Section 14
Basic Standards

Maine GenLead, LLC (Maine Gen) has prepared the Transmission Line Erosion and Sedimentation Control Plan (the T-Line E&S Plan or Plan) to be a stand-alone document containing all erosion and sedimentation control requirements related to the 115-kilovolt (kV) Transmission Line Project (project). The T-Line E&S Plan contains standards and methods used to protect terrestrial and aquatic resources during construction of the transmission line. The Plan is based on the Maine Department of Environmental Protection's Maine Erosion and Sediment Control Best Management Practices (BMPs), dated March 2003, and the experience gained from the practical application of the BMPs for construction of transmission lines in utility corridors during Maine Gens' recent construction of the Line 56 Project.

The project is an approximately 59-mile 115-kV transmission line that would extend from the Evergreen Wind Power II, LLC's amended Oakfield Wind Power Project to the Bangor Hydro Electric Company (BHE) Keene Road 115kV Substation. Approximately 60 percent of the total length of the project would be adjacent to existing transmission corridors. The purpose of the Plan is to supply the transmission line contractors, Maine GenLead's Environmental Inspector's, and agency Third Party Inspectors with a single cohesive set of erosion control specifications for this project. The document is designed to provide specifications for the installation and implementation of soil erosion and sedimentation control measures while allowing adequate flexibility to apply the most appropriate measures based on site-specific conditions, the construction sequence, timing and weather. The T-Line E&S Plan is provided as Appendix 14-1.

The for proposed permanent access roads is included on the plan set found in Exhibit 2.

Appendix 14-1

Maine GenLead LLC

OAKFIELD 115 kV TRANSMISSION LINE

EROSION AND SEDIMENTATION CONTROL PLAN

Prepared for
Maine GenLead, LLC
129 Middle Street
Portland, Maine 04101

Prepared by
TRC Environmental Corporation
400 Southborough Drive
South Portland, Maine 04106

May 2011

TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 PROJECT BACKGROUND 2

3.0 PLANNING AND DESIGN CONSIDERATIONS 2

3.1 Soil Erosion and Sedimentation Potential 2

3.2 Resources 3

3.3 Project Walk-Through 4

3.3.1 Use of Flagging and Signs 4

3.3.2 Construction Access 4

4.0 CONSTRUCTION SCHEDULE 5

4.1 General 5

4.2 Typical Construction Sequence 5

4.2.1 Clearing 5

4.2.2 Transmission Line Construction 6

4.2.3 Clean-up and Final Stabilization 6

4.3 Erosion and Sedimentation Control Implementation Schedule 7

5.0 STANDARDS FOR CONSTRUCTION 7

5.1 Temporary Travel Lanes, Access Ways and Yarding Areas 7

5.2 Stream and Wetland Crossings 8

5.2.1 Types of Crossings Used 8

5.2.2 Construction in Wetlands 9

5.3 Construction in Buffer Areas 9

5.3.1 Stream Buffers 9

5.3.2 Significant Vernal Pool Buffers 10

5.3.3 Rare Plant Community Buffers 10

6.0 RESOURCE CROSSINGS 10

6.2 Temporary Timber Mat Bridges 10

6.2.1 Materials 10

6.2.2 Sizing 10

6.2.3 Positioning 11

6.2.4 Maintenance 11

6.2.5 Removal 11

6.3 Culverts 11

6.3.1 Materials 11

6.3.2 Sizing 12

6.3.3 Positioning 12

6.3.4 Installation 12

6.3.5 Removal 13

6.4 Construction Mats 13

6.4.1 Materials 13

6.4.2 Installation 13

6.4.3 Maintenance 14

6.4.4 Removal 14

7.0 SURFACE WATER DIVERSION (WATER BARS) 14

7.1 Materials 14
7.2 Positioning 14
7.3 Installation 15
7.4 Maintenance 15
7.5 Removal 15
8.0 STRUCTURAL MEASURES 15
8.1 Erosion Control Barriers 15
8.1.1 Use of Typical Erosion Control Barriers 16
8.1.2 Maintenance of Erosion Control Barriers 17
8.1.3 Removal of Erosion Control Barriers 17
8.2 Stone Check Dams 17
8.2.1 Maintenance of Check Dams 17
8.2.2 Removal of Check Dams 18
8.3 Construction Entrance 18
9.0 NON-STRUCTURAL MEASURES 18
9.1 Temporary Measures 18
9.1.1 Temporary Mulching 18
9.1.2 Erosion Control Matting 18
9.1.3 Temporary Seeding 19
9.1.4 ECM 19
9.1.5 Brush and Slash 19
9.1.6 Maintenance of Temporary Measures 20
9.1.7 Dust Control 20
9.2 Permanent Measures 21
9.2.1 Permanent Mulching 21
9.2.2 Permanent Revegetation 21
10.0 WINTER CONSTRUCTION 21
11.0 SITE RESTORATION 22
11.1 Restoration Procedures 22
12.0 TEMPORARY EROSION CONTROL REMOVAL 23
13.0 SUPERVISION AND INSPECTION 24
13.1 Contractor Environmental Representative 24
13.2 Permittee Environmental Inspector 24
13.3 DEP Third Party Inspector 25
14.0 ENVIRONMENTAL TRAINING FOR CONTRACTORS 25

APPENDIX A EROSION AND SEDIMENTATION CONTROL MEASURE ILLUSTRATIONS
APPENDIX B PROJECT CONTACT LIST

1.0 INTRODUCTION

This Erosion and Sedimentation Control Plan (E&S Plan) has been developed to provide a strategy for controlling erosion and sedimentation that may result from the construction of the Maine GenLead LLC's (MaineGen or the Permittee) 115 kilovolt (kV) Transmission Line Project (the project) that would extend from the amended Oakfield Wind Power Project in Oakfield to the Keene Road Substation in Chester, and to ensure all disturbed areas remain stabilized following construction. This plan is based upon sound conservation practices such as those outlined in the Maine Department of Environmental Protection (MDEP or Department) *Maine Erosion and Sediment Control Best Management Practices (BMPs)*, dated March 2003, and the experience gained from the practical application of the BMPs for construction of transmission lines in utility corridors during the recent construction of the Line 56 Project. Please refer to Appendix A of this E&S Plan for illustrations of proper installation techniques for erosion and sedimentation control measures along with illustrations of improper installation as a basis for comparison. For information regarding the location of the transmission line corridor and structures, existing ground cover, sensitive natural resources and topography, please refer to Exhibit 1.

The primary goals of any erosion and sedimentation control plan are to minimize soil movement and loss, preserve the integrity of environmentally sensitive areas, and maintain existing water quality. This document, together with the illustrations and drawing set, will supply contractors, environmental inspectors and agency inspectors with a complete, cohesive set of erosion control specifications for the amended project. These documents are designed to provide specifications for the installation and implementation of soil erosion and sedimentation control measures while allowing adequate flexibility to apply the most appropriate measures based on site-specific conditions, the construction sequence, timing and weather. All bid packages and contracts for work performed for the amended project will include these specific guidelines to ensure the work is completed in an environmentally sensitive manner. Maine Gen personnel and their representatives will ensure that the procedures contained in this E&S Plan are followed by regularly inspecting all work and requiring corrective action when necessary.

Implementation of the following objectives is required to achieve the E&S Plan goals:

- Minimize the extent and duration of disturbance;
- Protect exposed soil by diverting runoff to stabilized areas;
- Install temporary and permanent erosion control measures; and
- Establish an effective inspection and maintenance program.

The organization of the E&S Plan is as follows:

- Section 2 provides a brief description of the project;
- Section 3 describes the planning and design considerations utilized to prevent erosion and control sedimentation of natural resources during the construction phase of the project;
- Section 4 provides the construction schedule and general construction sequence for the project;
- Section 5 outlines the general construction standards intended to minimize the risk of erosion and sedimentation when working in or near wetlands, streams and other protected resources;
- Section 6 describes more specific construction techniques for temporary wetland and stream crossings;
- Section 7 describes the use of water bars to divert/control surface water runoff;
- Section 8 includes descriptions of the types and proper installation of structural methods for erosion and sedimentation control;
- Section 9 provides descriptions and describes the proper application of nonstructural measures, i.e. mulching & seeding;
- Section 10 describes modified construction procedures to be utilized during the winter construction period (November 1 through April 15);
- Section 11 describes the site restoration protocol, specifications and timelines;
- Section 12 provides the requirements for temporary erosion and sedimentation control measure removal;
- Section 13 details the levels of supervision and inspection related to environmental compliance that will be implemented during construction; and

- Section 14 describes the environmental training program for Permitere and contractor personnel.

This E&S Plan also contains appendices that provide supplemental illustrations the show correct and incorrect installation for most erosion and sedimentation control measures, as well as contact information for the appropriate project personnel to be consulted when questions regarding the proper use and function of erosion and sedimentation control techniques occur.

2.0 PROJECT BACKGROUND

The T-Line Project consists of a proposed approximately 59-mile long 115 kV transmission line from the proposed 34.5/115 kV substation near the southeast corner of the proposed Evergreen II amended Oakfield Wind Power Project in Oakfield, Maine, to the existing Bangor Hydro Electric Company (BHE) Keene Road Substation located in Chester, Maine. (See TRC Transmission Line Map Set - Sheets 1 to 64.) The proposed substation and wind farm are being permitted separately under the MDEP's expedited grid-scale wind power development permitting process. The T-Line Project also includes proposed access routes to the right-of-way (ROW) that are required to construct and maintain the line.. Although modifications to the Keene Road Substation are a component of the project, it is omitted from this E&S Plan because upgrading the substation will be permitted and completed by BHE.

