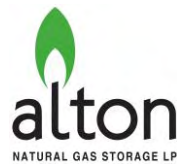




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**ALTON NATURAL GAS
PIPELINE ENVIRONMENTAL
ASSESSMENT
REGISTRATION**



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Project 121510724

Date: July 2012

Executive Summary

Alton Natural Gas Storage LP (Alton, the Proponent), a limited partnership between AltaGas Ltd. and Veresen Inc., will be developing an underground natural gas storage facility near Alton, Nova Scotia to meet the growing demand for natural gas storage in Nova Scotia, New Brunswick, and Northeastern United States. The storage facility received an Environmental Assessment (EA) Approval from the Nova Scotia Minister of Environment in December 2007 for the development of the storage caverns and associated facilities including the water pipelines to the Shubenacadie River. In June 2011, Alton submitted an application for approval to the Nova Scotia Utility and Review Board (NSUAR) to construct the caverns for gas storage which has been favourably received by the public. To enable the storage of natural gas within the caverns, the facility must be connected to a natural gas transmission system. Alton is therefore proposing to construct and operate a natural gas pipeline to connect the storage facility to the existing Maritimes and Northeast Pipeline (M&NE) Halifax Lateral approximately 10.8 km away (the Project). Presently, no storage facilities connect to the M&NE system.

The proposed natural gas pipeline will be 16 - 24 inches nominal outside diameter (OD) and approximately 10.8 km in length. It will be designed, constructed, operated and maintained in accordance with the 2011 edition of Canada Standards Association (CSA) CAN/CSA Z662 – Oil and Gas Pipeline Systems Standard. The maximum operating pressure will be 9930 kPa (1440 psig). No compressor stations are anticipated along the pipeline route.

A pipeline corridor evaluation study was conducted and a preferred Study Corridor was selected based on investigations to identify potential environmental, socio-economic, technical and cost constraints. Alton selected a preferred 20 m right-of-way (referred to as the Proposed RoW) within the Study Corridor based on refined constraint mapping and further investigation. This proposed RoW selection process involved a number of field surveys, and discussions with property owners and other stakeholders. In the future, this 20 m RoW may need to be expanded to 30 m if pipeline looping is required. If this is the case, additional permitting requirements will be undertaken at the time.

Nova Scotia has set a goal to protect 12% of the land in Nova Scotia by 2015 and selected the candidate lands, mainly Crown lands, for consideration under the program (NSE 2011). The majority of Crown land within the Study Corridor falls under the 12% candidate lands; however, these candidate lands were identified in 2011 after the Study Corridor was identified and studied for the purpose of this application. The Proposed RoW traverses the candidate lands in recently deforested regions and along existing roads/trails wherever possible to reduce disturbance. It is also noted that the existing M&NE Halifax Lateral natural gas transmission line runs through a portion of these candidate lands.

Proposed Project activities will be similar to those of other natural gas transmission pipeline projects in Nova Scotia. Construction will include clearing, grubbing, topsoil stripping and grading, trenching, pipe installation, backfilling, and clean-up and RoW restoration. Operations and maintenance will be limited to maintenance of the RoW, and regular inspections and testing.

In Nova Scotia, EA is regulated under the province's *Environment Act* and Environmental Assessment Regulations. The Project requires registration under the provincial EA process as a Class I Undertaking as it meets the following criteria: "An onshore pipeline that is 5 km or longer, other than a pipeline that carries natural gas, if the pipeline has a maximum operating pressure below 3,450 kPa (500 psig)".

This report describes and evaluates the potential environmental and socio-economic effects of the Project during all Project phases. The evaluation has included proposed mitigative measures, where required, to reduce or eliminate potential significant impacts arising from Project-related activities. The report is based on information collected during field surveys, consultation with government, non-government agencies and individuals, background research and professional judgment of the Study Team.

A scoping process was undertaken to identify the Valued Environmental Components (VECs) to focus this assessment. This scoping included: regulator and stakeholder consultation; regulatory issues and guidelines; research; and professional judgment.

The following VECs were selected for the assessment:

- Groundwater Resources;
- Fish and Fish Habitat;
- Rare Vascular Plants;
- Wildlife and Wildlife Habitat;
- Wetlands;
- Land and Resource Use; and
- Archaeological and Heritage Resources.

Each of the VECs selected for the assessment was evaluated for potential interactions between the VEC and Project activities during all Project phases (*i.e.*, construction, operation and maintenance). Malfunctions and accidental events that may occur were assessed separately. These interactions were evaluated for potential significance after application of technically and economically feasible mitigative measures, where appropriate, to reduce or eliminate potentially significant adverse Project-related environmental effects. Environmental monitoring measures will be undertaken, where necessary, to ensure compliance with applicable regulations,

standards, and guidelines, as well as to verify impact predictions and refine mitigative measures, where required.

Consultation with stakeholders, the general public and regulatory agencies is an important component of the assessment process. Consultation is directed at providing information to and obtaining feedback on the Project, particularly the location, design, construction and operations and maintenance procedures. Public involvement for the Project thus far includes:

- meetings with regulatory agencies;
- providing information through the Alton Gas website (www.altongas.com) and public access to the Project details provided in the application to the NSUARB.
- meetings with potentially affected landowners and other stakeholders;
- input from Aboriginal peoples (Mi'kmaq) including a Mi'kmaq Ecological Knowledge Study (MEKS); and
- a well-attended open house/public meeting in Stewiacke on November 30, 2011.

Consultation and provision of Project information will continue as the Project proceeds through the approvals process, as well as through the planning, construction, and operations phases.

It is the conclusion of this EA report that the proposed Alton Natural Gas Pipeline Project is not likely to have significant adverse effects on the environment. Potentially adverse environmental effects will be reduced to acceptable levels through the use of technically and economically feasible design and mitigative measures.

Positive effects from the Project are likely, particularly those related to increased economic activity and are described below.

Development of the Project will create a number of direct and indirect benefits for the Nova Scotian and Canadian economy. Projected costs for construction of the pipeline are expected to be \$6 to \$10 million. Furthermore, Alton is committed to using local resources where economically and technically feasible to provide benefit to Nova Scotians, particularly residents of Colchester County. Full time jobs will be created over the construction of the Project.

In addition to direct employment, the Project is expected to contribute to the community by:

- bringing gas closer to the communities of Alton, Brookfield, Stewiacke, and Truro through the development of a gas pipeline to the Alton facility;
- decreasing gas price and gas price volatility for Nova Scotia gas customers;
- decreasing gas price volatility and hence power price volatility for natural gas fired power generation;

- to the extent that stable gas prices and security of supply result in greater gas fired power generation and hence less coal fired generation, a potential reduction in greenhouse gas emissions;
- provide for growth of compressed natural gas (CNG), natural gas fired power generation, and natural gas distribution in Nova Scotia and Atlantic Canada;
- increase operational pressures and flow to the Halifax region where capacity constraints are expected to be a significant challenge in the near future;
- increasing regional security of supply levels;
- contributing to the tax base (income, property, and sales);
- allowing for the potential of developing other energy-related projects as a result of storage; and
- contributing to the overall economic growth of the community.

Overall, the Project will be developed to reduce or eliminate adverse effects on the environment and provide economic benefits to Colchester County and the Province of Nova Scotia.

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LIST OF ACRONYMS

CAO	Chief Administrative Officer
CAPP	Canadian Association of Petroleum Producers
CEAA	Canadian Environmental Assessment Act
CORDA	Colchester Regional Development Association
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CSA	Canada Standards Association
DFO	Fisheries and Oceans Canada
EA	Environmental Assessment
EMP	Environmental Management Plan
EPP	Environmental Protection Plan
ESD	Emergency ShutDown
HADD	Harmful Alteration, Destruction Or Disruption
HDD	Horizontal Directional Drilling
HDPE	High Density Poly Ethylene
KMKNO	Kwilmu'kw Maw-klusuaqn Negotiation Office (Mi'kmaq Rights Initiative)
LP	Limited Partnership
M&NE	Maritimes and Northeast Pipeline
MGS	Membertou Geomatics Solutions
MEKP	Mi'kmaq Ecological Knowledge Protocol
MEKS	Mi'kmaq Ecological Knowledge Study
NCNS	Native Council of Nova Scotia
NSE	Nova Scotia Environment
NSESA	Nova Scotia Endangered Species Act
NSDNR	Nova Scotia Department of Natural Resources
NEB	National Energy Board
NSE	Nova Scotia Environment
NSUARB	Nova Scotia Utility and Review Board
OD	Outside Diameter
PPE	Personal Protective Equipment
RoW	Right-of-Way
SARA	Species at Risk Act
WHMIS	Workplace Hazardous Materials Information System
WMP	Waste Management Plan
VEC	Valued Environmental Component

1.0 INTRODUCTION

1.1 PROJECT OVERVIEW

Alton Natural Gas Storage LP (Alton, the Proponent), a limited partnership between AltaGas Ltd. and Veresen Inc., will be developing an underground natural gas storage facility near Alton, Nova Scotia. The storage facility received an Environmental Assessment (EA) Approval from the Nova Scotia Minister of Environment in December 2007 for the development of the storage caverns and associated facilities including the water pipelines to the Shubenacadie River. In June 2011, Alton submitted an application for approval to the Nova Scotia Utility and Review Board (NSUARB) to construct the caverns for gas storage which has been favourably received by the public. To enable the storage of natural gas within the caverns, the facility must be connected to a natural gas transmission system. Alton is therefore proposing to construct and operate a natural gas pipeline to connect the storage facility to the existing Maritimes and Northeast (M&NE) Pipeline Halifax Lateral (the Project), approximately 10.8 km away. Figure 1.1 (Project Location) shows the current proposed Project (*i.e.*, the natural gas pipeline), as well as the general location of the storage caverns and associated water pipelines that received EA Approval in 2007.

The proposed natural gas pipeline will be 16 - 24 inches nominal outside diameter (OD) and approximately 10.8 km in length. It will be designed, constructed, operated and maintained in accordance with the 2011 edition of Canada Standards Association (CSA) CAN/CSA Z662 – Oil and Gas Pipeline Systems Standard. The maximum operating pressure will be 9,930 kPa (1,440 psig). No compressor stations are anticipated along the pipeline route.

A pipeline corridor evaluation study was conducted and a preferred Study Corridor was selected based on investigations to identify potential environmental, socio-economic, technical and cost constraints. Alton selected a preferred 20 m right-of-way (referred to as the Proposed RoW) within the Study Corridor based on refined constraint mapping and further investigation. This proposed RoW selection process involved a number of field surveys, and discussions with property owners and other stakeholders. The Study Corridor and Proposed RoW are shown on Figure 1.2.

Proposed Project activities will be similar to those of other gas transmission pipeline projects in Nova Scotia. Construction will include clearing, grubbing, topsoil stripping and grading, trenching, welding, pipe installation, backfilling, and clean-up and RoW restoration. Operations and maintenance will be limited to maintenance of the RoW and regular inspections and testing.

The natural gas pipeline will link the Alton storage caverns facility with the Maritimes and Northeast Pipeline's (M&NE) natural gas transmission system Halifax Lateral. The M&NE natural gas pipeline transports natural gas from Goldboro, Nova Scotia to the U.S. - Canada border in Maine, terminating in Beverly, Massachusetts. The M&NE main pipeline interconnects

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with the 323.94 mm (NPS 12') M&NE Halifax Lateral that is 124 km (77 mi) in length; this in turn provides the connection between the Alton cavern site and the M&NE transmission system. A Custody Transfer Meter Station located at the Halifax Lateral 70 km (44 mi) from the main line will measure and control the flow of gas to and from the Alton gas pipeline that is the subject of this EA application.

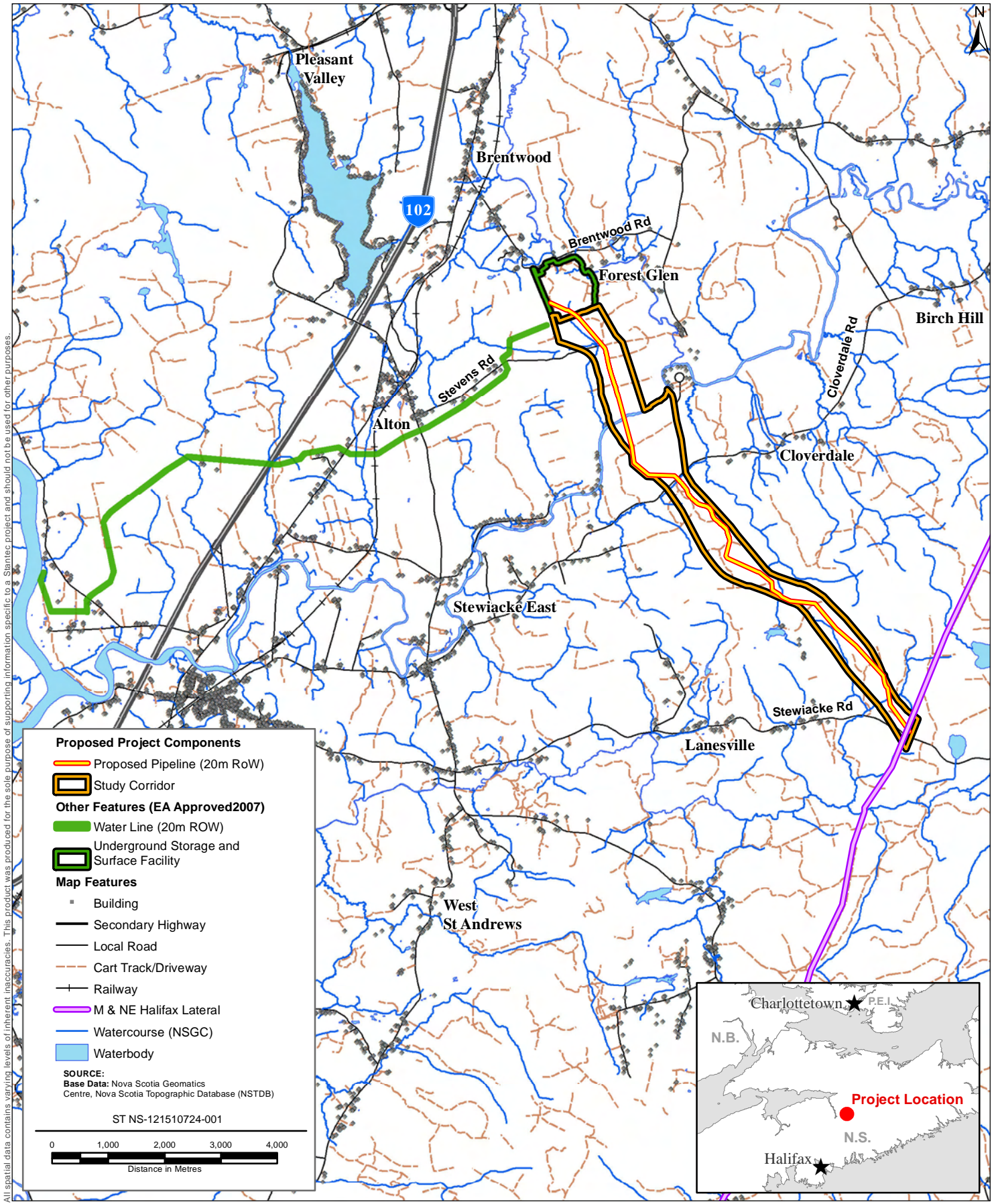
The Project will link the Alton storage caverns facility with the M&NE's natural gas transmission system Halifax Lateral. The natural gas pipeline lateral was not included as part of the 2007 Environmental Assessment (EA) because at the time, it was not yet clear if Alton would be building the lateral or if the lateral will be built, owned and operated by M&NE.

