

## **3.0 Public Consultation Summary**

### **3.1 Consultation**

Heritage Gas believes that public and stakeholder communication are an important means of providing information on the project and soliciting input into pipeline routing during the planning stage. Members of the study team also talked to local residents for the purpose of gaining access to property for field studies and to obtain feedback on pipeline routing options. In the planning for this project, Heritage Gas communicated with stakeholders through a public open house, meeting with regulators, and individual meetings with landowners and key stakeholders.

### **3.2 Open House**

An open house was held on October 7, 2004, at the Truemanville Fire Hall. Ads were placed in the Amherst Daily News for three days prior to the Open House. Radio advertisements were also run on CKDH 90FM Radio in Amherst the day before and on the day of the Open House. Open house displays included information on the Amherst natural gas project, construction methods, standard environmental protection measures, the EA and permitting process, potential pipeline routes, and the proposed time frame. Heritage Gas and Dillon Consulting representatives were present to answer questions and discuss issues in an informal setting. Participants were encouraged to complete a Comment Form on the potential routes and the project in general, which included the option to identify any additional community knowledge of historical use and features of the area that should be considered in routing/the EA. A "Frequently Asked Question and Answer" sheet was provided. Completed comment forms were requested to be returned the day of the open house. This was to allow time for review and consideration of comments into the routing process (open house presentation materials are provided in Appendix A).

A total of 36 people were registered in the public consultation guest book for the open house, and about 40 to 50 people were estimated as having attended the session. One comment form was completed. Other comments, as summarized here, were expressed verbally to Heritage representatives during the open house.

Many of the area residents that attended the open house expressed support for the project. A number inquired about getting access to natural gas. Others inquired about possible use of the easement by ATVs and snowmobiles.

Comments provided specifically on the preferred and alternative pipeline routes addressed:

- disturbance to old growth tree stands in the Amherst Head area;
- loss of good quality timber in the Amherst Head area;
- loss of existing or future blueberry land in Warren;
- proximity to a planned Ducks Unlimited wetland in the Warren area;
- clearing will weaken adjacent trees;
- loss of privacy;
- division of property;
- unwanted ATV users; and
- negative affect on property value.

Participants at the open house also pointed out that the pipeline route will cross the Trans Canada Trail and several bogs in the area could be difficult to cross. Several asked questions about environmental protection measures. The only comment form completed suggested that priority be given to minimizing environmental impacts and that “wet” crossings not be used. Others asked about the safety of natural gas (one expressed concern for public safety) and the compatibility of the pipeline with agricultural and forestry uses.

Landowners discussed specific issues with Heritage representatives and most were able to identify an alternate location for the easement on their property, which would address expressed concerns. Following the open house, Heritage Gas evaluated the issues expressed and was able to refine the pipeline route to address the majority of received comments.

### **3.3 Regulatory Meeting**

Heritage Gas held a meeting on June 29, 2004 with provincial and federal agencies with regulatory or other interests in the project. The meeting was attended by representatives of the Department of Environment and Labour, the Department of Natural Resources, and Fisheries and Oceans Canada. The intent of the meeting was to provide information on the project and to solicit input on issues to be addressed during the planning of the pipeline. A summary of comments (with responses in brackets) received in the meeting are provided in Table 3-1.

**Table 3-1 Summary of Regulatory Agency Comments, June 29, 2004**

Department	Individual	Comments	Note
NSDNR	R. Soper	<ul style="list-style-type: none"> <li>Interest in amount of Crown land to be crossed. Noted that land bordering MacLellans Brook transferred to Town of Amherst</li> </ul>	Info
NSDNR	R. Hall	<ul style="list-style-type: none"> <li>Were any rare plants identified? (No plants identified during spring survey)</li> <li>ATVs are a concern where new easements/rights-of-way are opened. Stream damage noted on M&amp;NP pipeline.</li> <li>Question raised regarding requirements for landowners wanting to cross pipeline. (NS Pipeline Regulations place onus on landowner to contact Heritage Gas when excavating in the vicinity of the pipeline)</li> </ul>	Section 4.5.5 Section 4.5.9 Included in land acquisition process
DFO	J. Leadbetter	<ul style="list-style-type: none"> <li>Concern regarding amount of open trench at any given time</li> <li>Copy of EPP requested (to be provided by Heritage Gas).</li> </ul>	Section 2.4.2 Attached
NSTPW	M. Coady and D. Morehouse	<ul style="list-style-type: none"> <li>Bored crossing requested for Highway 6 crossing.</li> <li>Use of provincial highway for any pipeline other than PE pipelines by exception, to NSTPW guidelines.</li> </ul>	Included in detailed design Info

### 3.4 Other Stakeholders and Landowners

At the regulatory meeting and during the course of the preparatory work for this environmental assessment, other stakeholders were identified. These stakeholders were also contacted by Heritage Gas to provide information on the project and to solicit input specific to the stakeholder. The stakeholders and their comments are provided in Table 3-2.

**Table 3-2 Summary of Stakeholder Comments**

Group	Comments	Note
Athol Forestry Cooperative	<ul style="list-style-type: none"> <li>Athol Forestry provides forestry management services to several landowners whose lands are being crossed by the proposed pipeline. They have acted as liaison between some of these landowners and Heritage Gas to address routing and forestry concerns.</li> <li>One of the concerns expressed is potential monetary impact on reforestation efforts. Athol Forestry will provide assistance in calculating the value of such impacts.</li> <li>Crossing of pipeline with heavy equipment used in forestry harvesting practice is an issue of concern, especially during the spring thaw (February to May). A potential mitigation is the provision of a portable bridge to landowners desirous to cross the pipeline.</li> </ul>	Info Included in land acquisition process Included in land acquisition process

Group	Comments	Note
	<ul style="list-style-type: none"> <li>Proximity to landowners' camps is a concern. Location of some of these camps provided by Athol Forestry.</li> </ul>	Pipeline re-aligned to avoid
Confederacy of Mainland Mi'kmaq	<ul style="list-style-type: none"> <li>No communities in the area but may have been used for traditional purposes. Mi'kmaq knowledge study in progress.</li> </ul>	MKS to be completed Spring 2005
Cumberland County Trails Association	<ul style="list-style-type: none"> <li>Provided information on Trans Canada Trail which is crossed by the alignment north of Truemanville.</li> </ul>	Info
Cumberland River Enhancement Association	<ul style="list-style-type: none"> <li>CREA will be concerned with wet weather policies and contingency plans for major rain events. (Wet crossings are not being considered)</li> <li>Salmon and trout both resident in the Tidnish system. MacLellans Brook has good juvenile rearing and refuge. Increasing numbers of Salmon in Tidnish.</li> <li>Major siltation events are a concern given the erodibility of the soils.</li> <li>Preserve as much of the buffer zone at stream crossings as possible.</li> <li>Requested copy of habitat data when available. (provided by Dillon Consulting)</li> </ul>	EPP  Directional drilling planned at sensitive streams Section 4.5.1  EPP  Info
Ducks Unlimited	<ul style="list-style-type: none"> <li>All existing and planned DU projects are avoided by the pipeline alignment.</li> </ul>	Info

Heritage Gas has been maintaining frequent communication with landowners starting with access permission. Concerns related to Heritage Gas from the landowners generally include:

- Routing of pipeline through centre portion of a property generally not preferred option. Several landowners suggested routing along boundary line.
- Impact on forestry practice and reduction of area available for reforestation a concern. Some landowners expressed a preference for the pipeline to be routed away from their property. Others have requested a relocation of the pipeline from high value tree stands to recently harvested areas.
- Depth of cover of the pipeline may be of concern if it brings about restrictions in the crossing of the easement by landowners, especially in forestry resource areas.
- Maximizing distance from camps.
- Restricting access to skidoos and ATVs. Potential adverse environmental impacts where ATVs cross water courses.
- Avoidance of blueberry growing lands.
- Avoidance of cultivated fields generally preferred (though not fields used primarily for hay or pasture).
- Locating pressure regulating stations outside of areas with residential development potential. (But no concerns expressed over pipelines routed through such areas.)

In addition, Heritage Gas has been in frequent contact with the Gas Committee struck with the community to facilitate the development of natural gas in the Amherst area. This Gas Committee is composed of members of the business community and municipal staff. Committee members have attended the Open House and have facilitated the relaying of comments from the community to Heritage Gas staff.

Presentations have been made by Heritage Gas staff to the councils of the Town of Amherst and Cumberland County.

Both councils were supportive of Heritage Gas' objectives. One Cumberland County councillor expressed some concern over impact on agricultural land and emphasized the importance of landowner consultation.

Meetings have been held with planning and engineering staffs from the Town of Amherst and Cumberland County. The purpose of these meetings was to determine that the proposed pipeline and facilities do not have any adverse impacts on municipal infrastructure and are compatible with zoning regulations.

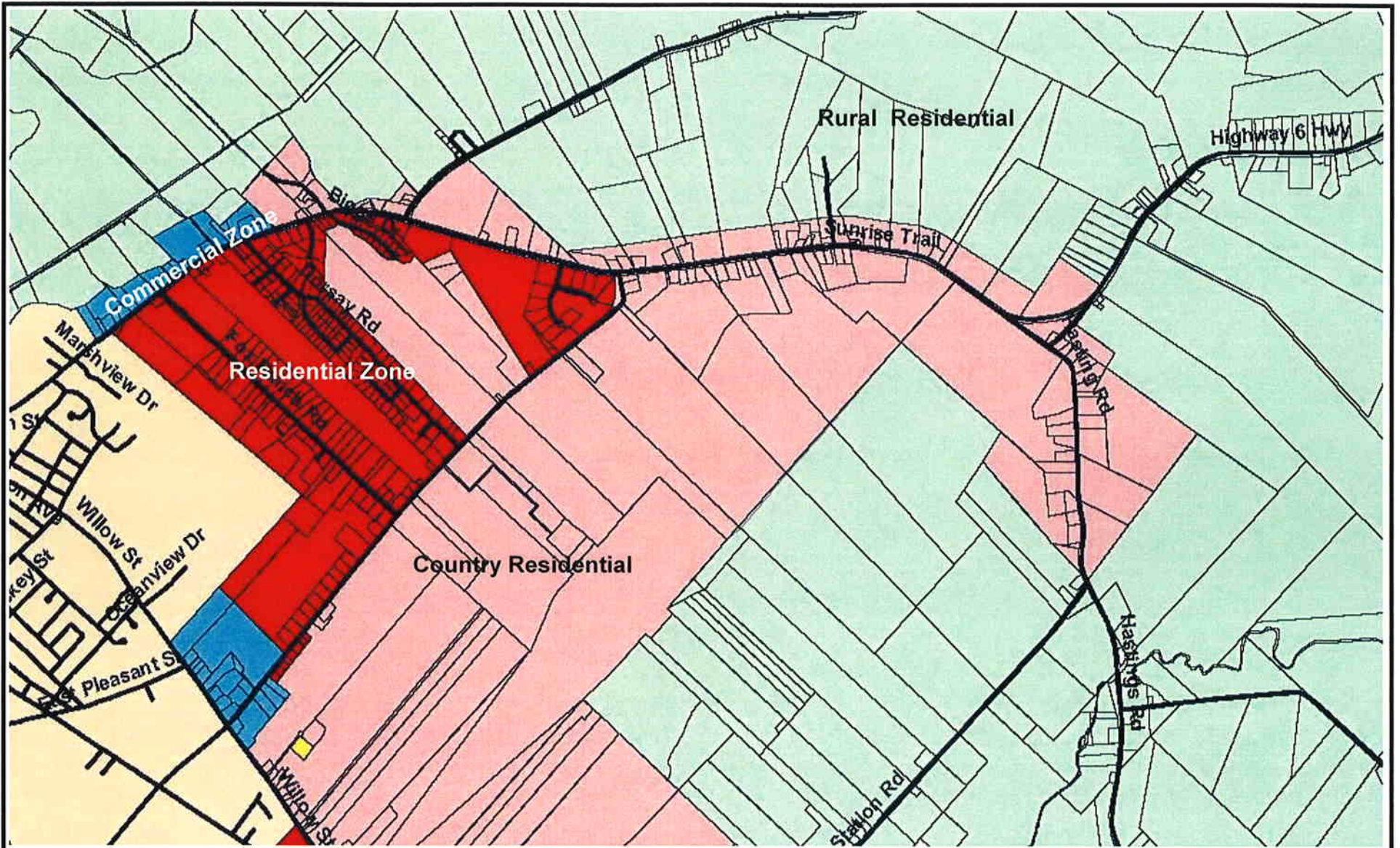
Cumberland County, with input from the Town, has recently concluded a planning exercise for the "central area" immediately around Amherst. The area southeast of the John Black Road (in the vicinity of the pipeline and the TBS) was earmarked for future residential development under the zoning "Country Residential (R2)". This zoning permits mixed use including single family, multi-family and light industrial (Figure 3-1). One concern was expressed over the impact of the proposed TBS on future development. The primary concern was that this type of facility would not mix well with residential development and may impact the value of the land. As a result, Heritage Gas has relocated the TBS close to the Rogers Wireless and Central Cable TV telecommunication towers. This was acceptable to the County, the Town and contracted landowners.