The proposed transmission line corridor is a combination of existing ROW, new ROW that parallels the existing ROW, and the creation of new, virgin ROW, as summarized in the Table 1 below. Because of its linear nature and length, construction of the transmission line will occur in varying terrain and encounter a wide variety of site conditions. The project area includes significant waterbodies, wetlands, and wildlife habitats that must be protected. The general location of the Maine GenLead project is shown on Figure 1 in Section 1: Development Description of this application.

Table 1: ROW for the T-Line Project

Type of ROW	Approx. Length (miles)
Within Existing	5.4
New, Adjacent to Existing	29.1
Virgin	24.3
Total	58.8

3.0 PLANNING AND DESIGN CONSIDERATIONS

3.1 Soil Erosion and Sedimentation Potential

For the purpose of developing an E&S Plan, transmission line projects are somewhat unique insomuch as the structures may span considerable distances (250 to 500 feet), and the areas of disturbed soil are relatively small and un-stabilized for short periods of time. Consequently, the overall potential for producing significant soil erosion and sedimentation in surface waters is generally small and will be limited to specific areas of the project for relatively short durations.

For building the 115kV line, the great majority of the proposed construction activity involves clearing over-story vegetation, which if carefully controlled, can be completed with only minimal disturbance to the soils and thereby reduce the potential for runoff to surface waters. The activities directly related to setting the pole structures and stringing the cable will cause minimal soil disturbance, as well. Therefore, the potential for soil erosion associated with the transmission component of the proposed Project is a function of the soil characteristics, slopes, existing vegetation and the specific construction activity taking place in an area.

3.2 Resources

Because this project is linear in nature and involves construction activities over a total of approximately 59 miles of ROW, a wide range of natural resources and soil conditions prevail. In planning the construction and erosion control measures, specific attention must be given to sensitive natural resource areas which are to receive priority treatment. These include:

- Streams;
- Great ponds;
- Wetlands;
- Significant vernal pools;
- Habitat for or locations of rare, threatened or endangered (RTE) plant or animal species;
- Other significant wildlife habitat; and
- Waterbody, wetland and significant wildlife habitat buffers.

Other types of sensitive areas, which may receive priority treatment depending upon the proximity to specific construction activities and timing, include:

- Steep slopes;
- Unstable soil conditions; and
- Historic and prehistoric (archaeological) sites.

Wetland delineation efforts, vernal pool surveys, and inventories of other sensitive natural and historic resources have been completed. Sensitive resource areas that require priority treatment have been identified on the Transmission Line Map Set and will also be shown on the Project Construction Plans. Procedures for avoiding or crossing sensitive areas are incorporated into construction planning, as well as this E&S Plan, to ensure that the E&S Plan is properly implemented. The Project Construction Plans will provide contractors and inspectors with a comprehensive reference guide that includes the method of avoiding or crossing the sensitive natural areas to minimize impacts in addition to locations of sensitive resource areas, permitted access, and abutter and landowner information.

Copies of the Project Construction Plans will be provided and explained to equipment operators to ensure that construction practices meet the intent of avoiding or minimizing impacts to the identified sensitive areas. In addition to documentation on the Project Construction Plans, the permitted access roads, water/wetland crossing locations, as well as other environmentally sensitive areas where activities will be restricted or prohibited, will be flagged and/or will have signs posted in the field.

Prior to any clearing or construction work in or near any sensitive areas, a project "walk-through" will be conducted. Typically, "near" a sensitive area is defined as within 100 feet of the closest edge of the resource, although this distance could be longer where steep slopes or erosive soils are present. Attendees at the walk-through will include: 1) the contractor field supervisor(s) and environmental representative(s), 2) the Permittee's environmental inspector(s), and may include, if available, 3) any assigned Third Party Inspector and/or other agency representatives (e.g., MDEP project manager, Maine Department of Inland Fisheries and Wildlife (MDIFW) and/or U. S. Fish and Wildlife Service (USFWS) representatives). The purpose of the walk-through is to achieve the following objectives:

- Identify and flag available points of access to the project site;
- Identify sensitive natural or historic areas within or adjacent to project construction and access areas;
- Determine appropriate construction methods to be used to protect the identified sensitive areas;
- Confirm equipment crossing and operating methods (mats, frozen ground, tracked equipment) when crossing resource areas;
- Identify "No-Access" areas and buffers;
- Review color designation for all flagging used; and
- Establish the lines of communication for construction activities when questions or concerns arise.

Recognizing that magnitude of the project and the potential for changing field conditions, the above objectives will be evaluated throughout the construction process. Project superintendents, foremen, and inspectors will also monitor weather conditions and reports on an on-going basis. Knowledge of changing or anticipated precipitation will allow time to address erosion control needs. In this way, the Permittee and its contractors will be prepared to respond to changing environmental conditions (e.g., unusually wet or dry weather) and other unknowns that affect construction impacts on sensitive resources.

3.3 Project Walk-Through

3.3.1 Use of Flagging and Signs

Flagging will be placed in the field prior to or at the time of the walk-through in order to visually identify select features or construction methods to be used. All wetlands, streams and other protected resources to be crossed by the project will have been or will be delineated and flagged prior to the project walk-through. Supplemental flagging will be completed as needed. Signs will also be installed following the walk-through to direct construction to approved access routes and away from “no access" areas. A flagging color-code will be established for the following considerations:

- "Wetland Delineation", "Wetland Boundary", or "Wetlands" – Flagging denotes the edge of wetlands.
- "Do Not Cross" - Flagging denotes a No Access area where no equipment is allowed.
- Environmental Measures – Flagging denotes use of a water bar, hay bale barrier, silt fence, etc. is required.
- Travel Ways – Flagging denotes each side of the designated travel lane for access.
- Waterbody or Significant Wildlife Habitat Buffers – Flagging denotes a setback from a regulated resource. Access inside buffer areas will be limited. It also designates the area where special clearing and vegetation maintenance requirements apply at designated locations.

3.3.2 Construction Access

The contractor will utilize existing public roads for access to the ROW during construction to the greatest extent possible. Additional access roads for construction have been identified utilizing existing logging roads and abandoned town or private roads to access the ROW as much as possible (see Exhibit 2) . The number and length of temporary project roads were kept to the minimum necessary to provide safe and efficient access, and were selected to avoid natural resource impacts to the greatest extent practicable. The movement of equipment and materials within the transmission line ROW will be confined as much as possible to a single road or travel path.

Improvements to access roads will be limited to trimming overhanging or adjacent vegetation, replacing existing damaged or malfunctioning culverts, and limited road improvements. Construction equipment will utilize the off-ROW access roads to the maximum extent practicable to cross or bypass wetlands and waterbodies. To cross wetlands and streams, the contractor will install temporary timber mat roads and bridges, as needed, to allow safe, reliable passage of the equipment, materials and people, and to avoid adverse impacts to natural resources. Wetland and waterbody crossings will be located to minimize the span of a wetland or stream crossing and avoid the more environmentally sensitive or "wetter" portions of a wetland or stream crossing. In a limited number of areas, additional gravel may be added to the road surface to improve the stability of the surface for passage of construction equipment in order to prevent rutting and the potential for off-road sedimentation. Any new gravel and grading will be limited to that necessary to maintain a safe, reliable surface. Access roads designated for use during construction are shown on the Transmission Line Map Set and the Construction Access Plan in Exhibit 2.

As a result of this planning and walk-through process, wetland and stream crossings, significant vernal pools or wildlife habitat, RTE species and habitat, steep slopes, unstable soils, and other sensitive natural or historic areas will be avoided or adverse impacts minimized to the extent feasible. In all situations, the contractors will be instructed to avoid and minimize impacts to sensitive areas as much as possible.

4.0 CONSTRUCTION SCHEDULE

4.1 General

Construction of the T-Line Project is expected to begin shortly after obtaining all approvals and permits, and is expected to be completed within approximately eight months. This schedule assumes that while some types of construction activity may be reduced or curtailed during the winter months through the spring mud season, construction activity may occur at any time of year. In fact, working in the wintertime on some aspects of construction, such as clearing and work on soft or saturated ground, is encouraged since it can often reduce the potential for environmental impacts. However, unanticipated delays, scheduling problems, or weather conditions may significantly alter the construction schedule. The contractor should give special attention to the sections of this E&S Plan pertaining to winter construction, as well as to sensitive areas and requirements for temporary seeding, dormant seeding, and mulching.

4.2 Typical Construction Sequence

The first steps in the construction sequence would be:

- Pre-construction meeting with the contractor, Maine Gen and the MDEP Project Manager.
- Preparation of the construction site (mobilization, surveying, flagging/signage of sensitive resources, technical evaluation).
- Pre-construction walk-through prior to entering a previously undisturbed area.

Following those initial preliminary activities, true construction would begin. Typically, the construction of a transmission line project progresses sequentially. As one activity (e.g., clearing) is completed in a construction area, that equipment will be shifted to the next area and the follow-up activity (e.g., installation of perimeter erosion/sedimentation/stormwater controls) will commence. However, separate contractors may perform a given activity, and there may be multiple contractors performing tasks within the same activity simultaneously. Major project components would involve clearing, transmission line structure construction, removal/replacement of existing structures, wire stringing, clean-up, final stabilization, and restoration activities.

