SECTION 01436
PRE AND POST CONSTRUCTION SURVEYS
AND MONITORING

PART 1 - GENERAL

1.01 SCOPE OF WORK

The work of this Section includes:

A. Pre-construction and post-construction inspection surveys of existing conditions of the dam and other existing structures, utilities, and facilities within 100 feet of the proposed Work, to be completed by the Contractor.

B. Notifying the Engineer and the Owner prior to conducting any vibration producing activity and/or any activity that could potentially cause damage to the existing masonry dam structure.

C. The Contractor shall be responsible for providing safe access for the Engineer to install and maintain vibration and settlement/deformation monitoring points and crack monitors prior to the start of work

D. The Contractor shall be responsible for protecting vibration and movement monitoring equipment, benchmarks, deformation monitoring points, crack monitors, and other monitoring equipment installed by the Engineer from damage resulting from the Contractor's (or their Subcontractors) operations.

E. The work specified under this Section includes conducting all activities on the project in such a manner that damage is prevented to the dam, adjacent structures, facilities, utilities, equipment, property and work.

1.02 EXISTING CONDITIONS

A. The Contractor's attention is called to the fact that the Emery Mills Dam is a 129 plus year old dam partially constructed with stone masonry and will require a higher standard of construction practices and quality for work on and around the dam. Typical construction practices may require modification or adjustment to meet dam construction standards. In addition, additional care is required since the consequences of construction mishaps could extend beyond the project site were a dam failure to result. Special care and precautions shall be undertaken to protect the dam, as well as other structures and utilities, within and nearby the Work.

B. The Contractor shall review the historic data regarding the dam to be fully informed on all existing conditions and limitations as they apply to this work and its relation to other construction work. Historic drawings of the dam are on file with the Owner.

1.03 RELATED WORK

The following is a list of related work items that shall be performed or furnished under other Section of these Specifications as indicated.

A. Site Restoration – Section 01740

B. Demolition, Removal, and Disposal – Section 02065

C. Earthwork – Section 02200

D. Rock and Boulder Excavation – Section 02201

E. Stone and Riprap – Section 02270

F. Grouting – Section 02340

1.04 SUBMITTALS

A. Pre- and Post-Construction Surveys

1. Submit Qualifications and Draft Reports for the pre- and post-construction surveys to the Owner and Engineer:

a. Qualifications for the firm or engineer performing the pre- and post-construction survey should be submitted for review at least two weeks prior to beginning the survey. The surveys should be performed under the responsible charge of a professional engineer, registered in the State of Maine who has completed at least five similar assignments over the last five years.

b. Original, plus three (3) copies of the pre- and post-construction survey reports for each building, with captioned photographs and narrated videos shall be submitted. The Contractor shall retain one (1) additional copy for their records.

c. Make any changes or corrections to the Draft Report required by the Owner or Engineer.

d. Draft pre-construction survey reports shall be submitted at least 15 days before any construction related activity within one hundred feet (100') of a structure or facility designated to be surveyed, but no later than within 15 days of Notice to Proceed.

2. Submit Final Reports for the pre- and post-construction surveys to the Owner:

a. After review, submit five (5) copies of the approved report; four copies and the original. The Contractor shall retain one (1) additional copy for their records.

B. Vibration and Movement Monitoring

1. Contractor shall submit a work plan and schedule indicating the start date and duration of each item anticipated to induce vibration and or displacement. At a minimum, these include. Clearing, earth and rock excavation, fill placement and compaction of the access roadway; clearing, grubbing, excavation, and slab demolition on the embankment; drilling and grouting; and earth and rock fill placement.

2. Based on the results of the pre-construction survey and their proposed work plan, and means and methods, the Contractor shall submit suggestions to the Engineer where additional vibration, crack, and/or deformation monitoring may be warranted.

3. The Engineer will prepare a monitoring and response plan prior to the outset of the work. The plan will include Threshold and Limiting values for vibration and deformation, which may affect the progress of the work. The Contractor shall prepare and submit the response plan indicating what measures will be undertaken in the event that a Threshold or Limiting value is exceeded.

4. The engineer will share the results of deformation monitoring, crack monitors, and vibration monitoring in the format and at a frequency suited to the nature of the ongoing work.

PART 2 PRODUCTS

This Section not used.

PART 3 - EXECUTION

3.01 GENERAL

A. In addition to the instrumentation and monitoring points installed by the Engineer, the Contractor may install and monitor instrumentation he/she deems necessary to ensure performance of the Work in accordance with the Contract Documents.

B. The intent of the monitoring program is to provide pre-construction baseline data for comparison with construction data and post-construction data to determine whether any utilities, facilities, or structures have been adversely affected by construction activities, and to provide warning of pending conditions that could require remedial measures or alternative construction approaches.

C. No work shall be conducted by the Contractor that may result in vibrations or deformation/settlement, as determined by the Owner/Engineer, until all instrumentation has been installed, initialized, and a series of suitable baseline readings have been recorded.

D. The Contractor shall:

1. Provide access and cooperate with installation of monitoring components.

2. Protect installed instruments

3. Replace any damaged instruments at their own expense.

4. Adjust construction activities, and implement remedial measures based on interpretations of the monitoring program data by the Engineer, at no additional cost to the Owner, as required.

E. The Contractor may provide, install and monitor additional instrumentation at the site as an independent check of the Engineer's supplied instrumentation and monitoring program. The Contractor shall coordinate their Work with the Engineer and provide safe access by the Engineer at all times. Additional monitoring will be at the expense of the Contractor.

3.02 PRE-CONSTRUCTION SURVEY

A. Prior to starting work, the Contractor, their Survey Subcontractor, the Engineer, and the Owner shall make a joint walk-through of the existing structures within 100 ft of the work area to observe and document their present conditions for inclusion in the survey.

B. The survey shall consist of a description of interior and exterior conditions. Descriptions shall locate cracks, damage or other defects existing and shall include information to make it possible to determine the effect, if any, of the construction operations on the defect. Where significant cracks or damage exists, or for defects too complicated to describe in words, photographs shall be taken and made part of the record. Photographs shall be taken to record any cracks or other evidence of structural distress in the structure. Potential crack monitor locations shall be identified during the pre-construction survey.

C. Baseline survey readings of structure elevations, monitoring point plan location, crack location documentation, and the placement of crack monitors shall be performed prior to the start of construction activity. All readings shall be referenced to suitable benchmarks, sufficiently remote as to be unaffected by any construction activity.

D. The Contractor shall prepare a report for each structure (including the stone masonry wall and other structures of the dam) documenting all pre-existing conditions, verified by the photographs, and signed by the personnel participating in the investigation and, if practicable, by the Owner and Engineer, whether or not they are present at the examinations.

E. It shall be the responsibility of the Contractor to notify and coordinate with private structure owners for the pre-construction survey.

F. If the property owner of a structure refuses the survey, the inspector shall request that he/she sign a waiver of the survey. If the owner or occupant refuses to sign a waiver, the inspector shall sign the waiver attesting to the refusal.

G. Three attempts shall be made to contact property Owner's to offer the survey. If no response is made after the second attempt, or the owner refuses to sign a survey waiver, a notice offering the survey shall be sent via any carrier capable of providing a receipt of delivery. A receipt of delivery shall satisfy this requirement.

3.03 POST-CONSTRUCTION SURVEY

A. Within 30 days after completion of all work on or near Emery Mills Dam, the Contractor will perform an examination similar to the pre-construction survey. The post-construction survey and inspection shall include all areas and items inspected in the pre-construction survey, and shall also include properties, buildings, sites, and structures where written or verbal complaints of damage have been received, or damage claims have been filed. 72-hour notice shall be given to the Owner or Engineer so that they may be present during final examination.

B. The post-construction survey shall include all areas included in the pre-construction survey, with photographs and videos taken from the same viewpoints, plus areas of where additional damage or distress is noted or where complaints of such have been received by the Owner, Engineer or Contractor.

C. Records of the final examination shall be distributed in the same manner as the original pre-construction survey

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT FOR PAYMENT

No measurement shall be made for Pre- and Post-Construction Surveys. The bid item for Pre- and Post-Construction surveys shall be a lump sum quantity.

4.02 PAYMENT

Payment for the scope of the work specified herein, including all labor, materials, equipment and incidental costs to provide Pre- and Post-Construction Surveys shall be paid for at the applicable lump sum price for Item No. 01436.01 stated on the Form for Bid.

Item No.	Payment Item	Unit
01436.01	Pre- and Post-Construction Surveys	Lump Sum

*** * * END OF SECTION * * ***

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SECTION 01560
TEMPORARY EROSION AND SEDIMENTATION CONTROLS

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Contractor shall furnish all labor, materials and equipment and shall perform all work required to install, maintain, and remove erosion, sedimentation, and siltation control measures to protect the site, and upstream and downstream wetlands, water bodies, streams, and drainage structures from siltation and sedimentation damage and accumulation or damage from other byproducts of the work during this Contract, as specified herein and as directed by the Owner or Engineer.

B. The scope of the Work of this Section shall include the installation of perimeter erosion controls, in-water sedimentation controls, construction entrances and all other sediment and erosion control Best Management Practices (BMPs), as shown on the Contract Drawings, and as needed elsewhere. This work shall also include the monitoring, cleaning, maintenance, and repair of all installed erosion control measures and their proper removal and disposal after final stabilization of the site.

C. Erosion control measures are used to prevent the displacement of soil. Such measures may include, but not be limited to, ditches, turnouts, grading, erosion control matting, plastic coverings, mulching, temporary seeding, riprap, check dams, cross tracking, and other items intended to stabilize soil material and/or reduce the erosive potential of water.

D. Perimeter sedimentation and siltation control measures are used to prevent the movement and transport of soil particles offsite or into water bodies. Sedimentation and siltation control measures may include, but not be limited to, use of straw or hay bales, compost filter socks, silt fence, turbidity curtain, stabilized construction entrances and other items as necessary to contain sediment and other deleterious material produced from excavation and filling, construction dewatering / water control, and other related contract operations.

E. It is the intent of this Section that the Contractor shall be responsible for the use of all BMPs, both structural and operational, to reduce, to the greatest extent possible, the erosion and transport of soil and sediment. The Contractor shall be responsible for implementing all measures which are both prudent under good construction practices and required under local, state, and Federal regulations and law. The Contractor shall also be responsible for all monitoring, maintenance, and repair of all BMPs utilized. In the event of the failure of sediment and erosion control BMPs, the Contractor shall be responsible, at no additional cost to the Owner, for all work necessary to mitigate and correct the situation, including, but not limited to, the removal of transported sediment.

F. The Contractor shall be responsible for monitoring, maintenance, and repair of BMPs at the site. The work of this Section shall include sediment and erosion control both upslope and downslope of the work area, as well as in and around all disturbed areas, including staging and laydown areas.

G. The Work of this Item specifically include all measures necessary for control of the movement of sediments and soil which might occur as part of the Contractor's efforts to de-water

excavated soils and dispose of them on-site. The Contractor, at no additional cost to the Owner, shall implement all means, measures, and BMPs necessary to confine and stabilize spoil stockpiles, limit sediment transport away from such stockpiles, and filter or otherwise treat runoff or decant water from the stockpiles.

1.02 SCOPE OF WORK

A. The scope of the Work of this Section shall include the installation of sedimentation and erosion controls as shown on the Contract Drawings, and as needed elsewhere. This work shall also include the monitoring, cleaning, maintenance, and repair/replacement of all installed sedimentation and erosion controls and other siltation and water control/handling devices as well as proper removal and disposal of same after final stabilization of the site.

B. General work covered and paid for under this Section shall include the installation of all other sediment and erosion control BMPs, as shown on the Contract Drawings, and as needed elsewhere. This work shall also include the monitoring, cleaning, maintenance, and repair of all installed sediment and erosion control BMPs and disposal after final stabilization of the site. General work covered and paid for under this Section shall also include all other work, including record keeping and reporting, necessary to meet the conditions of the Contract Documents, Permits, Approvals, Licenses issued for the project and all relevant codes, rules, regulations, laws and ordinances applicable to sediment and erosion control.

1.03 SPECIAL CONDITIONS

A. All Work shall comply with all codes, rules, regulations, laws and ordinances under the jurisdiction of the Town of Shapleigh, York County, Maine Department of Environmental Protection (MDEP), the U.S. Army Corps of Engineers, U.S. Environmental Protection Agency (EPA), and all other authorities having jurisdiction within the project areas.

B. Copies of all permits and licenses previously obtained for this Project by the City will be forwarded to the Contractor prior to the beginning of the Work. The Contractor shall be responsible for conducting his/her work in accordance to all provisions of said permits.

C. The Contractor shall procure all other required permits and licenses, (except for those to be or already obtained by the Owner as stated herein), pay all charges, fees and taxes and shall give all notices necessary and incidental to the due and lawful prosecution of the work under this Contract. The cost thereof shall be included in the prices bid for the various items specified herein for the work of this Contract. Copies of all required permits and licenses shall be filed with the Owner prior to the beginning of the work.

D. The Work of this Contract will fall under the jurisdiction of the Maine Department of Environmental Protection (MDEP) under the Natural Resources Protection Act (NRPA) regulations. The Contractor shall be responsible for developing a site-specific sediment and erosion control plan in accordance with the approved NRPA permit, which shall be submitted to the Owner and Engineer for approval. The Contractor's plan shall incorporate the requirements of the approved NRPA permit, this Section, and the controls and BMPs shown on the Contract Drawings; however, it shall be understood that these measures called for in the specifications and on the Contract Drawings represent the MINIMUM acceptable level of sediment and erosion control. The Contractor's plan shall be designed to account for the anticipated work plan, construction sequence, and anticipated level of disturbance.

E. No work of any type in any area shall commence until sedimentation control measures are in place to the satisfaction of the Owner, the Engineer, and permitting agencies/representatives having jurisdiction.

1.04 IMPLEMENTATION

A. The Contractor shall familiarize himself with the nature of work to be performed. The Contractor shall be responsible for scheduling his submittals and/or meetings, if required, with the applicable regulatory agencies.

B. Measures may include, but not be limited to, the following:

- Straw or Hay bales and Silt Fence
- Stabilized construction entrances.
- Turbidity curtain.
- Filling and stabilizing of erosion gullies with gravel.
- Application of weed-free straw (or other) mulch.
- Track-roughening of slopes to slow runoff flow.
- Temporary ditches and swales to divert drainage flow.

1.05 LOCATION AND STORAGE OF MATERIALS

A. No materials shall be dispersed or stockpiled in any wetland areas. No excavated materials or materials to be used in the backfilling shall be deposited within fifty feet (50') of any spillways and related areas, watercourses, wetland areas or drainage facilities unless appropriate and approved measures are specifically taken to protect the adjacent resource area and storage has been approved by the Engineer. Materials rejected for use in the Work shall be removed and disposed of as soon as practical to do so. Adequate protective measures shall be taken to prevent the erosion of stockpiled and/or placed materials and resultant sedimentation of adjacent spillways and related areas, watercourses, wetland areas or drainage facilities, during the course of performing the work. These include containing stockpiles using perimeter erosion controls and covering the stockpiles with 20-mil poly plastic sheeting overnight and in advance of forecast rainfall or as directed by the Engineer.

1.06 PROTECTION OF RESOURCE AREAS

A. The Contractor shall employ Best Management Practices (BMP's) throughout the conduct of the work of this Contract and ensure that impact on Mousam Lake, surrounding wetlands and the Mousam River is minimized.

B. The Contractor shall not store or discharge fuel oil, sewage, septic water or other deleterious substances into the Lake, River, or wetlands areas. The storage of fuel oil and refueling of equipment shall be restricted to designated areas approved by the Engineer, the Owner and regulatory agencies. Machinery shall not be refueled or washed within 100 feet of any resource area. Any spillage of deleterious substance (fuel oil, hazardous material, sewage, septic waste, etc.) shall be reported to the Contractor's Designated Representative, the Engineer, the Owner, and appropriate regulatory agency, by the Contractor and appropriate measures taken, (at costs solely borne by the Contractor) as determined by the regulatory agency, to contain and to clean up the affected areas. Any water that is pumped or bailed from

the excavations shall be conveyed by conduit or hose to a points of discharge approved by the Engineer. **Water shall be filtered through approved discharge area erosion controls and/or pumped water filter bag(s), constructed in such a manner so as to minimize velocities of discharge and to contain silt.** Sedimentation barriers shall be cleaned and/or replaced periodically to ensure effective control and protection of wetlands and water resource areas.

C. Contractor shall be in compliance with the State of Maine's Erosion and Sediment Control Law (Title 38 M.R.S.A. Section 420-C) and should conform to requirements of State of Maine Department of Transportation (MaineDOT) Standard Specifications, Section 656. The general BMP standard for contractors is outlined in the MDEP Maine Erosion and Sediment Control Practices Field Guide for Contractors.

1.07 RELATED WORK

The following is a list of related work items that shall be performed or furnished under other Sections of these Specifications as indicated.

A. Site Restoration – Section 01740

B. Demolition, Removal, and Disposal – Section 02065

C. Clearing, Grubbing, and Stripping – Section 02110

D. Earthwork – Section 02200

E. Rock and Boulder Excavation – Section 02201

F. Stone and Riprap – Section 02270

G. Loaming, Seeding, and Revegetation – Section 02930

1.08 SUBMITTALS

The Contractor shall complete and submit to the Owner all of the following submittal items consistent with submittal requirements prior to beginning any work on the Contract. All submittals shall be made within fifteen (15) working days after the Notice of Contract Award and prior to the Start of Work unless otherwise noted.

A. Submit qualifications demonstrating the Contractor is certified in erosion control practices by MDEP and approved to do work in the Shoreland Zone in accordance with Town and State requirements.

B. A written plan detailing the methods and layout of BMPs proposed to contain sediments, soils, and debris at the Site must be submitted to the Owner for review and approval prior to proceeding with the Work. If required by Permit, the plan shall also be submitted to MDEP or the Town of Shapleigh.

1. No work shall begin until the pollution, water, and erosion control schedules and plans have been approved by the Owner and Engineer.

2. If conditions change during construction, the Contractor shall revise the plan and resubmit to the Owner and Engineer for review and approval.

C. The methods and materials for proposed construction of individual BMP's, perimeter sedimentation controls or silt fence barriers shall be submitted to the Owner for review and approval prior to proceeding with the work of this Section.

D. The written plan shall detail the phasing of the installation and removal of the proposed BMPs, including which ones are to be left in place.

E. Submit a chemical and oil spill prevention and cleanup plan to be implemented by the Contractor in the event of any actual or suspected spill of any chemical, petroleum product, or waste water.

PART 2 - PRODUCTS

2.01 TEMPORARY GRASS SEED

A. Grass seed for temporary erosion control shall be Annual Ryegrass applied at a minimum rate of 2 pounds per 1,000 SF.

2.02 STRAW OR HAY BALES

A. Straw or hay bales used for erosion controls shall contain no living plant material to the extent practicable. Particular care shall be taken to ensure that straw or hay bales are free of invasive plant material and seeds. Straw or hay bales for use as sedimentation traps or perimeter barriers shall be rectangular shaped bales weighing at least forty (40) pounds per bale either wire-bound or string-tied. Bales shall be installed with bindings horizontal to the ground surface. Stakes for anchoring straw or hay bales shall be minimum one-inch by one-inch (1" x 1") construction grade timber.

2.03 SILT FENCE

A. Siltation fence shall be made of woven 5 mil industrial polypropylene (2.5 oz/s.y.) fabric. Coefficient of permeability shall be 0.009 cm./sec. with a water flow rate of 35 min./gal./s.f. Opening size shall be a maximum of 20 (U.S. Standard Sieve) with a minimum solids retention efficiency of 75%. Fabric shall be stable against ultraviolet radiation. Fabric width shall be three feet.

B. Siltation fence shall be "Envirofence" as manufactured by Mirafi Inc. Charlotte, North Carolina or approved equivalent. Stakes for anchoring the silt fence shall be one-inch by one-inch (1" x 1") construction grade timber. If necessary, the Contractor shall provide a backing mesh to provide stability to the silt fence fabric against blow over or knock down.

2.04 TURBIDITY CURTAIN

A. A pre-assembled medium duty system consisting of a geotextile curtain, flotation system, bottom weight and anchorage or securing mechanism shall be furnished suitable for use in waters subject to wind, waves, and currents.

1. Upstream turbidity curtain shall be Triton Type 1 Permeable Silt Barrier or approved equal.

B. The flotation system shall be closed cell polystyrene and shall be sufficient freeboard to prevent overtopping.

C. Hardware such as stakes, ballast chain, connection bolts, reinforcement, tension cables and other shall be galvanized, stainless steel, aluminum or otherwise corrosion resistant. The ballast chain shall be sufficient to maintain the curtain in a vertical position.

D. The length of turbidity curtain shall be selected to provide no greater than 1-foot of separation between the bottom of the channel and the bottom of the curtain.

2.05 SOIL MATERIAL

Soil material for use in sediment and erosion control measures shall conform to the specifications set out in Section 02200 – Earthwork. In general, all soil material must be clean, stable, and free or silt, clay, organics, rubble, and trash.

2.06 STONE AND ROCK

Stone and rock material for use in sediment and erosion control measures shall conform to the material specifications of the State of Maine Department of Transportation (MaineDOT) Standard Specifications (latest edition) and requirements outlined in the MDEP Maine Erosion and Sediment Control Practices Field Guide for Contractors. In general, all stone material must be clean, stable, and free or silt, clay, and organics. Sizing of crushed stone or riprap used for temporary erosion control shall be determined by the Contractor and shall be appropriate for expected flow rates and velocities. Storms with return periods of not less than two-years should be used in determining the sizing of stone and rock.

2.07 OTHER MATERIALS

Other materials required for completion of the work in this Section shall be of adequate quality and construction such that intended performance is satisfied.

PART 3 - EXECUTION

3.01 ANTICIPATED CONSTRUCTION SEQUENCE

The Anticipated Construction Sequence provided on the Contract Drawings, described in the referenced NRPA permit, is intended to provide guidance to the Contractor to help minimize the potential for events that result in transport of sediment outside of the work area. Changes to the Anticipated Construction Sequence may be warranted due to the field, construction, and weather

conditions during the course of performing the work, but will require written approval of the Owner or Engineer.