In Nova Scotia, EA is regulated under the province's *Environment Act* and Environmental Assessment Regulations. The Project requires registration under the provincial environmental assessment process as a Class I Undertaking because it meets the following criteria:

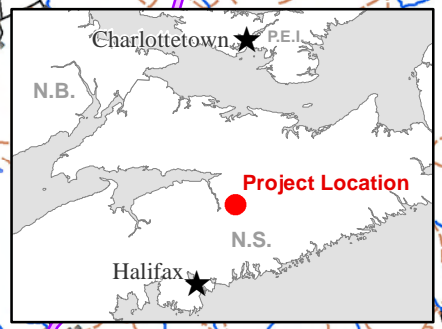
- An onshore pipeline that is 5 km or longer, other than a pipeline that carries: natural gas, if the pipeline has a maximum operating pressure below 3,450 kPa (500 psig)

The Halifax Lateral is a federally regulated undertaking and is subject to the *National Energy Board Act*. As the Project will be constructed by Alton, a federal environmental approval process under the *Canadian Environmental Assessment Act* (CEAA) with the National Energy Board (NEB, the Board) is not anticipated.

This report describes and evaluates the potential environmental and socio-economic effects of the Project during all Project phases. The evaluation has included proposed mitigative measures, where required, to reduce or eliminate potential significant impacts arising from Project-related activities. The report is based on information collected during field surveys, consultation with government and non-government agencies and individuals, background research and professional judgment of the Study Team.



All spatial data contains varying levels of inherent inaccuracies. This product was produced for the sole purpose of supporting information specific to a Stantec project and should not be used for other purposes.

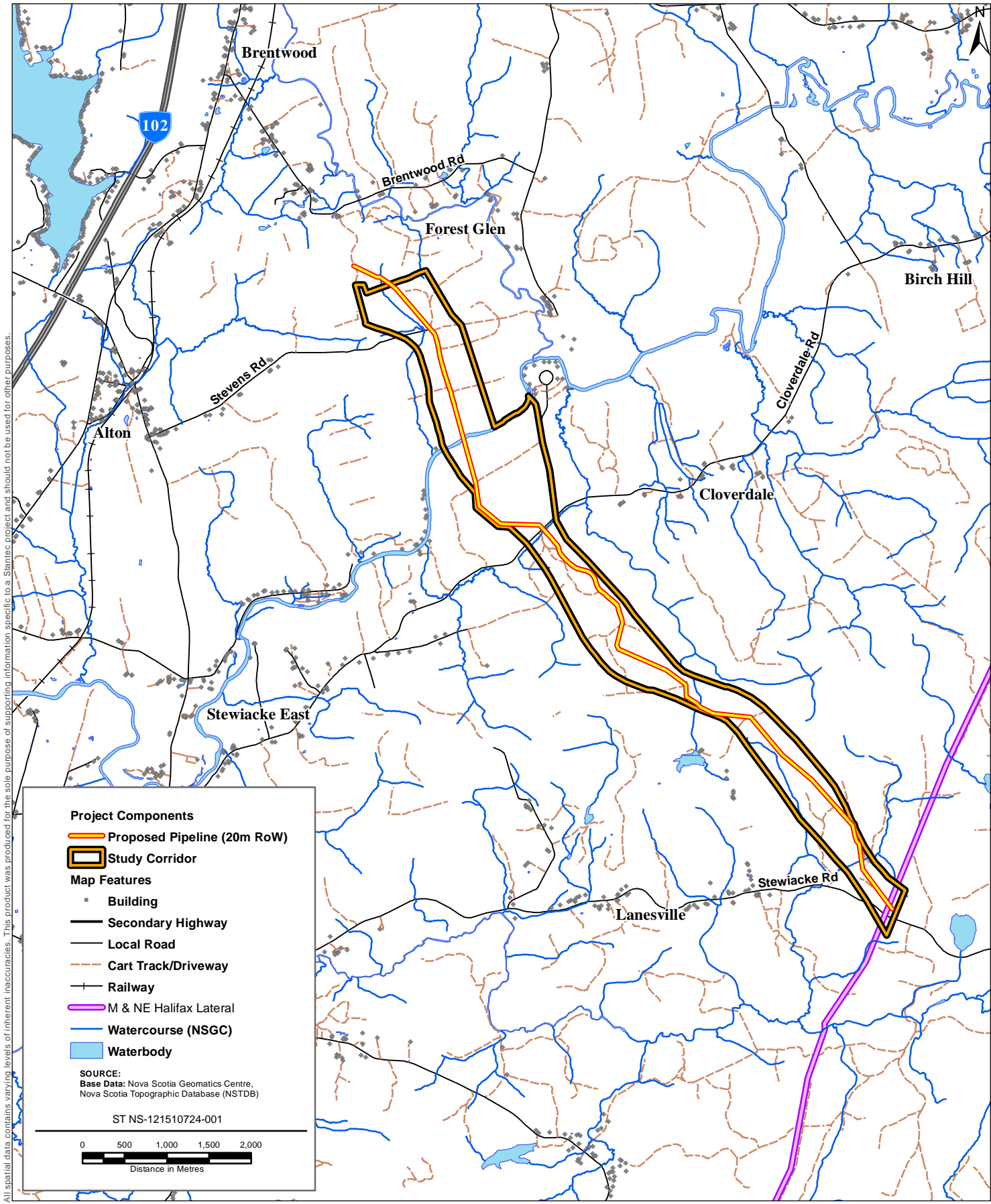


PREPARED BY:	J. Petho
REVIEWED BY:	C. Shupe
CLIENT:	

ALTON NATURAL GAS PIPELINE PROJECT

Project Location

FIGURE NO.:	1.1
DATE:	Dec 07, 2011



All spatial data contains varying levels of inherent inaccuracies. This product was produced for the sole purpose of supporting information specific to a Stantec project and should not be used for other purposes.

PREPARED BY:	J. Petho
REVIEWED BY:	C. Shupe
CLIENT:	

ALTON NATURAL GAS PIPELINE PROJECT

Study Corridor and Proposed Pipeline Right-of-Way

FIGURE NO.:	1.2
DATE:	Dec 07, 2011

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Proponent Information

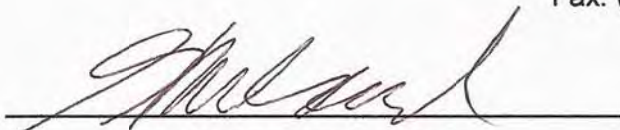
Alton Natural Gas Storage LP (Alton, the Proponent) is a limited partnership between AltaGas Ltd. and Veresen Inc. Alton will be the operator of the Project.

Contact Information for the Proponent:

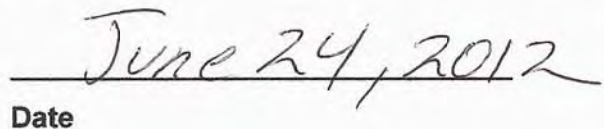
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**Scott G. McDonald, P. Eng., MBA
Vice President – Operations
Alton Natural Gas Storage LP**



Date

1.2 TITLE OF PROJECT

This Project is referred to as the Alton Natural Gas Pipeline Project.

1.3 PURPOSE AND NEED FOR THE PROJECT

Alton will be developing an underground natural gas storage facility near Alton, Nova Scotia to meet the growing demand for natural gas storage in Nova Scotia, New Brunswick, and Northeastern United States. The storage facility received EA Approval (with conditions) from the Nova Scotia Minister of Environment in December 2007 for the development of the storage caverns and associated water pipelines to the Shubenacadie River. To enable the storage of natural gas within the caverns, the facility must be connected to a natural gas transmission system. As such, Alton is proposing to construct and operate a natural gas pipeline to connect the storage facility to the existing M&NE Halifax Lateral. Presently, no storage facilities connect to the M&NE system.

1.4 PROJECT BACKGROUND

Previously EA Approved Project - Storage Caverns and Water Pipeline

In December 2007, the Alton Natural Gas Storage Project received an EA Approval (with conditions) from the Nova Scotia Minister of Environment for the development of the storage caverns. Subsequent to the EA Approval, several other permits were also obtained under Part V of the Nova Scotia *Environment Act*, including Industrial Approvals and Water Approvals (refer to Figure 1.1) for several phases of the cavern development project.

The Alton storage caverns will be located within the confines of the Hydrocarbon Storage-Area Lease obtained by Alton, while the surface facilities will be located within surface lands owned or leased by Alton. The Alton cavern site has a number of advantages including its subsurface geological properties, access to existing natural gas pipeline infrastructure, and proximity to valuable markets in eastern Canada and the north-eastern USA.

Key features of cavern development (as per 2007 EA) include:

- A buried water pipeline to the area overlaying the salt formation from the Shubenacadie Estuary (the Estuary), at a distance of approximately 12 km, where water will be drawn to the facility for solution mining, with a second pipeline to transport brine returned to the Estuary during the cavern development process;
- Cavern development facilities including water pumping, brine handling, measurement and control systems, and buffer fluid systems for cavern shape control;
- Pipeline systems from the cavern development facilities to the cavern access wells; and
- Cavern access wells through which leaching water flows to the salt zone where the caverns are developed, the resulting brine returns, and buffer fluid enters and exits the cavern
- Gas handling facilities including compression, dehydration, metering and control, and ancillary equipment will be located in a central gas handling facility located near the caverns and on Alton lands.

In June 2011, Alton submitted an Application for Approval to Construct the Alton Natural Gas Storage Cavern Development to the Nova Scotia Utility and Review Board which forms part of the overall application. This application was submitted to confirm that the cavern development will adequately conform to the Province of Nova Scotia's "Code of Practice Respecting the Underground Storage of Hydrocarbons (December 2002)" that regulates the design, development and operation of underground natural gas storage caverns in the province, as well as the national standard CAN/CSA Z341 "Storage of Hydrocarbons in Underground Formations", Series-10 (February 2010).

Current Proposed Project – Natural Gas Transmission Pipeline

In order to transport natural gas to and from storage, the facility requires a natural gas transmission pipeline. The subject of the current EA registration is a natural gas pipeline that will connect the caverns and facilities to the M&NE Halifax Lateral approximately 10.8 km away, which connects to a larger network of pipelines that supply natural gas to the Maritimes and others (refer to Figure 1.2).

1.5 REGULATORY FRAMEWORK

In Nova Scotia, EA is regulated under the province's *Environment Act* and Environmental Assessment Regulations. The Project triggers the provincial EA process as a Class I Undertaking.

- An onshore pipeline that is 5 km or longer, other than a pipeline that carries: natural gas, if the pipeline has a maximum operating pressure below 3450 kPa (500 psig)

This EA report, prepared on behalf of Alton by Stantec Consulting Ltd. (Stantec), is intended to support the required EA Registration for the Project made pursuant to the Environmental Assessment Regulations.

The Halifax Lateral is a federally regulated undertaking and is subject to the *National Energy Board Act*. As the Project will be constructed by Alton, a federal environmental approval process under the *Canadian Environmental Assessment Act* (CEAA) with the National Energy Board (the Board) is not anticipated. No triggers for an assessment under CEAA are anticipated for this Project, namely: federal proponent; federal funds; transfer of interest in federal lands; or permits/authorizations under the CEAA Law List Regulations.

Overall, the Project will be developed and operated in a manner that reduces adverse effects on the environment and provides economic benefits to Colchester County and the Province of Nova Scotia.

1.6 ORGANIZATION OF THE REPORT

Following this introduction, this EA includes the following sections:

- A description of the proposed Project (Section 2.0);
- A description of the methods of public involvement and steps taken to address public concerns (Section 3.0);
- The scope of the assessment and the methodology used to assess the environmental effects (Section 4.0);
- A description of the existing environmental and socio-economic setting of the Project (Section 5.0);

INTRODUCTION

- The environmental and socio-economic components effects assessment, including proposed and required mitigation and monitoring and follow-up studies (Section 6.0);
- A description of potential malfunctions and accidental events (Section 7.0);
- A summary of the report and concluding statements (Section 8.0);
- A list of references cited including literature and personal communications (Section 9.0); and
- Several appendices of technical information.

2.0 PROJECT DESCRIPTION

2.1 PROJECT LOCATION AND ROUTE SELECTION

The Project will be located within a 20 m wide right-of-way (RoW) extending approximately 10.8 km in a continuous route from the underground caverns site near Alton, NS, to a tie-in to the Halifax Lateral pipeline (refer to Figure 1.2).