Heritage Gas has also contacted Rogers Wireless regarding the location of the TBS. Heritage Gas will determine if the SCADA has potential to interfere with Rogers Wireless signal.

### **3.5 Integration of Consultation Input in Environmental Planning**

The comments, issues and concerns raised during the consultation process have been addressed through the planning for the project (see Section 2) and the selection of the final alignment. Inclusion of specific provisions in the EPP, landowner agreements, the ECPs and construction specifications will also be used as a means to integrate consultation input into project planning documentation.

Heritage Gas will continue to consult with the community through the Gas Committee and other means throughout the project. The public will also be notified of construction start dates and future information sessions, where warranted.



 <b>Heritage Gas</b> <i>Putting Our Energy Here. Naturally.</i>	TITLE	Land Use Zoning - Route 6 to Willow St.	PROJECT No. 04-3265
	DATE	Dec. 2004	PROJECT
			FIGURE No. 3-1

## **4.0 Description of the Environment and Environmental Impact Evaluation**

### **4.1 Introduction**

This section presents the description of the environment and the environmental impact evaluation in an integrated format. Introductory subsections describe how the impact evaluation was conducted, using an issues-based approach. Each of the issues identified is presented in detail and the impact evaluation is summarized at the end of each subsection.

### **4.2 Setting and Boundaries**

The development of the impact evaluation first requires establishment of the environmental setting and the boundaries of the assessment itself. The establishment of study boundaries and issue scoping have been conducted with a primary focus on the potential effects of the project on the environment. The environmental assessment must also consider the potential effects of the environment on the project. Where applicable, this consideration has been incorporated in the boundaries and the scoping process.

#### **4.2.1 Environmental and Socio-economic Setting**

The study area of this project includes a 17.6 km long corridor ranging in width from 100 m to 1,250 m where alternative alignments were considered.

#### **4.2.2 Spatial Boundaries**

The boundaries of the assessment vary depending on the issue being addressed. The bounded area within which the project could potentially interact with terrestrial biology resources generally included the study area described above. Occasionally, additional areas outside the study area were included, such as for watercourse crossing approaches and ancillary facilities.

From the perspective of aquatic biology, the bounded area within which proposed project activities could potentially interact includes the proposed easement plus the occasional requirements for additional work areas as discussed above. The potential areas of interaction of the project with aquatic resources vary depending on the sensitivity of the species being discussed. Generally, interactions are not anticipated at more than 500 m downstream or 100 m upstream of a pipeline easement.

When considering cultural heritage resources, the bounded area is the area disturbed by construction whether associated directly with construction activities within the high-pressure pipeline easement itself,



or the development of ancillary facilities including town border stations, regulator stations, stockpiling areas, marshalling yards, and temporary or permanent access roads. In construction settings, the most important pathway of potential interaction with cultural heritage resources is from excavation activities (of which trench construction has the greatest impact). For traditional land uses (i.e., hunting grounds, ceremonial areas, medicinal plants), the spatial boundaries may also fall outside the study area.

### **4.2.3 Temporal Boundaries**

Temporal boundaries for the impact evaluation cover project phases involving physical activities. Therefore, temporal boundaries encompass certain pre-construction activities, construction, operation and maintenance, monitoring, and decommissioning. In effect these boundaries are 25 years or more.

### **4.2.4 Regulatory Boundaries**

The regulatory boundaries of the project are the laws and regulations of the Province of Nova Scotia, of Canada, and the by-laws of the Town of Amherst and Cumberland County. Federal laws and regulations will apply to the project and are primarily related to aspects of watercourse crossings. These requirements have been considered in the definition of the project and in environmental planning. However, federal jurisdiction is not considered as part of the regulatory boundaries of this project for the purposes of the registration under the Nova Scotia *Environmental Assessment Regulations*.

## **4.3 Issue Scoping**

The purpose of scoping in an EA is to identify the key environmental Issues of Concern. Scoping involves defining the project scope; identifying the factors to be considered; and determining the interest of stakeholders in the project and how they can be incorporated. For this project, the project description presented in Section 2 of this report stands as a clear definition of the project scope. The experience of Heritage Gas and Dillon has helped to identify factors and determine the interests of stakeholders. This work has included:

- conducting consultation meetings with stakeholders and documenting concerns;
- reviewing applicable provincial and federal environmental laws and regulations;
- meeting with regulatory agencies at provincial and federal levels;
- considering available environmental literature and references;
- incorporating the experience of the EA study team in conducting environmental assessments in Nova Scotia and elsewhere in Canada; and,
- incorporating Heritage Gas' experience with pipeline installation, operation and maintenance in Nova Scotia and elsewhere in Canada.

Through this scoping exercise, the EA study team developed a methodology for evaluating and presenting issues in this assessment. This methodology and the resulting Issues of Concern are described in the following subsection.

## 4.4 Method of Assessment

The EA is based on the assessment of *issues* identified through issues scoping and to emphasize the issues in the completion of the effects assessment. This approach is particularly relevant in applications such as pipeline construction and operation where there exists an extensive database of literature, previously completed EAs and well established environmental protection measures that can be used to support the review of potential project effects or a given issue. In this manner, an issue with well defined mitigation, such as avoidance of designated areas, can be suitably addressed in the Project Description rather than in an effects assessment. This allows the assessment to focus on important site or project specific issues. The identified issues are reflected within an environmental effects assessment framework.

### 4.4.1 Impact Significance

The assessment methodology is based on EA study team experience and guidance from recent major environmental assessment studies undertaken elsewhere in Nova Scotia and Canada. Determination of significance is based on the consideration of the following results of interactions, as summarized in Table 4-1:

**Table 4-1 Assessment of Criteria for Determination of Significance of Effects**

Magnitude	Magnitude, in general terms, may vary among Issues, but is a factor that accounts for size, intensity, concentration, importance, volume and social or monetary value. It is rated as compared with background conditions, protective standards or normal variability.	
	Small	Small, relative to natural or background levels
	Moderate	Moderate, relative to natural or background levels
	Large	Large, relative to natural or background levels
Reversibility	Reversible	Effect can be reversed
	Irreversible	Effects are permanent
Nature	Positive	Net benefit
	Negative	Net loss or adverse effect
Extent	Intermediate	Confined to the easement
	Local	Effects extent beyond the easement but less than regional
	Regional	Effects on a wide scale

Duration	Short Term	Between 0 and 1 year duration
	Medium Term	Between 1 and 7 year duration
	Long Term	Beyond 7 years duration
Confidence in Prediction	Low	Based on limited understanding of cause and effect relationships and/or incomplete data
	Moderate	Based on a good understanding of cause and effect relationships using data from similar cases, or moderately understood cause and effect relationships and good site-specific information
	High	Based on a good understanding of cause and effect relationships and good site-specific information

**4.4.2 Issues of Concern**

The issues identified for assessment for the project through the issues scoping process are provided in Table 4-2 together with the section of the EA in which the issue is addressed.

**4.5 Environmental Impact Evaluation**

**4.5.1 Fine Grained Soils**

Glacial tills in the study area consist of unconsolidated and unsorted material deposited by glacial ice. Both soils and tills may consist of fine-grained clay and silt particles (less than 0.005 mm), originating from weathering and erosion of rocks and soils. A wide variety of factors affect the propensity of soil to erode, including texture, slope angle, soil depth, soil compaction, vegetative cover, precipitation, surficial run-off, and extent of disturbance by construction.

Surficial deposits in the study area are entirely of the Eatonville-Hants till group. The till morphology is primarily a silty till plain with the exception of a section of hummocky moraine through the MacLellans Brook area. The majority of the till is a moderately compact silty-sandy consistency with pockets of more stony-sandy till and less compact that the areas with higher silt content. Thickness of the till ranges from 1 to 20 m. The Eatonville-Hants till tends to be moderately to highly erodible.

**Table 4-2 Issues and Location in the EA**

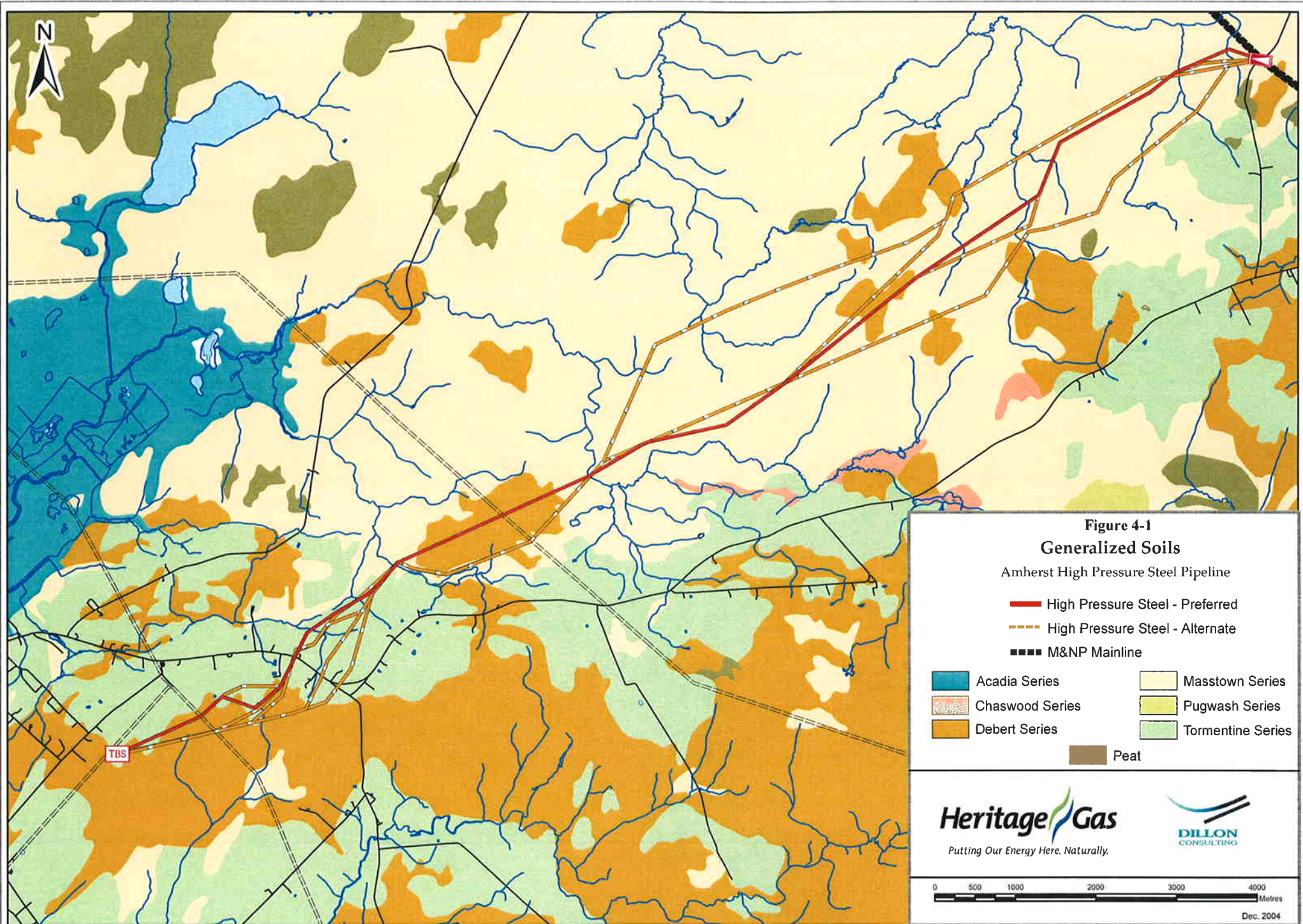
Issue	Section Addressed	Rationale for Inclusion	Stakeholder Consultation	Legislation, Policy, Guidelines	Regulatory Agency Concerns	Literature, References, Consultant Experience
Fine Grained Soils	2.5.3, 4.5.1	Erosion of fine grained soil may lead to sedimentation of watercourses, which are protected by the Fisheries Act and Nova Scotia Environment Act.	√	√	√	√
Wetlands	2.3.4.3, 4.5.2	Protected by Nova Scotia Environment Act, SARA, MBCA; valued	√	√	√	√
Fish & Aquatic Habitat	4.5.3	Protected by the Fisheries Act and Nova Scotia Environment Act; valued.	√	√	√	√
Environmentally Sensitive Areas	2.3.4.3, 4.5.4	Protected by the Nova Scotia Environment Act, Special Places Protection Act, Wildlife Act; valued.	√	√	√	
At Risk Species/ Ecosystems	2.3.4.3, 4.5.5	Protected by SARA, Nova Scotia Wildlife Act; valued.	√	√	√	√
Designated Areas	2.3.4.3	Protected by the Nova Scotia Environment Act, Special Places Protection Act.	√	√	√	√
Land Use	4.5.6	Valued land uses.	√		√	
Air Quality	4.5.7	Protected by Nova Scotia Environment Act; valued.		√		
Groundwater Supplies	4.5.8	Protected by Nova Scotia Environment Act.	√			√
Use of Easement by Off-Highway Vehicles	4.5.9	Concern of landowners regarding trespassing; potential impacts to fish habitat.	√		√	√
Accidents and Malfunctions	4.5.10					
Cultural Heritage Resources	4.5.11	Protected by Nova Scotia Special Places Protection Act; valued.	√	√		√