4.2.1 Clearing

Clearing activities will involve removing vegetation that could potentially interfere with construction, maintenance, or operation of the transmission line. Clearing activities will be performed under the supervision of project personnel, which may include construction managers and coordinators, and environmental inspectors. All clearing will be performed in accordance with the DEP *Acceptable Management Practices for Maintaining Water Quality on Logging Jobs* and applicable project permits.

During clearing activities, existing roads for overland travel would be utilized to the extent possible to access the ROW. In a few areas where existing roads are not available, temporary roads will be constructed to provide access and facilitate construction. Permanent access roads that impact regulated resources are identified in Exhibit 2. Methods for clearing will range from selective hand-clearing to clearing with machinery, depending on the specific conditions of the area to be cleared. To minimize temporary soil disturbance such as rutting and compaction, clearing activities will be accomplished using low-ground pressure rubber-tired or track-mounted equipment to cut trees to approximately six inches above the existing ground surface. Skidders or other tracked machinery would then be used to collect the organized bunches of timber.

Except in riparian buffer zones, all trees approximately two inches in diameter and larger will be removed from the ROW. Stumps will be removed in locations where structures or anchors would be installed and on a limited basis prior to the deployment of construction mats. Stumps will then be windrowed along the right-of-way, buried, chipped, or hauled to the off-site stockpile location for disposal. Limbs, brush, and small trees would be chipped and broadcast on-site to stabilize soils. Within riparian buffer zones that are located within the ROW, low growing vegetation and trees less than 8 feet tall will be maintained, to the

extent feasible, for bank stability, shading, and water quality protection. Danger or threat trees located outside of the ROW will be cleared as necessary to provide physical clearance for the proper, safe, and reliable operation and maintenance of the transmission line. Prior to clearing, survey crews will demarcate the ROW boundaries and flag any danger trees to be removed. Future clearing activities will be performed in accordance with the approved Vegetation Maintenance Plan.

4.2.2 Transmission Line Construction

Construction of the T-Line will involve establishing a typical 50-foot by 50-foot temporary work pad for single wooden poles to accommodate lay down of structure materials and construction equipment. All vegetation within the work pads will be subject to removal except for small brush, grasses, and shrubs. Selected E&S measures will be installed on the down-gradient side of work areas that are located in areas that have moderate to high potential for soil erosion, steep slopes, and/or are located near water resources (see Section 5.1, Table 2 and Section 8.1). Laydown areas will be located in generally flat, upland areas. If it is determined that E&S measures are necessary at these locations then they will be installed, as needed. Proposed laydown areas have been identified and their locations are shown on the Transmission Line Map Set.

Materials will be delivered to each structure work pad via tracked vehicles. Installation of the structures will initially involve drilling holes using a track-mounted auger or digging holes using an excavator. In some areas, blasting of shallow bedrock may be necessary for pole installation. Once the holes are drilled or dug, the structure will be erected by setting the poles in the holes using a crane with a long boom. After leveling the structure, the annular space around the poles will be backfilled. Native backfill will be used when possible. When soil conditions are not suitable for re-use as backfill, native off-site borrow material will be used. Borrow material will come from the closest site that contains needed material, which may include stone, gravel, and/or topsoil. Guy anchors will be connected to buried logs, rock anchors, or helical anchors installed at a depth of approximately five to seven feet. In upland areas, any excess soil material will be used for finish grading around the structures and guy anchors then seeded and mulched per Section 11.1 and Table 7.

Temporary construction access through wet areas, such as jurisdictional wetlands, will occur during dry or frozen-ground conditions or with the use of construction mats (see construction mat illustration, Fig. 7 in Appendix A). The specific method to be used for temporary access through wet areas will be determined in the field during the walk-trough. All wetlands that are temporarily impacted during construction will be restored in accordance with Section 11.1 and Table 7. Any excess soil generated as part of structure installation in wetlands would not be deposited in the wetland, and instead would be transported to an upland location, evenly spread and stabilized with seed and mulch per seeding and mulching guidelines for upland areas.

Excavation for poles in wetlands will require salvage of the surface layer of organic material to be placed around the structure once backfill is complete (see Section 5.2.2 for further discussion of pole installation in wetlands).

4.2.3 Clean-up and Final Stabilization

Upon completion of construction, all work areas will be cleared of construction debris and other materials. Specific clean-up requirements include: removal of all temporary work structures, including construction trailers; removal of material and equipment; disposal of all rubbish resulting from construction; removal and re-grading of embankments made for construction purposes; filling of any excavations; repairing ruts in existing access roads; grading of access roads to approximate original contours, and restoring approximate original contours. Final stabilization will involve seeding, mulching and/or matting all areas of disturbed soil where final grade has been achieved in accordance with Section 11.1.

4.3 Erosion and Sedimentation Control Implementation Schedule

The following general sequence will be followed to mitigate the potential for erosion of exposed soils and/or discharge of sediment-laden water from the work area.

1. Conduct a walk-through of the ROW to confirm that the limits of work for construction activity, location sensitive resources and travel lanes, and off-site access roads are properly identified and marked with flagging and/or signage. Establish the type and location for temporary erosion control measures.
2. Complete and stabilize with gravel any access roads needing improvement. Install and stabilize stormwater controls, as needed, for new permanent access roads.
3. Install and stabilize equipment crossings over wetlands and waterbodies, in accordance with Section 5.2 and Section 6.
4. Clear timber and brush. No grubbing will be necessary unless the area requires leveling.
5. Install silt fencing or other erosion control barriers around the perimeter of the work area, in accordance with Section 8.1, the BMPs and the results of the walk-though.
6. Protect resources along temporary travel lanes within the ROW and protect resources adjacent to construction laydown and parking areas, as needed.
7. Construct temporary or permanent water bars, if needed, and stabilize in accordance with Section 7 and the BMPs, prior to allowing them to convey water.
8. Level the construction area and conduct any blasting, as needed.
9. Excavate for the poles. Pump excavation seepage and runoff to a temporary sedimentation trap, prior to discharge to a well-vegetated upland area. Control and direct runoff from the excavation areas using water bars, berms or hay bales.
10. Monitor any paved public road used for access for signs of tracking and spilling of spoils on the roadway. Construct a stabilized construction entrance for paved public roads, as required by the Environmental Inspector (EI) or Third Party Inspector (3PI).
11. Complete pole and conductor installation.
12. Stabilize disturbed soils associated with temporary wetland and stream crossings in accordance with the Section 11.1 and Table 7 and the BMPs, within 48 hours of removal of the temporary crossing.
13. Re-grade the ROW to original contours, as needed, loam, seed, mulch, and anchor all exposed soils within 7 days from final grading in accordance with the Section 11.1 and Table 7 and the BMPs.

5.0 STANDARDS FOR CONSTRUCTION

5.1 Temporary Travel Lanes, Access Ways and Yarding Areas

The following six standards apply to the location of temporary travel lanes, yarding and other work areas.

1. Where travel lanes or work areas result in exposed soils and are located near water resources such that material or soil may be washed into them, these disturbances will be set back from the edge of the water resource to maximize the amount of vegetated area remaining between the disturbed area and the resource. Well-vegetated areas will effectively reduce sediment load in runoff water before it can enter the resource. Whereas this project is linear in nature and construction and/or construction access in close proximity to water resources is unavoidable, the contractor shall maintain the maximum filter strip area possible based on site conditions. In areas where sufficient density or width of vegetation is not present, sediment barriers will be placed to intercept sediment laden runoff. Table 2 below provides recommended guidance on preferred filter strip lengths.

Table 2: Recommended Widths for Vegetated Filter Strips Between Disturbed Areas and Water Resources

Land Slope (Percent)	Width* of Filter Strip (ft)
0	25
20	65
30	85
40	105
50	125
60	145
70	165

*Width of filter strip measured along flow path through undisturbed buffer.

2. Wherever possible, construction equipment will either avoid steep slopes or proceed across the slope in a safe manner to avoid excessive disturbance of vegetation and soils. Equipment will not travel straight up or down any slopes with a grade steeper than 10 percent, except where necessary due to safety concerns and/or terrain constraints.
3. Where travel lanes or construction areas cross slopes, the area will be properly sloped and maintained to retain the existing surface drainage.
4. All cut and fill slopes will be no steeper than 2H:1V.
5. Streams and wetland areas will be crossed at right angles to the channel and/or at points of minimum impact. To ensure that natural drainage patterns will not be altered or restricted as a result of construction activities, crossings will be designed and constructed according to specific standards in this document.
6. Due to the limited reach of mobilized tree harvesting equipment, travel lanes and access ways will be needed within the wider natural resource buffers (see Section 5.3, below) to enable cutting and removal of large trees across the entire ROW without the potential for additional ground disturbance and damage to remaining vegetation that can occur if the trees were hand cut and dragged out of the buffer with a cable. Travel lanes and access ways within buffers will be limited to approximately 16 feet wide and only the trees that would prevent the harvesting equipment from efficiently performing its job, or other vegetation that would otherwise be seriously damaged by harvesting equipment traveling along the access way, will be removed. Existing low vegetation will remain. Access ways will not extend closer than 25 feet from the top of banks of any waterbody and will not require grading or any gravel, stone or other surface material. Temporary erosion and sedimentation control measures will be implemented along the travel lanes and access ways, as required. Ground disturbance caused by the use of harvesting equipment will be repaired by returning the ground to its original contour, as needed, and seeding and mulching any bare ground.