3.02 INITIAL CONSTRUCTION ACTIVITIES AND PRELIMINARY DRAINAGE CONTROL

A. The Contract Drawings show the deployment of silt fence and straw or hay bales around the work areas as well as around adjacent staging areas. The limits of these controls have been established based on anticipated site conditions at the start of construction. Prior to the installation of any silt fence and straw or hay bales, the Contractor, Owner, and the Engineer shall meet on site to discuss conditions. Any adjustments to the configuration shown on the Contract Drawings shall be discussed at that time and mutually agreed upon.

B. Prior to beginning any dewatering, clearing, stockpiling, demolition, grouting, excavation or filling, the Contractor shall perform the following sequence of implementation of sedimentation and siltation control measures.

1. Perform all necessary work to install all anticipated sedimentation barriers including but not necessarily limited to silt fence, straw/hay bales, turbidity curtain, stabilized construction entrances, and other items as necessary. Provide all necessary sedimentation and siltation control measures as required by the Owner and/or Engineer and regulatory agencies, to minimize sedimentation or siltation from occurring beyond the immediate limits of work.

2. In addition to initial sedimentation and siltation control set-up measures, take additional steps as necessary to minimize sedimentation and siltation within work areas and eliminate sedimentation and siltation outside of work areas throughout the conduct of the Work at no additional cost to the Owner.

3. Following initial setup of sediment and erosion controls, the site shall be inspected by the Owner and/or the Engineer. No work can continue until the Erosion controls meet the approval of the aforementioned.

4. Damaged or loose erosion control measures shall be replaced as necessary to maintain their function of controlling sedimentation and siltation.

C. Remove any accumulation of silt or soil build up behind silt fence and straw or hay bales or other erosion control barriers or siltation dams, as it occurs. Remove accumulations of silt and soil build up from siltation sumps, sedimentation basins, and silt traps as necessary to properly maintain their function.

D. Following periodic cleaning of all sedimentation controls and upon completion of the use of the controls, the accumulated sediment shall be allowed to dry prior to transporting to lawful on-site upland locations, where it will be stabilized in place. Costs of said stabilization shall be included as part of the price for this item stated on the Bid Proposal Form.

E. The Contractor shall repair any damage resulting from sedimentation or siltation during any optional subsurface exploration program or related activities and restore property to its prior condition at no additional cost to the Owner.

3.03 ADDITIONAL EROSION AND SEDIMENTATION CONTROLS

A. The Owner or the Engineer shall make periodic inspections of the site and shall advise the Contractor of the need for additional erosion and sedimentation controls necessary to meet the performance standards of this Section. Representatives of the MDEP and the Town of Shapleigh may also make inspections.

B. Additional erosion and sedimentation control necessary to deal with transient conditions on the site, such as following the placement of topsoil but prior to the establishment of grass cover, shall be provided by the Contractor as needed and at no additional cost to the Owner.

3.04 INSPECTION AND MAINTENANCE

A. Throughout the entire duration of the Contract (including periods when actual site work is being conducted), the Contractor shall perform weekly inspections of erosion and sediment control installations. Additional inspections shall be required immediately after each rain event exceeding one-half (0.5) inches in a 24-hour period. The Contractor shall develop a checklist to assist with periodic inspection and maintenance and shall keep completed copies of the checklist for each inspection on file along with the sediment and erosion control plan.

B. Throughout the entire duration of the Contract (including periods when actual site work is being conducted), the Contractor shall repair any damage resulting from sedimentation or erosion during construction and/or construction related activities and restore property to its prior condition at no additional cost to the Owner.

C. Throughout the entire duration of the Contract (including periods when actual site work is being conducted), the Contractor shall take such steps as are necessary to maintain the sediment and erosion controls in good working order, including repair or replacing controls and cleaning or removing sediment from controls.

D. The site entrance(s) shall be maintained in a condition that will prevent tracking or flow of mud onto public right-of-way or adjacent roadways. All materials spilled, dropped, washed, or tracked from vehicles onto roadways or into on- or off-site storm drains must be removed immediately.

E. In the event of inclement weather, the Contractor shall protect the site and materials from damage from the weather. If, in the opinion of the Owner or the Engineer, any portion of the Work or materials has been damaged by reason of failure on the part of the Contractor to so protect the Work, such Work and materials shall be removed and replaced with new materials and Work to the satisfaction of the Owner. Weather protection shall include all activities necessary to prevent the spread of sediment from wind, runoff, erosion, and other causes.

3.05 REMOVAL AND CLEANUP

After the site has been fully stabilized against erosion and upon the approval of the Owner and Engineer, remove sediment control devices and accumulated silt. Legally dispose of on-site all accumulated sediment and grade and seed in-place. All sedimentation and siltation control devices

such as, but not limited to siltation fencing, straw/hay bales, sand bags, and other related products shall be disposed of off-site. All removal and cleanup of sediment and erosion controls and accumulated sediment shall be done at no additional cost to the Owner and no separate pay item has been provided.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT FOR PAYMENT

A. Measurement of Temporary Erosion and Sedimentation Control including Silt Fence, Hay/Straw bales, turbidity curtain shall be a lump sum quantity.

4.02 PAYMENT

A. Payment for the scope of the work specified herein, including all labor, materials, equipment and incidentals and mobilization/demobilization costs to provide, install, maintain, and remove Temporary Erosion and Sedimentation Control shall be paid for at a lump sum cost as stated on the Form for Bid.

Item No.	Payment Item	Unit
01560.01	Temporary Erosion and Sedimentation Controls	Lump Sum

*** * * END OF SECTION * * ***

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Section 01560 – Attachment 1
Approved Project Permits

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
17 STATE HOUSE STATION AUGUSTA, MAINE 04333-0017

DEPARTMENT ORDER

IN THE MATTER OF

CITY OF SANFORD	) NATURAL RESOURCES PROTECTION ACT
Shapleigh, York County	) ADJACENT ACTIVITY
DAM ACCESS AND REPAIR	)
L-27797-2F-A-N (Approval)	) WATER QUALITY CERTIFICATION
L-27797-3E-B-N (Approval)	) FINDINGS OF FACT AND ORDER

Pursuant to the provisions of 38 M.R.S. §§ 480-A–480-JJ, Section 401 of the Federal Water Pollution Control Act (33 U.S.C. § 1341), and Chapters 310, 315, and 335 of Department rules, the Department of Environmental Protection has considered the application of CITY OF SANFORD with the supportive data, agency review comments, and other related materials on file and FINDS THE FOLLOWING FACTS:

1. PROJECT DESCRIPTION:

A. History of Project: The Department accepted a Natural Resources Protection Act (NRPA) Permit by Rule Notification Form (PBR #28453) on October 9, 2001 for dam repairs in accordance with Chapter 305, Section 4 Permit by Rule Standards.

B. Summary: The applicant proposes to expand an existing footpath to create a permanent access road, approximately 12-feet wide and 520-feet long, and vehicle turn-around area for dam repair and maintenance to service the Emery Mills Dam. The access road will be built within 18 feet of Mousam Lake. The dam is located at the southwest end of Mousam Lake, a Great Pond as defined by the NRPA 38 M.R.S.A. 480-B (5), is 230-feet long and 29-feet high and forms the headwaters of the Mousam River. The applicant will remove approximately 10 trees to construct the access road to the dam, however most of the stumps and roots will be left in place. The applicant also proposes significant improvements to the dam. Vegetation and roots will be removed where they have overgrown on the upriver abutment and the existing riprap will be replaced with a 12 feet wide by 75 feet long section of new clean riprap at a 2.5H:1V slope. The top of the existing sluiceway is 20-feet wide by 10-feet long, and will be reienforced with concrete, field stone, and/or rebar as needed. A new berm will be constructed on the eastern side of the dam and will be approximately 19-feet wide by 146-feet long. A temporary construction area downriver of the dam will be created to perform this work, however it will be re-vegetated with a seed mix and stabilized when the work is complete. The existing concrete spillway on the western side of the dam will be reinforced to support the dam from the downriver side. A six-inch perforated pipe toe drain will be installed within the new eastern berm and the spillway directing seepage discharge from Mousam Lake into the existing stone-lined sluiceway. The proposed project is shown on a set of plans, the first of which is titled, “Site Plan,” prepared by GZA GeoEnvironmental, Inc. Engineers and Scientists, and dated November 2017,

including a latest revision date on any of the sheets of March 2018. The project site is located off the west side of Deering Ridge Road near the intersection with Emery Mills Road in the Town of Shapleigh.

C. Current Use of the Site: The project site adjacent to the dam is vegetated with mature trees with a portion that includes a footpath to the resource. The existing dam was constructed in 1889 separating Mousam Lake from the Mousam River, and consists of an earthen embankment and a stone masonry wall along the downriver side. The parcel is identified as Lot 14 on Map 14 of the Town of Shapleigh's tax maps.

2. EXISTING SCENIC, AESTHETIC, RECREATIONAL OR NAVIGATIONAL USES:

The Natural Resources Protection Act (NRPA), in 38 M.R.S. §480-D(1), requires the applicant to demonstrate that the proposed project will not unreasonably interfere with existing scenic, aesthetic, recreational and navigational uses.

In accordance with Chapter 315, *Assessing and Mitigating Impacts to Scenic and Aesthetic Uses* (06-096 C.M.R. ch. 315, effective June 29, 2003), the applicant submitted a copy of the Department's Visual Evaluation Field Survey Checklist as Appendix A to the application along with a description of the property and the proposed project. The applicant also submitted several photographs of the proposed project site and surroundings, including an aerial photograph of the project site. Department staff visited the project site on September 1, 2016, and March 19, 2018.

The proposed project is located within and adjacent to Mousam Lake and the Mousam River, which are scenic resources visited by the general public, in part, for the use, observation, enjoyment and appreciation of its natural and cultural visual qualities. The applicant has minimized tree removal and proposed two vegetated areas to reduce the visibility of the access way from the scenic resource as well as direct stormwater run-off.

The Department staff utilized the Department's Visual Impact Assessment Matrix in its evaluation of the proposed project and the Matrix showed an acceptable potential visual impact rating for the proposed project. Based on the information submitted in the application, the visual impact rating, and the site visit, the Department determined that the location and scale of the proposed activity is compatible with the existing visual quality and landscape characteristics found within the viewshed of the scenic resource in the project area.

The Department determined that based on the nature of the proposed project and its location, there are no existing recreational or navigational uses of the resource that would be unreasonably impacted.

The Department finds that the proposed activity will not unreasonably interfere with existing scenic, aesthetic, recreational or navigational uses of the Mousam River or Mousam Lake.

3. SOIL EROSION:

The NRPA, in 38 M.R.S. §480-D(2), requires the applicant to demonstrate that the proposed project will not cause unreasonable erosion of soil or sediment nor unreasonably inhibit the natural transfer of soil from the terrestrial to the marine or freshwater environment.

Work to the dam will take place in phases, dependent on timing of Mousam Lake water levels. The in-water work proposed for the replacement of riprap will be performed during the winter drawdown period to facilitate access to the riprap abutment. A silt curtain (also referred to as turbidity curtain or barrier) will be used in Mousam Lake at the five-foot lake depth during construction in this area. The silt curtain will keep sediment from migrating from the construction site into the rest of Mousam Lake. Limited permeation grouting will occur within the earthen embankment but no in-water work is proposed. Permanent erosion control measures will include stone check dams within ditches along the access road and turnouts. Temporary erosion control measures will include silt fence and hay bales, to manage stormwater within the temporary work area on the downriver side of the dam and along the downslope side of the access road during construction.

The Department finds that the activity will not cause unreasonable erosion of soil or sediment nor unreasonably inhibit the natural transfer of soil from the terrestrial to the marine or freshwater environment.

4. HABITAT CONSIDERATIONS:

The NRPA, in 38 M.R.S. §480-D(3), requires the applicant to demonstrate that the proposed project will not unreasonably harm significant wildlife habitat, freshwater wetland plant habitat, threatened or endangered plant habitat, aquatic or adjacent upland habitat, travel corridor, freshwater, estuarine or marine fisheries or other aquatic life.

The project site adjacent to the dam is vegetated with mature trees. There is a previously existing path to the resource within a portion of this area. The project site slopes downhill towards Mousam Lake and the Emery Mills dam. The dam consists of an earthen embankment and a stone masonry wall along the downriver side which separates the lake from the river. Mature trees and vegetation exist on both banks on the upriver and downriver side.

According to the Department's Geographic Information System (GIS) database there are no mapped Essential or Significant Wildlife Habitats located at the site.

The Maine Department of Inland Fisheries and Wildlife (MDIFW) reviewed the proposed project and stated silt curtains and clean riprap be used to minimize sedimentation. MDIFW further commented that in-water grouting is not proposed and they had no concerns regarding grouting. However, prevention of uncured concrete from getting into the water should be a priority. If contact were to occur, grout should be

applied in a slurry at a rate of two cubic yards per hour to reduce the likelihood of elevated pH values downriver. Turbidity curtains if practicable should be installed (in flows ≤1 foot per second) to separate high pH water from the rest of the river. An anti-washout admixture should be mixed with the grout prior to application. The applicant responded that they would add silt curtains and clarify the application details to show clean riprap. Although proposed grouting is not expected to get into the river, if this were to occur the applicant would follow MDIFW's comments.

The Department finds that the activity will not unreasonably harm any significant wildlife habitat, freshwater wetland plant habitat, threatened or endangered plant habitat, aquatic or adjacent upland habitat, travel corridor, freshwater, estuarine or marine fisheries or other aquatic life.

5. WATER QUALITY CONSIDERATIONS:

As discussed in Finding 3, the applicant proposes to use erosion and sediment control during construction to minimize impacts to water quality from siltation. As discussed in Finding 4 above, the applicant will take precautions to prevent water quality impacts from the placement of grout in the dam. Uncured concrete may not be placed directly into the water. No washing of tools, forms, etc. may occur in or adjacent to the waterbody.

The Department does not anticipate that the proposed project will violate any state water quality law, including those governing the classification of the State's waters, provided no concrete is poured directly into the water and no washing of tools forms, etc. occurs in or adjacent to a waterbody.

6. WETLANDS AND WATERBODIES PROTECTION RULES:

The applicant proposes to construct an approximately 12-feet wide and 520-feet long access road for maintenance that will be adjacent to Mousam Lake. A berm will be installed adjacent to the Mousam River on the eastern side of the dam and will be approximately 19-feet wide by 146-feet long. Riprap will be replaced on the western side of the dam in an approximately 12-foot wide by 75-foot long segment. The lower portion of the riprap is below the natural high water line. The applicant also proposes several maintenance and repair projects including replacing riprap to the dam.

The *Wetlands and Waterbodies Protection Rules*, 06-096 C.M.R. ch. 310 (last amended January 26, 2009), interpret and elaborate on the Natural Resources Protection Act (NRPA) criteria for obtaining a permit. The rules guide the Department in its determination of whether a project's impacts would be unreasonable. A proposed project would generally be found to be unreasonable if it would cause a loss in wetland area, functions and values and there is a practicable alternative to the project that would be less damaging to the environment. Each application for a NRPA permit that involves a Great

Pond or River alteration must provide an analysis of alternatives in order to demonstrate that a practicable alternative does not exist.

A. Avoidance. An applicant must submit an analysis of whether there is a practicable alternative to the project that would be less damaging to the environment and this analysis is considered by the Department in its assessment of the reasonableness of any impacts. The applicant submitted an alternatives analysis for the proposed project completed by GZA GeoEnvironmental, Inc. The purpose of the proposed project is to repair and make improvements to the Emery Mills Dam and to create a permanent access road for future maintenance. If the dam were not repaired, failure to address the existing issues could lead to further deterioration of the dam that will lead to potential failure. The dam controls water levels within Mousam Lake as well as the Mousam River and provides some measure of flood storage and protection for downriver communities including Sanford and Kennebunk. Loss of the dam may result in impacts to the lake, river, downriver communities and the loss of access for several residences along Deering Ridge Road across the Mousam River to Route 109. Therefore, the no-action alternative was determined to be impracticable. Resolving seepage and other deterioration issues by raising the dam was not considered a viable alternative because it would have been cost prohibitive and would increase upriver flooding in areas surrounding Mousam Lake. Additional alternatives for dam repairs were considered, however most were determined to be cost prohibitive and not economically feasible. A temporary access road was considered as an alternative to constructing the access road, however was not a viable option because removal would result in ongoing disturbance and disruption of the areas surrounding the dam. An access road along the Mousam River from Deering Ridge Road was also considered as an alternative, however this would impact a freshwater forested wetland within 100 feet of the Mousam River. The applicant found no practicable alternative to the proposed project, including dam repairs and improvements and construction of the access road.

B. Minimal Alteration. In support of an application and to address the analysis of the reasonableness of any impacts of a proposed project, an applicant must demonstrate that the amount of area above and adjacent to Mousam Lake and the Mousam River to be altered will be kept to the minimum amount necessary for meeting the overall purpose of the project. The applicant proposed a temporary construction area downriver of the dam, which once work is complete will be seeded and appropriately stabilized. The applicant has proposed to leave most of the roots and stumps from the trees that will be removed and the applicant has avoided any proposed impacts to the nearby forested freshwater wetland by proposing an access road within upland area, adjacent to the dam. The applicant stated that the proposed project minimizes impacts adjacent and above both resources to the greatest practicable extent.

C. Compensation. In accordance with1 Chapter 310 §5(C)(6)(c), compensation may be required to achieve the goal of no net loss of great pond functions and values if a project places fill below the normal high water line of a great pond, except for the purpose of shoreline stabilization. Further, the proposed project will not have an adverse

impact on wildlife habitat as determined by MDIFW. For these reasons, the Department determined that compensation is not required.

The Department finds that the applicant has avoided and minimized Mousam Lake and Mousam River impacts to the greatest extent practicable, and that the proposed project represents the least environmentally damaging alternative that meets the overall purpose of the project.

7. OTHER CONSIDERATIONS:

The Department finds, based on the design, proposed construction methods, and location, the proposed project will not inhibit the natural transfer of soil from the terrestrial to the marine environment, will not interfere with the natural flow of any surface or subsurface waters, and will not cause or increase flooding. The proposed project is not located in a coastal sand dune system, is not a crossing of an outstanding river segment, and does not involve dredge spoils disposal or the transport of dredge spoils by water.

BASED on the above findings of fact, and subject to the conditions listed below, the Department makes the following conclusions pursuant to 38 M.R.S. §§ 480-A–480-JJ and Section 401 of the Federal Water Pollution Control Act:

A. The proposed activity will not unreasonably interfere with existing scenic, aesthetic, recreational, or navigational uses.

B. The proposed activity will not cause unreasonable erosion of soil or sediment.

C. The proposed activity will not unreasonably inhibit the natural transfer of soil from the terrestrial to the marine or freshwater environment.

D. The proposed activity will not unreasonably harm any significant wildlife habitat, freshwater wetland plant habitat, threatened or endangered plant habitat, aquatic or adjacent upland habitat, travel corridor, freshwater, estuarine, or marine fisheries or other aquatic life.

E. The proposed activity will not unreasonably interfere with the natural flow of any surface or subsurface waters.

F. The proposed activity will not violate any state water quality law including those governing the classifications of the State's waters, provided the applicant meets the requirements in Finding 5 above.

G. The proposed activity will not unreasonably cause or increase the flooding of the alteration area or adjacent properties.

H. The proposed activity is not on or adjacent to a sand dune.

I. The proposed activity is not on an outstanding river segment as noted in 38 M.R.S. § 480-P.

THEREFORE, the Department APPROVES the above noted application of the CITY OF SANFORD to construct an access road and perform multiple repairs the Emery Mills Dam as described in Finding 1, SUBJECT TO THE ATTACHED CONDITIONS, and all applicable standards and regulations:

1. Standard Conditions of Approval, a copy attached.

2. The applicant shall take all necessary measures to ensure that their activities or those of their agents do not result in measurable erosion of soil on the site during the construction of the project covered by this approval.

3. Severability. The invalidity or unenforceability of any provision, or part thereof, of this License shall not affect the remainder of the provision or any other provisions. This License shall be construed and enforced in all respects as if such invalid or unenforceable provision or part thereof had been omitted.

4. Uncured concrete shall not be placed directly into the water. Washing of tools, forms, etc. shall not occur in or adjacent to the waterbody,

THIS APPROVAL DOES NOT CONSTITUTE OR SUBSTITUTE FOR ANY OTHER REQUIRED STATE, FEDERAL OR LOCAL APPROVALS NOR DOES IT VERIFY COMPLIANCE WITH ANY APPLICABLE SHORELAND ZONING ORDINANCES.

DONE AND DATED IN AUGUSTA, MAINE, THIS 24TH DAY OF APRIL, 2018.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: Mark Byron
For: Paul Mercer, Commissioner

Filed
APR 24 2018
State of Maine
Board of Environmental Protection

PLEASE NOTE THE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES.

JH/L27797ANBN/ATS#82651,83055

Natural Resources Protection Act (NRPA)
Standard Conditions

THE FOLLOWING STANDARD CONDITIONS SHALL APPLY TO ALL PERMITS GRANTED UNDER THE NATURAL RESOURCES PROTECTION ACT, 38 M.R.S. § 480-A ET SEQ., UNLESS OTHERWISE SPECIFICALLY STATED IN THE PERMIT.

A. Approval of Variations From Plans. The granting of this permit is dependent upon and limited to the proposals and plans contained in the application and supporting documents submitted and affirmed to by the applicant. Any variation from these plans, proposals, and supporting documents is subject to review and approval prior to implementation.

B. Compliance With All Applicable Laws. The applicant shall secure and comply with all applicable federal, state, and local licenses, permits, authorizations, conditions, agreements, and orders prior to or during construction and operation, as appropriate.

C. Erosion Control. The applicant shall take all necessary measures to ensure that his activities or those of his agents do not result in measurable erosion of soils on the site during the construction and operation of the project covered by this Approval.

D. Compliance With Conditions. Should the project be found, at any time, not to be in compliance with any of the Conditions of this Approval, or should the applicant construct or operate this development in any way other the specified in the Application or Supporting Documents, as modified by the Conditions of this Approval, then the terms of this Approval shall be considered to have been violated.

E. Time frame for approvals. If construction or operation of the activity is not begun within four years, this permit shall lapse and the applicant shall reapply to the Board for a new permit. The applicant may not begin construction or operation of the activity until a new permit is granted. Reapplications for permits may include information submitted in the initial application by reference. This approval, if construction is begun within the four-year time frame, is valid for seven years. If construction is not completed within the seven-year time frame, the applicant must reapply for, and receive, approval prior to continuing construction.

