

RABBIT FARM RFP DOCUMENTS

Electronic documents are provided at no charge by downloading them at www.union.maine.gov

Hard copies are available at the Union Town Office for a \$15.00 fee

INSTRUCTIONS TO BIDDERS

1. General Information

1.1. The project Owner is:

Town of Union 567 Common Road

P.O. Box 186 Union, Maine 04862 (207) 785-3658

(207) 785-3652 FAX

Town Manager: Jay Feyler jayunion@roadrunner.com

1.2. The project Engineer is:

Landmark Corporation Surveyors & Engineers 219 Meadow Street

Rockport, ME 04856

**** RFP ,Bids and Proposal are synonymous in this contract**

1.3. A Bidder is a Contractor who is qualified and submits a bid on the proposed project described in the Bid Documents. The Successful Bidder is the qualified Bidder selected by the Owner to perform the Work.

1.4. Each bidder is responsible for becoming thoroughly familiar with the Bid Documents.

2. Submitting Bid and Bid Requirements

2.1. Your firm is invited to submit an offer under seal to the Town of Union before 11:00 A.M. on Tuesday, May 24, 2016. Submit two copies of the executed offer on the Bid Forms provided, signed and sealed in a closed opaque envelope clearly marked:

RABBIT FARM ROAD REHABILITATION

Not to be opened until TUESDAY, May 24, 2016

2.2. To be considered a responsive Bidder, the Contractor shall have obtained at least one set of paper plans and specifications from the Town under the name of which they shall send a Proposal

2.3. Bids must be signed by an authorized officer of the company and sealed with the company's seal.

2.4. Your offer will be required to be submitted under a condition of irrevocability for a period of 60 days after submission.

2.5. The Town of Union reserves the right to accept or reject any or all offers.

2.6. Bids that are unsigned, improperly signed or sealed, conditional, illegible, obscure, contain arithmetical errors, erasures, alterations, or irregularities of any kind, may at the discretion of the Owner, be declared unacceptable.

2.7. Bid Forms, Appendices, and enclosures which are improperly prepared may, at the discretion of the Owner, be declared unacceptable.

3. Pre-Bid Conference

3.1. A Mandatory Pre-Bid Conference is scheduled at the site – Rabbit Farm Road, Clarry Hill intersection in Union, Maine – at 9:30 AM on Tuesday, May 17th, 2016.

3.2. Representatives of the Owner and Engineer will be in attendance at the Pre-Bid Conference.

4. Availability

4.1. Bid documents are available from the Union Town Office 567 Common Road, Union, Maine 04862 – or online at www.union.maine.gov Hard copies of Plans are available directly from the town for a \$15 reproduction fee.

4.2. Bid documents are made available only for the purpose of obtaining offers for this project. Their use does not grant a license for other purposes.

5. Inquiries/Addenda

5.1. Direct questions in writing (email, Fax, mail, or hand-delivered) to the Town of Union

5.2. Addenda may be issued during the bidding period. All issued Addenda will become part of the Contract Documents and resultant costs shall be included in the Bid Amount.

5.3. Verbal answers are not binding on any party.

5.4. Clarifications/questions requested by bidders must be in writing to the Town.

6. Product/Assembly/System Substitutions

6.1. Where the Bid Documents stipulate a particular product, functional equivalents will be considered.

6.2. In order for functional equivalents to be considered, the contractor shall provide sufficient information to determine that any proposed substitution is a functional equivalent of the specified product.

7. Qualifications

7.1. Evidence of Qualifications

7.1.1. To demonstrate qualification for performing the Work of this Contract, bidders shall submit their experience and qualifications in performing this type of work. This statement of qualifications shall include those of key subcontractors, if used.

7.2. Bonding & Insurance

7.2.1. The Successful Bidder shall procure and maintain, at its expense, the following minimum insurance coverage, to provide protection from its errors or omissions, claims under worker's compensation acts, claims for damages because of bodily injury including personal injury, sickness or disease or death of any and all employees, and from claims or damages because of injury to or destruction of property including loss of use resulting there from, which may arise from the performance of services here under. The minimum amounts of coverage are:

Type of Insurance	Each Occurrence	Aggregate
Errors & Omissions	\$ 1,000,000	
General Liability – Combined Bodily Injury and Property Damage	\$ 1,000,000	\$2,000,000
Automobile Liability – Combined Bodily Injury and Property Damage	\$ 1,000,000	
Worker's Compensation & Employer's Liability	\$ 500,000 (Each Accident)	
	\$ 500,000 (Disease Policy Limit)	
	\$ 500,000 (Disease Each Employee)	

The Successful Bidder shall furnish the Owner with a certificate or certificates of insurance that list the Owner as an **ADDITIONAL INSURED** and contains a statement of the insurer's obligation to notify the

Owner at least fifteen (15) days prior to cancellation of any policy described therein. In the event the Owner is required to defend itself, the Successful Bidder shall reimburse the Owner's costs, including reasonable attorneys' fees, for defense of such liabilities which arise out of the Contractor's negligence. In any claim which may arise as a result of intentional or negligent acts or omissions of the Contractor, the comprehensive general liability insurance provided by Contractor shall be deemed primary protection against such claims and the Owner shall not be called upon to contribute to a loss otherwise payable by the Contractor's insurer due to its insured's acts or omissions.

8. Contract Time

8.1. Perform the Work, inclusive of Substantial Completion as follows:

8.1.1. Award anticipated for May 24, 2016.

8.1.2. Pre-Construction Meeting required before at least one week before commencing project.

8.1.3. Start construction no earlier than May 31, 2016, and no later than September 1, 2016. Work shall be completed within four (4) weeks from start to finish.

8.2. The submitted bid shall be pursuant to the schedule provided above. The bidder may suggest a revision to the Contract Time with a specific adjustment to the Bid Amount.

9. Bid Acceptance / Rejection

9.1. Bids will be evaluated on the bid price and relevant experience and qualifications of the bidders.

9.2. The Town of Union reserves the right to accept or reject any or all offers. If awarded, the project will be awarded to the lowest, most responsive and responsible bidder.

- END OF SECTION -

SUMMARY

PART 1 GENERAL

1.1 PROJECT

- A. Project Name: Rabbit Farm Rehabilitation
- B. Owner's Name: Town of Union
- C. Engineer's Name: Landmark Corporation Surveyors & Engineers.

1.2 PROJECT DESCRIPTION

The Work is rehabilitation of Rabbit Farm Road in Union, Maine as according to the engineering by Landmark Engineering dated 5/5/2016. Included but not limited to the following:

A. Scope of Work

1. Surveying including before and after elevations
2. Placement of erosion control measures
3. Traffic control and safety during the project including flaggers and temporary safety barriers.
4. Excavate 3" of material on the majority of the road
5. Place fabric the entire length of the road as specified
6. Ditch the entire section, both sides of the road according to the engineering plans
7. Remove trees and stumps as needed.
8. Place rip rap on slopes and ditches as defined in plans
9. Excavate new and existing ditches to below road subgrade where possible. Safety and slope stability shall be considered.
10. Add 6" of material to the road as defined in the plans
11. Grade the final road to specifications in the plans and to ensure shoulders drain to roadside ditches
12. Install 2 culverts as directed, with rip rap protection, culverts will be supplied by the Town of Union
13. Install seed and mulch on disturbed areas.

1.3 OWNER OCCUPANCY

- A. The Town of Union requires that Rabbit Farm Road remain passable to vehicle traffic during construction. One lane must remain open at all times. The Contractor is responsible to provide traffic flaggers and maintain traffic.
- B. Work performed on private property not within the Town road right-of-way shall be coordinated via access and drainage easements and agreements with the land owners and the Town of Union. Work performed on private property shall be coordinated with the Town of Union.

1.4 CONTRACTOR USE OF SITE AND PREMISES

- A. Arrange use of site and premises to allow:
 - 1. Passage of vehicular and pedestrian traffic on Rabbit Farm Road
 - 2. Passage of vehicular and pedestrian traffic to driveways and private property.
 - 3. Work by Town of Union.
- B. Provide access to and from site as required by law and by the Town of Union:
 - 1. Do not obstruct existing roadways or driveways without first coordinating with the Owner.
- C. Utility Outages and Shutdown:
 - 1. No utility outages are anticipated, required, or allowed on this project.
 - 2. Prevent accidental disruption of utility services to other facilities.
- D. Property Usage and Damage:
 - 1. Storage and stockpiling of material and equipment must remain within the Town road right-of-way or offsite at a pre-approved location.
 - 2. Damage to Town or private property, including but not limited to pavement, structures or vegetation shall be repaired by the Contractor at the Contractor's expense prior to the date of completion and final payment.

- END OF SECTION -



**RABBIT FARM ROAD
AERIAL IMAGE EXHIBIT
UNION, MAINE**

DATE: MARCH 29, 2016

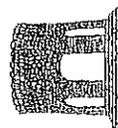
JOB No.: 16-008

SCALE: 1" = 200'

LANDMARK CORPORATION

SURVEYORS & ENGINEERS

PO BOX 51, MAINE 04866 PHONE: (207) 256-6757 WWW.LANDMARKCORP.COM



219 MEADOW STREET



BID FORM

RABBITT FARM ROAD REHABILITATION, UNION , MAINE

1.1 TO:

A. Town of Union Union Town Office 567 Common Road
P.O. Box 186 Union, Maine 04862

1.2 FOR:

A. North Union Road Bridge Embankment Repairs and Guardrail Replacement

1.3 DATE: (Bidder to enter date)

1.4 SUBMITTED BY: (Bidder to enter name and address)

A. Bidder's Full Name

1. Address

2. City, State, Zip

3. Telephone & Fax

4. Email Address

1.5 OFFER

A. Having examined the Place of the Work and all matters referred to in the Instructions to Bidders and the engineering design for the above mentioned project, we, the undersigned, hereby offer to enter into a Contract to perform the Work for the Prices listed in this bid form of:

B. Total Price:

dollars (\$) _____), in lawful money of the United States of America.

1.6 ACCEPTANCE

A. This offer shall be irrevocable for sixty days from the bid closing date.

B. Execution of the Draft Owner-Contractor Agreement will be in substantial conformance to the enclosed draft.

C. If this bid is accepted by the Town of Union within the time period stated in the Instructions to Bidders, we will:

1. Execute the Agreement within fourteen days of receipt of Notice of Award.

2. Commence work on an agreed upon date between, Owner, Bidder, and Engineer after written Notice to Proceed of this bid.

1.7 CONTRACT TIME

A. If this Bid is accepted, we will:

1. Mobilize and commence work on an agreed upon date between, Owner, Bidder, and Engineer by September 1, 2016.

2. Complete Work for Rabbit Farm Rehabilitation project by September 1, 2016.

1.8 CHANGES TO THE WORK

A. Changes to the work shall be in writing from the Town of Union and additional cost, if any, will be negotiated at the time of agreement

1.9 ADDENDA

A. The following Addenda have been received. The modifications to the Bid Documents noted below have been considered and all costs are included in the Bid Sum.

1. Addendum # Dated .

2. Addendum # Dated .

3. Addendum # Dated .

1.11 BID FORM SIGNATURE(S) BIDDERS SEAL

A. Bidder Name (print the full name of your firm)

B. Authorized Signing Officer (print name and title)

C. Authorized Signature

1.12 If the Bid is a joint venture or partnership, add additional forms of execution for each member of the joint venture in the appropriate form or forms as above.

- END OF SEC

**RABBIT FARM ROAD
REHABILITATION
DETAILS AND SPECIFICATIONS**



UNION, MAINE

MAY 5, 2016

Town of Union
567 Common Road
P.O. Box 186
Union, Maine 04862
Jay Feyler, Town Manager
Tel. 207-785-3658

Prepared By:



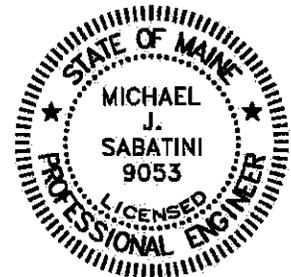
LANDMARK CORPORATION

SURVEYORS & ENGINEERS

219 MEADOW STREET ROCKPORT, MAINE 04856

PHONE: (207) 236-6757 FAX: (207) 470-7020

WWW.LANDMARKMAINE.COM



Michael J. Sabatini
5/5/16

**TOWN OF UNION
RABBIT FARM ROAD REHABILITATION**

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 - D8. Typical Gravel Road Section
 - D9. Typical Culvert Installation in Gravel Road Section

- III. SPECIFICATIONS
 - 01 10 00 Summary
 - 31 20 00 Earthwork
 - 31 25 00 Erosion and Sedimentation Controls
 - 31 32 19 Geotextile Fabric
 - 32 92 00 Turf and Grasses
 - 33 41 11 Site Storm Drainage Utility Piping

**TOWN OF UNION
RABBIT FARM ROAD REHABILITATION**

PROJECT DESCRIPTION

The Town of Union (Town) has decided to improve the condition of Rabbit Farm Road. The project includes rehabilitation of the gravel surface and drainage improvements to the road in anticipation of paving, from the intersection of Clarry Hill Lane to the Warren town line in Union, Maine. Landmark Corporation has provided the Town with the enclosed typical construction details and specifications to be utilized for the project. The Town will determine the limits of construction, prepare the Bid Documents, and administer the Bids.

The contractor is responsible for executing all work in the Bid Documents, including but not limited to the list below:

1. Traffic control and safety during the project including traffic flaggers and temporary safety barriers.
2. Placement of erosion control measures.
3. Demolition and removals, including clear and grub ditches and shoulders, stumps and tree removal, and excavation.
4. Install riprap channel protection and slope stabilization.
5. Install two new cross culverts with riprap apron protection.
6. Excavate new and existing ditches to below road subgrade where possible. Safety and slope stability shall be considered.
7. Regrade road shoulders to drain away or drain to roadside ditches.
8. Remove 3" of existing road surface material and regrade with center crown and 1/4" per foot cross slopes.
9. Install geotechnical fabric and 6" of new road surface aggregate.
10. Install seed and mulch on disturbed areas.