5.2 Stream and Wetland Crossings

The following standards apply to all unavoidable stream, drainage way, or wetland crossings encountered while accessing the project site or on the project site itself.

5.2.1 Types of Crossings Used

The type of crossing used for access is dependent on: the purpose and use of the crossing, the nature of the resource being crossed, ground conditions present at the time of construction, and construction materials available. Some planning guidance is provided below. The appropriate means and location of the crossing will be determined at the time of the walk-through.

- Permanent culverts will be used only to replace existing damaged or malfunctioning culverts along previously existing temporary access roads.
- Unless frozen, temporary resource crossings will be used at all other locations. Timber mat

bridges or construction mats must be used to cross any streams, drainage ways, or wetlands that contain: (1) flowing water, (2) standing water, (3) saturated soils, or (4) organic/mucky soils. No equipment will operate in or travel through the water or on soft or saturated wetland soils.

- All temporary waterbody crossings must be temporarily stabilized upon installation and permanently stabilized, as needed, within 48 hours of removal unless otherwise noted on the plans or approved by the 3PI.

5.2.2 Construction in Wetlands

Work on the transmission line ROW will largely avoid permanent impacts to wetlands, and most wetland impacts will be temporary in nature, and primarily from construction access. In saturated or inundated wetland areas, winter construction during frozen ground conditions is the preferred method of construction. Delineated wetland areas are shown on the Transmission Line Map Set and Project Construction Plans. Otherwise, wide tracked or balloon-tired equipment operating from timber mat stabilized work areas will be required. No permanent loss of wetland habitat is allowed from construction activities associated with the transmission lines. Where structures are to be placed in wetlands, topsoil must be excavated first, and stockpiled separate from subsoil. In some cases, wetland subsoil may be inadequate for the long-term stability of the structure. In such cases, granular, rocky material will need to be imported as structural backfill in wetlands. The subsoil will be removed from the wetland and spread evenly in an adjacent upland area. After pole installation, topsoil must be used to restore the disturbed area to the original surface grade, except where mounding around a structure is necessary for structure stability. The topsoil will serve as the “seed bed” for restoration of wetland vegetation.

5.3 Construction in Buffer Areas

5.3.1 Stream Buffers

A 100-foot riparian buffer from the top of banks of all perennial Class A, AA, Outstanding River Segments, and other rivers, streams or brooks known to contain RTE species will be established along the transmission line ROW. A minimum 25-foot riparian buffer will be maintained from all other waterbodies. To the greatest extent possible no structures will be located within the 25-foot buffer areas and no soil disturbance or vehicular traffic will be allowed within 25 feet of streams other than that necessary to remove trees and construct and utilize temporary equipment crossing bridges authorized during the walk-over. As described in Section 5.1, travel lanes and access ways will be required within the 100-foot buffers during initial clearing to enable tree harvesting equipment to reach all trees that need to be removed, and in some cases may be needed within the 25-foot buffers if no alternative access exists to avoid a temporary equipment crossing over the stream. Where a temporary equipment crossing is not required, access ways will not extend to within 25 feet of the top of bank of a waterbody. All appropriate erosion and sedimentation controls will be implemented and maintained along these travel lanes and access ways during and following construction

Construction activities within these waterbody buffers will be limited to the cutting of only capable species that are greater than 8-10 feet tall, and setting of pole structures within 75-foot. Dead, diseased or danger trees may be removed entirely. Cutting of these trees will be done by hand or by equipment reaching into the buffer from outside the buffer, if possible, or from the travel lanes and access ways within the buffer as needed. In many instances, hand cutting followed by pulling the downed trees out of the buffer using cables attached to a vehicle located outside the buffer may result in a higher risk of damage to the stream and surrounding vegetation and wetland than allowing tracked equipment into the buffer zone. Erosion control barriers will be established and maintained, as needed, along travel lanes and access ways within the buffers and along the approach to all stream crossings. Erosion control barriers will be supplemented, as appropriate, by water bars and/or erosion control barriers extending outside the buffer zone. In those situations where initial clearing within a buffer area cannot be completed during frozen ground conditions, the contractor will contact the 3PI and request authorization to allow equipment within the riparian buffer, utilizing access ways and appropriate

wetland and stream crossing procedures. If 3PI concurrence is not obtained for mechanized cutting, the trees will be cut by hand and pulled from the buffer as carefully as possible.

5.3.2 Significant Vernal Pool Buffers

A 250-foot critical terrestrial habitat buffer from the edge of all significant vernal pool depressions was established around all significant vernal pools identified in the project area. The project layout was modified to avoid any impacts within the significant vernal pool buffers as much as possible. In two locations, a travel lane or access ways are needed within these buffers.

Construction activities within significant vernal pool buffers will be limited to the cutting of only capable species that are greater than 8-10 feet tall, and setting of three pole structures where that could not be avoided. Dead, diseased or danger trees may be removed entirely. Cutting of these trees will be done by hand or by equipment reaching into the buffer from outside the buffer, if possible, or from a travel lane or access ways within the buffer as needed. Hand cutting is the only means of tree removal allowed in a significant vernal pool depression. Erosion control barriers will be established and maintained, as needed, along travel lanes and access ways within the buffers and will be supplemented, as appropriate, by water bars and/or erosion control barriers extending outside the buffer zone. If initial clearing within a pool or buffer area cannot be completed during frozen ground conditions, the contractor will contact the 3PI and request authorization to allow equipment within the critical habitat buffer, utilizing a travel lane, access ways and other appropriate techniques to minimize disturbance to the maximum extent practicable. If 3PI concurrence is not obtained for mechanized cutting, the trees will be cut by hand and pulled from the buffer as carefully as possible. Cutting of trees between April 1 and June 30 must utilize hand tools only, unless otherwise approved by MDIFW.

5.3.3 Rare Plant Community Buffers

Prior to initial clearing of the rare plant locations, a qualified botanist will demarcate the locations of the rare plants. This process will include flagging all individual plants of swamp fly-honeysuckle, the only woody species of the documented rare plants in the Project area. In all plant locations, including the swamp fly-honeysuckle locations, the habitat containing the densest concentrations of rare plants will be demarcated with brightly colored flagging or other obvious material (e.g., caution tape, snow fence). This process will serve to clearly distinguish the area in which the clearing restrictions must be applied.

During the initial clearing, all capable species within the demarcated habitat that are 8-10 feet or taller will be cut at ground level. To maintain suitable habitat conditions for the rare plants, no other vegetation will be cut within the demarcated areas. To avoid and minimize disturbance to flagged rare plants, capable species within the demarcated habitat should be cut by hand. No mechanized harvesting equipment will be permitted within the demarcated rare plant locations. The clearing contractor will also maintain wetland hydrology within and immediately adjacent to the rare plant locations when operating equipment around the habitats. Mats and other erosion control materials will be utilized to minimize impacts to wetland hydrology and to reduce rutting around the plant locations.

6.0 RESOURCE CROSSINGS

6.2 Temporary Timber Mat Bridges

6.2.1 Materials

Typically bridge construction will entail the use of log stringers as construction materials covered by decking planks or construction mats.

6.2.2 Sizing

Table 3 below illustrates log sizing requirements depending on the span length and anticipated loads:

Table 3: Timber Mat Bridge Stringer Requirement

Span, ft	Minimum Log Diameter, in 80,000 lb Load	40,000 lb Load
8	16	12
12	18	14
16	20	16

Assume 6 stringers at 24" centers

6.2.3 Positioning

Figures 1 and 2 in Appendix A illustrate the proper use and installation of crossing bridges.

- Temporary bridges will cross streams at right angles to the channel at a location with firm banks and level approaches whenever possible and as site conditions dictate.
- At the crossing location, the ends of the stringers will extend at least two feet onto firm banks or several feet into the upland edge of a wetland to ensure a dry, firm approach onto the bridge.
- Mats or a stone pad installed on top of geotextile fabric will be used where necessary, to provide a smooth transition for equipment travel from the adjacent ground or temporary road onto the bridge.
- No abutments other than the mats or stone pads mentioned above are to be installed as part of the temporary bridge.

6.2.4 Maintenance

Bridges will be continually monitored to ensure their correct functioning. Bridges covered with dirt will be cleaned and the material removed must be spread out and stabilized in an upland location. The material will not be scraped and shoveled into the water resource. The contractor will replace timbers or decking in poor condition as soon as deterioration is observed. At a minimum, the contractor will be responsible for inspecting all bridges once per week and will keep a log of all changes, improvements and other maintenance performed.

6.2.5 Removal

Bridges will not be removed until their use is no longer necessary. Specifically, all final restoration work along the adjacent ROW will be completed prior to removing the bridge from the crossings. The planned removal of bridges will be coordinated with the contractor and the EI. All bridges will be removed from the ROW upon completion of construction. The banks of streams and drainage ways must be graded back to original conditions. Exposed soils on the banks and within 100 feet of the crossing must be stabilized using seed and mulch. Banks of drainage ways that are expected to receive high flows will be stabilized with seed and mulch or erosion control blankets (Figure 3, Appendix A).

6.3 Culverts

No new culverts will be required for construction of the transmission line, other than as a temporary means of construction mat support for a long stream crossing and to replace existing damaged or malfunctioning culverts along previously existing roads used for construction access.

6.3.1 Materials

Permanent replacement culverts will be either corrugated metal or plastic pipe. Temporary culverts will be corrugated metal, plastic pipe, or lumber ties. Chemically-treated wood will not be used.

