Addendum #1

Directorate of Facilities Engineering

13 October 2021

This Addendum modifies, amends, and supplements designated parts of the Contract Documents, Specifications and Drawings for:

National Guard Vehicle Maintenance Shop Addition/Alteration, Project Number 230139-D, BGS Project Number 3276, Bid Number 22-012.

It shall be the responsibility of the Contractor to notify all Subcontractors and Suppliers for various portions of the work of any changes or modifications contained in this Addendum.

Clarification Items:

- <u>Question #1</u>: Is this project FM insured? <u>Answer:</u> The Contractor shall provide insurances in accordance with 00 72 13 General Conditions Article #9 - Insurance Requirements.
- 2. <u>Question #2:</u> Is there a specification for the type of Polyiso roof insulation? <u>Answer:</u> Spec Section 072100 contains Polyiso roof insulation requirements.
- 3. <u>Question #3:</u> Is .090 EPDM adhered with LVOC bonding adhesive acceptable? Specifications call for self-adhered EPDM but I am being told they are not manufacturing that material right now?

<u>Answer:</u> LVOC, water based, adhesive system per manufacturer's standards and warranty is acceptable per Spec Section 075323 p 2.3.G. provided that system meets uplift requirements within spec 075323 and complies with roof membrane warranty.

- 4. Question #4: In accordance with Section 01-00-00, 3.04 B States: "Owner will appoint and employ services of independent firm to perform testing, adjusting, and balancing. The Contractor shall pay for services." Please provide us with name of independent firm so Contractors may obtain a quote for their services or set an allowance. <u>Answer:</u> The Owner shall not provide a list of names to perform testing, adjusting, and balancing. The Owner and the Consultant shall determine if the independent firm is acceptable. The Contractor may submit their desired Contractor to perform testing, adjusting, adjusting, and balancing. The Owner and the Consultant will determine if the Method States in the Contractor's independent firm is acceptable. Note, the submitted Firms provided to the Owner will have to be shared with the other Bidders through the addendum process.
- <u>Question #4:</u> Will all unvaccinated employees of the Contractor be required to test weekly for Covid-19? If so, will subcontractor employees be required as well? <u>Answer:</u> The Contractor will have to follow the Covid recommends from the Federal Center For Disease Control (CDC) at the time of the contract and through the duration of the contract.

Specification Items:

- Replace Existing Table Of Content pages 1 through 6 with enclosed revised Table Of Content pages 1 through 6. Drawing names corrected and added Attachment #1 - R.W. Gillespie & Associates, Inc. - Revised Report Of Geotechnical Evaluation.
- 2. Replace Section 00 41 13 Contractor Bid Form, page 4 of 4 with enclosed revised Section 00 41 13 Contractor Bid Form, page 4 of 4. Addendum #1 is noted on page 4 of 4.
- 3. Replace Section 00 52 13 Construction Contract, page 3 of 4 with enclosed revised Section 00 52 13 Construction Contract page 3 of 4. Addendum #1 is noted on page 3 of 4.
- 4. Replace Section 01 00 00 Administrative Provision, pages 1 through 26 with enclosed revised Section 01 00 00 Administrative Provision, pages 1 through 26. Part 1 General, 1.01 Contract Requirements, Paragraph D. Contractor Use of Premises, Sub Paragraph #8, Winter Conditions Snow Plowing and Snow Removal. The Contractor shall be responsible to snow plow all their areas of operations and laydown areas. The Contractor shall be cleared in accordance with OSHA and Life Safety requirements, when the snow begins to impede safety requirements. The Contractor shall be responsible to relocate snow to designated snow pile areas on the property. The Owner shall show the Contractor the designated snow pile areas. Attachment #1 Contractor's Snow Plow Areas added to 01 00 00 Administrative Provision after page 26.
- 5. Division #1 Earthwork. After specification 31 20 00 Earth Moving add Attachment #1
 R.W. Gillespie & Associates, Inc. Revised Report Of Geotechnical Evaluation.

Drawing Items:

1. None.

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00 41 13 Contractor Bid Form

4. The Bidder acknowledges receipt of the following addenda to the specifications and drawings:

Addendum No. <u>#1</u>	Dated: 13 Oct. 2021	Addendum No.	Dated:
Addendum No.	Dated:	Addendum No	Dated:
Addendum No.	Dated:	Addendum No	Dated:
Addendum No.	Dated:	Addendum No.	Dated:

- 5. Bid security *is required* on this project. If noted above as required, 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.
- 6. 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).

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 General Conditions of the contract, instructions to bidders, bid form, Special Provisions, the written specifications and the 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: <u>22 September 2021</u>
- 8.3 Drawings: <u>22 September 2021</u>
- 8.4 Addenda: Addendum #1 Dated 13 October 2021

SECTION 01 00 00

ADMINISTRATIVE PROVISIONS

PART 1 GENERAL

1.01 CONTRACT REQUIREMENTS

A. Scope of Work

1. This project consists of a new General Purpose Maintenance Bay Addition to the existing Administration Building. There will be some minor alterations to the existing Administration Building. The majority of the work shall be the new General Purpose Maintenance Bay Addition. New metal building with steel structure, concrete floors, CMU walls, overhead doors, steel personnel doors, additional HVAC system, additional electrical, additional water, additional sprinkler and upgrade the existing Building Automation Controls (BAC). The Contractor shall furnish and install all items in accordance with Plans and Specifications.

B. Contract Method

- 1. Basis of award of this Contract will be in accordance with Section 1 Instructions to Bidder, Paragraph 2.
- 2. Contract type: State of Maine Bureau of General Services, Construction Contract, Section 00 52 13.
- 3. The project will be constructed under a single lump sum contract.
- C. Work Sequence

1. Work of the Contract and related provisions are as described in the Contract Documents.

- D. Contractor Use of Premises
 - 1. Work of this Contract includes coordinating the work with the daily operations of the Owner.
 - 2. Limit use of premises for Work and construction operations only, allow for Owner occupancy, work by other Contractors, and public access.
 - Federal and State Holiday Schedule. The Contractor may not work on Federal or State Holidays; non-working days of this Contract are 11, 25, 26 November, 24, 31 December 2021 and 1, 17 January, 21 February, 18 April, 30 May, 19 June, 4 July, 5 September, 10 October, 11, 24, 25 November, 25, 26 December 2022 and 2, 16 January, 20 February, 17 April, 29 May, 19 June 2023.
 - 4. Limit access to Owner's site, hours of operations are 7:00 A.M. 4:00 P.M. If

Contractor would like to work on a federal or state holiday he/she must request permission from Owner three working days in advance. The Owner reserves the right to accept or reject Contractor's request.

- 5. The Contractor must work with each organization to gain access to certain area through-out the building. When the Contractor needs to gain access to certain areas, he must notify each organization seven working days in advance.
- 6. Coordinate use of premises under direction of Owner.
- 7. The Contractor shall be responsible for his/her security in Construction Area until substantial completion. The contractor shall coordinate security of Building with Owner.
- 8. Winter Conditions Snow Plowing and Snow Removal. The Contractor shall be responsible to snow plow all their areas of operations and laydown areas. The Contractor shall be responsible to keep their areas free of snow and ice. Snow and ice shall be cleared in accordance with OSHA and Life Safety requirements, when the snow begins to impede safety requirements. The Contractor shall be responsible to relocate snow to designated snow pile areas on the property. The Owner shall show the Contractor the designated snow pile areas.
- E. Owner Occupancy

1. Owner will occupy surrounding areas during entire period of construction, to conduct Owner's normal operations. The Contractor shall cooperate with Owner to minimize conflict to the Owner's operations.

- F. Owner-furnished Products: Not Used
- G. Schedule of Allowances:

1. Allowance #1: Central Maine Power. Provide New Three Phase Electric Service. The Contractor will coordinate directly with CMP for a Complete and operational new Electrical Service. All materials and labor not provided by CMP will be provided by the Contractor. In accordance with CMP Quote - Three Phase Electric Service for Maine National Guard Mt. Apatite: SAP #10300776555. The new overhead high voltage power line will extend from existing pole #6 and terminate at new pole #7. These overhead wires will transition into the high voltage underground duct system that you are constructing as shown in the attached CMP Engineering drawing 905-5241 to serve the 208Y/120 volt pad mounted transformer. CMP will provide and install the high voltage underground wires and make these connections to the pad mounted transformer. Metering CT's (current transformer) will be installed inside the transformer and a meter cabinet will be pedestal mount by the customer Contractor.

All underground infrastructure will be provided and installed by your Contractor according to CMP Engineering specifications and construction requirements on drawing 905-5241 (attached). This includes but is not limited to pre-cast 7' x 7' concrete transformer foundation and the 5" electrical conduit runs from the riser pole to the pad mount transformer as noted.

Your contractor will also provide and install new conduits and 208 volt wires from the pad mount transformer to the new junction box and switchgear system. The Contractor shall contact CMP for additional specifications and drawings. The Contractor shall carry an allowance price of **\$43,000.00 dollars**.

2. The Owner shall also reclaim any portion of the allowance that may not be used from Allowance #1 from the contract amount with a Change Order Deduct.

H. Alternate Bids:

1. Alternate Bid #1, ERV: Provide ERV#3 as scheduled with supply and return duct. Provide electrical connection.

2. Alternate Bid #2, Crane: Provide 15 Ton Overhead Bridge Crane.

3. Alternate Bid #3, Removal of eyewash station from Bulk POL Storage Room and relocated to the Maintenance Bay.

4. Alternate Bid #4, Upgrade the entire Building Automation Controls System (BAC) for the Existing Facility and the New Maintenance Bay.

- 5. Alternate Bid #5, NOT USED.
- 6. Alternate Bid #6, Boiler #3: Provide Boiler B-3.
- 7. Alternate Bid #7, Boiler #4: Provide Boiler B-4 and remove Boiler B-1.
- 8. Alternate Bid #8, Combined Heat and Power (CHP) #1: Provide one 10KW CHP.
- 9. Alternate Bid #9, Combined Heat and Power (CHP) #2: Provide a second 10KW CHP.
- I. Unit Prices: Not Used
- J. Applications for Payment:

1. Submit Six (6) copies of each application under procedures of 00 72 13 Section 31, on B.G.S. Form "Requisition for Payment", revised 1 May 2020.

- K. Coordination:
 - 1. Work of this Contract includes coordination of the entire Work of the Project.
 - The Contractor shall contact the <u>City of Auburn</u> to coordinate required permitting. The Contractor shall obtain and pay for all necessary construction/building permits. The Contractor shall send <u>two (2)</u> copies of all permits to the Owner.

- 3. Coordinate work with all utilities. Interruption of services shall be coordinated with an appropriate official at the facility to minimize the disruption of operations within the facility.
- 4. Notify an appropriate official at the facility at least three days in advance of the need to move furnishings, equipment, materials, etc. from areas to be affected by the construction.
- 5. Control on-site activities to minimize the disruption of the occupants.
- 6. Coordinate the work of equipment and material suppliers and subcontractors.
- 7. Make arrangements for the timely delivery of materials and supplies to the job site and for their temporary storage on site.
- 8. Maintain the project site in a neat condition.
- 9. Assist the Owner during periodic site visits and in the review of construction.
- 10. Maintain up to date progress records and as-built drawings.
- L. CONFLICTS
 - 1. Contractor shall notify Owner in writing of any real or apparent conflicts in the Contract Documents and, except in cases of emergency, await Owner's determination before proceeding.
 - 2. The **<u>Owner's Project Manager</u>** shall resolve conflicts that arise during construction.
 - 3. If two or more solutions are indicated in the Contract Documents, the Contractor shall assume the cost of the more expensive solution unless otherwise directed by the Owner.
- M. Field Engineering
 - 1. The Contractor shall be responsible for all field engineering as required.
 - 2. The Contractor shall be responsible for all special inspections required to obtain a Building Permit from the <u>City of Auburn</u>.
- N. Field Testing and Inspections:
 - 1. The Contractor shall carry all costs for material testing and inspections required by the Contract Documents. The Contractor shall hire only Consultant approved and Owner approved independent testing agencies to perform all testing and inspections.
- O. Reference Standards

- 1. For products specified by association or trade standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- 2. The date of the standard is that in effect as of the Bid date, or date of Owner-Contractor Agreement when there are no bids, except when a specific date is given.
- 3. Obtain copies of standards when required by Contract Documents. Maintain copy at job site during progress of the specific work.

1.02 SCHEDULING AND PHASING OF WORK

A. Substantial Completion: Work of the Contract must be Substantially Completed by

<u>1 June 2023</u> so that the Owner can have full use of interior space.

- 1. Except as otherwise specified, Substantial Completion is hereby defined to mean a stage of completion sufficient for the Owner to have full beneficial use and occupancy of the structure involved, less only minor corrections and repairs that can be performed without undue annoyance to building occupants which shall be documented on the "punch list" as specified hereinafter. Beneficial use and occupancy means removal of all debris, interior and exterior scaffolding, surplus equipment and material and cleaning as required under the Contract completed.
- B. Final Completion of all Work of this Contract shall be by <u>30 June 2023</u>.
 - 1. Except as otherwise specified, Final Completion is when the Work of the Contract has been completed in accordance with the terms and conditions of the contract documents with no "punch list" items open, and is ready for final payment.
- C. The expiration date of this Contract is <u>30 August 2023</u>.
 - 1. Except as otherwise specified, Expiration Date is hereby defined to mean the date when all engagements of the parties has ended, except to those which arise from the non-fulfillment of obligations created during its existence, such as warranties.
- D. Normal building operations will continue throughout the length of the Project. The successful Contractor shall develop a schedule of work that is respectful of the Owner's needs but with a mutual understanding that temporary relocation of personnel within the building will be required.
- E. Within ten (10) working days following receipt of the fully executed formal Contract Agreement by the Contractor, the Contractor shall prepare a proposed Phasing and Progress Schedule. The final Schedule shall be as mutually agreed to by the Owner and Contractor, and within the following guidelines:
 - 1. The Owner's business operations must continue throughout the entire construction period.

- 2. Work within the building interior must comply with the Owner's requirements for continued use and occupancy.
- 3. Applicable egress codes must be complied with during the construction period. In particular, building entrances and exit ways must be kept open at all times.

1.03 REGULATORY REQUIREMENTS

A. Conform to Local, State and Federal codes.

1.04 PROJECT MEETINGS

- A. Requirements:
 - 1. Contractor shall, upon acceptance of a Contract and before commencing Work, contact the Owner and request a pre-construction conference as required in 00 72 13 Section 1.
- B. Pre-construction Conference
 - 1. The OWNER will administer pre-construction conference for execution of Owner-Contractor Agreement and exchange of preliminary submittals.
- C. Progress Meetings
 - 1. The Contractor shall schedule and administer Project meetings throughout progress of the Work, called meetings, and pre-installation conferences.
 - 2. The Contractor shall make physical arrangements for meetings, prepare agenda with copies for participants, preside at meetings, record minutes, and distribute copies within two days to Owner, participants, and those affected by decisions made at meetings.
 - 3. Attendance: Job superintendent, major Subcontractors and suppliers, Owner and those appropriate to agenda topics for each meeting.
 - 4. Suggested Agenda: Review of Work progress, status of progress schedule and adjustments thereto, delivery schedules, submittals, maintenance of quality standards, pending changes and substitutions, and other items affecting progress of Work.

1.05 SUBMITTALS

- A. Procedures
 - 1. In all submittals always refer to project number <u>DFE Project Number -230139</u>
 - 2. Refer to schedule of Contractor Deliverables provided by Owner/Designer.

- 3. Submit the number of copies which Contractor requires, plus two copies, which will be retained by OWNER.
- 4. Submittals can be delivered electronically to both the Designer and Owner. If submitting by e-mail, submit to the Designer for approval, and the Owner for review, at the e-mail address below:

Designer:	Winfield Stratton - winfields@colbycoengineering.com
Owner:	Robert W. Palmer III - <u>robert.w.palmer.nfg@mail.mil</u>
Owner:	Richard R. Darveau - <u>richard.r.darveau.civ@mail.mil</u>

5. Submittals can be delivered in paper form. Deliver copies of submittals to Designer for approval at the address below:

Colby Company, 47A York Street, Portland, Maine 04101.

And one (1) copy to the Owner for review:

Directorate of Facilities Engineering 194 Winthrop Street BLDG 7, Camp Keyes – ATTN: <u>Robert W. Palmer III, Richard R. Darveau</u> Augusta, ME 04330

- 6. Submittal Sheets:
 - a. Transmit each item under "Transmittal of Shop Drawings, Equipment Data, Material Samples, or Manufacturer's Certificates of Compliance" located at the end of this Section;
 - b. Identify Project, Contractor, Subcontractor, major supplier;
 - c. Identify drawing sheet and detail number, and Specification Section number, as appropriate;
 - d. Identify deviations from Contract Documents.
- 7. Comply with progress schedule for submittals related to Work progress. Coordinate submittal of related items.
- 8. DESIGNER shall have 14 calendar days for review of submittals.
- 9. After **DESIGNER** review of submittal, revise and resubmit as required identifying changes made since previous submittal.
- 10. Distribute copies of reviewed submittals to concerned persons. Instruct recipients to promptly report any inability to comply with provisions.
- B. Quality Assurance; Substitutions, in accordance with Section 01 00 00, para. 1.08 (E).
- C. Construction Progress Schedule

- 1. Submit an Initial Progress Schedule in duplicate. See 1.05.A.3 this section for submission information. After review by OWNER revise and resubmit as required.
- 2. The Contractor shall submit <u>two (2)</u> copies of the Final Construction Progress Schedule within 4 calendar days of OWNER review.
- 3. Submit revised schedules with each Application for Payment, reflecting changes since previous submittal.
- D. Submittal Schedule
 - 1. Submit a Submittal Schedule in duplicate within <u>twenty (20)</u> working days following receipt of the fully executed formal Contract Agreement by the Contractor. After review by <u>OWNER</u> and the <u>DESIGNER</u> revise and resubmit as required.
 - 2. Prepare the schedule in chronological order. Provide the following information:
 - a. Schedule date for the initial submittal.
 - b. Related section number.
 - c. Submittal category (Shop Drawings, Product Data, or Samples).
 - d. Name of Subcontractor.
 - e. Description of the part of Work covered.
 - f. Scheduled date for resubmittal.
 - g. Scheduled date for the Architect's final release of approval.
 - 3. Show submittal dates required for Shop Drawings, Product Data, and Samples, and product delivery dates, including those furnished by Owner and those under Allowances as applicable.
- E. Schedule Of Values
 - Submit Contract Schedule Of Values in duplicate within 10 days after date of Owner

 Contractor Agreement. The Contractor shall include in their Contract Schedule of
 Values a Closeout Documentation Line Item. The Closeout Documentation Line
 Item shall consist of 5% of the total contract amount. This Closeout Documentation
 Line Item is to ensure that all Closeout Documentation are provided to the Owner and
 Consultant in a timely manner as stated in these Contract Documents.
 - 2. Submit typed schedule on "Requisition for Payment", Form Section 00 62 76, BGS revised 5 April 2021.
 - 3 Format: Table of Contents of this Project Manual.
 - 4. Include in each line item a directly proportional amount of Contractor's overhead and profit.
 - 5. Revise schedule to list change orders, for each application for payment.
 - F. Shop Drawings
 - 1. Shop drawings will be submitted to Owner, in accordance with para. 1.05 of this Section.

- G. Product Data
 - 1. Mark each copy to identify applicable products, models, options, and other data; supplement manufacturers' standard data to provide information unique to the Work.
 - 2. Provide data certifying that each product complies with the provisions contained in the Buy American Act, see Special Conditions 00 73 00, Section 15.
 - 3. Submit the number of copies required in 1.05.A.3, this Section.
- H. Manufacturer's Instructions

1. Submit the number of copies required in 1.05.A.3, this Section, of Manufacturer's Instructions.

- I. Samples Not Used
- J. Field Samples Not Used
- K. Background Check Requirements:
 - 1. Anyone allowed into the facility by the contracted vendor's personnel is considered to be a representative of the contractor and is required to have a prior approved background check before gaining access into the facility.
 - 2. All Contractors/vendors must be in possession of a valid (not suspended, revoked, or expired) official government issued photo credential (i.e. driver's license, state issued identification card, etc.) and be screened through National Crime Information Center prior to being issued a Contractor Badge.
 - 3. <u>The Contractor shall supply a list of personnel who may be either involved in the</u> work effort or be present at the facility to the Owner. The list shall be supplied to Owner within two weeks after the award of the contract or two weeks prior to the beginning of the contract work, whichever comes first. Owner will provide Contractor with an excel spreadsheet to fill in with required employee information.
 - 4. The required employee information shall include: Company name, first name, middle initial, last name, suffix, maiden name(s), date of birth, gender, Driver License Number and State, Social Security Number, and Address with street, city and state for each person.
 - Results from the NCIC background check are controlled under the Privacy Act of 1974 and not permitted to be given to anyone not acting in a Security Force capacity. No details of the background check will be revealed other than a pass/fail or suspended/revoked.

- 6. The Department retains the right to screen and restrict from the facility, personnel employed by or who represent the contractor, who do not receive a satisfactory/passing background check.
- 7. The Department will provide to the Contractor the names of those personnel that are acceptable for access to facilities and those who are not acceptable for unescorted access.
- 8. Contractors/vendors with acceptable background checks will be issued Contractor Badges for that individual's unescorted entry. The badges will be issued for the duration of the contract, or service agreement, not to exceed two years.

1.06 QUALITY CONTROL

- A. Quality Control, General
 - 1. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Workmanship
 - 1. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
 - 2. Perform work by persons qualified to produce workmanship of specified quality.
 - 3. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.
- C. Manufacturers' Instructions
 - 1. Comply with instructions in full detail, including each step in sequence. Should instructions conflict with Contract Documents, request clarification from Owner before proceeding.
- D. Manufacturers' Certificates
 - 1. When required by individual Specifications Section, submit manufacturer's certificate, in duplicate, those products that meet or exceed specified requirements.

1.07 CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

- A. Electricity
 - 1. All temporary work shall be provided in conformity with the National Electric Code, State laws, and requirements of the power company

- 2. The Contractor shall be allowed to hook to existing electrical panel in building, for temporary power. The Contractor will not disrupt power at building. The Owner will only pay for cost of electricity.
- 3. The Contractor shall provide all temporary electrical panels.
- 4. The Contractor shall be responsible to fix any damages, caused by modifications for temporary services.
- B. Lighting
 - 1. The Contractor shall provide source of lighting.

C. Temporary Heat

- 1. The Contractor shall prove temporary heat and equipment in interior spaces:
 - a. The Contractor shall not use electrical heating units if the Owner is supplying electrical power to the Contractor.
 - b. The Contractor shall be completely responsible for providing all equipment and labor required to comply with this section.
 - c. The Contractor shall utilize the services of a qualified Heating subcontractor for providing Temporary Heat. These services shall be paid for by the Contractor.
 - d. At no time shall any part of the building served by the boiler be allowed to be without heat if called upon by the building control system.
- 2. Temporary heating system work shall be performed under the direct supervision of individuals properly licensed to perform the necessary work.
- 3. All temporary work shall be provided in conformity with all applicable codes, State laws, and requirements of the utility company.
- 4. The Contractor shall pay the costs of all fuel required for temporary heating until Substantial Completion, unless specified otherwise.
- 5. Utilizing the Permanent Heat Distribution System for Temporary Heat:
 - a. The Contractor may, with the approval of the Owner, elect to utilize the permanent heat distribution system for temporary heat.
 - b. If the permanent heat distribution system cannot be utilized or if work requires a shutdown of the existing system the Contractor shall make arrangements, acceptable to the Owner, to comply with this requirement at no additional cost to the Owner.
 - c. The Contractor shall furnish and pay the costs of any materials and equipment which are not part of the permanent heating system and which may be required to operate the permanent heat distribution system on a temporary basis.
- 6. Unit heaters, if used, shall be of the smokeless type and be installed and operated in such a way that finished work will not be damaged. "Salamanders" shall not be used.

- 7. Providing temporary heating service and equipment for exterior work:
 - a. Installation of weather protection and heating devices shall comply with all safety regulations including provisions for adequate ventilation and fire protection devices.
 - b. Unit heaters, if used, shall be of the smokeless type and be installed and operated in such a way that finished work will not be damaged. "Salamanders" shall not be used.
- D. Water

1. The Contractor shall be allowed to hook to existing water in building, for temporary water supply. The Contractor will pay for cost of water usage for dust control and compaction [large amounts of water].

- E. Sanitary Facilities
 - 1. The Contractor shall provide their Sanitary Facilities.
- F. Barriers

1. Provide as required to prevent public entry to construction areas, to provide for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations.

- G. The Contractor will provide:
 - 1a. Office Trailer: Weather tight, with lighting, electrical receptacles, heating, cooling and drawing display table. The office trailer will have separate office space for the project manager to conduct his/her daily business.
 - 1b. Office Trailer: If the Contractor does not require the use of an office trailer. The Contractor will be allowed to set up an office in one on the storage areas connect to the existing building that has direct access to the new construction area. The Contractor shall after construction shall repair any damage to the existing building at no expense to the Owner.
 - 2. Storage Sheds for Tools, Materials, and Equipment: Weather tight, with adequate space for organized storage and access, and lighting for inspection of stored materials.
 - 3. His/her own on-site telephone, if so required for the conduct of his/her business.
 - 4. Protected storage, if necessary.
 - 5. Temporary barricades to separate the Contract Site areas from the Owner's area or public area.
- H. Protection And Restoration

- 1. The Contractor shall be responsible for all damages to furnishings, equipment, supplies, existing construction, including finished surfaces, caused by Work of Contract.
- 2. The Contractor shall be fully responsible for maintaining weather-tight integrity of the roofing system and wall systems, including permanent and temporary flashings, during the entire construction period.
- 3. The Contractor's responsibilities shall include the cost to repair damage to the existing building's structure, finishes and contents associated with the Contractor's failure to maintain the watertight integrity of the roofing system and wall system, whether permanent or temporary, at no additional cost to the Owner.
- 4. The Contractor shall protect paved areas and lawns around the Building from damage associated with the construction. Costs to repair damage to paved areas and lawns will be deducted from Contractor's final payment to cover Owner's expenses to repair damage. The Owner will determine if damages to lawns are minor or major.
- I. Security

1. Provide security program and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, and theft. Coordinate with Owner's security program.

- J. Water Control Not Used
- K. Cleaning during Construction
 - 1. Throughout the construction period the Contractor shall be responsible for maintaining building and site areas affected by the Work in a standard of cleanliness.
 - a. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing protection of materials.
 - b. Completely remove all scrap, debris, waste material and other items not required for construction from the site at least once a week.
 - c. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the ecology.
 - 2. Conduct daily inspection, more often if necessary, to verify that requirements for cleanliness are being satisfied.
 - 3. Provide required personnel, equipment and materials needed to maintain the specified standard of cleanliness.

- 4. Use only those cleaning materials and equipment that are compatible with the surface being cleaned, as recommended by the manufacturer of the material.
- L. Removal
 - 1. Unless otherwise specified, materials to be removed, including all components and accessories, become property of the Contractor and shall be promptly removed from the Contract Site and legally disposed of at Contractor's expense.
 - 2. Remove temporary materials, equipment, services, and construction prior to Substantial Completion inspection.
 - 3. Clean and repair damage caused by installation or use of temporary facilities. Restore existing facilities used during construction to specified, or to original, condition.
 - 4. The Contractor shall be responsible for removing and disposing of solid wastes (including construction/demolition debris) per Section 01 35 43.

1.08 MATERIAL AND EQUIPMENT

A. Products

- 1. Products include material, equipment, and systems.
- 2. Comply with Specifications and referenced standards as minimum requirements.
- 3. Components required to be supplied in quantity within a Specification section shall be the same, and shall be interchangeable.
- 4. Do not use materials and equipment removed from existing structure, except as specifically required, or allowed, by Contract Documents.
- 5. Materials and equipment must comply with the provisions contained in the Buy American Act, see Special Conditions 00 73 00, Section 15. Provide certification document at project completion.
- 6. Purchased products must meet the Federal sustainability procurement requirements and the State sustainable procurement preferences. See Special Conditions 00 73 00, Section 17 for specific requirements.
- 7. ACBM (ASBESTOS CONTAINING BUILDING MAT'LS) NOT ALLOWED, materials containing asbestos in any manner or quantity are not allowed on this Project. If such materials are installed they shall be removed and replaced at no additional cost to the Owner.
- B. Transportation and Handling
 - 1. Transport products by methods to avoid product damage; deliver in undamaged condition in manufacturer's unopened containers or packaging, dry.
 - 2. Provide equipment and personnel to handle products by methods to prevent soiling or damage.

- 3. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.
- C. Storage and Protection
 - 1. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering; provide ventilation to avoid condensation.
 - 2. Arrange storage to provide access for inspection. Periodically inspect to assure products are undamaged, and are maintained under required conditions.
 - 3. Products Specified by Reference Standards or by Description Only: Any product meeting those standards.
 - 4. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not specifically named.
- D. Products List
 - 1. Within 15 days after date of Owner-Contractor Agreement, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- E. Substitutions
 - 1. Substitutions shall be submitted to Designer a minimum of 72 hours prior to the bid date for review. Any substitutions not submitted 72 hours prior to the bid date shall not be reviewed or considered.
 - 2. Do not assume that "or Equal" or terms of similar meaning indicate automatic approval of substitute products.
 - 3. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
 - 4. Request constitutes a representation that the Contractor:
 - a. Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product.
 - b. Will provide the same warranty for substitution as for specified product.
 - c. Waives claims for additional costs, which may subsequently become apparent.
 - 5. The OWNER will determine acceptability of proposed substitution, and will notify the Contractor of acceptance or rejection in writing within a reasonable time.

1.09 CONTRACT CLOSEOUT

A. Closeout Procedures

- Submit Closeout Documentation to the Architect/Engineer 10 days prior to the Substantial Completion Date. The Architect/Engineer shall confirm that the Contractor has fulfilled the Contract Closeout Documentation Requirements 10 days prior to the Substantial Completion Date. The Contractor shall not submit for Final Application for Payment until the Architect/Engineer has notified the Owner that Contractor has fulfilled the Contract Closeout Documentation Requirements.
- 2. When the Owner considers the Work of this contract has reached Substantial Completion, the Contractor and Owner shall sign a Certificate of Substantial Completion (Section 00 65 16). Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. This Certificate of Substantial Completion will be prepared by the Architect/Engineer as stated in Specification 00 72 13, Section 37.4. When the Certificate of Substantial Completion has been signed by the Owner and the Contractor, the completed Certificate of Substantial Completion shall set the date for Substantial Completion of the work or a designated portion of the work.
- 3. When the Contractor considers the Work of this contract has reached final completion, the Contractor shall submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for OWNER's inspection. This written notification shall be submitted to the Owner <u>7 calendar days</u> prior to the proposed inspection date. Per Specification 00 72 13, Section 36.4, the Contractor shall not call for final inspection of any portion of the Work that is not complete and permanently installed. The Contractor may be found liable for the expenses of individuals called to final inspection meetings prematurely.
- 4. Contractor must provide certificate of compliance that materials and equipment comply with the provision of the Buy American Act. See 00 73 00 Special Conditions Section 15 for additional requirements.
- 5. Contractor must provide certificate of compliance that purchased products comply with the Sustainable Procurement requirements. See 00 73 00 Special Conditions Section 17 for specific requirements.
- 6. In addition to submittals required by the conditions of the Contract, provide release of all liens, claims (Section 00 65 19) and submit final requisition.
- 7. The Contractor's failures to comply with Closeout Procedures, if the Closeout Documentation Requirements are not completed by the Substantial Completion Date. The Owner reserves the right to recover the costs to complete the Closeout Documentation Requirements from the Schedule of Values item Closeout Documentation Line Item. The Owner reserves the right to hire an Architect/Engineer to complete the required Contract Closeout Documentation.

8. Liquidated Damages: The minimum liquidated damages for this project shall be applied as described under Section 00 72 13 General Conditions, paragraph 37.5 and based on the Substantial Completion Date. The work to be performed under this contract shall be Substantially Completed on or before <u>1 June 2023</u>.

9. <u>Under this contract \$250.00 dollars per day shall be charged as liquidated</u> <u>damages for work required beyond the Substantial Completion Date.</u>

- B. Final Cleaning
 - 1. Execute prior to final inspection.
 - 2. Clean site; sweep hard surfaced areas, rake clean other surfaces.
 - 3. Remove waste and surplus materials, rubbish, and construction facilities from the Project and from the site. Owner will be responsible for cleaning after acceptance.
- C. Project Record Documents
 - 1. Store documents separate from those used for construction.
 - 2. Keep documents current; do not permanently conceal any work until Owner has inspected and required information has been recorded.
 - 3. At Contract closeout, submit documents with transmittal letter containing date, Project title, Contractor's name and address, list of documents, and signature of Contractor.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 FINAL CLEANING

- A. Execute final cleaning before final project assessment.
- B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- C. Clean equipment and fixtures to sanitary condition with cleaning materials appropriate to surface and material being cleaned.
- D. Replace filters of operating equipment.
- E. Clean debris from roofs, gutters, downspouts, and drainage systems.

- F. Clean site; sweep paved areas, rake clean landscaped surfaces.
- G. Remove waste and surplus materials, rubbish, and construction facilities from site.

3.02 STARTING OF SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems with Owner's Consultants.
- B. Notify Consultants seven days before start-up of each item.
- C. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable manufacturer's representative in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation before start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report stating the equipment or system has been properly installed and is functioning correctly.

3.03 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to Owner's personnel two weeks before date of Substantial Completion.
- B. Use operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- C. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at equipment location.
- D. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- E. Required instruction time for each item of equipment and system is specified in individual sections.

3.04 TESTING, ADJUSTING AND BALANCING

- A. The Contractor shall provide to the Owner one set of the copies of the test certification certificates that shall be provide to the State of Maine Fire Marshall's Office and or any other testing requirements that have been performed on the system.
- B. Owner will appoint and employ services of independent firm to perform testing, adjusting, and balancing. The Contractor shall pay for services.
- C. Independent firm will perform services specified in Section 01 91 13.
- D. Reports will be submitted by independent firm to Architect/Engineer indicating observations and results of tests and indicating compliance or non-compliance with requirements of Contract Documents.

3.05 PROTECTING INSTALLED CONSTRUCTION

- A. Protect installed Work and provide special protection where specified in individual specification sections.
- B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- F. Prohibit traffic from landscaped areas.

3.06 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed Shop Drawings, Product Data, and Samples.

- 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress, not less than weekly.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates used.
 - 3. Changes made by Addenda and modifications.
- F. Red-Line Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured depths of foundations in relation to finish main floor datum.
 - 2. Measured horizontal and vertical locations of underground utilities and an appurtenances, referenced to permanent surface improvements.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 4. Field changes of dimension and detail.
 - 5. Details not on original Contract drawings.
- G. Submit Closeout Documentation to the Designer 10 days prior to the Substantial Completion Date. The Designer shall confirm that the Contractor has fulfilled the Contract Closeout Documentation Requirements 10 days prior to the Substantial Completion Date.

3.07 OPERATION AND MAINTENANCE DATA

- A. Submittal Requirements:
 - Submit <u>three (3) copies</u> of data on 8-1/2 x 11-inch (A4) text pages, bound in <u>three</u> (3) separate D side ring binders with durable plastic covers.
 - 2. Contractor shall provide the O&M Manual in electronic form on CD/DVD. All sections of the electronic form of the O&M Manual shall be <u>searchable</u>, excluding drawings and warranties. Every effort should be made to have the "Technical Data"

section searchable as well, with the understanding this may not be possible in some instances. Provide <u>one</u> CD for each setup of O & M Manuals.

- 3. Prepare binder cover with printed title "OPERATION AND MAINTENANCE", title of project, location, project number, and subject matter of binder when multiple binders are required. A spine label with same information should also be provided.
- 4. Subdivide each binder's contents with permanent page dividers, logically organized, with tab titles clearly printed. Tabs should be organized and titled based on the Table of Contents.
- B. Manual Submission
 - 1. Submit **<u>one copy</u>** of preliminary draft or proposed formats and outlines of contents before start of Work. The Architect/Engineer will review the draft and return the copy with comments.
 - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.
 - 3. Submit one copy of completed volumes 15 days before final inspection. Draft copy will be reviewed and returned after final inspection, with Architect/Engineer comments. Revise content of document sets as required before final submission.
 - 4. Submit two sets of revised final volumes in final form within 10 days after Receipt from Owner.
- C. Contents
 - 1. <u>Project Summary</u>: The first page in binder should include a paragraph describing the Project followed by a Contact List. The Contact List is to include DFE Project Manager name along with company name, contact name, address, and telephone number for the Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.
 - 2. <u>Drawings:</u> Provide reduced copies of each plan printed on 11 x 17 pages and insert them after the Project Summary page. Also provide a CD/DVD in the back of each binder containing Record Drawing files in both Adobe PDF and AutoCAD Release 2018 format. AutoCAD drawings shall be delivered as stand-alone without X-references. If Drawing originally had X-references, Bind them using the Insert option and do not explode inserted block. The Architect shall also provide the AutoCAD Plot Style (CTB file) used for the drawings along with any and all images used within the drawings.
 - 3. <u>Table of Contents</u>: Provide a Table of Contents(TOC) for the binder and place behind the reduced plans. If multiple binders are necessary, include a TOC for the entire submission, then a TOC for the individual binder. TOC should be a listing of all products or systems and the 6 required components below each.

- 4. <u>Product/System Components:</u> Provide the following information for each product and/or system. Provide additional requirements as specified in individual product specification sections.
 - a. OVERVIEW and INFORMATION:
 - i. Equipment Register: equipment description, model number(s), date of installation, installer w/contact info, supplier w/contact info, manufacturer w/contact info, warranty date, warranty details, estimated life / useful life.
 - ii. Description of Complete Installation: A general description of the installation to provide a general understanding of the equipment and its operation.
 - iii. Specific System Description: A technical description of each system of the installation, written to ensure it can be clearly understood by persons not familiar with the installation.
 - iv. Performance Data: Technically description of the mode of operation of each system provided. This section provides functionality details.
 - v. When applicable, include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
 - b. OPERATIONS:
 - i. Manufacturers' technical literature as appropriate. For other than common accessories, where no manufacturer literature is available, provide a precise and concise description of the operation procedure in plain English.
 - ii. Safe start-up, break-in, routine operation, shut-down, and emergency operations for the equipment installed including a logical step-by-step sequence of instructions for each procedure. Include summer, winter and special operating instructions.
 - iii. List of all limiting conditions for equipment.
 - iv. Control Sequence and flow diagrams for the system installed.
 - v. A legend for color-coded services. A legend of the symbols used on the drawings, unless included on the drawings.
 - vi. Schedules of the parameter settings of each protective device, including fixed and adjustable circuit breakers, protective relays, adjustable photoelectric switches, pressure switches, and any other control and monitoring device, as established during commissioning and maintenance.
 - c. MAINTENANCE
 - i. Emergency procedures, including telephone numbers for emergency services, and procedures for fault-finding.
 - ii. Manufacturers' technical literature, as appropriate. Include original manufacturers' parts list, illustrations, assembly drawings, and diagrams required for maintenance.
 - iii. Detailed recommendations for the frequency of performance of routine maintenance tasks
 - iv. List of procedures and tasks associated with preventative (routine) maintenance.

- v. Procedures for safe trouble shooting, disassembly, repair and reassembly, cleaning, alignment, inspection and adjustment, including a logical step-by-step sequence of instructions for each procedure.
- vi. Include summer, winter and special maintenance instructions.
- vii. Maintenance Schedule: schedule of the frequency of the required or recommended maintenance, testing and inspection for each type of equipment. The schedule is to include weekly and monthly attendance times.
- viii. Installation and dismantling instructions: Instructions for the proper installation and dismantling of the equipment.
- ix. Spares and Consumables:
 - 1. Schedule of spares (including bearings) with an expected operating life less than 40,000 hours. Include expected replacement frequency, item label manufacturer name, address, and telephone number, catalogue number name and address of local distributor.
 - 2. Schedule of Consumable Items (oil, grease, belts, bearings) to be used during servicing.
 - 3. Furnish spare parts, consumable items, and extra products in quantities specified in individual specification sections and/or as recommended by manufacturer or requested by Owner. Deliver to project site and place in location as directed by Owner; *obtain receipt before final payment*.
- d. TECHNICAL DATA
 - i. Manufacturers' technical literature assembled specifically for the project and **excluding irrelevant matter.**
 - ii. Each product data sheet marked to clearly identify the specific products and components used in the installation and the data applicable. Additional instructions and illustrations, as required, to identify and changes to the manufacturers' data or to illustrate the function of each component in the installation.
 - iii. Provide performance curves and engineering data
 - iv. Include control diagrams by controls manufacturer as installed.
 - v. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
 - vi. Shop drawings when provided

e. WARRANTIES

- *i*. Provide originals of Manufacturers' warranties and bonds executed in duplicate by responsible subcontractors, suppliers, and manufacturers, <u>within</u> <u>ten days after completion of applicable item of work</u>
- ii. All Guarantees
- iii. Certificates of compliance for all electrical and plumbing works, where applicable.
- iv. If installation is not by the manufacturer, and product warranty is conditional on the manufacturer's approval of the installer, submit the manufacturer's approval of the installing firm.
- f. COMMISSIONING REPORTS
 - i. Air and water balance reports
 - ii. Include test and balancing reports as specified in Section 01 91 13.

- iii. Records of test results
- iv. Records of Commissioning Data

3.08 PRODUCT WARRANTIES AND PRODUCT BONDS

- A. Execute and assemble transferable warranty documents and bonds from subcontractors, suppliers, and manufacturers.
- B. Verify documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Submit before final Application for Payment.
- E. Time of Submittals:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
 - 2. Make other submittals within ten days after Date of Substantial Completion, before final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

END OF SECTION 01 00 00

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIA SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANC (Read instructions on page two prior to initiating this form.)				AL CE	DATE: TRA			≀ANSMITTAL NO		
то	SECTION I – REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS (This section will be initiated by the contractor.)							F•		
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REMARKS					I certify that the above submitted items have been reviewed in detail and are correct and in strict compliance with the contract drawings and specifications except as otherwise stated.				letail and and	
				SIGNATURE OF THE CONTRACTOR						
N				NAME:						
SECTION II – APPROVAL ACTION										
ENCLOSURES RETURNED (List by Item No.)		NAME, TITLE OF APPROVING AUTH		THORITY DA		DAT	ATE			

DFE SUBMITTAL FORM, AUG 2010

SHEET 1 of 1

INSTRUCTIONS

- 1. Section I will be initiated by the Contractor in the required number of copies.
- 2. Each transmittal shall be numbered consecutively in the space provided for "Transmittal No.". This number, in addition to the DFE Project Number, will form a serial number for identifying each submittal. For example: 23SR10-470-D-T1
- 3. For new submittals or resubmittals mark the appropriate box; on resubmittals, insert transmittal number of last submission as well as the new submittal number.
- 4. Submittals requiring expeditious handling will be submitted on a separate form.
- 5. A separate transmittal form will be used for submittals under separate sections of the specifications.
- 6. A check shall be placed in the "Variation" column (Section I, Column h) when a submittal is not in accordance with the plans and specifications. Also, a written statement to that effect shall be included in the space provided for "Remarks".
- 7. The form is a self-transmittal, i.e. letter of transmittal is not required.
- 8. When a sample of material or Manufacturer's Certificate of Compliance is transmitted, indicate "Sample" or "Certificate" in Section I, Column c.
- 9. Directorate of Facilities Engineering approving authority will assign action codes as indicated below in space provided in Section I, Column i to each item submitted. In addition, they will ensure enclosures are indicated and attached to the form prior to return to the Contractor. The Contractor will assign action codes as indicated below in Section I, Column g to each item submitted.

THE FOLLOWING ACTION CODES ARE GIVEN TO ITEMS SUBMITTED

- A Approved as submitted
- B Approved, except as noted on drawings
- C Approved, except as noted on drawings.
 - Refer to attached sheet resubmission required.
- D Will be returned by separate correspondence.

- E Disapproved (See Attached)
- F Receipt acknowledged.
- FX Receipt acknowledged, does not comply as noted with contract requirements.
- G Other (Specify)

10. Approval of items does not relieve the Contractor from complying with all the requirements of the contract plans and specifications




07 February 2020 (Revised) 09 January 2019 (Revised) 14 December 2018

Brian Beaulieu, P.E., S.E. Colby Company, LLC 47A York Street Portland, ME 04101

Subject: Revised Report of Geotechnical Evaluation Addition to FMS #2 Administration Building - Maine Army National Guard Auburn, Maine RWG&A Project No. 1564-006

Dear Mr. Beaulieu:

As requested, R.W. Gillespie & Associates, Inc. (RWG&A) is providing the revised Report of Geotechnical Evaluation for the above subject project. Three signed copies of the report are enclosed. The report has been revised to consider the building's seismic design category relative to liquefaction potential and ground improvement. The enclosed report supersedes all prior versions in their entirety. All printed copies of the prior versions should be destroyed or returned to RWGA&, and all digital copies should be removed from digital storage media.

We have enjoyed working with Colby Company, LLC on this project, and trust this report meets the project's needs. If you have any questions or if we may be of further service, please contact us.

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

Daniel E. Burgess Geotechnical Engineer

Wiberg, P.E. Erik 🛿 Principal Geotechnical Engineer

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Report of GEOTECHNICAL EVALUATION

for ADDITION TO FMS #2 ADMINISTRATIVE BUILDING MAINE ARMY NATIONAL GUARD AUBURN, MAINE

Prepared for COLBY COMPANY, LLC PORTLAND, MAINE

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



07 February 2020 (Revised) 09 January 2019 (Revised) 14 December 2018

RWG&A Project No. 1564-006

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1.0 INTRODUCTION

1.01 Background

The existing FMS #2 Administration Building is located in the central portion of the Maine Army National Guard facility off of Mount Apatite Road in Auburn, Maine. The project location is shown on the attached Figure 1, *Locus Map*. Topography at the site is relatively flat, with site grades in the area of the proposed addition being within about one foot above the current building floor elevation. Existing conditions exposed at ground surface at the proposed addition site include a gravel-surfaced parking field where Maine Army National Guard equipment and vehicles are stored. RWG&A's understanding of existing site conditions is based on communications with Colby Company and site visits.

RWG&A conducted subsurface explorations in 2009 at the site and provided geotechnical engineering recommendations for design and construction of an addition to the administration building. The results of the evaluation were provided in RWG&A's report titled *Addition to UTES #1 Administration Building - Maine Army National Guard, Auburn, Maine, RWG&A Project No. 767-58*, dated 11 September 2009 (2009 Report). Subsurface information from the 2009 Report is included herein. This report supersedes the 2009 Report in its entirety.

1.02 Proposed Construction

The proposed addition will be at the west side of the existing FMS #2 Administrative Building in an area that is used as a gravel-surfaced parking field. The addition will be approximately 75 feet by 90 feet in plan and used for vehicle maintenance. It is understood the building will be a steel-framed structure with no below-grade spaces. Drawing X-000, titled *Topographic Survey Existing Conditions*, produced by Dirigo Surveying, indicates the existing building has a finish floor elevation of 255.70 feet, the finished floor elevation of the proposed addition is 255.70 feet. Existing grades where the proposed addition is located range from about elevation 255 to 257 feet.

Structural loads and tolerable settlement amounts were unavailable when this report was prepared. Evaluations were based on maximum column loads in the range of 50 to 75 kips for interior and exterior column locations. RWG&A's evaluations were based on a maximum total settlement of 1-inch, tolerable angular distortion of 1/500, and 3/4-inch tolerable differential settlement between existing and proposed building construction. The designers should verify structural loads used and estimated settlements are appropriate for the proposed construction.

1.03 Scope

This evaluation was performed to develop site-specific soil and laboratory data and to make geotechnical evaluations for the proposed construction. The service was performed in general accordance with RWG&A's proposal to Colby Company, LLC (Colby Company) dated 31 July 2018 (RWG&A Proposal No. P-9935GI). Refer to Appendix A for other limitations and use of this report. As performed, our scope of work included the following items:

- 1. Reviewed nearby project information, published geologic maps and previous explorations and evaluations conducted by RWG&A at this location. Prepared an exploration program with Colby Company, and marked the proposed exploration locations in the field for DigSafe and utility clearance.
- 2. Arranged for a geophysical consulting firm to conduct shear wave velocity testing in support of the geotechnical evaluation to determine seismic site class of in-situ soils.
- 3. Arranged to have soil borings performed by a local drilling contractor. 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.
- 4. Performed laboratory testing of samples from the borings for use in engineering evaluations, consideration of reuse of on-site soils, and to assist in the description of the soil samples.
- 5. Conducted engineering evaluations of the geotechnical aspects of foundation and slab design, and evaluated construction and material utilization issues. The engineering evaluations included liquefaction susceptibility, liquefaction-induced settlement, building foundations, anticipated settlement under non-seismic dead and live loads, allowable foundation loads, and seismic site classification.
- 6. Prepared this report presenting the findings, conclusions, and recommendations of the geotechnical evaluation.

2.0 SUBSURFACE EVALUATION

2.01 General

RWG&A arranged for, monitored, and logged soil explorations at the site in 2009 and 2018. Logs of the explorations prepared by RWG&A are included in Appendix B, 2009 and 2018 Soil Boring Logs. Soil samples were described in general accordance with ASTM D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Stratification lines shown on the exploration logs represent the approximate boundaries between the different soil types encountered and approximate refusal depths; the actual transitions will be more gradual and will vary over short distances. Subsurface conditions described on the logs and in this report should only be considered representative of conditions encountered within the vertical reach of the explorations when they were completed.

RWG&A personnel conducted explorations in the field by tape and pace survey methods using site features exposed at ground surface and shown on plans provided. The exploration locations are shown on Figure 2, *Exploration Location Plan*. The exploration locations are approximate and should be considered accurate only to the degree implied by the method used to locate them. 2.02 2009 Soil Explorations

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RWG&A's previous subsurface exploration program was conducted in 2009 for an addition contemplated at that time. The program consisted of five test borings designated B-1 through B-5 advanced to depths of 22 feet below local ground surface and a sixth test boring designated B-6 that was advanced to refusal at a depth of 66.5 feet. Borings B-1 through B-5 were drilled on 24 July 2009, and boring B-6 was drilled on 18 August 2009 by Northern Test Borings, Inc., of Gorham, Maine, using a track-mounted drill rig. Split-barrel sampling with standard penetration testing (*ASTM D1586, Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils*) was performed at about 5-foot intervals in the borings. Borings B-1 through B-5 were advanced with hollow stem augers; boring B-6 was advanced with wash rotary techniques and steel casing.

2.02 Subject Geotechnical Evaluation

2.02.01 Soil Borings

Subsurface explorations for this project were conducted on 20 November 2018. The program consisted of five test borings, designated B-101 through B-105. Test boring B-101 was advanced to a refusal surface at a depth of 72.8 feet and test borings B-102 through B-105 were advanced to a depth of 6 feet below local ground surface. The borings were drilled by New England Boring Contractors Inc. of Hermon, Maine, using a truck-mounted drill rig. Split-barrel sampling with standard penetration testing (*ASTM D1586, Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils*) was performed at 2-foot intervals in the upper 12 feet and at 5-foot intervals thereafter in boring B-101 and continuously at 2-foot intervals for locations B-102 through B-105. Boring B-101 was advanced with wash rotary techniques and steel casing. Borings B-102 through B-105 were advanced in open boreholes formed by the split-barrel sampler.

2.02.02 Shear Wave Velocity Testing

Shear wave velocity testing was performed by Hager-Richter Geoscience, Inc. (Hager-Richter) of Salem, New Hampshire as a subconsultant to RWG&A. The purpose of the testing was to evaluate the shear wave velocity of materials in the upper 100 feet and assess Site Class for seismic design in accordance with International Building Code®. Shear wave velocity testing consisted of three 235-foot test alignments in the general vicinity of the proposed building addition and was performed on 5 November 2018. Interpretation of the shear wave velocity test results has been incorporated hereinafter. The report prepared by Hager-Richter titled *Shear Wave Velocity Testing, Army National Guard Facility, Auburn, Maine,* dated November 2018 is provided in Appendix C.

3.0 LABORATORY TESTING

RWG&A performed laboratory testing as part of its 2009 services and subject project to assist in description and estimation of engineering properties of the soils. The laboratory testing program using soil samples from explorations shown on Figure 2. Laboratory testing was performed on selected soil samples taken in the test borings. The laboratory testing program consisted of

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particle size distribution tests and moisture content determinations. Particle-size distribution test results are presented in Appendix D, *Laboratory Test Results*. Moisture content test results are shown on the exploration logs. The tests were performed in general accordance with the following methods and procedures:

- ASTM 422, Standard Test Method for Particle Size Analysis Soils.
- ASTM D2216, Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

All tests were conducted at the RWG&A materials testing laboratory in Biddeford, Maine, which is accredited by the American Association of State Highway and Transportation Officials (AASHTO) for the tests performed.

4.0 SUBSURFACE CONDITIONS

4.01 Subsurface Soils

Four different soil units were encountered in the explorations: fill, fine sand, fine sand interlayered with silty sand, and silt. In general, the conditions encountered in the upper 25 feet of the borings consisted of about 0.5 to 1 feet of fill underlain by naturally deposited fine sand with trace amounts of medium sand and silt. Fill generally consisted of coarse to fine sand with varying amounts of fine gravel and silt. At boring B-101, the fine sand deposit extended to about 25 feet depth; below 25 feet, soils consisted of fine sand interlayered with occasional 1 to 2-inch thick layers of silt down to a depth of about 55 feet. Very soft silty clay to clayey silt extended from about 55 feet to about 73 feet where an increase in roller cone resistance, interpreted to be on a boulder or on bedrock was encountered. Drilling at B-101 was terminated at a depth of 75 feet. Rock coring would be needed to verify the nature of the refusal surface. Refer to the exploration logs in Appendix B for information about soil conditions at specific locations.

4.02 Groundwater

Free water was observed only at boring B-101 and was observed to be about 8 feet below local ground surface. Free water was observed at depths of about 5.5 to 7.5 feet in the 2009 explorations. Water levels observed during the subsurface exploration program were influenced by the exploration methods and subsurface materials (e.g., slow groundwater response due to low soil permeability and addition of water during drilling) and might not be representative of stabilized groundwater levels. Groundwater levels at the site will fluctuate due to season, temperature, rainfall, nearby underground utilities, and construction activity in the area; therefore, water levels during and following construction will vary from those measured in the explorations.

5.0 ENGINEERING EVALUATIONS

5.01 General

Engineering evaluations for this project are based on the subsurface explorations, shear wave velocity testing, laboratory testing data, and the conceptual design information currently available to RWG&A. It is recommended foundation design and construction be in compliance with the requirements of all applicable ordinances, regulations, and codes.

5.02 Liquefaction and Foundation Considerations

The naturally deposited fine sands which occur below groundwater at the site are loose to medium dense. Geophysical shear wave velocity testing indicates the average shear wave velocity in the upper 100 feet per *International Building Code* (IBC) 2015 ranged from about 903 to 917 feet, which corresponds to a seismic site class D.

The need for building code-mandated seismic hazard evaluations depends in part on the building's seismic design category as determined by the engineer-of-record (EOR). Seismic hazard evaluations are required for buildings with seismic design categories C, D, E, and F. Seismic hazard evaluations would include an assessment of liquefaction potential and associated settlements, and determination of mitigation measures as appropriate. It's understood that the EOR has determined that the building's seismic design category is B. In accordance with building code seismic hazard evaluations are unnecessary.

In the interest of the project, liquefaction susceptibility was evaluated based on Unified Facilities Criteria for seismic design in order to assist the EOR with evaluating building performance under seismic conditions. Mitigation would be undertaken at the discretion of the EOR in consultation with the facility owner.

In accordance with building code, maximum considered earthquake ground motion used in liquefaction assessments is characterized by a site modified peak ground acceleration, PGA_m , of 0.263g. Maine Geologic Survey literature indicates an earthquake in Maine with a Richter magnitude of 7.0 would have a return period of about 2,500 years. Based on evaluations, the onsite naturally deposited fine sands are susceptible to liquefaction and that about 1 to 2 feet of settlement might occur with the site modified peak ground acceleration. This settlement amount would cause tilting and related structural damage; localized soil heaving and permanent ground deformations would also occur during liquefaction. Preliminary evaluations of other peak ground accelerations associated indicate earthquakes having a return period of more than about 600 to 700 years could cause liquefaction.

Hazards associated with liquefaction potential could be mitigated by improving the strength, density, and drainage characteristics of *in-situ* soils. RWG&A contacted GEOPIER[®] about ground improvement techniques that would increase the factor of safety against liquefaction to greater than 1, and allow the building to be supported on spread footings with slab-on-grade ground floors. Compacted stone columns are considered technically feasible for this project and would extend to depths of about 50 feet below ground surface. Other ground improvement

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techniques include but are not limited to vibroflotation, compaction grouting, and compaction piles. Ground improvement techniques would involve a specialty contractor with potentially proprietary construction equipment and methods. The proximity of existing structures to the proposed construction and the effects that ground improvement methods are design and construction considerations.

If liquefaction mitigation is determined unnecessary, then with the naturally deposited soils are suitable to support the building on continuous and spread footing foundations and slab-on-grade ground floors. Post-construction total and differential settlements of less than 1-inch are expected under non-seismic, design dead and live loads. Ground floors may be slab-on-grade construction. Existing fill encountered in the addition footprint should be undercut and replaced with compacted structural fill.

5.03 Foundation Drainage Considerations

Groundwater was observed at depths of about 8 feet below current local ground surface. It is anticipated that seasonal high groundwater levels will occur above bottom of footing elevation, and that groundwater will tend to collect around building foundations. It is recommended perimeter footing drains be provided around the proposed addition to reduce accumulation of water and fugitive moisture.

5.04 Construction Considerations

<u>Construction Dewatering</u>: The fine sandy soils are sensitive to disturbance when wet. To reduce disturbance of exposed subgrade soils, it will be important to divert runoff, provide positive grading to shed seepage and runoff from flat areas, and compact exposed soils to reduce rutting, ponding, and surface water infiltration.

Groundwater levels observed in the explorations were near or below anticipated depths of excavations. RWG&A anticipates that groundwater control can be accomplished through the use of open pumping methods for excavations extending not more than about 1-foot below groundwater levels at the time of construction. Excavations extending more than about 1-foot below groundwater will be susceptible to sloughing and other instability. Dewatering with side trenches, wells, and/or well points could be used to pre-drain sand deposits.

<u>Use of On-Site Soils</u>: It is anticipated the surficial fill layer will be stripped and be either incorporated into proposed landscaped areas, where practical, or removed from the area of new construction. Topsoil and organic materials are not considered suitable for use as fill.

