TOWN OF CAMDEN

CONTRACT DOCUMENTS AND SPECIFICATIONS

FOR

RAGGED MOUNTAIN RECREATIONAL AREA CULVERT REPLACEMENT





Town of Camden P.O. Box 1207 29 Elm Street Camden, ME 04543

May 1, 2020



Prepared By:



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TOWN OF CAMDEN RAGGED MOUNTAIN RECREATIONAL AREA – CULVERT REPLACEMENT INTRODUCTION

1. GENERAL

- A. This CONTRACT covers the Ragged Mountain Recreational Area Improvements project in the Town of Camden. This CONTRACT covers all work to be performed.
- B. Scope of work, to include, but not limited to:

BASE BID:

Includes but is not limited to:

- Removal of the existing 36" CMP culverts
- Installation of a new 15' wide by 40' long precast concrete box culvert
- Reshaping, loaming, seeding and mulching the existing grassed soil filter
- Regrading, shimming and paving the existing gravel adjacent to the existing grassed soil filter.
- All other project specifics indicated in the DRAWINGS and CONTRACT DOCUMENTS.

BID ALTERNATES: See Plans.

2. DEFINITIONS

A. Definitions shall be as listed in the Agreement. "OWNER' shall mean Town of CAMDEN, acting through or by its authorized representative.

3. SCHEDULE

A. Construction shall be substantially complete in accordance with the following schedule:

Bids Due:	May 22, 2020 @ 2:00 PM – Town Office
Anticipated Award:	June 12, 2020
Construction Commencement:	August 24, 2020
Usable Access:	September 11, 2020
Substantial Completion:	September 25, 2020

4. OTHER CONSIDERATIONS

- A. Bidders are advised of the requirement to maintain effective protection of Town property, adjacent private property, building occupants, pedestrians and vehicular traffic at all times.
- B. Each BIDDER is responsible for inspecting the site and for reading and being thoroughly familiar with the site conditions and CONTRACT DOCUMENTS. The failure or omission of any BIDDER to do any of the foregoing shall in no way relieve any BIDDER from any obligation in respect to its BID. Bidder shall be responsible for preparing quantities and takeoffs.

- C. Attention is drawn to the requirement to reconstruct all disturbed areas to their existing condition on the property. Reconstruction of disturbed areas shall include but not be limited to replacement of plantings, surface materials, signage, finishes, etc. All work shall be performed as part of the LUMP SUM bid.
- D. Alternative bond forms prepared by a bonding agent will be acceptable.
- E. Except when otherwise stated, the amount of insurance for each policy shall be not less than:
- 1. Liability for bodily injury, including accidental death:
- (1) \$2,000,000 for any one person and (2) \$2,000,000 for each accident.
- 2. Liability for Property Damage:
- (1) \$2,000,000 for any accident and (2) \$2,000,000 for all accidents.

TOWN OF CAMDEN RAGGED MOUNTAIN RECREATIONAL AREA – CULVERT REPLACEMENT NOTICE AND INFORMATION TO BIDDERS

BID DUE DATE

The Town of CAMDEN will receive sealed bids for a project entitled: <u>"Ragged Mountain Recreational</u> <u>Area Culvert Replacement</u>" on or before <u>May 22, 2020 at 2:00 PM</u> at the Town Office located at 29 Elm Street, Camden, Maine 04843. At which time, the received bids will be opened and read aloud. All bids shall be in accordance with the NOTICE AND INFORMATION TO BIDDERS, ALL PLANS LISTED IN THE DRAWING INDEX, BID FORM, CONTRACT AGREEMENT, OFFER AND AWARD, SPECIAL CONDITIONS, ADDENDA and SPECIFICATIONS. All of the bid documents are a material part of this NOTICE and are incorporated by reference into this NOTICE.

BID BOOK AND PLANS

Bid packages will be made available by Gartley & Dorsky Engineering & Surveying, Inc. Hard copies of the bid package will be provided for \$50.00 or by email at no charge.

QUESTIONS

Project-specific questions, identification of discrepancies, and/ or omissions from the project documents shall be requested in writing or emailed to Andrew Hedrich, Gartley & Dorsky Engineering & Surveying, Inc. 59 Union Street, Unit 1, P.O. Box 1031, Camden, ME 04843 or at <u>AHedrich@gartleydorsky.com</u>. Questions received less than two (2) days in advance of the Bid Due Date will not be answered. Prior to an award of the contract, no other person has been authorized to make any oral modifications or changes in the terms and specifications of this NOTICE. Bidders shall not contact any other staff for clarification of Contract provisions, and Owner will not be responsible for any interpretations so obtained. The Project Engineer will provide additional written clarification concerning the issues raised in the NOTICE to all prospective bidders no later than two (2) days prior to the bid due date.

BID REQUIREMENTS

For purposes of this BID NOTICE and all Project documents, the term "bidder" shall mean any person, company or organization submitting a Proposal pursuant to this NOTICE and the term "bid" shall mean a Proposal submitted by a bidder. Each Bid must be made upon blank forms provided in the Request for Bid provided by the Town of Camden and must be accompanied by a bid bond at five (5) percent of the bid amount as a bid guarantee. A Contract Performance Surety Bond and Contract Payment Surety Bond each in the amount of 100 percent of the Contract price, will be required of the successful Bidder. Contractor will pay to the Town of Camden the amount of \$500.00 per day for liquidated damages for each calendar day that the Contractor shall be in default after the time stipulated in the contract document.

In the execution of the contract, the Contractor and all subcontractors agree and undertake not to discriminate in their hiring or in the furnishing of goods or services required by this Contract on the grounds of race, color, religion, sex, sexual orientation, national origin or citizenship status, age, disability or veterans status, and to provide reasonable accommodations to qualified individuals with disabilities upon request. All employees, agents, or subcontractors of the Contractor who enter into or upon the Town's premises for any reason relating to this Contract shall at all times abide by and adhere to all laws, regulations, and/or the Town policies against sexual harassment and discrimination, and shall not engage in, and shall report to the Town, any criminal or nefarious conduct on the property.

All deviations from the contract documents must be noted in detail by the bidder, in writing, at the time of submittal of the formal bid. Bidders are expressly informed that any material deviation from the contract documents may be a basis for rejection of the Proposal at the time the Town considers an award of the contract.

At the time of the opening of proposals, each bidder shall be presumed to have read and be thoroughly familiar with the construction plans in this BID NOTICE and all enclosures. The failure or omission of any bidder to receive or examine any form, instrument, or document shall in no way relieve any bidder from any obligation in respect to the Proposal submitted. Any bidder to whom a contract is awarded shall be responsible for observing applicable standards for fair employment practices and work safety.

BONDING

Each bid must be made upon blank forms provided in the Request for Bid provided by the Town and must be accompanied by a bid bond of five (5) percent of the bid amount as a bid guarantee or an official bank check, cashier's check, certified check, certificate of deposit, or United States postal money order in the required amount payable to the Town of Camden as a Bid Guarantee. A Contract Performance Surety Bond and a Contract Payment Surety Bond, each in the amount of 100 percent of the Contract price, will be required of the successful Bidder.

BID AWARD AND PROJECT SCHEDULE

The Board of Selectmen reserve the right to accept or reject any or all bids. The bid will be awarded to the lowest responsive & responsible Bidder, while taking into consideration project experience and familiarity with the contractor. Bid results will be provided to Bidders upon request.

TOWN OF CAMDEN RAGGED MOUNTAIN RECREATIONAL AREA – CULVERT REPLACEMENT <u>BID FORM</u>

The undersigned Bidder acknowledges receipt of the NOTICE AND INFORMATION TO BIDDERS, ALL PLANS LISTED IN THE DRAWING INDEX, BID FORM, CONTRACT AGREEMENT, OFFER AND AWARD, SPECIAL CONDITIONS, ADDENDA and SPECIFICATIONS respectively and hereby proposes to provide the work. Provide lump sum bid price for the work to be completed by the dates indicated on the bid schedule. In addition to Lump Sum price provide units and unit pricing for contract adjustments.

Base Bid for Improvements –

Includes but is not limited to:

- Removal of the existing 36" CMP culverts
- Installation of a new 15' wide by 40' long precast concrete box culvert
- Reshaping, loaming, seeding and mulching the existing grassed soil filter
- Regrading, shimming and paving the existing gravel adjacent to the existing grassed soil filter.
- All other project specifics indicated in the DRAWINGS and CONTRACT DOCUMENTS.

		LUMP SUM - BID PRICE
BASE BID:		\$
Name of Individual / Company:		
Address:		
Printed Name of Person Signing	g Form:	
	Telephone:	
	Email:	
	Signature:	
	Date:	
Completion Date Acknowledge	d:	(initial)
Addenda Acknowledged:		(initial)

UNIT PRICING

BID ITEM	ITEM DESCRIPTION	UNIT	TOTAL UNITS	UNIT PRICE
203.20	Common Excavation	СҮ		
203.35	Crushed Stone 3/4"	СҮ		
304.10	Aggregate Subbase Course - Gravel - Type D	СҮ	 	
304.14	Aggregate Subbase Course - Type A	CY		
403.207	Hot Mix Asphalt, 19.0 mm Nominal Maximum Size	Ton		
403.208	Hot Mix Asphalt, 12.5 mm Nominal Maximum Size	Ton		
605.07	4" Underdrain Pipe	LF		
610.16	Heavy Riprap	СҮ		
613.319	Erosion Control Blanket	SY		
615.07	Loam	СҮ		
618.13	Seeding Method Number 1 (Unit 1000 SF)	Unit		
620.54	Stabilization/Reinforcement Geotextile	SY		
	15' Precast Bridge	LF		
	Footing Precast/Cast-In-Place	LF		
	Ledge Removal (Hammer)	Hour	Unknown	



TOWN OF CAMDEN RAGGED MOUNTAIN RECREATIONAL AREA – CULVERT REPLACEMENT AGREEMENT

BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

THIS AGREEMENT is by and between	Town of Camden	("Owner") and
		("Contractor").

Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

ARTICLE 2 – THE PROJECT

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows: The Town of Camden – Ragged Mountain Recreational Area Parking Lot Drainage Improvements.

ARTICLE 3 – ENGINEER

3.01 The Project has been designed by Gartley & Dorsky Engineering & Surveying, Inc.

ARTICLE 4 – CONTRACT TIMES

- 4.01 *Time of the Essence*
 - A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.
- 4.02 *Contract Times: Dates*
 - A. The Work will be substantially completed on or before ______, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions.
- 4.03 *Liquidated Damages*
 - A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with the Contract. The parties also recognize the delays, expense, and difficulties involved in proving in legal or arbitration proceedings the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):

1. Substantial Completion: Contractor shall pay Owner \$500.00 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified in Paragraph 4.02.A above for Substantial Completion until the Work is substantially complete.

4.04 Special Damages

- A. In addition to the amount provided for liquidated damages, Contractor shall reimburse Owner (1) for any fines or penalties imposed on Owner as a direct result of the Contractor's failure to attain Substantial Completion according to the Contract Times, and (2) for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Substantial Completion (as duly adjusted pursuant to the Contract), until the Work is substantially complete.
- B. After Contractor achieves Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times, Contractor shall reimburse Owner for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Work to be completed and ready for final payment (as duly adjusted pursuant to the Contract), until the Work is completed and ready for final payment.

ARTICLE 5 – CONTRACT PRICE

- 5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents the amounts that follow, subject to adjustment under the Contract:
 - A. For all Work other than Unit Price Work, a lump sum of: \$_____.
 - B. Accepted unit bid alternate prices:

All specific cash allowances are included in the above price in accordance with Paragraph 13.02 of the General Conditions.

ARTICLE 6 – PAYMENT PROCEDURES

- 6.01 *Submittal and Processing of Payments*
 - A. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Owner as provided in the General Conditions.
- 6.02 *Progress Payments; Retainage*
 - A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the <u>15th</u> day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.
 - 1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments

previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract

- a. <u>90</u> percent of Work completed (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and
- b. <u>90</u> percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).
- B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to <u>100</u> percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less <u>150</u> percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

6.03 Final Payment

A. Upon final completion and acceptance of the Work in accordance with Paragraph 15.06 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 15.06.

ARTICLE 7 – INTEREST

7.01 All amounts not paid when due shall bear interest at the rate of <u>12</u> percent per annum.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

- 8.01 In order to induce Owner to enter into this Contract, Contractor makes the following representations:
 - A. Contractor has examined and carefully studied the Contract Documents, and any data and reference items identified in the Contract Documents.
 - B. Contractor has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
 - C. Contractor is familiar with and is satisfied as to all Laws and Regulations that may affect cost, progress, and performance of the Work.
 - D. Contractor has carefully studied the Site and all drawings of physical conditions relating to existing surface or subsurface structures.
 - E. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (3) Contractor's safety precautions and programs.

- F. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
- G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
- H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
- I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
- J. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

ARTICLE 9 – CONTRACT DOCUMENTS

- 9.01 *Contents*
 - A. The Contract Documents consist of the following:
 - 1. This Agreement
 - 2. Performance Bond
 - 3. Payment Bond
 - 4. Other bonds
 - a. <u>None Noted</u>
 - 5. General Conditions
 - 6. Supplementary Conditions
 - 7. Specifications
 - 8. Drawings and items listed on the attached Drawings & Additional Item Index
 - 9. Addenda
 - 10. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
 - a. Notice to Proceed
 - b. Work Change Directives
 - c. Change Orders
 - d. Field Orders
 - B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).
 - C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified, or supplemented as provided in the General Conditions.

ARTICLE 10 – MISCELLANEOUS

- 10.01 *Terms*
 - A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.
- 10.02 Assignment of Contract
 - A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.
- 10.03 Successors and Assigns
 - A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.
- 10.04 Severability
 - A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

10.05 Contractor's Certifications

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 10.05:
 - 1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;
 - "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
 - 3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

This Agreement will be effective on	(which is the Effective Date of the Contract).
OWNER:	CONTRACTOR:
Ву:	Ву:
Title:	Title: (If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)
Attest:	Attest:
Title:	Title:
Address for giving notices:	Address for giving notices:

TOWN OF CAMDEN RAGGED MOUNTAIN RECREATIONAL AREA – CULVERT REPLACEMENT DRAWING & ADDITIONAL ITEM INDEX

DRAWING NO.TITLEC1Site PlanC2Civil DetailsS1.0Structural PlanV4Existing Conditions & Topographic Survey



TOWN OF CAMDEN RAGGED MOUNTAIN RECREATIONAL AREA – CULVERT REPLACEMENT ADDENDA & MODIFICATIONS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. No interpretation of the meaning of the Contract Documents will be made to any Bidder orally. Every request for such interpretations or questions, to be given consideration, must be received in the Engineer's office not later than the date specified in the Bidder's information. Any and all such interpretations and any supplemental instructions pertaining to General Bidders, will be in the form of written Addenda to the CONTRACT DOCUMENTS, which, if issued, will be sent by the Engineer to all persons on record as having received a complete set of CONTRACT DOCUMENTS (at the respective addresses furnished for such purposes). Such Addenda will be issued not later than 48 hours prior to time set for opening of General Bids.
- B. Failure of any Bidder to receive any such Addenda shall not relieve such Bidder from any obligation under their bid as submitted. All Addenda so issued shall become part of the CONTRACT DOCUMENTS.

TOWN OF CAMDEN RAGGED MOUNTAIN RECREATIONAL AREA – CULVERT REPLACEMENT <u>ACKNOWLEDGMENT OF BID AMENDMENTS</u>

With this form, the Bidder acknowledges their responsibility to ensure they have received all Amendments to the Bid Package. It is the responsibility of the Bidder to determine if there are Amendments to the Project, to download them, to incorporate them into their Bid Package, and to reference the Amendment number and the date on the form below. Bid Amendments will not be posted any later than noon the day before the bid opening without individually notifying all the plan holders.

Amendment Number	Date

The Contractor, for itself, its successors and assigns, hereby acknowledges that it has received all of the above referenced Amendments to the Bid Package.

CONTRACTOR

Date

Signature of Authorized Representative

TOWN OF CAMDEN RAGGED MOUNTAIN RECREATIONAL AREA – CULVERT REPLACEMENT <u>SPECIAL CONDITIONS</u>

PART 1 - GENERAL

1.1 HOURS OF OPERATION

A. Regular work hours shall be at the Contractor's option. No work shall be performed prior to 7 a.m. local time, and all work shall end by 7 p.m. local time or dusk, whichever is earlier.

1.2 SCHEDULE OF OPERATIONS

- A. No work is to be performed on Sundays. The Contractor shall provide a construction schedule indicating when access to the site shall be restricted.
- B. The Contractor shall, in good workmanlike manner, perform, or cause to be performed, all work and furnish all supplies and materials, machinery, equipment, facilities and means, except as herein otherwise expressly specified, necessary or proper to complete all the work required by this Contract, in accordance with the provisions of the Contract Documents, including all sub-divisions thereof, and in accordance with the directions of the Engineer as given from time-to-time during the progress of the work. He shall furnish, erect, maintain, and remove such construction plant and such temporary works as may be required. He alone shall be responsible for the safety, efficiency, and adequacy of his plant, appliances, and methods, and for any damage which may result from their failure or their improper construction, maintenance, or operation.

1.3 ACCIDENT PREVENTION

A. Comply with the American National Standards Institute (ANSI) and the American Society of Safety Engineers (ASSE) A10.33 Safety and Health Program Requirements for Multi-Employer Projects. The Field Superintendent of the Contractor shall conduct regular and frequent inspections of the site for compliance with these safety regulations, stating in writing to the Engineer each time that he has done so.

1.4 COORDINATION OF THE WORK

- A. The Contractor and all his Subcontractors shall coordinate their work with all adjacent work and shall cooperate with all other trades so as to facilitate general progress of the work. Each trade shall afford all other trades every reasonable opportunity for the installation of their respective work and for the storage of their materials and equipment. The Contractor shall be responsible for coordination.
- B. Each Subcontractor shall assume responsibility for the correctness and adequacy of his work. Each Subcontractor shall be responsible for and pay all damages done by his work or his workmen.
- C. The Contractor shall cooperate with, and provide access and working area to the Owner's Contractors for the performance of specific work assigned to them.

1.5 PROJECT MEETINGS

A. The Contractor will be required to meet with the Engineer, and the Owner's designated representative, if applicable, during the course of the Contract for purpose of progress review, coordination of shop drawing schedules, sample submittals, and other items of

work requiring such coordination. The dates of such meetings shall be as mutually agreed upon between the Contractor, the Engineer, and the Owner.

1.6 <u>TESTS AND INSPECTIONS</u>

- A. The Contractor shall make such tests and inspections of his workmanship and materials as may be required by the Building Code, state or municipal laws, or as called for under the various sections of the SPECIFICATIONS.
- B. All expense attached to such tests and inspections, unless otherwise specified under the various sections of the SPECIFICATIONS, shall be borne by the Contractor, who shall furnish all labor, tools, instruments, water, temporary power and light, construction and equipment necessary for these tests and inspections. Records of all tests and inspections shall be furnished to the Engineer. The Contractor shall remove all temporary work, materials, and equipment upon completion of tests and inspections.
- C. Where in the various sections of the SPECIFICATIONS inspection and testing of materials, processes, and the like is called for, the selection of bureaus, laboratories, and/or agencies for such inspection and test shall be subject to approval of the Engineer.
- D. Should any material or work be found, after testing or inspection, to be defective or inferior, such material and/or work shall be removed and replaced with new sound materials and/or work as approved by the Engineer. The removal and replacement herein called for shall be at the Contractor's expense. Refer to the GENERAL CONDITIONS and SUPPLEMENTARY CONDITIONS for additional requirements regarding testing and inspection of materials.