Soils along the proposed alignment are primarily of the Masstown Series, which is characterized as a fine-grained, sandy loam with very low permeability. Surface stoniness is minor with moderate stoniness at depth. The other significant soil type through which the proposed alignment crosses is the Tormentine Series, which is found in the Warren area. This soil type has higher silt content than the Masstown Series and also exhibits a low permeability. Portions of the proposed pipeline cross Debert Series soils, which are similar in characteristics to both the Tormentine and Masstown Series. Figure 4-1 illustrates the generalized soils for the proposed project area.

Sediment discharge from construction sites was a concern expressed by both regulators and stakeholders due to the fine grained soils in Cumberland County and sedimentation events on past projects in the county. The discharge of sediment to watercourses is regulated by both the Nova Scotia *Environment Act* the federal *Fisheries Act* and is regarded as a substance deleterious to water quality and fish habitat under both Acts.

Avoidance of these soils is not practical as they are widely spread across Cumberland County; however, with a 114 mm pipeline the trench is narrow, disturbing less material and allowing for rapid construction. In addition, vegetation will be largely preserved at sites where HDD is employed. This vegetated buffer will help minimize discharge of sediment to the most sensitive watercourses. Furthermore, Heritage Gas specifies erosion and sediment control measures for all aspects of construction in the EPP. During detail design, those areas particularly sensitive to disturbance will be identified and site specific ECPs prepared. In addition, the EPP provides a wet weather shutdown procedure that can be initiated by the environmental inspector when site and weather conditions pose a risk of erosion.

There is potential for short-term localized, cumulative effects resulting from the discharge of sediment to watercourses as forestry and forestry-related road construction and maintenance activities may be undertaken at the same time as pipeline construction and, similar to pipeline construction, have the potential for sediment generation. This potential will exist until the easement has been revegetated. Longer term potential for erosion of soils, such as disturbance by off-highway vehicles at watercrossings, also exists. In order to minimize the occurrence of watercrossings by off-highway vehicles, Heritage Gas will assess the suitability of access control measures used elsewhere in Canada, such as rollback and berms. In addition, the vegetated buffer zone at HDD sites will be largely preserved except for a single crossing point that can be filled in with rollback. As well, fencing to limit access will be constructed where required by landowner agreements.



Results:

Magnitude	Moderate
Reversibility	Reversible: revegetation following construction; natural flushing of watercourses
Nature	Negative
Extent	Local: effects can occur beyond the easement
Duration	Short to Medium term: If event occurs, contingency measures will be implemented to restrict run-off.
Confidence in prediction	High: due to extensive experience in Nova Scotia with this issue

Significance: Impacts are not significant with appropriate mitigation measures.

Residual Impact  
Statement:

Although fine grained soils are prone to erosion and have the potential to cause siltation of watercourses, erosion and sediment control measures are readily available and are employed as an industry standard during construction projects of this type. Environmental protection measures, combined with on-site construction and environmental monitoring in sensitive areas, mean that significant negative impacts are not expected. No significant residual impacts are expected from the presence of fine-grained soils.

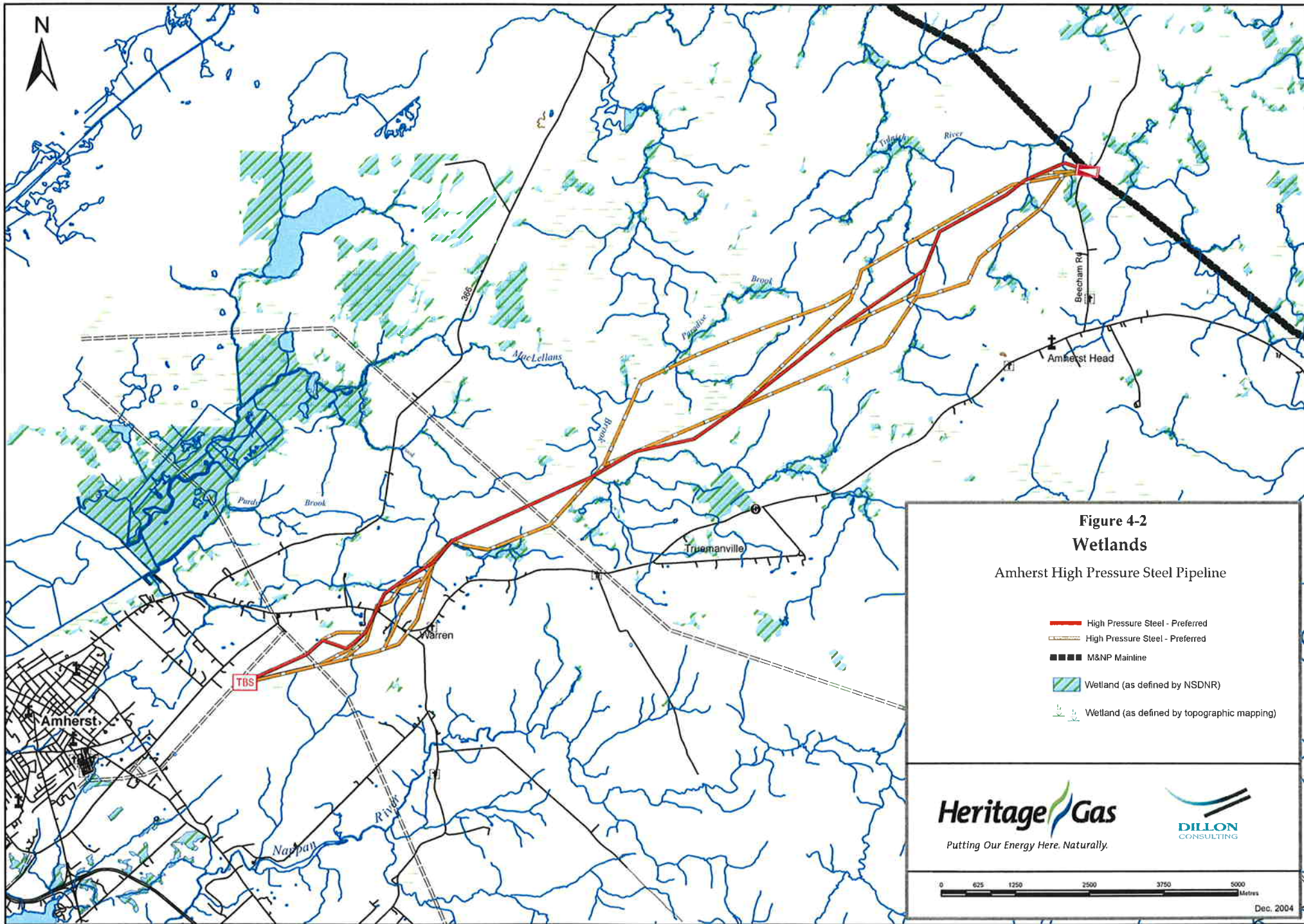
### 4.5.2 Wetlands

Wetlands are defined by the Province as land that is saturated or covered with water long enough to promote vegetation and biological activity adapted to a wet environment.

Wetlands are valued by the public and by stakeholders including individuals living near wetlands, hunting groups, Ducks Unlimited, First Nations, and recreational groups such as bird watchers. Wetlands are considered important and sensitive habitats, and are governed by policies that stress 'no net loss' of wetland habitat such as the Federal Wetlands Policy, the NS Provincial Wetlands Directive as well as the Provincial Environmental Assessment (EA) process.

Wetlands are prevalent throughout northern Cumberland County, however, the preferred alignment has been selected to avoid wetlands, based on available mapping, aerial photography and field truthing (Figure 4-2). The majority of wetlands in the vicinity of the alignment are alder-dominated streamside areas which flood seasonally. In addition, two flooded wet areas were identified during the route review overflight at the first two crossings on the MN&P end (Pr1 and A1 on Figure 4-3).

In the event that surveying during the detailed design stage identifies wetlands that extend beyond the mapped limits, these will be mitigated either by a modification to the alignment entirely or by adopting alternate construction locations or construction methods within the easement. Other mitigation methods for wetlands and wet areas include keeping the workspace as narrow as possible and scheduling to avoid





construction during especially sensitive periods such as nesting. No cumulative effects on wetlands are anticipated as wetlands have been avoided as part of the alignment selection process.

Results:

Magnitude	Small
Reversibility	Reversible: wildlife disturbance is temporary during construction periods
Nature	Negative
Extent	Local: effects can occur beyond immediate easement
Duration	Long-term: for loss of wetland function, short-term for wildlife disturbance
Confidence in prediction	High: wetland locations are well documented. Several measures were undertaken to confirm the confidence, such as field reconnaissance and helicopter overflight.

Significance: Not significant. Wetlands avoided during alignment selection.

