

**STRUCTURAL AND BUILDING ENVELOPE UPGRADES
FOR THE GREEN BARN AT THE
DOROTHEA DIX PSYCHIATRIC CENTER
656 STATE STREET
BANGOR, MAINE 04401**

**Issued for Bid
February 17, 2026**



Prepared For:

State of Maine - Bureau of General Services
111 Sewall Street, 77 State House Station
Augusta, ME 04333
BGS 3748

Prepared By:

Gale Associates, Inc.
5 Moulton Street, Suite 201
Portland, ME 04101
Gale JN 843180

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00 11 13
Notice to Contractors

BGS 3748

Structural and Building Envelope Upgrades for the Green Barn at Dorthea Dix Psychiatric Center

Structrual concrete and wood framing repairs, and siding, roofing and window replacements and associated work.

The contract shall designate the Substantial Completion Date on or before *September 16, 2026*, and the Contract Final Completion Date on or before *September 30, 2026*.

1. Submit bids on a completed Contractor Bid Form (Section 00 41 13), provided in the Bid Documents, include bid security when required, and scan each item as an attachment to an email addressed to: BGS.Architect@Maine.gov, so as to be received no later than **1:30 PM** on **March 24, 2026**. The email subject line shall be marked "**Bid for Structural and Building Envelope Upgrades for the Green Barn at Dorthea Dix Psychiatric Center**".

Bid submissions will be opened and read aloud at the time and date noted above at the Bureau of General Services Office, accessible as a video conference call. Those who wish to participate in the call must submit a request for access to BGS.Architect@Maine.gov.

Any bid received after the noted time will not be considered a valid bid and will remain unopened. Any bid submitted by any other means will not be considered a valid bid. In certain circumstances, the Bureau of General Services may require the Bidder to surrender a valid paper copy of the bid form or the bid security document. The Owner reserves the right to accept or reject any or all bids as may best serve the interest of the Owner.

2. Questions and comments on the *bid opening process* shall be addressed to:

Division of Planning, Design & Construction; Bureau of General Services; 77 State House Station; Augusta, ME 04333-0077, or BGS.Architect@Maine.gov.

3. Questions and comments regarding the *project* design specifications or drawings shall be directed in writing to the Consultant during the bid period prior to the question and comment deadline of 5:00 PM on *March 17, 2026*.

Gale Associates, Inc.
Arno L. Skalski, Project Manager
als@gainc.com

4. Bid security is required on this project.
The Bidder shall include a satisfactory Bid Bond (Section 00 43 13) or a certified or cashier's check for 5% of the bid amount with the completed bid form submitted to the Owner. The Bid Bond form is available on the BGS website.

or

- Bid security is not required on this project.

00 11 13
Notice to Contractors

5. Performance and Payment Bonds are required on this project.
If noted above as required, or if any combination of Base Bid and Alternate Bids amounts selected in the award of the contract exceeds \$125,000.00, the selected Contractor shall furnish a 100% contract Performance Bond (Section 00 61 13.13) and a 100% contract Payment Bond (Section 00 61 13.16) in the contract amount to cover the execution of the Work. Bond forms are available on the BGS website.
or
 Performance and Payment Bonds are not required on this project.

6. Filed Sub-bids *are not required* on this project.

7. Pre-qualified General Contractors are utilized on this project.
insert the company name, city and state for each
or
 Pre-qualified General Contractors are not utilized on this project.

8. An on-site pre-bid conference (*mandatory* or *optional*) will be conducted for this project. The pre-bid conference is intended for General Contractors. Subcontractors and suppliers are welcome to attend. Contractors who arrive late or leave early for a mandatory meeting may be prohibited from participating in this meeting and bidding.

March 5, 2026 at 10:00 AM
656 State Street; Bangor, ME 04401
Meet at the Green Barn located north of the Dorothea Dix Psychiatric Center Campus between State Hospital Drive and Mount Hope Avenue.

- or*
 An on-site pre-bid conference will not be conducted for this project.

9. Bid Documents - full sets only - will be available on or about *February 17, 2026* and may be obtained *type "at no cost" for electronic copies* from:

Gale Associates, Inc.
Arno Skalski
als@gainc.com

10. Bid Documents may be examined at:

AGC Maine
188 Whitten Road; Augusta, ME 04330
207-622-4741

Construction Summary
734 Chestnut Street; Manchester, NH 03104
603-627-8856

00 21 13
Instructions to Bidders

1. Bidder Requirements

- 1.1 A bidder is a Contractor which is evidently qualified, or has been specifically pre-qualified by the Bureau of General Services, to bid on the proposed project described in the Bid Documents.
- 1.2 Contractors and Subcontractors bidding on projects that utilize Filed Sub-bids shall follow the requirements outlined in these Bid Documents for such projects. See Section 00 22 13 for additional information.
- 1.3 Contractors and Subcontractors are not eligible to bid on the project when their access to project design documents prior to the bid period distribution of documents creates an unfair bidding advantage. Prohibited access includes consultation with the Owner or with design professionals engaged by the Owner regarding cost estimating, constructability review, or project scheduling. This prohibition to bid applies to open, competitive bidding or pre-qualified contractor bidding or Filed Sub-bidding. The Bureau may require additional information to determine if the activities of a Contractor constitute an unfair bidding advantage.
- 1.4 Each bidder is responsible for becoming thoroughly familiar with the Bid Documents prior to submitting a bid. The failure of a bidder to review evident site conditions, to attend available pre-bid conferences, or to receive, examine, or act on addenda to the Bid Documents shall not relieve that bidder from any obligation with respect to their bid or the execution of the work as a Contractor.
- 1.5 Prior to the award of the contract, General Contractor bidders or Filed Sub-bidders may be required to provide documented evidence to the Owner or the Bureau showing compliance with the provisions of this section, their business experience, financial capability, or performance on previous projects.
- 1.6 The selected General Contractor bidder will be required to provide proof of insurance before a contract can be executed.
- 1.7 Contracts developed from this bid shall not be assigned, sublet or transferred without the written consent of the Owner.
- 1.8 By submitting a bid the Contractor attests that it has not been declared ineligible to bid on State of Maine projects. The Director of the Bureau of General Services may disallow award of this contract to any Contractor if there is evidence that the Contractor or any of its Subcontractors, through their own fault, have been terminated, suspended for cause, debarred from bidding, agreed to refrain from bidding as part of a settlement, have defaulted on a contract, or had a contract completed by another party.
- 1.9 The Contractor attests that it is not presently indicted for or otherwise criminally or civilly charged by a Federal, State or local government entity with commission of any of the following offenses and has not within a three-year period preceding this bid been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction, or contract under a public transaction, violation of Federal or State anti-trust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property.

00 21 13
Instructions to Bidders

- 1.10 The Contractor shall not make any award or permit any award (subgrant or contract) at any tier to any party which is debarred or suspended or is otherwise excluded from or ineligible for participation in Federal assistance programs or State of Maine projects.
2. Authority of Owner
- 2.1 The Owner reserves the right to accept or reject any or all bids as may best serve the interest of the Owner.
- 2.2 Subject to the Owner's stated right to accept or reject any or all bids, the Contractor shall be selected on the basis of the lowest dollar value of an acceptable Base Bid, or any combination of Base Bid plus Alternate Bids, as well as other limited cost modifications the Owner determines may best serve the interests of the Owner. An acceptable bid is a duly submitted bid from a responsive and responsible bidder.
- 2.3 The Owner reserves the right to require Bid Bonds or Performance and Payment Bonds for any project of any contract value.
3. Submitting Bids and Bid Requirements
- 3.1 Each bid shall be submitted on the forms provided in the Bid Documents.
- 3.2 Each bid shall be valid for a period of thirty calendar days following the Project bid closing date and time. The bid expiration date may be extended in unusual circumstances by mutual consent of the Bidder and the Owner. The bid amount shall not be modified due to the bid expiration date extension.
- 3.3 Any provision contained in a bid which shows cost escalation, or any modification of schedule or other requirements shall not be accepted. Such a provision causes the bid to be invalid, or, at the discretion of the Owner and BGS, that element of the bid submission may be disregarded for the purpose of awarding the contract without that provision.
- 3.4 Bidders shall include a Bid Bond or other approved bid security with the bid form submitted to the Owner when the bid form indicates such bid security is required. The bond value shall be 5% of the bid amount. The form of bond is shown in section 00 43 13.
- 3.5 Bidders recognize that inclusion of contract bonds and the cost of those bonds is dependent on the awarded contract dollar value. Therefore, a Base Bid, or any combination of Base Bid plus Alternate Bids, as well as other limited cost modifications, resulting in a contract award shall include the cost of Performance and Payment Bonds in the submitted bid amount when the construction contract value is over \$125,000.00. Similarly, the cost of Performance and Payment Bonds is excluded in the submitted bid amount when the construction contract value is \$125,000.00 or less unless bonds are specifically required by the Bid Documents. When required for the project, the selected Contractor shall provide these bonds before a contract can be executed, pursuant to 14 M.R.S.A., Section 871, Public Works Contractors' Surety Bond Law of 1971, subsection 3. The form of bonds is shown in section 00 61 13.13 and 00 61 13.16.

00 21 13
Instructions to Bidders

- 3.6 Bidders may modify bids in writing, by the same means as the original bid submission, prior to the bid closing time. Such written amendments shall not disclose the amount of the initial bid. If so disclosed, the entire bid is considered invalid.
- 3.7 Bidders implicitly acknowledge all Addenda issued when they submit the bid form. By usual practice the Consultant shall not issue Addenda less than 72 hours prior to the bid closing time, to allow ample time for bidders to incorporate the information. However, some information, such as extending the bid due date and time, may be issued with shorter notice. Addenda shall be issued to all companies who are registered holders of Bid Documents.
- 3.8 A bid may be withdrawn without penalty if a written request by the bidder is presented to the Owner prior to the bid closing time. Such written withdrawal requests are subject to verification as required by the Bureau.
- A bid may be withdrawn without penalty after the bid closing time if, in the determination of the Bureau, evidence provided by the Contractor shows an apparent unintended error such as a miscalculation, or an erroneous number on estimating documents, was the cause of an inaccurate bid. The Bureau may allow withdrawal in consideration of the bid bond or, without utilizing a bid bond, if the Bureau considers documented evidence provided by the Contractor shows factual errors had been made on the bid form.
- 3.9 In the event State of Maine Offices unexpectedly close on the published date of a public bid opening in the location of that bid opening, prior to the time of the scheduled deadline, the new deadline for the public bid opening will be the following business day at the originally scheduled hour of the day, at the original location. Official closings are posted on the State of Maine government website.
- 3.10 The Owner may require, in a Notice of Intent to Award letter to the apparent low bidder, a Schedule of Values, Project Schedule, and List of Subcontractors and Suppliers as both a demonstration of capability of the Bidder and as a condition of award.
- 3.11 Projects which require a State of Maine wage determination will include that schedule as part of the Bid Documents. See section 00 73 46, if such rates are required.
- 3.12 Projects which require compliance with the Davis-Bacon Act are subject to the regulations contained the Code for Federal Regulations and the federal wage determination which is made a part of the Bid Documents. See section 00 73 46, if such rates are required.
- 3.13 The Owner is exempt from the payment of Maine State sales and use taxes as provided in 36 M.R.S. §1760 (1). The Contractor and Subcontractors shall not include taxes on exempt items in the construction contract.

00 31 26
Existing Hazardous Material Information



400 Commercial Street, Suite 404
Portland, ME 04101
207.772.2891

July 2, 2024

Project 211.06085.014

Arno L. Skalski, LEED AP
Gale Associates, Inc.
5 Moulton Street, Suite 201
Portland, ME

Re: Hazardous Building Materials Inventory
Green Barn
Dorothea Dix Psychiatric Center
656 State Street
Bangor, Maine

Dear Mr. Skalski:

Ransom Consulting, LLC (Ransom) has prepared this report presenting the results of the Hazardous Building Materials Inventory (HBMI) performed at the Green Barn (the “Site”) located on the campus of the Dorothea Dix Psychiatric Center located at 656 State Street in Bangor, Maine. The Site property is currently developed with a two-story wood frame barn structure of plank frame construction originally constructed in the early 1900’s. The HBMI included sampling for asbestos-containing materials (ACM), a lead-based paint (LBP) survey, and an inventory of “universal” waste as part of a larger study examining options for renovation or demolition. The work discussed herein was performed in accordance with Ransom’s Proposed Scope of Work and Cost Estimate, dated January 23, 2024.

EXECUTIVE SUMMARY

Ransom understands the Site building is being evaluated to determine options for renovation and repair or replacement of the building. Given the age and construction of the Site building, there is potential for ACM and LBP to be present in the building materials. To address these concerns, Ransom conducted an inspection for the presence of these materials as well as an inventory of other potentially hazardous building components at the Site during the HBMI conducted on May 23, 2024. Based on the results of this inspection, Ransom draws the following conclusions:

1. ACM were not identified in the samples collected in association with the Green Barn located on the Dorothea Dix Psychiatric Center campus. Special handling/disposal of waste materials as ACM during renovation activities is not required.
2. The painted surfaces sampled contained lead at concentrations which would delineate the materials as “lead-based” according to U.S. Housing and Urban Development (HUD) guidelines. These guidelines apply to federal housing projects and are referenced for comparison purposes only. Facility maintenance staff or redevelopment contractors may perform maintenance, renovation, or demolition on surfaces coated with LBP or lead-containing coatings, provided that the handling of components coated with paint

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containing lead at any concentration (referred to as lead-containing paint) complies with the Occupational Safety and Health Administration's (OSHA) lead standards.

3. During this investigation, Ransom also inventoried and field-verified quantities of universal waste items at the Site, including a small number of fluorescent bulbs, fluorescent light ballasts, and batteries that may contain mercury, polychlorinated biphenyl (PCBs), or other heavy metals. Disposal of each of these items is also subject to hazardous and/or universal waste disposal requirements. Also identified were a variety of miscellaneous, unknown liquids containers within the center of the barn's work area. If these items are no longer in use, Ransom recommends these items be characterized and transported for proper disposal.

SITE DESCRIPTION

The Site is located on the campus of the Dorothea Dix Psychiatric Center located at 656 State Street in Bangor, Maine. The Site is currently developed with a two-story wood frame barn of plank frame construction, occupying a footprint of 4,160 square feet. The Site building was initially constructed in the early 1900's. Key Site features, including sample locations are provided in Figures 1 through 5.

LIMITATIONS

This hazardous building materials inventory is subject to certain limitations, which must be considered when interpreting the results. The information presented in this report is based upon work undertaken by trained professional and technical staff in accordance with generally accepted engineering and scientific practices current at the time the work was performed. Conclusions represent the professional judgment of Ransom based on the data obtained from the work and the site conditions encountered at the time the work was performed and are not to be construed as legal advice.

In addition to these general stipulations, additional site-specific limitations are as follows:

1. Our survey was conducted utilizing limited destructive inspection and sampling techniques, using hand tools only. Limited additional suspect materials may be present in concealed or inaccessible spaces, including wall and ceiling cavities, subflooring layers, inside machinery/mechanical units, etc., which may be disturbed as part of the future renovations.
2. The scope of our inspection was limited to observation of aboveground conditions, and may not identify subterranean materials such as foundation sealants, underground steam lines, asbestos-cement utility piping, etc.
3. Our inspection was conducted on behalf of Gale Associates Inc. (Gale) and is representative of conditions observed at the time of this report. No reliance shall be made

Arno L. Skalski, LEED AP
Gale Associates Inc

by other users, for additional purposes, or for other future demolition/renovation projects at the Site.

HISTORICAL DOCUMENTATION

Ransom was not provided with historical documentation regarding the presence of ACM, LBP or universal wastes associated with the Site building.

ASBESTOS-CONTAINING MATERIALS

Ransom conducted an inspection of the Site for the presence of ACM on May 23, 2024. The scope of the ACM inspection included the identification, quantification, and sampling of accessible suspect building materials on the Site building's interior and exterior. The inspection was conducted by River Fenton of Ransom, who is certified by the State of Maine and accredited by the United States Environmental Protection Agency (U.S. EPA) as an asbestos inspector. Copies of Mr. Fenton's most recent training certificates and state asbestos inspector certifications are provided as Attachment B.

In the State of Maine, OSHA, the U.S. EPA, and the Maine Department of Environmental Protection (MEDEP) regulate the release of asbestos into the environment and protecting workers from exposure to airborne asbestos fibers. OSHA defines ACM as "any material containing more than one percent asbestos." MEDEP defines ACM as "any material containing asbestos in quantities greater than or equal to one percent by volume as determined by weight, visual evaluation, and/or point count analysis." Bulk samples of friable miscellaneous materials (e.g., plaster, and pressed fiber ceiling tile) were analyzed using the *Method for the Determination of Asbestos in Bulk Building Materials*, EPA/600/R-93/116 (1993) via polarized light microscopy (PLM) visual estimation. Non-friable organically bound (NOB) materials (e.g., floor tiles, caulks and mastics) were analyzed using PLM NOB-EPA 600/R-93/116 using the gravimetric reduction method (GRM). Samples were analyzed by Optimum Analytical and Consulting, LLC (Optimum) of Salem, New Hampshire. Optimum is a Maine-licensed asbestos analytical laboratory and is also certified to perform bulk sample analysis by the National Voluntary Laboratory Accreditation Program (NVLAP). Copies of Optimum's relevant certifications are provided in Attachment B.

Laboratory analysis of bulk samples collected during this investigation did not identify ACM in the building materials samples associated with the Green Barn.

The MEDEP requires consultants to advise the building owner or owner's agent whenever the asbestos analytical laboratory has reported suspect ACM above one percent but below ten percent asbestos. The owner or owner's agent may either elect to treat these materials as positive for asbestos, or have the samples re-analyzed using an alternate method as listed below:

1. PLM EPA/600R-93/116 – Point Count (friable ACM); or

Arno L. Skalski, LEED AP
Gale Associates Inc

2. Transmission electron microscopy (TEM):
 - a. U.S. EPA NOB EPA/600/R-93/116b §2.5; or
 - b. TEM Chatfield Method.

Re-analysis of samples testing negative for asbestos is not required.

A listing of each sample collected, analytical results, and estimated quantities of confirmed ACM can be found in Table 1.

A copy of the laboratory analytical report can be found in Attachment C.

Asbestos fibers present potential health hazards when they become airborne. Federal regulations suggest that ACM may be managed in-place as long as it remains intact, undamaged, and in good condition. Current regulations require that asbestos-containing building materials be removed, if they will be disturbed by demolition, renovation, or other building maintenance activities. ACM abatement should be performed using approved methods in accordance with applicable federal and state regulations and should be removed by a licensed asbestos abatement contractor and in accordance with a project design prepared by a certified asbestos abatement project designer, except where exempt from applicable rules.

Asbestos-containing asphalt-based roofing materials, as well as exterior caulks, glazings, and sealants are exempt from MEDEP asbestos abatement regulations, provided that these materials are removed wholly intact and are not sawed, sanded, grinded, cut, or drilled during demolition or renovation. This is still considered OSHA classified asbestos work, and it is generally recommended that licensed asbestos abatement contractors conduct the removal of all ACM identified. Additionally, these exempt materials still require disposal as an asbestos-containing material.

LEAD-BASED PAINT

An inspection for the presence of LBP was conducted via the collection of paint chip samples for lead analysis. Samples were analyzed for lead content via EPA SW-846 3rd Ed. Method 3050B/ Method 6010D for Inductively Coupled Plasma-Optical Emission Spectrometry by Alpha Analytical of Westborough, Massachusetts (Alpha). Alpha is an environmental lead laboratory accredited by the American Industrial Hygiene Association (AIHA).

Please note that the LBP sampling conducted during this HBMI does not constitute a U.S. EPA/ HUD-compliant lead survey.

Ransom collected a total of four samples for analysis of lead content from various building components and surfaces at the Site. Analytical results for three of the four samples (LBP-01 through LBP-03) contained lead concentrations above the HUD guideline ranging from 1.37 to 1.65 percent by weight. The fourth sample, LBP-04, did not contain lead above the laboratory reporting limit. Sample results are provided in Table 2. Laboratory analytical reports for lead analysis are included as Attachment C.

HUD has established a standard for characterizing LBP as any paint containing 1.0 milligram per square centimeter (mg/cm²) lead as tested using an x-ray fluorescence (XRF) analyzer, or 0.5 percent lead by weight for paint chips. These materials are considered to be “lead-based paint” according to Section 1017 of the *Residential Lead-Based Paint Hazard Reduction Act of 1992* (also referred to as Title X). HUD LBP guidelines only apply to housing funded by the federal government. While they are not regulatory considerations in commercial applications, these guidelines are a useful reference for assessing hazards associated with lead in paint in non-residential settings. When paint contains lead in concentrations greater than 1.0 mg/cm² or 0.5 percent by weight, special care should be taken when conducting activities that impact this paint. When surfaces covered in paint containing lead *at any concentration* are impacted by abrasive blasting, torch burning, or similar activities that generate significant dust or fumes, hazardous airborne concentrations can be generated even if the lead content is below the HUD standard.

Handling of components coated with lead-containing paint *at any concentration* requires compliance with the OSHA lead standard (*Lead in Construction*, 29 CFR 1926.62). Under the existing conditions, facility maintenance staff or contractors may perform demolition, renovation, abatement, stabilization, cleanup, and daily operations in buildings that have lead-based paint or lead-containing paint, provided that the requirements in the OSHA lead standard are met.

OTHER HAZARDOUS AND POTENTIALLY HAZARDOUS MATERIALS

Ransom inspected the Green Barn for the presence of hazardous and potentially hazardous building equipment and fixtures identified, typically classified, handled, and disposed as “universal” wastes. Ransom observed minimal amounts of “universal” wastes on or within the Green Barn during this HBMI.

Polychlorinated Biphenyls

PCB-containing oil is sometimes found in compressor oils, hydraulics fluids, and the dielectric fluid of older electrical transformers and the capacitors associated with older fluorescent light ballasts. Although electrical equipment is currently required to be properly labeled indicating the presence or absence of PCBs, this has not always been the case. Ransom observed 12 fluorescent light ballasts within the Site building which may have PCB-containing components. No overt evidence of a release of PCBs from the fixtures (i.e., leaking fluid) was observed. Fixtures/ballasts were not visually inspected for the presence of a “No PCBs” label due to safety concerns. When a “No PCBs” label is not observed, Ransom must presume that those fluorescent light ballasts contain PCBs.

Ransom recommends that ballasts be inspected for the “No PCBs” label prior to demolition or renovation activities. Fluorescent light ballasts without the “No PCBs” label are presumed to contain PCBs and should be managed as hazardous waste and recycled or disposed of in accordance with applicable federal and state regulations. The cost of disposal of these ballasts (approximately \$12 each) is several times less than the cost of testing the capacitor fluid for PCB content (approximately \$75 each).

Mercury-Containing Components

Mercury-containing components such as fluorescent light tubes and compact fluorescent light bulbs (CFLs) are classified as Universal Waste and are regulated by the U.S. EPA under 40 CFR Parts 260–273. The Universal Waste Rule provides streamlined management requirements tailored to several different kinds of waste. The types of waste covered by the Universal Waste Rule are frequently thrown in the trash by unregulated households and small businesses. Classifying an item as a Universal Waste provides flexibility for its proper management and can prevent the item from entering municipal waste streams. Instead, it can be readily collected and disposed of at a hazardous waste facility. Ransom observed a combination of 15 fluorescent light tubes and CFLs that may contain mercury.

Components presumed to contain mercury should be removed and recycled in accordance with Universal Waste regulations prior to proposed redevelopment activities that may impact them.

A full line-item listing of hazardous and potentially hazardous building materials identified during Ransom’s survey is provided in Table 3.

Miscellaneous

Although outside the scope of work for this building materials assessment, Ransom observed numerous containers of potentially hazardous materials throughout the Site building during the HBMI. These items included apparent propane tanks, gasoline tanks, 55-gallon drums, motor oil containers, aerosol cans, halogen lamps, tires, and numerous batteries. Photographs of these items are included in Attachment A. Ransom recommends that these items be characterized and transported for proper disposal if they are no longer in use.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of this HBMI, Ransom makes the following conclusions and recommendations.

1. ACM were not identified in the samples collected in association with Green Barn located on the Dorothea Dix Psychiatric Center campus. Special handling/disposal of waste materials as ACM during renovation activities is not required.
2. Painted surfaces sampled during the course of this HBMI exhibited lead at concentrations which would delineate the materials as “lead-based” according to HUD guidelines. These guidelines apply to federal housing projects and are referenced herein for comparison purposes only. General and/or demolition contractors may perform demolition of surfaces coated with LBP or lead-containing coatings, provided that the handling of components coated with paint containing lead at any concentration (referred to as lead-containing paint) complies with OSHA’s lead standards.
3. During this investigation, Ransom also inventoried and field-verified quantities of universal waste items at the Site, including a small number of fluorescent bulbs,

Arno L. Skalski, LEED AP
Gale Associates Inc

fluorescent light ballasts, and batteries that may contain mercury, PCBs, or other heavy metals. Disposal of each of these items is also subject to hazardous and/or universal waste disposal requirements. Also identified were a variety of miscellaneous, unknown liquids containers within the center of the barn's work area. If these items are no longer in use, Ransom recommends these items be characterized and transported for proper disposal.

If you have any questions regarding the information in this report, please do not hesitate to contact any of the undersigned.

Sincerely,

RANSOM CONSULTING, LLC



River Fenton
Hazardous Materials Specialist



Eriksen P. Phenix, L.G.
Senior Project Manager

Brian R. Pettingill, P.G.
Principal/Vice President

WEH/RBF/EPP/BRP:ags
Attachments

Legend & Notes

-  Sample Testing Negative for Asbestos
-  Sample Testing Negative for Lead

Notes:

1. Site plan based on measurements and observations made by Ransom Consulting, LLC. on --.
2. Some features are approximate in location and scale.
3. This plan has been prepared for Gale Associates. All other uses are not authorized unless written permission is obtained from Ransom Consulting, LLC.

Scale and Orientation



Prepared For

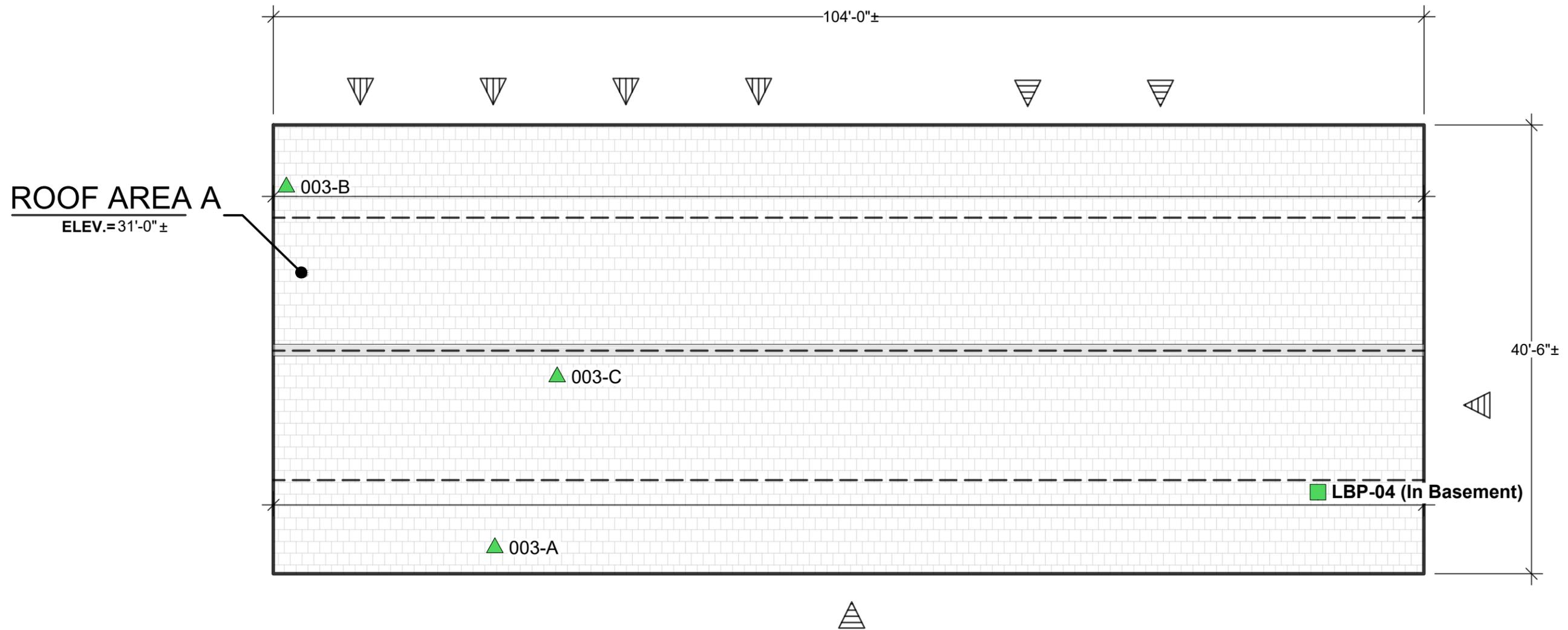
Gale Associates,
5 Moulton Street, Suite 201,
Portland, Maine

Site Address

Dorothea Dix Psychiatric Center
Campus Bangor, ME 04401

211.06085 | June 2024

Figure 1
Green Barn Roof
Area Plan



Legend & Notes

▲ Sample Testing
Negative for Asbestos



Notes:

1. Site plan based on measurements and observations made by Ransom Consulting, LLC. on --.
2. Some features are approximate in location and scale.
3. This plan has been prepared for Gale Associates. All other uses are not authorized unless written permission is obtained from Ransom Consulting, LLC.

Prepared For

Gale Associates,
5 Moulton Street, Suite 201,
Portland, Maine

Site Address

Dorothea Dix Psychiatric Center
Campus Bangor, ME 04401

211.06085 | June 2024

Figure 2
Partial South
Elevation

Legend & Notes



Notes:

1. Site plan based on measurements and observations made by Ransom Consulting, LLC. on --.
2. Some features are approximate in location and scale.
3. This plan has been prepared for Gale Associates. All other uses are not authorized unless written permission is obtained from Ransom Consulting, LLC.

Prepared For

Gale Associates,
5 Moulton Street, Suite 201,
Portland, Maine

Site Address

Dorothea Dix Psychiatric Center
Campus Bangor, ME 04401

211.06085 | June 2024

Figure 3
Partial South
Elevation

Legend & Notes

▲ Sample Testing
 Negative for Asbestos

Notes:

1. Site plan based on measurements and observations made by Ransom Consulting, LLC. on --.
2. Some features are approximate in location and scale.
3. This plan has been prepared for Gale Associates. All other uses are not authorized unless written permission is obtained from Ransom Consulting, LLC.

Prepared For

Gale Associates,
 5 Moulton Street, Suite 201,
 Portland, Maine

Site Address

Dorothea Dix Psychiatric Center
 Campus Bangor, ME 04401

211.06085 | June 2024

Figure 4
 West and East
 Elevations



Legend & Notes

- ▲ Sample Testing
Negative for Asbestos
- Sample Testing
Negative for Lead



Notes:

1. Site plan based on measurements and observations made by Ransom Consulting, LLC. on --.
2. Some features are approximate in location and scale.
3. This plan has been prepared for Gale Associates. All other uses are not authorized unless written permission is obtained from Ransom Consulting, LLC.

Prepared For

Gale Associates,
5 Moulton Street, Suite 201,
Portland, Maine

Site Address

Dorothea Dix Psychiatric Center
Campus Bangor, ME 04401

211.06085 | June 2024

Figure 5
North Elevation

TABLE 1: SUMMARY OF ASBESTOS TESTING RESULTS

Hazardous Building Materials Inventory
 Green Barn
 Dorothea Dix Psychiatric Center
 656 State Street
 Bangor, Maine

| Material | Location | Sample Number | Asbestos Quantity and Type | Estimated Quantity |
|-----------------------------------|--------------------------------------|-------------------|----------------------------|--------------------|
| Window glazing | Barn windows | 001A and 001B | NAD | NA |
| | | 001C | 0.96% Chrysotile | |
| Siding underlayment, black | East, south, and west exterior walls | 002A through 002C | NAD | NA |
| Slate shingle underlayment, black | Roof | 003A through 003C | NAD | NA |
| Siding underlayment, brown | North exterior wall | 004A through 004C | NAD | NA |

NOTES:

1. Samples were collected on May 23, 2024 by Ransom Consulting, LLC., and were analyzed by Optimum Analytical and Consulting, LLC of Salem, NH.
2. NAD = No asbestos detected; NA = Not Applicable. Quantities were not calculated for materials testing negative for asbestos.
3. CF = Cubic Feet. SF = Square Feet. LF = Linear Feet. EA = Each. NA = Not Applicable.
4. NAD = No asbestos detected; *PACM = Presumed Asbestos Containing Material.*
5. NQ = Not quantified. ACM joint compound should be assumed to be present throughout until further delineation.
5. Samples shown in bold are ACM, samples shown in bold and italics are PACM.
- 5 Room names provided in this table were obtained from site plans and/or past reports provided by the client and/or onsite observations. Refer to Figures 2 and 3.

TABLE 2: LEAD-BASED PAINT LABORATORY RESULTS

Hazardous Building Materials Inventory
Green Barn
Dorothea Dix Psychiatric Center
656 State Street
Bangor, Maine

| Sample ID | Color/Substrate/Component | Location | Lead Concentration (mg/kg) | Lead Concentration (% by weight) |
|-----------|------------------------------|-----------------------|----------------------------|----------------------------------|
| LBP-01 | sliver/metal/flashing | wood/slab interface | 14,400 | 1.44 |
| LBP-02 | green/wood/siding | Interior and exterior | 16,500 | 1.65 |
| LBP-03 | white/wood/siding | Interior and exterior | 13,700 | 1.37 |
| LBP-04 | gray/wood/canoe storage rack | Basement | BRL (19) | NC |

1. Suspect LBP samples were submitted to Alpha Analytical, Inc. for analysis.
2. BRL () = not detected (laboratory reporting limit); mg/kg = milligrams per kilogram
3. Values in **boldface** type indicate lead concentrations in excess of the HUD threshold value of 0.5 % by weight. HUD guidance is not a regulatory consideration in this scenario, and is provided for reference only.
4. NC = Not Calculated, analytical results below the reporting limit.

TABLE 3: INVENTORY OF OTHER HAZARDOUS/POTENTIALLY HAZARDOUS MATERIALS

Hazardous Building Materials Inventory

Green Barn

Dorothea Dix Psychiatric Center

656 State Street

Bangor, Maine

| Component | Hazard | Location | Total Quantity | Units |
|---|---------------|-----------------|-----------------------|--------------|
| Lightbulbs (incl. CFLs and fluorescent light tubes) | Mercury | Throughout | 15 | EA |
| Fluorescent light ballasts | PCBs | Throughout | 12 | EA |
| Batteries | Heavy Metals | Throughout | 22 | EA |

Notes:

1. Quantities presented are based on a cursory visual inspection. Quantities should be field-verified prior to removal/abatement work.
2. Lighting fixtures were not dismantled to observe labels regarding PCB content. Ballasts should be assumed to be PCB-containing and inspected during demolition/redevelopment to determine appropriate disposal.
3. EA = each

ATTACHMENT A

Photograph Log

Hazardous Building Materials Inventory
Green Barn
Dorothea Dix Psychiatric Center
656 State Street
Bangor, Maine

Project 211.06085.014



Photograph Log



Photo 1 (5/23/2024): Potentially hazardous waste accumulation area, top floor of the barn.



Photo 2 (5/23/2024): Potential hazardous waste storage area with approximately 22 batteries.



Photo 3 (5/23/2024): Pile of tires on the top floor of barn. There were more, smaller piles scattered throughout this floor.



Photo 4 (5/23/2024): Fluorescent light tubes and possible PCB-containing ballast located on top floor. One of three sets observed.



Photo 5 (5/23/2024): Ground floor of barn showing CFL light.



Photo 6 (5/23/2024): North exterior side of the barn where contractors removed siding and revealed differently colored, suspect ACM underlayment paper relative to other exterior walls. Also pictured is possible lead-containing flashing between foundation and building.

ATTACHMENT B

Certifications

Hazardous Building Materials Inventory
Green Barn
Dorothea Dix Psychiatric Center
656 State Street
Bangor, Maine

Project 211.06085.014



River B. Fenton



Inspector

Cert No. AI-0959

Trn.Exp.Date 03/06/2025

Expiration Date 03/31/2025

This is not a legal form of official identification



Certificate of Completion

Asbestos Inspector Certification Training

This certifies that

River B. Fenton

Has Met the Attendance Requirements, Successful Completion of the Exam, and the 32-Hour Curriculum Course Entitled Asbestos Inspector Certification Course, Accreditation Under TSCA Title II 40 CFR Part 763 & Maine Chapter 425.



Instructor: Bruce M. Hackett, Sr.
288 Narragansett Trail Buxton, Maine
(207)615-3694 License # TP-0032

Class Date(s): 03/04 – 03/06/24

Test Date: 03/06/24

Certification #: ASI24-02212000

Expiration Date: 03/06/25

Test Score: 88%

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

Optimum Analytical & Consulting LLC

85 Stiles Road

Suite 201

Salem, NH 03079

Ms. Jamie L. Noel

Phone: 603-458-5247

Email: jamie.noel@optimumanalytical.com

<http://www.optimumanalytical.com>

ASBESTOS FIBER ANALYSIS

NVLAP LAB CODE 101433-0

Bulk Asbestos Analysis

Code

Description

18/A01

EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples

18/A03

EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials



For the National Voluntary Laboratory Accreditation Program



JANET T. MILLS
GOVERNOR

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION



MELANIE LOYZIM
COMMISSIONER

March 14, 2024

Attn.: Jamie Noel, Laboratory Director
Optimum Analytical and Consulting, LLC
85 Stiles Road, Suite 201
Salem, NH 03079

Dear Ms. Noel:

This letter is about your renewal application for licensure as an **Asbestos Analytical Laboratory (Bulk)**.

This office has received and completed the review of your application and finds it to be in accordance with the requirements of Maine Asbestos Management Regulations Chapter 425, effective April 3, 2011.

Your application has been approved and your firm is licensed to provide asbestos analytical service(s) as described on the enclosed certificate.

Your renewal license number remains at **LB-0067** which is in effect for one year and will expire on March 31, 2025. A renewal application should be filed not less than thirty (30) days prior to expiration of this licensure. Thank you for your continued service to the people of the State of Maine.

If you have any questions, please call me at (207) 242-0877.

Sincerely,

Sandra J. Moody, Environmental Specialist
Division of Remediation
Bureau of Remediation and Waste Management

Enclosure

AUGUSTA
17 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0017
(207) 287-7688 FAX: (207) 287-7826

BANGOR
106 HOGAN ROAD, SUITE 6
BANGOR, MAINE 04401
(207) 941-4570 FAX: (207) 941-4584

PORTLAND
312 CANCO ROAD
PORTLAND, MAINE 04103
(207) 822-6300 FAX: (207) 822-6303

PRESQUE ISLE
1235 CENTRAL DRIVE, SKYWAY PARK
PRESQUE ISLE, MAINE 04769
(207) 764-0477 FAX: (207) 760-3143



State of Maine
Department of Environmental Protection

LICENSE

Optimum Analytical and Consulting, LLC

Asbestos Analytical Laboratory
(Air)

License Number: **LA-0065**

Expiration Date: **03/31/2025**



State of Maine
Department of Environmental Protection

LICENSE

Optimum Analytical and Consulting, LLC

Asbestos Analytical Laboratory
(Bulk)

License Number: **LB-0067**

Expiration Date: **03/31/2025**

ATTACHMENT C

Laboratory Reports

Hazardous Building Materials Inventory
Green Barn
Dorothea Dix Psychiatric Center
656 State Street
Bangor, Maine

Project 211.06085.014





Erik Phenix
Ransom Environmental Consultants, Inc.
400 Commercial Street
Portland, ME 04101

Project Reference: 211.06085.011
Laboratory Batch #: 2451225
Date Samples Received: 05/29/2024
Date Samples Analyzed: 06/03/2024
Date of Final Report: 06/03/2024

SAMPLE IDENTIFICATION:

Twelve (12) samples from Dorothea Dix Green Barn, Bangor, ME project were submitted by Client on 05/29/2024

This bulk sample(s) was delivered to Optimum Analytical Consulting, LLC (Optimum) located in Salem, New Hampshire for asbestos content determination.

ANALYTICAL METHOD:

Analytical procedures were performed in accordance with the U.S. Environmental Protection Agency (EPA) Recommended Method for the Determination of Asbestos in Bulk Samples by Polarized Light Microscopy and Dispersion Staining (PLM/DS)(EPA-40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples, EPA-600/ R-93-116 Method for Determination of Asbestos in Bulk Building Materials). This report relates only to those samples analyzed, and may not be indicative of other similar appearing materials existing at this, or other sites. Quantification of asbestos content was determined by Calibrated Visual Estimation. Optimum is not responsible for sample collection activities or analytical method limitations. The laboratory is not responsible for the accuracy of results when requested to physically separate and analyze layered samples.

In any given material, fibers with a small diameter (<0.25µm) may not be detected by the PLM method. Floor tile and other resinous bound materials may yield a false negative if the asbestos fibers are too small to be resolved using PLM. Additionally, there is currently no approved EPA analytical method to reliably confirm vermiculite as non-asbestos containing. Additional analytical methods may be required. Optimum Analytical recommends using Transmission Electron Microscopy (TEM) or other approved methods for a more definitive analysis.

Optimum will retain all samples for a minimum of three months. Further analysis or return of samples must be requested within this three month period to guarantee their availability. This report may not be reproduced except in full, without the written approval of Optimum Analytical and Consulting, LLC.

The client/laboratory shall not use the NVLAP and AIHA Logo or this test report in a way that constitutes or implies product certification, approval, or endorsement by the National Institute of Standards and Technology or the American Industrial Hygiene Association.

Detection Limit <1%, Reporting Limits: CVES = 1%, 400 Point Count = .25%, 1000 Point Count = 0.1%; Present or Absent are observations made during a qualitative analysis.

This report is considered preliminary until signed by both the Laboratory Analyst and Laboratory Director or Supervisor. If you have any questions regarding this report, please do not hesitate to contact us.

Jamie L. Noel
Laboratory Director



OPTIMUM

Analytical and Consulting, LLC

85 Stiles Road, Suite 201, Salem, NH 03079 Phone: (603)-458-5247

CLIENT: Ransom Environmental Consultants, Inc.
ADDRESS: 400 Commercial Street
CITY / STATE / ZIP: Portland, ME 04101
CONTACT: Erik Phenix
DESCRIPTION: PLM Analysis
LOCATION: Dorothea Dix Green Barn, Bangor, ME

BULK SAMPLE ANALYSIS REPORT POLARIZED LIGHT MICROSCOPY

PLM (EPA-40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples, EPA-600/ R-93-116 Method for Determination of Asbestos in Bulk Building Materials) NVLAP Lab Code: 101433-0

ORDER #: 2451225
PROJECT #: 211.06085.011
DATE COLLECTED: 05/24/2024
COLLECTED BY: Client
DATE RECEIVED: 05/29/2024
ANALYSIS DATE: 06/03/2024
REPORT DATE: 06/03/2024
ANALYST: Jamie Noel

REPORT OF ANALYSIS

| Laboratory ID Sample No. | Sample Location Description | Layer No. Layer % | Asbestos Type | (%) | Non-Asbestos Components | (%) |
|-----------------------------|---|----------------------|------------------|------|----------------------------------|--------------|
| 2451225-001 001A | Barn Windows Window Glazing, Gray/ Beige Note: Gravimetric Reduction | LAYER 1 100% | None Detected | | Cellulose Fiber Binder/Filler | 1% 99% |
| 2451225-002 001B | Barn Windows Window Glazing, Gray/ Beige Note: Gravimetric Reduction | LAYER 1 100% | None Detected | | Cellulose Fiber Binder/Filler | 1% 99% |
| 2451225-003 001C | Barn Windows Window Glazing, Gray/ Beige/White Note: Gravimetric Reduction | LAYER 1 100% | Chrysotile | .96% | Cellulose Fiber Binder/Filler | 1% 98.04% |
| 2451225-004 002A | East, South, West Exterior Walls Underlayment Paper Under Wood Siding, Black Note: Gravimetric Reduction | LAYER 1 100% | None Detected | | Cellulose Fiber Binder/Filler | 95% 5% |
| 2451225-005 002B | East, South, West Exterior Walls Underlayment Paper Under Wood Siding, Black Note: Gravimetric Reduction | LAYER 1 100% | None Detected | | Cellulose Fiber Binder/Filler | 95% 5% |
| 2451225-006 002C | East, South, West Exterior Walls Underlayment Paper Under Wood Siding, Black Note: Gravimetric Reduction | LAYER 1 100% | None Detected | | Cellulose Fiber Binder/Filler | 95% 5% |
| 2451225-007 003A | Roof Underlayment Paper Under Slate Shingles, Black Note: Gravimetric Reduction | LAYER 1 100% | None Detected | | Cellulose Fiber Binder/Filler | 95% 5% |
| 2451225-008 003B | Roof Underlayment Paper Under Slate Shingles, Black Note: Gravimetric Reduction | LAYER 1 100% | None Detected | | Cellulose Fiber Binder/Filler | 95% 5% |



OPTIMUM

Analytical and Consulting, LLC

85 Stiles Road, Suite 201, Salem, NH 03079 Phone: (603)-458-5247

CLIENT: Ransom Environmental Consultants, Inc.
ADDRESS: 400 Commercial Street
CITY / STATE / ZIP: Portland, ME 04101
CONTACT: Erik Phenix
DESCRIPTION: PLM Analysis
LOCATION: Dorothea Dix Green Barn, Bangor, ME

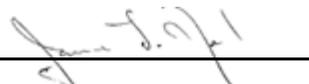
BULK SAMPLE ANALYSIS REPORT POLARIZED LIGHT MICROSCOPY

PLM (EPA-40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples, EPA-600/ R-93-116 Method for Determination of Asbestos in Bulk Building Materials) NVLAP Lab Code: 101433-0

ORDER #: 2451225
PROJECT #: 211.06085.011
DATE COLLECTED: 05/24/2024
COLLECTED BY: Client
DATE RECEIVED: 05/29/2024
ANALYSIS DATE: 06/03/2024
REPORT DATE: 06/03/2024
ANALYST: Jamie Noel

REPORT OF ANALYSIS

| Laboratory ID Sample No. | Sample Location Description | Layer No. Layer % | Asbestos Type (%) | Non-Asbestos Components (%) |
|-----------------------------|--|----------------------|----------------------|---|
| 2451225-009 003C | Roof Underlayment Paper Under Slate Shingles, Black Note: Gravimetric Reduction | LAYER 1 100% | None Detected | Cellulose Fiber 95% Binder/Filler 5% |
| 2451225-010 004A | North Exterior Wall Underlayment Paper Under Wood Siding, Brown | LAYER 1 100% | None Detected | Cellulose Fiber 95% Binder/Filler 5% |
| 2451225-011 004B | North Exterior Wall Underlayment Paper Under Wood Siding, Brown | LAYER 1 100% | None Detected | Cellulose Fiber 95% Binder/Filler 5% |
| 2451225-012 004C | North Exterior Wall Underlayment Paper Under Wood Siding, Brown | LAYER 1 100% | None Detected | Cellulose Fiber 95% Binder/Filler 5% |

Analyst Signatory: 
 Jamie Noel



2451225

| | | |
|-------------------------|--|--|
| Client: | Ransom Consulting, LLC | <p>*Instructions: Use Column "B" for your contact info</p> <p>To See an Example Click the bottom Example Tab.</p> <p>Enter samples between "<<" and ">>"</p> <p>Begin Samples with a "<<" above the first sample and end with a ">>" below the last sample. Only Enter your data on the first sheet "Sheet1"</p> <p>Note: Data 1 and Data 2 are optional fields that do not show up on the official report, however they will be included in the electronic data returned to you to facilitate your reintegration of the report data.</p> |
| Contact: | Erik Phenix / Wesley Harden / River Fenton | |
| Address: | 400 Commercial Street, Suite 404, Portland ME 04101 | |
| Phone: | 207-772-2891 / Cell: 207-272-8673 | |
| Fax: | | |
| Email: | wes.harden@ransomenv.com ephenix@ransomenv.com river.fenton@ransomenv.com | |
| Project: | Dorothea Dix Green Barn Asbestos Assessment | |
| Ransom Project # | 211.06085.011 | |
| Client Notes: | Positive Stop Requested Please analyze prepare NOB samples via gravimetric reduction, per MEDEP requirements | |
| P.O. #: | 6347 | |
| Date Submitted: | 5/24/2024 0:00 | |
| Analysis: | Bulk PLM | |
| TurnAroundTime: | Standard TAT | |

| Sample Number | Building/Area | Sample Description |
|---------------|----------------------------------|---|
| << | | |
| 001A | Barn Windows | White-painted window glazing |
| 001B | Barn Windows | White-painted window glazing |
| 001C | Barn Windows | White-painted window glazing |
| 002A | East, South, West Exterior Walls | Black Underlayment Paper under Wood Siding |
| 002B | East, South, West Exterior Walls | Black Underlayment Paper under Wood Siding |
| 002C | East, South, West Exterior Walls | Black Underlayment Paper under Wood Siding |
| 003A | Roof | Black Underlayment Paper under Slate Shingles |
| 003B | Roof | Black Underlayment Paper under Slate Shingles |
| 003C | Roof | Black Underlayment Paper under Slate Shingles |
| 004A | North Exterior Wall | Brown Underlayment Paper under Wood Siding |
| 004B | North Exterior Wall | Brown Underlayment Paper under Wood Siding |
| 004C | North Exterior Wall | Brown Underlayment Paper under Wood Siding |
| >> | | |

Call 5/29/24 8:40



ANALYTICAL REPORT

| | |
|-----------------|--|
| Lab Number: | L2429095 |
| Client: | Ransom Consulting, LLC. 400 Commercial Street Suite 404 Portland, ME 04101-4660 |
| ATTN: | Erik Phenix |
| Phone: | (207) 772-2891 |
| Project Name: | DOROTHEA DIX GREEN BARN |
| Project Number: | 211.06085.011 |
| Report Date: | 06/03/24 |

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0826), IL (200077), IN (C-MA-03), KY (KY98045), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), OR (MA-1316), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #525-23-122-91930A1).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: DOROTHEA DIX GREEN BARN
Project Number: 211.06085.011

Lab Number: L2429095
Report Date: 06/03/24

| Alpha Sample ID | Client ID | Matrix | Sample Location | Collection Date/Time | Receive Date |
|----------------------------|------------------|---------------|----------------------------|---------------------------------|---------------------|
| L2429095-01 | LBP-01 | SOLID | BANGOR, ME | 05/23/24 09:00 | 05/24/24 |
| L2429095-02 | LBP-02 | SOLID | BANGOR, ME | 05/23/24 09:30 | 05/24/24 |
| L2429095-03 | LBP-03 | SOLID | BANGOR, ME | 05/23/24 09:45 | 05/24/24 |
| L2429095-04 | LBP-04 | SOLID | BANGOR, ME | 05/23/24 10:00 | 05/24/24 |

Project Name: DOROTHEA DIX GREEN BARN
Project Number: 211.06085.011

Lab Number: L2429095
Report Date: 06/03/24

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: DOROTHEA DIX GREEN BARN
Project Number: 211.06085.011

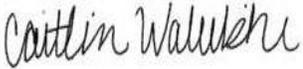
Lab Number: L2429095
Report Date: 06/03/24

Case Narrative (continued)

Total Metals

L2429095-01 through -04: The sample has an elevated detection limit due to the dilution required by the sample matrix.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:  Caitlin Walukevich

Title: Technical Director/Representative

Date: 06/03/24

METALS

Project Name: DOROTHEA DIX GREEN BARN**Lab Number:** L2429095**Project Number:** 211.06085.011**Report Date:** 06/03/24**SAMPLE RESULTS**

Lab ID: L2429095-01

Date Collected: 05/23/24 09:00

Client ID: LBP-01

Date Received: 05/24/24

Sample Location: BANGOR, ME

Field Prep: Not Specified

Sample Depth:

Matrix: Solid

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|-------------------------------------|--------|-----------|-------|------|-----|--------------------|------------------|------------------|----------------|----------------------|---------|
| Total Metals - Mansfield Lab | | | | | | | | | | | |
| Lead, Total | 14400 | | mg/kg | 18.8 | -- | 10 | 06/01/24 08:50 | 06/03/24 11:58 | EPA 3050B | 1,6010D | DHL |



Project Name: DOROTHEA DIX GREEN BARN**Lab Number:** L2429095**Project Number:** 211.06085.011**Report Date:** 06/03/24**SAMPLE RESULTS**

Lab ID: L2429095-02

Date Collected: 05/23/24 09:30

Client ID: LBP-02

Date Received: 05/24/24

Sample Location: BANGOR, ME

Field Prep: Not Specified

Sample Depth:

Matrix: Solid

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|-------------------------------------|--------|-----------|-------|------|-----|-----------------|----------------|----------------|-------------|-------------------|---------|
| Total Metals - Mansfield Lab | | | | | | | | | | | |
| Lead, Total | 16500 | | mg/kg | 19.7 | -- | 10 | 06/01/24 08:50 | 06/03/24 12:02 | EPA 3050B | 1,6010D | DHL |



Project Name: DOROTHEA DIX GREEN BARN**Lab Number:** L2429095**Project Number:** 211.06085.011**Report Date:** 06/03/24**SAMPLE RESULTS**

Lab ID: L2429095-03

Date Collected: 05/23/24 09:45

Client ID: LBP-03

Date Received: 05/24/24

Sample Location: BANGOR, ME

Field Prep: Not Specified

Sample Depth:

Matrix: Solid

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|-------------------------------------|--------|-----------|-------|-----|-----|-----------------|----------------|----------------|-------------|-------------------|---------|
| Total Metals - Mansfield Lab | | | | | | | | | | | |
| Lead, Total | 13700 | | mg/kg | 235 | -- | 100 | 06/01/24 08:50 | 06/03/24 13:22 | EPA 3050B | 1,6010D | DHL |



Project Name: DOROTHEA DIX GREEN BARN**Lab Number:** L2429095**Project Number:** 211.06085.011**Report Date:** 06/03/24**SAMPLE RESULTS**

Lab ID: L2429095-04

Date Collected: 05/23/24 10:00

Client ID: LBP-04

Date Received: 05/24/24

Sample Location: BANGOR, ME

Field Prep: Not Specified

Sample Depth:

Matrix: Solid

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|------------------------------|--------|-----------|-------|------|-----|-----------------|----------------|----------------|-------------|-------------------|---------|
| Total Metals - Mansfield Lab | | | | | | | | | | | |
| Lead, Total | ND | | mg/kg | 19.0 | -- | 10 | 06/01/24 08:50 | 06/03/24 12:10 | EPA 3050B | 1,6010D | DHL |



Project Name: DOROTHEA DIX GREEN BARN
Project Number: 211.06085.011

Lab Number: L2429095
Report Date: 06/03/24

Method Blank Analysis Batch Quality Control

| Parameter | Result Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|--|------------------|-------|------|-----|-----------------|----------------|----------------|-------------------|---------|
| Total Metals - Mansfield Lab for sample(s): 01-04 Batch: WG1928203-1 | | | | | | | | | |
| Lead, Total | ND | mg/kg | 2.00 | -- | 1 | 06/01/24 08:50 | 06/02/24 17:52 | 1,6010D | TAA |

Prep Information

Digestion Method: EPA 3050B

Lab Control Sample Analysis Batch Quality Control

Project Name: DOROTHEA DIX GREEN BARN
Project Number: 211.06085.011

Lab Number: L2429095
Report Date: 06/03/24

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|------------------|------|-------------------|------|---------------------|-----|------|------------|
| Total Metals - Mansfield Lab Associated sample(s): 01-04 Batch: WG1928203-2 | | | | | | | | |
| Lead, Total | 92 | | - | | 80-120 | - | | |

Project Name: DOROTHEA DIX GREEN BARN

Project Number: 211.06085.011

Sample Receipt and Container Information

Were project specific reporting limits specified?

YES

Cooler Information**Cooler** **Custody Seal**

A Absent

Container Information

| Container ID | Container Type | Cooler | Initial pH | Final pH | Temp deg C | Pres | Seal | Frozen Date/Time | Analysis(*) |
|---------------------|--|---------------|-----------------------|---------------------|-----------------------|-------------|-------------|-----------------------------|--------------------|
| L2429095-01A | Metals Only-Glass 60mL/2oz unpreserved | A | NA | | 5.4 | Y | Absent | | PB-TI(180) |
| L2429095-02A | Metals Only-Glass 60mL/2oz unpreserved | A | NA | | 5.4 | Y | Absent | | PB-TI(180) |
| L2429095-03A | Metals Only-Glass 60mL/2oz unpreserved | A | NA | | 5.4 | Y | Absent | | PB-TI(180) |
| L2429095-04A | Metals Only-Glass 60mL/2oz unpreserved | A | NA | | 5.4 | Y | Absent | | PB-TI(180) |

Project Name: DOROTHEA DIX GREEN BARN
Project Number: 211.06085.011

Lab Number: L2429095
Report Date: 06/03/24

GLOSSARY

Acronyms

| | |
|----------|--|
| DL | - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) |
| EDL | - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME). |
| EMPC | - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration. |
| EPA | - Environmental Protection Agency. |
| LCS | - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes. |
| LCSD | - Laboratory Control Sample Duplicate: Refer to LCS. |
| LFB | - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes. |
| LOD | - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) |
| LOQ | - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) |
| MDL | - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. |
| MS | - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values. |
| MSD | - Matrix Spike Sample Duplicate: Refer to MS. |
| NA | - Not Applicable. |
| NC | - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit. |
| NDPA/DPA | - N-Nitrosodiphenylamine/Diphenylamine. |
| NI | - Not Ignitable. |
| NP | - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil. |
| NR | - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests. |
| RL | - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable. |
| RPD | - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report. |
| SRM | - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples. |
| STLP | - Semi-dynamic Tank Leaching Procedure per EPA Method 1315. |
| TEF | - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD. |
| TEQ | - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values. |
| TIC | - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations. |

Report Format: Data Usability Report



Project Name: DOROTHEA DIX GREEN BARN
Project Number: 211.06085.011

Lab Number: L2429095
Report Date: 06/03/24

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

Report Format: Data Usability Report



Project Name: DOROTHEA DIX GREEN BARN
Project Number: 211.06085.011

Lab Number: L2429095
Report Date: 06/03/24

Data Qualifiers

- ND** - Not detected at the reporting limit (RL) for the sample.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name: DOROTHEA DIX GREEN BARN
Project Number: 211.06085.011

Lab Number: L2429095
Report Date: 06/03/24

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624.1: m/p-xylene, o-xylene, Naphthalene

EPA 625.1: alpha-Terpineol

EPA 8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol, Azobenzene; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.

Mansfield Facility

SM 2540D: TSS.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Nonpotable Water: EPA RSK-175 Dissolved Gases

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B

EPA 524.2: THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LACHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.

EPA 624.1: Volatile Halocarbons & Aromatics,

EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables).

Microbiology: SM9223B-Colilert-QT; Enterolert-QT, EPA 1600, EPA 1603, SM9222D.

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.

EPA 522, EPA 537.1.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

EPA 245.1 Hg.

SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

00 31 32
Geotechnical Data



R.W. Gillespie & Associates, Inc.

Geotechnical Engineering • Environmental Consulting • Materials Testing Services

09 September 2025

Arno L. Skalski, LEED AP, Associate
Gale Associates, Inc.
5 Moulton Street, Suite 201
Portland, ME 04101

VIA EMAIL: als@gainc.com

Subject: Geotechnical Engineering Evaluation Report
Green Barn Evaluation
Bangor, Maine
RWG&A Project No. 0851-083

As requested, R.W. Gillespie & Associates, Inc. (RWG&A) is pleased to present the attached report of the geotechnical engineering evaluation to support the design and construction of repairs to the historic Green Barn at the Dorothea Dix Psychiatric Center Campus in Bangor, Maine. This geotechnical engineering evaluation was performed in general accordance with the subconsultant amendment dated 16 May 2025, with reference to RWG&A's Proposal No. P-12069, dated 13 March 2025.

The purpose of the service was to explore subsurface conditions to help determine soil properties and to determine the causes of overturned foundations and ground floor slab damage, and prepare recommendations for design or repairs to the foundations and ground floor slab. The attached report presents the results of RWG&A's subsurface explorations, laboratory testing, engineering evaluations, and geotechnical engineering design recommendations for repairs of the Green Barn.

We trust this report meets the project's immediate needs. If you have any questions or if we may be of further service, please contact us.

Sincerely,
R. W. GILLESPIE & ASSOCIATES, INC.

Temitope B. Omokinde, E.I.T.
Geotechnical Engineer

Erik J. Wiberg, P.E.
Principal Geotechnical Engineer

TBO/EJW:fg

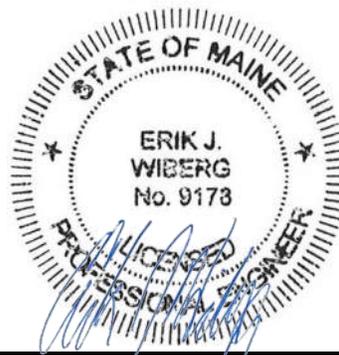
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R.W. Gillespie & Associates, Inc.

**Report
of
GEOTECHNICAL ENGINEERING EVALUATION
for
GREEN BARN EVALUATION
BANGOR, MAINE**

**Prepared
for
GALE ASSOCIATES, INC.
PORTLAND, MAINE**

**Prepared
by
R. W. GILLESPIE & ASSOCIATES, INC.
BIDDEFORD, MAINE**



**Erik J. Wiberg, P.E.
State of Maine License No. 9178**

R.W. Gillespie & Associates, Inc.

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1.0 INTRODUCTION

1.01 Background

The project consists of the design and construction of foundation repairs to the historic Green Barn at the Dorothea Dix Psychiatric Center Campus in Bangor, Maine. The project location is shown in Figure 1, *Locus Map*. R.W. Gillespie & Associates, Inc.'s (RWG&A's) understanding of the barn's condition is based on a site visit and communications with and information provided by Gale Associates, Inc. (Gale). The information provided included the following documents:

- Draft report titled *Shoring and Structural Upgrades Project, Green Barn at Dorothea Dix Psychiatric Center*, dated 28 August 2024, prepared by Gale Associates.
- Report titled *Structural Inspection, Green Barn, Dorothea Dix Psychiatric Center, Bangor, Maine*, dated 21 September 2015, prepared by Criterium Brown Engineers.
- Article titled *Carpentry and Building, Farm Barn of Plank Frame Construction*, dated July 1909.

Gale Associates, Inc. (Gale) and Criterium Brown Engineers (Criterium) documented overturned foundations and displaced columns and foundations at the east and north sides of the building. Criterium concluded that the portions of the foundation, ground floor slab, and interior footings are experiencing seasonal movement and saturated soil conditions. A July 1909 article about the barn's construction states that the perimeter wall is supported on a concrete trench, and interior columns are supported on isolated spread footings approximately 1.25 feet below ground floor grade. The Gale and Criterium reports corroborate the shallow interior spread footings.

1.02 Scope of Services

This evaluation was performed to develop site-specific soil and laboratory data and make geotechnical engineering evaluations for remedial measures. These services were performed in general accordance with the Gale/RWG&A subconsultant amendment dated 16 May 2025, with reference to RWG&A's Proposal No. P-12069, dated 13 March 2025. Refer to Appendix A for other limitations and use of this report. As performed, the scope of services included the following items:

- Reviewed project information, readily available published subsurface information and geologic mapping, and visited the site to observe surface conditions.
- Prepared a geotechnical engineering exploration program to obtain subsurface information for building foundation and ground floor evaluations.
- Arranged to have the subsurface explorations performed by a local drilling company as a subcontractor to RWG&A. Provided technical monitoring of exploration activities so that depths, locations, and sampling methods could be modified in response to the subsurface conditions encountered. Observed, logged, and sampled the explorations. Conducted dynamic cone penetration supplemented with hand auger sampling at one location within the barn.

- Performed laboratory tests on selected soil samples recovered from the subsurface explorations to aid in soil description and for estimation of engineering properties.
- Evaluated acquired field, office, and laboratory data relative to apparent foundation movement and ground floor slab conditions, and alternatives for remedial measures.
- Prepared this report presenting the findings, conclusions, and recommendations of the geotechnical engineering evaluation. Recommendations include measures to reduce future foundation movement and restore foundation support.

2.0 SUBSURFACE EXPLORATION

The subsurface exploration program consisted of five machine-drilled soil borings, designated B-1 through B-5, and a hand-auger boring, designated HA-1. On 09 June 2025, New England Boring Contractors of Hermon, Maine, drilled test borings using a track-mounted drill rig and an RWG&A representative performed a hand-auger boring inside the building at a heaved, fragmented slab area selected by Gale. Figure 2 shows the approximate exploration locations.

The soil borings were advanced using 2-1/4 inch inside diameter hollow-stem augers. Split-barrel sampling with standard penetration testing (*ASTM D1586, Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils*) was generally performed at about 2-foot intervals in the upper 4 to 10 feet and 5-foot intervals thereafter to refusal surfaces. The soils encountered in the explorations were described in general accordance with *ASTM D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)*. Logs of the soil boring explorations are included in Appendix B.

Stratification lines shown on the exploration logs represent the estimated boundaries between the different soil types encountered and approximate refusal depths; the actual transitions will be more gradual and vary over short distances. Subsurface information should only be considered representative of subsurface conditions encountered within the vertical reach of the explorations on the date the explorations were made.

RWG&A selected the general boring locations with Gale and modified them in the field based on access and proximity to underground utilities. The as-performed locations were determined using identified site features exposed at the ground surface. The locations shown in Figure 2 should be considered accurate only to the degree implied by the methodology used to determine them.

RWG&A performed a dynamic cone penetrometer test (DCP Test) at the bottom of the hand-auger borehole. The DCP test was performed in general accordance with *ASTM D6951/D6951M – 09, Standard Test Method for Use of the Dynamic Cone Penetrometer in Shallow Pavement Applications* from about 1.3 to 3.5 feet below local ground surface. The test was performed using the Dual-Mass, Dynamic Cone Penetrometer Model H-4219QC equipment produced by Humboldt Manufacturing Company. Plots of the test results are included in Appendix B.

3.0 LABORATORY TESTING

Laboratory testing was conducted to aid in the characterization and estimation of the engineering properties of the soils. The laboratory testing program consisted of three particle-size distribution tests with natural moisture content determination, and four moisture content determinations. The tests were performed in general accordance with the following methods and procedures:

- *ASTM D2216, Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.*
- *ASTM D6913/6913M, Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis.*
- *ASTM D1140 – 17, Standard Test Methods for Determining the Amount of Material Finer than 75-µm (No. 200) Sieve in Soils by Washing.*

Moisture content test results are presented on the test boring logs. Results of the particle-size distribution tests are presented in Appendix C, *Laboratory Test Results*. The above soil tests were conducted at the RWG&A soil and materials testing laboratory in Biddeford, Maine.

4.0 SUBSURFACE CONDITIONS

4.01 Subsurface Soils

In general, subsurface conditions consisted of a concrete slab over fill underlain by silt and silty sand with a varying amount of gravel extending to the bottom of the exploration. Refusal surface was encountered within the vertical reach of the exploration at about 16 to 25 feet below the adjacent ground surface. Please refer to the exploration logs in Appendix B for descriptions of subsurface conditions encountered at specific locations. Generalized soil descriptions with associated ranges of thicknesses encountered in the explorations are summarized below:

| Unit | Encountered Thickness (feet) | Generalized Description |
|---|-------------------------------------|---|
| Concrete Slab | 0.25 | Located within the building. The slab is discontinuous, fragmented and severely damaged. |
| Fill | 0.8 to 6 | Moist to wet, sand with silt to silty sand with varying amounts of gravel fill, light brown to black. It consisted of few coal, slag, ash-like material, coal fill. |
| Silt (ML) | 2.5 to 8 | Wet, loose to medium dense, silt with few to some sand, trace to little clay, olive to light brown. |
| Silty Sand to Silty Sand with Gravel (SM) | 2 to 17 | Wet, loose to very dense sand with little to some silt, trace to little gravel, olive to light brown. |

4.02 Groundwater

Free water was observed at depths of approximately 1.5 feet below the ground surface during the exploration program. Groundwater levels at the site will fluctuate due to seasonal variations, temperature, rainfall, nearby underground utilities, and construction activity in the area; therefore, water levels during and following construction will vary from those observed during explorations.

Soil mapping information from the United States Department of Agriculture's Natural Resource Conservation Service (NRCS) indicates that the seasonal high groundwater level is approximately 0.5 to 1.4 feet below the ground surface for the natural soil types mapped at the subject site. Groundwater levels at the site will fluctuate due to season, temperature, rainfall, river stage, and construction activity; therefore, water levels during and following construction will vary from those observed in the explorations.

5.0 EVALUATION OF GEOTECHNICAL ENGINEERING DATA

5.01 General

Engineering evaluations for this project are based on the subsurface exploration information, laboratory testing data, and design information available to RWG&A when this report was prepared. RWG&A should review the engineering evaluations that follow to confirm their continued applicability if changes are made to the project described herein. It is recommended foundation design and construction comply with the requirements of applicable ordinances, regulations, and codes.

5.02 Foundation Overturning and Ground Floor Slab Damages and Remedies

The building's foundation and ground floor slab are vintage and not of modern construction. The barn foundation is described in the reference article as a "concrete trench wall well below frost line." The depth of the perimeter foundation and the actual construction are uncertain; test pits would be needed to expose the foundation. Foundation details in the article indicate that interior piers were designed to be supported on 2-foot-square concrete footings bearing about 15 inches below the ground surface, and other support posts bear on the concrete slab. The concrete slab fragments appeared to lack wire mesh or other reinforcement and were plain concrete.

The barn is unheated, and its interior spaces are exposed to the same thermal conditions as those outdoors. Surface water was ponded near the northeast corner of the barn, both inside and outside, in May 2025, indicating poor surface water drainage conditions.

5.02.01 Frost Heaving

Based on field observations, conditions reported by others, and the results of subsurface explorations and laboratory testing, it appears that the ground floor slab lifting and cracking, as well as the foundation overturn, are primarily related to frost action. Some cracking might be due to non-uniform slab support. Frost heaving can occur where there is freezing temperature and a water supply (note: either from the surface or groundwater). Frost heaving in the soil is often

associated with the formation of ice lenses. Ice lenses develop in soils that are frost susceptible. Smaller amounts of frost heaving can also occur in saturated, non- to low-frost-susceptible soils due to the expansion of water as it changes to ice. The magnitude of the frost heaving will increase over time due to repeated freeze-thaw cycles, continued water supplies, or as colder temperatures penetrate deeper.

Although frost-heaved structures may settle as temperatures rise and the ground thaws, they generally will not return to their original state, and lingering heaving may persist and accumulate over time. If frost heaving occurs uniformly, it may go unnoticed. Where heaving occurs at different rates, differential movement occurs. Many conditions, including variations in material types, thicknesses, soil gradation, water content, and temperature, can cause differential movement. Soil with more than 5 percent fines is considered frost susceptible. Generally, the amount of frost heaving that occurs during a freezing cycle is proportional to the frost penetration depth, the fines content, and the soil density.

The composition of the near-surface fill was consistent in the explorations, and the fines content of the fill material from boring B-3 was about 19 percent. The measured fines content of naturally deposited sandy silt to silt was 57 and 94 percent. The materials are considered moderately to highly frost susceptible. Based on the soil types encountered and Maine Department of Transportation (MaineDOT) procedures, the design air-freezing index is approximately 1,750 Fahrenheit degree-days, and the estimated frost penetration depth at the site is approximately 4.5 to 5 feet.

It appears primarily related to water infiltration, surface and subsurface drainage conditions, and the presence of frost susceptible materials. The presence of high groundwater and material with a low rate of permeability within the freezing depth encourages the formation of ice lens and seasonal movement. Repeated seasonal movement and saturated soil conditions more likely than not contributed to the overturned foundations and displaced columns reported by Gale and Criterium.

5.02.02 Undocumented Fill

The presence of fill below foundations might have also contributed to foundation movement. The fill composition is not what would be used in modern construction. The fill consisted of silty sand with ash-like material, coal, and slag. The standard penetration test results indicate variable fill relative density and compressibility. The variability could be related to the effect of fill placement, compactive effort, and repeated freeze-thaw cycles. Inconsistent density and compaction can cause uneven settling beneath the foundations.

5.03 Remedial Measures

Remediation measures to restore foundations and ground floor slabs should address exposure to frost heaving and the presence of undocumented fill. It is understood that it may not be economically feasible to replace fill, foundations, and ground-floor slabs to modern construction practices and current building code standards at all locations. It is understood that the concerned parties will assess risks and apply certain remedial measures at selected locations, with the understanding that the risks of future differential movement remain between remediated areas and areas that have not been remediated. Specific recommendations are provided in Section 6.

Evaluations to develop candidate remedial measures were based on the following structural reactions provided by Gale:

Interior column loads: 16 kips
Perimeter column loads: 16 to 35 kips
Gable end exterior wall loads: 0.009 kips per foot
Side exterior wall loads: 0.0064 kips per foot

Foundation Remedial Measures

- Install a perimeter foundation underdrain around the building to divert groundwater away from the building.
- Grade the site to provide positive drainage away from the barn during and after construction.
- Lower foundations exposed to freezing temperatures to bear on naturally deposited inorganic soils or compacted structural fill below design frost penetration depth, or
- Provide frost-protected shallow foundations consisting of concrete footings bearing on a layer of rigid insulation located a minimum of 1 foot below ground surface underlain by compacted granular fill, or
- Underpin piers with helical piles to develop adequate gravity and frost heave load resistance in naturally deposited soils below design frost depth.

Preliminary evaluations indicate allowable helical pile loads of 6,500 pounds for piles with 8, 10, and 12-inch diameter helical plates on a single shaft with the smaller bottom helix located about 8.5 feet below ground surface and the larger helix located about 5.5 feet below ground surface (i.e., below design frost depth). An allowable load of 11,500 pounds is anticipated for a similar arrangement, with the lower and upper helical piles located approximately 15 feet and 13 feet below the ground surface. Approximately one inch of settlement is anticipated.

Ground Floor Slab Remedial Measures

- Provide full depth protection by replacing in-situ fill and soil down to frost penetration depth with non-frost susceptible fill such as clean gravelly sand or ¾-inch crushed stone encapsulated in geotextile, or
- Provide frost-protected ground floor slabs supported over a layer of rigid insulation bearing on compacted granular fill, or
- Provide partial depth frost protection with the expectation that some frost heaving will occur.

