Title: **Mainline and BC System Environmental Design Standard**		Document Type: Standard
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PURPOSE

The purpose of this Standard is to provide internal resources with an understanding of TransCanada's environmental protection planning processes and decision-making frameworks. Other goals include:

- Guidance for those doing environmental assessment for TransCanada projects;
- Documenting the program for the HSE Management System;
- Facilitating legislative compliance and efficient application review, therefore minimizing business risk and liability; and,
- Addressing the need to consistently and cost-effectively apply TransCanada's environmental protection planning processes.

SCOPE

This Standard applies to TransCanada projects on the Mainline and BC System requiring an environmental assessment. For projects on the Alberta System see *"Conservation and Reclamation Standard"* (April 1999). An environmental professional will determine the specifics of the environmental assessment.

BRIEF DESCRIPTION OF CHANGE (IF A REVISION)

This is a new document.

List of Tables

List of Figures

1.0 INTRODUCTION

The Environmental Design Standard (EDS) outlines TransCanada PipeLines Limited's (TransCanada) decision-making processes during the environmental design, implementation and monitoring phases of a project. A "project" for the purposes of the EDS is defined as "any proposed construction, maintenance, decommissioning, or abandonment of TransCanada's pipeline facilities which has the potential to affect the environment". An environmental professional will determine the degree to which specific sections will apply.

The overall approach to environmental design is aligned with TransCanada's Health, Safety & Environment Management System (HSEMS), as is demonstrated under section 1.2 HSE Management System Overview.

TransCanada ensures all of its projects comply with the appropriate and current legislative requirements. A listing of relevant legislative requirements for the environmental design phases of TransCanada's projects is provided under section 1.3 Regulatory Overview. TransCanada recognizes that legislation often undergoes revision and update and the contents of this section will be revised as part of the regular revision process. However, the current version of all applicable legislation must be considered for each project.

TransCanada's mitigative measures objectives are outlined in section 5.1 Environmental Protection Plan (EPP). These objectives form the basis upon which a project-specific environmental protection plan is developed.

The document is structured to follow TransCanada's approach to environmental design and protection planning for each project. That is, the document describes the following steps: description of the proposed project; issue scoping; analysis of potential environmental effects; development of mitigation; assessment of residual and cumulative effects and determination of significance (when required); implementation and monitoring of the design; and, post-implementation assessments. The degree to which each step is undertaken varies depending on the scope of the project and environmental issues and the particular life stage of the facility (e.g., new, operating, abandoned).

Within this framework, each section is broken down into more detailed sub-sections. Each sub-section (excepting the management system sections 1.1, 1.2, and 1.3) has the following structure:

PHILOSOPHY:

Describes the basis, that is, the concepts and/or beliefs, supporting TransCanada's environmental design criteria.

SCOPE:

This document only applies to TransCanada's facilities on the Mainline or in British Columbia. For comparative guidance applicable to the Alberta System, see the *"Conservation and Reclamation Standard"* (April 1999) ("C&R Standard"). Further, the document only applies to projects, as defined above, where the proposed construction, maintenance, decommissioning, or abandonment of TransCanada's facilities have the potential to affect the environment based on the review by the environmental professional.

TransCanada's facilities include pipeline, compressor stations, meter stations, and other related facilities (e.g. valves, sales taps, and cathodic protection). Each of these facilities can be in one of the following states: "existing"; "new"; or, "expansion". The phase of the facility can be described as "construction", "operation", "decommissioning", or "abandonment". The scope will provide an explanation of when the process applies to TransCanada's projects.

It is important to note that the level of detail of the environmental assessment is intended to correspond to the magnitude and nature of the project.

PROCESS:

Provides the series of actions or operations necessary for the environmental design of TransCanada's projects.

ROLES AND RESPONSIBILITIES:

Lists the individuals or teams responsible for actions within the Process. The roles include:

- Environmental Advisor
- Environmental Consultant
- Environmental Inspector
- Regulatory Co-ordinator
- System Design
- Engineering
- Contractor (construction - external)
- Management
- Project Manager
- Legal Counsel
- Construction Manager
- Land, Community, Aboriginal (LCA) Representative
- Project Team (all roles, excluding Contractor)

1.1. TRANSCANADA HEALTH, SAFETY AND ENVIRONMENT COMMITMENT

The executive leadership team, management and employees at TransCanada are committed to being an industry leader in health, safety and environmental practices, to maintaining a safe and healthy workplace and to protecting environmental quality. We believe excellence in Health, Safety and Environment practices is vital to the well being of all people everywhere and essential to all aspects of our global business.

The following principles will guide and measure our corporate goals and objectives in Health, Safety and Environment:

- We conduct our business so it meets or exceeds all applicable laws and regulations and minimizes risk to our employees, the public and the environment;
- We are committed to continuously improving our Health, Safety and Environment performance;
- We will continually promote employee safety on and off the job;
- We believe all occupational injuries and illnesses are preventable;
- We will respect the diverse environments and cultures in which we operate;
- We will endeavour to do business with companies and contractors which share our expectations for Health, Safety and Environment performance and commitment and we will regularly assess their performance;
- We will use our influence with companies in which we have partial ownership, to meet the Health, Safety and Environment Commitment of TransCanada, and
- We support open communication between TransCanada, the public, the scientific community and policy makers and public interest groups who research, develop and implement standards for Health, Safety and Environmental protection.

At TransCanada
we believe all employees are responsible and accountable
for Health, Safety and Environment Performance.

As endorsed by TransCanada's Operations Committee, January 2003

1.2. HS&E MANAGEMENT SYSTEM OVERVIEW

An HS&E Management System is an integral part of a business management system which enables a company to work towards defined Health, Safety and Environmental expectations and objectives.

The intent of developing and implementing the HS&E Management System in TransCanada is to:

- Provide methods to control and facilitate the improvement of critical HS&E work performed, manage associated risk, and permit the demonstrable achievement of measurable objectives and targets.
- Set an effective, well-defined structure that emphasizes the importance of HS&E impact prevention and continuous improvement, rather than detection and reaction.
- Establish structure and organization for integrating TransCanada's HS&E Commitment into daily business activities, ensuring compliance with all regulatory and other requirements.
- Establish a framework for the management of HS&E issues.

Since TransCanada's facilities are located in various geographic regions and regulatory jurisdictions within North America, TransCanada must meet a broad range of external regulatory constraints, while meeting TransCanada's internal HS&E commitments and requirements. The Management System document provides the framework for meeting the minimum acceptable level of performing activities and addressing issues that are related to HS&E activities. The requirements outlined in the Management System document stem from TransCanada's HS&E Commitment Statement and are designed to ensure TransCanada's businesses are among the leaders in HS&E management in their respective industries.

The TransCanada HS&E Management System applies to all facilities wholly owned and operated by TransCanada. TransCanada will also influence and select its partners to ensure the philosophy of the HS&E Management System is embedded in all of their business endeavours.

Each employee of TransCanada is responsible for the implementation and success of the HS&E Management System. All employees are responsible and accountable for health, safety and environment performance.

1.2.1. ALIGNMENT OF EDS TO HS&E MANAGEMENT SYSTEM

The Environmental Design Standard (EDS) is just one component of the HSE Management System. However, the EDS is also structured as a management system with its approach to identifying, understanding, and assessing environmental risks, developing plans to mitigate those environmental risks, and monitoring the mitigation. The elements of the HSE Management System are briefly described below and the alignment of the EDS to those elements is described.

Table 1: Alignment of the Environmental Design Standard to the HSE Management System.

Step / Activity /Process	EDS Alignment
Element 1: HSE Policy	
The TransCanada HS&E Commitment Statement will: • Have a universal application to all TransCanada businesses jurisdictions; • Include a firm commitment to comply with all applicable regulatory and industry requirements, to continual HS&E improvement, and to pollution prevention; • Provide a framework for setting and reviewing HS&E objectives and targets; • Be endorsed by leaders with executive responsibility; • Be available to all employees, partners, contractors and the public.	• The HSE Commitment statement is included in the document. • This statement provides the overall goals for this document. • The review process for the document includes leader review. • Available to employees on TransCanada's EDMS (Electronic Document Management System) and can be readily made available to employees, contractors and the public.
Element 2: Structure and Responsibility	
Structure and Responsibility ensures: • Specific HS&E roles and responsibilities, including accountability for the maintenance of the HS&E Management System, are defined, documented, and communicated throughout the organization; • Appropriate resources, essential for the establishment, implementation, maintenance, and continuous improvement of the HS&E Management System, are provided.	• Roles and responsibilities are outlined in each section of the document as well as in section 14.0. • Training and awareness needs and processes are identified in the document (section 7.2)
Element 3: Risk Assessment & Management	
Risk Assessment & Management will: • Enable the identification and evaluation of HS&E risks essential to prioritize HS&E activities, to mitigate HS&E exposure, and to provide direction toward continuous improvement in a cost effective manner; • Enable the identification and prioritization of risks provide the basis for developing objectives and targets, as well as programs to achieve them; • Establish procedures to identify and document HS&E aspects and determine which have significant impact on the environment and the health and safety of employees, contractors and the community; • Establish procedures to identify and have access to legal and other requirements applicable to TransCanada operations. Process: 1. Identify impacts of business activities 2. Evaluate risk of business activity	The overall purpose of the EDS is to manage potential risks to the environment. Some specific areas with the document that address this include, but are not limited to: • The Environmental Design Overview (section 1.4) describes TransCanada's environmental design process, which includes environmental assessment. • Sections 4.0 and 6.0 describe the processes to assess the potential environmental impacts from TransCanada's proposed activities and to determine the significance of any residual and / or cumulative effects. • The Regulatory Overview section (1.3) provides an overview of relevant legislative requirements as understood to date. • TransCanada tracks regulatory and stakeholder requirements using an "Environmental Commitments Tracking List" as described in section 7.1.

Step / Activity /Process	EDS Alignment
3. Determine legal requirements	
Element 4: Objectives and Targets	
The development and monitoring of objectives and targets, provides a foundation to communicate TransCanada's commitment to HS&E, as well as a process to monitor progress in achieving the commitment as part of the continuous improvement cycle. TransCanada will: • Establish and monitor documented HS&E objectives and targets, consistent with the management of HS&E aspects and achievement of the HS&E Policy; • Utilize performance data as the basis for continuous improvement efforts.	Objectives and Targets: • are set in the mitigation plans for a project (1.0) • implemented and monitored during construction (7.0) and after construction (8.0) • may be very specific (e.g. x% revegetation by x date) or very general (e.g. no net loss) Performance Measurement: • see section 8.2.
Element 5: Operational Control	
• TransCanada business activities that are well managed will prevent negative HS&E and business consequences. • Operational controls provide a consistent and agreed upon approach to managing TransCanada business activities which have the potential to impact health, safety or the environment. TransCanada Operational Controls define and document: • HS&E programs and procedures to mitigate and manage risk and to achieve defined objectives and targets; • Designated specific responsibilities for development and implementation of HS&E programs and procedures at each relative function and level; • Where the absence of procedures may contribute towards a detrimental effect on the health and safety of employees, contractors, the facility, or the environment; • Testing procedures including the testing of air emission, waste water, and waste generation equipment; • Design criteria for new facilities or improvements to existing facilities (design criteria are evaluated from an environmental, health, and safety perspective before approved and implemented); • Changes in personnel, the facility (all phases of the facility including decommissioning), or regulatory requirements. All changes take into consideration the environmental, health, and safety impacts before approved and implemented;	The purpose of the EDS is to provide a consistent and agreed upon approach to environmental design and protection planning. The EDS provides the following for Operational Control: • Processes to manage and mitigate environmental risks and potential effects from the development and maintenance of TransCanada's facilities; • Roles and responsibilities for ensuring environmental protection plans are implemented; • The identification and analysis of potential environmental effects and an assessment of residual and cumulative effects; • Approach to baseline studies and monitoring; • Process for environmental design for new or existing facilities; • Development and awareness of environmental protection plans; and, • A process to ensure that employees and contractors are aware of commitments.

Step / Activity /Process	EDS Alignment
• The acquisition or divestiture of a facility, or part of a facility, ensuring health, safety, and environmental Requirements are taken into account and evaluated before transactions have been completed; • Employee and contractor awareness and their understanding of the impact of deviation from defined controls; • Employee and contractor commitments to ensure defined controls are followed.	
Element 6: Contractor Management	
TransCanada Contractor Management ensures: • HS&E criteria is used in the selection of goods or contractor services; • Contractor HS&E expectations and performance objectives are included within the contract document; • Contractor performance is monitored and measured for the purpose of evaluating the continuation of existing or future contracts; • Inability to meet contractor HS&E expectations or performance objectives will be rectified through agreed upon, and implemented, corrective or preventive action plans.	• TransCanada ensures its Environmental Inspectors are competent and trained (see section 7.2 and 7.3) • The environmental protection plans form part of the reference materials in the contract for the construction contractor. • TransCanada provides a clear scope of work and expectations to its Contractors (section 7.3) • Pre-job meetings provide an interactive opportunity to discuss expectations and responsibilities. • The Environmental Commitments and Tracking Lists (ECTL) and Environmental Issues Lists (EIL) provide details on commitments to be met (7.1). • Post-job meetings provide an opportunity to discuss performance.
Element 7: Emergency Preparedness and Response	
Emergency Preparedness & Response ensures: • An emergency preparedness and response plan is in place that meets or exceeds regulatory and company requirements; • The plan is tested, reviewed and revised on a regular and scheduled basis; • Employees and contractors receive training on the plan; • Resources are identified and available to implement the plan	TransCanada has a detailed “Emergency Preparedness and Response Program” which is referenced in the protection plans.
Element 8: Training and Awareness	
Training and Awareness ensures: • Appropriate training is identified and made available based on regulatory requirements; • Employees and contractors are appropriately trained, where business activities of the employee or contractor could have an impact on the health and safety of the employees, the community or the environment; • New employees or new employees to a site, including contractors, are provided with required knowledge, work programs, and procedures.	Refer to section 7.2, “Environmental Training and Awareness”.