F. No Construction Equipment Below High Water. No construction equipment used in the undertaking of an approved activity is allowed below the mean high water line unless otherwise specified by this permit.

G. Permit Included In Contract Bids. A copy of this permit must be included in or attached to all contract bid specifications for the approved activity.

H. Permit Shown To Contractor. Work done by a contractor pursuant to this permit shall not begin before the contractor has been shown by the applicant a copy of this permit.

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
17 STATE HOUSE STATION, AUGUSTA, MAINE 04333

Erosion Control for Homeowners

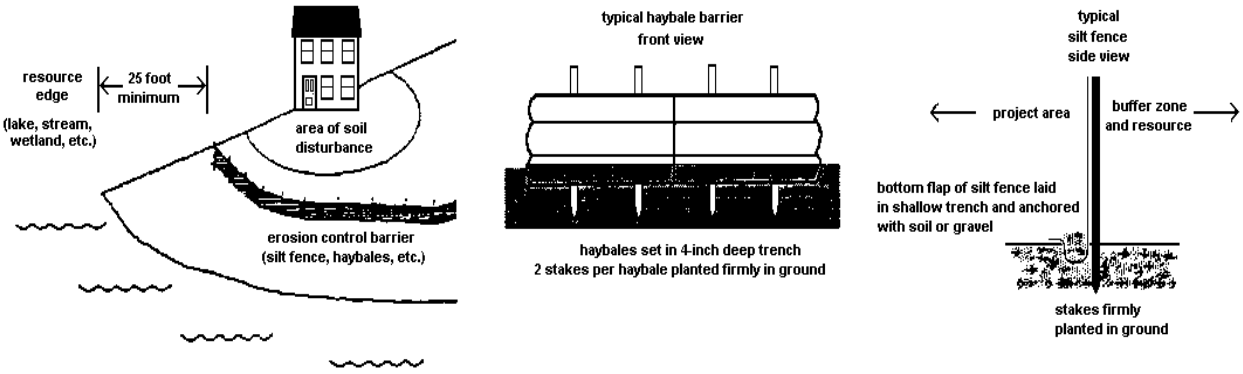
Before Construction

1. If you have hired a contractor, make sure you discuss your permit with them. Talk about what measures they plan to take to control erosion. Everybody involved should understand what the resource is, and where it is located. Most people can identify the edge of a lake or river. However, the edges of wetlands are often not so obvious. Your contractor may be the person actually pushing dirt around, but you are both responsible for complying with the permit.

2. Call around to find where erosion control materials are available. Chances are your contractor has these materials already on hand. You probably will need silt fence, hay bales, wooden stakes, grass seed (or conservation mix), and perhaps filter fabric. Places to check for these items include farm & feed supply stores, garden & lawn suppliers, and landscaping companies. It is not always easy to find hay or straw during late winter and early spring. It also may be more expensive during those times of year. Plan ahead -- buy a supply early and keep it under a tarp.

3. Before any soil is disturbed, make sure an erosion control barrier has been installed. The barrier can be either a silt fence, a row of staked hay bales, or both. Use the drawings below as a guide for correct installation and placement. The barrier should be placed as close as possible to the soil-disturbance activity.

4. If a contractor is installing the erosion control barrier, double check it as a precaution. Erosion control barriers should be installed "on the contour", meaning at the same level or elevation across the land slope, whenever possible. This keeps stormwater from flowing to the lowest point along the barrier where it can build up and overflow or destroy the barrier.



During Construction

1. Use lots of hay or straw mulch on disturbed soil. The idea behind mulch is to prevent rain from striking the soil directly. It is the force of raindrops hitting the bare ground that makes the soil begin to move downslope with the runoff water, and cause erosion. More than 90% of erosion is prevented by keeping the soil covered.

2. Inspect your erosion control barriers frequently. This is especially important after a rainfall. If there is muddy water leaving the project site, then your erosion controls are not working as intended. You or your contractor then need to figure out what can be done to prevent more soil from getting past the barrier.

3. Keep your erosion control barrier up and maintained until you get a good and healthy growth of grass and the area is permanently stabilized.

After Construction

1. After your project is finished, seed the area. Note that all ground covers are not equal. For example, a mix of creeping red fescue and Kentucky bluegrass is a good choice for lawns and other high-maintenance areas. But this same seed mix is a poor selection for stabilizing a road shoulder or a cut bank that you don't intend to mow. Your contractor may have experience with different seed mixes, or you might contact a seed supplier for advice.

2. Do not spread grass seed after September 15. There is the likelihood that germinating seedlings could be killed by a frost before they have a chance to become established. Instead, mulch the area with a thick layer of hay or straw. In the spring, rake off the mulch and then seed the area. Don't forget to mulch again to hold in moisture and prevent the seed from washing away or being eaten by birds or other animals.

3. Keep your erosion control barrier up and maintained until you get a good and healthy growth of grass and the area is permanently stabilized.

Why Control Erosion?

To Protect Water Quality

When soil erodes into protected resources such as streams, rivers, wetlands, and lakes, it has many bad effects. Eroding soil particles carry phosphorus to the water. An excess of phosphorus can lead to explosions of algae growth in lakes and ponds called blooms. The water will look green and can have green slime in it. If you are near a lake or pond, this is not pleasant for swimming, and when the soil settles out on the bottom, it smothers fish eggs and small animals eaten by fish. There many other effects as well, which are all bad.

To Protect the Soil

It has taken thousands of years for our soil to develop. It usefulness is evident all around us, from sustaining forests and growing our garden vegetables, to even treating our septic wastewater! We cannot afford to waste this valuable resource.

To Save Money ($$)

Replacing topsoil or gravel washed off your property can be expensive. You end up paying twice because State and local governments wind up spending your tax dollars to dig out ditches and storm drains that have become choked with sediment from soil erosion.

DEP INFORMATION SHEET

Appealing a Department Licensing Decision

Dated: March 2012 **Contact: (207) 287-2811**

SUMMARY

There are two methods available to an aggrieved person seeking to appeal a licensing decision made by the Department of Environmental Protection's ("DEP") Commissioner: (1) in an administrative process before the Board of Environmental Protection ("Board"); or (2) in a judicial process before Maine's Superior Court. An aggrieved person seeking review of a licensing decision over which the Board had original jurisdiction may seek judicial review in Maine's Superior Court.

A judicial appeal of final action by the Commissioner or the Board regarding an application for an expedited wind energy development (35-A M.R.S.A. § 3451(4)) or a general permit for an offshore wind energy demonstration project (38 M.R.S.A. § 480-HH(1)) or a general permit for a tidal energy demonstration project (38 M.R.S.A. § 636-A) must be taken to the Supreme Judicial Court sitting as the Law Court.

This INFORMATION SHEET, in conjunction with a review of the statutory and regulatory provisions referred to herein, can help a person to understand his or her rights and obligations in filing an administrative or judicial appeal.

I. ADMINISTRATIVE APPEALS TO THE BOARD

LEGAL REFERENCES

The laws concerning the DEP's *Organization and Powers*, 38 M.R.S.A. §§ 341-D(4) & 346, the *Maine Administrative Procedure Act*, 5 M.R.S.A. § 11001, and the DEP's *Rules Concerning the Processing of Applications and Other Administrative Matters* ("Chapter 2"), 06-096 CMR 2 (April 1, 2003).

HOW LONG YOU HAVE TO SUBMIT AN APPEAL TO THE BOARD

The Board must receive a written appeal within 30 days of the date on which the Commissioner's decision was filed with the Board. Appeals filed after 30 calendar days of the date on which the Commissioner's decision was filed with the Board will be rejected.

HOW TO SUBMIT AN APPEAL TO THE BOARD

Signed original appeal documents must be sent to: Chair, Board of Environmental Protection, c/o Department of Environmental Protection, 17 State House Station, Augusta, ME 04333-0017; faxes are acceptable for purposes of meeting the deadline when followed by the Board's receipt of mailed original documents within five (5) working days. Receipt on a particular day must be by 5:00 PM at DEP's offices in Augusta; materials received after 5:00 PM are not considered received until the following day. The person appealing a licensing decision must also send the DEP's Commissioner a copy of the appeal documents and if the person appealing is not the applicant in the license proceeding at issue the applicant must also be sent a copy of the appeal documents. All of the information listed in the next section must be submitted at the time the appeal is filed. Only the extraordinary circumstances described at the end of that section will justify evidence not in the DEP's record at the time of decision being added to the record for consideration by the Board as part of an appeal.

WHAT YOUR APPEAL PAPERWORK MUST CONTAIN

Appeal materials must contain the following information at the time submitted:

1. *Aggrieved Status*. The appeal must explain how the person filing the appeal has standing to maintain an appeal. This requires an explanation of how the person filing the appeal may suffer a particularized injury as a result of the Commissioner's decision.
2. *The findings, conclusions or conditions objected to or believed to be in error.* Specific references and facts regarding the appellant's issues with the decision must be provided in the notice of appeal.
3. *The basis of the objections or challenge.* If possible, specific regulations, statutes or other facts should be referenced. This may include citing omissions of relevant requirements, and errors believed to have been made in interpretations, conclusions, and relevant requirements.
4. *The remedy sought.* This can range from reversal of the Commissioner's decision on the license or permit to changes in specific permit conditions.
5. *All the matters to be contested*. The Board will limit its consideration to those arguments specifically raised in the written notice of appeal.
6. *Request for hearing.* The Board will hear presentations on appeals at its regularly scheduled meetings, unless a public hearing on the appeal is requested and granted. A request for public hearing on an appeal must be filed as part of the notice of appeal.
7. *New or additional evidence to be offered.* The Board may allow new or additional evidence, referred to as supplemental evidence, to be considered by the Board in an appeal only when the evidence is relevant and material and that the person seeking to add information to the record can show due diligence in bringing the evidence to the DEP's attention at the earliest possible time in the licensing process or that the evidence itself is newly discovered and could not have been presented earlier in the process. Specific requirements for additional evidence are found in Chapter 2.

OTHER CONSIDERATIONS IN APPEALING A DECISION TO THE BOARD

1. *Be familiar with all relevant material in the DEP record.* A license application file is public information, subject to any applicable statutory exceptions, made easily accessible by DEP. Upon request, the DEP will make the material available during normal working hours, provide space to review the file, and provide opportunity for photocopying materials. There is a charge for copies or copying services.
2. *Be familiar with the regulations and laws under which the application was processed, and the procedural rules governing your appeal.* DEP staff will provide this information on request and answer questions regarding applicable requirements.
3. *The filing of an appeal does not operate as a stay to any decision.* If a license has been granted and it has been appealed the license normally remains in effect pending the processing of the appeal. A license holder may proceed with a project pending the outcome of an appeal but the license holder runs the risk of the decision being reversed or modified as a result of the appeal.

WHAT TO EXPECT ONCE YOU FILE A TIMELY APPEAL WITH THE BOARD

The Board will formally acknowledge receipt of an appeal, including the name of the DEP project manager assigned to the specific appeal. The notice of appeal, any materials accepted by the Board Chair as supplementary evidence, and any materials submitted in response to the appeal will be sent to Board members with a recommendation from DEP staff. Persons filing appeals and interested persons are notified in advance of the date set for Board consideration of an appeal or request for public hearing. With or without holding a public hearing, the Board may affirm, amend, or reverse a Commissioner decision or remand the matter to the Commissioner for further proceedings. The Board will notify the appellant, a license holder, and interested persons of its decision.

II. JUDICIAL APPEALS

Maine law generally allows aggrieved persons to appeal final Commissioner or Board licensing decisions to Maine's Superior Court, see 38 M.R.S.A. § 346(1); 06-096 CMR 2; 5 M.R.S.A. § 11001; & M.R. Civ. P 80C. A party's appeal must be filed with the Superior Court within 30 days of receipt of notice of the Board's or the Commissioner's decision. For any other person, an appeal must be filed within 40 days of the date the decision was rendered. Failure to file a timely appeal will result in the Board's or the Commissioner's decision becoming final.

An appeal to court of a license decision regarding an expedited wind energy development, a general permit for an offshore wind energy demonstration project, or a general permit for a tidal energy demonstration project may only be taken directly to the Maine Supreme Judicial Court. See 38 M.R.S.A. § 346(4).

Maine's Administrative Procedure Act, DEP statutes governing a particular matter, and the Maine Rules of Civil Procedure must be consulted for the substantive and procedural details applicable to judicial appeals.

ADDITIONAL INFORMATION

If you have questions or need additional information on the appeal process, for administrative appeals contact the Board's Executive Analyst at (207) 287-2452 or for judicial appeals contact the court clerk's office in which your appeal will be filed.

Note: The DEP provides this INFORMATION SHEET for general guidance only; it is not intended for use as a legal reference. Maine law governs an appellant's rights.

SECTION 01740
SITE RESTORATION

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The work under this Section shall consist of all work and operations, including, but not limited to equipment, supplies, material, personnel, and incidentals to restore areas in and around the project site to pre-construction conditions.

B. The intent of the Work of this Section is that areas which are disturbed as a result of the overall Work of this Contract, whether intentionally or unintentionally, planned or unplanned, are restored to at or better than their conditions prior to the start of work. The Scope of Work under this Section shall also include both significant and incidental work necessary to repair damage to the site beyond those areas shown as disturbed on the Project Drawings. Areas to be restored shall include, but not be limited to, locations of trailers, laydown areas, construction access roads, etc. Facilities to be restored include paving, grassed areas, trees, and utilities.

C. It is the intent of the Contract that the Contractor avoid and minimize indirect construction impact to the maximum extent possible. To this end, the site and surrounding areas should be protected, as needed and as provided for under separate Sections of the Contract. The Contractor should also develop a plan to protect the site and inform and educate his forces regarding protective measures to be implemented. This Section covers the restoration of damage caused by unavoidable or inadvertent actions by the Contractor's forces, including all sub-contractors, material deliverers, and others under the Contractor's employ or authority. It is the intent of the Contract that the work of this Section be minimized to the extent possible by the Contractor's actions to avoid damage to the site and area.

1.02 DOCUMENTATION OF EXISTING CONDITIONS

Prior to the start of work, and in conjunction with the requirements of Section 01436, the Contractor shall be responsible for documenting the pre-construction conditions of those areas which might be disturbed by the Work of the Contract, including, but not limited to, Emery Mills Road at the site entrance, private driveways and parking areas, existing stone walls, trees, utilities, and other site features. This documentation, in the form of photographs and/or video tapes, and written documentation shall be provided to the Owner. This documentation shall be used to determine the extent to which post-construction site restoration shall be needed.

1.03 PROTECTION OF EXISTING FEATURES

The Contractor shall take such steps and measures as are necessary to protect the project site and adjacent areas from damage by construction activities and thereby minimize the extent of work to be done under this Section. Site protection and restoration shall be paid for as incidental to the Scope of other Sections.

1.04 SUBMITTALS

A. The Contractor shall submit a pre-construction site documentation package to the Owner.

B. The Contractor shall submit information, as needed, on site restoration methods and materials to be used in restoring site conditions (if necessary).

1.05 RELATED WORK

The following is a list of related work items that shall be performed or furnished under other Section of these Specifications as indicated.

A. Vibration and Deformation Monitoring – Section 01436

B. Temporary Erosion and Sediment Controls – Section 01560

C. Loaming, Seeding, and Revegetation – Section 02930

PART 2 – PRODUCTS

Products used in Site Restoration shall meet the requirements of the applicable Section(s) of the Contract Documents. If work similar to the nature of the necessary site restoration is not specified elsewhere in the Contract Documents, the applicable section of the State of Maine Department of Transportation (MaineDOT) Standard Specifications, shall control. Materials for restoration of utilities shall meet with the standards of the Owner or the utility to be restored.

PART 3 – EXECUTION

3.01 GENERAL

The work required and services for site restoration shall be done in a safe workmanlike manner and shall conform to any pertinent local or state law, regulation or code. Good housekeeping consistent with safety shall be maintained. The Contractor shall be responsible for all necessary permits and approvals.

3.02 PRE-CONSTRUCTION SITE DOCUMENTATION

Prior to the start of work at the site, the Contractor shall coordinate with the Owner and the Engineer to perform a pre-construction site walk for the purposes of documenting conditions prior to disturbance by the Contractor's forces and equipment, in addition to and conjunction with the pre-construction survey required by Section 01436. The Owner and/or Engineer shall accompany the Contractor during the site walk, but it shall be the Contractor's sole responsibility to properly document existing conditions in all areas which might be subject to disturbance. The Contractor shall utilize photographs, video, written descriptions, sketches, and any other means to document pre-construction conditions. The Contractor shall supply the Owner with one copy each of the documentation, including both hard copies and digital files, as appropriate. The Owner alone shall be empowered to make decisions about the pre-construction condition of areas not covered by the Contractor's documentation.

3.03 RESTORATION METHODOLOGY

Means of Site Restoration shall meet the requirements of the applicable Section(s) of the Contract Documents. If work similar to the nature of the necessary site restoration is not specified elsewhere in the Contract Documents, the applicable section of the State of Maine Department of Transportation

(MaineDOT) Standard Specification and Maine Department of Environmental Protection (MDEP) Stormwater Best Management Practices Manual shall be provided, as needed, at no additional cost.

3.04 RESTORATION OF ROADS

A. The Contractor shall be required to repair any damage to public roadways caused during the course of construction, in order to return the roads to pre-construction condition or better.

B. Restoration of paved areas shall be done with similar materials and paving characteristics.

C. The Owner or Town shall determine the appropriateness of proposed restorations (e.g. spot patching, full depth repaving, etc.)

3.05 RESTORATION OF VEGETATED AREAS

A. The Contractor shall be responsible for restoring all vegetated areas within and beyond the indicated limits of work disturbed during the work of this Contract. Restoration shall include, but not be limited to, loam placement, regrading, seeding, re-sodding, mulching, and maintenance. If growth can not be immediately established due to season, restoration will also include use of an approved temporary erosion control mat in accordance with the Maine BMPs and manufacturer's recommendations. The intent is to restore damaged areas to pre-construction condition or better. Loaming, seeding, and revegetation of areas which are shown on the plans as being filled, excavated, or graded shall be paid for under a separate Section of the Contract (02930). Loaming, seeding, and revegetation of other areas, including areas disturbed by construction traffic, trailer placement, material stockpiling, etc. shall be paid for under the pay item for this Section.

B. The Contractor shall be responsible for maintenance and care of all restored vegetated areas until establishment.

3.06 TREES

A. The Contractor shall be responsible for pruning and other actions necessary to repair construction-related damage to trees which are shown to remain in place or are outside of the construction areas.

B. The Contractor shall hire a certified arborist to perform restoration work on large trees, if judged necessary by the Owner.

3.07 GROUT SPOILS

The Contractor shall be responsible for protecting existing features to remain from deposition of grout spoil and shall remove all grout spoils from the site and clean existing features to the satisfaction of the Owner.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT FOR PAYMENT

No measurement shall be made for Site Restoration. The bid item for Site Restoration is a lump sum quantity.

4.02 PAYMENT

Payment for Site Restoration associated with the work of the contract will be paid for based on the Lump Sum price stated for Item No. 01740.01 on the Form for Bid.

Item No.	Payment Item	Unit
01740.01	Site Restoration	Lump Sum

*** * * END OF SECTION * * ***

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SECTION 02065
DEMOLITION, REMOVAL, AND DISPOSAL

PART 1 – GENERAL

1.01 DESCRIPTION

A. This Section describes the general parameters and requirements for dismantling, relocation, demolition, removal, off-site stockpiling and lawful off-site disposal of certain existing materials and structures at the Emery Mills Dam work site.

B. The work of this section will include removal of existing material, some of which may be re-used as part of the final project configuration.

C. The Contractor shall obtain all necessary permits, including local, state, and federal permits, coordinate all required inspections with appropriate agencies, and conduct all work in accordance with all local, state, and federal rules, regulations, and guidance.

D. If necessary, the scope of this item shall also include all work, materials, labor, and other costs associated with the design, installation, and removal of any temporary earth support systems required during demolition existing structures and subsequent construction of proposed structures.

1.02 SCOPE OF WORK

The scope of Work of this Section shall include the following:

A. The scope of the Work of this Section shall include the demolition, removal, and disposal of the existing reinforced concrete apron on top of the left (north) side of the gatehouse, as indicated on the Contract Drawings

B. Removal of existing stone paving on the upstream slope of the dam embankment, along the left training wall of the gatehouse; and stockpiling and transport of usable blocks to a City of Sanford maintenance facility, if directed by the Owner.

C. Removal and disposal of the unsuitable excavated soil wood and vegetative matter, and rock generated from within the left side, upstream embankment and access roadway work shall be performed under separate Sections.

D. The removal and disposal of all miscellaneous materials and debris at the job site, including timber, trash, wood chips, mulch, and other materials such as existing guardrails, handrails, above and below grade shall be considered incidental to the other pay items in this or other Sections of the Work.

1.03 EXISTING CONDITIONS IN THE WORK AREA

A. Emery Mills Dam consists of an approximately 230-foot-long earth embankment with a stone masonry wall along the downstream side. The dam has a top width ranging from approximately 5 feet at the abutments to approximately 15 feet at the gatehouse. The stone masonry wall ranges in height from approximately 3 feet at the left abutment to

approximately 13 feet at the gatehouse. A concrete apron runs from the gatehouse for approximately 15 along the left side, upstream embankment. The remainder of the 90 feet of the left side, upstream embankment consists of grass or thick vegetation consisting of small brush.

B. Test borings were drilled through the embankment and through and near the concrete slab in March of 2019. The locations of the borings are shown on sheet 4 of the contract drawings. The logs of the borings are attached to section 02340 of these specifications.

C. There are no records regarding the construction of the concrete slab to be demolished, and it's connection to the existing gatehouse and/or stone masonry downstream wall. The Contractor is also notified that the stone masonry wall is an important structural feature of the dam and is thought to play an important role in limiting seepage through the embankment. The Contractor shall perform no demolition of the stone masonry and special care must be taken by the Contractor to preserve the structural integrity of the Gatehouse and the stone masonry and to restore disturbed or damaged portions of both structures as directed by the Owner or Engineer.

D. The Contractor's attention is brought to the fact that the work of this Contract is located adjacent to, and in areas of the Mousam Lake and Mousam River. As such demolition activities shall protect the adjacent waterbodies and wetland resource areas from ingress of demolition debris .