A pipeline corridor evaluation study was conducted in 2007 to identify a preferred Study Corridor (approximately 1 km wide) from a larger study area (approximately 10 km wide) based on potential environmental, socio-economic, technical and cost constraints. Four potential Study Corridors were assessed: the preferred Southern Corridor; two Alternate Corridors that are variants of the Southern Corridor; and an Eastern Corridor (refer to Figures 2.1 and 2.2). The following constraints were reviewed at a high level for each of the four potential pipeline corridors:

- Geological and geotechnical conditions known to affect pipeline constructability and integrity (e.g., steep slopes, and exposed or shallow bedrock);
- Watercourse crossings and fisheries resources requiring special consideration (e.g., potential for wet crossings and/or horizontal directional drilling (HDD));
- Terrestrial resources requiring special consideration (e.g., high value habitat, concentration of sensitive species, wetlands);
- Land use (e.g., First Nations reserves, parks and protected areas, developed areas, proximity to residents, and land use planning); and
- Archaeological/cultural sites.

M&NE also added criteria with respect to preferred conditions at the tie-in to the Halifax Lateral; these are: easy accessibility, readily available electric power supply and telephone service, and access to land.

Potential constraints were identified through a desktop review of existing information, including readily available technical reports, databases, professional judgment and experience locating linear development projects in Canada. The review identified potential environmental, technical, and social issues or constraints in the area, based on readily available data. Sources of these data include the Maritimes Breeding Bird Atlas, Nova Scotia Department of Natural Resources, *Species at Risk Act* Registry, Canada Land Inventory, Atlas of Canada, official plans and other regional sources of information, where available for the area.

PROJECT DESCRIPTION

The Southern Corridor was selected as the preferred option in consideration of the following factors:

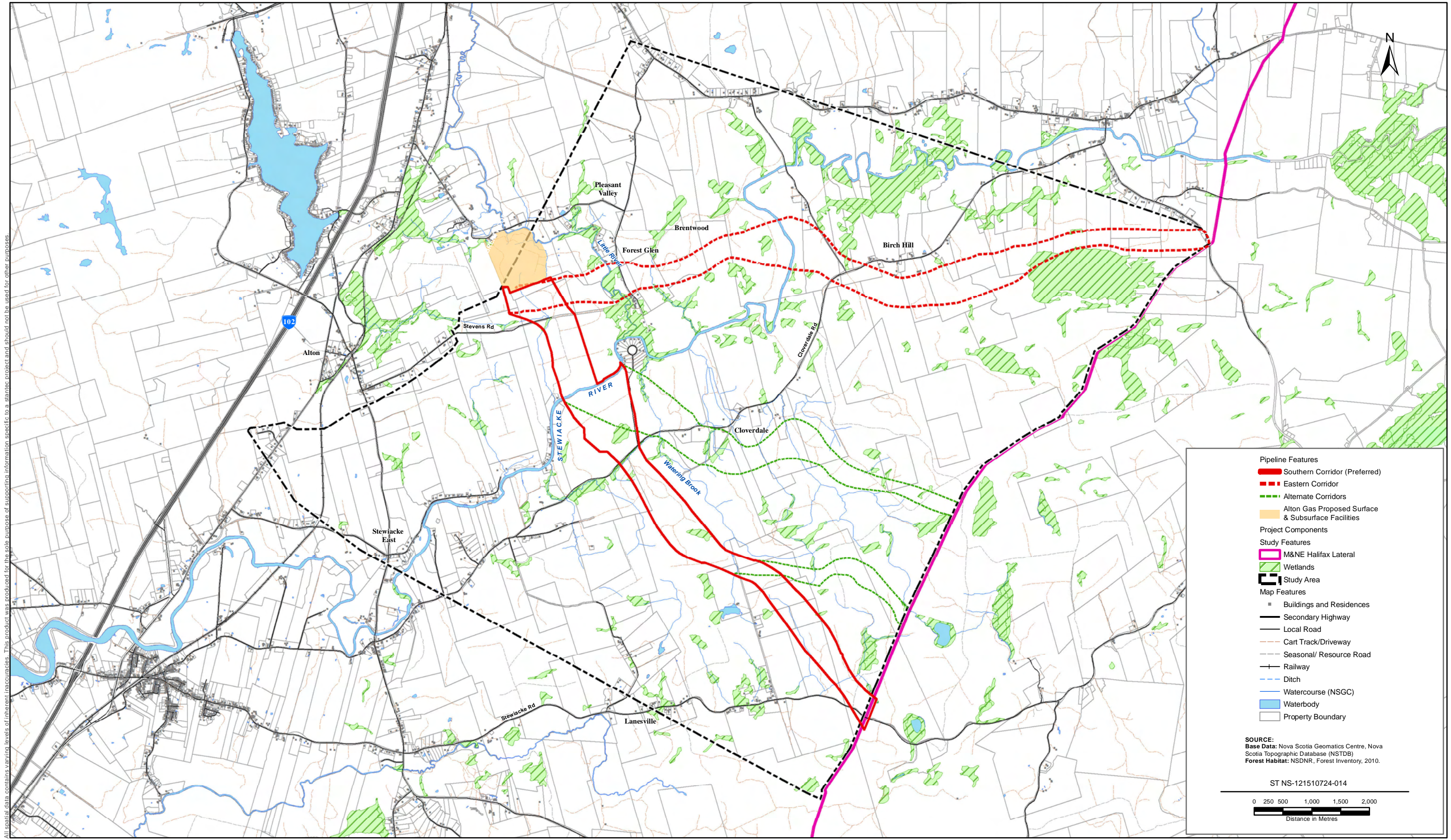
- As shown on Figure 2.1, the Southern Corridor traverses fewer environmentally sensitive areas, particularly government-identified wetlands, than the Eastern Corridor;
- The properties crossed by the Southern Corridor was owned by only six private landowners, whereas the properties crossed by the Eastern Corridor were owned by 33 different landowners (refer to Figure 2.2);
- The Southern Corridor maintains greater setback distances from residential properties than the Eastern Corridor (refer to Figure 2.2); and
- The length of the Southern Corridor (approximately 10.8 km) is shorter than the length of the Eastern Corridor (approximately 13 km). The Southern Corridor is preferable from this perspective because selection of a shorter pipeline route is generally expected to translate into relatively less environmental disturbance during Project construction and reduced potential for adverse environmental effects caused by accidental events.

The two potential Alternate Corridors branching off of the Southern Corridor were excluded due to the absence of one or more of M&NE's above-listed criteria for a preferred interconnection point.

Following identification of the Southern Corridor as the preferred Study Corridor, Alton conducted a pipeline constructability investigation/review that did not identify any unmanageable constraints. A meeting was subsequently held with Nova Scotia Environment's (NSE) on June 25, 2008 to review the Southern Corridor proposal, and no serious issues were raised at that time. All further investigation and analysis undertaken in support of the Project and this EA focused in the Southern Corridor.

Alton selected a preferred 20 m wide right-of-way (referred to as the Proposed RoW) within the Study Corridor based on refined constraint mapping and further investigation. This Proposed RoW selection process involved a number of field surveys, and discussions with property owners and other stakeholders. Further details on the Study Corridor and Proposed RoW selection can be found in Sections 3.0 (Public Involvement), 5.0 (Existing Environment), and 6.0 (Environmental and Socio-Economic Effects Assessment).

Nova Scotia has set a goal to protect 12% of the land in Nova Scotia by 2015 and selected the candidate lands, mainly Crown lands, for consideration under the program (NSE 2011). The majority of Crown land within the Study Corridor falls under the 12% candidate lands; however these candidate lands were identified in 2011 after the Study Corridor was identified. These lands are discussed further in Section 5.7.5 (Land and Resource Use).



All spatial data contains varying levels of inherent inaccuracies. This product was produced for the sole purpose of supporting information specific to a stantec project and should not be used for other purposes.

Pipeline Features

- Southern Corridor (Preferred)
- - - Eastern Corridor
- - - Alternate Corridors
- Alton Gas Proposed Surface & Subsurface Facilities

Project Components

Study Features

- M&NE Halifax Lateral
- Wetlands
- Study Area


Map Features

- Buildings and Residences
- Secondary Highway
- Local Road
- Cart Track/Driveway
- Seasonal/ Resource Road
- Railway
- Ditch
- Watercourse (NSGC)
- Waterbody
- Property Boundary

SOURCE:
 Base Data: Nova Scotia Geomatics Centre, Nova Scotia Topographic Database (NSTDB)
 Forest Habitat: NSDNR, Forest Inventory, 2010.

ST NS-121510724-014

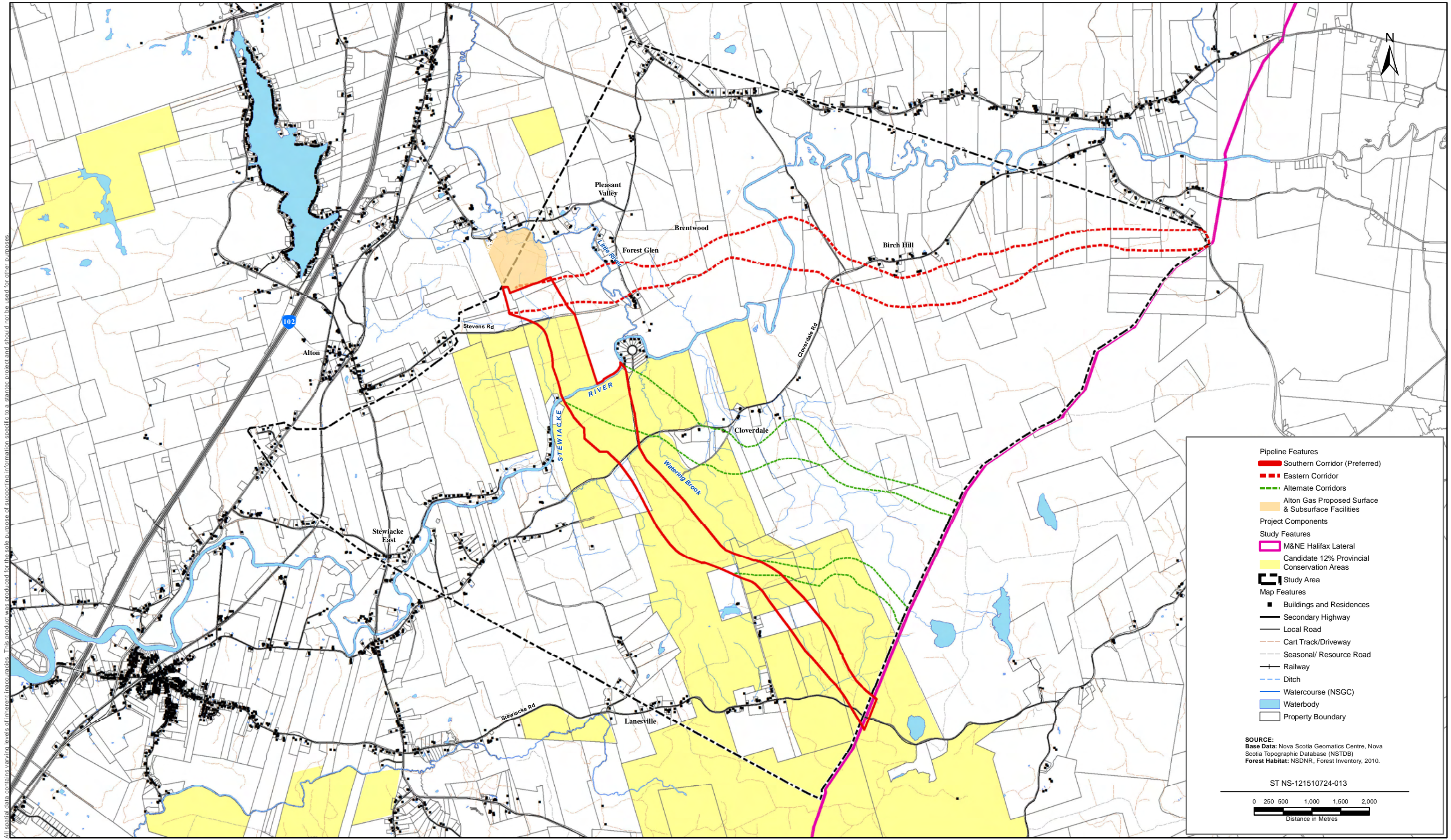
0 250 500 1,000 1,500 2,000
 Distance in Metres

PREPARED BY: M. Huskins-Shupe
REVIEWED BY: R. Federico
CLIENT: 

ALTON NATURAL GAS PIPELINE PROJECT

Pipeline Corridor Selection - Biophysical Considerations

FIGURE NO.: 2.1
DATE: Jun 13, 2012

All spatial data contains varying levels of inherent inaccuracies. This product was produced for the sole purpose of supporting information specific to a stantec project and should not be used for other purposes.

Pipeline Features

- Southern Corridor (Preferred)
- - - Eastern Corridor
- - - Alternate Corridors
- Alton Gas Proposed Surface & Subsurface Facilities

Project Components

- M&NE Halifax Lateral
- Candidate 12% Provincial Conservation Areas
- Study Area

Map Features

- Buildings and Residences
- Secondary Highway
- Local Road
- Cart Track/Driveway
- Seasonal/ Resource Road
- Railway
- Ditch
- Watercourse (NSGC)
- Waterbody
- Property Boundary


SOURCE:
 Base Data: Nova Scotia Geomatics Centre, Nova Scotia Topographic Database (NSTDB)
 Forest Habitat: NSDNR, Forest Inventory, 2010.