Step / Activity /Process	EDS Alignment
Element 9: Documents and Records Management	
Document & Records Management will ensure: • Core elements of the HS&E Management System, appropriate to the nature and size of TransCanada, are identified, documented, and linked to related HS&E Management System documentation. HS&E documents and records that have a need to be controlled: • Are current, legible, dated, maintained in an organized fashion, protected against damage or loss, and available at all locations where HS&E operations are performed; • Are periodically reviewed, revised and approved by appropriate personnel; • Are removed if obsolete or, if required for legal and/or knowledge preservation purposes, are suitably archived.	Refer to section 8.3 “Document / Program Review” and 8.4, “Control of Records”.
Element 10: Communication and Reporting	
Communication and reporting ensures internal and external processes are established and maintained to: • Communicate performance objectives and results; • Communicate HS&E regulatory requirements; • Communicate general HS&E awareness items; • Manage public expectations and respond to inquiries. Key communications and reports are: • Endorsed by leaders with executive responsibility; • Available to all employees, contractors and, where appropriate, the public.	Internal and external communications occur throughout the environmental design process. Within each section of the EDS it is clear that stakeholder consultation is critical to achieving the end goal of environmental protection for TransCanada’s activities. Section 3.1, “Stakeholder Consultation”, specifically deals with the processes used for communications.
Element 11: HSE Performance, Audit and Review	

Step / Activity /Process	EDS Alignment
TransCanada Continuous Improvement procedures ensure: • Incidents and non-conformances are identified, documented and assessed for appropriate learnings to engage corrective and/or preventive action; • Regulatory and HS&E Management System requirements are regularly assessed through independent audit activities; • Operational and regulatory requirements are assessed through ongoing self assessments; • The achievement of objectives and targets are measured and evaluated indicating progress towards improved performance relative to Corporate and Business Unit goals; • Results of measurement, monitoring and performance evaluation are collected, documented and communicated to Senior Management to address the possible need for changes to the HS&E Management System, or corrective and preventive action.	TransCanada is continuously reviewing its practices and procedures to ensure its systems are operating efficiently and effectively. Within the environmental design and protection planning process, many different areas address continuous improvement, including: • Further to TransCanada's "Issue and Incident Tracking" procedure, there is an ECTL and EIL which enable the tracking and management of compliance to commitments that were made during the environmental design process (section 7.1). The ECTL and EIL facilitate the reporting of compliance to regulators (section 7.5). • As part of the review of the EDS, (section 8.3), the operational and regulatory requirements are reviewed and updated as required. • Environmental monitoring (section 7.4, 8.1) is used to measure performance of mitigative measures and support the process of continuous improvement. • Specific details around performance measurement are found in section 8.2.

1.3. REGULATORY OVERVIEW

The National Energy Board (NEB) Act, as well as applicable federal, provincial and local legislation, regulates TransCanada's Mainline and BC Systems. These regulatory requirements are reflected within TransCanada's policies, programs and procedures and are monitored on a regular basis to ensure that any changes are incorporated into the EDS during its review.

The following sections introduce the process that TransCanada follows to obtain NEB approval for proposed projects. Key federal and provincial legislation that is adhered to by TransCanada can be found in Sections 10.0and 11.0.

1.3.1. NATIONAL ENERGY BOARD

TransCanada's Mainline and BC Systems are subject to the requirements of the *National Energy Board Act* as administered by the National Energy Board (NEB). The NEB also has additional duties when fulfilling its role as a Responsible Authority under the *Canadian Environmental Assessment Act*. As part of its public interest mandate, the NEB ensures that any proposed projects will have minimal adverse environmental effects.

Depending on the nature and scope of the project, TransCanada may provide information on proposed projects to government agencies, interest groups, and the public, including landowners, early in the planning process, as outlined in the NEB's "Memorandum of Guidance on Early Public Notification". Early notification gives the public a chance to have meaningful input into project planning and development. TransCanada's stakeholder consultation process is outlined further in section 3.1.

TransCanada must obtain approval from the NEB before carrying out any construction on its Mainline or BC Systems. The NEB may issue such approval either by way of a Certificate of Public Convenience and Necessity (granted under section 52 of the NEB Act) or by issuing an Order pursuant to section 58 of the NEB Act depending on the scope of the project. Both a Certificate and an Order give general authorization for the project. In addition, the NEB has issued "blanket" section 58 approval for certain projects as described in the Streamlining Order (XG/XO-100-2002). If a project meets all of the requirements of the Streamlining Order, a separate application need not be filed with the NEB before proceeding with the project. TransCanada's application for either a s. 52 or s. 58 approval must contain certain information as required by Part VII of the NEB's *"Guidelines for Filing Requirements"* (GFFR), including:

- An Environmental Assessment (EA);
- A Socio-Economic Impact Assessment (SEIA); and,
- A Heritage Resources Impact Assessment (HRIA).

It is important to note that the level of detail in the above-noted assessments and applications is intended to correspond to the magnitude and nature of the project.

The EA includes:

- An assessment of the environment.
- Identification and assessment of any potential short and long-term effects from the proposed project.
- An assessment of any environmental issues requiring individual attention.
- Environmental protection, reclamation and mitigation procedures that indicate how the potential environmental effects will be addressed to eliminate or reduce potential project impacts.
- A description of the programs that will be used to monitor the success of the environmental procedures.

Section 6.0 describes how the EA report comes together with the assessment of residual and cumulative effects and the determination of significance. The SEIA is briefly described under section 4.2 and the HRIA is described under section 4.1.8.

The NEB will review TransCanada's application in the context of the requirements outlined in the *National Energy Board Act*, the *Onshore Pipeline Regulations* (1999), and the GFFR, to ensure that all requirements have been addressed in the application. Where more information is required, the NEB will send formal or informal "Information Requests" (IR's) to TransCanada requesting the missing information.

In a Section 52 process, once the NEB is satisfied that all the necessary information has been provided, a date for a public hearing is set. A section 58 Application may also require a hearing if deemed necessary by the NEB. In instances, certain applications, such as routine maintenance programs, may be authorized without a public hearing. TransCanada announces the hearing in newspapers and explains how interested parties may participate in the hearing process.

Following the IR and / or hearing process, the NEB makes its decision whether or not to approve the project. If approval is granted, TransCanada will move to the implementation phase of the approved project.

1.3.2. CANADIAN ENVIRONMENTAL ASSESSMENT ACT

The *Canadian Environmental Assessment Act* (CEAA) provides the process for environmental assessment of projects requiring a federal approval or authorization, such as NEB-regulated projects. CEAA may also apply to other projects that may not require NEB approval but do require approval by other federal agencies such as Fisheries and Oceans Canada (e.g., a s. 35(2) Authorization under the *Fisheries Act*).

When CEAA applies, an environmental assessment (EA) under CEAA must be completed before any action to enable a project to proceed, can be taken under the NEB Act. Both the requirements of the NEB and those of CEAA need to be addressed by TransCanada on projects that require a s. 52 or s. 58 approval under the *National Energy Board Act*.

The federal authority that exercises or performs certain powers, duties, or functions in relation to a project is known as the Responsible Authority and is responsible to ensure an EA is conducted. For example, the NEB is the Responsible Authority for those TransCanada projects requiring a NEB s. 52 or 58 approval.

The overall CEAA process is outlined in Figure 1. The majority of TransCanada's projects that require an EA under CEAA will initially undergo a screening; some projects may require a comprehensive study or panel review. Both of these types of EA can be considered "self-directed". The process to undertake a self-directed EA is outlined in Figure 2. More information on the EA process under CEAA can be found in "The Canadian Environmental Assessment Act: Responsible Authority's Guide" (CEAA, 1994).

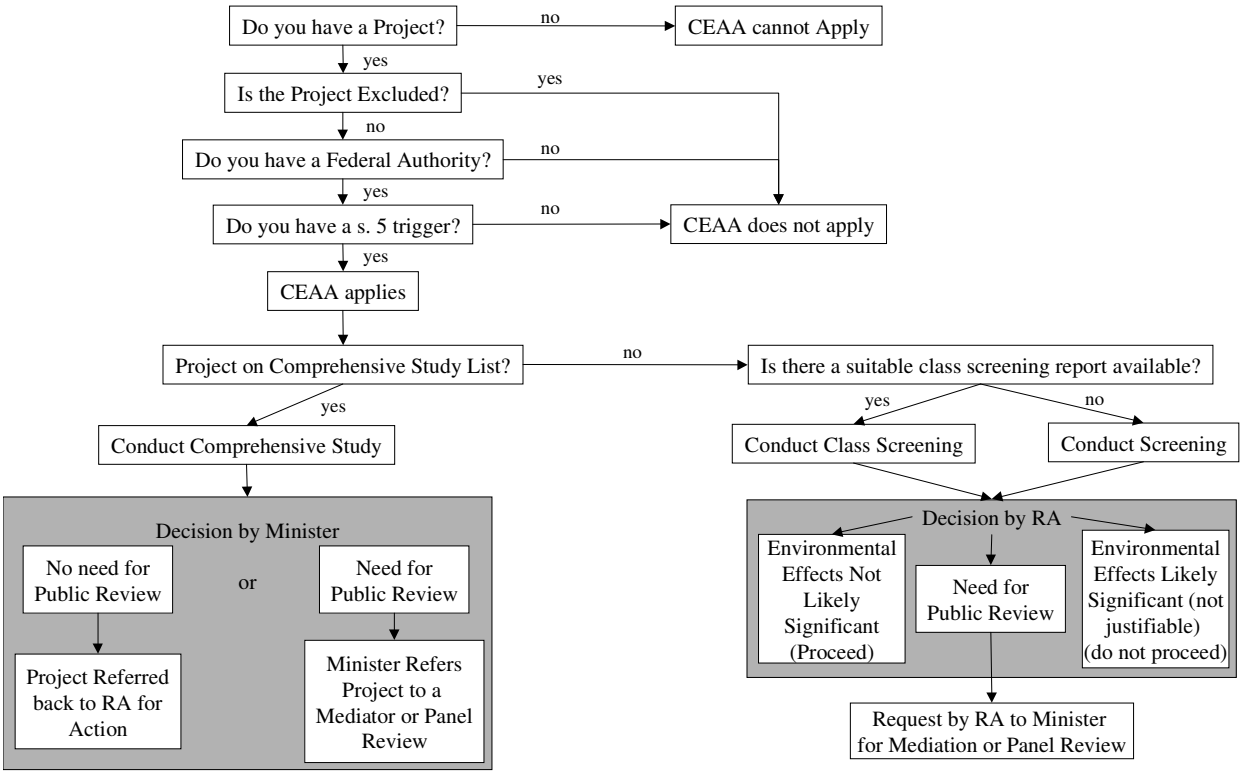

Figure 1: Overview of EA process under the *Canadian Environmental Assessment Act* (CEAA) (adapted from CEAA, 1994).

1.3.2.1. SCREENING

A screening under CEAA is the most common type of EA that applies to TransCanada's projects. The complexity of the screening will vary depending on the "scope of the project" and associated "scope of the assessment". The "scope of project" is defined under CEAA as "*those components of the proposed development that should be considered part of the project for the purposes of the EA*". The "scope of the assessment" is defined under CEAA as "*a determination of: the environmental effects to be addressed; the scope of the environmental effects to be assessed; and the effects to be considered in making decisions regarding the project*" (CEAA, 1994).

The "Project" is defined to mean physical works and undertakings, undertakings in relation to physical works and activities not in relations to physical works if that activity is of a type listed by the *Inclusion List Regulation*. Where a project is a physical work, s.15(3) of CEAA requires that the assessment include *"every construction, operation, modification, decommissioning, abandonment or other undertaking in relation to that physical work that is proposed by the proponent or is likely to be carried out in relation to that physical work"*.

If CEAA applies, an EA must be completed and a decision made by the responsible authority before any other action may be taken, or a decision made, pursuant to other legislation. The NEB, as a Responsible Authority (RA) within the meaning of CEAA, must completely consider the EA and reach a decision with respect to the Project under CEAA before it can turn to its own regulatory process.

As outlined in Figure 1, the RA must refer the project to the Minister for panel review or mediation if the following determination is made: (a) the project is likely to result in significant adverse effects notwithstanding mitigation, (b) the likelihood of significant adverse effects is uncertain, or (c) public concern warrants further review.

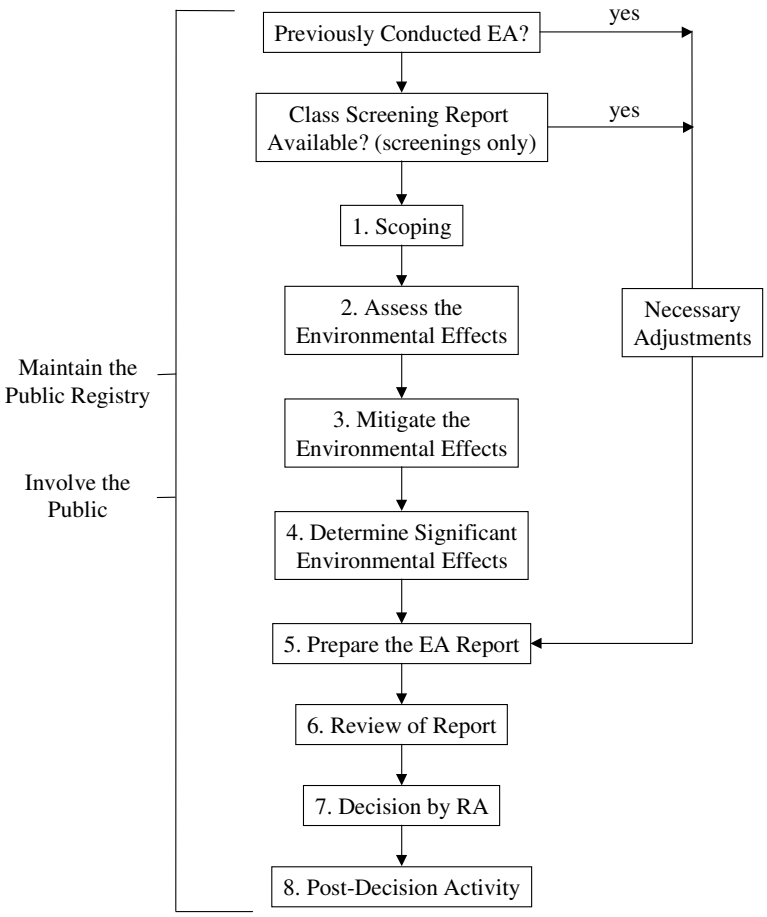

Figure 2: Key steps of the self-directed Environmental Assessment (EA) (CEAA, 1994).

1.3.2.2. COMPREHENSIVE STUDY, PANEL REVIEW, OR MEDIATION

Under CEAA the Minister of Environment receives and reviews a comprehensive study and Cabinet receives and reviews a panel report. The process is outlined in Figure 1.

If, following a comprehensive study, it appears that, (a) the project is likely to result in significant adverse environmental effects, notwithstanding mitigation, (b) it is uncertain whether, notwithstanding mitigation, the project is likely to result in significant adverse environmental impacts, or (c) public concern warrants further review, the project must be referred for review by a panel or mediation.

A comprehensive study is required for those projects of a type on the *Comprehensive Study List Regulation*. For example, pipelines that are either (a) 75 km or more on a new right of way or (b) an offshore pipeline, are on the *Comprehensive Study List Regulation*. A project of a type on the *Comprehensive Study List Regulation* can either be referred for preparation of a comprehensive study or can be immediately referred for panel review or mediation.

1.4. ENVIRONMENTAL DESIGN OVERVIEW

PHILOSOPHY:

The Environmental Design Standard (EDS) outlines TransCanada's environmental standard practices and mitigative measures that are undertaken when preparing and implementing an environmental design and protection plan for a project. The EDS explains TransCanada's decision-making processes during the environmental design, implementation and monitoring phases of a project. The following flow chart (Figure 3) provides the framework for both environmental design and the EDS.

SCOPE:

The EDS applies to all of TransCanada's projects that require an environmental assessment.

PROCESS:

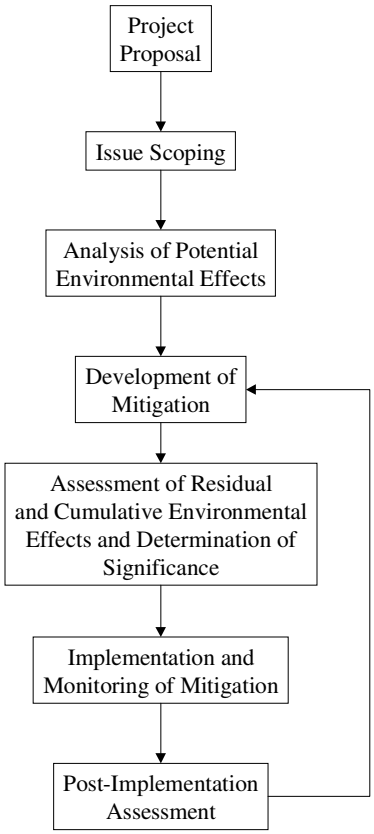

Figure 3: Overview of the environmental design and protection planning process.

A brief description of each of these components is provided below. Further details can be found in the according sections.

Project Proposal

This section describes the project proposal. That is, it defines the scope of a project, including: project description (including alternatives to and, where applicable, alternative means as described in *CEAA*); route / site selection; and, size of footprint / disturbance.

In operating its pipeline transmission system, TransCanada undertakes many projects, including the following activities: expansion; operation and maintenance; decommissioning; and, abandonment.

Issue Scoping

Issue scoping may involve the following activities:

- stakeholder consultation; and
- valued ecosystem component (VEC) selection.

Stakeholders, including Responsible Authorities (under CEAA), other regulatory authorities, aboriginal communities, landowners, and the public, are consulted and given the opportunity to participate in the issue scoping exercise through TransCanada's consultation process. However, the CEAA process includes a step where the RA will determine the scope of the assessment.

VECs, can be key indicator species, communities, special groups, ecosystems, or even pathways for transfer of environmental effects. VEC selection reflects issues identified in the consultation process and represents a means to obtain a focused analysis of potential environmental effects.

Analysis of Potential Environmental Effects

Environmental effects analysis is used to understand the potential for and degree of the pre-construction condition of the environment. The analysis begins with an understanding of the interactions between the proposed project and VECs. Environmental effects analysis outlines where and how the proposed project could potentially affect the identified VECs. Key activities undertaken when assessing potential environmental effects include:

- establishing study boundaries;
- undertaking baseline studies; and,
- analysis or consideration of potential project effects.

Baseline condition of VECs (biophysical and social) is used to determine the potential for environmental effects. Consideration is given to such VECs as: soil; vegetation / timber; wildlife; protected areas and land use; aquatic resources and hydrology; and, air. Other baseline studies include: heritage resources; noise; and, socio-economic (only with respect to its interactions with the environmental assessment).

Development of Mitigation

Once the potential environmental effects have been identified, appropriate mitigation measures are developed to minimize or eliminate the negative environmental effects and maximize the positive environmental effects. Mitigation refers to the design and protection strategies used to minimize or control adverse environmental effects. As part of its overall objective for environmental protection, TransCanada develops the following site-specific plans for its projects including:

- Environmental Protection Plan;
- Watercourse Crossing Plan;
- Contingency Plan; and,
- Reclamation Plan.

Inputs into these plans include the above issue scoping information, analysis of potential environmental effects, and the following:

- Regulatory conditions;
- Landowner Line Lists;
- Construction specifications;
- Environmental Programs, including:
  - Waste Management;
  - Brush Control;
  - Vegetation Management;
  - Environmental Noise Management; and,
  - Reclamation, and
- Emergency Response Program.

Assessment of Residual and Cumulative Effects and Determination of Significance

After the assessment of potential environmental effects has been made and appropriate mitigation assessed, the focus shifts to the assessment of residual and cumulative effects and the assigning of significance. Professional judgement and knowledge of pipeline construction and operation are critical throughout the entire assessment and is especially key in these final phases of the assessment.

The residual effects of a project are those effects that remain after mitigation. To assess cumulative effects from the proposed project, the past, present, and reasonably foreseeable future projects and activities within the boundaries of the assessment area of the proposed project must be identified and examined. The cumulative effect of these other projects and activities on the VECs, and the possible additive effect of the proposed project are considered.

In the assessment of significance, the residual and cumulative effects are assigned a rating of significance for each proposed project. A significant effect is judged to be one that is of sufficient magnitude, duration, frequency, geographic extent, and reversibility to alter the status or integrity of the VEC as defined by the significance rating criteria (CEAA, 1999).

Implementation and Monitoring of Mitigation

To ensure that the mitigation plans are implemented effectively, TransCanada informs key personnel of mitigation measures prior to construction (e.g., pre-job and tailgate meetings) and may also incorporate the environmental assessment and mitigation plans into the construction contract (when possible).

Further, TransCanada provides competent environmental inspection to oversee its activities and ensure mitigation measures are effectively implemented and adjusted where and when necessary (e.g., changing field conditions). Part of the environmental inspector's role is also to track the status of environmental commitments and issues (including regulatory and landowner) to make certain the commitments and issues are addressed.

Post-Implementation Assessment

TransCanada's Post-Construction Monitoring Program ensures compliance to specific post-construction and reclamation performance expectations and conditions outlined in any regulatory approvals and /or to specific clauses within TransCanada's current easement and lease agreements.

TransCanada reviews its mitigation measures and documents regularly to continually improve its practices. As such, the methodologies and measures described in this document, and the EDS itself, are reviewed and updated to provide the best measures available for environmental protection on its proposed projects. TransCanada requests feedback from its stakeholders, including landowners and regulators, when assessing its performance.

ROLES AND RESPONSIBILITIES:

As each of these activities is broken down into further detail in the following sections, the responsibilities will become better defined.

2.0 PROJECT PROPOSAL

This section describes the project proposal. That is, it defines the scope of a project, including: project description (including alternatives to and, where applicable alternative means as described in *CEAA*); route / site selection; and, size of footprint / disturbance.

In operating its pipeline transmission system, TransCanada undertakes many projects, including the following activities: expansion; operation and maintenance; decommissioning; and, abandonment.

TransCanada has over 38,000 km of pipelines and associated facilities in Canada, of which 14,000 km are under NEB jurisdiction. Facilities include pipelines, compressor stations, meter stations, and sales stations. Within Canada, TransCanada operates in British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, and Quebec. The Alberta facilities are regulated by the Alberta Energy and Utilities Board and will not be addressed in this document.

2.1. PROJECT SCOPE

PHILOSOPHY:

A "project" for the purposes of the EDS is defined as "any proposed construction, maintenance, decommissioning, or abandonment of TransCanada's pipeline facilities which has the potential to affect the environment". TransCanada applies the definition of "scope of the project" as defined in CEAA (1994): "*those components of the proposed development that should be considered part of the project for the purposes of the EA*". TransCanada scopes a project to encompass all associated activities that are related to the principal project. For example, if the principal project is the construction of a pipeline, there are other associated activities that may include metering, cathodic protection, and compression.

SCOPE:

The focus of this process is to determine the scope of the project as it relates to the environmental assessment. The description of the project should include:

- purpose (i.e., to transport sweet natural gas in a pipeline from specific receipt points to determined delivery points);
- location;
- physical layout and design;
- construction plans and scheduling;
- standard control procedures and mitigation measures; and
- operating procedures and decommissioning plans.

Some principal projects and associated activities include, but are not necessarily limited to:

New Construction / Expansion
- Pipeline Construction
- Meter Station, Sales Station Construction
- Compressor Station Construction
- Valve installation

Operations / Maintenance
- Planned Maintenance Program:
  - Investigative / SCC Digs (incl. Various repair techniques -- clock springs, sleeves)
  - Pipe replacements
  - Pipe stress relief
  - Shorted casings
  - Line lowerings
  - Electrical isolation
  - Hydrostatic re-testing
  - Launcher / receiver installations / modifications
- Cathodic Protection Program:
  - Coupon installation
  - Groundbed installation
  - Rectifier installation
- Inline Inspection

Decommissioning
- Site reclamation and / or remediation

Abandonment

- Removal of above ground appurtenances
- Possible removal of pipe sections
- Final reclamation

PROCESS:

The focus of this process is to determine the scope of the project as it relates to the environmental assessment. The process for scoping the project under CEAA is shown in Figure 4. The same process applies to determining the scope of TransCanada's projects even where an EA under *CEAA* is not required.

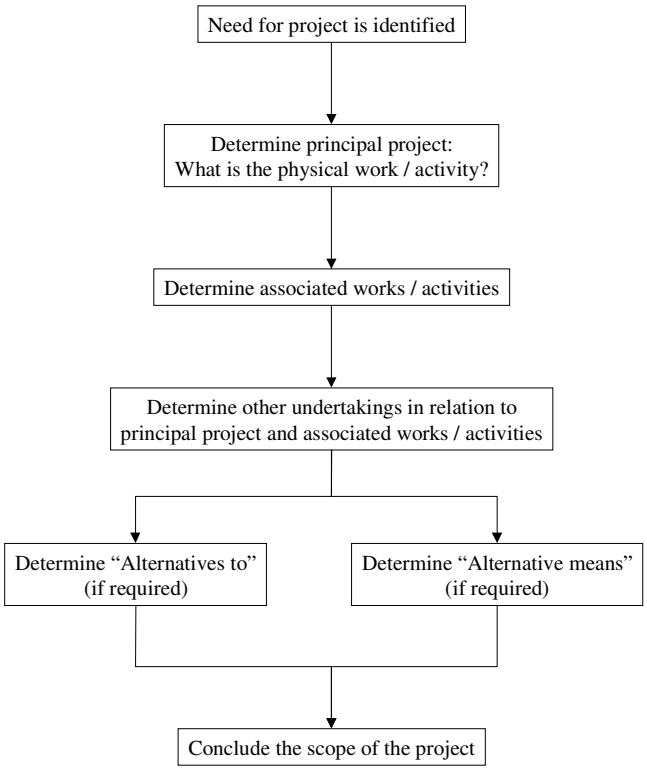

Figure 4: Determining the scope of a project.

It is critical that the project is scoped properly to ensure the environmental assessment is accurate and all-inclusive. Some points to consider in scoping the project include (CEAA, 1994):

- Which physical works fall within the scope of the project, and which undertakings in relation to those physical works fall within the scope of the project.
- Which physical activities not in relation to a physical work (identified in the *Inclusion List Regulation*) fall within the scope of the project.

- What is the "principal" project? The "principal" project is the undertaking in relation to a physical work or the physical activity for which there is a trigger under *CEAA*.
- What physical works or activities are "accessory" to the principal project?
- Case law.

Under CEAA, there are other considerations of the project scope that may need to be considered. "Alternative means" of carrying out the project and "alternatives to" the project may be required at the discretion of the RA for a screening or at the discretion of the Minister for a comprehensive study, mediation, or panel review.

"Alternative means" is defined as "*methods of a similar technical character or methods that are functionally the same*"(CEAA, 1994). For example, the alternative means of carrying out the construction of a new pipeline might be to add compression.

"Alternatives to" is defined as "*functionally different ways of achieving the same end*" (CEAA, 1994). For example, the alternatives to the construction of a new pipeline might be to conserve energy or reduce energy requirements.

ROLES & RESPONSIBILITIES:

The Project Team is responsible to determine:
- the need for project;
- the principal project;
- the associated works / activities;
- other undertakings in relation to the principal project and associated works / activities;
- alternatives to;
- alternative means; and
- the scope of the project.

2.2. ROUTE /SITE SELECTION

PHILOSOPHY:

When selecting a route or site for a TransCanada facility, TransCanada's objectives include minimizing the total route length, or footprint of the project, and the impacts to landowners, land users and the environment. TransCanada also needs to consider the project constructability of the route or site (i.e., with the current technology and technical requirements, can the facility be built within the route or on the site?).

TransCanada seeks to use existing corridors wherever possible. By using existing corridors, TransCanada allows for a potentially narrower right-of-way width of new disturbance. Following the same or an adjacent right-of-way can also have considerably less impact or reduced "cumulative impact" than establishing a new right-of-way.

TransCanada also seeks to expand existing compressor station sites and other facilities, rather than establishing new sites. However, this expansion is dependent on other factors such as, system efficiency and hydraulics, land availability, noise limitations, and airshed thresholds.

SCOPE:

Applies to all new facilities or facility expansions (pipeline and above-ground facilities).

PROCESS:

During the route /site selection process, TransCanada takes into account:

- project scope;
- constructability;
- biophysical and other environmental criteria determined through historical data and baseline studies;
- stakeholder input; and
- regulatory requirements.

Figure 5 demonstrates the process that TransCanada generally follows when selecting a route / site.

The scope of the project was previously defined in section 2.1. Scoping the project involves determining a preliminary route / site location. The scope of the project identifies whether the project is in a new location ("greenfield"), is looping existing linear facilities (pipeline), or is an expansion of an existing site. This information is then used to direct background and historical searches on possible constraints.

The considerations listed in Table 2 enable TransCanada to identify constraints and narrow the options for the routing corridor / site to facilitate more effective stakeholder consultation and baseline studies of a "preliminary route / site".

The process of determining a route that will be "applied for" is derived from a continuous loop of stakeholder consultation and baseline studies that further identify or resolve the constraints. Based on these consultations and baseline studies, a "preferred" route is chosen upon which the environmental assessment is undertaken. The "finalized" route / site is then determined based on the consultations and findings in the environmental assessment and subsequently applied for with the appropriate regulators.

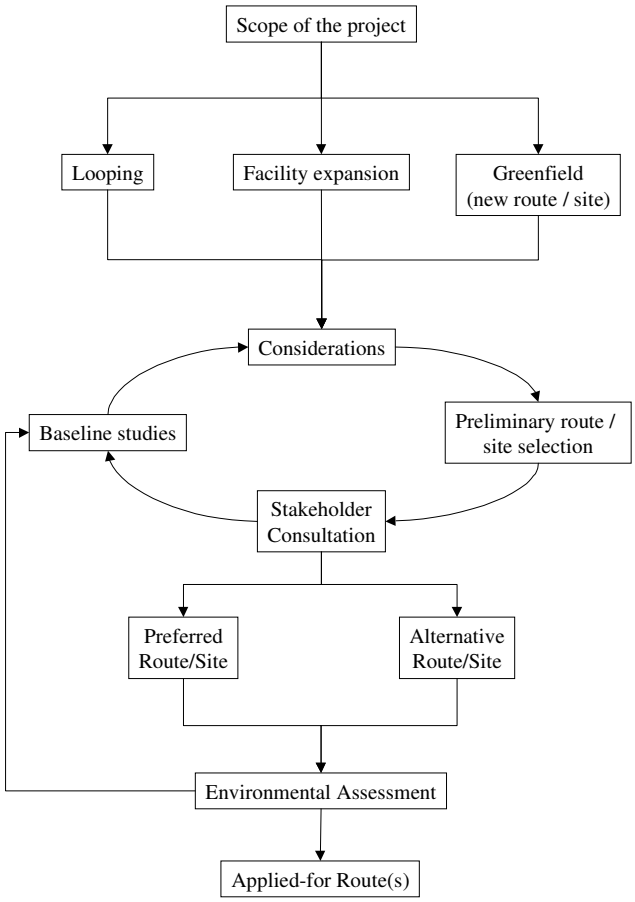

Figure 5: Route / site selection process.

Table 2: Routing and site selection considerations.

Constraint	Description
Location Boundaries	The tie-in points provided by TransCanada's System Design and by the construction limitations define the boundaries of the pipeline.
Terrain	• TransCanada assesses the geo-topography of the location boundaries and determines the shortest, driest, flattest route possessing the most stable and least-sensitive soils, as this minimizes the complexity of construction and generally reduces disturbance. • Route selection strives to mitigate terrain features such as side slopes, rocky areas, wetland areas, and water crossings. The analysis of these terrain features assists TransCanada in optimizing the constructability of the pipeline.
Land Use	• TransCanada attempts to choose a pipeline route or site that will minimize disturbance activities being carried out on the land and to the surrounding area. Consideration is given to existing and future land use(s). • Historical use of the land (e.g., industrial, oil well) should be considered and a determination of any potentially contaminated areas should be documented.
Protected Areas – Restricted Land Use	TransCanada evaluates protected areas and areas of restricted land use along a proposed route or site location. This evaluation identifies: • Potential conflicts between designated land uses and TransCanada's proposed

Constraint	Description
	pipeline routing or facility siting (e.g., multiple use of sensitive landscapes and environmentally significant sites). • Requirements for specific or special mitigative measures for the protection of wildlife resources and their habitat. • Stakeholder concerns associated with the proposed routing through protected and/or restricted areas (e.g., change within the habitat and parameters of specific valued ecosystem components).
Biophysical	When selecting the route or site, TransCanada considers the impact of the route on landforms, soils, water resources, vegetation, fisheries, wildlife, land use and the aesthetics. TransCanada examines each of these factors and evaluates them with respect to the recommended mitigative measures.
Crossings	The pipeline route alignment may cross under or over both natural and man made obstacles such as: • watercourses (e.g., creeks, drainages) • railways • roads • other pipelines • powerlines • water lines Whenever possible, new facilities are located/designed to either minimize or avoid environmental impact at these crossings. When a crossing is necessary, the best possible location is selected considering: • terrain • land use • safety considerations • pipeline corridors at the same crossing • regulatory requirements
Heritage Resources	Heritage resources include sites and artifacts of value for their paleontological, cultural, archaeological, or historic importance. TransCanada employs a qualified archaeologist to identify any heritage resources that would be affected by construction. If sites or artifacts are discovered during construction, all construction activities at that location cease until the proper authorities are notified and approval to proceed is granted.
Access	TransCanada considers the use of existing access to minimize interference with surrounding land use(s) when selecting a route or site. TransCanada prefers to locate valve sites at locations that are easily accessible by vehicle traffic to allow for regular operation and maintenance.
Construction Time Frame	The construction time frame is related to: • the required in-service date of the facility; • the terrain; and • wildlife / fisheries timing windows. TransCanada also considers the approximate timing of the construction phase as it is impacted by or has effects upon terrain, land use, environment, and cost factors. Construction timing is critical in the assessment of appropriate mitigation measures and the selection of the route or site.
Technical Limitations	Technical limitations include those related to engineering design and constructability. Such limitations could include: connections with existing gas lines, sales or purchase meter stations; future valve site locations; or, constructing another pipeline within an existing crowded, confined right-of-way.
Vegetation	Vegetation surveys are undertaken prior to construction where the potential for rare

Constraint	Description
	plants has been identified. Noteworthy plant associations or specimens are protected through a range of mitigative measures, including transplanting, narrowing the right-of-way, and carefully selecting compatible species for revegetation.
Wildlife	Impacts on important wildlife habitats or populations, including species at risk, are minimized by avoiding construction during sensitive life stages such as, migration, breeding, and nesting periods to the extent practicable. In waterfowl breeding or staging areas, original drainage configurations are reclaimed to maintain wetlands and sloughs. In locations with trapping areas, licensed trappers are notified of the construction schedule and locations are flagged where work will be taking place.
Special Land Uses	Special land use areas include airports, recreational areas, industrial parks, residential areas, and cemeteries. Where it is not feasible to avoid these sites, special arrangements are made with the owners or responsible authorities.
Future System Expansion	TransCanada also considers the possibility of future expansion of its system. If such a potential exists, TransCanada considers any constraints that may affect future looping of the pipeline or expansion of the site.
Costs	TransCanada endeavours to minimize costs consistent with prudent pipeline construction. If all other factors are determined to be equal, then the least expensive route, site, and / or construction technique will be chosen.

ROLES & RESPONSIBILITIES:

The Project Team is responsible to:

- identify constraints;
- determine the preliminary route / site selection;
- undertake stakeholder consultation;
- identify baseline studies;
- determine preferred and alternative routes / sites; and
- finalize applied-for route(s) or site(s).

2.3. RIGHT-OF-WAY WIDTH

PHILOSOPHY:

When determining right-of-way width, TransCanada takes into account environmental and stakeholder concerns, engineering design, and constructability. TransCanada has established a series of standard right-of-way widths that are used as a guideline for establishing safe rights-of-way that achieve this balance.

SCOPE:

All pipeline facilities.

PROCESS:

For each construction project, TransCanada determines the required construction right-of-way width by taking into account the following guidelines as well as these project-specific items:

- pipe size
- equipment needs
- access and constructability concerns
- construction season
- safety
- terrain
- land use
- environmental considerations
- grading and ditching requirements
- surface material/topsoil requirements
- existing right-of-ways

A right-of-way width could be reduced after construction, and the rights returned to the owners. This would allow for a narrower long-term footprint and possibly lessen potential effects of a corridor.

The following sections introduce the standard right-of-way widths that TransCanada uses for permanent and temporary rights-of-way. The following sections also provide an explanation of the key factors that are taken into account when determining the construction right-of-way area.

The standard right-of-way widths defined by TransCanada are for Nominal Pipe Size (NPS) 4– 48 inch pipe construction. The following tables (Table 3, Table 4, and Table 5) summarize TransCanada's recommended widths for base (typical requirement) construction right-of-way and temporary workspace.

Table 3: Typical Base Construction Right-of-way Widths

Pipe Size (inches/ millimetres)	RoW Width (metres)	RoW Width (metres)*	Spoil Side (metres)	Working Side (metres)	Working Side (metres)*
NPS 4 (114)	16		7	9	9
NPS 6 (168)	18		8	10	10
NPS 8 (219)	18		8	10	10
NPS 10 (273)	18		8	10	10
NPS 12 (324)	23		9	14	14
NPS 16 (406)	23		9	14	14
NPS 20 (508)	25	27	10	15	17
NPS 24 (610)	25	27	10	15	17
NPS 30 (762)	27	29	11	16	18
NPS 34 (864)	27	29	11	16	18
NPS 36 (914)	27	29	11	16	18
NPS 42 (1067)	32	34	12**	20	22
NPS 48 (1219)	32	34	12**	20	22

* Mechanized Welding
** Use a spacing of 10 metres from centreline ditch to centreline existing pipe when looping.

The need for additional temporary workspace is typically identified during the planning phase. The following tables outline the space requirements that TransCanada adheres to.

Table 4: Recommended Temporary Workspace Requirements - New Corridor

Activity	Allocation (metres)	Comments
Roads & Road Allowances	10m x 50m 15 m x 50m	Spoil side. Work side (both sides of road).
Secondary, Major Highways & Railroads	10m x 50m 15m x 50m	Spoil side. Work side (both sides of road).
Foreign Line Crossings	5m x 40m	Centered on the crossing on each side of the RoW.
Horizontal Deflections	5m x 40m	Centered on the bend on each side of the RoW.
Staging Area	variable	At or near the project kick-off location. Size and configuration are project specific.
Grading	variable	As required for the storage of material removed to ensure a level RoW.
Extra Depth	5m x 40m	On both sides of the RoW (as per STDS-03-ML-08-002).

Table 5: Recommended Temporary Workspace Requirements - Looping

Activity	Allocation (metres)	Comments
Roads & Road Allowances	20m x 35m	On either side of the road on the loop side of the RoW.
Secondary, Major Highways	20m x 50m	On either side of the crossing on the loop side of the RoW.

& Railroads		
Foreign Line Crossings	10m x 40m	Centered on the crossing on the loop side of the RoW.
Horizontal Deflections	5m x 40m	Centered on the bend on the loop side of the RoW.
Staging Area	Variable	At or near the project kick-off location. Size and configuration are project specific.
Grading	variable	As required for the storage of material removed to ensure a level RoW.
Extra Depth	10m x 40m	On loop side

The following right-of-way width factors (Table 6) are considered when determining the construction right-of-way width.

Table 6: Right-of-way width factors.

Factor	Considerations
Existing Right-Of-Way	• TransCanada attempts to make use of any existing utility, seismic or pipeline right-of-way corridor within the route selection area. This reduces the amount of clearing and land disturbance and, in the case of shared rights-of-way, allows for a narrower new right-of-way width by overlapping existing corridors. • TransCanada does require that any foreign right-of-way does not encroach within 5 m of the TransCanada pipeline.
Land Use	• TransCanada attempts to reduce right-of-way widths on native prairie areas to minimize disturbance. • On cultivated lands, TransCanada bases right-of-way configurations on construction needs and modifies the configurations accordingly. Extra temporary right-of-way may be taken to accommodate extra depth situations as well as excessive surface material depths (i.e., topsoil depths of 25 cm or more). • On forested lands, extra temporary workspace may be required on the workside and/or the spoil side of the right-of-way to accommodate the placement of duff and snow, vehicle turn- around, and timber decking sites.
Pipe Diameter	• Right-of-way width requirements increase or decrease according to the size of the pipe. • Larger diameter pipe requires a wider and deeper ditch, increasing the volume of associated ditch spoil, and therefore a wider right-of-way. • Pipe weight increases with diameter necessitating an increase in the size and quantity of equipment required for handling it.
Technology	Changes in technology also impact right-of-way width requirements. For example, the use of shacks for mechanized welding or modern side booms increases the width requirement for welding by up to two metres.
Workspace	The working side of the right-of-way must provide space for: • pipe lay-up area (e.g., stringing, welding, coating and storage, i.e., drag sections) • construction equipment • travel space to allow vehicular traffic to pass construction activities (e.g. emergency vehicles) • material storage (e.g., swamp weights, roll back) • storage of surface material, duff and snow Additional temporary workspace is also acquired by TransCanada as needed to accommodate: • storage of surface material/topsoil; • ditch spoil at crossings; • grade material;

Factor	Considerations
	• decking sites; and, • equipment and contractor staging areas, etc.
Grading	• The amount of grading required also increases with the diameter and weight of the pipe. Permanent and temporary right-of-way widths must allow for storage of the grading material. • Note that the typical right-of-way widths assume minimal grading.
Equipment Requirements	• The typical right-of-way widths TransCanada has established (except for NPS 42/48) assume stick welding will be used rather than mechanized welding. • Mechanized welding may require up to two metres more workside space than stick welding due to the equipment used for mechanized welding (e.g., welding shacks).
Surface Material/Topsoil and Spoil	The width of the right-of-way includes space for topsoil material storage and will vary depending on the depth of topsoils. Additional space may also be required to ensure separation between stored surface material/topsoil and spoil from ditches. The amount of additional space depends on many factors including the ditch size and volume of surface material. Additional workspace for surface material/topsoil and spoil can occur at: • open cut road crossings (deep ditch) • bored road crossings (deep ditch plus wider ditch for boring equipment and tie-ins) • water crossings (staging and deep ditch plus storage of material from watercourse) • areas requiring swamp weights (deep ditch plus wide ditch to accommodate the weights) • areas where steep or unstable slopes require grading • swampy or sandy areas which are prone to ditch sloughing • locations for specialty applications such as directionally drilled water crossings. • areas where additional depth of cover is also required for buoyancy control to allow for deep tillage, or other needs.
Access	• The condition and width of the right-of-way will be affected as road access becomes limited and the right-of-way is used more for construction vehicle access and travel. • Additional space for turnarounds may be required (e.g. for stringing trucks). • A narrowed construction right-of-way may require planned by-pass areas to ensure safe passage for equipment and emergency vehicles.
Looping	• TransCanada is often in the situation where it will "loop" its existing pipelines. That is, TransCanada will place a new pipeline parallel to an existing one, and thus can share some of the existing right-of-way and minimize the overall new disturbance. In this scenario, certain technical considerations need to be made, such as maintaining a safe distance between the two pipelines. • The distance between the centre of the new ditch and the centre of the existing pipe is typically 10 m, however, a number of factors (e.g., soil type and stability) need to be taken into consideration to determine final pipe separation for a project. The spoil side is typically between the existing pipe and the ditch. • Spoil and grade material can be stored on the existing right-of-way and over any existing operating pipelines. However, permission must be obtained for any operating pipelines not belonging to TransCanada. • If the work side is between the operating pipeline and the ditch, then a two-metre buffer is added between the edge of the construction right-of-way and the centreline of the existing line. This buffer is added to decrease the effects of ground pressure on the operating pipeline.

The example in Table 7 below illustrates the potential necessity for off right-of-way storage (i.e., temporary / extra workspace areas) for grade material, surface material, snow, duff and other materials specific to a the project (e.g.,

taking into consideration; equipment, topography, weather, safe passage of vehicles and emergency equipment (e.g., ambulance)).

The 32 m right-of-way width has been successfully used for NPS 42 and NPS 48 loops (in a variety of terrains, including both stick and mechanized welding). However, there is limited space on the right-of-way for an adequate by-pass area and push-outs or natural clearings must be found to allow for a truck to pass a mechanized welding crew.

It is important to note that every right-of-way width allocation is unique, however, removal of heavy snowfall from the right-of-way for construction activities cannot usually be accommodated within the standard construction right-of-way boundaries.

Nominal right-of-way width for a 42-inch pipeline is approximately 32 m on cultivated and forested lands. The total disturbed area can be significantly wider, or it may be narrower depending on specific construction circumstances. For example, right-of-way width could be reduced if there is existing right-of-way to share (e.g., looping) or it may be increased if the project occurs in rolling, hilly terrain which requires a lot of grading and therefore more spoil material.

TransCanada makes every effort to identify the potential requirement for additional workspace early in the project. Construction delays can be avoided if necessary temporary workspace is acquired at the same time as the new right-of-way.

TransCanada also ensures that the necessary regulatory personnel are made aware that construction will require additional working space and that the quantity cannot be fully defined except by the Pipeline Contractor at the time of construction.

ROLES & RESPONSIBILITIES:

The activity of determining right-of-way widths is an iterative process between TransCanada, the Construction Contractor, and key stakeholders with Project Team members responsible for determining right-of-way widths.

Table 7: Sample Calculation for an NPS 42 (1067 mm O.D.) right-of-way.

This example illustrates how a NPS 42 pipeline right-of-way dimension is determined and what factors need to be considered. This example is based on a pipeline in agricultural land with 25 cm topsoil depth (single lift) and no pipeline padding requirements. The spoil side is 14 m and the work side is 18 m for a total width of 32 m. This example also illustrates the variability in typical right-of-way widths and demonstrates the need to calculate the detailed right-of-way width requirements on a project-specific basis.

Pipeline Variable	**Dimension**	**Measurements (Calculation / Requirement)**	**Factors (Assumptions / Exceptions)**
Spoil Side	**14 m**	Spoil Side = 14 m (as described below) • ditch = 1.6 m • spoil pile = 5.0 m • topsoil pile width = 4.5 m (single pile based on 25 cm topsoil depth) • separation between surface material and ditch spoil = 1.0 m • separation between the ditch and the spoil pile = 1.0 m • separation between topsoil pile and right-of-way boundary = 0.9 m	This example assumes: • a representative bulking factor of 30% • an angle of repose of 30 º
1. Minimum Ditch Width	1.7 m	Approx. 1.7 m	• allows approximately 0.3 m of clearance on either side of the pipe for equipment • A wider and/or sloped ditch may be required because of rock, unstable material, muskeg or other site-specific problems (e.g., 2 m width required for swamp weights or screw anchors).

2. Minimum Ditch Depth and Cover	2.0 m	0.9 m + pipe diam.
		= 0.9 m + 1.067 m
		= 1.967 m
			• 0.9 m plus pipe diameter to ensure the minimum cover is achieved (assumes no padding which would add 0.3 m)
			• TransCanada's standard cover over the top of pipe is based on location and class of pipe as follows:
			  • 0.9m (Class 1 pipe)
			  • 1.2m (Class 2, 3 or 4 pipe, and cultivated lands)
			  • 0.6m (all Classes of pipe in areas with rock cover).

3. Spoil Pile		1.75 m high and 5.0 m wide	TransCanada considers moisture content, type of material, method of excavation and whether the ground is frozen to determine the slope angles of the spoil pile and the increase in bulk (from the undisturbed conditions to the spoil piles).

Pipeline Variable	Dimension	Measurements (Calculation / Requirement)	Factors (Assumptions / Exceptions)
			For example, ditching with a backhoe in the winter causes greater bulking than with wheel ditching excavation in the summer and clay piles occupy less surface area than water saturated muskeg material.
4. Topsoil Pile	1.575 m high x 4.5 m wide	• ditchline stripping and 6 m spoil pile + 1 m work side • ditchline and spoil side stripping = 1.4 m high and 4.8 m wide • full width stripping = two piles = 4.6 m wide and 1.3 m high; 5.9 m wide and 1.7 m high	Assuming: • 0.3 m either side of the ditch, and • a loop, with 14 m centre ditch to centre hot line including a 2 m buffer where no grading is allowed Topsoil is stripped and stored prior to ditching. The three approaches normally used are: 1. ditchline stripping (normally stored on the spoilside of the right-of-way); 0.6 m high and 2 m wide, allowing 0.3 m either side of the ditch **(total width =2.3 m)**, 2. ditchline and spoil side stripping (normally stored on the spoilside); 1.4 m high and 4.8 m wide, producing a width to be stripped of **(12.0 + 1.7/2 + 0.3) = 13.2 m**, or 3. full width stripping (stored on one or both sides of the right-of-way); the two piles would be 4.6 m wide and 1.3 m high; 5.9 m wide and 1.7 m high respectively, assuming the ditch & spoil side (12.0 m) are stored separately from the work side **(20.0 m)**. • TransCanada determines which approach to take according to the site-specific requirements to optimize soil conservation as well as grading required during construction.
Work Side	**18 m**	To summarize the workside right-of-way width would be a total of 17.885 m including: • 1.585 m ditch • 5.0 m pipe lay-up	• Allowing for NPS 42 swamp weights would increase the width to 19.0 m; • using model 589 sidebooms in conjunction with allowing for the weights would increase the workside width requirement to 20.6 m.

Pipeline Variable	Dimension	Measurements (Calculation / Requirement)	Factors (Assumptions / Exceptions)
		• 6.0 m workspace • 5.3 m bypass lane	
1. Pipe lay-up area	5.0 m		• 1.2 m for possible sloping of the ditchline walls and/or topsoil stripping material, • 1.2 m for the width of the pipe, and • approx. 1.3 m on either side of the pipe for working space for the welders.
2. Workspace	6.0 m		• takes into consideration the largest sideboom normally encountered on the right-of-way (a Caterpillar 594) which is 5.8 m wide with counterweights extended.
3. Bypass area	5.3 m		• used for travel past the working crews as well as storage of materials such as swamp weights duff and snow: - A 594 is 4.3 m wide with the counterweights retracted, ➔ Allow an extra metre for clearance and the possibility of carrying a sling.
Total Width	**32 m**		**Allow an additional 2 m for mechanized welding shacks (potential total of 34 m)**

3.0 ISSUE SCOPING

Issue scoping involves the following activities:

- researching historical information including, data, precedence, guidance documents, industry best practice, and legislation;
- consideration of company knowledge;
- stakeholder consultation; and
- valued ecosystem component (VEC) selection.

Stakeholders, including Responsible Authorities (under CEAA), other regulatory authorities, aboriginal communities, landowners, and the public, are consulted and given the opportunity to participate in the issue scoping exercise through TransCanada's consultation process.

VECs, can be key indicator species, communities, special groups, ecosystems, or even pathways for transfer of environmental effects. VEC selection reflects issues identified in the consultation process and represents a means to obtain a focused analysis of potential environmental effects. During the issue scoping phase, the potential for effect of the environment on the project should also be considered. For example, the terrain and weather can pose some challenges to the project.

3.1. STAKEHOLDER CONSULTATION

PHILOSOPHY:

TransCanada is in constant communication with many different stakeholders to support current knowledge and awareness of issues. TransCanada believes that it is critical to all of its activities to have an iterative process whereby stakeholders can have their concerns and issues addressed. Consideration is then given to these concerns and issues when siting the facilities and developing mitigation plans. TransCanada maintains communication with its key stakeholders throughout the planning, design, construction, and operation of its facilities.

SCOPE:

Applies to all projects to varying degrees, depending on the nature and scope of the proposed project and work. The level of detail in the consultation plan will depend on the nature and scope of the project and the stakeholders in the project area.

PROCESS:

When planning a project, a public consultation plan may be developed to identify stakeholders and to identify potential issues and concerns as well as a means of communication between the company and these stakeholders.

Stakeholders are those who may be affected by or have a direct interest in the application and may include: relevant federal and provincial government agencies, municipalities, local communities, landowners and occupants, Trappers, First Nations and other aboriginal groups, special interest groups, and elected and appointed officials. Once stakeholders are identified and potential issues and concerns are scoped, an appropriate consultation approach is selected. This approach may include mail-outs, one-on-one meetings, small group meetings, presentations, and / or open houses.

In all cases, identified stakeholders will receive a package of information that generally includes:

- A covering letter with highlights of the proposed project and names of company representatives to contact.
- Maps showing the general location of the proposed facilities.
- A Landowner's Guide to the implications of the proposed project.
- NEB Information Bulletins explaining how the public can take part in the approval process.
- TransCanada contacts.

If any additional individual or group approaches TransCanada, or if the company becomes aware of any party with an interest in the potential environmental or socio-economic effects of a proposed project, TransCanada provides them with the same information.

Proposed projects may be advertised in local or regional newspapers within the project area, when required. The Public Notices typically run twice in each newspaper before TransCanada files an application.

ROLES & RESPONSIBILITIES:

Overall, the many members of the Project Team are responsible for stakeholder consultation.

3.1.1. PUBLIC CONSULTATION

PHILOSOPHY:

The objectives of TransCanada's Public Consultation program are to:

- identify and understand the public stakeholders who are affected by or interested in TransCanada's projects;
- provide relevant information to these stakeholders; and,
- work with stakeholders to seek input and resolve concerns about its projects.

SCOPE:

Applies to projects, where and when required (i.e., where the issues warrant and there is a regulatory requirement).

PROCESS:

TransCanada accomplishes the above objectives by:

- Identifying stakeholders;
- Identifying and addressing stakeholder issues, concerns, values and needs;
- Understanding areas of mutual agreement; and,
- Understanding existing and potential problems and areas of conflict and ensuring resolution.

The key steps in TransCanada's Public Consultation process are outlined in Figure 6 and Table 8.

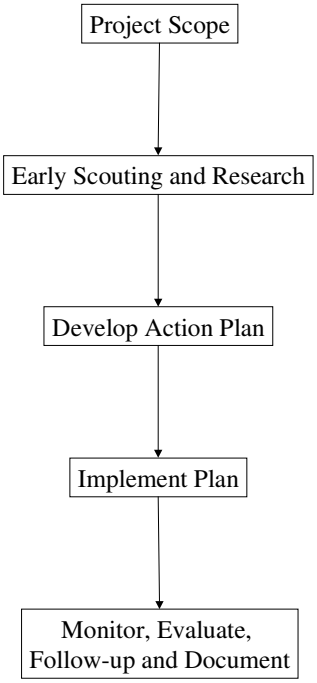

Figure 6: Public Consultation process.

Table 8: Key steps in the Public Consultation process.

Activity	Description
Early Scouting and Research	1. Define Scope of Project and Scope Assessment • Identify special characteristics of project • Project timing • Identify engineering or technical issues • Identify seasonal sensitivities • Identify environmental sensitivities • Identify potential economic impact on community (short and long-term) • Specific regulatory requirements (e.g. CEAA, SEIA)
	2. Research Community/Region • Research demographics, population density • Review economics: type of employment, local industries • Identify community values • Research TransCanada presence and relationship, past projects
	3. Identify Potential Stakeholders • Identify internal stakeholders • Identify external stakeholders
	4. Identify Existing or Potential Issues
	5. Document Research Findings
Develop Action Plan	1. Determine Overall Strategy • Identify elements “open” to consultation
	2. Develop Public Consultation and Public Participation Goals and Objectives
	3. Develop Key Messages • Identify key issues of interest/concern to stakeholders
	4. Develop Detailed Tactical Action Plan • Determine approach, techniques and tools required • Outline a schedule • Determine the budget
	5. Define Roles and Responsibilities for Implementation of Action Plan •
	6. Define Decision Making Process
	7. Document Action Plan
Implement Plan	1. Implement Activities of the plan . These activities may include but are not limited to: • Project notifications • Land documentation • Crossing agreements • Advertisements • Community/aboriginal community contact • Open houses/Meetings/Presentations • Landowner negotiations
	2. Gather and record feedback; modify consultation plans as required
	3. Address outstanding issues • Identify decision making/issue resolution process • Identify responsibilities for resolving issues
	4. Document

Activity	Description
Monitor, Evaluate, Follow-up and Document	1. Identify, respond and document issues
	2. Evaluate Success • Identify whether objectives were achieved • Identify whether the process lead to publicly acceptable plans • Identify whether all participants are satisfied with the outcome • Identify whether the process enhanced the company's image in the eyes of the community • Identify whether a representative level of public input was incorporated into the project plans
	3. Final Documentation • Review Regulatory checklists • Document goals and objectives and whether they were met • Document action/consultation plan • Document issues raised/addressed • Document all contacts made • Document results of evaluation • Identify recommendations for improvements

ROLES & RESPONSIBILITIES:

The LCA Representative has the lead responsibility for the following, with many members of the Project Team supporting:

- Undertaking early scouting and research;
- Developing the action plan;
- Implementing the action plan; and
- Monitoring, evaluating, following-up and documenting the consultation process and plan.

3.1.2. COMMUNICATIONS WITH ENVIRONMENTAL REGULATORS

PHILOSOPHY:

TransCanada believes in contacting key environmental regulators early in the planning process to assist in the identification of issues and valued ecosystem components, as well as to keep the environmental regulators informed as to the status of TransCanada's activities.

It is acknowledged that communication efforts will need to be adjusted to suit the individual projects. The intent is to focus in maintaining effective communications with environmental regulators at the local and project-specific levels to ensure the most effective environmental protection measures are implemented and review processes are efficient and issue-focused.

SCOPE:

Applies to all of TransCanada's projects that have the potential to impact on the environment.

PROCESS:

Early Planning Phases:

TransCanada contacts all applicable environmental regulators to notify them of the project and to discuss key issues such as:

- preliminary routing;
- coincidental activities by others;
- local issues (i.e. access, timber salvage, project water needs, landowner public concerns, etc.);
- watercourse crossings;
- potential timing constraints (fisheries and wildlife);
- RoW width;
- additional information requirements; and,
- key contacts.

Following initial contact, TransCanada works towards having face-to-face meetings with the environmental regulators and key members of the project team (e.g., environmental planner, project manager, construction manager, and survey co-ordinator) to discuss the proposed project in more detail. In addition, depending on the scope of the project and the issues, a site visit with key environmental regulatory contacts is made when possible to discuss routing and other design issues.

Design Phase:

Once the routing has been finalized, the necessary data collected from the field, and various construction techniques determined, key members of the project team again work towards meeting with the local environmental regulators to discuss project specific information.

The primary purpose of this meeting is to discuss any additional concerns the environmental regulators may have and develop an action plan to address those concerns prior to the various regulatory applications being filed. TransCanada's objective is to avoid any unnecessary delays or miscommunication during the review of the proposed project and regulatory applications. In trying to minimize any confusion or miscommunication, TransCanada keeps environmental regulators appraised of any project plan changes as soon as they are known.

Construction Phase:

When required (i.e., more significant project where many people are involved), immediately prior to construction a pre-job meeting is held with the key environmental regulatory field contacts, TransCanada's field construction management team (i.e. environmental inspector, construction manager, etc.) and the environmental planner to:

- establish lines of communication;
- finalize any last minute construction details;
- ensure regulatory obligation and EPP are understood; and,
- transfer the key environmental contact role from the environmental planner to the environmental inspector.

During construction, the key TransCanada contact with environmental regulators will be the on-site environmental inspector. Of primary importance during this phase is:

- keeping the key regulatory contacts appraised of construction activities;
- obtaining approvals for any necessary field design changes; and
- communication of any construction-related environmental difficulties.

Reclamation and Post-Construction Phases:

On major projects, TransCanada conducts post-construction meetings with environmental regulators to obtain their feedback on how the project went from their perspective. The intent of these meetings is to listen and learn from the feedback so that TransCanada can improve its performance on the next project. During the post-construction reclamation phases it is important to advise environmental regulators of any problems that TransCanada is aware of that may have developed subsequent to the construction (i.e. ditch settlement, revegetation problems, slope movements, etc.) and TransCanada's plans to implement remedial measures.

ROLES & RESPONSIBILITIES:

The Environmental Advisor has the main responsibility for each phase of the communications to the environmental regulators. However, during the planning and design phases, the Project Manager plays a key support role and the Construction Manager and Environmental Inspector are critical to the communications during the construction, reclamation and post-construction phases.

3.2. VALUED ECOSYSTEM COMPONENT SELECTION

PHILOSOPHY:

TransCanada has identified eight main Valued Ecosystem Components (VECs) as typical components of the planning phase of a project.

Identifying VECs and collecting environmental parameter information is essential in:

- Assessing the potential environmental effects of a project;
- Planning and developing mitigative measures, and
- Identifying performance measurement criteria.

SCOPE:

All projects requiring an assessment of environmental effects as required by the NEB and/or CEAA.

PROCESS:

Assessment of each VEC on a proposed project is based on a consideration of:

- researching historical information including, data, precedence, guidance documents, and legislation;
- the environmental setting;
- issues scoping;
- professional judgment and knowledge of pipeline construction and operation; and
- results of public, stakeholder, regulatory, and Aboriginal consultation.

The VECs are outlined in the table below. Each VEC is described further in its own section of the EDS as listed in Table 9.

Table 9: Description of the Valued Ecosystem Components (VECs) addressed in the EDS.

Section	VEC	Description
4.1.1	Soil	• Proper surface materials/topsoil handling and mitigative measures are necessary to ensure that surface material/topsoil and subsoil are conserved. • Baseline soil information is used to determine: - Surface material/topsoil availability, quality and depths. - Storage requirements for surface material/topsoil and subsoil, as well as adequate separation between piles. - Right-of-way width requirements. - Procedure and equipment requirements for removal and replacement of surface/ topsoil and subsoil material. - Problem soils and special mitigative measures and or surface material/topsoil handling procedures. - Reclamation and revegetation mitigative measures, and possible surface material/topsoil amendments - Mitigative measures to protect salvaged surface material/topsoil from erosion and/or degradation. - Appropriate surface material/topsoil handling procedures based on the construction schedule and season. • Further, the baseline information aids in the discussion of proposed materials handling

Section	VEC	Description
		procedures with regulatory authorities/ stakeholders and helps to resolve any concerns prior to the submission of an Application.
4.1.2	Vegetation / Timber	• The level of vegetation assessment will vary based on the land use (e.g., native prairie, forested, agricultural). • In some areas (e.g., forested lands) the assessment of the vegetation community could include: rare plants; rare natural plant communities; old growth forests; or, native understory vegetation. • An assessment of timber is undertaken, where required, to determine the potential quantity of merchantable timber.
4.1.3	Wildlife	• Wildlife and key wildlife habitats within the proposed area of the project are assessed. • The assessment is based on: - Species of concern with the potential to occur within the study area (e.g., COSEWIC species); - species of management concern; - migratory birds; and - identified environmentally sensitive habitats (e.g., habitats with high wildlife biodiversity values such as old-growth forest and wetlands).
4.1.4	Protected Areas, Land Use	• Identifies potential conflicts between the proposed project and existing land uses. • Protected areas include parks, wildlife reserves, and natural heritage areas. • Includes activities on the land such as, commercial timber harvesting, energy resource exploration and development, cattle grazing, hunting and guide outfitting, trapping, and recreational use (e.g., fishing, camping, hiking).
4.1.5	Water Crossings and Aquatic Resources	• Aquatic resource assessments are mainly focussed on requirements to protect fish and fish habitat. • Activities that have the potential to affect the aquatic resources and hydrology of an area include pipe installation at water crossings and hydrostatic testing.
4.1.6	Air	• The main concerns during construction are dust and emissions from equipment. • Ambient air quality assessments are undertaken to assess potential impacts from operating compression facilities.
4.1.7	Noise	• Not a true VEC -- this is a result of an activity which has an effect on other VECs. • Consideration is given to the above VECs, with respect to potential noise impacts during all phases of the proposed facilities. • There is potential to impact wildlife (e.g. nesting birds) in an area due to construction noise. • Ambient noise assessments are undertaken to assess potential impacts from compression facilities.
4.1.8	Heritage Resources	An HRIA is conducted to determine whether paleontological, archaeological, cultural or historical artifacts exist at the proposed project site and therefore must be protected.
4.2	Socio-economic factors	The process for identifying and assessing the socio-economic impacts is closely linked to the environmental assessment (EA). Information from the evaluation of one is used in the evaluation of the other. The Socio-Economic Impact Assessment (SEIA): • provides the land use and economic setting for the proposed project area (e.g., oil and gas operations, timber harvesting, trapping, Land and Resource Management Plans, community profiles and services, access, recreational activities, etc.); • assesses the economic and other direct effects of the project on these activities; and • provides this information for the EA. The EA: • provides the biophysical setting for the project; • assesses the effects of the project on biophysical resources; and

Section	VEC	Description
		• identifies project-related effects on biophysical resources that have the potential to influence land use practices that in turn are assessed in the SEIA with respect to the related economic implications.

ROLES & RESPONSIBILITIES:

The primary responsibility for the selection of VECs is that of the Environmental Advisor and Environmental Consultant in consultation with many members of the Project Team and external stakeholders.

4.0 ANALYSIS OF POTENTIAL ENVIRONMENTAL EFFECTS

PHILOSOPHY:

The information that is gathered during the issue scoping phase is reviewed taking into consideration the scope of the proposed project. Environmental effects analysis is used to identify and outline the potential interactions between the proposed project and the identified VECs as well as the potential effects of the environment on the project. The analysis describes the scope of the assessment for each VEC, as well as the scope of the effects of the environment on the project.

Each VEC is given a specific rating criteria (some are defined by resource managers, others are recommended by knowledgeable scientists or other professionals) or threshold (if available) to determine the level above which potential environmental effects would occur. These criteria/thresholds determine at which point the VEC would experience environmental effects to a sufficient geographic extent, magnitude, duration, frequency, and or reversibility as to affect its integrity.

During the scoping exercise, many effects of the environment on the project can also be identified. Effects of the environment on the project are those where the project design must be altered due to environmental considerations. For example, due to wildlife timing restrictions, the construction schedule of a project may need to be altered, which could lead to effects on other VECs as well. Climate Change has also had an impact to many projects with respect to the addition or modification of specific technologies to minimize the release of greenhouse gases.

The objective of the assessment is to minimize the potential negative effects and enhance or encourage the potential positive effects.

SCOPE:

All projects where there is the potential to have an environmental effect and / or those requiring an assessment of environmental effects as required by the NEB and/or CEAA.

PROCESS:

Baseline studies of VECs are undertaken to determine potential environmental effects. Consideration is given to such VECs as: soil; vegetation / timber; wildlife; protected areas and land use; aquatic resources and hydrology; and, air. Other baseline studies include heritage resources, noise, and socio-economic (only with respect to its interactions with the environmental assessment).

To further focus the scope of work for the baseline studies, and allow for meaningful analysis of potential effects, boundaries must be determined. Spatial and temporal boundaries encompass those periods and areas during, and within which, the VECs are likely to measurably interact with, or be influenced by, the proposed project.

Key to many of the steps is the application of “professional judgement”. That is, the importance of having experienced, competent resources establishing the framework for assessing potential environmental effects. The establishment of this framework begins in the issue scoping phase. Professional judgement is applied at key steps of the process including, VEC selection, and establishing the plan for undertaking baseline studies. The role of professional judgement will be discussed in the remaining sections as well.

Under CEAA an “environmental effect” is defined as:

- any change that the project may cause in the environment, including any effect of any such change on health and socio-economic conditions, on physical and cultural heritage, on the current use of lands and resources for traditional purposes by aboriginal persons, or on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance, and
- any change to the project that may be caused by the environment.

There are three main steps in the analysis of the potential environmental effects of a project:

1. Determining the scope of the project (see section 2.1);
2. Determining the existing conditions and establishing boundaries (see section 4.1); and
3. Identifying the potential interactions between the identified VECs and proposed project.

The first two steps are discussed in EDS sections 2.1 and 4.1. The third step, project-environment interactions, compares the location and timing of project activities with the spatial and temporal factors of the VECs (CEAA, 1994). Another factor that needs to be considered, as described in the definition of environmental effect, is the effect of the environment on the project.

Environmental Effects caused by the Project

The majority of environmental assessments focus on the environmental effects that result from the project on the environment. The project may cause changes to the environment (as described by the VECs), either positive or negative. The objective is to enhance the positive effects and minimize the negative effects. For example, a pipeline water crossing installation may affect the water quality negatively (for a short duration) while a compressor station upgrade could positively improve air quality in an area. In this example, the proponent could apply water crossing methods such as a dam and bypass pump that could minimize or eliminate the potential for negative effects to water quality.

Impacts to the Project caused by the Environment

The environmental effects that are often over-looked are those where the environment has an effect on the project. For example, wildlife and fisheries windows often impact the construction timing of a project. Migratory bird windows occur from mid-April until the end of July in many portions of the country and fall fisheries windows often start in mid-late August. That allows for approximately 2-4 weeks for construction in the summer -- a period of time that is extremely short to allow for the construction of a pipeline.

Other impacts to the project from the environment are outlined in Table 2: Routing and site These include impacts from the terrain (e.g., Canadian Shield requires blasting), biophysical factors (e.g., water crossing timing windows), and heritage resources (e.g., re-routing around a significant site).

Once the potential environmental effects on each VEC and on the project are identified, appropriate mitigation is developed to minimize and potentially eliminate any adverse effects.

ROLES & RESPONSIBILITIES:

The assessment of potential environmental effects is managed by the Environmental Advisor using professional judgement based on the proposed scope of the project and the baseline and biophysical (when required) assessments. To support the assessment process, TransCanada often hires an experienced external consultant to undertake the analysis of environmental effects in conjunction with the Environmental Advisor and Project Manager.

4.1. BASELINE STUDIES

PHILOSOPHY:

As well as providing information to assess potential environmental effects, baseline studies are used in the determination of routing or site selection and as a basis for monitoring during and following construction. Field studies specifically, help to address information gaps in the existing baseline information, and are undertaken when required.

SCOPE:

All projects where there is the potential to have an environmental effect and / or those requiring an assessment of environmental effects as required by the NEB and/or CEAA.

PROCESS:

Baseline studies of Valued Environmental Components (VECs) are undertaken to determine potential environmental effects to the VECs resulting from a proposed project during a specific time period. Consideration is given to the VECs identified in section 3.2 or others that may arise during stakeholder consultation. However, baseline studies are only undertaken on project-specific VECs.

Baseline studies can be conducted as literature searches (including existing data inventories), gathering of traditional knowledge, and/or as field studies. Each of these approaches may be used when assessing the potential environmental effects on a VEC.

Professional judgement is also important when determining which studies are required and how the studies should be undertaken. TransCanada often hires experienced third-party environmental consultants to undertake baseline studies. The professional judgement that the environmental consultant brings to the project, along with the professional judgement and facility knowledge of TransCanada's employees (e.g. Environmental Advisor), results in a more complete assessment of the potential environmental effects of a proposed project by selecting and undertaking the appropriate baseline studies.

To further focus the scope of work for the baseline studies, and allow for meaningful analysis of potential effects, boundaries must be determined. Spatial and temporal boundaries encompass those areas within which, and periods during, that the VECs are likely to interact with, or be influenced by, the proposed project.

Spatial Boundaries

Spatial boundaries are characterized as the geographic limits within which the proposed project could potentially interact with the selected VEC.

For example, the spatial boundary for the impacts from a water crossing installation would be identified as a defined area upstream and downstream of the area of instream activity, including impacts to riparian habitats. The professional judgement of the fisheries biologist, in consideration of the potential fish habitat and the scope of the project, would be used to determine the specific distances upstream and downstream to be evaluated. Consideration would be given to the potential for direct (e.g. impact to the habitat at the crossing) and indirect (e.g. downstream transport of sediment) impacts.

Temporal Boundaries

Temporal boundaries are characterized as the duration that the proposed project could potentially interact with the selected VEC.

Temporal boundaries include the following periods of time:

- During the construction or implementation of the project;
- Post-construction or post-implementation period (up to 2 years after); and
- Operations (up to the complete abandonment of a facility).

For example, the temporal boundaries for the construction of a pipeline water crossing would encompass the period of construction and immediate reclamation at and near the crossing. During the post-construction period, further reclamation of the site is being completed and evaluated, usually for a two-year period. After this time, the facility would move into the operations phase, which could last for 40 years or longer. During the post-construction and operations period, there is the potential for environmental effects from erosion and malfunctions or accidents.

ROLES & RESPONSIBILITIES:

The Environmental Advisor along with the Environmental Consultant(s) (when required), are responsible for developing and implementing the plans for any baseline studies (including establishing boundaries).

4.1.1. SOIL

PHILOSOPHY:

A soils handling plan is developed for all of TransCanada's projects. In some instances, a soil survey will be conducted to help develop the soils handling plan. The soil survey, when required, is conducted for route alignments on arable or potentially arable lands in order to gather information on the soils and landforms along the proposed route and to ensure the necessary handling and mitigative measures are clearly recognized.

SCOPE:

A soil survey is undertaken for proposed projects occurring on arable or potentially arable lands, when required (e.g., new pipelines or loops) as determined using professional judgement of qualified environmental staff. Generally, a soil survey is not required for projects that take place in forested lands. In specific locations however, a soils evaluation may be conducted to determine appropriate seed mixes for land surface reclamation purposes.

Soil surveys may also be undertaken for due diligence purposes in areas where there are potentially contaminated soils (e.g., areas used for industrial purposes).

PROCESS:

The following figure and table describe TransCanada's approach to preparing soils handling measures.

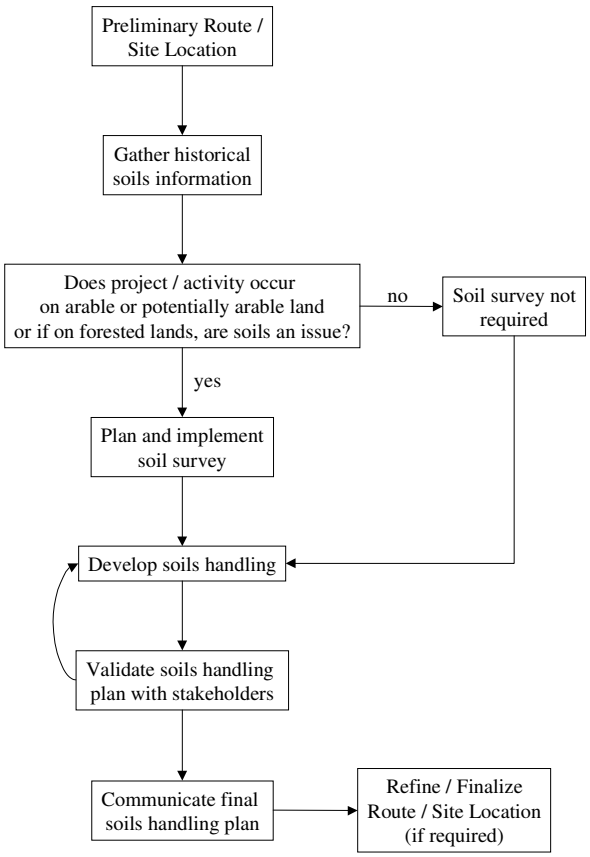

Figure 7: Process for developing the soils handling plan.

Table 10: Process for developing the soils handling plan.