1.04 SALVAGE

A. Debris resulting from demolition activities shall be segregated and recycled to the greatest extent possible. Salvage value accrues to the Contractor, except in cases where material is specifically reserved by the Owner. Material that the Owner does not request shall become the property of the Contractor.

B. Material salvaged for the Owner by the Contractor shall be handled with care so as to not damage the material, to the extent possible. Material salvaged for the Owner shall be transported and placed in a storage location designated by the Owner, at no additional cost to the Owner.

1.05 PROJECT CONDITIONS

A. Explosives: Blasting and use of explosives is not permitted.

B. Burning: Burning on site is not permitted.

C. Protection: The Contractor shall prevent injury to persons and damage to abutting property in conjunction with Sections 01436 and 01740. The Contractor shall further provide adequate shoring and bracing to prevent uncontrolled collapse and immediately repair damaged property to its condition prior to being damaged.

D. The Contractor shall carefully examine all the Contract Documents for requirements that affect the work of this Section. Certain construction, systems, or equipment identified in the Contract Documents or by the Engineer in the field shall remain in-place for future service and shall be protected.

E. The Contractor shall immediately repair, to the satisfaction of the Owner, any damage directly and indirectly caused by the Contractor's operations at no cost to the Owner.

F. The Contractor shall remove and legally dispose of all clearing debris, demolition debris, and solid waste from the Site. No on-site disposal of stumps shall be allowed. On-site recycling or reuse of demolition debris, including metal, brick, concrete, and asphalt, is not allowed, except where specifically authorized by the Specifications or by the Engineer.

1.06 RELATED WORK

The following is a list of related work items that shall be performed or furnished under other Section of these Specifications as indicated.

A. Vibration and Deformation Monitoring – Section 01436

B. Temp. Erosion and Sediment Control – Section 01560

C. Site Restoration – Section 01740

D. Earthwork – Section 02200

E. Grouting – Section 2340

1.07 SUBMITTALS

A. The Contractor shall submit a plan detailing procedure, equipment, sequences of operations, and schedule to perform the demolition activities called for in this Work Item. The Work Plan shall include the name, contact information, and qualifications of any subcontractors assisting with or conducting the demolition. The submission shall also include procedures for supporting of excavation sidewalls, if necessary.

B. If a temporary earth support system is utilized, submit to the Owner all plans, sections, details, and calculations describing the Contractor's proposed temporary earth support system. The design of the bracing and support system shall be certified by a Professional Engineer licensed in the State of Maine.

C. Documentation of existing conditions shall be submitted under Sections 01436 and 01740. Documentation of the dismantling, removal, storage, and replacement work shall be submitted to the Owner.

PART 2 - PRODUCTS

This Section Not Used.

PART 3 - EXECUTION

A. The Contractor shall determine the means and methods for demolition tasks specified and as shown in the Contract Plans, subject to the restrictions contained in this specification and subject to approval by the Engineer.

B. Presence of steel reinforcement in the concrete apron is unknown, but likely. The Contractor should anticipate the presence of rebar within the section of apron to be demolished.

C. The Contractor shall be responsible for providing power and water for any cutting activities.

D. Slurry and dust created by demolition/saw cutting, coring shall be controlled and disposed of in an appropriate manner consistent with local, state, and federal rules and regulations. Slurry and dust shall not be permitted to enter the Lake or River.

E. Protect the portions of the concrete apron to remain as well as the adjacent stone and brick masonry structures that are not to be demolished. Contractor shall be responsible for repairing damage caused by their work activities and shall receive no additional compensation for necessary repairs.

F. Take all steps necessary to prevent movement or settlement of adjacent portions of the dam and other existing structures and utilities.

G. The Contractor shall coordinate with the Owner regarding the transport and stacking of the salvaged material to remain the property of the Owner.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT FOR PAYMENT

A. No measurement for payment for demolition, removal and disposal of the existing concrete apron, or the removal, transport and stockpiling of the existing stone paving shall be made. The bid item for the Removal, Transport and Stockpiling of Existing Stone Paving shall be a lump sum quantity.

B. No separate measurement shall be made for work associated with removal and disposal of miscellaneous materials from the work site. Removal and disposal of items such as excavated soils, rock, woody vegetative material, trees, stumps, rootballs, excess soil, and other debris and the legal off-site disposal of said materials which cannot be reused on-site shall be considered incidental to the respective Sections and items of the Work

4.02 PAYMENT

A. Payment for the scope of work specified herein, including all fabrication, transport, labor, materials, equipment, and incidentals associated with the work of demolishing/saw cutting the concrete apron and to remove, transport and stockpile the existing stone paving to the location specified by the City of Sanford shall be paid for at the applicable unit sum price stated for item 02065.01 on the Bid Form.

B. Payment for all labor, materials, equipment, incidentals and mobilization/demobilization cost to shall be paid for at the applicable lump sum price for Item 02065.02 of the Form for Bid.

Item No.	Payment Item	Unit
02065.01	Demolition, Removal and Disposal of Existing Concrete and Removal, Transport and Stockpiling Of Existing Stone Paving	Lump Sum

*** * * END OF SECTION * * ***

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SECTION 02110
CLEARING, GRUBBING, AND STRIPPING

PART 1 - GENERAL

1.01 SCOPE

A. The Contractor shall furnish all labor, material, tools and equipment and perform all operations necessary to cut and clear trees and brush, remove surficial debris, grub up primary roots and surficial stones, clear the areas indicated in the drawings, and strip and stockpile organic topsoil prior to riprap restoration work.

B. The work shall consist of clearing, grubbing, removal, stockpiling, and lawful off-site disposal of all vegetation, roots, and surficial debris from proposed areas of construction within the Site boundaries as shown on the Contract Drawings, and replacement of existing riprap and stone on the upstream dam face.

C. The work shall further consist of stripping the topsoil from all areas where excavations will be made and from all areas where access roads will be constructed or materials stockpiled and/or disposed of on-site. The stripped topsoil shall be segregated, stockpiled, and protected for later reuse at the site as topsoil material. It is the intent of the Contract that stripped topsoil be re-used on site to the maximum extent possible.

D. The Contractor shall conduct work in a manner that preserves from injury or defacement of all vegetation and objects designated by the Owner or Engineer.

E. The Owner, Engineer, and Contractor shall jointly pre-mark certain trees within the Limit of Work (but outside the extent of the Dam) that have been permitted for removal. In accordance with the NRPA permit, the stumps and root systems will remain in-place. Trees elsewhere on the site, with the exception of those within the upstream riprap area are NOT to be cut or otherwise disturbed. The Contractor shall coordinate with the Owner regarding this effort and then shall protect the trees to remain from harm.

F. Prior to stripping topsoil, the Contractor and Engineer shall survey the areas to be stripped for the presence of invasive species. If invasive species are found in a particular area, topsoil from that area shall NOT be reused for re-vegetation purposes. Such topsoil may be disposed of lawfully off-site.

G. Clearing, grubbing, and stripping shall be limited to only those areas inside the limits of work absolutely needed by the Contractor for his/her operations. If the implementation of the Work of the Contract does not require clearing, or grubbing, or stripping of some portion of the site area, and work can proceed in a neat and orderly fashion without any or all of these operations, then such operations will not be required by the Owner.

1.02 REQUIREMENTS

A. All work of this Section shall comply with all applicable codes, rules, regulations, laws, and ordinances of the Town of Shapleigh, York County, Maine Department of Environmental Protection (MDEP), the U.S. Army Corps of Engineers, U.S. Environmental Protection Agency (EPA) and all other authorities having jurisdiction within the project areas.

B. Clearing and Grubbing shall only commence after respective sedimentation and erosion control measures are in place to the satisfaction of the Owner or Engineer in accordance with Section 01560 of these Specifications. The Contractor remains solely responsible for the suitability and adequacy of any of the sedimentation and control materials, methods and procedures. It is recognized that a certain amount of site clearing may be necessary in order to access portions of the site to install sediment and erosion controls. Such clearing shall be acceptable provided steps are taken to limit disturbance of soils and generation of sediment.

C. The Contractor shall not burn trees, brush, stumps, and other ignitable materials.

D. Any clearing beyond the boundary limits shall not be permitted without express permission from the Owner.

E. The Contractor shall make all arrangements necessary for the disposal of cleared lumber, surficial debris, and other material collected during Site clearing. Debris materials may be temporarily stockpiled at an approved on-site location prior to being lawfully disposed of off-site.

F. Timber cleared from the site may be salvaged by the Contractor for any other lawful off-site uses, with permission from the Owner.

1.03 RELATED WORK

The following is a list of related work items that shall be performed or furnished under other Sections of these Specifications as indicated.

A. Temporary Erosion and Sediment Controls – Section 01560

B. Site Restoration – Section 01740

C. Earthwork – Section 02200

D. Loaming, Seeding, and Revegetation – Section 02930

E. Stone and Riprap – Section 02270

1.04 SUBMITTALS

At least ten days prior to the work of this Section, submit to the Owner for review and comment a plan showing the boundaries of all areas to be cleared and grubbed, and showing the locations of proposed stockpiles. Indicate in the submittal the sediment and erosion control measures which will be implemented on and around the stockpiles. Indicate means and methods of clearing and grubbing and of accessing areas to be cleared and grubbed. Indicate stockpile areas and means of placement which will minimize re-handling, particularly with respect to existing stone and riprap encountered on the upstream dam face. Indicate sequencing, if any. Indicate off-site disposal locations, along with any required permits which the Contractor or disposal facility is required to obtain.

PART 2 - PRODUCTS

This section intentionally left blank.

PART 3 - EXECUTION

3.01 PREPARATION

A. The Contractor shall confirm with the Owner or Engineer those areas to be cleared, grubbed, and stripped and the location for the debris stockpiles for materials which will be disposed of off-site.

B. The Contractor, the Owner or Engineer, will identify areas where invasive species are present. These areas shall be marked so that soil stripped from these areas will not be re-used or mixed with other topsoil. All such work shall be considered incidental and the cost shall be included in the unit price bid for these items.

C. The Contractor shall coordinate with the Owner to identify trees which will be cleared from the site. These trees shall be prominently marked.

D. The Contractor shall protect sensitive areas (especially wetland areas, protected trees, forest areas) and the existing facilities (downstream masonry wall, upstream training walls, gatehouse, stone slope paving) from damage or displacement.

3.02 CLEARING AND GRUBBING

A. The Contractor shall clear, cut, or otherwise remove all trees and vegetation from the indicated areas. Trees and vegetation outside the indicated areas shall be protected.

B. Contractor shall remove surficial debris, vegetation, roots, and obstructions from the upstream face of the dam which will affect excavation and repair operations on the Site. This shall include grubbing of all stumps and major subsurface root systems where roots exceed a quarter of an inch in diameter, with the exception of the 5 trees noted in the NRPA permit.

C. The Contractor shall place all surficial debris into on-site stockpiles for off-site disposal at an approved disposal location. Transportation and disposal will be performed at the Contractors convenience after approval of the material for disposal and location of disposal.

D. No burning shall be allowed. The Contractor may chip cleared trees or brush to create wood chip mulch. This material can be used on site where approved by the Owner or Engineer. The Owner may have use for some portion of the chip mulch material and shall be allowed to remove quantities not used on-site by the Contractor, upon request by the Owner. The remaining material not utilized on-site shall be removed and lawfully disposed of off-site at the Contractor's sole expense.

3.03 STRIPPING OF TOPSOIL

A. The Contractor shall strip all organic topsoil from areas access/stockpile construction on the Site.

B. The Contractor shall place all stripped organic topsoil into on-site stockpiles for storage until reused in on-site loaming operations. The Contractor shall site the topsoil stockpiles based on the need to store the material until the final stages of the earthwork at the site. All stockpiles shall be protected against rain and shall have appropriate sediment and erosion controls placed around them. No topsoil shall be stockpiled in any location which drains directly into a lake, river, channel, or wetland (other than the borrow area).

3.04 REMOVAL AND STOCKPILE OF ON-SITE RIPRAP

A. The upstream slope of the dam is presumed to include an existing layer of riprap. The existing stone material is believed to be suitable for reuse as riprap on the upstream slope once the existing vegetation and root systems have been removed.

B. If boulder-sized pieces of riprap are moved from the upstream slope as part of the clearing and grubbing efforts, it shall be considered as handling of on-site riprap and shall not be considered boulder excavation. Such material shall be reused on-site at no additional cost to the Owner.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT FOR PAYMENT

No measurement shall be made for Clearing, Grubbing, and Stripping. The bid item for Clearing, Grubbing, and Stripping is a lump sum quantity.

4.02 PAYMENT

Payment for the scope of the work specified herein, including all labor, materials, equipment and incidentals and mobilization/demobilization costs to clear, grub, and strip the site shall be paid for at the applicable Lump Sum price for item 02110.01 – Clearing, Grubbing and Stripping as stated on the Form for Bid.

Item No.	Payment Item	Unit
02110.01	Clearing, Grubbing and Stripping	Lump Sum

*** * * END OF SECTION * * ***

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SECTION 02200
EARTHWORK

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The work of this section applies to all operations involving earthwork and/or soil materials. This specification governs the execution of excavation, fill placement, and all other earthwork tasks. This specification also generally governs acceptable soil material properties. The provisions of this specification shall apply to all such work and materials unless specifically superseded by another section.

B. When earthwork is included as a fundamental or incidental part of the work of the lump sum or individual pay item, the Contractor shall provide all equipment, materials, labor, and incidentals and do all work necessary to complete the earthwork shown on the drawings.

C. Earthwork tasks governed by this Section include, but are not limited to, the following:

1. Excavation of soil, temporary on-site stockpiling, lawful on-site disposal and stabilization of unsuitable and excess materials (at locations approved by the Owner).
2. Handling and placement of fill materials, in lifts, appropriate grading and compacting to specified densities at specified moistures, of fill materials.
3. Supplying of all required common and special fill and backfill material.
4. Grading and compaction of sub-grades.
5. Compaction testing by an independent lab (if required).
6. Intermediate and temporary grading of slopes and excavations.
7. Final grading as per design plans and sections.
8. Executing all incidental excavation, filling, and grading for the placement of riprap slope protection and general site preparation. This work includes, but is not limited to, access/haul roads and site drainage.
9. Design and Construction of excavation support systems, if applicable.
10. Testing of fill imported from offsite for chemical contamination.
11. Off-site disposal of excess spoil material excavated from the Site, if required, at an appropriate facility with all required chemical analyses.

D. The Contractor shall coordinate with the Owner and Engineer in regard to field quality control for earthwork.

E. Stripping of topsoil shall be performed as described under Section 02110.

1.02 RELATED WORK

The following is a list of related work items that shall be performed or furnished under other Sections of these Specifications as indicated:

A. Temp. Erosion and Sediment Control - Section 01560

B. Site Restoration - Section 01740

C. Demolition, Removal and Disposal – Section 02065

D. Clearing, Grubbing, and Stripping – Section 02110

E. Rock and Boulder Excavation – Section 02201

F. Stone and Riprap – Section 02270

G. Loaming, Seeding, and Revegetation – Section 02930

1.03 SUBMITTALS

The Contractor shall complete and submit to the Owner all of the following submittal items consistent with Owner submittal requirements prior to beginning any work on the Contract. All submittals shall be made within fifteen (15) working days after the Notice of Contract Award and prior to the Start of Work unless otherwise noted.

A. Submit to the Owner and Engineer, for review, at least five (5) days prior to the commencement of associated Work, certified sieve analysis reports and Modified proctor curves for soil materials proposed for use at the site (on-site and off-site material).

B. Submit for review, at least fifteen (15) days prior to the commencement of associated Work, the proposed construction schedule, sequence of construction, provisions for providing and maintaining site access, proposed access road design and construction methods, materials, and layout; the proposed methods of construction including equipment to be used; excavation support methods and details; and proposed locations of haul roads and staging areas within work limits.

C. If support structures are used by the Contractor to support the sides of excavations or existing structures, the Contractor shall submit to the Owner all plans, sections, details, and calculations describing the Contractor's proposed temporary earth support system. The design of the bracing and support system shall be certified by a Professional Engineer licensed in the State of Maine.

   The Contractor shall remain solely responsible for the adequacy and safety of materials and methods used in construction in meeting all regulatory and OSHA standards despite review and comment by the Owner or Engineer.

D. The Contractor shall submit the proposed location(s) for the disposal of excavated spoil that meet all appropriate laws, regulations and direction from the Owner.

Other submittals, as per the Contract Specifications, may be required prior to the initiation of the relevant Work described herein.

1.04 FIELD MEASUREMENTS

A. Verify survey benchmarks and intended grades for the work prior to commencement of work.

B. Verify final grading for conformance to Construction Drawings.

1.05 OBSERVATION

The work shall be performed under the observation of the Owner or the Engineer, who shall interpret the Specifications and will decide all questions in connection therewith. The observation of the work by the Owner or Engineer shall not relieve the Contractor of any obligations to fulfill the terms of the contract as herein required.

1.06 REFERENCE STANDARDS

A. ASTM D6913 – Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis

B. ASTM D1557 – Modified Proctor Density Test for Soil Materials

C. ASTM D1556 Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method

D. ASTM D6938 Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

E. OSHA Regulations, 29 CFR Part 1926 - Excavations, current revisions.

F. State of Maine Department of Transportation (MaineDOT) Standard Specifications, November 2014 Edition.

1.07 CONTRACTOR'S EQUIPMENT

A. The condition of all equipment to be used by the Contractor shall be subject to acceptance by the Owner or Engineer before the work is started. However, acceptance of the equipment shall not be construed as including acceptance of the performance thereof. Additional equipment shall be provided by Contractor where required to perform the work satisfactorily according to the specifications.

B. All equipment provided by the Contractor shall be clean and free from any possible chemical or biological contamination, including but not limited to invasive species. All equipment shall be properly cleaned and decontaminated prior to being brought on site.

1.08 PERMITS AND CODES

A. All work shall conform to the Drawings and Specifications and shall comply with applicable codes and regulations.

B. Comply with all rules, regulations, laws and ordinances of the Town of Shapleigh, York County, State of Maine, and of all other Federal, state, and local authorities

having jurisdiction. All labor, materials, equipment and services necessary to make the work comply with such requirements shall be provided without additional cost.

C. Excavation safety and support in accordance and compliance with all applicable OSHA and other regulations shall be the sole responsibility of the Contractor.

D. The Contractor shall be responsible for clearing the site with DigSafe® and with all relevant entities which may maintain utility structures in and around the site.

1.09 PROTECTION OF EXISTING PROPERTY

A. The work shall be executed in such manner as to prevent any damage to Owner facilities at the site and adjacent property and any other property and existing improvement, such as but not limited to streets, guardrails, fences, gates, existing outlet structure, existing drainage structures, instrumentation, and other public or private property. Protect existing improvements from damage caused by settlement, lateral movements, undermining, washout and other hazards created by earthwork operations.

B. In case of any damage or injury caused in the performance of the work, the Contractor shall, at his own expense, make good such damage or injury to the satisfaction of, and without cost to, the Owner. Existing features damaged during the project work shall be repaired or replaced to their original condition at the commencement of operations. The Contractor shall replace, at his own cost, existing drainage structures or instruments which are disturbed or destroyed.

1.10 DRAINAGE

A. The Contractor shall provide, at his own expense, adequate drainage facilities to complete all work items in an acceptable manner, in accordance with the requirements of Section 01560. Drainage shall be done in a manner so that runoff will not adversely affect construction product, construction procedures, nor cause excessive disturbance of underlying natural ground or exacerbate erosion and sedimentation.

B. The Contractor is advised that groundwater levels within the work area may be high and that surface water and groundwater control will likely be required. Lateral and/or upward seepage through existing and proposed slope faces and subgrades should be expected. The Contractor shall provide, at his own expense, adequate drainage and/or dewatering methods and facilities such that groundwater seepage will not adversely affect the construction product, procedures, nor cause excessive disturbance of underlying natural ground. It is anticipated that shallow sumps will be sufficient to address seepage and/or rainfall into excavations, given the dewatered state of the Lake.

C. The Contractor shall grade and ditch the staging areas and access roads, as necessary, to direct and control surface runoff in working areas.

D. Water from excavations and surface runoff shall be disposed of in such a manner as will not cause injury to public health, nor water quality, nor to public or private property, nor to existing work, nor to the work completed or in progress and shall be in accordance with requirements given in Section 01560.

1.11 FROST PROTECTION AND SNOW REMOVAL

A. The Contractor shall, at his own expense, keep the operations under this Contract clear and free of accumulations of snow and ice within the limit of work and on access roads as required to carry out the work.

B. The Contractor shall protect the subgrade beneath the work area from frost penetration when freezing temperatures are expected.

C. The Contractor shall NOT place fill over frozen soils and shall NOT place frozen fill. The frozen soils shall be removed to the satisfaction of the Owner prior to fill placement.

1.12 LAYOUT AND GRADES

A. Lay out all lines and grade work at the site in accordance with drawings and specifications. Establish and maintain permanent bench marks.

B. The word "subgrade" as used herein, means the required surface of existing ground, final prepared ground after excavation, or compacted fill.

PART 2 - PRODUCTS

2.01 GENERAL

A. The Contractor shall furnish all installation tools, materials and miscellaneous components.

B. All measurements, graduations, and other markings shall be in U.S. Customary Units, for, example, feet, inches, pounds.

2.02 FILL MATERIALS

A. On-Site Common Fill Material

On-site Common Fill material shall consist of material previously excavated by the Contractor from the project site. Excavated material will be examined by the Owner or Engineer to judge its suitability for re-use on the project site as backfill material. Excavated material may be judged suitable if it generally meets the standards for Common Fill, being a friable soil, free of rubbish, ice, snow, tree stumps, roots and organic matter, with no less than 15 percent (15%) and no more than thirty percent (30%) passing the No. 200 sieve. There shall be no stones greater than 3 inches in size. There shall also be no observable indications of contamination.

Peat, topsoil or other organic laden materials are NOT acceptable for common fill. The Contractor may, at his own expense, choose to modify the excavated material (by screening, mixing, etc.) to attempt to make the material more suitable for re-use. Mixing of peat with other material will NOT be permitted to produce common fill material. Some additional handling of suitable material (drying, mixing, culling of oversized stones) may be necessary and shall be done at no additional cost to the Owner.

Material judged to be unsuitable or extra material shall be separated from the rest and be removed from the work area by the Contractor for lawful disposal.