Residual Impact  
 Statement:

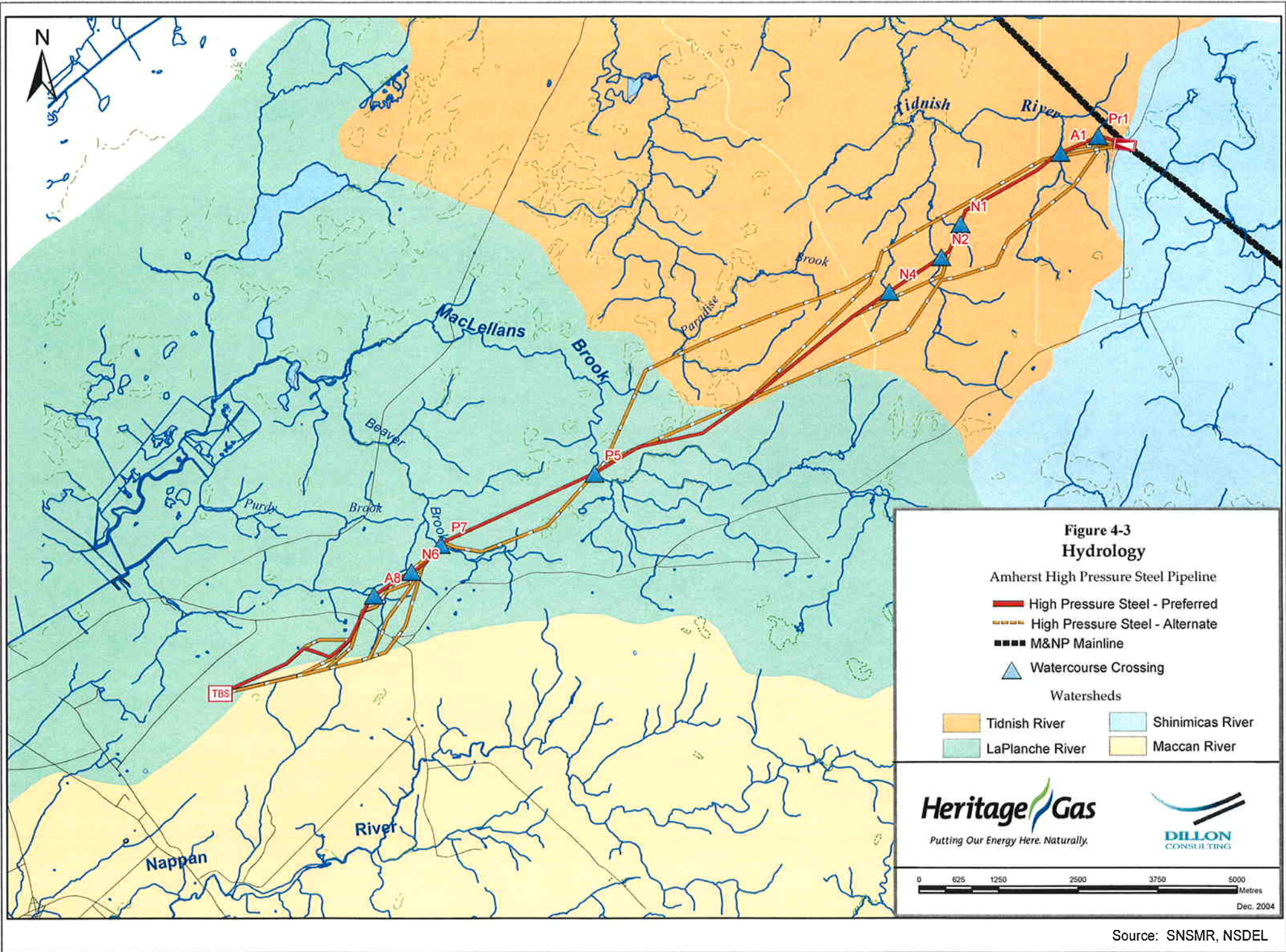
Based on field-truthing and document review, it appears that the route avoids crossing wetland habitat. It is anticipated that if wetlands are encountered in the field, the impact would be limited to small areas of non-significant wetlands. No encroachment will occur where habitat or wetland function is deemed to be significant based on document review and discussion with resource specialists. No residual impacts are expected with the implementation of standard mitigation measures.

**4.5.3 Fish and Aquatic Habitat**

Aquatic habitat includes components of the environment "on which fish depend, directly or indirectly, in order to carry out their life processes" (DFO, 1986). "Fish" includes all life stages of fish, shellfish, crustaceans, marine animals and marine plants. Valued aquatic species include a variety of recreationally, commercially and/or traditionally important fish species. Watercourses include all waterbodies crossed by the project. Watersheds are the land and water areas that drain to a given watercourse.

Watercourses are recognized as a primary environmental concern of many stakeholder groups including First Nations and numerous conservation based community groups. Fish and fish habitat are protected under the *Fisheries Act* by DFO. Watercourse crossings involving instream work are regulated by NSDEL under the *Activities Designation Regulations*.

As can be seen from Figure 4-3, the preferred alignment has been selected to minimize the number of watercourses crossed and the impact on watersheds. The pipeline will cross nine watercourses. Instream work associated with some types of watercourse crossings has the potential to interact with fish habitat. In addition, the potential for generation of sediment during general construction activities is a concern (see 4.6.1).



Source: SNSMR, NSDEL

Sensitivity of fish habitat is a key criterion in selecting a watercourse crossing method. The use of isolated crossing techniques (i.e., dry crossing methods and directional drilling), selection of an appropriate time for construction of the crossing (June to September), and standard environmental protection practices throughout the project emphasize protection of fish and fish habitat and erosion and sediment control. No wet crossings of watercourses are proposed for this project.

The watercourses crossed by the proposed alignment are generally small with minimal or seasonal fish habitat. As described in Section 2.4.2.5, all water crossings will be carried out employing isolated methods. Crossings in which habitat will be temporarily disrupted will be completed within one day. On completion of the crossing, the existing habitat will be replaced to a condition as close as practical to pre-construction conditions. It is expected that habitat, especially substrate, will generally be improved as the trench will be protected by clearstone rock.

The most sensitive water crossings, such as MacLellan's Brook (P5), will be crossed using HDD. This will result in no impacts to fish habitat as no in-stream work is required. Other streams where HDD is considered are Pr1, N2 and P7 (Figure 4-3). With HDD, there is a very remote possibility for the release of drilling mud up to the watercourse due to fracturing during drilling. If this situation arises, Heritage Gas will immediately suspend drilling and implement contingency measures.

Given the temporary nature of impacts on fish habitat, cumulative effects are not anticipated. A detailed description of fish habitat and physical features of each of the watercourse crossing locations is provided in Appendix B. Fish habitat assessments were conducted following DFO protocols to identify stream size, gradient, habitat character, cover and bottom composition. Each crossing was addressed through specific assessment of physical features and habitat assessment a minimum of 50 m upstream of the crossing and 100 m downstream of the crossing.

The watercourses within the western portion of the alignment are located within the LaPlanche River watershed. This watershed supports brook trout, however the majority of crossings are located in upper headwater areas and likely provide fish habitat only during times of high flow (seasonally). MacLellans Brook is one of the larger crossings in the watershed and provides brook trout habitat. Watercourse crossings in the eastern portion of the watershed are within the Tidnish River watershed. This watershed supports Atlantic salmon (Northumberland stock) in the lower reaches but the primary salmonid found in the upper reaches crossed by the pipeline alignment is brook trout. As with the LaPlanche tributaries, the majority of crossings are within headwater areas with only seasonal flow and associated habitat. An uncommon minnow species, the brook stickleback, also inhabits roadside ditches and similar habitat in this watershed. This minnow is considered rare by the Nova Scotia Museum but as listed by NSDNR as having a stable population. Other fish which may occur in the watershed, likely downstream of the crossing areas include gaspereau and brown trout (Davis and Browne, 1996). Sucker and eel were also

observed at some of the crossing locations. Figure 4-3 shows the major watersheds in the proposed project area and the expected watercourse crossing locations. Table 4-3 summarizes crossing characteristics.

Results:

Magnitude	Small
Reversibility	Reversible: disruption to habitat will be temporary; habitat sensitivity will be considered in crossing method selection and construction restoration and natural processes will reverse effects over time.
Nature	Negative/Positive: Improvement in substrate conditions in some watercourses.
Extent	Immediate: isolation crossing techniques expected to temporarily affect habitat within the crossing area.
Duration	Short-term: as noted above, effects will be reversible.
Confidence in prediction	High: effects of watercourse crossings are well known and Heritage Gas will implement standard industry environmental protection measures.

Significance: Not significant: avoidance and protection measures are well established for adopted crossing methods involving isolation.

Residual Impact  
 Statement:

No significant impacts are predicted based on Heritage Gas' commitments to the selection of isolated and drilled (at major watercourses) crossing techniques and the implementation of mitigation measures and monitoring programs.

**4.5.4 Environmentally Sensitive Areas**

Sensitive habitat is defined as habitat that is vulnerable to human disturbance. Such habitats include areas of high biodiversity, riparian zones, wetlands, old-growth forests, estuaries, salt marshes and areas with medicinal plants.

Some bird habitat and bird species are protected under the federal *Migratory Bird Convention Act*, or provincially under the *Wildlife Act*. In addition, NSDNR has hunting and trapping regulations, *Wildlife Guidelines and Standards*, and *Wildlife Habitat Management Regulations*; these policies strive to maintain biodiversity through maintenance of habitat such as old-growth forests. The public and stakeholders may also express opinions as to what they consider sensitive habitat to be.

**Table 4-3 Summary of Watercourse Crossings**

<b>Crossing No.</b>	<b>Watercourse</b>	<b>Watershed</b>	<b>Stream Width</b>	<b>Depth</b>	<b>Dominant Substrate</b>	<b>Stream Character</b>	<b>Potential Fish Habitat</b>	<b>Other Observation</b>
A8	Trib. to Purdy Brook	Laplanche (Bay of Fundy)	<2 m Upstream wider and backflooded	0.2 m	Fines	Flat	Minnow	Backflooded access road culvert
N6	Trib. to Beaver Brook	Laplanche (Bay of Fundy)	Dry at survey time	-	Fines	Intermittent	Seasonal minnow	-
P7	Beaver Brook	Laplanche (Bay of Fundy)	<1 m	0.3 m	Sand	Run	Forage fish	Grassy floodplain at crossing
P5	MacLellan's Brook	Laplanche (Bay of Fundy)	8 m	0.3 m	Rock, cobble, sand	Riffle, flat	Seasonal brook trout	
N4	Trib to Tidnish River	Tidnish River (Northumberland)	1.5 m	0.2 m	Cobble, gravel, sand	Riffle, shallow run	Minnow	Meander through woodlot
N2	Data Pending	Tidnish River (Northumberland)	1.8 m	0.3 m				
N1	Data Pending	Tidnish River (Northumberland)	<1 m	0.2 m				
A1	Trib. to Tidnish River	Tidnish River (Northumberland)	2.5 m	0.2 m	Cobble, sand	Riffle, flat	Minnow, brook trout passage	Beaver meadow
Pr1	Trib. to Tidnish River	Tidnish River (Northumberland)	1.2 m	0.5	Sand	Flat	Minnow	Flow through alder

### Wildlife Habitats

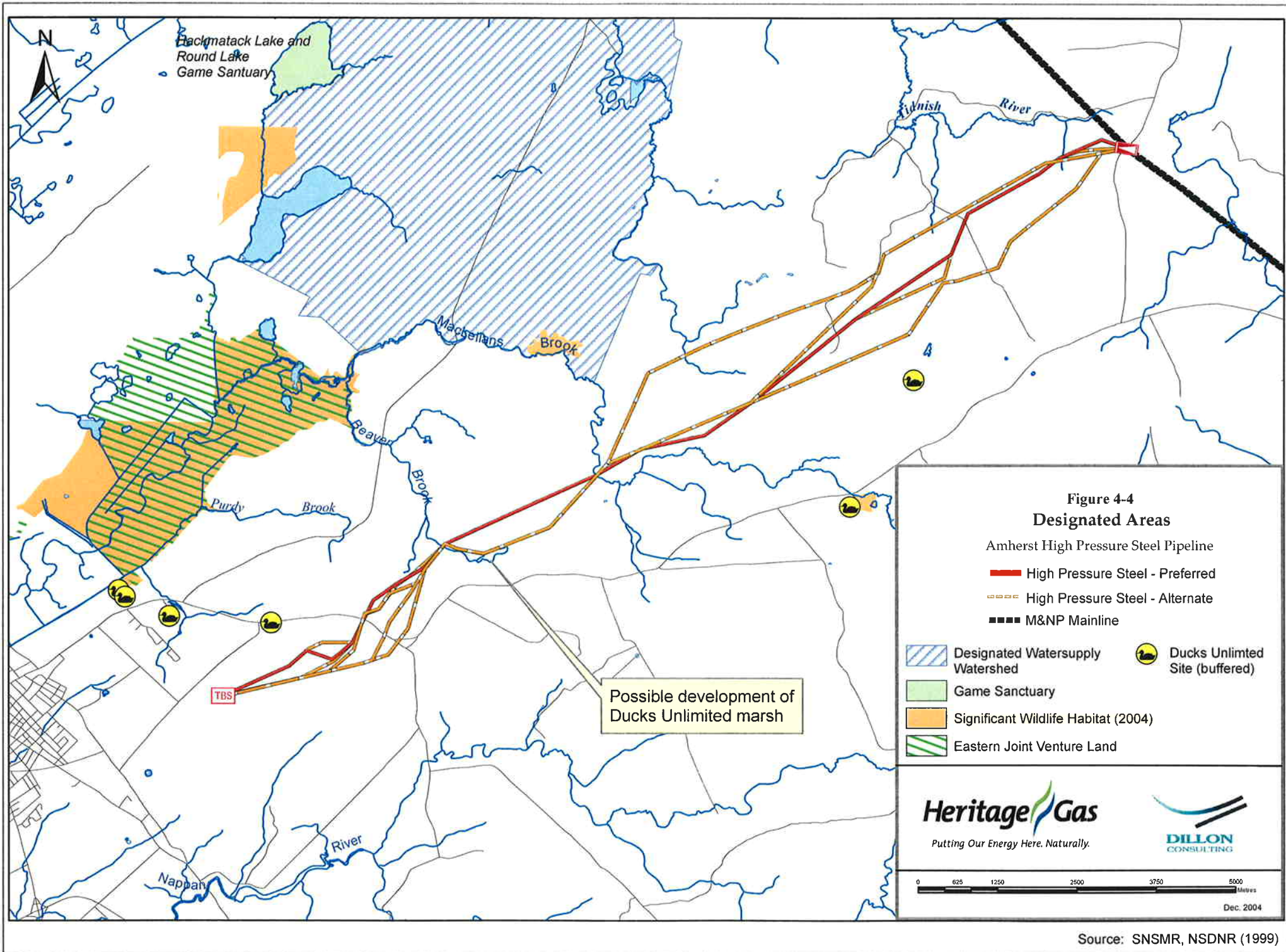
The area surrounding the proposed alignment falls within the Maritime Lowlands Ecoregion of Loucks' Red Spruce, Hemlock, and Pine Zone. The forests are heterogeneous mixtures of early to mid-successional stages dominated by hardwoods and influenced by forestry and agriculture. Black Spruce, Jack Pine, White Spruce, Red Spruce, and Red Maple are the most abundant species, although Eastern Hemlock and White Pine are not uncommon (Davis and Browne, 1996). Eastern Hemlock may occur in pure stands and can be among the first species to colonize disturbed areas. Larch and Black Spruce occur in the extensive boggy areas. American Beech and Sugar Maple are found on a few slopes near the larger streams. Much of the area is forested, but has undergone varying degrees of forest harvest and management including the development of plantations and silviculture (based on November, 2003 aerial photography, 60-70% of the alignment is under silviculture).