6.3.2 Sizing

The size of replacement or temporary pipe culverts will be determined by the largest pipe diameter equal to the undisturbed cross sectional area of the “bank full” condition of the stream. It should fit into the existing channel without major excavation of the waterway channel or without major approach fills. If a channel width exceeds 3 feet, additional pipes may be used until the cross sectional area of the pipes approaches that of the existing channel. The minimum size culvert that may be used is an 18-inch diameter pipe. The required flow capacity of the culvert(s) will be determined at highest stream flows (bank full) or will be approximated during periods of lower flows using the apparent natural high water marks remaining on the stream banks.

6.3.3 Positioning

The following guidelines will be used for the positioning of culverts:

- Culverts will be placed to allow for the crossing to take place at right angles to the channel to ensure that natural drainage patterns will not be altered.
- Culverts will be placed at the point of narrowest crossing and where firm banks and level approach slopes are available. Slopes should be no greater than 1.5 to 1.

6.3.4 Installation

The following guidelines will be used for the installation of culverts:

- Culverts will be of sufficient length to allow both ends to extend at least one foot beyond the toe of any fill used to cover the culvert.
- Culverts will be bedded on firm ground. Supplemental use of geotextile with gravel can be used to create this firm base.
- Both the inlet and outlet ends of the culverts will be set at or slightly below the natural stream bottom to allow passage of fish and other aquatic life at all levels of flow. At no point will either end of an installed culvert be positioned in the air out of the water.
- Multiple culverts must be offset in order to concentrate low flows into the culvert within the natural channel.
- Fill used to bury the culvert will be compacted at least half-way up the side of the culvert for its full length to ensure that flowing water will not undermine the culvert.
- Culverts will be covered with fill to a depth of at least one foot or one-half the culvert diameter, whichever is greater.
- Road fill at the upstream (headwall) and downstream (out-fall) ends of culverts will be armored with rock rip rap to protect the road fill from being eroded by the action of water or road traffic. This material will be installed up to the level of anticipated high water.
- In areas where the streambed appears highly erodible, the streambed at the outlet end of a replacement or temporary culvert will be lined with riprap to prevent erosion and potential streambed scour. Table 4 below indicates the distances away from the culvert to install such riprap.

Table 4. Culvert Size - Length of Rock Protection

Culvert Diameter (Inches)	Length of Rock Protection From Culvert (Feet)
12 – 20	7
21 – 24	9
30	11
36	13
42 – 48	18
54 – 60	24
66 – 78	32

Figures 4 and 5 in Appendix A illustrate typical culvert installation with inlet and outlet protection for replacement or temporary culverts.

6.3.5 Removal

Temporary culverts used to support bridge spans will be removed from the stream channel and ROW at the same time the span is removed. Replacement culverts along temporary access roads will be left in place, because the original damaged or malfunctioning culvert was removed. Culverts along new or improved permanent access roads will remain in place.

6.4 Construction Mats

The contractor will be responsible for providing adequate construction mats at the project site prior to construction. A readily accessible source of mats shall also be available in case construction conditions change and necessitate the need for more mats.

6.4.1 Materials

A number of differently sized and constructed timber mats are typically available. For example:

- Longer mats will be used for spanning the longer crossings. This practice avoids the need to install additional mats within the crossing area in order to support the "span" mats.
- Mats will be cleaned of residual mud or vegetation prior to their first use on the project site and will be in good condition to allow for their proper and reliable installation and use. Using mats with timbers and cables in good condition minimizes the potential for breakage during installation and use, and helps prevent them from becoming imbedded in mud and the need to drag them in or out of the resource versus carrying them above the resource.
- Mats with partial/short timbers joined end to end will not be used to cross stream channels.

6.4.2 Installation

Illustrations of the proper use and installation of construction mats are provided on Figures 6 and 7 in Appendix A.

- Whenever possible, mats will be carried and not dragged. Dragging mats creates more soil disturbance which requires additional erosion control or final restoration work.
- At the crossing location, the ends of the timber mats will extend at least two feet onto firm banks or several feet into the upland edge of a wetland to ensure a dry, firm approach onto the mats.
- At wetland crossings requiring multiple mats, the mats will be oriented with their longest dimension perpendicular to the direction of travel to reduce the potential for the mats to work into the wetland soils as vehicles cross and cause significant disturbance of the wetland surface.
- Mats used as temporary bridges will not require support piers or abutments to cross a stream or inundated wetland. The contractor will use appropriately sized and spaced timbers to span the resource and support the mats. In certain instances, a culvert may be used to provide midstream support if more than one mat is required to cross a long span, as approved by the EI. Support culverts will be oriented parallel to the direction of flow, and fish passage maintained.
- At "dry" crossings where no water is present or anticipated during project construction, the mats may be placed directly onto the sensitive natural area in order to prevent excessive rutting, provided stream banks and bottom are not altered.

6.4.3 Maintenance

Matted crossings will be continually monitored to ensure their correct functioning. Mats which become covered with dirt will be kept clean and the material removed must be spread out and stabilized in an upland location. The material will not be scraped and shoveled into the water resource. Mats which become imbedded will be reset or layered to prevent mud from covering them or water passing over them. The contractor will replace mats as soon as deterioration is observed. At a minimum, the contractor will be responsible for inspecting all matted crossings once per week and will keep a log of all changes, improvements and other maintenance performed.

6.4.4 Removal

Construction mats will not be removed until their use is no longer necessary. Specifically, all final restoration work along the adjacent ROW will be completed prior to removing the mats from the crossings. The planned removal of mats will be coordinated with the EI. All mats will be removed from the ROW upon completion of construction. Exposed soils within 100 feet of the crossing must be stabilized using seed and mulch.

7.0 SURFACE WATER DIVERSION (WATER BARS)

A number of above-ground structures or techniques are available to divert water out of travel ways and construction areas in order to prevent subsequent runoff and erosion. Water bars (also, called slope breakers) are a useful tool to redirect water moving down a prolonged, steep slope into adjacent, undisturbed vegetated areas (filter strips).

7.1 Materials

Water bars will be constructed by excavating or moving and shaping earth from within the construction area to form a shallow cross-drainage swale. The excavated material will be used to form an elevated bar immediately down slope of the swale.

7.2 Positioning

Water bars will be installed immediately above and along steep pitches in construction areas or travel lanes and below seepage areas on natural or cut banks, as determined during the site walkthrough. They will be sited to take advantage of existing vegetation for filtering and slope away from the erodible area. The interval for installing these diversion structures depends on the slope of the area, as well as the nature of the surface, soils, and wetness. Generally speaking, steeper slopes require shorter distances between water bars. Recommended spacing of water bars is provided in Table 5 below.

Table 5. Recommended Distances Between Water Diversion Structures

Slope (Percent)	Spacing (Feet)
0 – 2	500-300
3 – 5	250-180
6 – 10	165-140
11 – 15	135-130
16 – 20	125-120
21+	100

7.3 Installation

Illustrations of the proper use and installation of water bars are provided on Figures 8 and 9 in Appendix A. Water bars will be installed at 30-degrees angled downgrade. The shape of the backside portion of the structure will have a reverse slope of about 3 percent. Use of a pop-level is recommended to ensure that drainage is away from the erodible area. Water bars will be constructed with rounded (not vertical) mounds and dips to allow for firm compaction and to allow re-vegetation.

The inlet end of water bars will extend beyond the edge of the erodable area so that it fully intercepts water flows that may flow onto the area. The outlet end of the structure will extend out far enough to prevent water from flowing around and re-entering the work area. The discharge ends will outlet into a vegetated filter strip. Where heavy flows are encountered or anticipated, the outlet end of the water bar will incorporate an apron of rock and/or geotextile fabric to reduce water velocities and prevent erosion.

Where the water bar discharge is within 100 feet of a stream or wetland, a small, excavated settling basin or ditch turnout will be incorporated to reduce the velocity of flows and the continued movement of sediment downslope. In addition, temporary stone check dams, silt fencing or staked hay bales will be installed at the outlet of the diversion structure, where vegetated filter strips are narrow or sparsely vegetated, in order to prevent sediment from entering water resources. Additionally, a temporary mulch liner (anchored erosion control blanket) will be installed immediately upslope of the sediment barrier to reduce the erosion potential of the concentrated flow. The proper installation of temporary stone or hay bale check dams and other swale stabilization measures are illustrated on Figures 10 and 11 (Appendix A).

7.4 Maintenance

Due to repeated travel over these structures, maintenance is critical to their effective functioning. As the structure becomes flattened or rutted, it will be re-excavated or graded to ensure the interception and redirection of water runoff. The outlet ends and sediment basins will be maintained by clearing away any potential blockages and accumulated sediments. In areas where silt fence or hay bale barriers are used, the barriers will be replaced with stone check dams if inspections during construction indicate that channelized runoff is undercutting the barrier. At a minimum, the contractor will be responsible for inspecting all water bars in active construction areas once per week and will keep a log of all changes, improvements and other maintenance performed.

7.5 Removal

After the completion of the construction project, removal of these structures is not a requirement. Water bars can be left in place provided they have been suitably stabilized with seed and mulch. Any hay bale barriers or silt fence at the outlet end will be removed when the site has a healthy vegetative cover.