1.7 FIRE PROTECTION AND PREVENTION

- A. Provide and maintain adequate fire protection including fire extinguishers, dry chemical, or other effective means of fire extinguishment, ready for instant use, distributed around the project, and in and about temporary structures during construction of the Work.
- B. The Contractor shall provide effective means of fire extinguishment to provide adequate firefighting coverage for the project.
- C. Gasoline and other flammable liquids shall be stored in and dispensed from U. L. listed safety containers in conformance with National Board of Fire Underwriters' recommendations. Storage shall not be within the permanent buildings.
- D. The Contractor shall keep the site free of rubbish and debris as specified hereunder.
- E. Make arrangements for periodical inspection by local fire protection authorities and insurance underwriters' inspections. Cooperate with said authorities and promptly carry out their recommendations. Comply with all applicable laws and ordinances and with Owner's fire prevention requirements.
- F. Tarpaulins that may be used during construction of work shall be made of material which is resistant to fire, water, and weather. Tarpaulins shall have U. L. approval and comply with FS-CC-C-746.
- G. Torch-cutting and welding operations shall have approval of the Contractor before such work is started, and chemical extinguishers shall be available at location where work is in progress.
- H. Open fires of any kind will not be permitted in or about premises.

1.8 EXISTING UTILITIES

- A. Conform to Dig Safe protocols.
- B. Existing utility lines indicated on the Drawings, such as cables, ducts, conduits, and piping shall, if damaged (unless they are to be abandoned), be immediately repaired, protected,

and maintained in use until relocation of same has been completed, or shall be cut and capped where directed, or shall be prepared for service connections when so required. Damaged utilities shall be repaired by the Contractor at no extra cost to the Owner. Any utilities encountered which are <u>not</u> indicated on the Drawings shall be reported.

- C. The Contractor shall notify the Owner in writing three days in advance of the proposed time for shutting down or interrupting any utilities, services, or facilities which may affect the operation of other buildings, services, or facilities of the Owner. Unless otherwise authorized by the Owner, he shall so schedule and coordinate his work that such interruption will occur on weekends, holidays, or before or after the normal working day of the Owner's facilities. In no case shall any shutdown or interruption of any utilities, services, or facilities be made without the approval and authorization of the Owner. Both new and existing service and utility systems shall be complete and ready for service before connecting existing lines to new systems.
- D. The Owner will cooperate fully, at the Contractor's request, in assisting the Contractor in locating and identifying underground utilities.

1.9 <u>AS-BUILT DRAWINGS</u>

A. The Contractor, mechanical and electrical Subcontractors shall keep one set of prints up to date showing the actual work "as-built" for all items of work. "As-built" drawings will be turned over to the Engineer at the completion of the Work.

1.10 RUBBISH REMOVAL

- A. The Contractor shall require each of his Subcontractors engaged upon the Work to bear his full responsibility for cleaning up during and immediately upon completion of his work on a daily basis, and shall remove all rubbish, waste, tools, equipment, and appurtenances caused by and used in the execution of his work; but this shall in no way be construed to relieve the Contractor of his primary responsibility leaving all work in a clean and proper condition satisfactory to the Engineer and/or Owner.
- B. Immediately after unpacking, all packing materials, case lumber, excelsior, wrapping, or other rubbish, flammable or otherwise, shall be collected and removed from the buildings and premises.

1.11 SITE DRAINAGE AND PUMPING

- A. The Contractor shall take over the responsibility for site drainage upon entering the premises and shall maintain such drainage during the life of his Contract in a manner approved by the Engineer and so as not to adversely affect the adjacent areas.
- B. The Contractor shall during the progress of the Work, provide and maintain all required pumps, suction and discharge lines, and power in sufficient number and capacity to keep all excavations, pits, trenches, foundations, and the entire property area free from accumulation of water from any source whatsoever, at all times, and under any and all circumstances and contingencies that may arise.

1.12 CONSTRUCTION HOISTS

A. The Contractor shall provide and pay for hoisting machinery and/or crane service as necessary to lift all personnel and materials for all operations, both his and his Subcontractors, of sufficient capacity and speed to produce no delay in the completion of the Work.

1.13 PARKING

A. Vehicles of persons employed on the construction project shall park in an area as mutually agreed upon by the Owner, Contractors and Engineer. At the conclusion of the Work, and prior to Substantial Completion, the Contractor shall restore the selected on-site parking area to its original condition.

1.14 <u>SITE ACCESS</u>

A. Safe passage shall be maintained for pedestrians during construction. No equipment, materials, or staging may block the walks, accessible walks, steps, ramps, or egress routes of the facility.

1.15 <u>FINAL CLEANING</u>

A. Before the final inspection all finished surfaces shall be swept, dusted, and cleared of all construction debris.

SECTION 01 35 43 - ENVIRONMENTAL PROCEDURES

PART 1 - GENERAL

1.1 DEFINITIONS OF CONTAMINANTS

- A. Sediment: Soil and other debris that has been eroded and transported by runoff water.
- B. Solid Waste: Rubbish, debris, garbage, and other discarded solid materials resulting from construction activity.
- C. Chemical Wastes: Includes salts, acids, alkalis, herbicides, pesticides, and organic chemicals.
- D. Sanitary Wastes: Wastes characterized as domestic sanitary sewage.

1.2 ENVIRONMENTAL PROTECTION REQUIREMENTS

Contractor is advised that the project is subject to municipal standards and the standards of Maine Department of Environmental Protection Erosion and Sedimentation Control Law permit requirements (MRSA 38 § 420-C). Provide and maintain during the life of the Contract, environmental protection as defined therein. Provide environmental protective measures as required to prevent or control pollution that develops during normal construction practice. Provide environmental protection measures required to correct conditions that develop during the construction of permanent or temporary features associated with the project. Prevent unauthorized placement of fill, any material, or any unauthorized disturbance of any natural resource. Comply with all federal, state, and local regulations pertaining to water, air, and noise pollution.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 PROTECTION OF NATURAL RESOURCES

No wetland shall be disturbed. Other natural areas shall be preserved in their existing condition or restored to an equivalent or improved condition upon completion of the Work. Confine construction activities to areas defined by the work schedule, Drawings, and Contract Documents.

A. Land Resources: Except in areas indicated to be cleared, do not remove, cut, deface, injure, or destroy trees or shrubs without special approval of the Owner's



representative. Do not fasten or attach ropes, cables, or guys to any existing nearby trees for anchorages unless specifically authorized. Where such special emergency use is authorized, the Contractor shall be responsible for any resultant damage.

- 1. Protection: Protect existing trees that are to remain and which may be injured, bruised, defaced, or otherwise damaged by construction operators. Remove displaced rocks from uncleared areas. Protect monuments and markers.
- Repair and Restoration: Repair or restore to their original condition all trees or other landscape features scarred or damaged by the equipment operations. Obtain approval of the repair or restoration from the Engineer prior to its initiation.
- 3. Temporary Construction: Remove all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, and all other vestiges of construction. Temporary roads, parking areas, and similar temporary use areas shall be graded in conformance with surrounding areas and revegetated, seeded, or sodded as required by the plans.
- B. Water Resources: Perform all work in such a manner that any adverse environmental impact on water resources is avoided. Storage of hydraulic fluid is not permitted on-site. Quantities of bulk materials shall be reduced to a level acceptable to the Owner's representative.
- 3.2 EROSION AND SEDIMENT CONTROL MEASURES
 - A. Burn-off: Burn-off of ground cover is not permitted.
 - B. Protection of Erodible Soils: All earthwork brought to final grade shall be immediately finished as indicated or specified. Protect immediately side slopes and backslopes upon completion of rough grading. Plan and conduct all earthwork in such a manner as to minimize the duration of exposure of unprotected soils, and in no case shall exposure exceed seven (7) days. Consult weather forecasts prior to exposing large areas of soil. Check erosion control measures before forecasted major storm events.
 - C. Temporary Protection to Erodible Soils: Utilize the following methods to prevent erosion and control sedimentation.
 - 1. Vegetation and Mulch: Provide temporary protection on all side and back slopes as soon as rough grading is completed or sufficient soil is exposed to require protection to prevent erosion. Such protection shall be by accelerated growth of permanent vegetation, temporary vegetation, mulching, or netting. Stabilize slopes by hydroseeding, anchoring mulch in place, covering with anchored netting, sodding, or such combination of these and other methods necessary for effective erosion control.
- 3.3 CONTROL AND DISPOSAL OF SOLID, CHEMICAL AND SANITARY WASTES



Pick up solid wastes and place in containers that are emptied on a regular schedule. The preparation, cooking and disposing of food is strictly prohibited on the project site. Conduct handling and disposal of wastes to prevent contamination of the site and other areas. On completion, leave areas clean and natural looking. Remove signs of temporary construction and activities incidental to construction of permanent work in place

- A. Disposal of Rubbish, Garbage, and Debris: Dispose of rubbish, garbage and debris in accordance with the requirements specified herein.
- B. Sewage, Odor, and Pest Control: Dispose of sewage through chemical toilets or comparable effective units and periodically empty wastes. Include provisions for pest control and elimination of odors.
- C. Petroleum Products: Conduct fueling and lubricating of equipment and motor vehicles in a manner that affords the maximum protection against spills and evaporation. Dispose of lubricants to be discarded and excess oil in accordance with approved procedures meeting federal, state and local regulations.

3.4 DUST CONTROL

Keep dust down at all times, including nonworking hours, weekends, and holidays. Sprinkle or treat with dust suppressers, the soil at the site, haul roads, and other areas disturbed by operations. Petroleum products will not be used as suppressers. No dry power brooming is permitted. Instead use vacuuming, wet mopping, wet sweeping, or wet power brooming.

3.5 NOISE

No blasting or use of explosives is permitted without written permission of the owner's representative and then only during designated times.

END OF SECTION 01 35 43



SECTION 01 55 26 - TRAFFIC CONTROL

1.1 DESCRIPTION

- A. Work Included:
 - 1. Provide all materials and perform all work necessary to completely regulate traffic in the area of Work.
 - 2. Perform all work in such a manner as to provide safe passage at all times for the public and with a minimum of obstruction to traffic.
 - 3. Do not close roads or streets to passage of the public without the permission of the proper authorities.
- B. The local police department or road commissioner will decide if safe passage is being maintained and shall have the authority to require the Contractor to take any additional steps necessary to maintain safe passage. If a regulator furnishes an inspector on the job as a result of poor traffic control by the Contractor, the Contractor shall be responsible for all costs assessed by the regulator.

1.2 SCHEDULING WORK

- A. Schedule all work so that road closures are minimized. Limit closure to 21 days.
- B. Revise the plan of work if it will create a traffic hazard or an unreasonably long detour.
- C. Do not start work in any new location without the permission of the Engineer.
- D. Notify all police and fire departments of all scheduled detours and when streets are reopened, as needed.

PART 2 - PRODUCTS

2.1 WARNING SIGNS AND BARRICADES

- A. Provide adequate warning signs, barricades, signal lights, watchmen and take other necessary precautions for the safety of the public.
- B. Provide and illuminate suitable warning signs to show where construction, barricades or detours exist.
- C. Provide barricades of substantial construction and painted with a finish that increases visibility at night.
- D. Keep signal lights illuminated at all barricades and obstructions from sunset to sunrise.

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- E. Maintain all necessary signs, barricades, lights, watchmen and other safety precautions during authorized suspension of the Work, weekends, holidays or other times when the Work is not in progress.
- F. Traffic control signs for construction work shall be located and of the size and type as outlined in the Manual on Uniform Traffic Control Devices for Streets and Highways as published by the U.S. Department of Transportation.

2.2 UNIFORMED POLICE OFFICER

- A. A uniformed police officer is a police officer (local, county or state) on regular or special duty dressed in uniform with the necessary high visibility vest and apparel needed for traffic control.
- B. Arrange the police detail with the local Chief of Police, County Sheriff, or State Police Captain depending on jurisdiction.

2.3 FLAG PERSON

- A. A flag person is an individual assigned specifically to the task of directing traffic and is outfitted in the necessary high visibility vest and apparel needed for traffic control.
- B. Flag persons shall be provided by the Contractor.

PART 3 - EXECUTION

3.1 DETOURS

- A. Provide, identify and maintain suitable detours when the project, or any part thereof, is closed to public travel.
- B. When the closed part of the project is reopened, restore the detour area and any other disturbed areas to the original condition.

3.2 INCONVENIENCE TO RESIDENTS OF VICINITY

- A. Whenever a traveled way is closed, perform the Work in such a manner that local travel and residents in the vicinity of the Work will be inconvenienced as little as possible.
- B. Allow access to residents and abutting land owners along the project to driveways and other normal outlets from their property.

3.3 TRAFFIC CONTROL OFFICERS

A. Where required by the local, county or state police departments and/or when specified, traffic control officer shall be Uniformed Police Officers.



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B. Where the local, county or state police departments do not wish to or are unable to furnish traffic control officers and/or when specified, the traffic control officers shall be flag person.

END OF SECTION 01 55 26



SECTION 01 70 00 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

- 1.1 SECTION INCLUDES
 - A. Closeout Procedures.
 - B. Final Cleaning.

1.2 RELATED SECTIONS

A. Section 01 74 13 – Project Cleaning

1.3 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Engineer's inspection.
- B. Provide submittals to Engineer that are required by governing or other authorities.
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.4 FINAL CLEANING

- A. Execute final cleaning prior to final inspection.
- B. Clean interior and exterior surfaces exposed to view; remove temporary labels, stains and foreign substances.
- C. Clean debris from roof.
- D. Clean site; sweep paved areas, rake clean landscaped surfaces.
- E. Remove waste and surplus materials, rubbish, and construction facilities from the site.

END OF SECTION 01 70 00



SECTION 01 74 13 - PROJECT CLEANING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work Included:
 - 1. Maintain premises and public properties free from accumulation of waste, debris, and rubbish, caused by activities relating to the Work.
 - 2. At completion of the Work, remove waste materials, tools, equipment, machinery and surplus materials, and clean all sight-exposed surfaces. Leave project clean and ready for use.

1.2 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies: Conduct cleaning and disposal operations in accordance with all applicable local and state laws, ordinances, and code requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Use only cleaning materials recommended by manufacturer of surfaces to be cleaned.
- B. Use cleaning materials only on surfaces recommended by cleaning material manufacturers.

PART 3 - EXECUTION

3.1 PERFORMANCE

- A. Cleaning During Construction:
 - 1. Execute cleaning operations to ensure that buildings, grounds, and public properties are maintained free from accumulations of waste materials and rubbish.
 - 2. Entirely remove and dispose of material or debris during the progress of the work that has washed into or has been placed in watercourses, ditches, gutters, drains, catch basins, or elsewhere as a result of the Contractor's operations.
 - 3. Wet down dry materials and rubbish to lay dust and prevent blowing dust.
 - 4. At reasonable intervals during the progress of work, clean the site and dispose of waste materials, debris, and rubbish.



- 5. Clean interiors of buildings, when applicable, prior to finish painting, and continue to clean, on an as-needed basis, until buildings or project areas are ready for occupancy.
- 6. Handle materials in a controlled manner with as few handlings as possible. Do not drop or throw material from heights.
- 7. When applicable, schedule cleaning operations so that dust and other contaminants resulting from the cleaning process will not fall on wet, newly painted surfaces.
- B. Control of Hazards:
 - 1. Store volatile wastes in covered metal containers, and remove from premises daily.
 - 2. Prevent accumulation of wastes which may create hazardous conditions.
 - 3. Provide adequate ventilation during use of volatile or noxious substances.
- C. Disposal:
 - 1. Do not burn or bury rubbish and waste materials on project site.
 - 2. Do not dispose of volatile wastes, such as mineral spirits, oil, or paint thinner, in storm or sanitary drains.
 - 3. Do not dispose of wastes into streams or waterways.
- D. Final Cleaning:
 - 1. Employ experienced workmen, or professional cleaners, for final cleaning.
 - 2. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials, from all sight-exposed interior and exterior finished surfaces.
 - 3. Repair, patch and touch up marred surfaces to specified finishes.
 - 4. Broom clean paved surfaces.
 - 5. Rake clean non-paved surfaces of the project site.
 - 6. Restore to their original condition those portions of the site not designated for alterations by the Contract Documents.

END OF SECTION 01 74 13



SECTION 31 05 13 - SOILS FOR EARTHWORK

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work Included:
 - 1. Provide, place and compact borrow and bedding material in authorized excavation(s) below normal depth and in other location(s) as shown on the Drawings and/or as specified herein.
- B. Related Work Specified Elsewhere:
 - 1. Trench Excavation Earth, Trench Excavation Ledge, Trench Backfilling, Compaction, Control and Testing are specified in the appropriate sections in this division.

PART 2 - PRODUCTS

2.1 MATERIALS

All materials shall be applicable as specified in owner's geotechnical report. Utilize materials specified in the geotechnical report in all applicable locations. Materials otherwise not specified in owner's geotechnical report shall conform to the following minimum standards:

- A. Gravel Borrow:
 - 1. Well graded granular material having no rocks with a maximum dimension over six (6) inches, except where it is used for pipe bedding in which case the maximum size shall be two (2) inches.
 - 2. Free from frozen material and other unsuitable material.
 - 3. That portion passing a three inch square mesh sieve shall contain no more than 70 percent passing a I/4" mesh sieve and not more than IO percent passing a number 200 mesh sieve when used as pipe bedding material and not more than five percent passing a number 200 mesh sieve when used as backfill around structures.
- B. Screened Stone (Bedding Material):
 - 1. Shall be either screened stone or crushed stone and shall be well graded in size from 1/4" to 3/4".
 - 2. Clean, hard, and durable particles or fragments.

SOILS FOR EARTHWORK 31 05 13

- 3. Free from dirt, vegetable, or other objectionable matter, and excess of soft, thin elongated, laminated or disintegrated pieces.
- 4. Sieve Analysis:

Sieve	% Passing by Weight
Designation	Square Opening
1"	100
3/4"	90-100
3/8"	20-50
No. 4	0-10
No. 8	0-5

C. Sand:

- 1. Clean, hard and durable particles or fragments.
- 2. Sieve Analysis:

Sieve	% Passing by Weight
Designation	Square Opening
3/8"	100
No. 4	95-100
No. 16	50-85
No. 50	10-30
No. 100	2-10

- D. Underdrain Backfill Material:
 - 1. Free from organic matter.
 - 2. Gradations:

Type "B" Underdrain:		
Sieve	% Passing by Weight	
Designation	Square Mesh Sieves	
1″	95-100	
1/2"	75-100	
No. 4	50-100	
No. 20	15-80	
No. 50	0-15	
No. 100	0-10	
Type "C" Underdrain:		

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Sieve	% by Weight Passing	
Designation	Square Mesh Sieves	
1"	100	
3/4"	90-100	
3/8"	0-75	
No. 4	0-25	
No. 10	0-5	

Filter Fabric Lined Trench: 3"- 6" coarse aggregate. Filter fabric in accordance with SECTION 31 32 19.23.

- 3. Shall conform to AASHTO T 27
- E. French Drain Stone:
 - 1. Hard, durable rock.
 - 2. Gradations:

Sieve	% by \	Neight Passing
Designat	ion	Square Mesh Sieves
6 inch		90-100
1½ inch	i i	0-40
No. 4		0-5

- 3. Shall conform to AASHTO T 27 except that the total material sampled shall be sieved and the minimum weight of the sample will be 120 lbs.
- F. 3/4"- Crushed Stone: Crushed Stone shall be a uniform material, containing angular pieces, as are those which come from a mechanical crusher. Gradation requirements shall be as follows:

Sieve	% by Weight
Designation	Passing Square Mesh Sieve
1"	98-100
3/4"	0-30
No. 200	0-3

- G. Impervious Dam Material: As applicable, impervious dam material shall be uniform natural or selected cohesive soil with minimum of 30 percent of the material passing a No. 200 sieve. It shall not contain vegetation, masses of roots, individual roots larger than 12". long or 1/2". in diameter or other porous or organic matter.
- H. Unsuitable Soil Materials: Shall be those defined in AASHTO M145, soil classification Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7; also, peat and other highly organic soils.