No significant wildlife habitats, as listed by NSDNR, are present in or near the proposed route alignments (refer to Figure 4-4). The closest NSDNR significant wildlife habitat is located in Truemanville adjacent to Route 6, approximately 2 km south of the proposed preferred alignment. This habitat was identified as significant due to the occurrence of a rare plant, *Polygala anguinea* (field milkwort), in 1941 records from the EC Smith Herbarium at Acadia. Another significant wildlife habitat is located on MacLellans Brook and was identified as an eagle nest (pers. comm., Ross Hall, NSDNR Wildlife Division). Both sites are well outside (over 1 km) the proposed construction area.

Northern Cumberland County has several designated sites for migratory bird habitats. Waterfowl make use of the numerous Ducks Unlimited wetlands scattered across the inland region as well as the marshlands of the Maccan River, Tantramar River, and Cumberland Basin. The closest Ducks Unlimited site is approximately one km south of the proposed preferred route near the headwaters of the Tidnish River. Other Ducks Unlimited sites are located in wetlands northeast of Amherst, in the LaPlanche River system and will not be effected by the project (D. Meadus, pers. comm.). A landowner expressed an interest in developing a marshy area into a habitat for waterfowl. This is noted on Figure 4-4 as a potential site.

### Avifauna

Migratory birds in the study area were identified visually and by their vocalizations. A survey was conducted over the study area to establish a list of species occupying the project footprint. The survey was conducted by listening for birds, starting before dawn, when avian activity begins. Numbers of each species were recorded for those found within the project footprint. The passerine survey was conducted in a similar fashion to the owl survey (listening for 10 minutes every 1 km). A list of birds observed or heard during the avian survey is presented in Appendix C.



Source: SNSMR, NSDNR (1999)

A survey for owls was conducted in the early morning hours when these species would be most active. Species-specific calls were used to initiate a response from owls within the study area or beyond. Beginning at 2:00 a.m., the team surveyed for owls approximately every kilometre, stopping for approximately 10 minutes. No owls were identified during the survey.

Coyote, black bear and white-tailed deer are known to inhabit the study area. Other common fauna include muskrat, mink, raccoon and red fox. However, the pipeline alignment does not cross significant habitat for any of these species. The clearing of the pipeline will result in the removal of approximately 28 ha of forest (based on November 2003 aerial photography) much of which is being actively harvested or has been harvested in the past. This represents a relatively minor loss of forest habitat that is not considered to appreciably contribute to cumulative effects on wildlife habitat. A survey of medicinal plants within the easement will be completed prior to construction.

Results:

Magnitude	Small
Reversibility	Reversible: disruption is temporary and restricted to construction periods
Nature	Negative
Extent	Immediate: limited to easement
Duration	Short-term
Confidence in prediction	High: Sensitive habitat is well documented through the province or easily identified.

Significance: Not significant.

Residual Impact  
Statement: Not significant.

#### **4.5.5 Species At Risk (Flora and Fauna)**

Species at risk include those for which critical habitat is restricted to a few locations, or which are represented by a few individuals locally, nationally or globally. Species at risk are valued by numerous stakeholder groups. Provincial and pending federal legislation provides for the protection, designation, recovery and other aspects of conservation of species at risk. At Risk Species are identified nationally under the Committee on the Status of Wildlife in Canada (COSEWIC) listings and provincially under the status of wildlife process. Regulatory protection is extended under the federal Species at Risk Act (SARA) and the provincial Nova Scotia Endangered Species Act (NSESA). Under SARA, the initial List of Wildlife Species at Risk is Schedule 1 and is based on recent COSEWIC assessment of endangered or threatened species. As of June 1, 2004, SARA applies to aquatic or migratory bird (under MBCA protection) at risk species and listed endangered, threatened or extirpated species on federal lands. The NSESA provides “for the protection, recovery and other relevant aspects of conservation of species at risk



in the Province, including habitat protection” (Nova Scotia Department of Natural Resources 1998). At risk species are designated for protection under the Act by the Species-at-risk Working Group.

Other species are identified as potentially rare within the province based on literature assessments such as the Atlas of Rare Vascular Plants of Nova Scotia (Pronych & Wilson, 1993).

With construction of the natural gas pipeline in a new easement, there is potential to encounter rare species either directly within the easement or to have construction activities result in disturbance to rare species adjacent to the easement.

#### *Flora Methodology*

Potential at-risk flora known to occur within the general vicinity of the project (10 km square or adjacent grid to ensure a complete plant list as the 10 km grid may not be centered on the study area) are identified in the Atlas of Rare Vascular Plants of Nova Scotia and in NSM and ACCDC data. Data reports are provided in Appendix D.

Field surveys were conducted within the study area with particular attention paid to habitats with a higher potential for containing at-risk species. These habitats included any wetlands, swales and low-lying areas, specific forest stands and road sides/disturbed areas. The survey was conducted over two periods, spring and late summer, to ensure different flower periods were observed. A spring survey was conducted in late May 2004, while the late summer plant survey was conducted in late August/early September 2004.

#### *Fauna Methodology*

Potential at-risk fauna known to occur within the general vicinity of the project are identified based on the Atlas of Breeding Birds (Erskine 1999), NSM and ACCDC data, and habitat. Data reports are provided in Appendix D.

Field surveys were conducted within the study area with particular attention paid to habitats with a higher potential for containing at-risk species. These habitats included any wetlands, swales and low-lying areas, specific forest stands and disturbed areas.

No at-risk flora or fauna were observed during field surveys and no at risk species were listed by the Atlantic Canada Conservation Data Centre as being recorded in the proposed alignment. Minor route alignment changes were made subsequent to the open house and further discussions with landowners. Heritage Gas is committed to survey areas not previously assessed prior to construction.

Results:

Magnitude	Not applicable: At risk species not observed along the proposed alignment
Reversibility	Not applicable
Nature	Not applicable
Extent	Not applicable
Duration	Not applicable
Confidence in prediction	High: Alignments were field truthed and at risk species were not observed.

Significance: Not significant.

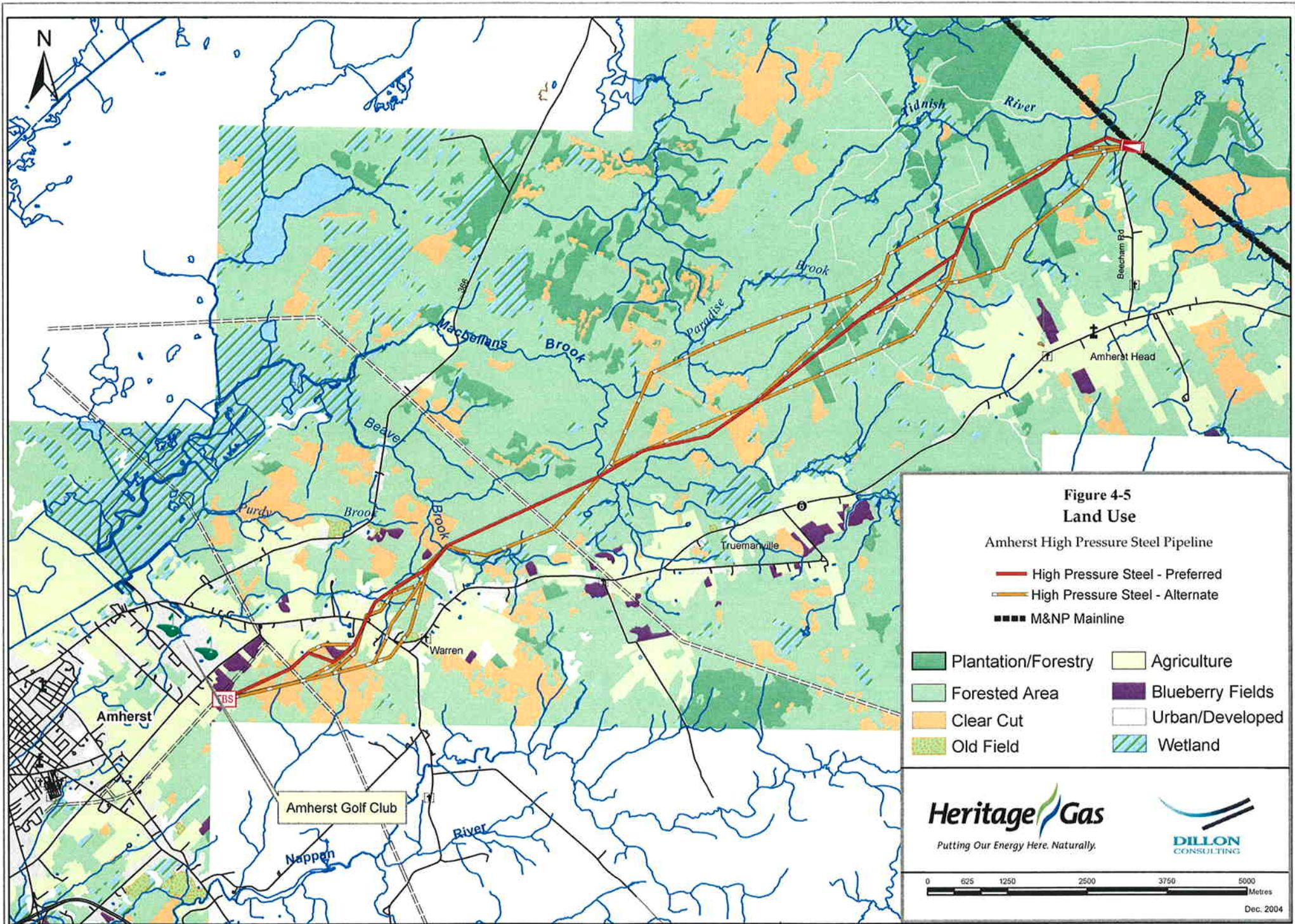
Residual Impact

Statement: No significant impacts are predicted on species at risk based on the findings of the survey and the commitment to implement field identification survey prior to construction in those areas not assessed.

#### **4.5.6 Land Use**

The primary economic activities potentially impacted by the project are forestry and agriculture (Figure 4-5). Productive or potentially productive forest comprises approximately 85% of land use in the vicinity of the alignment, while agriculture accounts for approximately 15% of the land use. Of the 85% that is forested, approximately 60-70% is being actively harvested or was harvested in the past. Agricultural lands are located between Amherst and the community of Warren and consist of blueberries, produce and livestock production. The protection of land with existing or future forestry or agricultural productivity is an important issue whenever linear corridors are created. Although this land is not specifically protected by provincial or federal statutes, it is nonetheless considered as an issue of concern by landowners.

From consultation with landowners, a number of issues arose regarding the impact of the project on forestry activities. Some portions of the alignment pass through high quality timber stands and a concern was raised not only regarding the direct loss of timber from the clearing of the easement, but the longer term impact of blow-downs at the edge of the easement, effectively widening the affected area. In response, Heritage Gas moved the proposed alignment to avoid the identified areas of concern. Landowners with forestry interests also were concerned with potential access limitations posed by the pipeline. Heritage Gas will implement a number of mitigation measures to maintain access across the easement including: improvements to access roads crossing the easement and the provision of temporary pipeline crossings (plated steel/movable structures) when landowners do not require a permanent crossing. Given the relatively small area removed from forest production (estimated 28 ha) and the extensive silvaculture throughout the region, the loss is not anticipated to significantly impact forestry in a direct or cumulative manner.



Source: SNSMR, NSDNR (1999)

Effects on agricultural productivity can be caused by: construction workspace requirements; access for construction; dust generation onto adjacent sensitive crops; and effects on livestock from equipment noise and blasting. Where agricultural lands are excavated or used by heavy equipment, soils may be mixed or compacted, which reduces crop productivity.

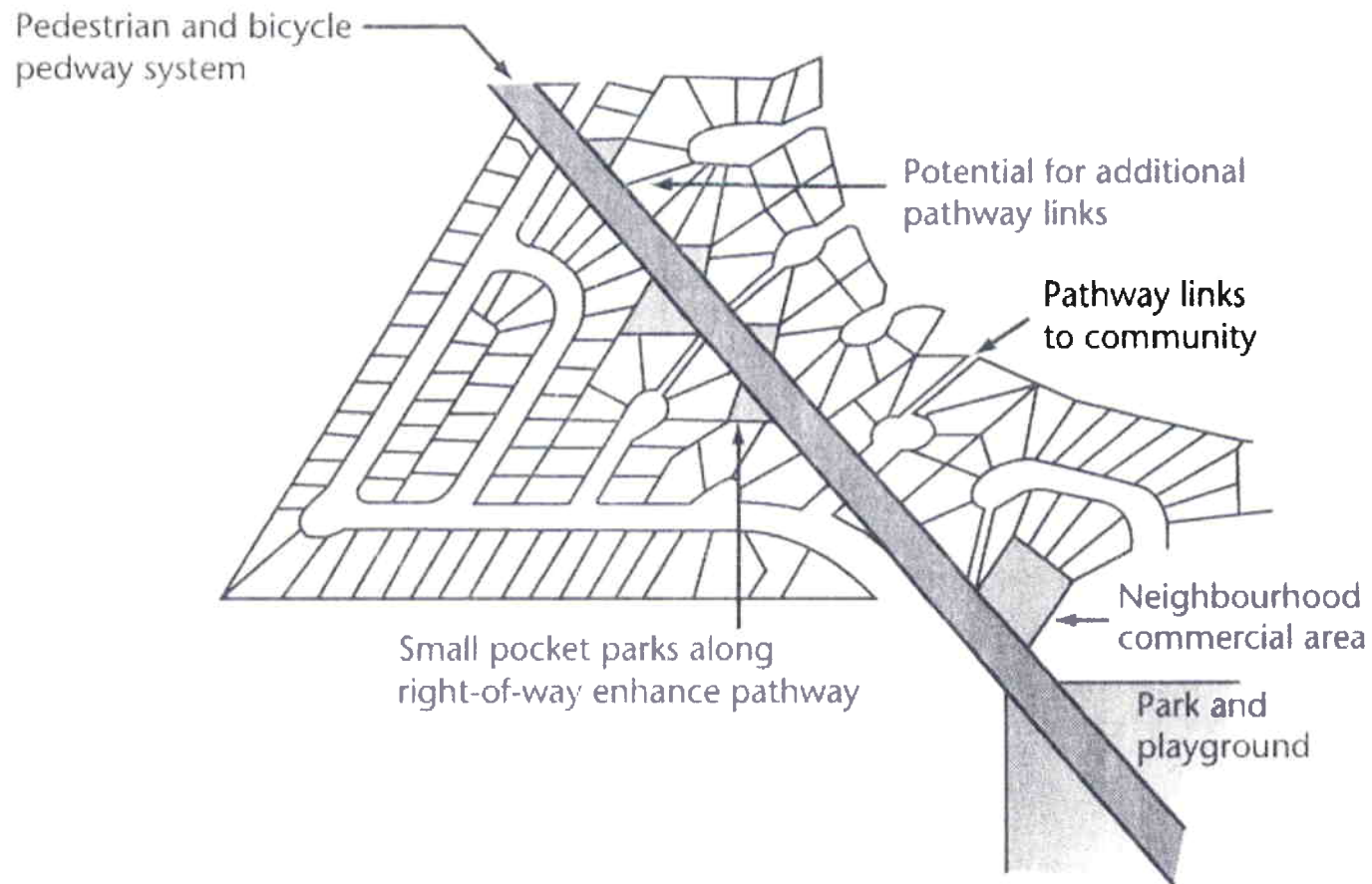
In general, the alignment avoids lands with sensitive crops such as blueberries or has been aligned outside productive agricultural lands. The short duration of construction limits the potential disturbance effects on livestock. Impacts on agriculture are also not significant as productive lands will be avoided and there is no impact from pipeline construction on pasture lands. Specific measures have been identified for pasture lands for topsoil preservation as noted in Section 2. The need for additional mitigation and the specific mitigation measures for these lands will be developed in consultation with the affected landowners and will be incorporated into the ECPs.

It is noted that the end of the alignment closest to Amherst crosses areas zoned "Country Residential", which allows mixed use including residential, commercial and light industrial (see Figure 3-1). Future residential developments are considered to be compatible with pipeline operations, as shown in Figure 4-6. Pipeline systems are also compatible with light industrial uses, such as communications towers. Heritage Gas will review operational considerations, such as potential signal interference with Rogers Wireless, with the towers owners.

Results:


Magnitude	Small
Reversibility	Reversible: Impacts on agriculture are expected to be fully reversible with mitigation over a period of two to three years. Irreversible: Easement will take a limited area out of forestry production and residential development.
Nature	Negative
Extent	Immediate: The potential extent of effects on forestry and agriculture is limited to the easement. Local: May affect future development plans in vicinity of Amherst.
Duration	Short-term: The duration of impacts is not anticipated to be more than a single season during construction for agriculture. Long-term: A limited area of forestry production will be permanently lost. Some potential long-term impact on land development near Amherst.
Confidence in prediction	High

Significance: Not significant: Forestry and agriculture are not expected to be significantly impacted by the project. Effects on forestry production are limited to the easement and effects on agriculture are fully reversible. Pipeline systems are compatible with residential and light industrial land uses and will have minimal impact on future development in the vicinity of Amherst.



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Source: CSA Special Publication PLUS 663 Land use planning for pipelines: A guideline for local authorities, developers, and pipeline operators. 2004

 <b>DILLON</b> CONSULTING	TITLE	PROJECT No.
	<b>Land Use Integration with Pipeline Easement</b>	<b>04-3265</b>
DATE	PROJECT	FIGURE No.
<b>Dec. 2004</b>	<b>Amherst High Pressure Steel Pipeline</b>	<b>4-6</b>

**Residual Impact  
 Statement:**

While a limited area of forestry will be permanently removed from production, landowners will be compensated for their losses through the easement acquisition process. Heritage Gas will work with landowners to maintain access where required. Agriculture will not be significantly impacted by the project provided mitigation measures described above and in Section 2 are implemented.

**4.5.7 Air Quality**

Local and global air quality issues relating to the proposed project include emissions of natural gas (methane) and vehicle emissions (e.g., carbon dioxide and oxides of nitrogen) as well as dust and noise.

Air emissions must comply with the provincial *Air Quality Regulation* made under Section 112 of the *Environment Act*, 1995. The Government of Canada is also a signatory to the Kyoto Accord committing it to reduce greenhouse gas emissions. Fugitive emissions of natural gas, as well as point source emissions such as those from equipment and vehicles, are sources of greenhouse gases, but this contribution is minor on regional and global scales. Heritage Gas is committed to and supportive of the Voluntary Challenge and Registry (VCR) program and will implement measures to minimize fugitive emissions from its facilities such as:

- conducting regular equipment/vehicle maintenance to improve operating performance and fuel efficiency (and thereby reducing greenhouse gas emissions);
- managing wood waste from construction activities, such that chipping is the preferred waste management method;
- reducing natural gas emissions during line commissioning by monitoring gas concentrations at the exit point in the line and/or by flaring purged gas; and,
- specifying, constructing and implementing high quality system components that reduce fugitive emissions from the system.

It is expected that the minimal emissions of greenhouse gases resulting from the project will be greatly offset by reductions in greenhouse gas emissions by use of natural gas instead of coal and oil. The following values are estimated GHG savings calculated by Heritage Gas on the basis of published government sources.

Savings (in tonnes of GHG per person per year) Natural Gas Over Current Energy Source in Nova Scotia			
Savings	Oil	Current Energy Propane	Electricity
Natural Gas	1.0	0.2	5.3

Noise and dust at nuisance levels can be generated by construction. Certain components of the system may generate nuisance noise during operation of the system. Noise and dust can be health issues,

however, the project will not generate noise or dust at levels or over periods of time that need to be addressed as a health risk for the public.

Guidelines are provided for noise levels and dust levels by the NSDEL. These levels are related to the disturbance and nuisance created by excess noise at different times of day and the nuisance effect of fugitive dust.

Noise and dust sources from natural gas system construction are generally the same as those for other similar utility construction activities. Appropriate control measures include continuous maintenance of standard noise suppression on construction equipment and vehicles, and application of dust suppression when dry soils are exposed in areas where fugitive dust can be a nuisance. The common dust suppression method is water spray, but approved chemical sprays may also be used.

Over-pressure during operation from some project facilities may occur over brief periods. Heritage Gas will design all of its Amherst pressure reduction stations utilizing remote monitoring and “relief containment” design philosophy. This approach relies on each pressure regulating run having two regulators placed in series, such that should one regulator fail, the other would take over. Two regulator runs are installed in parallel, operating and standby. This high degree of redundancy coupled with remote monitoring provides the ability to respond quickly to an equipment failure without any loss of gas to atmosphere or loss of service.

Noise generation levels during operation will be uncommon and confined to few locations where regulator stations are installed. Regulator stations will be sited and housed to limit the potential for noise impacts on sensitive land uses, which include residences, schools, churches and other public institutions. Planned shutdown of the system will permit the controlled release of natural gas and the control of noise levels. Emergency blowdown will be infrequent and isolated. Over pressure releases will be through noise suppressors in sensitive areas. Noise and dust issues, if any, will be very short term and transitory in nature. In emergency conditions or during planned maintenance shutdown, natural gas may be vented to the atmosphere and flared. Noise levels generated in these conditions can be high; however, such conditions are very infrequent and adjacent landowners are contacted in advance whenever possible.

Results:

Magnitude	Small: similar to other utility construction projects.
Reversibility	Reversible: Emissions, noise and dust are temporary. Positive reductions in GHG
Nature	Positive/Negative
Extent	Regional: The extent of noise and dust effects are limited to areas close to high-Pressure pipeline construction and limited areas around above-ground facilities. Overall reduction of greenhouse gases from the project.
Duration	Short-term: The potential duration of impacts from emissions, nuisance noise and dust is confined to the construction period in any particular area, and to short durations during infrequent operations events.
Confidence in prediction	High

Significance: Not significant. Fugitive and point source emissions from the project are minor to negligible on a global scale. In addition, greenhouse gas emissions associated with heating will be significantly reduced as facilities burning oil switch to natural gas. The impacts of nuisance noise and dust are not expected to be significant with protection measures.

Residual Impact

Statement: The residual impacts of nuisance noise and dust are considered not significant. During construction the effects will be mitigated by standard methods. During operation high noise levels will be infrequent and of limited extent. No residual long-term impacts on air quality are expected from the project.

**4.5.8 Groundwater Supplies**

Groundwater supplies are defined as potable water from a subsurface groundwater aquifer supplied by a drilled or dug well.