8.0 STRUCTURAL MEASURES

The standards and procedures outlined in this section are meant to address a majority of the situations encountered during construction activities. For additional information on sediment and erosion control methods and techniques, or to address a particularly problematic situation, the information in this section may be supplemented by the DEP's *Maine Erosion and Sediment Control BMPs*, dated March 2003.

8.1 Erosion Control Barriers

The use of properly installed erosion and sediment control barriers is the most fundamental and critical component for stopping and controlling erosion during construction. Erosion control barriers include hay or straw bales, silt fences, and/or erosion control mix (ECM) or continuous contained berms. In some cases, these barriers may be deemed unnecessary due to factors including slope and the presence of

filter strips within project boundaries. Typically, earth work near water and on steep slopes will require the use of at least one of these types of barriers, or some combination of them, to effectively prevent and/or control erosion and sediment transport. Placement and type is determined in the field during the site walkover with follow-up consultations, as needed, between the contractor and EI. Additional measures may be required as determined on a case by case basis.

8.1.1 Use of Typical Erosion Control Barriers

Erosion Control Barriers are typically installed across or at the toe of a slope, parallel to natural contours, and down gradient of disturbed earth. Its purpose is to intercept and retain sediment entrained in runoff from disturbed or unprotected areas where:

- Sedimentation can pollute or degrade a wetland or other water resource where existing vegetated filter strips are not adequate;
- Soils are stockpiled;
- The contributing drainage area does not exceed 0.25 acre per 100 feet of barrier length; the maximum length of slope above the barrier is 100 feet; and the maximum gradient behind the barrier is 50 percent (2H:1V). If the slope length is greater, additional measures such as multiple rows of sediment barriers or water bars may be necessary to reduce that length;
- Sediment barriers should not be used in areas of concentrated flows without supplemental measures to prevent end flow such as extending them uphill or installing check dams. Under no circumstances should sediment barriers be constructed in streams or in swales where there is a possibility of a washout.

Hay or Straw Bales are especially useful for precautionary overnight protection where construction traffic or other activity will require frequent removal in order that construction can proceed in a timely fashion, or may be required to supplement/reinforce silt fencing. Bales that are intended to provide a barrier for a period of weeks are to be staked with ends tightly abutting adjacent bales and otherwise installed as shown on Figures 12, 13 and 14 in Appendix A. Where staking and embedding of straw or hay bales is impractical due to frozen ground, excessive roots, ledge, or other construction hazards, ECM berms are the recommended substitute. Straw bales must be used rather than hay in or adjacent to wetlands.

Silt Fence is the most commonly used erosion control barrier and is generally a better filter than hay or straw bales when installed properly (see Figures 15-18, Appendix A for proper installation and fabric specifications). Silt fence may also be used to supplement other types of erosion control barriers. As with hay/straw bales, ECM berms are the recommended substitute where staking and embedding fabric is impractical due to frozen ground, excessive roots, ledge, or other construction hazards.

ECM Berms are practical and very effective in most situations, but are especially suited for frozen ground, outcrops of bedrock, and forested areas with many roots where silt fence or hay bales cannot be effectively keyed in. For slopes less than 25 percent (4H:1V), the barrier must be a minimum of one foot deep and two feet wide. On longer or steeper slopes, the barrier must be wider to accommodate additional runoff. It is especially suited for use in travel lanes and roads, since, with proper periodic maintenance, it can be driven over without adversely affecting its effectiveness. ECM consists primarily of organic materials such as shredded bark, stump grindings, composted bark, or similar materials. Wood chips, ground construction debris, or reprocessed wood products are not acceptable for use in ECM. It can be manufactured on site from stump grindings or manufactured or purchased off site, and will contain a well-graded mix of particle sizes, a high organic content, and small proportions of silts, clays or fine sands, but may contain rocks up to 4-inches in diameter. An installation detail is provided as Figure 19 in Appendix A.

Continuous Contained Berms (or filter socks) are fabric socks that are filled with ECM. They are an alternative effective barrier on smooth ground that cannot be effectively trenched for installation of silt fence or hay bales. They are especially suited for use on pavement, because it can be driven over without adversely affecting its effectiveness. The netting holds the organic mix together and keeps it from being displaced.

8.1.2 Maintenance of Erosion Control Barriers

Once a week, or after rainstorms producing more than 1 inch of rainfall, whichever is more frequent, the contractor will inspect all temporary erosion control barriers. During a prolonged rainfall, barriers will be inspected at least daily. Such inspection is necessary to ensure the structures are functioning properly as well as identifying new areas requiring installation. A maintenance log will be kept of all erosion control changes, improvements, and maintenance performed.

If any barriers are not functioning properly, they will be repaired or replaced. A barrier is not functioning if:

- Water is flowing around the sides, under or over the barrier;
- Soil has built up behind the barrier to the point more than half-way up its height;
- There is excessive sag or evidence of movement or deterioration of the barrier;
- There is evidence of erosion and sedimentation such as gullying, sediment deposits, or the discoloration of surface water down slope of the barrier.

Corrective measures include removing accumulated sediment from behind the barrier, re-staking/replacing the barrier, extending the barrier at the ends, and installing another barrier further up-slope or a stone check dam(s) in areas of significant concentrated flow.

8.1.3 Removal of Erosion Control Barriers

Erosion control barriers will be removed once it is evident that the soils have become stabilized and the potential for erosion no longer exists, generally a healthy growth of vegetation over at least 90 percent of the stabilized area (see Section 12 of this E&S Plan). All removed silt fence and continuous contained berms will be properly disposed of off-site. Bales may be spread as mulch as appropriate in upland areas (straw bales may be used, if needed, in wetlands) or removed and properly disposed of off-site. ECM berms are generally spread out on site in an upland area.

Any ridges or mounds of soil or caught sediment remaining in place after the barrier has been removed will be leveled off to conform to the existing grade. Any newly exposed soil that may erode will be seeded and mulched.

8.2 Stone Check Dams

Stone Check Dams are installed in existing and proposed swales or at culvert inlets to slow down channelized flow velocities thus helping to reduce erosive energy, suspended sediment and sediment transport. Check dams are constructed with a 6- to 12-inch tapered spillway at the center to prevent breaching and scour at the outer edges along the sides of the ditch.

Check dams can either be constructed of stone or hay bales. Stone check dams are to be constructed of 2 to 3 inch stone and placed from downstream to upstream so that the toe of the upstream check dam is at the same elevation as the top of the downstream check dam. Stone check dams are required in the locations shown on the Permit Plan Set.

Hay bales are to either be wire bound or string tied, and must be toed-in. Hay bales will be placed in a single row, across the swale, tightly abutting one another. The gaps between bales will be chinked (filled by wedging) with hay to prevent water from escaping between the bales. Figures 10 and 11 in Appendix A illustrate the proper installation of typical check dams.

8.2.1 Maintenance of Check Dams

Once a week, or after rainstorms producing at least 1 inch of rainfall, whichever is more frequent, the contractor will inspect all check dams. During a prolonged rainfall, check dams will be inspected at least daily. A maintenance log will be kept of all erosion control changes, improvements, and maintenance

performed. If check dams are not functioning properly, they will be repaired or replaced. A check dam is not functioning if:

- Water is flowing around the sides or under the dam.
- Evidence of excessive siltation in the water or channel is apparent downstream
- Soil has built up to the point more than half-way up the spillway height.

Corrective measures include removing accumulated sediment, re-staking or re-shaping, repair of erosion caused by high flows around the edges of the dam, and/or or installing additional dams further up-slope.

8.2.2 Removal of Check Dams

If it is possible, check dams are to be left in place permanently. Another option is to spread the stone or hay along the ditch invert to provide additional protection. In temporary ditches and swales, check dams must be removed and the ditch filled in when it is no longer needed. In permanent structures, check dams can be removed when permanent stabilization has been established. If a check dam must be removed from a grass lined ditch, wait until the grass has matured to protect the ditch or swale. The area beneath the check dam must be seeded and mulched or otherwise stabilized immediately after it is removed.

8.3 Construction Entrance

A stabilized construction entrance will be installed wherever construction traffic results in significant tracking of mud onto a paved public road system, as determined by the EI or 3PI. The crushed stone construction entrances will be maintained by the addition of more crushed stone as the voids become filled. The public roadway shall be swept if a significant amount of mud is tracked onto it.

9.0 NON-STRUCTURAL MEASURES

Nonstructural measures are temporary or permanent methods used to cover exposed soil areas to prevent erosion from occurring. Their purpose is to cover the entire area of exposed soil to prevent initial erosion of soil from a construction site. Examples of nonstructural measures include hay or straw mulch, ECM, matting, or seeding.

9.1 Temporary Measures

9.1.1 Temporary Mulching

Temporary mulching consists of spreading of straw (or hay) mulch over bare or disturbed areas, including soil stockpiles, applied at a rate of 70 pounds (about two bales) per 1,000 square feet. Mulch must be anchored on sustained slopes greater than eight percent. Mulching will be substituted by matting in locations where mulch has proven to be ineffective in the field or as otherwise specified herein. Alternative mulch materials or methods such as hydro seeding may be used. Mulching rates are to be doubled based on observations in the field or in locations undergoing winter construction. Figure 20 in Appendix A illustrates proper mulch anchoring using netting.