6.0 RECOMMENDATIONS

6.01 Site Preparation

1. Site grading around the proposed building should provide positive drainage away from constructed facilities during and after construction. All topsoil, organic material, debris, rubbish, frozen soils, muck, loose/soft or disturbed soils, and other unsuitable materials should be removed from areas of new construction. Unsuitable materials include uncontrolled fills (i.e., fills placed without systematic densification and moisture control to specified percent compaction) and deleterious substances.
2. Existing fill (i.e., in-situ fill) at foundations to be replaced with spread footing foundations should be excavated down to naturally deposited, inorganic soil and replaced with compacted crushed stone wrapped in a geotextile or structural fill. As a minimum, in-situ fill below planned footings and within the limits of a 1 unit horizontal to 1 unit vertical (1H:1V) line projecting down and away from the outside edge of footings should be removed and replaced with compacted structural fill. Excavations in naturally deposited soils should be made with equipment fitted with smooth-edged buckets or short, ripper teeth.
3. Foundation bracing and temporary support should be designed to limit movements of the existing structure to tolerable amounts as determined by the Structural and Civil Engineer. The Contractor's excavation procedures and lateral support design, including lateral support for new construction, should be submitted for review and approval by the Structural Engineer before construction.
4. The Contractor should be aware of the potential for encountering obstructions, such as remnants from prior structures and buildings, associated foundations, and underground utilities (including both active and abandoned ones), during site work activities. It is anticipated that obstructions may include, but not be limited to, concrete footings, masonry block, rubble fill, and buried utilities. Where such items are encountered, they should be excavated to their full extent, removed, and replaced with compacted fill.
5. Groundwater was observed during exploration. It should be practicable to dewater excavations extending about 1 to 2 feet below groundwater by open pumping methods. If necessary, deeper excavations below the groundwater level may require side trenches within or adjacent to the excavations or other dewatering methods. Surface runoff and infiltration of groundwater should be controlled so that excavation, filling, and foundation construction can be completed in the dry.

6.02 Fill

6. Only imported structural fill should be used as fill below ground floor slabs and as backfill within 3 feet of footings, piers, and foundation walls.
7. Structural fill should be a clean, well-graded, low to non-frost susceptible, and free-draining sand and gravel mixture meeting the following gradation requirements:

| Screen Number or Sieve Size | Percent Passing (%) |
|-----------------------------|---------------------|
| 3 inches | 100 |
| Number 4 | 35 to 70 |
| Number 40 | 5 to 35 |
| Number 200 | 0 to 5 |

As an alternate, MaineDOT *Section 703.13 Crushed Stone 3/4-Inch* with geotextile between the stone and adjacent soils may be used. Geotextile should be non-woven MaineDOT *Section 722.01, Stabilization/Reinforcement Geotextile, Class 2 geotextile fabric*.

- 8. In open areas, structural fill should be placed in level, uniform lifts not exceeding 12 inches in uncompacted thickness and compacted with self-propelled compaction equipment. In confined areas and within 3 feet of foundation walls, structural fill should be placed in lifts not exceeding 6 inches in uncompacted thickness and be compacted with hand-operated compaction equipment. All fill placed for footing and slab support should be structural fill compacted to at least 95 percent of the maximum dry density as determined by *ASTM Standard D1557 Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³))*.
- 9. Crushed stone should be compacted to at least 100% of the maximum dry density determined, per *ASTM C29, Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate*. Compacted dry density measurements should be made in general accordance with *ASTM D2922, Standard Test Method for Density of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow Depth)*.

6.03 Foundation Remediation Alternatives

- 10. The in-place soils encountered in the explorations are not considered susceptible to liquefaction. In accordance with the *2021 International Building Code*[®], the site is classified as Site Class D.
- 11. The final excavation of footing bearing surfaces should be performed using earthwork equipment fitted with smooth-edged buckets. Final subgrade preparation should include compaction with hand-guided, vibratory compaction equipment. Following compaction and before placing concrete, care should be taken to minimize disturbance of the bearing surfaces. Any softened or disturbed material resulting from construction traffic should be removed before placing concrete and backfilled with compacted structural fill.
- 12. The integrity of natural soils and structural fill must be maintained during cold weather conditions. Footing and slab subgrades should not be allowed to freeze. The naturally deposited soils near the anticipated footing depth are considered frost susceptible. Freezing of subgrade soils beneath footings and floor slabs might result in heaving and post-construction settlement. The Contractor should make every effort to prevent freezing of subgrade soils. If frost penetration occurs, all frozen and previously frozen soils should be removed and replaced with compacted structural fill. At no time should frozen material be placed as fill.

6.03.01 Spread Footings Alternative

- 13. Spread and/or continuous footings bearing on naturally deposited inorganic soil or compacted structural fill may be used to replace existing foundations. Footings should be proportioned using an allowable load-bearing pressure of 2,000 pounds per square foot. Less than 1 inch of post-construction total settlement is anticipated.

Minimum footing width should be per concrete design and building code requirements, and no less than 2 feet. For footings having a least lateral dimension less than 3 feet, the above allowable pressure should be taken as 1/3 of the above value times the least dimension in feet.

The bottom of footing level for footings exposed to freezing temperatures should be a minimum of 5 feet below the lowest adjacent ground surface exposed to freezing temperatures. Alternatively, frost-protected shallow foundations may be used.

Lateral loads from wind and earthquakes may be resisted by friction between the foundation bottoms and supporting compacted structural fill and earth pressure against the sides of foundations. A friction coefficient of 0.25 and an equivalent fluid pressure of 100 pounds per square foot are recommended for use in the design of footings.

- 14. Frost-protected shall foundations may be used as an alternative to full-depth frost protection embedment. Frost protection should be designed using the American Society of Civil Engineers (ASCE) *Design and Construction of Frost-Protected Shallow Foundations SEI/ASCE 32-01*. Provide a continuous horizontal layer of ASTM C578 Type V or VII extruded polystyrene insulation below and extending outward from footings. A minimum of 6 inches of compacted structural fill should be provided below the insulation. Minimum recommended thicknesses and projections depending on insulation burial depth below the lowest adjacent ground surface exposed to freezing temperatures are provided below.

| Insulation Depth Below Ground Surface (inches) | Width of Insulation Beyond Footing Perimeter (inches) | Minimum Insulation Thickness (inches) |
|---|--|--|
| 12 | 56 | 1.6 |
| 18 | 48 | 1.1 |
| 24 | 41 | 0.6 |

- 15. Horizontal insulation extending more than 24 inches from the foundation edge should be protected against damage by concrete or asphalt pavement at the ground surface, or with cementitious board or plywood for below-grade use, or other approved materials placed directly on top of the insulation.
- 16. Polystyrene insulation must be protected from petroleum-based solvents and their vapors. Examples of these solvents are gasoline, diesel fuel, concrete curing compound, coal tar pitch, and asphaltic mastic compounds. If the insulation might come into contact with

solvents, then it is recommended that the insulation be encapsulated in a chemically resistant membrane.

6.03.02 Helical Piles Alternative

17. Only helical pile systems evaluated and approved for use under ICC-ES and by the Building Official should be used. The manufacturer's pile system should comply with all aspects of current *ICC-ES AC 358-Helical Pile Systems and Devices* acceptance criteria. Helical piles should be designed, installed, and tested by a qualified specialty contractor with demonstrated experience in construction and testing of helical piles in similar subsurface and site conditions. The helical pile design should be determined by a qualified Professional Engineer licensed in the State of Maine and engaged by the specialty contractor. Piles should be designed to fail in shear around the pile, such that the failure surface does not extend to the ground surface.
18. Verification pile load tests should be conducted in accordance with *ASTM D1143 Standard Test Methods for Deep Foundations Under Static Axial Compressive Load* and *ASTM D3689 Standard Test Methods for Deep Foundations Under Static Axial Tensile Load* on a minimum of one pile for each type of pile application (axial compression and axial tension, lateral load resistance) and installation depth. The test pile should be installed using the Contractor's planned installation methods and procedures before production pile installation to confirm that the pile and the contractor's installation equipment, methods, and procedures, that will be used in production pile installation, can produce the required load carrying capacity and, in the case of helical piles, to validate correlation of torque to the load-carrying capacity that is used for production installation.

If subsurface conditions are encountered that vary from test conditions or installation procedures change, then additional tests should be conducted. RWG&A recommends that the design allowable pile capacity not exceed one-half the maximum applied test load, demonstrating tolerable movements. The maximum applied test load should be at least twice the largest structural reaction.

19. Helical piles should develop bearing resistance in soils a minimum of 3 times the helix diameter below the design frost depth of 5.5 feet.
20. Helical piles should be designed to resist uplift forces due to frost heave. A literature review indicates that design adfreeze uplift bond values for the soils encountered are in the range of 2,500 pounds per square foot (psf) to 5,500 psf. The upper range of adfreeze uplift bond values is recommended for the portion of the pile above design frost depth in naturally deposited soils exposed to freezing temperatures.

Adfreezing forces on the shafts of piles can be reduced by replacing frost susceptible soils from around the pile with structural fill to a depth equal to the design frost depth, placing a layer of buried rigid insulation horizontally along the grade, insulating the pile shaft, or adding low-adhesion frost sleeves to the piles. The pile designer should determine insulation type, extent, and details.

21. The recommended maximum eccentricity from the design location is 1 inch for single piles and groups of two piles. Piles should be installed as plumb as is practicable. A pile

should be considered out of plumb if the inclination is 1 inch in 10 feet for single piles and groups of two piles.

22. Axially loaded helical piles should have a center-to-center spacing at the helix depth of at least 3 feet. The tops of the piles may be closer to the ground surface but battered away from each other to meet the spacing criteria at the helix bearing depth. Lateral loads could be resisted using battered piles of the same pile type and allowable load as described above, except center-to-center spacing should be increased to a minimum of 4 feet at the helical plate bearing location. It is recommended that lateral loads be resisted by using piles that react in axial compression.
23. Design capacities of helical piles vary depending on the helical disc type, sizes, spacing, and depths as determined by the helical pile designer. RWG&A recommends a minimum factor of safety of 2 be used in determining geotechnical axial allowable bearing pressure and allowable helical pile loads. Final helical pile foundation system design should include settlement analyses performed by the helical system designer based on design structural loads, and tolerable and differential settlements as determined by the project designer(s).

6.04 Ground Floor Slabs

24. Slabs sensitive to frost action should be underlain by a minimum of 5 feet of structural fill or frost-protected per SEI/ASCE 32-01 using the widths and thicknesses provided in Section 6.03.01. The insulation embedment depth should be determined using the design wheel contact stress distribution and the insulation's allowable contact stress for conditions with cyclic loading. Only Type IV, V, VI, and VII extruded polystyrene insulation should be used.
25. Slabs at locations where frost heaving is tolerable should be directly underlain by a minimum of 12 inches of structural fill. A subgrade modulus of 100 pounds per cubic inch (pci) should be used to design slabs-on-grade subjected to concentrated wheel loads.
26. Concrete slab-on-grade floors, regardless of their design or construction, are prone to some cracking, and the use of control joints and concrete reinforcing are methods to reduce random patterned cracking. It is anticipated that the design and construction details of the floor slab, including concrete thickness, reinforcing, bedding, control joint depth and spacing, vapor retarder type and thickness, and rigid insulation will be provided by the project's Structural Engineer. The surrounding area should be pitched to drain away to reduce available moisture for ice and frost lens generation.

6.05 Foundation Drainage

27. An underdrain should be installed around the building's perimeter. The drain invert should be installed a minimum of 4 feet below ground floor slab elevation. The drains should consist of perforated pipe bedded in 2 cubic feet of underdrain stone per linear foot. The underdrain stone should be completely wrapped in a filter fabric such as Mirafi 160N, or equivalent. The underdrain trench above the fabric should be backfilled with

structural fill or Maine Department of Transportation Standard Specification *Section 703.22 Underdrain Backfill Material, Type B.*

The drain outlets should provide for the free discharge of the drains under all conditions. Multiple outlets should be provided so as not to be reliant on a single flow path. Roof drains should not be connected to the underdrains.

6.06 Temporary Excavations

28. Soils at this site, encountered within the anticipated depths of excavations, consist of silty sand fill, sandy silt, and silty sand with gravel. We anticipate that foundation and utility excavations can be accomplished using sloped, open-cut techniques. It is also anticipated that dewatering can be accomplished using sumps and open pumping methods.
29. The Contractor should be aware that slope height, slope inclination, and excavation depths (including utility trench excavations) should in no case exceed those specified in local, state, or federal safety regulations (e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations). Such regulations are strictly enforced and, if they are not followed, the Owner, Contractor, and/or earthwork and utility subcontractors could be liable for substantial penalties.
30. As a safety measure, it is recommended all vehicles and spoil piles be kept at a minimum lateral distance from the top of excavations equal to no less than 100 percent of the slope height. Exposed slope faces should be protected against the elements.

6.07 Geotechnical Engineering Observation

The geotechnical engineering recommendations provided as the basis for this project's design were developed using limited observations and tests. The Owner and Contractor should be sensitive to the potential need for adjustment in the field. RWG&A should be retained to observe the geotechnical engineering aspects of the project's construction. These services should include observing general compliance with the design concepts, specifications and recommendations, and assisting in the development of design changes should subsurface conditions differ from those anticipated before the start of construction. Observation improves the likelihood that the design intent will be carried out during construction. Additionally, it enables RWG&A to confirm its design recommendations. For this project, geotechnical engineering observation of the following aspects is recommended:

- Site preparation,
- Structural fill placement and compaction,
- Foundation and ground floor slab subgrade preparation, including insulation installation
- Helical pile installation.

In addition to geotechnical engineering observation, RWG&A can also provide comprehensive construction inspection and materials testing services. This would include soils, portland cement

and asphaltic concrete, structural steel and welding inspections, destructive and non-destructive testing, and special inspection services in fulfillment of building code requirements.

7.0 CLOSURE

This report has been prepared for specific application to the design and construction of repairs to the historic Green Barn at the Dorothea Dix Psychiatric Center Campus in Bangor, Maine, and for the exclusive use of Gale Associates, Inc. Other users accept responsibility for their interpretation and use of the information contained in this report.

This work has been completed in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made. In the event any changes are made in the nature, design, or location of the proposed construction, RWG&A should review the conclusions and recommendations of this report.

The recommendations presented are based on the results of widely spaced explorations. The nature of variations between the explorations may not become evident until construction has begun. If variations are encountered, it will be necessary for RWG&A to re-evaluate the recommendations presented in this report. RWG&A requests an opportunity for a general review of the final design and specifications to determine that earthwork and foundation recommendations have been interpreted in the manner in which they were intended.



SITE



SCALE, FEET

SOURCE:
USGS 7.5-MINUTE TOPOGRAPHIC QUADRANGLE OF
VEAZIE, ME, DATED 2024 & BANGOR, ME, DATED 2024.

FIGURE 1
LOCUS MAP
GEOTECHNICAL ENGINEERING EVALUATION
GREEN BARN EVALUATION
BANGOR, MAINE

SEPTEMBER 2025

PROJECT NO. 0851-083-25





LEGEND:

 B-1 APPROXIMATE LOCATION OF SOIL BORING DRILLED 09 JUNE 2024.

SOURCE:

© GOOGLE EARTH 2025 IMAGERY DATE 05/10/2018.



FIGURE 2
EXPLORATION LOCATION PLAN
GEOTECHNICAL ENGINEERING EVALUATION
GREEN BARN EVALUATION
BANGOR, MAINE

SEPTEMBER 2025

PROJECT NO. 0851-083-25



APPENDIX A

LIMITATIONS AND USE OF REPORT

Geotechnical Engineering Evaluation Report
Green Barn Evaluation
Bangor, Maine

LIMITATIONS

This evaluation has been limited to consideration of the geotechnical engineering aspects of the design and construction of repairs to the Green Barn at the Dorothea Dix Psychiatric Center Campus in Bangor, Maine. The primary purpose of the evaluation was to explore subsurface conditions to help determine soil properties, determine the causes of overturned foundations and ground floor slab damage, and prepared recommendations for design or repairs to the foundations and ground floor slab. This report identifies construction considerations intended to solely assist engineers that will design the project and monitor its construction. This report is not a technical specification nor is it intended to be used as a specification for bidding or building the project.

This geotechnical engineering evaluation might also aid the Contractor responsible for construction of the planned building. However, the recommendations and comments provided hereinafter are not intended to be instructions or directives to the project Contractor. The project Contractor must evaluate construction issues encountered in the work on the basis of their experience with similar projects, taking into account their own methods and procedures.

RWG&A has not considered the construction from a worker safety perspective. Construction safety is the responsibility of the project Contractor, who is also solely responsible for the means, methods, and sequencing of construction operations. RWG&A is providing this information as a service to Gale Associates, Inc. Under no circumstances should this information be interpreted to mean that RWG&A and/or Gale Associates, Inc. are assuming responsibility for construction site safety or the Contractor's activities; such responsibility is not being implied and should not be inferred.

RWG&A's services excluded:

- Any environmental site assessment relative to oil and hazardous materials or evidence of a potential release or threat of oil or hazardous materials on, below, or around the site. (Note: any statement in this report, or on the exploration logs, regarding odors or unusual or suspicious conditions is for informational purposes only and is not intended to constitute an environmental assessment.)
- Any service to investigate or detect the presence of mold or other biological contaminants, or any service that was designed or intended to prevent or lower the risk of the occurrence of an infestation of mold or other biological contaminants (MOBC infestation).

All earthwork, including dewatering, should be conducted in accordance with environmental, and health and safety requirements of the contract documents. Nothing in this report shall be interpreted to supersede or replace contractual requirements.

APPENDIX B

EXPLORATION LOGS AND DCP TEST RESULTS

Geotechnical Engineering Evaluation Report
Green Barn Evaluation
Bangor, Maine

RWG&A, Inc. soil descriptions are based on the following criteria. Descriptive terminology is used to denote the grain size and percentage of each component. The soil descriptions are based on visual-manual classification procedures, Standard Penetration Test results, and the results of laboratory testing on selected soil samples, where available. The Unified Soil Classification Group Symbol will be indicated in capital letters.

COMPONENT DEFINITIONS BY GRADATION SIEVE LIMITS

| Materials | Definitions | Fractions | Upper | Lower |
|-----------|--|--------------------------|---|--|
| Boulders | Material too large to pass through an opening 12 in. square. | | | |
| Cobbles | Material passing through a 12 in. opening and retained on the 3 in. sieve. | | | |
| Gravel | Material passing the 3 in. sieve and retained on 1/4" (No. 4 sieve). | Coarse Fine | 3 in. 3/4 in. | 3/4 in. 1/4 in. |
| Sand | Material passing the No. 4 sieve and retained on the No. 200 sieve. | Coarse Medium Fine | No. 4 (1/4") No. 10 (1/8") No. 40 (1/32") | No. 10 (1/8") No. 40 (1/32") No. 200 |
| Silt | Material passing the No. 200 sieve which is usually non-plastic in character and exhibits little or no strength when air dried. | | No. 200 | |
| Clay | Material passing the No. 200 sieve which can also be made to exhibit plasticity within a certain range of moisture contents and which exhibits considerable strength when air dried. | | No. 200 | |

SOIL DESCRIPTION

General

Soils are described as to the Unified Soil Classification Systems Group Symbol, density or consistency, color, grain size distribution and other pertinent properties such as plasticity and dry strength. The RWG&A order of descriptors is as follows:

1. USCS Group Name and Symbol, or Fill
2. Density or Consistency
3. Moisture
4. Grain Size & Constituent percentages
5. Other pertinent descriptors
6. Color

DESCRIPTIVE TERMINOLOGY DENOTING COMPONENT PROPORTIONS

| <u>Descriptive Terms</u> | <u>Range of Proportions</u> |
|------------------------------------|--|
| Noun (major component) | ≥50% |
| Adjective (secondary component) | 20 - 50% |
| Some (third component) | 25 - 45% |
| Little (second or third component) | 15 - 25% |
| Few (second or third component) | 5 - 15% |
| Trace | 0 - 5% |
| With | Amount of component not determined. Used as a conjunction only. Does not indicate component percentile |

OTHER DESCRIPTIVE TERMS

Where appropriate, geological classifications are also used (Glacial Till, etc.)

TYPICAL DESCRIPTIONS

SAND WITH SILT (SP-SM): Medium dense, moist, coarse to medium sand, few silt, brown.
FILL: Loose, dry, fine sand, some gravel and silt, with brick and concrete fragments, dark brown.
SILTY CLAY (CL): Very stiff, moist, silty clay, olive-brown.

| <u>DENSITY OR CONSISTENCY OF SOILS</u> | | |
|--|--|---------------------------------------|
| <u>COHESIVE SOILS</u> | | |
| <u>Consistency of Cohesive Soils</u> | <u>Standard Penetration Test (Blows Per Foot) (N)</u> | <u>Undrained Shear Strength (TSF)</u> |
| Very Soft | 0 - 2 | Below 0.13 (250 psf) |
| Soft | 2 - 4 | 0.13 to 0.25 (to 500 psf) |
| Medium | 4 - 8 | 0.25 to 0.5 (to 1,000 psf) |
| Stiff | 8 - 15 | 0.5 to 1.0 (to 2,000 psf) |
| Very Stiff | 15 - 30 | 1.0 to 2.0 (to 4,000 psf) |
| Hard | Over 30 | over 2.0 (over 4,000 psf) |
| Consistency of cohesive soils is based upon field vane shear, torvane, or pocket penetrometer, or laboratory vane shear or Unconsolidated-Undrained Triaxial Compression tests. Consistency of cohesive soils is based upon the Standard Penetration test when no other data is available. | | |
| <u>COHESIONLESS SOILS</u> | | |
| <u>Density of Cohesionless Soils</u> | <u>Standard Penetration Test (Blows per Foot) (in)</u> | |
| Very Loose | 0 - 4 | |
| Loose | 4 - 10 | |
| Medium Dense | 10 - 30 | |
| Dense | 30 - 50 | |
| Very Dense | over 50 | |
| <u>PENETRATION RESISTANCE</u> | | |
| STANDARD PENETRATION TEST (ASTM D1586) - a 2.0-inch diameter, 1-3/8 inch inside diameter split barrel sample is driven into soil by means of a 140-pound weight falling freely through a vertical distance of 30 inches. The total number of blows required for penetration from 6 to 18 inches is the Standard Penetration Resistance (N). | | |
| <u>COBBLES AND BOULDERS</u> | | |
| The percentage of cobbles and boulders is estimated visually where possible. | | |
| <u>Descriptive Term</u> | <u>Estimated Percentage</u> | |
| Very Few | 0 - 10% | |
| Few | 10 - 25% | |
| Common | 25 - 40% | |
| Numerous | 40 - 50% | |
| If the percentage cannot be determined, as in a typical test boring, then use "with" to indicate the presence of cobbles and/or boulders. (i.e., gravelly sand with cobbles and boulders). | | |
| <u>FILLS</u> | | |
| The following terminology is used to denote size range of man-made materials within fill deposits: | | |
| <u>Size Range</u> | <u>Comparative Soil Terms</u> | |
| <No. 200 Sieve | Silt - size | |
| No. 200 to 1/4 in. | Sand - size | |
| 1/4 in. to 3 in. | Gravel - size | |
| 3 in. to 12 in. | Cobble - size | |
| >12 in. | Boulder - size | |
| <u>SUPPLEMENTAL SOIL DESCRIPTION TERMINOLOGY</u> | | |
| <u>Term</u> | <u>Example</u> | |
| Seam | Typically 1/16 to 1/2 inch thick | 1/4 inch sand seams |
| Layer | Greater than 1/2 inch thick | 2-inch sand layers |
| Occasional | One or less per foot of thickness | |
| Frequent | More than one per foot of thickness | |
| Interbedded | Alternating soil layers of different composition | |
| Varved | Alternating thin seams of silt and clay | |
| Mottled | Variations in color | |



Project Name: Green Barn Evaluation
 RWG&A Project No. 0851-083-25
 Location: Bangor, Maine
 Client: Gale Associates, Inc.
 RWG&A Representative: Tom Snow
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill with cuttings
 Observed Water Depth: 1.5'

Drilling Co.: New England Boring Contractors
 Drill Rig: Mobile Drill B-53 Track Rig
 Driller Rep.: Brad Enos
 Date Started: 06/09/25
 Date Completed: 06/09/25
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type:

| DEPTH, FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N VALUE | MOISTURE CONTENT % | LAB TESTS |
|------------|--------|---------|--|----------------------|--|-------------|--------------------|-----------------|
| 0 | | S-1 | FILL; Silty sand with gravel, coarse to fine sand, little silt, little fine gravel, brown. | 10 | 1 2 4 | 6 | | |
| | | S-2 | FILL; Sand with silt and gravel, moist to wet, coarse to fine sand, few silt, few coal, slag, and ash like material, black with coal fill. | 6 | 4 3 | 9 | | |
| 5 | | S-3 | SILT (ML); Loose to medium dense, wet, silt, few fine sand, little clay, olive. Pocket Penetrometer: Undrained Shear Strength: Su < 1.5 | 17 | 5 4 4 | 9 | 21.1 | MC GS HYD |
| | | S-4 | | 18 | 4 5 | 17 | 17.6 | MC |
| 10 | | S-5 | SILTY SAND WITH GRAVEL (SM); Dense to very dense, moist, coarse to fine sand, some silt, little gravel, gray. | 11 | 5 8 9 9 12 14 10 11 | 24 | 11.4 | MC |
| 15 | | S-6 | | 14 | 12 15 37 | 52 | 13.9 | MC |
| | | | Bottom of exploration at 16.0'; Auger refusal on possible bedrock or boulder. | | 50/5" | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |

Notes: SPT N-values are uncorrected for hammer energy transfer ratio.



R.W. Gillespie & Associates

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: B-2

Total Depth (ft): 16

Sheet 1 of 1

Project Name: Green Barn Evaluation
 RWG&A Project No. 0851-083-25
 Location: Bangor, Maine
 Client: Gale Associates, Inc.
 RWG&A Representative: Tom Snow
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill with cuttings
 Observed Water Depth: 1.5'

Drilling Co.: New England Boring Contractors
 Drill Rig: Mobile Drill B-53 Track Rig
 Driller Rep.: Brad Enos
 Date Started: 06/09/25
 Date Completed: 06/09/25
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type:

| DEPTH, FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N VALUE | MOISTURE CONTENT % | LAB TESTS |
|------------|--------|---------|--|----------------------|--------------|-------------|--------------------|-----------|
| 0 | | S-1 | FILL; Silty sand with gravel, coarse to fine sand, little silt, little fine gravel, brown. | 16 | 3 | 9 | | |
| | | S-2 | FILL; Sand with silt and gravel, moist to wet, coarse to fine sand, few silt, few coal, slag, and ash like material, black. Becomes some silt. | 8 | 4 | 13 | | |
| | | S-3 | | 10 | 5 | 15 | | |
| 5 | | S-4 | SANDY SILT (ML); Medium dense, wet, silt, some sand, trace to few gravel, olive. | 3 | 6 | 12 | 25.2 | MC |
| | | S-5 | Pocket Penetrometer: Undrained Shear Strength: $S_u < 1.5$ | 20 | 7 | 13 | | |
| | | | | | 4 | | | |
| | | | | | 8 | | | |
| 10 | | | | | 7 | | | |
| | | | | | 6 | | | |
| | | | | | 6 | | | |
| | | | | | 7 | | | |
| | | | | | 9 | | | |
| 15 | | S-6 | SILTY SAND WITH GRAVEL (SM); Dense, moist, coarse to fine sand, some silt, little gravel, gray. | 15 | 8 | 32 | | |
| | | | Bottom of exploration at 16.0'; Auger refusal on possible bedrock or boulder. | | 17 | | | |
| | | | | | 15 | | | |
| | | | | | 50/5" | | | |
| 20 | | | | | | | | |
| | | | | | | | | |
| 25 | | | | | | | | |

Notes: SPT N-values are uncorrected for hammer energy transfer ratio.



Project Name: Green Barn Evaluation
 RWG&A Project No. 0851-083-25
 Location: Bangor, Maine
 Client: Gale Associates, Inc.
 RWG&A Representative: Tom Snow
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill with cuttings
 Observed Water Depth: 1.5'

Drilling Co.: New England Boring Contractors
 Drill Rig: Mobile Drill B-53 Track Rig
 Driller Rep.: Brad Enos
 Date Started: 06/09/25
 Date Completed: 06/09/25
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type:

| DEPTH, FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N VALUE | MOISTURE CONTENT % | LAB TESTS |
|------------|--------|---------|---|----------------------|---------------------------------|-------------|--------------------|-----------|
| 0 | | S-1 | FILL; Silty sand with gravel, coarse to fine sand, little silt, little fine gravel, light brown. | 6 | 5 | 10 | 18.8 | MC GS |
| | | S-2 | FILL; Sand with silt and gravel, some coal, slag, ash like material, black. | 8 | 5 | 7 | | |
| | | S-3 | SILT (ML); Loose to medium dense, wet, silt, some coarse to fine sand, trace fine gravel, trace clay, light brown. Pocket Penetrometer: Undrained Shear Strength: Su < 1.0 | 16 | 2 3 4 4 4 6 5 | 10 | | |
| 5 | | S-4 | SILTY SAND WITH GRAVEL (SM); Medium dense to dense, coarse to fine sand, some silt, few to little gravel, olive. | 10 | 8 15 18 11 | 33 | | |
| 10 | | S-5 | | 14 | 5 5 6 7 | 11 | | |
| 15 | | | Auger grinding on possible weathered bedrock. | | | | | |
| 20 | | | Bottom of exploration at 19.0'; Auger refusal on possible bedrock. | | | | | |
| 25 | | | | | | | | |

Notes: SPT N-values are uncorrected for hammer energy transfer ratio.



Project Name: Green Barn Evaluation
 RWG&A Project No. 0851-083-25
 Location: Bangor, Maine
 Client: Gale Associates, Inc.
 RWG&A Representative: Tom Snow
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill with cuttings
 Observed Water Depth: 1.5'

Drilling Co.: New England Boring Contractors
 Drill Rig: Mobile Drill B-53 Track Rig
 Driller Rep.: Brad Enos
 Date Started: 06/09/25
 Date Completed: 06/09/25
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type:

| DEPTH, FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N VALUE | MOISTURE CONTENT % | LAB TESTS |
|------------|--------|---------|--|----------------------|--------------|-------------|--------------------|-----------|
| 0 | | S-1 | FILL; Silty sand with gravel, moist, coarse to fine sand, some silt, few coal fragments, black. | 16 | 1 | 5 | | |
| | | S-2 | SILT (ML); Loose to medium dense, wet, silt, some coarse to fine sand, trace fine gravel, trace clay, light brown. | 20 | 2 | 7 | | |
| | | S-3 | | 14 | 3 | 26 | | |
| 5 | | S-4 | SILTY SAND WITH GRAVEL (SM); Medium dense to very dense, wet, coarse to fine sand, some silt, olive to gray. | 5 | 4 | 26 | | |
| | | S-5 | | 22 | 6 | 32 | | |
| | | S-6 | | 22 | 6 | 21 | | |
| 10 | | S-7 | | 10 | 8 | 20 | | |
| | | S-8 | | 15 | 13 | 97 | | |
| | | | | 15 | 14 | 50/4" | | |
| 20 | | | Bottom of exploration at 22.0'; Auger refusal on possible bedrock or boulder. | | | | | |
| 25 | | | | | | | | |

Notes: SPT N-values are uncorrected for hammer energy transfer ratio.



Project Name: Green Barn Evaluation
 RWG&A Project No. 0851-083-25
 Location: Bangor, Maine
 Client: Gale Associates, Inc.
 RWG&A Representative: Tom Snow
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill with cuttings
 Observed Water Depth: 1.5'

Drilling Co.: New England Boring Contractors
 Drill Rig: Mobile Drill B-53 Track Rig
 Driller Rep.: Brad Enos
 Date Started: 06/09/25
 Date Completed: 06/09/25
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type:

| DEPTH, FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N VALUE | MOISTURE CONTENT % | LAB TESTS |
|------------|--------|---------|--|----------------------|----------------------------|-------------|--------------------|-----------|
| 0 | | S-1 | FILL; Silty sand with gravel, coarse to fine sand, little silt, little gravel, brown. | 9 | 2 3 4 | 7 | | |
| | | S-2 | FILL; Sand with silt and gravel, moist to wet, coarse to fine sand, few silt, few coal, slag, and ash like material, black. Becomes some silt. | 7 | 4 4 4 | 8 | | |
| 5 | | S-3 | SANDY SILT (ML); Loose to medium dense, wet, silt, some sand, light brown. | 16 | 4 5 4 4 4 5 | 8 | | |
| 10 | | S-4 | SILTY SAND WITH GRAVEL (SM); Medium dense to very dense, coarse to fine sand, some silt, little gravel, olive to gray. | 13 | 5 5 6 9 | 11 | | |
| 15 | | S-5 | | 15 | 7 10 11 13 | 21 | | |
| 20 | | S-6 | | 12 | 15 14 14 | 29 | | |
| 25 | | S-7 | Bottom of exploration at 25.0'; Auger refusal on possible bedrock or boulder. | 6 | 23 50/5" | 50+ | | |

Notes: SPT N-values are uncorrected for hammer energy transfer ratio.



Project Name: Green Barn Evaluation
 RWG&A Project No. 0851-083-25
 Location: Bangor, Maine
 Client: Gale Associates, Inc.
 RWG&A Representative: Tom Snow
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill with cuttings
 Observed Water Depth: 1.5'

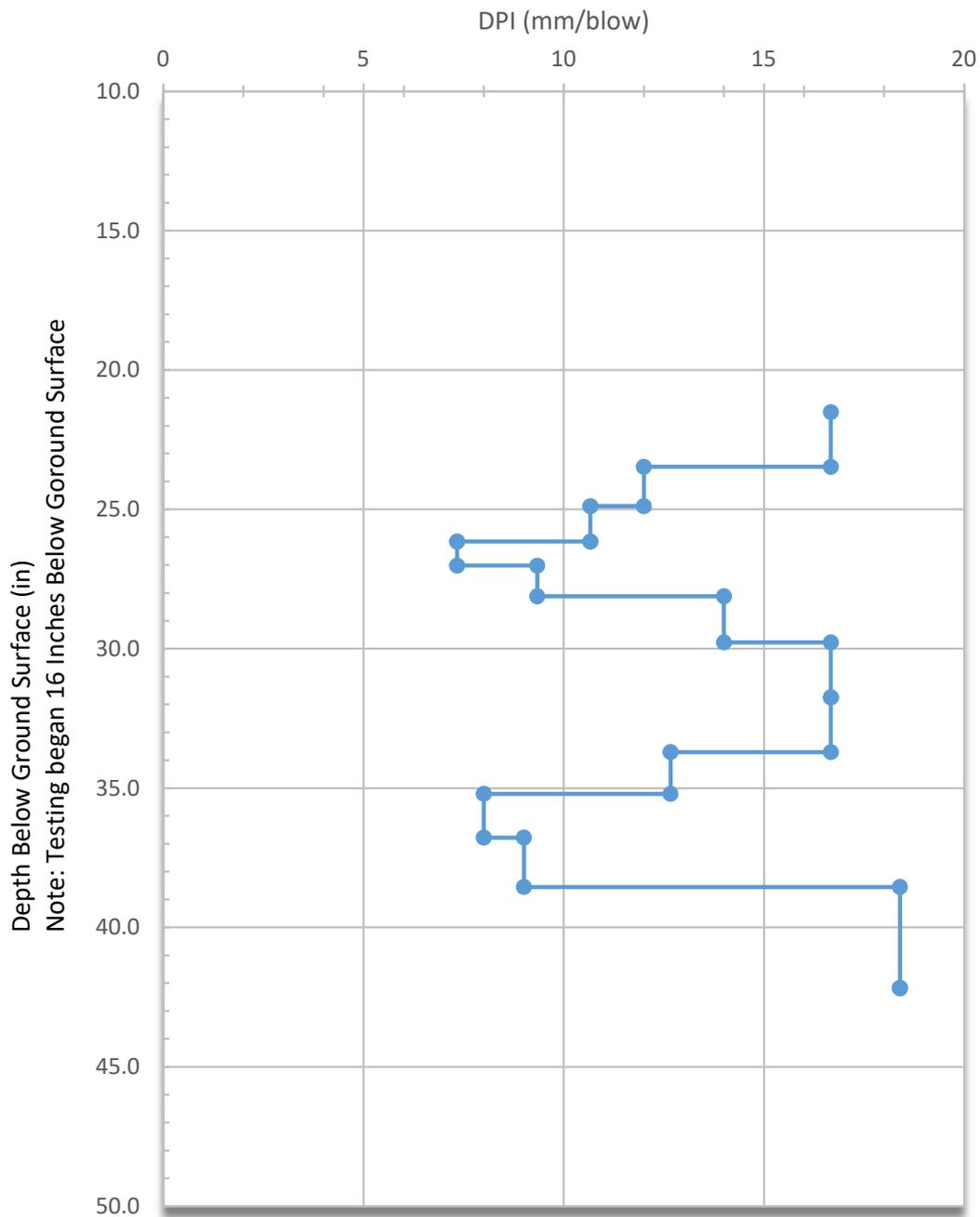
Drilling Co.: New England Boring Contractors
 Drill Rig: Mobile Drill B-53 Track Rig
 Driller Rep.: Brad Enos
 Date Started: 06/09/25
 Date Completed: 06/09/25
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type:

| DEPTH, FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N VALUE | MOISTURE CONTENT % | LAB TESTS |
|------------|--------|---------|--|----------------------|--------------|-------------|--------------------|-----------|
| 0 | | S-1 | 3 inch concrete slab. | 6 | | | | |
| | | S-2 | FILL; Silty sand with gravel, moist to wet, coarse to fine sand, little silt, little gravel, few coal, slag, and ash like material, black. | 6 | | | | |
| | | S-3 | SILTY SAND (SM); Wet, coarse to fine sand, little to some silt, orange to light brown. | 6 | | | | |
| 5 | | | Bottom of exploration at 3.5'; Not refusal. | | | | | |
| 10 | | | | | | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |

Notes: SPT N-values are uncorrected for hammer energy transfer ratio.

Dynamic Cone Penetrometer DPI vs Depth

Project: **Green Barn Evaluation**
Project Number: **0851-083**
Location: **DCP-1 at HA-1**
Date: **09 June 2025**

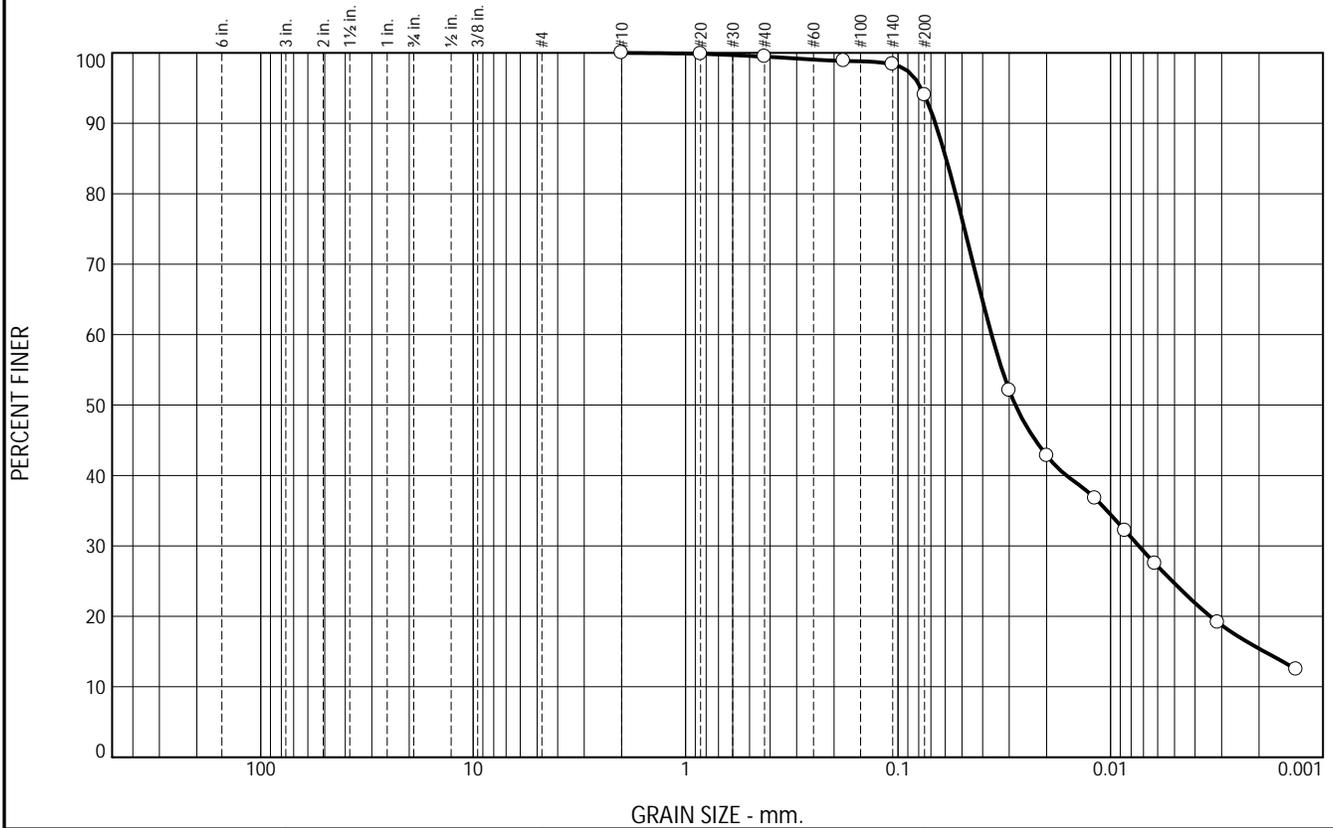


APPENDIX C

LABORATORY TEST RESULTS

Geotechnical Engineering Evaluation Report
Green Barn Evaluation
Bangor, Maine

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 5.5 | 78.6 | 15.4 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| #10 | 100.0 | | |
| #20 | 99.9 | | |
| #40 | 99.5 | | |
| #80 | 98.9 | | |
| #140 | 98.4 | | |
| #200 | 94.0 | | |
| 0.0300 mm. | 52.1 | | |
| 0.0199 mm. | 42.8 | | |
| 0.0118 mm. | 36.8 | | |
| 0.0085 mm. | 32.2 | | |
| 0.0062 mm. | 27.5 | | |
| 0.0031 mm. | 19.1 | | |
| 0.0013 mm. | 12.5 | | |

Soil Description

silt

Atterberg Limits

PL= LL= PI=

Coefficients

D₉₀= 0.0667 D₈₅= 0.0594 D₆₀= 0.0363
D₅₀= 0.0280 D₃₀= 0.0074 D₁₅= 0.0019
D₁₀= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Moisture Content: 21.1%

* (no specification provided)

Location: B-1
Sample Number: S-3 Depth: 4-6'

Date: 06/24/2025

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Gale Associates, Inc. Project: Green Barn Evaluation Bangor, ME Project No: 0851-083 Lab No. 18552-01 |
|---|---|

Tested By: WCD/FMG

Checked By: CAG

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 24.7 | 13.7 | 23.9 | 18.5 | 19.2 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 3/4" | 100.0 | | |
| 1/2" | 85.8 | | |
| 3/8" | 85.8 | | |
| 1/4" | 78.6 | | |
| #4 | 75.3 | | |
| #10 | 61.6 | | |
| #20 | 47.7 | | |
| #40 | 37.7 | | |
| #80 | 28.4 | | |
| #140 | 22.9 | | |
| #200 | 19.2 | | |

Soil Description

silty sand with gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D₉₀= 15.1563 D₈₅= 8.6484 D₆₀= 1.8079

D₅₀= 0.9827 D₃₀= 0.2107 D₁₅=

D₁₀= C_u= C_c=

Classification

USCS= SM AASHTO= A-1-b

Remarks

Moisture Content: 18.8%

* (no specification provided)

Location: B-3
 Sample Number: S-1 Depth: 0-2'

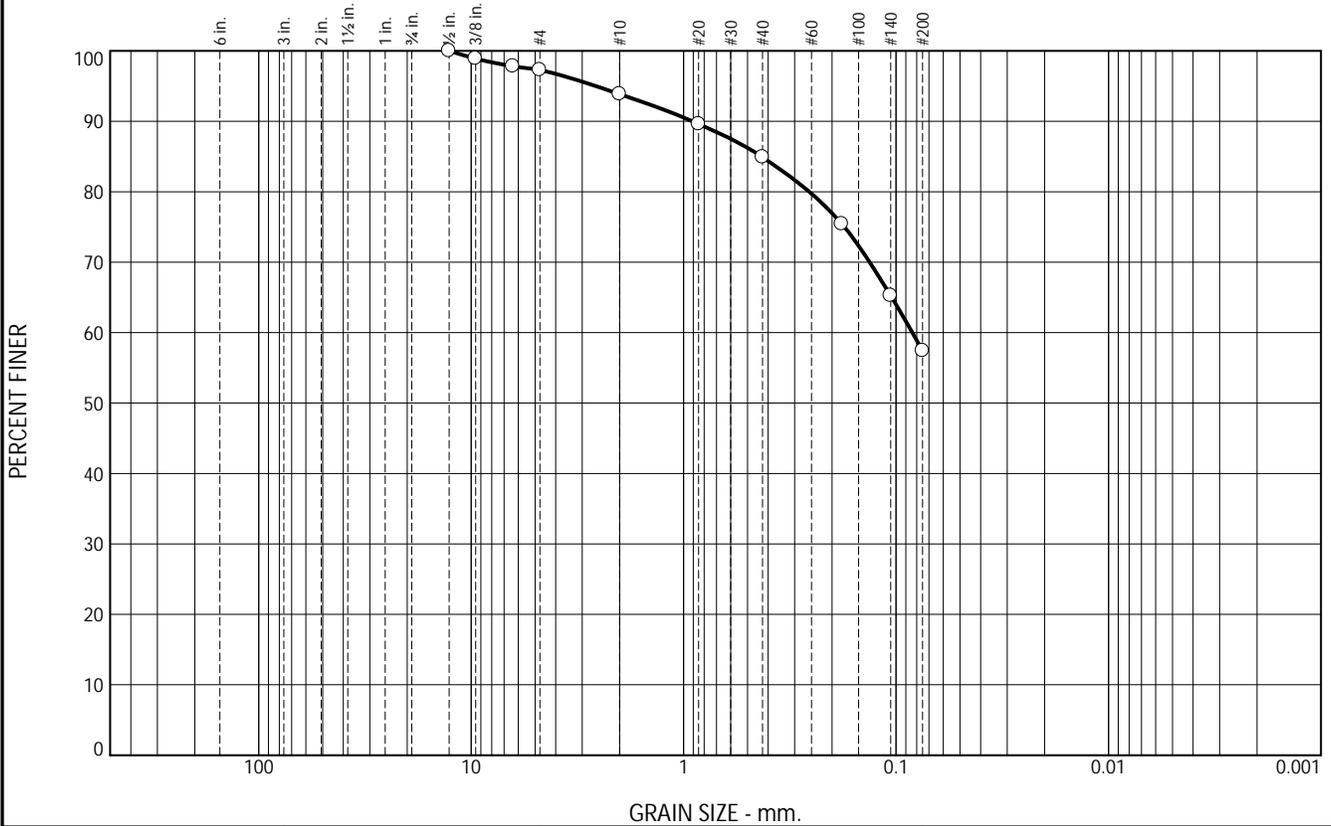
Date: 06/25/2025

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Gale Associates, Inc. Project: Green Barn Evaluation Bangor, ME Project No: 0851-083 Lab No. 18552-03 |
|---|---|

Tested By: SJS/HFS

Checked By: CAG

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 2.7 | 3.4 | 9.0 | 27.5 | 57.4 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1/2" | 100.0 | | |
| 3/8" | 98.9 | | |
| 1/4" | 97.8 | | |
| #4 | 97.3 | | |
| #10 | 93.9 | | |
| #20 | 89.6 | | |
| #40 | 84.9 | | |
| #80 | 75.4 | | |
| #140 | 65.3 | | |
| #200 | 57.4 | | |

Soil Description

sandy silt

Atterberg Limits

PL= LL= PI=

Coefficients

D₉₀= 0.9079 D₈₅= 0.4302 D₆₀= 0.0839

D₅₀= D₃₀= D₁₅=

D₁₀= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Moisture Content: 15.6%

* (no specification provided)

Location: B-4
 Sample Number: S-3 Depth: 4-6'

Date: 06/24/2025

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Gale Associates, Inc. Project: Green Barn Evaluation Bangor, ME Project No: 0851-083 |
| Lab No. 18552-04 | |

Tested By: SJS/HSF

Checked By: CAG

**00 41 13
Contractor Bid Form**

Structural and Building Envelope Upgrades for the Green Barn at Dorthea Dix Psychiatric Center

BGS 3748

Bid Form submitted by: *email only to email address below*

Bid Administrator:

BGS.Architect@Maine.gov

Bureau of General Services
111 Sewall Street, Cross State Office Building, 4th Floor
77 State House Station
Augusta, Maine 04333-0077

Bidder:

Signature: _____

Printed name and
title: _____

Company name: _____

Mailing address: _____

City, state, zip code: _____

Phone number: _____

Email address: _____

State of
incorporation,
if a corporation: _____

List of all partners,
if a partnership: _____

The Bidder agrees, if the Owner offers to award the contract, to provide any and all bonds and certificates of insurance, as well as Schedule of Values, Project Schedule, and List of Subcontractors and Suppliers if required by the Owner, and to sign the designated Construction Contract within twelve calendar days after the date of notification of such acceptance, except if the twelfth day falls on a State of Maine government holiday or other closure day, or a Saturday, or a Sunday, in which case the aforementioned documents must be received before 12:00 noon on the first available business day following the holiday, other closure day, Saturday, or Sunday.

As a guarantee thereof, the Bidder submits, together with this bid, a bid bond or other acceptable instrument as and if required by the Bid Documents.

00 41 13
Contractor Bid Form

1. The Bidder, having carefully examined the *Structural and Building Envelope Upgrades for the Green Barn at Dorthea Dix Psychiatric Center* Project Manual dated *TBD 2026*, prepared by *Gale Associates Inc.*, as well as Specifications, Drawings, and any Addenda, the form of contract, and the premises and conditions relating to the work, proposes to furnish all labor, equipment and materials necessary for and reasonably incidental to the construction and completion of this project for the **Base Bid** amount of:

\$ _____ .00

2. Allowances *are not included* on this project.
No Allowances

\$ 0.00

3. Alternate Bids *are not included* on this project.
Alternate Bids are as shown below
Any dollar amount line below that is left blank by the Bidder shall be read as a bid of **\$0.00**.

1 *Furnish and Install Synthetic Simulate Slate Shingles* \$ _____ .00

2 *insert title of Alternate or "not used"* \$ _____ .00

3 *insert title of Alternate or "not used"* \$ _____ .00

4 *insert title of Alternate or "not used"* \$ _____ .00

4. Bid security *is required* on this project.
If noted above as required, or if the Base Bid amount exceeds \$125,000.00, the Bidder shall include with this bid form a satisfactory Bid Bond (section 00 43 13) or a certified or cashier's check for 5% of the bid amount with this completed bid form submitted to the Owner.

5. Filed Sub-bids *are not required* on this project.
If noted above as required, the Bidder shall include with this bid form a list of each Filed Sub-bidder selected by the Bidder on the form provided (section 00 41 13F).

00 43 13
Contractor Bid Bond

Bond No.: insert bond number

We, the undersigned, insert company name of Contractor, select type of entity of insert name of municipality in the State of insert name of state as principal, and insert name of surety as Surety, are hereby held and firmly bound unto select title of obligee in the penal sum of five percent of the bid amount, for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns, signed this insert date, i.e.: 8th day of select month, select year, which is the same date as that of the first specified bid due date, or subsequent bid due date revised by addendum.

The condition of the above obligation is such that whereas the principal has submitted to the Owner, or State of Maine, to a certain bid, attached hereto and hereby made a part hereof, to enter into a contract in writing, for the construction of insert name of project as designated in the contract documents

Now therefore:

If said bid shall be rejected, or, in the alternate,

If said bid shall be accepted and the principal shall execute and deliver a contract in the form of contract attached hereto, properly completed in accordance with said bid, and shall furnish a bond for the faithful performance of said contract, and for the payment of all persons performing labor or furnishing material in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said bid, then this obligation shall be void.

Otherwise, the same shall remain in force and effect- it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received hereby stipulates and agrees that the obligation of said Surety and its bonds shall be in no way impaired or affected by any extension of the time within which the Obligee may accept such bid and said Surety does hereby waive notice of any such extension.

**00 43 13
Contractor Bid Bond**

In witness whereof, the principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set above.

Signed and sealed this insert date, i.e.: 8th day of select month, select year, which is the same date as that of the first specified bid due date, or subsequent bid due date revised by addendum.

Contractor

(Signature)

insert name and title

insert company name

*insert address
insert city state zip code*

Surety

(Signature)

insert name and title

insert company name

*insert address
insert city state zip code*

If Contractor is a partnership, all partners shall execute the bond. A power of attorney document indicating that it still is in full force and effect shall be provided by the person executing this bond.

**State of Maine
CONSTRUCTION CONTRACT**

Large Construction Project

*This form is used when the Contract value is \$50,000 or greater.
The Project Manual, Specifications and Drawings, and any Addenda are considered part of this Contract.*

Agreement entered into by and between the contracting entity name hereinafter called the **Owner** and Contractor company name hereinafter called the **Contractor**.

BGS Project No.: number assigned by BGS Other Project No.: _____

For the following Project: title of project as shown on bid documents at facility or campus name, municipality, Maine.

The Specifications and the Drawings have been prepared by Consultant firm name, acting as Professional-of-Record and named in the documents as the Consultant Architect or Engineer.

The *Owner* and *Contractor* agree as follows:

ARTICLE 1 COMPENSATION AND PAYMENTS

1.1 The Owner shall pay the Contractor to furnish all labor, equipment, materials and incidentals necessary for the construction of the Work described in the Specifications and shown on the Drawings the Contract Amount as shown below.

| | |
|---|---------------|
| Base Bid | \$0.00 |
| <u>Alternate Bid number and name or "no Alternates"</u> | \$0.00 |
| <u>Alternate Bid number and name or "no Alternates"</u> | \$0.00 |
| <u>Alternate Bid number and name or "no Alternates"</u> | \$0.00 |
| <u>Alternate Bid number and name or "no Alternates"</u> | \$0.00 |
| <u>Alternate Bid number and name or "no Alternates"</u> | \$0.00 |
| Total Contract Amount | \$0.00 |

1.2 The Contractor’s requisition shall contain sufficient detail and supporting information for the Owner to evaluate and support the payment requested.

1.2.1 Payments are due and payable twenty-five working days from the date of receipt of a Contractor requisition which is approved by the Owner.

1.2.2 Provisions for late payments are governed by 5 M.R.S. Chapter 144, *Payment of Invoices Received from Business Concerns*, and interest shall be calculated at 1% per month.

ARTICLE 2 COMMENCEMENT AND COMPLETION DATES

2.1 The Work of this Contract shall commence no sooner than the date this document is executed by the approval authority, or a subsequent date designated in the contract documents.

2.2 The Substantial Completion Date shall be _____.

2.3 The Work of this Contract shall be completed on or before the Contract Final Completion Date of _____.

2.4 The Contract Expiration Date shall be _____. (This date is the Owner's deadline for internal management of contract accounts. The Contract Expiration Date does not directly relate to any contract obligation of the Contractor.)

ARTICLE 3 INELIGIBLE BIDDER

3.1 By signing this contract the Contractor attests that it has not been declared ineligible to bid on State of Maine projects. The Bureau of General Services may disallow award of this contract to any Contractor if there is evidence that the Contractor or any of its Subcontractors, through their own fault, have been terminated, suspended for cause, debarred from bidding, agreed to refrain from bidding as part of a settlement, have defaulted on a contract, or had a contract completed by another party.

3.2 By signing this contract the Contractor attests that it is not presently indicted for or otherwise criminally or civilly charged by a Federal, State or local government entity with commission of any of the following offenses and has not within a three-year period preceding this bid been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction, or contract under a public transaction, violation of Federal or State anti-trust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property.

3.3 The Contractor shall not make any award or permit any award (subgrant or contract) at any tier to any party which is debarred or suspended or is otherwise excluded from or ineligible for participation in Federal assistance programs or State of Maine projects.

ARTICLE 4 CONTRACTOR'S RESPONSIBILITIES

4.1 On this project, the Contractor shall furnish the Owner the appropriate contract bonds in the amount of 100% of the Contract Sum. Contract bonds are mandated if the Contract Sum exceeds \$125,000, or if bonds are specifically required by the Contract Documents.

4.2 The Contractor shall comply with all laws, codes and regulations applicable to the Work.

4.3 The Contractor shall acquire all permits and third-party approvals applicable to the Work not specifically identified as provided by the Owner. Costs for Contractor-provided permits and third-party approvals shall be included in the Contract Sum identified in Section 1.1 above.

4.4 The Contractor shall remain an independent agent for the duration of this Contract, shall not become an employee of the State of Maine, and shall assure that no State employee will be compensated by, or otherwise benefit from, this Contract.

4.5 The Contractor shall be responsible for any design cost, construction cost, or other cost incurred on the Project to the extent caused by the negligent acts, errors or omissions of the Contractor or their Subcontractors in the performance of Work under this Contract.

ARTICLE 5 OWNER'S RESPONSIBILITIES

5.1 The Owner shall provide full information about the objectives, schedule, constraints and existing conditions of the project. The Owner has established a budget with reasonable contingencies that meets the project requirements.

5.2 By signing this contract, the Owner attests that all State of Maine procurement requirements for this contract have been met, including the solicitation of competitive bids.

ARTICLE 6 INSTRUMENTS OF SERVICE

6.1 The Contractor's use of the drawings, specifications and other documents known as the Consultant's Instruments of Service is limited to the execution of the Contractor's scope of work of this project unless the Contractor receives the written consent of the Owner and Consultant for use elsewhere.

ARTICLE 7 MISCELLANEOUS PROVISIONS

7.1 This Contract shall be governed by the laws of the State of Maine.

7.2 The Owner and Contractor, respectively, bind themselves, their partners, successors, assigns and legal representatives to this Contract. Neither party to this Contract shall assign the Contract as a whole without written consent of the other party, which consent the Owner may withhold without cause.

7.3 Notwithstanding any other provision of this Agreement, if the Owner does not receive sufficient funds to fund this Agreement or funds are de-appropriated, or if the Owner does not receive legal authority from the Maine State Legislature or Maine Courts to expend funds intended for this Agreement, then the Owner is not obligated to make payment under this Agreement; provided, however, the Owner shall be obligated to pay for services satisfactorily performed prior to any such non-appropriation in accordance with the termination provisions of this Agreement. The Owner shall timely notify the Contractor of any non-appropriation and the effective date of the non-appropriation.

ARTICLE 8 CONTRACT DOCUMENTS

8.1 The Project Manual, Specifications and Drawings, and any Addenda, together with this agreement, form the contract. Each element is as fully a part of the Contract as if hereto attached or herein repeated.

8.2 Specifications: **indicate date of issuance of project manual**

8.3 Drawings: **note here or attach each sheet number and title**

8.4 Addenda: **note each addenda number and date, or "none"**

00 61 13.13
Contractor Performance Bond

Bond No.: insert bond number

We, the undersigned, insert company name of Contractor, select type of entity of insert name of municipality in the State of insert name of state as principal, and insert name of surety as Surety, are hereby held and firmly bound unto select title of obligee in the penal sum of the Contract Price \$ insert the Contract Price in numbers for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

The condition of the above obligation is such that if the principal shall promptly and faithfully perform the contract entered into this insert date, i.e.: 8th day of select month, select year, which is the same date as that of the notice of intent to award letter, or in the absence of such a letter, not later than the date the Owner signs the construction contract, for the construction of insert name of project as designated in the contract documents, then this obligation shall be null and void.

Otherwise, the same shall remain in force and effect- it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received hereby stipulates and agrees that the obligation of said Surety and its bonds shall be in no way impaired or affected by any extension of the time which the Obligee may accept during the performance of the contract and said Surety does hereby waive notice of any such extension.

00 61 13.13
Contractor Performance Bond

In witness whereof, the principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set above.

Signed and sealed this *insert date, i.e.: 8th* day of *select month, select year*, which is the same date as that of the notice of intent to award letter, or in the absence of such a letter, not later than the date the Owner signs the construction contract.

Contractor

(Signature)

insert name and title

insert company name

insert address

insert city state zip code

Surety

(Signature)

insert name and title

insert company name

insert address

insert city state zip code

If Contractor is a partnership, all partners shall execute the bond. A power of attorney document indicating that it still is in full force and effect shall be provided by the person executing this bond.

00 61 13.16
Contractor Payment Bond

Bond No.: insert bond number

We, the undersigned, insert company name of Contractor, select type of entity of insert name of municipality in the State of insert name of state as principal, and insert name of surety as Surety, are hereby held and firmly bound unto select title of obligee in the penal sum of the Contract Price \$ insert the Contract Price in numbers for the use and benefit of claimants, defined as an entity having a contract with the principal or with a subcontractor of the principal for labor, materials, or both labor and materials, used or reasonably required for use in the performance of the contract, for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

The condition of the above obligation is such that if the principal shall promptly satisfy all claims and demands incurred for all labor and materials, used or required by the principal in connection with the work described in the contract entered into this insert date, i.e.: 8th day of select month, select year, which is the same date as that of the notice of intent to award letter, or in the absence of such a letter, not later than the date the Owner signs the construction contract, for the construction of insert name of project as designated in the contract documents, and shall fully reimburse the obligee for all outlay and expense with said obligee may incur in making good any default of said principal, then this obligation shall be null and void.

Otherwise, the same shall remain in force and effect- it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received hereby stipulates and agrees that the obligation of said Surety and its bonds shall be in no way impaired or affected by any extension of the time which the Obligee may accept during the performance of the contract and said Surety does hereby waive notice of any such extension.

00 61 13.16
Contractor Payment Bond

In witness whereof, the principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set above.

Signed and sealed this *insert date, i.e.: 8th* day of *select month, select year*, which is the same date as that of the notice of intent to award letter, or in the absence of such a letter, not later than the date the Owner signs the construction contract.

Contractor

(Signature)

insert name and title

insert company name

insert address

insert city state zip code

Surety

(Signature)

insert name and title

insert company name

insert address

insert city state zip code

If Contractor is a partnership, all partners shall execute the bond. A power of attorney document indicating that it still is in full force and effect shall be provided by the person executing this bond.

State of Maine
CONSTRUCTION CONTRACT
Application for Payment

Project name
location / school / campus

Application Number: 1

Contractor Company name
address
city state zip code

Period Start Date: 1-Jul-2020
Period End Date: 31-Jul-2020
BGS Project No.: n
Other Project No.: x

Table with 9 rows and 3 columns: Line Item, Description, Amount. Includes items like Original Contract Amount, Net of Change Orders to Date, Contract Sum to Date, Total Completed and Stored to Date, Retainage, Total Earned Less Retainage, Less Previous Approved Applications for Payment, Current Payment Due, and Balance to Finish.

Change Order Summary table with 4 rows and 3 columns: Change Order Summary, Additions, Deductions. Includes rows for Total Changes Approved in Previous Months, Total Changes Approved this Month, Subtotals, and Net of Change Orders to Date.

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information, and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which the previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

Contractor
Type company name here
Type person's name, title here

signature date

In accordance with the Contract Documents, based on on-site observations and the data comprising this Application, the Consultant certifies to the Owner that to the best of the Consultant's knowledge, information, and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the Amount Certified. Amount Certified:

Consultant (Architect or Engineer)
Type firm name here
Type person's name, title here

signature date

Owner
Type contracting entity name here
Type person's name, title here

signature date

Owner's Rep / other - clear this text if not used
Type entity name here
Type person's name, title here

signature date

Bureau of General Services
Type person's name, title here

signature date

00 62 76.01

| | | | | | | | | | |
|--|--------------|-----|-----|-----|-----|-----|------|-----|-----|
| | Total | \$0 | \$0 | \$0 | \$0 | \$0 | 0.0% | \$0 | \$0 |
|--|--------------|-----|-----|-----|-----|-----|------|-----|-----|

**State of Maine
CONSTRUCTION CONTRACT
Change Order**

Project name
location / school / campus

Change Order Number: **1**

Issue Date of this Document: **31-Dec-2022**

Contractor Company name
address
city state zip code

BGS Project No.: **n**
Other Project No.: **x**

Cost Change

Show Deduct as a negative number, e.g.: "-\$850".

| | Add | Deduct | Total |
|--------------------------------------|------------|---------------|--------------|
| Net Amount of this Change Order | \$0 | \$0 | |
| Net Amount of Previous Change Orders | \$0 | \$0 | |
| Net of Change Orders to Date | \$0 | \$0 | \$0 |
| Original Contract Amount | | | \$0 |
| Revised Contract Amount | | | \$0 |

Time Change

Show Deduct as a negative number, e.g.: "-8".

| | Add | Deduct | Total |
|--|------------|---------------|--------------------|
| Net Calendar Days Adjusted by this Change Order | 0 | 0 | |
| Net Calendar Days Adjusted by Previous Change Orders | 0 | 0 | |
| Net of Change Orders to Date | 0 | 0 | 0 |
| Original Contract Final Completion Date | | | 31-Dec-2023 |
| Revised Contract Final Completion Date* | | | 31-Dec-2023 |

Consultant (Architect or Engineer)

Type firm name here
Type person's name, title here

signature date

Contractor

Type company name here
Type person's name, title here

signature date

Owner

Type contracting entity name here
Type person's name, title here

signature date

Type Entity, such as "Owner's Rep", or "not used"

Type entity name here
Type person's name, title here

signature date

Bureau of General Services

Division of Planning, Design & Construction
Type person's name, title here

signature date

Attach the "List of Change Order Items" sheet, plus all supporting documentation for each Change Order Item.

Substantial Completion Date: the deadline for first beneficial use by Owner, as certified by Consultant.

** Contract Final Completion Date : the Contractor's final completion deadline for contract work.*

Contract Expiration Date: the Owner's deadline for internal management of contract accounts;

Contract Expiration Date does not directly relate to any contract obligation of the Contractor.

| |
|--------------------|
| <i>1-Dec-2023</i> |
| <i>31-Dec-2023</i> |
| <i>29-Feb-2024</i> |

List of Change Order Items

Project name

C. O. Number: 1

Contractor Company name

| CO Item No. | CP No. | Item Name | Reason Code | Calendar Days* | Cost |
|---------------|--------|---|-------------|----------------|------------|
| 1 | 1 | Type brief name of Change Order Item here | | 0 | \$0 |
| | | | | 0 | \$0 |
| | | | | 0 | \$0 |
| | | | | 0 | \$0 |
| | | | | 0 | \$0 |
| | | | | 0 | \$0 |
| | | | | 0 | \$0 |
| | | | | 0 | \$0 |
| | | | | 0 | \$0 |
| | | | | 0 | \$0 |
| | | | | 0 | \$0 |
| | | | | 0 | \$0 |
| | | | | 0 | \$0 |
| | | | | 0 | \$0 |
| | | | | 0 | \$0 |
| | | | | 0 | \$0 |
| Totals | | | | 0 | \$0 |

Reason Codes

- EO Error or omission of Consultant
- UC Unforeseen job site condition
- OC Owner-generated change
- RC Regulatory authority-generated change
- CC Contractor-generated change

* Calendar Days shows Contract Final Completion Date impact only.

Attach this sheet to the BGS "Change Order" cover sheet (with cost and time summaries, and signatures). Attach a "Details" sheet, and other supporting documentation, for each Change Order Item listed above.

General Services

Type person's name, title here

signature

date

00 71 00
Definitions

1. Definitions
 - 1.1 *Addendum*: A document issued by the Consultant that amends the Bid Documents. Addenda shall not be issued less than seventy-two hours prior to the specified bid opening time.
 - 1.2 *Allowance*: A specified dollar amount for a particular scope of work or service included in the Work that is identified in the Bid Documents and included in each Bidder's Bid. The Contractor shall document expenditures for an Allowance during the Project. Any unused balance shall be credited to the Owner. The Contractor is responsible for notifying the Owner of anticipated expenses greater than the specified amount and the Owner is responsible for those additional expenses.
 - 1.3 *Alternate Bid*: The Contractor's written offer of a specified dollar amount, submitted on the Bid Form, for the performance of a particular scope of work described in the Bid Documents. The Owner determines the low bidder based on the sum of the base Bid and any combination of Alternate Bids that the Owner selects.
 - 1.4 *Architect*: A Consultant acting as, or supporting, the Professional-of-Record who is responsible for the design of the Project. Equivalent to "Consultant" in State of Maine contract forms.
 - 1.5 *Architectural Supplemental Instruction (ASI)*: A written instruction from the Architect for the purpose of clarification of the Contract Documents. An ASI does not alter the Contract Price or Contract Time. ASIs may be responses to RFIs and shall be issued by the Architect in a timely manner to avoid any negative impact on the Schedule of the Work.
 - 1.6 *Bid*: The Contractor's written offer of a specified dollar amount or amounts, submitted on a form included in the Bid Documents, for the performance of the Work. A Bid may include bonds or other requirements. A base Bid is separate and distinct from Alternate Bids, being the only cost component necessary for the award of the contract, and representing the minimum amount of Work that is essential for the functioning of the Project.
 - 1.7 *Bid Bond*: The security designated in the Bid Documents, furnished by Bidders as a guaranty of good faith to enter into a contract with the Owner, should a contract be awarded to that Bidder.
 - 1.8 *Bidder*: Any business entity, individual or corporation that submits a bid for the performance of the work described in the Bid Documents, acting directly or through a duly authorized representative. See also *Responsive and Responsible Bidder*.
 - 1.9 *Bid Documents*: The drawings, procurement and contracting requirements, general requirements, and the written specifications -including all addenda, that a bidder is required to reference in the submission of a bid.
 - 1.10 *Bureau*: The State of Maine Bureau of General Services, or BGS, in the Department of Administrative and Financial Services.
 - 1.11 *Calendar days*: Consecutive days, as occurring on a calendar, taking into account each day of the week, month, year, and any religious, national or local holidays. Calendar days are used for changes in Contract Time.

00 71 00
Definitions

- 1.12 *Certificate of Substantial Completion*: A document developed by the Consultant that describes the final status of the Work and establishes the date that the Owner may use the facility for its intended purpose. The Certificate of Substantial Completion may also include a provisional list of items - a "punch list" - remaining to be completed by the Contractor. The Certificate of Substantial Completion identifies the date from which the project warranty period commences.
- 1.13 *Certificate of Occupancy*: A document developed by a local jurisdiction such as the Code Enforcement Officer that grants permission to the Owner to occupy a building.
- 1.14 *Change Order (CO)*: A document that modifies the contract and establishes the basis of a specific adjustment to the Contract Price or the Contract Time, or both. Change Orders may address correction of omissions, errors, and document discrepancies, or additional requirements. Change Orders should include all labor, materials and incidentals required to complete the work described. A Change Order is not valid until signed by the Contractor, Owner and Consultant and approved by the Bureau.
- 1.15 *Change Order Proposal (COP) (see also Proposal)*: Contract change proposed by the Contractor regarding the contract amount, requirements, or time. The Contractor implements the work of a COP after it is accepted by all parties. Accepted COPs are incorporated into the contract by Change Order.
- 1.16 *Clerk of the Works*: The authorized representative of the Consultant on the job site. Clerk of the Works is sometimes called the Architect's representative.
- 1.17 *Construction Change Directive (CCD)*: A written order prepared by the Consultant and signed by the Owner and Consultant, directing a change in the Work prior to final agreement with the Contractor on adjustment, if any, in the Contract Price or Contract Time, or both.
- 1.18 *Contract*: A written agreement between the Owner and the successful bidder which obligates the Contractor to perform the work specified in the Contract Documents and obligates the Owner to compensate the Contractor at the mutually accepted sum, rates or prices.
- 1.19 *Contract Bonds (also known as Payment and Performance Bonds)*: The approved forms of security, furnished by the Contractor and their surety, which guarantee the faithful performance of all the terms of the contract and the payment of all bills for labor, materials and equipment by the Contractor.
- 1.20 *Contract Documents*: The drawings and written specifications (including all addenda), Standard General Conditions, and the contract (including all Change Orders subsequently incorporated in the documents).
- 1.21 *Contract Expiration Date*: Date determined by the Owner as a deadline for internal management of contract accounts. This allows time after the Contract Final Completion Date for processing the final Requisition for Payment. The Contract Expiration Date does not directly relate to any contract obligation of the Contractor.
- 1.22 *Contract Final Completion Date*: Point of time when the Work is fully completed in compliance with the Contract Documents, as certified by the Consultant. Final payment to the Contractor is due upon Final Completion of the Project.
- 1.23 *Contract Price*: The dollar amount of the construction contract, also called *Contract Sum*.

00 71 00
Definitions

- 1.24 *Contract Time*: The designated duration of time to execute the Work of the contract, with a specific date for completion.
- 1.25 *Contractor*: Also called the "General Contractor" or "GC" the individual or entity undertaking the execution of the general contract work under the terms of the contract with the Owner, acting directly or through a duly authorized representative. The Contractor is responsible for the means, methods and materials utilized in the execution and completion of the Work.
- 1.26 *Consultant*: The Architect or Engineer acting as Professional-of-Record for the Project. The Consultant is responsible for the design of the Project.
- 1.27 *Drawings*: The graphic and pictorial portion of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.
- 1.28 *Engineer*: A Consultant acting as, or supporting, the Professional-of-Record who is responsible for the design of the Project. Equivalent to "Consultant" in State of Maine contract forms.
- 1.29 *Filed Sub-bid*: The designated major Subcontractor's (or, in some cases, Contractor's) written offer of a specified dollar amount or amounts, submitted on a form included in the Bid Documents, for the performance of a particular portion of the Work. A Filed Sub-bid may include bonds or other requirements.
- 1.30 *General Requirements*: The on-site overhead expense items the Contractor provides for the Project, typically including, but not limited to, building permits, construction supervision, Contract Bonds, insurance, field office, temporary utilities, rubbish removal, and site fencing. Overhead expenses of the Contractor's general operation are not included. Sometimes referred to as the Contractor's General Conditions.
- 1.31 *Owner*: The State agency which is represented by duly authorized individuals. The Owner is responsible for defining the scope of the Project and compensation to the Consultant and Contractor.
- 1.32 *Owner's Representative*: The individual or entity contracted by the Owner to be an advisor and information conduit regarding the Project.
- 1.33 *Overhead*: General and administrative expenses of the Contractor's principal and branch offices, including payroll costs and other compensation of Contractor employees, deductibles paid on any insurance policy, charges against the Contractor for delinquent payments, and costs related to the correction of defective work, and the Contractor's capital expenses, including interest on capital used for the work.
- 1.34 *Performance and Payment Bonds (also known as Contract Bonds)*: The approved forms of security, furnished by the Contractor and their surety, which guarantee the faithful performance of all the terms of the contract and the payment of all bills for labor, materials and equipment by the Contractor.
- 1.35 *Post-Bid Addendum*: Document issued by the Consultant that defines a potential Change Order prior to signing of the construction contract. The Post-Bid Addendum allows the Owner to negotiate

00 71 00
Definitions

contract changes with the Bidder submitting the lowest valid bid, only if the negotiated changes to the Bid Documents result in no change or no increase in the bid price.

A Post-Bid Addendum may also be issued after a competitive construction Bid opening to those Bidders who submitted a Bid initially, for the purpose of rebidding the Project work without re-advertising.

- 1.36 *Project*: The construction project proposed by the Owner to be constructed according to the Contract Documents. The Project, a public improvement, may be tied logistically to other public improvements and other activities conducted by the Owner or other contractors.
- 1.37 *Proposal (see also Change Order Proposal)*: The Contractor's written offer submitted to the Owner for consideration containing a specified dollar amount or rate, for a specific scope of work, and including a schedule impact, if any. A proposal shall include all costs for overhead and profit. The Contractor implements the work of a Proposal after it is accepted by all parties. Accepted Proposals are incorporated into the contract by Change Order.
- 1.38 *Proposal Request (PR)*: An Owner's written request to the Contractor for a Change Order Proposal.
- 1.39 *Punch List*: A document that identifies the items of work remaining to be done by the Contractor at the Close Out of a Project. The Punch List is created as a result of a final inspection of the work only after the Contractor attests that all of the Work is in its complete and permanent status.
- 1.40 *Request For Information (RFI)*: A Contractor's written request to the Consultant for clarification, definition or description of the Work. RFIs shall be presented by the Contractor in a timely manner to avoid any negative impact on the Schedule of the Work.
- 1.41 *Request For Proposal (RFP)*: An Owner's written request to the Contractor for a Change Order Proposal.
- 1.42 *Requisition for Payment*: The document in which the Contractor certifies that the Work described is, to the best of the Contractor's knowledge, information and belief, complete and that all previous payments have been paid by the Contractor to Subcontractors and suppliers, and that the current requested payment is now due. See *Schedule of Values*.
- 1.43 *Responsive and Responsible Bidder*: A bidder who complies, when submitting a bid on a given project, with the following *responsive* standards, as required by the Bid Documents:
- submits specific qualifications to bid the project, if required;
 - attends mandatory pre-bid conferences, if required;
 - submits a bid prior to the close of the bid period;
 - submits a complete bid form;
 - submits a bid without indications of intent contrary to the stated requirements;
 - submits other materials and information, such as bid security, as required;
- and, meets the following minimums regarding these *responsible* standards:
- sustains a satisfactory record of project performance;
 - maintains a permanent place of business in a known physical location;
 - possesses the financial means for short- and long-term operations;
 - possesses the appropriate technical experience and capabilities;
 - employs adequate personnel and subcontractor resources;

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maintains the equipment needed to perform the work;
complies with the proposed implementation schedule;
complies with the insurance and bonding requirements;
provides post-construction warranty coverage;
and other criteria which can be considered relevant to the contract.

- 1.44 *Retainage*: The amount, calculated at five percent (5%) of the contract value or a scheduled value, that the Owner shall withhold from the Contractor until the work or portion of work is declared substantially complete or otherwise accepted by the Owner. The Owner may, if requested, reduce the amount withheld if the Owner deems it desirable and prudent to do so. (See Title 5 M.R.S.A., Section 1746.)
- 1.45 *Sample*: A physical example provided by the Contractor which illustrates materials, equipment or workmanship and establishes standards by which the Work will be judged.
- 1.46 *Schedule of the Work*: The document prepared by the Contractor and approved by the Owner that specifies the dates on which the Contractor plans to begin and complete various parts of the Work, including dates on which information and approvals are required from the Owner.
- 1.47 *Schedule of Values*: The document prepared by the Contractor and approved by the Owner before the commencement of the Work that specifies the dollar values of discrete portions of the Work equal in sum to the contract amount. The Schedule of Values is used to document progress payments of the Work in regular (usually monthly) requisitions for payment. See *Requisition for Payment*.
- 1.48 *Shop Drawings*: The drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.
- 1.49 *Specifications*: The portion of the Contract Documents consisting of the written requirements of the Work for materials, equipment, systems, standards, workmanship, and performance of related services.
- 1.50 *Subcontractor*: An individual or entity undertaking the execution of any part of the Work by virtue of a written agreement with the Contractor or any other Subcontractor. Also, an individual or entity retained by the Contractor or any other Subcontractor as an independent contractor to provide the labor, materials, equipment or services necessary to complete a specific portion of the Work.
- 1.51 *Substantial Completion Date*: Point of time when the Work or a designated portion of the Work is sufficiently complete in compliance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended purpose without unscheduled disruption. Substantial Completion is documented by the date of the Certificate of Substantial Completion signed by the Owner and the Contractor.
- 1.52 *Superintendent*: The representative of the Contractor on the job site, authorized by the Contractor to receive and fulfill instructions from the Consultant.
- 1.53 *Surety*: The individual or entity that is legally bound with the Contractor and Subcontractor to insure the faithful performance of the contract and for the payment of the bills for labor, materials and equipment by the Contractor and Subcontractors.

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- 1.54 *Work*: The construction and services, whether completed or partially completed, including all labor, materials, equipment and services provided or to be provided by the Contractor and Subcontractors to fulfill the requirements of the Project as described in the Contract Documents.

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1. Preconstruction Conference

- 1.1 The Contractor shall, upon acceptance of a contract and prior to commencing work, schedule a preconstruction conference with the Owner and Consultant. The purpose of this conference is as follows.
- 1.1.1 Introduce all parties who have a significant role in the Project, including:
Owner (State agency or other contracting entity)
 Owner's Representative
Consultant (Architect or Engineer)
 Subconsultants
 Clerk-of-the-works
Contractor (GC)
 Superintendent
 Subcontractors
Other State agencies
Construction testing company
Commissioning agent
Special Inspections agent
Bureau of General Services (BGS);
- 1.1.2 Review the responsibilities of each party;
- 1.1.3 Review any previously-identified special provisions of the Project;
- 1.1.4 Review the Schedule of the Work calendar submitted by the Contractor to be approved by the Owner and Consultant;
- 1.1.5 Review the Schedule of Values form submitted by the Contractor to be approved by the Owner and Consultant;
- 1.1.6 Establish routines for Shop Drawing approval, contract changes, requisitions, et cetera;
- 1.1.7 discuss jobsite issues;
- 1.1.8 Discuss Project close-out procedures;
- 1.1.9 Provide an opportunity for clarification of Contract Documents before work begins; and
- 1.1.10 Schedule regular meetings at appropriate intervals for the review of the progress of the Work.

2. Intent and Correlation of Contract Documents

- 2.1 The intent of the Contract Documents is to describe the complete Project. The Contract Documents consist of various components; each component complements the others. What is shown as a requirement by any one component shall be inferred as a requirement on all corresponding components.
- 2.2 The Contractor shall furnish all labor, equipment and materials, tools, transportation, insurance, services, supplies, operations and methods necessary for, and reasonably incidental to, the construction and completion of the Project. Any work that deviates from the Contract Documents which appears to be required by the exigencies of construction or by inconsistencies in the Contract Documents, will be determined by the Consultant and authorized in writing by the Consultant, Owner and the Bureau prior to execution. The Contractor shall be responsible for requesting clarifying information where the intent of the Contract Documents is uncertain.
- 2.3 The Contractor shall not utilize any apparent error or omission in the Contract Documents to the disadvantage of the Owner. The Contractor shall promptly notify the Consultant in writing of such errors or omissions. The Consultant shall make any corrections or clarifications necessary in such a situation to document the true intent of the Contract Documents.

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3. Additional Drawings and Specifications

- 3.1 Upon the written request of the Contractor, the Owner shall provide, at no expense to the Contractor, up to five sets of printed Drawings and Specifications for the execution of the Work.
- 3.2 The Consultant shall promptly furnish to the Contractor revised Drawings and Specifications, for the area of the documents where those revisions apply, when corrections or clarifications are made by the Consultant. All such information shall be consistent with, and reasonably inferred from, the Contract Documents. The Contractor shall do no work without the proper Drawings and Specifications.

4. Ownership of Contract Documents

- 4.1 The designs represented on the Contract Documents are the property of the Consultant. The Drawings and Specifications shall not be used on other work without consent of the Consultant.

5. Permits, Laws, and Regulations

- 5.1 The Owner is responsible for obtaining any zoning approvals or other similar local project approvals necessary to complete the Work, unless otherwise specified in the Contract Documents.
- 5.2 The Owner is responsible for obtaining Maine Department of Environmental Protection, Maine Department of Transportation, or other similar state government project approvals necessary to complete the Work, unless otherwise indicated in the Contract Documents.
- 5.3 The Owner is responsible for obtaining any federal agency project approvals necessary to complete the Work, unless otherwise indicated in the Contract Documents.
- 5.4 The Owner is responsible for obtaining all easements for permanent structures or permanent changes in existing facilities.
- 5.5 The Contractor is responsible for obtaining and paying for all permits and licenses necessary for the implementation of the Work. The Contractor shall notify the Owner of any delays, variance or restrictions that may result from the issuing of permits and licenses.
- 5.6 The Contractor shall comply with all ordinances, laws, rules and regulations and make all required notices bearing on the implementation of the Work. In the event the Contractor observes disagreement between the Drawings and Specifications and any ordinances, laws, rules and regulations, the Contractor shall promptly notify the Consultant in writing. Any necessary changes shall be made as provided in the contract for changes in the work. The Contractor shall not perform any work knowing it to be contrary to such ordinances, laws, rules and regulations.
- 5.7 The Contractor shall comply with local, state and federal regulations regarding construction safety and all other aspects of the Work.
- 5.8 The Contractor shall comply with the Maine Code of Fair Practices and Affirmative Action, 5 M.R.S. §784 (2).

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6. Taxes

- 6.1 The Owner is exempt from the payment of Maine State sales and use taxes as provided in 36 M.R.S. §1760 (1). The Contractor and Subcontractors shall not include taxes on exempt items in the construction contract.
- 6.2 Section 1760 further provides in subsection 61 that sales to a construction contractor or its subcontractor of tangible personal property that is to be physically incorporated in, and become a permanent part of, real property for sale to or owned by the Owner, are exempt from Maine State sales and use taxes. Tangible personal property is defined in 36 M.R.S. §1752 (17).
- 6.3 The Contractor may contact Maine Revenue Services, 24 State House Station, Augusta, Maine 04333 for guidance on tax exempt regulations authorized by 36 M.R.S. §1760 and detailed in Rule 302 (18-125 CMR 302).

7. Labor and Wages

- 7.1 The Contractor shall conform to the labor laws of the State of Maine, and all other laws, ordinances, and legal requirements affecting the work in Maine.
- 7.2 The Consultant shall include a wage determination document prepared by the Maine Department of Labor in the Contract Documents for state-funded contracts in excess of \$50,000. The document shows the minimum wages required to be paid to each category of labor employed on the project.
- 7.3 On projects requiring a Maine wage determination, the Contractor shall submit monthly payroll records to the Owner ("the contracting agency") showing the name and occupation of all workers and all independent contractors employed on the project. The monthly submission must also include the Contractor's company name, the title of the project, hours worked, hourly rate or other method of remuneration, and the actual wages or other compensation paid to each person.
- 7.4 The Contractor shall not reveal, in the payroll records submitted to the Owner, personal information regarding workers and independent contractors, other than the information described above. Such information shall not include Social Security number, employee identification number, or employee address or phone number, for example.
- 7.5 The Contractor shall conform to Maine statute (39-A M.R.S. §105-A (6)) by providing to the Workers' Compensation Board a list of all subcontractors and independent contractors on the job site and a record of the entity to whom that subcontractor or independent contractor is directly contracted and by whom that subcontractor or independent contractor is insured for workers' compensation purposes.
- 7.6 The Contractor shall enforce strict discipline and good order among their employees at all times, and shall not employ any person unfit or unskilled to do the work assigned to them.
- 7.7 The Contractor shall promptly pay all employees when their compensation is due, shall promptly pay all others who have billed and are due for materials, supplies and services used in the Work, and shall promptly pay all others who have billed and are due for insurance, workers compensation coverage, federal and state unemployment compensation, and Social Security

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charges pertaining to this Project. Before final payments are made, the Contractor shall furnish to the Owner affidavits that all such payments described above have been made.

- 7.8 The Contractor may contact the Maine Department of Labor, 54 State House Station, Augusta, Maine 04333 for guidance on labor issues.
- 7.9 The Contractor may contact the Maine Workers' Compensation Board, 27 State House Station, Augusta, Maine 04333 for guidance on workers' compensation issues.

8. Indemnification

- 8.1 The Contractor shall indemnify and hold harmless the Owner and its officers and employees from and against any and all damages, liabilities, and costs, including reasonable attorney's fees, and defense costs, for any and all injuries to persons or property, including claims for violation of intellectual property rights, to the extent caused by the negligent acts or omissions of the Contractor, its employees, agents, officers or subcontractors in the performance of work under this Agreement. The Contractor shall not be liable for claims to the extent caused by the negligent acts or omissions of the Owner or for actions taken in reasonable reliance on written instructions of the Owner.
- 8.2 The Contractor shall notify the Owner promptly of all claims arising out of the performance of work under this Agreement by the Contractor, its employees or agents, officers or subcontractors.
- 8.3 This indemnity provision shall survive the termination of the Agreement, completion of the project or the expiration of the term of the Agreement.

9. Insurance Requirements

- 9.1 The Contractor shall provide, with each original of the signed Contract, an insurance certificate or certificates acceptable to the Owner and BGS. The Contractor shall submit insurance certificates to the Owner and BGS at the commencement of this Contract and at policy renewal or revision dates. The certificates shall identify the project name and BGS project number, and shall name the Owner as certificate holder and as additional insured for general liability and automobile liability coverages. The submitted forms shall contain a provision that coverage afforded under the insurance policies will not be canceled or materially changed unless at least ten days prior written notice by registered letter has been given to the Owner and BGS.
- 9.2 The Owner does not warrant or represent that the insurance required herein constitutes an insurance portfolio which adequately addresses all risks faced by the Contractor or its Subcontractors. The Contractor is responsible for the existence, extent and adequacy of insurance prior to commencement of work. The Contractor shall not allow any Subcontractor to commence work until all similar insurance required of the Subcontractor has been confirmed by the Contractor.
- 9.3 The Contractor shall procure and maintain primary insurance for the duration of the Project and, if written on a Claims-Made basis, shall also procure and maintain Extended Reporting Period (ERP) insurance for the period of time that any claims could be brought. The Contractor shall ensure that all Subcontractors they engage or employ will procure and maintain similar insurance

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in form and amount acceptable to the Owner and BGS. At a minimum, the insurance shall be of the types and limits set forth herein protecting the Contractor from claims which may result from the Contractor's execution of the Work, whether such execution be by the Contractor or by those employed by the Contractor or by those for whose acts they may be liable. All required insurance coverages shall be placed with carriers authorized to conduct business in the State of Maine by the Maine Bureau of Insurance.

9.3.1 The Contractor shall have Workers' Compensation insurance for all employees on the Project site in accordance with the requirements of the Workers' Compensation law of the State of Maine. Minimum acceptable limits for Employer's Liability are:

| | |
|--------------------------------|-------------------------|
| Bodily Injury by Accident..... | \$500,000 |
| Bodily Injury by Disease..... | \$500,000 Each Employee |
| Bodily Injury by Disease..... | \$500,000 Policy Limit |

9.3.2 The Contractor shall have Commercial General Liability insurance providing coverage for bodily injury and property damage liability for all hazards of the Project including premise and operations, products and completed operations, contractual, and personal injury liabilities. The policy shall include collapse and underground coverage as well as explosion coverage if explosion hazards exist. Aggregate limits shall apply on a location or project basis. Minimum acceptable limits are:

| | |
|---|-------------|
| General aggregate limit..... | \$2,000,000 |
| Products and completed operations aggregate | \$1,000,000 |
| Each occurrence limit..... | \$1,000,000 |
| Personal injury aggregate..... | \$1,000,000 |

9.3.3 The Contractor shall have Automobile Liability insurance against claims for bodily injury, death or property damage resulting from the maintenance, ownership or use of all owned, non-owned and hired automobiles, trucks and trailers. Minimum acceptable limit is:
Any one accident or loss\$500,000

9.3.4 For the portion of a project which is new construction, the Contractor shall procure and maintain Builder's Risk insurance naming the Owner, Contractor, and any Subcontractor as insureds as their interest may appear. Covered causes of loss form shall be all Risks of Direct Physical Loss, endorsed to include flood, earthquake, transit and sprinkler leakage where sprinkler coverage is applicable. Unless specifically authorized in writing by the Owner, the limit of insurance shall not be less than the initial contract amount, for the portion of the project which is new construction, and coverage shall apply during the entire contract period and until the work is accepted by the Owner.

9.3.5 The Contractor shall have Owner's Protective Liability insurance for contract values \$50,000 and above, naming the Owner as the Named Insured. Minimum acceptable limits are:
General aggregate limit.....\$2,000,000
Each occurrence limit.....\$1,000,000

10. Contract Bonds

10.1 When noted as required in the Bid Documents, the Contractor shall provide to the Owner a Performance Bond and a Payment Bond, or "contract bonds", upon execution of the contract. Each bond value shall be for the full amount of the contract and issued by a surety company authorized to do business in the State of Maine as approved by the Owner. The bonds shall be

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executed on the forms furnished in the Bid Documents. The bonds shall allow for any subsequent additions or deductions of the contract.

- 10.2 The contract bonds shall continue in effect for one year after final acceptance of the contract to protect the Owner's interest in connection with the one year guarantee of workmanship and materials and to assure settlement of claims for the payment of all bills for labor, materials and equipment by the Contractor.

11. Patents and Royalties

- 11.1 The Contractor shall, for all time, secure for the Owner the free and undisputed right to the use of any patented articles or methods used in the Work. The expense of defending any suits for infringement or alleged infringement of such patents shall be borne by the Contractor. Awards made regarding patent suits shall be paid by the Contractor. The Contractor shall hold the Owner harmless regarding patent suits that may arise due to installations made by the Contractor, and to any awards made as a result of such suits.
- 11.2 Any royalty payments related to the work done by the Contractor for the Project shall be borne by the Contractor. The Contractor shall hold the Owner harmless regarding any royalty payments that may arise due to installations made by the Contractor.

12. Surveys, Layout of Work

- 12.1 The Owner shall furnish all property surveys unless otherwise specified.
- 12.2 The Contractor is responsible for correctly staking out the Work on the site. The Contractor shall employ a competent surveyor to position all construction on the site. The surveyor shall run the axis lines, establish correct datum points and check each line and point on the site to insure their accuracy. All such lines and points shall be carefully preserved throughout the construction.
- 12.3 The Contractor shall lay out all work from dimensions given on the Drawings. The Contractor shall take measurements and verify dimensions of any existing work that affects the Work or to which the Work is to be fitted. The Contractor is solely responsible for the accuracy of all measurements. The Contractor shall verify all grades, lines, levels, elevations and dimensions shown on the Drawings and report any errors or inconsistencies to the Consultant prior to commencing work.

13. Record of Documents

- 13.1 The Contractor shall maintain one complete set of Contract Documents on the jobsite, in good order and current status, for access by the Owner and Consultant.
- 13.2 The Contractor shall maintain, continuously updated, complete records of Requests for Information, Architectural Supplemental Instructions (or equivalent), Information Bulletins, supplemental sketches, Change Order Proposals, Change Orders, Shop Drawings, testing reports, et cetera, for access by the Owner and Consultant.

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14. Allowances

- 14.1 The Contract Price shall include all allowances described in the Contract Documents. The Contractor shall include all overhead and profit necessary to implement each allowance in their Contract Price.
- 14.2 The Contractor shall not be required to employ parties for allowance work against whom the Contractor has a reasonable objection. In such a case, the Contractor shall notify the Owner in writing of their position and shall propose an alternative party to complete the work of the allowance.

15. Shop Drawings

- 15.1 The Contractor shall administer Shop Drawings prepared by the Contractor, Subcontractors, suppliers or others to conform to the approved Schedule of the Work. The Contractor shall verify all field measurements, check and authorize all Shop Drawings and schedules required by the Work. The Contractor is the responsible party and contact for the Contractor's work as well as that of Subcontractors, suppliers or others who provide Shop Drawings.
- 15.2 The Consultant shall review and acknowledge Shop Drawings, with reasonable promptness, for general conformity with the design concept of the project and compliance with the information provided in the Contract Documents.
- 15.3 The Contractor shall provide monthly updated logs containing: requests for information, information bulletins, supplemental instructions, supplemental sketches, change order proposals, change orders, submittals, testing and deficiencies.
- 15.4 The Contractor shall make any corrections required by the Consultant, and shall submit a quantity of corrected copies as may be needed. The acceptance of Shop Drawings or schedules by the Consultant shall not relieve the Contractor from responsibility for deviations from Drawings and Specifications, unless the Contractor has called such deviations to the attention of the Consultant at the time of submission and secured the Consultant's written approval. The acceptance of Shop Drawings or schedules by the Consultant does not relieve the Contractor from responsibility for errors in Shop Drawings or schedules.

16. Samples

- 16.1 The Contractor shall furnish for approval, with reasonable promptness, all samples as directed by the Consultant. The Consultant shall review and approve such samples, with reasonable promptness, for general conformity with the design concept of the project and compliance with the information provided in the Contract Documents. The subsequent work shall be in accord with the approved samples.

17. Substitutions

- 17.1 The Contractor shall furnish items and materials described in the Contract Documents. If the item or material specified describes a proprietary product, or uses the name of a manufacturer, the term "or approved equal" shall be implied, if it is not included in the text. The specific item or material specified establishes a minimum standard for the general design, level of quality, type, function, durability, efficiency, reliability, compatibility, warranty coverage, installation factors

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and required maintenance. The Drawing or written Specification shall not be construed to exclude other manufacturers products of comparable design, quality, and efficiency.

- 17.2 The Contractor may submit detailed information about a proposed substitution to the Consultant for consideration. Particular models of items and particular materials which the Contractor asserts to be equal to the items and materials identified in the Contract Documents shall be allowed only with written approval by the Consultant. The request for substitution shall include a cost comparison and a reason or reasons for the substitution.
- 17.3 The Consultant may request additional information about the proposed substitution. The approval or rejection of a proposed substitution may be based on timeliness of the request, source of the information, the considerations of minimum standards described above, or other considerations. The Consultant should briefly state the rationale for the decision. The decision shall be considered final.
- 17.4 The duration of a substitution review process can not be the basis for a claim for delay in the Schedule of the Work.

18. Assignment of Contract

- 18.1 The Contractor shall not assign or sublet the contract as a whole without the written consent of the Owner. The Contractor shall not assign any money due to the Contractor without the written consent of the Owner.

19. Separate Contracts

- 19.1 The Owner reserves the right to create other contracts in connection with this Project using similar General Conditions. The Contractor shall allow the Owner's other contractors reasonable opportunity for the delivery and storage of materials and the execution of their work. The Contractor shall coordinate and properly connect the Work of all contractors.
- 19.2 The Contractor shall promptly report to the Consultant and Owner any apparent deficiencies in work of the Owner's other contractors that impacts the proper execution or results of the Contractor. The Contractor's failure to observe or report any deficiencies constitutes an acceptance of the Owner's other contractors work as suitable for the interface of the Contractor's work, except for latent deficiencies in the Owner's other contractors work.
- 19.3 Similarly, the Contractor shall promptly report to the Consultant and Owner any apparent deficiencies in their own work that would impact the proper execution or results of the Owner's other contractors.
- 19.4 The Contractor shall report to the Consultant and Owner any conflicts or claims for damages with the Owner's other contractors and settle such conflicts or claims for damages by mutual agreement or arbitration, if necessary, at no expense to the Owner.
- 19.5 In the event the Owner's other contractors sue the Owner regarding any damage alleged to have been caused by the Contractor, the Owner shall notify the Contractor, who shall defend such proceedings at the Contractor's expense. The Contractor shall pay or satisfy any judgment that may arise against the Owner, and pay all other costs incurred.

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20. Subcontracts

- 20.1 The Contractor shall not subcontract any part of this contract without the written permission of the Owner.
- 20.2 The Contractor shall submit a complete list of named Subcontractors and material suppliers to the Consultant and Owner for approval by the Owner prior to commencing work. The Subcontractors named shall be reputable companies of recognized standing with a record of satisfactory work.
- 20.3 The Contractor shall not employ any Subcontractor or use any material until they have been approved, or where there is reason to believe the resulting work will not comply with the Contract Documents.
- 20.4 The Contractor, not the Owner, is as fully responsible for the acts and omissions of Subcontractors and of persons employed by them, as the Contractor is for the acts and omissions of persons directly or indirectly employed by the Contractor.
- 20.5 Neither the Contract Documents nor any Contractor-Subcontractor contract shall indicate, infer or create any direct contractual relationship between any Subcontractor and the Owner.

21. Contractor-Subcontractor Relationship

- 21.1 The Contractor shall be bound to the Subcontractor by all the obligations in the Contract Documents that bind the Contractor to the Owner.
- 21.2 The Contractor shall pay the Subcontractor, in proportion to the dollar value of the work completed and requisitioned by the Subcontractor, the approved dollar amount allowed to the Contractor no more than seven days after receipt of payment from the Owner.
- 21.3 The Contractor shall pay the Subcontractor accordingly if the Contract Documents or the subcontract provide for earlier or larger payments than described in the provision above.
- 21.4 The Contractor shall pay the Subcontractor for completed and requisitioned subcontract work, less retainage, no more than seven days after receipt of payment from the Owner for the Contractor's approved Requisition for Payment, even if the Consultant fails to certify a portion of the Requisition for Payment for a cause not the fault of the Subcontractor.
- 21.5 The Contractor shall not make a claim for liquidated damages or penalty for delay in any amount in excess of amounts that are specified by the subcontract.
- 21.6 The Contractor shall not make a claim for services rendered or materials furnished by the Subcontractor unless written notice is given by the Contractor to the Subcontractor within ten calendar days of the day in which the claim originated.
- 21.7 The Contractor shall give the Subcontractor an opportunity to present and to submit evidence in any progress conference or disputes involving subcontract work.

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- 21.8 The Contractor shall pay the Subcontractor a just share of any fire insurance payment received by the Contractor.
- 21.9 The Subcontractor shall be bound to the Contractor by the terms of the Contract Documents and assumes toward the Contractor all the obligations and responsibilities that the Contractor, by those documents, assumes toward the Owner.
- 21.10 The Subcontractor shall submit applications for payment to the Contractor in such reasonable time as to enable the Contractor to apply for payment as specified.
- 21.11 The Subcontractor shall make any claims for extra cost, extensions of time or damages, to the Contractor in the manner provided in these General Conditions for like claims by the Contractor to the Owner, except that the time for the Subcontractor to make claims for extra cost is seven calendar days after the receipt of Consultant's instructions.
22. Supervision of the Work
- 22.1 During all stages of the Work the Contractor shall have a competent superintendent, with any necessary assistant superintendents, overseeing the project. The superintendent shall not be reassigned without the consent of the Owner unless a superintendent ceases to be employed by the Contractor due to unsatisfactory performance.
- 22.2 The superintendent represents the Contractor on the jobsite. Directives given by the Consultant or Owner to the superintendent shall be as binding as if given directly to the Contractor's main office. All important directives shall be confirmed in writing to the Contractor. The Consultant and Owner are not responsible for the acts or omissions of the superintendent or assistant superintendents.
- 22.3 The Contractor shall provide supervision of the Work equal to the industry's highest standard of care. The superintendent shall carefully study and compare all Contract Documents and promptly report any error, inconsistency or omission discovered to the Consultant. The Contractor may not necessarily be held liable for damages resulting directly from any error, inconsistency or omission in the Contract Documents or other instructions by the Consultant that was not revealed by the superintendent in a timely way.
23. Observation of the Work
- 23.1 The Contractor shall allow the Owner, the Consultant and the Bureau continuous access to the site for the purpose of observation of the progress of the work. All necessary safeguards and accommodations for such observations shall be provided by the Contractor.
- 23.2 The Contractor shall coordinate all required testing, approval or demonstration of the Work. The Contractor shall give sufficient notice to the appropriate parties of readiness for testing, inspection or examination.
- 23.3 The Contractor shall schedule inspections and obtain all required certificates of inspection for inspections by a party other than the Consultant.

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- 23.4 The Consultant shall make all scheduled observations promptly, prior to the work being concealed or buried by the Contractor. If approval of the Work is required of the Consultant, the Contractor shall notify the Consultant of the construction schedule in this regard. Work concealed or buried prior to the Consultant's approval may need to be uncovered at the Contractor's expense.
- 23.5 The Consultant may order reexamination of questioned work, and, if so ordered, the work must be uncovered by the Contractor. If the work is found to conform to the Contract Documents, the Owner shall pay the expense of the reexamination and remedial work. If the work is found to not conform to the Contract Documents, the Contractor shall pay the expense, unless the defect in the work was caused by the Owner's Contractor, whose responsibility the reexamination expense becomes.
- 23.6 The Bureau shall periodically observe the Work during the course of construction and make recommendations to the Contractor or Consultant as necessary. Such recommendations shall be considered and implemented through the usual means for changes to the Work.
24. Consultant's Status
- 24.1 The Consultant represents the Owner during the construction period, and observes the work in progress on behalf of the Owner. The Consultant has authority to act on behalf of the Owner only to the extent expressly provided by the Contract Documents or otherwise demonstrated to the Contractor. The Consultant has authority to stop the work whenever such an action is necessary, in the Consultant's reasonable opinion, to ensure the proper execution of the contract.
- 24.2 The Consultant is the interpreter of the conditions of the contract and the judge of its performance. The Consultant shall favor neither the Owner nor the Contractor, but shall use the Consultant's powers under the contract to enforce faithful performance by both parties.
- 24.3 In the event of the termination of the Consultant's employment on the project prior to completion of the work, the Owner shall appoint a capable and reputable replacement. The status of the new Consultant relative to this contract shall be that of the former Consultant.
25. Management of the Premises
- 25.1 The Contractor shall place equipment and materials, and conduct activities on the premises in a manner that does not unreasonably hinder site circulation, environmental stability, or any long term effect. Likewise, the Consultant's directions shall not cause the use of premises to be impeded for the Contractor or Owner.
- 25.2 The Contractor shall not use the premises for any purpose other than that which is directly related to the scope of work. The Owner shall not use the premises for any purpose incompatible with the proposed work simultaneous to the work of the Contractor.
- 25.3 The Contractor shall enforce the Consultant's instructions regarding information posted on the premises such as signage and advertisements, as well as activities conducted on the premises such as fires, and smoking.

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- 25.4 The Owner may occupy any part of the Project that is completed with the written consent of the Contractor, and without prejudice to any of the rights of the Owner or Contractor. Such use or occupancy shall not, in and of itself, be construed as a final acceptance of any work or materials.
26. Safety and Security of the Premises
- 26.1 The Contractor shall designate, and make known to the Consultant and the Owner, a safety officer whose duty is the prevention of accidents on the site.
- 26.2 The Contractor shall continuously maintain security on the premises and protect from unreasonable occasion of injury all people authorized to be on the job site. The Contractor shall also effectively protect the property and adjacent properties from damage or loss.
- 26.3 The Contractor shall take all necessary precautions to ensure the safety of workers and others on and adjacent to the site, abiding by applicable local, state and federal safety regulations. The Contractor shall erect and continuously maintain safeguards for the protection of workers and others, and shall post signs and other warnings regarding hazards associated with the construction process, such as protruding fasteners, moving equipment, trenches and holes, scaffolding, window, door or stair openings, and falling materials.
- 26.4 The Contractor shall restore the premises to conditions that existed prior to the start of the project at areas not intended to be altered according to the Contract Documents.
- 26.5 The Contractor shall protect existing utilities and exercise care working in the vicinity of utilities shown in the Drawings and Specifications or otherwise located by the Contractor.
- 26.6 The Contractor shall protect from damage existing trees and other significant plantings and landscape features of the site which will remain a permanent part of the site. If necessary or indicated in the Contract Documents, tree trunks shall be boxed and barriers erected to prevent damage to tree branches or roots.
- 26.7 The Contractor shall repair or replace damage to the Work caused by the Contractor's or Subcontractor's forces, including that which is reasonably protected, at the expense of the responsible party.
- 26.8 The Contractor shall not load, or allow to be loaded, any part of the Project with a force which imperils personal or structural safety. The Consultant may consult with the Contractor on such means and methods of construction, however, the ultimate responsibility lies with the Contractor.
- 26.9 The Contractor shall not jeopardize any work in place with subsequent construction activities such as blasting, drilling, excavating, cutting, patching or altering work. The Consultant must approve altering any structural components of the project. The Contractor shall supervise all construction activities carried out by others on site to ensure that the work is neatly done and in a manner that will not endanger the structure or the component parts.
- 26.10 The Contractor may act with their sole discretion in emergency situations that potentially effect health, life or serious damage to the premises or adjacent properties, to prevent such potential loss or injury. The Contractor may negotiate with the Owner for compensation for expenses due to such emergency work.

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- 26.11 The Contractor and Subcontractors shall have no responsibility for the identification, discovery, presence, handling, removal or disposal of, or exposure of persons to, hazardous materials in any form at the project site. The Contractor shall avoid disruption of any hazardous materials or toxic substances at the project site and promptly notify the Owner in writing on the occasion of such a discovery.
- 26.12 The Contractor shall keep the premises free of any unsafe accumulation of waste materials caused by the work. The Contractor shall regularly keep the spaces “broom clean”. See the Close-out of the Work provisions of this section regarding cleaning at the completion of the project.
27. Changes in the Work
- 27.1 The Contractor shall not proceed with extra work without an approved Change Order or Construction Change Directive. A Change Order which has been properly signed by all parties shall become a part of the contract.
- 27.2 A Change Order is the usual document for directing changes in the Work. In certain circumstances, however, the Owner may utilize a Construction Change Directive to direct the Contractor to perform changes in the Work that are generally consistent with the scope of the project. The Owner shall use a Construction Change Directive only when the normal process for approving changes to the Work has failed to the detriment of the Project, or when agreement on the terms of a Change Order cannot be met, or when an urgent situation requires, in the Owner's judgment, prompt action by the Contractor.
- 27.3 The Consultant shall prepare the Construction Change Directive representing a complete scope of work, with proposed Contract Price and Contract Time revisions, if any, clearly stated.
- 27.4 The Contractor shall promptly carry out a Construction Change Directive which has been signed by the Owner and the Consultant. Work thus completed by the Contractor constitutes the basis for a Change Order. Changes in the Contract Price and Contract Time shall be as defined in the Construction Change Directive unless subsequently negotiated with some other terms.
- 27.5 The method of determining the dollar value of extra work shall be by:
- .1 an estimate of the Contractor accepted by Owner as a lump sum, or
 - .2 unit prices named in the contract or subsequently agreed upon, or
 - .3 cost plus a designated percentage, or
 - .4 cost plus a fixed fee.
- 27.6 The Contractor shall determine the dollar value of the extra work for both the lump sum and cost plus designated percentage methods so as not to exceed the following rates. The rates include all overhead and profit expenses.
- .1 Contractor - for any work performed by the Contractor's own forces, up to 20% of the cost;
 - .2 Subcontractor - for work performed by Subcontractor's own forces, up to 20% of the cost;
 - .3 Contractor - for work performed by Contractor's Subcontractor, up to 10% of the amount due the Subcontractor.
- 27.7 The Contractor shall keep and provide records as needed or directed for the cost plus designated percentage method. The Consultant shall review and certify the appropriate amount which

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- includes the Contractor's overhead and profit. The Owner shall make payments based on the Consultant's certificate.
- 27.8 Cost reflected in Change Orders shall be limited to the following: cost of materials, cost of delivery, cost of labor (including Social Security, pension, Workers' Compensation insurance, and unemployment insurance), and cost of rental of power tools and equipment. Labor cost may include a pro-ratio share of a foreman's time only in the case of an extension of contract time granted due to the Change Order.
- 27.9 Overhead reflected in Change Orders shall be limited to the following: bond premium, supervision, wages of clerks, time keepers, and watchmen, small tools, incidental expenses, general office expenses, and all other overhead expenses directly related to the Change Order.
- 27.10 The Contractor shall provide credit to the Owner for labor, materials, equipment and other costs but not overhead and profit expenses for those Change Order items that result in a net value of credit to the contract.
- 27.11 The Owner may change the scope of work of the Project without invalidating the contract. The Owner shall notify the Contractor of a change of the scope of work for the Owner's Contractors, which may affect the work of this Contractor, without invalidating the contract. Change Orders for extension of the time caused by such changes shall be developed at the time of directing the change in scope of work.
- 27.12 The Consultant may order minor changes in the Work, not involving extra cost, which is consistent with the intent of the design or project.
- 27.13 The Contractor shall immediately give written notification to the Consultant of latent conditions discovered at the site which materially differ from those represented in the Drawings or Specifications, and which may eventually result in a change in the scope of work. The Contractor shall suspend work until receiving direction from the Consultant. The Consultant shall promptly investigate the conditions and respond to the Contractor's notice with direction that avoids any unnecessary delay of the Work. The Consultant shall determine if the discovered conditions warrant a Change Order.
- 27.14 The Contractor shall, within ten calendar days of receipt of the information, give written notification to the Consultant if the Contractor claims that instructions by the Consultant will constitute extra cost not accounted for by Change Order or otherwise under the contract. The Consultant shall promptly respond to the Contractor's notice with direction that avoids any unnecessary delay of the Work. The Consultant shall determine if the Contractor's claim warrants a Change Order.
28. Correction of the Work
- 28.1 The Contractor shall promptly remove from the premises all work the Consultant declares is non-conforming to the contract. The Contractor shall replace the work properly at no expense to the Owner. The Contractor is also responsible for the expenses of others whose work was damaged or destroyed by such remedial work.

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- 28.2 The Owner may elect to remove non-conforming work if it is not removed by the Contractor within a reasonable time, that time defined in a written notice from the Consultant. The Owner may elect to store removed non-conforming work not removed by the Contractor at the Contractor's expense. The Owner may, with ten days written notice, dispose of materials which the Contractor does not remove. The Owner may sell the materials and apply the net proceeds, after deducting all expenses, to the costs that should have been borne by the Contractor.
- 28.3 The Contractor shall remedy any defects due to faulty materials or workmanship and pay for any related damage to other work which appears within a period of one year from the date of substantial completion, and in accord with the terms of any guarantees provided in the contract. The Owner shall promptly give notice of observed defects to the Contractor and Consultant. The Consultant shall determine the status of all claimed defects. The Contractor shall perform all remedial work without unjustifiable delay in either the initial response or the corrective action.
- 28.4 The Consultant may authorize, after a reasonable notification to the Contractor, an equitable deduction from the contract amount in lieu of the Contractor correcting non-conforming or defective work.
29. Owner's Right to do Work
- 29.1 The Owner may, using other contractors, correct deficiencies attributable to the Contractor, or complete unfinished work. Such action shall take place only after giving the Contractor three days written notice, and provided the Consultant approves of the proposed course of action as an appropriate remedy. The Owner may then deduct the cost of the remedial work from the amount due the Contractor.
- 29.2 The Owner may act with their sole discretion when the Contractor is unable to take action in emergency situations that potentially effect health, life or serious damage to the premises or adjacent properties, to prevent such potential loss or injury. The Owner shall inform the Contractor of the emergency work performed, particularly where it may affect the work of the Contractor.
30. Termination of Contract and Stop Work Action
- 30.1 The Owner may, owing to a certificate of the Consultant indicating that sufficient cause exists to justify such action, without prejudice to any other right or remedy and after giving the Contractor and the Contractor's surety seven days written notice, terminate the employment of the Contractor. At that time the Owner may take possession of the premises and of all materials,

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tools and appliances on the premises and finish the work by whatever method the Owner may deem expedient. Cause for such action by the Owner includes:

- .1 the contractor is adjudged bankrupt, or makes a general assignment for the benefit of its creditors, or
- .2 a receiver is appointed due to the Contractor's insolvency, or
- .3 the Contractor persistently or repeatedly refuses or fails to provide enough properly skilled workers or proper materials, or
- .4 the Contractor fails to make prompt payment to Subcontractors or suppliers of materials or labor, or
- .5 the Contractor persistently disregards laws, ordinances or the instructions of the Consultant, or is otherwise found guilty of a substantial violation of a provision of the Contract Documents.

- 30.2 The Contractor is not entitled, as a consequence of the termination of the employment of the Contractor as described above, to receive any further payment until the Work is finished. If the unpaid balance of the contract amount exceeds the expense of finishing the Work, including compensation for additional architectural, managerial and administrative services, such balance shall be paid to the Contractor. If the expense of finishing the Work exceeds the unpaid balance, the Contractor shall pay the difference to the Owner. The Consultant shall certify the expense incurred by the Contractor's default. This obligation for payment shall continue to exist after termination of the contract.
- 30.3 The Contractor may, if the Work is stopped by order of any court or other public authority for a period of thirty consecutive days, and through no act or fault of the Contractor or of anyone employed by the Contractor, with seven days written notice to the Owner and the Consultant, terminate this contract. The Contractor may then recover from the Owner payment for all work executed, any proven loss and reasonable profit and damage.
- 30.4 The Contractor may, if the Consultant fails to issue a certificate for payment within seven days after the Contractor's formal request for payment, through no fault of the Contractor, or if the Owner fails to pay to the Contractor within 30 days after submission of any sum certified by the Consultant, with seven days written notice to the Owner and the Consultant, stop the Work or terminate this Contract.

31. Delays and Extension of Time

- 31.1 The completion date of the contract shall be extended if the work is delayed by changes ordered in the work which have approved time extensions, or by an act or neglect of the Owner, the Consultant, or the Owner's Contractor, or by strikes, lockouts, fire, flooding, unusual delay in transportation, unavoidable casualties, or by other causes beyond the Contractor's control. The Consultant shall determine the status of all claimed causes.
- 31.2 The contract shall not be extended for delay occurring more than seven calendar days before the Contractor's claim made in writing to the Consultant. In case of a continuing cause of delay, only one claim is necessary.
- 31.3 The contract shall not be extended due to failure of the Consultant to furnish drawings if no schedule or agreement is made between the Contractor and the Consultant indicating the dates

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which drawings shall be furnished and fourteen calendar days has passed after said date for such drawings.

31.4 This article does not exclude the recovery of damages for delay by either party under other provisions in the Contract Document.

32. Payments to the Contractor

- 32.1 As noted under *Preconstruction Conference* in this section, the Contractor shall submit a Schedule of Values form, before the first application for payment, for approval by the Owner and Consultant. The Consultant may direct the Contractor to provide evidence that supports the correctness of the form. The approved Schedule of Values shall be used as a basis for payments.
- 32.2 The Contractor shall submit an application for each payment (“Requisition for Payment”) on a form approved by the Owner and Consultant. The Consultant may require receipts or other documents showing the Contractor's payments for materials and labor, including payments to Subcontractors.
- 32.3 The Contractor shall submit Requisitions for Payment as the work progresses not more frequently than once each month, unless the Owner approves a more frequent interval due to unusual circumstances. The Requisition for Payment is based on the proportionate quantities of the various classes of work completed or incorporated in the Work, in agreement with the actual progress of the Work and the dollar value indicated in the Schedule of Values.
- 32.4 The Consultant shall verify and certify each Requisition for Payment which appears to be complete and correct prior to payment being made by the Owner. The Consultant may certify an appropriate amount for materials not incorporated in the Work which have been delivered and suitably stored at the site. The Contractor shall submit bills of sale, insurance certificates, or other such documents that will adequately protect the Owner’s interests prior to payments being certified.
- 32.5 In the event any materials delivered but not yet incorporated in the Work have been included in a certified Requisition for Payment with payment made, and said materials thereafter are damaged, deteriorated or destroyed, or for any reason whatsoever become unsuitable or unavailable for use in the Work, the full amount previously allowed shall be deducted from subsequent payments unless the Contractor satisfactorily replaces said material.
- 32.6 The Contractor may request certification of an appropriate dollar amount for materials not incorporated in the Work which have been delivered and suitably stored away from the site. The Contractor shall submit bills of sale, insurance certificates, right-of-entry documents or other such documents that will adequately protect the Owner’s interests. The Consultant shall determine if the Contractor's documentation for the materials is complete and specifically designated for the Project. The Owner may allow certification of such payments.
- 32.7 Subcontractors may request, and shall receive from the Consultant, copies of approved Requisitions for Payment showing the amounts certified in the Schedule of Values.
- 32.8 Certified Requisitions for Payment, payments made to the Contractor, or partial or entire occupancy of the project by the Owner shall not constitute an acceptance of any work that does

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not conform to the Contract Documents. The making and acceptance of the final payment constitutes a waiver of all claims by the Owner, other than those arising from unsettled liens, from faulty work or materials appearing within one year from final payment or from requirements of the Drawings and Specifications, and of all claims by the Contractor, except those previously made and still unsettled.

33. Payments Withheld

- 33.1 The Owner shall retain five percent of each payment due the Contractor as part security for the fulfillment of the contract by the Contractor. The Owner may make payment of a portion of this “retainage” to the Contractor temporarily or permanently during the progress of the Work. The Owner may thereafter withhold further payments until the full amount of the five percent is reestablished. The Contractor may deposit with the Maine State Treasurer certain securities in place of retainage amounts due according to Maine Statute (5 M.R.S. §1746).
- 33.2 The Consultant may withhold or nullify the whole or a portion of any Requisitions for Payment submitted by the Contractor in the amount that may be necessary, in his reasonable opinion, to protect the Owner from loss due to any of the following:
- .1 defective work not remedied;
 - .2 claims filed or reasonable evidence indicating probable filing of claims;
 - .3 failure to make payments properly to Subcontractors or suppliers;
 - .4 a reasonable doubt that the contract can be completed for the balance then unpaid;
 - .5 liability for damage to another contractor.

The Owner shall make payment to the Contractor, in the amount withheld, when the above circumstances are removed.

34. Liens

- 34.1 The Contractor shall deliver to the Owner a complete release of all liens arising out of this contract before the final payment or any part of the retainage payment is released. The Contractor shall provide with the release of liens an affidavit asserting each release includes all labor and materials for which a lien could be filed. Alternately, the Contractor, in the event any Subcontractor or supplier refuses to furnish a release of lien in full, may furnish a bond satisfactory to the Owner, to indemnify the Owner against any lien.
- 34.2 In the event any lien remains unsatisfied after all payments to the Contractor are made by the Owner, the Contractor shall refund to the Owner all money that the latter may be compelled to pay in discharging such lien, including all cost and reasonable attorney’s fees.

35. Workmanship

- 35.1 The Contractor shall provide materials, equipment, and installed work equal to or better than the quality specified in the Contract Documents and approved in submittal and sample. The installation methods shall be of the highest standards, and the best obtainable from the respective trades. The Consultant’s decision on the quality of work shall be final.

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- 35.2 The Contractor shall know local labor conditions for skilled and unskilled labor in order to apply the labor appropriately to the Work. All labor shall be performed by individuals well skilled in their respective trades.
- 35.3 The Contractor shall perform all cutting, fitting, patching and placing of work in such a manner to allow subsequent work to fit properly, whether that be by the Contractor, the Owner's Contractors or others. The Owner and Consultant may advise the Contractor regarding such subsequent work. Notwithstanding the notification or knowledge of such subsequent work, the Contractor may be directed to comply with this standard of compatible construction by the Consultant at the Contractor's expense.
- 35.4 The Contractor shall request clarification or revision of any design work by the Consultant, prior to commencing that work, in a circumstance where the Contractor believes the work cannot feasibly be completed at the highest quality, or as indicated in the Contract Documents. The Consultant shall respond to such requests in a timely way, providing clarifying information, a feasible revision, or instruction allowing a reduced quality of work. The Contractor shall follow the direction of the Consultant regarding the required request for information.
- 35.5 The Contractor shall guarantee the Work against any defects in workmanship and materials for a period of one year commencing with the date of the Certificate of Substantial Completion, unless specified otherwise for specific elements of the project. The Work may also be subdivided in mutually agreed upon components, each defined by a separate Certificate of Substantial Completion.
36. Close-out of the Work
- 36.1 The Contractor shall remove from the premises all waste materials caused by the work. The Contractor shall make the spaces "broom clean" unless a more thorough cleaning is specified. The Contractor shall clean all windows and glass immediately prior to the final inspection, unless otherwise directed.
- 36.2 The Owner may conduct the cleaning of the premises where the Contractor, duly notified by the Consultant, fails to adequately complete the task. The expense of this cleaning may be deducted from the sum due to the Contractor.
- 36.3 The Contractor shall participate in all final inspections and acknowledge the documentation of unsatisfactory work, customarily called the "punch list", to be corrected by the Contractor. The Consultant shall document the successful completion of the Work in a dated Certificate of Substantial Completion, to be signed by Owner, Consultant, and Contractor.
- 36.4 The Contractor shall not call for final inspection of any portion of the Work that is not completely and permanently installed. The Contractor may be found liable for the expenses of individuals called to final inspection meetings prematurely.
- 36.5 The Contractor and all major Subcontractors shall participate in the end-of-warranty-period conference, typically scheduled close to one year after the Substantial Completion date.

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37. Date of Completion and Liquidated Damages

- 37.1 The Contractor may make a written request to the Owner for an extension or reduction of time, if necessary. The request shall include the reasons the Contractor believes justifies the proposed completion date. The Owner may grant the revision of the contract completion date if the Work was delayed due to conditions beyond the control and the responsibility of the Contractor. The Contractor shall not conduct unauthorized accelerated work or file delay claims to recover alleged damages for unauthorized early completion.

- 37.2 The Contractor shall vigorously pursue the completion of the Work and notify the Owner of any factors that have, may, or will affect the approved Schedule of the Work. The Contractor may be found responsible for expenses of the Owner or Consultant if the Contractor fails to make notification of project delays.

- 37.3 The Project is planned to be done in an orderly fashion which allows for an iterative submittal review process, construction administration including minor changes in the Work and some bad weather. The Contractor shall not file delay claims to recover alleged damages on work the Consultant determines has followed the expected rate of progress.

- 37.4 The Consultant shall prepare the Certificate of Substantial Completion which, when signed by the Owner and the Contractor, documents the date of Substantial Completion of the Work or a designated portion of the Work. The Owner shall not consider the issuance of a Certificate of Occupancy by an outside authority a prerequisite for Substantial Completion if the Certificate of Occupancy cannot be obtained due to factors beyond the Contractor’s control.

- 37.5 Liquidated Damages may be deducted from the sum due to the Contractor for each calendar day that the Work remains uncompleted after the completion date specified in the Contract or an approved amended completion date. The dollar amount per day shall be calculated using the Schedule of Liquidated Damages table shown below.

| If the original contract amount is: | The per day Liquidated Damages shall be: |
|---------------------------------------|---|
| Less than \$100,000 | \$250 |
| \$100,000 to less than \$2,000,000 | \$750 |
| \$2,000,000 to less than \$10,000,000 | \$1,500 |
| \$10,000,000 and greater | \$1,500 plus \$250 for each \$2,000,000 over \$10,000,000 |

38. Dispute Resolution

38.1 Mediation

- 38.1.1 A dispute between the parties which arises under this Contract which cannot be resolved through informal negotiation, shall be submitted to a neutral mediator jointly selected by the parties.

- 38.1.2 Either party may file suit before or during mediation if the party, in good faith, deems it to be necessary to avoid losing the right to sue due to a statute of limitations. If suit is filed before good faith mediation efforts are completed, the party filing suit shall agree to stay all proceedings in the lawsuit pending completion of the mediation process, provided such stay is without prejudice.

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38.1.3 In any mediation between the Owner and the Consultant, the Owner has the right to consolidate related claims between Owner and Contractor.

38.2 Arbitration

38.2.1 If the dispute is not resolved through mediation, the dispute shall be settled by arbitration. The arbitration shall be conducted before a panel of three arbitrators. Each party shall select one arbitrator; the third arbitrator shall be appointed by the arbitrators selected by the parties. The arbitration shall be conducted in accordance with the Maine Uniform Arbitration Act (MUAA), except as otherwise provided in this section.

38.2.2 The decision of the arbitrators shall be final and binding upon all parties. The decision may be entered in court as provided in the MUAA.

38.2.3 The costs of the arbitration, including the arbitrators' fees shall be borne equally by the parties to the arbitration, unless the arbitrator orders otherwise.

38.2.4 In any arbitration between the Owner and the Consultant, the Owner has the right to consolidate related claims between Owner and Contractor.

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Wage Determination Schedule

PART 1- GENERAL

1.1 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specifications Sections, apply to this Section.

1.2 Summary

- A. This Section includes the wage determination requirements for Contractors as issued by the State of Maine Department of Labor Bureau of Labor Standards or the United States Department of Labor.

1.3 Requirements

- A. Conform to the wage determination schedule for this project which is shown on the following page.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION (not used)

**State of Maine
Department of Labor
Bureau of Labor Standards
Augusta, Maine 04333-0045
Telephone (207) 623-7906**

Wage Determination - In accordance with 26 MRS §1301 et. seq., this is a determination by the Bureau of Labor Standards, of the fair minimum wage rate to be paid to laborers and workers employed on the below titled project.

2026 Fair Minimum Wage Rates – Building 2 Penobscot County (other than 1 or 2 family homes)

| <u>Occupational Title</u> | <u>Minimum Wage</u> | <u>Minimum Benefit</u> | <u>Total</u> |
|--|---------------------|------------------------|--------------|
| Brickmasons and Blockmasons | \$43.02 | \$7.64 | \$50.66 |
| Bulldozer Operator | \$30.62 | \$5.38 | \$36.00 |
| Carpenter | \$30.01 | \$19.69 | \$49.70 |
| Cement Masons and Concrete Finisher | \$24.42 | \$2.52 | \$26.94 |
| Construction and Maintenance Painters | \$23.96 | \$1.59 | \$25.55 |
| Construction Laborer | \$21.90 | \$19.72 | \$41.62 |
| Conveyor Operators and Tenders | \$30.17 | \$13.77 | \$43.94 |
| Crane and Tower Operators | \$40.43 | \$8.63 | \$49.06 |
| Crushing Grinding and Polishing Machine Operators | \$26.15 | \$3.24 | \$29.39 |
| Earth Drillers - Except Oil and Gas | \$25.04 | \$3.77 | \$28.81 |
| Electrical Power - Line Installer and Repairers | \$48.12 | \$15.63 | \$63.75 |
| Electricians | \$38.74 | \$21.14 | \$59.88 |
| Elevator Installers and Repairers | \$67.34 | \$39.76 | \$107.10 |
| Excavator Operator | \$34.12 | \$6.49 | \$40.61 |
| Fence Erectors | \$30.90 | \$2.18 | \$33.08 |
| Flaggers | \$21.39 | \$0.86 | \$22.25 |
| Floor Layers - Except Carpet/Wood/Hard Tiles | \$29.00 | \$8.65 | \$37.65 |
| Glaziers | \$23.73 | \$4.62 | \$28.35 |
| Hazardous Materials Removal Workers | \$24.12 | \$1.60 | \$25.72 |
| Heating and Air Conditioning and Refrigeration Mechanics and Installers | \$32.88 | \$4.41 | \$37.29 |
| Heavy and Tractor - Trailer Truck Drivers | \$24.44 | \$2.50 | \$26.94 |
| Highway Maintenance Workers | \$23.30 | \$1.14 | \$24.44 |
| Industrial Machinery Mechanics | \$29.97 | \$6.74 | \$36.71 |
| Industrial Truck and Tractor Operators | \$24.61 | \$4.21 | \$28.82 |
| Insulation Worker - Mechanical | \$27.35 | \$6.05 | \$33.40 |
| Light Truck or Delivery Services Drivers | \$26.79 | \$5.14 | \$31.93 |
| Loading Machine and Dragline Operators | \$29.71 | \$4.79 | \$34.50 |
| Millwrights | \$35.99 | \$10.52 | \$46.51 |
| Mobile Heavy Equipment Mechanics - Except Engines | \$30.67 | \$5.10 | \$35.77 |
| Operating Engineers and Other Equipment Operators | \$39.74 | \$3.67 | \$43.41 |
| Paving Surfacing and Tamping Equipment Operators | \$30.74 | \$10.67 | \$41.41 |
| Pile-Driver Operators | \$37.15 | \$3.12 | \$40.27 |
| Pipe/Steam/Sprinkler Fitter | \$43.76 | \$25.44 | \$69.20 |
| Pipelayers | \$28.75 | \$3.64 | \$32.39 |
| Plumbers | \$40.00 | \$24.71 | \$64.71 |
| Radio Cellular and Tower Equipment Installers | \$34.72 | \$5.63 | \$40.35 |
| Reinforcing Iron and Rebar Workers | \$33.35 | \$27.55 | \$60.90 |
| Riggers | \$31.25 | \$7.68 | \$38.93 |
| Roofers | \$24.71 | \$4.70 | \$29.41 |
| Sheet Metal Workers | \$24.97 | \$5.69 | \$30.66 |
| Structural Iron and Steel Workers | \$30.98 | \$7.12 | \$38.10 |
| Tapers | \$29.16 | \$5.64 | \$34.80 |
| Telecommunications Equipment Installers and Repairers - Except Line Installers | \$37.09 | \$10.21 | \$47.30 |
| Telecommunications Line Installers and Repairers | \$28.49 | \$5.29 | \$33.78 |
| Tile and Marble Setters | \$28.91 | \$5.46 | \$34.37 |

Welders are classified as the trade to which welding is incidental (e.g. welding structural steel is Structural Iron and Steel Worker)

Apprentices – The minimum wage rates for registered apprentices are the rates recognized in the sponsorship agreement for registered apprentices working in the pertinent classification.

For any other specific trade on this project not listed above, contact the Bureau of Labor Standards for further clarification.

Title 26 §1310 requires that a clearly legible statement of all fair minimum wage and benefits rates to be paid the several classes of laborers, workers and mechanics employed on the construction on the public work must be kept posted in a prominent and easily accessible place at the site by each contractor and subcontractor subject to sections 1304 to 1313.

Appeal – Any person affected by the determination of these rates may appeal to the Commissioner of Labor by filing a written notice with the Commissioner stating the specific grounds of the objection within ten (10) days from the filing of these rates.

A true copy

Attest: 
Scott R. Cotnoir
Wage & Hour Director
Bureau of Labor Standards

Supersedes 02-03-2025
Effective 01-10-2026

**State of Maine
Department of Labor
Bureau of Labor Standards
Augusta, Maine 04333-0045
Telephone (207) 623-7906**

Wage Determination - In accordance with 26 MRS §1301 et. seq., this is a determination by the Bureau of Labor Standards, of the fair minimum wage rate to be paid to laborers and workers employed on the below titled project.

2026 Fair Minimum Wage Rates – Highway & Earth Penobscot County

| <u>Occupational Title</u> | <u>Minimum Wage</u> | <u>Minimum Benefit</u> | <u>Total</u> |
|--|---------------------|------------------------|--------------|
| Brickmasons and Blockmasons | \$43.02 | \$7.64 | \$50.66 |
| Bulldozer Operator | \$29.19 | \$5.62 | \$34.81 |
| Carpenter | \$33.75 | \$3.55 | \$37.30 |
| Cement Masons and Concrete Finisher | \$24.42 | \$2.52 | \$26.94 |
| Construction and Maintenance Painters | \$32.96 | \$0.45 | \$33.41 |
| Construction Laborer | \$23.02 | \$0.30 | \$23.32 |
| Conveyor Operators and Tenders | \$30.17 | \$13.77 | \$43.94 |
| Crane and Tower Operators | \$40.43 | \$8.63 | \$49.06 |
| Crushing Grinding and Polishing Machine Operators | \$26.15 | \$3.24 | \$29.39 |
| Earth Drillers - Except Oil and Gas | \$25.04 | \$3.77 | \$28.81 |
| Electrical Power - Line Installer and Repairers | \$48.12 | \$15.63 | \$63.75 |
| Electricians | \$50.10 | \$5.18 | \$55.28 |
| Elevator Installers and Repairers | \$67.34 | \$39.76 | \$107.10 |
| Excavator Operator | \$29.33 | \$3.87 | \$33.20 |
| Fence Erectors | \$31.01 | \$3.35 | \$34.36 |
| Flagger | \$21.10 | \$1.06 | \$22.16 |
| Floor Layers - Except Carpet/Wood/Hard Tiles | \$29.00 | \$8.65 | \$37.65 |
| Glaziers | \$37.00 | \$6.60 | \$43.60 |
| Hazardous Materials Removal Workers | \$24.12 | \$1.60 | \$25.72 |
| Heating and Air Conditioning and Refrigeration Mechanics and Installers | \$35.68 | \$5.93 | \$41.61 |
| Heavy and Tractor - Trailer Truck Drivers | \$27.98 | \$3.26 | \$31.24 |
| Highway Maintenance Workers | \$17.02 | \$5.37 | \$22.39 |
| Industrial Machinery Mechanics | \$29.97 | \$6.74 | \$36.71 |
| Industrial Truck and Tractor Operators | \$24.61 | \$4.21 | \$28.82 |
| Insulation Worker - Mechanical | \$27.35 | \$6.05 | \$33.40 |
| Light Truck or Delivery Services Drivers | \$26.79 | \$5.14 | \$31.93 |
| Loading Machine and Dragline Operators | \$26.61 | \$3.68 | \$30.29 |
| Millwrights | \$35.99 | \$10.52 | \$46.51 |
| Mobile Heavy Equipment Mechanics - Except Engines | \$27.93 | \$2.47 | \$30.40 |
| Operating Engineers and Other Equipment Operators | \$24.65 | \$5.07 | \$29.72 |
| Paving Surfacing and Tamping Equipment Operators | \$30.17 | \$13.85 | \$44.02 |
| Pile-Driver Operators | \$37.15 | \$3.12 | \$40.27 |
| Pipe/Steam/Sprinkler Fitter | \$32.33 | \$7.56 | \$39.89 |
| Pipelayers | \$28.75 | \$3.64 | \$32.39 |
| Plumbers | \$34.11 | \$7.80 | \$41.91 |
| Radio Cellular and Tower Equipment Installers | \$34.72 | \$5.63 | \$40.35 |
| Reinforcing Iron and Rebar Workers | \$32.94 | \$20.82 | \$53.76 |
| Riggers | \$31.25 | \$7.68 | \$38.93 |
| Roofers | \$25.50 | \$3.49 | \$28.99 |
| Sheet Metal Workers | \$28.77 | \$7.00 | \$35.77 |
| Structural Iron and Steel Workers | \$30.98 | \$7.12 | \$38.10 |
| Tapers | \$29.16 | \$5.64 | \$34.80 |
| Telecommunications Equipment Installers and Repairers - Except Line Installers | \$37.09 | \$10.21 | \$47.30 |
| Telecommunications Line Installers and Repairers | \$28.49 | \$5.29 | \$33.78 |
| Tile and Marble Setters | \$28.91 | \$5.46 | \$34.37 |

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A true copy

Attest: 
Scott R. Cotnoir
Wage & Hour Director
Bureau of Labor Standards

Supersedes 02-03-2025
Effective 01-10-2026

SECTION 011000

SUMMARY OF WORK

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

- A. In general, the Contractor shall supply all labor, materials, equipment, temporary protection, tools, and appliances necessary for the proper completion of the work, as required in the Specifications, in accordance with good construction practice, and as required by the materials manufacturer. The work includes, but is not limited to, the following items:
- B. The contractor is to perform timber repairs and install all related accessory construction in accordance with the Contract Documents. Any deviations from the Contract Documents are to be reviewed with the Owner and Engineer.
- C. Supply all temporary shoring, lighting, barricades, signage, and protection necessary to protect the building areas, building systems, and building patrons and public. Maintain such protection for the complete duration of the project.
- D. Supply all disposal facilities, transportation and labor necessary to dispose of all demolished materials, dirt, and debris off-site in a legal dumping area. The Contractor shall obtain all permits necessary to transport and dispose of all materials, rubbish, and debris.
- E. Provide temporary fencing around set-up and storage locations. Set-up and lay down areas should be sufficient for all sub-trades to have adequate area to store materials and equipment. Set-up and lay down areas must be within areas designated by the Owner.
- F. Complete all associated work in accordance with the project specifications and Contract Drawings. Coordinate the work with the Owner.
- G. The Contractor shall provide all lifts, cranes, and equipment necessary to access and perform the work.
- H. Remove and replace timber columns and bracing members as indicated on the Contract Drawings.
- I. Remove and replace concrete slab on grade where shown and as described on the Contract Drawings.
- J. Remove and replace concrete foundation footings where shown and as described on the Contract Drawings.
- K. Install new perimeter French drain as indicated on the Contract Drawings.
- L. Remove and dispose of wood deck planking on the existing exterior ramp, including but not limited metal railings and posts, steel brackets and fasteners and replace with all new wood decks planking, including but not limited metal railings and posts, steel brackets and fasteners as indicated on the Contract Drawings.

SUMMARY OF WORK

- M. Remove and dispose of all existing wood clapboard siding, wood trim and mouldings, and associated wood siding components including but not limited to building paper, felts, nails and fasteners, sealants and mastics and replace with new wood clapboard siding, historic replicating wood trim and mouldings, and associated wood siding components including but not limited to weather resistant barriers, window and door membrane flashings, sheet metal flashings, nails, fasteners, sealants and mastics as indicated on the Contract Drawings.
- N. Remove and dispose of all existing natural slate shingles and slate roofing components including but not limited to sheet metal flashings and ridge cap, felt underlayment, nails and fasteners, sealants and mastics and replace with new natural slate shingles, including but not limited to ice and water shield membrane, felt underlayment, drip edge, rake and ridge cap sheet metal flashings, nails and fasteners, and sealants and mastics as indicated on the Contract Drawings.
- O. Remove and dispose of all existing overhead garage doors and garage door components including but not limited to rollers, springs, brackets, fasteners and weatherstripping, and replace them with new overhead garage doors and garage door components including but not limited hardware, rollers, springs, brackets, fasteners and weatherstripping as indicated on the Contract Drawings.
- P. Remove and dispose of the existing passage door, including but not limited to door frame, door hardware, fasteners, sealants and mastics and weatherstripping and replace with new wood aluminum clad passage door, door frame, hardware fasteners, sealants and mastics and weatherstripping as indicated on the Contract Drawings.
- Q. Remove and dispose of all existing sliding and swinging wood barn doors, including but not limited to wood door frames, door hardware, tracks, fasteners and replace with new custom historic replicated sliding and swinging wood barn doors, including but not limited to wood door frames, hardware, tracks and fasteners as indicated on the Contract Drawings.
- R. Remove and dispose of all existing wood windows and glazing, including but not limited to metal screening, wood sash, glass and glazing compound, wood window trim, sheetmetal flashings, fasteners and sealants and replace with new wood aluminum clad windows including but not limited to glass and glazing, wood window trim, flexible self-adhered membrane flashings, sheetmetal flashings, fasteners and sealants as indicated on the Contract Drawings.
- S. All new exterior wood siding, trim, mouldings, and wood barn doors to receive solid wood stain finish as indicated on the Contract Drawings.
- T. All existing exterior wood soffit boards, trim and mouldings to remain shall be stripped of existing paint finish and prepared to receive new solid wood stain finish as indicated on the contract documents.
- U. All new pressure treated wood bridge decking, railings and posts shall receive new semi-transparent stain finish as indicated on the Contract Drawings.

- V. Clean and restore all areas affected by the work, including the site, to the satisfaction of the Owner.

1.02 UNIT PRICES

- A. Technical requirements for related Unit Price work are defined in this section. Refer to Division 01 Section "Unit Prices" for quantities to be carried in the Base Bid and provided on the Bid Form. Any work in addition to those shown on the Contract Drawings shall be either added or deducted based on the unit costs.

1.03 ALTERNATES

- A. Technical requirements for related Alternate work are defined in this section. Refer to Division 01 Section "Alternates" for scope to be carried and provided on the Bid Form.

1.04 SPECIAL JOB CONDITIONS

- A. The building is historic and involves the Maine Historical Preservation Commission (MHPC). Care shall be taken with the work so as not to adversely affect the historic conditions and the historic character of the Barn. The Contractor shall cooperate with MHPC and the Architect with any requests for modifications or corrections to any installed work that do not comply with these Contract Documents or meet historic repair and restoration standards.

1.05 MATERIALS OWNERSHIP

- A. Historic items, relics, and similar objects including, but not limited to, commemorative plaques, antiques, and other items of interest or value to the Owner that may be encountered during selective demolition remain property of the Owner or user Agency as applicable. Carefully remove each item or object in a manner to prevent damage and deliver promptly to a location acceptable to the Owner

1.06 PROJECT CONDITIONS

- A. Contractor to coordinate and strictly follow the Owner's requirements for construction, including interior access and protection requirements. Contractor to obtain a copy from the Owner.
- B. The Contractor will be required to provide their own fall arrest system as required to access and work on the building, as no arrest systems are currently in place.
- C. Provide walk through overhead protection where work areas are above doors, walkways, or sidewalks in accordance with OSHA.
- D. The Contractor shall comply with all requirements of the Owner regarding temporary protection, staging and use of the site.

Structural and Building Envelope Upgrades for the
Green Barn at Dorthea Dix Psychiatric Center
656 State Street - Bangor, ME 04401
Gale JN 843180

- E. All existing items including windows, doors, building, plant life and site features, including but not limited to, pavement, lawns, sidewalks, frames, glazing, flashings, sealants, and trim shall be protected from the effects of all new work. Any damages to existing to remain items resulting from construction will be repaired/replaced by the Contractor at no additional cost to the Owner.
- F. All temporary protection shall be properly secured and able to withstand all perils of weather and use. The contractor to protect the building and grounds.
- G. The Contractor shall supply, install and maintain all barriers; protection or warning lines; lights and lighting; and personnel as required to support the structure, fixtures and facilities affected by the work, and to segregate the work area(s) from pedestrian and/or vehicular traffic, as applicable, as well as to prevent damage to the building, its occupants and the surrounding site elements as required. All applicable OSHA and D.L.I. requirement shall be strictly followed by the Contractor at all times during the performance of the work under this Contract. Refer to Section 01 50 00 - Temporary Facilities for additional information.
- H. The Contractor shall schedule and execute all work without exposing the interior of the buildings to the effects of weather. Protect the buildings and their occupants and users against such risks, at all times during the course of the work hereunder. All work/weather related damage shall be repaired/replaced to the satisfaction of the Owner at no additional cost to the Owner.
- I. The Contractor shall conform to all requirements of this Specification as well as those of all manufacturers of materials used in performing the work hereunder.
- J. All materials and workmanship shall be of the best quality and the highest standard of construction practice. Refer to the requirements of materials manufacturers and the specifications for handling and installation of all materials used in the work under this Contract.
- K. Protect the buildings and site and any other areas not included in the scope of work. The Contractor shall replace or repair all damage to the buildings or site elements because of the performance of the work hereunder to the satisfaction of the Owner at no additional cost to the Owner.
- L. Supply all labor, vacuums, tools, appliances, shoring, supports or other items required to properly support, elevate and protect fixtures, equipment, and facilities affected by the work and to properly install the work.
- M. At the end of each workday, the Contractor shall confirm and make the site safe and secure to all public access to the building's interior.
- N. Remove only as much existing construction as can be completely replaced and made weather tight by the end of each workday including all flashing work. Install temporary barriers during all work breaks as required to protect the public and the work.
- O. A disposal plan, materials delivery and storage plan shall be submitted by the Contractor (for Owner and Engineer review and approval) outlining all methods and techniques to be used in the transportation, storage and delivery of debris and materials at the site.

- P. Supply all necessary disposal facilities, transportation and labor in connection therewith as necessary to legally dispose of all demolished materials, dirt and debris off-site. The Contractor shall obtain all permits required to transport and dispose of all materials rubbish and debris in strict compliance with all legal requirements.
- Q. Any open ducts, grills, thermostats, electric boxes or similar fixtures and/or items which could be soiled or adversely affected by the work shall be masked, protected and cleaned as necessary by the Contractor at no additional cost to the Owner.
- R. Provide an adequate number of skilled workers who are trained and experienced in the necessary crafts and are completely familiar with the specified requirements and the methods needed for proper performance of the work of each trade.
- S. The Contractor shall cooperate, coordinate, and work in harmony with all Contractors working at the site during the course of work hereunder.
- T. Upon completion of the work, all temporary protection installed by the Contractor shall be removed and areas shall be cleaned to the satisfaction of the Owner.

1.04 SUBMITTALS

- A. Emergency Response Contacts
- B. Project Contact Directory
- C. Construction Schedule
- D. Schedule of Values
- E. Safety Plan
- F. Material Data Sheets (MDS)
- G. Safety Data Sheets (SDS)
- H. Refer to technical specification sections for material submittals.

1.05 PRE-CONSTRUCTION CONFERENCE

- A. A Pre-Construction Conference will be held with the Owner, Engineer, Contractor and all involved trades to discuss all aspects of the project. The Contractor's foreman or field representative will attend this Conference. The foreman must be English-speaking. The conference will not be held until all shop drawings and submittals have been received and reviewed by the Owner.
- B. The Owner shall reserve the right to require an alternate Superintendent and/or Foreman.
- C. Delivery of materials and commencement of construction shall not proceed until the preconstruction conference is held. Delays in obtaining a complete set of submittals shall not extend the Contracted completion date.

1.06 REFERENCES

- A. Applicable Publications: Publications listed herein form a part of the Specification to the extent referenced and are indicated in the text by basic designation only. Applicable publications referenced shall be those that were issued and in use at the time of the Bid Submission.

1.07 EMERGENCY RESPONSE

- A. The Contractor shall provide the Owner with after-hours (twenty-four hours [24 hrs.], emergency telephone numbers of the Contractor's Superintendent and Foreman.
- B. The Contractor must respond to emergency situations or calls within two hours (2 hrs.).

1.08 CONSTRUCTION SCHEDULE

- A. The Contractor shall be responsible for coordinating and scheduling all applicable trades as well as the erection of all staging, delivery of materials and disposal of existing materials scheduled to be removed within the time constraints established in the Contract.
- B. The Contractor's Construction Schedule shall clearly identify the on-site crew foreman and the size of the crew to be utilized. The crew size shall remain consistent, and work shall be continuous throughout the project, from start-up to completion.
- C. The Owner shall review the Contractor's Construction Schedule prior to the start of any work. It shall be the responsibility of the Contractor to supply the Owner with written notice, seventy-two hours (72 hrs.) in advance, if his work location(s) for a workday is different from the schedule. The Contractor shall update his Construction Schedule weekly and submit a copy to the Owner for review.

1.09 DIMENSIONS AND QUANTITIES

- A. The Contractor is solely responsible for compliance with the project specifications, plans and drawings. Make necessary investigations and take necessary precautions to properly supply, fabricate, and install work.

1.10 SCHEDULE OF VALUES

- A. Provide a line-item breakdown of construction labor and materials costs for each Specification Section included in these Contract Documents. Itemize units of work, as they will be shown on the Application for Payment (use AIA Form G703). A value of work shall be itemized for each technical section within the Specification.
- B. Utilize AIA Forms G703 and G703A to prepare and submit the Schedule of Values.
- C. Schedule of Values to include all unit costs and allowances within the final construction amount.

1.11 WORK RESTRICTIONS

- A. Contractor shall maintain public driveway access at all times. On-Site Work Hours: Work shall be generally performed during normal business working hours of 7:00 AM to 6:00 PM, Monday through Friday, except otherwise indicated by the Owner.
- B. Contractor shall maintain work areas in an orderly condition and will be responsible for cleanup and removal of debris to the Contractor's dumpster on a daily basis. If, in the opinion of the Owner, cleanup is not being performed satisfactorily, the Owner shall, after twenty-four hours (24 hrs.) of having notified the Contractor of the same, have the work performed by others and all charges incurred thereby deducted from the next progress payment of the Contractor.
- C. Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas where work is directly being performed. Do not disturb portions of the site beyond the areas in which the Work is indicated.
- D. Site Enclosure Fence: Required around perimeter of dumpster and storage/staging areas to enclose and prevent the general public from access.

1.12 PROGRESS MEETINGS

- A. The Owner shall establish a time and date for reoccurring weekly meetings throughout the duration of the construction period, in which the contractor's representative is required to attend. The Owner reserves the right to schedule additional meetings as deemed necessary, and/or change the reoccurring meeting and time.

1.13 MATERIAL SAFETY DATA SHEETS

- A. Material safety data sheets (MSDS) shall be submitted in complete sets for all products to be used prior to any work being performed.

1.14 GUARANTEES

- A. Refer to specific Sections of this specification for systems and product warranty requirements. Verify with Manufacturer of proposed systems and products that specified warranty requirements are acceptable, without exception, prior to selecting materials for use on this project.
- B. Submit a full Contractor Warranty of the Work to be free from defect in materials and workmanship upon Substantial Completion, and prior to final payment. This Warranty shall be for a period of two years (2 yrs.) from the date of Substantial Completion and shall be signed by a Principal of the Contractor's firm and sealed if a Corporation.

1.15 INDEMNIFICATION AND WAIVER OF LIENS

- A. Beginning with the first (1st) Application for Payment and thereafter, the Contractor, and suppliers shall submit an Indemnification and Waiver of Liens for the construction period covered by the previous application on the form attached as part of the required documentation in any application for payment.

1.16 DUST AND ODOR CONTROL

- A. Contractor to coordinate and strictly follow the Owner's requirements for construction and temporary protection to mitigate dust and odor contamination within the interior of the facility.
- B. The Contractor will install clear plastic secured with duct tape over all air intake vents at the beginning of each workday to reduce any construction related odors and dust from entering the building. The Contractor will remove the plastic at the end of the project.
- C. During removal operations, the Contractor shall be responsible for the containment of all dust, dirt, debris, overspray and/or run-off resulting from the performance of the work. The Contractor shall collect and contain all materials and repair any resulting damage to adjacent materials, building and/or site elements and personal property. Specific attention is drawn to the use of chemicals and cleaners that must be used responsibly in strict compliance with manufacturer's requirements and all applicable regulatory guidelines.

1.17 WORK INSIDE THE BUILDING

- A. Contractor to coordinate and strictly follow the Owner's requirements for construction and temporary protection inside the building.
- B. The Contractor shall not leave or store any tools, equipment, materials, debris or other items on or within the building unless permission is given by Owner.
- C. Contractor shall not use building's dumpster for debris associated with this project.

1.18 CLEANUP

- A. Restore property of the Owner to its original condition prior to the completion of construction. Refer to Section 01 50 00 - Temporary Facilities. General cleanup of the site shall be performed on a daily basis.
- B. Clean, restore and/or replace items stained, dirtied, discolored or otherwise damaged due to the Work, as required by the Owner.
- C. Clean roof, building (interior and exterior), landscaped and parking areas so they are free of trash, debris and dirt caused by, or associated with the Work.
- D. Sweep paved areas clean.
- E. Site cleanup shall be performed daily.

1.19 WORK UNDER OTHER CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract. Coordinate the Work of this Contract with work performed under separate contracts.
- B. Separate Contract: The Owner reserves the right to perform construction operations at the site. Those operations may be conducted simultaneously with work under this Contract. No specific projects are planned at this time.

1.20 USE OF PREMISES

- A. General: Contractor shall have full use of the rooftop for construction operations, including limited use of Project site as defined by the Owner, during construction period.
- B. The Contractor is responsible for safety on the job site at all times. The Contractor shall take the appropriate actions to assure the areas of construction are secured from the public. The Contractor shall construct and/or install temporary fencing, signs and barricades as required assuring a safe and secure environment.
- C. Contractor's staging/lay down areas is to be coordinated through an Owner representative. Contractor is responsible for repairing any damage to staging/lay down area. Contractor shall not place trailers, equipment, lay down, storage facilities outside of project site after normal working hours. Contractor shall have no vehicles, trailers, storage containers in any fire lanes or prohibited areas.
- D. Contractor shall not restrict the owner's access to the building's entrances area. If, the Contractor should need to temporarily restrict the owner's access to any areas, the Contractor shall submit a written notice to the Owner seventy-two hours (72 hrs.) in advance of access restriction.
- E. Contractor to supply temporary facilities (toilets).
- F. The Contractor must provide safe assisted means to access the roof from the exterior. Access must be maintained and secure at all times. The access must be locked or restricted during off work hours.
 - 1. Accessing the work areas by climbing or scaling existing obstacles or structures will not be allowed.
 - 2. Accessing the work areas through the interior of the building will not be allowed, there will be exterior access only.

PART 2 – PRODUCTS

NOT USED.

PART 3 – EXECUTION

NOT USED.

END OF SECTION

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SECTION 012200

UNIT PRICES

PART 1 – GENERAL

1.01 IN GENERAL

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section
- B. Examine all other Sections of the Specifications for requirements that impact work of this Section whether or not such work is specially mentioned in this Section.
- C. Coordinate work with that of all other trades impacting or impacted by work of this Section. Cooperate with such trades to ensure the steady progress of all work under the Contract.

1.02 DESCRIPTION

- A. This Section contains instructions and references other Contract Documents that relate to Unit Prices. The Owner may elect certain aspects of the Work, whose quantities cannot be determined at this time, to be performed or deleted by the Contractor. The Unit Price quantities indicated herein should be included in the Base Bid.
- B. A Unit Price is an amount proposed by Bidders and stated on the Bid Form as a price per unit of measurement for materials or services that will be added to or deducted from the Contract Sum by Change Order in the event the estimated quantities of work required by the Contract Documents are increased or decreased.
- C. The successful Bidder shall coordinate related work and modify or adjust adjacent work as necessary to ensure that work impacted by each Unit Price item is complete and fully integrated into the project.
- D. The specific quantities of Unit Price work included in the Base Bid are provided herein. This applies to items whose exact quantities are unknown, but are anticipated to exist, for example, additional deteriorated decking.
- E. The quantities of Unit Price work listed in this Section and the Bid and Contract forms are in addition to the quantities shown on the Contract Drawings.
- F. The Unit Prices requested herein shall include a pro-rata share of all costs for materials, labor, equipment costs, overhead, profit, and applicable taxes.
- G. Where not otherwise specified, Unit Prices cover net costs and credits to the Owner for executing authorized changes in the work. No separate adjustments are made for labor, materials, transportation, handling, storage, overhead, profit, or other related work expenses.

- H. If the Unit Price quantities vary twenty percent greater than (20% >) the amounts carried in the Base Bid, the Owner reserves the right to renegotiate Unit Price costs during the project. The Contractor will be required to notify the Owner's representative once they approach this limit as the work progresses.
- I. Should the Unit Prices referenced in this Section not be used as part of the project, they shall be credited back to the Owner less ten percent (10%) for overhead and profit.
- J. Materials, methods of installation, and definitions of terms set forth under the various Unit Price items in the Schedule of Unit prices shall be as indicated in the Contract Documents.

1.2 APPLICABILITY OF UNIT PRICES

- A. Prior to commencing removal or replacement of materials set forth in the schedule of Unit Prices, the Contractor shall notify the Owner in sufficient time to permit proper inspection and measurements to be taken. Only quantities that have been approved in writing by the Owner will be considered in the determination of adjustments to the Contract Sum.
- B. Unit Price Work includes providing and installing all accessories and appurtenant work necessary to properly execute the Unit Price Work.
- C. Performance of Work not required by the Contract Documents, or which is not authorized by Change Order or Field Order, whether or not such work is set forth hereunder as a Unit Price item, shall not be considered cause for extra payment. The Contractor will be held fully responsible for such unauthorized work, including the performance of all corrective measures required by the Owner.

1.3 VERIFICATION OF UNIT PRICE QUANTITIES

- A. The following minimum procedures must be included by the Contractor for each of the indicated unit repair items for the duration of the project:
- B. Measurement and Payment: Refer to individual specification Sections for Work that requires establishment of Unit Prices and estimated quantities.
- C. Methods of measurement and payment for Unit Prices and estimated quantities are as follows:
 - 1. For Work covered by scheduled quantities, notify the Owner and Designer a minimum of twenty-four hours (24 hrs.) in advance of the performance of such Work.
 - 2. Document such Work in writing, identifying type of Work and the quantity and location of the Work. Promptly submit documentation on the Contractor's letterhead.
 - 3. All documentation of Work covered by scheduled quantities will be subject to verification and approval by the Owner and Designer.
 - 4. Photographic documentation of Unit Price Work with an approximate scaling device, must be performed if an Owner's representative is not available at the time of the work being performed.

5. In order to be considered for payment, documentation for Work covered by scheduled quantities shall be submitted within one month (1 mo.) of performance of such Work. Requests for payment of such Work submitted more than one month (> 1 mo.) after the Work has been performed will not be accepted.
 6. Only documentation signed and verified by the Contractor, trade, and the Owner's representative will be considered valid. Documentation not signed by all these parties will be considered invalid.
- B. The Contractor shall contact the Owner and Designer if a Unit Price quantity is anticipated to be reached prior to exceeding that quantity. No additional costs will be awarded to the Contractor for additional Unit Price Work without written approval from the Owner.
 - C. The Contractor must provide safe, adequate, and ample access for the Owner and Designer to review the Work for verification of the Unit Price Work throughout the course of construction.
 - D. The Contractor is required to track and record actual placed and completed Unit Price Work throughout the course of construction, and to submit a breakdown to the Owner and Designer on a weekly basis, or as requested. The breakdown shall include the following for each Unit Price item:
 1. Completed quantity to date.
 2. Remaining quantity to date.
 3. Percentage of total quantity remaining.

1.4 SCHEDULE OF UNIT PRICES

- A. The Unit Prices listed below are above and beyond that shown on the Contract Drawings and shall be included by the Contractor under the appropriate Base Bid Scope of Work. The Contractor's Schedule of Values will carry each item under the Bid amount selected for this project. Should the Unit Price Work not be performed on this project, the total amount, or remaining amount if portions of Unit Price Work are performed, shall be credited to the Owner as indicated herein.

Base Bid Unit Prices:

| Specification | | | | |
|---------------|--|-----|-------------|----------|
| 06 10 00 | Replacement of deteriorated wood roof deck planking, with new 1 x 6 rough sawn planking. | 500 | Square Feet | \$ _____ |
| 06 10 00 | Replacement of deteriorated wood board wall substrate, with new 1 x 6 rough sawn board. | 300 | Square Feet | \$ _____ |

PART 2 – PRODUCTS

NOT USED.

PART 3 - EXECUTION

NOT USED.

END OF SECTION

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SECTION 012300

ALTERNATES

PART 1 GENERAL

1.01 GENERAL

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. The Bidders shall submit with their Bids, prices for the performance of Alternate Scopes of Work. The scopes of Alternate Work are defined within this section.
- C. The successful Bidder shall coordinate related work and modify or adjust adjacent work as necessary to ensure that work affected by the Alternate is complete and fully integrated into the project.

1.02 BASE BID

- A. The Base Bid shall include all labor, equipment, materials and accessories necessary to perform the work in accordance with the Contract Documents and as described in Section 01 10 00 - Summary of Work.

1.03 SCHEDULE OF ALTERNATES

- A. Alternate Number One (1): Shall include all labor, equipment, materials and accessories necessary to install Synthetic Slate Shingles in lieu of natural slate shingles.
 - 1. Drawing sheets associated with Alternate Number One include, but are not limited to:
 - a. A103 – Roof Plan
 - b. A301 – Details
 - c. A302 – Details
 - 2. Specifications associated with Alternate Number One include, but are not limited to:
 - a. Section 01 10 00 - Summary of Work
 - b. Section 02 41 00 – Selective Demolition
 - c. Section 07 32 29 – Synthetic Slate Shingles and Flashing
 - d. Section 07 62 00 – Sheet Metal Flashing and Trim

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

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SECTION 013300

SHOP DRAWINGS AND SUBMITTALS

PART 1 GENERAL

1.01 IN GENERAL

- A. This section contains instructions for submittals and shop drawings required at various stages of the project. The following submittals will be required of all construction materials and systems:
1. List of materials stating manufacturer's name and address, as well as material trade name and manufacturer's designation.
 2. Shop Drawings.
 3. Samples (as specified in the Technical Sections).
 4. Manufacturer's Catalog Data.
 5. Material Data Sheets (MDS).
 6. Safety Data Sheets (SDS).
 7. Manufacturer's Installation Instructions.
 8. Construction Photographs.
 9. Contractor's Schedule as it affects the contracted completion date and sequence of construction.

1.02 SUBMITTALS

- A. The following submittals are required during the various phases of the Contract. Each submittal item shall have the technical section and paragraph number clearly indicated. All submittal items without the proper designations will be returned and will not be reviewed.
- B. Contract Submissions: The Contractor shall provide electronic copies of the following submittals to the Architect/Engineer:
1. Proposed Construction Schedule for completion of the Work specified in this project manual.
 2. List of Manufacturers for each product proposed. Include manufacturer's literature with system designations and a sample of the product guarantee.
 3. Shop Drawings.
 4. Scaffolding plans.
 5. Temporary Shoring plans.
 6. Complete Materials List.
 7. Manufacturer's Technical Literature as selected.
 8. Manufacturer's Instructions.
 9. Catalog Data ("SPEC-DATA" Sheets).
 10. Material Safety Data Sheets (MDS).
 11. Safety Data Sheets (SDS).

SHOP DRAWINGS AND SUBMITTALS

12. Samples of materials of construction.
 13. Certificates as approved Applicator by Manufacturer.
 14. List of proposed storage facilities and their location(s).
 15. Proposed location(s) of dumpsters.
 16. Schedule of Values.
 17. Emergency Response Contacts.
 18. Disposal Plan and Methods of removal of materials.
 19. Temporary protection procedures.
 20. Staging/set-up procedures.
- C. Weekly Submissions: At the end of each weekly period during construction, the Contractor shall submit an updated construction schedule which will show the status of the work with respect to the schedule, anticipated completion date, and a list of all completed work.
- D. Resubmittals: All resubmittals required from the Contractor shall be submitted within five (5) working days of return of original submittals.
- E. Permits: Prior to start of construction, the Contractor is to provide the Owner with copies of all building permits, licenses, and other documents required by the General Conditions.
- F. Close-Out Submission: See Section 017000 - Project Closeout for required Submittals.
- G. OSHA Requirements: All employees to be employed at the worksite must have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least ten hours (10 hrs.) in duration at the time the employee begins work.

1.03 SHOP DRAWINGS

- A. Original Submittal: An electronic copy of all shop drawings shall be submitted for approval within five (5) days of Award of Contract.
- B. Shop drawings for all aspects of this project shall be submitted. The shop drawings shall include existing conditions, all applicable dimensions, new products to be installed, locations, etc.
- C. Resubmittal: When a resubmittal is required, the original transparency so indicating will be returned to the Contractor. After revision of the original, one (1) new reproducible and one (1) print shall be submitted for review.
- D. Review: The above procedure shall be repeated until approval is obtained. The original reproducible copy of the reviewed shop drawing will be returned to the Contractor, at which time the Contractor shall make prints in sufficient numbers for the Engineer (four [4] copies), as well as sufficient copies for his use.
- E. Shop drawings of an engineering nature shall be sent directly to the Engineer for review, with a copy of the transmittal and one (1) print sent to the Owner.
- F. Transmittal: All reproducibles shall be transmitted rolled in mailing tubes and not folded.

- G. Changes on the submitted shop drawings that deviate from the Design Drawings must be brought to the Owners and Designers attention in writing prior to review. Changes must be clearly visible on the shop drawings in the form of written notation, ballooning or highlighting the intended change. A written description for the proposed change must also be included and submitted on company letterhead. Changes to drawings and details not submitted in accordance with these requirements will not be recognized as an approved deviation from the Design of Record. Construction repairs, renovations or replacements required as a result of shop drawing and submittal deviations that are not documented in accordance with these requirements are subject to removal and/or replacement by the Contractor, at the sole cost of the Contractor.

1.04 RECORD DRAWINGS

- A. The Contractor shall provide a copy of all Contract Drawings showing as-built conditions and any Contract changes to the Owner at the completion of the project.

1.05 SAMPLES

- A. Original Submittal: Four (4) samples, unless otherwise specified, of each item for which samples are required shall be furnished for approval. Approval shall be obtained prior to delivery of the materials to the project site. Such samples shall be representative of the actual material proposed for use in the project and of sufficient size to demonstrate design, color, texture and finish when these attributes will be exposed to view in the finished work.
- B. Resubmittal: All rejected samples will be returned upon request, and any or all resubmittals shall consist of four (4) new samples.
- C. Review: Upon approval by the Engineer, one sample so noted will be returned and the remainder will be retained by the Engineer until completion of the work. When requested, all approved samples will be returned for installation, provided their identity is maintained in an approved manner until final acceptance of the project.
- D. Important specific samples are specified in Technical Sections of the Specifications. The Contractor is cautioned to quickly provide specified samples.
- E. Each submittal item shall have the technical section and paragraph number clearly indicated. All submittal items without the proper designations will be returned and will not be reviewed.

1.06 CATALOG DATA

- A. Submittals: Four (4) copies of catalog data are required for the original submittal and each subsequent resubmittal along with shop drawings. Following review, one (1) copy will be returned with its status noted. If approved, such additional copies may be requested by the Engineer and shall be furnished without additional cost.
- B. Data: Each submittal shall have all pertinent data contained therein that is applicable to the item submitted for review, adequately and permanently designated.

1.07 CERTIFICATES AND GUARANTEES

- A. Certificates of performance, treatment and conformance to specified standards (four [4] printed copies) shall be submitted prior to initiating work on the project.
- B. Copies of all guarantees (four [4] printed copies) required on the project shall be submitted for review and acceptance as to form.

1.08 IDENTIFICATION

- A. Data: All submittals for review shall have the following identification data, as applicable, contained thereon or permanently adhered thereto:
 - 1. Project name and location.
 - 2. Engineer's name.
 - 3. Subcontractor's, Vendor's and/or Manufacturer's name and address.
 - 4. Product Identification. (It is important that the specific product intended for use is indicated on manufacturer's literature).
 - 5. Shop drawing title, drawing number, revision number and date of drawing and revision.
 - 6. Applicable Contract Drawings and Specification Section numbers.
- B. Catalog Data: Each separate catalog, brochure or single page submitted shall have the identification required hereinbefore.
 - 1. Catalogs or brochures submitted containing multiple items for approval need the identification on the exterior and on each specific item clearly circled, flagged or otherwise identified.
 - 2. In the event that one or more of the multiple items are not approved in any submittal, the additional copies required will not be requested until all items are approved.
 - 3. Do not commence work until every submittal is accepted.
- C. Space: Vacant space approximately two- and one-half inches wide by four inches high (2-1/2" W x 4"H) shall be provided adjacent to the identification data to receive the Engineer's status stamp.

1.09 CONTRACTOR'S RESPONSIBILITY

- A. Representation: By his submittal of any shop drawing or catalog data, the Contractor thereby represents that he has determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data, or will do so, and that he has checked and coordinated each item with other applicable approved shop drawings and the Contract requirements. Certification shall appear on each shop drawing stating that the Contractor has made this check. All drawings without this certification will be returned without examination.
- B. Deviations: Changes on the submitted shop drawings that deviate from the Design Drawings must be brought to the Owners and Designers attention in writing prior to review. Changes must be clearly visible on the shop drawings in the form of written notation, ballooning or highlighting the intended change. A written description for the proposed change must also be included and submitted on company letterhead.

Changes to drawings and details not submitted in accordance with these requirements will not be recognized as an approved deviation from the Design of Record. Construction repairs, renovations, or replacements required as a result of shop drawing and submittal deviations that are not documented in accordance with these requirements are subject to removal and/or replacement by the Contractor, at the sole cost of the Contractor.

- C. Prohibitions: No portion of the work requiring a shop drawing, sample or catalog data shall be started, nor shall any materials be fabricated or installed, prior to the approval of such item.
- D. Review: Project work, materials, fabrication and installation shall conform with approved shop drawings, applicable samples and catalog data.
- E. Failure to submit shop drawings in ample time for review, approval and resubmission (if required) prior to the commencement of construction shall not affect the completion date of the Contract.
- F. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Designer's receipt of submittal.
 - 1. Initial Review: Allow **ten (10)** workdays for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. The Engineer will advise the Contractor when a submittal being processed must be delayed for coordination.
 - 2. Concurrent Review: Where concurrent review of submittals by the Engineer's consultants, or other parties is required, allow **ten (10)** workdays for initial review of each submittal.
 - 3. Direct Transmittal to Consultant: Where the Contract Documents indicate that submittals may be transmitted directly to Engineer's consultants, provide duplicate copy of the transmittal to the Engineer. The submittal will be returned to Engineer before being returned to Contractor.
 - 4. If intermediate submittal is necessary, process it in same manner as initial submittal.
 - 5. Allow **ten (10)** workdays for processing each re-submittal.
 - 6. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.
 - 7. The engineer will schedule one working day for submittal review for this project, typically on a Wednesday of each week. Unless a time critical submittal requires immediate attention, all individual, or partial submittal packages will be retained, and not reviewed until multiple items are provided until said designated day. The contractor shall take this into account when scheduling and coordinating submittal and construction activities to prevent delays in their work activities.
 - 8. Multiple individual submittal reviews or incomplete packages are subject to potential back charges to the contractor due to unreasonable review times which may be required. The contractor is to provide complete submittal packages for technical section.

1.10 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Procedures: Comply with procedures required by the Owner.
- B. Time Frame: Extend schedule from date established for commencement of the Work or the Notice to proceed to date of Final Completion.
 - 1. Contractor shall indicate specific dates which may require the Designer's attention to proceed on a critical path.
- C. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than sixty (> 60) days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
- D. Submittal Review Time: Include review and resubmittal times and coordinate with Contractor's Construction Schedule with Submittals Schedule.
- E. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Owner, OPM, Designer's and administrative procedures necessary for certification of Substantial Completion.
- F. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, interim milestones, Substantial Completion, and Final Completion.
- G. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis to demonstrate the effect of the proposed change on the overall project schedule.

1.11 PRELIMINARY CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Within twenty (20) days of written notice to proceed or contract award, submit preliminary horizontal bar-chart-type construction schedule prior to the Preconstruction conference.
- B. Preparation: Indicate each significant construction activity separately. Identify first (1st) workday of each week with a continuous vertical line. Outline significant construction activities for the duration of construction.

1.12 CONTRACTOR'S CONSTRUCTION SCHEDULE, GANTT CHART

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule within twenty (20) days of the Pre-Construction meeting. Base schedule on the Preliminary Construction Schedule and any updates and feedback received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first (1st) workday of each week with a continuous vertical line.

1. For construction activities that require three months (3 mos.) or longer to complete, indicate an estimated completion percentage in twenty percent (20%) increments within time bar.

PART 2 – PRODUCTS

NOT USED.

PART 3 – EXECUTION

NOT USED.

END OF SECTION

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SECTION 014339

MOCKUPS

PART 1 GENERAL

1.01 GENERAL PROVISIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 DESCRIPTION OF WORK

- A. This Section specifies requirements for mockups. Provide and coordinate mockup assemblies at Project site for Designer's and Owner's review and acceptance, in accordance with requirements of the Contract Documents. Refer also to individual specification sections for mockup requirements. Generally, without limitation, mockups on site include the following:
 - 1. Mockups of individual pieces of the work, as specified within the individual specification section.
- B. It shall be the responsibility of the Contractor to coordinate the work of the related Specification Sections so that each mockup meets the specified requirements.
- C. Examine Contract Documents for requirements that affect Work of this Section.

1.03 DEFINITIONS

- A. Freestanding Mockups: Full-size, physical assemblies that are constructed on-site in a protected location.
 - 1. Freestanding mockups are not part of the final construction. Freestanding mockups will be used to verify selections made under sample submittals, to demonstrate aesthetic effects, qualities of materials and execution, and to review construction, coordination, testing, and operation.
 - 2. Approved freestanding mockups establish the standard by which the Work will be judged.
 - 3. Approved freestanding mockups remain on site during the balance of construction and are demolished and removed from site at completion of the Work they represent.
- B. In-Place Mockups: Full-size, physical assemblies that are constructed in-place and remain part of final construction.
 - 1. In-place mockups will be used to verify selections made under sample submittals, to demonstrate aesthetic effects, qualities of materials and execution, and to review construction, coordination, testing, or operation.
 - 2. Approved in-place mockups establish the standard by which the Work will be judged.
 - 3. Approved mockups remain part of the completed Work.

1.04 SUBMITTALS

- A. Schedule: The Contractor shall submit a schedule of mockup construction, including dates for mockup review by the Designer.
 - 1. Mockup schedule shall be reviewed at each progress meeting, revised and resubmitted as required.
 - 2. Schedule shall allow sufficient time for mockups which are not accepted to be reconstructed and reviewed until accepted by the Designer.
- B. Shop Drawings of Mockups: Provide large scale shop drawings for fabrication, installation and erection of all parts of each mockup. Include plans, elevations, and details of anchorage, connections and accessory items. Include details of foundation and temporary supports.
- C. Photographs of Mockups: Submit 20 digital photographs of mockups after completion of installation and acceptance of each mockup. Submit photographs on a thumb drive to the Owner and Designer or upload them to the project's online page.
- D. Submittal Samples: Refer to individual Specification Sections for submittal requirements of mockup components and coordinate accordingly.

1.05 QUALITY ASSURANCE

- A. Mockup Modifications: Make design modifications to work only as required to meet performance requirements and to coordinate the work. Indicate proposed design modifications on shop drawings. Maintain the original design concept without altering profiles and alignments indicated.

PART 2 PRODUCTS

2.01 MATERIALS AND PRODUCTS

- A. Provide materials, components, and products for mockups as specified in individual Specification Sections.

PART 3 EXECUTION

3.01 GENERAL

- A. Refer to individual specification sections for specific requirements regarding condition of surfaces, erection, and erection tolerances.

End of Section

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SECTION 015000

TEMPORARY FACILITIES

PART 1 GENERAL

1.01 GENERAL

- A. This Section contains instructions and requirements for the provision and utilization of temporary facilities to protect the Owner's property, the site and construction materials; and daily maintenance and cleanup of the site during the project.

1.02 STORAGE FACILITIES

- A. See Section 016300 - Weather Protection and Materials Storage

1.03 CONTRACTOR'S USE OF EXISTING FACILITIES

- A. The Contractor shall provide all protection, guards and barriers necessary to segregate the work area and adjacent or below areas from pedestrian and vehicular traffic. Protect existing building, building finishes, landscaping and paved areas from damage.
- B. Limit use of the premises to the work indicated, so as to allow for the Owner's uninterrupted occupancy and use. Confine operations to the areas indicated under the Contract. Conformance to the regulations set forth by the Owner, regarding use of existing facilities is mandatory.
- C. Take precautions necessary and provide equipment, materials and labor to adequately protect previous construction, the building, its contents and occupants, and surrounding landscaped areas from damage due to construction as well as from inclement weather during construction.
- D. Clean interior and exterior areas affected by the construction on a daily basis. Do not allow construction debris, waste materials, tools, excess packaging materials or other construction related materials to accumulate on the roof, in the facility, or at the exterior grounds and pavements.
- E. Coordinate with the Owner for additional interior cleaning and protections required for the work.
- F. See Section 016300 - Weather Protection and Materials Storage for product storage facilities and requirements.

1.04 SANITARY FACILITIES

- A. The Contractor will furnish portable toilets. Temporary toilets shall be kept in a sanitary condition at all times and properly supplied at appropriate locations by the Owner until completion of the project. Use of the sanitary facilities within the building is not permitted.

TEMPORARY FACILITIES

1.05 BARRIERS

- A. The Contractor shall install temporary fencing, warning lines, barriers and the like, as required, to segregate the construction areas from existing facilities, occupants and the public.
- B. All Contractors are required to conform to OSHA requirements and all local, state and federal safety regulations.
- C. The Contractor shall provide guard lights on all barriers and all lighting necessary to prevent vandalism of work and storage areas. The Owner is not responsible for Contractor's losses due to damage or theft by vandals.

1.06 CRANES AND HOISTING EQUIPMENT

- A. All hoisting equipment and machinery required for the proper and expeditious prosecution and progress of the work shall be furnished, installed, operated and maintained in a safe condition by the Contractor. All costs for hoisting operating services shall be borne by the Contractor including street permits and police details.

1.07 ACCESS

- A. Provide ladders, scaffolding, staging and hoists as required to access the project area(s) in accordance with OSHA and D.L.W.D. guidelines. Should damage to the building and/or grounds occur, restore damaged areas to the original condition and clean up debris.
- B. Where scaffolding and staging is required for the proper installation of the work it shall be erected to provide a minimal impact on the site.
- C. All barriers and warning lines shall be installed at the base of any scaffolding or staging and around ground areas below elevated staging.
- D. Provide walk through overhead protection where work areas are above doors, walkways, or sidewalks in accordance with OSHA.
- E. All scaffolding and staging shall be erected in conformance with all applicable state, federal and local codes. The Contractor shall follow all applicable local, state, and federal requirements regarding the construction of scaffolding and staging and the protection of public safety. Specific reference shall be made to the OSHA Construction Safety Regulations and all requirements of the State of Maine Department of Labor.

1.08 SETUP AREAS AND USE OF THE SITE

- A. The Owner shall determine the locations of the Contractor's designated setup areas.
- B. The Contractor may not utilize any other locations unless permission is obtained from the Owner.
- C. The Contractor shall permit the Owner and Engineer access to the staging, work areas and test areas at any time, as required to perform inspections and review mock-ups. The Contractor shall not move or remove staging or access to the work areas until instructed by the Owner and Engineer to do so. Any staging or access to the

work areas removed by the Contractor without approval of Owner and Engineer, shall be reinstalled and setup at the request of the Owner and/or Engineer at no additional cost to the Owner.

- D. Other specific requirements of the Owner will be addressed and outlined at the Pre-Construction meeting to be held prior to the start of work.
- E. Take precautions necessary and provide equipment, materials and labor to adequately protect previous construction, the building, its contents and occupants, and surrounding landscaped areas from damage due to construction as well as from inclement weather during construction.

1.09 UTILITIES

- A. Most utilities have been shut-off, removed, capped or are no longer in service. The Contractor should anticipate providing their own utilities assuming what is there is not working.
- B. The Owner, through exterior electrical outlets, if operable, will provide electrical service to the Contractor free of charge. Use shall be limited to construction hours. The Contractor and/or subcontractors shall provide their own electrical generator for welding equipment, HEPA vacuum, and grinding equipment. The Owner reserves the right to charge the Contractor(s) for excessive electrical service usage (i.e., wasteful usage). Should charges be considered, the Owner will notify the Contractor in writing of his intent forty-eight hours (48 hrs.) in advance.
- C. Owner will provide water for construction purposes free of charge through exterior water spigots, if operable. The Owner reserves the right to charge the Contractor for excessive or wasteful use. Should charges be considered, the Owner will notify the Contractor in writing of his intent forty-eight hours (48 hrs.) in advance. The Contractor shall provide drinking water.
- D. Contractor shall provide all other utilities required by the work.
- E. Ensure proper and safe operation and maintenance of utility systems within the construction limits, whether these are supplied by the Owner's distribution system or otherwise, until the Owner accepts the work. Maintain and operate appurtenances within the construction area that serve the distribution system, subject to periodic inspection by the Owner's operating personnel. Inspection by any representative or personnel of the Owner shall not relieve the Contractor of his responsibilities in connection with operation and maintenance of these facilities and equipment.

1.10 TEMPORARY PROTECTION

- A. Provide suitable Owner-approved temporary protection to prevent the entrance of debris, obstructions, and water infiltration into the building. Provide warning signs to reroute personnel around areas of dangerous work.
- B. Protect materials scheduled for reuse from damage by placing them in labeled containers or wrappings stored in a weathertight trailer.
- C. Provide temporary protection such as plywood and tarps for streets, drives, curbs, sidewalks, landscaping and existing exterior improvements during all phases of the project.

1.11 DEBRIS REMOVAL

- A. The Owner shall designate crane and refuse container locations. This area shall be sectioned off with proper warning lines.
- B. Removed materials shall not be thrown freely from the roof but shall be discarded in an enclosed chute, in order to reduce the spread of dust and other debris.
- C. Supply adequate covered receptacles for waste, debris and rubbish. One receptacle will be allowed on site at a time, and must be immediately removed from the site when full. Clean the project area daily and prior to moving the receptacle to another location on the site. Locations shall be as permitted by the Owner. Disposal shall be off-site in a legal dump authorized to accept construction demolition solid wastes. The Contractor shall be responsible for receptacle-related damage to site grounds.
- D. Receptacles shall be removed from the site daily. Should, for any reason, receptacle removal is not possible on any given day, the Contractor shall move the receptacle a minimum of fifty feet (50') from the building or as required by local fire officials.

1.13 ACCESS TO THE WORK

- A. The Contractor is responsible for providing access to all areas included within the project's scope of work. Contractor is required to maintain, clean and keep clear all exterior pathways utilized to access the work. Tools, materials or equipment will not be permitted within the building unless it is specifically required to complete the work. Failure to comply with Owner's requirements will result in the Contractor providing their own access to the work at no additional cost to the Owner. A Contractor's staging and/ or laydown area will be designated by the Owner adjacent to the building.

1.14 ACCESS TO THE INTERIOR

- A. The Contractor must secure and coordinate access with the Owner prior to entering building or performing work at the building interior. All access locations/methods shall be located at an Owner approved location for this purpose, and shall be made secure at the end of each work day to prevent un-authorized access into the building. As an alternative, an extension ladder erected and removed daily will be permitted.
- B. The Owner will designate which portions of the site the Contractor may utilize and access for the performances of the work. The Contractor must submit a site plan indicating his locations of set up, material storage, and parking. Parking at other locations throughout the lot, without prior authorization, is subject to vehicle removal at no cost to the Owner.
- C. All hoisting of equipment and materials must be done on the exterior of the building. No tools will be permitted inside the building unless they are specific to perform the required work.
- D. The Contractor will be required to provide access to the designer and manufacturer's representatives at no additional cost, to review the work operations, and to perform final observations.

1.15 VEHICLES

- A. Contractor to park vehicles in the designated storage/laydown location or at locations designated by the Owner.

1.16 TRAFFIC CONTROL

- A. The Contractor shall arrange and pay for all police details required to control traffic affected by any part of the work, if required.

1.17 CLEANUP

- A. Site cleanup shall be complete and to the satisfaction of the Owner. Site cleanup shall be performed daily.
- B. All building (interior and exterior), landscape and parking areas shall be cleaned of all trash, debris, and dirt caused by or associated with the work.
- C. All landscape areas damaged or littered due to the work shall be raked clean and reseeded if required.
- D. All paved areas shall be swept clean of debris daily. All paved areas shall be washed clean at the completion of work.
- E. All areas stained, dirtied, discolored or otherwise damaged due to the work shall be cleaned, restored or replaced as required.

1.18 SIGNS

- A. If requested by Owner, the Contractor shall conspicuously post a project sign at ground level. This sign shall designate the project entrance. Only one (1) entry may be used by the Contractor. The entry location shall be as directed by the Owner.
- B. The Contractor shall install adequate signage to inform facility users of any changes to existing conditions or construction areas.
- C. The Contractor shall also construct a project sign must be at least four feet (4') tall by eight feet wide (8' W) or as designated by the Owner. Contractor to provide small scale graphic illustration of the sign for review and approval prior to final construction.

PART 2 – PRODUCTS

NOT USED.

PART 3 – EXECUTION

NOT USED.

END OF SECTION

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SECTION 016300

WEATHER PROTECTION AND MATERIALS STORAGE

PART 1 GENERAL

1.01 GENERAL

- A. The Contractor shall take the necessary precautions and provide all equipment, materials and labor necessary to adequately protect the Contract Area, previous construction, the building and its contents and occupants, and surrounding landscape areas from damage due to the construction or inclement weather during construction.
- B. No storage on or within the building will be allowed without prior authorization from the Owner and Engineer.
- C. The Contractor shall provide all access to the work. Staging and other access shall be provided until new work has been accepted by the Owner.

1.02 WEATHER PROTECTION

- A. Weather protection shall mean the temporary protection of that work adversely affected by moisture, wind, heat and cold by covering, patching, sealing, enclosing, ventilating, cooling and/or heating. This protection shall be provided for all work areas, the building and its contents, trafficked adjacent areas, and all construction materials and accessories.
- B. The Contractor shall be responsible for protecting the Work from moisture in order to prevent the growth of fungus, bacteria, and other biological contaminants. Remove and replace work that has been wet for twenty-four hours (24 hrs.) or more, or that shows evidence of biological growth due to the presence of moisture.
- C. The cost of heat, fuel and power necessary for proper weather protection shall be the responsibility of the Contractor.
- D. Installation of weather protection shall comply with all safety regulations, including provisions for adequate ventilation and fire protection devices.

1.03 FIRE PROTECTION

- A. The Contractor shall provide all necessary temporary fire protection for the building, building contents and materials during construction. The Contractor shall provide incombustible protective blankets where necessary to protect surfaces or building contents from damage.
- B. At no time shall any combustibles be stored inside the building. All adhesives, caulks and cleaning solvents shall be stored well away from the building in a method approved by local fire officials.

WEATHER PROTECTION AND MATERIALS STORAGE

- C. Should any cutting, burning or welding be necessary, the Contractor shall provide a fire watch. This watch will continue during the operations and for four hours minimum after completion.
- D. At no time shall open flames be present around adhesives, caulks or cleaning solvents as they will readily ignite. Rags soaked with cleaning solvents shall not be discarded in the dumpsters but shall be stored in a metal receptacle and removed from the site daily.
- E. The Contractor shall be required to comply with all local fire codes and shall obtain all permits necessary from the local fire department and provide one (1) copy to the Engineer.
- F. The Contractor shall provide recently tested, fully charged fire extinguishers around the storage area, rubbish receptacle and two (2) within one hundred feet (100') of the work area or as specifically required by local fire officials.
- G. Provide necessary temporary fire protection for the buildings, their contents and materials during construction. Do not store combustibles inside the buildings or on the roofs. Store adhesives, caulks and cleaning solvents away from the building using a method approved by local fire officials. Should cutting, burning or welding be necessary, provide a fire watch during operations and for four hours (4 hrs.) minimum after completion of the operations.
- H. Comply with local fire codes and obtain permits necessary from the local fire department. Provide a copy to the Owner. Provide recently tested, fully charged fire extinguishers around the storage area, rubbish receptacle and two (2) fire extinguishers on the roof within fifty feet (50') of the Work.

1.04 MATERIALS STORAGE

- A. In the event that materials are exposed to the elements, they shall be marked as unacceptable and immediately removed from the site. They may not be used.
- B. On-site storage of materials is the responsibility of the Contractor. The Owner is not responsible for Contractor's losses due to damage or vandalism.

1.05 NOTIFICATION

- A. If, during the Contract period, the Contractor is notified of insufficient weather protection, he shall, immediately, properly restore the weather protection and repair or replace any damaged unprotected materials and systems. Should the Contractor not effect immediate repair or replacement when notified, the Owner shall have the proper protection installed at the Contractor's expense.

1.06 MANUFACTURER'S INFORMATION

- A. The manufacturers of all the materials shall supply written instructions concerning the storage and handling of all supplied materials, including sealants, and accessories. The manufacturer shall also provide information concerning storage and handling of flammable or volatile materials.
- B. Storage facilities shall be acceptable to the manufacturer and conform to his written requirements concerning temperature, humidity, ventilation and the like.
- C. The "shelf-life" of materials shall be provided with the date of manufacture of all perishables, including volatiles, caulking and mastics.
- D. The Contractor shall supply a copy of all manufacturer's written instructions to the Owner and the Engineer as outlined in Section 01 33 00 - Shop Drawings and Submittals. The Contractor shall comply with all storage and handling requests and instructions of the manufacturer.

1.07 VOLATILE MATERIALS

- A. The Contractor is reminded that the adhesives, solvents, bitumens, etc., are highly volatile and flammable materials. Do not store these materials, contaminated tools, applicators or rags, on or within the buildings. No overnight storage on the roofs will be allowed. Do not transport materials through the building. Take precautions and closely follow the Specification requirements for fire protection on site during construction.
- B. Locate and use flame-heated equipment so as not to endanger the structure, other materials on site, or adjacent property. Do not place flame-heated equipment on the roof. Locate and use flame-heated equipment in specific areas approved by the Owner. Do not relocate flame-heated equipment without prior approval from the Owner.
- C. The use of flame-heated equipment or torches on the roof is prohibited unless specifically approved in writing by the Owner.

PART 2 – PRODUCTS

NOT USED.

PART 3 – EXECUTION

NOT USED.

END OF SECTION

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SECTION 016500

PRODUCT DELIVERY REQUIREMENTS

PART 1 GENERAL

1.01 GENERAL PROVISIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 DESCRIPTION

- A. This Section contains instructions and requirements for the provision and maintenance of adequate delivery, storage, and handling on site of products and materials to be utilized in the Work.

1.03 IN GENERAL

- A. The Contractor shall take the necessary precautions and provide all equipment, materials, and labor necessary to adequately protect the Contract Area, previous construction, the buildings, their contents, and occupants, surrounding landscaped and paved areas from damage due to the construction or inclement weather during construction.
- B. No storage on or within the building will be allowed without prior authorization from the Owner and Designer.

1.04 WEATHER PROTECTION

- A. Weather protection shall mean the temporary protection of that work adversely affected by moisture, wind, heat and cold by covering, patching, sealing, enclosing, ventilating, cooling and/or heating. This protection shall be provided for all work areas, the buildings, and their contents, trafficked adjacent areas, and all construction materials and accessories.
- B. The cost of heat, fuel, and power necessary for proper weather protection shall be the responsibility of the Contractor.
- C. Installation of weather protection shall comply with all safety regulations, including provisions for adequate ventilation and fire protection devices.

1.05 MATERIALS STORAGE, STORAGE, AND HANDLING

- A. All materials shall be stored in trailers onsite or brought to the site daily. Storage trailers will be allowed in the location(s) designated by the Owner. All flammable substances cannot be stored along the building.
- B. In the event that materials are exposed to the elements, they shall be marked as unacceptable and immediately removed from the site. They may not be used.
- C. The Contractor will be required to provide additional tarps or canvas covers over any materials that may be stored with the Owner's permission at the site. The

Structural and Building Envelope Upgrades for the
Green Barn at Dorthea Dix Psychiatric Center
656 State Street - Bangor, ME 04401
Gale JN 843180

Contractor will not be permitted to rely on the manufacturer's shrink wrap material as the sole source of weather protection. These covers are to be adequately ballasted and secured to prevent wind uplift.

- D. Protect all existing and new wood stored on site to prevent moisture absorption. Use tarps over the wood pile (top, sides, and bottom) elevated on pallets (one side lower to shed water).
- E. Onsite storage of materials is the responsibility of the Contractor. The Owner is not responsible for the Contractor's losses due to damage or vandalism.

1.06 TOOLS AND EQUIPMENT

- A. The Contractor is responsible for delivery, storage, maintenance, and security of tools and equipment.

1.07 INSPECTION NOTIFICATION

- A. Materials stored on site and subject to damage from wind, precipitation, or other potential climactic conditions will be subject to inspection on a daily basis by the Owner or Owner's Representative.
- B. If, during the Contract period, the Contractor is notified of insufficient weather protection, they shall, within 24-hours, properly restore the weather protection and repair or replace any damaged unprotected materials and systems.
- C. Should the Contractor not enact immediate repair or replacement when notified, the Owner shall have the proper protection installed at the Contractor's expense. The Contractor is responsible for all damages to the building as a result of leaks.

1.08 MANUFACTURER'S INFORMATION

- A. The manufacturers of all the materials shall supply written instructions concerning the storage and handling of all supplied materials, including sealants, and accessories. The manufacturer shall also provide information concerning storage and handling of flammable or volatile materials.
- B. Storage facilities shall be acceptable to the manufacturer and conform to his written requirements concerning temperature, humidity, ventilation, and the like.
- C. The "shelf-life" of materials shall be provided with the date of manufacture of all perishables, including volatiles, caulking, and mastics.
- D. The Contractor shall supply a copy of all manufacturers' written instructions to the Owner and Designer as outlined in Section 013300 – Submittal Procedures. The Contractor shall comply with all storage and handling requests and instructions of the manufacturer.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

End of Section

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SECTION 017000

PROJECT CLOSEOUT

PART 1 – GENERAL

1.01 GENERAL

- A. When the project is established to be substantially complete, preparations will be made to close out the project prior to Owner's final acceptance. The preparations are as follows:

1.02 SUBSTANTIAL COMPLETION

- A. Substantial completion for this project is defined as the date when the Owner and Owner's Representative mutually agree and certify that all project related work has been properly installed and completed in a manner conforming to the Contract Documents. Work specified within the Contract Documents which has not been performed or has been performed in a manner which does not conform with the Contract Documents shall be deemed as not achieving substantial completion.

1.03 PUNCH LIST

- A. After the project is determined to be substantially complete the Engineer and a representative of the Owner will tour the project and compile a "punch list" of minor unsatisfactory conditions. A copy of this list will be sent to the Contractor and will be used by the Contractor. He shall then correct the unsatisfactory conditions. When all items on the list have been corrected, the Contractor shall notify the Engineer and the Owner representative, and a reinspection will be made by that representative.
- B. Minor "punch list" items shall be only those items which have been installed and are functional, requiring cosmetic repair or cleaning which does not affect the integrity of the system. Any work specified within the Contract Documents, which has not been performed or has been performed in a non-conforming manner to the Contract Documents shall not be defined as minor "punch-list" items, and must be performed or corrected as appropriate in order to achieve substantial completion.
- C. Should additional re-inspections be required due to punch list items which are reported to be complete but are not completed or improperly completed, the costs of these re-inspections will be assessed to the General Contractor.

1.04 PUNCH LIST RE-INSPECTIONS

- A. After providing written notification to Owner and the Engineer that the punch list work has been completed, the Owner and the Engineer will perform one (1) final inspection.
- B. Should additional re-inspections be required due to punch list items which are not completed or improperly completed, the costs of these re-inspections will be assessed to the Contractor as liquidated damages.

1.05 MANUFACTURER'S INSPECTION

- A. After the re-inspection by the Owner's representative, the Materials Manufacturer's representative will be required to tour the site. The representative shall determine if the materials have been installed as required by the Manufacturer.
- B. Any items the representative determines were not so installed shall be reinstalled so as to comply with the Manufacturer's intended use. The Manufacturer shall forward a copy of the list of all items determined to be not installed as intended by the Manufacturer to the Engineer.
- C. Costs associated with all manufacturer inspections shall be the responsibility of the General Contractor.

1.06 GUARANTEES

- A. When both the Owner's representative and the Manufacturer's representative agree that the Contractor has performed according to the Specifications and has installed the materials to the satisfaction of the Manufacturer, the Contractor shall petition the Manufacturer for the materials guarantee. He shall forward this guarantee to the Owner and provide a copy for the Engineer.
- B. The Contractor will be required to provide lien releases for their work. The Contractor shall then forward his guarantee covering the construction to the Owner and provide one (1) copy for the Engineer.

1.07 RETAINAGE RELEASE

- A. When all guarantees, certifications, close out documents and requested lien releases have been received, the Owner shall release to the Contractor the project retainage and any other monies retained by the Owner to guarantee project completion. Except with the Owner's prior approval, payments to the Contractor shall be subject to retention of ten percent (10%).

1.08 DOCUMENTS REQUIRED FROM THE CONTRACTOR PRIOR TO FINAL PAYMENT

- A. Documents will be submitted to the Engineer in triplicate, each set-in individual binders for submission to the Owner. These items include, but are not limited to, the following:
 - 1. All applicable manufacturer's warranties.
 - 2. Contractor and Sub-Contractor's two-year (2-yr.) guarantee.
 - 3. Manufacturer's roof system warranties.
 - 4. Executed Punch List Inspection letter(s).
 - 5. Consent of Surety Company to Final Payment (AIA Form G707).
 - 6. Lien Releases from Contractor, subcontractor and suppliers (AIA Forms G706, G706A).
 - 7. Contractor's Affidavit of Payment of Debts and Claims.
 - 8. Final Application and Certificate for Payment.
 - 9. Completed waste shipment records and dumping manifests.
 - 10. As Built Drawings.
 - 11. Other documents which may be specifically required by the Owner or the Engineer.

PART 2 – PRODUCTS

NOT USED.

PART 3 – EXECUTION

NOT USED.

END OF SECTION

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SECTION 024100

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 DESCRIPTION OF WORK

- A. In general, the General Contractor shall supply all labor, materials, equipment, temporary protection, tools, and appliances necessary for the proper completion of the work in this Section, as required in the Specifications and in accordance with good construction practice. The work under this Section generally includes the following:
 - 1. Demolition and removal of selected portions of buildings and structures and as required for new work. Refer to the appropriate technical sections and Contract Drawings for additional requirements and for coordination.
 - 2. Removal and legal disposal of demolished materials off site. Except those items specifically designated to be relocated, reused, or turned over to the facility, all existing removed materials, items, trash, and debris shall become property of the Contractor and shall be completely removed from the site and legally disposed of at their expense. Salvage value belongs to the Contractor. On-site sale of materials is not permitted.
 - 3. Scheduling and sequencing operations without interrupting utilities serving occupied areas. If interruption is required, obtain written permission from the utility company and the Owner. Schedule interruption when the least amount of inconvenience will result.
 - 4. Refer to other technical specification sections for selective demolition operations.
 - 5. Coordinate all work with the Owner.
 - 6. Clean areas affected by the work.

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 024100 - Selective Demolition
- B. Section 030010 – Concrete Work
- C. Section 061000 - Rough Carpentry
- D. Section 062013 – Exterior Finish Carpentry
- E. Section 073126 – Slate Shingles
- F. Section 076200 – Sheet Metal Flashings and Trim

- G. Section 081423 – Clad Wood Commercial Doors and Frame
- H. Section 083613 – Overhead Doors
- I. Section 085213 – Aluminum Clad Wood Windows
- J. Section 099100 – Painting

1.04 UNIT PRICES

- A. Technical requirements for related Unit Price work are defined in this section. Refer to Division 01 Section “Unit Prices” for quantities to be carried in the Base Bid and provided on the Bid Form. Any work in addition to those shown on the Contract Drawings shall be either added or deducted based on the unit costs.

1.05 MEASUREMENT AND FIELD VERIFICATION PROCEDURES

- A. All dimensions, quantities, and existing conditions shall be determined or verified by the Contractor. The Contract Drawings have been compiled from various sources and may not reflect the actual condition at the moment of construction. The Contractor is cautioned to take all precautions and make all investigations necessary to install the proposed work. The Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.

1.06 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Detach items from existing construction and deliver them to the User Agency ready for reuse, at a location designated by the User Agency. Protect from weather until accepted by User Agency.
- C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated. Protect from weather until reinstallation.
- D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed, and salvaged, or removed and reinstalled.

1.07 SPECIAL JOB CONDITIONS

- A. The building is historic and involves the Maine Historical Preservation Commission (MHPC). Care shall be taken with the work so as not to adversely affect the historic conditions and the historic character of the Barn. The Contractor shall cooperate with MHPC and the Architect with any requests for modifications or corrections to any installed work that do not comply with these Contract Documents or meet historic repair and restoration standards.

1.08 MATERIALS OWNERSHIP

- A. Historic items, relics, and similar objects including, but not limited to, commemorative plaques, antiques, and other items of interest or value to the Owner that may be encountered during selective demolition remain property of the Owner or user Agency as applicable. Carefully remove each item or object in a manner to prevent damage and deliver promptly to a location acceptable to the Owner.

1.09 SUBMITTALS

- A. Refer to Section 013300 - Shop Drawings and Submittals for submittal provisions and procedures.
- B. Contractor shall provide a site-specific safety plan and Job Hazard Analysis to the Owner. Submission should be inclusive of all work being performed by other trades and Subcontractors.
- C. Schedule of Selective Demolition Activities: Indicate the following:
1. Detailed sequence of selective demolition and removal work, with early and late starting and finishing dates for each activity. Ensure Owner's on-site operations are uninterrupted if applicable.
 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 3. Coordination for shutoff, capping, and continuation of utility services.
 4. of elevator and stairs.
 5. Locations of proposed dust- and noise-control temporary partitions and means of egress, including for other occupants affected by selective demolition operations.
 6. Coordination continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
 7. Means of protection for items to remain and items in path of waste removal from building.
- D. Inventory: After selective demolition is complete, submit a list of items that have been removed and salvaged, and turned over to the Owner.
- E. Pre-Demolition Videotapes: Show existing conditions of adjoining construction and site improvements, including finish surfaces, which might be misconstrued as damage caused by selective demolition operations. Comply with Division 01. Submit before Work begins.

1.10 ASSURANCE

- A. Examination of Existing Conditions: The Contractor shall examine the Contract Drawings for demolition and removal requirements and provisions for new work. Verify all existing conditions and dimensions before commencing work. The Contractor shall visit the site and examine the existing conditions as he finds them and shall inform herself/himself of the character, extent and type of demolition and removal work to be performed. Submit any questions regarding the extent and character of the demolition and removal work in the manner and within the time period established for receipt of such questions during the bidding period.
- B. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
- C. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.
- D. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- E. Standards: Comply with ANSI A10.6 and NFPA 241.

1.11 WARRANTY AND GUARANTEE

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.
- B. Upon completion of the work and prior to final payment, the Contractor shall submit a guarantee of their work as free from defect in materials and workmanship. The guarantee shall be for a period of two years (2 yrs.) from date of substantial completion. The guarantee shall be signed by an officer of the Contractor's firm and sealed if a corporation.

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that utilities have been disconnected and capped.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

- C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate, and measure the nature and extent of conflict. Promptly submit a written report to Designer.
- E. Survey of Existing Conditions: Record existing conditions by use of preconstruction videotapes.
 - 1. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.
- F. Perform surveys as the work progresses to detect hazards resulting from selective demolition activities.

3.02 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Arrange to shut off indicated utilities with utility companies and User Agency.
 - 2. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing. Where entire wall is to be removed, existing services/systems may be removed with removal of the wall.
 - 4. Prior to commencing cutting work in existing surfaces, take all precautionary measures to assure that mechanical and electrical services to the particular area have been made inactive. Coordinate with Fire Protection, Plumbing, HVAC, and Electrical subcontractors. Only licensed tradesmen of that particular trade shall disconnect and cap existing mechanical and electrical items that are to be removed, abandoned and/or relocated.
 - 5. If, during the process of cutting work, existing utility lines are encountered which are not indicated on the Drawings, regardless of their condition, immediately report such items to the Designer. Do not proceed with work in such areas until instructions are issued by the Designer. Continue work in other areas.

3.03 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
1. Comply with requirements for access and protection specified in Section 015000 - Temporary Facilities.
 2. Maintain adequate passage to and from all exits at all times. Before any work is done, which significantly alters access or egress patterns, consult with the Designer and obtain approval of code required egress. Under no condition block or interfere with the free flow of people at legally required exits, or in any way alter the required condition of such exits.
- B. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
1. Strengthen or add new supports when required during progress of selective demolition.
 2. Remove temporary shoring, bracing and structural supports when no longer required.
 3. Post warning signs and place barricades as applicable during placement and removal of temporary shoring.
- C. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around demolition area(s).
1. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction. Provide temporary barricades as required to limit access to demolition areas.
 2. Protect existing site improvements, appurtenances, and landscaping to remain.
- D. Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with demolition operations.

3.04 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain

or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering, and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.

3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during and after flame-cutting operations.
5. Maintain adequate ventilation when using cutting torches.
6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
9. Dispose of demolished items and materials promptly.

B. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to the Owner.
4. Transport items to storage area designated by the Owner.
5. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Designer, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

Items for Re-use and Preservation of Existing Surfaces to Remain:

1. The Contractor shall inspect closely each item specifically designated to be relocated, re-used, or turned over to the Owner prior to its removal, and immediately report damages and defects to the Designer and Owner. The Contractor shall be responsible for any subsequent damage to the same other than latent defects not readily apparent from close inspection and shall bear responsibility for its repair or same replacement as directed by the Designer, to the satisfaction of the Owner.
2. Unless special surface preparation is specified under other Specification Sections, leave existing surfaces that are to remain in a condition suitable to receive new materials and/or finishes.

3.05 PROTECTION OF PUBLIC AND PROPERTY

- A. Provide all measures required by federal, state, and municipal laws, regulations, and ordinances for the protection of surrounding property, the public, workmen, and the state's employees during all demolition and removal operations. Measures are to be taken, but not limited to installation of sidewalks, sheds, barricades, fences, warning lights and signs, trash chutes and temporary lighting.
- B. Protect all walks, roads, streets, curbs, pavements, trees, and plantings, on and off premises, and bear all costs for correcting such damage as directed by the Designer, and to the satisfaction of the Owner.
- C. Demolition shall be performed in such a manner that will ensure the safety of adjacent property. Protect adjacent property from damage and protect persons occupying adjacent property from injuries which might occur from falling debris or other cause and so as not to cause interference with the use of other portions of the building, of adjacent buildings or the free access and safe passage to and from the same.
- D. Every precaution shall be taken to protect against movement or settlement of the building, of adjacent buildings, structures, sidewalks, roads, streets, curbs, and pavements. Provide and place at the Contractor's own expense, all necessary bracing and shoring in connection with demolition and removal work.
- E. Remove portions of structures with care by using tools and methods that will not transfer heavy shocks to existing and adjacent building structures, both internal and external of the particular work area.
- F. Provide and maintain in proper condition, suitable fire resistive dust barriers around areas where interior demolition and removal work is in progress. Dust barriers shall prevent the dust migration to adjacent areas. Remove dust barriers upon completion of major demolition and removal in the particular work area.
- G. Protect unaltered portions of existing construction, including finishes, furnishings, and equipment.
- H. Provide secure weather protection where demolition has removed a portion of the exterior envelope.

3.06 DISCOVERY OF HAZARDOUS MATERIALS

- A. If hazardous materials, such as chemicals, asbestos-containing materials, or other hazardous materials are discovered during the course of the work, cease work in affected area only and immediately notify the Designer and the Owner of such discovery. Do not proceed with work in such areas until instructions are issued by the Designer. Continue work in other areas.
- B. If unmarked containers are discovered during the course of the work, cease work in the affected area only and immediately notify the Designer and the Owner of such discovery. Do not proceed with work in such areas until instructions are issued by the Designer. Take immediate precautions to prohibit endangering the containers integrity. Continue work in other areas.

3.07 CUTTING

- A. Perform all cutting of existing surfaces in a manner which will ensure a minimal difference between the cut area and new materials when patched. Use extreme care when cutting existing surfaces containing concealed utility lines which are indicated to remain and bear full responsibility for repairing or replacement of all such utilities that are accidentally damaged.
- B. Provide a flush saw cut edge where pavement, curb and concrete removals abut new construction work or existing surfaces to remain undisturbed.
- C. Provide fire-safing through all interior penetration walls to seal around new penetrations.

3.08 REMOVAL OF TIMBER FRAMING

- A. Identify timber framing members to be removed, where shown on the Contract Drawings. Prior to removal install temporary roof supports as necessary to support the roof loads during framing removal. Provide detail temporary support plan to the Owner and Engineer for review.
- B. With temporary supports in place relieve the load from the framing member to be removed.
- C. Mechanically remove the timber framing members where indicated on the Contract Drawings and prepare the opening for new framing. Coordinate with Section 06 10 00 - Rough Carpentry.

3.09 DISPOSAL OF DEMOLISHED MATERIALS

- A. Do not allow demolished materials to accumulate onsite.
- B. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- C. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- D. Burning: Do not burn demolished materials.

3.10 CLEAN-UP

- A. The Contractor shall not demobilize the site until the completed work is toured by the Owner and Designer. Any unsatisfactory items observed will be reported in "punch list" form. These items shall be corrected immediately by the Contractor prior to demobilization from the job site.
- B. All scaffolding, barriers, temporary facilities, and the like shall be removed upon completion of the work. Areas damaged as a result of the Contractor's equipment shall be restored to their original condition, all to the satisfaction of the Owner.
- C. Refer to the Close-Out Procedures described in Division One for additional information.

END OF SECTION

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SECTION 030010

CONCRETE WORK

PART 1 – GENERAL

1.01 GENERAL PROVISIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 DESCRIPTION OF WORK

- A. In general, the Contractor shall supply all labor, equipment, temporary protection, tools, and appliances necessary for the proper completion of the work as required in the Specifications, in accordance with good construction practice, and as required by the materials manufacturer, as amended.
- B. Removal and disposal of existing slab on grade concrete.
- C. Removal and disposal of existing cast-in-place concrete footings.
- D. Formwork, complete with required shoring, reshoring, bracing, and anchorage.
- E. Reinforcing, complete with required supports, spacers, and related accessories.
- F. Provide and install slab on grade at the first level.
- G. Provide and Install cast in place concrete footings.
- D. Coordinate the work in this section with the appropriate trades to ensure the proper work sequence.
- E. Clean and restore all areas affected by the work.

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 024100 – Selective Demolition
- B. Section 310000 – Earthwork

1.04 MEASUREMENT AND FIELD VERIFICATION PROCEDURES

- A. All dimensions, quantities, and existing conditions shall be determined or verified by the Contractor. The Contract Drawings have been compiled from various sources and may not reflect the actual condition at the moment of construction. The Contractor is cautioned to take all precautions and make all investigations necessary to install the proposed work. The Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.

1.05 CONTROL

- A. Requirements of Regulatory Agencies: The Work under this section shall be subject to all applicable provisions of the state and local building and safety codes.
- B. Reference Standards: Comply with following standards except where more stringent requirements are shown or specified:
1. AMERICAN CONCRETE INSTITUTE (ACI):
 - a. ACI 214 Recommended Practice for Evaluation of Strength Test Results of Concrete
 - b. ACI 301 Specifications for Structural Concrete for Buildings
 - c. ACI 302.1R Guide for Concrete Floor and Slab Construction
 - d. ACI 305R Hot Weather Concreting
 - e. ACI 306R Cold Weather Concreting
 - f. ACI 318 Building Code Requirements for Reinforced Concrete
 - g. ACI 347 Recommended Practice for Concrete Formwork
 - h. ACI SP-15 ACI Field Reference Manual
 - i. ACI SP-66 ACI Detailing Manual
 2. AMERICAN SOCIETY FOR TESTING MATERIALS (ASTM):
 - a. ASTM C Test Method for Compressive Strength for Hydraulic Cement Mortars Using (Two-Inch [2"] or Fifty Millimeter [50-mm] Cube Specimens)
 - b. ASTM C Test Method for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete
 - c. ASTM C31 Method of Making and Curing Concrete Test Specimen in the Field
 - d. ASTM C33 Specifications for Concrete Aggregates
 - e. ASTM C39 Test Method for Compressive Strength of Cylindrical Concrete Specimens
 - f. ASTM C94 Specifications for Ready-Mixed Concrete
 - g. ASTM C143 Test Method for Slump of Portland Cement Concrete
 - h. ASTM C150 Specification for Portland Cement
 - i. ASTM C172 Method of Sampling Freshly Mixed Concrete
 - j. ASTM C173 Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
 - k. ASTM C231 Test Method for Air Content of Freshly Mixed

Concrete by the Pressure Method

- l. ASTM C260 Specifications for Air-Entraining Admixtures for Concrete
 - m. ASTM C311 Methods of Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland Cement Concrete
 - n. ASTM C457 Practice for Microscopical Determination of Air-Void Content and Parameter of the Air-Void System in Hardened Concrete
 - o. ASTM C494 Specifications for Chemical Admixtures for Concrete
 - p. ASTM C567 Test Method for Unit Weight of Structural Lightweight Concrete
 - q. ASTM C618 Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete
 - r. ASTM C666 Test Method for Resistance of Concrete to Rapid Freezing and Thawing
 - s. ASTM C672 Test for Method for Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals
 - t. ASTM C685 Standard Specification for Concrete made by Volumetric Batching and Continuous Mixing
 - u. ASTM C1077 Standard Practice for Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluations
3. Other: CONCRETE REINFORCING STEEL INSTITUTE (CRSI):
- a. CRSI MSP-2 Manual of Standard Practice
4. Contractor shall have the following ACI publications at Project construction site:
- a. ACI 302.1R Guide for Concrete Floor and Slab Construction
 - b. ACI 305R Hot Weather Concreting
 - c. ACI 306R Cold Weather Concreting
 - d. ACI 306.1 Standard Specification for Cold Weather Concreting
 - e. ACI SP-15 Specifications for Structural Concrete for Buildings CI301-84 (Revised 1989) with selected ACI and ASTM References

- C. Design Criteria:
1. Concrete: See General Notes on Structural Drawings and ACI 301, Chapter 3.
 2. Formwork Design: The Contractor shall assume all responsibility for the safety of the formwork and shall provide all necessary design, construction, materials, and maintenance to produce the required concrete work safely. Design all formwork to have sufficient camber to maintain the tolerances specified. Strength shall be sufficient to compensate for the weight of the fresh concrete and a construction live load of fifty pounds per square feet (50 psf) minimum.
 3. Shoring and Reshoring Design: The Contractor shall assume all responsibility for the safety of shoring and reshoring and shall provide all necessary design, construction, materials, and maintenance to produce the required concrete work safely. Design all shoring to take the full load of the concrete, place directly above any reshoring occurring below. Keep in place until the structural members have obtained the design concrete strength as called for on the drawings. Removal strength shall be determined in accordance with ACI 301 4.7. Shoring and reshore calculations shall be available at the request of the Architect or Structural Engineer.
- D. The Contractor is responsible for quality control, including workmanship and materials furnished by his subcontractors and suppliers.
1. Inspection or testing by the Owner does not relieve the Contractor of his responsibility to perform the Work in accordance with the Contract Documents.
 2. Workmanship: The Contractor is responsible for and shall bear the cost of correcting concrete work which does not conform to the specified requirements including, but not limited to, strength, tolerances, finishes and flatness/levelness. Correct deficient concrete by means acceptable to the Architect and Structural Engineer. The cost of extra work incurred by the Architect and Structural Engineer to approve corrective work shall be borne by the Contractor.
- E. Record of Work: A record shall be kept by the General Contractor listing the time and date of placement of all concrete for the structure. Such record shall be kept until the completion of the project and shall be available to the Architect and Structural Engineer for examination at any time.
1. All concrete batch trip tickets will be collected and retained by the Contractor. Concrete batch trip tickets shall contain information specified in ASTM C94, Paragraph entitled "Batch Ticket Information," including items 15.2.1 through 15.2.8. Batch trip ticket shall also show the total amount of water in the mix as batched (including water present in the aggregate before batching) and the amount of water required by the design mix proportions.

1.06 QUALITY ASSURANCE

- A. General Contractor's Quality Control System:
1. General: The General Contractor shall establish a quality control system and shall perform sufficient inspection and tests of all items of work, including that of his subcontractors, to ensure conformance to the Contract Documents for materials, workmanship, construction, finish, functional performance and identification. Contractor's quality control system is the means by which he assures himself that his construction complies with the requirements of the Contract Documents. Controls shall be adequate to cover all construction operations.
 2. Records: Contractor shall maintain correct records on an appropriate form for all inspections and tests performed, instructions received from the Architect, Structural Engineer or Testing Agency, and actions taken as a result of those instructions. These records shall include evidence that the required inspections or tests have been performed (including type and number of inspections or tests, nature of defects, causes for rejection, etc.), proposed or directed remedial action, and corrective action taken. Contractor shall document inspections and tests as required by this section.
- B. The Owner will employ an Independent Testing Laboratory acceptable to the Architect and Structural Engineer to provide testing services specified in paragraph 1.5 Testing and Inspection.
- C. The Structural Engineer and Independent Testing Laboratory shall be offered uninterrupted access to the ready-mix batching plant at all times that the work is in progress.
- D. Provide the Testing Agency with the following:
1. Incidental labor required to facilitate testing.
 2. Minimum one day's advance notice when concrete is to be placed.
 3. Storage facilities for concrete test cylinders.
 4. Materials, samples, and access to materials as required for testing.
 5. Reimbursement of costs for testing and inspection resulting as a consequence of the following:
 - a. Work not in compliance with the Contract Documents.
 - b. Testing requested by Contractor or Subcontractor such as additional cylinders for early breaks, etc.
 - c. Testing to verify the adequacy of work done, without prior notice, without proper supervision, or contrary to standard construction practice.
- E. All concrete flat work finishers on project shall hold current ACI concrete flat work finisher certification.

1.07 TESTING AND INSPECTION

- A. Concrete inspection and testing will be made in accordance with building code requirements, and Contract Documents, and will include the following:
1. Testing concrete for strength, slump, air content, temperature, and unit weight.
 2. Marking and testing concrete cylinders, including furnishing cylinder containers for specimens.
 3. Transporting and storing of all specimens involved in testing and inspection. Test cylinders are to be transported to laboratory not later than twenty-four hours (24 hrs.) after casting, not earlier than sixteen hours (16 hrs.) after casting.
 4. Inspection of mixing and placing of concrete at the site, including recording of amount and location of concrete placement, method of placing concrete, and any other pertinent information. Verify compliance with requirements of this specification for concrete placement and curing (including Sections 1.7 and 1.8).
 5. Testing for slab levelness as per Section 3.13B.
 6. Rapid Chloride permeability test of core samples in accordance with AASHTO test method T277, as and when directed by specification or engineer.
- B. Test Specimens: The Testing laboratory will take specimens of each class of concrete from different locations on the job as follows: At least one (1) set of four (4) cylinders for each one hundred cubic yards (100 cu. yd.) or fraction thereof of each class of concrete, but not less than one (1) set for any one (1) day's operations.
1. For concrete placed by pumping, test specimens and concrete used for determination of slump, air content, and weight are to be taken at the point of placement of concrete.
 2. Samples will be obtained in accordance with ASTM C172.
 3. Marking, curing and subsequent handling of test cylinders, except as modified herein, shall be in accordance with ASTM C31. Testing shall be in accordance with ASTM C39.
 4. Cure test specimens for ASTM C31 as follows:
 - a. To verify twenty-eight (28) day compressive strength unless otherwise noted: The cylinders shall be placed in laboratory storage under moist curing conditions at approximately seventy degrees Fahrenheit (70°F) within twenty-four hours (24 hrs.) after molding and maintained therein until tested.
 - b. To verify compressive strength for latex modified concrete or form removal or for additional test cylinders required due to cold weather concreting conditions:

1. Store test specimens on structure as near to point of sampling as possible and protect from elements in same manner as that given to portion of structure as specimen represents.
 2. Transport to test laboratory no more than four hours (4 hrs.) before testing. Remove molds from specimen immediately before testing.
 5. One (1) cylinder shall be tested at seven (7) days for information.
 6. Two (2) cylinders shall be tested at twenty-eight (28) days for acceptance. The acceptance test results shall be the average strength of these two (2) cylinders.
 7. One (1) cylinder shall be kept for eventual testing at fifty-six (56) days to verify any marginal results of twenty-eight (28) day tests. If not required to be tested, cylinder will be discarded after twenty-eight (28) days.
- C. Test Reports: Reports of cylinder tests shall be submitted as specified herein within five (5) days of laboratory testing. Test reports shall, as a minimum, include:
1. Project data including project name and address, concrete supplier, supplier's delivery ticket number and mix identification number, Testing Agency's test or cylinder identification number, and location of pour.
 2. Results of field testing at time of sampling including date and time of sampling, amount of water added at site prior to sampling, ambient air temperature and concrete temperature, concrete slump and air content, and concrete wet unit weight.
 3. Results of laboratory testing including date test specimens were transported to laboratory, date and age of concrete at time of testing, compressive strength of each cylinder tested, average compressive strength of tested cylinders, and specified design strength of concrete represented by the test.
- D. Additional Testing: Contractor shall bear the cost of testing and inspection resulting as a consequence of the following:
1. Work not in compliance with the Contract Documents.
 2. Testing requested by the Contractor or Subcontractor such as additional cylinders for early breaks, etc.
 3. Testing to verify the adequacy of work done without prior notice, without proper supervision, or contrary to standard construction practice.
- E. Reinforcing Steel Inspection: Concrete reinforcing shall be inspected prior to closing of concrete form work or placing of concrete. Refer to Section 3.4 for placing requirements. Inspect all reinforcing for conformance with contract requirements. Submit written reports of all inspections in accordance with Test reports herein. Such reports shall include a description of each area inspected and deficiencies noted. Deficiencies observed shall immediately be brought to the attention of the contractor's field superintendent. Corrections made by the contractor to resolve such deficiencies must be addressed and listed in the report. It is not sufficient to

simply document that deficiencies were observed and brought to the contractor's attention.

- F. Mix Designs: Review of concrete mix designs for compliance with ACI 318 Chapter 4 and Sections 5.2, 5.4, and 5.8 is not required by the testing agency.

1.07 SUBMITTALS

- A. All submittals to be in accordance with The General Conditions of the Contract.
- B. Mix Designs:
 - 1. Submit substantiating data for each concrete mix design contemplated for use to the Structural Engineer not less than six weeks (6 wks.) prior to first (1st) concrete placement. Data for each mix shall, as a minimum, include the following:
 - a. Mix identification designation (unique for each mix submitted).
 - b. Statement of intended use for mix.
 - c. Mix proportions, including all admixtures used.
 - d. Manufacturer's data and/or certifications verifying conformance of all mix materials, including admixtures, with specified requirements.
 - e. Wet and dry unit weight, ASTM C138.
 - f. Entrained air content, ASTM C173.
 - g. Design slump, ASTM C143.
 - h. Required average strength qualification data per ACI 301 3.9.1 and 3.9.2. Submit separate qualification data for each production facility which will supply concrete to the project.
 - i. Average strength qualification data (trial mix data or field test data per ACI 301 3.9.3). When field test data is used to qualify average strength, submit separate qualification data for each production facility which will supply concrete to the project.
 - j. Field test data submitted for qualification of average strength under ACI 301 3.9.1, 3.9.2, and 3.9.3 shall include copies of the Concrete Testing Agency's reports from which the data was compiled.
 - k. Submit one (1) copy of a representative concrete batch trip ticket containing information as specified herein.
 - l. Silica fume additive.
 - 2. Separate design mixes are required for each strength and class of concrete, each change in type and/or quantity of mix materials including admixtures, each change in slump limits, and each change in entrained air content.
 - 3. Rapid chloride permeability test results per AASHTO test method T277.

- C. Submit shop drawings for fabrication, bending and placement of concrete reinforcement. Comply with ACI Detailing Manual (SP 66). Provide one-quarter inch (1/4") scale elevations of all walls with reinforcing shown. Include special reinforcement required at openings through concrete structure. Include all accessories specified and required to support reinforcement. Obtain from General Contractor location of proposed construction joints and show them on the shop drawings.
- D. Submit formwork shop drawings for fabrication and erection of specific finished concrete surfaces indicated on the architectural drawings. Show general construction of forms including jointing, special form joints or reveals, location and pattern of form tie placement, and other items which visually affect the exposed concrete. Review will be for conformance to Architectural layout and details only.
- E. Product Data:
 - 1. Submit product data with application and installation instructions for proprietary materials and items including reinforcement and forming accessories, admixtures, patching compounds, epoxies, grouts, dry-shake finish material, hardeners, sealer, water stops, joint systems and others as required by the Architect.
 - 2. Submit curing compound product data and verification of its compatibility with other finish materials and surface treatments required.
 - 3. Submit samples of concrete materials if requested by the Architect, including names, sources, and descriptions.
 - 4. Substitutions: Any request for product substitution must be submitted for acceptance, with all necessary documentation prior to time of bid. No request for substitutions will be considered after bids have been received.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Delivery of Materials: Deliver materials in manufacturer's unopened containers fully identified with manufacturer's name, trade name, type, class, grade, size, and color.
- B. Storage of Materials: Store materials in unopened containers. Store off ground and under cover, protected from damage.
- C. Reinforcing: Unload and store reinforcing bars so they will be kept free of mud and damage.
- D. Concrete: No water is to be added after the addition of super plasticizers.
 - 1. Non-Silica Fume Concrete:
 - a. Hauling Time: Discharge all concrete transmitted in a truck mixer, agitator, or other transportation device not later than one- and one-half hours (1-1/2 hrs.), or three hundred (300) revolutions of the drum after the mixing water has been added, whichever is earliest.

- b. Extra Water: Deliver concrete to the job in exact quantities required by the design mix. Should extra water be required before depositing the concrete, the Contractor's Superintendent shall have sole authority to authorize the addition of water. Any additional water added to the mix after leaving the batch plant shall be indicated on the trip ticket and signed by the person responsible. Where extra water is added to the concrete, it shall be mixed thoroughly for thirty (30) revolutions of the drum at mixing speed. Water may be added at the site only once (1x) to each batch.

1.08 JOB CONDITIONS

A. Cold Weather Concreting (ACI 306R):

- 1. When concrete is placed after the first (1st) frost or under conditions of cold weather concreting (defined as period when mean daily temperature drops below forty degrees Fahrenheit [$< 40^{\circ}\text{F}$]. for more than three (3) successive days), take additional precautions as specified in this Section and in ACI 306R, when placing, curing, monitoring, and protecting fresh concrete.
- 2. Warm mix water, sand and aggregated so that no frozen lumps or ice, snow or aggregate will survive mixing but do not overheat ingredients to cause flash setting of concrete or loss of entrained air.
- 3. Place and maintain internal concrete temperature as near to minimums given in following table:

| Least Dimension of Member as Placed and Maintained | Minimum Internal Concrete Temperature (in degrees Fahrenheit) |
|---|---|
| Less than 12 inches | 55°F |
| 12 to 36 inches | 50°F |
| 36 to 72 inches | 45°F |
| Greater than 72 inches | 40°F |
| <i>Do not exceed given minimum placement temperature by more than twenty degrees Fahrenheit (20°F).</i> | |

- a. Cure slabs on grade, foundations, and substructures other than grade beams not subject to early loading, at placement temperature for two (2) days minimum.
- b. Temporary heaters used to maintain temperature of air surrounding exposed, uncured concrete during curing operations shall be vented type, vented to outside of protection envelope.
- c. Before placing concrete topping, structure upon which topping is to be placed shall be preheated to placement temperature of topping.

- d. Cure and protect concrete for supported slabs, beams, columns and bumper walls at temperature specified above until attainment of seventy-five percent (75%) design strength, but no less than 4000 psi twenty-eight (28) day strength.
- e. Determine strength of curing concrete by either of following methods:
 1. Calculate maturity factor based upon curing time and ensured internal concrete temperature as described in ACI 306R, Chapter 7.
 2. Cast and field cure at least six test specimens from last one hundred cubic yards (100 cu. yd.) of concrete but no fewer than three (3) specimens for each two hours (2 hrs.) of entire placing time or for each one hundred cubic yards (100 cu. yd.), whichever yields greatest number of specimens. Make specimens in accordance with ASTM C31. Cover specimens properly, immediately after finishing. Protect outside surfaces of cardboard molds, if used, from contact with sources of water for first (1st) twenty-four hours (24 hrs.) after molding. Field cure test specimens on structure as near to point of sampling as possible and protect from elements in same manner as that given to portion of structure specimen represents. Test cylinders in accordance with ASTM C31 and ASTM C39.
4. Cast expandable thermistors or thermocouples in concrete at rate of at least one (1) per one hundred cubic yards (100 cu. yd.) of concrete placed for supported structure. Monitor internal temperature of concrete at twelve-hour (12-hr.) maximum intervals throughout curing process.
5. During operation, maintain temperature of placed concrete as constant as possible, and protect from rapid atmospheric temperature changes.
6. Maintain concrete in continually moist condition during curing process by leaving forms in place as long as possible and by use of steam or moisture retaining covers on unformed surfaces.
7. Following curing operation, avoid rapid changes in concrete temperature. Do not allow internal temperature of concrete to change at rate exceeding fifty degrees Fahrenheit (50°F) in any twenty-four hour (24 hr.) period or five degrees Fahrenheit (5°F) in any one hour (1 hr.).
8. Do not place concrete without approval of the Structural Engineer on days when temperature at 9:00 AM is below thirty degrees Fahrenheit (< 30°F) and wind velocity exceeds ten (10) knots.
9. The non-chloride accelerator specified in Part 2 of this Specification Section 030010 or high-early strength type III cement may be used when accepted by the Structural Engineer.

- B. Hot Weather Concreting (ACI 305R):
1. When concrete is placed under conditions of hot weather concreting, Contractor shall provide extra protection of concrete against excessive placement temperatures and excessive drying throughout placing and curing operations. Hot weather is defined as any combination of high temperature, low humidity and high wind velocity which causes rate of evaporation in excess of 0.2 pounds per square ft. per hour as determined by ACI 305R, Figure 2.1.5.
 2. Forms, reinforcement, and air shall be cooled by water fog spraying immediately before placing concrete. Placement temperature of concrete shall not exceed ninety degrees Fahrenheit (90°F).
 3. Protect concrete during finishing operations by one (1) of the following:
 - a. Continuous fog spray between finishing operations.
 - b. Immediately following screening, applying evaporation retarding agent in accordance with recommendations of manufacturer.
 4. Immediately following screening, apply specified evaporation retarding agent in accordance with recommendations of manufacturer. Plastic cracking conditions may require application of compound several times during concrete finishing sequence.
 5. During curing operation cover concrete with wet burlap or cotton mats. Keep mats constantly wet for seven (7) days minimum. Leave mats in place for three (3) additional days after discontinuing wetting process.
 6. When the air temperature is expected to exceed ninety-two degrees Fahrenheit (> 92°F), the contractor shall obtain acceptance from the Structural Engineer of the procedures to be used in protecting, depositing, finishing, and curing the concrete.
- C. Protection: Protect newly finished slabs from rain damage. Protect finished slabs from mortar leakage from pouring of concrete above. Cover masonry walls, glazing, and other finish materials with polyethylene or otherwise protect from damage due to pouring of concrete.

PART 2 – PRODUCTS

2.01 GENERAL

- A. All materials shall be in accordance with ACI 301 unless amended or superseded by requirements of following articles or General Notes on the structural drawings.

2.02 FORM MATERIALS AND SYSTEMS

- A. Formwork and formwork systems shall be designed by a Professional Engineer employed by the Contractor. The Professional Engineer shall be registered in the state of Massachusetts. The Contractor shall submit written certification indicating conformance with this requirement.

- B. Forms for Exposed Finish Concrete: Unless otherwise indicated, construct formwork for exposed concrete surfaces with plywood, metal, metal-framed plywood faced or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide form material with sufficient thickness to withstand pressure of newly placed concrete without bow or deflection.
- C. Forms for Unexposed Finish Concrete: Form concrete surfaces which will be unexposed in finished structure with plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.
- D. Forms for Textured Finish Concrete: Form-textured finish concrete surfaces with units of face design, size, arrangement, and configuration as shown on drawings or as required to match Architect's control sample. Provide solid backing and form supports to ensure stability of textured form liners.
- E. Pan Forms: Provide factory fabricated pan form units of required sizes and shapes. Fabricate of 16-gauge (minimum) steel or glass-fiber, reinforced plastic, molded under pressure with matched dyes, 0.11-inch minimum wall thickness. Pans shall be free of dents, irregularities, sag, or rust. Provide pan forms complete with covers, end closures, and tapered shapes required to form true, clean, smooth concrete surfaces as shown.
- F. Slab Construction Joint Forms: Galvanized steel with continuous tongue and groove.
 - 1. Subject to compliance with requirements, provide one (1) of the following:
 - a. "Keyed Kold" - Burke Co.
 - b. "Super Screed" - Vulcan Metal Product
- G. Slab Control Joint Forms: Molded plastic material for insertion into slab surface during finishing. Configuration to provide joint depth of not less than one-fourth ($\frac{1}{4}$) of the slab thickness.
 - 1. Subject to compliance with requirements, provide one (1) of the following:
 - a. "Zipcap" - Greenstreak Plastic Products Co.
 - b. "Crack Inducer" - Progress Unlimited, Inc.
 - c. "Kold-Seal Zipper Strip" - Vinylex Corp.
- H. Chamfer Strips: Three-quarter inch ($\frac{3}{4}$ "), forty-five degree (45°) job-cut wood.
- I. Rustication Strips: Job-cut wood size and shape as indicated on the drawings.
- J. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
 - 1. Provide the following or equal: "Nox-Crete PSC from Coating," manufactured by Non-Crete Inc., Omaha, NE. Telephone: 800-228-7170.

2.03 REINFORCING MATERIALS

- A. General: Sizes, types, grade or yield strengths as indicated on the drawings. Use 60,000 psi yield strength if not otherwise indicated. Use reinforcing conforming to ASTM A706 where welding of reinforcing is required unless otherwise indicated. Provide uncoated finish unless otherwise indicated.
- B. Deformed Bars: ASTM A615 plus supplementary requirement (S1), Deformed Billet Steel Bars or ASTM A706, Low-Alloy Steel Deformed Bars unless otherwise indicated.
- C. Smooth Bars for Masonry Joint Reinforcement: Conform to requirements of ASTM A615 plus supplementary requirement (S1) or ASTM A706.
- D. Welded Wire Fabric: Mesh size and gauge as indicated on the drawings. Conform to ASTM A185, plain in flat sheets.
- E. Coatings:
 - 1. Galvanized: ASTM A767, Class II, hot dip after fabrication and bending. Provide galvanized reinforcing as defined below:
 - 2. Epoxy Coated: ASTM A775. Apply after fabrication and bending. Film thickness of coating after curing to be eight- to twelve millimeters (8-12 mils) when measured in accordance with Method G12. Provide epoxy coated reinforcing where indicated on the drawings.
- F. Tie Wire: Tie wire shall be No. 16 American Wire Gage or heavier black annealed.
- G. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers, and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place within specified tolerances. Use wire bar-type supports complying with CRSI, Class 1 or 2, unless otherwise acceptable.
 - 1. Use supports with sand plates or horizontal runners for slab-on-grade where base material will not support chair legs.
 - 2. All materials that come in direct contact with coated bars, such as slab bolsters, highchairs, tie wires, etc., shall be plastic coated.
 - 3. Provide accessories and supports for welded wire fabric and reinforcement in slabs as required to maintain position as shown on the drawings.
- H. Reinforcing Splices: Mechanical splices for reinforcing shall develop one hundred twenty-five percent (125%) of the specified yield strength F_y of the bar. Subject to compliance with the requirements use one (1) of the following:
 - 1. DB Grout sleeve system by Richmond Screw Anchor Co.
 - 2. NMB splice sleeve type O-X by Sleeve Splice North America, Inc.
 - 3. Or approval equal.

2.04 CONCRETE MATERIALS

A. Cementitious Materials:

1. General: Provide materials of the same brand or source throughout the project unless otherwise specified.
2. Portland Cement: ASTM C150 Type I or II.
3. Fly Ash:
 - a. ASTM C618, Class C or F, except maximum loss on ignition: Three percent (3.0%). Maximum percentage retained on No. 325 sieve: Twenty-eight percent (28%). Maximum water requirement, stated as percentage of control: One hundred percent (100%).
 - b. Testing: ASTM C311.
 - c. Percentage of fly ash in mix design shall be by weight, not by volume. Water/cement ratio will be calculated as water/cementitious (total cement and fly ash) ratio.
 - d. Fly Ash Substitution:
 1. Class C fly ash may be substituted for up to twenty-five percent (25%) of minimum cement or cementitious at one pound (1 lb.) of fly ash for one pound (1 lb.) cement substitution rate, providing required strength at all specified ages is attained.
 2. Class F fly ash may be substituted for up to twenty percent (20%) of minimum cement or cementitious at substitution rate (not more than one pound [1 lb.] of fly ash to one pound [1 lb.] of cement) sufficient to provide required strength at all specified ages.
 3. Permitted only with written permission of Engineer following review of mix submittals.
 - c. Prohibited: Fly ash in same mix with Type IP blended cement.
 - d. Mix Submittals: Limited amounts of fly ash may be added to aid pumping: Permitted only with permission of Engineer following review. See 2.05 G.4.
2. Portland blast-furnace slag cement: ASTM C595, Type IS or ISCMS.
3. Ground granulated blast-furnace slag: ASTM C989
 - a. Subject to compliance with the requirements provide one (1) the following:
 1. NEW CEM - Blue Circle Cement, Inc.
 2. Or approved equal.

B. Aggregates:

1. General: Provide aggregates from the same source throughout the project unless otherwise specified.
2. Normal Weight Aggregate: ASTM C33 containing no deleterious substances which cause surface spalling. Certify that no alkali reactivity is produced with the proposed aggregate-cement combinations when tested in accordance with ASTM C227. Pea gravel shall be graded for ninety percent (90%) passing the three-eighths inch ($\frac{3}{8}$ ") screen and ninety percent (90%) retained on the one-quarter inch ($\frac{1}{4}$ ") screen. Use pea gravel only when acceptable to the Architect and Structural Engineer.
3. Maximum nominal aggregate size to be three-quarter inch ($\frac{3}{4}$ ") unless otherwise approved by the structural engineer.

C. Water: Potable.

D. Admixtures:

1. General: Unless specified, no admixtures may be used without specific approval of the Architect and Structural Engineer.
2. Prohibited Products: Calcium chloride or admixtures containing more than 0.05% chloride ions or thiocyanates are not permitted.
3. Air-Entraining Admixture: ASTM C260
 - a. Subject to compliance with requirements, provide one (1) of the following:
 1. "Air Mix" - Euclid Chemical Co.
 2. "Daravair" - W. R. Grace
 3. "MB-VR" or "MB-AE" - Master Builders
4. Water Reducing Admixture: ASTM C494, Type A
 - a. Subject to compliance with requirements, provide one (1) of the following:
 1. "Eucon WR-75" - Euclid Chemical Co.
 2. "Pozzolith 200N" - Master Builders
 3. "Plastocrete 161" - Sika Chemical Co.
 4. "WRDA" - W.R. Grace & Co.
5. High Range Water Reducing Admixture (Superplasticizer): ASTM C494, Type F or G.
 - a. Subject to compliance with requirements, provide one (1) of the following:
 1. "Eucon 37" - Euclid Chemical Co.
 2. "Pozzolith 400N" - Master Builders
 3. "Sikament" - Sika Chemical Co.

4. "Daracem" - W.R. Grace & Co.
6. Non-Corrosive, Non-Chloride Accelerator: ASTM C494, Type C or E. The admixture manufacturer must have long-term, non-corrosive test data (of at least a year's [1 yr.] duration) using an acceptable accelerated corrosion test method such as electrical potential measurements.
 - a. Subject to compliance with requirements, provide one (1) of the following:
 1. "Accelguard 80" - Euclid Chemical Co.
 2. "Daraset Accelerator" - W. R. Grace & Co.
 3. "Pozzolith-40" - Master Builders
7. Retarding Admixture: ASTM C494, Type D
 - a. Subject to compliance with requirements, use one (1) of the following:
 1. "Eucon Retarder 75" - Euclid Chemical Co.
 2. "Daratard" - W. R. Grace & Co.
 3. "Pozzolith 300-R" - Master Builders
8. Corrosion Protection Admixture: Concrete for parking decks, vehicular bridges, and slabs on grade including all car and truck ramps and turn-around areas shall include DCI corrosion inhibitor admixture at a rate of minimum 3.0 gallons per cubic yard of concrete. Use in conjunction with WRDA19 admixture and Daratard 17 retarding admixture (all three as manufactured by W. R. Grace and Company). Entrained air content for all concrete with DCI admixture shall be maintained at 7% +/- 1.5% per ACI 201.2R, Guide to Durable Concrete. Arrange for obtaining necessary technical and field assistance from the manufacturer and strictly follow his instructions of the use of the admixtures.
9. Micro-silica admixture shall be:
 - a. "Cormix EMSAC F-100" and "Cormix F-90" by Elken Chemicals, Inc., of Pittsburg, PA.
 - b. "FORCE" 10,000" by W.R. Grace Co., Cambridge, MA.
 - c. Use of dry silica fume product is not acceptable unless approved in writing by Engineer.
10. Certification: Written certification of conformance to above requirements will be required from all admixture manufacturers prior to mix design review by the Structural Engineer.

2.05 RELATED MATERIALS

- A. Moisture Barrier: Provide moisture barrier cover where indicated. Use only materials which are resistant to decay when tested in accordance with ASTM E154, as follows:

1. Polyethylene sheet, not less than eight millimeters (8 mils) thickness.
 2. Subject to compliance with requirements, use one (1) of the following:
 - a. "Ply-Bar Plus II" - Glas-Kraft Co.
 - b. "Moistop" - Fortifiber Co.
- B. Expansion Joints:
1. Interior Use or Exterior Use Where Sealants Are Specified: Bituminous saturated fiber conforming to ASTM D1751, one-half inch ($\frac{1}{2}$ ") thickness. Provide manufacturer's certification of compatibility with specified sealants where required.
 2. Exterior Use Where Sealants Are Not Specified: Pre-molded asphalt and fiber conforming to ASTM D994, one-half inch ($\frac{1}{2}$ ") thickness.
 3. Water Stops: Provide flat, dumbbell type or center bulb type water stops at construction joints and other joints as indicated. Size to suit joints, but no less than six inches (6").
- C. Water Stops: Provide flat, dumbbell type or center bulb type water stops at construction joints and other joints as indicated. Size to suit joints, but no less than six inches (6").
1. Rubber Water Stops: Corps of Engineers CRD-C513.
 - a. Subject to compliance with requirements, provide products of one (1) of the following manufacturers:
 1. Burke Company
 2. Edoco Technical Products
 3. Williams Products
 2. Polyvinyl Chloride Water Stops: Corps of Engineers CRD-C572
 - a. Subject to compliance with requirements, provide products of one (1) of the following manufacturers:
 1. Burke Company
 2. Edoco Technical Products
 3. Progress Unlimited
- D. Curing Compounds: Unless otherwise indicated on ARCH or structural plans referenced to curing compound refers to a dissipating resin compound.
1. Curing and Sealing Compound: (VOC Compliant) Federal Specification TT-C-800A, thirty percent (30%) solids content minimum, and have test data from an independent laboratory indicating a maximum moisture loss of 0.030 grams per sq. cm. when applied at a coverage rate of 300 sq. ft. per gallon. Manufacturer's certification required.

- a. Subject to compliance with requirements, provide one (1) of the following:
 1. "Kurez Vox" – Euclid Chemical Company
 2. "Super-Rez Seal" or "Super Pliocure" – Euclid Chemical Co.
 3. "Master Kure 30" – Master Builders
2. Dissipating Resin Compound: ASTM C309, Type I. The film must chemically break down in a two- to four-week (2-4 wk.) period allowable moisture loss shall not exceed 0.030 g/sq.cm
 - a. Subject to compliance with requirements, provide one (1) of the following:
 1. "W.B. Resin Cure = 30%" - Conspec Marketing & Manufacturing Co., Inc.
 2. "Kurez DR" - Euclid Chemical Co.
 3. "Masterseal" - Master Builders
3. Curing and Hardening Compound: Sodium silicate compound. Use for remedial curing and hardening subject to acceptance by Architect and Structural Engineer.
 - a. Subject to compliance with requirements, provide one (1) of the following:
 1. "Conspec #21 – Conspec Marketing & Manufacturing Co., Inc.
 2. "Eucosil" - Euclid Chemical Co.
 3. "ChemHard" - L&M Construction Chemicals
 4. "Saniseal" - Master Builders
- E. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately nine ounces (9 oz.) per sq. yd., complying with AASHTO M182, Class 2.
- F. Moisture-Retaining Cover: One (1) of the following, complying with ASTM C171:
 1. Waterproof paper.
 2. Polyethylene film.
 3. Polyethylene-coated burlap.
- G. Clear Penetrating Sealer: Material suitable for application on horizontal surfaces containing not less than twenty percent (20%) siloxane or forty percent (40%) silane in mineral spirits or alcohol-based carrier. Provide certification of ninety percent (90%) chloride screen effectiveness when tested in accordance with the procedure of NCHRP Report No. 244, "Southern Climate Exposure" at manufacturer's recommended rate of application.
 1. Subject to compliance with requirements, provide one (1) of the following:
 - a. "Chem-Treat BSM40" - Dynamit Nobel of America, Inc.

- b. "Consolideck SX" - ProSoCo, Inc.
 - c. "Enviro Seal 40" – Harris Specialty Chemicals, Inc.
- H. Surface Hardeners: Apply where indicated on Architectural or Structural plans.
- 1. Metallic Hardener: Mixture of specially processed and graded iron aggregate, Type III Portland Cement, and plasticizing agents.
 - a. Subject to compliance with requirements, provide one (1) of the following:
 - 1. "Euco-Plate" - Euclid Chemical Co.
 - 2. "Masterplate 200" - Master Builders
 - 2. Mineral Aggregate Hardener: Factory blended mixture of specially processed and graded mineral aggregate, Type I Portland Cement and plasticizing agents.
 - a. Subject to compliance with requirements, provide one (1) of the following:
 - 1. "Surflex" - Euclid Chemical Co.
 - 2. "Mastercron" - Master Builders
- I. Non-Slip Aggregate Finish: Provide fused aluminum oxide grits, or crushed emery, as abrasive aggregate for non-slip finish with emery aggregate containing not less than forty percent (40%) aluminum oxide and not less than twenty-five percent (25%) ferric oxide. Use material that is factory-graded, packaged, rust-proof and non-glazing, and is unaffected by freezing, moisture, and cleaning materials. Apply where indicated on architectural drawings.
- J. Colored Wear-Resistant Finish: Packaged, dry, combination of materials, consisting of Portland Cement, graded quartz aggregate, coloring pigments, and dispersing agents. Use coloring pigments that are finely ground, non-fading mineral oxides, inter-ground with cement. Color, as selected by Architect, unless otherwise indicated.
- 1. Subject to compliance with requirements, provide one (1) of the following:
 - a. "Surflex" - Euclid Chemical Co.
 - b. "Colorchron" - Master Builders
- K. Epoxy Products: Two-component material suitable for use on dry or damp surface, complying with ASTM C881, for use in all structural concrete repairs. Obtain prior approval of Architect and Structural Engineer as to methods and procedures.
- 1. Injection Epoxy: Subject to compliance with requirements, provide one (1) of the following:
 - a. "Fx-751 Hydro-Ester Low Modulus LV" - Fox Industries
 - b. "Sikadur 35, Hi Mod LV" - Sika Chemical Corp.

2. Epoxy Mortar: Subject to compliance with requirements, provide one (1) of the following:
 - a. "Concresive 1310" - Adhesive Engineering Co.
 - b. "Euco Thin Coat" or "Euco Concrete Coat" - Euclid Chemical
 - c. Co. "Sikatop Sikatoe 121 and 122" - Sika Chemical Corp
3. Epoxy Adhesive: Subject to compliance with requirements, provide one (1) of the following:
 - a. "Euco Epoxy #463" - Euclid Chemical Co.
 - b. "Sikadur 32 Hi-Mod" - Sika Chemical Corp.
4. Watertight Joint Compound: Subject to compliance with requirements, use one (1) of the following:
 - a. "Euco Epoxy #452" - Euclid Chemical Co.
 - b. "Sidadur Hi-Mod" - Sika Chemical Corp
- L. Epoxy Joint Filler: Three-component, one hundred percent (100%) solids epoxy compound, with a minimum shore D hardness of fifty (50).
 1. Subject to compliance with requirements, provide one (1) of the following:
 - a. "Euco Epoxy #600 or #700" - Euclid Chemical Co.
 - b. "Sikadur Lo-Mod" - Sika Chemical Corp.
- M. Bonding Compound: Polyvinyl acetate, rewettable type. Interior usage only.
 1. Subject to compliance with requirements, provide one (1) of the following:
 - a. "Euco Weld" - Euclid Chemical Co.
 - b. "Weldcrete" - Larson Co.
 - c. "Sikabond" - Sika Chemical Corp.
- N. Bonding Admixture: Acrylic latex, non-rewettable type. Interior or exterior usage.
 1. Subject to compliance with requirements, provide one (1) of the following:
 - a. "SBR Latex" or "Flex-Con" - Euclid Chemical Co.
 - b. "Daraweld C" - W.R. Grace Co.
 - c. "Acryl 60" - Standard Dry Wall
- O. Underlayment Compound: Free-flowing, self-leveling, pumpable cementitious base compound. Seven (7) day minimum strength = 4000 psi.
 1. Subject to compliance with requirements, provide one (1) of the following:
 - a. "SilFlo 300" - Silpro Corp.
 - b. "Flo-Top" - Euclid Chemical Co.
 - c. "Pourcrete" - Master Builders

P. Under slab vapor retarder:

1. Subject to compliance with requirements, provide the following:
 - a. Stego Wrap Vapor Barrier (15-mil) by Stego Industries LLC., with required seam, sealing, and penetration accessories. Products of equal quality and performance acceptable with Owner's and Architect's approval.

Q. Below grade insulation:

1. Subject to compliance with requirements, provide the following:
 - a. Extruded Polystyrene Board Insulation: Owens Corning Foamular Extruded Polystyrene (XPS) or equal.
 - b. Comply with ASTM C578, Type IV, 25 psi minimum compressive strength, 1.55 lb/cu. ft. (26 kg/cu. m)
 - c. Thermal Resistance: (180-day real-time aging as mandated by ASTM C578, measured per ASTM C518 at mean temperature of 75°F): R-5.0, 5.6 per inch of thickness, with ninety percent (90%) lifetime limited warranty on thermal resistance.
 - d. Blowing Agent Formulation: Zero (0) ozone depleting.
 - e. Surface Burning Characteristics (ASTM E84): Flame spread less than twenty-five (< 25), smoke developed less than 450, certified by independent Third Party such as Underwriters Laboratories (UL).
 - f. Indoor Air Quality: Compliance certified by independent third party such as GREENGUARD Indoor Air Quality Certified® and/or GREENGUARD Children and Schools CertifiedSM.
 - g. Recycled Content: Minimum twenty percent (20%), certified by independent third party such as Scientific Certification Systems.
 - h. Warranty: Limited lifetime warranty covering all ASTM C578 physical properties.

R. Non-Shrink Grout:

1. Subject to compliance with requirements, provide one (1) of the following:
 - a. SikaGrout 428 FS – Sika USA.
 - b. NS Grout – Euclid.

2.06 PROPORTIONING AND DESIGN OF MIXES

- A. Strength: Proportion mixes to attain compressive strengths as indicated on the drawings in twenty-eight (28) days unless higher strengths are specified herein. Strength requirements for high-early strength concrete based on seven (7) day compressive strength.

- B. Durability: Conform to ACI 301 3.4 as modified herein.
1. Concrete Exposed to Weather or Freeze-Thaw Cycles such as paving, site work, loading docks, and exterior slabs: Meet requirements of ACI 301 3.4.1.
 2. Concrete Exposed to Deicers or Other Aggressive Chemicals: Meet requirements of ACI 301 3.4.3 except that normal weight concrete shall have a water-cement ratio not exceeding 0.40.
- C. Slump Limits: Slump of concrete, measured at point of placement, shall fall within the following limits:
1. Concrete Containing HRWR (Superplasticizer): Eight inches (8") maximum unless otherwise directed by the Architect or Structural Engineer.
 2. All Other Structural Concrete: Four inches (4") maximum.
- D. Minimum Cementitious Materials Content (Portland Cement plus Fly Ash and/or blast furnace slag):
1. Interior slabs on Ground and Slip Formed Concrete Elements: 517 lbs. per cu. yd.
 2. City Sidewalks: 564 lbs. per cu. yd.
 3. Concrete exposed to freezing and thawing:
 - a. 564 lbs. per cu. yd. $f_c' = 4000$ psi
 - b. 607 lbs. per cu. yd. $f_c' = 4500$ psi
 - c. 650 lbs. per cu. yd. $f_c' = 5000$ psi
 4. All Other Structural Concrete: 470 lbs. per cu. yd.
- E. Fly Ash/Portland Cement Replacement: See Section 2.04 Item A.3
- F. Concrete for Floors: Conform to ACI 301 3.14 as modified herein.
1. Parking slabs, vehicular ramps, and loading docks exposed to freezing and thawing or deicing salts: Class 4, $f_c' = 4000$ psi except that the maximum water-cement ratio shall be 0.40 and minimum concrete cover shall be two inches (2").
 2. All other floor slabs, $f_c' = 4000$ psi. (U.M.O.)
- G. Selection of Proportions: Use method of ACI 301 3.9. Proportioning based on method of ACI 301 3.10 not allowed.
1. Field test records used for documentation of the average strength produced by a proposed mix in accordance with ACI 301 3.9.3.2 shall, in addition to the requirements there listed, comply with the following:
 - a. The test record shall represent production concrete from a single design mix, produced during the past year, and may be composed of thirty (30) or more consecutive tests.

- b. The test record shall represent concrete made with identical materials and proportions (including admixtures) to the proposed mix.
 - c. The test record shall represent concrete proportioned to produce the maximum slump allowed by these specifications, and for air-entrained concrete, within plus/minus one-half percent (+/- 0.5%) of the maximum air content allowed.
- 2. Mixes proportioned on the basis of trial mixtures shall meet the provisions of ACI 301 3.9.3.3.
- H. Air Entrainment: (Non-Latex Modified Concrete)
- 1. For nominal maximum aggregate size of three-quarters ($\frac{3}{4}$), total air content to be four- and one-half percent to seven- and one-half percent ($4\frac{1}{2}\%$ - $7\frac{1}{2}\%$).

PART 3 – EXECUTION

3.01 GENERAL

- A. Perform concrete work in accordance with ACI 301 except as specified herein and on the drawings.
- B. Use ready-mixed concrete conforming to ASTM C94; no job-mixed concrete allowed.

3.02 CONCRETE CAST ON EARTH

- A. Preparation:
 - 1. Foundation Bearing Surfaces: Excavate to smooth, level surface in undisturbed, natural soil unless otherwise indicated or accepted by the Geotechnical Engineer.
 - 2. Slab Subgrade: Underslab surfaces shall be fine graded to smooth, level surface prior to installation of slab forms.
 - 3. Vapor Barrier: Install where indicated on drawings at slabs-on-grade.
 - 4. Earth Cuts: When using earth forms, hand trim sides and bottoms, square edges, and remove loose dirt prior to placing concrete.
- B. Inspection: All foundation bearing surfaces shall be inspected and accepted by the Soils Engineer prior to start of formwork.

3.03 FORMWORK

- A. General:
 - 1. Design, construct, brace, and maintain formwork in accordance with ACI 301 and ACI 347 as modified herein.

2. Fabricate forms for easy removal. Provide crush plates or wrecking plates where stripping may damage concrete surfaces. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to facilitate removal.
 3. Provide temporary openings where interior area of formwork is inaccessible for clean out, for inspection before concrete placement, or for placement of concrete. Securely brace temporary openings and seal to forms to prevent loss of concrete mortar.
 4. Composite beams that require temporary shoring shall remain shored until the slab has attained seventy-five percent (75%) of twenty-eight (28) day design strength. At least two (2) levels of temporary shoring shall be used to support a floor on which concrete is being placed.
- B. Preparation of Form Surfaces:
1. Clean reused forms of concrete matrix residue, repair and patch as required to return forms to acceptable surface condition.
 2. Coat contact surfaces of forms with specified form-coating compound before reinforcement is placed in conformance with manufacturer's instructions.
 3. Thin form-coating compounds only in conformance with manufacturer's instructions. Do not allow excess form-coating material to accumulate in forms or to come into contact with concrete surfaces against which fresh concrete will be placed.
- C. Void Spaces: Contractor shall be solely responsible for providing void spaces of full size and extent shown on the drawings. Specified void forms may be used at the Contractor's option. Where used, such forms shall be placed in the largest pieces practical and shall be adequately secured in place with joints sealed to prevent leakage of concrete into the void space. Contractor shall provide evidence satisfactory to the Structural Engineer that proper void spaces have been provided.
- D. Chamfer Strips: Install forty-five degree (45°) chamfer strips at exposed outside corners. Install chamfer strips at internal corners and edges of formed joints as detailed.
- E. Rustication Strips: Install as shown in the drawings. Securely nail within the forms using finish nails.
- F. Architectural Finish Concrete:
1. Sandblasted Finish Concrete: Construct forms with new high density overlay plywood, with joints regularly spaced and held to a minimum both horizontally and vertically. Install cone ties in a regular pattern acceptable to the Architect with no tie located within two inches (2") of the edge of the pour. Between formwork joints at all exposed outside corners, install one-eighth inch by three-quarter inch ($\frac{1}{8}$ " x $\frac{3}{4}$ ") compressible form tape to prevent leakage of mortar from forms.
 2. Form Liner: Install form liners using methods and materials recommended by the form liner manufacturer.

- G. Inspection of Formwork: All formwork surfaces that will provide the finish surface of exposed concrete must be approved by the Architect before depositing concrete.

3.04 PLACING REINFORCEMENT

A. General:

1. Comply with Concrete Reinforcing Steel Institute's "Recommended Practice for Placing Reinforcing Bars," and as herein specified.
2. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.
3. Accurately position, support, and secure reinforcement against displacement by construction or concrete placement operations with metal chairs, runners, bolsters, spacers, hangers, or other means acceptable to the Structural Engineer. On vertical formwork, use approved bar chairs or spacers as required to maintain proper concrete cover and bar position.
4. Install reinforcement to tolerances given in ACI 301 5.4.
5. Install welded wire fabric in the longest lengths practical. Lap adjoining pieces at least one full mesh and wire together. Offset end laps in adjacent widths to prevent continuous laps.
6. Handling of Epoxy-Coated Bars: All systems for handling coated bars shall have padded contact areas. All bundling bands shall be padded.

- B. Welding of Reinforcement: Welding reinforcing bars not permitted except where specifically indicated. Protect exposed bars intended for bonding with future construction from corrosion by providing adequate covering.

- C. Field Bending of Reinforcement: Reinforcement partially embedded in concrete shall not be field bent except as shown on the drawings or specifically permitted by the Structural Engineer.

- D. Inspection of Reinforcement: Completed installation of concrete reinforcement must be accepted by the Testing Agency before depositing concrete.

3.05 INSTALLATION OF EMBEDDED ITEMS

A. General:

1. Coordinate work with requirements of other trades and notify Architect and Structural Engineer of all conflicts and nonconforming conditions.
2. Coordinate the requirements for installation of embedded items specified and furnished in other sections of the specifications. Obtain templates and instructions for setting embedded items.
3. Do not install sleeves in concrete slabs, beams, walls, or columns except where shown on the structural drawings or approved by the Architect and Structural Engineer.

- B. Embedded Pipes and Conduits: Conform to requirements of ACI 318 6.3.

- C. Anchor Bolts, Inserts, Form Blockouts, and other items built into the concrete shall be securely fastened to formwork or held in place with templates. Insertion into concrete after casting is not allowed.
- D. Dovetail Slots: Install in formwork whenever masonry abuts concrete such as brick ledges, or surfaces to receive masonry veneer, intersections of masonry walls with concrete walls or columns. At wall intersections, install one (1) vertical slot for each eight inches (8") of masonry wall width. At brick ledges, or concrete backup, install vertical slots at sixteen inches (16") on-center.

3.06 JOINTS

- A. Construction Joints in Formed Elements:
 - 1. General: Locate and install construction joints as indicated on the drawings or, if not shown on drawings, locate so as not to impair strength or appearance of the structure. Submit construction joint locations not shown on drawings to Architect and Structural Engineer for acceptance.
 - 2. Keyways: Provide keyways as detailed on the drawings. Where not detailed, provide one- and one-half inch (1-½") minimum depth continuous keyways in all construction joints in walls and slabs and between walls and footings.
 - 3. Place construction joints in the center one-third of spans of beams and girders unless indicated otherwise. Continue reinforcement across construction joints. Submit construction joint locations not shown on the drawings for Structural Engineer's acceptance.
 - 4. Water Stops: Provide water stops in construction joints continuously at all construction joints below grade. Install water stops to form continuous diaphragm in each joint. Make provisions to support and protect exposed water stops during progress of work. Fabricate field joints in water stops in accordance with manufacturer's instructions.
- B. Joints in Slabs on Ground:
 - 1. Construction Joints: Form joints as shown on the drawings or with specified slab construction joint form.
 - 2. Control (Contraction) Joints: Construct joint by saw cutting or with specified slab control joint form. Make saw cuts as soon as possible after placing concrete without dislodging aggregate and to a depth of one-quarter (¼) of the slab thickness.
 - 3. Isolation Joints: Separate slabs from vertical surfaces with specified expansion joint material unless otherwise shown on the drawings. Refer to drawings for special isolation joint details.
 - 4. Interior Slabs on Grade to Receive Floor Covering: Construct slabs in as large a placement area as practical. Locate construction joints on column center lines. Provide control joints at column center lines and at intervals not more than twenty feet (20') each way.

5. Exposed Interior Slabs on Grade: Locate construction joints on column center lines. Provide control joints at column center lines and at intervals not more than fifteen feet (15') each way.
- C. Joints in Suspended Slabs: Locate construction joints in the center of the slab span between two framing members. Joints to be parallel to supporting elements unless otherwise shown or accepted. Continue all reinforcement across joints uninterrupted. Submit construction joint locations not shown on drawings to Architect and Structural Engineer for acceptance.
- D. Bonding of Construction Joints: Apply specified watertight joint compound in accordance with manufacturer's instructions at all joints required to be watertight in areas below grade.
- E. Doweled Connections to Existing Work: In locations where, new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solidly with specified non-shrink grout or epoxy as directed by the Structural Engineer.

3.07 BELOW GRADE THERMAL INSULATION

- A. Install Insulation after subsurface has been prepared per the manufacturer's specification. Subsurface to be thoroughly tamped and vapor retarder placed.
- B. Lay insulation in place with edges pressed together and butting the foundation wall or adjacent vertical insulation.
- C. For vertical installation follow manufacturer's requirements for positioning and securement.

3.08 SUB SLAB VAPOR BARRIER

- A. Preparation:
 1. Ensure that subsoil is approved by Architect or Geotechnical Engineer.
 2. Level and compact base material.
- B. Installation:
 1. Install vapor barrier in accordance ASTM E1643.
 2. Unroll vapor barrier with the longest dimension parallel with the direction of the concrete placement and face laps away from the expected direction of the placement whenever possible.
 - a. Extend vapor barrier to the perimeter of the slab. If practicable, terminate it at the top of the slab, otherwise (a) at a point acceptable to the structural engineer or (b) where obstructed by impediments, such as dowels, water stops, or any other site condition requiring early termination of the vapor barrier. At the point of termination, seal vapor barrier to the foundation wall, grade beam or slab itself.
 - b. Seal vapor barrier to the entire perimeter wall or footing/grade beam with double sided StegoTack Tape, or both Stego Term Bar and

- StegoTack Tape, per manufacturer's instructions. Ensure the concrete is clean and dry prior to adhering tape.
- c. Overlap joints six inches (6") and seal with manufacturer's seam tape.
 - d. Apply seam tape/Crete Claw to a clean and dry vapor barrier.
 - e. Seal all penetrations (including pipes) per manufacturer's instructions.
 - f. For interior forming applications, avoid the use of non-permanent stakes driven through vapor barrier. Use Beast Form Stake and Beast Foot as a vapor barrier-safe forming system. Ensure Beast Foot's peel-and-stick adhesive base is fully adhered to the vapor barrier.
 - g. If non-permanent stakes must be driven through vapor retarder, repair as recommended by vapor retarder manufacturer.
 - h. Use reinforcing bar supports with base sections that eliminate or minimize the potential for puncture of the vapor barrier.
 - i. Repair damaged areas with vapor barrier material of similar (or better) permeance, puncture and tensile.
 - j. For vapor barrier-safe concrete screeding applications, install Beast Scream (vapor barrier-safe screed system) per manufacturer's instructions prior to placing concrete.

3.09 CONCRETE PLACEMENT

- A. Preplacement Inspection: Formwork installation, reinforcing steel placement, and installation of all items to be embedded or cast-in to be verified by the Contractor prior to placement.
- B. General: Comply with ACI 301, ACI 304, and as herein specified.
 - 1. Do not place concrete in free-standing water, over ice, or on frozen subgrade.
- C. Conveying: Convey concrete from the mixer to point of deposit without segregation.
- D. Placing:
 - 1. Wet exposed subgrade, masonry filler units, precast concrete, previously placed concrete, and uncoated wood forms immediately prior to placing concrete (except during freezing temperatures).
 - 2. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.

3. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than twenty-four inches (24") and in a manner to avoid inclined joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
 - a. Guide the flow of concrete in walls and columns for vertical drop between the reinforcing. Free fall, except in walls and columns, shall not exceed five feet (5') Free fall in walls and columns shall not exceed ten feet (10') without prior acceptance by Structural Engineer.
 4. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
 - a. Continuous intermediate screed strips at intervals not greater than fifteen feet (15') set prior to concrete placement are required. For slabs cast over metal deck, place screeds along beam lines. Set screeds and adjust as necessary to achieve proper slab elevation and minimum thickness, allowing for beam camber and deflection of deck and framing members.
 5. Topping: Protect base surface from oil, paint, dirt, or other contaminants. Mechanically remove prior to topping placement. Thoroughly dampen base surface and leave free of standing water prior to placement. Place concrete as specified for slabs.
 6. Do not add water to compensate for slump loss at fiber reinforced concrete that does not contain a superplasticizer.
- E. Consolidating:
1. Maintain one (1) standby vibrator for every three vibrators used.
 2. Consolidate placed concrete by internal vibrating equipment with a minimum frequency of 7000 rpm, supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.
 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least six inches (6") into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.
 4. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

3.10 FINISH OF FORMED SURFACES

- A. Definitions: Refer to ACI 301 Chapter 10, for formed surface finish definitions.
- B. Provide formed surface finishes as defined on the Architectural drawings.

3.11 SLAB SURFACE FINISHES

- A. Definitions: Refer to ACI 301 11.7 for definition of slab surface finishes.
- B. Provide broom finish on slab surfaces in the direction perpendicular to traffic. Do not over-finish the concrete surface. Follow the guidelines of ACI 325.9R, the Guide for Construction of Concrete Pavements, for finishing precautions. See Section 3.12B for specific slab levelness requirements.

3.12 CONCRETE CURING, PROTECTION AND SURFACE TREATMENTS

- A. General:
 - 1. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Maintain concrete with minimal moisture loss at a relatively constant temperature for the period necessary for hydration of the cement and hardening of concrete.
 - 2. Curing shall commence as soon as free water has disappeared from the concrete surface after placing and finishing. The curing period shall be seven days for all concrete except high-early strength concrete which shall be cured for three (3) days minimum, unless test cylinders, made and kept adjacent to the structure and cured by the same methods, are tested with the average compressive strength equal to seventy percent (70%) of the specified twenty-eight (28) day strength.
 - 3. Curing shall be in accordance with ACI 301 procedures. Avoid rapid drying at the end of the curing period. During hot and cold weather, cure concrete in accordance with ACI 305 and ACI 306.
- B. Curing Methods: Perform curing of concrete by moisture curing, by moisture-retaining cover curing, by curing compound, and by combinations thereof, as herein specified. The Contractor shall choose a curing method that is compatible with the requirements for subsequent material usage on the concrete surface. The curing period shall be seven days minimum for all concrete except high early strength concrete which shall be cured for three (3) days minimum, unless test cylinders, made and kept adjacent to the structure and cured by the same methods are tested with the average compressive strength equal to seventy percent (70%) of the specified twenty-eight (28) day strength.
 - 1. Provide moisture curing when specified by one of the following methods:
 - a. Keep concrete surface continuously wet by covering with water.
 - b. Continuous water-fog spray.
 - c. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping it continuously wet. Place absorptive cover to provide coverage of concrete

- surfaces and edges, with four-inch (4") lap over adjacent absorptive covers.
2. Provide moisture-cover curing as follows:
 - a. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practical width with sides and ends lapped at least three inches (3") and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 3. Provide dissipating curing and sealing compound to interior slabs with resilient flooring, carpet over cushion, or left exposed, and to exterior slabs, walks and curbs as follows:
 - a. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within thirty minutes [30 mins.]). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Re-coat areas subjected to rainfall within three hours (3 hrs.) after initial application.
 - b. Maintain continuity of coating and repair damage during curing period.
 - c. Use moisture curing as specified above in lieu of membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete such as liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring (such as ceramic or quarry tile, glue-down carpet), painting, and other coatings and finish materials.
- C. Curing Formed Surfaces: Where wooden forms are used, cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. When forms are removed, continue curing by methods specified above for specified curing time.
- D. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of appropriate curing method.
 1. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.
- E. Surface Treatments: Apply specified surface treatments in areas shown on the architectural drawings in accordance with manufacturer's instructions and as specified below:
 1. Apply Metallic Hardener at a rate of 1.5 lbs. per sq. ft.
 2. Apply Mineral Aggregate Hardener at a rate of 1.0 lbs. per sq. ft.
- F. Environmental Conditions: See Section 1.8 for cold and hot weather concreting requirements.

3.13 FORM REMOVAL AND RESHORING

- A. Removal of Forms: Supplement and Modify ACI 301 as follows:
1. ACI 301 4.5.4: Formwork not supporting weight of concrete such as sides of beams, walls, columns and similar parts of the work, may be removed after cumulatively curing at not less than fifty degrees Fahrenheit (50°F) for twenty-four hours (24 hrs.) after placing the concrete, provided the concrete is sufficiently cured to be undamaged by form removal operations, and provided that supplementary curing and protection is provided for the exposed concrete.
 2. ACI 301 4.5.5: Formwork supporting weight of concrete such as beam soffits, joists, slabs and other structural elements may not be removed in less than fourteen (14) days or until concrete has attained seventy-five percent (75%) of twenty-eight (28) day design strength.
 - a. Form removal time may be altered if a reshoring program is used, which is acceptable to the Architect and Structural Engineer.
 - b. Compressive strength of cast-in-place concrete shall be determined by testing field-cured concrete specimens' representative of the concrete location for the members in question.
 - c. Field-cured concrete specimens (if required by the Contractor for early form removal) shall be made and tested by the Owner's testing facility and paid for by the Contractor.
 3. ACI 301 4.5.6: Form facing material may be removed four (4) days after placement only if shores and other vertical supports have been designed and arranged to permit removal of form facing material without loosening or disturbing shores and supports.
- B. Reshoring: (Supplement and Modify ACI 301 as follows):
1. ACI 301 4.6: Remove shores and reshore in a planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to safely support the work without excessive stress or deflection.
 2. Keep reshores in place a minimum of fifteen (15) days after placing upper tier, and longer if required until the concrete has attained its required twenty-eight (28) day strength and until heavy loads due to construction operations have been removed.

3.14 REPAIR OF SURFACE DEFECTS

- A. Formed Surfaces:
1. Allow Architect or Structural Engineer to observe concrete surfaces immediately upon removal of forms.
 2. Modify or replace concrete not conforming to required lines, details, and elevations.

3. Repair or replace concrete not properly placed resulting in excessive honeycombing and other defects. Patch, repair, or replace exposed architectural finished concrete as directed by the Architect.
 4. Patching of tie holes is required. At areas exposed to view only.
 5. Repair defects in structural concrete elements as follows:
 - a. Deep Defects Exposing Reinforcing: Chip to sound concrete and clean thoroughly to remove all loose concrete and dust. Apply thin coat of specified epoxy adhesive. Form and pour, or dry pack with specified non-metallic, non-shrink grout, prior to development of tack-free condition of epoxy adhesive. Strip forms after grout has hardened and provide specified finish. Moist cure or apply specified clear curing and sealing compound immediately after finishing.
 - b. Defects Greater Than One-Half Inch ($> \frac{1}{2}$ ") Depth Not Exposing Reinforcing: Chip, clean, and apply specified epoxy adhesive. Dry pack using specified non-metallic, non-shrink grout prior to development of tack-free condition of epoxy adhesive. Provide specified finish and cure as specified above.
 - c. Defects Less Than One-Half Inch ($< \frac{1}{2}$ ") Depth and Tie Holes: For concrete having a specified compressive strength of 5,000 psi or less: Chip and clean as specified above. Dry pack, finish, and cure as specified above.
 1. For concrete having a specified compressive strength greater than 5,000 psi: Chip and clean as specified above. At Contractor's option, dampen surface and apply specified epoxy mortar, followed by specified finish (no curing required); or apply thin coat of the specified bonding compound followed by dry pack, finish and cure as specified above.
 - d. Other equivalent repair procedures may be used subject to review and acceptance by the Architect and Structural Engineer.
- B. Unformed Surfaces:
1. Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness using a template having required slope.
 2. Correct high areas in unformed surfaces by grinding or other methods acceptable to the Architect after concrete has cured a minimum of fourteen (14) days.

3. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend with adjacent concrete. Where acceptable to the Architect and Structural Engineer, the specified underlayment compound, applied in accordance with the manufacturer's instructions, may be used.
4. Repair defective areas, except random cracks and single holes not exceeding one-inch (1") diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with a least three-quarter inch ($\frac{3}{4}$ ") clearance all around. Dampen concrete surfaces in contact with patching concrete and apply specified bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
5. Repair isolated random cracks and single holes not over one-inch (1") in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned surfaces and apply specified bonding compound. Mix dry pack, consisting of one (1) part Portland Cement to two- and one-half ($2\frac{1}{2}$) parts fine aggregate passing a No.16 mesh sieve, using only enough water as required for handling and placing. Place dry pack after bonding compound has dried. Compact dry pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than seventy-two hours (72 hrs.).

3.15 TOLERANCES

- A. Formed Surfaces and Building Lines: Conform to ACI 301 4.3, as modified and amended herein.
 1. Sleeves and Blockouts in Shear Walls and Slip-Formed Elements:
 - a. Size: Plus one-half inch ($+ \frac{1}{2}$ "), Minus zero inch ($- 0$ ").
 - b. Location:
 1. Minimum dimension six inches (6") or larger: Plus/minus one-half inch ($\pm \frac{1}{2}$ ").
 2. Minimum dimension less than six inches (< 6 "): Locate in nearest open space between reinforcing, not less than one-inch (1") clear from nearest reinforcing bar.
 2. See drawings for tolerances for slip-formed elements.
- B. Slab Finishing Tolerances: Floor flatness (FF) and Levelness (FL) tolerances shall conform to the criteria listed below except Floor Levelness (FL) does not apply to slabs on unshored steel deck. Measure (FL) on shored floor slabs prior to removing shores.
 1. Scratch Finish:

- a. Scratch finish slab surfaces that are to receive concrete floor topping or mortar setting beds for tile, stone and other bonded applied cementitious finish flooring material.
 - b. After placing slabs, plane surface to a flatness number for the floor surface (FF) not less than fifteen (15) and a levelness number (FL) not less than thirteen (13). Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms or rakes. No less than eighty percent (80%) of the floor surface profile shall fall outside a plus or minus one-half inch (+/- 1/2") envelope within any ten foot (10'-0') length.
2. Float Finish:
- a. Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, and as otherwise indicated.
 - b. After screeding, consolidating, and leveling concrete slabs, does not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Check and level surface plane to a flatness number for the floor surface (FF) not less than twenty (20) and a levelness number (FL) not less than fifteen (15). Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surfaces to a uniform, smooth, granular texture.
 - c. No less than eighty percent (80%) of the floor surface profile shall fall outside a plus or minus five-sixteenths inch (+/- 5/16") envelope within any ten-foot (10'-0') length.
3. Trowel Finish:
- a. Apply trowel finish to monolithic slab surfaces to be exposed to view, and slab surfaces to be covered with wood flooring, resilient flooring, carpet, thin-set tile and stone, paint or other thin film finish coating system.

- b. After floating, begin first (1st) trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free or trowel marks, uniform in texture and appearance, and with a surface plane tolerance not exceeding three-sixteenths inch (3/16") in ten feet (10') when tested with ten-foot (10') straightedge or to be flatness number for the floor surface (FF) not less than twenty-five (25) and levelness number (FL) not less than twenty (20). Grind smooth surface defects which could telegraph through applied floor covering system. No less than eighty percent (80%) of the floor surface profile shall be outside a plus or minus one-quarter inch (+/- 1/4") envelope within any ten-foot (10'-0') length.
- C. Embedded Items: Unless noted otherwise on drawings, tolerances shall be as follows:
1. Anchor Bolts:
 - a. Adjacent anchor bolts in a group receiving a single fabricated setting piece: Plus/minus one-eighth inch (+/- 1/8").
 - b. Location and alignment of anchor bolt groups from designated location and alignment: Plus/minus one-quarter inch (+/- 1/4").
 2. Embedded Plates and Weldments:
 - a. Location: Plus/minus one-inch (+/- 1") vertical. Plus/minus two inches (+/- 2") horizontal.
 - b. Plumb and Alignment: One-quarter inch (1/4") in twelve inches (12").

3.16 EVALUATION AND ACCEPTANCE CRITERIA

- A. General:
1. Evaluation and acceptance of work under this section shall be in accordance with the provisions of ACI 301 Chapters 17 and 18.
- B. Floor Flatness:
1. Measurement Criteria:
 - a. FF defines the maximum floor curvature allowed over twenty-four inches (24"). Computed on the basis of successive twelve-inch (12" [300 mm]) elevation differentials, FF is commonly referred to as the "Flatness F Number".
$$FF = 4.45 / \text{Maximum difference in elevation in decimals of inches, between successive twelve-inch (12") elevation differences.}$$
 - b. FL defines the relative conformity of the floor surface to a horizontal plane as measured over a ten-foot (10' [30.5 mm]) distance. FL is commonly referred to as the "Levelness F Number".
$$FL = 12.5 / \text{Maximum difference in elevation in decimals of inches, between two (2) points separated by 120" (10'-0").}$$

- c. All floors shall be measured in accordance with ASTM E1155 "Standard Test Method for Determining floor flatness and levelness using the "F Number" system" (Inch-Pound Units). Measure instruments must be capable of measuring point elevations at twelve-inch (12") centers such as dipstick floor profile or F-meter.
- d. Floor tolerance compliance tests shall be performed by the testing agency within twenty-four hours (24 hrs.) after placement. Results will be reported to the architect and structural engineer not later than seventy-two hours (72 hrs.) after installation. All tests shall be performed before forms and shoring has been removed.
- e. Floor tolerance compliance testing shall be performed as follows:
- f. For all slab placements:
 - 1. Remedial action to floor surfaces not meeting flatness criteria specified herein will not proceed until test results have been reviewed by Structural Engineer. Any costs associated with remedial action will be at the contractor's expense.

3.17 MISCELLANEOUS CONCRETE REQUIREMENTS

- A. All other concrete work indicated on the drawings shall be provided and installed, even though not specifically mentioned herein, to complete the work, including the following:
- B. Anchors: Install anchors furnished under other sections in accordance with shop approved drawings and/or setting instructions.

END OF SECTION

SECTION 051200

STRUCTURAL STEEL

PART 1 GENERAL

1.01 GENERAL PROVISIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 DESCRIPTION OF WORK

- A. In general, the Contractor shall supply all labor, equipment, temporary protection, tools, and appliances necessary for the proper completion of the work as required in the Specifications, in accordance with good construction practice, and as required by the materials manufacturer, as amended.
- B. Structural Steel is that work defined in the American Institute of Steel Construction (AISC) "Code of Standard Practice for Steel Buildings and Bridges" and is otherwise indicated and sized on the Contract Drawings. Such work includes, but is not limited to, the following:
 - 1. Structural steel plates and angles
 - 2. Bolts, nuts, and washers
 - 3. Anchor bolts, nuts, and washers
- C. Fabrication and erection, including field welding, protection of adjacent structures, and general clean-up, required to attach and/or install new supplemental steel members and reinforcement as indicated on the Contract Drawings. Refer to Structural Drawings for additional information.
- D. Coordinate the work in this section with the appropriate trades to ensure the proper work sequence.
- E. Clean and restore all areas affected by the work.

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 030010 – Concrete Work
- B. Section 061000 – Rough Carpentry

1.04 MEASUREMENT AND FIELD VERIFICATION PROCEDURES

- A. All dimensions, quantities, and existing conditions shall be determined or verified by the Contractor. The Contract Drawings have been compiled from various sources and may not reflect the actual condition at the moment of construction. The Contractor is cautioned to take all precautions and make all investigations necessary to install the proposed work. The Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.

1.05 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
- B. AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings, (AISC Specifications)
 - 1. AISC 360-16 Specification for Structural Steel Buildings
 - 2. AISC 326-09 Detailing for Steel Construction
 - 3. AISC 303-10 Code of Standard Practice for Steel Buildings and Bridges
- C. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
 - 1. ASTM A36-14 Standard Specification for Carbon Structural Steel
 - 2. ASTM A325 Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
 - 3. ASTM F436 Standard Specification for Hardened Steel Washers
 - 4. ASTM F844 Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use
- D. AMERICAN WELDING SOCIETY (AWS)
 - 1. AWS A2.4 Standard Symbols for Welding, Brazing and Nondestructive Examination
 - 2. AWS D1.1 Structural Welding Code - Steel

1.06 SUBMITTALS

- A. Refer to Section 013300 – Submittal Procedures for additional information.
- B. Provide a project specific safety plan and job hazard analysis.
- C. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.
- D. Shop Drawings:
 - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.

2. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
 3. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
 4. For structural-steel connections indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- E. Erection plan of the structural steel members and reinforcement required. Erection plan shall conform to the requirements of AISC 303, shall be submitted prior to erection, and shall describe all necessary temporary supports, including the sequence of installation and removal.
- F. A copy of the AISC certificate indicating that the fabrication plant meets the specified structural steelwork category.
- G. Certified copies of welder qualifications test records showing qualification in accordance with AWS D1.1.
- H. Samples for Verification: Before erecting mockup, submit samples of the following:
1. Random samples of bolts, nuts, and washers as delivered to the job site if requested, taken in the presence of the Owner's representative, and provided to the Owner's representative for testing to establish compliance with specified requirements.
- I. Material Test Reports:
1. Structural steel including chemical and physical properties.
 2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
 3. Shop primers.

1.07 QUALITY ASSURANCE

- A. General: The Contractor shall establish a quality control system and shall perform sufficient inspection and tests of all items of work, including that of his subcontractors, to ensure conformance to the Contract Documents for materials, workmanship, construction, finish, functional performance and identification. The Contractor's quality control system is the means by which he assures himself that his construction complies with the requirements of the Contract Documents. Controls shall be adequate to cover all construction operations.
- B. Records: The Contractor shall maintain correct records on an appropriate form for all inspections and tests performed, instructions received from the Designer or Testing Agency, and actions taken as a result of those instructions. These records shall include evidence that the required inspections or tests have been performed (including type and number of inspections or tests, nature of defects, causes for

rejection, etc.), proposed or directed remedial action, and corrective action taken. The Contractor shall document inspections and tests as required by this section.

- C. Fabricator Qualifications: Experienced in fabrication of structural steel for projects of similar size and difficulty. Subject to approval of the Designer, Structural Engineer and Owner. The fabricator must have the current AISC Quality Certification. The qualified fabricator must participate in the AISC Certification Program and be designated an AISC Certified Plant, Category BU at time of bid.
- D. Erector Qualifications: A qualified installer who participates in the AISC Certification program and is designated an AISC Certified Erector, Category CSE at time of bid.
- E. Steel Detailer Qualifications: Steel detailers must have current AISC Certification. Steel detailers must be experienced in detailing structural steel for projects of similar size and complexity. Steel detailer must be experienced in detailing structural steel in accordance with AISC seismic provisions for structural steel buildings.
- F. Welder Qualifications: Welding shall be done only by welding operators currently qualified according to AWS D1.1.
- G. Testing Agency:
 - 1. The "testing agency" shall perform duties as required herein and serve as Special Inspector where so referenced in the SER's program of structural tests and inspections.
 - 2. Testing and inspection will be made by an approved testing laboratory selected and paid by the Owner. The Contractor shall furnish testing agency access to work, facilities and incidental labor required for testing and inspection. Retention by the Owner of an independent testing agency shall in no way relieve the Contractor of responsibility for performing all work in accordance with the contract requirements.
 - 3. Furnish the testing agency with the following:
 - a. A complete set of shop and erection drawings.
 - b. Information as to time and place of all rollings and shipment of material to shops.
 - c. Full and ample means and assistance for testing all material.
 - d. Proper facilities, including scaffolding, temporary work platforms, etc., for inspection of the work in the mills, shop and field.
 - e. Representative sample pieces requested for testing.
 - f. Mill tests reports.
 - 4. Each person installing connections shall be assigned an identifying symbol or mark, and all shop and field connections shall be identified so that the inspector can refer back to the person making the connection.

H. Reference Standards:

1. Design, Detailing, Fabrication and Erection: Meet requirements of AISC "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings," and AISC "Code of Standard Practice for Steel Buildings and Bridges." latest editions including supplements, except as amended below:
 - a. The AISC "Code of Standard Practice for Steel Buildings and Bridges," is amended as follows:
 - 1) Section 3.1 Structural Steel: Add a new second paragraph to this section as follows:
 - a) "Structural steel members shown on plans but not identified as to size, section or material grade will be included in the bid price for the work by assuming sizes, sections or material grades shown for similarly loaded members having approximately the same overall length. All such members, and their associated cost, will be identified in the bid for the work."
 - 2) Section 3.3 Discrepancies: Delete the sentence "In case of discrepancies between plans and specifications for buildings, the specifications govern."
 - 3) Section 3.4 Legibility of Plans: In the first sentence, delete the phrase "and made to a scale not less than 1/8-inch to the foot."
 - 4) Section 4.2.1: Delete the sentence "This approval constitutes the owner's acceptance of all responsibility for the design adequacy of any connections designed by the fabricator as part of his preparation of these shop drawings."
- I. Welding: Meet requirements of AWS Structural Welding Code D1.1, latest edition.
- J. High Strength Bolts: Meet requirements of AISC Specifications for Structural Joints Using ASTM A325 or A490 Bolts, latest edition.
- K. Surface Preparation: Meet requirements of specifications contained in Steel Structures Painting Council's Steel Structures Painting Manual, Volume 2, Systems and Specifications, latest edition.
- L. The Contractor shall be responsible for correctness of detailing, fabrication, and for the correct fitting of structural members. Connections, for any part of the structure not shown on the Contract Drawings, shall be considered simple shear connections, and shall be designed and detailed in accordance with pertinent provisions of AISC. Substitution of sections or modification of connection details will not be accepted unless approved by the Structural Engineer in writing.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
 - 1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
 - 2. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.09 PROJECT CONDITIONS

- A. The Contractor shall supply, install and maintain all shoring, supports, barriers, protection, temporary heat, warning lines, lighting and personnel required to support the structure, fixtures and facilities affected by his work and segregate the work area(s) from pedestrian or vehicular traffic, as well as to prevent damage to the building, occupants and the surrounding landscaped and paved areas.
- B. The building occupants are highly sensitive to fumes, odors, noise, and disturbances. The Contractor shall submit a detailed sequence schedule for the building area prior to the start of work and shall coordinate daily schedules with the Owner.
- C. Schedule and execute all work without exposing the interior building areas to inclement weather. Protect the existing building and its contents against all risks, and repair or replace all damage to the Owner's satisfaction.
- D. Coordinate the work in this section with the work by other trades to ensure the orderly progress of the work.
- E. Under no circumstances shall the Contractor remove existing materials and systems to the ground in an uncontrolled manner. Machinery or devices used shall be manufactured for this purpose. Adjacent buildings and property areas shall be protected from airborne debris.
- F. During removal operations, the Contractor is responsible for the containment of all dust, dirt, debris, overspray, and run-off resulting from the work. The Contractor shall collect and contain all materials and repair any resulting damage to adjacent surfaces, site fixtures or personal property. Specific attention is drawn to the use of chemicals and cleaners.
- G. Fully charged, inspected, and approved fire extinguishers shall be on site at all times. No cutting, grinding, or welding of any kind shall proceed without an approved, fully charged fire extinguisher.
- H. The Contractor shall utilize skilled and experienced specialty workers to install all aspects of the work.

1.10 CONTRACTOR GUARANTEE

- A. Upon completion of the work and prior to final payment, the Contractor shall submit a guarantee of their work as free from defect in materials and workmanship. The guarantee shall be for a period of two (2) years. The guarantee shall be signed by an officer of the Contractor's firm and sealed if a corporation.

1.11 WARRANTY

- A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official.
- B. See Division 01 Section "Description of Work" for the Contractor's warranty.

PART 2 PRODUCTS

2.01 MATERIALS

- A. All structural steel materials shall conform to the following requirements unless specified otherwise on the design drawings.
 - 1. Angles and Plates: ASTM A36.
- B. High-Strength Threaded Fasteners: Heavy hexagon torque control structural bolts, heavy hexagon nuts, and hardened washers, as follows:
 - 1. Bolts complying with ASTM A325, Type I
 - 2. Nuts complying with ASTM A563 Grade DH
 - 3. Hardened steel washers complying with ASTM F436
- C. Electrodes for Welding: Comply with AWS Code. E70 series unless otherwise noted.

2.02 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.03 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's "Specification for Structural Steel Buildings-Allowable Stress Design and Plastic Design." Welding shall comply with the latest provisions of AWS D1.1 Structural Welding Code – Steel.
 - 1. Camber structural-steel members where indicated.
 - 2. Mark and match-mark materials for field assembly.
 - 3. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
 - 1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.
- C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Holes: Provide holes required for securing other work to structural steel and for passage of other work through steel framing members.
 - 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 - 2. Base-Plate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
 - 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.04 SOURCE QUALITY CONTROL

- A. Engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.
 - 1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
- C. Bolted Connections: Shop-bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

PART 3 EXECUTION

3.01 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- B. Preparation of Existing Structural Members: Prepare and verify that the existing framing members to receive structural steel members have been prepared to receive the new steel and connections. Clean and remove existing paint and coatings from all mating surfaces.
- C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- D. Align and adjust various members forming part of complete frame or structure before permanently fastening or welding. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform

necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure as indicated on Contract Drawings.
 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Splice members only where indicated.
- F. Remove erection bolts on welded, architecturally exposed structural steel; fill holes with plug welds; and grind smooth at exposed surfaces.
- G. Do not use thermal cutting during erection unless approved by Designer. Finish thermally cut sections within smoothness limits in AWS D1.1.
- H. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.
- I. Temporary Bracing: The permanent lateral bracing system for each section bounded by expansion joints is not complete until all connections have been made up in all lateral system components of the building section. This may include the field connections of tie joists and joist girders to columns. Consider all structural steel in a building section as steel frames once the concrete slabs and non-composite metal decks are in place. Provide suitable temporary bracing as necessary to maintain structural steel in proper position until permanently secured. Leave temporary bracing in place as required for safety and until concrete slabs have reached 75% of design strength and all non-composite metal deck connections to steel members have been made.
- J. Field Modification: Written acceptance from the Structural Engineer must be obtained before using cutting torch for field modification or refabrication of structural steel. The structural steel fabricator shall be responsible for errors in fabrication and for correct fit in the field.
- K. Drilled-In Inserts: Install in accordance with manufacturer's recommendations in accurately drilled holes of required diameter and depth. Where epoxy-bonded inserts are used, thoroughly clean hole of all debris and drill dust prior to installation of insert and epoxy bonder. Do not drill holes in concrete or masonry until material has achieved full design strength.

3.02 VERIFICATION OF ERECTION TOLERANCES

- A. Surveys, made by a surveyor with experience on similar projects, employed by the General Contractor and acceptable to the Designer, Structural Engineer, and Owner, shall be made as follows:
1. Actual plan location at the top and bottom splice points of each column shall be determined immediately upon completion of each of the first four tiers erected and every third tier thereafter.
 2. Actual elevation at the top splice point of each column shall be determined immediately upon completion of every third tier.

3. Actual elevation at each support and at midspan of the top of all members framing into columns shall be determined prior to erection and/or installation of any materials over the top of the members.
- B. Survey reports shall be submitted to the Designer, Structural Engineer, and Owner within 24-hours after recording the date. Such reports shall, in addition, identify all deviations of member location and/or elevation in excess of allowable tolerances specified.
- C. Take necessary measures, and modify details and/or procedures as required, to correct any columns whose plan location or top elevation vary beyond allowable tolerances. Review of survey data by the Owner and/or his consultants is for verification of compliance with specified tolerances only and does not relieve the Contractor of responsibility for complying with all contract requirements.

3.03 FIELD CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 1. Joint Type: Snug tightened.

3.04 QUALITY CONTROL

- A. The Owner will engage an independent testing and inspection agency to inspect high strength bolted connections and welded connections to perform and test and to prepare test reports.
- B. Testing agency shall conduct and interpret tests and state in each report whether test specimens comply with requirements, and specifically state any deviations therefrom.
- C. Testing agency may inspect structural steel at shop before shipment; however, Structural Engineer reserves right, at any time before final acceptance, to reject material not complying with specified requirements.
- D. Any material or workmanship which is rejected by the Structural Engineer either in the mill, shop or field shall be replaced promptly to the satisfaction of the Structural Engineer.
- E. Corrective Work:
 1. Structural steel members or assembles having fabrication errors, exceed permissible tolerances, or which inspections or laboratory test reports have indicated to be not in compliance with specifications, shall not be allowed in the finished work. Such members or assemblies may be corrected if permitted by the Structural Engineer or the testing agency.
 2. Perform additional test(s), at the Contractor's expense, as may be necessary to reconfirm any non-compliance of original work, and as may be necessary to show compliance of corrected work.

3. Corrective work is to be done preferably in the shop, and in accordance with AISC and AWS requirements. When requested by the Structural Engineer, submit shop drawings, "for approval", showing details of proposed corrective work.
- F. Field-Bolted Connections: One half of the bolts in the twenty percent (20%) of the connections shall be tested by the testing agency. If one bolt in a connection fails, then all bolts in the connection will be tested. If more than 5% of the tested connections have a bolt which fails, additional testing will be done at the Contractor's expense. The additional tests shall be the testing of 20% of the untested connections in a similar manner.

3.05 SUPPORT OF OTHER WORK

- A. No permanent loading, other than the weight of supported metal deck and concrete slabs, shall be imposed on composite beams and girders until the concrete in such slabs has achieved 75 percent of its design strength, without prior approval by the Structural Engineer. The Contractor shall submit calculations prepared by a Structural Engineer registered in the State of Maine verifying the adequacy of the non-composite members to support the anticipated loading. All costs associated with the accommodation of such loading, including review of submittals and modification of structural members and/or details, shall be borne by the Contractor.

3.06 PROTECTING AND CLEANING

- A. Clean adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.07 CLEAN-UP

- A. The Contractor shall not demobilize the site until the completed work is toured by the Owner and Designer. Any unsatisfactory items observed will be reported in "punch-list" form. These items shall be corrected immediately by the Contractor prior to demobilization from the job site.
- B. All scaffolding, barriers, temporary facilities, and the like shall be removed upon completion of the work. Areas damaged as a result of the Contractor's equipment shall be restored to their original condition, all to the satisfaction of the Owner.
- C. Refer to the Close-Out Procedures described in Division 01 for additional information.

End of Section

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Structural and Building Envelope Upgrades
For the Green Barn at Dorthea Dix Psychiatric
656 State Street
Bangor, ME 04401
Gale JN 843180

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SECTION 061000

ROUGH CARPENTRY

PART 1 GENERAL

1.01 GENERAL PROVISIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SCOPE OF WORK

- A. In general, the Contractor shall supply all labor, materials, equipment, temporary protection, tools, and appliances necessary for the proper completion of the work in this Section, as required in the Specifications and in accordance with good construction practice and as required by the material manufacturer, as amended. The work under this Section generally includes the following:
1. Coordinate this work with all trades to provide orderly progress of the tasks.
 2. Install timber structural framing members where shown and as described on the Contract Drawings.
 3. Remove and replace timber structural framing members where shown and as described on the Contract Drawings.
 4. Remove and replace deteriorated wood deck planking with new one by six (1 x 6) rough sawn lumber. Refer to Section 012300 - Unit Prices.
 5. Remove and replace deteriorated exterior substrate wall boards with new one by six (1 x 6) rough sawn lumber. Refer to Section 012300 - Unit Prices.
 6. Furnish and install new five-eighths inch ($\frac{5}{8}$ ") CDX plywood roof deck overlay as described on the Contract Drawings
 7. Remove and replace exterior bridge wood decking with new two by six (2 x 6) pressure treated rough sawn lumber. Refer to Section
 8. Remove existing metal posts and railings from exterior bridge and furnish and install pressure treated wood timber posts and railings as described on the Contract Drawings
 9. Clean and restore all areas affected by the work.

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 024100 - Selective Demolition
B. Section 051200 – Structural Steel
C. Section 062013 – Exterior Finish Carpentry
D. Section 073126 – Slate Shingles

ROUGH CARPENTRY

E. Section 073126 – Synthetic Slate Shingles – Alternate No. 1

F. Section 099100 – Painting

1.04 UNIT PRICES

- A. Technical requirements for related Unit Price work are defined in this section. Refer to Division 01 Section “Unit Prices” for quantities to be carried in the Base Bid and provided on the Bid Form. Any work in addition to those shown on the Contract Drawings shall be either added or deducted based on the unit costs.

1.05 MEASUREMENT AND FIELD VERIFICATION PROCEDURES

- A. All dimensions, quantities, and existing conditions shall be determined or verified by the Contractor. The Contract Drawings have been compiled from various sources and may not reflect the actual condition at the moment of construction. The Contractor is cautioned to take all precautions and make all investigations necessary to install the proposed work. The Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.

1.06 SPECIAL JOB CONDITIONS

- A. The building is historic and involves the Maine Historical Preservation Commission (MHPC). Care shall be taken with the work so as not to adversely affect the historic conditions and the historic character of the Barn. The Contractor shall cooperate with MHPC and the Architect with any requests for modifications or corrections to any installed work that do not comply with these Contract Documents or meet historic repair and restoration standards.

1.07 JOB CONDITIONS

- A. All surfaces to receive the new timber framing shall be thoroughly dry. Should surface moisture such as dew exist, the Contractor shall provide the necessary equipment to dry the surface prior to application. Do not dry with open flames.
- B. Coordinate this work with the work described in other Sections of this Specification.
- C. Protect all existing new timber stored on site to prevent moisture absorption. Use tarps over the timber pile (top, sides, and bottom) elevated on pallets (one side lower to shed water).
- D. Verify condition and securement of existing timber framing designated to remain.
- E. If delays in the project exceeding one week (1 wk.) are anticipated due to inclement weather (or due to any other condition), all wood shall be stored in weatherproof box trailers or storage sheds in locations to be designated by the Owner.

1.08 REFERENCE STANDARDS

- A. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- B. APA – THE ENGINEERED WOOD ASSOCIATION
- C. NATIONAL DESIGN SPECIFICATION (NDS)
- D. AMERICAN FOREST AND PAPER ASSOCIATION (AFPA)
- E. AMERICAN WOOD PROTECTION ASSOCIATION (AWPA)

1.09 SUBMITTALS

- A. Submittals shall be made in accordance with the General Conditions and Section 013300 - Shop Drawings and Submittals.
- B. Shop Drawings:
 - 1. Provide temporary shoring shop drawings and calculations stamped by a Structural Engineer Registered Licensed in the State of Maine.
 - 2. Provide shop drawings for rough carpentry, and all associated connections and hardware.
- C. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for each type and species of wood and lumber, as indicated in the Contract Documents.
 - 2. Include data for each type of nail, fastener and connectors.
 - 3. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used, net amount of preservative retained, and chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.
 - 4. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials, both before and after exposure to elevated temperatures when tested according to ASTM D5516 and ASTM D5664.
 - 5. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
 - 6. Include copies of warranties from chemical treatment manufacturers for each type of treatment.
- D. Contractor to provide site safety plan and Job Hazard Analysis.

1.10 QUALITY ASSURANCE

- A. Forest Certification: Provide rough carpentry produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC's "Principles and Criteria for Forest Stewardship."

1.11 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, and other panels; place spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

1.12 GUARANTEE

- A. The Contractor shall supply the Owner with a minimum two-year (2-yr.) workmanship warranty for their work. In the event any work related to this section is found to be defective within two years (2 yrs.) of substantial completion, the Contractor shall remove and replace such at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 DIMENSIONAL LUMBER

- A. All lumber shall conform to the latest editions of the AFPA "National Design Specification for Wood Construction" and supplement "Design Values for Wood Construction".
- B. All framing lumber and blocking shall be of the following minimum grade and species for the specified use. All lumber shall be grade stamped by a recognized grading agency and shall be kiln dry Douglas Fir-Larch (North) No. 1, or better, with a minimum allowable bending stress of $F_b=1,400$ psi and a minimum modulus of elasticity of $E = 1,600,000$ psi. Dimensional lumber shall be formed to the dimensions shown on the Detail Drawings and as required for proper installation of the new work.
- C. All woodwork shall have a maximum moisture content of nineteen percent (19%) by weight on a dry weight basis. Kiln drying may be required to conform to maximum nineteen percent (19%) moisture content.
- D. For items of dimension lumber size, provide Construction, Stud, or No. 2 grade lumber with fifteen percent (15%) moisture content.

2.02 PLYWOOD SHEATHING

- A. Plywood Sheathing: APA PS 1 Exposure 1 sheathing, five-eighths inch (5/8") thick.

2.03 FASTENERS

- A. In general, all fasteners, anchors, nails, straps, and other accessories shall be of stainless steel (316 stainless steel), galvanized steel, or fluorocarbon coated steel. Galvanizing shall be hot dip in accordance with ASTM A153 Specifications. Electro-galvanized items shall not be used.

2.04 PRESERVATIVE TREATED

- A. Pressure treated wood members used for exterior application (bridge decking, bridge railing, etc.) shall be pressure treated with ACQ preservative, or approved equal, to a minimum retention of 0.25 to 0.40 PCF in accordance with AWPA C2.
- B. Mark each treated item with Quality Mark Requirements of inspection agency approved by ALSC's Board of Review.

- C. If cut after treatment, coat cut surfaces to comply with AWP A M4.
- D. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

- A. Discard units of material with defects that impair quality of carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.
- B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- C. Apply field treatment complying with AWP A M4 to cut surfaces of preservative-treated lumber and plywood.
- D. Securely attach carpentry work as indicated and according to applicable codes and recognized standards.
- E. Countersink fastener heads on exposed carpentry work and fill holes with wood filler.
- F. Use fasteners of appropriate type and length. Pre-drill members when necessary to avoid splitting wood.

3.02 INSTALLATION OF TIMBER FRAMING

- A. Refer to the Contract Drawings for written and illustrated description of timber framing removal and replacement.

3.03 PROTECTING AND CLEANING

- A. New timber framing shall be kept dry before, during and after installation.
- B. Clean adjacent construction using cleaning agents and procedures recommended by manufacturers of affected construction.
- C. Refer to close-out procedures described in Division One of these Specifications for additional information.

END OF SECTION

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SECTION 062013

EXTERIOR FINISH CARPENTRY

PART 1 – GENERAL

1.01 GENERAL PROVISIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SCOPE OF WORK

- A. In general, the Contractor shall supply all labor, materials, equipment, temporary protection, tools, and appliances necessary for the proper completion of the work in this Section, as required in the Specifications and in accordance with good construction practice and as required by the material manufacturer, as amended. The work under this Section generally includes the following:
1. Coordinate this work with all trades to provide orderly progress of the tasks.
 2. Remove and dispose of all existing wood clapboard siding, wood trim and mouldings, and associated wood siding components including but not limited to building paper, felts, nails and fasteners, sealants and mastics.
 3. Remove and dispose of all roof rake edge trim and mouldings.
 4. Remove and dispose of all existing wood window components, including trim, mouldings, sills, sash and glazing and hardware.
 5. Remove and dispose of all existing wood barn doors, including trim, mouldings, thresholds and hardware.
 6. Remove and dispose of all existing wood trim and mouldings at passage door.
 7. Remove and dispose of all existing wood trim and mouldings at overhead doors.
 8. Furnish and install new wood clapboard siding, wood trim and mouldings, and associated wood siding components including but not limited to weather resistant barriers, window and door membrane flashings, nails, fasteners, sealants and mastics as indicated on the Contract Drawings.
 9. Furnish and install new wood roof rake edge trim and mouldings.
 10. Furnish and install new wood components for all window openings including flexible self-adhered membrane flashings, and sheet metal flashings as indicated on the Contract Drawings. Coordinate this work with Sections 076200 – Sheet Metal Flashing and Trim and 085213 – Aluminum Clad Wood Windows.
 11. Furnish and install custom-built sliding and swinging wood barn doors, including exterior and interior wood trim, casings, mouldings, thresholds and hardware.

- a. The Barn door on Second Floor Level on the North Elevation will be fixed in the opening and be non-operable.
12. Furnish and install all exterior and interior wood trim, casings, mouldings for overhead doors openings. Coordinate this work with Sections 083613 – Overhead doors.
13. Furnish and install all exterior and interior wood trim, casings, mouldings for passage door opening. Coordinate this work with Section 081423 – Clad Wood Commercial Doors and Frames.
14. The existing eave trim, mouldings and beaded soffit panels are to remain, and are to be prepared for the application of new solid stain, and shall be protected from damage during the Work of the Contract Documents.
15. Construct mock-ups as specified in this section. The materials and mock-ups shall be reviewed and accepted by the Owner, MHPC and the Architect prior to proceeding with the construction of this specification section and all other sections relating to the mock-ups as specified.

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02 41 00 - Selective Demolition
- B. Section 06 10 00 - Rough Carpentry
- C. Section 07 62 00 - Sheet Metal Flashing and Trim
- D. Section 081423 – Clad Wood Commercial Doors and Frame
- E. Section 083613 – Overhead Doors
- F. Section 085213 – Aluminum Clad Wood Windows
- G. Section 09 91 23 - Painting

1.04 MEASUREMENT AND FIELD VERIFICATION PROCEDURES

- B. All dimensions, quantities, and existing conditions shall be determined or verified by the Contractor. The Contract Drawings have been compiled from various sources and may not reflect the actual condition at the moment of construction. The Contractor is cautioned to take all precautions and make all investigations necessary to install the proposed work. The Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.

1.05 SPECIAL JOB CONDITIONS

- A. The building is historic and involves the Maine Historical Preservation Commission (MHPC). Care shall be taken with the work so as not to adversely affect the historic conditions and the historic character of the Barn. The Contractor shall cooperate with MHPC and the Architect with any requests for modifications or corrections to any installed work that do not comply with these Contract Documents or meet historic repair and restoration standards.

1.06 JOB CONDITIONS

- A. The Contractor shall supply, install and maintain all shoring, supports, barriers, protection, temporary heat, warning lines, and lighting and personnel required to support the structure, fixtures and facilities affected by his work and segregate the work area(s) from pedestrian or vehicular traffic, as well as to prevent damage to the building, occupants and the surrounding landscaped and paved areas.
- B. Schedule and execute all work without exposing the interior building areas to inclement weather. Protect the existing building and its contents against all risks, and repair or replace all damage to the Owner's satisfaction.
- C. Coordinate the work in this section with the work by other trades to ensure the orderly progress of the work.
- D. Under no circumstances shall the Contractor remove existing materials and systems to the ground in an uncontrolled manner. Machinery or devices used shall be manufactured for this purpose. Adjacent building and property areas shall be protected from airborne debris.
- E. During removal operations, the Contractor is responsible for the containment of all dust, dirt, debris, overspray, and run-off resulting from the work. The Contractor shall collect and contain all materials and repair any resulting damage to adjacent surfaces, site fixtures or personal property. Specific attention is drawn to the use of chemicals and cleaners.
- F. Fully charged, inspected, and approved fire extinguishers shall be on site at all times. No cutting, grinding, or welding of any kind shall proceed without an approved, fully charged fire extinguisher.
- G. The Contractor shall utilize skilled and experienced specialty workers to install all aspects of the work.
- H. Maintain environmental conditions (temperature, humidity, ventilation) within limits recommended by the manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
- I. Weather Limitations: Proceed with installation only when existing and forecast weather conditions permit work to be performed and at least one (1) coat of specified finish can be applied without exposure to rain, snow, or dampness.
- J. Do not install any finish carpentry materials that are wet, moisture damaged, or mold damaged.

1.07 TECHNICAL REFERENCES

- A. Current versions of the following:
 - 1. American Softwood Lumber Standard PS 1.
 - 2. American Softwood Lumber Standard PS 20.
 - 3. American Wood Council's Wood Frame Construction Manual (WFCM).
 - 4. Architectural Woodwork Institute (AWI)
 - 5. AWI/AWMAC/WI's "Architectural Woodwork Standards" (AWS)
 - 6. ASTM E84 - Surface Burning Characteristics of Building Materials

7. FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship"
8. National Park Service (NPS) Historic Preservation Standards and Guidelines.
9. Northeastern Lumber Manufacturers Association (NeLMA)

1.08 SUBMITTALS

- A. Refer to Section 013300 - Submittal Procedures for additional information.
- B. Provide a project specific safety plan and job hazard analysis.
- C. The Contractor shall submit the following items with their submittal package:
 1. Methods of removal of materials.
 2. Temporary protection procedures.
 3. Staging/set-up procedures.
- D. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.
 1. Wood Clapboards.
 2. Wood Trim.
 3. Wood Mouldings.
 4. Wood Casings
 5. Wood Windowsills
 6. Wood Components of the custom-built barn doors.
 7. Weather Resistant Barrier.
 8. Flexible Membrane Flashing.
 9. Sheet Metal Flashing.
 10. Nails and Fasteners.
- E. Samples for Verification: Before erecting mockup, submit samples of the following:
 1. Wood Clapboards.
 2. Wood Trim.
 3. Wood Mouldings.
 4. Wood Windowsills
 5. Wood Components of the custom-built barn doors.
 6. Weather Resistant Barrier.
 7. Flexible Membrane Flashing.
 8. Sheet Metal Flashing.
 9. Nails and Fasteners.
- F. Shop Drawings:
 1. The Contractor shall submit a full set of shop drawings for the fabrication and installation of all finish carpentry items, including but not limited to trim boards, mouldings, sills and siding, and shall include all dimensions, sizes, existing conditions, materials to be removed, weather barrier and sealing,

etc. Shop drawings for eaves, rakes, corners, and head, jamb, and sills for door and window openings for each different existing condition shall be submitted.

2. The Contractor shall submit a full set of shop drawings for the fabrication and installation of all barn doors, including but not limited to trim boards, panels boards and hardware for each barn door type and shall include all dimensions, sizes, connections, adhesives and fastening.

G. Qualification Data:

1. Unless otherwise indicated, comply with AWI Standards or the Architectural Woodwork Standards (Current Edition), including installation, for grades of exterior finish carpentry woodwork, construction, finishes and other requirements.
2. Provide AWI Quality Certification Program Labels and Certificates indicating that the woodwork, including installation, complies with requirements of grades specified.

H. Compliance Certificates:

1. For lumber that is not marked with grade stamp.
2. For preservative-treated wood that is not marked with treatment-quality mark.

For fire-retardant-treated wood that is not marked with classification marking of testing and inspecting agency.

1.09 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years (3 yrs.). Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

Regulatory Requirements: Comply with requirements of authorities having jurisdiction and applicable codes at the location of the project.

- B. Manufacturer Qualification: Minimum five years' (5 yrs.) experience manufacturing similar products.

- C. Installer Qualifications: Minimum five years' (5 yrs.) experience installing similar products.

- D. Mock-ups: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

1. Provide a minimum of two linear feet (2 LF) of each type, of unique exterior finish carpentry wood profiles for comparison of the existing wood to be replaced.
2. Construct one (1) custom barn door leaf with solid stain finish.
3. Install a minimum of five (5) mock-up panels, in locations as designated by the Architect and as follows:

- a. At the base of the exterior wall on one (1) corner of the barn, which shall be constructed with all exterior wall components as detailed in the Contract Documents and shall include but not limited to weather barrier, sheet metal flashings, corner board trim and siding, including applying solid stain finish. The Panel shall be a minimum of four feet (4ft) feet by four feet (4ft) and shall extend to either side of the exterior wall corner.
- b. At the mid-height (at the band trim) of the exterior wall on one (1) corner of the barn, which shall be constructed with all exterior wall components as detailed in the Contract Documents and shall include but not limited to weather barrier, sheet metal flashings, corner board trim, band trim and siding, including applying solid stain finish. The Panel shall be a minimum of four feet (4ft) feet by four feet (4ft) and shall extend to either side of the exterior wall corner.
- c. At the eave and rake of the exterior wall on one (1) corner of the barn, which shall be constructed with all exterior wall components as detailed in the Contract Documents and shall include but not limited to weather barrier, sheet metal flashings, corner board trim, eave trim and moulding, rake edge trim and molding, and siding, including applying solid stain finish. This mock-up coordinated with the slate roof mock-up in accordance with Section 073126 – Slate Shingles of Section 073229 – Synthetic Slate Shingles and Flashing (Alternate No. 1) The Panel shall be a minimum of four feet (4ft) feet by four feet (4ft) and shall extend to either side of the exterior wall corner.
- d. At one (1) window location that shall be coordinated with Section 085213 – Aluminum Clad Wood Windows, which shall be constructed with all exterior wall and window opening components as detailed in the Contract Documents and shall include but not limited to weather barrier, self-adhered flashings, sheet metal flashings, trim boards, sill and siding, including applying solid stain finish. The Panel shall be a minimum of four feet (4ft) feet by four feet (4ft) and shall extend to either side of the exterior wall corner.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, 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 air circulation around stacks and under coverings.
- B. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
- C. Comply with manufacturer's recommendations. Handle materials to avoid damage.

1.11 WARRANTY

- A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official.

1.12 GUARANTEES

- A. Upon completion of the work and prior to final payment, the Contractor shall submit a guarantee of his work as free from defect in materials and workmanship. The guarantee shall be for a period of two year (2 yrs.). The guarantee shall be signed by an officer of the Contractor's firm and sealed if a corporation.

1.13 CLEAN UP

- A. Complete site cleanup shall be performed daily, and throughout the day as required, to the satisfaction of the Owner.
- B. All roof, building (interior and exterior), landscaping, parking, and other areas shall be cleaned of all trash, debris, and dirt caused by or associated with the work.
- C. All trash and debris shall be completely removed from the site daily during the work and at the completion of work. All debris shall be legally disposed of offsite.
- D. Prior to acceptance of the work of this Section, the Contractor shall perform a thorough cleaning of all areas. Any new or existing items damaged shall be repaired or replaced to the satisfaction of the Owner at no additional cost.

PART 2 – PRODUCTS

2.01 MATERIALS, GENERAL

- A. Certified Wood: The following wood products shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship":
 - 1. Exterior wood trim, mouldings, banding and window sills.
 - 2. Exterior wood for custom-built barn doors
 - 3. Exterior wood clapboard siding.
- B. Lumber: DOC PS 20.
- C. Factory-mark each piece of lumber with grade stamp of inspection agency indicating grade, species, moisture content at time of surfacing, and mill.
 - 1. For exposed lumber, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by inspection agency.
- D. Boards shall be sized to match the existing wood trim component scheduled for replacement.
- E. Mouldings shall match the existing wood trim component scheduled for replacement in size and profile.

2.02 EXTERIOR TRIM BOARDS, MOULDINGS AND SILLS

- A. Species and Grade: Western Red Cedar, Clear Heart VG (Vertical Grain); NLGA, WCLIB, or WWPA.
- B. Maximum Moisture Content: Nineteen percent (19%) with at least eighty-five percent (85%) of shipment at twelve percent (12%) or less.
- C. Finger Jointing: Not allowed.
- D. Face Surface: Surfaced (smooth).
- E. Trim Boards, Mouldings and Sills for Solid Stain Finish, WMMPA WM 4, N-grade wood moldings, without finger jointing. Made from kiln-dried stock to patterns included in WMMPA WM 12.

2.03 WOOD CLAPBOARD SIDING

- A. Provide kiln-dried lumber siding complying with DOC PS 20.
- B. Species and Grade: Clear VG (Vertical Grain) Heart Western Red Cedar; NLGA, WCLIB, or WWPA.
- C. Pattern: Bevel siding, S1S2E, actual overall dimensions of five- and one-half inch by eleven-sixteenth inch (5-1/2" x 11/16") measured on the face and thick edge at 19 percent moisture content.
- D. Species and Grade: Western Red Cedar, Clear Heart VG (Vertical Grain); NLGA, WCLIB, or WWPA.
- E. Maximum Moisture Content: Nineteen percent (19%) with at least eighty-five percent (85%) of shipment at twelve percent (12%) or less.
- F. Finger Jointing: Not allowed.
- G. Face Surface: Surfaced (smooth).

2.04 WOOD BARN DOOR BOARDS AND TRIM

- A. Species and Grade: Western Red Cedar, Clear Heart VG (Vertical Grain); NLGA, WCLIB, or WWPA.
- B. Maximum Moisture Content: Nineteen percent (19%) with at least eighty-five percent (85%) of shipment at twelve percent (12%) or less.
- C. Finger Jointing: Not allowed.
- D. Face Surface: Surfaced (smooth).
- E. Wood Barn door boards and trim for Solid Stain Finish, WMMPA WM 4, N-grade wood moldings, without finger jointing. Made from kiln-dried stock to patterns included in WMMPA WM 12.

2.05 INTERIOR WOOD TRIM AND CASINGS

- A. Species and Grade: Localized sourced softwood, eastern white pine, C Select or better (NeLMA)

2.06 FINISHES

- A. All exterior finish carpentry wood shall be fabricated and installed in a condition to receive finishes specified in Section 099100 – Painting.

2.07 ACCESSORIES

- A. Weather Barrier:
1. WeatherSmart Housewrap by Henry, a Carlisle Company.
 2. Or approved equal.
- B. Weather Barrier Tape:
1. Henry Sheathing Tape by Henry, a Carlisle Company.
 2. Or approved equal.
- C. Window and Door Membrane Flashing:
1. FortiFlash by Henry, a Carlisle Company.
 2. Or approved equal.
- D. Fasteners:
1. Use 12-gauge stainless steel fasteners designed for trim and siding. Fasteners should have sufficient flexural and tensile strength to resist bending.
 2. Use fasteners with thin shanks, blunt points, and full round heads that are long enough to penetrate the substrate a minimum one- and one-quarter inches (1- $\frac{1}{4}$ ").
 3. Do not use staples, small brads, and wire nails. Avoid using fine threaded wood screws and ring shank fasteners.
 4. Use standard nail guns with a pressure setting between seventy- and one hundred pounds per square inch (70 psi -100 psi) or as recommended by the manufacturer. The recommended pressure depends on the type of gun, type of nail, ambient temperature, and the substrate. Care should be taken not to overdrive the nail into the material.
 5. Pre-drilling is not typically required unless large fasteners are used, or the product is installed during temperatures below forty degrees Fahrenheit (< 40°F).
 6. Use two (2) fasteners for every framing member for trim board applications. Sheet and trim boards eight inches (8") and wider require additional fasteners.
 7. Install fasteners no more than two inches (2") from the end of each board.
 8. Avoid fastening over hollow or uneven areas. Fasten onto flat, solid substrates.
- E. Wood Adhesive for Barn Door Joints:
1. Type 1, Fully Waterproof Adhesive

- F. Sealants:
 - 1. Single-Component Polyurethane Sealant for use at weather barrier and sheet metal flashing and trim transitions shall conform to ASTM C 920, Type S, Grade NS, Class 50, Uses NT, M, A and O, such as:
 - a. Dymonic 100 as manufactured by Tremco.
 - b. Or approved equal.
- G. Nail Hole Filler:
 - 1. Fill nail holes with nail hole filler recommended by the Paint and Stain manufacturer.

2.08 BARN DOOR HARDWARE

- A. Manufacturer: National Hardware (NH) or Approved Equal.
- B. Material: Steel
- C. Finish: All shall be Hot-Dipped Galvanized or Zinc Plated where indicated.
- D. Fasteners: Use fasteners as provide by the Manufacturer for hardware component.
- E. Hardware Schedule:
 - 1. Door Type 3: Hinged Door Hardware
 - a. Eight-inch (8") Heavy Duty Strap Hinge, three (3) per Door Panel
 - b. Door Pulls for each door panel, NH Product No. 6
 - c. Latch, NH Product No. 1134
 - 2. Door Type 5: Sliding Door Hardware
 - a. Face Mount Box Rail: Length as indicated in the Contract Documents, NH Product No. 5116
 - b. Box Rail End Caps, NH Product No. 51ED
 - c. Truck hangers: Two (2) hangers per door panel, NH Product No. 5047
 - d. Stay Roller, NH Product No. 318
 - e. Door Bumper, NH Product No. 316
 - f. Latch, NH Product No. 1134
 - g. Door Pull, NH Product No. 6
 - 1. Door Type 6: Bi-Parting Sliding Door Hardware
 - a. Face Mount Box Rail: Length as indicated in the Contract Documents, NH Product No. 5116
 - b. Box Rail End Caps, NH Product No. 51ED
 - c. Truck hangers: Four (4) hangers, two (2) per door panel, NH Product No. 5047
 - d. Stay Rollers two (2) each for each door panel, NH Product No. 318
 - e. Center Door Guide, NH Product No. 20
 - f. Door Bumpers for each door panel, NH Product No. 316
 - g. Latch, NH Product No. 1134

- h. Door Pulls for each door panel, NH Product No. 6

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Prime lumber and moldings to be painted, including both faces and edges, unless factory primed. Cut to required lengths and prime ends.

3.03 INSTALLATION, GENERAL

- A. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements.
 - 1. Do not use manufactured units with defective surfaces, sizes, or patterns.
- B. Shop-apply finishes prior to installation. Obtain Designer's approval prior to application and installation.
- C. Install exterior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
 - 1. Scribe and cut exterior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by the manufacturer.
 - 2. Install to tolerance of one-eighth inch ($\frac{1}{2}$ ") in ninety-six inches (96") for level and plumb. Install adjoining exterior finish carpentry with one-thirty-second inch ($\frac{1}{32}$ ") maximum offset for flush installation, and one-sixteenth inch ($\frac{1}{16}$ ") maximum offset for reveal installation.
 - 3. 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.
- D. Nail Location:
 - 1. For trim board applications use minimum two (2) fasteners per framing member.
 - 2. Install fasteners at a maximum of two inches (2") from the end of each board.
- E. Expansion and Contraction:
 - 1. Properly fasten along the entire length of trim to minimize expansion and contraction.

2. Allow three-sixteenths inch (3/16") space per eighteen-foot (18') run trim for expansion and contraction.
 3. Bond joints between pieces of trim to eliminate separation.
 4. Allow expansion and contraction space at the end of long runs.
- F. Cleaning:
1. Clean trim with mild detergent and water.
 2. Products with pumice may be applied with a nylon brush.
 3. For more stubborn stains use a mild household cleaner and degreaser with a nylon brush.

3.04 STANDING AND RUNNING TRIM INSTALLATION

- A. Install flat-grain lumber with bark side exposed to weather.
- B. Install trim with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than twenty-four inches long (24" L) except where necessary.
 1. Use scarf joints for end-to-end joints.
 2. Stagger end joints in adjacent and related members.
- C. Fit exterior joints to exclude water. Cope at returns and miter at corners to produce tight-fitting joints with full-surface contact throughout length of joint. Plane backs of casings to provide uniform thickness across joints, where necessary for alignment.
- D. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.

3.05 SIDING INSTALLATION

- A. Install siding to comply with manufacturer's written instructions.
- B. Horizontal Lumber Siding: Apply starter strip along bottom edge of sheathing or sill. Install first course of siding with lower edge at least one-eighth inch (1/8") below starter strip and subsequent courses lapped one-inch (1") over course below. Nail at each stud. Do not allow nails to penetrate more than one-inch (1") thickness of siding.
 1. Leave one-eighth inch (1/8") gap at trim and corners, unless otherwise recommended by manufacturer, and apply sealant.
 2. Butt joints only over framing or blocking, nailing top and bottom on each side and staggering joints in subsequent courses.
- C. Finish: Apply within two weeks (2 wks.) of installation.

3.06 BARN DOOR CONSTRUCTION AND INSTALLATION

- A. Barn doors shall be constructed in accordance with the design as shown in the Contract Documents.

- B. Contractor shall field verify the existing and newly installed exterior finish carpentry conditions to ensure doors fit properly into the prepared openings for their intended operation.
- C. Barn doors shall be constructed with dado joints to be adhered and fastened.
- D. Shiplap wood panel joints shall be adhered and fastened.
- E. All fasteners shall be installed so that they are concealed.
- F. All barn doors shall be constructed square and true, and installed level and plumb, and aligned.
- G. Any barn doors found to be racked, warped, deformed, delaminated or defective will be rejected by the Architect.
- H. Install all barn hardware as specified in the Contract Documents.

3.07 ADJUSTING

- A. Replace exterior finish carpentry that is damaged or does not comply with requirements. Exterior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

3.08 CLEANING

- A. Clean exterior finish carpentry on exposed and semi-exposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

3.09 PROTECTION

- A. Protect installed products from damage from weather and other causes during construction.
- B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.
 - 1. Indications that materials are wet, or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

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SECTION 073126

SLATE SHINGLES

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 DESCRIPTION OF WORK

- A. The Contractor shall supply all labor, equipment, temporary protection, tools, and appliances necessary for the proper completion of the work as required in the Specifications, in accordance with good construction practice, and as required by the materials manufacturer, as amended.
- B. Remove and dispose of all existing natural slate shingles and slate roofing components including but not limited to sheet metal flashings and ridge cap, felt underlayment, nails and fasteners, sealants and mastics.
- C. Clear roof surfaces of debris by sweeping and vacuuming methods as required.
- D. Verify the condition of existing wood plank decking and complete any necessary repairs as described in Section 061000 - Rough Carpentry and in the Contract Drawings. Document repair sections on as-built plans. Undocumented work will not be considered for payment for the allotted Unit Price work.
- E. Furnish and install with new Grade S1 natural slate shingles, including but not limited to felt underlayment, modified bituminous membrane sheet metal flashings and ridge cap, nails and fasteners, sealants and mastics as indicated on the Contract Drawings.
- F. Install modified bitumen (ice dam protection) membrane flashings at eave and rake edges and along ridge. as indicated on the Contract Drawings. Modified bitumen membranes shall be installed as indicated on the drawings and referenced within these specifications.
- G. Provide and maintain temporary protection of all roof systems to remain or newly installed roof systems throughout the duration of the project.
- H. Coordinate the work in this section with the appropriate trades to ensure proper work sequence.
- I. Clean and restore all areas affected by the work.

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 024100 - Selective Demolition
- B. Section 061000 - Rough Carpentry

- C. Section 062000 – Exterior Finish Carpentry
- D. Section 076200 - Sheet Metal Flashing and Trim

1.04 MEASUREMENT AND FIELD VERIFICATION PROCEDURES

- A. All dimensions, quantities, and existing conditions shall be determined or verified by the Contractor. The Contract Drawings have been compiled from various sources and may not reflect the actual condition at the moment of construction. The Contractor is cautioned to take all precautions and make all investigations necessary to install the proposed work. The Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.

1.05 ALTERNATES

- A. Technical requirements for related Alternate work are defined in this section. Refer to Division 01 Section 012300 - Alternates for scope to be carried as an Alternate and provided on the Bid Form.
- B. Alternate No. 01: In lieu of the natural slate shingles, Contractor to furnish and install synthetic slate shingles at locations and as indicated in the Contract Documents. Refer to Specification Section Synthetic Slate Shingles and Flashing.

1.06 REFERENCES

- A. AMERICAN SOCIETY FOR TESTING MATERIALS (ASTM)
 - 1. ASTM C406/C406M-15 Standard Specification for Roofing Slate
 - 2. ASTM D4586/D4586M-07 Standard Specification for Asphalt Roof Cement, Asbestos-Free
 - 3. ASTM D4869-15 Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing
- B. NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)
 - 1. NRCA Roofing Manual - Steep-slope Roof Systems
- C. "Slate Roofs" published by Vermont Structural Slate Company, Inc.
- D. SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION (SMACNA)
 - 1. Architectural Sheet Metal Manual

1.07 SUBMITTALS

- A. Refer to Section 013300 - Submittal Procedures for additional information.
- B. Provide a project specific safety plan and job hazard analysis.
- C. The Contractor shall submit the following procedural items with their submittal package:
 - 1. Methods of removal of materials.
 - 2. Temporary protection procedures.

3. List of local emergency numbers.
4. Staging/set-up procedures.
- D. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.
- E. Submit slates to illustrate the full range of colors and surface finish. The Contractor shall provide several samples to ensure new slates match existing. No slates shall be purchased or installed until approval by the Owner is obtained.
- F. Samples for Verification: Before erecting mockup, submit samples of the following:
 1. Three (3) replacement slates shingles in each color.
- G. Qualification Data: The slate manufacturer/supplier shall furnish a certificate stating that materials used for this project strictly adhere to the provisions of these specifications.
- H. Material Test Reports.
- I. Maintenance Data: The slate manufacturer/supplier shall provide a certificate stating that any required roof repairs resulting solely from defective materials or workmanship by manufacturer furnished under this contract shall be made without cost to the owner for a period of two years (2 yrs.).

1.08 MOCK-UPS

- A. Provide field samples on the building to verify selections made under sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Mock-ups shall be performed prior to the commencement of the full scope of work and shall be reviewed by the Owner, Designer and Manufacturer's field representative as to acceptability of color, texture and appearance match with the existing construction.
 1. Five square feet (5 SF) of slate installation.
 - a. Provide large enough mock-up area to review graduated slate pattern.
 2. Five square feet (5 SF) of underlayment installation, including overlaps.
- B. Mock-ups shall be repeated until acceptable results are obtained, at no additional cost to the Owner. The accepted work shall be a standard for all subsequent work.
- C. Approved mock-ups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.09 QUALITY ASSURANCE

- A. The Contractor shall provide qualified workers, trained and experienced in installing slate roofing systems of this configuration, and shall submit documentation of five consecutive years (5 yrs.) of work of this type. The Contractor shall be familiar with and shall perform work in accordance with SMACNA Architectural Sheet Metal Manual and NRCA 0405. A list of installations

made shall be provided, identifying when, where, and for whom the installations were made.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Materials shall be delivered in the manufacturer's unopened bundles and containers with the manufacturer's brand and name marked clearly thereon. Shingles shall be stored in accordance with manufacturer's printed instructions. Roll goods shall be stored on end in an upright position. Immediately before laying, roofing felt shall be stored for twenty-four hours (24 hrs.) in an area maintained at a temperature not lower than fifty degrees Fahrenheit (50°F [ten degrees Celsius (10°C)]).

1.11 SPECIAL JOB CONDITIONS

- A. The building is historic and involves the Maine Historical Preservation Commission (MHPC). Care shall be taken with the work so as not to adversely affect the historic conditions and the historic character of the Barn. The Contractor shall cooperate with MHPC and the Architect with any requests for modifications or corrections to any installed work that do not comply with these Contract Documents or meet historic repair and restoration standards.

1.12 PROJECT CONDITIONS

- A. The Contractor shall supply, install and maintain all shoring, supports, barriers, protection, temporary heat, warning lines, lighting and personnel required to support the structure, fixtures and facilities affected by his work and segregate the work area(s) from pedestrian or vehicular traffic, as well as to prevent damage to the building, occupants and the surrounding landscaped and paved areas.
- B. The building occupants are highly sensitive to fumes, odors, noise, and disturbances. The Contractor shall submit a detailed sequence schedule for the building area prior to the start of work and shall coordinate daily schedules with the Owner.
- C. Schedule and execute all work without exposing the interior building areas to inclement weather. Protect the existing building and its contents against all risks, and repair or replace all damage to the Owner's satisfaction.
- D. Under no circumstances shall the Contractor remove existing materials and systems to the ground in an uncontrolled manner. Machinery or devices used shall be manufactured for this purpose. Adjacent buildings and property areas shall be protected from airborne debris.
- E. Coordinate the work in this section with the work by other trades to ensure the orderly progress of the work.
- F. During removal operations, the Contractor is responsible for the containment of all dust, dirt, debris, overspray, and run-off resulting from the work. The Contractor shall collect and contain all materials and repair any resulting damage to adjacent surfaces, site fixtures or personal property. Specific attention is drawn to the use of chemicals and cleaners.

- G. Fully charged, inspected, and approved fire extinguishers shall be on site at all times. No cutting, grinding, or welding of any kind shall proceed without an approved, fully charged fire extinguisher.
- H. The Contractor shall utilize skilled and experienced specialty workers to install all aspects of the work.

1.13 CONTRACTOR GUARANTEE

- A. Upon completion of the work and prior to final payment, the Contractor shall submit a guarantee of their work as free from defect in materials and workmanship. The guarantee shall be for a period of two years (2 yrs.). The guarantee shall be signed by an officer of the Contractor's firm and sealed if a corporation.

1.14 WARRANTY

- A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official.
- B. Special Warranty: Standard form in which the slate supplier guarantees the slate materials to be free from damage or defect within specified warranty period.
 - 1. Warranty Period: Seventy-five plus years (75+ yrs.) from date of Substantial Completion

1.15 ATTIC STOCK

- A. Unless designated otherwise by the Owner, the Contractor shall provide ten percent (10%) of the replacement square footage of the slate shingle replacement to the Owner for future repairs. The Contractor shall anticipate that the attic stock will be transported by the Contractor, to an owner's approved location within two miles (2 mi.) from the project site. The attic stock shall be palleted and secured to allow movement via forklift.

PART 2 PRODUCTS

2.01 NATURAL SLATE SHINGLES

- A. Slate Shingles: ASTM C406, Grade S1; hard, dense, and sound; chamfered edges, with nail holes machine punched or drilled and countersunk. No broken or cracked slates, no broken exposed corners, and no broken corners on covered ends that could sacrifice nailing strength or laying of a watertight roof.
- B. Slate:
 - 1. The replacement slates shall match the existing color, texture, hue, appearance, and size. The Contractor shall verify the configuration and appearance of the existing slate in the field.
 - 2. Surface Texture: Rough.
 - 3. Size: Sixteen inches long by twelve inches (16" L x 12"), sizes may vary by location.

4. Nail Holes: Two (2) per slate shingle.
 5. Butt Shape: Standard square cut.
 6. Color: Unfading Green.
 7. Weather-Exposure Color Change: Unfading.
- C. Slate Shingle Producer and Supplier:
1. The Vermont Slate Company.
 2. Sheldon Slate Products Company.
 3. Evergreen Slate Company, Inc.
 4. Or approved equal.
- D. Starter Slate: Slate shingles with chamfered nail holes front-side punched.
1. Length: Exposure of slate shingle plus head lap.
- E. Refer to the Contract Drawings for more information regarding slate patterns and configurations.

2.02 UNDERLAYMENT MATERIALS

- A. Self-Adhering Sheet Underlayment, High Temperature: ASTM D1970 minimum of forty millimeter (40-mil) thick, slip-resisting, polyethylene-film-reinforced top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release paper backing; cold applied.
1. Thermal Stability: Stable after testing at 240 degrees Fahrenheit (116 degrees Celsius); ASTM D1970.
 2. Low-Temperature Flexibility: Passes after testing at minus twenty degrees Fahrenheit (- 20°F [twenty-nine degrees Celsius (29°C)]); ASTM D1970.
- B. Asphalt Felt Underlayment: ASTM D226, Type II, No. 30 asphalt-saturated organic felt, unperforated.
- C. Red Rosin Paper: Minimum 3.0 lb./CSF, 0.11 mils thick.
- D. Utilize the manufacturer's required primer for the underlayments.
- E. Slip sheet, if required, shall be five-pound (5-lb.) kraft paper, or as recommended by the modified bitumen manufacturer.

2.03 SLATE ACCESSORIES

- A. Asphalt Roofing Cement: ASTM D4586, Type II, asbestos free.
- B. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied.
- C. Elastomeric Sealant: ASTM C920, elastomeric polyurethane polymer sealant; of type, grade, class and use classifications required to seal joints in slate-shingle roofing and remain watertight.

- D. Slating nails to secure slates to wood sheathing: ASTM F1667, copper, smooth shanked, wire nails; 0.135-inch minimum thickness; sharp pointed; with three-eighths inch ($\frac{3}{8}$ ") minimum diameter flat head; of sufficient length to penetrate a minimum of one-inch (1") into sheathing.
- E. Where nails are in contact with metal flashing, use nails made from same metal as flashing.
- F. Felt Underlayment Nails: Hot-dip galvanized-steel wire nails with low-profile metal heads on plastic disc caps, one-inch (1") minimum diameter.
- G. Wire for hanging slate shall be 99.99% pure copper wire conforming to ASTM B3, 0.051" diameter, minimum.
- H. Plain copper for bibs shall be 16 oz. cold rolled sheet conforming to ASTM B370-88 Type I, Class A Specifications.

2.04 SHEET METAL FLASHING ACCESSORIES

- A. General: Comply with requirements in Section 076200 - Sheet Metal Flashing and Trim.

PART 3 EXECUTION

3.01 GENERAL WORKMANSHIP

- A. Follow all applicable local, state and federal requirements regarding construction of scaffolding and protection for public safety. Specific reference should be made to OSHA Construction Safety Regulations.
- B. Set-up of scaffolding or similar access and location of on-site storage areas shall be subject to review and approval by the Owner.
- C. Keep covers tightly sealed on all evaporative products to prevent premature curing.
- D. The Contractor shall follow the recommendations published in the NRCA Roofing and Waterproofing Manual Volume 2 - Steep Roofing Manual and guidelines published "Slate Roofs" published by Vermont Structural Slate Company, Inc.

3.02 PROTECTION OF ROOF SURFACES

- A. Equipment and techniques shall be used to prevent damage to the roofing within and around the work area as a result of foot or material traffic. The Contractor shall be responsible for controlling breakage of new or existing slate. The progression of work shall be laid out and presented to the Owner and Designer to prevent other trades from working on or above completed roofing. Personnel who are working on the roof shall have proper shoes which will not damage slates, and shoe soles shall be made of a material which will aid in preventing falls.

3.03 REMOVAL OF EXISTING SLATE SHINGLES AND ASSOCIATED COMPONENTS

- A. All debris shall be transported to dumpsters, in locations approved by the Owner, at ground level by enclosed chute or crane and scaling bucket. Uncontrolled dropping of debris to ground level will not be permitted.
- B. Remove only as many slates and flashing materials that can be replaced and made weathertight the same day.
- C. Slate shall be removed and handled from the roof without causing damage to the building.
- D. The Contractor shall avoid overloading the existing scaffolding, mobile lift equipment or other means of access during the slate shingle removal process.

3.04 ROOF DECK PREPARATION

- A. Roof deck surfaces shall be smooth, clean, firm, dry, and free from loose boards, and projecting ends that might damage roofing. Foreign particles should be cleaned from interlocking areas to ensure proper seating and to prevent water damming. Prior to installation of slate, pipes, and other roof penetrations, projections through the roofs shall be properly flashed and secured in position, and projecting nails shall be driven firmly home.
- B. During the removal of any existing component(s), the Contractor shall report to the Owner any areas of damaged, deteriorated or otherwise unsuitable framing, wood blocking, or wall materials uncovered during the work. Do not cover unacceptable areas until reviewed by the Owner and Designer. Provide temporary protection to the area in question until such time as the area can be reviewed.
- C. Remove and replace portions of deteriorated wood roof deck as a Unit Price. Coordinate with Section 061000 - Rough Carpentry.

3.05 INSTALLATION OF UNDERLAYMENT

- A. Note for slate repair areas: it is not anticipated that underlayment installation will be required for individual slate shingle repairs. However, should large sale (greater than four square feet [> 4 SF]) slate replacement be considered, new underlayments shall be tucked under the slate shingles above and be overlapped onto the slate shingles below to allow drainage. The following installation practices are for flashing areas which may be encountered as part of this project.
- B. Self-Adhering Sheet Underlayment: Install, wrinkle free, on entire roof deck. Comply with low-temperature installation restrictions of underlayment manufacturer if applicable. Install at locations indicated, lapped in direction to shed water. Lap sides not less than three- and one-half inches ($3\frac{1}{2}$ "). Lap ends not less than six inches (6"), staggered twenty-four inches (24") between courses. Roll laps with roller. Cover underlayment within seven (7) days.
 - 1. If priming is required, primer shall be applied at a coverage rate of six- to nine square meters per liter (6-9 sq. meters/L. [250-350 sq. ft./gal.]). Primer shall be applied by spray or paint roller.
 - 2. Install at locations where indicated on the Contract Documents.

- C. Double-Layer Felt Underlayment: Install on roof deck parallel with and starting at the eaves. Install a nineteen-inch wide (19" W) starter course at eaves and completely cover with full-width second course. Install succeeding courses lapping previous courses nineteen inches (19") in shingle fashion. Lap ends a minimum of six inches (6"). Stagger end laps between succeeding courses at least seventy-two inches (72"). Fasten with felt underlayment nails.
1. Install felt underlayment on roof sheathing not covered by self-adhering sheet underlayment. Lap edges over self-adhering sheet underlayment not less than three inches (3") in direction to shed water.
 2. Terminate felt underlayment extended up not less than four inches (4") against sidewalls, curbs, chimneys, and other roof projections.
- D. Provide and install red rosin slip-sheets at all locations where sheet metal flashings will rest over self-adhered modified bitumen underlayments if required by the modified bitumen manufacturer.

3.06 SHEET METAL FLASHING INSTALLATION

- A. General: Install metal flashings and other sheet metal to comply with requirements in Section 076200 - Sheet Metal Flashing and Trim.

3.07 SLATE SHINGLE INSTALLATION

- A. Use caution not to rack the existing roof framing system when installing the new slate shingles by coordinating the slate replacement to coincide with adding additional loading to the adjacent roof areas. Multiple mechanics may be required to install separate sections of the replacement slate shingle system.
- B. General: Beginning at eaves, install slate shingles according to written instructions of manufacturer and details and recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."
1. Install wood nailer strip cant at eave edges.
 2. Install shingle starter course chamfered face down.
- C. Install first (1st) and succeeding shingle courses with chamfered face up. Install full-width first (1st) course at rake edge.
1. Offset joints of uniform-width slate shingles by half ($\frac{1}{2}$) the shingle width in succeeding courses.
 2. Offset joints of random-width slate shingles a minimum of three inches (3") in succeeding courses.
- D. Maintain a three-inch (3") minimum head lap between succeeding shingle courses.
- E. Graduate thickness, exposure, and color of slate from the eaves to the ridge as indicated on the Contract Drawings.
- F. Extend shingle starter course and first (1st) course two inches (2") at eaves.
- G. Extend shingle starter course and succeeding courses one-inch (1") over fascia at rakes.

- H. Cut and fit slate neatly around roof vents, pipes, ventilators, and other projections through roof.
- I. Hang slate with two (2) or four (4) slating nails for each shingle with nail heads lightly touching slate. Do not drive nails home drawing slates downward or leave nail head protruding enough to interfere with overlapping shingle above.
- J. Remove and replace damaged or broken slate shingles.

3.08 CLEAN-UP

- A. The Contractor shall not demobilize the site until the completed work is toured by the Owner and Designer. Any unsatisfactory items observed will be reported in "punch-list" form. These items shall be corrected immediately by the Contractor prior to demobilization from the job site.
- B. All scaffolding, barriers, temporary facilities, and the like shall be removed upon completion of the work. Areas damaged as a result of the Contractor's equipment shall be restored to their original condition, all to the satisfaction of the Owner.
- C. Refer to the Close-Out Procedures described in Division One for additional information.

END OF SECTION

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SECTION 073229

SYNTHETIC SLATE SHINGLES AND FLASHING

(ALTERNATE NO. 1)

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 DESCRIPTION OF WORK

- A. The Contractor shall supply all labor, equipment, temporary protection, tools, and appliances necessary for the proper completion of the work as required in the Specifications, in accordance with good construction practice, and as required by the materials manufacturer, as amended.
- B. Supply all shoring and protection necessary to protect the building areas, building systems and landscape areas.
- C. Supply all necessary chutes, disposal facilities, transportation and labor necessary to dispose of all demolished materials, dirt, and debris off-site in a legal dumping area. The Contractor shall obtain all permits necessary to transport and dispose of all materials, rubbish and debris.
- D. Remove and dispose of all existing natural slate shingles and slate roofing components including but not limited to sheet metal flashings and ridge cap, felt underlayment, nails and fasteners, sealants and mastics.
- E. Clear roof surfaces of debris by sweeping and vacuuming methods as required.
- F. Verify the condition of existing wood plank decking and complete any necessary repairs as described in Section 061000 - Rough Carpentry and in the Contract Drawings. Document repair sections on as-built plans. Undocumented work will not be considered for payment for the allotted Unit Price work.
- G. Furnish and install new synthetic slate shingle roof system including, but not limited to, synthetic shingles, underlayment, modified bituminous membrane, and associated components at locations and as indicated in the contract documents.

- H. Install modified bitumen (ice dam protection) membrane flashings at eave and rake edges and along ridge, as indicated on the Contract Drawings. Modified bitumen membranes shall be installed as indicated on the drawings and referenced within these specifications.
- I. Provide and maintain temporary protection of all roof systems to remain or newly installed roof systems throughout the duration of the project.
- J. Coordinate the work in this section with the appropriate trades to ensure proper work sequence.
- K. Clean and restore all areas affected by the work.

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 024100 - Selective Demolition
- B. Section 061000 - Rough Carpentry
- C. Section 073126 – Slate Shingles
- D. Section 076200 - Sheet Metal Flashing and Trim

1.04 MEASUREMENT AND FIELD VERIFICATION PROCEDURES

- A. All dimensions, quantities, and existing conditions shall be determined or verified by the Contractor. The Contract Drawings have been compiled from various sources and may not reflect the actual condition at the moment of construction. The Contractor is cautioned to take all precautions and make all investigations necessary to install the proposed work. The Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.

1.05 ALTERNATES

- A. Technical requirements for related Alternate work are defined in this section. Refer to Division 01 Section 012300 - Alternates for scope to be carried as an Alternate and provided on the Bid Form.
- B. Alternate No. 01: In lieu of the natural slate shingles, Contractor to furnish and install synthetic slate shingles at locations and as indicated in the Contract Documents. Refer to Specification Section Synthetic Slate Shingles and Flashing.

1.06 SPECIAL JOB CONDITIONS

- A. The building is historic and involves the Maine Historical Preservation Commission (MHPC). Care shall be taken with the work so as not to adversely affect the historic conditions and the historic character of the Barn. The Contractor shall cooperate with MHPC and the Architect with any requests for modifications or corrections to any installed work that do not comply with these Contract Documents or meet historic repair and restoration standards.

1.07 JOB CONDITIONS

- A. Refer to the Information for Bidders related to the proprietary specifications.
- B. Carefully coordinate the work in this section with the work in other sections to be sure the Contract Areas are in weather tight condition at the end of each day's work. This includes flashing work.
- C. All surfaces to receive underlayment, synthetic shingle roofing or flashings shall be thoroughly dry. Should surface moisture such as dew exist, the Contractor shall provide the necessary equipment to dry the surface prior to application of roofing materials. No open flames will be allowed.
- D. Completed roof areas shall be trafficked as little as practical. Work shall be coordinated to prevent this situation by working toward the roof edges and access ways. The Contractor shall provide protection for the existing roof areas trafficked during construction.
- E. Prior to, and during, synthetic shingle installation, all dirt and debris shall be removed from surfaces by sweeping and/or by similar methods.
- F. The Contractor shall take all precautions to properly install the specified materials at appropriate temperatures. Consult with and follow all manufacturer requirements. Materials which have a temperature other than the recommended application temperature of the manufacturer shall not be installed.
- G. The Contractor shall provide and equip as much labor force as is necessary to complete the project within the Contract period and in accordance with the Contract Documents without sacrificing workmanship quality.
- H. Materials, equipment, and demolition debris shall not be stored on the roof so as not to overstress and/or damage the existing wood deck and supporting structure.
- I. The Contractor will be responsible for providing the staging/scaffolding required to access the roof area to perform the work.
- J. The Contractor shall supply, install and maintain all shoring, supports, barriers, protection, warning lines, lighting and personnel required to support the structure, fixtures and facilities affected by his work and to segregate the work area(s) from pedestrian or vehicular traffic, as well as to prevent damage to the building, the occupants and the surrounding landscaped and paved areas.
- K. The Contractor, his workmen, and all his suppliers and agents shall make every effort to work in harmony with the building occupants.

- L. All new and temporary construction, including equipment and accessories, shall be secured from vandalism or abuse. The Owner is not responsible for any damages or losses that result from vandalism.
- M. Stored shingle bundles are not to be stacked more than six feet high (6' H). Rolled underlayments shall be stored on ends, not laid flat.
- N. The Contractor shall provide all necessary temporary protection and barriers to segregate the work area and to prevent damage to adjacent areas.
- O. Under no circumstances shall the Contractor remove existing materials and systems to the ground in an uncontrolled manner. Adjacent building and property areas shall be protected from airborne debris.

1.08 REFERENCES

A. AMERICAN SOCIETY FOR TESTING MATERIALS INTERNATIONAL (ASTM):

- 1. ASTM D31 Methods of Testing Woven Textiles Fabrics
- 2. ASTM D412 Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
- 3. ASTM D570 Standard Test Method for Water Absorption of Plastics
- 4. ASTM D638 Standard Test Method for Tensile Properties of Plastics
- 5. ASTM D790 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
- 6. ASTM D2626 Standard Specification for Asphalt-Saturated and Coated Organic Felt Base Sheet Used in Roofing
- 7. ASTM G155 Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials

B. UNDERWRITERS LABORATOIRES, INC. (UL):

- 1. UL 580 Tests for Uplift Resistance of Roof Assemblies
- 2. UL 790 Standard Test Methods for Fire Tests of Roof Coverings
- 3. UL 2218 Impact Resistance of Prepared Roof Covering Materials
- 4. UL ER 18920-01

C. DADE COUNTY BUILDING CODE:

- 1. PA100 Test Procedure for Wind and Wind Driven Rain Resistance of Discontinuous Roofing System
- 2. Notice of Acceptance for Empire product lines
- 3. Notice of Acceptance for Glacier Guard 100

1.09 SUBMITTALS

- A. Submittals shall be made in accordance with the General Conditions and Section 013000 - Shop Drawings and Submittals.
- B. A sample of the Manufacturer Warranty and a letter of confirmation from the Manufacturer stating that the Contract Documents have been reviewed and that there are no exceptions to the Specifications and Contract Drawings shall be submitted. The roofing system must meet or exceed UL 790, Class C and be in conformance with all local and state building codes and must be accepted by the manufacturer for the required warranty.
- C. The Contractor shall submit the following procedural items with their submittal package:
 - 1. Methods of removal of materials.
 - 2. Temporary protection procedures.
 - 3. Fire watch procedures (if needed).
 - 4. List of local emergency numbers.
 - 5. Staging/set-up procedures.
 - 6. Schedule of roof renovations with coordination of structural improvements and masonry renovations as they relate to temporary protection.
- D. The Contractor shall submit the following samples with their submittal package:
 - 1. Color samples of the synthetic slate shingles.
 - 2. Manufacturer's literature and sample warranties.
 - 3. Synthetic shingle manufacturer's installation instructions.
 - 4. Confirmation letter from the synthetic shingle manufacturer acknowledging the project and that the warranty will be issued upon completion of the project.
- E. Provide the manufacturer's product and installation literature for each item listed in Part 2 and other material anticipated for use on the project, for approval. Shop drawings are required indicating any anticipated changes.
- F. Submit slates to illustrate the full range of colors and surface finish. The contractor shall provide several samples to ensure new slates match existing. No slates shall be purchased or installed until approval by the Owner is obtained.

1.10 MOCK-UPS

- A. Provide field samples on the building to verify selections made under sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Mock-ups shall be performed prior to the commencement of the full scope of work and shall be reviewed by the Owner, Engineer and Manufacturer's field representative as to acceptability of color, texture and appearance match with the existing construction.
 - 1. Five square feet (5 SF) of underlayment installation, including overlaps.

2. Five square feet (5 SF) of slate installation.
 3. Two linear feet (2 LF) of each roof edge metal configuration.
- B. Each mock-up shall be a minimum of two feet by two feet (2' x 2') where applicable and shall include all components of the roofing system.
- C. Mock-ups shall be repeated until acceptable results are obtained, at no additional cost to the Owner. The accepted work shall be a standard for all subsequent work.
- D. Approved mock-ups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.11 QUALITY ASSURANCE

- A. Installer Qualifications: Authorized applicator.
1. Contractor is to submit documentation from the Manufacturer confirming that installers have completed their certification program and are an Authorized Applicator.
- B. Inspection: Upon completion of the installation, an inspection shall be conducted by manufacturer's Field Service Representative to ascertain that the roofing system has been installed according to manufacturer's published specifications and details at time of bid. This is not intended to be a final inspection for the benefit of the Owner, but for the manufacturer to determine whether a warranty shall be issued.
- C. Testing Requirements: Comply with the following requirements.
1. Impact Resistance: UL 2218 Test Standard; Class 4.
 2. Wind Driven Rain: PA100 Test Standard.
 3. Wind Uplift: UL 580 Test Standard.

1.12 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle materials and products in strict compliance with manufacturer's instructions and recommendations and industry standards. Store materials within absolute limits for temperature and humidity recommended by the manufacturer. Protect from damage.
1. Store tile materials above forty-five degrees Fahrenheit (> 45°F [7.2° C]). If exposed to lower temperatures, restore product temperature to forty-five degrees Fahrenheit (45°F [7.2° C]) minimum before using.
 2. Store materials in a dry protected area. Damaged materials shall not be used as part of finished installation.
 3. Installed materials found to be damaged shall be replaced at Gold Star Authorized Applicator's expense.
- B. Deliver materials in original unopened packages. Store products in manufacturer's labeled packaging until ready for installation. Packages shall be labeled with manufacturer's name, brand name and identification of various items.

1.13 WARRANTY

- A. Contractor Guarantee: Upon completion of the work, and prior to final payment, the Contractor shall submit a Guarantee of his work to be free from defect in materials and workmanship. This Guarantee shall be for a period of two year (2 yrs.), and shall be signed by a Principal of the Contractor's firm, and sealed if a corporation.
- B. Roof System Manufacturer Warranties: Upon completion of the work, and prior to final payment, the Contractor shall submit the shingle manufacturer's warranty.
- C. Roof System Performance: The roof shall meet or exceed Underwriter Laboratory 790 Class C, and all local and state building codes. The roof system shall receive additional fastening, as per the manufacturer, to meet the manufacturer's high wind speed/hurricane nailing pattern.

PART 2 – PRODUCTS

2.01 SYNTHETIC SLATE SHINGLES

- A. Synthetic slate shingles shall match the existing natural slate shingles which are twenty-two inches long by fourteen inches wide (22" L x 14" W). Color to match existing and be submitted to Owner for approval.
 - 1. Basis of Design: Be EcoStar LLC's, EcoStar Majestic Niagra Slate.
 - a. Composition: Eighty percent (80%) post-industrial recycled materials.
 - b. Design: As indicated on Drawings.
 - c. Thickness: Five-eighths inch ($\frac{5}{8}$ " [15.8 mm]).
 - d. Tile Width: Fourteen inches (14" [355 mm]).
 - e. Exposure: Nine- and one-half inches (9- $\frac{1}{2}$ ").
 - f. Head lap: Three inches (3").
 - 2. Or approved equal.
- B. Compliance:
 - 1. Fire Rating: UL 790, Class C fire resistance.
 - 2. Impact Resistance: UL 2218, Class 4.
 - 3. UV Exposure: Tested in accordance with ASTM G155, prolonged exposure.
 - 4. Water Absorption: ASTM D570, zero percent (0%) by weight.

2.02 UNDERLAYMENT MEMBRANES

- A. The primary underlayment system shall be spun bonded polyolefin coated with a layer of UV stabilized polyolefin on both sides, meeting requirements of ASTM D2626; without perforations.
 - 1. Basis of Design: EcoStar LLC's Aqua Guard.
 - 2. Or approved equal.

- B. Modified bitumen underlayment and flashing shall be a composite membrane consisting of fiberglass reinforced rubberized asphalt laminated to an impermeable polyethylene film layer.
 - 1. Basis of Design: EcoStar LLC's, EcoStar Glacier Guard ice and water shield underlayment.
 - 2. Or approved equal.
- C. Adhesive tape shall be as required by the approved synthetic slate manufacturer. Adhesive tape shall be installed as required to meet manufacturer's warranty.
- D. Alternates will be accepted as required to meet the manufacturer's warranty.

2.03 FASTENERS

- A. In general, all fasteners shall be as required by the approved synthetic slate manufacturer to meet the manufacturer's warranty.
- B. Underlayment fasteners shall be corrosive-resistant, plastic-capped roofing nails with a minimum plastic cap diameter of one- inch (1"). Fasteners shall be ninety degrees (90°) to the roof deck and shall not be under or over driven.
- C. Synthetic slate shingle fasteners are to be stainless steel ring shank roofing nails with a three-eighths inch ($\frac{3}{8}$ ") diameter head; of sufficient length to penetrate a minimum of three-quarter inch ($\frac{3}{4}$ ") into sheathing.
- D. Fasteners for securement of flashings, clips, blind nailers, and hook strips to masonry shall be one-quarter inch ($\frac{1}{4}$ ") diameter hammer drive anchors with zinc sheaths and flat heads such as Zamac Nailins by Rawl, Star Fasteners, Unifast, or approved equal. Anchors shall be of sufficient length to penetrate the substrate one- and one-quarter inch (1- $\frac{1}{4}$ ") minimum.

PART 3 - EXECUTION

3.01 GENERAL WORKMANSHIP

- A. The prepared existing roof surface must be dry, clean and smooth with no obtrusions or irregularities.
- B. Comply with the manufacturer's written instructions and these Specifications for all renovations and associated work.
- C. Handle materials to prevent damage to building components and project site areas.
- D. Flashings shall be installed along with roof systems to assure weathertight termination.
- E. Do not cut any material with a solvent or dilutant unless specifically instructed by the manufacturer in writing.

3.02 PREPARATION

- A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
 - 1. Contact the manufacturer's Technical Department for procedures when installing tile roof system during temperatures lower than forty-five degrees Fahrenheit ($> 45^{\circ}\text{F}$ [7.2 degrees C]).
 - 2. Existing roof material must be removed and a clean substrate, free of foreign material, must be provided prior to the installation of the tile roof system.
 - 3. Roofing surface must be free of ice, water, or snow, prior to and during the roofing project. The building owner or owner's representative is responsible for ensuring that wet or damaged substrate has been removed in a re-roofing application.
 - 4. Decking materials must be dimensionally stable prior to installing the tiles. If the materials are not dry, manufacturer recommends installing the underlayment and allowing the roof to dry out before installing tiles.
- B. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.
- C. Do not proceed with installation until substrates have been properly prepared and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.
- D. Roof System Preparation: Provide clearance on underside of decking or sheathing to allow for specified penetration of fasteners. Manufacturer recommends system be applied only over the following:
 - 1. Substrate: Minimum 15/32 inch (12 mm) plywood or 7/16 inch (11 mm) OSB decking, properly gapped for expansion.
 - 2. Substrate: Minimum three-quarter inch ($\frac{3}{4}$ " [19 mm]) tongue and groove wood decking with end gaps not exceeding one-quarter inch ($\frac{1}{4}$ " [6 mm]), and board widths not exceeding six inches (6" [152 mm]).
 - 3. Substrate: Manufacturer approved metal deck systems. Metal deck systems require installation of nail base insulation of appropriate thickness prior to attaching the roof tiles.

3.03 PROTECTION OF ROOF SURFACES

- A. Equipment (i.e. staging) and techniques shall be used which prevent damage to the roof as a result of foot or material traffic. The progression of work shall be laid out and presented to the Owner and Engineer to prevent other trades from working on or above completed roofing. Personnel who are working on the roof shall have proper shoes which will not damage the new synthetic slate shingles, and shoe soles shall be made of a material which will aid in preventing falls.

3.04 REMOVAL OF EXISTING SLATE SHINGLES

- A. Existing slate shingles, modified bitumen and felt underlayments included in this Contract shall be removed down to the existing roof deck. The Contractor shall follow the recommendations published in the NRCA Roofing and Waterproofing Manual Volume 2 - Steep Roofing Manual.
- B. Remove only as many shingles and flashings that can be made weather tight the same day. The entire existing shingle roof system shall be removed, and the underlayments installed prior to the installation of the new shingle system.
- C. Should damage to new shingles be encountered as a result of trafficking the roof system and where work involves partial replacement or repair of the roof, the Contractor shall remove and replace the damaged units at no additional cost to the owner.

3.05 INSTALLATION OF UNDERLAYMENT – SYNTHETIC SHINGLE SYSTEM

- A. Dust, dirt, loose nails or other protrusions shall be removed. Priming is not required for wood or metal surfaces unless recommended by the manufacturer. Should it be required, primer shall be applied by spray or paint roller at a coverage rate as recommended by the manufacturer.
- B. Install underlayment atop roof decks as described in these specifications, as shown on the Contract Drawings and recommended by the manufacturer. Underlayment sheets shall have six-inch (6") minimum horizontal laps and six-inch (6") end laps unless otherwise specified so as not to buck water. Underlayment sheets shall be installed per manufacturer's instructions and shall be sealed without wrinkles. Roll in all underlayment with rollers to assure one hundred percent (100%) adhesion. In general, modified underlayment shall be installed as follows:
 - 1. At all eave and rake edge locations modified bitumen sheets shall extend up the roof deck seventy-two inches (72") minimum beyond the interior face of the existing exterior walls.
 - 2. At all ridges, minimum thirty-six inches (36") on both sides of ridge.
 - 3. At valleys, underlayment sheet shall extend thirty-six inches (36") minimum up slope on both sides of valley. Form six-inch wide (6" W) end and side laps per membrane manufacturer's written instructions. Membrane shall be applied starting at the low point and working upwards. All sheets shall be overlapped a minimum of six inches (6"). Provide a six-inch (6") minimum wide strip up the center of the valley to strip in the uppermost sheet of flashing to protect it from water accumulation.
 - 4. At all roof penetrations, underlayment sheets shall extend thirty-six inches (36") minimum onto the roof deck above and on all sides of the penetration.
 - 5. Underlayment shall not be left permanently exposed to sunlight. Membrane shall be covered with exposed roofing materials as soon as possible. Membrane damaged due to exposure to sunlight shall be patched prior to the application of final roof covering

6. Membrane shall be applied only in fair weather when air and surface temperatures are above forty degrees Fahrenheit (> 40°F).
- C. Weather resistive underlayments shall be installed in a one-ply application across the roof slope lapped fifty percent (50%) to shed water. Underlayments shall be side lapped four-inch (4") minimum and shall have six-inch (6") minimum end laps. Torn or otherwise damaged underlayments shall be replaced. Underlayments shall be secured with nails through tin disks as required to prevent wind damage and traffic damage during the roof renovations. All damaged sections shall be removed and replaced at no additional cost to the Owner.
- D. Provide and install red rosin slip sheets at all locations where sheet metal flashings will rest over modified bitumen underlayments, or as required for separation between dissimilar metals.

3.06 SYNTHETIC SLATE SHINGLE INSTALLATION

- A. Install shingles in accordance with synthetic slate manufacturer's instructions and these specifications.
- B. Use caution not to rack the existing roof framing system when installing the new synthetic slate shingles by coordinating the replacement to coincide with adding additional loading to the adjacent roof areas. Multiple mechanics may be required to install separate sections of the replacement synthetic slate shingle system.
- C. Install synthetic slate shingles in a profile to match existing and as indicated in the Contract Documents. There shall be no through joints from the roof surface to the underlayment.
- D. Synthetic slate tiles shall be fitted neatly around pipes, roof penetrations and other vertical surfaces.
- E. Synthetic slate mitered hips to be installed per the approved slate manufacturer's recommendations.
- E. Coordinate the installation of the sheet metal flashings as part of the work operations.

3.07 SYNTHETIC SLATE SHINGLE UNDERLAYMENT INSTALLATION

- A. Synthetic Single-Layer Felt Underlayment: Install on roof deck parallel with and starting at the eaves. Lap sides a minimum of four inches (4") over underlying course. Lap ends a minimum of four inches (4"). Stagger end laps between succeeding courses at least seventy-two inches (72"). Fasten with felt underlayment nails.
 1. Install felt underlayment on roof deck not covered by self-adhering sheet underlayment. Lap sides of felt over self-adhering sheet underlayment not less than three inches (3") in direction to shed water. Lap ends of felt not less than six inches (6") over self-adhering sheet underlayment.

3.08 INSTALLATION OF SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

- B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated, eliminate air pockets, and ensure contact and adhesion of sealant at sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint profile per Figure 8A in ASTM C1193, unless otherwise indicated.
 - 4. Provide flush joint profile where indicated per Figure 8B in ASTM C1193.
 - 5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C1193.
 - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.09 CLEAN-UP

- A. All floor and adjacent areas, both interior and exterior, damaged or stained by the installation of the roofing work shall be repaired and cleaned of all dust, debris and any other materials to the Owner's satisfaction.

- B. The Contractor shall not demobilize the site until the completed work is toured by the Owner and Engineer. Any unsatisfactory items observed will be reported in "punch-list" form. These items shall be corrected immediately by the Contractor prior to demobilization from the job site. Final payment will not be made until all punch list items are complete and guarantees have been received.
- C. All scaffolding, barriers, temporary facilities and the like shall be removed upon completion of the work. Areas damaged as a result of the Contractors equipment shall be restored to their original condition, all to the satisfaction of the Owner.
- D. Refer to the Close-Out Procedures described in Division One for additional information.
- E. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- F. Clean and neutralize flux materials. Clean off excess solder and sealants.
- G. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.
- H. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

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SECTION 076200

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 DESCRIPTION OF WORK

- A. The Contractor shall supply all labor, equipment, temporary protection, tools, and appliances necessary for the proper completion of the work as required in the Specifications, in accordance with good construction practice, and as required by the materials manufacturer, as amended.
- B. Provide all necessary underlayment, miscellaneous flashing, attachment clips, and closure members to ensure a weathertight installation.
- C. Remove and replace sheet metal eave and rake drip edge flashings, sheet metal ridge flashings, and associated components as shown on the Contract Drawings at designated locations.
- D. Miscellaneous Sheet Metal Flashings at wood clapboard siding as shown on the Contract Drawings at designated locations.
- E. Sheet Metal Drip Cap Flashings at doors and windows as shown on the Contract Drawings at designated locations.
- F. Coordinate the work in this section with the appropriate trades to ensure the proper work sequence.
- G. Clean and restore all areas affected by the work.

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 024100 - Selective Demolition
- B. Section 061000 - Rough Carpentry
- C. Section 062013 - Exterior Finish Carpentry
- D. Section 073126 - Slate Shingles
- E. Section 073229 - Synthetic Slate Shingles and Flashing (Alternate No.1)
- F. Section 081423 - Commercial Clad Wood Door
- G. Section 083613 - Overhead Doors
- H. Section 085213 - Clad Wood Windows

1.04 MEASUREMENT AND FIELD VERIFICATION PROCEDURES

- A. All dimensions, quantities, and existing conditions shall be determined or verified by the Contractor. The Contract Drawings have been compiled from various sources and may not reflect the actual condition at the moment of construction. The Contractor is cautioned to take all precautions and make all investigations necessary to install the proposed work. The Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.

1.05 PERFORMANCE REQUIREMENTS

- A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. Fabricate and install roof edge flashing and copings capable of resisting the Wind Zone forces required by Code according to recommendations in FMG Loss Prevention Data Sheet 1-49.
- C. Thermal Movements: Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): One hundred twenty degrees Fahrenheit (120½F), ambient; one hundred eighty degrees Fahrenheit (180°F), material surfaces.
- D. Water Infiltration: Provide sheet metal flashing and trim that does not allow water infiltration to building interior.

1.06 SUBMITTALS

- A. Refer to Section 013300 - Submittal Procedures for additional information.
- B. Provide a project specific safety plan and job hazard analysis.
- C. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.
- D. Shop Drawings: Show layouts of sheet metal flashing and trim, including plans and elevations. Distinguish between shop- and field-assembled work. Include the following:
 - 1. Identify material, thickness, weight, and finish for each item and location in Project.
 - 2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.

3. Details for fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.
 4. Details of expansion-joint covers, including showing direction of expansion and contraction.
- E. Samples for Verification: Before erecting mockup, submit samples of the following:
1. Sheet Metal Flashing: Twelve inches long (12" L). Include fasteners, cleats, clips, closures, and other attachments.
 2. Trim: Twelve inches long (12" L). Include fasteners and other exposed accessories.
 3. Accessories: Full-size Sample.
- F. Qualification Data: For Installer and manufacturer.
- G. Material Test Reports: For Tin-Zinc alloy coated copper
- H. Maintenance Data: For roofing system to include in maintenance manuals.

1.07 QUALITY ASSURANCE

- A. Sheet Metal Flashing and Trim Standard: Comply with Sheet Metal and Air Conditioning Contractors National Association (SMACNA)'s "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
- B. Pre-Installation Conference: Conduct conference at Project site to comply with requirements in Division 01.
1. Meet with the Owner, Architect, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials and roof accessories.
 2. Review methods and procedures related to sheet metal flashing and trim.
 3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
 4. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.
- B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1.09 SPECIAL JOB CONDITIONS

- A. The building is historic and involves the Maine Historical Preservation Commission (MHPC). Care shall be taken with the work so as not to adversely affect the historic conditions and the historic character of the Barn. The Contractor shall cooperate with MHPC and the Architect with any requests for modifications or corrections to any installed work that do not comply with these Contract Documents or meet historic repair and restoration standards.

1.10 PROJECT CONDITIONS

- A. The Contractor shall supply, install and maintain all shoring, supports, barriers, protection, temporary heat, warning lines, lighting and personnel required to support the structure, fixtures and facilities affected by his work and segregate the work area(s) from pedestrian or vehicular traffic, as well as to prevent damage to the building, occupants and the surrounding landscaped and paved areas.
- B. The building occupants are highly sensitive to fumes, odors, noise, and disturbances. The Contractor shall submit a detailed sequence schedule for the building area prior to the start of work and shall coordinate daily schedules with the Owner.
- C. Schedule and execute all work without exposing the interior building areas to inclement weather. Protect the existing building and its contents against all risks, and repair or replace all damage to the Owner's satisfaction.
- D. Coordinate the work in this section with the work by other trades to ensure the orderly progress of the work.
- E. Under no circumstances shall the Contractor remove existing materials and systems to the ground in an uncontrolled manner. Machinery or devices used shall be manufactured for this purpose. Adjacent building(s) and property areas shall be protected from airborne debris.
- F. During removal operations, the Contractor is responsible for the containment of all dust, dirt, debris, overspray, and run-off resulting from the work. The Contractor shall collect and contain all materials and repair any resulting damage to adjacent surfaces, site fixtures or personal property. Specific attention is drawn to the use of chemicals and cleaners.
- G. Fully charged, inspected, and approved fire extinguishers shall be on site at all times. No cutting, grinding, or welding of any kind shall proceed without an approved, fully charged fire extinguisher.
- H. The Contractor shall utilize skilled and experienced specialty workers to install all aspects of the work.

1.11 CONTRACTOR GUARANTEE

- A. Upon completion of the work and prior to final payment, the Contractor shall submit a guarantee of their work as free from defect in materials and workmanship. The guarantee shall be for a period of two years (2 yrs.). The guarantee shall be signed by an officer of the Contractor's firm and sealed if a corporation.

PART 2 PRODUCTS

2.01 SHEET METAL

- A. Zinc-Tin Alloy-Coated Copper Sheet: ASTM B370, cold-rolled copper sheet, H00 temper, coated on both sides with a zinc-tin alloy (fifty percent [50%] zinc, fifty percent [50%] tin).
1. Available Product: Subject to compliance with requirements, a product that may be incorporated into the Work includes, but is not limited to, "FreedomGray" by Revere Copper Products, Inc.
 2. Weight (Thickness): 16-oz./sq. ft. uncoated weight, with 0.787-mil coating thickness applied to each side.
- B. All accessories, including but not limited to nails, screws and clips shall be stainless steel or galvanized steel and completely compatible with the surrounding metal to prevent galvanic reaction. Galvanizing shall be per ASTM A153-09.
- C. Rivets shall be three-sixteenths inch (3/16") diameter copper or stainless steel as required by the metal being secured.
- D. Sheet metal flashings shall be shop fabricated. All breaks, bends and hems shall be uniform, clean, straight lines.
1. All aluminum joints shall be adequately overlapped, back sealed, and riveted.
 2. Flanges shall be four-inch wide (4" W) minimum.
 3. Drip edges shall be hemmed three-quarter inch wide (¾" W) and break at a thirty degree (30°) angle.
 4. Clips shall be two inches wide (2" W).
 5. All flanges to be covered with roofing or flashing membranes shall have a one-quarter inch (¼") minimum hem on the edge.
 6. All sheet metal joints shall have a six-inch wide (6" W) cover and backer plates.
 7. Blind nailers shall be four-inch wide (4" W), folded to two-inch wide (2" W) final dimension.
 8. Fascia reveals shall not exceed eight-inch (8"). Fascia requiring a greater vertical face than eight-inch (8") shall be fabricated as a two-piece system with each face of equal exposure.
 9. Maintain equal fascia height around the entire perimeter of each roof area and where fascias abut.

2.02 SEALANT AND ACCESSORIES

- A. Single-Component Polyurethane Sealant for use at weather barrier and sheet metal flashing and trim transitions at shall conform to ASTM C920, Type S, Grade NS, Class 50, Uses NT, M, A and O, such as:
1. Dymonic 100 as manufactured by Tremco.

2. Sikaflex -15 LM by Sika.
 3. Seal 'N' Flex 1 by Bostik.
 4. Or approved equal.
- B. Provide a sealant compatible with the air barrier transition membrane specified in this section.
- C. Interior caulking shall be one-part, odorless, neutral cure silicone compound as manufactured by Tremco, Dow, Sika Corporation, Pecora or approved equal.
- D. Color(s) shall be selected by the Owner from the approved manufacturer's premium color chart.
- Cleaners and primers shall be as recommended by the manufacturer of the caulking.
- E. Backer rod shall be continuous length, closed cell polyethylene foam, as recommended by the sealant manufacturer. Backer rod shall be compressible, resilient, non-waxing, non-extruding, and non-staining. Backer rod shall be of sufficient size to be compressed thirty percent (30%) of maximum joint width and shall be totally compatible with the sealant, primer, and substrates. Backers shall conform to the requirements of ASTM C 962 - Type A, ASTM D1622, ASTM D1623, and ASTM D5249 such as Green Rod by Nomaco, Sonofoam by Sonneborn, ITP soft type backer rod or approved equal.
- F. Bond breaker tape shall be self-adhesive polyethylene tape as recommended by the sealant manufacturer.
- G. Masking material shall be commercially available masking tape of appropriate width or other material recommended by the sealant manufacturer. Self-adhesive masking materials shall be of low tack and completely strippable, leaving no adhesive residue behind when removed.

2.03 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.
- B. Sealing Tape: Pressure-sensitive, one hundred percent (100%) solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.
- C. Asphalt Roofing Cement: ASTM D4586, asbestos free, of consistency required for application.

2.04 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.

- B. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
- C. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
- D. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.
- E. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than one-inch (1") deep, filled with elastomeric sealant concealed within joints.
- F. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.
- G. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
 - 1. Thickness: As recommended by SMACNA's "Architectural Sheet Metal Manual" for application but not less than thickness of metal being secured.

2.05 FABRICATION SCHEDULE

- A. Note, similar flashing components have been listed under multiple metal fabrications type and thicknesses. The Contractor shall coordinate the use of compatible metals to prevent galvanic corrosion and coordinate painted finish components at visible locations.
 - 1. 16 oz. Tin-Zinc Coated Copper
 - a. Roof Eave Drip Edge Flashings
 - b. Roof Rake Edge Flashings
 - c. Counterflashings at Clapboard Siding
 - d. Drip Cap Flashings at Sectional Doors and Passage Doors
 - e. Drip Cap Flashings at Clad Wood Windows
 - 2. 20 oz. Tin-Zinc Coated Copper
 - a. Roof Ridge Cap Flashing

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of work.
 - 1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

2. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. It is the project's intent to replicate the existing sheet metal profiles, configurations, sizes, etc. of the existing gutters, downspouts, conductor boxes, and eave trim, rake, ridge flashings, unless otherwise indicated in the Contract Documents.

3.02 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
1. Torch cutting of sheet metal flashing and trim is not permitted.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.
1. Coat side of stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
 2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip-sheet or install a course of polyethylene underlayment.
 3. Bed flanges in thick coat of asphalt roofing cement where required for waterproof performance.
- C. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
- D. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and elastomeric sealant.
- E. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
1. Space cleats not more than twelve inches (12") apart. Anchor each cleat with two (2) fasteners. Bend tabs over fasteners.
- F. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of ten feet (10') with no joints allowed within twenty-four inches (24") of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than one-inch (1") deep, filled with elastomeric sealant concealed within joints.
- G. Fasteners: Use fasteners of sizes that will penetrate substrate not less than one-and-one-quarter inches (1- $\frac{1}{4}$ ") for nails and not less than three-quarter inch ($\frac{3}{4}$ ") for wood screws.

1. Stainless Steel: Use stainless-steel fasteners.
- H. Seal joints with elastomeric sealant as required for watertight construction.
1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than one-inch (1") into sealant. Form joints to completely conceal sealant. When ambient temperature at the time of installation is moderate, between forty- and seventy degrees Fahrenheit (40°F - 70°F) set joint members for fifty percent (50%) movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below forty degrees Fahrenheit (< 40°F).

3.03 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal roof flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight.
- B. Drip Edge flashings
1. Fabricate flashings to the configurations shown on the Contract Drawings.
 2. Insert flashings beneath new materials as detailed. Overlap adjacent sections a minimum of three inches (3").
 3. Secure wall flashing skirt flashing with clips at twelve inches (12") on-center and a minimum of two (2) per section. All fasteners shall be concealed.
- C. Counter-flashings
1. Fabricate new counterflashing and receivers to the dimensions and shapes where shown in the Contract Drawings and as specified herein.
 2. Secure counter-flashings with clips where indicated. Fabricate and secure clips as previously specified.
 3. Clip counterflashings onto new throughwall flashings where indicated.
- D. Ridge: Install continuous ridge vents over shingles according to manufacturer's written instructions. Fasten with roofing nails of sufficient length to penetrate sheathing.
1. Fasten ridge cap asphalt shingles to cover ridge vent without obstructing airflow.

3.04 FIELD QUALITY CONTROL

- A. Cooperate with field quality control personnel. Allow inspectors to access scaffolding and work areas, as needed to perform inspections.
- B. Additional inspections and retesting of materials which fail to comply with specified material and installation requirements shall be performed at the Contractor's expense.

3.05 CLEAN-UP

- A. The Contractor shall not demobilize the site until the completed work is toured by the Owner and Designer. Any unsatisfactory items observed will be reported in "punch-list" form. These items shall be corrected immediately by the Contractor prior to demobilization from the job site.
- B. All scaffolding, barriers, temporary facilities, and the like shall be removed upon completion of the work. Areas damaged as a result of the Contractor's equipment shall be restored to their original condition, all to the satisfaction of the Owner.
- C. Refer to the Close-Out Procedures described in Division One for additional information.

End of Section

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SECTION 081423

CLAD WOOD COMMERCIAL DOORS AND FRAMES

PART 1 – GENERAL

1.01 GENERAL PROVISIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 DESCRIPTION OF WORK

- A. The Contractor shall supply all labor, equipment, temporary protection, tools, and appliances necessary for the proper completion of the work as required in the Specifications, in accordance with good construction practice, and as required by the materials manufacturer, as amended.
- B. Furnish all necessary templates and schedules required to fabricate new door and frame.
- C. Remove existing door and frame and prepare opening and install sheet metal and membrane flashings and other associated components at designated opening to receive new clad wood commercial door as shown in the Contract Drawings.
- D. Install new clad wood commercial door frame and door, complete with hardware, weather strip, anchors and attachments, set in prepared opening with the configurations as shown the Contract Drawings.
- E. Coordinate the work in this section with the appropriate trades to ensure the proper work sequence.

Clean and restore all areas affected by the work.

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 024100 - Selective Demolition
- B. Section 061000 - Rough Carpentry
- C. Section 062013 - Exterior Finish Carpentry
- D. Section 076200 - Sheet Metal Flashing and Trim
- E. Section 099100 – Painting

1.04 MEASUREMENT AND FIELD VERIFICATION PROCEDURES

- A. All dimensions, quantities, and existing conditions shall be determined or verified by the Contractor. The Contract Drawings have been compiled from various sources and may not reflect the actual condition at the moment of construction. The Contractor is cautioned to take all precautions and make all investigations necessary to install the proposed work. The Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.

1.05 REFERENCES

- A. It is the intent of this specification that all hollow metal and its application will comply or exceed the standards as listed. The latest published edition of each reference applies.
- B. Window & Door Manufacturers Association (WDMA):
1. WDMA I.S.4 Industry Standard for Water Repellent Preservative Treatment Millwork
- C. Sealed Insulating Glass Manufacturers Association / Insulating Glass Certification Council (SIGMA/IGCC)
- D. American Architectural Manufacturers Association (AAMA):
1. AAMA 2605 Voluntary Specification for High-Performance Organic Coatings on Architectural Extrusions and Panels
- E. American Society for Testing and Materials (ASTM):
1. ASTM E330 Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
 2. ASTM E2112 Standard Practice for Installation of Exterior Windows, Doors, and Skylights

1.06 SUBMITTALS

- A. Refer to Section 013300 - Submittal Procedures for additional information.
- B. Provide a project specific safety plan and job hazard analysis.
- C. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.
- D. Shop Drawings: All shop drawings submitted shall be checked by the Contractor and indicated as such on the shop drawings. Submit shop drawings for approval prior to fabrication. Shop drawings shall include detailed plans, elevations, details of framing members, required clearances, anchors, and accessories.

- E. Doors shall not be ordered until final approval of the hardware schedule. After final approval of the hardware schedule, provide templates for doors and other work specified to be factory prepared for the installation of door hardware.
- F. Samples for Verification: Before erecting mockup, submit samples of the following:
 - 1. Door: Submit manufacturer's sample of door showing face sheets, core, framing, and finish.
 - 2. Color: Submit two (2) complete sets of selected face sheet samples with the standard finish colors representing manufacturer's full range of available colors and finishes. Samples shall represent the color selected on face sheet typical of grain patterns and coloration for the specified door.
- G. Material Test Reports: Submit certified test reports for all referenced materials.
- H. Maintenance Data: Submit manufacturer's maintenance and cleaning instructions for doors, including maintenance and operating instructions for hardware.

1.07 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Source Limitations: Obtain standard steel doors and frames through one source from a single manufacturer.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials and products in labeled protective packages. Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from damage from weather, excessive temperatures, and construction operations.
- B. Store materials in a protected dry area off the ground floor with a minimum one-quarter inch ($\frac{1}{4}$ ") space between pieces. Follow the storage and handling requirements of the manufacturer.
- C. Glazing materials shall be delivered in the manufacturer's original, unopened containers, leaving manufacturer's labels intact.
- D. All packages shall be legibly labeled indicating the manufacturer's numbers, types, sizes, and hardware schedule reference number. All hardware shall be protectively wrapped and shall be packed in the same package as all screws, bolts and fasteners required for proper installations. Items shall be free from nicks, scratches, and blemishes. Defective and/or damaged materials shall be replaced by the Contractor, at no expense to the Owner.
- E. Protect installed doors against damage from other construction work. Scratches or disfigurement caused in shipping, handling or installation shall be promptly cleaned and touched up with rust inhibitive enamel.

1.09 SPECIAL JOB CONDITIONS

- A. The building is historic and involves the Maine Historical Preservation Commission (MHPC). Care shall be taken with the work so as not to adversely affect the historic conditions and the historic character of the Barn. The Contractor shall cooperate with MHPC and the Architect with any requests for modifications or corrections to any installed work that do not comply with these Contract Documents or meet historic repair and restoration standards.

1.10 PROJECT CONDITIONS

- A. The Contractor shall supply, install and maintain all shoring, supports, barriers, protection, temporary heat, warning lines, lighting and personnel required to support the structure, fixtures and facilities affected by his work and segregate the work area(s) from pedestrian or vehicular traffic, as well as to prevent damage to the building, occupants and the surrounding landscaped and paved areas.
- B. The building occupants are highly sensitive to fumes, odors, noise, and disturbances. The Contractor shall submit a detailed sequence schedule for the building area prior to the start of work and shall coordinate daily schedules with the Owner.
- C. Schedule and execute all work without exposing the interior building areas to inclement weather. Protect the existing building and its contents against all risks, and repair or replace all damage to the Owner's satisfaction.
- D. Coordinate the work in this section with the work by other trades to ensure the orderly progress of the work.
- E. Under no circumstances shall the Contractor remove existing materials and systems to the ground in an uncontrolled manner. Machinery or devices used shall be manufactured for this purpose. Adjacent buildings and property areas shall be protected from airborne debris.
- F. During removal operations, the Contractor is responsible for the containment of all dust, dirt, debris, overspray, and run-off resulting from the work. The Contractor shall collect and contain all materials and repair any resulting damage to adjacent surfaces, site fixtures or personal property. Specific attention is drawn to the use of chemicals and cleaners.
- G. Fully charged, inspected, and approved fire extinguishers shall be on site at all times. No cutting, grinding, or welding of any kind shall proceed without an approved, fully charged fire extinguisher.
- H. The Contractor shall utilize skilled and experienced specialty workers to install all aspects of the work.

1.11 CONTRACTOR GUARANTEE

- A. Upon completion of the work and prior to final payment, the Contractor shall submit a guarantee of their work as free from defect in materials and workmanship. The guarantee shall be for a period of two years (2 yrs.). The guarantee shall be signed by an officer of the Contractor's firm and sealed if a corporation.

1.12 WARRANTY

- A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official.
- B. Standard exterior aluminum cladding finish shall be warranted against manufacturing defects resulting in chalk, fade, and loss of adhesion (peel) per the American Manufacture's Association's (AAMA) Specification 2605-11 Section 8.4 and 8.9 for twenty years (20 yrs.) from the original date of purchase.
- C. Factory applied interior finish shall be warranted to be free from the Finish Defects for a period of five years (5 yrs.) from the original date of purchase.
- D. Hardware and other non-glass components shall be warranted to be free from manufacturing defects for ten years (10 yrs.) from the original date of purchase.

PART 2- PRODUCTS

2.01 PRODUCT LINE AND MANUFACTURER

- A. Ultimate Commercial Door and Frame by Marvin, or similar door and frame products as manufactured by Pella, Anderson or an APPROVED EQUAL.

2.02 DOOR FRAME

- A. Vertical Grain Douglas Fir core with non-finger-jointed Vertical Grain:
 - 1. Kiln dried to moisture content no greater than twelve percent (12%) at the time of fabrication
 - 2. Water repellent, preservative-treated in accordance with WDMA I.S.4.
- B. Frame Width: Four- and nine-sixteenths inch (4- 9/16").
- C. Frame Thickness: One- and one-sixteenth inch (1-1/16").
- D. Exterior Extruded Aluminum Clad: 0.050" thick.
- E. Sill Options:
 - 1. Standard factory installed thermal barrier saddle low profile 0.500" by 7.125" sill.

2.03 DOOR MATERIAL

- A. Two- and One-Quarter Inch (2-1/4") Doors: Stiles and top rail contain laminated veneer lumber (LVL) core with non-finger-jointed, Mixed Grain Douglas Fir. Solid wood bottom and intermediate rails.
- B. Composite Panel Thickness: Two- and one-quarter inches (2-1/4").
- C. Exterior Extruded Aluminum Clad: 0.055" thick.
- D. Top Rail Width: Two- and one-quarter inches (2-1/4").
- E. Panel: Eight- and one-eighth inches (8-1/8").
- F. Stile width: Six inches (6").

- G. Bottom rail height: Eleven- and three-eighths inches (11- $\frac{3}{8}$ ")
- H. Panel corners glued and fastened with five-eighths inch by four-inch ($\frac{5}{8}$ " x 4") fluted hardwood dowels.

2.04 FINISH

- A. Exterior: Aluminum Clad. Fluoropolymer modified acrylic topcoat over a primer that shall meet AAMA 2605 requirements.
 - 1. Custom Color to be selected by Owner and Architect
- B. Interior Finish:
 - 1. Factory-applied waterborne stain. Stain applied over a wood (stain) conditioner. Apply water-borne acrylic enamel clear coat was applied in two (2) separate coats, with light sanding between coats applied, over the stain.
 - a. Custom Color to be selected by Owner and Architect.

2.05 HARDWARE

- A. Hinges: Four- and one-half inches by four- and one-half inches (4- $\frac{1}{2}$ " x 4- $\frac{1}{2}$ ") square corner ball bearing hinges.
- B. Finish: Brass (US3),
- C. Locking System:
 - 1. Commercial Hardware Package: closer, rim device, mortise lock, removable mullion, and kick plate
- D. Hardware Routs and Preparations:
 - 1. Schlage ND Cylindrical locks with Deadbolt.

2.06 WEATHER STRIPPING

- A. Head Jamb and Hinge Jamb: Bulb type weather strip.
 - 1. Color: Black.
- B. Locking Jamb: Gray pile weather strip.
- C. Surface-mounted aluminum panel drip mounted at the bottom of the panel.
 - 1. Custom Colors: Matches panel finish with stainless steel screws.

2.07 RAISED PANEL

- A. Stamped Raised Panel:
 - 1. Six-inch (6") intermediate rail constructed of 0.080" aluminum to the exterior with foam backing. Available in all aluminum clad colors. Aluminum clad shall meet AAMA 2605 requirements.
 - 2. Core shall be medium density fiberboard (MDF) with non-finger-jointed wood laminated to the interior.

3. High Placement: 40 5/16" on center (OC) of 6" intermediate rail from bottom sill for a 25 1/8" visible panel height.

2.08 ACCESSORIES

- A. Installation Brackets: Six- and three-eighths inch (6-³/₈""); nine- and three-eighths inch (9-³/₈""); fifteen- and three-eighths inch (15-³/₈"").

2.09 FLASHING AND ACCESSORIES

- A. Vapor permeable air barrier shall be self-adhered membrane with poly-release film, such as Blueskin VP100 by Henry, Air Shield SMP by W.R. Meadows, WrapShield SA by VaproShield, or approved equal. Provide primer as recommended by membrane manufacturer.
- B. Flexible transition flashing membrane shall be a butyl rubber based, self-adhering vapor permeable membrane. Transition membrane shall be provided by the same manufacturer as the vapor permeable air barrier. Mastic and primer shall be as recommended by the membrane manufacturer. Temporary UV protection and corner fillets shall be as recommended by the membrane manufacturer.

2.10 SEALANT AND ACCESSORIES

- A. Single-Component Polyurethane Sealant for use at weather barrier and sheet metal flashing and trim transitions at shall conform to ASTM C920, Type S, Grade NS, Class 50, Uses NT, M, A and O, such as:
 1. Dymonic 100 as manufactured by Tremco.
 2. Sikaflex -15 LM by Sika.
 3. Seal 'N' Flex 1 by Bostik.
 4. Or approved equal.
- B. Provide a sealant compatible with the air barrier transition membrane specified in this section.
- C. Interior caulking shall be one-part, odorless, neutral cure silicone compound as manufactured by Tremco, Dow, Sika Corporation, Pecora or approved equal.
- D. Color(s) shall be selected by the Owner from the approved manufacturer's premium color chart.
- E. Cleaners and primers shall be as recommended by the manufacturer of the caulking.
- F. Backer rod shall be continuous length, closed cell polyethylene foam, as recommended by the sealant manufacturer. Backer rod shall be compressible, resilient, non-waxing, non-extruding, and non-staining. Backer rod shall be of sufficient size to be compressed thirty percent (30%) of maximum joint width and shall be totally compatible with the sealant, primer, and substrates. Backers shall conform to the requirements of ASTM C 962 - Type A, ASTM D1622, ASTM D1623, and ASTM D5249 such as Green Rod by Nomaco, Sonofoam by Sonneborn, ITP soft type backer rod or approved equal.

- G. Bond breaker tape shall be self-adhesive polyethylene tape as recommended by the sealant manufacturer.
- H. Masking material shall be commercially available masking tape of appropriate width or other material recommended by the sealant manufacturer. Self-adhesive masking materials shall be of low tack and completely strippable, leaving no adhesive residue behind when removed.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verification of Condition: Before installation, verify openings are plumb, square, and of proper dimensions. Report frame defects or unsuitable conditions to the General contractor before proceeding.
- B. Acceptance of Condition: Beginning on installation confirms acceptance of existing conditions.

3.02 INSTALLATION

- A. Assemble and install door unit(s) according to manufacturer's instruction and review shop drawing.
- B. Install sealant and related backing materials at the perimeter of the unit or assembly in accordance with Section 079200 - Joint Sealants. Do not use expansive foam sealant.
- C. Install accessory items as required.
- D. Use non-corrosive finish nails to apply wood trim and mouldings.

3.03 DOOR FRAME INSTALLATION

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing hollow metal door frames, accessories, and other components.
- B. Install door frame level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
- C. Set shims such that they do not interfere with required perimeter sealant joint depth, backer rod or sealant installation.

3.04 DOOR INSTALLATION

- A. Install door(s) to comply with manufacturer's instructions, applicable to requirements of referenced quality standard, and as indicated.
- B. Align and fit door in frame with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted with fire rated doors. Machine door for hardware. Seal cut surfaces after fitting and machining.

- C. Provide one-eighth inch ($\frac{1}{8}$ ") at jambs and heads, and one-eighth inch ($\frac{1}{8}$ ") from bottom of door to top of the floor finish or covering. Where threshold is shown or scheduled, provide one-quarter inch ($\frac{1}{4}$ ") clearance from bottom of door to top of threshold.

3.05 ADJUSTING, CLEANING, AND DEMONSTRATING

- A. Adjust and check each operating item of hardware and each door, to insure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly
- B. Clean adjacent surfaces soiled by hardware installation.
- C. Instruct Owner's personnel in the proper adjustment, lubrication, and maintenance of door hardware and hardware finishes.
- D. Refinish or replace doors damaged during installation.
- E. Re-hang or replace doors that do not swing or operate freely.

3.06 CLEAN-UP

- A. The Contractor shall not demobilize the site until the completed work is toured by the Owner and Designer. Any unsatisfactory items observed will be reported in "punch-list" form. These items shall be corrected immediately by the Contractor prior to demobilization from the job site.
- B. All scaffolding, barriers, temporary facilities, and the like shall be removed upon completion of the work. Areas damaged as a result of the Contractor's equipment shall be restored to their original condition, all to the satisfaction of the Owner.
- C. Refer to the Close-Out Procedures described in Division One for additional information.

End of Section

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SECTION 083613

OVERHEAD DOORS

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 DESCRIPTION OF WORK

- A. The Contractor shall supply all labor, equipment, temporary protection, tools, and appliances necessary for the proper completion of the work as required in the Specifications, in accordance with good construction practice, and as required by the materials manufacturer, as amended.
- B. Remove all existing sectional overhead doors, frames, tracks, brackets, associated components, hardware, weather-stripping and prepare openings to receive new sectional overhead doors as shown in the Contract Drawings.
- C. Coordinate with Section 024100 - Selective Demolition for the removal of the existing overhead doors.
- D. Coordinate with Section 061000 - Rough Carpentry for the installation of wood framing and blocking.
- E. Install new manually operated metal sectional overhead frames, tracks, brackets, associated components, hardware, weather-stripping in prepared openings as shown in the Contract Drawings.
- F. Install perimeter sealants at one hundred percent (100%) of replacement window openings.
- G. Coordinate with Section 062013 - Exterior Finish Carpentry for exterior trim.
- H. Coordinate the work in this section with the appropriate trades to ensure the proper work sequence.
- I. Clean and restore all areas affected by the work.

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 024100 - Selective Demolition
- B. Section 061000 - Rough Carpentry
- C. Section 062013 - Exterior Finish Carpentry

- D. Section 076200 - Sheet Metal Flashing and Trim
- E. Section 099100 – Painting

1.04 MEASUREMENT AND FIELD VERIFICATION PROCEDURES

- A. All dimensions, quantities, and existing conditions shall be determined or verified by the Contractor. The Contract Drawings have been compiled from various sources and may not reflect the actual condition at the moment of construction. The Contractor is cautioned to take all precautions and make all investigations necessary to install the proposed work. The Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.

1.05 REFERENCES

It is the intent of this specification that all hollow metal and its application will comply or exceed the standards as listed. The latest published edition of each reference applies.

- A. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) / DOOR AND ACCESS SYSTEMS MANUFACTURERS ASSOCIATION INTERNATIONAL (DASMA):

- 1. ANSI/DASMA 108 Standard Method for Testing Sectional Garage Doors and Rolling Doors: Determination of Structural Performance Under Uniform Static Air Pressure Difference

- B. Underwriters Laboratories, Inc. (UL)

1.06 PERFORMANCE REQUIREMENTS

- A. Wind Loads: Design and size components to withstand loads caused by pressure and suction of wind acting normal to plane of wall as calculated in accordance with applicable code.
 - 1. Zone 4 (within the middle area of the building elevation): Forty-three pounds per square foot (43 psf).
 - 2. Zone 5 (within five feet [5'] of outside corners of the building): Fifty-one pounds per square foot (51 psf).
- B. Single-Source Responsibility: Provide doors, tracks, motors, and accessories from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.

1.07 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.

- B. Shop Drawings: Indicate plans and elevations including opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.
- C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns for selection by Owner and Architect.
- D. Verification Samples: For each finish product specified, provide a minimum of two (2) samples; minimum size six inches (6") square that represent actual product, color, and patterns.
- E. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- F. Operation and Maintenance Data
- G. Qualification Data: For Installer.

1.08 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years (5 yrs.) documented experience.
- B. Installer Qualifications: Authorized representative of the manufacturer with minimum five years (5 yrs.) documented experience.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturers' unopened labeled packaging until ready for installation.
- B. Protect materials from exposure to moisture until ready for installation.
- C. Store materials in a dry, ventilated, and weathertight location.
- D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.10 SPECIAL JOB CONDITIONS

- A. The building is historic and involves the Maine Historical Preservation Commission (MHPC). Care shall be taken with the work so as not to adversely affect the historic conditions and the historic character of the Barn. The Contractor shall cooperate with MHPC and the Architect with any requests for modifications or corrections to any installed work that do not comply with these Contract Documents or meet historic repair and restoration standards.

1.11 JOB CONDITIONS

- A. The Contractor shall supply, install and maintain all shoring, supports, barriers, protection, temporary heat, warning lines, lighting and personnel required to support the structure, fixtures and facilities affected by his work and segregate the work area(s) from pedestrian or vehicular traffic, as well as to prevent damage to the building, occupants and the surrounding landscaped and paved areas.

- B. Schedule and execute all work without exposing the interior building areas to inclement weather. Protect the existing building and its contents against all risks, and repair or replace all damage to the Owner's satisfaction.
- C. Coordinate the work in this section with the work by other trades to ensure the orderly progress of the work.
- D. Under no circumstances shall the Contractor remove existing materials and systems to the ground in an uncontrolled manner. Machinery or devices used shall be manufactured for this purpose. Adjacent building and property areas shall be protected from airborne debris.
- E. During removal operations, the Contractor is responsible for the containment of all dust, dirt, debris, overspray, and run-off resulting from the work. The Contractor shall collect and contain all materials and repair any resulting damage to adjacent surfaces, site fixtures or personal property. Specific attention is drawn to the use of chemicals and cleaners.
- F. Fully charged, inspected, and approved fire extinguishers shall be on site at all times. No cutting, grinding, or welding of any kind shall proceed without an approved, fully charged fire extinguisher.
- G. The Contractor shall utilize skilled and experienced specialty workers to install all aspects of the work.

1.12 WARRANTY

- A. Limited lifetime warranty against splitting and cracking; ten years (10 yrs.) against delamination of polyurethane foam from steel face; ten years (10 yrs.) against delamination of the facial molding from the skins of the panel and all other components for one year (1 yr.).

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Acceptable Manufacturer: Overhead Door Corporation, which is located at:
2501 S. State Hwy 121, Suite 200; Lewisville, TX 75067
Toll Free Tel: (800) 275-3290
Tel: (469) 549-7100
Fax: (972) 906-1499
Email: arcat@overheaddoor.com
Web: www.overheaddoor.com
 - 2. Or APPROVED EQUAL.

2.02 METAL OVERHEAD DOOR

- A. Insulated Steel Sectional Overhead Doors: Thermacore 5745 Series Windstorm Wind Load-Rated Insulated Steel Doors by Overhead Door Corporation or Approved Equal.
1. Door Assembly: Rigid steel fully insulated construction with a metal foam metal sandwich panel. Fabricated with EPDM seals between sections.
 - a. Size: As indicated on the Drawings.
 - b. Panel Thickness: One- and three-eighths inches (1- $\frac{3}{8}$ ") [34.93 mm].
 - c. Panel Style: Tongue-and-groove panels.
 - 1) All Panel Style options shall be made available for selection by the Owner and Architect.
 - d. Exterior Steel: 0.012 inch (0.030 mm) nominal, high strength hot dipped galvanized steel with an embossed wood grain texture.
 - e. Insulation: CFC-free foamed in place polyurethane.
 - f. Thermal Values: R-value of 12.12. U-Factor of < 0.37 (exceeds 2015 IECC climate zone requirements for maximum U-Factor of Operable fenestrations, section C402.4).
 - g. Air Infiltration: < 0.40 (meet 2015 IECC Section C402.5.2 for Garage Doors).
 - h. Windload Design: Provide to meet the Design/Performance requirements specified.
 2. Finish/Color: Two-coat baked-on polyester. Color as follows:
 - a. All color options shall be made available for selection by the Owner and Architect
 3. Hardware: Standard hinges.
 4. Lock:
 - a. Interior mounted slide lock.
 - b. Keyed lock.
 5. Bottom fixture: DASMA 103 red-head fasteners.
 6. Manual Operation.

2.03 TRACKS, SUPPORTS, AND ACCESSORIES

- A. Tracks: Manufacturer's standard, galvanized steel track system, sized for door size and weight, designed for lift type indicated and clearances shown, and complying with ASTM A653/A653M for minimum G60 zinc coating. Provide complete track assembly including brackets, bracing, and reinforcement for rigid support of ball-bearing roller guides for required door type and size. Slot vertical sections of track spaced at two inches (2") apart for door-drop safety device. Slope tracks at proper angle from vertical or design to ensure tight closure at jambs when door unit is closed. Weld or bolt to track supports.
- B. Track Reinforcement and Supports: Galvanized steel track reinforcement and support members, complying with ASTM A36/A36M and ASTM A123/A123M. Secure, reinforce, and support tracks as required for door size and weight to provide strength and rigidity without sag, sway, and vibration during opening and closing of doors.
 - 1. Support and attach tracks to opening jambs with continuous angle welded to tracks and attached to wall. Support horizontal (head) tracks with continuous angle welded to track and supported by laterally braced attachments to overhead structural members at curve and end of tracks.
 - a. Repair galvanized coating on tracks according to ASTM A780.
- C. Weather Seals: Replaceable, adjustable, continuous, compressible weather-stripping gaskets of flexible vinyl, rubber, or neoprene fitted to bottom and top of overhead door.
 - 1. Provide continuous flexible seals at doorjambs for a weathertight installation.

2.04 HARDWARE

- A. General: Provide heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless steel, or other corrosion-resistant fasteners, to suit door type.
- B. Hinges: Heavy-duty galvanized steel hinges of not less than 0.0747-inch-thick, uncoated steel at each end stile and at each intermediate stile, according to manufacturer's written recommendations for door size. Attach hinges to door sections through stiles and rails with bolts and lock nuts or lock washers and nuts. Use rivets or self-tapping fasteners where access to nuts is not possible. Provide double-end hinges where required, for doors exceeding sixteen feet (16') in width, unless otherwise recommended by door manufacturer.
- C. Rollers: Heavy-duty rollers with steel ball bearings in case hardened steel races, mounted with varying projections to suit slope of track. Extend roller shaft through both hinges where double hinges are required. Provide three-inch (3") diameter roller tires for three-inch wide (3" W) track, and two-inch (2") diameter roller tires for two-inch wide (2" W) track.
- D. Push/Pull Handles: For push-up-operated or emergency-operated doors, provide galvanized steel lifting handles on each side of door.

- E. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on single-jamb side, operable from inside only.
- F. Fabricate locking device assembly with lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bar to engage through slots in tracks. Lock cylinder is specified in Section 087100 - Door Hardware.
- G. If door unit is power operated, provide safety interlock switch to disengage power supply when door is locked.

2.05 COUNTERBALANCE MECHANISM

- A. Extension Spring: Counterbalance mechanism with aircraft-type steel cable over ball-bearing sheaves. Provide oil-tempered wired springs with internal safety rods. Combine operation with a spring bumper in each horizontal track to cushion door at end of opening operation.
- B. Torsion Spring: Counterbalance mechanism consisting of adjustable-tension torsion springs fabricated from oil-tempered-steel wire complying with ASTM A229/A 229M, Class II, mounted on a cross-header tube or steel shaft. Connect to door with galvanized aircraft-type lift cables with cable safety factor of at least five to one (5:1). Provide springs calibrated for a minimum of 10,000 cycles.
- C. Cable Drums: Cast-aluminum or gray-iron casting cable drums grooved to receive cable. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of shaft. Provide one (1) additional midpoint bracket for shafts up to sixteen feet long (16' L), and two additional brackets at one-third ($\frac{1}{3}$) points to support shafts more than sixteen feet long (> 16' L) unless closer spacing is recommended by door manufacturer.
- D. Cable Safety Device: Include a spring-loaded, steel or bronze cam mounted to bottom door roller assembly on each side and designed to automatically stop door if either cable breaks.
- E. Bracket: Provide anchor support bracket as required to connect stationary end of spring to the wall and to level shaft and prevent sag.
- F. Provide a spring bumper at each horizontal track to cushion door at end of opening operation.

2.06 MANUAL DOOR OPERATORS

- A. Push-up Operation: Lift handles and pull rope for raising and lowering doors, operating with a maximum twenty-five-pound force (25-lbf) lift or pull.

2.07 SEALANT AND ACCESSORIES

- A. Single-Component Polyurethane Sealant for use at weather barrier and sheet metal flashing and trim transitions at shall conform to ASTM C920, Type S, Grade NS, Class 50, Uses NT, M, A and O, such as:
 - 1. Dymonic 100 as manufactured by Tremco.
 - 2. Sikaflex -15 LM by Sika.

3. Seal 'N' Flex 1 by Bostik.
 4. Or approved equal.
- B. Provide a sealant compatible with the air barrier transition membrane specified in this section.
 - C. Interior caulking shall be one-part, odorless, neutral cure silicone compound as manufactured by Tremco, Dow, Sika Corporation, Pecora or approved equal.
 - D. Color(s) shall be selected by the Owner from the approved manufacturer's premium color chart.
 - E. Cleaners and primers shall be as recommended by the manufacturer of the caulking.
 - F. Backer rod shall be continuous length, closed cell polyethylene foam, as recommended by the sealant manufacturer. Backer rod shall be compressible, resilient, non-waxing, non-extruding, and non-staining. Backer rod shall be of sufficient size to be compressed thirty percent (30%) of maximum joint width and shall be totally compatible with the sealant, primer, and substrates. Backers shall conform to the requirements of ASTM C 962 - Type A, ASTM D1622, ASTM D1623, and ASTM D5249 such as Green Rod by Nomaco, Sonofoam by Sonneborn, ITP soft type backer rod or approved equal.
 - G. Bond breaker tape shall be self-adhesive polyethylene tape as recommended by the sealant manufacturer.
 - H. Masking material shall be commercially available masking tape of appropriate width or other material recommended by the sealant manufacturer. Self-adhesive masking materials shall be of low tack and completely strippable, leaving no adhesive residue behind when removed.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. General: Install door, track, and operating equipment complete with necessary hardware, jamb and head molding strips, anchors, inserts, hangers, and equipment supports according to Shop Drawings, manufacturer's written instructions, and as specified.
- B. Fasten vertical track assembly to framing, spaced not less than twenty-four inches apart (24"). Hang horizontal track from structural overhead framing with angle or channel hangers fastened to framing by welding or bolting or both. Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track and door-operating equipment.
- C. Protect doors and tracks against damage from construction operations and placement of equipment and fixtures during the remainder of construction period.

3.02 ADJUSTING

- A. Lubricate bearings and sliding parts; adjust doors to operate easily, free from warp, twist, or distortion and with weathertight fit around entire perimeter.
- B. Adjust belt-driven motors as follows:
 - 1. Use adjustable motor-mounting bases for belt-driven motors.
 - 2. Align pulleys and install belts.
 - 3. Tension belt according to manufacturer's written instructions.
- C. Touch-up Painting: Immediately after welding galvanized track to track supports, clean field welds and abraded galvanized surfaces and repair galvanizing to comply with ASTM A780.

3.03 DEMONSTRATION

- A. Engage a factory-authorized service representative to train the User Agency's maintenance personnel to adjust, operate, and maintain sectional overhead doors.

END OF SECTION

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SECTION 085213

ALUMINUM CLAD WOOD WINDOWS

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 DESCRIPTION OF WORK

- A. In general, the Contractor shall supply all labor, equipment, temporary protection, tools, and appliances necessary for the proper completion of the work as required in the Specifications, in accordance with good construction practice, and as required by the materials manufacturer, as amended. The work under this Section generally includes the following:
 - B. Coordinate work within this Section with all other associated trades to perform work in an orderly fashion and to minimize temporary supports and weather protection.
 - C. Coordinate with Section 024100 - Selective Demolition for the removal of the existing wood windows and glazing.
 - D. Coordinate with Section 061000 - Rough Carpentry for the installation of wood blocking.
 - E. Install self-adhering flashing membrane as indicated in the Contract Documents over properly prepared openings. Coordinate with Section 06 10 00 - Rough Carpentry for window rough opening preparation.
 - F. Install sheet metal flashing as indicated in the Contract Documents over properly prepared window openings. Coordinate the installation with the self-adhering flashing membrane.
 - G. Install fixed and operable single hung aluminum-clad wood-framed windows with factory-installed glass and glazing, and with high-performance exterior finish and painted wood interior finish.
 - H. Install metal clips to properly support and anchor the new window assemblies.

- I. Install perimeter sealants at one hundred percent (100%) of replacement window openings.
- J. Coordinate with Section 062013 - Exterior Finish Carpentry for exterior trim.
- K. Clean and restore all areas affected by the work to the satisfaction of the Owner.

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 024100 - Selective Demolition
- B. Section 061000 - Rough Carpentry
- C. Section 062013 - Exterior Finish Carpentry
- D. Section 076200 - Sheet Metal Flashing and Trim
- E. Section 099100 - Painting

1.04 MEASUREMENT AND FIELD VERIFICATION PROCEDURES

- A. All dimensions, quantities, and existing conditions shall be determined or verified by the Contractor. The Contract Drawings have been compiled from various sources and may not reflect the actual condition at the moment of construction. The Contractor is cautioned to take all precautions and make all investigations necessary to install the proposed work. The Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.

1.05 REFERENCES

- A. AMERICAN SOCIETY FOR TESTING MATERIALS (ASTM):
 - 1. ASTM C1036 Standard Specification for Flat Glass
 - 2. ASTM E283 Standard Test method for Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors
 - 3. ASTM E330 Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls and Door by Uniform Static Air Pressure Difference
 - 4. ASTM E547 Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Cyclic Static Air Pressure Differential
 - 5. ASTM E548 Standard Guide for General Criteria Used for Evaluating Laboratory Competence
 - 6. ASTM E1886 Standard Test method for Performance of Exterior Windows, curtain Walls, and Storm Shutters Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials
 - 7. ASTM E1996 Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Storm Shutters Impacted by Windborne Debris in Hurricanes
 - 8. ASTM E2068 Standard Test Method for Determination of Operating Force of Sliding Windows and Doors
 - 9. ASTM E2112 Standard Practice for Installation of Exterior Windows, Doors, and Skylights

10. ASTM E2190 Specification for Sealed Insulated Glass Units
11. ASTM F2090-17 Standard Specifications for Windows Fall Prevention Devices with Emergency Escape (egress) Release Mechanisms

B. AMERICAN ARCHITECTURAL MANUFACTURER'S ASSOCIATION / WINDOW AND DOOR MANUFACTURER'S ASSOCIATION / CANADIAN STANDARDS ASSOCIATION (AAMA/WDMA/CSA):

1. AAMA/WDMA/CSA 101/I.S.2/A440-08
Standard/Specification for Windows, Doors and Skylights
2. AAMA/WDMA/CSA 101/I.S.2/A440-11
Standard/Specification for Windows, Doors and Skylights
3. AAMA 450-10 Voluntary Performance Rating Method for Muller Fenestration Assemblies

C. WINDOW AND DOOR MANUFACTURER'S ASSOCIATION (WDMA):

1. WDMA I.S.4 Industry Standard for Water Repellent Preservative Treatment for Millwork
2. WDMA 101/I.S.2 Hallmark Certification Program

D. SEALED INSULATING GLASS MANUFACTURER'S ASSOCIATION / INSULATING GLASS CERTIFICATION COUNCIL (SIGMA/IGCC)

E. AMERICAN ARCHITECTURAL MANUFACTURER'S ASSOCIATION (AAMA):

1. AAMA 2605 Voluntary Specification for High Performance Organic Coatings on Architectural Extrusions and Panels

F. NATIONAL FENESTRATION RATING COUNCIL (NFRC):

1. NFRC 101 Procedure for Determining Fenestration Product Thermal Properties
2. NFRC 200 Procedure for Determining Solar Heat Gain Coefficients at Normal Incidence

G. WINDOW COVERING MANUFACTURER'S ASSOCIATION (WCMA):

1. A100.1 American National Standard for Safety of Corded Window Coverings Products

1.05 PERFORMANCE REQUIREMENTS

- A. General: Provide aluminum clad wood windows capable of complying with performance requirements indicated, based on testing manufacturer's windows that are representative of those specified and that are of test size indicated below:
- B. Minimum size required by AAMA/[National Wood Window & Door Association] NWWDA/CSA 101/I.S.2/A440.
- C. AAMA/NWWDA Performance Requirements: Provide wood windows of the performance class and grade indicated that comply with AAMA/NWWDA/CSA 101/I.S.2/A440.
- D. Performance Class: CW - Commercial
- E. Performance Grade: Minimum PG 50, or to meet Design Pressure requirements, whichever is more strict
- F. Exception to AAMA/NWWDA/CSA 101/I.S.2/A440: In addition to requirements for performance class and performance grade, design glass framing system to limit lateral deflections of glass edges to less than 1/175 inches of glass-edge length or three-quarter inch ($\frac{3}{4}$ "), whichever is less, at design pressure based on Code requirements.
- G. Structural Performance: Provide wood windows capable of withstanding the following, including wind loads based on passing AAMA/NWWDA/CSA 101/I.S.2/A440, Uniform Load Structural Test, at basic wind speed indicated.
- H. Deflection: Based on passing AAMA/NWWDA/CSA 101/I.S.2/A440, Uniform Load Deflection Test.
- I. Deflection: Design glass framing system to limit lateral deflections of glass edges to less than 1/175 inches of glass-edge length or three-quarter inch ($\frac{3}{4}$ "), whichever is less, at design pressure based on structural computations.
- J. Wind Speed: As required by Code.
- K. Design Pressures: In accordance with code-required wind loads within the Main Uniform Building Code which adopts the IBC 2021 with amendments.
 - 1. Zone 4 (within the middle area of the building elevation): Forty-three pounds per square foot (43 psf).
- L. Zone 5 (within five feet [5'] of outside corners of the building): Fifty-one pounds per square foot (51 psf).
- M. Maximum Rate: As required by Code.
- N. Water Resistance: No water leakage as defined in AAMA/NWWDA referenced test methods at a water test pressure equaling that indicated, when tested according to AAMA/NWWDA/CSA 101/I.S.2/A440, Water Resistance Test.
- O. Test Pressure: Fifteen percent (15%) of positive design pressure, but not less than 2.86 lbf/sq. ft. or more than 12 lbf/sq. ft.

- P. Thermal Transmittance: Provide wood windows with a whole window U-value maximum indicated at fifteen miles per hour (15 mph) exterior wind velocity and winter condition temperatures when tested according to AAMA 1503.
1. U-Value: As required by the 2021 International Energy Conservation Code (IECC) Requirements.
 - a. Fixed Fenestration Units: 0.34 maximum.
 - b. Operable Fenestration Units: 0.42 maximum.
- Q. Solar Heat-Gain Coefficient: Provide wood windows with a whole window SHGC maximum as required by the 2021 International Energy Conservation Code determined according to NFRC 200 procedures.
1. Fixed Fenestration Units: 0.38.
 2. Operable Fenestration Units: 0.34.

1.06 SUBMITTALS

- A. Refer to Section 013300 - Shop Drawings and Submittals for additional information.
- B. Provide a project specific safety plan and job hazard analysis.
- C. Product Data: Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions for each type of wood window indicated.
- D. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other Work, operational clearances, and the following:
1. Mullion details, including reinforcement and stiffeners.
 2. Joinery details.
 3. Expansion provisions.
 4. Flashing and drainage details.
 5. Weather-stripping details.
 6. Glazing details.
- E. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer licensed in the Commonwealth of Massachusetts responsible for their preparation and used to determine the following:
1. Structural test pressures and design pressures from basic wind speeds indicated.
 2. Deflection limitations of glass framing systems.
- F. Samples for Verification: For wood window components required, prepared Samples of size indicated below.

1. Main Framing Member: Twelve-inch long (12" L), full-size sections of extrusions with factory-applied color finish.
 2. Hardware: Full-size units with factory-applied finish.
 3. Weather Stripping: Twelve-inch long (12" L) sections.
- G. Qualification Data: For Installer and professional engineer.
- H. Product Test Reports: Based on evaluation of comprehensive tests performed within the last four years (4 yrs.) by a qualified testing agency, for each type, grade, and size of wood window. Test results based on use of downsized test units will not be accepted.
- I. Maintenance Data: For operable window sash, operating hardware, weather-stripping and finishes to include in maintenance manuals.

1.07 TEST AREAS

- A. Before commencing full-scale work, install one (1) sample window in finished openings for review by the Owner and Engineer. Contractor to coordinate the sample window location with the Owner and Engineer. Installations shall conform to the Contract Documents and once accepted shall become a standard for all subsequent work on the project.
- B. Test areas shall be repeated until acceptable results are obtained and the accepted area shall be a standard for all subsequent work. Installation of test items shall be in conformance with all Contract Documents and shall use only submitted materials. After curing for seven (7) days, the test areas shall be viewed, sampled and/or removed as directed by the Engineer to establish to his satisfaction the actual performance of the installed materials. Evidence of improper or unsatisfactory performance shall be grounds for rejection of any or all of the submitted materials.
- C. The Contractor shall test fenestration products for air leakage resistance and water penetration resistance as specified at various stages of the product installation.

1.08 QUALITY ASSURANCE

- A. Installer Qualifications: An installer acceptable to wood window manufacturer for installation of units required for this Project.
- B. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, with the experience and capability to conduct the testing indicated, as documented according to ASTM E548.
- C. Source Limitations: Obtain wood windows through one source from a single manufacturer.
- D. Product Options: Information on Drawings and Specifications establishes requirements for wood windows' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.

- E. Fenestration Standard: Comply with AAMA/NWWDA/CSA 101/I.S.2/A440, "Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors," for minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
- F. Provide AAMA-certified wood windows with an attached label.
- G. Glazing Publications: Comply with published recommendations of glass manufacturers and GANA's "Glazing Manual" unless more stringent requirements are indicated.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Deliver in original packaging and protect from weather.
- B. Prime and seal wood surfaces, including to be concealed by wall construction, if more than thirty (> 30) days will expire between delivery and installation.
- C. Store window units in an upright position in a clean and dry storage area above ground to protect from weather under provisions of Section 016300 - Weather Protection and Materials Storage.

1.10 SPECIAL JOB CONDITIONS

- A. The building is historic and involves the Maine Historical Preservation Commission (MHPC). Care shall be taken with the work so as not to adversely affect the historic conditions and the historic character of the Barn. The Contractor shall cooperate with MHPC and the Architect with any requests for modifications or corrections to any installed work that do not comply with these Contract Documents or meet historic repair and restoration standards.

1.11 JOB CONDITIONS

- A. This building is listed on the National Register of Historic Places. The contractor is to perform window repairs and install replacement windows and related accessory construction in accordance with the Contract Documents. Any deviations from the Contract Documents are to be reviewed with the Owner and Engineer prior to performing the work.
- B. The Contractor shall supply, install and maintain all shoring, supports, barriers, protection, temporary heat, warning lines, and lighting and personnel required to support the structure, fixtures and facilities affected by his work and segregate the work area(s) from pedestrian or vehicular traffic, as well as to prevent damage to the building, occupants and the surrounding landscaped and paved areas.
- C. Schedule and execute all work without exposing the interior building areas to inclement weather. Protect the existing building and its contents against all risks, and repair or replace all damage to the Owner's satisfaction.
- D. Coordinate the work in this section with the work by other trades to ensure the orderly progress of the work.

- E. Under no circumstances shall the Contractor remove existing materials and systems to the ground in an uncontrolled manner. Machinery or devices used shall be manufactured for this purpose. Adjacent building and property areas shall be protected from airborne debris.
- F. During removal operations, the Contractor is responsible for the containment of all dust, dirt, debris, overspray, and run-off resulting from the work. The Contractor shall collect and contain all materials and repair any resulting damage to adjacent surfaces, site fixtures or personal property. Specific attention is drawn to the use of chemicals and cleaners.
- G. Fully charged, inspected, and approved fire extinguishers shall be on site at all times. No cutting, grinding, or welding of any kind shall proceed without an approved, fully charged fire extinguisher.
- H. The Contractor shall utilize skilled and experienced specialty workers to install all aspects of the work.
- I. Field Measurements: Verify wood window openings by field measurements before fabrication and indicate measurements on Shop Drawings.
- J. Windows shall meet the requirements of the Buy America Act (BAA) and the Build America, Buy America Act (BABA).

1.12 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace windows that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
 - 1. Failure to meet performance requirements.
 - 2. Structural failures including excessive deflection.
 - 3. Water leakage, air infiltration, or condensation within the IGU.
 - 4. Faulty operation of movable sash and hardware.
 - 5. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 6. Insulating glass failure.
- B. Warranty Period: Two years (2 yrs.) from the date of Certificate of Agency Use and Occupancy. Guarantees or warranties that start at the date of shipment from the factory, or from the completion date of an individual portion of the project, are not acceptable.
- C. Warranty Period for Metal Finishes: Ten years (10 yrs.) from the date of Certificate of Agency Use and Occupancy. Guarantees or warranties that start at the date of shipment from the factory, or from the completion date of an individual portion of the project, are not acceptable.

- D. Warranty Period for Glass: Ten years (10 yrs.) from the date of Certificate of Agency Use and Occupancy. Guarantees or warranties that start at the date of shipment from the factory, or from the completion date of an individual portion of the project, are not acceptable.
- E. Warranty Period for Factory-applied Interior Finish: Factory-applied interior finishes to be warranted to be free from finish defects for a period of five years (5 yrs.).
- F. Hardware and other non-glass components are to be warranted to be free from manufacturing defects for a period of ten years (10 yrs.).

PART 2- PRODUCTS

2.01 WINDOW UNITS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Basis of Design for Aluminum-Clad Wood Windows: Ultimate Double Hung G2, and Ultimate Picture Window as manufactured by Marvin, Warroad, Minnesota.
- C. Window Operation: Fixed and Double-hung Units.
- D. Frame Description:
 - 1. Interior: Non-Finger-Jointed Pine or finger-jointed core with non-finger-jointed Pine veneer; with factory-applied paint finish.
 - a. Kiln-dried to moisture content no greater than twelve percent (12%) at the time of fabrication.
 - b. Water repellant, preservative treated in accordance with ANSI/WDMA I.S.4.
 - 2. Exterior: Aluminum clad with 0.050" (1.3mm) thick extruded aluminum.
 - 3. Frame Thickness: 1 1/16" (17 mm) head and jambs.
 - 4. Frame Depth: 4-9/16" (116 mm) jamb depth from the nailing fin plane to the interior face of the frame for new construction.
 - 5. Sill Assembly including the sill liner: 2-7/32" (56mm).
 - 6. Factory-applied historic profile extrusion.
- E. Sash Description:
 - 1. Interior: Non-Finger-Jointed Pine or finger-jointed core with non-finger-jointed Pine veneer; with factory-applied paint finish.
 - a. Kiln-dried to moisture content no greater than twelve percent (12%) at the time of fabrication.
 - b. Water repellant, preservative treated in accordance with ANSI/WDMA I.S.4.

- c. Color: Marvin Pine White.
 - 1. Contractor to submit color sample to Owner for approval.
- 2. Sash Exterior: Aluminum clad with 0.050" (1.3mm) thick extruded aluminum.
- 3. Sash Thickness: One- and three-quarter inch (1-³/₄" [44mm]). Corner slot and tenoned.
- 4. Operable sash tilt to interior for cleaning or removal.
- 5. Sash Options: Equal sash.
 - a. Exterior Cope Profile: Putty.
 - b. Interior Sash Sticking: Ogee.
- 6. Rail Options:
 - a. Manufacturer's reduced height thin bottom rail
 - b. Alternate: Manufacturer's standard bottom rail. Refer to Section 012300 - Alternates for additional information.

2.02 GLAZING

- A. Window and glazing system required to meet performance requirements listing within the Contract Documents. Select quality complying with ASTM C1036. Insulating glass SIGMA/IGCC certified to performance level CBA when tested in accordance with ASTM E2190.
- B. Glazing Method: Insulating glass.
- C. Glazing Seal: Silicone bedding on interior and exterior.
- D. Glass Fill: Air with capillary tubes, Argon.
- E. Insulating-Glass Units for Vertical Glazing: One-inch-thick (1" THK) insulating glass consisting of two (2) lites of one-quarter inch (¹/₄") glass, low e-coating on the No. 2 surface and argon gas filled. Provide one (1) of the following or equal:
 - 1. VE1-2M by Viracon.
 - a. Visible Light Transmittance: Seventy percent (70%).
 - b. Reflectance Visible Light: Eleven percent (11%).
 - c. U-Value (Winter): 0.25
 - d. Shading Coefficient: 0.43
 - e. Solar Heat Gain Coefficient: 0.37
 - 2. Solarban 60 by PPG Industries.
 - a. Visible Light Transmittance: Seventy percent (70%).
 - b. Reflectance Visible Light: Eleven percent (11%).
 - c. U-Value (Winter): 0.29
 - d. Shading Coefficient: 0.44
 - e. Solar Heat Gain Coefficient: 0.38
 - 3. SN-68 by Guardian Industries.
 - a. Visible Light Transmittance: Sixty-eight percent (68%).

- b. Reflectance Visible Light: Ten percent (10%).
 - c. U-Value (Winter): 0.29
 - d. Shading Coefficient: 0.43
 - e. Solar Heat Gain Coefficient: 0.37
- F. Matching: To the greatest extent practical, glass on the exterior of the building shall match. Coordinate with mock-ups and specified requirements.
- G. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.

2.03 HARDWARE

- A. General: Comply with AAMA/NWWDA 101/I.S. 2. Finish as selected by the Owner from manufacturer's full range.
- B. Locking system that provides locking, unlocking, balancing, and tilting of the sash members
- C. Lock Actuator Assembly:
- 1. Material:
 - a. Zinc die-cast.
 - b. Available Finishes (standard): Satin Taupe, White, Bronze, Matte Black.
- D. Latches:
- 1. Bottom sash latch:
 - a. Material:
 - 1. Bolt: Glass-filled nylon.
 - 2. Latch housing: Acetal.
 - 3. Sash latch reinforcement: Stainless steel.
 - 2. Top sash tilt latch:
 - a. Material:
 - 1. Bolt: Glass-filled nylon.
 - 2. Latch housing: Glass-filled nylon.
- E. Strike Assembly:
- 1. Material:
 - a. Zinc die-cast strike plate and injection-molded Acetal housing and button.
 - b. Available Finishes (standard): Satin Taupe, White, Bronze, Matte Black.
- F. Sash Limiter:
- 1. Bottom Sash Limiter (Acetal):
 - a. Available on all operator configurations, and StormPlus IZ3
 - b. Selectable bottom sash locations: Four inches (4").
 - c. Non-tilt hardware is default, and a sash removal tool is required in order to by-pass the Sash limiter for sash removal (tilt wash mode)

- d. Standard application is factory applied. Available for field retrofit applications.
- e. Color: Will align with the Exterior Weather Strip Package selection.

2.04 WEATHER STRIPPING

- A. Operating Units:
 - 1. Jambs: Foam-filled bulb.
 - 2. Header: Continuous dual leaf.
 - 3. Bottom Rail and Check Rail: Hollow bulb.
- B. Stationary Units:
 - 1. Jambs: Foam for picture units; foam-filled bulb for transom unit.
 - 2. Header and Bottom Rail: Hollow bulb.

2.05 SIMULATED DIVIDED LITES (SDL)

- A. Five-eighths inch ($\frac{5}{8}$ " [16 mm]) wide, rectangular, with internal spacer bar
- B. Exterior Muntins: 0.050" (1.3 mm) thick extruded aluminum.
- C. Interior Muntins: Pine.
- D. Muntins adhere to glass with closed-cell copolymer acrylic foam tape.
- E. Exterior Sticking: Putty.
- F. Interior Sticking: Ogee.
- G. Patterns: Rectangular, diamond, custom lite cut.
- H. Finish: Exterior matches exterior aluminum clad colors, interior matches interior wood species and color.

2.06 ACCESSORIES

- A. Jamb Extension: Available for various wall thickness factory-applied up to fourteen inches wide (14" W) in a color to match the interior frame finish
- B. Installation Accessories:
 - 1. Factory-installed vinyl nailing/drip cap.
 - 2. Installation Brackets: Six- and three-eighths inch ($6\text{-}\frac{3}{8}$ " [162 mm]); Nine- and three-eighths inch ($9\text{-}\frac{3}{8}$ " [283 mm]); Fifteen- and three-eighths inch ($15\text{-}\frac{3}{8}$ " [390 mm])
 - 3. Masonry Brackets: Six-inch (6" [152 mm]); Ten-inch (10" [254 mm]).
- C. Aluminum Extrusions:
 - 1. Casing Profile: Custom Profile. Profile to be submitted to Owner for review and approval prior to fabrication.
 - 2. Aluminum Clad Extrusion: Frame Expander, Jamb Extender, Mullion Cover, Mullion Expander, Subsill, Subsill End Cap and Lineal Cap.

3. Finish: Fluoropolymer modified acrylic topcoat applied over primer. Meets AAMA 2605 requirements.
4. Available in all exterior aluminum clad colors.

D. Historic casing, factory-applied profiles: Custom profile to be submitted to Owner

2.07 FINISHES

- A. Exterior: Aluminum clad. Fluoropolymer modified acrylic topcoat over a primer. Meets AAMA 2605 requirements.
1. Aluminum clad color: All color options shall be provided.
 - a. Color sample to be submitted to Owner for approval.

2.08 MODIFIED BITUMINOUS MEMBRANE

- A. Self-adhering flashing membrane shall be a butyl rubber based, self-adhering underlayment such as Grace Ultra, as manufactured by W.R. Grace Construction Products or approved equal. Modified bitumen shall be high temperature products for use under sheet metal or panning.
- B. Mastic and primer shall be as approved by the membrane manufacturer. Temporary UV protection and corner fillets shall be as recommended by the membrane manufacturer.

2.09 SEALANT AND ACCESSORIES

- A. Single-Component Polyurethane Sealant for use at weather barrier and sheet metal flashing and trim transitions at shall conform to ASTM C920, Type S, Grade NS, Class 50, Uses NT, M, A and O, such as:
1. Dymonic 100 as manufactured by Tremco.
 2. Sikaflex -15 LM by Sika.
 3. Seal 'N' Flex 1 by Bostik.
 4. Or approved equal.
- B. Provide a sealant compatible with the air barrier transition membrane specified in this section.
- C. Interior caulking shall be one-part, odorless, neutral cure silicone compound as manufactured by Tremco, Dow, Sika Corporation, Pecora or approved equal.
- D. Color(s) shall be selected by the Owner from the approved manufacturer's premium color chart.
- E. Cleaners and primers shall be as recommended by the manufacturer of the caulking.

- F. Backer rod shall be continuous length, closed cell polyethylene foam, as recommended by the sealant manufacturer. Backer rod shall be compressible, resilient, non-waxing, non-extruding, and non-staining. Backer rod shall be of sufficient size to be compressed thirty percent (30%) of maximum joint width and shall be totally compatible with the sealant, primer, and substrates. Backers shall conform to the requirements of ASTM C 962 - Type A, ASTM D1622, ASTM D1623, and ASTM D5249 such as Green Rod by Nomaco, Sonofoam by Sonneborn, ITP soft type backer rod or approved equal.
- G. Bond breaker tape shall be self-adhesive polyethylene tape as recommended by the sealant manufacturer.
- H. Masking material shall be commercially available masking tape of appropriate width or other material recommended by the sealant manufacturer. Self-adhesive masking materials shall be of low tack and completely strippable, leaving no adhesive residue behind when removed.

2.10 SHEET METAL FLASHING

- A. Refer to Specification Section 076200 - Sheet Metal Flashing and Trim.

PART 3- EXECUTION

3.01 EXAMINATION

- A. Verification of Condition: Before installation, verify openings are plumb, square and of proper dimensions as required in the Contract Documents. Report frame defects or unsuitable conditions to the General contractor before proceeding.
- B. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances; rough opening dimensions; levelness of sill plate; coordination with wall flashings, vapor retarders, and other built-in components; and other conditions affecting performance of work.
- C. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
- D. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. General: Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components; Drawings; and Shop Drawings.
- B. Install sealant and related backing materials at perimeter of unit or assembly.
- C. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.

- D. Set sill members in bed of sealant or with gaskets, as indicated, for weathertight construction.
- E. Metal Protection: Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials by complying with requirements specified in "Dissimilar Materials" Paragraph in Appendix B in AAMA/NWWDA/CSA 101/I.S.2/A440.
- F. Coordinate Section 062013 - Exterior Finish Carpentry for the installation of wood trim.

3.03 ADJUSTING

- A. Adjust operating sashes and ventilators, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.

3.04 FIELD QUALITY CONTROL

- A. Remove visible labels and adhesive residue according to manufacturer's instruction.
- B. Unless otherwise specified, air leakage resistance tests shall be conducted at a uniform static pressure of 75 Pa (~1.57 psf). The maximum allowable rate of air leakage shall not exceed 2.3 L/sm² (~0.45 cfm/ft²).
- C. Unless otherwise specified, water penetration resistance testing shall be conducted per AAMA 502 and ASTM E1105 at two-thirds (2/3) of the fenestration products design pressure (DP) rating using "Procedure B" - cyclic static air pressure difference. Water penetration shall be defined in accordance with the test method(s) applied.
- D. Cooperate with field quality control personnel. Allow inspectors access to scaffolding and work areas, as needed to perform inspections.
- E. Additional inspections and retesting of materials which fail to comply with specified material and installation requirements shall be performed at Contractor's expense.

3.05 PROTECTION AND CLEANING

- A. Protect window surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations.
- B. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances. Remove visible labels and adhesive residue according to manufacturer's instruction.

- C. Clean factory-glazed glass immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels and clean surfaces..
- D. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

3.06 FLASHING INSTALLATION

- A. Install perimeter backer rod and sealant back seals at all cavity and masonry joint locations as shown on the Contract Drawings. Back seal shall be continuous and full width or height of the opening.
- B. Prior to installing flashings, install wood blocking, plywood and shims necessary for the proper installation of the flashings and windows. Refer to Section 061000 - Rough Carpentry.
- C. Install flashings to all properly prepared window openings prior to installation of windows or insulated panels.
- D. Adhere underlayments around the prepared openings with the approved adhesive sealant where shown on the Contract Drawings. Shingle lap consecutive layers in accordance with the manufacturer's requirements, and to shed water to the exterior.
- E. All flashings shall be shop fabricated. All bends, breaks and hems shall be clean straight lines. Form flashings to the shapes and configurations shown on the Contract Drawings.
- F. All head and jamb flashings are to be continuous, and are intended to drain down, onto the new sill flashings. Set flashings in a full bed of sealant. Use the aluminum flashings to conceal the limits of existing window components that may not be fully removed (i.e. sealants, old fastener holes, etc.). All head flashings and cladding shall run continuous from jamb to jamb and shall overlap jamb flashings.
- G. Where sheets cannot run continuous due to length, all seams shall be overlapped three inches (3") minimum and back-sealed. At vertical surfaces, the top panel shall overlap over the bottom panel.

END OF SECTION

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SECTION 099100

PAINTING

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 DESCRIPTION OF WORK

- A. In general, the Contractor shall supply all labor, equipment, temporary protection, tools, and appliances necessary for the proper completion of the work as required in the Specifications, in accordance with good construction practice, and as required by the materials manufacturer, as amended.
- B. Strip, remove and dispose existing paint from all exterior wood trim and soffit boards to remain.
- C. Furnish and apply exterior solid wood stain to all new clapboard siding and trim, mouldings, eaves, rakes and to existing trim and soffit boards to remain.
- D. Coordinate the work in this section with the appropriate trades to ensure the proper work sequence.
- E. Clean and restore all areas affected by the work.

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 024100 - Selective Demolition
- B. Section 061000 - Rough Carpentry
- C. Section 062013 - Exterior Finish Carpentry

1.04 MEASUREMENT AND FIELD VERIFICATION PROCEDURES

- A. All dimensions, quantities, and existing conditions shall be determined or verified by the Contractor. The Contract Drawings have been compiled from various sources and may not reflect the actual condition at the moment of construction. The Contractor is cautioned to take all precautions and make all investigations necessary to install the proposed work. The Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.

1.05 REFERENCES

- A. American National Standards Institute (ANSI)
 - 1. Performance Standards.
- B. Asthma and Allergy Foundation of America and Allergy Standards, Ltd.
 - 1. The Certified Asthma and Allergy Friendly Mark. A registered certification mark.
- C. American Society for Testing Materials (ASTM)
 - 1. Testing Methods.
- D. Cradle to Cradle Products Innovation Institute
 - 1. Cradle to Cradle Certification.
- E. Environmental Protection Agency; Electronic Code of Federal Regulations (CFR)
 - 1. 40 CFR 59, Subpart D National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- F. Master Paint Institute (MPI No.)
 - 1. Established paint categories and standards.
- G. National Paint and Coatings Association (NPCA)
 - 1. Gloss Standard.
- H. Occupational Safety and Health Act (OSHA)
 - 1. Safety Standards.
- I. Ozone Transmission Commission (OTC)
 - 1. Established levels of Volatile Organic Compounds.
- J. Paint Decorating Contractors of America (PDCA)
 - 1. Application Standard.

1.06 SUBMITTALS

- A. Refer to Section 013300 - Submittal Procedures for additional information.
- B. Provide a project specific safety plan and job hazard analysis.
- C. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.
- D. Samples for Verification: Before erecting mockup, submit samples of the following:
 - 1. Paint swatches for wood clapboard siding and trim.
 - 2. Paint swatches for wood trim requiring accents colors.
- E. Qualification Data: For Applicator

- F. Material Test Reports: For each paint product specified.
- G. Maintenance Data: For each paint product specified

1.07 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Designer will select one (1) surface to represent surfaces and conditions for application of each paint system.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least one hundred square feet (100 sq. ft.).
 - b. Other Items: Designer will designate items or areas required.
- B. Final approval of color selections will be based on mockups.
 - 1. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Designer at no added cost to Owner.
- C. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Designer specifically approves such deviations in writing.
- D. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated, elevated platforms, in areas with ambient temperatures continuously maintained at not less than forty-five degrees Fahrenheit (45°F).
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.09 SPECIAL JOB CONDITIONS

- A. The building is historic and involves the Maine Historical Preservation Commission (MHPC). Care shall be taken with the work so as not to adversely affect the historic conditions and the historic character of the Barn. The Contractor shall cooperate with MHPC and the Architect with any requests for modifications or corrections to any installed work that do not comply with these Contract Documents or meet historic repair and restoration standards.

1.10 PROJECT CONDITIONS

- A. The Contractor shall supply, install and maintain all shoring, supports, barriers, protection, temporary heat, warning lines, and lighting and personnel required to support the structure, fixtures and facilities affected by his work and segregate the work area(s) from pedestrian or vehicular traffic, as well as to prevent damage to the building, occupants and the surrounding landscaped and paved areas.

- B. The building occupants are highly sensitive to fumes, odors, noise, and disturbances. The Contractor shall submit a detailed sequence schedule for the building area prior to the start of work and shall coordinate daily schedules with the Owner.
- C. Schedule and execute all work without exposing the interior building areas to inclement weather. Protect the existing building and its contents against all risks, and repair or replace all damage to the Owner's satisfaction.
- D. Coordinate the work in this section with the work by other trades to ensure the orderly progress of the work.
- E. Under no circumstances shall the Contractor remove existing materials and systems to the ground in an uncontrolled manner. Machinery or devices used shall be manufactured for this purpose. Adjacent buildings and property areas shall be protected from airborne debris.
- F. During removal operations, the Contractor is responsible for the containment of all dust, dirt, debris, overspray, and run-off resulting from the work. The Contractor shall collect and contain all materials and repair any resulting damage to adjacent surfaces, site fixtures or personal property. Specific attention is drawn to the use of chemicals and cleaners.
- G. Fully charged, inspected, and approved fire extinguishers shall be on site at all times. No cutting, grinding, or welding of any kind shall proceed without an approved, fully charged fire extinguisher.
- H. The Contractor shall utilize skilled and experienced specialty workers to install all aspects of the work.

1.11 CONTRACTOR GUARANTEE

- A. Upon completion of the work and prior to final payment, the Contractor shall submit a guarantee of their work as free from defect in materials and workmanship. The guarantee shall be for a period of two years (2 yrs.). The guarantee shall be signed by an officer of the Contractor's firm and sealed if a corporation.

1.12 WARRANTY

- A. Inspection of all surfaces to be coated must be done by the manufacturer's representative to ensure proper preparation prior to application. All thinners, fillers, primers, and finish coatings shall be from the same manufacturer to support a product warranty. Products other than
- B. At project closeout, provide to the Owner and Architect an executed copy of the Manufacturer's standard form outlining the terms and conditions of and any exclusions to their Limited Warranty against Manufacturing Defect.

1.13 EXTRA MATERIALS

- A. At project closeout, supply the Owner or owner's representative one gallon of each product for touch-up purposes. Cans shall be clearly marked with color name, number, and type of paint.
- B. At project closeout, provide the color mixture name and code to the Owner or owner's representative for accurate future color matching.

PART 2 - PRODUCTS

2.01 PAINT, GENERAL

A. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

2.02 MATERIALS - GENERAL

A. Volatile Organic Compound (VOC) Content:

1. Provide coatings that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - b. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
 1. All references to (0 g/L) are Zero VOCs according to EPA Method 24.

- #### B. Compatibility: Provide materials that are compatible with one another, and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

2.03 MIXING AND TINTING

- A. Except where specifically noted in this section, all paint shall be ready-mixed and pre-tinted. Agitate all paint prior to and during application to ensure uniform color, gloss, and consistency.
- B. A thinner addition shall not exceed the manufacturer's printed recommendations. Do not use kerosene or other organic solvents to thin water-based paints.
- C. Where paint is to be sprayed, thin according to manufacturer's current guidelines.

2.04 PAINT MATERIALS

- A. All paint materials shall be products of a recognized reliable manufacturer and shall be of the best quality and professional grade (1st line). All paint materials shall be lead free. Colors shall match the new window frames, or as selected by the Owner.
- B. Basis of Design:
 1. Benjamin Moore.
- C. Other acceptable manufacturers are:
 1. Sherwin Williams.
 2. Olympic Stain.

3. Cabot Stain.

D. Exterior - New Wood:

1. 100% Acrylic Latex Option - Solid Color:

- a. Cleaner: Benjamin Moore® Woodluxe® Wood Brightener and Neutralizer 017.
- b. First (1st) Coat: Benjamin Moore® Woodluxe Water-Based Deck & Siding Exterior Stain Solid 694 (<80 g/L).
- c. Second (2nd) Coat: Benjamin Moore® Woodluxe Water-Based Deck & Siding Exterior Stain Solid 694 (<80 g/L).

E. Exterior - Previously Stained Surfaces:

1. 100% Acrylic Latex Option - Solid Color:

- a. Cleaner: Benjamin Moore® Woodluxe® Wood Stain Remover 015.
- b. First (1st) Coat: Benjamin Moore® Woodluxe® Water-Based Deck & Siding Exterior Stain Solid 694 (>100 g/L).
- c. Second (2nd) Coat: Benjamin Moore® Woodluxe® Water-Based Deck & Siding Exterior Stain Solid 694 (>100 g/L).

F. Paint thinner shall be as recommended by the manufacturer.

G. Mineral spirits shall meet ASTM D12 specifications.

2.05 ACCESSORIES

- A. Paint applications shall be performed by brush or roller only. No spraying shall be permitted unless approved in advance by Owner.
- B. Masking tapes, sheets, and sealants shall be compatible with materials they are applied to and shall not leave stains on adjacent surfaces.

2.06 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to surface preparation and coating applications, remove mask or otherwise protect all adjacent surfaces. Repair or replace items damaged in course of painting to Owner's satisfaction.
- B. Before applying succeeding coats, undercoats shall be completely integral and shall perform the function for which they are specified. Properly prepare and touch up all scratches, abrasions or other disfigurements and remove any foreign matter before proceeding with the following coat. All spot-priming or painting shall be featheredged into adjacent areas to produce smooth monolithic appearance.
- C. Post "Wet Paint" signs as required.
- D. Surfaces to receive paint shall meet the requirements established by the manufacturer of the paint and these specifications.
- E. Environmental Conditions:
 - 1. Air and surface temperatures shall be between fifty- and one hundred degrees Fahrenheit (50°F - 100°F) during the application of paint.
 - 2. Relative humidity shall not be higher than eighty percent (80%), and the surface temperature shall be a minimum of five degrees Fahrenheit (5°F) above the dew point.
 - 3. Surfaces to be painted shall be fully dried, cured, or otherwise set to receive the paint prior to application.
 - 4. At areas of interior finishes damaged as a result of the work, apply one (1) coat of the specified primer and two (2) coats of the specified paint to the entire area requiring painting. Finish shall be satisfactory to the Owner.
- F. Previously Painted Surfaces: Previously painted surfaces specified to be repainted shall be thoroughly cleaned of all grease, dirt, dust, or other foreign matter. Blistering, cracking, flaking, and peeling or other deteriorated coatings shall be removed. Slick surfaces shall be roughened. Damaged areas such as, but not limited to, nail holes, cracks, chips, and spalls shall be repaired with suitable material to match adjacent undamaged areas. Edges of chipped paint shall be feather edged and sanded smooth. Solvent, mechanical, or chemical cleaning methods shall be used to provide surfaces suitable for painting. New, proposed coatings shall be compatible with existing coatings. If existing surfaces are glossy, gloss shall be reduced.
- G. Ferrous Surfaces: Ferrous surfaces including those that have been shop-coated, shall be solvent-cleaned. Surfaces that contain loose rust, loose mill scale, and other foreign substances shall be cleaned mechanically with hand tools according to SSPC SP 2, power tools according to SSPC SP 3. Shop-coated ferrous surfaces shall be protected from corrosion by treating and touching up corroded areas immediately upon detection.

3.02 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, workers shall be skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer. SSPC-SP 2.
 - 1. SSPC-SP 3.
 - 2. SSPC-SP 7/NACE No. 4.
 - 3. SSPC-SP 11.
- E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- G. Wood Substrates:
 - 1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.
 - 2. Sand surfaces that will be exposed to view, and dust off.
 - 3. Prime edges, ends, faces, undersides, and backsides of wood.
 - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- H. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.03 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
 3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
 4. Paint entire exposed surface of window frames and sashes.
 5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Lightly sand and dust between each coat to remove defects visible from five feet (5'). Finish coats shall be smooth, free from brush marks, streaks, laps, sags, skips, holidays, etc.
- C. Tint undercoats same color as topcoat but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.
- D. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- E. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.04 PAINTING - WOOD SURFACE PREPARATION AND FINISH COAT

- A. Mechanical removals shall not significantly alter the original thicknesses or profiles of existing wood components and shall be limited to flat surfaces.
- B. Mechanical methods shall not leave surfaces unsuitable for paint.
- C. Install "beauty" sealant at the locations indicated on the Contract Drawings. Follow manufacturer's instructions for sealant installation.
- D. Preparation shall include:
1. The specified requirements are minimal. Comply with the application instructions and paint manufacturer's requirements.
 2. Remove all surface contamination including mildew and chalk. Rinse thoroughly and allow to dry. Remove any oil or grease with a water-based degreasing cleaner approved by the paint manufacturer.
 3. Remove fungus and mold, if encountered, with a solution composed of three ounces (3 oz. [$\frac{2}{3}$ cup]) trisodium phosphate, one ounce (1 oz. [$\frac{1}{3}$ cup]) household detergent, one quart (1 qt.) five percent (5%) sodium hypochlorite solution, and three quarts (3 qts.) warm water. Rinse thoroughly with fresh water.
 4. Surfaces shall be free from dust and other deleterious materials.

- E. Prime all surfaces before the wood becomes dirty, warped, or weathered.
- F. Putty stop all nail heads and cracks after the prime coat has dried.
- G. Sand, fill, and treat minor defects to render them smooth. Lightly sand surface to roughen the entire area of previously coated wood surfaces as required by the paint manufacturer.
- H. Application of paint shall include:
 - 1. All materials shall be applied in accordance with the manufacturer's recommendations.
 - 2. If new wood or pre-primed wood has been exposed to sunlight for more than two weeks (> 2 wks.) before painting, lightly sand the wood surface prior to painting.
 - 3. Finishing materials shall be free from skins, lumps, or any foreign matter when used, and shall be kept well stirred while being applied.
 - 4. If staining of wood persists after application of first (1st) coat [primer coat], allow initial coat to dry for four hours (4 hrs.) and then spot prime severe areas with a second (2nd) application of the specified primer.
 - 5. Do not paint in direct sunlight, or where the sun will warm the surface being painted immediately after application.
 - 6. Apply paint/primer with one hundred percent (100%) polyester brushes.
 - 7. Each coat of finish shall be evenly brushed out and allowed to dry before any subsequent coat is applied. The finished work shall be free from runs, sags, defective brushing and clogging of lines or angles. Drying time between coats of paint shall be in accordance with the manufacturer's labeled instructions.
- I. All surfaces to be painted shall receive one (1) prime coat, and two (2) finish coats, or as required to provide a uniform appearance.

3.05 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.06 CLEAN-UP

- A. The Contractor shall not demobilize the site until the completed work is toured by the Owner and Designer. Any unsatisfactory items observed will be reported in "punch-list" form. These items shall be corrected immediately by the Contractor prior to demobilization from the job site.

Structural and Building Envelope Upgrades for the
Green Barn at Dorthea Dix Psychiatric Center
656 State Street - Bangor, ME 04401
Gale JN 843180

- B. All scaffolding, barriers, temporary facilities, and the like shall be removed upon completion of the work. Areas damaged as a result of the Contractor's equipment shall be restored to their original condition, all to the satisfaction of the Owner.
- C. Refer to the Close-Out Procedures described in Division 01 for additional information.

End of Section

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SECTION 310000

EARTHWORK

PART 1 GENERAL

1.01 GENERAL PROVISIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 DESCRIPTION OF WORK

- A. In general, the Contractor shall supply all labor, material, and equipment, necessary for the proper completion of the work as required in this Section, in accordance with good construction practice, and as required by the materials manufacturer, as amended.
- B. The Work shall include, but not be limited to the following:
 - 1. Removing and replacing unsuitable existing fill material.
 - 2. Excavating and backfilling for structures.
 - 3. Subbase and base course for concrete pavements.
 - 4. Handling, transportation, and off-site disposal of excess materials.
 - 5. Perform all and any other work necessary to complete earthwork activities.
- C. Coordinate the work in this Section with the appropriate trades to ensure the proper work sequence.
- D. Clean and restore all areas affected by the work.

1.03 PRODUCTS FURNISHED/SUPPLIED BUT NOT INSTALLED UNDER THIS SECTION

- A. Not applicable to this section.

1.04 PRODUCTS INSTALLED BUT NOT FURNISHED/SUPPLIED UNDER THIS SECTION

- A. Not applicable to this section.

1.05 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 024100 – Selective Demolition
- B. Section 030010 – Concrete Work
- C. Section 312319 – Dewatering
- D. Section 329200 – Turf and Grasses

1.06 ALLOWANCES

- A. Not applicable to this section.

1.07 UNIT PRICES

- A. Not applicable to this section.

1.08 MEASUREMENT AND FIELD VERIFICATION PROCEDURES

- A. All dimensions, quantities, and existing conditions shall be determined or verified by the Contractor. The Contract Drawings have been compiled from various sources and may not reflect the actual condition at the time of construction. The Contractor is cautioned to take all precautions and make all investigations necessary to install the proposed work. The Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.
- B. Subsurface Information:
1. Variations in existing subsurface utility conditions from those indicated on the Contract Drawings shall not constitute grounds for changes in contract price or completion dates of this contract. The Contractor is responsible for contacting DIG SAFE (888-344-7233) at least 72-hours prior to commencing and/all construction activities.
 2. Variations in existing ground or subsurface soil conditions from those indicated on the subsurface investigation (such as geotechnical report, soil borings logs, test pit logs, and ledge profile) shall not constitute grounds for changes in contract price or completion dates of this contract.
 3. Subsurface soil conditions from those indicated on the subsurface investigation (such as geotechnical report, soil borings logs, test pit logs, and ledge profile) is for informational purposes only. The opinions expressed represent interpretations of subsoil conditions, tests, and results of analyses conducted. The Contractor shall be responsible for reviewing the subsurface investigation information and preparing their own conclusions concerning subsurface soil conditions.
 4. The Contractor may dig additional test pits to locate existing subsurface utilities or perform independent subsurface soil condition evaluations at no additional cost to the Owner.

1.09 ALTERNATES

- A. Not applicable to this section.

1.10 REFERENCES

- A. ASTM C33: Standard Specification for Concrete Aggregates.
- B. ASTM C117: Standard Test Method for Materials Finer than 75-um (No. 200) Sieve in Mineral Aggregates by Washing.
- C. ASTM C136: Standard Specification for Portland Cement.

- D. ASTM C150: Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- E. ASTM D698: Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
- F. ASTM D1140: Standard Test Methods for Determining the Amount of Material Finer than 75- μ m (No. 200) Sieve in Soils by Washing.
- G. ASTM D1556: Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method.
- H. ASTM D1557: Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (2700 kN-m/m³).
- I. ASTM D2167: Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
- J. ASTM D2216: Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.
- K. ASTM D2487: Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
- L. ASTM D2974: Moisture, Ash, and Organic Matter of Peat and Other Organic Soils.
- M. ASTM D4318: Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- N. ASTM D4829: Standard Test Method for Expansion Index of Soils.
- O. ASTM D4832: Standard Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders.
- P. ASTM D5268: Topsoil Used for Landscaping Purposes.
- Q. ASTM D6938: Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
- R. ASTM D8167: Standard Test Method for In-Place Bulk Density of Soil and Soil-Aggregate by a Low-Activity Nuclear Method (Shallow Depth).
- S. EPA SW-846.3-3: Test Methods for Evaluating Solid Waste: Physical/Chemical Methods.
- T. Maine Department of Transportation (MaineDOT), Standard Specifications, 2020 edition, but not including references to method of measurement, basis of payment, and payment items in the Standard Specifications. References made to particular sections or paragraphs in the Standard Specifications shall include all related articles mentioned.

1.11 DEFINITIONS

- A. AASHTO – American Association of State Highway and Transportation Officials.
- B. ANSI – American National Standards Institute.
- C. ASTM – American Society for Testing and Materials.

- D. Backfill – Soil material or controlled low-strength material used to fill an excavation.
- E. BMP – Best Management Practices.
- F. Degree of Compaction (Proctor) – Degree of compaction is expressed as a percentage of the maximum dry density obtained by the test procedure presented in ASTM D698, or ASTM D1557 abbreviated as a percent of laboratory maximum dry density. ASTM D1557 applies only to soils that have 30% or less by weight of their particles retained on the 3/4 inch sieve.
- G. Degree of Compaction (Relative Density): Degree of compaction is expressed as a relative percentage of the maximum index density/dry unit weight (ASTM D698, or ASTM D1557) and the minimum index density/dry unit weight, obtained by the field test procedures in accordance with ASTM D1556, ASTM D2167, or ASTM D6938, respectively, abbreviated as a percent of laboratory relative density. Required for soils with less than 5% passing the No. 200 sieve.
- H. FHWA – U.S. Federal Highway Administration.
- I. ICC – International Code Council.
- J. MaineDEP – Maine Department of Environmental Protection.
- K. MaineDOT – Maine Department of Transportation.
- L. MUTCD – Manual on Uniform Traffic Control Devices.
- M. NETTCP – NorthEast Transportation Technician Certification Program.
- N. NICET – National Institute for Certification in Engineering Technologies.
- O. NTPEP – National Transportation Product Evaluation Program.
- P. OSHA – Occupational Safety and Health Administration.
- Q. PCI – Precast/Prestressed Concrete Institute.
- R. pcf – Pounds per cubic foot.
- S. psi – pounds per square inch.
- T. USCS – Unified Soil Classification System.

| UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART | | |
|---|---|----|
| COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.) | | |
| Clean Gravels (Less than 5% fines) | | |
| GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size |  | GW |
| |  | GP |
| | Gravels with fines (More than 12% fines) | |
| |  | GM |
| |  | GC |
| Clean Sands (Less than 5% fines) | | |
| SANDS 50% or more of coarse fraction smaller than No. 4 sieve size |  | SW |
| |  | SP |
| | Sands with fines (More than 12% fines) | |
| |  | SM |
| |  | SC |
| FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.) | | |
| SILTS AND CLAYS Liquid limit less than 50% |  | ML |
| |  | CL |
| |  | OL |
| SILTS AND CLAYS Liquid limit 50% or greater |  | MH |
| |  | CH |
| |  | OH |
| HIGHLY ORGANIC SOILS |  | PT |

U. USEPA – U.S. Environmental Protection Agency.

1.12 MATERIAL OWNERSHIP

A. Not applicable to this section.

1.13 SUBMITTALS

A. Refer to Section 013300 – SUBMITTAL PROCEDURES for additional information.

B. Provide a project specific safety plan and job hazard analysis.

- C. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.
1. None.
- D. Shop Drawings:
1. Excavation and Trenching Plan
 2. Pre-construction survey photographs that document existing conditions of buildings, trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing, demolition, and preparation activities.
 3. Schedule indicating proposed sequence of operations for demolition, and preparation activities prior to start of work. Include coordination for shutoff, capping, and continuation of utility services as required, together with details for dust and noise protection.
 - a. Provide detailed sequence of work to ensure uninterrupted progress of Owner's on-site operations.
 - b. Coordinate with Owner's continuing occupation of portions of existing building(s), adjacent building(s), and with Owner's partial occupancy of completed portions of the project.
 - c. Indicate hold points for inspection and testing.
- E. Samples for Verification:
1. None.
- F. Qualification Data:
1. Qualifications and experience of Contractor
 2. Qualifications and experience of Foreman
 3. Qualifications and experience of Geotechnical Engineer
 4. Qualifications and experience of Certified Laboratory
 5. Qualifications and experience of Qualified Technician
- G. Material Test Reports:
1. Sieve Material Test of material used
 2. Proctor (Moisture-Density Curve) of material used
 3. In-place Compaction (Relative Density) Test of material used
- H. Maintenance Data:
1. None.
- I. Record Drawings:
1. Refer to Section 017700 – CONTRACT CLOSEOUT for additional information.

1.14 QUALITY ASSURANCE

- A. The Contractor shall sample and test all materials to be incorporated into the project, including the employment of a Geotechnical Engineer, Qualified Technician, and Certified Laboratory to assist with testing incorporated materials. All copies of test results shall be submitted to the Engineer within 5 calendar days of completing the test.
- B. Material Sampling:
 - 1. Collect material samples for laboratory testing in conformance with ASTM D75.
- C. Material Laboratory Test:
 - 1. Gradation:
 - a. Perform gradation testing in conformance with ASTM C117 and ASTM C136 using sieves conforming to ASTM E11.
 - 2. Liquid Limit and Plasticity Index:
 - a. Determine liquid limit and plasticity index in accordance with ASTM D4318.
 - 3. Moisture-Density Determinations:
 - a. Determine the laboratory maximum dry density and optimum moisture in accordance ASTM D698, or ASTM D1557 as specified for each material. Refer to 310000 – EARTHWORKS, Part 2 - PRODUCTS.
- D. Material Field Density Tests:
 - 1. Measure field density in accordance with ASTM D1556, ASTM D2167, or ASTM D6938.
- E. Geotechnical Engineer:
 - 1. Professional Geotechnical Engineer shall oversee certified laboratory and qualified technician work of sieve analysis, proctor (moisture-density curve), and in-place compaction (relative density) test of materials used, and observe and record groundwater conditions throughout construction.
- F. Certified Laboratory:
 - 1. Certified Laboratory shall perform material laboratory testing. The laboratory shall be certified with ASTM, and ANSA.
- G. Qualified Technician:
 - 1. Qualified Technician shall observe, report, monitor, sample and perform field testing. The technician qualifications shall be 1 of the following standards:
 - a. NICET Level II minimum certification in construction materials testing soils;
 - b. Geologist-in-Training with minimum 1 year experience;
 - c. Engineer-in-Training with minimum 1 year experience;

d. Registered Geologist; or Professional Engineer.

H. Tolerances:

1. The following subbase and base aggregate course maximum placement tolerances shall be adhered to:
 - a. Slope Plus or minus 0.50%
 - b. Variation from Design Elevation Plus or minus 1/4 inch
 - c. Compacted Thickness Plus or minus 1/4 inch

1.15 DELIVERY, STORAGE, AND HANDLING

A. Not applicable to this section.

1.16 PROJECT CONDITIONS

- A. Coordinate the work in this Section with the work by other trades to ensure the orderly progress of the work.
- B. The Contractor shall utilize skilled and experienced specialty workers to complete all aspects of the work.
- C. Do not commence demolition, and preparation activities until erosion and sedimentation control measures are in place.
- D. During removal operations, the Contractor is responsible for the containment of all dust, dirt, debris, overspray, and run-off resulting from the work. The Contractor shall collect and contain all materials and repair any resulting damage to adjacent surfaces, site fixtures, or personal property. Specific attention is drawn to the use of chemicals and cleaners.

1.17 SPECIAL PROJECT CONDITIONS

A. Not applicable to this section.

1.18 EXAMINATION OF SITE AND DOCUMENTATION

- A. The Contractor shall carefully examine the site and all conditions affecting work under this Section. No claim for additional costs will be allowed due to the lack of knowledge regarding existing conditions as indicated in the Construction Documents, or obvious from observation of the site.
- B. Plans, surveys, measurements, and dimensions under which the work is to be performed are believed to be correct. However, it shall be the responsibility of the Contractor to examine the documents for themselves and formed their own conclusions as to the full requirements of the work involved.
- C. Written dimensions have precedence over scaled dimensions. Should the Contractor find a conflict with the documents relative to the Contract Drawings, Contract Specifications, and/or applicable codes, the Contractor shall be responsible for notifying the Engineer, in writing, prior to the initiation of work. Failure by the Contractor to notify the Engineer shall constitute acceptance of full responsibility by the Contractor to complete the scope of work defined by the

Contract Drawings, Contract Specifications, and in full conformance with local state and federal laws and regulations.

1.19 CONTRACTOR GUARANTEE

- A. Upon completion of the work and prior to final payment, the Contractor shall submit a guarantee of their work is free from defect in materials and workmanship. The guarantee shall be for a period of two (2) year. The guarantee shall be signed by an officer of the Contractor's firm and sealed if a corporation.

1.20 WARRANTY

- A. See Division 01 Section "Description of Work" for contractor's warranty.
- B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official.

PART 2 PRODUCTS

2.01 COARSE AGGREGATE – CRUSHED GRAVEL (BASE COURSE)

- A. Granular materials directly below foundations in building slab and pavement areas including shoulders.
- B. Clean, coarse-grained material identified as MaineDOT 703.06(a).

2.02 COARSE AGGREGATE – GRAVEL (SUBBASE COURSE)

- A. Granular materials directly below base course in pavement areas including shoulders.
- B. Clean, coarse-grained material identified as MaineDOT 703.06(c).

2.03 EXPANSIVE SOILS

- A. Soil material having an expansion index greater than 20 when tested in accordance with ASTM D4829.

2.04 FILL – EMBANKMENT

- A. Soil material placed to elevate a subgrade elevation to subbase elevation.
- B. Materials shall be USCS materials in accordance with ASTM D2487 as GW, GP, GM, GC, GW-GM, GW-GC, GP-GM, GP-GC, GC-GM, SW, SP, SM, SC, SW-SM, SW-SC, SP-SM, SP-SC, CL, or CH.
- C. Material identified as MaineDOT 703.20

2.05 FILL – FLOWABLE

- A. Plastic or liquid form that flows to near its final placement location with limited assistance and subsequently cures or solidifies to provide a stable or impermeable barrier.

- B. Material shall be excavatable and meet the following requirements:
1. Unconfined compressive strength shall be no greater than 150 psi at 28 day in accordance with ASTM D4832
 2. Fine aggregates in accordance with ASTM C33.
 3. Air-entrain fill in accordance with ASTM C260.
 4. The air content to be between 8% to 15% in accordance with ASTM D6023.
 5. The flow to be between 8 and 12 inches in accordance with ASTM D6103.
 6. Portland cement to be Type I or II in accordance with ASTM C150.
 7. Fly ash to be Class 'C' in accordance with ASTM C618.
 8. Provide slag cement in Grade 100 or 120 in accordance with ASTM C989.

2.06 FILL – POROUS

- A. Soil material that is free-draining, containing less than 5% passing the No. 200 sieve, and placed for subsurface drainage as a capillary break or other specific purpose.

2.07 FILL – STRUCTURAL

- A. Soil material to support buildings, walls, pads, and other similar facilities.
B. Fill shall meet the requirements as shown in Table 1.

Table 1 – Gradation of Structural Fill

| Sieve Size | % Passing by Weight |
|------------|---------------------|
| 3 inch | 100 |
| No. 4 | 35 – 70 |
| No. 40 | 5 – 35 |
| No. 200 | 0 – 5 |

2.08 FINE AGGREGATE – SAND

- A. Clean, coarse-grained material identified as MaineDOT 703.05.

2.09 GEOTEXTILE

- A. Geotextile shall be nonwoven needle-punched geotextile that is product tested under the AASHTO NTPEP. Manufactures of geotextiles and those marketing geotextiles made by others as a "Private Labeler" shall participate in and maintain compliance with the NTPEP audit program for geotextiles. Manufacturer's labels providing product name, AASHTO M288 class, roll number, and production date shall be affixed to both ends of the roll.
- B. All geotextile properties referenced in the specifications and certified by the Contractor, with the exception of Apparent Opening Size (AOS), shall be

considered minimum average roll values in the weaker principal direction (i.e., the average test results for any sampled roll in a lot shall meet or exceed the minimum values specified). Values for AOS shall represent maximum average roll values.

- C. Fibers used in the manufacture of geotextiles, and threads used in joining geotextiles by sewing, shall meet the requirements of the most current version of the applicable sections of AASHTO M 288.
- D. Geotextile shall exhibit an ultraviolet stability (retained strength) of at least 50% after 500 hours of exposure, measured in accordance with ASTM D 4355.
- E. Each roll shall be clearly labeled so as to easily identify the product in the field. The label shall include as a minimum the manufacturer's name, product name and number, and the Contract Item name and number.
- F. Application:
 - 1. Subsurface Drainage:
 - a. Geotextile for this Application consists of fabric placed against a soil to allow for long-term passage of water into a subsurface drain system while retaining the in situ soil.
 - 2. Separation:
 - a. Geotextile for this Application consists of fabric placed to prevent mixing of in situ or subgrade soil with aggregate cover materials.
 - 3. Stabilization:
 - a. Geotextile for this Application consists of fabric placed in wet, saturated conditions to provide the coincident functions of separation and filtration. This Application may also be specified for geotextiles used to provide the function of reinforcement.
 - 4. Permanent Erosion Control:
 - a. Geotextile for this Application consists of fabric placed below riprap or other armor systems to prevent soil loss and/or instability of the erosion control system.
- G. Strength Class:
 - 1. Class 1 (high strength), Class 2 (medium strength), or Class 3 (low strength) shall meet the applicable requirements of AASHTO M 288, Table 1, including sewn seam strength when sewn seams are used. A higher strength geotextile may be substituted for a lower strength geotextile provided all other specification requirements are met.
 - 2. Class 0. Geotextile specified as Class 0 (extra high strength) shall meet the following minimum requirements:

| | | | |
|----|--------------------|----------|------------|
| a. | Grab Tensile | 375 lbf | ASTM D4632 |
| b. | Sewn Seam Strength | 335 lbf | ASTM D4632 |
| c. | Tear Strength | 135 lbf | ASTM D4533 |
| d. | Puncture Strength | 1237 lbf | ASTM D6241 |
- H. Staples or Pins:

1. Staples or pins required to hold the geotextile prior to placing overlying materials shall be those prescribed by the geotextile manufacturer.

2.10 GROUT

- A. Durable non-shrink, non-metallic, grout composed of cement, water, an air-entraining admixture, and sand mixed in proportions of one-part Portland cement to one-part of sand.
- B. Water shall be added to produce a stiff, workable mixture.
- C. Air-entrainment admixture shall be added to entrain sufficient air.
- D. Mix grout in a concrete mixer. Allow a sufficient mixing time to produce a mixture having a consistency permitting gravity flow into the interstices of the riprap with limited spading and brooming.

2.11 MATERIALS – COHESIONLESS

- A. Materials shall be USCS materials in accordance with ASTM D2487 as GW, GP, SW, and SP. Materials classified as GM and SM will be identified as cohesionless only when the fines are non-plastic.
- B. Perform testing, required for classifying materials, in accordance with ASTM D4318, ASTM C117, ASTM C136 and ASTM D1140.

2.12 MATERIALS – COHESIVE

- A. Material shall be USCS materials in accordance with ASTM D2487 as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesive only when the fines are plastic.
- B. Perform testing, required for classifying materials, in accordance with ASTM D4318, ASTM C117, ASTM C136 and ASTM D1140.

2.13 MATERIALS – FILTER COURSE

- A. Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand.
- B. Modified AASHTO coarse aggregate No. 67 (as identified on the AASHTO M43 – Sizes of Course Aggregate) with 0% to 5% passing a No. 4 sieve.

2.14 MATERIALS – SATISFACTORY

- A. Material for fill, backfill, and/or any in-situ soils to remain in place.
- B. Materials shall be USCS materials in accordance with ASTM D2487 as GW, GP, GM, SW, SP, and SM or a combination of these groups and free from debris, waste, frozen materials, vegetation, and other deleterious matter. Maximum particle size to be less than 6 inches in any dimension.

2.15 MATERIALS – UNSATISFACTORY

- A. USCS materials in accordance with ASTM D2487 as GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D2487, or a combination of these groups
- B. Materials include man-made fills; trash; refuse; backfills from previous construction; roots and other organic matter or frozen material.
- C. Materials include satisfactory soils not maintained within 2% of optimum moisture content at time of compaction.

2.16 MATERIALS – UNSTABLE

- A. Soil materials that are unable to support the weight of a structure or site improvements and may become unstable due to ineffective drainage, dewatering, becoming frozen, excessive loading.

2.17 MATERIALS – UNYIELDING (LEDGE)/BOULDERS (ROCK)

- A. Solid homogeneous interlocking crystalline material with firmly cemented, laminated, or foliated masses or conglomerate deposits, neither of which cannot be removed without systematic drilling and blasting, drilling and the use of expansion jacks or feather wedges, or the use of backhoe-mounted pneumatic hole punchers or rock breakers.
- B. Boulders, buried masonry, or concrete other than pavement exceeding 2 cubic yards in volume.

2.18 PEASTONE

- A. Clean, coarse-grained crushed or natural stone meeting AASHTO coarse aggregate No. 8 (as identified on the AASHTO M43 – Sizes of Course Aggregate).

2.19 SUBGRADE

- A. Soil materials below foundations and directly below granular base and subbase materials in building slab and pavement areas side-slopes.

2.20 TOPSOIL

- A. Surface layer of primarily organic soil capable of supporting vegetation growth, refer to Section 329200 – TURF AND GRASSES.

2.21 STONEDUST

- A. Crushed stone meeting AASHTO coarse aggregate No. 10 (as identified on the AASHTO M43 – Sizes of Course Aggregate).

2.22 UTILITY BEDDING MATERIAL

- A. Fill placed to directly support pipes, conduits, and appurtenant structures. Except as specified otherwise in the individual piping section, bedding shall be in accordance with ASTM D2321, ASTM D2774, or AWWA C600.

- B. Bedding material may include sand (as described above), or AASHTO coarse aggregate No. 67 (as identified on the AASHTO M43 – Sizes of Course Aggregate).

PART 3 EXECUTION

3.01 PROTECTION

- A. Perform all work specified in accordance with applicable local, state, and federal laws and requirements.
- B. Provide a Geotechnical Engineer to monitor construction activities and to prepare necessary work plans and reports; refer to Section 310000 – EARTHWORK, Subsection 1.14 – QUALITY ASSURANCE.
- C. Traffic:
 - 1. Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during construction operations.
 - 2. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from the Engineer and authorities having jurisdiction.
 - 3. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- D. Protect subgrade and subbase materials from freezing temperatures and frost.
- E. Use equipment of type and size appropriate for the site conditions, soil character, and moisture content.
- F. Maintenance and protection of exposed subgrades and fills is the responsibility of the Contractor. The Contractor is required to prevent damage by ineffective drainage, dewatering, and heavy loads and equipment by implementing precautionary measures. Repair or replace any defects or damage.
- G. The Contractor shall prepare an Excavation and Trenching Plan. The plan shall identify measures to stabilize features, prevent undermining or unintended horizontal and vertical movement of adjacent structures, and prevent slippage or movement in banks or slopes adjacent to the excavation. The Plan shall include drawings and calculations, certified by a registered professional engineer, describing the methods for shoring and sheeting of excavations. Drawings shall include material sizes and types, arrangement of members, and the sequence and method of installation and removal. Calculations shall include data and references used.

3.02 SURFACE PREPARATION

- A. Stripping and Stockpiling:

1. Strip existing surficial soils to the necessary grading depths as indicated on the Contract Drawings. All stripped materials not suitable for reuse will be wasted in specified disposal area.
 - a. Place and grade stockpiles of satisfactory, unsatisfactory, and wasted materials as specified.
 - b. Clear, grub, and seal by rubber-tired equipment, the ground surface at stockpile locations.
 - c. Separately stockpile excavated satisfactory, unsatisfactory, and wasted materials. Protect stockpiles of satisfactory materials from contamination of other stockpile materials. If the Contractor fails to protect the stockpiles, and any material becomes unsatisfactory, the Contractor shall remove and replace such material with satisfactory material from approved sources at no additional cost to the Owner.
 - d. Do not stockpile materials within the borrow area work limits such that the stockpiles interfere with borrow operations. Maintain a minimum of 30 feet between all stockpile toes and the top of the borrow cut.
 - e. Do not create stockpiles that could obstruct the flow of any stream, endanger a partly finished structure, impair the efficiency or appearance of any structure, or be detrimental to the completed work in any way.
 - f. Keep stockpiles in a neat and well drained condition, giving due consideration to drainage at all times.

3.03 EXCAVATION

A. General Requirements:

1. Excavate to contours, elevation, and dimensions indicated on the Contract Drawings. Excavate soil disturbed or weakened by Contractor's operations, and soils softened or made unstable for subsequent construction due to exposure to weather. Use material removed from excavations meeting the specified requirements in the construction of fills, embankments, subgrades, shoulders, bedding (as backfill), and for similar purposes to minimize surplus material and to minimize additional material to be brought on site. Do not excavate below indicated depths except to remove unstable material as determined by the Geotechnical Engineer and confirmed by the Engineer. Remove and replace excavations below the grades shown with appropriate materials as directed by the Engineer.

B. Ditches, Gutters, and Channel Changes:

1. Finish excavation of ditches, gutters, and channel changes by cutting accurately to the cross sections, grades, and elevations shown.
2. Do not excavate below grades shown.
3. Backfill excessive excavation as directed by the Engineer, with satisfactory, compacted, material or with suitable stone or cobble to grades shown.
4. Dispose excavated material as shown or as directed.

5. Do not allow material to be deposited within 4 feet from the edge of a ditch.
 6. Maintain excavations free from detrimental quantities of leaves, brush, sticks, trash, and other debris until final acceptance of the work.
- C. Existing Underground Utilities:
1. Perform work adjacent to existing underground utilities in accordance with procedures outlined by utility owner. Excavation made with power-driven equipment is not permitted within 2 feet of known utility or subsurface construction. For work immediately adjacent to or for excavations exposing a utility or other buried obstruction, excavate by hand. Start hand excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured. Support uncovered lines or other existing work affected by the contract excavation until approval for backfill is granted by the Engineer. Report damage to utility lines or subsurface construction immediately to the Engineer.
- D. Trench Excavation:
1. Trench:
 - a. Unless otherwise permitted by the Engineer, no more than 100 feet of trench shall be open at any time and in dry ground, at least 30 feet of trench shall be excavated to within 6 inches of specified subgrade in advance of pipe laying.
 - b. Excavated or other material shall not be stored closer than 4 feet from the edge of any excavation and shall be so stored as to prevent its falling or sliding back into the excavation.
 - c. Excessive widths of trench will not be permitted. The walls of trenches shall be kept as nearly vertical as practicable below the level of the top of the pipes. Trenches shall be shored in accordance with OSHA Regulations.
 - d. Sides, slopes, and faces of all excavations shall meet accepted engineering requirements by scaling, benching, barricading, rock bolting, wire meshing, or other equally effective means. Special attention shall be given to slopes which may be adversely affected by weather or moisture content.
 - e. Sides of trenches in hard or compact soil including embankments, shall be shored or otherwise supported when the trench is more than 5 feet in depth and 8 feet or more in length. In lieu of shoring, the sides of the trench above the 5 foot level, may be sloped to preclude collapse, but shall not be steeper than 1/2 Horizontal to 1 Vertical (0.5:1). When the outside diameter of a pipe is greater than 72 inches, a bench of 4 feet minimum shall be provided at the toe of the sloped portion.
 - f. In locations where oxygen deficiency or gaseous conditions are possible, air in the excavation shall be tested. Controls shall be established to assure acceptable atmospheric conditions. When flammable gasses are present, adequate ventilation shall be

- provided or sources of ignition shall be eliminated. Attended emergency rescue equipment, such as breathing apparatus, a safety harness and line, and basket stretcher etc., shall be readily available where adverse atmospheric conditions may exist or develop in an excavation.
- g. Where people are required to be in trenches 4 feet deep or more, ladders extending from the floor of the trench excavation to at least 3 feet above the top of the excavation shall be provided and located to provide means of exit without more than 25 feet of lateral travel.
- 2. Bottom Preparation:
 - a. Excavate for utility pipe as indicated on the Contract Drawings. Grade the bottoms of trenches accurately to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Excavate bell holes to the necessary size at each joint or coupling to eliminate point bearing. Remove stones of 3 inch or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, to avoid point bearing.
 - 3. Removal of Unyielding Material:
 - a. Where unyielding material is encountered in the bottom of the trench, notify the Engineer. Following approval, remove such material 12 inches below the required grade and replaced with sand.
 - 4. Removal of Unsuitable Material:
 - a. Where unsuitable material is encountered in the bottom of the trench, remove such material to the depth directed and replace it to the proper grade with suitable material as directed by the Engineer.
 - b. When removal of unsuitable material is required due to the Contractor's fault or neglect in performing the work, the Contractor is responsible for excavating the resulting material and replacing it at no additional cost to the Owner.
 - 5. Excavation for Appurtenances:
 - a. Provide excavation for manholes, catch-basins, inlets, or similar structures sufficient to leave at least 24 inches clear between the outer structure surfaces and the face of the excavation or support members.
- E. Unsuitable Soil:
- 1. When approved by the Engineer, the Contractor may be required to remove unsuitable soils, fill, or natural soil materials in areas where fills are to be placed when determined to be undesirable in their location or condition. The Contractor shall be required to remove the undesirable material and backfill with approved material properly compacted.
 - 2. At locations where unstable soil is identified, the removal and replacement of such soil shall be as directed as recommended by the Engineer.

3. At locations where soil is wet of optimum moisture, the Contractor shall provide a "good faith" effort in drying and discing these areas prior to completing over-excavation as approved by the Engineer.
 4. Where over-excavations are required adjacent or beneath the location of the proposed drainage structure, undercut and backfill shall be done over a sufficient distance adjacent to the installation to prevent future operations from disturbing the completed drainage structure.
 5. All material removed in the work of over-excavation will be classified by the Engineer and Owner as either suitable for other use without excessive manipulation and utilized by the Contractor elsewhere in the work, or unsuitable for future use and disposed of by the Contractor as directed by the Engineer.
 6. The Contractor shall conduct over-excavation operations in such a way that the necessary measurements can be taken before any backfill is placed.
 7. Backfill in over-excavation areas shall be placed as a continuous operation along with the over-excavation operation. Backfill materials shall be consistent with the intended use. No backfill material shall be placed in water unless otherwise permitted by the Engineer.
- F. Unyielding Materials, Ledge, Boulders, Rock:
1. If at any time during excavation, including excavation from borrow areas, the Contractor encounters material that may be classified as hard/unyielding material, uncover such material, and notify the Engineer. Do not proceed with the excavation of this material until the Engineer has classified the materials as common excavation or rock/ledge excavation. Failure on the part of the Contractor to uncover such material, notify the Engineer, and allow sufficient time for classification and delineation of the undisturbed surface of such material will cause the forfeiture of the Contractor's right of claim to any classification or volume of material to be paid for other than that allowed by the Engineer for the areas of work in which such deposits occur.
 2. If unyielding material is able to be scraped, drilled, or jackhammered, then blasting may be required.
 3. Remove unyielding material to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:
 - a. 24 inches outside of concrete forms other than at footings.
 - b. 12 inches outside of concrete forms at footings.
 - c. 6 inches outside of minimum required dimensions of concrete cast against grade.
 - d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
 - e. 6 inches beneath bottom of concrete slabs on grade.
 - f. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.

3.04 SUBGRADE PREPARATION

A. General Requirements:

1. Shape subgrade to line, grade, and cross section as indicated.
2. Remove unsatisfactory and unstable material in surfaces to receive fill or in excavated areas and replaced with satisfactory materials.
3. Do not place material on surfaces that are muddy, frozen, contain frost, or otherwise containing unstable material.
4. Scarify the surface to a depth of 4 inches prior to placing fill.
5. Step or bench sloped surfaces steeper than 4 Horizontal to 1 Vertical (4:1) prior to scarifying.
6. Place 4 inches of loose fill and blend with scarified material.

B. Embankment – Earth:

1. Construct earth embankments from satisfactory materials free of organic or frozen material and rocks with any dimension greater than 3 inches.
2. Place the material in successive horizontal layers of loose material not more than 8 inches in depth.
 - a. Do not lay material on a muddy, spongy, frozen or otherwise unstable subgrade.
3. Spread each layer uniformly on a soil surface that has been moistened or aerated as necessary and scarified or otherwise broken up so that the fill will bond with the surface on which it is placed.
4. After spreading, plow, disk, or otherwise break up each layer; moisten or aerate as necessary; thoroughly mix; and compact to at least 90% laboratory maximum dry density for cohesive materials or 95% laboratory maximum dry density for cohesionless materials.
5. Backfill and fill material are to be within plus or minus 2% of optimum moisture.
6. Compaction requirements for the upper portion of earth embankments forming subgrade for pavements are identical with those requirements specified in Section 310000 – EARTHWORK, Subsection 3.09 – SUBGRADE PREPARATION.
7. Finish compaction by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment.

C. Subgrade Filter Fabric:

1. Place filter fabric as indicated directly on prepared subgrade free of vegetation, stumps, rocks larger than 2 inch diameter and other debris which may puncture or otherwise damage the fabric.
2. Repair damaged fabric by placing an additional layer of fabric to cover the damaged area a minimum of 3 foot overlap in all directions.

3. Overlap fabric at joints a minimum of 3 feet.
 4. Obtain approval of filter fabric installation before placing fill or backfill.
 5. Place fill or backfill on fabric in the direction of overlaps and compact as specified herein. Follow manufacturer's recommended installation procedures.
- D. Subgrade for Structures, Spread Footings, and Concrete Slabs:
1. Do not excavate below depth shown for structures, spread footings, and concrete slabs.
 2. If over excavation occurs, notify the Engineer and remove, replace, and compact as directed.
 3. Compact disturbed material to 95% ASTM D1557.
 4. The surface of the subgrade for buildings and pavements must not show deviations greater than 0.50 inch when tested with a 10 foot straightedge applied both parallel and at right angles to the centerline of the area.

3.05 FILLING AND COMPACTION

- A. General Requirements:
1. Prepare ground surface on which backfill is to be placed and provide compaction requirements for backfill materials in conformance with the applicable portions of this section.
 2. Do not place material on surfaces that are muddy, frozen, or contain frost.
 3. Finish compaction by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, or other approved equipment well suited to the soil being compacted.
 4. Moisten material as necessary to plus or minus 2% of optimum moisture.
 5. Fill and backfill to contours, elevations, and dimensions indicated. Compact and test each lift before placing overlaying lift.
- B. Backfill for Appurtenances:
1. After the manhole, catch basin, inlet, or similar structure has been constructed, place backfill in such a manner that the structure is not be damaged by the shock of falling earth.
 2. Deposit the backfill material, compact it as specified for final backfill, and bring up the backfill evenly on all sides of the structure to prevent eccentric loading and excessive stress.
- C. Bedding and Initial Backfill:
1. Provide utility bedding material and thickness indicated on Contract Drawings.

2. Utility bedding material shall be used to backfill the spaces left by the excavation. Bedding material shall be uniformly compacted prior to the laying of pipe.
 3. Pipe shall be bedded in stone up to half of the pipe diameter evenly on both sides of the pipe for the full length of the pipe. Take care to ensure thorough compaction of the fill under the haunches of the pipe.
 4. Pipe shall be capped with utility bedding material or sand as indicated on the Contract Drawings.
 5. Compact backfill to top of pipe to 95% of ASTM D698 maximum dry density.
- D. Compaction:
1. General Site:
 - a. Compact underneath areas designated for vegetation and areas outside the 5 foot line of the paved area or structure to 80% ASTM D698.
 2. Pavement Areas:
 - a. Compact underneath areas designated within the 5 foot line of the paved area or structure to 95% ASTM D698.
- E. Flowable Fill:
1. Place fill in a manner to completely fill voids in the location indicated.
 2. Do not place when atmospheric temperatures are expected to be below 33 degrees Fahrenheit at any time during the 3 day period following placement.
- F. Final Backfill:
1. Do not begin backfill until construction below finish grade has been approved, underground utilities systems have been inspected, tested and approved, forms removed, and the excavation cleaned of trash and debris.
 2. Bring backfill to indicated finish grade.
 3. Where pipe is coated or wrapped for protection against corrosion, the backfill material up to an elevation 2 feet above sewer lines and 1 foot above other utility lines need to be free from stones larger than 1 inch in any dimension.
 4. Heavy equipment for spreading and compacting backfill are not to be operated closer to foundation or retaining walls than a distance equal to the height of backfill above the top of footing; compact remaining area in layers not more than 6 inches in compacted thickness with power-driven hand tampers suitable for the material being compacted.
 5. Place backfill carefully around pipes or tanks to avoid damage to coatings, wrappings, or tanks.
 6. Do not place backfill against foundation walls prior to 7 days after completion of the walls.

7. As far as practicable, bring backfill up evenly on each side of the wall and sloped to drain away from the wall.
 8. Fill the remainder of the trench, except for special materials for buildings and pavements with satisfactory material.
 9. Place backfill material and compact as follows:
 - a. Buildings and Pavements:
 - 1) Place backfill up to the required elevation as indicated on the Contract Drawings.
 - 2) Compact materials as specified with the materials being placed.
 - 3) Do not compact with water flooding or jetting methods.
 - b. Turfed or Seeded Areas and Miscellaneous Areas:
 - 1) Deposit backfill in layers of a maximum of 12 inches loose thickness.
 - 2) Compact to 85 percent maximum dry density for cohesive soils and 90 percent maximum dry density for cohesionless soils.
- G. Replacement of Unsuitable Material:
1. Replace unsuitable material removed from the bottom of the trench or excavation with suitable material as directed by the Engineer. Material shall be placed in layers not exceeding 6 inches loose thickness.
- H. Replacement of Unyielding Material:
1. Replace unyielding material removed from the bottom of the trench with sand material or utility bedding material.

3.06 GRADING

- A. General Requirements:
1. Finish grades as indicated within 1/4 inch.
 2. Grade areas to maintain positive slope away from structures.
 3. Maintain areas free of trash and debris.
 4. For existing grades that will remain but which were disturbed by Contractor's operations, grade as directed.
- B. Grading Around Structures:
1. Construct areas within 5 feet outside of each building and structure line true-to-grade, shape to drain, and maintain free of trash and debris until final inspection has been completed and the work has been accepted.

3.07 TOPSOIL AND SEED

- A. Refer to Section 329200 – TURF AND GRASSES

3.08 DISPOSITION OF SURPLUS MATERIAL

- A. Remove from Owner's property all surplus or other soil material not required or not suitable for filling or backfilling, along with brush, refuse, stumps, roots, and timber.
- B. Properly disposed of surplus and other soil materials in accordance with all applicable local, state, and federal laws and regulations.
- C. Prepare plan for Disposition of Surplus Materials to include permissions document to dispose of nonsalable products.

3.09 FINISHING/FINISH OPERATIONS

- A. During construction, keep embankments and excavations shaped and drained.
- B. Maintain ditches and drains along subgrade to drain effectively at all times.
- C. Do not disturb the finished subgrade by traffic or other operation.
- D. Protect and maintain the finished subgrade in a satisfactory condition until ballast, subbase, base, or pavement is placed.
- E. Do not permit the storage or stockpiling of materials on finished subgrade.
- F. Do not lay subbase, base course, ballast, or pavement until the subgrade has been checked and approved, and in no case place subbase, base, surfacing, pavement, or ballast on a muddy, spongy, frozen or otherwise unstable subgrade.
- G. Finish the surface of excavations, embankments, and subgrades to a smooth and compact surface in accordance with the lines, grades, and cross sections or elevations shown.
- H. Provide the degree of finish for graded areas within 0.1 foot of the grades and elevations indicated except as indicated for subgrades specified in Section 310000 – EARTHWORK, Subsection 3.02 – SUBGRADE PREPARATION.
- I. Finish gutters and ditches in a manner that will result in effective drainage.
- J. Finish the surface of areas to be turfed to a smoothness suitable for the application of turfing materials.
- K. Repair graded, topsoiled, or backfilled areas prior to acceptance of the work, and re-established grades to the required elevations and slopes.

3.10 CLEAN-UP

- A. The Contractor shall not demobilize the site until the completed work is toured by the Owner and Engineer. Any unsatisfactory items observed will be reported in "punch-list" form. These items shall be corrected immediately by the Contractor prior to demobilization from the job site.
- B. The Contractor shall remove all scaffolding, barriers, temporary facilities, and the like upon completion of the work.
- C. Areas damaged as a result of the Contractor's work shall be restored to their original condition, all to the satisfaction of the Engineer, and at no additional cost to the Owner.

Structural and Building Envelope Upgrades
For the Green Barn at Dorthea Dix Psychiatric
656 State Street
Bangor, ME 04401
Gale JN 843180

D. Refer to Section 017700 – CONTRACT CLOSEOUT for additional information.

End of Section

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SECTION 312319

DEWATERING

PART 1 GENERAL

1.01 GENERAL PROVISIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 DESCRIPTION OF WORK

- A. In general, the Contractor shall supply all labor, material, and equipment, necessary for the proper completion of the work as required in this Section, in accordance with good construction practice, and as required by the materials manufacturer, as amended.
- B. The Work shall include, but not be limited to the following:
 - 1. Site dewatering work.
 - 2. Perform any and all other work necessary for site dewatering that allows construction to proceed.
- C. Coordinate the work in this Section with the appropriate trades to ensure the proper work sequence.
- D. Clean and restore all areas affected by the work.

1.03 PRODUCTS FURNISHED/SUPPLIED BUT NOT INSTALLED UNDER THIS SECTION

- A. Not applicable to this section.

1.04 PRODUCTS INSTALLED BUT NOT FURNISHED/SUPPLIED UNDER THIS SECTION

- A. Not applicable to this section.

1.05 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 030010 – Concrete Work
- B. Section 310000 – Earthwork

1.06 ALLOWANCES

- A. Not applicable to this section.

1.07 UNIT PRICES

- A. Not applicable to this section.

1.08 MEASUREMENT AND FIELD VERIFICATION PROCEDURES

- A. All dimensions, quantities, and existing conditions shall be determined or verified by the Contractor. The Contract Drawings have been compiled from various sources and may not reflect the actual condition at the time of construction. The Contractor is cautioned to take all precautions and make all investigations necessary to install the proposed work. The Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.
- B. Subsurface Information:
 - 1. Variations in existing subsurface utility locations and conditions from those indicated on the Contract Drawings shall not constitute grounds for changes in contract price or completion dates of this contract. The Contractor is responsible for contacting DIG SAFE (888-344-7233) at least 72-hours prior to commencing construction activities.
 - 2. Variations in existing ground or subsurface soil conditions from those indicated in the subsurface investigation (such as geotechnical report, soil borings logs, test pit logs, and ledge profile) shall not constitute grounds for changes in contract price or completion dates of this contract.
 - 3. Subsurface soil conditions indicated in the subsurface investigation (such as geotechnical report, soil borings logs, test pit logs, and ledge profile) are for informational purposes only. The opinions expressed represent interpretations of subsoil conditions, tests, and results of analyses conducted. The Contractor shall be responsible for reviewing the subsurface investigation information and preparing their own conclusions regarding subsurface soil conditions.
 - 4. The Contractor may dig additional test pits to locate existing subsurface utilities or perform independent subsurface soil condition evaluations at no additional cost to the Owner.

1.09 ALTERNATES

- A. Not applicable to this section.

1.10 REFERENCES

- A. Not applicable to this section.

1.11 DEFINITIONS

- A. MaineDEP – Maine Department of Environmental Protection.
- B. NOI – USEPA, Notice of Intent.
- C. NOT – USEPA, Notice of Termination.
- D. NPDES - National Pollutant Discharge Elimination System.
- E. SWPPP – Stormwater Pollution Prevention Plan.
- F. USDA – U.S. Department of Agriculture.

G. USEPA – U.S. Environmental Protection Agency.

1.12 MATERIAL OWNERSHIP

A. Not applicable to this section.

1.13 SUBMITTALS

A. Refer to Section 013300 – SUBMITTAL PROCEDURES for additional information.

B. Provide a project specific safety plan and job hazard analysis.

C. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.

1. None.

D. Shop Drawings:

1. None.

E. Samples for Verification:

1. None.

F. Qualification Data:

1. None.

G. Material Test Reports:

1. None.

H. Maintenance Data:

1. None.

I. Other:

1. None.

J. Record Drawings:

1. None.

1.14 QUALITY ASSURANCE

A. The Contractor shall design, furnish, install, test, operate, monitor, and maintain a dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of groundwater and permit excavation and construction to proceed on dry, stable subgrades

B. The dewatering system shall be performed in accordance with local, state, and federal laws and regulations.

1.15 DELIVERY, STORAGE, AND HANDLING

A. Not applicable to this section.

1.16 PROJECT CONDITIONS

A. Coordinate the work in this Section with the work by other trades to ensure the orderly progress of the work.

- B. The Contractor shall utilize skilled and experienced specialty workers to install all aspects of the work.
- C. Subsurface Information:
 - 1. Refer to Section 310000 – EARTHWORK, Subsection 1.08 – MEASUREMENT AND FIELD VERIFICATION PROCEDURES.
- D. Existing Utilities:
 - 1. Existing utility services are not to be interrupted unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - a. Notify the Engineer not less than 48 hours in advance of proposed utility interruptions.
 - b. Do not proceed with utility interruptions without the Engineer's permission, in writing.

1.17 SPECIAL PROJECT CONDITIONS

- A. Not applicable to this section.

1.18 EXAMINATION OF SITE AND DOCUMENTATION

- A. The Contractor shall carefully examine the site and all conditions affecting work under this Section. No claim for additional costs will be allowed due to the lack of knowledge regarding existing conditions as indicated in the Construction Documents, or obvious from observation of the site.
- B. Plans, surveys, measurements, and dimensions under which the work is to be performed are believed to be correct. However, it shall be the responsibility of the Contractor to examine the documents for themselves and formed their own conclusions as to the full requirements of the work involved.
- C. Written dimensions have precedence over scaled dimensions. Should the Contractor find a conflict with the documents relative to the Contract Drawings, Contract Specifications, or applicable codes, the Contractor shall be responsible for notifying the Engineer, in writing, prior to the initiation of work. Failure by the Contractor to notify the Engineer shall constitute acceptance of full responsibility by the Contractor to complete the scope of work defined by the Contract Drawings, Contract Specifications, and in full conformance with local, state, and, federal laws and regulations.

1.19 CONTRACTOR GUARANTEE

- A. Not applicable to this section.

1.20 WARRANTY

- A. Not applicable to this section.

PART 2 PRODUCTS

2.01 Not applicable to this section.

PART 3 EXECUTION

3.01 GENERAL

- A. Protect and maintain temporary erosion and sedimentation controls during dewatering operations.
- B. The Contractor shall be responsible for the power supply necessary to operate the dewatering system.
- C. Protection of Existing Natural Resources:
 - 1. Provide protection necessary to prevent damage to existing vernal pools, wetlands, waterways, waterbodies, natural habitats, and other natural resources located adjacent to and on-site areas. Protect natural resources on adjoining properties and on the Owner's property.
 - 2. Restore natural resource areas damaged by the Contractor's dewatering activities to their original condition, at no additional expense to the Owner.
- D. Protection of Existing Improvements:
 - 1. Provide protection necessary to prevent damage to existing improvements indicated to remain in place or outside of the limits of work. Protect improvements on adjoining properties and on the Owner's property.
 - 2. Restore improvements damaged by the Contractor's dewatering activities to their original condition, at no additional expense to the Owner.
- E. Traffic:
 - 1. Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during dewatering operations.
 - 2. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without written permission from the Engineer and authorities having jurisdiction.
 - 3. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- F. Prevent surface water and groundwater from entering excavations, ponding on prepared subgrades, and flooding site and surrounding area.
- G. Protect subgrades and foundation soils from softening and damage by precipitation and water accumulation.
- H. Provide temporary grading to facilitate dewatering and control of surface water.
- I. Monitor dewatering systems continuously.
- J. Promptly repair damages to adjacent facilities caused by dewatering.

3.02 INSTALLATION

- A. Before excavating below groundwater level, install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls in accordance with the approved Dewatering Plan.
 - 1. Space well at intervals required to provide sufficient dewatering.
 - 2. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.
- B. Provide standby equipment on site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense to Owner.

3.03 DEWATERING

- A. Control groundwater flowing toward or into excavations to prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction.
- B. French drains, sumps, ditches, or trenches are not allowed within 3 feet of the foundation of any structure, except with specific written approval from the Engineer, and after specific contractual provisions for restoration of the foundation area have been made.
- C. Perform control measures by the time the excavation reaches the water level in order to maintain the integrity of the in-situ material.
- D. While the excavation is open, reduce hydrostatic head in water-bearing strata below subgrade elevations of excavations.
 - 1. Maintain piezometric water level a minimum of 24 inches below surface of excavation.
- E. Operate dewatering system continuously until construction work below existing water levels is complete.
 - 1. Remove dewatering system and fill well holes with sand, or cut off and cap wells, a minimum of 36 inches below overlying construction.
- F. Dispose of water removed by dewatering in a manner that avoids endangering natural resources, public health, property, and portions of work under construction or completed.
 - 1. Dispose of water and sediment in accordance with local, state, and federal laws and regulations.
 - 2. Provide sumps, sedimentation tanks, and other flow-control devices as required by the Dewatering Plan.

- G. Damages:
 - 1. Promptly repair damages to adjacent facilities caused by dewatering operations.
- H. Noise Impacts:
 - 1. Use mitigation measures to reduce noise impacts of the dewatering system on any sensitive noise receptors that are pointed out by the Engineer.

3.04 FIELD CONTROL

- A. Repair or replace, within 24 hours, observation wells that become inactive, damaged, or destroyed. In areas where observation wells are not functioning properly, suspend construction activities until reliable observations can be made. Add or remove water from observation-well risers to demonstrate that observation wells are functioning properly.
- B. Fill observation wells, remove piezometers, and fill holes when dewatering is completed.
- C. Provide continual observation to ensure that subsurface soils are not being removed by the dewatering operation.

3.05 CLEAN-UP

- A. The Contractor shall not demobilize the site until the completed work is toured by the Owner and Engineer. Any unsatisfactory items observed will be reported in "punch-list" form. These items shall be corrected immediately by the Contractor prior to demobilization from the job site.
- B. The Contractor shall remove all scaffolding, barriers, temporary facilities, and the like upon completion of the work.
- C. Areas damaged as a result of the Contractor's work shall be restored to their original condition, all to the satisfaction of the Engineer, and at no additional cost to the Owner.
- D. Refer to Section 017700 – CONTRACT CLOSEOUT for additional information.

End of Section

Structural and Building Envelope Upgrades
For the Green Barn at Dorthea Dix Psychiatric
656 State Street
Bangor, ME 04401
Gale JN 843180

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SECTION 329200

TURF AND GRASSES

PART 1 GENERAL

1.01 GENERAL PROVISIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 DESCRIPTION OF WORK

- A. In general, the Contractor shall supply all labor, material, and equipment, necessary for the proper completion of the work as required in this Section, in accordance with good construction practice, and as required by the materials manufacturer, as amended.
- B. The Work shall include, but not be limited to the following:
 - 1. Application of seed material in loamed areas.
 - 2. Application of weed control in loamed areas.
 - 3. Maintenance of grassed areas.
 - 4. Perform any and all other work necessary for healthy grassed areas.
- C. In general, grassed areas shall include all areas within project limit lines that have not been designated on the Contract Drawings for any other type of surface treatment.
- D. Coordinate the work in this section with the appropriate trades to ensure the proper work sequence.
- E. Clean and restore all areas affected by the work.

1.03 PRODUCTS FURNISHED/SUPPLIED BUT NOT INSTALLED UNDER THIS SECTION

- A. Not applicable to this section.

1.04 PRODUCTS INSTALLED BUT NOT FURNISHED/SUPPLIED UNDER THIS SECTION

- A. Not applicable to this section.

1.05 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 310000 – Earthwork

1.06 ALLOWANCES

- A. Not applicable to this section.

1.07 UNIT PRICES

- A. Not applicable to this section.

1.08 MEASUREMENT AND FIELD VERIFICATION PROCEDURES

- A. All dimensions, quantities, and existing conditions shall be determined or verified by the Contractor. The Contract Drawings have been compiled from various sources and may not reflect the actual condition at the time of construction. The Contractor is cautioned to take all precautions and make all investigations necessary to install the proposed work. The Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.

1.09 ALTERNATES

- A. Not applicable to this section.

1.10 REFERENCES

- A. AMS Seed Act: USDA – Agricultural Marketing Service, Federal Seed Act.
- B. ASTM C602: Agricultural Liming Materials.
- C. ASTM D422: Standard Test Method for Particle-Size Analysis of Soils.
- D. ASTM D698: Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort.
- E. ASTM D1140: Standard Test Methods for Determining the Amount of Material Finer than 75- μ m (No. 200) Sieve in Soils by Washing.
- F. ASTM D2974: Standard Test Methods for Determining the Water (Moisture) Content, Ash Content, and Organic Material of Peat and Other Organic Soils.
- G. ASTM D4427: Standard Classification of Peat Samples by Laboratory Testing.
- H. ASTM D4972: Standard Test Methods for pH of Soils.
- I. ASTM D5268: Standard Specification for Topsoil Used for Landscaping and Construction Purposes.
- J. ASTM F1632: Standard Test Method for Particle Size Analysis and Sand Shape Grading of Golf Course Putting Green and Sports Field Rootzone Mixes.
- K. DOA SSIR 42: Kellogg Soil Survey Laboratory Methods Manual, Soil Survey Investigations Report, No. 42, Version 6.0.

1.11 DEFINITIONS

- A. AOAC – Association of Official Agricultural Chemists.
- B. AOSCA – Association of Official Seed Certifying Agencies
- C. ASTM – American Society for Testing and Materials.
- D. CES – Cation Exchange Capacity.
- E. PPM – Parts per million.

- F. Pesticide – Any substance or mixture of substances, including biological control agents, that may prevent, destroy, repel, or mitigate pests and are specifically labeled for use by the USEPA. Also, any substance used as a plant regulator, defoliant, disinfectant, or biocide. Examples of pesticides include fumigants, herbicides, insecticides, fungicides, nematocides, molluscicides, and rodenticides.
- G. Solvita index – Score used in testing the quality of compost and soil health, based on measurements of carbon dioxide and ammonia emissions.
- H. SSSA – Soil Science Society of America.
- I. TPI – Turfgrass Producers International.
- J. Turf – 95% ground cover of the established species.
- K. USDA – U.S. Department of Agriculture.
- L. USEPA – U.S. Department of Environmental Agency.

1.12 MATERIAL OWNERSHIP

- A. Except for topsoil surplus or other materials indicated to remain the Owner's property, materials shall become the Contractor's property and shall be removed from the project site in accordance with local, state, and federal laws and requirements.

1.13 SUBMITTALS

- A. Refer to Section 013300 – SUBMITTAL PROCEDURES for additional information.
- B. Provide a project specific safety plan and job hazard analysis.
- C. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.
 - 1. Grass seed mix
 - 2. State Certification and Approval for seed
 - 3. Cellulose Fiber Mulch
 - 4. Mulches topdressing
 - 5. Organic mulch materials
 - 6. Hydroseeding product information, with mix ratios and amounts
 - 7. Fertilizer, herbicide, and fungicide products for application, as required
- D. Shop Drawings:
 - 1. None.
- E. Samples for Verification:
 - 1. None.
- F. Qualification Data:
 - 1. Qualifications and experience of Contractor

2. Soil laboratory state certification
3. Fertilizer applicator's state license
- G. Material Test Reports:
 1. Mechanical analysis of any soil amendments
- H. Maintenance Data:
 1. Maintenance inspection report
- I. Other:
 1. Integrated pest management plan
- J. Record Drawings:
 1. None.

1.14 QUALITY ASSURANCE

- A. The Contractor shall have a minimum of 5 years of experience operating similar equipment and performing the same or similar work in similar environments, similar in size and scope of the project.
- B. Do not make substitutions without written approval from the Engineer. If specific materials are not available, the Contractor shall obtain approval for substitution from the Engineer, in writing, prior to the proceeding with the work.
- C. All seed and amendments shall comply with all local, state, and federal laws and regulations inspection for plant disease and insect control.
- D. All fertilizer applications shall be performed by a licensed applicator in strict conformance with all local, state and federal laws and regulations. Notify the Engineer at least 2 weeks prior to scheduled application. A copy of the applicator's license shall be given to the Engineer.
- E. Maintain seeded areas immediately after placement until seed areas are accepted, refer to Section 329200 – TURF AND GRASSES, Section 3.12 – ACCEPTANCE OF SEEDING.

1.15 DELIVERY, STORAGE, AND HANDLING

- A. Delivery:
 1. Deliver seed to the site in original, unopened containers bearing producer's guaranteed analysis for percentages of mixtures, purity, germination, weedseed content, and inert material. Label shall be in conformance with AMS Seed Act and applicable state and federal laws and regulations.
 2. Protect all products from weather saturation and drying out, damaging or deteriorating conditions, and from contamination during delivery. Wet, moldy, or otherwise damaged products will be rejected.
 3. Deliver soil amendments to the site in original, unopened containers bearing manufacturer's chemical analysis, name, trade name, trademark, and indication of conformance to state and federal laws.

- a. Instead of containers, soil amendments may be furnished in bulk with certificate indicating the above information.
- B. Storage:
1. Protect all products from weather saturation and drying out, damaging or deteriorating conditions, and from contamination during on-site storage. Wet, moldy, or otherwise damaged products will be rejected.
- C. Handling:
1. Materials shall not be handled or moved when in wet or frozen conditions.
 2. Sow seed within 24 hours after lawn preparation has been completed.
 3. Sowing grass seed shall be performed between April 1st and May 31st, or between August 15th and October 1st, except as otherwise approved in writing by the Engineer.
 - a. If sowing out of season, as described above, the Contractor shall continue to be responsible for all maintenance of lawn areas until final acceptance of all lawn areas, refer to Section 329200 – TURF AND GRASSES, Subsection 3.06 – MAINTENACE FOR LAWN AREAS.
 4. Do not seed when ground is muddy, frozen, snow covered or in unsatisfactory condition for seeding.
 5. If special conditions exist that may warrant a variance in the above seeding dates or conditions, the Contractor shall submit a written request to the Engineer stating the special conditions and proposed variance. Seeding will not commence until approval, in writing, has been received by the Engineer.

1.16 PROJECT CONDITIONS

- A. Coordinate the work in this section with the work by other trades to ensure the orderly progress of the work.
- B. The Contractor shall utilize skilled and experienced specialty workers to install all aspects of the work.
- C. During removal operations, the Contractor is responsible for the containment of all dust, dirt, debris, overspray, and run-off resulting from the work. The Contractor shall collect and contain all materials and repair any resulting damage to adjacent surfaces, site fixtures or personal property. Specific attention is drawn to the use of chemicals and cleaners.
- D. Each seed bag or container shall display a label which identifies the contents as true representation of the seed mix and percentages required by specification. No seed shall be applied to a site until display labels are submitted to the Engineer and has determined the mixture meets all requirements.

1.17 SPECIAL PROJECT CONDITIONS

- A. Not applicable to this section.

1.18 EXAMINATION OF SITE AND DOCUMENTATION

- A. The Contractor shall carefully examine the site and all conditions affecting work under this Section. No claim for additional costs will be allowed due to the lack of knowledge regarding existing conditions as indicated in the Construction Documents, or obvious from observation of the site.
- B. Plans, surveys, measurements, and dimensions under which the work is to be performed are believed to be correct. However, it shall be the responsibility of the Contractor to examine the documents for themselves and formed their own conclusions as to the full requirements of the work involved.
- C. Written dimensions have precedence over scaled dimensions. Should the Contractor find a conflict with the documents relative to the Contract Drawings, Contract Specifications, or applicable codes, the Contractor shall be responsible for notifying the Engineer, in writing, prior to the initiation of work. Failure by the Contractor to notify the Engineer shall constitute acceptance of full responsibility by the Contractor to complete the scope of work defined by the Contract Drawings, Contract Specifications, and in full conformance with local, state, and, federal laws and regulations.

1.19 CONTRACTOR GUARANTEE

- A. Upon completion of the work and prior to final payment, the Contractor shall submit a guarantee of their work is free from defect in materials and workmanship. The guarantee shall be for a period of two (2) years. The guarantee shall be signed by an officer of the Contractor's firm and sealed if a corporation.

1.20 WARRANTY

- A. See Division 01 Section "Description of Work" for contractor's warranty.
- B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official.

PART 2 PRODUCTS

2.01 HERBICIDES, PESTICIDES, AND FUNGICIDES

- A. May be used, subject to the approval of the Engineer, and handled by state-licensed operators only.

2.02 HYDROSEEDING

- A. A water, fiber, seed, fertilizer, and tackifier homogeneous slurry. Fiber shall comprise of wood cellulose fiber, paper fiber, or recycled paper and consist of 1,000 pounds, dry weight, per acre. Seed mix shall be mixed to ensure broadcasting at the rate identified in 329200 – TURF AND GRASSES, Subsection 2.05 – SEED. When hydraulically sprayed on the ground, material must form a blotter like cover impregnated uniformly with grass seed. Spread with one application with no second application of mulch.

2.03 JUTE MESH

- A. Jute mesh shall be uniform, open, plain weave of undyed and unbleached single jute yarn, a minimum of 4 feet in width. There shall be 78 warp ends per width and 41 weft ends per yard. Weight shall average 1.22 pounds per linear yard, plus or minus 5%. Staples for erosion control materials shall be 9 gauge staples when used with jute mesh and 11 gauge when used with woven paper.

2.04 MULCH

- A. Straw:
 - 1. Stalks from oats, wheat, rye, barley, or rice. Furnish in air-dry condition and of proper consistency for placing with commercial mulch blowing equipment. Straw shall contain no fertile seed and free from noxious weeds, mold, and other deleterious materials.
- B. Hay:
 - 1. Air-dry dried, whole-plant material harvested condition and of proper consistency for placing with commercial mulch blowing equipment. Hay must be sterile, containing no fertile seed and free from noxious weeds, mold, and other deleterious materials.
- C. Bonded Fiber Matrix (hydro mulch):
 - 1. Hydraulically applied erosion system having properties that it will disperse uniformly into a slurry when mixed with water. The fiber shall consist of long strand, virgin wood fibers (90% by weight), bound together by a pre-blended, high-strength polysaccharide polymer adhesive (10% by weight). The virgin wood fibers shall be thermo-mechanically defibrated from clean whole wood chips, containing a minimum of 25% of the fibers averaging 10 millimeters long, with a minimum of 50% or more retained on a #24 mesh screen. The organic binders shall be a high viscosity. Fiber shall not be produced from recycled material such as sawdust, paper or cardboard.

2.05 ORGANIC COMPOST

- A. Organic Compost shall be natural or manufactured mature, composted organic material produced from a MassDEP approved composting vendor. Only USEPA Class 'A' compost products shall be used. Sewage Sludge (Biosolids) shall not be used.
- B. Compost shall originate from aged organic materials, free from sticks, stones and/or other substances which would be injurious to health plant growth. Test results shall indicate maturity and age of organic compost. Raw uncomposted or unprocessed or incompletely composted organic matter shall be rejected.
- C. Compost shall contain no uncomposted bulking agents such as uncomposted wood chips and shall be free from hard lumps and free from seeping water when handled.
- D. Compost shall be free from sticks, stones, plastic, debris or other substances which would be injurious to healthy plant growth. 100% of compost material shall pass a 1/2 inch sieve.

- E. Compost acidity range minimum and maximum pH value shall be between 6 to 8 when tested according to methods of testing or AOAC.
- F. Compost shall contain a minimum of 30% of organic matter (humus) as determined by loss by ignition testing standard of the AOAC.
- G. Compost shall have a moisture content between 35% to 70% as determined by ASTM D2974.
- H. Compost shall have a Carbon:Nitrogen ratio between 15:1 to 30:1.
- I. Compost shall have a solvita index range between 6 to 8.
- J. Compost shall not consist of any unpleasant or detectable odor of ammonia or hydrogen sulfide, indicating immature compost.
- K. Compost color shall be dark brown.

2.06 PEAT MOSS

- A. Peat moss shall be a natural Canadian sphagnum peat product derived from a freshwater site and conforming to ASTM D4427. The peat shall be shred and granulate to pass a 1/2 inch mesh screen, having an ash content not exceeding 15% as determined by ASTM D2974, and condition in storage pile for minimum 6 months after excavation.

2.07 SEED

- A. Grass seed shall be clean, new crop seed, composed of a mixture of varieties, mixed in proportion by weight, tested for minimum percentages of purity and germination, and in accordance with State and Federal laws and regulations.
- B. Seed mix for all lawn areas within the limit of disturbance, unless otherwise noted on the Contract Drawings, shall conform to the requirements outlined in Table 1:

Table 1 – Lawn Seed Mix

| <u>Seed</u> | <u>% by Weight</u> | <u>Min. Purity %</u> | <u>Min. Germination %</u> |
|--------------------|--------------------|----------------------|---------------------------|
| Perennial Ryegrass | 40 | 98 | 90 |
| Chewing Fescue | 30 | 96 | 85 |
| Kentucky Bluegrass | 30 | 97 | 85 |

- C. Application rate for new lawns shall be 5 – 7 pounds per 1,000 square-foot area. Overseed application rate shall be 2 to 3 pounds for 1,000 square-foot area.

2.08 SOIL ADDITIVES

- A. Limestone:
 - 1. Adjustment of soil pH shall be agricultural grade ground dolomitic limestone containing up to 50% magnesium carbonate in a dry, granular form. Limestone shall be ground to such a fineness that at least 50% will pass through a No. 100 U.S. Standard Sieve and 90% to 100% will pass through a No. 20 U.S. Standard Sieve. The lime shall be uniform in composition,

dry and free flowing, and shall be delivered to the site in the original, unopened containers, each bearing the manufacturer's guaranteed analysis. Any lime which becomes caked or otherwise damaged, making it unsuitable for use, will be rejected.

- B. Aluminum Sulfate:
 - 1. Adjustment of soil pH shall be commercial sulfur, unadulterated, 57% and delivered in containers with the name of the manufacturer, material analysis and net weight appearing on each container.
- C. Fertilizer:
 - 1. Lawn starter and maintenance growth shall be a complete commercial product complying with the state and federal fertilizer laws and regulations.
 - a. Fertilizer shall be granular.
 - b. Deliver to the site in the original unopened containers that shall bear the manufacturer's certificate of compliance covering analysis.
 - c. At least 50% by weight of the nitrogen content shall be derived from organic materials.
 - d. Fertilizer shall contain not less than the percentages of weight of ingredients as follows or as recommended by the soil analysis:
 - 1) Nitrogen 10%
 - 2) Phosphorus 20%
 - 3) Potash 10%
 - e. Adjust nitrogen type and analysis for spring growth and slow release in fall.
 - f. The number of applications and application rate of fertilizer shall be per the manufacturer's instructions and as recommended by soil test results.

2.09 WATER

- A. Clean, fresh potable water free of salt and other impurities injurious to vegetation.
- B. Site irrigation may be used. Automatic controller shall be adjusted to comply with the local, state, and federal water conservation regulations schedule.

2.10 WEED CONTROL

- A. Pre-emergent weed control for Loam and Seed Areas shall be Tenacity or approved equal. Deliver in manufacturer's fully identified containers and apply according to manufacturer's directions.
- B. Contractor shall notify Engineer 4 days prior to anticipated application, time, and type of pre-emergent weed control.

PART 3 EXECUTION

3.01 GENERAL

- A. Grassed areas shall include all areas within project limit lines that have not been designated on the Contract Drawings for any other type of surface treatment.

- B. Any grassed areas that are rutted or eroded due to construction, weather or otherwise damaged shall be the responsibility of the contractor to correct.
- C. Multi-phased projects may have different seeding times based on each phase. It is the contractor's responsibility to follow the specifications herein for each phase of construction.

3.02 SOWING OF SEED

- A. Apply seed within 24 hours after seed bed preparation.
- B. Sowing grass seed shall be performed between April 1st and May 31st, or between August 15th and October 1st, except as otherwise approved in writing by the Engineer.
 - 1. If sowing out of season, as described above, the Contractor shall continue to be responsible for all maintenance of lawn areas until final acceptance of all lawn areas, refer to Section 329219 – SEEDING, Subsection 3.12 – MAINTENACE FOR LAWN AREAS.
- C. Do not seed when ground is muddy, frozen, snow covered or in unsatisfactory condition for seeding. If special conditions exist that may warrant a variance in the above seeding dates or conditions, the Contractor shall submit a written request to the Engineer stating the special conditions and proposed variance. Seeding will not commence until approval, in writing, has been received by the Engineer.
- D. Before sowing, scarify soil and rake until surface is smooth, friable and of uniformly fine texture.
- E. The approved seed mixture shall be applied at a rate indicated in 329219 – SEEDING, Subsection 2.07 – SEED by means of a seeder device capable of penetrating ground to depth of 1 inch. Seeder machine shall be equipped with disc-type penetrating action and seeder tubes which plant seeds. Do not use wet seeds which are moldy or otherwise damaged in transit or storage.
- F. Distribute seed over area in 2 separate passes, each one perpendicular to the other (north-south, east-west orientation), and each pass receiving half the seed quantity. Each pass shall be in a linear progression and shall confirm to the field direction that permits the longest straight line application procedure.
- G. Do not sow seed on a windy day or when the ground is frozen, wet or otherwise non-tillable.
- H. Cover seed with a thin layer of topsoil by raking or dragging and then cover topsoil with mulch to a uniform depth on the same day as the seeding.
 - 1. Hay or straw mulch must be spread uniformly at the rate of 2 tons per acre. Mulch must be spread by hand, blower-type mulch spreader, or other approved method. Mulching must be started on the windward side of relatively flat areas or on the upper part of steep slopes, and continued uniformly until the area is covered. The mulch must not be bunched or clumped. Sunlight must not be completely excluded from penetrating to the ground surface.

2. Hydro mulch hydraulically applied to the ground, shall form an absorptive mat of mulch. No materials which inhibit growth or germination shall be present in the mixture
 - I. Keep soil moist throughout the germination period.
 - J. Hydroseeding will be permitted only with permission from the Engineer, in writing. All requests shall be in writing with detailed and itemized procedure to be followed.
 - K. Broadcast seeding will be permitted only with permission from the Engineer, in writing. All requests shall be in writing with detailed and itemized procedure to be followed.

3.03 APPLICATION OF FERTILIZER

- A. The Contractor shall test the topsoil for soil fertility by an approved soil testing laboratory. Soil fertility test results and recommended fertilization program shall be submitted to the Engineer.
- B. Apply fertilizer in accordance with the recommended fertilization program throughout the initial germination and maintenance periods.

3.04 INSTALLING JUTE MESH

- A. Jute mesh shall be installed to any slopes 3 Horizontal to 1 Vertical (3:1) steeper.
- B. Install jute mesh loosely but smoothly to fit the contour of the finished grade, parallel to and in same direction as the flow of water. The up-slope end of each separate strip or piece of jute mesh shall be buried in a 6 inch minimum vertical anchor slot or junction slot with the soil tamped firmly against the mesh. Where more than one width of material is required, edges shall overlap a minimum of 12 inches, and the up-slope section of mesh will be on top. Downhill ends of the jute mesh shall be folded under approximately 4 inches and stapled in place. Staples will be inserted through the mesh along edges, overlaps, and in the center of all jute mesh strips at intervals not greater than 3 feet. All anchor slots, junction slots, check slots, and terminal folds shall have 5 staples spaced not more than 9 inches on center across widths.
- C. On seeded banks, jute shall be applied immediately after seeding.

3.05 CLEAN-UP

- A. The Contractor shall not demobilize the site until the completed work is toured by the Owner and Engineer. Any unsatisfactory items observed will be reported in "punch-list" form. These items shall be corrected immediately by the Contractor prior to demobilization from the job site.
- B. The Contractor shall remove all scaffolding, barriers, temporary facilities, and the like upon completion of the work.
- C. Areas damaged as a result of the Contractor's work shall be restored to their original condition, all to the satisfaction of the Engineer, and at no additional cost to the Owner.

Structural and Building Envelope Upgrades
For the Green Barn at Dorthea Dix Psychiatric
656 State Street
Bangor, ME 04401
Gale JN 843180

D. Refer to Section 017700 – CONTRACT CLOSEOUT for additional information.

End of Section

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