Disturbance of the groundwater regime resulting from excavation or blasting can have a variety of effects on groundwater quality and quantity, including increased turbidity, increased metals concentrations, decreased pH, increased and/or decreased quantity.

The majority of the homes in the study area rely on groundwater for potable water supplies. According to a 1990 study examining proposed water supply locations for the Town of Amherst, groundwater quality at that time was noted as excellent, low in total dissolved solids, colors, metals and nutrients for the Tyndal Road (Hwy. 366) and John Black Road aquifers. These aquifers are situated north of the central portion of the alignment and near the southeastern portion of the alignment, respectively. The Tyndal Road aquifer was chosen for future water supply needs of Amherst and has been avoided. Likewise, the alignment does not affect the John Black Road aquifer.

The majority of pipeline route runs approximately 2 km from homes and is not expected to impact groundwater. In the areas closer to Amherst, the pipeline runs closer to a small number of residential



homes, but the impact is expected to be minimal as depths of excavation will, in most places, not exceed 1.5 m.

Heritage Gas will evaluate groundwater supply conditions on potentially effected supplies before and after construction. This will include evaluation of domestic water supply quality and general water quality. Blasting is not expected, but if it is to occur, design of the blast relative to the geological conditions and proximity of water supply wells will be evaluated before blasting. In the event that groundwater conditions are severely altered by construction, Heritage Gas will rehabilitate or replace the affected well and ensure comparable water supply characteristics.

No cumulative effects on the groundwater supplies are anticipated.

Results:

Magnitude	Small. Very few homes affected.
Reversibility	Reversible: if a water supply is adversely affected, it can be restored or replaced
Nature	Negative
Extent	Local: effects can occur on groundwater supplies beyond the limits of the easement
Duration	Short-term
Confidence in prediction	High: considerable experience exists in Nova Scotia with this issue

Significance: Not Significant. Significant groundwater supplies are avoided.

Residual Impact

Statement: No residual impacts are expected, with application of mitigative measures described above.

#### **4.5.9 Use of Easement by Off-Highway Vehicles**

Opening of new easement and access associated with the pipeline may result in use of the easement by off-highway vehicles. Concerns regarding the use of off-highway vehicles on the easement have been identified by both landowners and regulatory agencies. Landowner concerns stem from trespassing to potential damage to agricultural crops. Regulatory agency concern is related primarily to the uncontrolled crossing of watercourses and the resulting damage to fish habitat and potential for increased erosion.

Access to the easement can be facilitated by the extensive network of forestry roads and it is expected that with ongoing forestry, additional access points will be created. Anecdotal evidence, however, suggests that all-terrain vehicle (ATV) users in the area tend to prefer good trails (such as the roads) over rougher trails (such as utility easements) and there appears to be a trend to reducing unauthorized traffic (P. Hawkes, pers. comm.). The critical time for access control will be 1-5 years following construction as grass and shrub growth will not be sufficient to discourage access. There is potential for cumulative land

use effects as the easement can provide unauthorized access to private lands by all-terrain vehicles or snowmobiles.

Heritage Gas will deter access along the easement in a number of ways. At watercourses to be directionally drilled, Heritage Gas will maintain a minimum of 10 m buffer to limit access to the watercourse. In addition, Heritage Gas may also employ the rollback of slash and stumps at selected locations along the easement to discourage access. Fencing may also be installed where requested by landowners. This is further discussed in Section 4.5.1. In addition, the Province is considering ATV regulations, which may assist in alleviating this concern.

Results:

Magnitude	Small
Reversibility	Reversible: Access to easement most available during construction but following clean up measures described above will limit unauthorized access.
Nature	Negative
Extent	Immediate: The extent of unauthorized access limited to the easement.
Duration	Long Term: Easement can be used as travelway, if not mitigated.
Confidence in Prediction	High

Significance: Not significant, with access controls and monitoring.

Residual Impact

Statement: Residual impacts resulting from unauthorized access are predicted to be mitigable with access controls, monitoring and response to events by Heritage Gas.

#### **4.5.10 Accidents and Malfunctions**

Accidents and malfunctions that can lead to environmental effects may occur during any phase of the project. During pre-construction and construction these events largely involve minor spills of hydraulic oil, fuel, lubricants and pipe coatings within the easement. These spills are readily contained and cleaned up following standard industry spill contingency measures and, when mitigated promptly, do not result in environmental effects. When spills occur close to or into a watercourse, there is potential for environmental effects on fish and fish habitat and water quality, both within the easement and downstream of the spill depending on the volume spilled.

To minimize the likelihood of a spill, Heritage Gas will implement environmental awareness training that will provide all staff with information on environmental protection measures to be employed on the project. This training will include handling and disposal of hazardous materials. As well, no

fueling/maintenance zones will be established around watercourses and other sensitive features to minimize potential of spills reaching watercourses.

In the event of a spill, Heritage Gas and its contractors will follow the procedures described in the spill contingency plan detailed in the EPP. In addition, contractors will be required to maintain appropriate spill response cleanup materials during construction.

In addition to spills, there is a potential for fire associated with pipeline construction, either during the burning of slash or by an errant spark during construction. Uncontrolled fire will result in a loss of merchantable timber and may result in effects on environmentally sensitive areas outside the study area depending on the extent of the fire. Fire prevention and response is another key component Heritage Gas' environmental awareness. As well, appropriate fire fighting equipment will be maintained by construction crews in high fire risk areas.

During operations, accidents and malfunctions include potential for release of odourant. Odourant typically vapourizes rapidly when exposed to atmosphere, but under certain conditions may also remain present in liquid phase. The environmental impact may therefore be of two types, the release of odourant vapours and the spill of liquid odourant. Employees that are working in close proximity to the odourizing equipment must ensure that they are not exposed to high vapour concentrations or coming in direct skin contact with the odourant.

Once vapourized and dispersed at low concentrations, odourant vapours are of no health and safety concerns to the public; however, public perception may be that a serious incident has occurred. This may lead to undue alarm and a large number of odour calls, since any release of odourant has the potential to be perceived directly by adjacent landowners within a wide radius, depending on dispersion patterns at the time of the incident.

In order to mitigate potential releases, odourant will be purchased in sealed containers, typically within pressure vessels that will be filled at the manufacturer's plant. These pressure vessels are then transported to the site and connected to the odourizer to provide 'odourant-free' transfer. When empty, the pressure vessel is resealed and returned to the manufacturer. Odour masking agent or biological digesting agent are stored on site in order to enable releases to be brought quickly under control.

Leakage of pipeline or facilities, or damage through third-party hit or other causes may also result in short term unintentional releases. Regular O&M procedures, "Call Before You Dig" program, and emergency response plans of Heritage Gas will mitigate such events. Accordingly, accidental releases of this type are expected to be rare, localized and reversible.

Following a release, depending upon the circumstances of the event, the spillage or unintentional release of hazardous substances will be reported to Nova Scotia Department of Environment and Labour and the Utilities and Review Board. It may also be necessary to file a report with Transport Canada.

Results:

Magnitude	Small
Reversibility	Reversible: Spills can be contained and cleaned up. Releases of gas or odourant will dissipate quickly.
Nature	Negative
Extent	Immediate: Largely contained to the easement, but effects can occur beyond the easement if not adequately contained.
Duration	Short Term: If event occurs, contingency measures will be implemented to contain and cleanup spill or release.
Confidence in prediction	High: Due to extensive experience in Nova Scotia with this issue

Significance: Not significant provided contingency and emergency plans are implemented in accordance with the EPP.

Residual Impact

Statement: No significant residual impacts are anticipated as spills will be contained and cleaned up immediately following their discovery.

#### **4.5.11 Cultural Heritage Resources**

Construction of the high-pressure pipeline may disrupt cultural heritage resources as a result of construction related activities associated with the following: construction within the pipeline easement itself, development of the Tap Station and TBS, stockpiling areas, marshalling yards, temporary work areas, and access roads, either temporary or permanent.

Nova Scotia's cultural heritage resources are protected under the terms of *The Special Places Protection Act*, *The Heritage Property Act*, and *An Act to Provide for the Protection of Cemeteries*. Public/stakeholder interest in cultural heritage resources in relation to this pipeline construction project has been clearly expressed by Mi'kmaq communities throughout the Province.

In order to minimize these impacts and mitigate those that cannot be avoided, Cultural Resource Management (CRM) Group Limited has undertaken a cultural heritage impact assessment of the proposed alignments on behalf of Heritage Gas (Appendix E). This assessment was used to identify areas of resource potential and design strategies for the pre-construction field verification of resource potential. The results of the assessment will also be used to develop a program of construction monitoring, and identify appropriate mitigation measures for addressing accidental cultural heritage resource impacts during construction.

The archaeological impact assessment designed to address archaeological resource potential within the proposed Amherst steel pipeline alignment is comprised of four components: archaeological potential modelling; field reconnaissance; pre-construction assessment; and, construction monitoring. Prior to formal identification of the actual alignment, only the modelling and field reconnaissance components have been completed. The pre-construction assessment and construction monitoring will be conducted at subsequent stages of the project (i.e., following selection of the preferred alignment).

Archaeological potential modelling focuses on the identification of environmental, cultural and historical factors which shape the pattern of human land use and resource exploitation. In the preparation of a model for the Amherst area, many sources were consulted. During the course of the modelling exercise, archaeological sensitivity was assigned to the crossing of MacLellans Brook, Highway 6 at Warren and a nineteenth century "Surveyed Road" located north of Amherst Head, as well as three nineteenth century mill sites, one of which was located on Beaver Brook and the other two located on an unnamed tributary of Chapman Brook. The majority of the corridor has been assigned low archaeological potential.

Field reconnaissance was conducted on six separate occasions between September 9 and October 30, 2004. The visits served to field-truth historic features identified as a result of background research and to evaluate areas identified as having high archaeological potential. The principal features to be identified in the field were the three nineteenth century mill complexes identified within the study corridor (Church 1873). The "J. & B. Saw Mill" and the "R. Mason Saw Mill" were inspected on an un-named tributary of Chapman Creek. An unnamed saw mill site on Beaver Brook was also inspected. While identifying the primary features evident at each site, the field team also recorded a series of GPS coordinates to clearly anchor the sites in relationship to the proposed alignment. Neither the preferred or alternate alignments fell in close association with any of the mill related features. Also visited were the proposed crossings of MacLellans Brook, Highway 6 at Warren and the "Surveyed Road" just west of Beecham Road in Amherst Head. Pre-construction shovel testing will be conducted in these areas of high archaeological following detailed design.

Results:

Magnitude	Moderate
Reversibility	Irreversible: once features are destroyed they cannot be recovered
Nature	Negative: due to the fragile and unique character of cultural heritage resources, the anticipated construction related impacts are considered negative Positive: the planning and modeling being undertaken to identify cultural heritage resource impacts will serve to advance the understanding of human history and population distribution
Extent	Immediate: confined only to excavated areas
Duration	Short-term: effects will only occur during construction
Confidence in prediction	High

Significance: Significant: high potential of encountering cultural heritage features limited to the crossing of Highway 6.

Residual Impact Statement: Implementation of the pre-construction field verification strategies and construction period monitoring activities will allow Heritage Gas to carry out appropriate and responsible mitigation strategies to avoid impacts where practical and address accidental cultural heritage resource impacts during construction.

## **4.6 Environmental Impact Summary**

The preceding sections provide a detailed project description, outline environmental protection measures that Heritage Gas will follow, and discuss potential impacts resulting from project activities.

In summary, environmental impacts and residual impacts associated with the project are considered to be *not significant* as environmentally sensitive areas have been avoided and effects generally can be mitigated through environmental protection measures and compensation through landowner agreements. Further, effects are limited in scope and duration, or are reversible following the completion of construction.

Table 4-4 presents a summary of the identified issues and provides a determination of significance for each.