ST NS-121510724-013

0 250 500 1,000 1,500 2,000
 Distance in Metres

PREPARED BY:
M. Huskins-Shupe

REVIEWED BY:
R. Federico

CLIENT:


ALTON NATURAL GAS PIPELINE PROJECT

Pipeline Corridor Selection - Land Use Considerations

FIGURE NO.:
2.2

DATE:
Jun 13, 2012


 Stantec Consulting Ltd. © 2011

2.2 PROJECT INFRASTRUCTURE AND ACTIVITIES

2.2.1 Project Design Overview

Components of the proposed Project include:

- Approximately 10.8 km of NPS 16 - 24 steel buried pipeline designed to a maximum operating pressure of 9,930 kPa (1,440 psig) (see Table 2.1). The pipeline will be designed to allow for pigging capabilities using internal inspection tools. The pipeline will be designed, constructed, operated and maintained in accordance with the 2011 edition of CAN/CSA Z662 - Oil and Gas Pipeline Systems.
- The proposed pipeline will require a 20 m wide permanent RoW with additional temporary work spaces in all crossing locations. The work space required will vary depending upon the size and nature of the crossing.
- Valve stations will be installed at each end of the pipeline along with facilities for flow control, gas metering and isolation capabilities for maintenance and safety requirements. The valve stations will be fenced for security purposes. The valve station at the caverns site was assessed as part of the 2007 EA (Jacques Whitford 2007).

TABLE 2.1 Line Pipe Specifications

Specification	CAN/CSA Z245.1
Nominal Diameter (inches)	NPS 16 to NPS 24
Minimum Burial Depth m	0.91
External Coating	Extruded HDPE or Fusion Bonded Epoxy
Design Pressure (kPa)	9,930
Joint Type	Welded
External Coating at Joints	Per coating manufacturer's instructions

Wherever practical, the pipeline will parallel existing lateral disturbances (e.g., woods roads) and utilize existing infrastructure for construction purposes. Contractor marshaling yards will be located on commercial property. A few new access roads (temporary or permanent) will be necessary for the construction of this pipeline and associated facilities. The location of new access roads and additional work areas will be determined prior to construction using environmental siting procedures similar to those used to locate the Proposed RoW.

2.2.2 Construction

The following is a general description of typical pipeline construction activities. Further detail will be provided in the Environmental Management Plan (EMP), which will be prepared at the Industrial Approval stage. An outline of the EMP is provided in Section 2.8.5. The EMP will serve as an umbrella document that includes information such as the Waste Management Plan (WMP), Environmental Protection Plan (EPP) and the Emergency Response and Contingency Plan, as well as other key environmental planning documents.

PROJECT DESCRIPTION

Inspection staff will enforce Alton's construction specifications, site-specific environmental mitigation measures contained in the EMP, and any conditions imposed by regulatory authorities. Environmental Inspectors will be experienced in pipeline construction and hired to perform this task. The EMP will also include additional information on the Environmental Inspectors' roles and responsibilities.

All landowner or industry issues and crossing agreements are to be resolved prior to making the NSUARB application for approval to construct the pipeline.

Before the contractor's work force enters onto any private property, an Alton representative will contact each landowner to discuss specific issues regarding the Project. Appropriate mitigative measures to address landowner concerns may involve temporary fencing, access through existing private trails to the work area, topsoil conservation, cut timber disposal, and revegetation. Discussions with landowners will be recorded and a copy of agreed mitigation measures is left with the landowner and provided to the pipeline contractor. A card will be left with the landowner with telephone numbers of Alton personnel who can be reached during construction.

Site Preparation

The pipeline RoW will traverse and intersect several existing public and private roads and forestry roads. It is anticipated that access to the RoW for construction will be from these points and few if any new access roads will be built for this Project. Where required, access roads will be built as temporary access routes and will consider the applicable local or provincial standards or guidelines for this use. Environmental protection measures similar to those used for RoW construction will be applied to access road construction thus avoiding or reducing potential adverse effects from road construction (see Section 2.8.5 for EMP outline).

All utilities (e.g., existing pipelines, telephone lines, power lines) are located or "daylighted" to avoid damage to the utility and hazards to construction workers.

The clearing crew is the first to begin work on the RoW. The crew braces and cuts all fences crossing the RoW and installs temporary gates as required. The crew clears trees, stumps, brush, and crops from the RoW to permit construction of the pipeline. Merchantable timber is salvaged and property owners are compensated for any trees that are removed. Clearing will be restricted to the 20 m RoW and temporary work spaces.

The next step is for the grading crew who prepare temporary approaches to transportation corridors to allow equipment the required access to the RoW. This crew grades the entire RoW to prepare for pipeline construction and strips and conserves topsoil from the ditch line such that different soil types are not mixed. The various soil types along the proposed RoW will be identified in the EMP (see outline in Section 2.8.5) which will form an integral part of the contract documents and identify mitigative measures to be taken.

PROJECT DESCRIPTION

Pipeline Installation

This pipeline will likely be constructed utilizing one pipeline spread comprised of several crews with different responsibilities. The work will be supervised by Alton representatives.

Line pipe is delivered to the RoW by trucks with flatbed trailers. The stringing crew is responsible for the offloading of the individual pipe joints and positioning them along the RoW on skids in preparation for the next crew.

The bending crew is the next on the RoW. Their responsibility is to bend individual joints of pipe in order to allow the completed pipeline to match the contours of the RoW (lateral, vertical and compound deflections).

Welding of the individual pipe joints is the next step in the process and is handled by the welding crew. This crew can be comprised of rig welders and/or automatic welders. Each welded joint will require several welding passes to complete the weld and grinding and cleaning of the weld area is required between passes.

Following the welding crews is another group of workers tasked with cleaning the welded joint and applying the necessary coating to the weld area as recommended by the pipe coating manufacturer to complete the external corrosion protection.

Using backhoe excavators or trenching machines, the contractor excavates a trench, approximately one metre wide and about 1.5 metres deep, to provide the required cover over the pipe. The contractor will provide access across the trench and work area as required for property owners.

In rock areas, pipeline cover requirements may be reduced in accordance with code requirements; however, no such areas have been identified during route surveying and assessments.

Concurrent with trenching, a boring crew prepares all transportation corridors as necessary for bored crossings. This operation involves an excavation on both sides of the proposed crossing large enough to allow room for the boring equipment to operate and at the proper elevation. Augers placed in a bore pipe are used to bore beneath the proposed crossing to avoid disrupting surface features at the crossing site. When the bore pipe exits on the far side of the crossing, the augers are removed, the carrier pipe or casing pipe is attached to the bore pipe, and the bore pipe is pulled back, drawing the carrier pipe or casing pipe into place. Typically, paved highways and main roads are bored; smaller road crossings may be crossed using an open-cut method. If a road is open-cut, the trench is backfilled as quickly as possible to maintain access.

In the unlikely circumstance that substantial bedrock is encountered, blasting may be required to permit trench excavation for the pipeline. All blasting activity is carried out by licensed blasting personnel to protect the general public, personnel and property.

PROJECT DESCRIPTION

As the pipeline trench is completed a lowering-in crew follows with side boom tractors and roll cradles to lift the pipe off the temporary skids and lower the completed pipe system into the trench. Inspection personnel work with the lowering crew to inspect the integrity of external coating of the pipe with an electronic inspection device. This operation commonly referred to as “Jeeping”.

The contractor will install the necessary safeguards for open trenches and construction operations traffic to protect workers and the general public. These safeguards may consist of regular safety meetings, barricades, signs, lighting, flag persons and traffic detours *etc.* All safety measures will comply with provincial regulations.

Watercourse Crossings

Typically watercourse crossings will be installed as outlined in the Canadian Association of Petroleum Producers (CAPP) manual “Pipeline Associated Water Course Crossings” (CAPP 2005) which has been endorsed by Fisheries and Oceans Canada (DFO). The width and depth of the watercourse, flow characteristics, environmental sensitivities, and the time of year that construction takes place, costs, adjacent land use, and soil conditions all influence the choice of crossing method.

It is proposed that conventional boring or horizontal directional drilling (HDD) will be utilized for the Stewiacke River. The Stewiacke River proposed HDD crossing will be further described within the Project-specific EMP that will be prepared at the Industrial Approval stage. A generic diagram of the HDD crossing technique is provided for reference (Figure 2.3). It is proposed that the remaining watercourses will be crossed utilizing a dry crossing technique as illustrated in Figure 2.4. Environmental issues associated with potential leaking of drilling fluids are considered in Section 7.2 (Assessment of Malfunctions and Accidental Events).

PROJECT DESCRIPTION

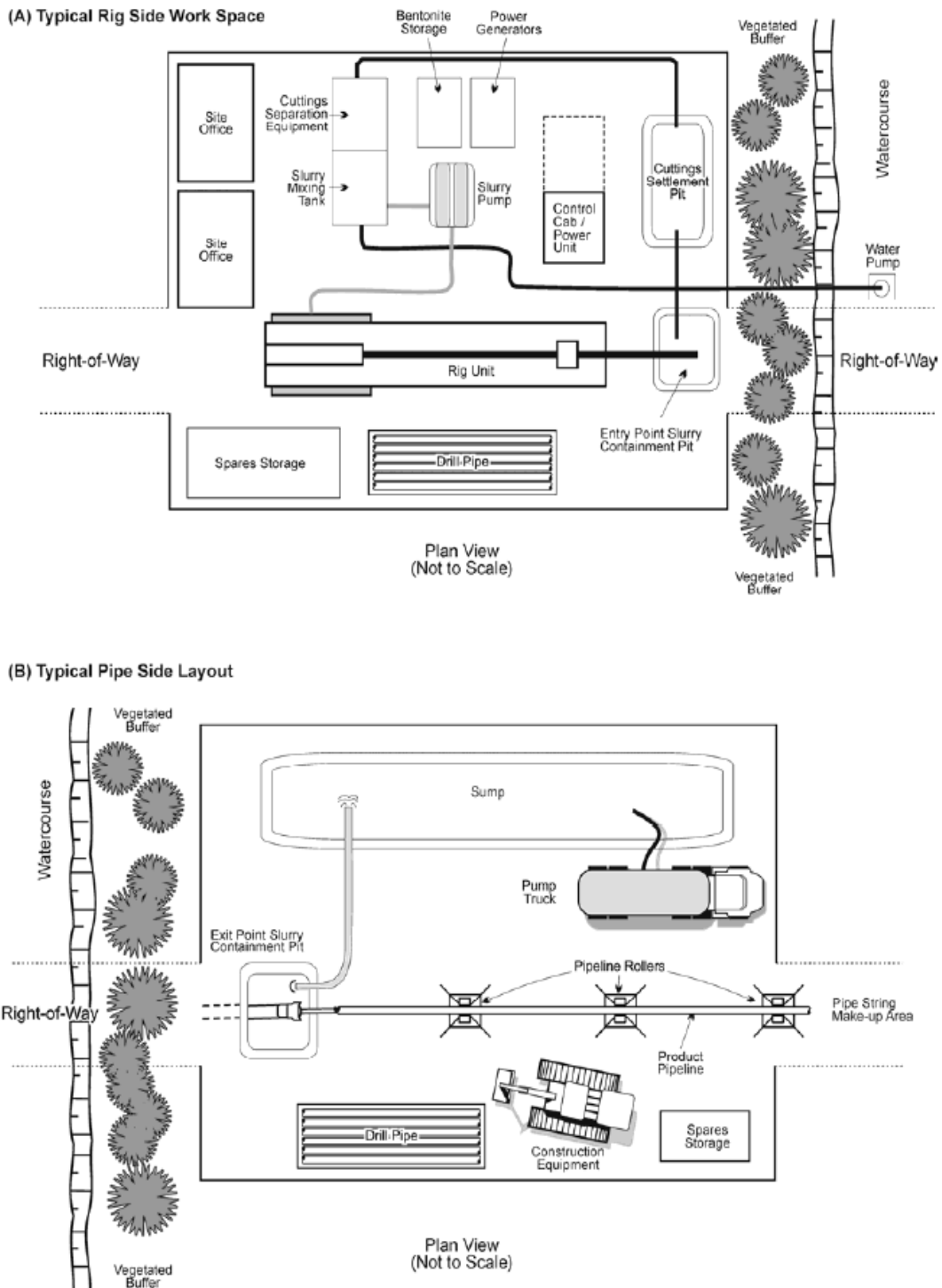


FIGURE 2.3 Typical HDD Watercourse Crossing Technique (Source: CAPP 2005)

PROJECT DESCRIPTION

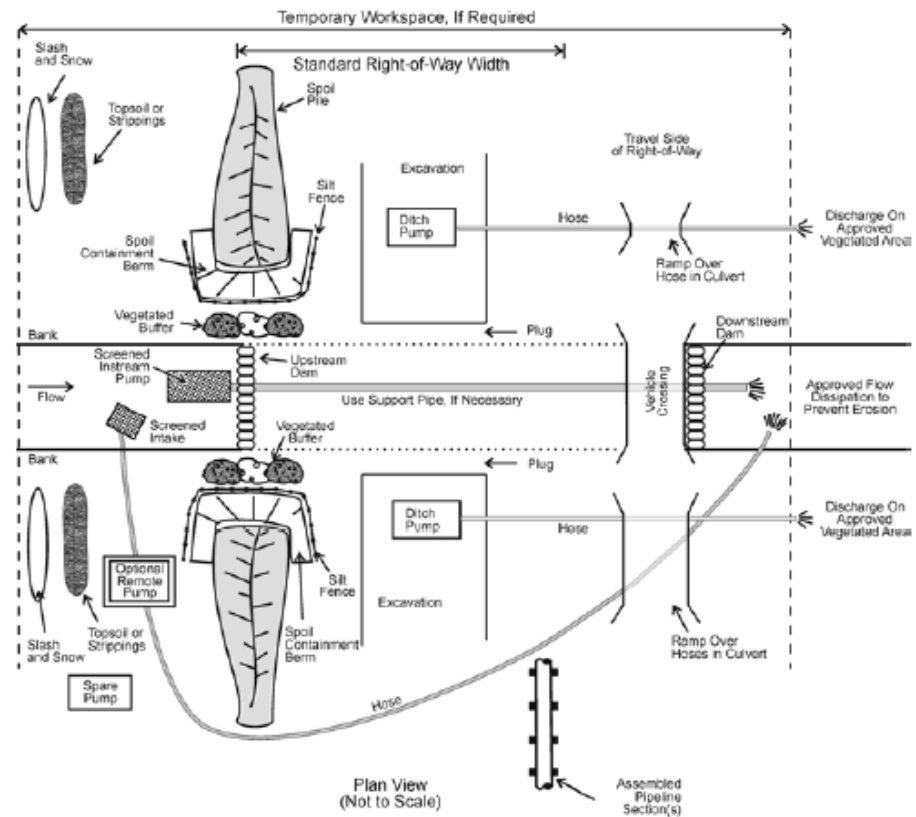


FIGURE 2.4 Typical Dam and Pump Watercourse Crossing Technique
(Source: CAPP 2005)

Backfilling of the trench commences immediately after the pipe has been installed. This backfilling operation is carried out using a dozer or backhoe. In areas of steep slopes, ditch plugs, RoW cross drains and diversion berms are installed at regular intervals to prevent trench and surface erosion and promote re-vegetation.