The Town may hold a pre-bid meeting for contractors to describe any proposed improvements not clearly identified in the typical details, such as location of stump and tree removals, riprap slope stabilization, and stormwater management improvements.

**TOWN OF UNION
RABBIT FARM ROAD REHABILITATION**

TYPICAL DETAILS

- D1. Erosion and Sedimentation Control Notes
- D2. General Notes / Aggregate and Borrow Notes
- D3. Silt Fence Detail
- D4. Erosion Control Filter Berm
- D5. Stone Check Dam
- D6. Typical Riprap Apron Detail
- D7. Typical Riprap Channel Protection and Slope Stabilization
- D8. Typical Gravel Road Section
- D9. Typical Culvert Installation in Gravel Road Section

EROSION & SEDIMENTATION CONTROL NOTES

IN ORDER TO PROTECT THE SOIL AND WATER RESOURCES OF THIS DEVELOPMENT AND ADJACENT LANDS, THE FOLLOWING ACTIONS WILL BE TAKEN:

A. EROSION CONTROL/TEMPORARY MEASURES

THE FOLLOWING TEMPORARY MEASURES TO CONTROL EROSION AND SEDIMENTATION SHALL BE USED.

1. SILT FENCE OR WOOD WASTE COMPOST/BARK FILTER BERM WILL BE INSTALLED AROUND THE LIMITS OF CLEARING ASSOCIATED WITH EACH PORTION OF THIS PROJECT. SILT FENCE SHALL REMAIN IN PLACE UNTIL ALL DISTURBED AREAS HAVE BEEN STABILIZED. SILT FENCING WILL BE INSTALLED TO SPECIFICATIONS OUTLINED IN THE MAINE EROSION AND SEDIMENTATION CONTROL HANDBOOK FOR CONSTRUCTION: BEST MANAGEMENT PRACTICES.
2. EACH GROUND AREA, OPENED OR EXPOSED, WHETHER DIRECTLY OR INDIRECTLY DUE TO THE PROJECT CONSTRUCTION, SHALL BE MINIMIZED AND SHALL BE STABILIZED WITHIN 15 DAYS OF THE INITIAL DISTURBANCE OF THE MINERAL SOIL, AND SHALL BE PERMANENTLY STABILIZED WITHIN 7 DAYS OF FINAL GRADING.
3. TEMPORARY SOIL STABILIZATION SHALL BE EITHER BY TEMPORARY MULCHING, TEMPORARY SEEDING, OR PERMANENT BASE GRAVEL, AS FOLLOWS:

TEMPORARY SEEDING

SEED SHALL BE AROOSTOOK RYE APPLIED AT 2.60#/1000SF. LIME SHALL BE AGRICULTURAL GROUND LIMESTONE APPLIED AT 138#/1000SF. FERTILIZER SHALL BE 10-10-10 CLASSIFICATION APPLIED AT 13.8#/1000SF. MULCH SHALL CONSIST OF HAY OR STRAW MULCH AND SPREAD EVENLY AT A RATE OF 70-90#/1000SF. TEMPORARY SEEDING SHALL ONLY BE MADE BETWEEN APRIL 15TH AND OCTOBER 15TH, AND SHALL NOT BE PLACED OVER SNOW. IF THE SEEDING IS NOT COMPLETED BY OCTOBER 15TH, ADDITIONAL MULCH WILL BE ADDED TO PROVIDE ADEQUATE WINTER PROTECTION.

TEMPORARY MULCHING

MULCH SHALL CONSIST OF CHOPPED HAY OR STRAW MULCH AND SPREAD BY MECHANICAL BLOWER, OR BY HAND IF ADJACENT TO WETLAND HABITAT, EVENLY AT A RATE OF 150-200#/1000 SF. TEMPORARY MULCH SHALL BE REMOVED PRIOR TO PERMANENT SOIL STABILIZATION. MULCH MUST NOT BE PLACED OVER SNOW.

PERMANENT BASE GRAVEL

COMPACTED BASE GRAVEL SHALL BE SUITABLE AS TEMPORARY SOIL STABILIZATION UNDER THE FOLLOWING CONDITIONS:

- A. SLOPES SHALL BE LESS THAN 5 PERCENT OR DESIGN GRADE
- B. GRAVEL SHALL MEET THE SPECIFICATIONS FOR BASE OR SUBBASE GRAVEL FOR THE RE-PAVED AREA.

B. EROSION CONTROL/PERMANENT LAWN SEEDING MEASURES

1. EXCESSIVELY STEEP SLOPES, 2:1 OR GREATER, SHALL BE PROTECTED BY EROSION CONTROL EXCELSIOR BLANKET WITH BIODEGRADABLE PLASTIC OR JUTE MESH AFTER SEEDING.
2. BULK TOPSOIL FOR ALL LAWN AREAS SHALL CONTAIN 75% SCREENED TOPSOIL AND 25% ORGANIC COMPOST. SOIL SHALL BE WELL BLENDED PRIOR TO INSTALLATION. ALL LAWN AREAS TO RECEIVE 4" TOPSOIL DEPTH.
3. PERMANENT SEEDING SHALL BE PERFORMED DURING CONSTRUCTION OPERATIONS AS EACH DISTURBED AREA HAS BEEN BROUGHT TO FINISH GRADE. ALL NEW GRASS AREAS SHALL BE SEED AT THE RATE OF (8 LBS/1000SF) WITH THE FOLLOWING MIXTURE: 35% CREEPING RED FESCUE, 35% KENTUCKY BLUEGRASS, 20% CHEWINGS FESCUE, 10% PERENNIAL RYEGRASS.

PRIOR TO SEEDING, APPLY (10/10/10) FERTILIZER AT A RATE OF (80 LBS/1000SF) MULCH ALL SEEDED AREAS WITH HAY AT A RATE OF 4 BALES PER 1000 SF. REMOVE MULCH WHEN GRASS IS 3" HIGH & RESEED ALL BARE SPOTS.

4. THE CONTRACTOR SHALL MAINTAIN THE SEEDED AND MULCHED AREAS UNTIL FINAL ACCEPTANCE OF THE WORK. MAINTENANCE SHALL CONSIST OF PROVIDING PROTECTION AGAINST TRAFFIC AND REPAIRING ANY AREAS DAMAGED DUE TO WIND, WATER, EROSION, FIRE OR OTHER CAUSES. SUCH DAMAGED AREAS SHALL BE REPAIRED TO REESTABLISH THE CONDITION AND GRADE OF THE SOIL PRIOR TO SEEDING AND SHALL THEN BE REFERTILIZED, RESEEDED AND REMULCHED.



LANDMARK CORPORATION

SURVEYORS & ENGINEERS

219 MEADOW STREET ROCKPORT, MAINE 04856 PHONE: (207) 234-6757 WWW.LANDMARKMAINE.COM

RABBIT FARM ROAD REHABILITATION

TYPICAL DETAILS

UNION, MAINE

JOB #: 16-008

MAY 5, 2016

D1

GENERAL NOTES

1. THE CONTRACTOR SHALL VERIFY THE EXISTENCE, LOCATION, AND DEPTH OF ANY UTILITIES AND SHALL NOTIFY THE ENGINEER OF ANY CONFLICTS PRIOR TO BEGINNING WORK. THE CONTRACTOR AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE CAUSED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UTILITIES AND UNDERGROUND CONDUITS.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE ENGINEERING OFFICE OF LANDMARK CORPORATION AT (207) 236-6757 IN THE EVENT OF ANY DISCREPANCIES IN THE PLANS PRIOR TO BEGINNING WORK.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTENANCE OF TRAFFIC.
4. THE CONTRACTOR SHALL NOTE THAT IN CASE OF A DISCREPANCY BETWEEN THE SCALED AND FIGURED DIMENSIONS SHOWN ON THESE PLANS, THE FIGURED DIMENSIONS SHALL GOVERN.
5. IT SHALL BE DISTINCTLY UNDERSTOOD THAT FAILURE TO MENTION SPECIFICALLY ANY WORK WHICH WOULD NORMALLY BE REQUIRED TO COMPLETE THE PROJECT SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY TO PERFORM SUCH WORK.
6. ALL CONSTRUCTION SHALL CONFORM TO AMERICANS WITH DISABILITIES ACT (ADA) WHERE APPLICABLE.
7. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT ALL LOCAL, STATE, & FEDERAL CONSTRUCTION SAFETY REGULATIONS ARE FOLLOWED DURING THE CONSTRUCTION OF THIS SITE.
8. LANDMARK CORPORATION IS NOT RESPONSIBLE FOR THE CONTRACTOR'S MEANS OR METHODS FOR CONSTRUCTION, INCLUDING, BUT NOT LIMITED TO THE CONTRACTOR'S UTILIZATION OF PERSONNEL, MATERIALS, EQUIPMENT, OR SAFETY MEASURES IN THE PERFORMANCE OF ANY WORK FOR THIS CONSTRUCTION. THE CONTRACTOR ASSUMES ALL RESPONSIBILITY FOR PERFORMING THE WORK CORRECTLY AND IN CONFORMANCE WITH ALL FEDERAL, STATE, AND LOCAL CODE AND/OR REGULATORY REQUIREMENTS.

AGGREGATE & BORROW NOTES

1. AGGREGATE FOR BASE & SUBBASE GRAVEL

AGGREGATE FOR TYPE A AND B BASE GRAVEL SHALL BE CRUSHED LEDGE OR CRUSHED GRAVEL OF HARD DURABLE PARTICLES FREE FROM VEGETABLE MATTER, LUMPS OR BALLS OF CLAY AND OTHER DELETERIOUS SUBSTANCES. AGGREGATE FOR TYPE D SUBBASE GRAVEL SHALL BE SCREENED SAND OR 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 3 INCH SIEVE SHALL MEET THE GRADING REQUIREMENTS OF THE FOLLOWING TABLE:

SIEVE DESIGNATION	PERCENTAGE BY WEIGHT PASSING SQUARE MESH SIEVES		
	TYPE A BASE	TYPE B BASE	TYPE D SUBBASE
1/2 INCH	45-70	35-75	35-80
1/4 INCH	30-55	25-60	25-65
No. 40	0-20	0-25	0-30
No. 200	0-6.0	0-6.0	0-7.0

TYPE A BASE GRAVEL SHALL NOT CONTAIN PARTICLES WHICH WILL NOT PASS THE 2 INCH SQUARE MESH SIEVE. TYPE B BASE GRAVEL SHALL NOT CONTAIN PARTICLES WHICH WILL NOT PASS THE 4 INCH SQUARE MESH SIEVE. TYPE D SUBBASE GRAVEL SHALL NOT CONTAIN PARTICLES WHICH WILL NOT PASS THE 6 INCH SQUARE MESH SIEVE.

EACH LAYER AS APPLIED SHALL BE ROLLED WITH A 20 TON ROLLER. THE MATERIAL AS SPREAD SHALL BE WELL MIXED WITH NO POCKETS OF EITHER FINE OR COARSE MATERIAL. OVER SIZED STONES SHALL BE REMOVED FROM THE AGGREGATE.

EACH LAYER OF AGGREGATE SHALL BE PLACED OVER THE FULL WIDTH OF THE SECTION. AGGREGATE BASE AND SUBBASE COURSES MAY BE PLACED UPON FROZEN SURFACES WHEN SUCH SURFACES HAVE BEEN PROPERLY CONSTRUCTED.

THE SURFACE OF EACH LAYER SHALL BE MAINTAINED DURING COMPACTION OPERATIONS IN SUCH A MANNER THAT A UNIFORM TEXTURE IS PRODUCED AND THE AGGREGATE IS FIRMLY KEED. THE MOISTURE CONTENT OF THE MATERIAL SHALL BE MAINTAINED AT THE PROPER PERCENT TO ATTAIN THE REQUIRED COMPACTION AND STABILITY. COMPACTION OF EACH LAYER SHALL BE CONTINUED UNTIL DENSITY OF NOT LESS THAN 95 PERCENT OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D-1557 "MODIFIED PROCTOR DENSITY" HAS BEEN ACHIEVED FOR THE FULL WIDTH AND DEPTH OF EACH LAYER AS APPLIED.

THE SURFACE TOLERANCE OF EACH BASE COURSE AS APPLIED SHALL BE 3/8 INCHES ABOVE OR BELOW THE REQUIRED TEMPLATE LINES.

2. COMMON BORROW

COMMON BORROW SHALL CONSIST OF EARTH, SUITABLE FOR EMBANKMENT CONSTRUCTION. IT SHALL BE FREE FROM FROZEN MATERIAL, PERISHABLE RUBBISH, PEAT AND OTHER UNSUITABLE MATERIAL.

THE MOISTURE CONTENT SHALL BE SUFFICIENT TO PROVIDE THE REQUIRED COMPACTION AND STABLE EMBANKMENT. IN NO CASE SHALL THE MOISTURE CONTENT EXCEED 4 PERCENT ABOVE OPTIMUM.

3. RIPRAP

STONE FOR RIPRAP SHALL CONSIST OF HARD, SOUND DURABLE ROCK THAT WILL NOT DISINTEGRATE BY EXPOSURE TO WATER OR WEATHER. STONE FOR RIPRAP SHALL BE ANGULAR AND ROUGH. ROUNDED OR LONG THIN STONES WILL NOT BE ALLOWED. THE MAXIMUM ALLOWABLE LENGTH TO WIDTH RATIO WILL BE 3:1.