9.1.2 Erosion Control Matting

Curlex or jute matting (also known as erosion control blankets) consists of straw, coconut or excelsior sandwiched between photodegradable netting. Although mating is typically used during final restoration, it is considered a temporary measure because it generally degrades within two years. Matting is to be used as follows:

- On areas of high wind exposure, unstable soils, and stream/river bank restoration areas;
- In the base of swales with moderate slopes and erosive capability. High velocity ditch lining or geotextile soft armor may be required in steep ditches (> 8%) or areas receiving significant concentrated flows;

- On sustained, steep slopes (>15%) and where rilling occurs or where mulching has proven to be otherwise ineffective in the field.

Matting is typically anchored with large staples, as recommended by the manufacturer. Figures 3 and 21 in Appendix A illustrate proper installation of erosion control blankets.

9.1.3 Temporary Seeding

Temporary seeding, covered by hay or straw mulch, can be used between April 16 and October 31 on soil stockpiles or areas of exposed soil within 100 feet of sensitive resources that are not scheduled for final restoration for 30 days or more. It may also be used in other areas where final stabilization is not expected for several weeks. Temporary seeding is not required during the winter construction season; however, mulching is required on exposed soils during winter, followed by temporary or permanent seeding, as appropriate, as soon as growing conditions allow. (See Section 10 of this E&S Plan for details of winter construction.)

9.1.4 ECM

ECM can be used as a temporary or permanent slope reinforcement or mulch on slopes that are 2H:1V or less, on frozen ground or forested areas, and at the edge of gravel parking or other active construction areas. On slopes that are 3H:1V or less, ECM will be applied at a minimum of 2 inches thick plus an additional 1/2 inch per 20 feet of slope up to 100 feet (e.g., 3 inches thick for 60 feet of slope; 4 inches thick for 100 feet of slope). For slopes between 3H:1V and 2H:1V, ECM will be applied 4 inches thick plus an additional 1/2 inch per 20 feet of slope up to 100 feet (e.g., 5 inches thick for 60 feet of slope; 6 inches thick for 100 feet of slope). ECM must be spread evenly and must provide 100 percent soil coverage. ECM will not support grass, but will support clover and other legumes and woody vegetation. Re-vegetation can be promoted by seeding or it can be left to occur naturally.

Table 6 below, provides a summary of temporary mulching and seeding requirements along with the recommended application rates for seed, mulch and fertile.

9.1.5 Brush and Slash

The use of brush and slash tops is an effective measure to control soil disturbance during initial clearing activities and before it is practical to install erosion control barriers. Brush and slash tops include small branches and woody pieces removed from trees that are otherwise unusable. During initial clearing, these items can be placed on skidder trails as the machines cut and remove timber. This debris reduces the opportunity for skidder tires to sink into soft soil when they are spread out along the skidder trail.

Table 6: Temporary Mulching/Seeding Summary

Within 100 feet of wetlands and waterbodies	Apply hay and/or straw mulch at a minimum of 70 lbs/1000 square feet of exposed soil*. Must be done within 48 hours of initial soil disturbance and before forecasted storm events, unless specified otherwise. Do not use hay mulch in or adjacent to wetlands. ECM** or matting may also be used.
	If final restoration is not scheduled within 30 days, apply annual ryegrass at 1 lb/l000 square feet beneath hay or straw mulch.
Other areas of exposed soil with slopes less than 8% and soils stockpiles	If no activity is scheduled within 30 days (7 days for stockpiles), apply hay and/or straw mulch at a minimum of 70 lbs/1000 square feet of exposed soil*, unless specified otherwise. ECM** may also be used. Hay/straw mulch may also be supplemented by temporary seeding with annual ryegrass at 1 lb/l000 square feet for areas where additional activity is not expected for several more weeks.
Other areas of exposed soil with slopes greater than 8%	If final restoration is not scheduled within 30 days or prior to a storm event, apply hay or straw mulch at the above rates*. Hay or straw must be anchored, unless specific site conditions do not require use of anchoring. ECM** or matting may also be used. Temporary seeding with annual ryegrass at 1 lb/l000 square feet is also recommended for areas where final stabilization is not expected for several more weeks.
Temporary seedbed preparation	Apply limestone and fertilizer (uplands only) according to soil test data. If soil test is not possible, 10-10-10 fertilizer may be applied at a rate of 600 lbs/acre and limestone at 3 tons/acre. Loosen compacted soils.
Temporary seeding in wetlands	If required, apply annual ryegrass at a rate of 1 lb/1000 square feet and cover with straw mulch. Do not add lime or fertilizer to wetlands.

*Mulch application rates shall be doubled for winter construction.
**Minimum ECM thickness is 4 inches for winter construction.

9.1.6 Maintenance of Temporary Measures

Once a week, or after rainstorms producing at least 1 inch of rainfall, whichever is more frequent, the contractor will inspect all areas where temporary non-structural measures are used. The inspection schedule will be increased to daily during the winter construction period. A maintenance log will be kept of all erosion control changes, improvements, and maintenance performed. At a minimum, 75 percent of the soil surface should be covered by mulch or vegetation. If any evidence of erosion or sedimentation is apparent or ground cover is less than 75 percent, repairs will be made and additional temporary measures applied (e.g., additional mulch, anchoring, re-seeding, install erosion control barriers, check dams, etc.).

9.1.7 Dust Control

The contractor will take necessary steps to prevent excessive blowing and airborne movement of dust from exposed soil surfaces. Maintaining natural or temporary vegetation and or mulching will be used where practical. Mechanical sweepers or washing of pavement will be used where necessary to prevent and remove dust buildup on paved surfaces. Regularly traveled soil surfaces will be maintained to minimize dust by periodically moistening bare areas with adequate water to prevent dust. Calcium chloride solution spray should be used in areas experiencing significant dust problems to reduce frequency of watering. Repetitive treatment will be applied as necessary to accomplish adequate dust control (refer to Section B.5 in the *Maine Erosion and Sediment Control BMPs*).

9.2 Permanent Measures

9.2.1 Permanent Mulching

ECM can be used as a permanent ground cover, as an overwinter stabilization mulch, and left to revegetate to near natural conditions. It should be applied in accordance with the specifications provided in Section 9.1.4 above. It is not used where grass vegetation is required, but legumes or woody vegetation may be established if allowed to revert to natural conditions. Re-vegetation can be enhanced by seeding, which is encouraged if used as a permanent stabilization measure. Permanent mulch must not be used in areas of concentrated water flows and evidence of groundwater seepage on slopes may require the ECM to be replaced with riprap.

9.2.2 Permanent Revegetation

Permanent seeding will be used on all exposed soil that is not permanently stabilized by rock, gravel or ECM. The Permanent Seed Mix covered by hay or straw mulch will be applied on all remaining exposed soil that has been restored to final grade. This seeding generally applies between April 16 and October 31, however winter rye will be added to the Permanent Seed Mix after October 1. Permanent seeding is not required during the winter construction season, although dormant seeding may be performed (See Section 10, below). Summary information regarding proper permanent seed mix, application rates, locations, and mulching requirements is provided in Section 11 and Table 7.

10.0 WINTER CONSTRUCTION

For work proposed during the winter season (typically November 1 – April 15), the contractor will adhere to the following practices.

- A plan and schedule of activities shall be submitted to the Permittee for approval prior to any work being done.
- Limit the total area of exposed soil to that in which earth work can be completed within 15 days and mulched within one day prior to a snow event.
- Exposed soil may be left bare for no more than 15 days.
- Mulch all exposed soil where no activity is scheduled within 7 days and prior to a forecasted snow event of more than 1 inch.
- Where practicable, mulch should be applied at the end of each day's work for areas that are final graded. Otherwise, mulch the next day.
- Do not apply mulch over more than 1 inch of snow.
- Hay or straw much will be applied at 140 lbs/1000 square feet (about 4 bales) and so that the ground surface is not visible through the mulch.
- ECM is the preferred mulching material and will be applied at a minimum 4-inch thickness, with higher amounts as indicated in Section 9.1.4 and Table 6.
- ECM is the preferred erosion control barrier. If ECM is not available, installation of silt fence on frozen ground may be modified from illustrations and detail drawings to substitute six inches of suitable non-organic material over the bottom of the silt fence in lieu of trenching and backfilling fabric.
- A double row of erosion control barrier will be used where required within 100 feet of wetlands and waterbodies.
- Inspection of erosion control measures and repair/replacement as needed will occur each work day.
- Permanent seeding is not required during the winter season; however, if done the contractor will follow procedures for dormant seeding. The Permanent Seed Mix will be applied at three times the standard rate, and mulched. Re-vegetation success must be inspected by the contractor in the following spring (after April 15) and reseeded as necessary if vegetative cover is less than 75 percent. Acceptance of dormant seeding as successful will not occur until after June 1 of the following spring.

11.0 SITE RESTORATION

Following completion of the construction activity that will result in earth disturbance in an area of the project, the contractor will be responsible for final restoration of the area.

Highest priority restoration areas include, but are not limited to:

- All wetland, stream, or brook crossings, particularly stream banks and the disturbed areas within 100 feet;
- Drainage ways or ditches;
- Cut/fill banks and slopes over eight percent;
- Around pole structure and anchor pole placement; and
- Travel corridors and construction laydown areas.

This prioritization can be adjusted considering time of year, ground conditions, re-vegetation probabilities, and equipment availability, as determined jointly by the contractor and Permittee.