Additional mitigation measures for watercourse crossings are provided in Section 6.2.5.

Right-of-Way Restoration

The clean-up crew is the final crew on the property. The crew prepares the subsoil on the stripped portion of the RoW. The trench line is crowned with enough subsoil to allow for trench settlement. The topsoil is replaced over the stripped area, graded, harrowed and reseeded as required. The clean-up crew also repairs fences, picks up debris, and restores sensitive areas such as steep slopes, ditch banks, and stream crossing areas. Final clean-up typically occurs after the following spring, when settlement or other issues may show up.

Large rock not suitable for use as backfill material will be disposed of, either by windrowing along the edge of the RoW, buried on or off the RoW, or hauled off the RoW depending upon

PROJECT DESCRIPTION

the requirements of the property owner. In bedrock areas rock is used to backfill the trench level with the existing bedrock profile. In such areas, the pipe is protected with rock shield or shaded with sand fill prior to backfilling.

When clean-up is completed, the landowner and an Alton representative conduct a RoW review to assess conditions. The landowner is asked to sign a clean-up acknowledgment form if satisfied with the clean-up. When signed, this form releases the contractor, allowing payment for the clean-up on the property, but in no way releases Alton from its obligation to compensate for damages or to rehabilitate disturbance directly attributable to the pipeline construction.

2.2.3 Cleaning and Testing

The completed pipeline is hydrostatically tested with water to ensure pipeline integrity and confirm it is suitable for the intended service and operating pressures. Water for testing is normally obtained from water sources near the pipeline, including streams or lakes, or available municipal supply lines. Water withdrawal sites are selected in accordance with environmental guidelines and the requirements of regulatory agencies and landowners affected by the operation. All necessary permits will be obtained from regulatory authorities for the use of water from the selected withdrawal sites.

Once the pipeline test is complete the pipeline is dewatered and dried with in-line mechanical tools called "pigs". The test water is collected and disposed of only at approved locations and in accordance with the regulations and in consultation with the landowners. Water is generally released over land at low velocities to prevent flooding or erosion. If released directly to streams, care is taken to prevent scouring of the stream or river beds and banks, and, where practicable, the water is returned to the same source. Any methanol used in testing for freeze protection will be recovered and disposed in accordance with local and provincial regulations.

Alton will consider practice guidance from government and industry and implement it as appropriate during fluid selection, testing operations, and disposal of waste fluid.

2.2.4 Custody Transfer Station

A custody transfer metering station will be constructed at the tie-in point of the 16 to 24" steel gas pipeline and the 12" M&NE Halifax Lateral. M&NE will build and own the station. This station will measure and control the natural gas flow to and from the storage cavern system. An Emergency Shutdown (ESD) system will allow for the isolation of the Alton Gas Pipeline in case of an emergency.

2.3 OPERATION AND MAINTENANCE

Alton will operate and maintain the pipeline in accordance with standard procedures designed to ensure the integrity of the system, including those specified by CAN/CSA Z662. The pipeline is designed for a minimum 40-year life, although the actual life would probably be much longer. The pipeline will be patrolled by Alton on a routine basis and required maintenance will be

PROJECT DESCRIPTION

handled by qualified personnel. Commercial air services may be used as required for routine inspection of the pipeline.

The pipeline RoW will be clearly marked with sign and post markings at public roads, railroad and navigable water crossings, and other areas as required to reduce the possibility of damage or interference resulting from construction activities of other projects. This will also allow the rapid identification of the pipeline during aerial surveillance. Prior to commissioning the pipeline, Alton will file an Operations Manual with the NSUARB. This manual will take into consideration current and ongoing discussions with regulatory agencies, stakeholders, and community groups to ensure consideration of local needs.

Typical maintenance or routine activities during pipeline operation may include internal pipeline inspections using “Smart Pigs” (electronic inspection tools), annual aerial surveillance, over the ground surveys, and cathodic protection monitoring. Excavation, inspection, and replacement of pipe segments will be undertaken, if necessary.

The pipeline RoW will traverse a number of different terrain types and environmental conditions. RoW maintenance procedures will be consistent with Alton’s existing procedures and those used by other major pipeline companies across Canada, with specific modifications made for the region. Maintenance will be performed by Alton personnel and equipment and/or qualified contractors.

Vegetation control on the RoW will be accomplished by mechanical means. No chemical spraying will be undertaken on the RoW; however, limited chemical spraying may be used, where allowed by regulation, to control vegetation growth within the confines of meter stations and other station facilities. The use of herbicides for vegetation control may be required in areas where physical vegetation management techniques are unsuccessful at controlling noxious weeds. Only herbicides of low persistence and low ecological toxicity will be used and no chemical vegetation control will be performed within or adjacent to wetlands or within 30 m of watercourses.

Pipeline valves and aboveground facilities will be properly secured and protected by suitable fences to prevent tampering by unauthorized parties. The fenced areas will be maintained to ensure safety and an acceptable appearance.

Additional safety measures are described in Section 2.8.5.

2.4 DECOMMISSIONING

Alton facilities are designed and will be operated and maintained to provide safe and efficient service for a minimum of 40 years and likely much longer. However, if unforeseen events occur, some facilities may eventually need to be decommissioned. Should decommissioning be required, options include leaving pipeline structures in place, or removing them. If abandonment of the structures is chosen, it will be undertaken in accordance with the regulatory requirements applicable at the time of such activities and appropriate technology will be used. An

PROJECT DESCRIPTION

abandonment plan and, if required, a site restoration plan, will be developed in consultation with the Nova Scotia UARB and other appropriate regulatory authorities.

At a minimum, an abandonment plan would include a schedule for equipment decommissioning and disassembly. The plan would indicate the approximate time required to remove and dispose all abandoned installations, structures, and buildings for which onsite reuse is not possible, and to reinstate the site to a quality necessary for subsequent industrial land use. Decommissioning planning will be developed in consideration of environmental goals for the area. Activities that support such planning may include a review of baseline and follow up monitoring data; thorough record keeping; adherence to applicable standards and guidelines during Project operations; documentation of potential influencing factors; and development of a rehabilitation plan.

To protect the public and the environment, surface facilities, particularly valves and metering devices, will be removed. Sites will meet legislative standards and will be left clean and safe.

Disposal of waste will be conducted in accordance with NSE waste management regulations and guidelines. Removal of buildings or structures is expected to have similar effects and considerations as construction and will be conducted in accordance with regulatory requirements applicable at the time of removal.

Removing below-ground pipe may result in environmental effects similar to those experienced during construction. To reduce adverse effects, the pipeline is typically left in the ground and disconnected and isolated from any operating facilities, then filled with an inert medium, such as nitrogen, and permanently sealed. Following abandonment, Alton will continue to monitor land use along the RoW to continue to conform to permitted uses on the RoW. Heavy equipment use will be restricted directly over the pipeline and will only be allowed to cross the pipeline at properly installed crossings. As with pipeline construction, landowners will be compensated should there be any damage during pipeline abandonment. In some cases, pipe is removed and salvaged during decommissioning. If pipe removal becomes necessary, pipe sections under watercourse crossings and wetlands will be left in place. Alton will approach the Nova Scotia Government for approval to take other action as available and deemed appropriate.

2.5 PROJECT SCHEDULE

The construction of the approximately 10.8 km pipeline can be completed within approximately two months.

In general, RoW clearing activities will be scheduled to avoid potential interactions with Valued Environmental Components (VECs) during sensitive periods (e.g., breeding bird periods between April 15 and August 31) where recommended as specific mitigative measures (Section 6.4), as general environmental protection practices (Section 2.8.5), or to comply with specific conditions of required permits. Instream work at watercourses will generally be limited to the period from June 15 through September 30 to avoid fish migration and periods of higher precipitation and runoff potential. Winter construction may be undertaken in some cases where there may be advantages to working on frozen ground. Clean-up activities will begin late

PROJECT DESCRIPTION

summer or early fall. Any remaining clean-up will be completed the following summer as well as repair of any settlement that occurs during the spring. An in-service date for the pipeline is planned for 2014/2015.

2.6 LABOUR REQUIREMENTS

Development of the Project will create a number of direct and indirect benefits for the Nova Scotian and Canadian economy. Projected costs for construction of the pipeline are expected to be \$6 to \$10 million. Furthermore, Alton is committed to using local resources where economically and technically feasible to provide benefit to Nova Scotians, particularly residents of Colchester County.

2.7 EMISSIONS AND WASTE DISCHARGES

The Project will meet or improve upon the compliance standards outlined in applicable regulations or standards with respect to liquid and gaseous emissions and discharges, sedimentation, and waste management. Where no standards exist, appropriate industry practices will be adopted, where feasible. Alton will reduce to the extent practical, volumes of wastes and concentrations of contaminants entering the environment. A Waste Management Plan (WMP) will be developed for all phases of the Project and included in the Project Environmental Management Plan (EMP). The objective of this plan is to reduce waste discharges and emissions and identify appropriate waste reduction and other mitigative measures.

2.7.1 Air Emissions

Air emissions associated with construction activities are generally related to the generation of dust and routine emissions from the operation of construction equipment. Waste wood will be mulched and spread on the RoW, thus burning of wood waste materials is not anticipated. Control measures, such as use of dust suppression techniques, will be used in construction zones as required to reduce the impacts from fugitive dust. The air emissions from the construction equipment will be localized and temporary, lasting the duration of construction activities. Routine inspection and maintenance of construction equipment will reduce exhaust fumes. Specific construction equipment is discussed in Section 2.2.2; however, generally it will consist of trucks, bulldozers, graders, backhoes, ditchers and other heavy equipment, similar to what may be seen on many industrial construction sites. Alton will attempt to reduce emissions throughout the Project.

There is also potential for venting from the M&NE Halifax Lateral while they are doing their hot tap, tie-in, and meter station purging.

During operation, no provision will be made in the pipeline design to vent or flare gas except at the separate facilities at each end of the pipeline (*i.e.*, at the cavern site or as operated by M&NE at the Halifax Lateral tie-in). All such activities will be a part of the terminal plant or meter station facilities and included in those operations. Routine maintenance may very infrequently

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require natural gas (methane) emissions and routine inspection will rarely, if ever, result in natural gas emissions. If necessary and when possible, gas from de-pressuring (blow down) will be flared in a controlled manner to mitigate atmospheric impact.

All blow downs and controlled releases of natural gas will be carried out in accordance with the Operating Procedures and the Emergency Response and Contingency Plan which will be filed with the NSUARB prior to the pipeline being put into service. The Emergency Response and Contingency Plan will address emergency response in the event of rupture or damage resulting from a natural event or from the actions of a transient third party resulting in the accidental release of natural gas (see Section 2.8.5).

The amount of natural gas released to the atmosphere will range from less than 0.2 m³ for the change-out of a tubing fitting to approximately 16,000 standard m³ in the event of a planned blow down of the pipe (approximately 10.8 km in length).

Potential air emissions during decommissioning and abandonment will be similar to emissions associated with construction if the pipeline is removed. If the pipeline is left in place, air emissions will be associated with removal of above-ground facilities and purging of the system. A decommissioning and abandonment plan which includes details of potential sources of air emissions will be filed with the NSUARB prior to decommissioning and abandonment of the pipeline.

During all stages of the Project, all air emissions will be maintained within the Nova Scotia Air Quality Regulations (*Environment Act*) and *Canadian Environmental Protection Act* Ambient Air Quality Objectives.

2.7.2 Noise Emissions

Most noise emissions during construction are associated with operation of construction equipment and construction activities, possibly including blasting. Project construction noise will be intermittent, as equipment is operated on an as-needed basis and mostly during daylight hours.

The NSE has developed guidelines that apply to a continuous point source in excess of two hours duration and located within close proximity to residential areas. The guidelines for acceptable equivalent continuous sound levels (Leq) are:

- Leq of 65 dBA between 0700 to 1900 hours;
- Leq of 60 dBA between 1900 to 2300 hours; and
- Leq of 55 dBA between 2300 to 0700 hours.

The only continuously point source of noise is from crossing bores; other noise to be expected from pipeline operations is from maintenance and inspection, and vehicles and equipment.

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2.7.3 Liquid Wastes

Liquid wastes generated during construction include oils and greases, from the construction equipment and solvents plus any inadvertent fuel spills. These wastes are considered hazardous and will be collected and disposed of in accordance with applicable local and provincial regulations. Liquid wastes from construction crews, including sewage and domestic waste water, will also be collected and disposed of consistent with local and provincial standards.

Liquid wastes typically produced during pipeline operations include waste methanol, ethylene, and spent varsol solvent used for maintenance of the pipeline. These wastes are considered hazardous and will be collected and disposed of in accordance with local and provincial regulations. None of these will be used along the pipeline route, except at the terminal facilities or during possible repair operations.

Liquid wastes associated with decommissioning and abandonment will be similar to construction and operation wastes if the pipeline is removed. A decommissioning and abandonment plan which includes details of potential sources of liquid waste will be filed with the NSUARB prior to decommissioning and abandonment of the pipeline.