B. Off-Site Common Fill Material

The Owner shall approve all off-site common fill material. Off-site material imported for use as Common Fill shall have the same characteristics as stated above under On-Site Common Fill Material, except as follows: The material shall be well graded as per the Unified Soil Classification System and shall not be gap graded. Atterberg limits must plot above the "A" of the standard plasticity chart and the liquid limit shall not exceed 50.

C. Granular Fill Material

Granular Fill Material, to be used as fill below the proposed access road, or where directed by the Engineer shall meet the requirements of "Granular Borrow" as described in the State of Maine Department of Transportation (MaineDOT) Standard Specifications, Item No. 703.19.

D. The Owner or Engineer shall approve all off-site material. Off-site material imported for use as Riprap, Crushed Stone, and Geotextiles shall be in accordance with the requirements of Section 02270.

PART 3 – EXECUTION

3.01 EXAMINATION AND PREPARATION

Grading, both existing and proposed, is indicated on the Drawings, except for the access roadway. The Contractor is responsible for designing and constructing the access road to provide safe access for his or her proposed equipment and material delivery; and for achieving the specified drainage directions in accordance with an approved access road plan submittal. The Contractor shall check all areas wherein grades are shown to satisfy himself as to actual conditions. The Contractor shall be responsible for establishing all control points and marks necessary for the work. Precautions shall be taken to preserve the materials outside the lines of the limit of work in the most undisturbed condition possible. The Contractor shall:

A. Identify and check all required lines, levels, contours, and datum.

B. Notify the Owner in writing of unanticipated subsurface conditions and discontinue affected work in area until notified to resume.

C. Protect plant life, grassed areas and other features remaining as a portion of final landscaping.

D. Verify fill materials to be reused are acceptable.

E. Notify appropriate utility company to remove or relocate utilities, if necessary.

F. Maintain and protect existing utilities or structures to remain which pass through or by work area.

3.02 PROTECTION OF ADJACENT FACILITIES AND PROPERTIES

A. Protect all adjacent facilities which may be damaged by excavation work. All construction induced damage shall be repaired by the Contractor at no additional expense to the Owner. Refer to Section 01436 for additional requirements.

B. The work area shall be graded, shaped, and otherwise drained in such a manner as to minimize soil erosion, siltation of drainage channels, damage to existing vegetation and property outside the limits of the work area and shall be in accordance with Section 01560.

3.03 DISTURBANCE OF EXCAVATED AND FILLED AREAS DURING CONSTRUCTION

A. The Contractor shall take the necessary steps to avoid disturbance of subgrade during excavation and filling operations. Methods of excavation and filling operations shall be revised as necessary to avoid disturbance of the subgrade, including dewatering and other acceptable excavation control measures. The Contractor shall cooperate with the Owner or Engineer to modify procedures and protect bearing soils.

B. The construction of temporary benches into the slope to facilitate equipment access shall not be allowed without prior approval by the Engineer. The Contractor shall provide equipment with sufficient capability to execute the work as shown on the Contract Drawings without making substantial modifications to the existing dam embankment.

C. No payment shall be made for temporary excavations and/or fills to execute construction, beyond those required for the final lines and grades shown on the Contract Drawings. The Contractor shall remove/restore temporary grading at his/her own expense.

3.04 ACCESS ROAD CONSTRUCTION

A. The approved, permitted location of the access road is indicated on the Contract Drawings. The Contractor is responsible for designing and constructing the access road to provide safe access for his or her proposed equipment and material delivery within the indicated limits. The required direction of drainage flow is also indicated on the drawings.

B. It is anticipated that the access roadway will at a minimum consist of a of 6 inches of crushed stone overlying a proof-compacted natural soil or granular fill subgrade.

C. It is anticipated that portions of the access roadway require excavation of bedrock and placement of fill. The contractor shall provide a roadway capable of providing access for emergency vehicles and maintenance vehicles. The maximum grade of the access roadway should be no steeper than 5H:1V.

3.05 EXCAVATION

A. Perform all work of any nature and description required to accomplish the work as shown on the Drawings as specified. The work shall include, although not be limited, to earth excavation; on-site stockpiling of materials suitable for re-use; and removal of unsuitable materials to legally designated on or off-site disposal locations provided by the Contractor and approved by the Owner.

B. Excavations, unless otherwise required by the Owner or Engineer, shall be carried only to the elevations and limits shown on the Drawings. If unauthorized excavation is carried out below required subgrade and/or beyond minimum lateral limits shown on Drawings, it shall be backfilled with compacted fill, of a type approved by the Owner, at the Contractor's expense.

C. Excavations shall be kept in-the-dry, and in good condition at all times. In-The-Dry excavation shall be considered an excavation subgrade where the groundwater level has been lowered to at least 1 foot below the lowest level of the excavation, is stable with no ponded water, mud, or muck, is able to support construction equipment without rutting or disturbance and is suitable for the placement and compaction of fill materials.

D. The Contractor shall lawfully and satisfactorily dispose of, at his own expense, surplus excavated materials. As necessary, the Contractor will be required to adequately reduce the water content of the spoil material prior to reuse as borrow or offsite disposal. The dewatering technique may include creation of temporary containment areas within the work area or other method approved by the Owner and shall be in accordance with Section 01560. The Owner shall designate surplus excavated materials as materials from the excavations that are unacceptable for use as fill or that are in excess of the fill materials required. These materials, if any, which cannot be placed at once in permanent positions, may be deposited in storage piles at designated locations. Dewatering efforts, re-excavation, and re-handling from such storage piles shall be included in unit prices.

E. Excavated material which meets the criteria put forth in the specifications shall be reused at the site if the opportunity exists. The Contractor is encouraged to reuse excavated material, but only in so far as meeting the lines and grades shown on the final site conditions plan.

F. All excavations shall be performed in accordance with OSHA requirements.

G. All appropriate care shall be taken to avoid damage to the existing stone masonry and concrete walls and structures during excavation. Hand excavation shall be performed within 5 feet of these and other structures and elsewhere as required at no additional cost to the Owner.

3.06 FILL

A. All soil subgrades shall be stripped of organic or otherwise unsuitable material and proof compacted prior to placement of fill. Proof-compact the sub-grade by means of a vibratory plate compactor having a centrifugal force of not less than 3,500 lbs. Proof compaction may be omitted at the direction of the Engineer. Soft areas shall be excavated and replaced with appropriate compacted fill.

B. Fill soil shall not be placed over porous, wet, frozen, or spongy subgrade or fill. In the event these conditions occur, the Contractor shall excavate and remove the unsuitable material prior to placing more fill.

C. Contractor shall dewater to maintain groundwater levels a minimum of one (1) foot below bottom of excavations and/or subgrades. All fill is to be placed in-the-dry, except as allowed for certain rock material.

D. The Contractor shall bench all existing slopes prior to placing horizontal fill layers on existing slopes of greater than 6H:1V.

E. Place and compact soil materials in continuous horizontal layers not exceeding eight-inch (8") loose (pre-compaction) lift thickness. Do not place frozen material.

F. The general standard for compaction for all granular soil materials shall be a firm and stable material which, if tested, would achieve a minimum ninety-five percent (95%) of the maximum dry density as determined by ASTM Test D-1557 (Modified Proctor Test), with a water content between plus or minus two percent (±2%) of optimum moisture content. If wet fill cannot be adequately compacted, remove and replace with drier fill.

G. Fill that is too wet for proper compaction, as determined by testing or the Owner or Engineer's judgment, shall be disced, harrowed, or otherwise dried to a proper moisture content for compaction to the required density, specified herein. If the fill material cannot be dried within forty-eight (48) hours of placement, it shall be removed and replaced with drier fill at the Contractor's expense.

H. Fill that is too dry for proper compaction, as determined by testing or the Owner or Engineer's judgment, shall receive water uniformly applied over the surface of the loose layer. Sufficient water shall be added to allow compaction to the required density.

I. Fill which becomes disturbed after compaction as a result of the Contractor's operations shall be removed and replaced or re-compacted to the specified degree of compaction at the Contractor's expense.

J. Placement and compaction of soil material on the embankments shall be in a direction parallel to the dam embankment, when possible.

K. In cases where prior excavation has not been made, the Contractor shall strip all organic topsoil from along the length and breadth of all areas which are to have fill material placed on top. This work shall be paid for under other Sections of the Contract and shall be in accordance with the requirements of Section 02110.

L. Rough and fine grade the surface of slopes and fills as shown on the Contract Plans and on the approved access road plan. All surfaces shall be appropriately graded to drain and provided with a firm and stable surface which is resistant to erosion.

3.07 EXCAVATION SUPPORT AND PROTECTION

A. As necessary, provide temporary shoring, sheeting, and/or bracing of excavations in accordance with approved submittal as required to assure complete safety against collapse of earth at side of excavations.

B. Comply with local safety regulations and/or, in the absence thereof, with the provisions of the Occupational Safety and Health Act (OSHA) for trenching and excavation.

C. Remove sheeting and shoring, etc., as backfilling operations progress, taking all necessary precautions to prevent collapse of excavation sides.

D. The Contractor shall be fully responsible for furnishing, installing, maintaining, reinforcing and removal of all sheeting and bracing and shall be fully responsible for all damages, losses and claims involving the use or non-use of sheeting and bracing despite any orders given or any orders failed to be given by the Owner or Engineer. The Contractor shall hold harmless the Owner and Engineer from all damages, losses and claims involving the use or non-use of sheeting, shoring and bracing.

E. The Contractor shall furnish, put in place, and maintain sheeting and bracing to support the vertical side of excavations, to prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction, and to protect adjacent structures from disturbance, undermining or other damage.

F. If the Owner is of the opinion that at any point, sufficient or proper supports have not been provided, he/she may order additional supports put in at the expense of the Contractor, and compliance with such order shall not relieve or release the Contractor from his responsibility for the sufficiency of such supports. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed, they shall be immediately filled and rammed.

G. The Contractor is responsible for understanding the subsurface and soil conditions in areas where excavation support is required. The Contractor shall examine available subsurface data and make additional explorations as needed and as approved by the Owner.

3.08 FIELD QUALITY CONTROL

A. The Owner or Engineer shall observe the placement of all fill material, and make such observations as are judged necessary to render an opinion as to whether the materials used and compaction effort provided are appropriate to meet the intent of the specifications.

B. The Owner or Engineer shall judge achievement of the compaction standards by either visual observation of compaction effort and success or through the use of in-place density tests including, but not be limited to, in-place compaction (density and moisture) testing performed in accordance with ASTM D6938 (nuclear density meter). The frequency of testing shall be at the Engineer's sole discretion.

C. If compaction is judged to be inadequate, the Contractor shall provide additional compaction or otherwise correct the problem at no additional cost to the Owner.

D. The Contractor shall be responsible for providing to the Owner the results of independent analysis of proposed on-site and off-site fill materials performed in accordance with ASTM D6913 and ASTM D1557. Test results to be provided are as follows:

1. Particle size (sieve) analysis for each off-site material.
2. Maximum dry densities and optimum moisture contents, as per the Modified Proctor Test Methodology, for each off-site material.
3. New Proctor curves shall be developed whenever the properties of a certain material are judged by the Engineer to have substantially changed.

E. The Contractor shall be responsible for coordinating with the Owner and Engineer. No fill shall be placed if the Engineer is not available to observe the Work. Fill placed in

the absence of the Engineer may be required to be excavated and replaced at the Contractor's expense.

F. The Contractor shall provide the Owner or Engineer free and safe access to work at all times. Provide for observation of bottom of excavation and of bearing surfaces.

3.09 SPOIL DISPOSAL AND DEWATERING

A. Disposal of excess or unsuitable soil shall be the responsibility of the Contractor. The Contractor shall be responsible for all handling and transport, including but not limited to, sampling, testing, analyzing, dewatering, treatment, and hauling, necessary to legally disposal of spoil material.

B. The Contractor is responsible at his sole expense for any dewatering, treatment, sampling, testing (analytical or otherwise), and/or analysis which may be required by an offsite spoil disposal facility. This includes the services of a qualified environmental professional, as necessary.

C. Spoil material may consist of common excavated material, common excavated material with organics and roots, peat, topsoil, sediment, cobbles, rock, or other material which is unsuitable or has been excavated in excess of that quantity needed for use at the site.

D. The Contractor shall be responsible as part of the work of spoil disposal for controlling the water content of the spoil (i.e. dewatering) such that it is suitable for transport and disposal and to the degree that the spoils pass the Paint Filter Liquids Test (EPA Method 9095B). Such methods may require working of the material. The addition of Portland cement or other amendments to the excavated spoils shall not be authorized unless approved by the Engineer. It is specifically noted that cold weather may make dewatering difficult and the Contractor must account for such conditions in his/her work plan and bid price. The Contractor shall not create sanitary problems during the transport of spoil material and shall be responsible for cleaning areas where liquids or solids have leaked.

E. The Contractor shall truck the spoil (i.e. excess excavated soil) to the approved spoil disposal area via approved routes as directed by the Owner. The Contractor shall be responsible for improving such routes as necessary, at no additional expense to the Owner.

F. If directed by the Owner, disposal of excess or unsuitable soils and/or spoil materials, shall be off-site and in conformance with local, state and federal regulations for proper management, transportation, and disposal of these materials at a suitable disposal facility with appropriate documentation to transport and the permits, licenses, and insurance to receive such materials.

G. The Contractor shall be responsible to ensure that free liquid is properly transported. "Wet soils" shall not be loaded for transport. The Contractor shall dewater "wet soils," and properly dispose of free liquids in accordance with local, state, and federal regulations. The Contractor shall dispose of any free liquids that may result during transportation at no additional cost to the Owner. Dewatering of "wet soils" shall conform to requirements of Section 01560.

H. The Contractor shall provide appropriate Bills of Lading or Material Transport Documentation for ALL spoil material which leaves the site. This documentation shall meet all local, state and federal regulations and shall, at minimum, record the amount of material, date of transport, and the location of disposal of the material. All transport documentation shall be certified by the Contractor.

3.10 EARTHWORK UNDER OTHER SECTIONS

Unless specifically contradicted, all earthwork executed under other Sections of the Contract shall be governed by the Methods specifications detailed in this Section.

3.11 STOCKPILING

A. Stockpile materials on site in such a manner so as to maintain the segregation of different types of material.

B. The Contractor shall provide all appropriate sediment and erosion controls around stockpiles, including but not limited to perimeter sediment barriers and stockpile covers and controls shall be in accordance with Section 01560.

C. The Contractor shall provide, at no additional cost, temporary signage which identifies the type of soil or rock material in each stockpile.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT FOR PAYMENT

A. No measurement for payment of any soil excavation, filling, compaction, or grading related to construction of the Contractor's Access Road shall be made. The bid item for Design and Construction of the Contractor's Access Road shall be a lump sum quantity. Rock Excavation associated with the Contractor's Access Road shall be measured and paid under Section 02201.

B. No measurement for payment of any Common Excavation after Stripping, Common or Granular Fill, or off-site disposal of excess common fill shall be made. The bid item for these operations shall be a lump sum quantity.

4.02 PAYMENT

A. Payment for the scope of the work specified herein, including all labor, materials, equipment and incidentals and mobilization/demobilization costs to design, provide, install, and maintain the Contractor's Access Road shall be paid for at the applicable lump sum price for Item No. 02200.01 stated on the Form for Bid.

B. Payment for the scope of work specified herein, including all labor, materials, equipment and incidentals, including all handling and temporary stockpiling effort, associated with Common Excavation after Stripping, Common or Granular Fill from on-site or off-site, or off-site disposal of excess common fill shall be paid for at the applicable unit price for Item 02200.02 stated on the Form for Bid.

Item No.	Payment Item	Unit
02200.01	Contractor's Access Road	Lump Sum
02200.02	Common Excavation after Stripping, Furnishing, Placement and Compaction of Granular Fill, or Common Fill, and Off-Site Disposal of Fill	Lump Sum

*** * * END OF SECTION * * ***

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SECTION 02201
ROCK AND BOULDER EXCAVATION

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and perform excavation of rock and boulders utilizing non-explosive methods such that damage is prevented to adjacent utilities, pipes, structures, property and the work and such that resulting ground vibrations are consistently maintained below the maximum levels specified in this Section and Section 01436. Non-explosive methods include bucket excavation, picking, hoe-ramming, hydraulic splitting or other approved methods.

B. Obtain necessary written approvals and permissions and pay for permits and licenses required to complete the Work of this Section.

C. Protect the existing structures, utilities, adjacent properties, workers, Owner, Engineer, all abutters and the public from damage or injury from rock and boulder excavation.

D. The Contractor shall not be compensated separately for rock and boulder excavation, unless authorized by the Owner prior to the start of the work. If necessary, this work is considered incidental to construction of the access roadway.

1.02 EXISTING CONDITIONS

The Contractor shall review the available information on subsurface conditions to be fully informed on all existing conditions and limitations as they apply to this work and its relation to other construction work.

1.03 RELATED WORK

A. Vibration and Deformation Monitoring – Section 01436

B. Temp. Erosion and Sediment Control - Section 01560

C. Site Restoration - Section 01740

D. Earthwork – Section 02200

E. Stone, Rockfill, and Riprap – Section 02270

1.04 SUBMITTALS

A. Rock Removal Plan: Submit at least two weeks prior to commencement of the Work, a description of the means and methods for rock and boulder excavation. Review by the Owner or Engineer of information submitted by the Contractor shall not relieve the Contractor of responsibility for the accuracy, adequacy and safety of the Work, exercising proper supervision and field judgment and producing the results within the boulder excavation limits required by this Section.

1.05 DEFINITIONS

B. Rock: Any intact, large mass of stone, bedrock, or ledge-rock.

C. Rock Excavation: The removal of solid rock or rock fragments greater than 1 cu yd in volume which cannot be removed by conventional mechanical excavation equipment such as a Caterpillar 330 Tracked Excavator or equivalent or which requires mechanical impact equipment such as hoe-rams, chemical expanders or other special procedures. **Rock Excavation is not anticipated within the limits of work at the dam but may be necessary for construction of the access road.**

D. Boulder: Naturally-deposited rock fragments exceeding 1 cu yd in volume. Boulders encountered within the limits of the upstream slope of the dam shall be considered "Existing Riprap", and the removal and handling shall be in accordance with the provisions of Section 02770.

E. Boulder Excavation: The removal of boulders exceeding 1 cu yd in volume which can be excavated without resorting to drilling and blasting, mechanical impact equipment such as hoe-rams, chemical expanders or other special procedures.

F. Peak particle velocity (PPV) – The instantaneous maximum ground vibration velocity vector measured in one of the vertical, longitudinal, or transverse directions at the point of interest. Peak particle velocity is expressed in units of inches per second (ips).

1.06 PROTECTION OF EXISTING PROPERTY

A. The Work of this Section shall be executed in such manner as to prevent any damage to the existing dam, powerhouse, upstream and downstream channel walls, existing utilities or structures, the new Work and adjacent property and any other property and existing improvements, such as but not limited to the street, service utility lines, structures, bench marks, and other public or private property. Facilities and utilities shall remain in continual service throughout the duration of the project.

B. The Contractor shall be completely responsible for all damages resulting from the rock and boulder excavation operations and shall, as a minimum, take whatever measures are necessary to avoid damage to existing utilities and structures.

C. In case of any damage or injury caused in the performance of the Work, the Contractor shall, at his own expense, make good such damage or injury to the satisfaction of, and without cost to, the Owner, in accordance with the requirements of Section 01740.

PART 2 – PRODUCTS

This section is not used.

PART 3 - EXECUTION

3.01 GENERAL

A. Removal of boulder-size material within the limits of the upstream slope of the dam shall be considered as removal of on-site riprap, as defined in Section 02270.

B. It is the intent of this Work that excavated boulders or rock from access road construction be reused on-site. Excess boulders may be broken down and utilized as riprap on the upstream side of the dam, or elsewhere as allowed, provided the requirements of Section 02270 are met.

C. Rock and Boulder excavation shall be completed by non-explosive techniques in a manner, in accordance with the approved rock removal plan and shall not cause damage to existing structures, utilities, or new construction.

D. Grading, both existing and proposed, are indicated on the Contract Drawings. The Owner is not responsible for existing grades shown on the Drawings. The Contractor shall check all areas wherein grades are shown to satisfy himself as to actual conditions. The Contractor shall be responsible for establishing all control points and marks necessary for the work. Precautions shall be taken to preserve the materials outside the lines of the limit of work in the most undisturbed condition possible.

3.02 BOULDER EXCAVATION

A. Boulders may be reduced in size by rock excavation methods to simplify removal only in the case that they would be unsuitable for use on site as riprap and with approval of the Engineer.

B. Removal of boulders under 1 cu yd in volume shall be considered incidental to earth excavation.

3.03 DISPOSAL OF ROCK AND BOULDERS

A. Boulders may be reused directly in grading for the access roadway, as riprap, or crushed and screened for reuse in the work, provided that the resultant materials meet the requirements for crushed stone or riprap specified in Section 02270.

B. **Priority shall be given to the reuse of on-site boulders for grading the access roadway or for riprap. On-site supplies shall be supplemented with off-site materials only to make up for necessary additional quantities above that available from usable on-site material**.

C. Disposal of unused, excavated boulders shall be in accordance with Section 02200.3.09.

D. If directed by the Owner, the Contractor shall coordinate with the City of Sanford or Town of Shapleigh regarding the transport and stockpiling of excess rock or boulders resulting from the work of this Contract. The Owner will provide the Contractor with the address of the facility where the rock spoil should be delivered.

3.05 VIBRATION CONTROL AND MONITORING

A. Vibration monitoring shall be performed per the approved Vibration Monitoring Plan.

B. The Contractor shall not excavate rock within twenty-five feet (25') of concrete or grout less than three (3) days old and shall limit vibrations at new or existing concrete or grout as specified below:

Concrete Age	Maximum Peak Particle Velocity (inches/second)
Less than 1 day old	0.5
Greater than 1 days old	1.0

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT FOR PAYMENT

A. This section is not used.

4.02 PAYMENT

A. Payment for the scope of work specified herein, including all labor, materials, equipment and incidentals, associated with Boulder Excavation shall not be paid for separately, but is considered incidental to construction access roadway item.

B. Payment for the scope of work specified herein, including all labor, materials, equipment and incidentals, transport, handling, placement, and disposal fees, associated with Legal Off-Site Disposal of Excess Rock and Boulders shall be paid for at the applicable unit price for Item 02201.03 stated on the Form for Bid.