**Table 4-4 Impact Assessment Summary**

Issue (Including Mitigation)	Section Reference	Magnitude	Reversibility	Nature	Extent	Duration	Confidence
Fine Grained Soils	4.5.1	M	REV	NEG	L	ST/MT	H
Wetlands	4.5.2	S	REV	NEG	L	LT/ST	H
Fish and Aquatic Habitat	4.5.3	S	REV	NEG/POS	I	ST	H
Environmentally Sensitive Areas	4.5.4	S	REV	NEG	I	ST	H
Species At Risk	4.5.5	N/A	N/A	N/A	N/A	N/A	H
Land Use	4.5.6	S	REV/IRR	NEG	I/L	ST/LT	H
Air Quality	4.5.7	S	REV	NEG	R	ST	H
Groundwater Supplies	4.5.8	S	REV	POS/NEG	L	ST	H
Use of Easement by Off- Highway Vehicles	4.5.9	S	REV	NEG	I	LT	H
Accidents and Malfunctions	4.5.10	S	REV	NEG	I	ST	H
Cultural Heritage Resources	4.5.11	S	IRR/REV	NEG	I	ST	H

Keys to Table 4-3

N/A Not Applicable  
 POS Positive  
 NEG Negative  
 IRR Irreversible  
 REV Reversible  
 I Immediate  
 L Local  
 R Regional  
 ST Short Term  
 MT Medium Term  
 LT Long Term  
 S Small  
 M Moderate  
 H High

## **4.7 Follow-up**

### **4.7.1 Additional Field Studies**

Prior to construction of the pipeline, Heritage Gas will complete field programs for areas of the preferred alignment not addressed due to access or timing of the alignment revision. The include:

- rare flora survey in segments of the alignment confirmed in late November; and
- assessment of watercrossings N1, N2, PR1.

In addition, the Mi'kmaw Knowledge Study is expected to be completed in the Spring of 2005 following a spring medicinal plant survey.

### **4.7.2 Environmental Protection Plan (EPP)**

Heritage Gas has prepared an EPP addressing its activities over the life of the project as well as environmental contract specifications. The EPP and the contract specifications are an integral part of the environmental management program. The EPP will be reviewed and adjusted if necessary to address the conditions of the Amherst project. In addition to the EPP, site or project specific environmental instructions will be provided in the form Environmental Control Plans (ECPs) where required. ECPs will be employed where the need for site-specific mitigative measures have been identified by Heritage Gas, the regulatory agencies, or through agreement with landowners.

### **4.7.3 Contingency Plans**

Heritage Gas has prepared environmental Contingency Plans as part of the EPP and its construction specifications. These address and provide direction on response to: discovery of cultural resources; discovery of contaminated materials; hazardous materials handling; and spill response.

### **4.7.4 Compliance Monitoring**

Compliance monitoring will conform with the Conditions of Approval and the commitments made in the registration. Throughout the life of the Heritage Gas project, construction/operations/ decommissioning will be undertaken in accordance with these as well as the EPP. The intent of which is to conduct operations in an environmentally responsible manner and in compliance with applicable laws and regulations, as well as standards and guidelines.

Compliance monitoring applies to project construction, operation, and decommissioning, including direct and indirect activities, and is typically completed by an environmental inspector. Typical compliance monitoring activities address construction issues specified in EPP and ECPs such as:



- buffer zones for clearing near sensitive areas;
- site drainage and sediment control;
- vegetation protection and mitigation;
- watercourse crossing techniques and compensation requirements; and,
- re-vegetation plans.

#### ***4.7.5 Environmental Coordination and Inspection***

The role of the Heritage Gas Environmental Coordinator is to ensure environmental commitments and conditions of approval are met and that work proceeds in compliance with environmental regulations, Heritage Gas policy, specifications, and requirements set out in the EPP, ECPs and Conditions of Approval. Where the environmental sensitivities of the site warrant specialized expertise, an Environmental Inspector will be onsite during all or portions of the construction to ensure that specified mitigative measures are implemented in a manner that minimizes potentially adverse environmental effects. On-site environmental inspection is anticipated during construction at watercourse crossings and in the vicinity of significant wetlands.

In addition to the Environmental Inspectors, Heritage Gas' Inspectors will be engaged in overseeing the construction or operation on-going at the time. At least one inspector will cover each spread or contract. The inspectors will be trained so that they understand the environmental protection requirements of the project, have knowledge of construction techniques, and ultimately, have the ability to integrate the two in the field.

It is the responsibility of the Environmental Inspector to bring to the immediate attention of the Environmental Coordinator, Heritage Gas, the Contractor and the appropriate regulatory authorities any activity that may cause negative environmental impact, or that may be in non-compliance with environmental requirements.

The Environmental Coordinator will take the necessary steps to recommend the immediate suspension or re-direction of any activity that could contravene environmental specifications or legislation. The Environmental Coordinator will have stop work authority (outlined in Section 2.8).

The Environmental Coordinator and Environmental Inspectors' duties and responsibilities include:

- provide day-to-day guidance to the contractor and all construction personnel regarding compliance with environmental legislation, regulations and industry standards;
- provide day-to-day guidance to the contractor and all construction personnel regarding adherence to environmental specifications and commitments made to landowners, regulatory agencies and in the environmental assessment report. This entails the provision of recommendations about protection and mitigative measures with respect to the following:

- vegetation, including ground cover, trees and shrubs;
- topsoil;
- water crossings and aquatic life;
- waste handling and spill response;
- wildlife and habitat protection;
- drainage;
- clean-up;
- erosion control and slope stabilization; and,
- seed and fertilizer mixes.
- file reports with Heritage Gas which document the environmental conditions encountered, environmental concerns, and response and mitigation measures implemented;
- liaise with specialists such as the cultural resources monitor, when applicable;
- provide advice during changing weather conditions and how these conditions may affect the success of mitigative measures, such as during unusually wet weather or during conditions of early ground frost;
- assist in implementing environmental contingency plans, as required;
- coordinate any water and soil sampling, or field research on any special environmental conditions relating to the construction, if required;
- act as liaison with Environmental Regulators, Government agencies and environmental interest groups:
  - advise on construction progress so interested agencies or groups can schedule their field visits appropriately;
  - explain Heritage Gas' environmental practices and procedures in order to ensure understanding of the project; and,
- landowner and community relations:
  - discuss topsoil salvage and clean-up procedures or other environmental issues arising during construction.

#### **4.7.6 Post-Construction Environmental Effects Monitoring**

Following the completion of construction in a given area, an environmental effects monitoring program may be conducted (either self-directed or required by Conditions of Approval) to assess the effectiveness of mitigation measures in alleviating project impacts. Post-construction monitoring provides a mechanism for evaluating whether environmental protection and mitigation measures have been successful in attaining the goals of environmental protection. Additionally, post-construction monitoring can provide feedback that can be integrated into future environmental planning and management. Where applicable, post-construction monitoring programs will be implemented for terrestrial and aquatic construction activities. These are described in the following two sections.

#### **4.7.6.1 Terrestrial Construction**

The objective of the post-construction monitoring program for terrestrial construction is to determine that lands disturbed by the project have been successfully restored following the completion of construction. Monitoring will include the easements, as well as other areas affected by construction activities, such as access roads. Monitoring indicators should be easily measured and should be selected to optimize the detection of potential or actual change. For example, indicators may include the survival of planted trees and shrubs. Inspection will be completed over one complete growing season following the completion of construction.

To evaluate the effectiveness of landscape restoration and access controls, visual examination of affected areas will determine trends in recovery and identify areas requiring further investigation or additional restoration. Simple measures of re-vegetation success, tree and shrub planting viability, evidence of subsidence, and the effectiveness of sediment and erosion control measures will be noted.

#### **4.7.6.2 Aquatic Construction**

A post-construction monitoring program may be implemented in select locations for watercourse crossings to determine whether aquatic components of the environment disturbed by construction are returned to their original condition. The monitoring program design will be based on specified watercourse crossing objectives and terms of authorizations, conditions of approval or agreements identified by regulatory agencies, and may include in-stream and riparian areas affected by construction. Post-construction monitoring may be undertaken to:

- confirm that specific crossing objectives have been achieved;
- confirm the effectiveness of environmental protection at certain sites;
- observe actual effects of construction and restoration at, and downstream of, the site;
- observe indicators of recovery including physical, chemical and biological parameters;
- determine the need for supplementary maintenance and/or mitigative measures to achieve objectives; and,
- fulfill mitigation and compensation requirements.

Post-construction monitoring requirements will vary with the significance and sensitivity of the watercourse affected by construction and with crossing methods employed. Typical post-construction monitoring programs for larger watercourses may last for one year and involve periodic monitoring of physical stability, water quality, aquatic habitat recovery, and the repopulation of the affected area by aquatic biota. Typically, measurements of pre-defined habitat parameters are evaluated. Measures of physical stability can include evidence of erosion, slumping, tension cracks, movement of in stream structures, bed material changes, debris accumulation, and changes in sediment transport and deposition and visual indicators of habitat quality. Riparian vegetation can be evaluated based on survival and aerial

coverage. Typical water quality parameters included in post-construction monitoring programs include measurements of total suspended solids, dissolved oxygen, water temperature, pH and conductivity. Control sites, located upstream of the pipeline crossing, may be considered to address natural ambient factors affecting the construction site, and to provide a means for comparison.

## References

- Agriculture and Agri-Foods Canada. Soil Survey Data for Nova Scotia – Cumberland County
- Beanland, G. and Duinker, P. 1983. *An Ecological Framework for Environmental Impact Assessment in Canada*. Institute for Resource and Environmental Studies. Dalhousie University, 132 pp.
- Canadian Environmental Assessment Act* S.C. 1992, c-37
- Canadian Migratory Birds Convention Act* S.C., 1994 c.22
- Canadian Standards Association. CSA Z662-03: Oil and Gas Pipeline Systems.
- Crown Lands Act*. R.S., c. 114, s. 1.
- Davis, D and Browne, S (Eds.) 1996. *The Natural History of Nova Scotia*. Halifax. Nimbus Publishing and The Nova Scotia Museum.
- Dangerous Goods Transportation Act*. R.S., c. 119, s. 1
- Erskine, A.J. 1992. *Atlas of Breeding Birds of the Maritime Provinces*. Nimbus Publishing and The Nova Scotia Museum.
- Environment Act*. 1994-95, c. 1, s. 1.
- Environmental Assessment Regulations, N.S. Reg. 44/2003 (February 28, 2003)
- Fisheries Act* S.C., 1985 c. F-14
- Fisheries and Oceans Canada. 1998. *Guidelines for Use of Explosives In or Near Canadian Fisheries Waters*. Canadian Technical Report of Fisheries and Aquatic Sciences 2107
- Gas Distribution Act*. 1997, c. 4, s. 1.
- Maritimes & Northeast Pipeline *Public Notice and Route Maps*, March 1998 (1:50,000)
- Maritimes & Northeast Pipeline *Constraint Mapping, Environmental and Socio-Economic Assessment*, September 1996
- McBeath, G., Black, M., and Rose P. (TUNS). March 1998. The Hydrogeology of Mainland Nova Scotia.
- Nova Scotia Department of the Environment. 1995. Wetlands Directive.
- Nova Scotia Department of Environment and Labour. Nova Scotia Watersheds Digital Map
- Nova Scotia Department of Environment and Labour. 2002. Well Log Database.

Nova Scotia Department of Environment and Labour. 2001. Pump Test Database.

Nova Scotia Department of Natural Resources. Forestry Database

Nova Scotia Department of Natural Resources. Geological Map of the Province of Nova Scotia. (ME 2000-1)

Nova Scotia Department of Natural Resources. Restricted and Limited Use Land Database

Nova Scotia Department of Natural Resources. Significant Wildlife Habitats Database

Nova Scotia Department of Natural Resources. Wetlands Database

Nowland, J.L. and MacDougall, J. I. 1973. *Soils of Cumberland County Nova Scotia*. Canada Department of Agriculture.

*Occupational Health and Safety Act*. 1996, c. 7, s. 1.

*Pipeline Act*. R.S., c. 345, s. 1.

Porter Dillon. November 1990. Groundwater Management Plan and Protection Strategy, Town of Amherst, North Tyndal Road.

Pronych, A. and Wilson, A. 1993. *Rare Vascular Plants Atlas for Nova Scotia*. Nova Scotia Museum curatorial report.

*Public Highways Act* R.S., c. 371, s. 1.

Service Nova Scotia and Municipal Relations. 1:10,000 Digital Topographic Series

Service Nova Scotia and Municipal Relations. Digital Property Series

*Special Places Protection Act*. R.S., c. 438, s. 1.

*Sulfide Bearing Material Disposal Regulations* NS Reg. 57/97 (April 11, 95) Nova Scotia.

**Personal Communications**

Hall, Ross. NSDNR Regional Biologist.