2.7.4 Surface Run-off and Sedimentation

Although the Proposed RoW is only approximately 10.8 km long by 20 m wide, there is potential for erosion and sedimentation of freshwater systems associated with land-based construction activities as well as sediment resuspension associated with in-water construction activities. A Project-specific EMP, including plans for erosion and sediment control measures will be developed prior to commencement of construction activities and implemented to reduce impacts to water quality from construction activities. On-land measures will include, but are not limited to:

- schedule site activities to reduce the disturbance of the Project surface area;
- coordinate construction activities with consideration of seasonal constraints (e.g. attempt to time clearing, grubbing, and excavation activities to avoid heavy precipitation and sensitive periods for fish and wildlife; shut down and stabilize the work site in accordance with pre-established criteria in advance of the winter season) – *i.e.*, before revegetation is no longer possible and before freeze-up;
- reduce the exposed soil area (by limiting the area that is exposed at any one time and by limiting the amount of time that any area is exposed);
- compact soils as soon as excavations, filling, or levelling activities are complete;
- stabilize exposed soil as soon as possible (e.g. stabilize interim exposed soil with mulch, erosion control blankets or final exposed soil with fast-growing, non-invasive, native vegetation);

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- implement measures to control sedimentation and erosion, and to ensure that construction personnel are familiar with these practices and conduct them properly; and
- maintain vegetated buffer zones as appropriate to protect watercourses supporting fish habitat..

In addition, the following measures will be implemented as applicable to reduce and control the release or resuspension of sediments resulting from in-water activities:

- install siltation control structures (e.g. silt curtains) prior to beginning any in-water work. Siltation control structures should be designed and installed to enclose an area from the water surface to the bottom;
- schedule work so as to attempt to avoid heavy precipitation;
- immediately stabilize any disturbed areas along the shoreline to prevent erosion;
- check the integrity and effectiveness of the siltation control structures daily for the duration of the project and ensure they remain in place following completion of the work until suspended solids levels return to ambient levels;
- monitor water quality to ensure total suspended solid levels and contaminant concentrations in the water column are within limits prescribed by the CCME Environmental Quality Guidelines for the Protection of Aquatic life when considered in conjunction with existing ambient water quality and site-specific factors; and
- take further mitigative actions as necessary based on monitoring results.

A Spill Management Plan and Emergency Response and Contingency Plan will be developed and implemented to reduce the effects of spills on the terrestrial and aquatic environment including groundwater, and will also include mitigation measures to reduce impact if a spill occurs and reaches a waterbody. This is further addressed in the Malfunctions and Accidental Events Section (Section 7.0).

2.7.5 Solid and Hazardous Wastes

Solid wastes generated during construction will include brush, cables, extraneous subsoil and rock, temporary fencing, signs, metal containers, canisters as well as scrap pipe, welding rods, and domestic wastes. Scrap paper and other office wastes will also be generated. During operation, a limited amount of solid wastes may be generated by grease containers used for the maintenance of valves. Other solid wastes will be produced during daily operations in the Alton and contractor offices.

Alton will actively cooperate with municipal waste reduction and recycling programs and will encourage conservation throughout its facilities. Solid wastes will be collected and disposed of consistent with local and provincial standards. Non-hazardous wastes will be segregated as recyclable and non-recyclable, with recyclable material collected and transported to a licensed recycling facility using authorized local services. An effort will be made to reduce the amount of waste generated by application of 4-R principals (reduce, reuse, recycle, recover) to the extent

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practical. Waste management procedures will be outlined in the WMP (Waste Management Plan) and comply with provincial solid waste resource management regulations as well as additional municipal and disposal facility requirements. Non-recyclable wastes will be transported offsite to a permitted landfill.

Hazardous waste will be stored onsite in a separate temporary hazardous waste storage area provided with full containment. Hazardous wastes will be removed from the site by a licensed contractor and recycled or disposed at an approved facility. Other control measures for hazardous waste include developing and implementing Spill Management Plan and Emergency Response and Contingency Plan to avoid impacts from release of potentially hazardous materials.

If the pipeline is removed, solid wastes generated will be similar to those produced during construction and operation. The pipe itself will be salvaged or disposed of according to relevant regulatory requirements. If the pipeline is left in place, wastes generated will be associated with purging operations and will include items such as welding rods, metal containers, and signs. A decommissioning and abandonment plan which includes details of potential sources of solid wastes will be filed with the NSUARB prior to decommissioning and abandonment of the pipeline.

No pyritic slates are known to occur in the Proposed RoW. The Sulphide Bearing Material Disposal Regulations under the *Environment Act* will be adhered to as necessary in the unlikely event that acid generating bedrock is encountered during the course of Project activities.

2.8 ENVIRONMENTAL AND SAFETY PROTECTION SYSTEMS

2.8.1 Safety and System Integrity

Canadian pipeline companies operate almost a quarter of a million kilometres of natural gas pipelines and have maintained an exceptional safety record. Pipeline safety and reliability are achieved primarily through prudent design, construction, and maintenance practices.

The Alton Natural Gas pipeline is being designed and will be constructed and operated by personnel employed or contracted by Alton, owned by AltaGas and Veresen who are leaders in the North American gas industry with numerous regulated facilities. Construction procedures will be based on extensive experience on similar projects. Canadian pipeline industry involvement in research and development of pipeline safety and system integrity-related projects has resulted in:

- up-to-date regulations, codes, and material standards (e.g., Nova Scotia *Pipeline Act* and Regulations and CAN/CSA Z662, Oil & Gas Pipeline Systems);
- corporate proprietary standards that contain supplemental requirements to the industry standards;
- techniques and procedures for non-destructive examination, inspection, and testing;

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- operational procedures including monitoring, surveillance, Call-Before-You-Dig programs, and supervisory control; and
- emergency response and contingency plans and procedures.

Alton will comply with 2011 CAN/CSA Z662 standards and safety and environmental protection guidelines and regulations.

2.8.2 Incident Probability

Pipelines are an efficient method of transporting natural gas. The main reasons for pipeline incidents are:

- accidental damage, usually by third-party encroachment.
- external corrosion,
- manufacturing material or construction defects.

Education and vigilance are the main tools used by pipeline operators to avoid third-party encroachment. Alton will incorporate the following in its operating and maintenance plans:

- periodic manned or unmanned aerial or ground patrols of the RoW;
- direct contact with landowners, contractors, and local authorities;
- Call-Before-You-Dig program will be implemented and RoW warning markers;
- monitoring of pipeline pressures and remotely operated gas shut-off; and
- public awareness programs in accordance with Nova Scotia regulations.

While corrosion is one of the main reasons for reportable incidents such as ruptures and leaks, the frequency is dropping continually, mainly due to improvements in protection and monitoring.

Alton will incorporate the following design, construction, and operation elements to produce a state-of-the-art pipeline that will exhibit a very low probability of failure by corrosion.

- The external surface of the pipe will be coated with fusion bonded epoxy or extruded high density polyethylene are highly resistant to disbonding, and provide a durable primary protection against galvanic corrosion.
- The pipeline will include an impressed current cathodic protection system as a secondary protection in addition to external coating. Monitoring procedures will be used to optimize the complete corrosion protection system.
- Provision for launchers and receivers will be installed on the pipeline system to allow for periodic inspection with in-line electronic inspection tools.

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Material and construction defects are being reduced as technology improves. Defects of critical dimensions will be eliminated by the post-construction pressure test at pressures higher than the maximum operating pressure, as well as a post-construction internal inspection for deformation. The probability of an uncontrolled rupture of the pipeline is extremely low. Alton will develop an Emergency Response and Contingency Plan in consultation with local and provincial emergency response organizations to ensure rapid and effective response in the unlikely event of a serious accidental gas release.

2.8.3 Release Behavior of Methane

Methane, the primary component of natural gas is colourless, odourless, and is not toxic. The specific gravity of methane is 0.61; therefore, it is buoyant in air at atmospheric pressures and temperatures and tends to dissipate in the atmosphere. Methane has an ignition temperature of 540°C and is flammable at concentrations between 5 and 15 percent in air. A flammable concentration in the presence of an ignition source can explode; this is the most serious concern in dealing with natural gas, and requires that it be treated with respect and understanding.

2.8.4 Emergency Shutdown System

For the Project, the largest accumulation of hazardous material is the natural gas that is contained in the pipeline and constitutes a substantial fuel source. As long as this gas remains in the pipeline, it is not a concern, as oxygen and a heat source are unavailable to create conditions suitable for combustion. The hazard occurs if and when natural gas is accidentally released. Much of the safety effort is therefore directed towards eliminating any possible loss of containment, and secondly to reduce the amount of loss.

A custody transfer metering station will be constructed at the tie-in point of the 16" to 24" steel gas pipeline and the 12" M&NE Halifax Lateral. This station will measure and control the natural gas flow to and from the storage cavern system. An ESD (Emergency Shutdown) system will allow for the isolation of the Alton Gas Pipeline in case of an emergency. A similar control and ESD system will be installed at the Alton Natural Gas Storage Site. If the emergency is a fire or potential fire, these will close off the main source of fuel. Equipment will be housed in a lockable building and the site will be fenced.

Because of the potential risk of an on-site leak or rupture and associated fire/explosion to staff that could be present in the immediate vicinity of the event, the potential adverse effects for public health and safety are considered significant. Such a significant effect; however, is considered highly unlikely as demonstrated by the extremely low historical probability.

Potential hazards are thoroughly identified in the applicable standards so that they may be addressed with corrective designs, controls or operating procedures. The design and implementation of this pipeline will meet the best current standards of safety available worldwide.

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2.8.5 Forest Fires

Fires within the RoW and surrounding area could result from a number of causes:

- natural events such as lightning strikes during prolonged dry spells (heat waves greatly increase potential for serious fires);
- hot engines;
- human carelessness (*e.g.*, cigarettes); or
- pipeline explosion due to a rupture or leak with an ignition source.

The responsibility for fighting wildland fires in Nova Scotia is with the Nova Scotia Department of Natural Resources (NSDNR). Other firefighting units (*e.g.*, municipal units) cooperate extensively in fighting these fires. NSDNR firefighting techniques include specially designed fire trucks, fire foam (approved by NSE), and water. Depending on the nature and severity of a forest fire, foam and water are applied with equipment ranging from portable pumps to helicopters. Typical response time for NSDNR deployment to the scene of a forest fire is under 20 minutes (NSDNR 2009). Volunteer and/or municipal firefighters may arrive earlier because of their numbers and provincial distribution.

2.8.6 Environmental Management Plan

Environmental protection has been integrated into the Project as a key feature throughout Project planning. In particular, the pipeline has been routed to avoid sensitive environmental areas wherever possible (see Section 2.1 and Section 6.0) The pipeline has been designed to comply with all current codes and standards reflecting the most current knowledge about pipeline safety and integrity (Section 2.8.1).

A Project-specific EMP will be prepared at the Industrial Approval stage to provide the required procedures to adhere to regulatory obligations and other environmental commitments.

The purpose of the EMP is to:

- ensure that the company's commitments to reduce environmental effects in general, and specific regulatory commitments, will be met;
- provide concise and clear instructions regarding procedures for protecting the environment, and reducing potential environmental effects;
- document environmental concerns and appropriate protection measures associated with Project operations;
- provide a reference document for planning and/or conducting specific activities which may have an effect on the environment;
- function as a training document/guide for environmental education and orientation; and
- communicate changes in the program through the revision process.

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Environmental management is considered an integral element in the way daily operations are performed and Alton is committed to upholding this position while complying with applicable laws, regulations, and internal standards. Alton will develop an EMP in order to communicate this commitment as well as detailed Project requirements for environmental management to staff, contractors, regulatory agencies, and the public. By first ensuring that working conditions promote an atmosphere of health and safety for all employees, employees will then incorporate the environmental management practices into their daily work routine. The EMP will be used during construction and operating conditions at the site.

A sample table of contents for a typical EMP is shown below:

Environmental Management Plan Table of Contents**1.0 Introduction**

- 1.1 Alton Natural Gas Storage LP's Commitment to Environment, Health and Safety
- 1.2 Purpose of the Environmental Management Plan
- 1.3 Scope of the EMP
- 1.4 Organization of the EMP
- 1.5 Maintenance of the EMP

2.0 Summary of Regulatory Requirements**3.0 Responsibilities and Training**

- 3.1 Roles and Responsibilities
- 3.2 Training and Orientation Requirements
 - 3.2.1 Environmental Orientation Training
 - 3.2.2 Additional Training and Communication

4.0 Summary of Key Environmental Issues and Environmentally Sensitive Areas**5.0 Environmental Protection Procedures**

- 5.1 Right of Way Preparation
 - 5.1.1 Scope of the Program
 - 5.1.2 Environmental Issues
 - 5.1.3 Relevant Regulations, Guidelines, and Commitments
 - 5.1.4 Environmental Protection Procedures
 - 5.1.5 Training Requirements
 - 5.1.6 Records
 - 5.1.7 References
- 5.2 Erosion Control
 - 5.2.1 Scope of the Program
 - 5.2.2 Environmental Issues
 - 5.2.3 Relevant Regulations, Guidelines, and Commitments
 - 5.2.4 Environmental Protection Procedures
 - 5.2.5 Training Requirements
 - 5.2.6 Records
 - 5.2.7 References
- 5.3 Watercourse Protection
 - 5.3.1 Scope of the Program
 - 5.3.2 Environmental Issues
 - 5.3.3 Relevant Regulations, Guidelines, and Commitments
 - 5.3.4 Environmental Protection Procedures
 - 5.3.5 Training Requirements

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	5.3.6	Records
	5.3.7	References
5.4		Wetland Protection
	5.4.1	Scope of the Program
	5.4.2	Environmental Issues
	5.4.3	Relevant Regulations, Guidelines, and Commitments
	5.4.4	Environmental Protection Procedures
	5.4.5	Training Requirements
	5.4.6	Records
	5.4.7	References
5.5		Right of Way Restoration
	5.5.1	Scope of the Program
	5.5.2	Environmental Issues
	5.5.3	Relevant Regulations, Guidelines, and Commitments
	5.5.4	Environmental Protection Procedures
	5.5.5	Training Requirements
	5.5.6	Records
	5.5.7	References
5.6		Right of Way Maintenance
	5.6.1	Scope of the Program
	5.6.2	Environmental Issues
	5.6.3	Relevant Regulations, Guidelines, and Commitments
	5.6.4	Environmental Protection Procedures
	5.6.5	Training Requirements
	5.6.6	Records
	5.6.7	References
5.7		Dust Control
5.8		Noise Management
5.9		Waste Management Plan
6.0		Environmental Monitoring and Inspection
6.1		Environmental Compliance Monitoring
	6.1.1	Groundwater Quality Monitoring
	6.1.2	Surface Water Quality Monitoring
	6.1.3	Noise Monitoring
7.0		Complaint Resolution Program
8.0		Contingency Plans
8.1		Spills
	8.1.1	Scope of the Program
	8.1.2	Environmental Issues
	8.1.3	Relevant Regulations, Guidelines, and Commitments
	8.1.4	Contingency Procedures
	8.1.5	Training Requirements
	8.1.6	Records
	8.1.7	References
8.2		Fires
8.3		Heritage and Archaeological Discovery
8.4		Erosion Control Failure
8.5		Transportation Safety
9.0		Contact List and Incident Reporting
9.1		Contact List
9.2		Incident Reporting Procedures

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The EMP will serve as an umbrella document that includes information such as the WMP and the Emergency Response and Contingency Plan, as well as other key environmental planning documents.