11.1 Restoration Procedures

Restoration procedures are as follows:

- Timbers, construction mats, culverts or other materials or structures used at temporary stream crossings will be removed, and the banks restored to their original depth and contour. Complete final restoration (finish grade, seed and mulch) of all areas within 100 feet of the waterbody within 48 hours of the removal of the crossing, unless specified otherwise.
- Construction mats used to cross or work in wetlands will be removed and any surface damage repaired as needed by regarding to match pre-construction contours. Wetland topsoil segregated during excavation will be placed back on the top of the regraded wetland to serve as the seed bed. Exposed wetland soils will be stabilized by seeding with annual rye and/or weed-free straw mulch, if restoration occurs after October 1 or if otherwise required by the EI or 3PI. Complete final restoration of all other areas within 100 feet of the wetland within 48 hours of final grading.
- Previously installed water bars may remain or new ones installed at locations designated by the EI. Water bars will be permanently seeded to ensure their long-term stability.
- Soil that is excavated, mounded, or deposited during construction will be re-graded or removed from the site for proper disposal. All re-grading and redistribution of soil will be done to replicate original contours.
- All areas severely rutted by construction equipment will be re-graded and permanently re-vegetated.
- Erosion control mats will be used in conjunction with seeding on sustained slopes greater than a 15 percent grade, and as otherwise indicated in Section 9.1.2;
- All areas of exposed soil not within 100 feet of waterbodies or wetlands will be permanently re-vegetated or otherwise permanently stabilized within 7 days of final grading. For re-vegetation, lime, fertilizer, seed and hay or straw mulch will be applied as follows:

Table 7: Permanent Seed Mix Specifications

Area	Soil Amendments	Seed Mix Varieties	Seed Rate, lb/acre	Mulch, Tons/acre
Upland	Apply ground limestone @ 3 tons/acre Apply 10-20-20 fertilizer @ 800 lbs/acre	Creeping Red Fescue/(Pennlawn, Ensyla, Wintergreen) Redtop/(any native species) Tall Fescue/(Kentucky 31)	20 2 20	1.5 - 2 (90-100 bales)
Wetlands	None (replace original topsoil)	Annual ryegrass, if required/(any native species)	40	1.5 - 2 (90-100 bales)

- Increase seeding rates by 10% when hydroseeding.
- Add winter rye to the upland mix at a rate of 120 lb/acre after October 1.
- Seed or mulch wetlands only where required by the EI or 3PI, or when restoration occurs after October 1. Typically, replacing the original wetland soil on the restored surface will provide an adequate seed bed.
- Do not lime or fertilize any areas within the waterbody buffers or wetlands.
- Mulch wetlands with weed-free straw only.

- The contractor will be responsible for the proper maintenance of all re-vegetated areas until the project has been completed and accepted. Following final seeding, the contractor will inspect restored areas every 30 days until 90 percent vegetative cover has been established unless adjacent, undisturbed areas indicate that achieving that level of vegetation in the area is unlikely. Where seeded areas have become eroded or damaged by construction operations, or where poor germination is observed, the affected areas will be promptly re-graded, limed, fertilized, and re-seeded as needed until the above criteria are met. The contractor may be required to reseed during the following spring in order to achieve the required vegetative cover.
- The contractor will perform all erosion control work to the complete satisfaction of the EI before the work is accepted. A final site inspection will be completed to confirm the acceptability of the erosion control and stabilization work and will include the contractor, EI and 3PI.

12.0 TEMPORARY EROSION CONTROL REMOVAL

Removal of temporary erosion control measures is the responsibility of the contractor. Temporary erosion controls will remain in place and be maintained by the contractor until all construction activity that has the potential for creating ground disturbance is complete and the area is stable. An area is considered stable if: 1) 90 percent vegetative cover has been established, unless adjacent, undisturbed areas indicate that achieving that level of vegetation in the area is unlikely; or 2) rock riprap, stabilized stormwater conveyance structures or other permanent measures are in place and functioning properly.

Straw/hay bales and silt fence shall be removed once the areas upstream are stable. Silt fence and continuous contained berms will be disposed of legally and properly off-site, straw/hay may be used as mulch in accordance with Table 6 or 7, as applicable, or disposed of legally and properly off-site. ECM berms will be spread out on site in an upland area. The stone from the check dams that are removed may be either removed and disposed of legally and properly off-site, or regraded in a manner that does not inhibit flow, revegetation or create erosion. Sediment trapped behind these controls will be distributed to an upland area undergoing final grading and fertilized, seeded and mulched in accordance with the Table 7. Exposed soil that occurs where temporary erosion controls have been removed will similarly be fertilized, seeded and mulched, as needed.

13.0 SUPERVISION AND INSPECTION

To effectively mitigate project-related impacts, the E&S Plan must be properly implemented. Field decisions may be required regarding timing of construction activities and erosion and sedimentation control measures; proper placement and installation of erosion controls; final restoration, stabilization and re-vegetation; and other construction related items. Construction will be continually monitored and inspected in the field for compliance with the E&S Plan, as well as other environmental permit requirements and regulations, through the combined efforts of the contractors, Permittee and an independent 3PI. A description of the responsibilities of each of these three groups for supervising and inspecting construction activity and sites for compliance with the E&S Plan is provided below.

13.1 Contractor Environmental Representative

All contractors working on construction of the project will be required to designate at least one individual that is present at the jobsite on a daily basis as the contractor's environmental representative(s). The environmental representative will be responsible for monitoring the activities of their employees for compliance with the E&S Plan and other environmental permit requirements. The contractor's environmental representative will work closely with his or her own personnel and the Permittee's construction field supervisor(s) and EI to ensure compliance. The contractor's environmental representative will be responsible for inspecting erosion control measures in accordance with Sections 8, 9 and 11 of this E&S Plan, as well as documenting the implementation, maintenance and repair of temporary and permanent erosion control measures and for reporting all petroleum or other hazardous material spills to the Permittee's construction field supervisor and EI.

13.2 Permittee Environmental Inspector

To further ensure proper implementation of the E&S plan, one or more Permittee representatives will be assigned as EI(s) and will be present at the jobsite on an as-needed basis during active construction. The EI will monitor the environmental compliance aspects of construction activities and will report directly to the Permittee's construction field supervisor(s). The EI will have the authority to stop activities that violate the provisions of this E&S Plan or other permit requirements and to order corrective action. The EI will have construction inspection experience, be experienced in erosion control techniques and have an understanding of the wetland, waterbody and other resources required to be protected.

Responsibilities of the EI include working with the contractors, construction field supervisor(s), and the 3PI to ensure project compliance with all environmental requirements, permits, and approvals. Specific duties include:

- Participation in the walk-through and regular meetings with the Permittee's construction field supervisor(s) and the contractors to determine the sequence of construction and the selection and placement of erosion control measures to be employed;
- Verifying and marking the location of sensitive resource areas;
- Verifying that all authorized construction work areas are marked before clearing;
- Monitoring clearing activities;
- Checking for the proper installation and maintenance of erosion control measures;
- Ensuring the repair of all ineffective erosion control measures within 24 hours of identification;
- Working with the contractors to determine corrective action and implementation of additional measures deemed necessary based on field or weather conditions;
- Checking for the proper restoration of contours, placement of topsoil and final stabilization measures and timeframes;
- Documentation of temporary and permanent erosion control and stabilization implementation;
- Ensuring compliance with environmental permit conditions, the Spill Prevention, Control and Countermeasure Plan (SPCC) Plan, and other environmental impact mitigation requirements; and
- Coordination with environmental regulatory agency representatives.

13.3 DEP Third Party Inspector

The third level of supervision and inspection for the project will be provided by the 3PI, if required by the Maine Site Location Permit. If required, the 3PI will be selected jointly by Permittee and the DEP, with final approval by the Department, and will work for the Department to provide independent monitoring of construction activities and compliance. The 3PI will be compensated for their services by the Permittee. The final details regarding responsibilities and authority of the 3PI will be developed jointly by Permittee and the Department and will be in general conformance with the Department's *Special Condition for Third Party Inspection Program*.

14.0 ENVIRONMENTAL TRAINING FOR CONTRACTORS

Environmental training will be provided to both Permittee and contractor personnel whose activities or responsibilities could impact the environment during project construction. The level of training will be commensurate with the type of duties of the individual. All personnel who will be present at a construction site at any time during construction will be given some form of environmental training before he/she is allowed access to a construction area. The training for those who will be actively working at the site will be given prior to the commencement of the individual's job responsibilities. Monthly refresher training will be provided throughout the construction process to reinforce the importance of compliance with environmental requirements and identify potential changes in erosion and sedimentation control or other requirements that have occurred during construction.

The training program will cover the Project Construction Plans, this E&S Plan, the Maine Erosion and Sedimentation Control Law, the SPCC Plan, RTE species restrictions, job specific permit conditions, and any other pertinent information related to the project. All construction personnel are expected to play an important role in maintaining compliance with permit conditions to protect the environment during construction. A record will be kept of the date, location, attendees and topics covered at all training sessions.

APPENDIX A

EROSION AND SEDIMENTATION CONTROL MEASURE ILLUSTRATIONS

APPENDIX B

PROJECT CONTACT LIST

Project Contact List

Contractor's Project Construction Manager: To be determined	Office: Cell: Pager: Email:
Contractor's Environmental Representative: To be determined	Office: Cell: Pager: Email:
Maine Gen's Environmental Compliance Manager: To be determined	Office: Cell: Pager: Email:
Maine Gen's Lead Environmental Inspector: To be determined	Office: Cell: Pager: Email:
Land Agent: To be determined	Office: Cell: Pager: Email:
Public relations: To be determined	Office: Cell: Pager: Email: