

APPENDIX M

WETLAND RESTORATION PROCEDURES FOR TEMPORARY WETLAND IMPACTS FOR THE HUBLINE/EAST TO WEST PROJECT

Algonquin Gas Transmission, LLC

Wetland Restoration Procedures for Temporary Wetland Impacts for the HubLine/East to West Project



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INTRODUCTION

Algonquin Gas Transmission, LLC (“Algonquin”) has developed this Wetland Restoration Plan (“WR Plan”) for the HubLine/East to West Project (“E2W Project”). The purpose of the WR Plan is to document the specific practices that will be implemented to minimize potential adverse effects on wetlands and aquatic ecosystems during construction of the E2W Project. This WR Plan contains a summary of wetland impact mitigation measures presented in Algonquin’s Erosion and Sediment Control Plan (“E&SC Plan”). The purpose of this WR Plan is to provide the U.S. Army Corps of Engineers (“ACOE”) and other resource agencies with a comprehensive overview of the measures to be used during construction to minimize impacts, as well as details on how wetlands will be restored.

Most wetland impacts will occur during the construction phase. Although some permanent cover type conversions will occur to some forested wetlands, there will be no permanent fill of wetlands during construction of the pipeline. There will be approximately 4,200 square feet of wetland loss that will occur for the construction of the permanent access road at the start of the existing Q-1 System in Massachusetts at milepost (“MP”) 12.24. This access road is necessary to allow maintenance personnel access to the regulator station that will be constructed at that location. Restoration of wetland areas will be expedited by minimizing the duration of work and restoring the pre-construction topographic and hydrologic conditions.

Vegetation will be cut just above ground level, leaving the existing root systems in place. Removal of stumps in wetlands will be minimal along the E-3 System Pipeline in Connecticut and along the Q-1 System Pipeline in Massachusetts as these sections of the E2W Project will consist of the lift and replacement of existing pipelines within existing and regularly maintained pipeline rights-of-way (“ROW”). Along the new I-10 Extension in Massachusetts, stump removal will be limited to locations directly over the trench line, unless personnel safety requires additional stump removal. The stumps that are left in place may promote natural regeneration within the construction ROW depending on the species. Except in standing water, saturated soils, frozen conditions, or where ledge is encountered at the surface, the top 12 inches of hydric soils in wetlands over the trenchline will be segregated and stockpiled separately from subsoils. Once the trench is backfilled, the topsoil will be replaced over the trench to its original location and grades. This topsoil material typically contains an extensive seed bank and root propagules that aid in the reestablishment of herbaceous and some woody vegetation in disturbed areas.

Specific locations of wetlands are provided on the 1" = 100' scale project alignment sheets. The alignment sheets depict the wetland boundaries in relation to the proposed pipeline overlain on digitized aerial photography.

Algonquin’s approach to wetland restoration involves a combination of substrate and hydrology restoration, and vegetation establishment involving natural succession processes as a key component. In Algonquin’s experience this approach is effective in minimizing short and long-term impacts to all wetland types along the proposed project route.



WETLAND CONSTRUCTION MITIGATION

General Measures

Algonquin will minimize impacts to wetlands by implementing the following protective measures:

- ◆ Wetland boundaries and buffers will be clearly marked in the field with highly visible flagging and signs until construction-related ground disturbing activities are completed.
- ◆ Sediment barriers will be installed across the entire construction ROW immediately upslope of the wetland boundary at all wetland crossings to prevent sediment flow into the wetland.
- ◆ Where wetlands are adjacent to the construction ROW and the ROW slopes toward the wetland, sediment barriers will be installed along the edge of the construction ROW, as necessary, to prevent sediment flow into the wetland.
- ◆ Where the construction ROW passes through wetlands, sediment barriers will be installed along the edge of the construction ROW, as necessary, to contain spoil and sediment within the construction ROW.
- ◆ To expedite revegetation of wetlands, the top 1 foot of topsoil from the area disturbed by trenching will be segregated and stockpiled separately for restoration purposes. Immediately after backfilling is completed, the segregated topsoil will be restored to its original location. Exceptions to this procedure include areas with standing water, where saturated or frozen soils are present, and where no topsoil layer is evident or the topsoil layer exceeds the depth of the trench.
- ◆ Construction equipment operating within wetlands will be limited primarily to equipment needed to clear the construction ROW, dig the trench, fabricate and install the pipeline, backfill, and restore the construction ROW. All other construction equipment will use access roads in upland areas to the extent practicable.
- ◆ To minimize disturbance and compaction in wetlands with saturated soils or standing water, low ground weight construction equipment will be used, or equipment will operate from timber riprap, prefabricated equipment mats, or terra mats. Imported rock, stumps, brush, or off-site soil as temporary or permanent fill will be prohibited. Following construction, all materials used to support equipment on the construction ROW and stabilize the ROW will be removed.

To reduce disturbance to wetland soils, construction in and around wetlands will be expedited. The equipment utilized and amount of construction activities within wetlands will also be limited. Construction materials, including fuels, will not be stored within 100 feet of any surface water or wetland system, except under limited, highly controlled circumstances. All personnel handling fuels and other hazardous materials will be properly trained and all equipment will be in good operating order and inspected regularly. Construction equipment will not be refueled within 100 feet of any surface water or wetland system, except under limited, highly controlled circumstances. Each construction crew will have sufficient supplies of absorbent and barrier materials to allow the rapid containment and recovery of spilled materials and each foreman will be knowledgeable with spill reporting procedures. Construction equipment will not be washed in or near any wetland. The construction ROW will be inspected



periodically during and after construction. Erosion control or restoration features will be repaired as needed and in a timely manner until permanent revegetation is successful.

The general wetland construction and mitigation procedures that will be followed by Algonquin are those as outlined by the FERC in its *Wetland and Waterbody Construction and Mitigation Procedures* (1/17/2003 version). The actions, as outlined below, are intended to minimize adverse environmental impacts to wetlands. Algonquin will use the best available technology by:

- ◆ Using the most appropriate equipment or machinery;
- ◆ Implementing appropriate maintenance and operation on the equipment or machinery, including adequate training, staffing, and working procedures;
- ◆ Using machinery and techniques that are designed to reduce drainage impacts to wetlands;
- ◆ Designing appropriate wetland crossings that will maintain water flows and accommodate fluctuating water tables;
- ◆ Routing the pipeline to minimize the number of wetland crossings;
- ◆ Maintaining adequate flow in wetlands to protect aquatic life and prevent the interruption of downstream uses;
- ◆ Assembling the pipeline in upland and use “push-pull” or “float” techniques to place the pipe in the trench;
- ◆ Limiting equipment operation in wetlands;
- ◆ Limiting removal of vegetation;
- ◆ Segregate wetland surface soils for restoration during backfilling;
- ◆ Using low-ground-weight construction equipment if standing water or saturated soils are present;
- ◆ Dewatering trenches in such a manner that no heavy silt-laden water flows into any wetland;
- ◆ Utilizing temporary sediment barriers;
- ◆ Where the pipeline trench may drain a wetland, a trench breaker will be constructed and/or the trench bottom will be sealed to maintain original hydrology; and
- ◆ Providing post-construction maintenance and monitoring to establish success of wetland revegetation and restoration.

Temporary Sediment Controls

Prior to any grading and trenching activities, a temporary sediment barrier (*i.e.*, silt fence or hay bales) will be installed across the entire construction ROW immediately upslope of the wetland boundary. Erosion controls will be placed as needed parallel to the construction ROW within the wetland. The



erosion and sedimentation barrier will be properly installed and maintained throughout the construction period to prevent sediment from flowing into adjacent undisturbed wetland areas.

Specific Wetland Crossing Methods

Algonquin will use one of three methods for crossing wetlands during construction depending on individual wetland soil conditions and degree of saturation. The actual method for crossing any given wetland will be determined by the Environmental Inspector (“EI”), Chief Inspector (“CI”), and Contractor based on conditions encountered at the time of construction. The three typical wetland crossing methods are:

- 1) Standard Cross-Country Construction
- 2) Conventional Wetland Construction
- 3) Push/Pull Wetland Construction

Standard cross-country construction can be used in wetlands where soils are dry enough at the time of construction to support equipment. This method is typically used when construction occurs during the mid-to-late summer and early-to-mid fall, when water tables are lowest. This crossing method typically requires no additional equipment support for stability purposes. In addition, this method involves the segregation of topsoil from subsoil over the trenchline.

Conventional wetland construction will be used for crossing wetlands with saturated soils or soils otherwise unable to support mainline construction equipment. Where the soils are saturated, the construction ROW must be stabilized with prefabricated equipment mats, timber riprap, or terra mats during construction.

Push/pull wetland construction entails pushing or pulling a floating section of pre-assembled pipe into position over an inundated trench. The floats are removed and the concrete-coated pipe (or pipe with set on weights) sinks into the trench. The section of pipeline to be floated into place must be straight or nearly straight to be able to float within the confines of the excavated ditch. Algonquin will use this method in large wetland areas where soils are saturated and generally unable to support larger pieces of equipment, where water levels are high enough at the time of construction to float the pipeline into the trench, and where such levels can be maintained without damming. The push/pull method may require less clearing than either standard or conventional wetland construction because construction space is only required to allow the backhoe to traverse the wetland and to stockpile excavated soil. Only equipment needed to clear, excavate, set on the weights required for negative buoyancy, backfill and restore the trenchline will be permitted in the wetland area.

Cleanup/Restoration

The cleanup/final restoration phase is critical for mitigating long-term wetland impacts, and thus will be closely monitored by the EI. During the initial restoration phase, all construction debris will be removed from the ROW. Segregated topsoil will be replaced over the trenchline, and wetland contours and drainage patterns will be restored to approximate original condition by matching that which exists in adjacent undisturbed areas. Restoring the grade, drainage patterns, and replacing topsoil over the trench will promote the re-establishment of native hydrophytic vegetation. Surface rocks and boulders that had been windrowed during the construction phase will be distributed in a more natural configuration in the temporary work space area or hauled off-site. Prefabricated equipment mats and timber riprap access pads will be removed when access to the wetland is no longer required. Where the pipeline trench may affect wetland hydrology (e.g., drain the wetland), trench breakers will be installed or the trench bottom



will be sealed as necessary to maintain the original wetland hydrology. In areas of sloped terrain, permanent slope breakers shall be constructed across the ROW to replace temporary erosion control barriers at wetland boundaries. These clean-up and final grading steps shall be completed within 10 working days after the pipeline is backfilled, weather conditions permitting.

Within 6 working days of restoration of the substrate, weather conditions permitting, wetlands will typically be seeded with annual ryegrass at a rate of 40 pounds per acre. The use of annual ryegrass in restoring wetlands is recommended by the FERC and the National Resources Conservation Services (“NRCS”) and has been shown to stabilize effectively the site and serve as a nursery crop as the indigenous wetland vegetation reestablishes itself. The ryegrass quickly loses vigor during the first growing season and allows revegetation by native wetland plant species.

Construction Supervision and Inspection

As stated above, Algonquin will ensure implementation of the wetland restoration plan through its construction supervision and Environmental Inspection Program (“EIP”). Training of EIs will be undertaken to ensure that the EIs will be able to carry out their duties as described in this document. Construction activities will be in compliance with the E&SC Plan and with requirements of applicable federal, state and local environmental permits and approvals. The EIs will review all project documents (ROW descriptions, reports, permits, alignment sheets, aerial photography and relevant plans) prior to construction. The EIs will also be responsible for the following tasks to protect and mitigate impacts to wetlands:

- ◆ Verify the location of signs and highly visible flagging marking the boundaries of sensitive resource areas, wetlands, and waterbodies.
- ◆ Ensure the repair of all ineffective temporary erosion control measures by the Contractor within 24 hours of identification.
- ◆ Oversee restoration and revegetation of wetlands and adjacent upland areas, and monitoring of waterbodies.
- ◆ Ensure that all construction activities occur within authorized work areas and only approved access roads are used.
- ◆ Monitor collection and disposal of construction waste.
- ◆ Inspect construction activities daily to verify and document that Contractors are complying with the requirements of the E&SC Plan, the environmental provisions included in the construction drawings and construction line list, the environmental conditions and mitigation measures of the FERC Certificate, and with all applicable federal and state permit requirements.
- ◆ Maintain daily activity logs, prepare weekly progress reports, and complete other required documentation (including photos/videos) of construction activities.
- ◆ Identify potential problems and initiate appropriate actions prior to occurrence.
- ◆ Ensure that the soil profiles are restored as required.



- ◆ Educate other Company Inspectors about project specific environmental concerns.
- ◆ Provide notification concerning proposed construction activities to agencies as required in permits.
- ◆ Work directly with the water and wetland resource agencies to assure that Wetland Crossing Plans are properly implemented.
- ◆ Verify that trench dewatering activities do not result in the deposition of sand, silt, and/or sediment near the point of discharge into a wetland or waterbody. If such deposition is occurring, the dewatering activity will be stopped and the design of the discharge will be changed to prevent reoccurrence.

The EIs will be supervised by and be responsible to the CI who has overall authority over construction. The EI will report compliance problems, have “stop-task” and corrective action authority and make “stop-work” recommendations to the CI who has “stop-work” authority. At the direction of the CI, the EI will take the appropriate steps to redirect work as necessary.

Post-Construction Restoration Monitoring

As required by the FERC and specified in the E&SC Plan, Algonquin will conduct post-construction monitoring of all wetlands affected by construction, annually for 3 years, to assess the condition of revegetation and the success of restoration. Wetland revegetation shall be considered successful when the cover of herbaceous and/or woody species is at least 80 percent of the type, density, and distribution of the vegetation in adjacent wetland areas that were not disturbed by construction.

Upon determination of successful revegetation, sediment barriers will be removed and disposed of properly in accordance with the E&SC Plan.

If an area is not showing signs of re-establishment of native wetland vegetation or if there is a need for exotic invasive plant species control measures following construction, Algonquin shall consult with the ACOE and other applicable federal and state agencies to develop appropriate remedial actions. Algonquin shall produce quarterly monitoring reports and provide them to the FERC, ACOE, and other applicable agencies as requested. Please refer to the E2W Project Invasive Species Management Plan for more details regarding exotic invasive plant species controls.



WETLAND MITIGATION

On March 21, 2008, Algonquin met with the ACOE New England District to discuss preliminary considerations for wetland compensation for approximately 6.0 acres of permanent forested wetland conversion as a result of ROW vegetation maintenance and for the permanent fill of 4,200 square feet of wetland for the construction of the permanent access road at the start of the Q-1 System in Massachusetts at MP 12.24.

Algonquin anticipates that “preservation,” at a 15:1 ratio, will be the preferred compensation measure for both the forested wetland conversion to other wetland cover types and the permanent fill associated with the new access road at the beginning of the Q-1 System. This compensation ratio is consistent with those outlined in the ACOE’s December 18, 2007 Public Notice entitled *Addendum to New England District Compensatory Mitigation Guidance: Compensation for Impacted Aquatic Resource Functions* and would equate to an approximately 91-acre compensation site.

Given the extremely limited acreage of permanent forested wetland conversion in Connecticut (0.34 acres), the ACOE indicated that they would accept one wetland compensation site in Massachusetts for the entire E2W Project area pending concurrence with Connecticut resource agencies, the U.S. Environmental Protection Agency, and the U.S. Fish and Wildlife Service. Several potential compensation sites have been identified by Algonquin within Massachusetts. Algonquin will continue to work with the ACOE and other applicable federal and state agencies to develop the final wetland mitigation package.