2.8.7 Emergency Response and Contingency Plan

A Project-specific Emergency Response and Contingency Plan for unplanned events will be prepared. A Spill Management Plan will also be developed to prevent and respond to smaller spills. In the case of an accidental release of materials from the facility, reporting and clean-up procedures will follow provincial emergency spill regulations as required. Lubricants and other petroleum products will be stored and waste oils will be disposed of in accordance with provincial regulations. Small spills will be contained by on-site personnel using spill kits kept at the site.

Typical elements of the Emergency Response and Contingency Plan include:

- purpose and scope of plan coverage;
- general facility identification information (e.g., name, owner, address, key contacts, phone number);
- facility and locality information (e.g., maps, drawings, description, layout);
- discovery/initial response;
- sustained action;
- termination and follow-up actions/prevention of recurrence;
- notification (internal, external, and agencies);
- response management system (e.g., incident commander, safety, liaison, evacuation plan);
- assessment/monitoring, discharge or release control, containment, recovery, and decontamination;
- logistics – medical needs, site security, communications, transportation, personnel support, equipment maintenance and support, emergency response equipment (e.g., Personal Protective Equipment (PPE), respiratory, fire extinguishers, first aid);
- incident documentation (accident investigation and history);
- a description of biological and human-use resources that could be impacted;
- an inventory of oil and chemical products and associated storage locations for both Project construction and operational phases;
- the identification of spill response equipment that will be on-site or available in case of emergency events;
- procedures for responding to operational spills and releases;
- an incident reporting system, including notification and alerting procedures;

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- a list of responsible organizations and clarification of the roles of each organization;
- clean-up and disposal procedures;
- training and exercises/drills;
- plan review and modification;
- prevention; and
- regulatory compliance.

The Emergency Response and Contingency Plan will also reference relevant and appropriate standards to supplement code requirements as applicable in the development of the Emergency Response and Contingency Plan. Alton commits to submitting the Emergency Response and Contingency Plan to appropriate regulatory agencies for review.

The capacity of local fire and/or ambulance services to respond to incidents will be evaluated. Alton will work closely with related agencies on the issue of public safety.

3.0 STAKEHOLDER CONSULTATION AND MI'KMAQ ENGAGEMENT

Consultation with potentially affected stakeholders, the general public and regulatory agencies and engagement with the Mi'kmaq community is an important component of Project planning and EA scoping. Public involvement for the Project thus far includes:

- meetings with regulatory agencies;
- providing information through the Alton Gas website (www.altongas.com) and public access to the project details provided in the application to the NSUARB. meetings with potentially affected landowners and other stakeholders;
- input from the Mi'kmaq community including an Mi'kmaq Ecological Knowledge Study MEKS; and
- a well-attended open house/public meeting in Stewiacke on November 30, 2011.

Consultation and engagement will continue as the Project proceeds through the approvals process, as well as through the planning, construction, and operations phases. For example, this EA Registration will be made available to the public as part of the requirements under the Provincial EA process and comments regarding the EA Registration will be collected and reviewed by NSE.

3.1 REGULATORY CONSULTATION

Communication for this Project with the regulators has been ongoing since 2007 when the corridor was initially selected. Alton has also held discussions with the Municipality of Colchester and the local NSE office since 2007 to provide updates on the Project.

A Project meeting was held on November 7, 2011 at the NSDNR office and included representatives from Alton and Stantec, NSE EA Branch, NSE Monitoring and Compliance Branch, NSE Protected Areas and Wetlands Branch, as well as several representatives from NSDNR. The purpose of the meeting was to provide information about the Project, identify and discuss issues and concerns, and discuss the proposed Project schedule and regulatory approvals process.

The 12% proposed protected lands review was also discussed at the meeting. Nova Scotia has set a goal to protect 12% of the land in Nova Scotia by 2015 and selected the candidate lands, mainly Crown lands, for consideration under the program (NSE 2011). The majority of Crown land within the Study Corridor falls under the 12% candidate lands; however these candidate lands were identified in 2011 after the Study Corridor was identified and studied for the purpose of this application. Alton submitted a letter to the Deputy Ministers of Environment, Natural Resources, and Energy on November 22, 2011 to outline the Project history and current status. These lands are discussed further in Section 5.7.5 (Land and Resource Use).

On November 8, 2011, Alton representatives met with NSE Protected Areas and Wetlands Branch to further discuss the 12 percent proposed protected lands review and the implications for the Alton Natural Gas Project.

On November 29, 2011, a natural gas storage information event was held at the Halifax Marriott Haboutfront during which the Alton project was discussed as part of the agenda. Regulatory, community and business stakeholders were invited to attend the presentation. Approximately 40 people attended the event.

A summary of the meetings and discussions to date is provided in Table 3.1 below. These consultations will continue throughout the regulatory approval process for the Project.

TABLE 3.1 Summary of Regulatory Consultation

Regulator(s)	Date	Location	Topics Discussed and Issues Raised
NSE EA Branch, NSE Monitoring and Compliance Branch, and the NSE Protected Areas and Wetlands Branch, NSDNR	November 7, 2011	NSDNR office, Halifax	<ul style="list-style-type: none"> • Overview of Project • Supply and market of gas • Environmental and socio-economic considerations • Summary of field work, corridor selection, and routing of RoW • 12 percent protected lands review
NSE Protected Areas and Wetlands Branch	November 8, 2011	NSDNR office, Halifax	<ul style="list-style-type: none"> • Overview of Project • 12 percent protected lands review
NS Department of Energy	November 2011	Halifax	<ul style="list-style-type: none"> • Natural Gas Storage Information Event
Municipality of Colchester	November 2011	Telephone	<ul style="list-style-type: none"> • Overview of Project • Invitation to Open House
Colchester Regional Development Association (CoRDA)	November 2011	Telephone	<ul style="list-style-type: none"> • Overview of Project • Invitation to Open House

A copy of the newspaper advertisement for the Open House and the Open House Handout were provided to the Nova Scotia Department of Energy, NSE, NSURB, Maritimes Energy Association, Colchester Regional Development Association (CORDA), Kwilmu'kw Maw-klusuaqn (KMKNO, also known as Mi'kmaq Rights Initiative), landowners, Chief Administrative Officer (CAO) for the County of Colchester (to distribute to the Mayor and Councillors), Musquodoboit MLA's office and the Stewiacke Mayor's office on November 25, 2011. Alton also met with Joshua McNeely of the Maritime Aboriginal Aquatic Resources Secretariat (MAARS) on the November 28, 2011 to inform them of the Open House.

Two hundred copies of the Project description with information about the Open House were mailed out to residents living within a few kilometers of the Project.

In addition, comments were received during the regulatory review process for the Draft EA document. These comments and appropriate responses are presented in a disposition table in Appendix F of this Final EA Registration.

3.2 PUBLIC AND STAKEHOLDER CONSULTATIONS

Public and stakeholder consultations for the Project to date specifically included:

- regular project updates with local governments (Stewiacke mayor's and local MLA's office) and Mi'kmaq KMKNO's office;
- responding to landowners questions in a timely manner;
- providing information through the Alton Gas website and public access to the Project details provided in the application to the NSUARB;
- a presentation in Halifax regional business community; and
- a public Open House session in Stewiacke.

The Project website (www.altongas.com) was launched on August 3, 2006 to inform and solicit comments from the public on the EA Registration for the underground storage facility and brining operations.

An Open House session was held in the Alton Project Office in Stewiacke, NS from 4 to 8 pm on November 30, 2011. In order to publicize the event, a newsletter was distributed to approximately 200 stakeholders and area residents (Appendix A). The event was also advertised in the Truro Daily News for one week prior to the open house (Appendix A). The intent of the Open House session was to encourage dialogue between members of the Project Team in attendance and the general public and stakeholders; to enable the public and stakeholders to obtain Project information; to view the proposed Project; and to participate in the environmental assessment process.

The Open House session was informal consisting of: a series of poster storyboards (Appendix A); maps of the Project area; descriptions of the Project components and activities; and regulatory approval processes for the Project. Alton staff and consultants providing expertise on technical, environmental and land use were available to discuss the Project, answer questions, and document and discuss issues related to the Project with interested members of the public.

Attendees were asked to sign-in (optional) and were encouraged to complete a feedback form prior to leaving the sessions (Appendix A). Approximately 41 people attended the event. Attendees included local residents, landowners, as well as representatives from the local NSE office, CoRDA, Assistant Mayor of Stewiacke, KMKNO, and the Truro Daily News. Issues/comments raised at the open house were tracked and are addressed in this EA Registration document, where appropriate. The open house session was very well received by the community. The community commented that they appreciated the informative storyboards, mapping and friendly, knowledgeable staff. Issues/comments raised and addressed at the Open House were:

- wanted to see a map showing the storage facilities, and water pipeline as well as the proposed natural gas pipeline;

- whether local First Nations leadership had been informed of the Project;
- location of the Project with respect to existing buildings/structures and other features;
- opportunities for employment during planning, construction and operations and maintenance of the Project;
- Project schedule;
- level of construction traffic;
- road restoration;
- activities which can be conducted over the pipeline;
- landowner agreement process;
- why hasn't construction started yet;
- length of construction period;
- noise and dust during construction;
- Stewiacke River crossing;
- safety of natural gas pipelines; and
- whether natural gas will be brought to Stewiacke and area homes in the future.

Key issues identified during public consultation and the resolution status is summarized in Table 3.2.

Alton will continue to notify the public on the construction progress of the Project through website updates. Ongoing consultations are also being held between the Proponent's land agents and landowners with the location of the RoW and pipeline, compensation and land use.

3.3 MI'KMAQ ENGAGEMENT

Over the past six years, Alton has endeavored to develop a positive business relationship with the Mi'kmaq. The following summarizes Mi'kmaq engagement activities conducted by the Proponent:

- Initial discussion with Jason Googoo (Membertou Geomatics Solutions) re: commissioning Mi'kmaq Ecological Knowledge Study (MEKS) for the natural gas lateral in April 2010 and subsequent discussions regarding moving forward with the MEKS in summer and fall of 2011. The MEKS was finalized in March 2012 and is included in Appendix D;
- Project updates provided to Eric Christmas of Kwilmu'kw Mau-klusuaqn Mi'kmaq Rights Initiative (KMKNO) and Native Council on an ongoing basis including update at the open house session on November 30, 2011;
- Meetings with Economic Development Officers for Millbrook and Shubenacadie (Indian Brook) Bands;

- Request for bids for the 2008 clearing contract for the water pipeline – representation of underrepresented groups would be one criteria used to award to the successful bidder;
- Presentation/discussions with KMKNO in September 2008 and is ongoing to date; and
- Alton site tour and Supplier Session for Mi'kmaq owned businesses in July 2009.

In order to determine Mi'kmaq traditional and current uses of the area, Membertou Geomatics Solutions undertook a MEKS (Appendix D) to update the MEKS prepared for the 2007 EA on behalf of the Proponent. This work:

- determines historic and current Mi'kmaq land and resource use in the Project area;
- provides an inventory of plants of significance to the Mi'kmaq in the Project area;
- provides an analysis of potential impacts of the Project on Mi'kmaq land and resource use; and
- provides recommendations for further action or mitigation.

Information from this study is included in Sections 5.7.6 and 6.6.

3.4 RELEVANT IDENTIFIED ISSUES

Issues raised throughout the consultation process (*i.e.*, at the open house sessions, meetings with landowners and other stakeholders) have been tracked and are summarized in Table 3.2 along with their status and where the issues are addressed in the EA.

TABLE 3.2 Key Issues Identified During Public Consultation

Issue	Resolution Status
Provide a map showing the storage facilities, and water pipeline as well as the proposed natural gas pipeline	This issue is addressed in Section 1.1.
Informing local First Nations leadership about the Project	This issue is addressed in Sections 3.3, 5.7.6, 6.6.
The location of the Project with respect to existing buildings/structures and other features	This issue is addressed in Section 2.1, 5.8
Opportunities for employment during planning, construction and operations and maintenance of the Project	This issue is addressed in Section 5.7.
The Project schedule	This issue is addressed in Section 2.5.
The level of construction traffic	This issue is addressed in Sections 2.2 and 6.8.
Restoration of public roads after construction	This issue is addressed in Section 6.6.
Activities which can be conducted over the pipeline	This issue is addressed in Section 6.6.
Landowner agreement process	This issue is addressed in Section 2.2.
Length of construction period	This issue is addressed in Section 2.2.
Noise and dust during construction	This issue is addressed in Section 2.2 and 4.1.
Stewiacke River crossing methods	This issue is addressed in Section 2.2 and 6.2
Safety of natural gas pipelines; and	This issue is addressed in Section 2.8 and 7.0.
Future availability of natural gas for Stewiacke and area homes.	This will be decision by Heritage Gas rather than Alton.

4.0 EFFECTS ASSESSMENT METHODS AND SCOPE

4.1 ENVIRONMENTAL ASSESSMENT METHODS

The EA methods for the Project have been developed to satisfy regulatory requirements of a Class I Registration under the Nova Scotia *Environment Act* and Environmental Assessment Regulations.

The methodology used in this report has evolved from methods proposed by Beanlands and Duinker (1983), who stressed the importance of focusing the assessment on environmental components of greatest concern. In general, the methodology is designed to produce an environmental assessment document that:

- is focused on issues of greatest concern;
- addresses regulatory requirements;
- addresses issues raised by the public and other stakeholders;
- integrates engineering design and mitigative and monitoring programs into a comprehensive environmental management planning process; and
- integrates the effects assessment into the overall assessment of residual environmental effects.

The environmental assessment methodology for this Project includes an evaluation of the potential effects of each Project phase – construction, operation and maintenance, as well as malfunctions and accidents, with regard to Valued Environmental Components (VECs). Project-related effects are assessed within the context of temporal and spatial boundaries established for the assessment.

4.1.1 Issues Scoping Summary and Selection of VECs

An important part of the assessment process is the early identification of VECs upon which the assessment can be focused for a meaningful and effective evaluation. Issues scoping is an important part of the VEC identification process. The issues scoping process for this assessment included:

- regulatory meetings and other informal discussions regarding potential environmental interactions with NSE, Nova Scotia Department of Natural Resources (NSDNR) and Nova Scotia Museum;
- review of relevant provincial and federal websites and documents (*e.g.*, NSDNR, Environment Canada, Fisheries and Oceans Canada);
- review of listed species and/or species-at-risk found within the Project area using existing regional information and/or site surveys;

EFFECTS ASSESSMENT METHODS AND SCOPE

- previous environmental investigations conducted by Alton environmental and engineering consultants including the EA for the storage cavern development project;
- open house public meeting held by Alton in Stewiacke on November 30, 2011 and subsequent comments received as part of the ongoing public consultation process;
- consultation with stakeholders; and
- the professional judgement of the Proponent’s Study Team.

The environmental issues considered are shown in Table 4.1, along with the rationale for inclusion/exclusion as a VEC.

TABLE 4.1 Selection of Valued Environmental Components

Environmental Issue	Scoping Considerations	Selected VEC
Air Quality	Air quality is important to environmental and human health. Project activities are expected to result in minor emissions typical of mid-sized construction equipment (e.g., dust generated during Project construction). Limited construction equipment exhaust will be addressed by limiting idling and implementing appropriate dust control. Soils in the RoW will be rapidly stabilized by restoration and revegetation. Routine inspection and maintenance of construction equipment will reduce exhaust fumes. Air quality will be addressed in the malfunctions and accidental events section.	<ul style="list-style-type: none"> • Not included as a VEC but addressed under Malfunctions and Accidental Events
Noise	Project activities are expected to result in minor noise emissions (e.g., construction equipment). The Project is located in a rural area accustomed to low levels of ambient sound; therefore it may be detected by residents within 1 km. Construction of the pipeline is only expected to take approximately two months, and will only be heard for a few days at each location. Project construction noise will be buffered by vegetation in most cases and any noise will be intermittent, as equipment is expected to be operated during daylight hours only. Any nuisances will be temporary and in a limited area. Noise emissions generated during construction and operations is not expected to exceed the NSE provincial guidelines at sensitive receptors (e.g., nearest residence).	<ul style="list-style-type: none"> • Not included as a VEC
Fish and Fish Habitat	Fish and fish habitat are protected by the federal <i>Fisheries Act</i> . Species at risk are protected under the <i>Species-at-Risk Act</i> (e.g., Inner Bay of Fundy population of Atlantic salmon). Public concern exists for freshwater fish and fish habitat in the area. Three watercourses crossed by the RoW are considered to provide fish habitat. One of these, the Stewiacke River, supports commercial, recreational and Aboriginal fisheries. The Proponent intends to avoid any harmful alteration, destruction or disruption (HADD) of the productive capacity of fish habitat through careful design of water crossings including the proposed horizontal directional drilling of the Stewiacke River.	<ul style="list-style-type: none"> • Fish and Fish Habitat
Groundwater Resources	Groundwater is important in the hydrologic cycle and provides an important ecological function (e.g., surface water discharge), as well as important as a water supply, particularly to rural users.	<ul style="list-style-type: none"> • Groundwater Resources

TABLE 4.1 Selection of Valued Environmental Components

Environmental Issue	Scoping Considerations	Selected VEC
Surface Water Resources	Surface water resources in terms of water quality are inherently linked to habitat quality for aquatic species. Protection of species biodiversity is administered through the <i>Fisheries Act</i> , <i>Species-at-Risk Act</i> , <i>Nova Scotia Endangered Species Act</i> .	<ul style="list-style-type: none"> • Fish and Fish Habitat
Vegetation	Species of special concern are protected under the <i>Species-at-Risk Act</i> and <i>Nova Scotia Endangered Species Act</i> . The focus of concern is on protection of species biodiversity, unique species assemblages, mature forest habitats and uncommon habitats.	<ul style="list-style-type: none"> • Rare Vascular Plants
Mammals	Protection of species biodiversity for mammals is administered through the <i>Species-at-Risk Act</i> , <i>Nova Scotia Endangered Species Act</i> , <i>Nova Scotia Wildlife Act</i> and the federal <i>Fisheries Act</i> . Scientific and public concern exists for rare species as well as habitat that is important to mammal species, such as deer wintering areas.	<ul style="list-style-type: none"> • Wildlife and Wildlife Habitat
Amphibians and Reptiles	Protection of species biodiversity is administered through the <i>Species-at-Risk Act</i> , <i>Nova Scotia Endangered Species Act</i> and <i>Nova Scotia Wildlife Act</i> . The focus of concern is on rare species. Scientific concern is that rare amphibian and reptile species are at risk from development since large proportions of their populations can be affected by even relatively small perturbations if the population is very small and concentrated in a small area.	<ul style="list-style-type: none"> • Wildlife and Wildlife Habitat
Birds and Bird Habitat	Protection of migratory species and species of concern are mandated by the <i>Migratory Birds Convention Act</i> , <i>Species-at-Risk Act</i> , <i>Nova Scotia Endangered Species Act</i> and <i>Nova Scotia Wildlife Act</i> . The focus of concern is on protection of species diversity, migratory and non-migratory birds, rare or sensitive species potentially feeding, breeding, moving and/or migrating through the Project area and their habitat.	<ul style="list-style-type: none"> • Wildlife and Wildlife Habitat
Wetlands and Wetland Functions	Wetlands are an important habitat type often associated with high species diversity including species-at-risk. The Proponent has committed to avoiding wetlands where feasible in pipeline routing. It is anticipated that two wetlands will be crossed. These and any other wetlands determined to be unavoidable upon final design of pipeline routing and other aboveground structures, will be subject to full wetland evaluations will according to provincial policy and guidelines, and permit applications submitted with habitat compensation proposals.	<ul style="list-style-type: none"> • Wetlands
Archaeological and Heritage Resources	Land based archaeological and heritage resources are administered under the <i>Nova Scotia Special Places Protection Act</i> . Ground disturbance from pipeline construction can potentially affect archeological or heritage resources that may be present.	<ul style="list-style-type: none"> • Archaeological and Heritage Resources
Land and Resource Use for First Nations and Aboriginal Peoples	First Nations current use of Lands and Resources is included as a VEC in this assessment in recognition of the potential interest of First Nations traditional use of land and resources.	<ul style="list-style-type: none"> • Land and Resource Use • Archaeological and Heritage Resources
Land Use	It is important to consider the compatibility of the Project with existing land uses, municipal land use plans and zoning designations.	<ul style="list-style-type: none"> • Land and Resource Use

TABLE 4.1 Selection of Valued Environmental Components

Environmental Issue	Scoping Considerations	Selected VEC
Public Health and Safety	Concern exists for human health and safety in communities surrounding the facility in the event of a malfunction or accidental event.	<ul style="list-style-type: none"> Not included as a VEC but addressed under Malfunctions and Accidental Events

The following VECs have therefore been selected and are addressed in greater detail in Section 6.0:

- Groundwater Resources;
- Fish and Fish Habitat;
- Rare Vascular Plants;
- Wildlife and Wildlife Habitat;
- Wetlands;
- Land and Resource Use; and
- Archaeological and Heritage Resources.

Air Quality and Public Health and Safety will be addressed in the context of potential Malfunctions and Accidental Events.

4.2 OUTLINE OF THE ENVIRONMENTAL EFFECTS ASSESSMENT

This section provides an outline and overview of each of the subsections containing the assessment of environmental effects.

Boundaries

The determination of assessment boundaries is an important step in the effects assessment process. Temporal and spatial boundaries encompass those periods during, and areas within which, the VECs are likely to interact with, or be influenced by, the Project. Administrative and technical boundaries, which address the limitations on the scope of, or approach to, work during the assessment of environmental effects, have also been considered for the assessment.

The temporal boundaries considered for this assessment include the construction and operation life of the Project. Spatial boundaries for the assessment vary according to the VEC but are generally limited to the immediate Project area unless otherwise noted. For example, effects on migratory birds may include a more regional perspective, while effects on rare flora are limited to populations in the immediate Project area (*i.e.*, “footprint” and adjacent land). The temporal and spatial boundaries for each VEC are described in Section 6.0. Administrative boundaries discussed in the assessment define the administrative/political/regulatory considerations for the assessment of the VEC (*e.g.*, relevant jurisdictions, legislation) while technical boundaries

define technical factors which may have imposed constraints on the assessment (*e.g.*, availability of data, time).

Description of Existing Conditions

Existing conditions (*i.e.*, pre-Project) are described for each VEC. The description is restricted to a discussion of the status and characteristics of the VEC within the boundaries established for the assessment. In order to improve the focus of the assessment, the description focuses on aspects that are relevant to potential Project interactions.

Residual Environmental Effects Evaluation Criteria

For this assessment, significance is specifically defined and determined for each environmental component and is defined based on information obtained in issues scoping, available information on the status and characteristics of the environmental component, existing standards or regulations, and professional judgment.

Potential Interactions, Issues and Concerns

Potential Project interactions with VECs are described in the assessment through a description of the degree to which VECs are exposed to each Project activity. Where appropriate, the assessment includes a summary of major concerns or hypotheses of relevance regarding the effect of each Project activity on the VECs being considered. Where existing knowledge indicates that an interaction is not likely to result in an effect, certain issues may not warrant further analysis.

Analysis, Mitigation and Residual Environmental Effects Prediction

The assessment focuses on the evaluation of potential interactions between the VECs and the various Project activities outlined in the Project description. Residual environmental effects are those that remain after mitigation and control measures are applied.

The effects evaluation for each VEC is conducted by Project phase (*i.e.*, construction and operation) and for malfunctions and accidental events. For each phase, the Study Team selects those Project activities that may result in a positive or adverse effect. To determine if there are adverse effects, the Study Team considers a number of factors including:

- magnitude;
- geographic extent;
- duration;
- frequency;
- reversibility; and
- context.

During the evaluation, the definition of significance is applied to any residual adverse environmental effects that have been identified. As a result, residual adverse environmental effects are predicted to be either **significant** or **not-significant**.

Follow-up and Monitoring

Recommendations for follow-up studies or monitoring activities are included, where appropriate.

Summary of Residual Environmental Effects Assessment

Finally, the residual environmental effects on each VEC by Project phase are summarized.

4.3 SPECIES AT RISK DEFINITIONS

Endangered and threatened plant species that are protected federally under the *Species at Risk Act (SARA)* are listed in Schedule 1 of the *Act*. As defined in *SARA*, "wildlife species" means a species, subspecies, variety or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus, that is wild by nature and (a) is native to Canada; or (b) has extended its range into Canada without human intervention and has been present in Canada for at least 50 years. The purpose of this *Act* is to protect wildlife Species at Risk and their critical habitat. *SARA* is administered by Environment Canada, Parks Canada Agency, and DFO. Those species listed as "Endangered" or "Threatened" in Schedule 2 or 3 of *SARA* may also be considered as Species at Risk, pending regulatory consultation. Designations to *SARA* are primarily based on rankings and reports provided by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). While not a regulatory designation, the importance of COSEWIC-listed species that are not currently listed under *SARA* are noted throughout the document for added context.

Certain species are also protected under the *Nova Scotia Endangered Species Act (NSES)*. Species identified as seriously at risk of extinction in the province are identified by a provincial status assessment process through the Nova Scotia Endangered Species Working Group. Once identified, they are protected under the *NSES*. The conservation and recovery of species assessed and legally listed under the *NSES* is coordinated by the Wildlife Division of the Nova Scotia Department of Natural Resources (NSDNR).

There is also a provincial General Status assessment process that serves as a first alert tool for identifying species in the province that are potentially at risk. Under this process, the populations of species which are native to the province are classified to be either "At Risk", "May be at Risk", "Sensitive" to human activities or natural events, "Secure", or "Undetermined" should there be insufficient data, information, or knowledge available to assess their status. Although species listed under this process are not granted legislative protection, the presence of plants whose populations are considered to be At Risk, May be at Risk, or Sensitive is an issue of concern for provincial regulators. Also, the Atlantic Canada Conservation Data Center (ACDC) provides rarity rankings which may be used to identify species of conservation concern and these require consideration for the purpose of environmental assessments.

Information used in support of the assessment of wildlife and vegetation includes that obtained from COSEWIC, SARA, NSDNR, and the ACCDC. Definitions of rarity ranks for each of these resources are summarized in Appendix B. To simplify the integration of these resources, the following definitions are used:

Species at Risk: all plants listed in Schedule 1 of SARA as “Extirpated”, “Endangered” or “Threatened”; or protected by the NSESA.

Species of Conservation Concern: all plants listed as “Special Concern” in Schedule 1 of SARA; listed in Schedule 2 or 3 of SARA; considered “May Be At Risk” or “Sensitive” by NSDNR; and / or ranked as “S1” to “S3” by the ACCDC.

Secure Species: all plants considered to have “Secure” populations in the province by NSDNR and ranked as “S4” to “S5” by the ACCDC, or which do not otherwise meet the criteria for a Species of Conservation Concern.