Item No.	Payment Item	Unit
02201.01	Disposal of Excess Rock and Boulders	Tons

*** * * END OF SECTION * * ***

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SECTION 02270
STONE AND RIPRAP

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Contractor shall furnish all equipment, materials and labor and do all work necessary to place stone materials, including filter geotextile, crushed stone bedding, and riprap, as required.

B. Areas of crushed stone bedding and riprap shall be sized as indicated on the Contract Drawings or as indicated in these Specifications. The Contractor shall be responsible for all furnishing, handling, processing, transportation, and placement necessary to achieve stone with quality and gradations meeting the specifications. Woven geotextile shall be provided and placed under stone material, as shown on the Contract Drawings or as indicated in these Specifications.

C. Placement, intermediate grading and final grading of areas of crushed stone and riprap placement shall be included in the work of this section at no additional cost to the Owner. Such work may involve handling and placement of individual stones to achieve a stable slope at the lines and grades shown on the Plans. The cost of such work shall be included in the price bid for items which involve stone and riprap placement.

D. Stone, rock, and riprap material placed by the Contractor shall not exceed the limits shown on the Contract Drawings.

E. Adherence to the lines, grades, and slopes shown on the Contract Drawings is critical so as to meet permit requirements and minimize encroachment into resource areas.

F. Existing riprap on the upstream slope of the dam embankment will be supplemented with new stone as necessary, after removal of vegetation and/or soil from within the existing riprap.

G. Stone, rock, and riprap placed as incidental under this or other Sections shall conform to the requirements of this Section, except as specified elsewhere.

H. Handling of existing riprap encountered during excavation shall be included under the Work of this Section. This Work shall include removing, stockpiling and reusing suitable existing riprap removed from within the limits of the upstream slope of the dam, and then handling, replacing or otherwise re-establishing the existing riprap along the left side, upstream embankment as shown on the Contract Drawings, or elsewhere as Directed by the Engineer. Additional Riprap shall be furnished by the Contractor if quantities of excavated, existing riprap are insufficient.

1.02 SCOPE

A. Work involving stone and Riprap shall include, but not be limited to the following:

1. Removal and stockpiling of excavated rock from portions surrounding the existing dam structure and access road, for re-use along the left-side upstream embankment, and elsewhere on-site
2. Furnishing and placing of woven geotextile filter fabric under and around crushed stone bedding layers, riprap, and elsewhere as shown on the Contract Drawings, or as directed by the Engineer.

3. Furnishing and placing Crushed Stone Bedding material as shown on the Contract Drawings, or as directed by the Engineer.

4. Furnishing and stockpiling Riprap from on-site rock and boulder excavation or off-site sources for use along the left-side, upstream embankment.

5. Placing and grading of Riprap from stockpiles at the site.

6. Furnishing and placing of "Chinking" stone for treatment/grading of final riprap surfaces, as necessary.

1.03 RELATED WORK

The following is a list of related work items that shall be performed or furnished under other Sections of these Specifications as indicated:

A. Temp. Erosion and Sediment Control - Section 01560

B. Clearing, Stripping, and Grubbing – Section 02110

C. Earthwork – Section 02200

D. Rock and Boulder Excavation – Section 02201

1.04 SUBMITTALS

A. Two (2) weeks prior to the delivery of any stone material to the site, the Contractor shall submit the name and location of the proposed quarry(s) to be used to supply the stone products. The Contractor shall provide the Owner with information regarding the type and physical characteristics of the stone, as required below. The Contractor shall also provide copies of any certifications or approvals of the quarries products from other agencies.

B. Two (2) weeks prior to the delivery of any crushed stone material, stone, rock, or riprap to the site, the Contractor shall submit a description of the material, the source of the material, a gradation analysis, density/specific gravity test results, and samples of the materials as required by the Construction Engineer. The Contractor shall provide certification of stone source, type, and properties from the quarry.

If gradation test results of riprap are unavailable, or as otherwise requested by the Owner or Engineer, actual sample loads shall be delivered by the Contractor to the Site for review by the Engineer. Alternatively, the Contractor may arrange for the Engineer to inspect stockpiles of proposed riprap at the source quarry or other off-site stockyard.

C. Five (5) days prior to the delivery of any geotextile filter fabric to the site; the Contractor shall submit a description of the material, the source of the material, manufacturer's specifications, and samples of the material as required by the Owner or Engineer.

1.05 PERMITS AND CODES

A. All work shall conform to the Drawings and Specifications and shall comply with applicable codes and regulations.

B. The Contractor shall comply with all rules, regulations, laws and ordinances of the State of Maine, Town of Shapleigh and of all other local authorities having jurisdiction at the site. All labor, materials, equipment and services necessary to make the work comply with such requirements shall be provided without additional cost.

1.06 REFERENCE STANDARDS

State of Maine Department of Transportation (MaineDOT) Standard Specifications, November 2014 Edition.

PART 2 - PRODUCTS

2.01 STONE RIPRAP

A. Riprap shall conform to the material requirements of the Maine Department of Transportation (MaineDOT) Specification Sections noted herein, and shall consist of hard, durable, and sound angular stone which is resistant to weathering.

B. Riprap stone for restoring the upstream embankment slope shall consist of MaineDOT 703.26, Plain Riprap.

C. All off-site riprap stone placed at the site shall be of the same parent rock from the same quarry and shall be visually similar to the existing riprap and the rock outcrops within the site or work area.

D. Priority shall be given to the re-use of excavated riprap, bedrock fragments and boulders resulting from on-site rock and boulder excavation, provided that the excavated rock and boulders generally meet the requirements provided above.

2.02 CRUSHED STONE BEDDING MATERIAL

A. Crushed stone material used for bedding material for riprap and other areas as specified in the Contract Documents shall consist of MaineDOT 702.13 3/4-inch crushed stone.

2.03 GEOTEXTILE FABRIC

Geotextile filter fabric for use under riprap, bedding stone layers, or elsewhere as directed shall be a nonwoven, needle punched product meeting the requirements of MaineDOT 722.04 Class 1 Separation Geotextile (provided below).

CLASS 1 SEPERATION GEOTEXTILE REQUIREMENTS

Minimum Strength Class Requirements					Separation Property Values		
Class	Grab Strength (lbf)	Sewn Seam Strength (lbf)	Tear Strength (lbf)	Puncture Strength (lbf)	Apparent Opening Size (Max) (mm.)	Minimum Permittivity (sec-1)	Ultraviolet Stability (%/500 hrs)
1	375	335	135	745	0.6	0.02	50

PART 3 - EXECUTION

3.01 EXAMINATION AND PREPARATION

Grading, both existing and finished, are indicated on the Contract Drawings. The Contractor shall check all areas wherein grades are shown to satisfy him/her as to actual conditions. The Contractor shall be responsible for establishing all control points and marks necessary for the work. Precautions shall be taken to preserve the materials outside the lines of the limit of work in the most undisturbed condition possible. The Contractor shall:

A. Identify and check all required lines, levels, contours, and datum.

B. Notify the Owner in writing of unanticipated subsurface conditions and discontinue affected work in area until notified to resume.

C. Verify fill materials to be reused are acceptable.

3.02 GENERAL RIPRAP PLACEMENT

A. The prepared subgrade in full-depth Riprap placement areas shall be cleared of all roots, stumps, or any other items that may damage a geotextile. The prepared surface shall be observed by the Owner or Engineer prior to installation of geotextile, crushed stone bedding or riprap.

B. If the exposed subgrade consists of granular fill, then the woven geotextile and crushed stone bedding will be placed prior to installing the heavy riprap.

C. If exposed subgrade consists of stone fill or riprap, neither a crushed stone bedding layer nor a geotextile is required, though some crushed stone may be required as "choke stone" if voids are observed at the subgrade.

D. Crushed stone bedding material shall be placed immediately after the placement of the geotextile filter fabric.

E. Care shall be taken during riprap placement so as not to damage or disturb the geotextile. Do not dump riprap directly from truck into placement location.

F. Riprap shall be placed in such a manner as to produce a reasonably well graded distribution of the various stone sizes, with no localized areas of uniform size material. **Each of the largest stones are to touch adjacent large stones**. The stones shall be placed so that the dimension approximately equal to the layer thickness is perpendicular to the slope surface. The smaller size

stones shall fill the spaces between the larger stones so as to obtain a minimum practical percent of void space. Dumping from trucks and spreading shall not be allowed. Post-placement manipulation of the riprap shall be performed, as required, such that individual stones are in contact with one another, without gaps or spaces between.

G. Riprap shall be compacted and shaped by tamping and manipulation with the bucket of an excavator, or other means acceptable to the Owner or Engineer.

H. It may be necessary to handle and place individual riprap stones to place the material such that it achieves a stable slope conforming to the lines, grades, and slopes shown on the Contract Plans. The Contractor shall be responsible for all efforts necessary to place the riprap in such a manner which produces a stable slope conforming to the lines, grades, and slopes shown on the Contract Plans. The Contractor shall not place material beyond the limits shown on the Contract Drawings without specific direction from the Owner or Engineer.

I. "Chink" the final riprap surface, manually if necessary, to eliminate any significant gaps in the riprap surface. "Chinking" shall involve the placement and setting of smaller stones in gaps between larger stones so as to provide a more uniform coverage across the riprap surface.

J. Tolerances for placement of stone riprap surface shall be within plus or minus six inches (±6") of the grading shown on the plans.

3.03 SUPPLEMENTAL RIPRAP AND STONE PLACEMENT

A. The upstream slope of the dam is presumed to include an existing layer of riprap. The existing stone material is believed to be suitable for reuse as riprap on the upstream slope once the existing vegetation and root systems have been removed.

B. Supplemental stone and riprap for the upstream slope shall be placed in locations where there is no existing riprap encountered, or at locations where removed stumps or vegetation leave a significant gap in the coverage of riprap slope protection.

C. The Contractor shall work with the Engineer to determine the locations where supplemental riprap is needed.

D. The intent of placing supplemental crushed stone is to fill gaps between existing riprap where smaller vegetation has been removed and bare embankment soil is exposed. It is NOT intended that a general layer of crushed stone be applied to the upstream face of the dam.

E. Where buried existing riprap is present at the subgrade elevation, it may be necessary to "choke" gaps in the buried riprap using crushed stone, prior to placement of backfill materials. It is anticipated that the stone materials specified in this Section, or elsewhere in the Contract Documents will be sufficient for this purpose.

F. **Priority shall be given to the re-use of existing riprap excavated from the upstream slope or excess material from access road rock excavation. On-site supplies of excavated riprap, boulders, and bedrock fragments shall be supplemented with off-site materials only to make up for necessary additional quantities above that available from usable on-site material.**

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT FOR PAYMENT

A. Measurement of geotextile filter fabric placed in conjunction with crushed stone bedding and riprap or stone paving shall be on a basis of the actual, in-place area of the Geotextile Fabric successfully placed, in square yards. Measurement shall be made by taping the in-place extent of the fabric. Overlaps of a minimum of three feet are required, but no measurement shall be made of overlapping material.

B. Measurement of ¾-inch crushed stone shall be shall be on a basis of the Certified weight of the Crushed Stone material placed, in tons. Certified weight slips for all trucks shall be provided by the Contractor and confirmed by the Engineer as material having been used for this purpose.

C. Measurement of all off-site stone riprap shall be on a basis of the Certified weight of the riprap placed, in tons. Certified weight slips for all trucks shall be provided by the Contractor and confirmed by the Engineer as material having been used for this purpose.

D. No payment shall be made for quantities of materials not utilized in the construction of the project to meet established lines and grades as indicated on the plans.

4.02 PAYMENT

A. Payment for the scope of work specified herein, including all labor, materials, equipment and incidentals, associated with Furnishing and Placement of Woven Geotextile Fabric shall be paid for at the applicable unit price for Item 02270.02 stated on the Form for Bid. Overlaps of a minimum of three feet are required, but no payment shall be made for overlapping material.

B. Payment for the scope of work specified herein, including all labor, materials, equipment and incidentals, associated with Furnishing and Placement of 3/4-inch Crushed Stone Fill shall be paid for at the applicable unit price for Item 02270.04 stated on the Form for Bid.

C. Payment for the scope of work specified herein, including all labor, materials, equipment and incidentals, associated with Furnishing and Placement of Off-Site Stone Riprap shall be paid for at the applicable unit price for Item 02270.05 stated on the Form for Bid.

Item No.	Payment Item	Unit
02270.01	Furnishing and Placement of Woven Geotextile Fabric	Square Yard
02270.02	Furnishing and Placement of 3/4-inch Crushed Stone Fill	Ton
02270.03	Furnishing and Placement of Off-Site Stone Riprap	Ton

*** * * END OF SECTION * * ***

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SECTION 02340
PERMEATION GROUTING

PART 1 - GENERAL

1.01 SCOPE

A. The Work of this Section includes the furnishing of all supervision, labor, plant, material, equipment, water supply, and all else necessary for making drill holes and performing permeation grouting of the dam embankment soils, as described herein and shown on the Contract Drawings and as directed by the Owner or Engineer. The work shall also be in conjunction with monitoring by the Engineer for potential signs of distress caused by drilling operations, performing certain field tests, recovering rock cores or samples (when drilling methods permit), grouting, and the related work as herein specified and as shown in the attached Contract Drawings. The Work of this Section shall be performed under the observation of the Engineer.

B. The drill holes and grouting shall be executed from the top of the dam embankment as stated herein, as shown on the plans, and as directed by the Owner's Engineer. Drill holes for grouting shall typically be advanced through the full height of the dam embankment and to the top of the underlying bedrock.

C. Execution of the Work of this Section shall comply with the performance standards described herein. Of primary importance is that the integrity of Emery Mills Dam is not compromised by the drilling, testing, or grouting methods employed by the Contractor. **The stone masonry portion of Emery Mills Dam is more than 125 years old. No drilling, testing, or grouting methods which have the potential to cause damage to the dam shall be permitted.** The Engineer will be monitoring deformation of the downstream stone masonry and the repair of any damage caused during the advancing of the drill holes, grouting, or any other work of this Section.

D. The intent of the grouting program is to mitigate seepage through the downstream face of the masonry/retaining wall by grouting potentially pervious zones within the embankment via injection of grout under low to moderate pressures. The exact limits of grouting shall be determined in the field by the Engineer based on soil conditions and grout takes observed and recorded during grouting operations.

E. The Work of this Section shall be performed only by qualified Drilling/Grouting Contractors and competent supervisors and workmen acceptable to the Owner and Owner's Engineer as set forth herein. The Contractor is referred to the Bidder Experience and Reference Form for minimum qualifications. Further qualification requirements are specified in Paragraph 1.03 below.

F. GZA completed 5 borings designated GZ-1 through GZ-5 along the embankment dam to assess the nature of the embankment fill material. Logs of the borings, laboratory testing results of selected samples, and a boring location plan are attached at the end of this specification section for information purposes, and the locations are shown on sheet 4 of the contract drawings.

G. Grouting shall be performed in a split spacing sequence as shown on the Contract Drawings and described hereinafter. The base bid will include 16 locations, assumed to have a typical

depth of 20 feet +- 5 feet.

H. The Owner or Owner's Engineer may increase or decrease the number and/or add additional grouting locations, adjust the grout mix, or make similar alterations to the work, all at no change in the Contract Unit Prices. If requested by the Engineer, the additional grout installation will include 6 locations. Quantities stated in the Contract and Bid Form are based on current information and are approximate only. Some quantities may increase up or down depending on conditions encountered in the field. The Contractor shall receive payment for only that quantity of work actually performed.

1.02 RELATED WORK

The following is a list of related work items that shall be performed or furnished under other Sections of these Specifications as indicated.

A. Vibration and Deformation Monitoring – Section 01436

B. Temporary Erosion and Sediment Control – Section 01560

C. Site Restoration – Section 01740

1.03 QUALIFICATIONS

A. As part of their bid submittal package, the Contractor shall submit the names and qualification package for the Grouting Contractor or subcontractor(s)/supplier(s) to the Engineer. The Owner/Engineer will be the sole judge of whether the submitted Grouting Contractor or subcontractor(s)/ supplier(s) will be qualified and his decision will be final.

Submittals for qualifications shall contain the following items at a minimum:

1. Company brochures and experience providing and/or performing grouting and providing all materials and supplies and performing the grouting operation.

2. The firm(s) undertaking the grouting work shall have at least five (5) years demonstrable experience in such work similar to that specified herein, and demonstrable experience on at least 2 projects involving grouting of embankment dams and foundations.

3. The driller(s) and associated subcontractors who will undertake the work of this section must demonstrate satisfactory completion of a minimum of at least 5 grouting projects where drilling methods of the type proposed by the Contractor have been utilized.

4. Specific name and phone number of the Owner or Project Manager involved with each of the above projects.

5. A list and technical description of the specific equipment the subcontractor/supplier proposes to use on this project.

6. The name and resume of the person(s) who will manage/direct the work and the person(s) who will have full-time charge of the work at the site.

1.04 SUBMITTALS

A. Submit qualification package for the grouting Contractor in accordance with Paragraph 1.03.A above.

B. Drilling Submittal:

The submittal shall include as a minimum, the following information:

1. The names and resumes of the drillers to be employed on the job along with information showing the Contractor/Subcontractor meets the requirements of the qualifications section as described herein.
2. A list and description of all drilling and lifting equipment to be utilized on the job, as well as the proposed means of gaging grout pressure to +-10 psi.
3. A description of the proposed means of access and removal of equipment from the dam.
4. A description of the proposed means and methods for drilling through the dam embankment and grouting. The description shall include information on the type of drilling or installation equipment to be utilized, proposed hole diameters, whether the hole will be cased or uncased, how any casing or installation equipment will be advanced and removed, and how grouting operations will be performed.
5. Contingency plans to be utilized if drilling methods are observed to be causing distress to the dam. Such plans shall include a list of and priorities of modifications to drilling methods which will serve to mitigate the impact of drilling on the dam. This may include alternative methods of advancing the holes.
6. A construction sequence for moving from location to location.
7. A construction schedule showing anticipated start and stop dates.
8. Means of controlling drilling by-products (including drilling spoils, water, and excess grout) to prevent environmental impacts to Mousam Lake and Mousam River, the air, and surrounding environment.

C. Grouting Submittal

1. Submit descriptions of grouting equipment and all associated grouting methods and test procedures, demonstrating compliance with the specifications contained herein.
2. Submit grout mix(es) including a breakdown of the all constituents/additives proposed for permeation grouting.

1.05 QUALITY CONTROL

A. All work under this section shall be performed under the observation of the Engineer. The Contractor shall fully cooperate with the Engineer in providing or assisting in determining location and depth of grout holes and grout quantities. The Contractor shall engage a qualified testing laboratory for the purpose of quality control in testing of grout at the Contractor's expense.

B. The Engineer shall have safe access to the work at all times and the Contractor shall furnish

the Engineer with every reasonable facility for checking conformance with the plans and specifications, to include field testing of the grout with a Marsh funnel.

PART 2 - MATERIALS

2.01 EQUIPMENT

A. All drilling and grouting equipment used shall be of a type, capacity and mechanical condition suitable for performing the work, in accordance with the requirements specified in these Specifications, and to the satisfaction of the Engineer. The power, equipment and the layout thereof shall meet all applicable requirements of local, State, and Federal regulations and codes.

B. Drilling and Grouting Equipment

1. Grout holes shall be established with standard suitable rotary or percussion drilling equipment. Holes shall be drilled and grouted to minimize loss of soil, (i.e. in excess or those outside quantities which are displaced and removed by the Contractor submitted, Engineer approved drilling method).

2. Grouting equipment shall be equipped with a flow meter that is capable of measuring flows to at least 0.1 cubic foot or 1 gallon.

3. The Contractor is hereby forewarned that sidewalls of drilled holes may not stay open during drilling and grouting operations. It will be the responsibility of the Contractor to supply and utilize drilling and grouting methods which account for these anticipated conditions such that soil loss due to hole collapse is prevented and grouting of the hole can be satisfactorily accomplished in the presence of hole support equipment.

4. The existing embankment material is anticipated to consist of a mixture of stone fill and granular soil above and below groundwater level. The contractor should be prepared to drill and grout the holes in any range of these conditions.

C. Equipment Arrangement and Operation

1. The arrangement of the grouting equipment shall be such as to provide a continuous circulation of grout throughout the system and to permit accurate pressure control by operation of a valve on the grout return line, regardless of how small the grout take may be. The equipment and lines shall be prevented from becoming fouled by the constant circulation of grout and by the periodic flushing-out of the system with water. Flushing shall be done with the grout intake valve closed, the water supply valve open and the pump running at 100 percent of its capacity.

2. The dam site is located in a sensitive watershed. Uncontrolled discharge of grout or flushing fluid will not be allowed. Any excess water produced during the grouting or flushing processes, shall be treated in accordance with an approved grouting submittal, and state and local requirements.

3. The Contractor's grout mixing plant shall be located in an approved location. The plant may be located in the staging and lay-down areas identified in the Contract Drawings. Pumping of grout shall be limited to a maximum length of 500 feet from the grout plant to the connection to the grout hole. A standby grout pump shall be included in the equipment available at the site, utilizing a separate power source from the primary grouting equipment. Grouting equipment shall include a high-shear colloidal mixer capable of continuous mechanical mixing which shall produce a fluid grout free of lumps, of un-dispersed cement and all other ancillary equipment necessary to do the work. The equipment shall be capable of injecting two different grout mixes in the same and/or different holes.

3. The Contractor's equipment shall be capable of limiting grout pressures to prevent heaving and shall have a pressure gage in good operating condition accurate to plus or minus 10 psi. The grout plant shall be maintained in good operating condition at all times and any grout hole that is lost or damaged due to mechanical failure of equipment or to any inadequacy of grout supply shall be replaced by another hole, drilled/cored by the Contractor at his expense.

2.02 GROUTING MATERIALS

A. Grout mixes shall be selected by the Contractor with the approval of the Engineer based on the proposed grouting method(s) and anticipated conditions. **Based on previous dye testing and seepage observations at the dam, an area of high permeability and seepage exists closer to the gatehouse and training wall that may require a thicker grout mixture to resist transport through the downstream masonry face or into the Lake**. Initial grout mixes are specified below, which may be supplemented or replaced by suitable alternative mixes that are submitted to and approved by the Engineer prior to shipping to the site.

B. Composition:

It is anticipated that Type III Portland cement/bentonite grout mix (with sand as required) will be used. In lieu of preparation of a cement/bentonite mix in the field, a pre-mixed non-shrink grout may be submitted to the Engineer for approval. Any admixtures proposed by the Contractor shall be approved by the Engineer prior to incorporating materials into the work.

C. Water

The water used in the drilling, water testing and grout mix(es) shall be clean and free from injurious amounts of sewerage, oil acid, alkali, salts, sediments, organic and other deleterious materials. Water temperature ranges for mixing shall be between 50º F to 100º F when added to the grout mixer. Public water from hydrants is not available at the site. Water from Mousam Lake shall not be suitable for use in mixing grout unless it meets the following minimum test parameters and acceptable ranges:

Parameter	Acceptable Value/Range
pH	4.5 to 8.5
temperature	< 77º
total suspended solids	< 2,000 ppm.
Total dissolved salts	< 1,500 ppm
Sulfides	< 5,000 ppm
Chlorides	< 10,000 ppm

Organic matter < 3,000 ppm

The Contractor shall be responsible for verifying his source water is acceptable via laboratory testing for the presence of deleterious material and shall be responsible for providing any treatment, filtration, or transportation and storage from an alternative source, as needed at his or her own expense. The Contractor shall be responsible for obtaining any water withdrawal permits from the appropriate entity.

D. Cement/Bentonite Grout Mix

1. Portland cement for use in the mix shall by Type III. The initial cement/bentonite grout mix to be used shall be composed of the following materials and shall be non-shrink.

   Water/cement ratio (by weight) = 1.5:1
   Bentonite = 1.5% by weight of cement

2. The amount of bentonite additive stated is approximate and shall be verified in the field by the Contractor in the presence of the Engineer to meet the following grout mix characteristics:

   Bleed = less than 10% (ASTM C 940);
   Viscosity = 35 to 40 seconds, for a 26 second Marsh funnel (see standardized Marsh funnel for testing drilling muds, American Petroleum Institute, RP 13B, Section 2); and
   Set = about six hours

3. In lieu of preparation of a cement/bentonite mix in the field, a pre-mixed non-shrink grout may be submitted to the Engineer for approval. In this event, the price bid per Bag of non-shrink grout should be pro-rated to reflect the actual weight of bags of the pre-mixed material as compared to a standard 94 lb bag of cement. No additional compensation will be made. Suitable pre-mixed, non-shrink cement grouts include:

   - SikaGrout 212, as manufactured by Sika Corporation, Lyndhurst, New Jersey

4. The quantity of water added to the grout mix may be varied with approval of the Engineer, or if requested by the Engineer or Owner, depending upon field conditions, to obtain different flow characteristics and grout penetration and control.

5. In situations where large voids may be present and/or a single grouting port or stage has taken in excess of 5 cubic feet per foot of stage, sand may be added, or requested by the Engineer or Owner to be added, to the grout in a proportion of up to 1 part sand to 1 part Portland cement with approval of the Engineer.

6. All grout materials and admixtures shall be stored at temperatures above freezing.

E. Sand

1. Sand for grout, if used, shall consist of hard, durable un-coated particles free of mica. The shape of the particles shall be generally rounded and shall not contain more than

ten percent (10%) of flat or elongated particles having a maximum dimension in excess of four (4) times the minimum dimension. The sand shall be well graded from fine to coarse and the gradation shall conform to the following requirements.

Sieve Designation	Percent Finer by Weight
No. 10	100
No. 20	95-100
No. 40	80-100
No. 60	20-100
No. 100	20-50
No. 200	0-5

2. The Contractor shall provide representative sand samples and test data for approval by the Engineer at least three days prior to incorporating material into the work. All tests will be made by the Contractor at the Contractor's expense. The percentage of surface moisture in terms of the saturated surface-dried sand will be determined in accordance with ASTM Designation C70-47, or other method giving comparable results. Sand shall be stored in such a manner as to avoid the inclusion of any foreign materials in the grout. The storage piles shall be constructed so as to prevent segregation. All sand shall remain in free drainage storage for at least seventy-two (72) hours prior to use.

PART 3 – EXECUTION

3.01 GENERAL

A. Access to the dam is relatively limited, as the top of the embankment is approximately 10 to 12 feet wide, and generally slopes towards the impoundment. Placement of equipment at drilling locations at the top of dam will require special consideration possibly including a temporary working pad so as not to cause damage or excessive stresses at the downstream stone masonry structure. Restoration of the site as a result of any improvements made for grouting access are considered incidental to the scope of the grouting. No separate payment will be made for such restoration.

B. Mousam Lake is recreational waterbody and should be considered as a sensitive wetland resource area. Therefore, the Contractor shall execute the work in a manner which will not cause damage, harm, or otherwise impact the water quality of said pond, discharge channel (Mousam River) and surroundings. All grout holes shall be drilled at locations, in the direction, and to depths specified herein and as directed by the Engineer.

3.02 GROUTING

A. General

1. Grout shall be injected at the locations shown on the Contract Drawings to the minimum depths specified herein in accordance with the Contractor submitted, Engineer approved methods.

2. Unless otherwise approved, maintaining verticality of the drilled hole alignment is essential, and the Contractor shall utilize installation equipment of type and rigidity

so as to maintain a near-vertical installation.

3. Based on the borings, cobble- and boulder-sized stone is present in the embankment fill. Methods used to advance the grout installation equipment to the top of bedrock level (estimated 20 feet +-5 feet) will need to be capable of advancing and delivering grout to near a point the bedrock surface through a mixture of stone and granular fill. The holes should then be grouted in progressive stages from the bottom up. Alternative grouting sequences shall not be used unless submitted in writing and approved by the Engineer.

4. The final number of grout holes shall be as deemed necessary by the Engineer. Grouting shall continue until the rate of grout "take" indicates that the permeability of the area is no longer greater than the permeability of the material in the non-loosened portions of the downstream foundation and/or dam embankment as determined solely by the Engineer.

B. Grout Installation and Injection

1. The grouting shall be carried out using the Contractor submitted, Engineer approved grouting method(s).

2. The grout injection shall proceed in a continuous manner until either refusal is reached for a stage or injection is stopped by the Engineer due to excessive takes and a switch to a thicker mix is ordered, Threshold or Limiting deformations are observed, or siltation or other adverse environmental impact is observed. Refusal is defined as a grout take of less than 2 cubic feet in ten minutes at typical grouting pressure.

3. "Excessive" grout take shall be defined as 5 cubic feet of grout per vertical linear foot of stage being grouted. Determination of excessive take may also be made based on observation of flowing grout through the downstream stone masonry or into the Lake.

4. The Contractor shall provide means of continuously monitoring injection pressure of grout. In the event of a sudden increase or decrease in grout pressure, the Contractor shall evaluate the observed pressure changes and make necessary adjustments to the mix and our grouting procedure. If there is a sudden increase in pressure, the Engineer may request that the grouting equipment be removed from the hole and flushed until any clog or restriction is cleared. If there is a sudden decrease in grout pressure, the Engineer will evaluate if the mix needs to be adjusted (thickened) to reduce grout take.

5. In no event, except as provided above, shall the Contractor stop pumping grout or modify the grout mix unless directed to do so by the Engineer.

6. Grout that cannot be placed, for any reason, within two (2) hours after mixing shall be discarded in a manner satisfactory to the Engineer.

7. During freezing weather conditions, grout shall not be allowed to freeze or partially freeze until fully cured. Grout temperatures shall be maintained above 50º F until injected. Ground or rock temperatures at the point of injection and within the zone of influence of the grout shall be no colder than 40º F at the time of injection and for a period of 5 days thereafter.

3.04 PROTECTION OF WORK AREA AND CLEANUP

A. During grouting operations, the area around the grouting location and the waters upstream and masonry downstream shall be visually monitored for signs of grout leakage or outbreaks. If grout, cloudiness, or other indications of leakage are observed, injection pressure shall be immediately reduced. Pressure reduction shall continue until leakage indications cease. If leakage indications continue even after pressure reduction, then other steps shall be taken in consultation with the Engineer, including, but not limited to changing the grout mix, pointing the leak area, temporarily plugging the leak area, etc.

B. During grouting operations, the Contractor shall take such precautions as may be necessary to prevent silt, equipment exhaust oil, and grout, from entering Mousam Lake or surrounding sensitive areas. The Contractor will be required to furnish such sumps as may be necessary to contain waste water and grout from his operations. The Contractor shall, upon completion of his operations, clean up all waste resulting from his operations that is unsightly or would interfere with the efficient continuation of the project as anticipated by the original design. No separate payment will be made for the work required for cleanup. Protection of the work area and cleanup shall be in accordance with Sections 01436 and 01560.

C. The Contractor shall submit a plan for daily disposal of wasted and unused grout for the approval of the Engineer prior to initiating and grouting work. It is envisioned that the Contractor will initially flush out grout lines and depositing spoils therefrom on the ground surface. Area of deposition shall be cordoned off with hay bales and other sedimentation controls so as to prevent spread of spoils into non-work areas or within impoundment limits, and in accordance with Section 01560. Thereafter, Contractor will transfer hardened spoils to a dumpster and dispose of legally off-site. Spoils shall be transferred to the dumpster(s) and the dumpster emptied on a regular basis so as to maintain a tidy work area.

3.05 RECORDS

The Contractor shall keep formal, accurate records of all grouting operations. Records will include a hole and depth, grout volume, grout mix, time of each change of grouting operations, pressure, rate of pumping, amount of cement for each change in water cement ratio, and other data as deemed by the Engineer to be necessary.

3.06 ABANDONED GROUT LOCATIONS

A. The Contractor must assume the risk of obstacles and difficult drilling and must carry the drill hole through or past such obstacles. If drill holes or grout installation locations are abandoned in preference to driving through or past the obstacles, or because of damaged or mis-aligned tooling, no payment shall be made for the partially completed drill hole. The location must be grouted and a new hole drilled in a location selected by the Contractor and approved by the Engineer. Payment for the grout used to in partially completed holes shall be made on a unit basis as per prices bid.

B. Should a hole or grout location be abandoned without permission of the Engineer, or should a drill hole or grout location be started for any reason without inspection of the Owner's Engineer, or should the Contractor fail to keep the complete records or fail to furnish the Owner's Engineer with the records, no payment shall be made for drilling, grouting, or anchor installation within the abandoned or unauthorized hole.

3.07 APPROVAL OF QUANTITIES

Payment for all items of work performed under this Contract to the Contractor by the Owner shall be based upon the certified approval of all such quantities by the Engineer. The Engineer shall be solely responsible for determining the acceptability of all the work performed under this Section and the final quantities under each respective items for which payment will be allowed.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT FOR PAYMENT

A. Measurement for work associated with Installation of Grout Injection Locations shall be on a per-location basis, at the locations depicted on the Drawings and as directed in the field by the Engineer. No separate measurements shall be made for the installation of different types of grout injection apparatuses, and no differentiation shall be made between "primary" and "secondary" or "tertiary" grouting locations.

B. Grouting

For grouting, measurement will be made of the number of bags of Portland cement incorporated into the selected grout mix.

Measurement of quantities for the items covered under this item shall be by the bag (sack) of cement added to the grout mix. One bag of cement shall be considered to equal 94 pounds, dry. If material is delivered in bags of different weight, then the number of bags shall be pro-rated based on ratio of weight of bag to standard 94-pound bag of cement.

Measurement shall be to the nearest full bag added into the grout mixer and injected into the structure or foundations. **No measurement shall be made of material remaining in the mixer or lines at the end of operations each day.** The Contractor and Engineer shall each keep a separate accounting of bags of material utilized each day. At the end of each day, the Contractor and Engineer shall compare and reconcile the counts to arrive at and record an agreed upon number. In the event of an un-reconciled disagreement about quantity, the Owner shall be notified immediately to assist and adjudicate.

No measurement shall be made of water, sand, bentonite, admixtures, or other material which shall be considered incidental to the grouting operations.

If the Contractor selects to utilize a pre-mixed non-shrink grout, the measurement of non-shrink grout shall be per equivalent 94-pound bag (sack) of cement. For example, one 50 lb. bag of pre-mixed non-shrink grout would be counted as 0.53 bags of cement for the purposes of bidding. Alternatively, if non-shrink grout is exclusively used, then each bag may be counted on a one-for-one basis provided the bid price for cement is reduced by a factor of 50/94 (i.e. multiplied by 0.53) for a 50-pound sack.

4.02 PAYMENT

A. Payment for the scope of the work specified herein, including all labor, materials, equipment and incidentals and mobilization/demobilization costs to complete Installation of Grout Injection Locations shall be made at the applicable per location unit price stated under Item

02340.01 on the Bid Form.

C. Grouting

Payment for the scope of the work specified herein, including all labor, materials, equipment, incidentals, and mobilization/demobilization costs to perform Grouting activities shall be made on the basis of the quantity of 94 lb. Bags of Portland Cement incorporated into the grout mix and injected into the embankment, at the applicable per Bag unit price stated under Item 02340.02 on the Bid Form.

If the Contractor selects to utilize a pre-mixed, non-shrink grout, his/her bid price for Portland Cement under 02340.02 shall be considered to be applicable for pre-mixed, non-shrink grout when considered on a pound-for-pound basis. Payment shall be made based on either a) factoring the number of bags used or b) factoring the bid price based on the weight of each bag of pre-mixed, non-shrink grout. The method used to convert for payment shall be agreed to in writing prior to the work and shall be consistent throughout the entire project.

If Engineer requests Installation of Additional Grout Injection Locations, payment for the scope of the work specified herein, including all labor, materials, equipment and incidentals and mobilization/demobilization costs to complete Installation of Additional Grout Injection Locations shall be made at the applicable per location unit price stated under Item 02340.03 on the Bid Form.

Item No.	Description	Quantity	Unit
02340.01	Installation of Grout Injection Locations	16	Each
02340.02	Grouting	400	94 lb. Bag of Portland Cement
02340.03	Installation of Additional Grout Injection Locations (If requested by Owner/ Owner's Engineer)	6	Each

***** END OF SECTION 02340 *****

P:\09 Jobs\0025900s\09.0025905.00 - Emery Mills Dam\09.0025905.02 - Bid Designs & Specifications\April 2019 Design Doc Development\Revised Specs\02340 - Grouting_Emery Mills Dam_052019.docx

Section 2340 – Attachment 1
Boring Logs

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Town of Sanford, Maine
Emery Mills Dam
Shapleigh, Maine

EXPLORATION NO.: GZ-1
SHEET: 1 of 1
PROJECT NO: 09.0025905.02
REVIEWED BY:

Logged By: B. Cardali / L. Navarrete
Drilling Co.: New England Boring Contractors
Foreman: E. Baron

Type of Rig: ATV
Rig Model: M2
Drilling Method: Drive & Wash/Spin

Boring Location (N,E): See Plan
Ground Surface Elev. (ft.): 487.0
Final Boring Depth (ft.): 3
Date Start - Finish: 3/25/2019 - 3/25/2019

H. Datum: NAD83
V. Datum: NAVD88

Hammer Type: Safety Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.0"/3.0"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size:

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
		None Observed	

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0.6-2.6	24	10	6 14 9 17	23	S-1: Medium dense, brown, fine to coarse SAND, little Gravel, trace Silt, moist.	1		0.6	CONCRETE	486.4
											3	FILL (SAND WITH COBBLES)	484.0
								End of exploration at 3 feet.	2				

REMARKS

1 - Used thin-wall core barrel from 0.0' to 0.6'.
2 - Attemped to advance roller bit from 2.6'-3.0'; roller bit encountered ressitance at 3.0', boring terminated.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: GZ-1

GZA TEMPLATE TEST BORING; 4/9/2019; 3:11:18 PM

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Town of Sanford, Maine
Emery Mills Dam
Shapleigh, Maine

EXPLORATION NO.: GZ-2
SHEET: 1 of 1
PROJECT NO: 09.0025905.02
REVIEWED BY:

Logged By: B. Cardali / L. Navarrete
Drilling Co.: New England Boring Contractors
Foreman: E. Baron

Type of Rig: ATV
Rig Model: M2
Drilling Method: Drive & Wash/Spin

Boring Location (N,E): See Plan
Ground Surface Elev. (ft.): 486.0
Final Boring Depth (ft.): 11
Date Start - Finish: 3/25/2019 - 3/25/2019

H. Datum: NAD83
V. Datum: NAVD88

Hammer Type: Safety Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.0"/3.0"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size:

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
		None Observed	

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0.0-2.0	24	20	22 10 50 17	60	S-1: Very dense, brown, fine to coarse SAND, some Gravel, little Silt, moist, probable cobbles.					
		S-2	2.0-4.0	24	15	16 34 27 31	61	S-2: Very dense, brown, fine to coarse SAND, some Gravel, little Silt, moist.				FILL (SAND WITH COBBLES)	
5		S-3	4.0-6.0	24	12	8 10 12 16	22	S-3: Very dense, brown, fine to coarse SAND, some Gravel, trace Silt, moist.					
		S-4	6.0-6.4	17	1	50/1"	R	S-4: Split spoon refusal. Granite chips in spoon tip.	1		6.4		479.6
									2		8.8	BOULDER (BLOCK)	477.2
		S-5	8.8-10.7	23	11	17 11 13 50/1"	24	S-5: Medium dense, brown, fine to coarse SAND and GRAVEL, trace Silt, moist.					
10		S-6	10.7-11.0	4	4	15 80/1"	R	S-6: Medium dense, brown, fine to coarse SAND and GRAVEL, trace Silt, moist.	3 4 5		11	FILL (GRAVEL)	475.0
								End of exploration at 11 feet.					
15													
20													
25													
30													

REMARKS

1 - Drill water not visible after 6.3' bgs. Communication with downstream face of dam observed.
2 - Bottom of casing 7.5'.
3 - Probable granite block at 11.0'.
4 - Borehole grouted. Mix consists of 94 lb cement, 14 lb bentonite powder, 13 gal of water.
5 - Borehole backfilled with 175 lb bentonite chips over grout.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: GZ-2

GZA TEMPLATE TEST BORING; 4/9/2019; 3:11:19 PM

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Town of Sanford, Maine
Emery Mills Dam
Shapleigh, Maine

EXPLORATION NO.: GZ-3
SHEET: 1 of 1
PROJECT NO: 09.0025905.02
REVIEWED BY:

Logged By: B. Cardali / L. Navarrete
Drilling Co.: New England Boring Contractors
Foreman: E. Baron

Type of Rig: ATV
Rig Model: M2
Drilling Method: Drive & Wash/Spin

Boring Location (N,E): See Plan
Ground Surface Elev. (ft.): 487.0
Final Boring Depth (ft.): 1.1
Date Start - Finish: 3/26/2019 - 3/26/2019

H. Datum: NAD83
V. Datum: NAVD88

Hammer Type: Safety Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.0"/3.0"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size:

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
		None Observed	

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0.0-0.7	8	12	24 50/1"	R	S-1: Very dense, brown, fine to coarse SAND, little Gravel, trace Silt, moist.	1		0.7	FILL (SAND)	486.3
								End of exploration at 1.1 feet.	2		1.1	PROBABLE GRANITE BLOCK	485.9

5
10
15
20
25
30

REMARKS

1 - Granite gravel-size pieces observed at spoon tip.
2 - Offset attempted approximately 1.0' toward upstream (GZ-3B), blow counts 24, 34, 50/1"; refusal at 1.1'. Soil conditions were similar to S-1.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: GZ-3

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Town of Sanford, Maine
Emery Mills Dam
Shapleigh, Maine

EXPLORATION NO.: GZ-4
SHEET: 1 of 1
PROJECT NO: 09.0025905.02
REVIEWED BY:

Logged By: L. Navarrete
Drilling Co.: New England Boring Contractors
Foreman: E. Baron

Type of Rig: ATV
Rig Model: M2
Drilling Method: Drive & Wash/Spin

Boring Location (N,E): See Plan
Ground Surface Elev. (ft.): 486.0
Final Boring Depth (ft.): 8.2
Date Start - Finish: 3/26/2019 - 3/26/2019

H. Datum: NAD83
V. Datum: NAVD88

Hammer Type: Safety Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.0"/3.0"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size:

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
		None Observed	

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0.0-2.0	24	18	11 20 24 17	44	S-1: Dense, brown, fine to coarse SAND, trace Gravel, trace Silt, moist.	1			FILL (SAND)	
		S-2	2.0-4.0	24	12	10 22 9 7	31	S-2: Dense, brown, GRAVEL, little fine to coarse Sand, trace Silt, wet.			2		484.0
		S-3	4.0-6.0	24	6	6 3 3 4	6	S-3: Loose, brown, fine to coarse SAND, trace Gravel, trace Silt.	2			FILL (GRAVEL)	
		S-4	6.0-8.0	24	10	5 7 3 20	10	S-4: Medium dense, fine to coarse SAND and GRAVEL, trace Silt, wet.	3 4 5		4		482.0
		S-5	8.0-8.2	3	5	35/1"	R	S-5: Very dense, brown, GRAVEL, little fine to coarse Sand.	6			FILL (SAND WITH COBBLES)	
								End of exploration at 8.2 feet.			8.2	PROBABLE BEDROCK	477.8

REMARKS

1 - Wall adjacent to boring 10.7' tall, GZ-4 8.0' away from wall edge (stream side).
2 - Gravel-size pieces of granite observed at bottom of sample S-2.
3 - Drill cuttings at 8.0' from roller bit indicate probable cobble.
4 - Bottom of casing at 8.0'. Borehole did not lose water.
5 - Borehole grouted. Mix consists of 50 lb cement, 10 lb bentonite powder, 7 gal of water.
6 - Borehole backfilled with 25 lb bentonite chips over grout.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: GZ-4

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Town of Sanford, Maine
Emery Mills Dam
Shapleigh, Maine

EXPLORATION NO.: GZ-5
SHEET: 1 of 1
PROJECT NO: 09.0025905.02
REVIEWED BY:

Logged By: B. Cardali / L. Navarrete
Drilling Co.: New England Boring Contractors
Foreman: E. Baron

Type of Rig: ATV
Rig Model: M2
Drilling Method: Drive & Wash/Spin

Boring Location (N,E): See Plan
Ground Surface Elev. (ft.): 486.0
Final Boring Depth (ft.): 6.9
Date Start - Finish: 3/26/2019 - 3/26/2019

H. Datum: NAD83
V. Datum: NAVD88

Hammer Type: Safety Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.0"/3.0"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size:

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
		None Observed	

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0.0-2.0	24	19	14 15 23 16	38	S-1: Dense, brown, fine to coarse SAND, trace Gravel, trace Silt, moist.	1				
		S-2	2.0-4.0	24	13	6 2 16 18	18	S-2: Medium dense, brown, fine to coarse SAND, some Silt, trace Gravel, moist, probable cobbles.	2			FILL (SAND WITH COBBLES)	
5		S-3	4.0-6.0	24	10	3 4 6 7	10	S-3: Medium dense, brown, fine to coarse SAND, some Silt, some Gravel, wet.	3 4				
		S-4	6.0-6.9	11	7	13 50/4"	R	S-4: Very dense, brown, fine to coarse SAND, trace Gravel, trace Silt, wet.	5		6.9		479.1
								End of exploration at 6.9 feet.				PROBABLE BEDROCK	
10													
15													
20													
25													
30													

REMARKS

1 - Casing refusal at 0.8'. Moved boring 12" north; refusal at 0.8'. Spoon from 0'-4.0' visibly drifting northward while drilling. Boring then moved 12" east.
2 - Gravel-size pieces of fragmented rock found on spoon tip.
3 - Bottom of casing 4.0'. Casing driven 212 blows until refusal at 4.0'.
4 - Borehole grouted. Mix consists of 50 lb cement, 10 lb bentonite powder, 7 gal of water.
5 - Borehole backfilled with 25 lb bentonite chips over grout.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: GZ-5

GZA TEMPLATE TEST BORING; 4/9/2019; 3:11:21 PM

SECTION 02930
LOAMING, SEEDING, AND REVEGETATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. The work under this Section includes the furnishings of all labor, equipment, supplies and materials for loaming (on-site topsoil or imported loam), seeding, revegetating, and related items, as indicated on the drawings and/or as specified herein as follows:

1. Topsoil or Loam (from off-site sources)
2. Seeding
3. Fertilizing
4. Erosion Protection
5. Maintenance

B. The work of this Section covers loaming and seeding operations, as well as prior preparation and subsequent conditioning (fertilizer and erosion protection) and maintenance, at all locations where fill is placed, excavations made, or existing vegetation is disturbed.

C. The performance of this work shall be judged by the establishment of appropriate ground cover, as specified, in the indicated areas. The Contractor shall be responsible for the watering and other proper care of the seeded areas until final acceptance by the Owner.

D. Loaming operations shall utilize reclaimed topsoil previously stripped from on-site locations unless specifically directed by the Owner or Engineer. On-site topsoil will not be used only in the event that it is found to be unsuitable due to its composition, the inclusion of invasive plant material or seeds, or the presence of undesirable substances.

E. In the event that on-site topsoil is found to be un-usable or the quantities are found to be inadequate, the Contractor shall supply acceptable weed-free loam (i.e. suitable topsoil from off-site sources). The Contractor shall be responsible for the determination of the quantities of off-site loam required. Any topsoil created by mixing of different on-site soils shall be considered as on-site topsoil and paid for accordingly.

F. In general, the work shall consist of all loaming, seeding, and revegetation necessary to prepare all areas on the site for revegetation, placing loam (on-site topsoil and/or off-site loam), seeding with approved seed mix, conditioning and fertilizing the soil as required, protecting areas without permanent turf reinforcement from erosion through the use of mulch or biodegradable blankets, and maintaining the seeded areas (watering, etc.) until the grass and vegetation is well established.

G. The Contractor shall be responsible for all maintenance and repair of loam and seeded areas until final acceptance. The Contractor shall loam, seed, and revegetate all areas where construction shall take place as shown on the Contract Plans, as well as any other areas necessary for the work of the Contract (with approval from the Owner). The Contractor

shall perform ALL necessary loaming, seeding, and revegetation at all locations on the site.

H. It is specifically noted that seeding and revegetation operations may be affected by cold weather. It is possible that project scheduling may require dormant seeding, re-seeding, and resumption of work during more favorable weather conditions. Seeding of frozen soil will NOT be allowed. It shall be the Contractor's responsibility to develop a plan to ensure adequate establishment and maintenance of vegetation which takes into account the schedule and potential cold weather conditions.

I. The embankment dam surface is an erosion-critical area. All areas slated for loam and seed will be surfaced with an approved Erosion Control Blanket. The top and bottom edges of the blanket shall be installed in anchor trenches in accordance with manufacturer's specification.

1.02 RELATED WORK

A. The following is a list of related work items that shall be performed or furnished under other Sections of these Specifications as indicated:

1. Temporary Erosion and Sedimentation Control – Section 01560
2. Site Restoration – Section 01740
3. Clearing, Grubbing and Stripping – Section 02110
4. Earthwork – Section 02200

1.03 PROTECTION OF THE RESERVOIR AND WATERWAYS

Because the project is located adjacent to Mousam Lake, Mousam River, and environmentally sensitive wetland resources, it is critical that no fertilizers or other chemicals be allowed to reach open water or stream areas. DO NOT over-fertilize and take care that runoff containing fertilizer does not enter the Lake or downstream areas. NO herbicides, pesticides, or similar chemicals will be allowed at the site. Fertilizers must be approved prior to application and shall not contain herbicides or pesticides.

1.04 SUBMITTALS

The Contractor shall submit to the Owner for review and approval, the following information a minimum of eight (8) days in advance of starting any loaming, seeding, and revegetation operations:

A. Composition, test data as specified herein, Manufacturer's information, and/or source of following material:

1. Soil Chemistry Test Results (On-site and Off-site sources)
2. Off-site Loam (topsoil) material information
3. Seed (including certification of weed content)
4. Limestone
5. Fertilizer

6. Compost
7. Erosion Control Blanket cutsheets and installation details.

PART 2 – PRODUCTS

2.01 LOAM

A. Off-site loam, to be furnished from sources outside of the project limits, shall consist of loose, friable, sandy loam, or loam topsoil, free of admixture of subsoil, refuse, stumps, rocks, brush, weeds and other materials which will prevent the formation of suitable seed bed. No stones in excess of one and one-quarter inch (1-1/4") in diameter will be tolerated. The soils shall conform to the following gradation:

Sieve Size	Percent Finer by Weight
1-inch	90-100%
No. 4	70-95%
No. 40	30-85%
No. 100	25-50%
No. 200	20-40%

(No more than 15 percent of loam shall be clay)

Mixing of on-site peat and mineral soils to make loam is acceptable. The product shall meet the requirements of off-site loam.

The Contractor shall notify the Owner of the location of the source supply for the loam at least ten days prior to delivery of the loam to the project site. Any imported materials which do not meet the above requirements shall be rejected and removed from the site.

The pH of the material shall be between 5.5 and 7.6. The loam shall contain at least 4%, but not more than 20%, organic material as determined by the loss during ignition of oven-dried samples. Test samples shall be dried to a constant weight at a temperature of 221°F ± 5°F. Loam shall not have greater than 500 ppm salt.

B. All topsoil and/or loam shall, at the Contractor's expense, be subjected to a Standard Soil Test with Organic Matter which shall include reporting of the following parameters: pH, Buffer pH, Extractable Nutrients, Extractable Heavy Metals (e.g. Lead), Cation Exchange Capacity, Percent Base Saturation, Percent Organic Matter, and Total Soil Nitrogen. The laboratory test results shall provide recommendations for nutrient and pH adjustments.

A minimum of one test shall be performed on each distinct topsoil or loam source. A standard soil test shall be performed for every 500 CY of topsoil or loam used at the site.

Soil testing shall be performed at the University of Maine Soil Testing Service or other approved accredited testing laboratory.

2.02 COMPOST

A. Compost shall be mature and well cured (4-6 months curing after completion of thermophillic compost process) and moderately screened. It shall have a moisture content that results in no visible free water or dust produced when handling the material.

B. Compost shall meet the following criteria:

	Minimum	Maximum
Percent passing 2”	100%	--
Percent passing 1”	90%	100%
Percent passing ¾”	70%	100%
Percent passing ¼”	4%	75%

C. Compost pH shall be between 6.0 and 8.5. Manufactured inert material (plastic, metal, etc) shall be less than 0.5 percent on a dry weight or volume basis, whichever provides the least amount of foreign material. Minimum organic matter shall by 40 percent dry weight basis as determined by Loss-On-Ignition Matter Method. Soluble salt contents shall be less than 6.0 mmhos/cm. The compost shall be composed of a minimum of 65 percent by volume recycled plan waste. A maximum of 35 percent by volume of other approved organic waste and/or biosolids may be substituted for recycled plant waste. The supplier shall provide written verification of feedstock sources.

D. Compost shall be certified free of herbicides and other harmful chemicals. Composts generated from the decompositions of biosolids shall not be used.

2.03 SEED

A. Seed shall be the commercial product of a reputable grower approved by the Owner and shall be certified to be not more than one (1) year old. Seed mixes provided by New England Wetlands Plants, Inc. (NEWPI) or other approved grower/vendor and optimized for the on-site conditions shall be applied where shown on the Contract Drawings. The seed mix proposed for use shall be the New England Erosion Control/Restoration Mix for Dry Sites or equivalent. Plant species typically provided as follows:

Creeping Red Fescue (Festuca rubra), Annual Rye-grass (naturalized)(Lolium multiflorum), Little Bluestem (Schizachyrium scoparium), Indian Grass (Sorgastrum nutans) Upland Bentgrass (Agrostis perennans), Rough Bentgrass/Ticklegrass (Agrostis scabra), Blue Grama (Bouteloua gracilis), Canada Wild Rye (Elymus canadensis), Perrenial Ryegrass (naturalized)(Lolium perenne).

B. The loading rate will be 1 pound of New England Erosion Control/Restoration Mix for Dry Sites per 1,250 square feet of seed area or the manufacturer’s recommended application rate, whichever is greater.

C. Other seed mixes may be utilized subject to prior approval by the Owner.

D. The seed shall be furnished and delivered premixed in the proportions specified above. All seed shall comply with applicable State and Federal seed laws. A grower's certificate of compliance with the specifications shall be submitted by the grower with the shipment of

the seed. The certificate shall include the guaranteed percentage of purity, weed content and germination of the seed, and also the net weight and date of shipment. No seed shall be sown until the Contractor has submitted the certificate to the Owner.

2.04 FERTILIZER

A. Fertilizers may be either fluid or dry formulations of commercial carriers of available plant nutrients.

B. Packaged fertilizers shall be in the manufacturer's standard containers or packets. Containers shall weigh not more than 100 lbs and shall include a label stating the name of the material, the net weight of the contents, the manufacturer's name, and the guaranteed analysis of the fertilizer. Labels on containers of fluid fertilizers shall state the net volume of the container.

C. Fertilizer shall be furnished in containers plainly marked with chemical analysis of the product and showing one of the following compositions by weight. At least 50% by weight of the nitrogen content of the fertilizer shall be derived from organic materials.

	(1)	(2)	(3)
Nitrogen	10% min.	8% min.	7% min.
Available Phosphoric Acid	6% min.	6% min.	7% min.
Water Soluble Potash	4% min.	4% min.	7% min.

2.05 LIMESTONE

A. Limestone shall be ground limestone having a minimum total neutralizing value of 88% calcium carbonate equivalence. A minimum of 90% shall pass the No. 20 sieve and a minimum of 60% shall pass the No. 100 sieve.

B. Packaged agricultural limestone packed in the manufacturer's standard containers shall weigh not over 100 lbs each, with the name of the material, net weight of contents and the manufacturer's name and guaranteed analysis appearing on each container.

C. Bulk delivery of limestone shall be accompanied by a certificate providing the names, weight and analysis as specified herein for packaged material.

2.06 EROSION CONTROL BLANKET MATERIAL

A. Erosion control blankets shall be appropriate for use on slopes where mulch is not stable. The erosion protection blankets shall be for temporary application and shall be biodegradable and non-toxic. All erosion control products should be new and previously unused and free of weed and other undesirable seeds. The purpose of these materials is to provide temporary erosion control during the period of establishment of the underlying grass. The blankets shall allow for the growth of grass seeded under the blankets.

B. Erosion control blankets for the top of the dam shall be American Excelsior Company Curlex II Fibrenet or approved equal meeting the requirements provided on the manufacturer's website at https://americanexcelsior.com/wp-content/uploads/2017/09/Curlex-II-CSI.pdf.

C. Erosion control blankets that may be necessary for establishing grass cover at other areas of the site after construction (laydown areas, access road, etc.) shall be photo- or bio-degradable after 12 months and may consist of a straw matrix with jute or polypropylene netting.

D. Erosion control blankets anchors shall be compatible with the blanket material and shall be as specified by the manufacturer.

2.07 MULCH

A. Hay or straw mulch used in this project shall be stalks of grass, oats, wheat, rye or other similar crops which are free from noxious and invasive species. Hay or straw shall show no signs of excessive moisture and be visually free of mold or mildew.

B. Hydraulically applied wood fiber mulch (Hydro-mulch) shall be manufactured so that the materials will remain uniformly suspended in water under agitation and will blend with seeds, fertilizer and other additives to form homogeneous slurry. It shall have the characteristics which, upon hydraulic application, shall form a blotter-like ground coating with moisture absorption and percolation properties and the ability to cover and hold seeds in contact with the soil. Hydro-mulch shall contain no growth or germination inhibiting factors.

PART 3 – EXECUTION

3.01 PREPARATION

A. The Contractor shall clean all equipment involved in turf establishment to remove plants, seeds and propagules prior to commencement of work. Any work to clean equipment shall be at no additional cost to the Owner.

B. The Contractor shall rough grade areas to be loamed and seeded in accordance with Section 02200 and the grading shown on the Contract Drawings.

3.02 TOPSOIL OR LOAM

A. Topsoil (or Loam) shall be spread on the designated areas so as to form a cover of topsoil to a minimum depth of 6 inches unless otherwise shown on the drawings or directed by the Owner or Engineer. Areas designated for covering with topsoil shall be scarified or otherwise roughened, just prior to the application of topsoil. After the spreading of topsoil all stiff clods, hard lumps, large stones, trash, wood, brush, stumps, roots, or other objectionable material shall be gathered and removed from topsoiled area. Compaction may be accomplished by the use of a lawn roller commonly used for this work.

B. Promptly fertilize, seed, mulch, or otherwise cover, and stabilize through tracking with suitable equipment any topsoil placed on grades steeper than 5 percent.

3.03 FERTILIZING AND LIMING

A. Fertilizing and liming shall be done when the soil is in a moist condition and at least twenty-four (24) hours before the sowing of seed. The fertilizer and lime shall be applied to the soil at the rates dictated by the laboratory analysis. Spreading may be accomplished by means of a mechanical spreader or other approved method capable of maintaining a uniform rate of application and shall be thoroughly harrowed, raked or otherwise mixed with the soil to a depth of not less than 1 inch.

B. The fertilizer and lime shall not be applied together. If the limestone and fertilizer are applied dry, the limestone shall precede the fertilizer and shall be worked thoroughly into the soil before the fertilizer is spread. Fertilizer shall be raked to a depth of at least two inches (2") and the area brought to a smooth surface

C. Extreme care shall be taken by the Contractor so as not to introduce fertilizer into adjacent waterbodies or wetland areas. Over-fertilization will not be allowed.

3.04 SEEDING

A. Grass seed of the required mixture and quality shall be spread by a mechanical seeder or other method which sow the seed uniformly at the required rate over the entire area to be seeded. The mechanical seeder shall be capable of being operated to avoid the growth of grass in rows and shall be so operated.

B. The Contractor shall apply the seed mix at one and one half to two times the manufacturer's recommended rate.

C. After seeding, all areas shall be lightly raked by hand to mix the seed and topsoil. Seeded areas shall be rolled with a lawn roller not to exceed one hundred and twenty pounds (120 lbs.) in weight.

D. The recommended seeding periods are from April 1 to June 1, and from August 15 to October 1. Dormant seeding after October 1 shall be allowed, however, seed application rate shall be doubled. Regardless of the time of seeding, the Contractor shall be responsible for a full establishment and growth of vegetation.

3.05 MULCHING

A. Protection of seeded areas shall be either through the application of mulch or the installation of temporary erosion control blankets.

B. Areas which have been seeded shall be mulched immediately following seeding. Areas which cannot be seeded within the specified seeding periods shall be mulched to provide temporary protection to the soil surface. Mulch shall be spread with a mulch blower or by hand. Mulch shall be immediately anchored with a mulch-anchoring tool (operated perpendicular to the contour) or by tracking with a tracked vehicle (operated parallel to the contour). Applying mulch simultaneous to seeding in a hydroseeding operation is acceptable.

C. The Contractor shall perform the initial watering and shall spread straw or wood fiber (hydro) mulch uniformly in a continuous blanket to hide the soil from view.

D. Hay or straw mulch shall be applied to seeded areas at a rate of 10 pounds per 100 square feet. The rate shall be doubled for unseeded areas.

3.06 TEMPORARY EROSION CONTROL BLANKET INSTALLATION

A. Protection of seeded areas shall be either through the installation of temporary biodegradable erosion control blankets or the application of mulch. Temporary erosion control blankets may be necessary if mulch is found to be ineffective in controlling erosion prior to the establishment of vegetation.

B. Erosion control blankets are anticipated to be necessary for areas of revegetation where slopes exceed 3H:1V.

C. Temporary erosion control blankets shall be installed as per the contract drawings and the manufacturer's instructions and recommendations. In general, such blankets are installed down (perpendicular to) slopes and the top and bottom are anchored in trenches in the slope, and in general accordance with the details shown on the manufacturer's website at https://americanexcelsior.com/wp-content/uploads/2018/03/Curlex-Slope-CAD.pdf.

D. All temporary erosion control blankets must be anchored to the ground by the use of stakes, as per the manufacturer's instructions and recommendations. In general, stakes should be placed in staggered rows on 2 to 3 foot centers. Stakes should be long enough to achieve adequate anchorage.

3.07 MAINTENANCE AND REPAIR

A. The Contractor shall be responsible for the watering and other proper care of the seeded areas until final acceptance. If seeded areas have not established by the end of the initial growing season, the maintenance period shall extend through the following growing season.

B. The Contractor shall be responsible for repair of all damage to and erosion of the loamed and seeded areas until final acceptance by the Owner. Repair responsibilities shall include,

but not be limited to, repair of eroded areas, reseeding, replacement of erosion control measures, re-grading, etc. The intent is to facilitate the establishment of an adequate ground cover over all disturbed areas on the site. If seeded areas have not established by the end of the initial growing season (September 1), the period during which the Contractor is responsible for repairs shall extend through the following season (June 1 or later).

3.08 ACCEPTANCE

A. Seeded areas shall show no gaps or dead spots at acceptance. The grass growth shall be widespread and robust with vigorous, healthy root growth.

B. The Contractor is responsible for ensuring that a satisfactory firm stand of grass is obtained and shall do all necessary re-loaming, re-fertilizing and re-seeding, and make all necessary repairs, regardless of cause of damage, to this effect until final acceptance of the project.

C. If seeded areas have not established and been accepted by the end of the initial growing season (September 1), the Owner will defer evaluation for acceptance until the following season (June 1 or later).

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT FOR PAYMENT

A. Topsoil/Loam and seed placed to restore areas outside of the dam embankment, such as laydown or stockpile areas shall be considered incidental to Section 01740 – Site Restoration.

B. Measurement of topsoil or loam from off-site shall be on a basis of the actual, in-place dry weight of the acceptable loam material successfully placed to a minimum depth as shown on the Contract Drawings and directed in the Specifications, in Tons. Certified weight slips shall be submitted to the Owner or Engineer for approval and no payment shall be made for quantities not approved and countersigned by the Owner or Engineer. The Contractor shall, at no additional cost to the Owner, provide the results of an independent moisture test for each load of loam brought to the site and the weight of water shall be subtracted from the total net weight of soil to establish the dry weight of loam delivered.

C. Measurement of Seeding shall be shall be on a basis of the actual area seeded with an approved Seed mix at the appropriate application rate, in Square Yards. Measurement shall be made by taping the planar extent of the area, or by other methods mutually acceptable to the Authority and the Contractor. No measurement shall be made for increases in seeding rate due to the need for dormant seeding. No measurement shall be made for re-seeding necessary for full establishment of vegetation.

D. Measurement of placement of erosion control blanket within the limits of the top of the dam shall be on a basis of the actual, in-place area of the acceptable erosion control blanket material successfully installed, in Square Yards Measurement shall be made by taping the in-place extent of the fabric. Overlaps of per the manufacturer's recommendations are required, but no measurement shall be made of overlapping material.

E. No separate measurement or payment will be made for soil testing, amendments, mulch,

or temporary erosion control blankets in areas outside of the top of the dam that may be required to aid in establishing vegetative cover. These items shall be considered incidental to the other items of this Section.

4.02 PAYMENT

A. Payment for the scope of work specified in the Contract, including all labor, materials, equipment and incidentals, including all handling effort, sorting, testing, preparation, placement, grading, mixing and other work associated with the successful placement of On-Site Topsoil shall be paid for at the applicable unit price for Item 02930.01 on the Form for Bid.

B. Payment for the scope of work specified in the Contract, including all labor, materials, equipment and incidentals, including the provision of and all handling effort, sorting, testing, preparation, placement, grading, mixing and other work associated with the work to Provide and Place Off-Site Loam shall be paid for at the applicable unit price for Item 02930.02 on the Form for Bid. If no Off-Site Loam is required to complete the work, then no payment under this item shall be made.

C. Payment for the scope of work specified in the Contract, including all labor, materials, equipment and incidentals, including the provision of soil amendments, fertilizer, seed, mulch and all handling effort, preparation, placement, rolling, protection with mulch or erosion control blankets, watering & maintenance until final acceptance, and other work associated with Seeding shall be paid for at the applicable unit price for Item 02930.03 stated on the Form for Bid.

D. Payment for the scope of work specified herein, including all labor, materials, equipment and incidentals, associated with Furnishing and Placement of Erosion Control Blanket at the Top of the Dam shall be paid for at the applicable unit price for Item 02930.04 stated on the Form for Bid. Overlaps of a minimum of three feet are required, but no payment shall be made for overlapping material.

Item No.	Payment Item	Unit
02930.01	Furnishing and Placement of Loam from Off-Site Sources	Ton
02930.02	Fertilizing, Seeding, and Mulching	Square Yard
02930.03	Erosion Control Blanket – Top of Dam	Square Yard

*** * END OF SECTION * * ***

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