PART 3 - EXECUTION

- 3.1 INSTALLATION
 - A. Place bedding material, initial backfill, impervious dam material and fill below pipe bedding in layers of uniform thickness as specified or shown on the Drawings. Maximum lift thickness shall be as specified or shown on the drawings, but not greater than 12".
 - B. Thoroughly compact each layer by means of a suitable vibrator or mechanical tamper. Conform to the requirements of the geotechnical report, but in no case shall compaction be

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less than 95 percent of the fill material's maximum dry density determined in accordance with ASTM D1557.

- C. In excavations below normal depth or where unsuitable materials are excavated, gravel borrow shall be used unless ground water makes such usage not practical; if such is the case, then screened stone shall be used.
- D. No stone two (2) inches in diameter or larger shall be allowed within six (6) inches of the pipe.
- E. Where soft silt and clay soils are encountered the trench shall be excavated 6" below the normal bedding and backfilled with six (6) inches of compacted sand.
- F. No stone or rock greater than 12" measured at any point shall be placed in the trench backfill.
- G. Bed from specified depth below pipe to top of pipe to support pipe and prevent damage. Unless otherwise specified in plan, detail, or applicable section, the following schedule gives the minimum bedding requirements for various types of pipe. Dimensions refer to distance below bottom of pipe.

D.I. Pipe	6" min. gravel borrow.
Concrete pipe	6" min. gravel borrow.
Culverts and Storm Drain Pipe	6" min. gravel borrow.
PVC or ABS Pipe	6" min. screened stone.
P.E. Pipe	6" min. screened stone.

H. Unless otherwise specified in plan, detail, or applicable section, the following schedule gives the minimum initial backfill requirements for various types of pipes.

D.I. Pipe	Gravel borrow; 6" min. over top of pipe.
Concrete Pipe	Gravel borrow; 6" min. over top of pipe.
Culverts and Storm Drain Pipe	Gravel borrow; 6" min. over top of pipe.
PVC or ABS	Screened stone; 6" min. over the top of the pipe.
P.E. Pipe	Screened stone; 6" min. over the top of the

pipe.

END OF SECTION 31 05 13

SECTION 31 05 16 - AGGREGATES FOR EARTHWORK

PART 1 - GENERAL

- 1.1 SECTION INCLUDES
 - A. Building perimeter construction and backfilling, pond embankment construction and site structure backfilling.
 - B. Fill under slabs-on-grade.
 - C. Consolidation and compaction.

1.2 RELATED SECTIONS

A. Section 31 23 16 - Excavation.

1.3 REFERENCES

- A. ANSI/ASTM C136 Method for Sieve Analysis of Fine and Coarse Aggregates.
- B. ANSI/ASTM D698 Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.49 kg) Rammer and 12" (304.8 mm) Drop.
- C. ASTM D922 Test Method for Density of Soil and Soil Aggregate in Place by the Nuclear Methods. (Shallow Depth)
- D. ANSI/ASTM D1556 Test Method for Density of Soil in Place by the Sand-Cone Method.

PART 2 - PRODUCTS

- 2.1 FILL MATERIAL (as applicable)
 - A. Common Borrow: MDOT 703.18: (Only for site construction not for building construction). Place and compact materials in continuous layers not exceeding 8" of compacted depth, compacted to 95 percent of its maximum dry density, in accordance with ASTM D1557 (modified proctor density).
 - B. Structural Backfill: Furnish in accordance with geotechnical report or specific plan requirements. Gravel Borrow: as specified in the geotechnical report, these plans, or MDOT 703.20: Place at over excavations below slabs and footings. Place over native material after organic soils are removed to raise subgrade below slabs and footings. Utilize per Geotechnical Report, as applicable. As a minimum, construct a 12" layer in a single 12" lift or lifts, and compacted to 95 percent of its maximum dry density, in accordance with ASTM D1557 (modified proctor density). In the case of footings set higher than original grade of competent mineral soil, first compact native material, use structural backfill to establish and


compact fill slopes at 1:1 slopes from the edges of footings (entire backfill areas for retaining walls).

- C. Granular Backfill: Per MDOT 703.22 for utility excavations and backfilling operations.
- D. Crushed Stone: Per MDOT 703.31 for utility excavations and backfilling operations, except that 100 percent shall pass the 2" sieve.
- E. Detention Pond Embankment: Excavated or imported clay silt material, graded, free of lumps larger than 3", rocks larger than 2", and debris. Material shall have at least 20% fines, more than 20% by weight passing the No. 200 sieve, and shall be compacted to a minimum of 95% modified proctor density in 9"-12" maximum lifts. The contractor may utilize glacial marine soil excavated on site with the approval of the owner's representative.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify fill materials to be reused are acceptable.
- B. Owner's designated representative shall observe the excavation and accept suitable borrow material for placement as pond embankment material. Sandy layers shall be excluded from use as embankment fill.
- C. Verify foundation perimeter drainage installation has been inspected.

3.2 PREPARATION

- A. Generally, compact subgrade to density requirements for subsequent backfill materials. The foundation and slab base soil should be placed directly on the existing proof-rolled native mineral soil. Proof rolling should consist of making three passes in a north-south direction followed by three passes in an east-west direction using a large (minimum three ton at drum static weight) vibratory roller in slab areas and narrow roller vibratory trench rollers at footings (all passes in same direction).
- B. Cut out soft areas of subgrade not capable of insitu compaction. Fill and compact to density equal to or greater than requirements for subsequent backfill material.

3.3 BACKFILLING

- A. Backfill and compact areas to contours and elevations with unfrozen materials.
- B. Backfill and compact where footing elevations are higher than suitable native mineral soil with structural backfill below and at 1:1 slope from edge of footing (level for retaining walls). Structural fill should be placed in a maximum of 12" lifts and be compacted to 95 percent of its maximum dry density determined in accordance with ASTM D1557, Modified Proctor Density



- C. Backfill and compact pond embankment areas as early as possible to allow maximum time for settlement before shaping overflow structures.
- D. Systematically backfill and compact to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces. Work shall be scheduled so that the pond embankment shall be constructed three months prior to final setting of elevation sensitive components, such as the emergency spillway, allowing maximum time for settlement to occur.
- E. Place and compact materials in continuous layers not exceeding 6" compacted depth. Pond Embankment requirements: Pond embankment sections shall be constructed from 8" to 12" lifts. At each lift, a bulldozer or similar equipment shall mechanically break down clods of clay-silt material as each lift is shaped. The owner's representative shall verify that no sand layers remain in each lift. Unsuitable material shall be replaced. Each lift shall be compacted with a sheepsfoot roller to 90 percent modified proctor density. Water shall be added as may be required to reach compaction.
- F. Employ a placement method that does not disturb or damage foundation perimeter drainage, foundation damp proofing, and utilities in trenches.
- G. Maintain optimum moisture content of backfill materials to attain required compaction density.
- H. Make changes gradual. Blend slope into level areas.
- I. Remove surplus backfill materials from site.

3.4 FIELD QUALITY CONTROL

- A. Compaction testing will be performed in accordance with ANSI/ASTM D1556, ANSI/ASTM D1557, and ANSI/ASTM D698.
- B. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

3.5 PROTECTION OF FINISHED WORK

A. Recompact fills subjected to vehicular traffic. Place and compact additional material of like kind and to equal compaction to re-establish suitable finished or subgrade.

END OF SECTION 31 05 16

SECTION 31 10 00 - SITE CLEARING

PART 1 - GENERAL

- 1.1 DESCRIPTION
 - A. Work Included:
 - 1. Clearing includes, but is not limited to, removal of trees, brush, stumps, wooded growth, grass, shrubs, poles, posts, signs, fences, culverts and other vegetation and minor structures; the protection of designated wooded growth; the storage and protection of minor structures and materials which are to be replaced; and the disposal of non-salvageable structures and materials, and necessary preliminary grading.
 - B. Limits of Work:
 - 1. Perform clearing and grubbing work within the areas required for construction, or as shown on the Drawings, to a depth of I2 inches below the existing grade.
 - 2. Perform additional clearing and grubbing work within areas and to depths which, in the opinion of the Engineer, interfere with excavation and/or construction, or are otherwise objectionable.
 - C. Work Not Included:
 - 1. Clearing and grubbing work performed for the convenience of the Contractor will not be considered for payment.

1.2 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies:
 - 1. Dispose of combustible material by burning only when permitted by and in accordance with all applicable local and state laws, ordinances and code requirements.
 - B. Remove and dispose of non-salvageable structures and material in accordance with all applicable local and state laws, ordinances and code requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Provide all materials required to complete the work.

- B. All timber and wood shall become the property of the Contractor unless other agreements are made between the Owner and the Contractor.
- C. Repair any damage to structures to the complete satisfaction of the Owner and Engineer.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Carefully preserve and protect from injury all trees and/or shrubs not to be removed.
- B. Right-of-way:
 - 1. Where excavation is required on public or private rights-of-way containing trees, shrubs, other growth, or any structure or construction, obtain the Engineer's direction concerning the extent to which such obstacles can be cleared or stripped prior to performing the Work.
 - 2. In all rights-of-way, remove only those particular growths or structures which are, in the opinion of the Engineer, essential for construction operations.
 - 3. All other removals or damage shall be replaced or restored at the Contractor's expense.

3.2 PERFORMANCE

- A. Clearing:
 - 1. Remove and dispose of all trees, brush, slash, stubs, bushes, shrubs, plants, debris and obstructions within the area to be cleared, except any areas that may be designated as "Selective Clearing", and except as otherwise shown on the Drawings or as directed by the Engineer.
 - 2. Remove all stumps unless otherwise directed by the Engineer.
 - 3. Dispose of material to be removed daily as it accumulates.
 - 4. Take special care to completely dispose of all elm trees and branches immediately after cutting either by burial in approved locations or, when permitted, by burning in areas well removed from standing elm growth.
- B. Protection of Wooded Growth:
 - 1. Fell trees toward the center of the area being cleared to protect trees and shrubs to be left standing.

- 2. Cut up, remove and dispose of trees unavoidably falling outside the area to be cleared.
- 3. Employ skilled workmen or tree surgeons to trim and repair all trees that are damaged but are to be left standing and paint all cut surfaces with an approved bituminous paint.
- C. Selective Clearing:
 - 1. When shown on the Drawings and when directed by the Engineer, perform selective clearing work to preserve natural tree cover.
 - 2. Perform selective clearing work only under the direction and supervision of the Engineer.
 - 3. Remove all dead and uprooted trees, brush, roots and other material which, in the opinion of the Engineer, are objectionable.
 - 4. Cut flush with the ground and remove only those trees indicated by the Engineer.
 - 5. Employ skilled workmen or tree surgeons to carefully trim all branches requiring cutting on trees to be left standing and to paint all cut surfaces with an approved bituminous paint.
 - 6. Paint tree roots which are cut and are to be left exposed to the weather with an approved bituminous paint.
- D. Grubbing:
 - 1. Perform grubbing work beneath new roads, driveways, walks, seeded areas and other areas and as directed by the Engineer.
 - 2. Grub out all sod, vegetation and other objectionable material to a minimum depth of I2 inches below the existing grade.
 - 3. Completely remove all stumps, including major root systems.
- E. Disposal:
 - 1. Remove from the site and dispose of material not being burned.
 - 2. Provide an approved disposal area unless otherwise specified.
- F. Burning:
 - 1. Dispose of combustible materials by burning only if approved by local and state officials.

- 2. Employ competent workmen to perform burning work in such a manner and at such locations that adjacent properties, trees and growth to remain, overhead cables, wires and utilities will not be jeopardized.
- 3. Do not leave fires unguarded.
- 4. Do not burn poison oak, poison ivy or other plants of similar nature.
- 5. Do not use tires or other combustible waste material to augment burning.
- 6. Burn combustible materials daily as the work progresses.
- 7. The Contractor shall be responsible for all damage caused by burning and shall be responsible for obtaining all necessary permits for burning.

3.3 REPLACEMENT OF MATERIALS

- A. Paving, Curbing and Miscellaneous Material:
 - 1. Remove all paving, subpaving, curbing, gutters, brick, paving block, granite curbing, flagging and minor structures that are over the area to be filled or excavated.
 - 2. Remove and replace bituminous asphaltic and portland cement concrete in accordance with the appropriate sections of these Specifications.
 - 3. Properly store and preserve all material to be replaced in a location approved by the Engineer.
- B. Shrubs and Bushes:
 - 1. Remove, store, and replace ornamental shrubs and bushes to be preserved in accordance with accepted horticultural practices.
- C. Topsoil:
 - 1. When applicable, carefully remove, store, and protect topsoil in accordance with the appropriate section of this division.
- D. Responsibility:
 - 1. Replace, at no additional cost to the Owner, materials lost or damaged because of careless removal or neglectful or wasteful storage, disposal or use of these materials.

END OF SECTION 31 10 00

SECTION 31 23 16 - EXCAVATION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Perform the following items of work, as shown on the Drawings and specified herein:
 - 1. Excavate and furnish all material necessary to establish suitable finished grades for subgrade preparation, cut slope or embankment construction, as required to complete the work of this Contract, including the furnishing and compaction of additional material as needed.
 - 2. Completely remove from the site all excavated material which is not approved by the Engineer for use as embankment material. This provision does not apply to topsoil which will remain the property of the Owner.
 - 3. Establish subgrades as indicated on the Drawings and specified hereunder.
 - 4. Perform cutting and removal of existing pavements to the extent indicated on the Drawings and as required for the work under this Contract.
 - 5. Protect all trees, shrubs and plantings not designated on the Drawings to be removed, for the duration of the Contract.
 - 6. Protect all utilities on the site for the duration of the work.
- B. Related Work Specified Elsewhere:
 - 1. Quality Control

1.2 DEFINITIONS

- A. The work involved includes removal, haul and disposal of materials to prepare for construction and the placing and compaction of material to construct embankments.
- B. Excavation shall be designated as common, rock, unclassified or muck.
 - 1. Common excavation shall consist of removal of earth, of boulders, solid mortared stone masonry and concrete masonry when each is less than two (2) cubic yards in volume and of rock which can be removed with ordinary excavating machinery. Grubbing shall be considered as common excavation.
 - 2. Rock excavation shall consist of removal of solid rock which cannot be excavated without the use of explosives or ripping equipment and of boulders, solid mortared stone masonry and concrete masonry having a volume of two (2) cubic yards or more.



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- 3. Unclassified excavation shall consist of removal of materials without consideration to their composition.
- 4. Muck excavation shall consist of excavation of soils and organic materials which are not suitable for use in embankment.
- C. Embankment construction shall consist of constructing roadway embankments, including preparation of the areas upon which they are to be placed; site grading around buildings and structures; the construction of parking areas, lawns, berms, and dikes; the placing and compacting of approved material within areas where unsuitable material has been removed; and the placing and compacting of embankment material in holes, pits and other depressions within the roadway area or construction site limits.
- D. Related Work Specified Elsewhere (When Applicable):
 - 1. Stripping and Stockpiling of Topsoil; Trench Excavation-Earth; Trench Excavation-Ledge; Borrow and Bedding Material; Trench Backfilling, Compaction, Control and Testing; Temporary Erosion Control and Dewatering are specified elsewhere in this division.

1.3 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies:
 - 1. All work shall be performed and completed in accordance with all local, state or federal regulations.
 - 2. The General Contractor shall secure all necessary permits from, and furnish proof of acceptance by, the local and state departments having jurisdiction and shall pay for all such permits, except as specifically stated elsewhere in the Contract Documents.
- B. Grade and Elevations:
 - 1. The Contractor shall establish the lines and grades in conformity with the Drawings and maintain same to properly perform the contract installation.
- C. Compaction:
 - 1. The Contractor shall compact all embankment materials in accordance with this specification.
 - 2. Density testing shall be performed by an Independent Testing Laboratory retained by the Owner and acceptable to the Engineer and Contractor.
 - 3. Independent Testing Laboratory shall determine in place densities in accordance with ASTM D1556 or other methods approved by the Engineer.

- 4. Independent Testing Laboratory shall submit one (1) copy of the following reports to each of the following: Engineer, Resident Project Representative, Contractor;
 - a. Test reports on material
 - b. Field density test reports
 - c. One moisture density curve for each type of soil encountered
- 5. Location of Tests: (OWNER WILL HANDLE ALL TESTING)
 - a. One test per 300 feet of completed roadway subgrade just prior to placement of subbase gravels and additional tests at depths as required by the Engineer.
 - b. Two tests on finished subgrade in parking area just prior to placing the subbase gravels and additional tests at depths as required by the Engineer.
- 6. If the test results fail to meet the requirements of these specifications, the Contractor shall correct the situation and obtain a passing test. The cost of reworking the material to obtain a passing test shall be borne by the Contractor and no allowance will be made for delays in the performance of the work. All testing and retesting shall be conducted by the Independent Testing laboratory. Costs of retesting will be paid by Owner. The cost of retesting will be determined by Engineer and Owner will invoice Contractor for this cost. If unpaid after 60 days, the invoice amount will be deducted from the Contract Price.

1.4 JOB CONDITIONS

- A. Disposition of Utilities:
 - The locations of utilities shown on the plans are approximate as determined from physical evidence on or above the surface of the ground and from information supplied by the utilities. The Engineer in no way warranties that these locations are correct. It shall be the responsibility of the Contractor to determine the actual locations of any utilities within the project area.
 - 2. Rules and regulations governing the respective utilities shall be observed in executing all work in this section. Active utilities shall be adequately protected from damage, and removed or relocated only as indicated or specified. Inactive and abandoned utilities encountered in excavation and grading operations shall be removed, plugged or capped. Report in writing to the Engineer, the locations of such abandoned utilities. Extreme care shall be taken when performing work in the vicinity of existing utility lines, utilizing hand excavation in such areas, as far as practicable. If, in the progress of excavation, any utility should become damaged and result in any damage to public or private property, the General Contractor shall restore to the original condition, at no additional cost to the Owner, anything which has been damaged or disturbed.

PART 2 – PRODUCTS

2.1 DEFINITIONS OF GRAVEL, SAND, AND SILT CLAY

- A. The terms "gravel", "coarse sand," "fine sand" and "silt-clay," as determinable from the minimum test data required in this classification arrangement and as used in subsequent word descriptions, are defined as follows:
 - 1. Gravel Material passing sieve with 75 mm (3-inch) square openings and retained on the 2.00 mm (No. 10) sieve.
 - 2. Coarse Sand Material passing the 2.00 mm (No. 10) sieve and retained on the 0.425 mm (No. 40) sieve.
 - 3. Fine Sand Material passing the 0.425 mm (No. 40) sieve and retained on the 0.075 mm (No. 200) sieve.
 - 4. Silt-Clay (Combined silt and clay) Material passing the 0.075 mm (No. 200) sieve.
 - 5. Boulders (retained on 77 mm (3-inch) sieve) should be excluded from the portion of the sample to which the classification is applied, but the percentage of such material, if any, in the sample should be recorded.
 - 6. The term "silty" is applied to fine material having plasticity index of ten (10) or less and the term "clayey" is applied to fine material having plasticity index of 11 or greater.

2.2 SOIL MATERIALS

- A. Use of Excavated Material:
 - 1. To the extent they are needed, all suitable materials from the specified excavation may be used in the construction of required embankment and slope protective devices (riprap).
 - 2. Surplus excavated materials suitable for filling operations shall be stockpiled for future use as directed by the Owner's. This specific location will be determined at the start of construction.
 - 3. Unsuitable material shall consist of grubbings or other materials which contain rock of size exceeding specifications, organic materials, or other materials of a deleterious nature as deemed by the Engineer. Silts, clays and granular materials with more than 8% passing the number 200 sieve shall be considered unsuitable for embankment in the Frost Penetration Zone under paved areas when sufficient water supply is available to cause heaving.
- B. Common borrow shall consist of approved material required for the construction of embankments or for other portions of the work as designated and shall be obtained from a



source off-site, except as otherwise noted. Common borrow shall be free from frozen material, clay, perishable rubbish, peat, organic and other deleterious materials.

- C. Gravel borrow shall be free of rocks with a maximum dimension over six inches, frozen material and other unsuitable material. That portion passing a three (3) inch square mesh sieve shall contain no more than 70% passing a ¼-inch mesh sieve and not more than 10% passing a number 200 mesh sieve.
- D. Rock fill shall consist of rock for use in embankments which consists of hard durable particles broken to various sizes that will form a compact embankment with a minimum of voids. It shall contain no particles or fragments with a maximum dimension in excess of the compacted thickness of the layer being placed.
- E. Embankment material shall consist of suitable approved common excavation and/or common, or gravel borrow. Rock excavation may be used as embankment material if it is thoroughly mixed with common excavation and/or common borrow to eliminate voids.
- F. Crushed stone shall consist of clean, angular rock with a blended size range of 3/8'' to $1 \frac{1}{2''}$.

PART 3 - EXECUTION

- 3.1 SAFETY
 - A. Comply with applicable local, state or federal safety regulations or in the absence thereof, with the provisions of the Manual of Accident Prevention in Construction of the Associated General Contractors of America, Inc.
 - B. Provide shoring, sheeting and/or bracing at excavations as required to prevent cave-ins of excavation, and to assure complete safety of existing structures, utilities and pavements that are to remain in place.
 - C. Remove sheeting and shoring and bracing, as backfilling operations progress, taking all necessary precautions to prevent failure of excavation sides. Where sheeting is to be left in place, it shall not be within two (2) feet of subgrade.

3.2 COMMON EXCAVATION

- A. The Contractor shall excavate material encountered to establish required grade elevations.
 - 1. Unauthorized Excavation:
 - a. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of the Engineer. Unauthorized excavation, as well as remedial work directed by the Engineer, shall be at the Contractor's expense.

- b. The Contractor shall backfill and compact unauthorized excavations as specified for authorized excavations of the same classification, unless otherwise directed by the Engineer.
- 2. Additional Excavation:
 - a. When excavation has reached required subgrade elevations, notify the Engineer who will make an inspection of conditions.
 - b. If unsuitable bearing materials are encountered at the required subgrade elevations, carry excavations deeper and replace the excavated material as directed by the Engineer.
 - c. Removal of unsuitable material and its replacement as directed will be paid on the basis of contract conditions relative to changes in work.
- B. Common excavation areas shall be maintained in such condition that the excavation will be well drained.
- C. Roadway excavation, in general, shall proceed in a direction upgrade. Subgrades shall be promptly rolled to prevent absorption of water.
- 3.3 EXCAVATION FOR UTILITY SERVICES
 - A. Water, telephone, data, fire alarm, storm drainage, electric services, utility structures, sanitary sewer piping, manholes, and catch basins will be installed under the work of the respective Sections.
- 3.4 MINIMUM LIMITS FOR EARTH EXCAVATION
 - A. Earth excavation must be carried to the following limits, unless otherwise indicated herein or on the drawings or authorized by the Engineer
 - 1. Subgrades for site work shall be as follows:
 - a. Areas to receive topsoil Four (4) inches below finish grades.
 - b. Utility structures Bottom of structure or as shown on the site details and eighteen (18) inches outside wall extremities.
 - c. On-site bituminous concrete paved surfaces, as noted on the Drawings.
 - d. Off-site paved areas, as noted on the Drawings.
 - e. Unspecified site improvements To bottom elevation of item plus ample working space on all sides.

2. In non-specified areas - To the lines indicated on the Drawings plus proper side clearance for construction.

3.5 ROCK EXCAVATION

- A. In open excavations material will be classified as rock only when the following conditions prevail:
 - 1. When the natural compound, natural mixture, and/or chemical element cannot be broken and removed from its existing position and state by a 3/4-yard backhoe or D8 dozer and requires the use of drills, or the use of explosives.
 - 2. Boulders or old concrete foundations in excess of two (2) cubic yards.
 - 3. Anything other is "earth" insofar as removal of the material to be excavated is concerned.
 - 4. NOTE: When during the process of excavation, rock is encountered such material shall be uncovered and exposed, and the Engineer shall be notified by the Contractor, before proceeding further. The areas in question shall then be measured as stipulated in paragraph B, following. The Contractor shall not proceed with excavation of material claimed as rock until the material has been classified by the Engineer. Should the Contractor proceed with the excavation without notifying the Engineer, or prior to the survey, he shall forfeit his right to extra payment in the subject area.
- B. The Contractor will provide qualified personnel, acceptable to both the Owner and the Engineer, to take cross-sections of rock before removal of same, and to provide computations of cross-sections and volumes within the pay-line limits.
- B. Excavate rock, encountered in grading areas within the contract, to depths as follows:
 - 1. Under pavements and surfaced areas To six (6) inches below the required subgrade for such areas.
 - 2. Under lawn areas to two (2) feet below finished grade, unless approved otherwise by the Engineer.
- D. Blasting Obtain written permission and approval of method from the local authorities before proceeding with rock excavation. Explosives shall be stored, handled, and employed in accordance with the provisions of the "Manual of Accident Prevention in Construction: of the Associated General Contractors of America, Inc.

3.6 COLD WEATHER PROTECTION

- A. Protect excavations against freezing when atmospheric temperature is less than 35 degrees F.
- 3.7 COMPACTION

- A. General: Control soil compaction during construction to the satisfaction of the Engineer and/or Resident Project Representative by providing compaction to at least the minimum percentage of maximum density as specified for each area classification.
- B. Conform to the recommendations of the geotechnical report.
- C. Percentage of Maximum Density Requirements: Unless otherwise specified, compact soil to not less than the following percentages of maximum dry density for soils which exhibit a well-defined moisture density relationship (determined in accordance with ASTM D1557) and to not less than the following percentages of relative dry density (determined in accordance with ASTM D2049) for soils which do not exhibit a well- defined moisture density relationship.
 - 1. Lawn or Vegetated Areas: Compact top six (6) inches of subgrade and each layer of backfill or fill material to 90 percent maximum dry density as determined by AASHTO T-180, Method C or D.
 - 2. Pavements: Compact top 12 inches of excavation subgrade and each layer of fill material to 95 percent maximum dry density as determined by AASHTO T-180, Method C or D.
- D. Moisture Control: Where subgrade or a layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade or layer of soil material at a rate such that free water does not appear on surface during or subsequent to compaction operations.
- E. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
- F. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry.

3.8 EMBANKMENT

- A. Compaction Equipment
 - 1. Provide sufficient equipment units of suitable types to spread, level and compact fills promptly upon delivery of materials.
 - 2. The Contractor may use any compaction equipment or device which he finds convenient or economical, but the Engineer retains the right to disapprove equipment which, in his opinion, is of inadequate capacity or unsuited to character of material being compacted.
 - 3. The Contractor shall be responsible for the proper placement and compaction of backfill material. Any settlement that occurs shall be repaired by the Contractor at his own cost and expense. If pipeline and/or structures are damaged or displaced, they shall be repaired at the Contractor's expense.

- B. Areas to be filled or backfilled shall be free of construction debris, refuse, compressible or decayable materials and standing water.
- C. Notify the Engineer when excavations are ready for inspection. Filling and backfilling shall not be started until conditions have been approved by the Engineer.
- D. Place acceptable soil materials in layers to required subgrade elevations, for each area classification listed below.
 - 1. In excavations, use satisfactory excavated or borrow material.
 - 2. Under grassed areas, use satisfactory excavated or borrow material.
 - 3. Under pavements, use satisfactory excavated or borrow material or combination of both.
- E. Grub areas a depth of 12-inches where fills are to be less than five (5) feet in depth as shown on the Drawings.
- F. When existing ground surface has a density less than that specified under "Compaction" for the particular area classification, break up the ground surface, pulverize, moisture-condition to the optimum moisture content, and compact to required depth and percentage of maximum density.
- G. Placement and Compaction: Place fill materials in layers no thicker than ten (10) inches.
- H. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification.
- I. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
- J. Place backfill and fill materials evenly to required elevations adjacent to structures. Take care to prevent wedging action of fill against structures by carrying the material uniformly around structure to approximately the same elevation in each lift.
- K. When water and sewer piping is laid in filled areas, place the fill before any pipe is placed, and compact as specified to a depth or not more than two (2) feet above the proposed top of the pipe. A trench shall then be excavated to the required grade, and of sufficient width to permit thorough tamping of the fill under the bells and around the pipe.
- L. At the end of each day's work the embankment shall be shaped and rolled to minimize infiltration of water.

3.9 GRADING

A. General: Uniformly grade areas within limits of construction. Smooth finished surface within specified tolerances.



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- 1. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10 feet above or below the required subgrade elevations.
- 2. Pavements: Shape surface of areas under pavement to line, grade and cross-section, with finish surface not more than ½-inch above or below the required subgrade elevation.

3.10 MAINTENANCE

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades to specified tolerances in settled, eroded or rutted areas.
- C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, reshape, and compact to required density prior to further construction.

3.11 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Removal from Owner's Property: Remove waste materials, including unacceptable excavated material, trash and debris, and dispose of it off the Owner's property. This provision does not apply to stockpiled topsoil which shall remain on site unless written authorization for its removal is provided by the Engineer.

END OF SECTION 31 23 16



SECTION 31 23 16.13 - TRENCHING

PART 1 - GENERAL

- 1.1 DESCRIPTION
 - A. Work Included:
 - 1. Trench excavation work in earth includes the removal of sand, gravel, existing sewers and manholes, ashes, loam, organics, clay, soft or disintegrated rock or hard pan existing sewers and manholes which can be removed with a backhoe, or a combination of such materials, and boulders measuring less than one (1) cubic yard for the installation of pipes, utilities and appurtenant structures.
 - 2. All trench excavation shall be classed as earth or ledge.
 - B. Related Work Specified Elsewhere:
 - 1. Traffic regulation and pedestrian protection is specified in the appropriate division.
 - 2. Clearing, removal and replacement of paving, trench excavation ledge, borrow and bedding, material, manholes, and catch basins, trench backfilling, compaction, control and testing, when applicable, are specified in the appropriate sections in this division.
 - 3. Pipe and pipe fittings, valves, gates, and hydrants, when applicable, are specified the applicable sections.

1.2 JOB CONDITIONS

- A. Utilities:
 - I. The locations of utilities shown on the plans are approximate as determined from physical evidence on or above the surface of the ground and from information supplied by the utilities. The Engineer in no way warranties that these locations are correct. It shall be the responsibility of the Contractor to determine the actual locations of any utilities within the project area.
 - 2. Rules and regulations governing the respective utilities shall be observed in executing all work in this section. Active utilities shall be adequately protected from damage, and removed or relocated only as indicated or specified. Inactive and abandoned utilities encountered in excavation and grading operations shall be removed, plugged or capped only with written authorization from the Utility Company. Report in writing to the Engineer, the locations of such abandoned utilities. Extreme care shall be taken when performing work in the vicinity of existing utility lines, utilizing hand excavation in such areas, as far as practicable. If, in the progress of excavation, any utility should become damaged and result in any damage to public or private property, the General Contractor

shall restore to the original condition, at no additional cost to the Owner, anything which has been damaged or disturbed.

- B. Existing Structures:
 - I. Perform excavation in such a manner that will prevent any possibility of undermining and disturbing the foundations of any existing structures and any work previously completed under this Contract.
 - 2. Where existing buildings and other structures are in proximity to the proposed construction, exercise extreme caution and utilize sheeting, bracing, and whatever other precautionary measures, that may be required.
- C. Repairing Damage:
 - 1. Repair, or have repaired, all damage to existing utilities, structures, lawns, other public and private property which results from construction operations, at no additional expense to the Owner, to the complete satisfaction of the Engineer, the utility company, the property owners and the Owner.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. The Contractor shall not have any right of property in any suitable materials taken from any excavation. Do not remove any such materials from the construction site without the approval of the Engineer. This provision shall in no way relieve the Contractor of his obligations to remove and dispose of any material determined by the Engineer to be unsuitable for backfilling.
- C. Unsuitable Material:
 - 1. If, in the opinion of the Engineer, the material encountered above the indicated grade, shown on the Drawings, for excavation is unsuitable material, remove the material to the widths and depths as directed by the Engineer. Replace this material as specified in the "Trench Backfilling, Compaction, Control and Testing" section of this division.
 - 2. If, in the opinion of the Engineer, the material encountered at or below the grade shown on the Drawings for excavation is unstable material, remove the material to the full width of the trench and to a minimum depth of twelve inches below the pipe. Replace this material with thoroughly compacted suitably screened gravel bedding material.
 - 3. All excavated materials designated by the Engineer as unsuitable shall become the property of the Contractor and disposed of at locations acceptable to or designated by the Owner, at no additional cost to the Owner.
- C. Embankment Material:

- 1. Obtain prior approval and instructions from the Engineer prior to undertaking the excavation for pipe placement of any fill material that has been in an embankment less than one year.
- PART 3 EXECUTION
- 3.1 PERFORMANCE
 - A. General:
 - 1. Unless otherwise specifically directed or permitted by the Engineer, begin excavation at the low end of sewer and storm lines and proceed upgrade.
 - 2. Perform excavation for force mains and water mains in a logical sequence.
 - B. Amount of Excavation:
 - 1. Trench width: As shown on the Drawings.
 - 2. Trench depth: As shown on the Drawings.
 - 3. Open Excavation:
 - a. The extent of open excavation shall be controlled by prevailing conditions.
 - b. Open excavation shall, at all times, be confined to the limits prescribed by the Engineer.
 - c. No trenches shall be left open during non-working hours unless adequate provisions are made to prevent injury to the work or persons. Appropriate barricades and warning devices shall be used to alert the public of hazardous areas.
 - 4. Unauthorized Excavation:
 - a. Backfill to the specified grade, any excavation beyond the limits stated above and as shown on the Drawings (unless specifically ordered by the Engineer) with thoroughly compacted gravel borrow or screened gravel.
 - b. Backfilling unauthorized excavation shall be at no additional cost to the Owner.
 - C. Shoring and Bracing:
 - 1. As the excavation progresses, install such shoring and bracing necessary to prevent caving and sliding and to meet the requirements of the state and OSHA safety standards.

END OF SECTION 31 23 16.13

TRENCHING 31 23 16.13

SECTION 31 25 13 - EROSION CONTROLS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work Included:
 - 1. The work under this section shall include provision of all labor, equipment, materials and maintenance of temporary erosion control devices as specified herein, as shown on the Drawings and as directed by the Engineer.
 - 2. Erosion control measures shall be provided as necessary to correct conditions that develop prior to the completion of permanent erosion control devices or as required to control erosion that occurs during normal construction operations.
 - 3. Construction operations shall comply with all federal, state and local regulations pertaining to erosion control.
 - 4. After award of the Contract, prior to commencement of construction activities, meet with the Engineer to discuss erosion control requirements and develop a mutual understanding relative to details of erosion control.
- B. Related Work Specified Elsewhere:
 - 1. Site work is specified in appropriate sections of this Division.
 - 2. Provisions stipulated in Environmental Protection.
- C. Design Criteria:
 - 1. Conduct all construction in a manner and sequence that causes the least practical disturbance of the physical environment. Protect existing vegetation designated to remain.
 - 2. Stabilize disturbed earth surfaces in the shortest time and employ such temporary erosion control devices as may be necessary until such time as adequate soil stabilization has been achieved.

1.2 SUBMITTALS

A. The Contractor shall furnish the Engineer, in writing, his work plan giving proposed locations for storage of topsoil and excavated material before beginning construction. A schedule of work shall accompany the work plan. Acceptance of this plan will not relieve the Contractor of the responsibility of completion of the work as specified.

PART 2 - PRODUCTS

- 2.1 MATERIALS
 - A. Baled Hay:
 - 1. At least 14" by 18" by 30" securely tied to form a firm bale, staked as necessary.
 - B. Sand Bags:
 - 1. Heavy cloth bags of approximately one cubic foot capacity filled with sand or gravel.
 - C. Mulches:
 - 1. Loose hay, straw, peat moss, wood chips, bark mulch, crushed stone, wood excelsior, or wood fiber cellulose. Provide specified item by type and use as and where specified.
 - 2. Type and use shall be as specified by the "Maine Erosion and Sedimentation Control Handbook for Construction Best Management Practices" prepared by the Maine DEP and the Soil and Water Conservation Commission herein after referred to as the BMP.
 - D. Mats and Nettings:
 - 1. Twisted Craft paper, yarn, jute, excelsior wood fiber mats, glass fiber and plastic film.
 - 2. Type and use shall be as specified on the plan and consistent with the BMP manual.
 - E. Permanent Seed:
 - 1. Conservation mix appropriate to the predominant soil conditions as specified in the BMP and subject to approval by the Engineer.
 - F. Temporary Seeding:
 - 1. Use species appropriate for soil conditions and season as specified in the BMP and subject to approval by the Engineer.
 - G. Water:
 - 1. The Contractor shall provide water and equipment to control dust, as directed by the Engineer.
 - H. Filter Fabrics:
 - 1. Filter fabric shall be of one of the commercially available brands such as Mirafi, Typar or equivalent. Fabric types for particular applications shall be approved by the Engineer prior to installation.

- I. Silt Fence:
 - 1. Consistent with BMPs.
- J. Bark Mulch Berm:
 - 1. Consistent with BMPs.
- K. Stone Check Dam:
 - 1. Consistent with BMPs.

2.2 CONSTRUCTION REQUIREMENTS

- A. Temporary Erosion Checks:
 - 1. Temporary erosion checks shall be constructed in ditches and other locations as necessary. Stones shall be used for check dams as specified.
 - 2. Baled hay or sediment barrier may be used to fit local conditions.
- B. Temporary Berms:
 - 1. Temporary barriers shall be constructed along the toe of embankments when necessary to prevent erosion and sedimentation.
- C. Temporary Seeding:
 - 1. Areas to remain exposed for a time exceeding 15 days shall receive temporary seeding per the current Maine Erosion and Sediment Control Best Management Practices (BMPs) Manual for Designers and Engineers or as depicted on the plans in the absence of Maine DEP standards.
- D. Construct silt fence in accordance with details provided prior to soil disturbance.
- E. Mulch All Areas Receiving Seeding: Use either wood cellulose fiber mulch (750 lbs/acre); or straw mulch with chemical tack (as per manufacturers' specifications). Wetting for small areas may be permitted. Biodegradable netting is recommended in areas to be exposed to drainage flow.

PART 3 - EXECUTION

- 3.1 INSTALLATION
 - A. Temporary Erosion Checks:

- 1. Temporary erosion checks shall be constructed in ditches and at other locations designated by the Engineer. The Engineer may modify the Contractor's arrangement of silt fences, bales and bags to fit local conditions.
- 2. Baled hay, silt fences, or sandbags, or some combination, may be used in other areas as necessary to inhibit soil erosion.
- 3. Siltation fence, if called for in the plans, shall be located and installed as shown.
- 4. Sedimentation ponds shall be sited and constructed to the grades and dimensions as shown on the Drawings and will include drainage pipe and an emergency spillway.
- B. Maintenance: Erosion control features shall be installed prior to excavation wherever appropriate. Temporary erosion control features shall remain in place and shall be maintained until a satisfactory growth of grass is established. The Contractor shall be responsible for maintaining erosion control features throughout the life of the construction contract. Maintenance will include periodic inspections by the Owner or Engineer for effectiveness of location, installation and condition with corrective action taken by the Contractor as appropriate.
- D. Removing and Disposing of Materials:
 - 1. When no longer needed, material and devices for temporary erosion control shall be removed and disposed of as approved by the Engineer.
 - 2. When removed, such devices may be reused in other locations provided they are in good condition and suitable to perform the erosion control for which they are intended.