The subsurface soils from foundation and site work excavations will generally consist of sandy soils that are not suitable for use as structural fill but are suitable for use as common fill in landscaped areas. If on-site soil is proposed for use other than common fill, the soil should be stockpiled separately and tested to determine if it meets specification requirements for its intended use.

6.0 RECOMMENDATIONS

The recommendations presented below are provided for use in the design of the building addition foundation and site work features for the project. Foundation design and construction will be greatly influenced by subsurface conditions at the site. The recommendations are provided on the assumption the owner and designers have addressed hazards associated with liquefaction potential at the site prior to final design and construction. It is recommended that foundation design and construction be in compliance with the requirements of all applicable ordinances, regulations, and rules. It is understood that the applicable building code for the project is the Unified Facilities Criteria, which adopts the 2018 *International Building Code⁷* by reference.

6.01 Site Preparation

1. All topsoil, loose soils, existing on-site fill materials, and other unsuitable materials should be removed from areas of new construction. Topsoil and existing fill soils may be stockpiled outside the construction area for reuse in landscape areas. Unsuitable materials include uncontrolled, existing onsite fills (i.e., fills placed without systematic densification and moisture control to acceptable percent compaction) and deleterious substances.

Due to the developed nature of the site, the contractor should expect to encounter obstructions such as underground utilities during site work activities. Where such items are encountered and it is feasible to remove/relocate them from the addition footprint, they will need to be excavated to their full extent, removed, and replaced with compacted structural fill.

- 2. Site grading should provide positive drainage away from constructed facilities both during and after construction. Depending on the depths of excavations and season, dewatering may be required, as seasonal high groundwater levels may be near footings level. Sand below groundwater may be susceptible to sloughing into excavations. Groundwater levels should be maintained a minimum of 1 foot below exposed subgrade during foundation construction and until perimeter foundation drains are installed and functioning. Excavations deeper than about 1/2-foot below groundwater will likely require pre-drainage with wells. Surface runoff and infiltration of groundwater should be controlled so that excavation, filling, and foundation construction can be completed in-the-dry.
- 3. Ground improvement methods, dump trucks, large compaction equipment, and construction traffic might cause perceivable shaking inside and near the existing building. The shaking might be disturbing to those within the building or to vibration-sensitive equipment; wall hangings may be jarred loose and/or could fall. Methods of reducing these vibrations include using smaller compaction equipment and compacting with low vibratory energy or statically, if necessary. Compacting with low vibratory energy or statically require the use of thinner lifts and more passes/coverages with the equipment to achieve the specified compaction.

6.02 Ground Improvement for Liquefaction Mitigation

Note: The following ground improvement recommendations are intended for use in design and construction only if the EOR determines the ground improvement is needed.

- 4. RWG&A recommends ground improvement be used to reduce the hazard of large ground movements and damaging effects on the structure. The recommendations provided in this section are based on the need for liquefaction mitigation, as determined by the designer and/ or the building official, using rammed aggregate piers.
- 5. Ground improvement should extend a minimum distance of 10 feet outside of the proposed building footprint on all sides. Regardless of the method selected, the contract documents should include verification of the ground improvement using either standard penetration testing or cone penetration testing as part of the contractor's scope of work.
- 6. The ground improvement specialty contractor should submit a Ground Improvement Aggregate Pier Design Report (Design Report) describing the size, locations, anticipated ground improvement depths, and a liquefaction hazard assessment in accordance with building code base on the lengths and capacities of the aggregate piers. The Design Report should be prepared by a qualified, State of Maine-licensed Professional Engineer who has who has a minimum of 5-years training and experience in the design and construction of rammed aggregate piers, and experience in the design and construction of aggregate piers in similar soil deposits (e.g., loose fine sand over sensitive marine silt and clay deposits). A resume documenting the Licensed Professional Engineer's education, training, and experience should be provided.
- 7. The design/build specialty contractor should be provided the opportunity to conduct additional test borings and/or other subsurface explorations so they can verify their proposed installation methods are adequate.
- 8. At the minimum, the Design Report should consider the bearing capacity and settlement of all footings and ground floor slabs, and be in accordance with acceptable engineering practice. Soil improvement with rammed aggregate piers should achieve a minimum allowable footing contact pressure of 3,000 pounds per square foot.
- 9. The Design Report should include descriptions of measures that might be implemented such as installation sequence, reduced lift thickness of aggregate piers, displacement installation method (e.g., predrilled, cased boreholes), etc., heaving and/or lateral displacement of previously installed inclusions, quake and shaking.

The Design Report should also include descriptions of how displaced soils below aggregate piers/rigid inclusions would be detected and corrected, and how the load capacity and hazard mitigation using installed aggregate piers would be verified.

6.03 Site Filling

- 10. Only compacted structural fill is recommended for use as fill beneath foundations, slabson-grade, and as backfill around foundation walls.
- 11. Structural fill should be a well-graded sand and gravel mixture free of roots, topsoil, loam, organic and any other deleterious materials, and meet the following gradation requirements:

Screen or Sieve Size	Percent Passing
6 inches	100
3 inches	70 - 100
No. 4	35-70
No. 40	5-35
No. 200	0-5

Maximum particle size should be limited to 3 inches within 2 feet of foundation walls, footings, and floor slabs.)

6.04 Foundations

- 12. The building may be supported on spread and/or continuous footings bearing on naturally deposited sand or compacted structural fill. The footings should be proportioned for an allowable contact pressure of 2,000 pounds per square foot base. If ground improvement is used, the allowable contract pressure provided in the Ground Improvement Aggregate Pier Design Report should be used.
- 13. Consistent with good construction practices, footing subgrades should be re-compacted after excavation to subgrade level. It is recommended final excavation to subgrade level be made with excavation equipment fitted with smooth-edged buckets. Any loose or disturbed subgrade soils should be removed and replaced with compacted fill before footing forms and reinforcing are set, and concrete is placed.
- 14. Earth pressure against backfilled foundation walls may be calculated using an equivalent fluid unit weight of 130 pounds per cubic foot, which is based on a passive pressure coefficient of 3, a backfill unit weight of 130 pounds per cubic foot, and a safety factor of 3 (note: 1/3 reduction to account for strain-compatibility for mobilization of friction and passive earth pressure). It is recommended that spread footings be backfilled with compacted structural fill extending a minimum of 4 feet laterally beyond the units.
- 15. The building foundations should be designed to withstand lateral, uplift, and overturning forces due to wind and earthquake. In accordance with the 2015 International Building

Code, the site is classified as Site Class D. The site class was determined by geophysical measurement of shear wave velocity.

- 16. Lateral loads from wind and earthquake may be resisted by friction between the footing bottoms and supporting soil, and earth pressure against the sides of footings. Based on the footings backfilled with structural fill and bearing on naturally deposited sand, a lateral bearing pressure of 200 pounds per square foot per foot below finish grades and a friction coefficient of 0.35 are recommended.
- 17. Bottoms of exterior and perimeter footings should be founded at least 4 feet below adjacent finished ground surface for frost protection. At heated interior locations, footings may be designed to bear a minimum of 18 inches below the top of ground floor slabs. If exposure to freezing is anticipated, either during or following construction, then interior footings should be lowered in accordance with the recommendations for exterior footings.
- 18. Spread footing and ground floor slab subgrade should not be allowed to freeze. The urban fill is considered highly to moderately frost-susceptible. Freezing of any fill or soils beneath spread footings and ground floor slabs may result in frost heaving or lateral wedging. Earthwork, ground improvement and foundation construction should be planned to prevent freezing of subgrade soils.

6.05 Floor Slabs and Foundation Drainage

- 19. The ground floor slabs may be slab-on-grade construction bearing on a minimum 12-inch thickness of compacted structural fill. Fill used to raise site grade beneath the slab should consist of compacted structural fill. A subgrade modulus of 150 pounds per cubic inch should be used for design of all slabs-on-grade. It is anticipated that design and construction details of the floor slab, including concrete thickness, reinforcing, bedding, and control joint depth and spacing, will be provided by the project Structural Engineer.
- 20. Exterior slabs at entrances and other locations where frost heaving would be problematic should be underlain by a minimum of 4 feet of underdrain stone. Underdrain stone should consist of *State of Maine Department of Transportation Standard Specifications Revision of December 2002*, 703.22 Underdrain Backfill Material Type C. The underdrain stone should be completely wrapped in filter fabric and the surrounding area pitched to drain away in order to reduce available moisture for ice and frost lense generation.
- 21. Perimeter foundation drains should be installed along the exterior walls of the addition. Foundation drains should consist of 4-inch diameter perforated pipe surrounded by a 12-inch, minimum, thickness of 3/4-inch crushed stone, all wrapped in a separation geotextile such as Mirafi 140N. The invert of the pipes should be installed at the bottom of exterior footing level or at least 18 inches below the adjacent finished floor level, whichever is lower. The pipes should be pitched to drain by gravity to a surface drainage feature or storm drain that will be free-flowing at all times and under all conditions. A

minimum of two outlets is recommended so that the system is not dependent upon a single flow path. Roof drains should not be connected to the perimeter footing drains.

6.06 Geotechnical Observation During Construction

The geotechnical recommendations provided as the basis for design of this project were developed using limited numbers of observations and tests. The Army National Guard and Contractor should be sensitive to the potential need for adjustment in the field. We recommend that the Army National Guard retain RWG&A to observe geotechnical construction aspects of the project. These services should include observing general compliance with the design concepts, specifications and recommendations, and assisting in development of design changes should subsurface conditions differ from those anticipated prior to the start of construction. Observation improves the likelihood that the design intent will be carried out during construction and it allows RWG&A to confirm its design recommendations.

In addition to geotechnical observation, RWG&A can also provide full-service construction inspection and materials testing. This would include soils, Portland cement, 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 proposed Addition to FMS #2 Administration Building at the Maine Army National Guard facility in Auburn, Maine, and for the exclusive use of Colby Company, LLC. 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 that any changes are made in the nature, design, or location of the proposed construction, the conclusions and recommendations of this report should be reviewed by RWG&A.

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 in order to determine that earthwork and foundation recommendations have been interpreted in the manner in which they were intended.





SOURCE: USGS 7.5-MINUTE TOPOGRAPHIC QUADRANGLE OF MONIT, ME, DATED 2018. DECEMBER 2018

PROJECT NO. 1564-006





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LEGEND:

- ⊕^{B-1} APPROXIMATE LOCATION OF SOIL BORING DRILLED JULY & AUGUST 2009.
 - B-101 APPROXIMATE LOCATION OF SOIL BORING DRILLED NOVEMBER 2018.

SOURCE:

- 1. DRAWING NO. X-000, TITLED "TOPOGRAPHIC SURVEY EXISTING CONDITIONS", PREPARED BY DIRIGO SURVEYING, DATED 11-10-2018.
- 2. DRAWING NO. A-101, TITLED "FLOOR PLAN", PROVIDED BY COLBY COMPANY, LLC.



FIGURE 2 EXPLORATION LOCATION PLAN GEOTECHNICAL EVALUATION ADDITION TO UTES #1 ADMINISTRATION BUILDING MAINE ARMY NATIONAL GUARD AUBURN, MAINE



APPENDIX A

LIMITATIONS AND USE OF REPORT

Geotechnical Evaluation Addition to FMS #2 Administration Building - Maine Army National Guard Auburn, Maine

LIMITATIONS

This evaluation has been limited to consideration of the geotechnical aspects of the proposed Addition to FMS #2 Administration Building in Auburn, Maine. The purpose of the evaluation was to obtain information regarding subsurface conditions on which to base recommendations about the geotechnical aspects of design and construction of foundations, ground floor slabs, and seismic considerations. 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 evaluation might also aid Contractors 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 Contractors. The project Contractors must evaluate construction issues encountered in the work on the basis of their experience with similar projects taking in to 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 Colby Company, LLC. Under no circumstances should this information be interpreted to mean that RWG&A and/or the Colby Company, LLC. 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).

APPENDIX B

EXPLORATION LOGS

Geotechnical Evaluation Addition to FMS #2 Administration Building - Maine Army National Guard Auburn, 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

Descriptive Terms	Range of Proportions
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.

DENSITY OR CONSISTENCY OF SOILS COHESIVE SOILS

Consistency of Cohesive Soils	Standard Penetration Test (Blows Per Foot) (N)	Undrained Shear Strength (TSF)
Very Soft Soft Medium Stiff Very Stiff Hard	0 - 2 2 - 4 4 - 8 8 - 15 15 - 30 Over 30	Below 0.13 (250 psf) 0.13 to 0.25 (to 500 psf) 0.25 to 0.5 (to 1,000 psf) 0.5 to 1.0 (to 2,000 psf) 1.0 to 2.0 (to 4,000 psf) 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.

COHESIONLESS SOILS

Density of Cohesionless Soils	Standard Penetration Test (Blows per Foot) (in)
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	over 50

PENETRATION RESISTANCE

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).

COBBLES AND BOULDERS

The percentage of cobbles and boulders is estimated visually where possible.

Descriptive Term	Estimated Percentage
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).

FILLS

The following terminology is used to denote size range of man-made materials within fill deposits:

Size Range	Soil Terms
<no. 200="" sieve<="" td=""><td>Silt - size</td></no.>	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

SUPPLEMENTAL SOIL DESCRIPTION TERMINOLOGY

Term	Example	
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 composit	tion
Varved	Alternating thin seams of silt and clay	
Mottled	Variations in color	

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\\saco\data\MASTERS\FIELD\2008-12-17 Soil Description and Classification.doc

clier Clier	Dect Na S&A ation nt: 0 S&A ng Lo ng A erve	R.W. & As Project : Auburn Dak Poin Represe cation: bandonn d Water	Gillespie sociatesGeotechnical Engineering Environmental Consulting • Materials Testing ServicesTotal Depth Sheet 1 of Drilling Contract Drilling Contract Driller Rep.: M Date Started: 0 Date Complete Surface Elevati Drilling Method: Depth: 5.5'	(ft): 22 tor: Nort ich D-50 ike Nade 7/24/09 d: 07/24/0 on: () 2 1/4-inch V/A	hern Tracl au)9 HSA	Test \	Boring	g, Inc.	-
]	SYMBOL	SAMPLE NUMBER	DESCRIPTION OF MATERIAL		SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
		S-1	 SAND (FILL); Medium dense, moist, fine to medium sand, trace g coarse sand, light brown. SAND (SP-SM); Loose, moist to wet, fine sand, few to trace silt, t medium sand, light yellow brown. 	gravel and race	16	6 7 5 5	12		
¥	TACLI MALCI	S-2			14	3 3 4 <u>4</u>	7		
		S-3			19	1 2 2 2	4		
	linit Mili Mili Mili Mili Mili Mili Mili Mi	S-4			14	1 3 3 <u>3</u>	6		
		S-5	Bottom of exploration at 22 ft: not refuse!		20	4 4 <u>4</u>	8		And the second secon
			Bonom of exploration at 22 ft; not refusal.		· · · · · · · · · · · · · · · · · · ·	-			

		D 18/	O UL	Geotechnical Enginee	ring	Boring Loa	: B-2						
	Ch.	R.W.	Gillespie	Environmental Consu	lting	Total Depti	n (ft): 22						
	IJ	& AS	sociates	 Materials Testing Service 	ices	Sheet 1 (of 1					1	
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• DEPTH, FT.	SYMBOL SAMPLES	SAMPLE NUMBER		DESCRIPTION	OF MATEF	RIAL		SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS	
		S-1	SAND (FILL) coarse sand, li SAND (SP-SM medium sand,	; Medium dense, moist, ght brown. //); Loose, moist to wet, light yellow brown.	, fine to med , fine sand, f	ium sand, trac	e gravel and	14	4 5 <u>6</u>	9			
- 5 -		S-2						13	4 5 4 5	9			
- 10 -		S-3						10	1 1 2 <u>3</u>	3			
- 15 -		S-4						20	1 2 2 2	4			
- 20 -		S-5	Bottom of exp	loration at 22 ft not ref	incal			10	2 3 2 2	5			
- 25 - 			Bonom of exp	ioration at 22 11, not fen	usaı.				· · ·				
INDLES	•								<u></u>				

	Proje RWC Loca Clier RWC Borin Borin Obse	ct Nar S&A F Ition: It: Oa S&A F g Loca Ing Ab	me: Bu Project Auburr ak Poir Repres ation: andon Water	Sheet 1 of 1 ilding Addition - Maine Army National Guard Drilling Contractor: No No. 767-58 Driller Rep.: Mike Nad n, Maine Driller Rep.: Mike Nad at Associates Date Started: 07/24/09 entative: C. Morrell Date Completed: 07/24 See Exploration Location Plan Surface Elevation: () ment Method: Backfilled with cuttings Drilling Method: 2 1/4-inc	rthern) Trac eau /09 h HSA	Test k	Boring	g, Inc	•	
	DEPTH, FT.	SYMBOL SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LABIÉSTS	
	0		S-1	SAND (FILL); Medium dense, moist, fine to medium sand, trace gravel an coarse sand, light brown. SAND (SP-SM); Loose, moist to wet, fine sand, few to trace silt, trace medium sand, light yellow brown.	d 17	3 4 5 <u>5</u>	9			
	- 5 -		S-2		15	4 4 5 5	9			
	- 10 -		S-3		22	4 4 5 <u>5</u>	9			
	- 15 -	Net Met Met Met Met Met Met Met Met Met M	S-4		17	3 2 3 <u>3</u>	5			
	- 20 -		S-5	Occasional iron oxide staining (21' to 22') Bottom of exploration at 22 ft; not refusal.	18	1 2 3 <u>2</u>	5			
and the second secon	- 25									

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DEPTH, FT.	SYMBOL SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATER	IAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS	
0		S-1	SAND (FILL); Medium dense, moist, fine to medi brown. SAND (SP-SM); Medium dense to loose, moist to trace silt, yellow brown and orange brown.	um sand, few silt, dark wet, fine sand, few to	19	4 5 <u>6</u>	10	11	GS MC	
5 -		S-2			14	4 5 6	11			
10 -		S-3			20	1 2 1 3	3	30.3	GS MC	
15 -		S-4			19	1 2 3 <u>3</u>	5			
20 -		S-5	Bottom of exploration at 22 ft; not refusal.		23	4 4 3 <u>4</u>	7			
25 -										

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DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIA	L	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0			S-1	SAND (FILL); Medium dense, moist, fine to medium brown. SAND (SP-SM); Loose, moist, fine sand, few to trac	n sand, few silt, dark e silt, light gray.	15	4 5 6 <u>7</u>	11	11	GS MC
- 5 -			S-2	Occasional iron oxide staining (5' to 7')		16	4 4 5 <u>4</u>	9		
- 10 -			S-3			14	2 1 2 <u>3</u>	3	30.3	GS MC
- 15 -			S-4			20	1 1 2 <u>3</u>	3		
- 20 -			S-5			24	5 6 2	8		
- 25 -				Bottom of exploration at 22 ft; not refusal.						
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oje V iei V iei V iei V i	ect h G&/ ation nt: G&/ ng L ng /	Nar A F Oa A F oca Ab ed	me: Bui Project I Auburn ak Poin Represe ation: andonn Water	Sheet 1 of 4Iding Addition - Maine Army National GuardDrilling ContractorNo. 767-58Driller Rep.: Diedrich, MaineDriller Rep.: Miket AssociatesDate Started: 08/*entative: S. DixonDate Completed:See Exploration Location PlanSurface Elevationnent Method: Backfilled with cuttingsDrilling Method: WatDepth: 7.5'Casing Type: N/A	r: Nor h D-50 h Nade 18/09 08/18/ c () ash Ro	thern Tracl au 09 tary	Test k	Boring	g, Inc	•
-	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL		SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
	***		S-1	FILL (SP); Medium dense, dry, medium to fine sand, trace silt, brown orange-brown. SAND (SP); Loose to very loose, dry, fine sand, trace silt and medium sand, light orange-brown, damp near 5'.	n and n	24	7 8 <u>9</u>	16		
			S-2			24	4 4 4 <u>4</u>	8		
			S-3	Change to light brown. NOTE: Drive 4" casing from 10' to 45'. See end of log for casing blow	ws.	8	2 2 3	4		
			S-4	With alternating orange-brown seams.		10	3 3 <u>4</u>	6		
			S-5			NR	2 2 3 <u>3</u>	5		
			S-6			16	5 4 5	10		

ct N ion: t: C	lame: B Auburn Dak Poin d Water	uilding Addition - Maine Army National Guard MaineSheet 2 of 4Wilding Addition - Maine Army National Guard MaineRWG&A Project No. 76' Surface Elevation: () Casing Type: N/ADepth: 7.5'7.5'	7-58				····
SYMBOL SAMDI FS	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
	S-7		18	2 3 4 <u>4</u>	7		
	S-8	Medium stiff, wet, clayey silt, gray-brown, with layers and seams of fine sand, little silt and silty fine sand, little clay, orange-brown and light brown.	22	5 4 3	8		
	S-9	Change to gray near 43' with layers of fine sandy silt, trace clay.	16	4 4 5 5	9		
	S-10		16	1 2 1 2	3		
	S-11	Change to very loose, wet, fine sand, trace to little silt, gray with layers of clayey silt, trace fine sand, and layers of dark gray silty clay ranging from about 1' to 3' thick.	24	3 2 2 2	4		
	S-12	Wash rotary probe from 57' to 66' depth encounters sand with frequent layers of silty clay.	24	11 3 3	4		

.oca Clien Obse	ect N tion: ht: C	ame: B Auburn Dak Poin d Water	Sociates Materials Testing Services Fotal Depth. 70 ilding Addition - Maine Army National Guard Sheet 3 of 4 Surface Elevation: () Associates Casing Type: N/A	-58				
	SYMBOL SAMPI FS	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
5								
0			Possible weathered rock. Bottom of Exploration at 66.5'; Wash rotary refusal on possible bedrock. Drove 4-inch casing with 140-lb hammer from 10' to 45'.					
5 -			Depth (ff) Blows/ft $10.0 - 11.0$ 12 $11.0 - 12.0$ 18 $12.0 - 13.0$ 28 $13.0 - 14.0$ 38 $14.0 - 15.0$ 49 $15.0 - 16.0$ 17					
0 -			16.0 - 17.0 27 17.0 - 18.0 31 18.0 - 19.0 52 19.0 - 20.0 78 20.0 - 21.0 37 21.0 - 22.0 34			-		
5 -			22.0 - 23.0 58 23.0 - 24.0 76 24.0 - 25.0 77 25.0 - 26.0 50 26.0 - 27.0 81 27.0 - 28.0 88			т. 		and the second secon
			28.0 - 29.0 124 29.0 - 30.0 117 30.0 - 31.0 73 31.0 - 32.0 85 32.0 - 33.0 109				· · · · · · · · · · · · · · · · · · ·	
			29.0 - 30.0 117 30.0 - 31.0 73 31.0 - 32.0 85 32.0 - 33.0 109					

Ling Name DESCRIPTION OF MATERIAL Name Ling Status Status <t< th=""><th>Li Normalization Normalization</th><th>Project Name: Building Addition - N Location: Auburn Maine Client: Oak Point Associates Observed Water Depth: 7.5'</th><th>Maine Army National Guard</th><th>RWG&A Project No. 76 Surface Elevation: () Casing Type: N/A</th><th>57-58</th><th></th><th></th></t<>	Li Normalization Normalization	Project Name: Building Addition - N Location: Auburn Maine Client: Oak Point Associates Observed Water Depth: 7.5'	Maine Army National Guard	RWG&A Project No. 76 Surface Elevation: () Casing Type: N/A	57-58		
90 $33.0 - 34.0$ 115 $34.0 - 35.0$ 121 $35.0 - 36.0$ 82 $36.0 - 37.0$ 133 $37.0 - 38.0$ 141 $38.0 - 39.0$ 145 $39.0 - 40.0$ 156 $40.0 - 41.0$ 115 $41.0 - 42.0$ 121 $42.0 - 43.0$ 114 $43.0 - 44.0$ 136 $44.0 - 45.0$ 135	90 33.0 - 34.0 115 34.0 - 35.0 121 35.0 - 36.0 82 36.0 - 37.0 133 37.0 - 38.0 141 38.0 - 39.0 145 39.0 - 40.0 156 40.0 - 41.0 115 41.0 - 42.0 121 43.0 - 44.0 136 44.0 - 45.0 135	DEPTH, FT. SYMBOL SAMPLES SAMPLE NUMBER	DESCRIPTION OF MATI	ERIAL	SAMPLE RECOVERY, IN. BLOWS PER 6"	SPT-N BLOWS PER FT. MOISTURE CONTENT %	LAB TESTS
		$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	115 121 82 133 141 145 156 115 121 114 136 135				
		- 100 -					

		DV	Geotechnical Engineering	Boring Log: B-101					
	5	R.V	Sociates Materials Testing Services	Total Depth (ft)	: 75				
			• Materials resting services	Sheet 1 of 3					
Proj RW Loc Clie RW Bori Bori Obs	ject N G&A ation: ont: C G&A ing Lo ing Al serveo	lame: Proje Aub Colby Repr ocatic bando d Wat	Addition to Administration BuildingIct No. 1564-006Iurn, MaineICompany, LLCIesentative: David ChapmanIn: See Exploration Location PlanSomment Method: Backfill with cuttingsper Depth: 8'G	Drilling Co.: N.E. Bo Drill Rig: Mobile Dril Driller Rep.: Brad E Date Started: 11/20/2 Date Completed: 11/ Surface Elevation: Drilling Method: Driv Casing Type: 4" I.D	oring Co I B-53 ⁻ nos 2018 /20/201 /e & Was . Steel (ontrac Fruck 8 sh Casing	tors		
DEPTH, FT.	SYMBOL SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL		SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0		S-1	FILL; Silty sand, moist, coarse to fine sand, few fine gr	cavel, few silt, brown.	15	7 5	10		
		S-2	POORLY GRADED SAND (SP); Medium dense to loc trace silt, brown to light brown.	ose, moist, fine sand,	12	5 5 6 6 7	15	5	MC GS
- 5 -		S-3			11	7 8 <u>8</u> 6	15		
		S-4			20	7 8 8	11		
<u>Ţ</u>		S-5			19	4 5 6	11	25	MC GS
- 10 -		S-6			4	<u>6</u> 5 55	5		
						6 3 3 2			
- 15 -		S-7			6	1 3 3 2 3 3 3 3 3 3 3 3 3	5	25	MC GS
						0			
- 20 -									
- 25 -		S-8	SILTY SAND (SM); Medium dense, wet, fine sand, so	me silt, brown.	15	3 6	14		
			POORLY GRADED SAND (SP); Medium dense, wet, brown to light brown.	fine sand, trace silt,		8 <u>7</u>			
30 Notes	<u>1.8951</u> St								
NOLES									

		R.V	V. Gillespie	Geotechnical Engineering Environmental Consulting		Boring Log: B-10 Total Depth: 75	1				
	2	Q,	-350018105	 Materials lesting Services 		Sheet 2 of 3					
Pro Loc	ject N ation:	ame: Aubi	Addition to Adminis	tration Building		RWG&A Project No. Surface Elevation:	1564-00	06			
Clie Obs	ent: C served	olby d Wat	Company, LLC er Depth: 8'			Casing Type: 4" I.D. S	Steel Ca	asing			
DEPTH , FT.	SYMBOL	SAMPLE NUMBER		DESCRIPTION OF MAT	ERIA	L	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
30		S-9					11	5 7 6 <u>7</u>	13	27	MC GS
- 35 -		S-10					10	5 5 <u>5</u>	10	25	MC GS
- 40		S-11					10	4 7 8	14	25	MC GS
- 45		S-12	SILTY SAND (M	L); Loose, wet, medium to fin	ne sar	nd, some silt, gray.	20	3 3 4 <u>3</u>	7	27	MC GS
- 50		S-13	SILTY SAND (SP); Medium dense, wet, fine s	and, s	some silt, brown.	13	7 7 5 <u>5</u>	12	26	MC GS
60		S-14	SILT (ML); Loose	, wet, few fine sand, gray.			22	1 1 <u>1</u>	2	27	MC GS
Notes	5:										

Pro		R.V & /	V. Gillespie Associates	Geotechnical Engineering Environmental Consulting Materials Testing Services tration Building	E T S	Boring Log: B-10 Total Depth: 75 Sheet <u>3 of 3</u> WG&A Project No.	1	06			
Loc Clie Obs	ation: nt: C serve	Aubu olby d Wat	urn Maine Company, LLC er Depth: 8'	in an en e an an ag	Si	urface Elevation: asing Type: 4" I.D.	Steel C	asing			
DEPTH, FT.	SYMBOL SAMPI FS	SAMPLE NUMBER		DESCRIPTION OF MATE	ERIAL		SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
60		S-15					4	1 FOR 2'	<1	27	MC GS
- 65 -		S-16					24	WOH WOH WOH <u>WOH</u>	WOH		
- 70 -		S-17	Increased roller co	ne resistance, possible bedroc	ck.		24	WOH WOH WOH <u>WOH</u>	WOH		
- 75 -		-	Bottom of Explora	tion at 75'.							
- 80 -	-										
- 85 -											
90 Notes	<u>.</u>										

				Geotechnical Engineering	Boring Log: B-102	2				
	51)	8.1	Environmental Consulting	Total Depth (ft)): 6				
		/	Ot 1	Materials Testing Services	Sheet 1 of 1					
Proj RW Loca Clie RW Bori Bori Obs	ect G&/ atior nt: G&/ ing l ing /	Na A I C A I _0 Ab ed	ame: Proje Aub olby Repr catic and Wat	Addition to Administration Building ect No. 1564-006 urn, Maine Company, LLC esentative: David Chapman on: See Exploration Location Plan onment Method: Backfill with cuttings ter Depth: Not Obs.	Drilling Co.: N.E. Bo Drill Rig: Mobile B-5 Driller Rep.: Brad E Date Started: 11/20/ Date Completed: 11, Surface Elevation: Drilling Method: Cor Casing Type: N/A	oring Co 53 nos 2018 /20/201 ntinuous	ontrac 8 Samp	ling		
DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	-	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0	XXX		S-1	FILL; Silty sand, moist, coarse to fine sand, trace grav brown.	vel, few silt, dark	12	6 6	12		
		/	S-2	POORLY GRADED SAND (SP); Medium dense, mo brown to light brown.	ist, fine sand, few silt,	13	6 <u>7</u> 5	11		
			S-3			15	5 6 7	9		
- 5 -							55			
	-			Bottom of Exploration at 6'; Refusal.			4 <u>5</u>			
- 10 -	-									
	-									
	-									
	-									
- 15 -										
	-									
- 20 -										
- 25 -										
Notes							<u> </u>	1	1	

				Geotechnical Engineering	Boring Log: B-103	3				
	5	J	R.V	• Environmental Consulting	Total Depth (ft)): 6				
		/	~ /	Materials lesting Services	Sheet 1 of 1					
Proj RW Loca Clie RW Bori Bori Obs	ect G&/ atior nt: G&/ ing l ing /		ame: Proje Aub olby Repr catic pando	Addition to Administration Building ect No. 1564-006 urn, Maine Company, LLC esentative: David Chapman on: See Exploration Location Plan onment Method: Backfill with cuttings ter Depth: Not Obs.	Drilling Co.: N.E. Bo Drill Rig: Mobile B-5 Driller Rep.: Brad E Date Started: 11/20/ Date Completed: 11, Surface Elevation: Drilling Method: Cor Casing Type: N/A	oring Cc 53 nos 2018 /20/201 ntinuous	ontrac 8 Samp	tors ling		
DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	-	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0	***		S-1	FILL; Silty sand, moist, coarse to fine sand, trace fine brown.	gravel, few silt, dark	18	18 12 10	22	13	MC GS
		7	S-2	POORLY GRADED SAND (SP); Medium dense, mo	ist, fine sand, brown.	17	<u>9</u> 9	20		
- 5 -			S-3			15	9 11 <u>11</u> 7	12		
		4		Bottom of Exploration at 6': Refusal			6			
	-			bottom of Exploration at 0, Refusal.			6 <u>7</u>			
- 10 -										
	-									
- 15 -										
- 20 -										
- 25 -										
<u> </u>										
30	 									
110165										

		D	Geotechnical Engineering	Boring Log: B-104	1					
		R.1	• Environmental Consulting	Total Depth (ft): 6					
		a	Materials Testing Services	Sheet 1 of 1						
Proj RW Loc Clie RW Bori Bori Obs	ect N G&A ation nt: (G&A ing L ing A erve	Name Proje : Aub Colby Rep ocation band d Wa	: Addition to Administration Building ect No. 1564-006 urn, Maine Company, LLC resentative: David Chapman on: See Exploration Location Plan onment Method: Backfill with cutitngs ter Depth: Not Obs.	Drilling Co.: N.E. Bo Drill Rig: Mobile B-5 Driller Rep.: Brad E Date Started: 11/20/ Date Completed: 11 Surface Elevation: Drilling Method: Con Casing Type: N/A	oring Co 53 nos /2018 /20/201 ntinuous	ontrac 8 Samp	ling			
DEPTH, FT.	SYMBOL	SAMPLE NUMBER	DESCRIPTION OF MATERIA	_	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS	
0		S-1	FILL; Silty sand with gravel, moist, coarse to fine san silt, brown to dark brown.	nd, little gravel, few	12	4 6	13			
		S-2	POORLY GRADED SAND (SP); Medium dense, mo to light brown.	bist, fine sand, brown	12	7 <u>7</u> 6	13			
_		S-3			18	6 7 6	12			
_ 5 -					-	5 5				
			Bottom of Exploration at 6'; Refusal.			7 <u>6</u>				
- 10 -										
15										
- 15 -										
- 20 -	$\left \right $									
- 25 -										
30										
notes										
				Geotechnical Engineering	Boring Log: B-105	5				
---	------------------	---------	---------------	--	------------------------	--	---------------------	------------------------	-----------------------	-----------
	5)	R.V &	• Environmental Consulting	Total Depth (ft)): 6				
	1	/	-	• Plateriais lesting services	Sheet 1 of 1					
Project Name: Addition to Administration BuildingDrilling Co.: N.E. BoRWG&A Project No. 1564-006Drill Rig: Mobile B-53Location: Auburn, MaineDriller Rep.: Brad ErClient: Colby Company, LLCDate Started: 11/20/2RWG&A Representative: David ChapmanDate Completed: 11/2Boring Location: See Exploration Location PlanSurface Elevation:Boring Abandonment Method: Backfill with cuttingsDrilling Method: ComObserved Water Depth: Not Obs.Casing Type: N/A						oring Co 53 nos 2018 /20/201 ntinuous	ontrac 8 Samp	tors ling		
DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	-	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0			S-1	FILL; Silty sand with gravel, moist, coarse to fine san few silt, brown to dark brown.	d, little fine gravel,	4	16 12 8	20	13	MC GS
			S-2	POORLY GRADED SAND (SP); Moist, fine sand, fe	ew silt, light brown.	14	<u>8</u> 9 7	14		
- 5 -			S-3			18	7 <u>7</u> 8	16		
				Bottom of Exploration at 6'; Refusal.			8 8			
							<u>9</u>			
	-									
- 10 -										
	-									
- 15 -										
- 15	_									
	-									
- 20 -										
	-									
	_									
- 25 -	$\left \right $									
30 Notes	」 ;:									

R.W. Gillespie & Associates, Inc.

APPENDIX C

LABORATORY TEST RESULTS

Geotechnical Evaluation Addition to FMS #2 Administration Building - Maine Army National Guard Auburn, Maine



Checked By: MTG



Checked By: MTG



























R.W. Gillespie & Associates, Inc.

APPENDIX D

SHEAR WAVE VELOCITY TEST REPORT

Geotechnical Evaluation Addition to FMS #2 Administration Building - Maine Army National Guard Auburn, Maine

HAGER-RICHTER GEOSCIENCE, INC.

SHEAR WAVE VELOCITY TESTING ARMY NATIONAL GUARD FACILITY AUBURN, MAINE

Prepared for:

R.W. Gillespie & Associates, Inc. 20 Pomerleau Street, Suite 100 Biddeford, Maine 04005

Prepared by:

Hager-Richter Geoscience, Inc. 8 Industrial Way - D10 Salem, New Hampshire 03079

File 18J79 November, 2018

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Shear Wave Velocity TestingArmy National Guard FacilityAuburn, MaineFile 18J79Page 1

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2.	Equipment and Procedures	4
3.	Results and Discussion	7
4.	Limitations 1	0

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1.	pVs Testing Results
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FIGURES

- 1. General Site Location
- 2. Site Plan

APPENDIX

1. Boring Logs

HAGER-RICHTER GEOSCIENCE, INC.

Shear Wave Velocity Testing Army National Guard Facility Auburn, Maine File 18J79 Page 2

1. INTRODUCTION

Hager-Richter Geoscience, Inc. conducted surface shear wave velocity testing in support of a geotechnical investigation for R.W. Gillespie & Associates, Inc. (RWG) of Biddeford, Maine in November, 2018. The area of interest and scope of work were specified by RWG. The geophysical testing was performed as part of a geotechnical investigation for proposed a proposed building expansion project.

The site is located at 64 Mount Apatite Road in Auburn, Maine. The general location of the site is shown in Figure 1. As part of a geotechnical investigation for the design of a proposed building expansion, RWG required site specific shear wave velocity information as a function of depth for soil and rock to a depth of 100 feet for seismic site class determination per the International Building Code.

Boring logs provided by RWG generally indicate that subsurface stratigraphy consists of about 65 feet of sand and silt . Refusal was encountered in B8 at a depth of 66.5 feet. Copies of the boring logs provided by RWG are provided in Appendix 1.

The surface shear wave velocity testing was conducted using the passive shear wave seismic (pVs) or ReMi method. pVs data were acquired along three test lines identified as pVs Lines 1 through 3. Figure 2 shows the location of the pVs Test Lines. Photo 1 shows the seismic equipment set-up for pVs Test Line 3. The positions of the pVs survey lines were recorded using a Trimble Geo 7XCM GPS receiver outfitted with a Zephyr 2 external antenna.

Jeffrey Reid, P.G., and Sean Reid of Hager-Richter conducted the seismic testing on November 5, 2018. The fieldwork was coordinated with Mr. Erik Wiberg, P.E., of RWG. Mr. David Chapman, also of RWG, was on-site for the duration of the survey and specified the locations for the testing. Data analysis and interpretation were completed at the Hager-Richter offices. Original data and field notes will be retained in the Hager-Richter files for a minimum of three years. Shear Wave Velocity TestingArmy National Guard FacilityAuburn, MaineFile 18J79Page 3

HAGER-RICHTER GEOSCIENCE, INC.



Photo 1. View looking east along pVs Line 1 showing general site conditions at the time of the survey.

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Shear Wave Velocity Testing Army National Guard Facility Auburn, Maine File 18J79 Page 4

2. EQUIPMENT AND PROCEDURES

2.1 Method

The passive shear wave seismic (pVs) method is a geophysical method to determine a vertical shear-wave velocity profile at a single location by analyzing a particular type of seismic wave recorded on a multichannel record. The name pVs is derived from p for passive and Vs for velocity of shear waves. The pVs method, also called the Refraction Microtremor method, or ReMiTM, uses Rayleigh waves, a particular kind of wave first described by Lord Rayleigh in 1885. Such waves are dispersive (meaning that the velocity is a function of the wavelength), and the amplitude of such waves decreases with depth. The Rayleigh wave velocity depends primarily on the shear wave velocities and layering of the subsurface material.

Rayleigh waves are a significant part of the ambient subsurface noise at most, if not all, sites. There are many sources of such noise, including, but not limited to, wind, pedestrian and vehicular traffic, surface and subway trains, and construction activities. Although such noise can be troublesome for most seismic methods, it is the source of signals for the pVs method, and the higher the noise level, the better the results for this method.

Low frequency (4.5 Hz) geophones are installed 5 feet apart along a straight line and connected to a seismograph. The ambient noise is recorded for 30 seconds two or three times, and examined to be sure that noise of sufficiently low frequency is present. If the noise is sufficient, then 10 to 15 such records are acquired. If the noise spectra do not reach sufficiently low frequencies, then one walks or runs along the test line during data acquisition to add low frequency noise to the ambient noise. The surface waves used in the pVs method, considered noise in seismic refraction and reflection surveys, are enhanced during data acquisition and processing for the pVs method. The seismic data are analyzed using SeisOpt[®] ReMiTM, a commercially licensed software package developed by Optim, Inc. located at the University of Nevada at Reno. Results are normally presented as 1-D plots or in tabular form showing shear wave velocity as a function of depth at the center of the seismic line.

It should be noted that the method produces a single velocity profile (Vs as a function of depth Z) at one location (namely, the center of the line) for each line. The software also calculates the average shear wave velocity using the following equation (taken from the International Building Code):

HAGER-RICHTER GEOSCIENCE, INC.

Shear Wave Velocity Testing Army National Guard Facility Auburn, Maine File 18J79 Page 5

$$V_{avg} = \left(\sum_{i=1}^{N} d_i\right) / \sum_{i=1}^{N} d_i / V_i$$

Eq 1

where V_{avg} is average shear wave velocity d_i is thickness of the ith layer V_i is the shear wave velocity of the ith layer N is the number of layers

The Seismic Site Class, based solely on average shear wave velocity, is defined by the IBC as follows:

Site Class	Soil Profile Name	Soil Shear Wave Velocity (ft/s)
А	Hard rock	$V_{s} > 5000$
В	Rock	$2500 < V_s \le 5000$
С	Very dense soil and soft rock	$1200 < V_s \le 2500$
D	Stiff soil profile	$600 \le V_s \le 1200$
Е	Soft soil profile	$V_{s} < 600$

Although the IBC provides other methods to determine the Site Class, such as standard penetration resistance (blow counts) and soil undrained shear strength, this report provides site specific data for shear wave velocity only. Furthermore, there is no consideration of other factors that may affect a site such as liquefaction. The final determination of seismic site class should be made by the project engineer.

2.2 Equipment

We use a 48-channel digital seismograph (Geometrics Geode) coupled to as many as 48 geophones to acquire the pVs data. We used 4.5-Hz frequency vertical geophones for the subject shear wave velocity testing.

2.3 Limitations of the Method

As with all physical measurements, there is experimental error in the velocities that are determined using the passive shear wave velocity seismic method. For the pVs method, the accuracy of V_{avg} is stated by Optim, Inc. to be 5-15%.

The depth of investigation is a function of the noise spectrum, and long wavelengths (low frequencies) are required to determine velocity at large depths. Noise levels can be improved by a person running along the seismic spread during data acquisition.

Shear Wave Velocity TestingArmy National Guard FacilityAuburn, MaineFile 18J79Page 6

HAGER-RICHTER GEOSCIENCE, INC.

2.4 Site Specific

The locations of the three test lines are shown in Figure 2. The pVs data were acquired using 48 geophones and a geophone spacing of 5 feet for pVs Test Lines 1 through 3.

The pVs method yields a single vertical velocity profile at the mid points of the test lines, shown in Figure 2. The seismic source for the pVs test was ambient noise and random hammer striking while acquiring the data to enhance the high frequency content of the seismic signal.

HAGER-RICHTER GEOSCIENCE, INC.

Shear Wave Velocity Testing Army National Guard Facility Auburn, Maine File 18J79 Page 7

3. RESULTS AND DISCUSSION

The surface shear wave velocity testing was conducted along three seismic lines, designated as pVs Test Lines 1 - 3. The seismic test line locations and center points for the velocity profiles are shown in Figure 2.

Boring logs provided by RWG generally indicate that subsurface stratigraphy consists of about 65 feet of sand and silt . Refusal was encountered in B8 at a depth of 66.5 feet. Copies of the boring logs provided by RWG are provided in Appendix 1.

The results of the pVs testing are reported in Table 1. For modeling purposes, the subsurface stratigraphy was broken into four discrete units: the upper three layers correspond to sand and silt, and the bottom layer corresponds to dense till or bedrock. The velocity units do not necessarily correlate with specific lithologic units identified in the borings. We note that the boring logs do not provide a complete stratigraphic constraint, therefore, the number of layers and the thickness that provides the best statistical fit to the respective dispersion curve was used for each line independently. The root mean square error for the fit of the dispersion curve versus the measured data using the model velocities was 3.0, 2.6%, and 3.9% for pVs Test Lines 1 through 3, respectively.

No attempt was made to "force" a specific model to the data. The velocities for the units to the maximum depth investigated, and the average values of the velocity of shear waves, Vs_{100} , determined by Equation 1 for the depth interval of 0-100 ft are also reported in Table 1.

	pVs Tes	st Line 1			
Geologic Unit *	Depth Interval (ft)	Vs** (ft/s)			
Sand	0 - 14	603			
Sand and Silt	14 - 25	465			
Sand and Silt	25 - 60	1056			
Till or Bedrock	60 - 100 1,374				
Vs ₁₀₀ (ft/s)	917				
RMS (%)	3.0				

TABLE 1 - pVs TEST RESULTS

	pVs Tes	t Line 2
Geologic Unit *	Depth Interval (ft)	Vs** (ft/s)
Sand	0 - 16	562
Sand and Silt	16 - 45	812
Sand and Silt	45-70	1,005
Till or Bedrock	70 - 100	1,484
Vs ₁₀₀ (ft/s)	91	5
RMS (%)	2.	6

* Stratigraphy is based on Boring Logs

** Shear wave velocity profile is determined for the mid point of the test line

Shear Wave Velocity Testing Army National Guard Facility Auburn, Maine File 18J79 Page 9

	pVs Tes	est Line 3			
Geologic Unit *	Depth Interval (ft)	Vs** (ft/s)			
Sand	0 - 6	480			
Sand and Silt	6 - 41	639			
Sand and Silt	41 - 70	933			
Till or Bedrock	70 - 100 2413				
Vs ₁₀₀ (ft/s)	903				
RMS (%)	3.9				

* Stratigraphy is based on Boring Logs ** Shear wave velocity profile is determined for the mid point of the test line

Shear Wave Velocity Testing Army National Guard Facility Auburn, Maine File 18J79 Page 10

4. LIMITATIONS

This report was prepared for the exclusive use of R.W. Gillespie & Associates, Inc. (Client). No other party shall be entitled to rely on this Report or any information, documents, records, data, interpretations, advice or opinions given to Client by Hager-Richter Geoscience, Inc. (H-R) in the performance of its work. The Report relates solely to the specific project for which H-R has been retained and shall not be used or relied upon by Client or any third party for any variation or extension of this project, any other project or any other purpose without the express written permission of H-R. Any unpermitted use by Client or any third party shall be at Client's or such third party's own risk and without any liability to H-R.

H-R has used reasonable care, skill, competence and judgment in the preparation of this Report consistent with professional standards for those providing similar services at the same time, in the same locale, and under like circumstances. Unless otherwise stated, the work performed by H-R should be understood to be exploratory and interpretational in character and any results, findings or recommendations contained in this Report or resulting from the work proposed may include decisions which are judgmental in nature and not necessarily based solely on pure science or engineering. It should be noted that our conclusions might be modified if subsurface conditions were better delineated with additional subsurface exploration including, but not limited to, test pits, soil borings with collection of soil and water samples, and laboratory testing.

Except as expressly provided in this limitations section, H-R makes no other representation or warranty of any kind whatsoever, oral or written, expressed or implied; and all implied warranties of merchantability and fitness for a particular purpose, are hereby disclaimed.





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APPENDIX 1

Boring Logs Provided by RWG

APPENDIX A

EXPLORATION LOGS

Geotechnical Evaluation Addition to UTES #1 Administration Building - Maine Army National Guard Auburn, Maine

, Inc.
, Inc.
MOISTURE CONTENT % LAB TESTS

R.W. Gillespie & Associates, Inc. Boring Log: B-2 Geotechnical Engineering. Geohydrology.Materials Testing Services Total Depth (ft): 2					22				
Proje RWC Loca Clien RWC Borin Borin Obse	Project Name: Building Addition - Maine Army National Guard RWG&A Project No. 767-58 Location: Auburn, Maine Client: Oak Point Associates RWG&A Representative: C. Morrell Boring Location: See Exploration Location Plan Boring Abandonment Method: Backfilled with cuttings Observed Water Denth: 6.5'Sheet 1 of 1 Drilling Contractor: Nor Drill Rig: Diedrich D-50 Driller Rep.: Mike Nade Date Started: 07/24/09 Date Completed: 07/24/ Surface Elevation: () Drilling Method: 2 1/4-inch Casing Type: N/A					n Test ck A	Borir	ng, Inc	•
DEPTH, FT.	SYMBOL SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL		SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0		S-1	SAND (FILL); Medium dense, moist, fine to medium s coarse sand, light brown. SAND (SP-SM); Loose, moist to wet, fine sand, few to medium sand, light yellow brown.	sand, trace gravel and	14	4 4 5 <u>6</u>	9		
 	AND AND AND AND AND AND AND AND	S-2			13	4 5 4 5	9		
- 10 •		S-3			10	1 1 <u>3</u>	3		
- 15 -	1965 - 1965 - 1967 - 1967 - 1967 - 1967 - 1965 - 1965	S-4			20	1 2 <u>2</u>	4		
- 20		S-5	Bottom of exploration at 22 ft; not refusal.		10	2 3 2 <u>2</u>	5		
<u>30</u> Note:	s:	<u>]</u>			L	<u>.</u>	<u>I</u>	<u></u>	I

			E Aillennia O Annaniakan Ina	Boring Log: B-3					
		R.M	GIIIESPIE & ASSOCIATES, INC. Inical Engineering+Geohydrology+Materials Testing Services	Fotal Depth (ft): 2	2				
L.		/ 00000		Sheet 1 of 1				March State Street Street Street Street	
Proje RWC Loca Clien RWC Borir Borir Obse	Project Name: Building Addition - Maine Army National Guard RWG&A Project No. 767-58 Location: Auburn, Maine Client: Oak Point Associates RWG&A Representative: C. Morrell Boring Location: See Exploration Location Plan Boring Abandonment Method: Backfilled with cuttings Observed Water Depth: 6.5'					n Test ck A	: Borin	ng, Inc	•
					Ň.			%	
DEPTH, FT.	SYMBOL	SAMPLE NUMBER	DESCRIPTION OF MATERIAL		SAMPLE RECOVERY,	BLOWS PER 6"	SPT-N BLOWS PER F	MOISTURE CONTENT	LAB TESTS
0		S-1	SAND (FILL); Medium dense, moist, fine to medium coarse sand, light brown. SAND (SP-SM); Loose, moist to wet, fine sand, few t medium sand, light yellow brown.	sand, trace gravel and to trace silt, trace	17	3 4 5 5	9		
		S-2			15	4 4 5 5	9		
- 10	7411 12741 127	S-3			22	4 4 5 <u>5</u>	9		
- 15	ACCC ASSA ASSA ASCA	S-4			17	3 2 3 <u>3</u>	5		
20		S-5	Occasional iron oxide staining (21' to 22') Bottom of exploration at 22 ft; not refusal.		18	1 2 3 2	5		
- 25									
30 Note	is:								<u></u>
		R.N	. Gillespie & Associates, Inc.	Boring Log: B-4	2				
--	--	---------------	--	------------------------	----------------------	---	-------------------------	--	-----------
	5)/	Geoteci	nnical Engineering. Geohydrology Materials Testing Services	Shoot 1 of 1	hus				
Project Name:Building Addition - Maine Army National Guard RWG&A Project No. 767-58 Location: Auburn, MaineDrilling Contractor:Not Dot Driller Rep.:Client:Oak Point Associates RWG&A Representative:Date Started:07/24/09 Date Completed:Boring Location:See Exploration Location Plan Boring Abandonment Method:Backfilled with cuttings Daserved Water Depth:Not Obs.						n Test ck A	Borin	ıg, Inc	
DEPTH, FT.	SYMBOL SAMPI FS	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	-	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
		(<u>S</u> -1	SAND (FILL); Medium dense, moist, fine to medium brown. SAND (SP-SM); Medium dense to loose, moist to we trace silt, yellow brown and orange brown.	a sand, few silt, dark	19	4 5 <u>6</u>	10	11	GS MC
- 5	02614 75007 206012 12007 1	S-2			14	4 5 <u>6</u>	11		
- 10		S-3			20	1 2 1 <u>3</u>	3	30.3	GS MC
- 15	- UPEL INVER I	S-4			19	1 2 3 <u>3</u>	5		
~ 20		S-5	D. ((23	4 4 3 <u>4</u>	7		
- 25			Bottom of exploration at 22 rt; not refusal.						
<u>30</u> Note	s:	<u> </u>				ang	<u>Le comme contrar</u>	and a second	

Boring Log: B-5									
	5))	Geoteci	nical Engineering Geohydrology • Materials Testing Services	Fotal Depth (ft): 2	2				
Proje RWC Loca Clier RWC Borir Borir Obse	ect Na 5&A F tion: 7 at: Oa 5&A F ng Loo ng Aba erved	rojec Aubur Ak Po Repre catior andor Wate	Building Addition - Maine Army National GuardDt No. 767-58Dm, MaineDint AssociatesDsentative:C. Morrellx:See Exploration Location PlanSmment Method:Backfilled with cuttingsDer Depth:Not Obs.C	Sheet 1 of 1 rilling Contractor: No riller Rep.: Mike Nad vate Started: 07/24/09 vate Completed: 07/24 urface Elevation: () rilling Method: 2 1/4-ing casing Type: N/A	ortherr 0 Trac leau 1/09 ch HS	n Test ck A	Borir	ig, Inc	
DESCRIPTION OF MATERIAL SAMPLE SAMPLE SAMPLE NUMBER SAMPLE NUMBER				SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS	
0		<u>/</u>	SAND (FILL); Medium dense, moist, fine to medium \brown. SAND (SP-SM); Loose, moist, fine sand, few to trace	sand, few silt, dark silt, light gray.	15	4 5 <u>7</u>	11	11	GS MC
- 5	1.281 178 (V) 178 (V) 178 (V) 178 (V) 180 (S-2	Occasional iron oxide staining (5' to 7')		16	4 4 <u>4</u>	9		
- 10		S-3			14	2 1 <u>3</u>	3	30.3	GS MC
~ 15 	AUCT 1384 1384 1384 1384 1384 1384 1386	S-4			20	1 1 <u>3</u>	3		
- 20		S-5	Bottom of exploration at 22 ft; not refusal.		24	5 6 2 <u>2</u>	8		
÷ 25									
30 Note	s:		J						BDSPerdbystansoloutindspa

		s W	Gillesnie & Associates, Inc.	oring Log: B-6	0				
Geotechnical Engineering•Geohydrology•Materials Testing Services					0				
Project Name:Building Addition - Maine Army National GuardSheet 1 of 4RWG&A Project No.767-58Drilling Contractor:NonLocation:Auburn, MaineDriller Rep.:Diriller Rep.:Client:Oak Point AssociatesDate Started:08/18/09RWG&A Representative:S. DixonDate Completed:08/18Boring Location:See Exploration Location PlanSurface Elevation:()Boring Abandonment Method:Backfilled with cuttingsDrilling Method:Wash RecObserved Water Depth:7.5'Casing Type:N/A						i Test k	Borin	g, Inc.	
DEPTH, FT.	SYMBOL SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL		SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0		S-1	FILL (SP); Medium dense, dry, medium to fine sand, tr orange-brown. SAND (SP); Loose to very loose, dry, fine sand, trace s light orange-brown, damp near 5'.	ace silt, brown and ilt and medium sand,	24	7 8 <u>9</u>	16		
- 5 ·		S-2			24	4 4 4 <u>4</u>	8		
- 10 ·		S-3	Change to light brown. NOTE: Drive 4" casing from 10' to 45'. See end of log	for casing blows.	8	2 2 2 <u>3</u>	4		
- 15		S-4	With alternating orange-brown seams.		10	3 3 <u>4</u>	6		
- 20		S-5			NR	2 2 3 <u>3</u>	5		
~ 25		S-6			16	5 4 6 <u>5</u>	10		
<u>30</u> Note	s:				<u></u>	<u>I</u>	<u> </u>	<u> </u>	

Proie	R.W. Gillespie & Associates, Inc. Boring Log: B-6 Total Depth: 70 Sheet 2 of 4 Project Name: Building Addition - Maine Army National Guard								
Loca Clien Obse	tion: / nt: Oa erved	Auburn ak Poir Water	n, Maine ht Associates Depth: 7.5'	Surface Elevation: () Casing Type: N/A	200000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 200			80.00000000000000000000000000000000000	um-en dische Ballander - with a 192 (2019 -
DEPTH, FT.	SYMBOL SAMPI FS	SAMPLE NUMBER	DESCRIPTION OF MATERI	AL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
30		S-7			18	2 3 4 <u>4</u>	7		
~ 35		S-8	Medium stiff, wet, clayey silt, gray-brown, with la sand, little silt and silty fine sand, little clay, orang	yers and seams of fine e-brown and light brown.	22	5 4 3	8		
- 40		S-9	Change to grav pear 43' with layers of fine sandy s	;ilt. trace clay.	16	4 4 5 5	9		
~ 45		S-10	Change to gray near 45 with hypers of the standy		16	1 2 1 2	3	NYA	
- 50		/S-11	Change to very loose, wet, fine sand, trace to little clayey silt, trace fine sand, and layers of dark gray about 1' to 3' thick.	silt, gray with layers of silty clay ranging from	24	3 2 2 2	4		
~ 55		S-12	Wash rotary probe from 57' to 66' depth encounte layers of silty clay.	rs sand with frequent	24	1 1 3 <u>3</u>	4		
Note		nen dessaaren en e							

Figure 3 State State	Boring Log: B-6 Total Depth: 70 Sheet 3 of 4 RWG&A Project No. Surface Elevation: () Casing Type: N/A	IPLE RECOVERY, IN.	BLOWS PER 6"	T-N BLOWS PER FT.	JISTURE CONTENT %	LABTESTS
60	sal on possible bedrock.)' to 45'.	SAN		Ϋ́	SW	

Proje		Nai	R.M Geotec	Gillespie & Associates, Inc.	Boring Log: B-6 Total Depth: 70 Sheet 4 of 4 RWG&A Project No.	767-58			2000 - 2004 - 2004 - 2004 - 2004 - 2004 - 2004 - 2004 - 2004 - 2004 - 2004 - 2004 - 2004 - 2004 - 2004 - 2004 -	
Loca Clien Obse	uor it: (erve	ı. ₽ Oa ∋d \	k Pc Nate	int Associates or Depth: 7.5	Casing Type: N/A		0.02300#################################	2012-10-0		
DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATER	AL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
- 95 - - 95 - - 100 - - 100 - - 105 - - 110 - 110 - 110 - 115 - - 115 - - 115 - - 115 - - 115 - - 115 - - 115 -				$\begin{array}{cccccccccccccccccccccccccccccccccccc$						