RIPRAP SIZE FOR THE PROJECT SHALL BE D50=6". THIS MEANS THAT THE AVERAGE SIZE STONE IN THE RIPRAP IS ROUGHLY 6" IN DIAMETER. MAXIMUM SIZE OF THE RIPRAP SHOULD BE 9" AND MINIMUM SIZE SHOULD BE 2".

RIPRAP SHALL BE PLACED FULL DEPTH IN ONE OPERATION AND SHALL BE PLACED APPROXIMATELY TRUE TO THE REQUIRED SLOPE LINE AND BE UNIFORM IN APPEARANCE. RIPRAP SHALL BE PLACED TO SECURE INTERLOCKING OF ALL FACE STONES AND STONES PLACED AS BACKING. RIPRAP SHALL BE PLACED ON THE SLOPE IN A WELL KNIT, COMPACT AND UNIFORM LAYER. THE SURFACE STONES SHALL BE CHINKED WITH SMALLER STONES FROM THE SAME SOURCE.



LANDMARK CORPORATION

SURVEYORS & ENGINEERS

219 MEADOW STREET ROCKPORT, MAINE 04856 PHONE: (207) 236-6757 WWW.LANDMARKMAINE.COM

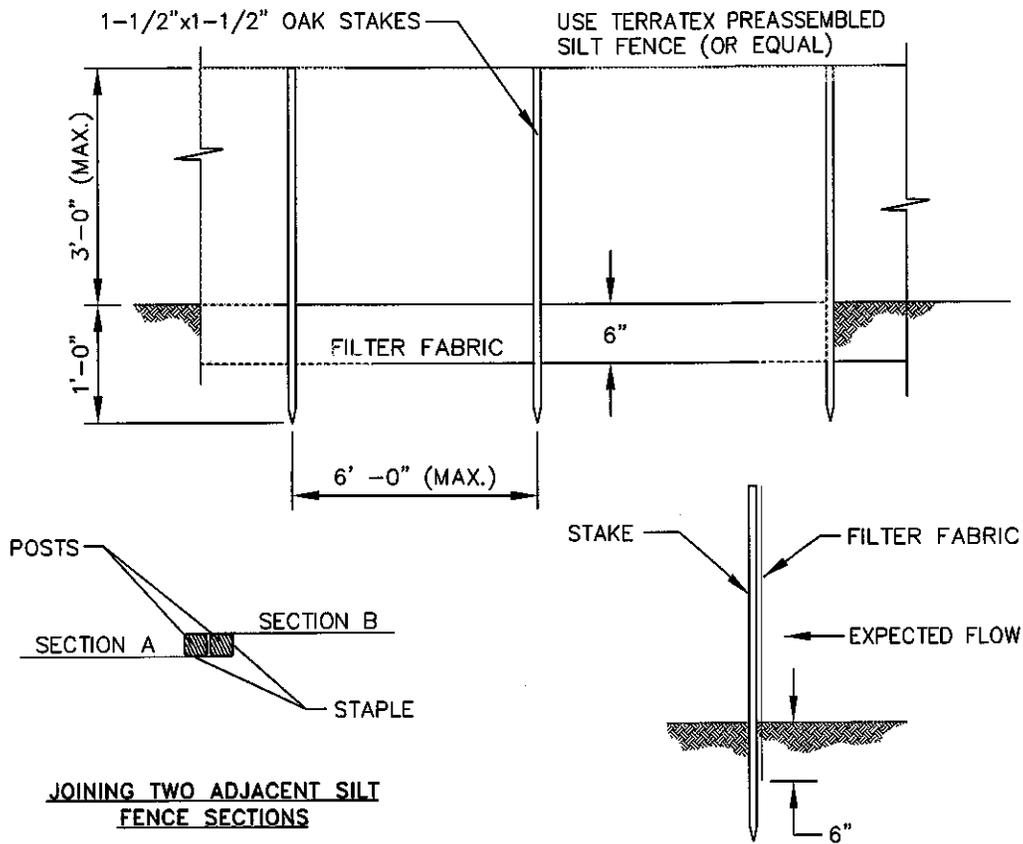
RABBIT FARM ROAD REHABILITATION TYPICAL DETAILS

UNION, MAINE

JOB #: 16-008

MAY 5, 2016

D2



JOINING TWO ADJACENT SILT FENCE SECTIONS

SECTION VIEW

NOTES:

SILT FENCE AND FILTER BARRIERS SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.

SHOULD THE FABRIC ON A SILT FENCE OR FILTER BARRIER DECOMPOSE OR BECOME INEFFECTIVE PRIOR TO THE END OF THE EXPECTED USABLE LIFE AND THE BARRIER STILL IS NECESSARY, THE FABRIC SHALL BE REPLACED PROMPTLY.

SEDIMENT DEPOSITS SHALL BE REMOVED AFTER EACH STORM EVENT. THEY MUST BE REMOVED WHEN DEPOSITS REACH APPROXIMATELY ONE-HALF THE HEIGHT OF THE BARRIER. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE SILT FENCE OR FILTER BARRIER IS NO LONGER REQUIRED SHALL BE DRESSED TO CONFORM WITH THE EXISTING GRADE, PREPARED AND SEED.

THE TRENCH SHALL BE BACKFILLED AND THE SOIL COMPACTED OVER THE FILTER FABRIC. SILT FENCES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY STABILIZED.

NOTE: SILT FENCE MAY BE USED IN PLACE OF EROSION CONTROL FILTER BERM.

SILT FENCE DETAIL

NOT TO SCALE



LANDMARK CORPORATION

SURVEYORS & ENGINEERS I

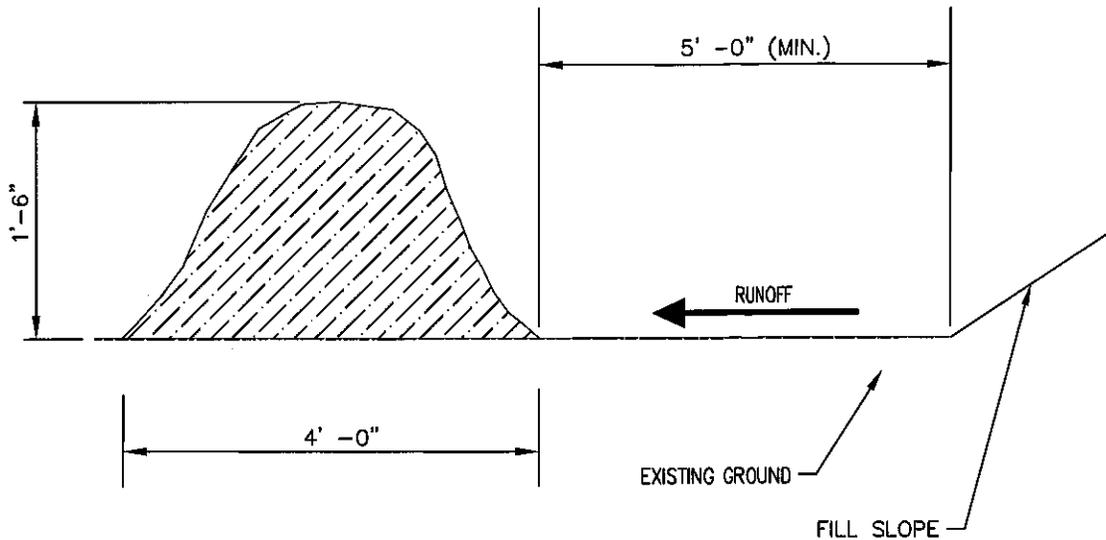
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**RABBIT FARM ROAD REHABILITATION
TYPICAL DETAILS
UNION, MAINE**

JOB #: 16-008

MAY 5, 2016

D3



SPECIFICATIONS:

THE FILTER BERM SHALL CONSIST OF A WOOD WASTE COMPOST/BARK MULCH MIX OR RECYCLED COMPOSTED BARK FLUME GRIT AND FRAGMENTED WOOD GENERATED FROM WATER-FLUME LOG HANDLING SYSTEMS.

THE MIX SHALL CONFORM TO THE FOLLOWING STANDARDS:

- A. MOISTURE CONTENT - 30-60%
- B. pH - 5.0-8.0
- C. SCREEN SIZE - 100% LESS THAN 3", MAXIMUM 70% LESS THAN 1".
- D. NO LESS THAN 40% ORGANIC MATERIAL (DRY WEIGHT) BY LOSS OF IGNITION
- E. NO STONES LARGER THAN 2" IN DIAMETER

THE COMPOSTED BERM SHALL BE PLACED, UNCOMPACTED ALONG A RELATIVELY LEVEL CONTOUR.

INSPECTION & MAINTENANCE NOTES:

WOOD WASTE COMPOST/BARK FILTER BERMS SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.

SEDIMENT DEPOSITS SHALL BE REMOVED AFTER EACH STORM EVENT. THEY MUST BE REMOVED WHEN DEPOSITS REACH APPROXIMATELY ONE-HALF THE HEIGHT OF THE FILTER BERM. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE FILTER BERM IS NO LONGER REQUIRED SHALL BE DRESSED TO CONFORM WITH THE EXISTING GRADE, PREPARED AND SEEDED.

FILTER BERM SHALL BE REMOVED WHEN IT HAS SERVED ITS USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY STABILIZED.

NOTE: EROSION CONTROL FILTER BERMS MAY BE USED IN PLACE OF SILT FENCE.

EROSION CONTROL FILTER BERM

NOT TO SCALE



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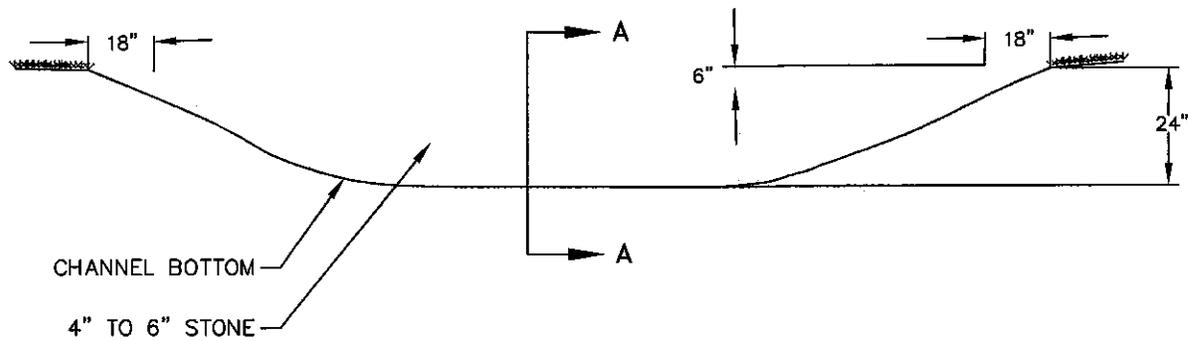
**RABBIT FARM ROAD REHABILITATION
TYPICAL DETAILS**

UNION, MAINE

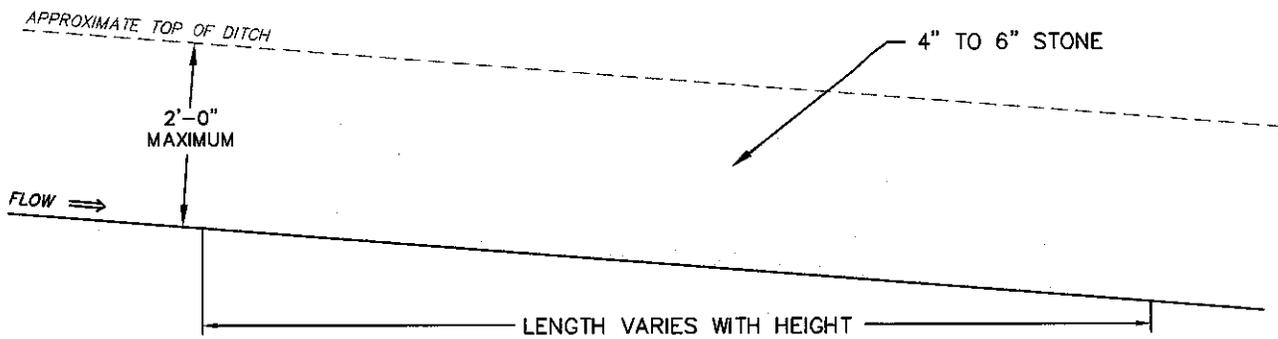
JOB #: 16-008

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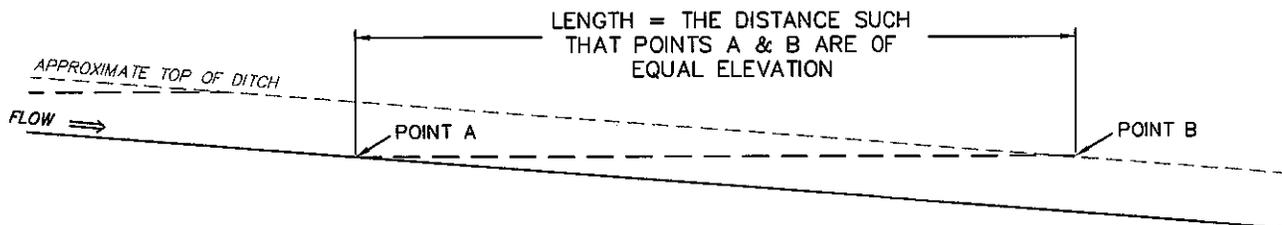
D4



UPSTREAM VIEW



SECTION A-A



CHECK DAM SPACING

NOTES:

1. CHECK DAMS SHALL BE INSTALLED IMMEDIATELY AFTER ROUGH GRADING OF THE DITCH.
2. CHECK DAMS SHALL BE CHECKED FOR SEDIMENT ACCUMULATION AFTER EACH SIGNIFICANT RAINFALL. SEDIMENT SHALL BE REMOVED BEFORE IT REACHES ONE HALF OF THE ORIGINAL HEIGHT OF THE DAM. REGULAR INSPECTION SHALL BE MADE TO ENSURE THAT THE CENTER OF THE DAM IS LOWER THAN THE EDGES. EROSION CAUSED BY HIGH FLOWS AROUND THE EDGES OF THE DAM SHALL BE CORRECTED IMMEDIATELY.
3. IN PERMANENT DITCHES, CHECK DAMS MAY BE LEFT IN PLACE PERMANENTLY, OR THE MATERIAL MAY BE SPREAD EVENLY ALONG THE DITCH INVERT.
4. IN GRASS LINED CHANNELS THAT WILL BE MOWED, CHECK DAMS SHALL BE REMOVED AFTER GRASS HAS BEEN ESTABLISHED. THE DISTURBED AREA BENEATH THE DAM SHALL IMMEDIATELY BE SEEDED AND MULCHED.

STONE CHECK DAM

NOT TO SCALE



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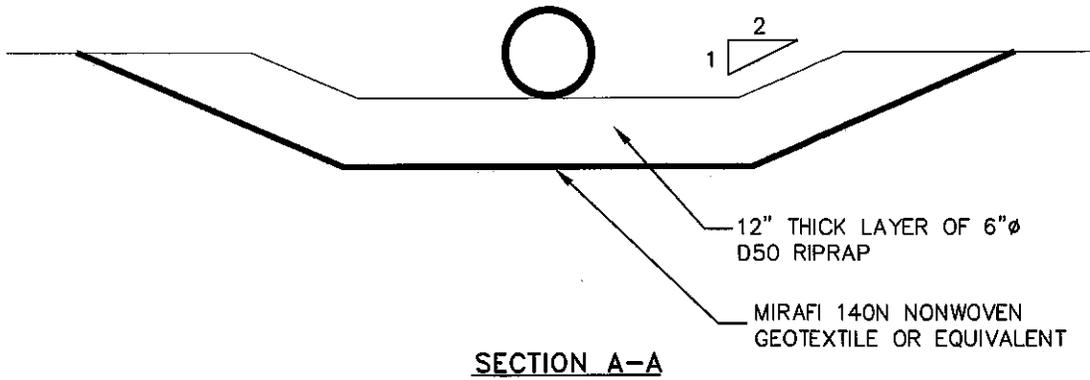
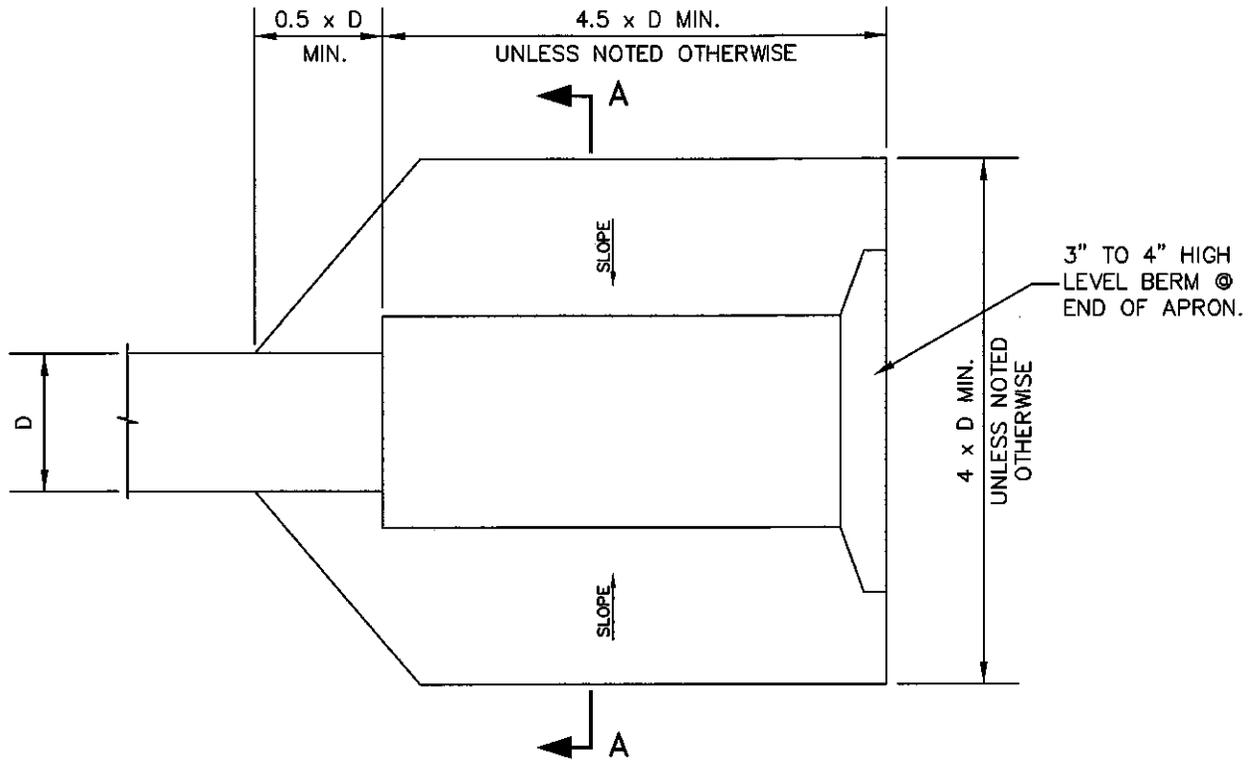
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RABBIT FARM ROAD REHABILITATION
TYPICAL DETAILS
UNION, MAINE

JOB #: 16-008

MAY 5, 2016

D5



TYPICAL RIPRAP APRON DETAIL
NOT TO SCALE



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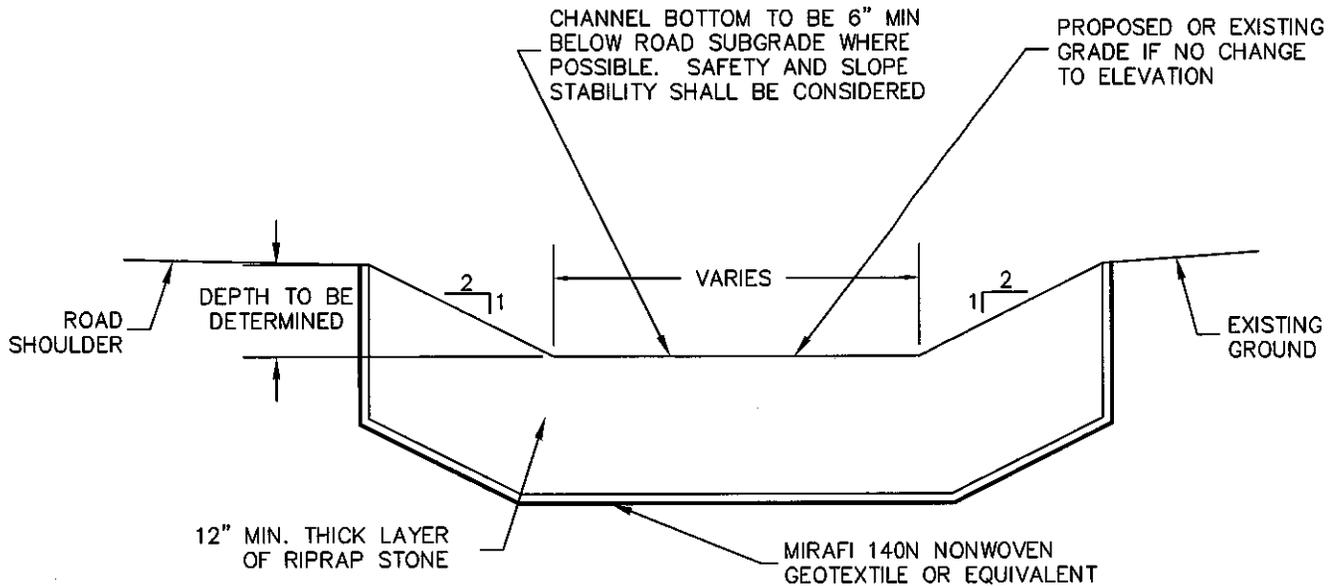
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RABBIT FARM ROAD REHABILITATION
TYPICAL DETAILS
UNION, MAINE

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NOTES:

1. RIPRAP SIZE IN THE PROTECTION AREA SHALL CONFORM TO THE RIPRAP SPECIFICATION IN THE AGGREGATE AND BORROW NOTES.
2. LOCATIONS OF RIPRAP CHANNEL PROTECTION AND SLOPE STABILIZATION TO BE DETERMINED IN FIELD.
3. SIDE SLOPES MAY NEED TO BE STEEPER DEPENDING ON FIELD CONDITIONS.

TYPICAL RIPRAP CHANNEL PROTECTION AND SLOPE STABILIZATION

NOT TO SCALE



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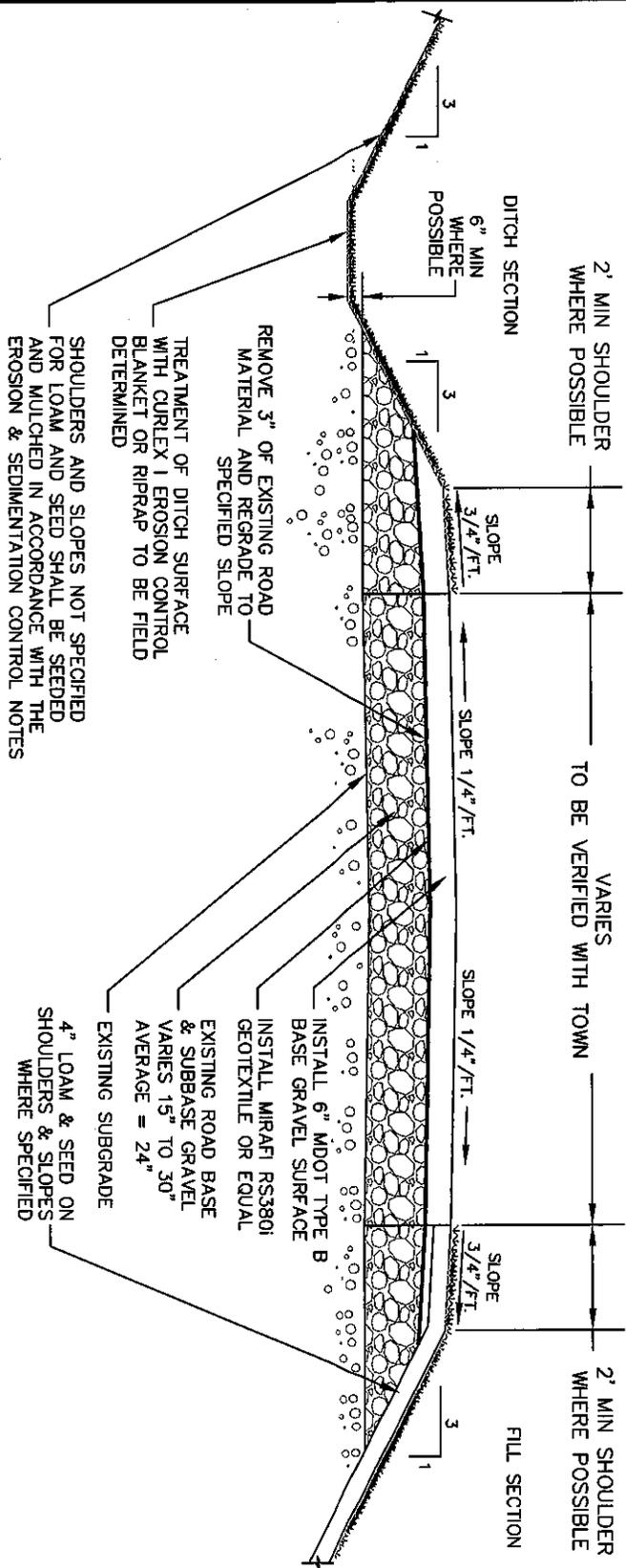
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RABBIT FARM ROAD REHABILITATION
TYPICAL DETAILS
UNION, MAINE

JOB #: 16-008

MAY 5, 2016

D7



- NOTES:**
1. CONTRACTOR SHALL REMOVE 3" OF EXISTING ROAD SURFACE MATERIAL TO THE EXTENT OF THE PROJECT LIMITS.
 2. EXISTING ROAD MATERIAL SHALL BE REGRADED TO THE SPECIFIED SLOPES WITH A CENTER CROWN TO ALLOW DRAINAGE TO DITCHING.
 3. FINAL ROAD SURFACE SHALL HAVE MINIMUM CROSS SLOPES OF 1/4" PER FOOT TO EACH SIDE WITH A CENTER CROWN.
 4. CONTRACTOR SHALL THE EXISTING DRIVEWAYS INTO ROAD WHILE MINIMIZING TRANSITION SLOPE TO 5% AS PRACTICABLE.
 5. SIDE SLOPES MAY NEED TO BE STEEPER THAN SHOWN DEPENDING ON FIELD CONDITIONS.
 6. SIDE SLOPES STEEPER THAN 3:1 REQUIRES CURLEX 1 STABILIZATION BLANKET, OR EQUAL.
 7. ROAD SIDE DITCHING MAY NEED TO BE REGRADED TO ENSURE PROPER DRAINAGE.
 8. CONTRACTOR MAY USE MDOT TYPE A BASE GRAVEL IN PLACE OF MDOT TYPE B BASE GRAVEL.

TYPICAL GRAVEL ROAD SECTION
NOT TO SCALE

RABBIT FARM ROAD REHABILITATION
TYPICAL DETAILS
UNION, MAINE



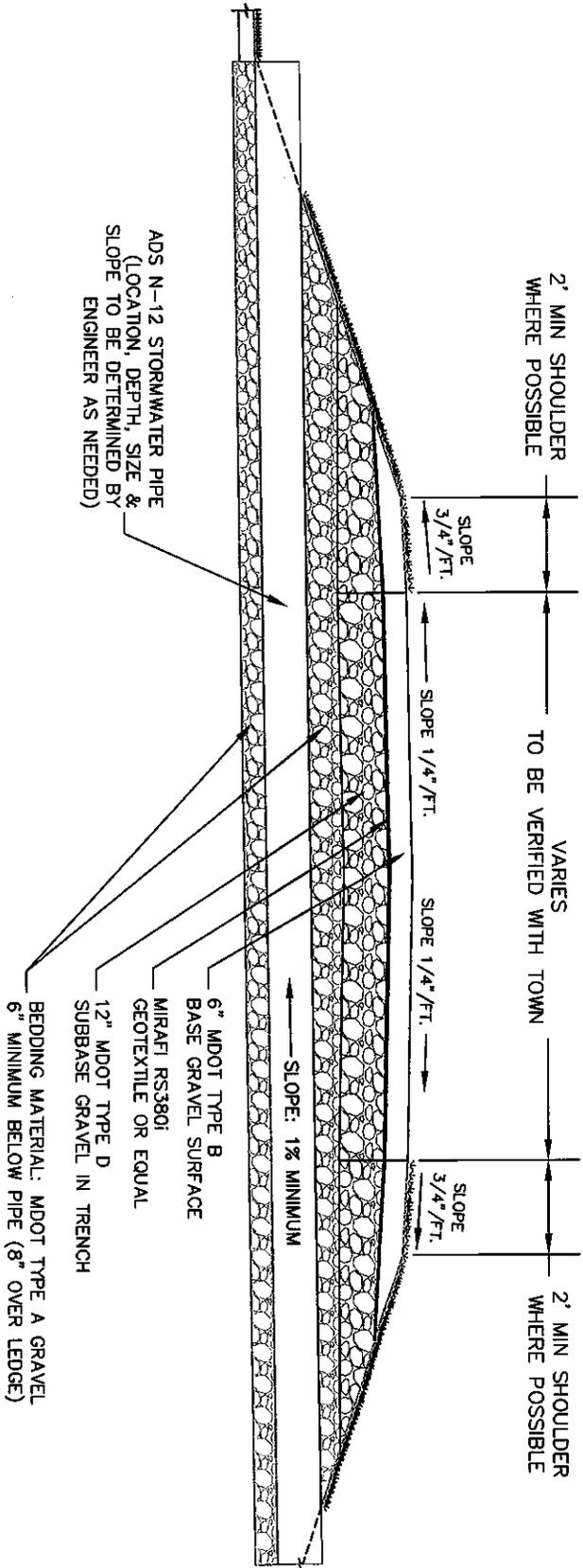
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JOB #: 16-008

MAY 5, 2016

D8



- NOTES:**
1. SIDE SLOPES MAY NEED TO BE STEEPER THAN SHOWN DEPENDING ON FIELD CONDITIONS.
 2. SIDE SLOPES STEEPER THAN 3:1 REQUIRES CURLEX 1 STABILIZATION BLANKET, OR EQUAL.
 3. ROAD SIDE DITCHING MAY NEED TO BE REGRADED TO ENSURE PROPER DRAINAGE.
 4. CULVERT LOCATIONS TO BE FIELD DETERMINED BY TOWN/ENGINEER AS NEEDED.
 5. INSTALL RIPRAP APRON AT DOWNSTREAM END OF ALL NEW CULVERTS.
 6. CONTRACTOR MAY USE MDOT TYPE A BASE GRAVEL IN PLACE OF MDOT TYPE B BASE GRAVEL.

TYPICAL CULVERT INSTALLATION IN GRAVEL ROAD SECTION
 NOT TO SCALE

RABBIT FARM ROAD REHABILITATION
TYPICAL DETAILS
 UNION, MAINE

**TOWN OF UNION
RABBIT FARM ROAD REHABILITATION**

SPECIFICATIONS

DIVISION 01 – GENERAL REQUIREMENTS

01 10 00 Summary

DIVISION 31 – EARTHWORK

31 20 00 Earthwork

31 25 00 Erosion and Sedimentation Controls

31 32 19 Geotextile Fabric

DIVISION 32 – EXTERIOR IMPROVEMENTS

32 92 00 Turf and Grasses

DIVISION 33 – UTILITIES

33 41 11 Site Storm Drainage Utility Piping

SECTION 01 10 0

SUMMARY

PART 1 GENERAL

1.1 PROJECT

- A. Project Name: Rabbit Farm Road Rehabilitation
- B. Owner's Name: Town of Union
- C. Engineer's Name: Landmark Corporation Surveyors & Engineers

1.2 PROJECT DESCRIPTION

The Work is rehabilitation of the gravel surface and drainage improvements to Rabbit Farm Road in anticipation of paving, from the intersection of Clarry Hill Lane to the Warren town line in Union, Maine. The project includes, but is not limited to the following list in accordance with the Typical Details, Sheets D1 - D9, prepared by Landmark Corporation Surveyors & Engineers, dated May 5, 2016. The contractor is responsible for executing all work in the Plans and Bid Documents, not necessarily in the order presented below:

A. Scope of Work

1. Traffic control and safety during the project including traffic flaggers and temporary safety barriers.
2. Placement of erosion control measures.
3. Demolition and removals, including clear and grub ditches and shoulders, stumps and tree removal, and excavation.
4. Install riprap channel protection and slope stabilization.
5. Install two new cross culverts with riprap apron protection.
6. Excavate new and existing ditches to below road subgrade where possible. Safety and slope stability shall be considered.
7. Regrade road shoulders to drain away or drain to roadside ditches.
8. Remove 3" of existing road surface material and regrade with center crown and 1/4" per foot cross slopes.
9. Install geotechnical fabric and 6" of new road surface aggregate.
10. Install seed and mulch on disturbed areas.

1.3 OWNER OCCUPANCY

- A. The Town of Union requires that Rabbit Farm Road remain passable to vehicle traffic during construction. The Contractor is responsible to provide traffic flaggers and maintain traffic.
- B. Work performed on private property not within the Town road right-of-way shall be coordinated via access and drainage easements and agreements with the land owners and the Town of Union. Work performed on private property shall be coordinated with the Town of Union.

1.4 CONTRACTOR USE OF SITE AND PREMISES

- A. Arrange use of site and premises to allow:
 - 1. Passage of vehicular and pedestrian traffic on Rabbit Farm Road.
 - 2. Passage of vehicular and pedestrian traffic to driveways and private property.
 - 3. Work by Town of Union.
- B. Provide access to and from site as required by law and by the Town of Union:
 - 1. Do not obstruct existing roadways or driveways without first coordinating with the Owner.
- C. Utility Outages and Shutdown:
 - 1. No utility outages are anticipated, required, or allowed on this project.
 - 2. Prevent accidental disruption of utility services to other facilities.
- D. Property Usage and Damage:
 - 1. Storage and stockpiling of material and equipment must remain within the Town road right-of-way or offsite at a pre-approved location.
 - 2. Damage to Town or private property, including but not limited to pavement, structures or vegetation shall be repaired by the Contractor at the Contractor's expense prior to the date of completion and final payment.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

- END OF SECTION -

SECTION 31 20 00

EARTHWORK

PART 1 GENERAL

1.1 SUMMARY

- A. Provide all labor, materials, equipment, and services and perform all operations necessary for earthwork required for the execution of all construction as indicated on the Drawings, specified herein, or otherwise required for a complete and proper job.
- B. Without limiting the generality thereof, the scope of work under this Section shall include, but shall not necessarily be limited to, the following items:
 - 1. Excavation and stockpiling of materials suitable for reuse in an on-site location approved by the Owner.
 - 2. Removing existing material and replacing that material in a suitable manner in accordance with the requirements of the drawings and these specifications.
 - 3. Removal and off-site disposal of existing pavements, foundations, and utilities which may be encountered during excavation and backfilling to the grades shown on the plans.
 - 4. Excavation, fill, refill, backfill, subgrade preparation, and compaction as indicated or required, including, but not necessarily limited to, all work related to utilities, walks, pavements, yards, fields, as well as general earthwork.
 - 5. Excavation and disposal (off-site) of unsuitable or excess materials. Excavation of all traces of rock, loam or other unsuitable materials to depths necessary to provide suitable bearing, including granular refill and compaction.
 - 6. Trench and pit excavations, beddings, fills and backfills, including compaction.
 - 7. Base and sub-base course material under walks and pavements including compaction.
 - 8. Rough and finish grading. (NOTE: The Engineer's authorization shall be required prior to proceeding with finish grading.)
 - 9. Dewatering and control of water for all construction operations.
 - 10. Dust, erosion, siltation, and environmental controls.
 - 11. Sheeting, shoring and bracing of all excavations and as otherwise required.
- C. Refer to other Divisions of these Specifications, other Sections in this Division, and Drawings for related Work which may affect the Work of this Section.

- D. The Contractor acknowledges that he has satisfied himself as to the nature and location of the Work, the general and local conditions, particularly those bearing upon transportation, disposal, handling, and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, ground water table or similar physical conditions at the site, the confirmation of subsurface materials to be encountered, the character of equipment and facilities needed prior to and during the prosecution of the Work and all other matters which can in any way affect the Work or the cost thereof under this contract. Any failure by the Contractor to acquaint himself with all information concerning these conditions will not relieve him from responsibility for estimating properly the difficulty or cost of successfully performing the Work.

1.2 SUBMITTALS

- A. Comply with:

1. Section 01 30 00 – Administrative Requirements

- B. Excavation Protection Plan:

Describe sheeting, shoring and bracing materials and installation required to protect excavations and adjacent structures and property, including structural calculations to support plan.

- C. Test Reports:

Submit the following reports:

1. Reports on material gradations (ASTM D422)
2. Field density test reports (ASTM D2922)
3. Other reports as specified herein

- D. Materials Source:

Submit name of imported materials source.

- E. Materials Certifications:

Submit materials certificate signed by the material supplier and Contractor, certifying that materials comply with, or exceed, the requirements herein.

- F. Product Data:

Submit data for geotextile fabric indicating fabric and construction.

1.3 CLOSEOUT SUBMITTALS

- A. Comply with:
 - 1. Section 01 30 00 – Administrative Requirements
 - 2. Section 01 78 00 – Closeout Submittals
- B. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations of inverts, and slope gradients.

1.4 QUALITY ASSURANCE

- A. Comply with the requirements of Section 01 30 00 – Administrative Requirements
- B. Documents affecting Work of this Section include but are not necessarily limited to the Conditions of the Contract, General Conditions, Supplementary Conditions, Addenda and all Sections of Division 1, and all apply to this Section.
- C. These Specifications specify material and Work requirements for this project, but do not define limits of construction for the project.
- D. Coordinate Work with that of other trades affecting or affected by Work of this Section. Cooperate with such trades to assure the steady progress of the Work.
- E. All Work shall comply with the requirements of the Maine Department of Environmental Protection (DEP), the U.S. Environmental Protection Agency (EPA) and Town of Union, Maine standards to minimize adverse environmental impacts.
- F. All Work shall be accomplished in accordance with regulations of local, county and state agencies and national or local utility company standards as they apply.
- G. Protection: Use all means necessary to protect all materials of this Section before, during, and after installation and to protect all objects designated to remain. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

1.5 SAFETY

- A. Properly support all trenches and all other excavations in strict accordance with all pertinent rules and regulations. Brace, sheet, and support trench walls and other excavations in such a manner that they will be safe and that the ground alongside the excavation will not slide or settle, and that all existing improvements of every kind, whether on public or private property, will be fully protected from damage. In the event of damage to such improvements, immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

PART 2 PRODUCTS

2.1 SOURCE QUALITY CONTROL

- A. Approval Required

All fill material shall be subject to the review of the Engineer. Qualified materials shall not change in source or character unless requalified. The Engineer's review of a material shall not in any way diminish the Contractor's responsibility to fulfill all requirements of the Specifications.

- B. Notification

For approval of fill materials, the Contractor shall:

1. Notify the Engineer at least four (4) working days in advance of intention to import or place fill material.
2. Provide sample to Engineer for the examination and certification of the material.
3. Sources shall be accessible to the Owner, or his agent, for inspection or additional sampling.

2.2 MATERIALS

- A. Common Borrow

Common Borrow shall consist of uniformly graded granular material having no particles with a maximum dimension of over six (6) inches and that portion passing a three (3) inch square mesh sieve shall contain not more than 70 percent passing a ¼" mesh sieve and not more than 10 percent passing a No. 200 mesh sieve.

B. MDOT Type A Base Gravel

Aggregate for Type A base shall be crushed ledge 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 3 inch sieve shall meet the grading requirements of the following table:

<u>Sieve Size</u>	<u>Percentage By Weight Passing</u>
½ Inch	45 - 70
¼ Inch	30 - 55
No. 40	0 - 20
No. 200	0 - 6.0

Type A aggregate for base shall only contain particles of rock that will pass the 2 inch square mesh sieve.

C. MDOT Type B Base Gravel

Aggregate for Type B base shall be crushed ledge 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 3 inch sieve shall meet the grading requirements of the following table:

<u>Sieve Size</u>	<u>Percentage By Weight Passing</u>
½ Inch	35 - 75
¼ Inch	25 - 60
No. 40	0 - 25
No. 200	0 - 6.0

Type B aggregate for base shall only contain particles of rock that will pass the 4 inch square mesh sieve.

D. MDOT Type D Subbase Gravel

Aggregate for subbase shall be sand or 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 3 inch sieve shall meet the grading requirements of the following table:

<u>Sieve Size</u>	<u>Percentage By Weight Passing</u>
½ inch	35 - 80
¼ Inch	25 - 65
No. 40	0 - 30
No. 200	0 - 7.0

Aggregate for subbase shall not contain particles of rock which will not pass the 6 inch square mesh sieve.

E. Crushed Stone ¾-Inch

Aggregate for crushed stone ¾-inch shall be of quarried stone, free from organic matter and shall meet the following gradation requirements:

<u>Sieve Size</u>	<u>Percentage By Weight Passing</u>
1 Inch	100
¾ Inch	90 - 100
½ Inch	20 - 55
3/8 Inch	0 - 15
No. 4	0 - 5

F. Rip Rap

Stone for rip rap shall consist of hard, sound, durable rock that will not disintegrate by exposure to water or weather. Stone for riprap shall be angular and rough. Rounded, subrounded or long thin stones will not be allowed. The maximum allowable length to width ratio will be 3:1.

Riprap size for the project shall be D50=6". This means that the average size stone in the riprap is roughly 6" in diameter. Maximum size of the riprap should be 9" and minimum size should be 2".

G. Sand Bedding

Aggregate for sand bedding shall be sand of hard durable particles free from vegetable matter, lumps, or balls of clay and other deleterious substances. The sand shall meet the following gradation requirements:

<u>Sieve Size</u>	<u>Percentage By Weight Passing</u>
3/8 Inch	100
No. 4	95 - 100
No. 16	50 - 85
No. 100	2 - 10

H. Topsoil

See Specification Sections 32 92 00 and 32 93 00 for technical requirements of topsoil for turf, grasses and plants.

I. Geotextile Fabric

See Specification Section 31 32 19 for technical requirements of geotextile fabric.

PART 3 EXECUTION

3.1 EXAMINATION

A. Familiarization

Prior to all Work of this Section, the Contractor shall become thoroughly familiar with the site, the site conditions, and all portions of the Work covered by this Section. The Contractor shall satisfy himself, by actual examination of the site of the Work, as to the existing conditions, contours and the elevations and the amount of Work required under this Section.

B. Material Encountered

Material encountered in the excavation may include pipe, storm drains, or other utility services, lumber, masonry, and other materials from previous constructions. Material may also include loam, or other unsuitable organics. The Contractor shall make his own investigations to determine the presence of such materials. The Bid by the Contractor and its acceptance by the Owner shall be considered a mutual agreement that, the removal and disposal of all materials encountered in excavating for the project, regardless of nature, size, and amount will be considered as included under the lump sum Bid, and that there shall be no addition to the Contract for these items if the operation is more difficult or costly than is expected, and that there shall be no deduction from the Contract if the operation is less difficult or costly than expected.

3.2 PREPARATION

- A. All unsuitable or excess materials shall be stripped to their entire depths from areas of new construction or regrading. Materials suitable for use shall be stored in designated locations that will not interfere with building or utility operations. Topsoil shall be stripped and stored before any underlying excavating is begun. Stripped topsoil to be reused shall be free from clay, stones larger than 2" diameter and debris. Excess materials and all materials not suitable for reuse shall be legally disposed of off-site. All excavations shall be performed in a manner to minimize the disturbance of underlying natural ground to remain and existing structures to remain.

3.3 PROTECTION

- A. The Contractor shall protect existing utilities, the location of which may be shown approximately on the Drawings, or which are located in the field by the Contractor or others. Utilities whose location is not known shall be protected insofar as possible. All costs for repair of utilities broken or damaged by the Contractor or his Subcontractor shall be the responsibility of the Contractor.

3.4 FIELD QUALITY CONTROL

- A. Inspection and Tests

Do not allow or cause any of the Work performed or installed to be covered up or enclosed by Work of this Section prior to all required inspections, tests, and approvals. Should any of the Work be so enclosed or covered up before it has been approved, uncover all such Work at no additional cost to the Owner. After the Work has been completely tested, inspected and approved, make all repairs and replacements necessary to restore the Work to the condition in which it was found at the time of uncovering, all at no additional cost to the Owner.

- B. Grades and Elevations

The Drawings indicate, in general, the alignment and finished grade elevations of site structures. The Engineer, however, may make such adjustments in grades and alignment as are found necessary in order to avoid interferences and other special conditions encountered. Grading between indicated final grades shall provide smooth, even surfaces, except as otherwise required.

3.5 EXCAVATION

- A. The Contractor shall excavate all unsuitable material to specified grade or to suitable subgrade soils in building, structure and pavement areas in the manner specified below and in the Drawings. The Engineer shall determine unsuitable materials classified as topsoil, existing soils containing decomposable material, or any material not meeting the gradation requirements or uses specified herein.
- B. The Contractor shall follow a construction procedure which permits visual identification of subgrade soils. In the event that groundwater is encountered, the size of the open excavation shall be limited to that which can be handled by the Contractor's chosen method of dewatering and allow visual observation of the bottom and placement of crushed stone and backfill in the dry.
- C. If subgrade soils become loose and saturated, the contractor shall be required to remove the soils and replace with crushed stone underlain with a geotextile.

D. Over Excavation Correction

Excavation beyond indicated or authorized limits shall be refilled with approved common borrow or other approved suitable granular soil material. Refills shall be compacted to 95 percent (Modified Proctor) of the maximum dry density at optimum moisture content. Refills shall be provided as required by the Engineer and at no additional cost to the Owner.

3.6 SITE DEWATERING

- A. The Contractor shall provide, at his own expense, adequate pumping equipment (including standby) and drainage facilities to keep the excavated site areas sufficiently dry from groundwater and/or surface runoff so as not to adversely affect site construction procedures or cause excessive disturbance of underlying natural ground. The drainage of all water resulting from pumping shall be discharged into existing drainage system or courses so as not to cause damages to adjacent bodies of water.
- B. The Contractor shall secure all necessary permits, and satisfy all local, state and federal environmental conservation and water control requirements.

3.7 SHEETING, SHORING AND BRACING

- A. Provide shoring, sheeting, and/or bracing of excavations as required to assure complete safety against collapse of earth at side of excavations. Alternatively, lay back excavations to a stable slope.
- B. Excavations shall be adequately sheeted, shored and braced as necessary to permit proper execution of the Work and to protect all slopes and earth banks until new structures are cured and acceptable for backfill. Sheet piling shall be installed if required to prevent cave-ins or settlement and to protect workmen and utilities. Shoring and bracing may be removed as the backfilling progresses, but only when banks are safe against caving, taking all necessary precautions to prevent collapse of excavation sides.
 - 1. The Engineer may direct that sheeting, shoring, and bracing be left in place at any time during the progress of the Work and direct that timber used for sheeting and bracing, authorized to be left in place, but cut off at a specified elevation. In removing sheeting or bracing, all necessary precautions shall be taken to prevent voids and collapse of excavation sides. Voids, if formed, shall immediately be filled with structural fill and then compacted.
 - 2. The installation of sheeting, shoring, and bracing shall comply with the safety precautions as outlined in the Associated General Contractors of America "Manual of Accident Prevention in Construction," and all local

and state regulations. Dewatering shall be performed as required or as directed by the Engineer for all excavations below ground water level.

- C. Comply with local and state safety regulations and with the provisions of the Occupational Safety and Health Act (OSHA).

3.8 FILLING AND BACKFILLING

- A. Base courses for site structures, pavements and sidewalks shall be made with materials indicated on the drawings, and specified in the standard specifications.
- B. Frost
 1. Do not excavate to full indicated depth when freezing temperatures may be expected, unless fill material or structures can be constructed immediately after the excavation has been completed. Protect the excavation from frost if placing of fill or structure is delayed.
 2. Fill shall not be placed over frozen soil which is more than one inch (1") thick. Soil that is frozen to a depth greater than one (1") inch shall be removed prior to placement of compacted fill. Remove all frozen uncompacted soil prior to placing additional fill for compaction.
- C. Protect fill area by grading to drain and providing a smooth surface which will readily shed water. Grade the surface of the areas in such a manner as to prevent ponding of surface runoff water in areas to receive compacted fill.
- D. To the extent that it is practicable, each layer of fill shall be compacted to the specified density the same day it is placed.
- E. Fill that is too wet for proper compaction shall be diced, harrowed or otherwise dried to the proper moisture content for compaction to the required density. If the fill material cannot be dried within 48 hours of placement, it shall be removed and replaced with drier fill.
- F. Fill that is too dry for proper compaction shall receive water uniformly applied over the surface of the loose layer. Sufficient water shall be added to allow compaction to the required density.
- G. Fill shall be placed in horizontal layers not to exceed thicknesses previously specified. Where the horizontal layer meets a natural rising slope, the layer shall be keyed into the slope by cutting a bench.
- H. The subgrade areas to be fine graded for loaming and seeding, mulching and landscaping shall be raked to remove all stones larger than 2" diameter and other unsatisfactory material and shall then be rolled. Any depressions which may occur during the rolling shall be filled with additional suitable material and the

surface regraded and rerolled until true to the lines and grades required. Care shall be taken not to affect the line or grade of walls and footings during grading and rolling operations.

I. All fill materials shall be spread uniformly by acceptable methods over the areas required to be covered so that the required thickness after compaction shall be obtained. The material shall be thoroughly consolidated by vibratory tampers, hand tamping or other approved means, to the final compacted grades as required. In no case shall the fill materials be placed in excess of 12 inches for each lift before compaction.

J. Pavement Subgrade Preparation

1. All topsoil, organic material, and unsuitable material shall be removed from proposed pavement areas. Remove all material to finish subgrade lines shown on the drawings. Remove any material below the subgrade levels as directed by the Engineer.
2. Subgrade fills, where required, may be placed in loose lifts not exceeding 1 foot thickness and compacted to at least 95 percent of the maximum dry density as determined by ASTM D-1557, Method C. Pavement subgrade fill may consist of compacted common borrow.

K. Unpaved and Landscaped Area Preparation

1. Surficial topsoil and borrow may be left in place in landscape and unpaved areas. Common borrow, where required, may be placed in lifts and compacted to at least 90 percent of the maximum dry density as determined by ASTM D-1557, Method C.

3.9 COMPACTION

A. Fills, refills and backfills within the new pavement areas and the various areas listed below shall be compacted to not less than the following specified maximum dry densities as determined by ASTM D-1557.

B. Compaction Requirements

<u>Areas</u>	<u>Minimum Degree of Compaction</u>
1. Below Pavement	95%
2. Trench Bedding Material and Backfill Material	95%
3. Below Grassed or landscaped areas	90%

C. Methods: The compaction guidelines given are stated to provide minimum compaction standards only and in no way relieves the Contractor of his obligation

to achieve the above specified degree of compaction by whatever additional effort is necessary.

D. Compaction requirements specified herein for all soils shall be in accordance with ASTM maximum dry densities as determined by ASTM D-1557 Method C for soils that exhibit a well drained moisture density relationship and in accordance with ASTM D-2049 for soils which do not exhibit a well drained moisture density relationship.

E. The in-place soil density shall be determined in accordance with ASTM Standard Test Method for Density of Soil in Place by the Sand Cone Method, Designation D-1556 or ASTM Standard Method of Density of Soil and Soil Aggregate in Place by Nuclear Methods (shallow depth), Designation D-2922.

F. Minimum compaction testing shall not be less than one compaction test for 250 linear feet of roadway per twelve (12) inch lift.

G. Test Prior to Placement

All soil samples proposed to be used for fills, refills, and backfills shall be delivered to the testing laboratory by the Contractor. All costs for obtaining, transporting and delivering soil samples to the testing laboratory shall be borne by the Contractor.

H. Tests After Field Compaction

Compaction tests shall be performed following field compaction. These field density tests shall be made by the Geotechnical Engineer to determine the actual in-place densities being attained.

I. Correction of Improper Compaction

If any of the field density test results fail to meet the density as specified herein for the earthwork involved, then the Contractor shall remove all of the earthwork in that portion of the Work involved as determined by the Engineer, and shall replace it in accordance with these Specifications to the required density. After the Work is replaced additional field density tests shall be made by the Geotechnical Engineer and the Contractor shall be responsible for all costs for such additional testing and material.

J. No rolling equipment shall be used to compact materials within four (4) feet of the vertical faces of any concrete walls or utility pipes or within the height of the wall for walls which retain soil. Plate vibratory tampers shall be used in these restricted areas and in other areas too confined to satisfactorily use rolling equipment.

3.10 GRADING

A. General

Perform all rough and finish grading required to attain the elevations shown on the Drawings, or as otherwise directed by the Engineer or required for a complete and proper job.

B. Rough Grading

Proper allowances shall be made for paving, or other finish surfaces. Rough grading shall be reasonably even and free from irregularities, and shall provide positive drainage away from structures without ditching or pools.

C. Fine Grading

Any depressions which may occur shall then be filled with additional suitable materials and the surface then regraded until true to the lines and grade required. Areas to be fine graded for loaming and seeding shall be raked to remove all stones and other unsatisfactory materials and shall be suitably compacted.

D. Treatment After Completion of Grading

After Grading is completed, permit no further excavating, filling, or grading. Use all means necessary to prevent erosion of freshly graded areas during construction and until such time as permanent drainage and erosion control measures have been installed.

3.11 WINTER PROTECTION

A. General

If the contractor plans for work to continue through the winter after paving plants have closed, any exposed areas shall be monitored and maintained by the contractor. Exposed soil shall be mulched in accordance with Section 31 25 00 and areas for future paving shall be "cold patched" and maintained at adjacent pavement grade throughout the winter until pavement plants re-open.

3.12 DUST, EROSION AND ENVIRONMENTAL CONTROLS

- A. Dust control shall be maintained constantly throughout the construction period and shall be accomplished by the uniform application of calcium chloride at the rate of 1 1/2 pounds per square yard by means of a lime spreader or other approved method. Water may also be used for dust control and applied by sprinkling with water trucks with distributors for that purpose as required or directed by the Engineer to maintain dust control.

- B. The Contractor shall be responsible for exercising every precaution to prevent erosion and siltation of lower elevations, existing drainage systems and adjacent bodies of water throughout the construction period. All damage caused by inadequate erosion control measures shall be repaired at the Contractor's expense. Erosion and siltation shall be effectively controlled by the construction and continual use of sedimentation barriers as shown on drawings and as directed by the Engineer. See Section 31 25 00.
- C. All environmental controls shall be performed in accordance with all applicable rules and regulations of local, county and state agencies having jurisdiction.

3.13 ROCK REMOVAL

A. General

- 1. This section includes the excavation and disposal of all rock and boulders encountered to the lines and grades indicated on the drawings or as specified. The Contractor shall dispose of the excavated material and shall furnish suitable backfill material in place of the excavated rock. Rock shall be removed to a minimum depth as detailed on the drawings.
- 2. Blasting shall not be allowed for this phase of the project.

B. Execution

- 1. Whenever possible, rock excavation shall be by use of modern mechanical means including ripper, large backhoe, jack hammers, predrilling at close spacing to aid excavation and other means selected by the Contractor. The use of explosives shall be limited as much as practicable by utilizing mechanical methods of excavation to the maximum feasible extent throughout the area. If mechanical methods are not feasible, the Contractor shall employ only controlled blasting methods to assist in rock excavation.

C. Excess Rock Excavation

- 1. If rock is excavated beyond the limits of payment indicated on drawings, specified, or authorized in writing by the Engineer, the excess excavation, whether resulting from over breakage or other causes, shall be backfilled, by and at the expense of the Contractor, with material approved by the Engineer.

- END OF SECTION -

SECTION 31 25 00

EROSION AND SEDIMENTATION CONTROLS

PART 1 GENERAL

1.1 SUMMARY

- A. Provide all labor, material, equipment, and services and maintain temporary erosion control devices as specified herein and shown on plans.
- B. The Work of this section includes but is not necessarily limited to:
 - 1. Provide such erosion control measures as may be 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.
 - 2. Construction operations shall comply with all federal, state and local regulations pertaining to erosion control.
 - 3. All work shall be in compliance with the most current editions of the "Maine Erosion & Sediment Control Handbook for Construction: Best Management Practices" by the Maine Department of Environmental Protection.
 - 4. After awarded 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.
- C. Refer to other Divisions of these Specifications, other Sections in this Division, and Drawings for related Work which may affect the Work of this Section. General requirements of Division 1 apply to this section.

1.2 SUBMITTALS

- A. None.

1.3 QUALITY ASSURANCE

- A. Documents affecting Work of this Section include but are not necessarily limited to the Conditions of the Contract, General Conditions, Supplementary Conditions, Addenda and all Sections of Division 1, and all apply to this Section.
- B. Coordinate Work with that of other trades affecting or affected by Work of this Section. Cooperate with such trades to assure the steady progress of the Work.
- C. All Work shall comply with the applicable requirements of the Maine Department of Environmental Protection (DEP), the U.S. Environmental Protection Agency

(EPA) and Town of Union, Maine standards to minimize adverse environmental impacts.

- D. All Work shall be accomplished in accordance with regulations of local, county and state agencies and national or local utility company standards as they apply.
- E. The Contractor shall pay all fines issued to the Owner as a result of poor erosion control practices by the Contractor.
- F. The Contractor shall bear all cost associated with correcting any Work that does not meet the requirements of this Section or any damaged items due to construction activities. These costs include any professional services required for inspection or repairs or replacements.
- G. The Contractor shall use all means necessary to protect all materials of this Section before, during, and after installation and to protect all objects designated to remain. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner's representative and at no additional cost to the Owner.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Silt Fence: Material shall comply with MDOT 656.02 and shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of 6 months of expected useable construction life at a temperature range of 0 to 120 degrees F. Post spacing shall not exceed 8 feet.
- B. Erosion Control Filter Berm: Material shall consist of wood waste compost/bark mulch mix or recycled composted bark flume grit and fragmented wood generated from water-flume log handling systems. The mix shall conform to the following standards:
 - 1. Moisture Content – 30-60%
 - 2. pH – 5.0-8.0
 - 3. Screen Size – 100% less than 3”, maximum 70% less than 1”
 - 4. No less than 40% organic material (dry weight) by loss of ignition
 - 5. No stones larger than 2” diameter
- C. Baled Hay: 20" X 20" X 30" - 40 lbs/bale minimum. Bales shall be free from weed seeds and rough or woody materials.
- D. Mulches: Compost, manure, corn stalks, gravel, crushed stone, loose hay, straw, peat moss, pine straw or needles, sawdust, wood chips, wood excelsior, or wood fiber cellulose.

- E. Seed
 - 1. Temporary Erosion Control Seed Mix – Aroostook Rye
 - 2. Permanent Grass Seed Mix – See Section 32 92 00.

- F. Lime & Fertilizer
 - 1. Temporary Erosion Control Lime – Agricultural Ground Limestone
 - 2. Temporary Erosion Control Fertilizer – 10-10-10
 - 3. Permanent Seeding Lime & Fertilizer – See Section 32 92 00.

PART 3 EXECUTION

3.1 GENERAL

- A. The Contractor shall be responsible for exercising every precaution to prevent erosion and siltation of lower elevations, existing drainage systems and adjacent bodies of water throughout the construction period. All damage caused by inadequate erosion control measures shall be repaired at the Contractor's expense. Erosion and siltation shall be effectively controlled by the construction and continual use of sedimentation barriers as shown on drawings, dust control as described below, and as directed by the Engineer.

- B. All environmental controls shall be performed in accordance with all applicable rules and regulations of local, county and state agencies having jurisdiction.

- C. Each ground area opened or exposed, whether directly or indirectly due to the construction, shall be minimized and shall be stabilized within 7 days of the last working of the mineral soil, and shall be stabilized within 7 days of final grading.

- D. Temporary soil stabilization shall be either by temporary mulching, temporary seeding, or permanent base gravel, as described below.

3.2 MULCH

- A. Mulching shall be done immediately after each area has been properly prepared. When seed for erosion control is sown prior to placing the mulch, the mulch shall be placed on the seeded areas within 24 hours after seeding. Hay that has been thoroughly fluffed shall be applied at approximately, three (3) tons per acre unless ordered. Blowing chopped mulch will be permitted when authorized. Authorization will be given when it can be determined that the mulch fibers will be of such length and applied in such a manner that there will be a minimum amount of matting that would retard the growth of plants. Hay mulch should be applied evenly at a rate of 150 – 200 lbs / 1000 square feet of area.

- B. In order to prevent its being blown away, after the mulch has been spread to the required depth, a light covering of loose branches, a system of pegs and strings, or other approved anchoring method shall be employed. Unless otherwise ordered, such means of control shall be removed prior to the acceptance of the project.
- C. All baling wire or rope, such as that used in the shipment of mulch, shall be disposed of outside the limits of the project in approved areas.

3.3 SEED FOR EROSION CONTROL

- A. Areas to be left temporarily and which will be re-graded or otherwise disturbed later during construction may be ordered to be seeded to obtain temporary control. Seed for temporary erosion control shall be Aroostook Rye applied at 2.6 lbs/1000 square feet. Agricultural ground limestone shall be applied at a rate of 13.8 lbs/1000 square feet and fertilizer shall be 10-10-10 applied at a rate of 13.8 lbs/1000 square feet.
- B. Temporary seeding shall only be made between April 15th and October 15th and shall not be placed over snow. If the seeding is not completed by October 15th, double the quantity of mulch will be added to provide adequate winter protection.

3.4 DUST CONTROL

- A. Dust control shall be maintained constantly throughout the construction period and shall be accomplished by the uniform application of calcium chloride at the rate of 1 1/2 pounds per square yard by means of a lime spreader or other approved method. Water may also be used for dust control and applied by sprinkling with water trucks with distributors for that purpose to limit fugitive dust.

3.5 MAINTENANCE

- A. Hay mulch that blows or washes away shall be replaced immediately.

- END OF SECTION -

SECTION 31 32 19

GEOTEXTILE FABRIC SOIL STABILIZATION AND LAYER SEPARATION

PART 1 GENERAL

1.1 SUMMARY

- A. Without limiting the generality thereof, the work under this Section consists of furnishing all labor, equipment, supplies, services and materials and performing all operations in connection with the installation of geotextile fabric of the types, dimensions and locations indicated on the drawings and as specified herein.

1.2 SUBMITTALS

- A. Submit product data indicating manufacturer, fabric type and construction.
- B. Manufacturer shall furnish certified test report with each shipment of material attesting that the fabric meets the requirements of this Specification.

1.3 QUALITY ASSURANCE

- A. Refer to other Divisions of these Specifications, other Sections in this Division, and Drawings for related work which may affect the work of this Section.
- B. The geotextile manufacturer shall have a competent laboratory at the location of production capable of performing the ASTM tests as outlined in the specification to insure quality control.
- C. During all periods of shipment and storage, each geotextile roll shall be wrapped with a heavy duty material that will protect the geotextile from damage due to shipment, water, sunlight and contaminants.
- D. During storage, geotextile rolls shall be elevated off the ground and adequately covered to protect them from the following: site construction damage, precipitation, extended ultraviolet radiation including sunlight, chemicals that are strong acids or strong bases, flames including welding sparks, excess temperatures, mud, dust, debris and any other environmental conditions that may damage the physical property values of the geotextile.

PART 2 PRODUCTS

2.1 MATERIALS

A. Non-Woven Geotextile Fabric

Non-woven geotextile fabric used for drainage, separation and under riprap shall be Mirafi 140N or its technical equivalent and shall meet the following minimum properties:

<u>Mechanical Property</u>	<u>Test Method</u>	<u>Minimum Average Roll Value</u>
Grab Tensile Strength	ASTM D4632	120 lbs
Grab Tensile Elongation	ASTM D4632	50 %
Trapezoidal Tear Strength	ASTM D4533	50 lbs
CBR Puncture Strength	ASTM D6241	310 lbs
Apparent Opening Size (max)	ASTM D4751	US Sieve 70
Permittivity	ASTM D4491	1.7 sec ⁻¹
Flow Rate	ASTM D4491	135 gal/min/ft ²
UV Resistance (at 500 hrs)	ASTM D4355	70 %

B. Geotextile for Subgrade Stabilization and Base Reinforcement

Geotextile fabric used to stabilize and reinforce an aggregate cover material (subbase, base, select embankment, etc.) of an unpaved or paved roadway shall be Mirafi RS380i or its technical equivalent and shall meet the following minimum properties:

<u>Mechanical Property</u>	<u>Test Method</u>	<u>Typical Roll Value</u>	<u>Min Average Roll Value</u>
Tensile Modulus @ 2% strain	ASTM D4595	60000 lbs/ft	51000 lbs/ft
Tensile Modulus @ 5% strain	ASTM D4595	51600 lbs/ft	45120 lbs/ft
Flow Rate	ASTM D4491	85 gal/min/ft ²	75 gal/min/ft ²
Permittivity	ASTM D4491	1.2 sec ⁻¹	0.9 sec ⁻¹
Pore Size 0 ₉₅	ASTM D6767	365 microns	
Pore Size 0 ₅₀	ASTM D6767	185 microns	
Interaction Coefficient	ASTM D6706	0.89 for (sand or gravel)	
Apparent Opening Size (max)	ASTM D4751	US Sieve 50	US Sieve 40
Factory Sewn Seam	ASTM D4884	2700 lbs/ft	
UV Resistance (at 500 hrs)	ASTM D 4355	90 %	

PART 3 EXECUTION

3.1 CONSTRUCTION

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

- END OF SECTION -

SECTION 32 92 00
TURF AND GRASSES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Seeding.
 - a. Turfgrass (lawn) species

B. DESCRIPTION OF WORK

1. Provide all materials and equipment, and do all work required to complete the loaming, seed bed preparation, seeding and maintenance through establishment.

C. RELATED WORK

1. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:
 - a. Section 31 20 00 – EARTHWORK
 - b. Section 31 25 00 – EROSION AND SEDIMENTATION CONTROLS

1.2 DEFINITIONS

- A. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.
- B. Finish Grade: Elevation of finished surface of planting soil.
- C. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- D. Planting Soil: Native or imported topsoil; manufactured topsoil or surface soil modified with soil amendments to become topsoil.
- E. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill before planting soil is placed.
- F. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1.4 SUBMITTALS

- A. Certification of Grass Seed: From seed vendor for each mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination and weed seed. Include the year of production and date of packaging.
- B. Product Data: From manufacturer for all manufactured soil amendments
- C. Soil Test Reports: For existing surface soils to be reused on site and imported topsoil
- D. Seeding Schedule: Indicating anticipated seeding dates for all areas

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape installer whose work experience includes installation of turfgrass as well as conservation applications, such as native grasses and wildflower seeding.
 - 1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
- B. Soil Analysis: Furnish soil analysis by the Maine Soil Testing Laboratory stating percentages of organic matter; gradation of sand, silt and clay content; cation exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of the topsoil. Recommendations and reporting shall include the following:
 - 1. Report suitability of tested soil for turf and conservation cover, including wildflowers.
 - 2. Recommendations:
 - a. State recommendations for nitrogen, phosphorus, and potash nutrients and soil amendment to be added to produce satisfactory planting soil suitable for healthy, viable plants.
 - b. Reported presence of problem salts, minerals, or heavy metals; if present, provide additional recommendations for corrective action.
 - c. Evidence of invasive or noxious plant material, including root fragments and seeds

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable.

1.7 PROJECT CONDITIONS

- A. Seeding Restrictions: Plant during one of the following periods unless otherwise approved by the Landscape Architect. Coordinate maintenance period with dates of seeding completion.
 - 1. Turfgrass Mix
 - a. Seeding Windows: Seeding can commence April 15, or when soil conditions reach 40 degrees Fahrenheit through September 15, or 30 days prior to hard Frost, with the noted Seeding Restrictions.
 - b. Seeding Restrictions: No seeding shall occur between July 1 and August 15, or when soil temperature exceeds 70 degrees Fahrenheit. In some instances, the Landscape Architect may grant exceptions, provided moisture conditions are favorable and soil temperatures do not exceed 75 degrees Fahrenheit.
- B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions are favorable.

1.8 MAINTENANCE SERVICE

- A. Initial Maintenance of Seeded Areas: Provide full maintenance by skilled employees of landscape installer. Maintain as required in Part 3. Begin maintenance immediately after each area is seeded and continue until acceptable turf is established but for not less than the following periods:
 - 1. Seeded Turf Areas:
 - a. Continue maintenance for a minimum of 60 days, or until attainment of a reasonably thick uniform stand of permanent grass species with at least 90 percent coverage, free from sizable thin or bare spots and invasive plant species.
 - b. When initial maintenance period has not elapsed before end of planting season, or if seeded area is not fully established, continue maintenance during next planting season.
 - c. Reseeding: Upon completion of work on the project, seeded areas that have not been accepted shall be reseeded.

PART 2 - PRODUCTS

2.1 SEED

- A. All seed shall be certified as to mixture and shall conform to the following requirements:
 - 1. Percent germination >80%
 - 2. Pure live seed >85%
 - 3. Percent Purity >85%
 - 4. Weed Seed <1%
 - 5. Inert Matter <7%

6. All seed shall be from the current year's crop unless recent tests by an approved testing agency demonstrate that older seed meets the above requirements.

B. Seed Species: State-certified seed of grass species as follows:

1. Turfgrass Mix: Proprietary, as noted, or similar approved, proportioned by weight as follows:

Botanical Name	Common Name	Percentage
Festuca rubra var. rubra (endophyte enhanced)	Creeping Red Fescue	15.00%
Lolium multiflorum	Perennial Ryegrass	15.00%
Poa pratensis 'KenBlue'	Kentucky Blue Grass	35.00%
Festuca rubra var. commutate 'Tiffany'	Chewings Fescue	15.00%

C. Proprietary Mixes:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work are as follows.
 - a. Turfgrass Seed: Park Mix by Allen, Sterling & Lothrop, Falmouth, ME.; tel. 207-781-4142.
 - b. Turfgrass Seed: Park Mix, Approved Equal

2.2 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
 1. Class: O, with a minimum of 95 percent passing through No. 8 (2.36-mm) sieve and a minimum of 55 percent passing through No. 60 (0.25-mm) sieve.
- B. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.
- C. Aluminum Sulfate: Commercial grade, unadulterated.
- D. Perlite: Horticultural perlite, soil amendment grade.
- E. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 (0.30-mm) sieve.
- F. Sand: Clean, washed, natural or manufactured, and free of toxic materials.

2.3 ORGANIC SOIL AMENDMENTS

- A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1/2-inch (12.5-mm) sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings.

2.4 FERTILIZERS

- A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 15 percent phosphoric acid.
- B. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.
- C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
 - 1. Composition: As recommended by the Maine Soil Testing Service based on the submitted soil samples for the project.
- D. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
 - 1. Composition: As recommended by the Maine Soil Testing Service based on the submitted soil samples for the project.

2.5 PLANTING SOILS

- A. Planting Soil: ASTM D 5268 topsoil, with pH range of 5.5 to 7, a minimum of 2 percent organic material content. Verify suitability of soil to produce viable planting soil. Clean soil of roots, plants, sod, stones, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth. Amend soil as recommended by the Maine Soil Testing Service based upon the submitted soil samples for intended use.

2.6 MULCHES

- A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 6 inches (150 mm). Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 - 1. Thoroughly blend planting soil off-site before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil.
 - 2. Spread planting soil to the specified minimum depth but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
 - a. Turfgrass Mix Areas: Topsoil depth of 4 inches minimum.
- B. Unchanged Subgrades: If seeding in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:
 - 1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
 - 2. Loosen surface soil to a depth of at least 6 inches (150 mm). Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 6 inches (150 mm) of soil. Till soil to a homogeneous mixture of fine texture.
 - 3. Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, trash, and other extraneous matter.
 - 4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.
- C. Finish Grading: Grade seeding areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch (13 mm) of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.
- D. Moisten prepared area before seeding if soil is dry. Water thoroughly and allow surface to dry before seeding. Do not create muddy soil.
- E. Before seeding, obtain Landscape Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.2 SEEDING

- A. Do not broadcast or drop seed when wind velocity exceeds 5 mph (8 km/h). Evenly distribute seed by sowing equal quantities in two directions at right angles to each other. Do not seed against existing trees, shrubs or within defined planting beds. Limit extent of seed to outside edge of planting saucers.

- B. Sow seed at a total rate indicated on the plans and/or according to the application rate recommended by the manufacturer for the season of the application.
 - 1. Turfgrass Seed
 - a. Application. Sow by hand or broadcast spreader in areas under an acre at a rate of 1 lb. per 200 square feet.
- C. Lightly rake seed lightly into top 1/8 inch (3 mm) of soil, roll lightly, and water with fine spray.
- D. Roll surface with a hand-powered lawn roller to ensure even seed to soil contact
- E. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre (42 kg/92.9 sq. m) to form a continuous blanket 1-1/2 inches (38 mm) in loose thickness over seeded areas. Spread by hand, blower, or other suitable equipment.
 - 1. Anchor straw mulch by crimping into soil with suitable mechanical equipment.
- F. Protect seeded areas with slopes exceeding 3:1, or as noted on the plans, with short-term biodegradable Turf Reinforcement Mat, Model S75 by North American Green, or equal. Install per manufacturer's specifications.

3.3 MAINTENANCE

- A. Turfgrass:
 - 1. Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.
 - a. Provide and maintain temporary piping, hoses and watering equipment as required to convey water from sources to planted areas.
 - b. Schedule watering to prevent wilting, puddling, erosion and displacement of seed or mulch, Lay out temporary watering system to avoid pedestrian and newly planted areas.
 - 2. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain height of 2-1/2 to 3 inches without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowings.

3.4 SATISFACTORY COVERAGE

- A. All seeding installations shall meet the following criteria as determined by Landscape Architect:

1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. (0.92 sq. m and bare spots not exceeding 5 by 5 inches (125 by 125 mm).
- B. Use specified materials to reestablish Seeded Turf that does not comply with requirements and continue maintenance until coverage is satisfactory.

- END OF SECTION -

SECTION 33 41 11

SITE STORM DRAINAGE UTILITY PIPING

PART 1 GENERAL

1.1 SUMMARY

- A. Without limiting the generality thereof, the work under this Section consists of furnishing all labor, equipment, supplies, services and materials and performing all operations in connection with the installation of under-drainage systems and storm drainage systems, including piping, pipe end sections, and all related work required for the storm drainage system as indicated on the drawings and as specified herein.

1.2 SUBMITTALS

- A. Submit product data indicating pipe, pipe accessories, and appurtenances.
- B. Submit shop drawings for all storm drainage items, described or indicated on the drawings for approval prior to ordering.

1.3 QUALITY ASSURANCE

- A. Refer to other Divisions of these Specifications, other Sections in this Division, and Drawings for related work which may affect the work of this Section.
- B. These Specifications specify material and work requirements for this project, but do not define limits of construction for the project.
- C. All work shall be accomplished in accordance with regulations of local, county and state agencies as they apply.
- D. Secure all necessary permits from municipal, county and state departments having jurisdiction prior to the start of construction and furnish proof of acceptance upon completion of the work.
- E. The Engineer may make adjustments in grades and alignment as are found necessary in order to avoid interference and to adapt the storm drains to other special conditions encountered.

PART 2 PRODUCTS

2.1 PRODUCTS

- A. Piping for site drainage work shall be of the following materials:
1. High Density Polyethylene Pipe (HDPE)
 - a. The products supplied under this specification shall be high density polyethylene corrugated exterior/smooth interior pipe. Four through ten inch diameters shall meet all requirements of AASHTO M252 with the addition that the pipe have a smooth interior liner. Twelve to thirty-six inch diameters shall conform to AASHTO M204 Type S. Forty-two and forty-eight inch diameters shall have minimum pipe stiffness' of 20 and 17 psi, respectively, at 5% deflection; and shall meet all other requirements of AASHTO M294.
 2. Poly Vinyl Chloride (PVC) Pipe
 - a. The products supplies under this specification shall be Schedule 40 bell and spigot style solvent sealed joint end. This material shall conform to ASTM D 1785.
- B. Structures
1. Precast Concrete Catch Basins
 - a. Precast concrete catch basins shall be precast concrete of dimensions and depth indicated on drawings or otherwise specified
 - b. Circular precast catch basins shall be conforming to ASTM C478. The base section shall consist of a 6-inch minimum thickness floor slab and 5-inch minimum thickness walls and base riser sections. Riser sections shall be 5-inch minimum thickness walls with lengths to provide depth indicated on drawings or otherwise specified. Top section shall be eccentric cone type.
 - c. Gaskets shall be flexible butyl resin sealant meeting the requirements of ASTM C990.
 - d. Steps, if required, shall be cast aluminum or steel reinforced polypropylene cast or anchor into base, riser, and top section sidewalls with steps at 12" intervals.
 - e. Pipe connectors shall be ASTM C923 resilient, of size required for each pipe connecting to base section.
 2. Type F Concrete Catch Basins (Precast Concrete Field Inlets)
 - a. Precast concrete field inlets shall be 24-inch square interior dimensions with 5 ½ inch minimum wall and floor thickness.
 - b. Riser sections shall be 5 ½ inch minimum thickness walls with 24-inch square interior dimensions and lengths to provide depth indicated on drawings or otherwise specified.
 - c. Pipe connectors shall be ASTM C923 resilient, of size required for each pipe connection to base section.

3. Castings
 - a. Catch basin and field inlet frames and grates shall be ASTM A536 Grade 60-40-18 ductile-iron castings designed for heavy duty service.

PART 3 EXECUTION

3.1 CONSTRUCTION

- A. Pre-Installation Stakeout and Approval
 1. The contractor shall stakeout all culvert and storm drain inlets and outlets with invert elevations shown for approval of the Engineer prior to installation. The Engineer may adjust the locations and grades of storm drains at their discretion.
- B. Site and Trench Excavation, Fill and Backfill
 1. Perform all pavement replacement, repair and patching, as specified under asphalt paving.
 2. Trench widths shall be sufficient to permit proper installation of the work, and bottoms of trenches shall be evenly graded. Excavations below required depths shall be refilled with $\frac{3}{4}$ " crushed stone and compacted. Immediately after trench excavations have been carried to the required grades, the exposed surface of the existing bottom shall be cleaned of all loose disturbed materials. Where the trench bottom is below the water level or within saturated earth materials, bedding below the storm drain shall be made with a minimum of 12 inches of crushed stone. Pipe beds in bedding material shall be rounded to accommodate the bottom quadrant of the pipe and to provide full support and uniform bearing for the entire length of the pipe barrel.
 3. Control and pitch the grading to prevent water from running into the excavated areas of the site or drain, or to prevent damage to other structures or work already accomplished.
 4. Furnish all pumping and other dewatering equipment necessary to keep excavated areas dry during construction. Water shall not be conducted onto adjacent property except in existing water courses.
 5. After piping and structures have been installed, tested, inspected and approved by the Engineer, bedding material as specified shall be carefully hand placed and hand tamped in 6 inch layers, under, around and to the spring line of the pipe. After this, backfill shall be carefully placed in eight inch layers to a level 1 foot above the top of the piping. The remaining excavation shall be backfilled with approved backfill materials, compacted in 1 foot layers loose measure. Backfill shall be compacted to not less than 95 percent of the ASTM maximum dry densities as specified herein.

6. Obtain information from the Owner and proper authorities concerning locations of existing utilities within the scope of this work in order to avoid damage to such utilities. The Owner will not be responsible for any such damage. Restore any structure and repair any resultant damage without additional cost to the Owner.
 - a. Rules and regulations governing the respective utilities shall be observed. Active utilities shall be adequately protected from damage and shall not be removed or relocated except as indicated or directed. Inactive and abandoned utilities shall be reported in writing to the Engineer and shall be removed, plugged or capped as directed.
7. Excavations shall be adequately sheeted, shored and braced as necessary to permit proper execution of the work and to protect all slopes and earth banks. Sheet piling shall be installed if required to prevent cave-ins or settlement and to protect workmen, adjacent structures and utilities. Shoring and piling may be removed as the backfilling progresses, but only when banks are safe against caving.
8. Excavation of earth, boulders or rock beyond indicated or authorized limits shall be refilled at no additional expense to the Owner with gravel compacted to 95 percent of the maximum dry density at optimum moisture content, or crushed stone, as required by the Engineer.

- END OF SECTION -