END OF SECTION 31 25 13

SECTION 31 32 19.23 - GEOTEXTILE LAYER SEPARATION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work Included:
 - 1. Furnish all materials and install filter fabric of the types, dimensions and in the location(s) shown on the Drawings and specified herein.
- B. Related Work Specified Elsewhere:
 - 1. Temporary Erosion Control, Riprap and Stone Ditch Protection, and Gabions and Revet Mattresses are specified in the appropriate sections of this Division.

1.2 QUALITY ASSURANCE

- A. A competent laboratory must be maintained by the manufacturer of the fabric at the point of manufacture to ensure quality control.
- B. During all periods of shipment and storage, the fabric shall be wrapped in a heavy duty protective covering to protect the fabric from direct sunlight, ultraviolet rays, temperatures greater than 140°F, mud, dirt, dust and debris.

1.3 SUBMITTALS

A. Manufacturer shall furnish certified test reports with each shipment of material attesting that the fabric meets the requirements of this Specification.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Filter fabric for use in stabilization, drainage, underdrains, erosion control, landscaping and beneath structures shall be formed in widths of not less than six (6) feet and shall be as specified on the plans. In the absence of a plan call out, fabric shall meet the requirements of Table 1. Both woven and non-woven geotextiles are acceptable; however no "slit-tape" woven fabrics will be permitted for drainage, underdrain, and erosion control applications.



T CIDIC		
Mechanical Property	Test Method	Permissible Value
Grab Tensile Strength	ASTM D4632	120 pounds
(both directions)		
Grab Elongation	ASTM D4632-8	6 50 percent
CBR Puncture Strength	ASTM D6241	310 pounds
Trapezoid Tear Strength	ASTM D4533-85	60 pounds
Water Flow Rate	ASTM D4491-8	5 135 gal/min/sf
Equivalent Opening Size	ASTM D4751	80 (EOS)
Coefficient of Permeability	ASTM D4491-8	5 0.2 cm/sec
UV Resistance	ASTM D4355	70% Strength Retained

Table 1 - Geotextile Minimum

The geotextile shall have property values expressed in "typical" values that meet or exceed the values stated above as determined by the most recent test methods specified above.

B. Filter fabric for use in reinforcement and under riprap shall be as specified on the plans. In the absence of a plan callout, fabric shall meet the requirements of Table 2. Woven and non-woven geotextiles are acceptable.

Table 2 Contautile Minimum

Table 2 - Geolextile Minimum							
	Mechanical Property	Test M	ethod	Permissible Value			
	Grab Tensile Strength	ASTM	D4632	200 pounds			
	(both directions)						
	Grab Elongation	ASTM	D4632-8	6 15 percent			
	CBR Puncture Strength	ASTM D3787		700 pounds			
	Trapezoid Tear Strength	ASTM D6431	75 pou	nds			
	UV Resistance	ASTM D4355		70% Strength Retained			
	Equivalent Opening Size	ASTM D4751		between #20 and #100			
			(EOS)	U.S. Std. Sieve			
	number(s)						

The geotextile shall meet or exceed the "typical" values stated above as determined by the most recent test methods specified above.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install geotextile as shown on the drawings or as directed in appropriate specifications in this division or in accordance with manufacturer's instructions or as directed by the Engineer.

END OF SECTION 31 32 19.23



DIVISION 31 – EARTHWORK

SECTION 32 11 23 - AGGREGATE BASE COURSES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The aggregate base and subbase courses for use below pavement shall be composed of layers of aggregate of different gradations.
- B. Related Work Specified Elsewhere (When Applicable):
 - 1. Excavation and Embankment, Bituminous Concrete Paving.

1.2 SUBMITTALS

A. Contractor shall certify that materials comply with the specification requirements by submitting either laboratory test results or certificates of compliance.

1.3 QUALITY ASSURANCE

- A. Compact aggregate base and subbase course materials to a density of at least 95 percent of the maximum density as determined in accordance with ASTM D-1557, Method D.
- B. Work shall be halted when the Engineer or Resident Project Representative is not satisfied with the apparent results of the Contractor's compaction operation. A testing laboratory acceptable to the Engineer shall then be obtained by the Owner to determine, by conducting density tests, if the Contractor is complying with these compaction specifications.
 - 1. If the test results fail to meet the requirements of these Specifications, the Contractor shall undertake whatever action is necessary, to obtain the required compaction. The cost of the testing service will be borne by the Contractor and no allowance will be considered for delays in the performance of the work.
 - 2. If the test results pass and meet the requirements of these Specifications, the direct invoice cost of the testing service will be borne by the Owner, but no allowance will be considered for delays in the performance of the work.

PART 2 - PRODUCTS

- 2.1 MATERIALS
 - A. Aggregate subbase course shall be gravel consisting of hard, durable particles which are free from vegetable matter, lumps or balls of clay and other deleterious substances. The gradation of the portion which will pass a three (3) inch sieve shall meet the grading requirements of the following tables:



DIVISION 32 – EXTERIOR IMPROVEMENTS

	Furnish only when specified	
	Percent by Weight	
Sieve	Passing Square Mesh Sieve	
Designation	Туре D	
1/2"	35-80	
1⁄4″	25-65	
No. 40	0-30	
No. 200	0-7.0	

Table 1 - Gradation Requirements - Aggregate Subbase Course:

B. Aggregate for base shall be screened or crushed gravel of hard durable particles free from vegetable matter, lumps or balls of clay and other deleterious substances. The gradation of the part that passes a three (3) inch sieve shall meet the grading requirements of the following table:

Table 2 - Gradation Requirement - Aggregate Base Course

	Percent by Weight Passing Square Mesh Sieves		
Sieve			
Designation	Type A Ty	/pe B	
	(Crushed)	(Screened)	
	Aggregate	e Aggregate	
1/2"	45-70	35-75	
1/4"	30-55	25-60	
No. 40	0-20	0-25	
No. 200	0-6.0	0-6.0	

C. Gradation tests shall conform to AASHTO Method T-27, except that the material may be separated on the 1/2" sieve. The subbase shall not contain particles of rock which will not pass the six (6) inch square mesh sieve. Type A aggregate for base shall not contain particles of rock which will not pass the two (2) inch square mesh. Type B aggregate for base shall not contain particles of rock which will not pass the four (4) inch sieve. Type C aggregate for base shall not contain particles of rock which will not pass the four (4) inch sieve.

PART 3 - EXECUTION

3.1 PLACING

- A. The subbase course may be constructed full depth in two (2) lifts provided compaction is achieved. Fine grading the lower layer will not be required.
- B. Aggregate base course shall be placed full depth in one (1) lift.
- 3.2 SHAPING AND COMPACTING

AGGREGATE BASE COURSES 32 11 23



DIVISION 32 – EXTERIOR IMPROVEMENTS

- A. All layers of aggregate subbase course shall be compacted to the required density immediately after placing. As soon as the compaction of any layer has been completed, the next layer shall be placed.
- B. The Contractor shall bear full responsibility for and make all necessary repairs to the base and subbase courses and the subgrade until the full depth of the base and subbase courses is placed and compacted. Repairs shall be considered incidental to other contract items and shall be made at no cost to the Owner.
- C. If the top of any layer of the aggregate base or subbase course becomes contaminated by degradation of the aggregate or addition of foreign materials, the contaminated material shall be removed and replaced with the specified material at the Contractor's expense.
- D. The top of any aggregate subbase course layer shall be scarified and loosened for a minimum depth of one (1) inch immediately prior to the placing of the next layer of aggregate base course. This scarifying shall be considered incidental to placing the course, and no separate payment will be made.

3.3 SURFACE TOLERANCE

A. The completed surface of the aggregate base and subbase courses shall be shaped and maintained to a tolerance, above or below the required cross sectional shape, of 3/8" for aggregate base course and 1/2" for aggregate subbase.

END OF SECTION 32 11 23



SECTION 32 12 16.13 - ASPHALT PAVING & MILLING - TOWN OF CAMDEN

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Asphaltic concrete paving, surface sealer, asphalt milling, wearing binder and/or base course and full depth asphalt reclamation.

1.2 RELATED SECTIONS

- A. Section 31 32 19.23 Geotextile Layer Separation
- B. Section 32 11 23 Aggregate Base Courses

1.3 REFERENCES

- A. Most Current Mix Design Methods for Asphalt Concrete and Other Hot Mix Types; The Asphalt Institute (AI).
- B. Most Current Asphalt Plant Manual The Asphalt Institute (AI).
- C. Most Current Asphalt Paving Manual The Asphalt Institute (AI).
- D. Most Current Basic Asphalt Emulsion Manual, The Asphalt Institute (AI).
- E. Town of Camden Land Use Ordinance.
- F. Maine Department of Transportation Standard Specifications (MDOT).

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with most current AI Manual.
- B. Mixing Plant: Conform to most current Al Manual.
- C. Obtain materials from same source throughout.
- D. Bituminous mixing plant proposed by contract shall have been inspected and approved by MDOT.
- E. Contractor shall provide Town with job mix formula and the daily batch reports from asphalt vendor.
- F. The Town's Public Works Director may at any time require the Contractor to perform quality control testing of the mix produced by supplier for conformance to the mix design.

- G. Contractor shall notify Town prior to construction, once aggregate base is prepared for paving, during and after placement of base course, and during and after placement of wearing course.
- 1.5 ENVIRONMENTAL REQUIREMENTS
 - A. Do not place asphalt when base surface temperature is less than 40 degrees F, or surface is wet or frozen.
- 1.6 TRAFFIC CONTROL
 - A. Contractor shall be responsible for maintaining traffic control in accordance with the Manual on Uniform Traffic Control Devices.
- PART 2 PRODUCTS
- 2.1 MATERIALS
 - A. Aggregate for Binder Course Mix: MDOT 19 mm, unless otherwise noted.
 - B. Aggregate for Wearing Course Mix: MDOT 12.5 mm or 9.5 mm, as requested by the Town or otherwise noted.
 - C. Fine Aggregate: In accordance with MDOT standards.
- 2.2 ACCESSORIES
 - A. Tack Coat (if required): Homogeneous, medium curing, liquid asphalt. In accordance with MDOT Standard Specification Section 409 Bituminous Tack Coat.
- 2.3 ASPHALT PAVING MIX
 - A. Binder Course: In accordance with MDOT Standard Specification Section 401 Hot Mix Asphalt Pavement.
 - B. Wearing Course: In accordance with MDOT Standard Specification Section 401 Hot Mix Asphalt Pavement.
- 2.4 MILLING OF EXISTING ASPHALT
 - A. Contactor shall remove existing asphalt pavement by milling to a depth determined by the Town. Milling shall be performed by equipment with a minimum cutting width of six (6) feet. Contractor responsible to dispose of material as determined by the Town.
 - B. Dust shall be controlled during milling, Town may require pre-wetting of pavement. Contractor is required to sweep the milled surface with a power broom and/or a mechanized street sweeper to remove all dust, fine particles and loose pieces of asphalt prior to opening road to traffic and again prior to placement of new asphalt.

- C. Any distress of the newly milled surface caused by the milling, which constitutes a driving hazard, shall be promptly repaired to satisfaction of the Town.
- D. Maximum between two surfaces should not exceed 1 ½" (40mm). If greater uneven mill depth is required contractor responsible for placement of proper signage and/or warning devices.
- E. Equipment shall be operated and maintained to prevent unnecessary breaking out of the underlying and adjacent materials. If damage occurs repairs shall be made immediately.

2.5 FULL DEPTH ASPHALT RECLAMATION

- A. Full depth asphalt reclamations shall be performed in accordance with MDOT Standard Specifications Section 307 Full Depth Recycled Pavement.
- B. Entire depth of existing pavement shall be pulverized together with one (1) inch of underling gravel. Recycled material depth will be specified by the Town. Material shall be processed to 100% passing the two (2) inch square mesh sieve.
- C. Reclaimed material shall be rolled with a vibratory roller with a minimum 54" diameter single drum or greater and shall be compacted to 98% of the target density.
- D. Contractor is responsible for all grading and finish grading to allow the road to be opened as soon as possible.
- E. Contractor shall coordinate with Town if stabilizing additives are recommended or necessary.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that compacted aggregate base course is dry and ready to support paving and imposed loads.
- B. Rocks larger than two (2) inches in diameter there are encountered in the gravel base layer shall be removed prior to paving.
- C. Verify gradients and elevations of base are correct.
- 3.2 BASE
 - A. Aggregate Base Course: In accordance with Town and MDOT Standards.
- 3.3 PLACING ASPHALT PAVEMENT DOUBLE COURSE

- A. Prior to placement of asphalt materials, remove loose and deleterious materials from substrate surfaces.
- B. Place binder course to specified compacted thickness. In no case shall the binder course thickness be less than 2 ½ inches, unless otherwise noted.
- C. Place wearing course to specified compacted thickness. In no case shall the wearing course thickness be less than 1 ½ inches unless otherwise noted.
- D. Compact pavement by rolling to 94% 97%. Complete compaction prior to mix temperature cooling to 185°F. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.
- E. Develop rolling with consecutive passes to achieve even and smooth finish, without roller marks. A tandem steel drum asphalt roller suitable to achieved required asphalt compaction levels shall be utilized along roadways.
- F. Promptly correct surface irregularities in or on if paving course behind paver. Remove excess material and fill depressions.
- G. Construction joints to ensure continuous bond between adjoining paving sections. Construction joints shall be free of depressions and have the same texture and smoothness as other sections of hot-mix asphalt course, grinding is required for all joints where new asphalt meets existing; including side streets and other locations determined by the Town.
- H. Repairs: Remove paved area that is defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt compacted by rolling to specified density and surface smoothness.

3.4 TOLERANCES

- A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.
- B. Scheduled Compacted Thickness: Within 1/4 inch.
- C. Variation from True Elevation: Within 1/4 inch.
- 3.5 PROTECTION
 - A. Prevent machinery from contacting finished pavement.

END OF SECTION 32 12 16.13

SECTION 32 92 19 - SEEDING

PART 1 - GENERAL

- 1.1 DESCRIPTION
 - A. Work Included: Furnish, place, and test topsoil, seed, lime, and fertilizer where shown on the drawings and protect and maintain seeded areas disturbed by construction work, as directed by the Engineer.
 - B. Related Work Specified Elsewhere (When Applicable): Earthwork, excavation, backfill, compaction, site grading and temporary erosion control are specified in the appropriate Sections of this Division.

1.2 SUBMITTALS AND TESTING

- A. Seed:
 - 1. Furnish the Engineer with duplicate signed copies of a statement from the vendor, certifying that each container of seed delivered to the project site is fully labeled in accordance with the Federal Seed Act and is at least equal to the specification requirements.
 - 2. This certification shall appear in, or with, all copies of invoices for the seed.
 - 3. The certification shall include the guaranteed percentages of purity, weed content and germination of the seed, and also the net weight and date of shipment. No seed may be sown until the Contractor has submitted the certificates and certificates have been approved.
 - 4. Each lot of seed shall be subject to sampling and testing, at the discretion of the Engineer, in accordance with the latest rules and regulations under the Federal Seed Act.
- B. Topsoil:
 - 1. Inform the Engineer, within 30 days after the award of the Contract, of the sources from which the topsoil is to be furnished.
 - 2. Obtain representative soil samples, taken from several locations in the area under consideration for topsoil removal, to the full stripping depth.
 - 3. Have soil samples tested by an independent soil testing laboratory, approved by the Engineer, and directed by owner at owners expense.

- 4. Have soil samples tested for physical properties and pH (or lime requirement), for organic matter, available phosphoric acid, and available potash, in accordance with standard practices of soil testing.
- 5. Approval, by the Engineer, to use topsoil for the work will be dependent upon the results of the soils tests.
- C. Lime & Fertilizer:
 - 1. Furnish the Engineer with duplicate copies of invoices for all lime and fertilizer used on the project showing the total minimum carbonates and minimum percentages of the material furnished that pass the 90 and 20 mesh sieves and the grade furnished.
 - 2. Each lot of lime and fertilizer shall be subject to sampling and testing at the discretion of the Engineer.
 - 3. Sampling and testing shall be in accordance with the official methods of the Association of Official Agricultural Chemists.
 - 4. Upon completion of the project, a final check may be made comparing the total quantities of fertilizer and lime used to the total area seeded. If the minimum rates of application have not been met, the Engineer may require the Contractor to distribute additional quantities of these materials to meet the minimum rates.

1.3 DELIVERY, STORAGE & HANDLING

- A. Seed:
 - 1. Furnish all seed in sealed standard containers, unless exception is granted in writing by the Engineer.
 - Containers shall be labeled in accordance with the United States Department of Agriculture's rules and regulations under the Federal Seed Act in effect at the time of purchase.
- B. Fertilizer:
 - 1. Furnish all fertilizer in unopened original containers.
 - 2. Containers shall be labeled with the manufacturer's statement of analysis.

1.4 JOB CONDITIONS

- A. Topsoil: Do not place or spread topsoil when the subgrade is frozen, excessively wet or dry, or in any condition otherwise detrimental, in the opinion of the Engineer, to the proposed planting or to proper grading. Do not use excessively wet topsoil.
- B. Seeding:



- 1. Planting Seasons: The recommended seeding time is from April 1 to September 15. The Contractor may seed at other times. Regardless of the time of seeding, the Contractor shall be responsible for each seeded area until it is accepted.
- 2. Weather Conditions:
 - a. Do not perform seeding work when weather conditions are such that beneficial results are not likely to be obtained, such as drought, excessive moisture, or high winds.
 - b. Stop the seeding work when, in the opinion of the Engineer, weather conditions are not favorable.
 - c. Resume the work only when, in the opinion of the Engineer, conditions become favorable, or when approved alternate or corrective measures and procedures are placed into effect.

PART 2 - PRODUCTS

- 2.1 MATERIALS
 - A. Seed:
 - 1. Provide the grass or plant material seed mixture specified on the drawings. When unspecified, provide a mix approved by the Engineer, having the following composition:
 - a. Roadside Mixture:
 - 50 percent Creeping Red Fescue 15 percent Kentucky Bluegrass 5 percent White Clover 2 percent Red Top 3 percent Birdsfoot Trefoil 25 percent Annual Ryegrass
 - b. Alternate Mixture:
 - 50 percent Creeping Red Fesque 30 percent Kentucky Bluegrass 20 percent Annual Ryegrass
 - 2. Do not use seed which has become wet, moldy, or otherwise damaged in transit or during storage.
 - B. Topsoil:
 - 1. Provide the quantity of topsoil necessary, in the opinion of the Engineer, to complete the work.



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- 2. Provide topsoil that is natural, friable clay-loam soil possessing the characteristics of representative soils in the vicinity which produce heavy growths of crops, grass, or other vegetation.
- 2. Provide topsoil which is reasonably free from subsoil, brush, objectionable weeds, other litter, clay lumps, stones, stumps, roots, objects larger than 2" in diameter, and toxic substances which might be harmful to plant growth or be a hindrance to grading, planting, and maintenance operations.
- 4. Obtain topsoil from naturally well drained areas.
- C. Lime:
 - 1. Provide lime which is ground limestone containing not less than 85% of total carbonate and of such fineness that 90% will pass a No. 20 sieve and 50% will pass a No. 100 sieve.
 - 2. Coarser materials will be acceptable provided the specified rates of application are increased proportionately on the basis of quantities passing a No. IOO sieve. No additional payment will be made to the Contractor for the increased quantity.
- D. Fertilizer:
 - 1. Provide a commercial fertilizer approved by the Engineer.
 - 2. Provide fertilizer containing the following minimum percentage of nutrients by weight:
 - 10 % Available phosphoric acid
 - 10 % Available potash
 - 10 % Available nitrogen (75% of the nitrogen shall be organic)

PART 3 - EXECUTION

- 3.1 PREPARATION
 - A. Equipment:
 - 1. Provide all equipment necessary for the proper preparation of the ground surface and for the handling and placing of all required materials.
 - 2. Demonstrate to the Engineer that the equipment will apply materials at the specified rates.
 - B. Soil: Perform the following work prior to the application of lime, fertilizer or seed.
 - 1. Scarify the subgrade to a depth of 2" to allow the bonding of the topsoil with the subsoil.
 - 2. Apply topsoil to a depth of 4" or as directed on areas to be seeded.


- 3. Trim and rake the topsoil to true grades free from unsightly variations, humps, ridges or depressions.
- 4. Remove all objectionable material and form a finely pulverized seed bed.

3.2 PERFORMANCE

- A. Grading:
 - 1. Grade the areas to be seeded as shown on the Drawings or as directed by the Engineer.
 - 2. Leave all surfaces in even and properly compacted condition.
 - 3. Maintain grades on the areas to be seeded in true and even conditions, including any necessary repairs to previously graded areas.
- B. Placing Topsoil:
 - 1. Uniformly distribute and evenly spread topsoil on the designated areas.
 - 2. Spread the topsoil in such a manner that planting work can be performed with little additional soil preparation or tillage.
 - 3. Correct any irregularities in the surface resulting from topsoiling or other operations to prevent the formation of depressions where water may stand.
 - 4. Thoroughly till the topsoil to a depth of at least 3" by plowing, discing, harrowing, or other approved method until the condition of the soil is acceptable to the Engineer.
- C. Placing Fertilizer:
 - 1. Distribute fertilizer uniformly at a rate determined by the soils test over the areas to be seeded.
 - 2. Incorporate fertilizer into the soil to a depth of at least 3" by discing, harrowing, or other methods acceptable to the Engineer.
 - 3. The incorporation of fertilizer may be a part of the tillage operation specified above.
 - 4. Distribution by means of an approved seed drill equipped to sow seed and distribute fertilizer at the same time will be acceptable.
- D. Placing Lime:
 - 1. Uniformly distribute lime immediately following or simultaneously with the incorporation of fertilizer.



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- 2. Distribute lime at a rate determined from the pH test, to a depth of at least 3" by discing, harrowing, or other methods acceptable to the Engineer.
- E. Seeding:
 - 1. Level out any undulations or irregularities in the surface resulting from tillage, fertilizing, liming or other operations before starting seeding operations.
 - 2. Hydroseeding:
 - a. Hydroseeding may be performed where approved and with equipment approved by the Engineer.
 - b. Sow the seed over designated areas at a minimum rate of 5 lbs per 1000 ft^2 .
 - c. Seed and fertilizing materials shall be kept thoroughly agitated in order to maintain a uniform suspension within the tank of the hydroseeder.
 - d. The spraying equipment must be designed and operated to distribute seed and fertilizing materials evenly and uniformly on the designated areas at the required rates.
 - 3. Drill Seeding:
 - a. Drill seeding may be performed with approved equipment having drills not more than 2" apart.
 - b. Sow the seed uniformly over the designated areas to a depth of I/2" and at a rate of 5 lbs per I,000 ft².
 - 4. Broadcast Seeding:
 - a. Broadcast seeding may be performed by equipment approved by the Engineer.
 - b. Sow the seed uniformly over the designated areas at a rate of 5 pounds per 1,000 square feet.
 - c. Sow half the seed with the equipment moving in one direction and the remainder of the seed with the equipment moving at right angles to the first sowing.
 - d. Cover the seed to an average depth of I/2" by means of a brush harrow, spike-tooth harrow, chain harrow, cultipacker, or other approved devices.
 - e. Do not perform broadcast seeding work during windy weather.
- F. Compacting:



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- 1. Seeded areas must be raked lightly after sowing unless seeding is to be directly followed by application of an approved mulch.
- 2. Compact the entire area immediately after the seeding operations have been completed.
- 3. Compact by means of a cultipacker, roller, or other equipment approved by the Engineer weighing 60 to 90 lbs per linear foot of roller.
- 4. If the soil is of such type that a smooth or corrugated roller cannot be operated satisfactorily, use a pneumatic roller (not wobbly wheel) that has tires of sufficient size to obtain complete coverage of the soil.
- 5. When using a cultipacker or similar equipment, perform the final rolling at right angles to the prevailing slopes to prevent water erosion, or at right angles to the prevailing wind to prevent dust.

3.3 PROTECTION & MAINTENANCE

- A. Protection:
 - 1. Protect the seeded area against traffic or other use.
 - 2. Erect barricades and place warning signs as needed.
- B. Maintenance:
 - 1. Properly care for the seeded areas during the period when the grass is becoming established.
 - 2. The protection period shall extend for I2 months after the completion of the entire project, unless the desired cover, in the opinion of the Engineer, is established in a shorter period of time.

3.4 ACCEPTANCE

A. At final acceptance of the project all areas shall have a close stand of grass with no weeds present and no bare spots greater than three inches (3") in diameter over greater than five percent (5%) of the overall seeded area.

END OF SECTION 32 92 19



SECTION 33 42 13 - PIPE CULVERTS

PART 1 - GENERAL

- 1.1 DESCRIPTION
 - A. Work Included:
 - 1. Provide and install culvert, surface drain, and storm drain pipe and sections of the type(s), size(s) and in the location(s) shown on the Drawings and as specified herein.
 - B. Related Sections:
 - 1. Section 31 23 16 Excavation
 - 2. Section 31 23 16.13 Trenching
 - 3. Section 31 32 19.23 Geotextile Layer Separation
 - 4. Section 33 46 00 Subdrainage
 - 5. Section 33 49 13 Storm Drainage Manholes, Frames and Covers

1.2 SUBMITTALS

- A. Submit, in duplicate, sworn certificates of inspections and tests performed at the location of manufacturers.
- B. Submit Shop Drawings in accordance with the General Conditions of the Construction Contract.
- 1.3 DELIVERY, STORAGE AND HANDLING
 - A. Exercise care when handling pipe to prevent damage of any nature to pipe and finish.
 - B. Immediately remove damaged materials and replace in kind at no additional cost to the Owner.
 - C. Store materials above ground on platforms, skids or other adequate supports.

1.4 FIELD QUALITY CONTROL

- A. Acceptance will be based on material tests and inspection of the complete product.
- B. Inspection may be made at the place of manufacture, local distributor or on the construction site after delivery. All Pipe Culvert materials are subject to rejection at any time throughout the project due to failure to meet specifications.



DIVISION 33 - UTILITIES

C. No damaged or rejected pipes are to be installed permanently for the Work. Contractor must immediately remove all rejected or damaged pipe culvert materials from the project site if not needed to complete the Work. Contractor is responsible for replacing damaged or rejected pipe materials at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Pipe shall be one of the following as specified on the Drawings; substitutions are only allowed with the approval of the Engineer.
 - 1. Corrugated Aluminum Alloy Pipe
 - 2. Aluminum Coated (Type 2) Corrugated Steel Pipe
 - 3. Zinc-Coated (Galvanized) Corrugated Steel Pipe
 - 4. Steel Structural Plate Pipe
 - 5. Aluminum Alloy Structural Plate Pipe
 - 6. Polymer Precoated, Galvanized Corrugated Steel Pipe
 - 7. Polyvinyl Chloride (PVC) Pipe
 - 8. Corrugated Polyethylene (PE) and High Density Polyethylene (HDPE) Pipe
 - 9. Reinforced Concrete Pipe
- B. Materials for pipes shall conform to AASHTO Standards.
 - 1. Corrugated Aluminum Alloy Pipe. This pipe and special fittings such as elbows, tees and wyes shall conform to the requirements of AASHTO M196, Type I or II. Special sections, such as elbows and metal end sections shall be of the gage called for in the Contract Documents and shall conform to the applicable requirements of AASHTO M196. Aluminum sheet shall conform to the requirements of AASHTO M197.
 - 2. Aluminum Coated (Type 2) Corrugated Steel Pipe. This pipe shall conform to the requirements of AASHTO M36 using steel sheet conforming to AASHTO M274.
 - 3. Zinc Coated (Galvanized) Corrugated Steel Pipe. This pipe shall conform to the requirements of AASHTO M36 using steel sheet conforming to AASHTO M218.

- 4. Steel Structural Plate Pipe. Plates, bolts, nuts and other accessories shall conform to the requirements of AASHTO specification M167 and the following additional requirements:
 - a. All shop welding shall meet the requirements of the latest edition of AWS D1.1, Structural Welding Code Steel.
 - b. Annually the fabricator shall have quality control tests performed on uncoated random samples of the lightest and heaviest gage plates produced by welding. The sampling and testing shall be done by a recognized independent testing agency and copies of the test reports, including all welding parameters, shall be submitted to the Engineer as requested.
 - c. No field welding will be allowed.
- 5. Aluminum Alloy Structural Plate Pipe. Plates, bolts and nuts for this pipe shall conform to the requirements of AASHTO M219.
- 6. Polymer Precoated, Galvanized Corrugated Steel Pipe. This pipe and special fittings such as elbows, tees and wyes shall conform to the requirements of AASHTO M245, Type I, with Type B coating for the pipe as specified in AASHTO M246 with the thinner coating on the outside.
- 7. Polyvinyl chloride (PVC) Pipe. This pipe and fittings shall conform to the requirements of AASHTO M278. All pipe shall be supplied with gasket type joints meeting the requirements of ASTM D3212.
- 8. Corrugated polyethylene (PE & HDPE) pipe. This pipe and fittings shall conform to the requirements of AASHTO M252 and AASHTO M294.
- 9. Reinforced Concrete Pipe. This pipe shall conform to the requirements of AASHTO M170, (ASTM C76) except paragraph 6.2. Elliptical pipe shall conform to the requirement of AASHTO M207, except paragraph 6.2. Unless otherwise specified, pipe wall design and use of elliptical reinforcement in circular pipe are optional. Pipe arch shall conform to the requirements of AASHTO M206, except paragraph 6.2. Aggregates shall meet the requirements of MDOT Standard Specifications Subsections 703.01 and 703.02 for fine aggregates and coarse aggregates respectively, except that grading requirements are hereby waived. Precast reinforced concrete special sections shall conform to the requirements of the cited specifications to the extent to which they apply.
- C. Area Drain Assemblies. Unless otherwise noted, provide Nyloplast Inline Drain with 8" Bronze Insert Grate. Drain Basin not required.

PART 3 - EXECUTION

3.1 INSPECTION

PIPE CULVERTS 33 42 13

- A. Examine areas to receive piping for the following
 - 1. Obstructions that adversely affect the installation and quality of the work.
 - 2. Deviations beyond allowable tolerances for clearances.
- B. Examine pipe and fittings before installation to assure no defective materials are incorporated into the Work.
- C. Start the work only when conditions are satisfactory.
- D. Remove and replace all defective materials at no additional cost to the Owner.

3.2 INSTALLATION

- A. Do not install pipe, nor backfill, between December 15th and April 1st without the written permission of the Engineer.
- B. Begin laying the pipe at the downstream end. Install bells upstream per manufacture's recommendations.
- C. Place metal pipe with the longitudinal laps of seams at the sides and the outside laps of circumferential joints pointing up grade.
- D. Lay paved or partially lined pipe with the lining on the bottom.
- E. Join flexible pipe sections and metal end sections by coupling bands as recommended by the manufacturer.
- F. Assemble the plates for structural plate arches according to the manufacturer's assembly instructions and as shown on the Drawings.
- G. Place geotextile and armor stones at inlets and outlets as indicated in the Drawings.

END OF SECTION 33 42 13



SECTION 33 46 00 - SUBDRAINAGE

PART 1 - GENERAL

- 1.1 SECTION INCLUDES
 - A. Underdrain system for paved sections and building perimeter.

1.2 RELATED SECTIONS

- A. Section 31 05 16 Aggregates for Earthwork
- B. Section 31 23 16.13 Trenching
- C. Section 31 32 19.23 Geotextile Layer Separation

1.3 REFERENCES

- A. ASTM D2729 Poly(vinyl chloride) (PVC) Sewer Pipe and Fittings.
- 1.4 DEFINITIONS
 - A. Bedding: Fill placed under, beside and directly over pipe, prior to subsequent backfill operations.

1.5 PROJECT RECORD DOCUMENTS

A. Record location of pipe runs, connections, cleanouts and principle invert elevations.

1.6 FIELD MEASUREMENTS

A. Verify that field measurements and elevations are as indicated on the construction Drawings.

PART 2 - PRODUCTS

2.1 PIPE MATERIALS

- A. Poly(vinyl chloride) Pipe (Perforated): ASTM D2729; plain end, provide inside diameter as indicated on the Drawings; with required fittings.
- 2.2 AGGREGATE AND BEDDING
 - A. As indicated in the Drawings or as approved by the Engineer.
- 2.3 ACCESSORIES

A. Pipe Coupling: Integral to pipe or solid plastic solvent weld.

PART 3 - EXECUTION

- 3.1 EXAMINATION
 - A. Verify that trench cut and excavated base is ready to receive work and excavations, dimensions, and elevations are as indicated on Drawings.

3.2 PREPARATION

- A. Hand trim excavations to required elevations. Correct over excavation with aggregate.
- B. Remove large stones or other hard matter which could damage drainage piping or impede consistent backfilling or compaction.

3.3 INSTALLATION

- A. Install and join pipe and pipe fittings in accordance with pipe manufacturer's instructions.
- B. Lay pipe to slope gradients of 1/4 inch per foot or as noted on Drawings with maximum variation from true slope of 1/8 inch in 10 feet.
- C. Place pipe with perforations facing down, or as indicated in the Drawings. Mechanically join pipe ends.

3.4 FIELD QUALITY CONTROL

A. Request inspection prior to and immediately after placing aggregate cover over pipe.

3.5 PROTECTION

A. Protect pipe and aggregate cover from damage or displacement until backfilling operation begins.

END OF SECTION 33 46 00



DEPARTMENT OF THE ARMY NEW ENGLAND DISTRICT, CORPS OF ENGINEERS 696 VIRGINIA ROAD CONCORD, MASSACHUSETTS 01742-2751

MAINE GENERAL PERMIT (GP) AUTHORIZATION LETTER AND SCREENING SUMMARY

AUDRA CALER-BELL, MANAGER TOWN OF CAMDEN P.O. BOX 1207 CAMDEN, MAINE 046843

CORPS PERMIT #	NAE-2019-02777	
CORPS GP ID#	19-575	
STATE ID#	PBR	

DESCRIPTION OF WORK:

Place temporary fill below	v the ordinary h	igh wate	r mark of an unn	named f	ributary to Hos	smer Pond at Camd	en,
Maine in order to replace	an existing det	eriorated	l culvert beneath	Barnst	town Road with	a clear span bridge	
This work will result in a	pproximately 10	0 s.f. of	of temporary str	eam be	d impact. This	work is shown on t	che
attached plans entitled "	SITE LOCATION	MAP, TO	OWN OF CAMDEN	I-RAGG	ED MOUNTAIN.	CAMDEN, MAINE"	in
one sheet dated "OCTOB	ER 2019" and "	COWN OF	CAMDEN, RAGO	GED MO	UNTAIN RECR	EATIONAL AREA,	
PARKING LOT DRAINAGE	IMPROVEMEN'	rs" in tw	o sheets dated "	SEPTE	MBER 2019".		
LATILONG COOPDINATES	44.216392°	N	-69.133091°	10/		CAMDEN, ME	

I. CORPS DETERMINATION:

Based on our review of the information you provided, we have determined that your project will have only minimal individual and cumulative impacts on waters and wetlands of the United States. Your work is therefore authorized by the U.S. Army Corps of Engineers under the Federal Permit, the Maine General Permit (GP). http://www.nae.usace.army.mil/Portals/74/docs/regulatory/StateGeneralPermits/ME/Maine_General Permit 2015.pdf

You must perform the activity authorized herein in compliance with all the terms and conditions of the GP [including any attached Additional Conditions and any conditions placed on the State 401 Water Quality Certification including any required mitigation]. Please review the enclosed GP carefully, including the GP conditions beginning on page 5, to familiarize yourself with its contents. You are responsible for complying with all of the GP requirements; therefore you should be certain that whoever does the work fully understands all of the conditions. You may wish to discuss the conditions of this authorization with your contractor to ensure the contractor can accomplish the work in a manner that conforms to all requirements.

If you change the plans or construction methods for work within our jurisdiction, please contact us immediately to discuss modification of this authorization. This office must approve any changes before you undertake them.

Condition 38 of the GP (page 16) provides one year for completion of work that has commenced or is under contract to commence prior to the expiration of the GP on October 13, 2020. You will need to apply for reauthorization for any work within Corps jurisdiction that is not completed by October 13, 2021.

This authorization presumes the work shown on your plans noted above is in waters of the U.S. Should you desire to appeal our jurisdiction, please submit a request for an approved jurisdictional determination in writing to the undersigned.

No work may be started unless and until all other required local, State and Federal licenses and permits have been obtained. This includes but is not limited to a Flood Hazard Development Permit issued by the town if necessary.

II. STATE ACTIONS: PENDING [X], ISSUED [], DENIED [] DATE
APPLICATION TYPE: PBR: x , TIER 1:, TIER 2:, TIER 3: DMR LEASE: NA:
III. FEDERAL ACTIONS:
JOINT PROCESSING MEETING: 10/31/19 LEVEL OF REVIEW: CATEGORY 1: CATEGORY 2: X
AUTHORITY (Based on a review of plans and/or State/Federal applications): SEC 10, 404 10/404, 103
EXCLUSIONS: The exclusionary criteria identified in the general permit do not apply to this project.
FEDERAL RESOURCE AGENCY OBJECTIONS: EPA_NO_, USF&WS_NO_, NMFS_NO_
If you have any questions on this matter, please contact my staff at 207-623-8367 at our Augusta, Maine Project Office. In order for us to better serve you, we would appreciate your completing our Customer Service Survey located at http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0

JAY L. CLEMENT SENIOR PROJECT MANAGER MAINE PROJECT OFFICE

FRANK J. DELGIUDICE CHIEF, PERMITS & ENFORCEMENT BRANCH

REGULATORY DIVISION



PLEASE NOTE THE FOLLOWING CONDITIONS FOR DEPARTMENT OF THE ARMY GENERAL PERMIT NO. NAE-2019-02777

1. This authorization requires you to 1) notify us before beginning work so we may inspect the project, and 2) submit a Compliance Certification Form. You must complete and return the enclosed Work Start Notification Form(s) to this office at least two weeks before the anticipated starting date. You must complete and return the enclosed Compliance Certification Form within one month following the completion of the authorized work and any required mitigation (but not mitigation monitoring, which requires separate submittals).

2. The permittee shall assure that a copy of this permit is at the work site whenever work is being performed and that all personnel performing work at the site of the work authorized by this permit are fully aware of the terms and conditions of the permit. This permit, including its drawings and any appendices and other attachments, shall be made a part of any and all contracts and sub-contracts for work which affects areas of Corps of Engineers' jurisdiction at the site of the work authorized by this permit. This shall be done by including the entire permit in the specifications for the work. If the permit is issued after construction specifications but before receipt of bids or quotes, the entire permit shall be included as an addendum to the specifications. The term "entire permit" includes permit amendments. Although the permittee may assign various aspects of the work to different contractors or sub-contractors, all contractors and sub-contract or sub-contract shall be obligated by contract to comply with all environmental protection provisions of the entire permit, and no contract shall require or allow unauthorized work in areas of Corps of Engineers jurisdiction.

3. The permittee and his contractor(s) shall minimize the potential for effects to salmon and both sturgeon species by conducting all construction activities for the project in accordance with the Maine DOT - approved Soil Erosion and Water Pollution Control Plan. Instream turbidity will be visually monitored and all erosion controls will be inspected daily to ensure that the measures taken are adequate. If inspection shows that the erosion controls are ineffective, immediate action will be taken to repair, replace, or reinforce controls as necessary.

4. All exposed soils resulting from the construction will be promptly seeded and mulched in order to achieve vegetative stabilization.

5. All areas of temporary fill shall be restored to their original contour and character upon completion of the work.

6. In water work shall be conducted between July 15 and September 30 of any year in order to minimize potential impacts to aquatic resources and local water quality.









(Minimum Notice: Permittee must sign and return notification within one month of the completion of work.)

COMPLIANCE CERTIFICATION FORM

Permit Number: NAE-2019-02970

Project Manager Clement

Name of Permittee: Kathleen Chapman

Permit Issuance Date: _____

Please sign this certification and return it to the following address upon completion of the activity and any mitigation required by the permit. You must submit this after the mitigation is complete, but not the mitigation monitoring, which requires separate submittals.

4	*****	**************	*****
*	MAIL TO:	U.S. Army Corps of Engineers, New England District	*
*		Permits and Enforcement Branch C	*
*		Regulatory Division	*
*		696 Virginia Road	*
*		Concord, Massachusetts 01742-2751	*
*	******	******	*****

Please note that your permitted activity is subject to a compliance inspection by an U.S. Army Corps of Engineers representative. If you fail to comply with this permit you are subject to permit suspension, modification, or revocation.

I hereby certify that the work authorized by the above referenced permit was completed in accordance with the terms and conditions of the above referenced permit, and any required mitigation was completed in accordance with the permit conditions.

Signature of Permittee

Date

Printed Name

Date of Work Completion

Telephone Number

Telephone Number



WORK-START NOTIFICATION FORM

(Minimum Notice: Two weeks before work begins)

EMAIL TO: jay.l.clement@usace.army.mil

or

MAIL TO:

Jay Clement US Army Corps of Engineers Maine Project Office 442 Civic Center Drive Augusta, Maine 04330

Corps of Engineers Permit No. NAE-2019-02777 was issued to the Town of Camden. This work is located an unnamed tributary to Hosmer Pond at Camden, Maine and authorized the permittee to place temporary fill below the ordinary high water mark in order to replace an existing deteriorated culvert beneath Barnstown Road with a clear span bridge. This work will result in approximately 100 s.f. of of temporary stream bed impact.

The people (e.g., contractor) listed below will do the work, and they understand the permit's conditions and limitations.

PLEASE PRIM	T OR	TYPE
-------------	------	------

Mana of Dougon /Finnes

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t:	Finish:
	Date:
	Title:
Date Pe	ermit Expires:
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Submitta	ls Required: <u>No</u>
Inspect as conven	nient
	() t:Date Po ************************************

The key to success starts with a solid foundation. ENGINEERING | EXPLORATION | EXPERIENCE

Geotechnical Report

Hosmer Pond Brook Culvert Replacement Camden, Maine





145 Lisbon Street (PO Box 7216) Lewiston, Maine 04243 | (207) 576-3313 173 Pleasant Street Rockland, Maine 04841 | (207) 318-7761 www.summitgeoeng.com <u>Client</u> Gartley & Dorsky Engineering and Surveying 59 Union St, Unit 1 Camden, Maine 04843

> Project #: 19201 Date: 7/10/2019



July 10, 2019 Summit #19201

Andrew D. Hedrich, P.E. Gartley & Dorsky Engineering and Surveying 59 Union St, Unit 1 Camden, Maine 04843

Reference: Geotechnical Engineering Services Hosmer Pond Brook Culvert Replacement - 20 Barnestown Rd, Camden, Maine

Dear Andrew;

We have completed our geotechnical investigation for the proposed culvert replacement for Hosmer Pond Brook stream crossing in Camden, Maine. Our scope of services included performing subsurface explorations at the site and preparing this report summarizing our findings and geotechnical recommendations.

The geotechnical considerations identified for the culvert replacement include:

- The presence of loose native sand and its susceptibility to disturbance during excavation
- The presence of loose sand and organic silt and its potential for settlement
- The presence of groundwater and stream relative to foundation excavations

Discussion and recommendations for the identified geotechnical considerations are included in this report along with geotechnical recommendations for the culvert replacement.

We appreciate the opportunity to serve you during this phase of your project. If there are any questions or additional information is required, please do not hesitate to call.

Sincerely yours, Summit Geoengineering Services

Erika Stewart

Erika Stewart, P.E. Senior Geotechnical Engineer



Trug N. Tartidge

Craig W. Coolidge, P.E. Vice President Principal Engineer



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Boring LogsAppendix B
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1.0 Project and Site Description

Summit Geoengineering Services (SGS) was asked to conduct a geotechnical investigation for a proposed culvert replacement off Barnestown Road in Camden. This site is located where Hosmer Pond Brook crosses beneath the unnamed access road to Rugged Mountain Recreational Area and Camden Snow Bowl. The existing culvert consists of twin corrugated metal pipes, each with a diameter of two feet. The top of the culvert is approximately two feet below the road surface with the bottom of the culvert at four feet below the road surface. We understand the new culvert structure is proposed as a 40-foot long open-bottom structure with a width of approximately 12 feet. Depth of the new culvert foundation is unknown.

2.0 Explorations & Laboratory Testing

2.1 Explorations

Summit Geoengineering Services (SGS) observed the subsurface conditions with the drilling of two test borings on June 20, 2019. Borings were performed by SGS using an AMS 9630 Pro drill rig and advanced using direct push 3-inch casing and 3-inch casing with rotary wash to a depth of 27 feet. Boring B-1 was probed to a depth of bedrock refusal, encountered at 70.7' below the ground surface. Soils were visually classified by SPT split spoon sampling (ASTM D1586). The explorations were approximately located by SGS relative to existing site features. Boring B-1 was performed on the south side of the existing culvert and boring B-2 was performed on the north side. A Test Boring Location Plan and geologic mapping of the site are included in Appendix A. Logs of the explorations are included in Appendix B.

2.2 Laboratory Testing

Two samples of alluvium sand were tested for grain size analysis in accordance with ASTM D6913. Two samples of alluvium silt were tested for Atterberg Limits in accordance with ASTM D4318 and six samples were tested for moisture content in accordance with ASTM D2216. The moisture of the stream alluvium deposit ranges from 24.5% to 71.3%. Results of the grain size and Atterberg Limit tests are summarized below. Detailed results of the laboratory tests are attached in Appendix C.

Laboratory Test Summary											
Device	Samala	Donth	Grain S	ize Distril	oution	Atterbe	rg Limit		Moisture		
DOTING	Sample	Depth	Gravel	Sand	Fines	LL	PI	0303	Content		
B-2	S-1	5.5' – 7'				69	30	OH	71.3%		
B-2	S-2	7′ – 8.5′	0.4%	80.8%	18.8%			SM	39.6%		
B-2	S-3	10' - 12'	4%	72%	24%			SM	24.5%		
B-2	S-6	26' – 27'				47	7	OL	68.1%		



3.0 Subsurface Conditions

The subsurface conditions consist of 6 to 12 inches of intact *bituminous pavement* overlying *fill*, overlying *stream alluvium*, explored to a depth of 27 feet. *Bedrock* was encountered at a depth of 70.7 feet in boring B-1 based on probe refusal. *Groundwater* was observed at a depth of range of 2 to 5 feet in the borings. The subsurface conditions are further described as follows:

3.1 Soil Layers

Fill is present beneath the pavement to a depth of 3 to 4 feet below the ground surface. The fill is described as brown sand with little silt and gravel and occasional cobbles. The fill is visually classified as SP-SM in accordance with the Unified Soil Classification System (USCS). The fill is considered compact and humid to damp.

Stream Alluvium is present beneath the fill explored to a depth of 27 feet below the ground surface. The stream alluvium consists predominantly of dark brown to dark gray sand with variable silt and gravel. Based on gradation results, the alluvium sand is classified as SP, SM, and SP-SM in accordance with USCS. The alluvium sand is considered loose to very loose and damp to saturated.

The sand is interlayered with variable but significant seams of organic silt. The silt seams range from 0.5 to 4 feet in thickness and are described as dark brown to black organic silt with trace sand and wood pieces. Silt seams were observed at a depth range of 5.5 to 9 feet in boring B-2, and a noteable layer of silt was encountered at a depth of range of 23 to 26 feet in both borings. Based on Atterberg Limit results, the silt classifies as OL and OH in accordance with USCS. The alluvium silt is considered soft to very loose and saturated.

3.2 Bedrock

Refusal on bedrock was encountered in boring B-1 at depth of 70.7 feet. Mapping by the Maine Geological Survey indicates bedrock at the site is part of the Megunticook Formation, consisting metamorphic schist and granulite.

3.3 Groundwater

Groundwater was measured at a depth range of 2 to 5 feet in the test borings. Moisture content of the soils indicates the water is present in native alluvium deposit at or near the elevation of the adjacent stream. Due to the close proximity to the streambed, we anticipate groundwater will fluctuate during wet and dry periods.



4.0 Geotechnical Design Recommendations

We anticipate the culvert will be constructed on crushed stone overlying stream alluvium sand and silt. The native soils are considered susceptible to disturbance and settlement. Based on this, the subgrade beneath culvert footings will require stabilization and care during excavation.

To support the culvert structure, we recommend strip footings be used beneath the precast concrete abutments. Foundations should be proportioned using a factored bearing resistance in accordance with AASHTO LRFD Bridge Design Specifications defined as $q_R = \phi_b q_n$ where:

- Nominal Bearing Resistance = q_n
- Resistance Factor = φ_b (0.45)
- Factored Bearing Resistance = q_R



Bearing Resistance - Strength Limit State

¹⁴⁵ Lisbon Street (PO Box 7216) Lewiston, Maine 04243 | (207) 576-3313 173 Pleasant Street Rockland, Maine 04841 | (207) 318-7761 www.summitgeoeng.com



As shown in the graph above, total settlement is estimated to range from 1.5 to 3 inches for footings upon native alluvium soils. Calculation for total settlement includes elastic settlement of loose native sand and consolidation settlement of organic silt layers. Elastic settlement will occur relatively rapidly upon placement of the soil backfill up to roadway grade. Consolidation settlement of the silt will occur over an extended time while the structure is in service. Differential settlement is estimated at 1 inch or less. This differential settlement is considered within an acceptable limit provided by AASHTO LRFD Bridge Design Specifications for short bridge structures.

Computations for bearing capacity and settlement are based on soil parameters obtained from the geotechnical investigation and limited by the the following conditions:

- The subgrade beneath culvert footings is over excavated and replaced with 12 inches of Crushed Stone wrapped in geotextile fabric such as Mirafi Polypropylene 500X or equivalent.
- If significant layers of organic silt and/or pockets of organics or wood are encountered at the base of excavations for the new culvert (beyond the 12-inch over excavation), they should be removed to a depth where native sand is encountered and replaced with Crushed Stone.
- The culvert structure is backfilled with Foundation Backfill as specified in Section 5.0. Foundation Backfill should be compacted to 95% of its maximum dry density in accordance with ASTM D1557.

The following soil parameters can be used for design of culvert foundations:

Foundation Backfill

- Active Earth Pressure Coefficient (K_A): 0.28
- At Rest Earth Pressure Coefficient (K₀): 0.44
- Passive Earth Pressure Coefficient (K_p): 3.54
- Total Unit Weight (γt): 125 pcf
- Effective Friction Angle (ϕ'): 34°

Crushed Stone

- Total Unit Weight (γ_t): 110 pcf
- Mass Concrete/Soil Friction Coefficient (f_c): 0.60

Summit Geoengineering Services, Inc. (SGS) should be made available to adjust computations for bearing capacity once design reaction loads are provided. Additional recommendations may be provided at that time as deemed appropriate.



5.0 Backfill Material Recommendations

We recommend the culvert structure be backfilled with Foundation Backfill. Foundation Backfill should be compacted to a minimum of 95 percent of its maximum dry density, determined in accordance with ASTM D1557. Foundation Backfill should consist of sand or gravel of hard durable particles free from organic matter, lumps or balls of clay, frozen material, and other deleterious substances. The portion passing a 3 inch sieve shall meet the following gradation requirements:

FOUNDATION BACKFILL							
Sieve Size Percent Passing							
½ inch	35-80						
¼ inch	25-65						
No. 40	0-30						
No. 200	0-7						

Reference: MDOT Specification 703.06, Type D

Foundation Backfill should be placed in maximum 12-inch lifts and compacted to a minimum of 95 percent of its maximum dry density, determined in accordance with ASTM D1557. Based on visual classification, the existing fill may be suitable for reuse. Material testing should be conducted to see if the existing fill conforms to specifications for Foundation Backfill prior to reuse.

Crushed Stone used to stabilize culvert subgrade should be tamped to lock the stone structure together. Crushed Stone should have a maximum particle size limited to 3 inches and meet the following:

CRUSHED STONE								
Sieve Size	Percent finer							
3 inch	100							
¾ inch	60 to 90							
½ inch	10 to 35							
3/8 inch	2 to 15							
No. 4	0 to 5							

Reference: MDOT Specification 703.12, Crushed Stone

6.0 Earthwork Considerations

The existing culvert, pockets of organics or wood, and/or boulders encountered in excavations for the new culvert should be removed prior to constructing new footings. Any voids created from this process should be replaced with Crushed Stone. The native soils are considered



susceptible to disturbance during excavation. Care should be taken during excavation to prevent disturbance; including keeping excavations dewatered, using a smooth edge bucket where applicable, and not overworking native soils. Where disturbed or softened, the subgrade should be over-excavated and replaced with Crushed Stone, as necessary.

Based on observed groundwater in the explorations, dewatering will be required for excavations extending approximately 2 to 5 feet below existing grade (near existing stream). Temporary diversion of the stream using methods such as a cofferdam and re-routing may be required during construction. Stream diversion should be sufficient to control stream water from entering excavations. If necessary, dewatering may consist of shallow sumps installed at the base of the excavation to ensure excavations remain free from standing water. Surface water (rain or snowmelt) should be diverted using cut-off trenching, sandbags, sloping, or other suitable method to adequately prevent surface water flow from entering the excavation.

General excavations below 4 feet should be sloped no greater than 1.5H:1V (OSHA Type C soil) in existing & imported fill, native soils, and/or below groundwater. This slope is based on the current OSHA Excavation Guidelines.

7.0 Closure

Our recommendations are based on professional judgment, generally accepted principles of geotechnical engineering, and project information provided by others. Some changes in subsurface conditions from those presented in this report may occur. Should these conditions differ materially from those described in this report, SGS should be notified so that we can re-evaluate our recommendations.

It is recommended that this report be made available in its entirety to contractors for informational purposes and be incorporated in the construction Contract Documents. We recommend that SGS be retained to review final construction documents relevant to the recommendations in this report.

We appreciate the opportunity to serve you during this phase of your project. If there are any questions or additional information is required, please do not hesitate to call.

APPENDIX A

SITE LOCATION MAP TEST PIT LOCATION PLAN GEOLOGIC MAPS











APPENDIX B BORING LOGS

~				SOIL BORI	NG LOG	Boring #: B-1						
		SIIM	MIT			Project:	Hosmer Pond Br	ook Culvert Replacement	Project #: 19201			
		GEOENGINEERI	NG SERVICES			Location:	Ragged Mtn Re	creational Area Entrance	Sheet:	1 of 3		
Drilling (`o.	Summit Cooon	aincoring. In	c		City, State: Poring Elevation	Camden, Maine	217 유 1/	спка ру:	ELS		
Driller:	.0.	C. Coolidae. P.	.F.	ι.		Reference:	Hosmer Pond B	rook - Stream Crossing Re	placement Sketch Pla	an by Gartley & Dorsky		
Summit	Staff:	S. Anderson, E	.I.			Date started:	6/20/2019	Date Completed:	6/20/2019			
DR	ILLING	METHOD	S	AMPLER				ESTIMATED GROUND W/	ATER DEPTH			
Vehicle:		Truck	Length:	24" SS		Date	Depth	Elevation	Re	ference		
Model:		9630 PRO	Diameter:	2"OD/1.5"	'ID	6/20/2019	3.6 ft	213.4 ft	Measured in boreho	le prior to rotary wash		
Method:	3" (Casing w/ wash	Hammer:	140 lb	-oc	6/20/2019	3.8 ft	213.2 ft	Measured in boreho	le end of test		
Hammer Donth	Style:	Auto	Method:	ASTM D15	500 Elov		SAMDI	E	Coological/	Coological		
(ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	(ft.)					Stratum		
(-)	S-1	24/16	0-2	20	(-)	Bituminous Pav	ement 2.5" Thic	kness		PAVEMENT		
1		-		12		Brown SAND, lit	ttle Silt & Gravel	, compact, humid, SP-SM		0.2'		
_				7						FILL		
2_				8	-							
2	S-2	24/16	2-4	10		Same as above	, compact, damp	, SP-SM				
3	-			10	1							
4				8	1				Water at 3.8'			
· ·				-						4'+/-		
5]					STREAM ALLUVIUM		
	S-3	24/18	5-7	4		Dark brown Sar	ndy GRAVEL, sor	ne Silt, loose, wet, GM				
6				7								
7				2								
·	S-4	24/4	7-9	1		Dark brown Gra	Dark brown Gravelly course SAND to Sandy GRAVEL.					
8	• •	= ., .		WOH		little Silt, loose,	wet, SP-SM to 0	SP-GM				
-				1								
9				WOH								
10_	C F	24/2	10.12	2				un val little te tuese Cilt		10' . /		
11	5-5	24/3	10-12	3	-	Dark gray coars	Se SAND, little GI	ravel, little to trace Slit,		10 +/-		
				3		1003C, WCC, SI	511 (0 51					
12				3								
_												
13												
14												
14_												
15												
	S-6	24/4	15-17	1		Dark gray medi	um-coarse SANE), trace Silt, loose, wet, SP				
16				1								
	L			1								
1/_				2	-							
18					1							
	1				1							
19					1							
l					l							
20	67	24/4	20.22	0		Davis average "						
21	5-7	24/4	20-22	9 2		Dark gray medi	um-coarse SANL	, inthe Graver, little Silt,				
²¹ -				WOH	1	Saturated, 10056	ויוט וט ו					
22				1	1							
I [–]]							
				04 F	L							
Granula Blows/ft	ar Soils	Cohesiv Blows /ft	e Soils	% Comp	osition	NOTES:	PP = Pocket Pene	trometer, MC = Moisture Con	tent Wang Tort	Soil Moisture Condition		
0-4	V. Loose	<2	V. soft	ASTIND	10/	1	בב – בוקטוט בווחול,	$r_1 - r_1asuc muex, rv = r_1er_0$		Humid: $S = 1 \text{ to } 25\%$		
5-10	Loose	2-4	Soft	< 5% T	Ггасе					Damp: S = 26 to 50%		
11-30	Compact	5-8	Firm	5-15%	Little					Moist: S = 51 to 75%		
31-50	Dense	9-15	Stiff	15-30%	Some					Wet: S = 76 to 99%		
>50	V. Dense	16-30	V. Stiff	> 30%	With	De Maria II		abbee dealers and a		Saturated: S = 100%		
		>30	Hard			Boulders = diame	eter > 12 inches, C	opples = diameter < 12 inche	es and > 3 inches			
						uavel = < 3 inch	1 anu > 110 4, Sano	u – < 110 4 and >110 200, Silt,	udy = < 110 200			

~					SOIL BORI	NG LOG	Boring #:	B-1				
		SIIM	MIT			Project: Hosmer Pond Brook Culvert Replacement			Project #:	19201		
		GEOENGINEERI	NG SERVICES			Location:	Ragged Mtn Red	creational Area Entrance	Sheet:	2 of 3		
Drilling (<u>`o'</u>	Summit Geoen	aineering In	-		City, State: Boring Elevation		217 ft ⊥/-	Cliku Dy:	ELS		
Driller:	.0.	C. Coolidae, P.	E.			Reference: Hosmer Pond Brook - Stream Crossing Replacement Sketch Plan by Gartley & Dorsky						
Summit	Staff:	S. Anderson, E	.I.			Date started: 6/20/2019 Date Completed: 6/20/2019						
DF	RILLING	METHOD	S	AMPLER		ESTIMATED GROUND WATER DEPTH						
Vehicle:		Truck	Length:	24" SS		Date	Depth	Elevation	Re	ference		
Model:	2" (9630 PRO	Diameter:	2"OD/1.5"	ID	6/20/2019	3.6 ft	213.4 ft	Measured in boreho	e prior to rotary wash		
Hammer	Style	Auto	Method:	ASTM D15	86	6/20/2019 5.8 It 215.2 It			Measured III Doreno			
Depth	01,101	71410	. localoui		Elev.		SAMPL	E	Geological/	Geological		
(ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	(ft.)		DESCRIPT	TION	Test Data	Stratum		
23						Change from a				STREAM ALLUVIUM		
24						change from sa	ind to slit at 23 4	-/-		23 +/-		
-''-												
25					1							
	S-8	24/19	25-27	1		Dark gray Orga	nic SILT, trace S	and, wood fibers,	PP = 1,000 psf			
26				WOH 1		saturated, very	soft, UL		MC = 50.8%			
27				1								
-	Roc	l blows per fo	ot with ham	mer ↓	1							
28				1	1	Probe beginning	g at 27' using sp	ear tip on probe rods.				
				4		Advanced with	blows from SPT	hammer.				
29												
30				3								
				4								
31				4								
22				5								
32_												
33				6								
				12								
34				12								
25				16								
36				14								
-				10								
37				10								
28				9								
50												
39				9								
				14]							
40												
41				12								
				11	1							
42				11								
42				9								
43					{							
44				9								
1				14	1							
				14				-				
Granula Blowc/ft	ar Soils	Cohesiv Blowc/ft	e Soils	% Comp	osition	NOTES:	PP = Pocket Pene	trometer, MC = Moisture Cont PI = Plastic Index FV = Field	tent Vane Test	Soil Moisture Condition		
0-4	V. Loose	<2	V, soft	ASTML	/07⊐/	1	LL – LIQUIO LIMIT,	ri – Flasuc Illuex, FV = Fleld		Humid: $S = 1 \text{ to } 25\%$		
5-10	Loose	2-4	Soft	< 5%]	Frace					Damp: $S = 26$ to 50%		
11-30	Compac	5-8	Firm	5-15%	Little					Moist: S = 51 to 75%		
31-50	Dense	9-15	Stiff	15-30%	Some					Wet: S = 76 to 99%		
>50	v. Dense	16-30	V. Stiff Hard	> 30%	with	Boulders – diama	ter > 12 inchos C	obbles = diameter < 12 incha	s and > 3 inchos	Saturated: $S = 100\%$		
		~50	i la ŭ			Gravel = < 3 inch	and > No 4, Sand	$I = \langle No 4 and \rangle No 200, Silt/$	Clay = < No 200			

						9	SOIL BORI	NG LOG	Boring #:	B-1
		SIM	MIT			Project:	losmer Pond Bro	ook Culvert Replacement	Project #:	19201
		GEOENGINEERI	NG SERVICES			Location:	Ragged Mtn Re	creational Area Entrance	Sheet:	3 of 3
		GEOENGINEERI	NG SERVICES			City, State:	Camden, Maine		Chkd by:	ELS
Drilling (Co:	Summit Geoer	ngineering, Ir	nc.		Boring Elevatio	n:	217 ft +/-		
Driller: C. Coolidge, P.E.						Reference:	Hosmer Pond B	rook - Stream Crossing Re	eplacement Sketch P	lan by Gartley & Dorsky
Summit Stall: S. Anderson, E.I.						Date started.	0/20/2019			
Vehicle	ILLING	Truck	Length:	24" SS		Date	Denth	Flevation	Ref	ference
Model:		9630 PRO	Diameter:	2"OD/1.5"	'ID	6/20/2019	3.6 ft	213.4 ft	Measured in boreho	le prior to rotary wash
Method:	3" C	asing w/ wash	Hammer:	140 lb		6/20/2019	3.8 ft	213.2 ft	Measured in boreho	le end of test
Hammer	Style:	Auto	Method:	ASTM D15	586					
Depth					Elev.		SAMPL	.E	Geological/	Geological
(ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	(ft.)		DESCRIP	TION	Test Data	Stratum
45	45 Bod blows per foot with hammer 1			Probe using sp	ear tin on nrohe	rods advanced		STREAM ALLUVIUM		
	Kou					with blows from	n SPT hammer.			STREAM ALLOVION
46				15						
-				12	Ì					
47				15						
10	-			11						
48_					ł					
49				12						
				12	ł					
50				13						
				13						
51					ł					
52				12						
				15						
53				15						
				13						
54					ł					
55				13						
				15	ł					
56				15						
				16						
5/_					ł					
58				15						
-				10	İ					
59				10	ļ					
60				21						
00										
61	<u> </u>			20						
-				17	1	Depth	Rod blows			
62				1/	ļ	67	per foot \downarrow			
63				18		68	24			
0.5					ł	1	27			
64				23		69	31			
				26	Ĩ					
65					ļ	70	60			
66				25	/	71	100/8"			
	1			20	/		Re	efusal on Bedrock at 70.7		70.7'
				20						BEDROCK
Granula	Granular Soils Cohesive Soils %		% Comp	osition	NOTES: PP = Pocket Penetrometer, MC = Moisture Content				Soil Moisture Condition	
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D	02487		LL = Liquid Limit,	P1 = Plastic Index, FV = Fiel	a vane Test	Dry: $S = 0\%$
0-4 5-10	v. LUOSE	<2 7-4	v. sort Soft	< 5%	Frace					Damp: $S = 1 to 25\%$
11-30	Compart	<u>∠</u> -¬ 5-8	Firm	5-15%	Little					Moist: $S = 51$ to 75%
31-50	Dense	9-15	Stiff	15-30%	Some					Wet: $S = 76 \text{ to } 99\%$
>50	V. Dense	16-30	V. Stiff	> 30%	With					Saturated: S = 100%
		>30	Hard			Boulders = diam	eter > 12 inches,	Cobbles = diameter < 12 inc	hes and > 3 inches	
						Gravel = < 3 inc				

~						9	SOIL BORI	NG LOG	Boring #:	B-2	
SUMMIT						Project: Iosmer Pond Brook Culvert Replacement			Project #:	19201	
GEOENGINEERING SERVICES				Location: Ragged Mtn Recreational Area Entrance Sheet:			Sheet:	1 of 2			
		GEOENGINEERI	NO SERVICES			City, State:	Camden, Maine		Chkd by:	ELS	
Drilling Co: Summit Geoengineering, Inc.						Boring Elevation: 217 ft +/-					
Driller: C. Coolidge, P.E.				Reference:	Hosmer Pond B	rook - Stream Crossing Re	eplacement Sketch F	'lan by Gartley & Dorsky			
Summit Staff: S. Anderson, E.I.				Date started:	6/20/2019		6/20/2019				
DRILLING METHOD SAMPLER			Date	Denth	ESTIMATED GROUND W		ference				
Model·		9630 PRO	Diameter:	24 33 2"00/1 5"	'חז	6/20/2019	5 ft	212 ft +/-	Observed moisture	content	
Method: 3" (asing w/ wash Hammer:		140 lb		6/20/2019	2 ft	212 ft +/-	Measured in open h	leasured in open borehole, end of day	
Hammer Style:		Auto	to Method: ASTM D1586			0,20,2015	210	215 10 17			
Depth	T Ó				Elev.		SAMPL	E	Geological/	Geological	
(ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	(ft.)		DESCRIP	TION	Test Data	Stratum	
	SP-1	24/16	0-2	PUSH		Bituminous Pav	ement 12" Thicl	kness		PAVEMENT	
1				PUSH							
				PUSH	ļ	Brown SAND, li	ttle Silt and Grav	vel, compact, damp		1'	
2_				PUSH	ļ	to moist, SP-SN	1		Mater - + 21	FILL	
2					ł	Cobble at 2.5'			Water at 2		
3	+					Loope at 2.5					
4					ł		based on drilling	gresistance		STRFAM ALLUVIUM	
· ·	1				ł					STREAT ALLOVION	
5					ł	Dark brown me	dium-coarse SA	ND, some Silt, trace			
-	S-1	24/24	5-7	1	t	organics, loose	organics, loose, saturated, SM				
6				WOH]	Dark brown Org	Dark brown Organic SILT, some to little wood pieces,			5.5'	
				1	I	soft, wet, OH			LL = 69		
7				WOH	ļ	L			PI = 30		
0	S-2	24/24	7-9	2	ł	Dark olive brow	n medium-fine	SAND, some Silt, trace	Gravel = 0.4%	7'	
8	-			1	ł	Gravel, loose to	o very loose, sati	urated, SM	Sand = 80.8%		
0				1	ł				MC = 30.6%		
5				2	ł	Dark olive grav	Organic SILT v	vood nieces soft wet OH	110 - 39.070	8 5'	
10	-				ł	Burk onve gruy			Gravel = 4%	9'	
	S-3	24/16	10-12	2	ł	Dark gray fine	SAND, some Silt	, trace Gravel, organics,	Sand = 72%	-	
11				1	ł	& wood, loose,	wet, SM	, , , ,	Fines $= 24\%$		
-				3	1				MC =24.5%		
12				2	Ι	Dark gray coars	se SAND, little S	ilt, wet, loose, SP-SM		11.5'	
					ļ						
13					ļ						
14					ļ						
14					ł						
15					ł						
15	S-4	24/7	15-17	1	ł	Dark grav med	ium SAND, trace	silt. saturated. loose. SP			
16		= ., ,	10 17	WOH	ł	Dani gia, mea	Dark gray medium SAND, trace sit, saturated, 100se, SP				
-				1	t						
17	WOH				Ι						
18					ļ						
10					ł						
19					ł						
20					ł						
20	S-5	24/8	20-22	2	ł	Dark grav med	ium-coarse SANI	D. trace Silt and Gravel			
21		21/0		1	ł	very loose. wet	, SP				
I -			1	2	1	,,					
22				3	1						
					ļ						
Granul	ranular Soils Cohesive Soils % Composition		NOTES: PP = Pocket Penetrometer, MC = Moisture Content				Soil Moisture Condition				
Blows/ft	Density	Blows/ft.	Consistency	ASTM D	02487	-	LL = Liquid Limit,	PI = Plastic Index, FV = Fiel	d Vane Test	Dry: $S = 0\%$	
U-4	V. Loose <2 V. soft						Humid: $S = 1$ to 25%				
5-10 11_20	LUOSE	2-4 5-8	SOIT	< 5% 5_150/	Little					Damp: $S = 26 \text{ to } 50\%$ Moist: $S = 51 \text{ to } 75\%$	
31-50	Dense	9-15	Stiff	15-30%	Some					Wet: $S = 76 \text{ to } 99\%$	
>50	-50 V. Dense 16-30 V. Stiff > 30% With								Saturated: $S = 100\%$		
>30 Hard B					-	Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches					
						Gravel = < 3 inch and $> No 4$, Sand = $< No 4$ and $> No 200$, Silt/Clay = $< No 200$					
		~				5	SOIL BORI	NG LOG	Boring #:	B-2	
-----------------------	----------	----------------	-----------------	-----------	------------	-------------------	----------------------	--	----------------------	--	
		SILM	MIT			Project:	Hosmer Pond B	rook Culvert Replacement	Project #:	19201	
		GEOENGINEERI	NG SERVICES			Location:	Ragged Mtn Reg	creational Area Entrance	Sheet:	2 of 2	
Duillin a. C		Commit Comm	T	_		City, State:	Camden, Maine	217 6 . /	Chkd by:	ELS	
Drilling C Driller	.0:	C Coolidge P	igineering, Inc			Boring Elevation	1: Hosmer Pond Bi	21/ TC +/- rook - Stream Crossing Re	nlacement Sketch Pla	n hv Gartlev & Dorsky	
Summit S	Staff:	S. Anderson, E				Date started:	6/20/2019	Date Completed:	6/20/2019	in by duricy & borsky	
DR	ILLING	METHOD	SA	AMPLER				ESTIMATED GROUND W	ATER DEPTH		
Vehicle:		Truck	Length:	24" SS		Date	Depth	Elevation	Re	ference	
Model:		9630 PRO	Diameter:	2"OD/1.5"	ID	6/20/2019	5 ft	212 ft +/-	Observed moisture	content	
Method:	3" (Casing w/ wash	Hammer:	140 lb	00	6/20/2019	2 ft	215 ft +/-	Measured in open be	orehole, end of day	
Hammer Depth	Style:	Auto	Method:	ASTM DIS	80 Flov		SAMDI		Geological/	Geological	
(ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	(ft.)		DESCRIP	LE FION	Test Data	Stratum	
		,			. ,						
23										STREAM ALLUVIUM	
24											
25	-										
	S-6	24/19	25-27	1		Dark grav to bla	ack Silty SAND. f	requent wood pieces.			
26				1		very loose, satu	irated, SM				
-				1		Dark gray to bla	ack Organic SILT	, trace Sand, wood fibers,	PP = 1,000 psf	26'+/-	
27				1		soft, wet, OL			MC = 68.1%		
20									LL = 47		
28						End of Explorat	ion at 27' No Re	fucal	PI = 7	27'	
29										27	
_											
30											
24											
31											
32											
33											
34											
35											
36											
3/											
38											
-											
39											
40											
40											
41											
-											
42											
42											
43											
44											
-											
Granula	ar Soils	Cohesiv	e Soils	% Comp	osition	NOTES:	PP = Pocket Pene	trometer, MC = Moisture Con	tent	Soil Moisture Condition	
BIOWS/ft.	V Loos	BIOWS/ft.	V soft	ASTM D	248/		LL = LIQUID LIMIT,	P1 = Plastic Index, FV = Field	i vane i est	Dry: $S = 0\%$ Humid: $S = 1 to 25\%$	
5-10	LOOSE	2-4	Soft	< 5% 1	race					Damp: S = 26 to 50%	
11-30	Compac	5-8	Firm	5-15%	Little					Moist: $S = 51$ to 75%	
31-50	Dense	9-15	Stiff	15-30%	Some					Wet: S = 76 to 99%	
>50	V. Dense	16-30	V. Stiff	> 30%	With					Saturated: S = 100%	
		>30	Hard			Boulders = diame	eter > 12 inches, C	obbles = diameter < 12 inche	es and > 3 inches		
						Gravel = < 3 inch	and > No 4, Sand	$i = \langle No 4 and \rangle No 200, Silt/$	'Clay = < No 200		

APPENDIX C LABORATORY TESTING RESULTS



Laboratory Determination of Water (Moisture) Content of Soil ASTM D2216

PROJECT NAME:	Culvert Replacement	PROJECT #:	19201
PROJECT LOCATION:	Hosmer Pond Brook, Camden, Maine	DRYING METHOD:	Oven Dried
CLIENT:	Gartley & Dorsky Engineering & Surveying	DESCRIPTION:	Stream Alluvium
SOURCE:	Test Borings	TECHNICIAN:	Colleen Sullivan
COLLECTION DATE:	06/20/19	TESTING DATE:	06/24/19

Location	Sample No.	<u>Depth</u>	Moisture Content	Remarks
B-1	S-8	25' - 27'	50.8%	Clayey SILT, little Organics
B-2	S-1a	5' - 5.5'	39.9%	Silty SAND, trace Organics
B-2	S-1b	5.5' - 7'	71.3%	Organic SILT
B-2	S-2	7' - 9'	39.6%	SAND, some Silt
B-2	S-3	10' - 12'	24.5%	SAND, some Silt
B-2	S-6	26' - 27'	68.1%	Organic SILT

REMARKS:



ATTERBERG LIMIT TEST - ASTM D4318

Method "A" (Multi-point)

PROJECT NAME:	Culvert Replacement	PROJECT NUMBER:	19201
CLIENT:	Gartley & Dorsky Engineering & Surveying	SAMPLE NUMBER:	S-1
SOURCE:	B-2	DEPTH:	5.5' - 7'
TEST DATE:	6/24/2019	TECHNICIAN:	Colleen Sullivan

DATA

Source	Depth	LL	PL	PI	Classification
B-2	5.5' - 7'	69	39	30	Dark brown Organic SILT, trace fine
					Sand, wood pieces, OH



Notes: Moisture Content = 71.3%



ATTERBERG LIMIT TEST - ASTM D4318

Method "A" (Multi-point)

PROJECT NAME:	Culvert Replacement	PROJECT NUMBER:	19201
CLIENT:	Gartley & Dorsky Engineering & Surveying	SAMPLE NUMBER:	S-6
SOURCE:	B-2	DEPTH:	26' - 27'
TEST DATE:	6/24/2019	TECHNICIAN:	Colleen Sullivan

DATA

Source	Depth	LL	PL	PI	Classification
B-2	26' - 27'	47	40	7	Dark gray to black Organic SILT, trace
					Sand, wood fibers, OL



Notes: Moisture Content = 68.1%



GRAIN SIZE ANALYSIS - ASTM D6913

PROJECT NAME:	Culvert Replacement	PROJECT #:	19201
PROJECT LOCATION:	Hosmer Pond Brook, Camden, Maine	EXPLORATION #:	B-2
CLIENT:	Gartley & Dorsky Engineering & Surveying	SAMPLE #:	S-2
TECHNICIAN:	Colleen Sullivan	SAMPLE DEPTH:	7' - 8.5'
SOIL DESCRIPTION:	Medium to fine SAND, some Silt, trace Gravel, SM	TEST DATE:	6/24/2019

TEST PROCEDURE

Sample Source: Split Spoon	Sieve Stack: Single	Specimen Procedure: Moist
Test Method: Method B	Separating Sieve(s): N/A	Dispersion Type: Tap Water

STANDARD SIEVE DESIGNATION (mm)	ALTERNATIVE SIEVE DESIGNATION (in)	PERCENT PASSING (%)
75	(3 in)	100.0
50	(2 in)	100.0
37.5	(1-1/2 in)	100.0
25.0	(1 in)	100.0
19.0	(3/4 in)	100.0
12.7	(1/2 in)	100.0
9.5	(3/8 in)	100.0
6.35	(1/4 in)	100.0
4.75	(No. 4)	99.6
2.00	(No. 10)	92.7
0.850	(No. 20)	66.2
0.425	(No. 40)	45.8
0.250	(No. 60)	35.9
0.150	(No. 100)	27.7
0.106	(No. 140)	23.1
0.075	(No. 200)	18.8

DATA





145 Lisbon Street (PO Box 7216) Lewiston, Maine (207) 576-3313 173 Pleasant Street, Rockland, Maine 04841, (207) 318-7761



GRAIN SIZE ANALYSIS - ASTM D6913

PROJECT NAME:	Culvert Replacement	PROJECT #:	19201
PROJECT LOCATION:	Hosmer Pond Brook, Camden, Maine	EXPLORATION #:	B-2
CLIENT:	Gartley & Dorsky Engineering & Surveying	SAMPLE #:	S-3
TECHNICIAN:	Colleen Sullivan	SAMPLE DEPTH:	10' - 12'
SOIL DESCRIPTION:	Fine SAND, some Silt, trace Gravel, SM	TEST DATE:	6/24/2019

TEST PROCEDURE

Sample Source: Split Spoon	Sieve Stack: Single	Specimen Procedure: Moist
Test Method: Method A	Separating Sieve(s): N/A	Dispersion Type: Tap Water

STANDARD SIEVE DESIGNATION (mm)	ALTERNATIVE SIEVE DESIGNATION (in)	PERCENT PASSING (%)
75	(3 in)	100
50	(2 in)	100
37.5	(1-1/2 in)	100
25.0	(1 in)	100
19.0	(3/4 in)	100
12.7	(1/2 in)	100
9.5	(3/8 in)	100
6.35	(1/4 in)	98
4.75	(No. 4)	96
2.00	(No. 10)	91
0.850	(No. 20)	83
0.425	(No. 40)	72
0.250	(No. 60)	55
0.150	(No. 100)	37
0.106	(No. 140)	29
0.075	(No. 200)	24

DATA



REMARKS: Moisture Content = 24.5%.

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