Activity	Description
Gather historical, baseline soils information	• Soil survey maps, soil surveys from past projects, landowner information, other historical data.
Determination of requirement for soil survey	• Does project occur on arable or potentially arable land or if on forested lands, are soils an issue, and / or, do legislation or application requirements deem it necessary? - If yes (to either), a soil survey may need to be undertaken. - If no (to both), the soils handling plan is based on typical drawings and existing information.
Plan and implement soil survey	• TransCanada hires an experienced external consultant to undertake the field survey. Activities in the survey include: - Examining all photomosaics, air photos and soil survey maps, to determine soil units prior to an actual field assessment. - Describing and classifying soils to trench depth - Describing land use categories, including comments describing unique conditions - Delineating soil units expected to require alternate soil handling procedures - Ensuring that topsoil depths are identified within Meter Station or Compressor Station boundaries - Providing information on the access road as well as the facility • The following information is gathered during the soil survey: - map of the soil resources - baseline soils data - map of present land use - identification of sample soils that may require alternate materials handling procedures or as required for soil classification
Develop soils handling plan	• Develop measures for soils handling along/within the proposed area of disturbance, including access areas. • Ensure the development of soil handling procedures in special areas of: - topsoil stripping, - sloughs, - stream crossings, - roads or highways, - topography, - salt affected areas, - contaminated areas, - changes in land use, and - changes in parent material • Topsoil handling procedures are listed in Table 11.
Validate soils handling plan with stakeholders	• After mapping soils handling on the alignment sheets, communicate plan to key stakeholders and make changes as required. • Review plan with construction personnel to confirm feasibility of plan and workspace requirements.
Communicate final soils handling plan	• The soils handling plan is communicated through the environmental and construction alignment sheets/plot plan, as well as in the environmental protection plan. • Further communication should also occur at the pre-job meetings and during construction (e.g., tailgate meetings).

The soils information gathered for a proposed project is used to determine:

- Surface material/topsoil availability, quality and depths.
- Storage requirements for surface material/topsoil and subsoil, as well as adequate separation between piles.
- Right-of-way width requirements.
- Procedure and equipment requirements for removal and replacement of surface/ topsoil and subsoil material.
- Problem soils and special mitigative measures and or surface material/topsoil handling procedures.
- Reclamation and revegetation measures, and possible surface material/topsoil amendments
- Mitigative measures to protect salvaged surface material/topsoil from erosion and/or degradation.
- Appropriate surface material/topsoil handling procedures based on the construction schedule and season.
- Discuss proposed materials handling procedures with regulatory authorities/ stakeholders and to resolve any concerns prior to the submission of the Application.

Proper surface materials/topsoil handling and mitigative measures are necessary to ensure that surface material/topsoil and subsoil are returned to equivalent land capability. In general, TransCanada tries to avoid areas that are rocky and that have thin or salty soils. Mitigative measures are outlined in both the generic and the project-specific environmental protection plans.

When alignment sheets are produced for a project, they will outline topsoil handling procedures, including stripping depth and criteria. It should be understood that equipment limitations might result in minor variations in stripping depth. Should TransCanada's authorized representative deem the variations to be beyond acceptable limits, the Contractor would be instructed to alter equipment or techniques used for topsoil stripping. Failing this, TransCanada's authorized representative will contact the authorized regulatory representative for further direction.

Table 11: Topsoil handling procedures.

Typical Drawing	Application	Topsoil Handling Procedure	Preferred Land Use
Topsoil Conservation, Ditchline & Spoilside (STDS-03-ML-05-402)	right-of-way	ditchline & spoilside	cultivated
Topsoil Conservation, Blade width (STDS-03-ML-05-404)	right-of-way	blade width	pasture
Topsoil Conservation, Ditchline (STDS-03-ML-05-405)	right-of-way	ditchline	pasture
Topsoil Conservation , Foreign Pipeline Crossing (STDS-03-ML-05-406)	foreign pipeline crossings	blade width or ditchline	pasture
Topsoil Conservation, Sidebends (STDS-03-ML-05-407)	side bends	ditchline	pasture
Topsoil Conservation, Road and Railway Crossings (STDS-03-ML-05-408)	road and railway crossings	full right-of-way	cultivated
Topsoil Conservation, Ditchline (STDS-03-ML-05-411)	right-of-way	ditchline	agricultural land
Topsoil Conservation, Foreign Pipeline Crossing (STDS-03-ML-05-412)	foreign pipeline crossings	ditchline	agricultural lands
Topsoil Conservation, Sidebends (STDS-03-ML-05-413)	Sidebends	ditchline	agricultural lands
Topsoil Conservation, road and Railway Crossings (STDS-03-ML-05-414)	road and railway crossings	variable (see schematic)	agricultural lands
Topsoil Conservation, Ditchline & Spoil Side to	right-of-way	ditchline & spoil side to	As directed by

Typical Drawing	Application	Topsoil Handling Procedure	Preferred Land Use
Work Side (STDS-03-ML-05-403)		work side	TransCanada
Grubbing and Topsoil Conservation for Freehold Treed Land (STDS-03-ML-05-442)	right-of-way	grubbings - full-right-of-way; surface material - ditchline	freehold treed lands
Grubbing and Topsoil Conservation for Freehold Land (STDS-03-ML-05-443)	right-of-way	grubbings - full right-of-way; surface material - ditch & spoil	freehold treed land
Summer Clean-up of Winter Construction, Secondary Stripping for Spoil Displacement (STDS-03-ML-05-431)	right-of-way	variable (spoil side)	As directed by TransCanada
Topsoil Conservation for Side Hill Grading in Agriculture Land (STDS-03-ML-05-421)	side hill grading	full right-of-way	agricultural land
Topsoil Conservation Cultivated Land Extra Depth and Width Excavations (STDS-03-ML-05-422)	extra depth and width excavations	ditchline & spoil side	cultivated land
Secondary Stripping for Spoil Displacement (STDS-03-ML-05-432)	side bends and foreign pipeline crossings	ditchline and spoil side - portion of the workside	cultivated lands
Two Lift Spoil Replacement for Rocky Subsoil (STDS-03-ML-05-423)	till/ bedrock at ditch depth	ditchline and spoil side	As directed by TransCanada
Topsoil Conservation, Full Width Stripping (STDS-03-ML-05-401)	right-of-way/ test sites	full right-of-way	As directed by TransCanada
Grubbing and Topsoil Conservation, White Area Crown Forested Land (SK-1610)	right-of-way	grubbings - full-right-of-way; surface material - ditchline	Crown Forested Land
Topsoil Conservation, Ditchline and Workside (SKCH-82003)	right-of-way	ditch and work side	As directed by TransCanada (grasslands with erosion prone soils)

ROLES & RESPONSIBILITIES:

The Environmental Advisor and Environmental Consultant gather the historical and baseline soils information and use this information to determine the need for a soils survey. If a soils survey were required, a qualified Environmental Consultant (i.e., soils specialist) would undertake the survey, directed by TransCanada's Environmental Advisor.

Using the baseline, historical, and when undertaken, the survey information, a soils handling plan is developed, validated, and communicated to the Environmental Advisor, Environmental Consultant, Environmental Inspector (when present / required), Project Manager and Construction Manager (when present).

4.1.2. VEGETATION

PHILOSOPHY:

Timber

TransCanada is often required to clear timber for a project. TransCanada recognizes that timber is a valuable natural resource that must be conserved, salvaged and utilized in an efficient manner.

Weeds

The objective of TransCanada's Weed Control program is to promote conditions on the right-of-way where the establishment of undesirable vegetation (weeds), directly associated with project construction, is controlled. Success is achieved when an equivalent level is reached on the right-of-way as compared to the adjacent undisturbed lands, both in variety and density of species. TransCanada strives for this level within a period of three years after the final cleanup of construction. To achieve this objective, a weed survey may be conducted prior to disturbance to establish a benchmark for post-construction monitoring and control. It is also important to consider on-going liaison with local regulatory agencies and directly affected landowners or occupants to ensure acceptance and effective implementation of a co-operative program. Mitigative measures are then developed and implemented during construction. These elements, coupled with the post-construction monitoring plan comprise the Vegetation Management Plan.

Rare Plants and Species at Risk

Along with the vegetation surveys, in non-cultivated areas that have previously not been disturbed, TransCanada undertakes rare plant surveys to determine if there are any species of concern in the area. The proposed *Species At Risk Act* (SARA) will provide further information and guidance on species at risk and associated habitats. The information from the survey is then used to determine appropriate mitigation if species at risk are found.

Traditional Plants

During the consultation process with First Nations community(ies), TransCanada may receive requests to undertake traditional plant surveys. TransCanada works closely with the local community(ies) to undertake these studies which can occur at the same time as the other vegetation surveys. Depending on the wishes of the community(ies), TransCanada may or may not be able to share the information with other parties (e.g., regulators). However, TransCanada will work with the community(ies) to determine any necessary mitigation.

SCOPE:

All projects where there is the potential to have an environmental effect and / or those requiring an assessment of environmental effects as required by the NEB and/or CEAA. Specific surveys undertaken are dependant on location (e.g., timber salvage plan on forested lands) and issues (e.g., weed surveys).

PROCESS:

The vegetation surveys conducted by TransCanada may encompass the following aspects:

- timber;
- weeds;
- rare plants and species at risk; and,
- traditional plants.

TransCanada works very closely with its stakeholders when undertaking these surveys to ensure relevant historical and baseline information is collected. Stakeholders involved could include local timber companies, multi-stakeholder committees addressing weed issues, local regulators, and local communities (including First Nations).

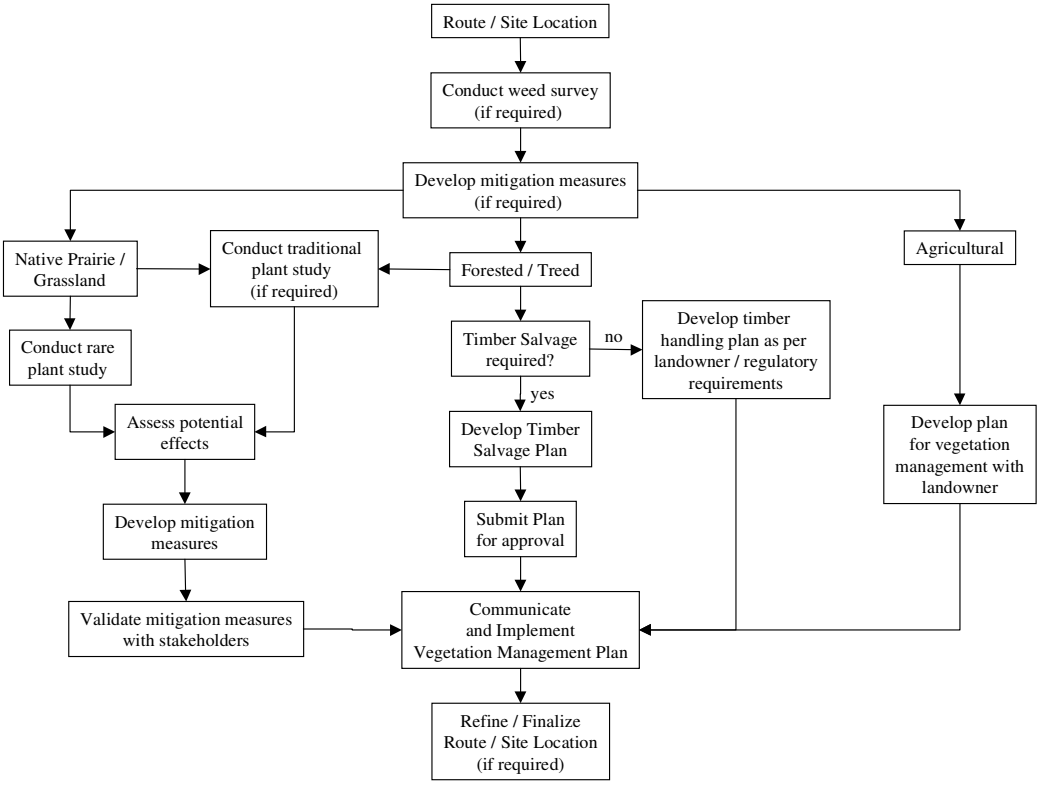

Figure 8: Vegetation assessment process.

Table 12: Process for assessing vegetation communities within the study area.

Activity	Description
Conduct weed survey (if required)	In areas where weeds are an issue, a weed survey should be conducted prior to disturbance to establish a benchmark for post-construction monitoring and control. • Conduct a pre-construction assessment of weed species in correlation with the vegetation survey. • The weed survey should be conducted prior to construction, during the planning stage and ideally in the prime months of the growing season (late May - early Sept, preferably June/July). • A copy of the weed survey may be signed by and provided to the landowner/occupant prior to construction. • Sites with weeds identified on them should be noted in order to alter construction practices to limit the spread of weeds.
Develop mitigation measures (see section 1.0)	• Mitigation may include removing any remnant mud and vegetative debris prior to entering the project site to control the spread of weeds. • Develop and maintain a pro-active Weed Control Plan that is incorporated with the post-construction monitoring program as well as the regional weed control program (also see Table 22) • Mitigation measures will become part of the vegetation management plan for the project.

Activity	Description
	• Identify new issues as they occur during construction on the Environmental Commitments Tracking List.
Native Prairie / Grassland	
Conduct rare plant study (if required)	• Collect listing of potential rare plant communities and habitats in the study area. • The vegetation survey should be conducted prior to construction, during the planning stage and ideally in the prime months of the growing season (late May - early Sept, preferably June/July).
Conduct traditional plant study (if required)	• Determine the need for a traditional plant survey with local First Nations communities • Gather baseline and historical information through discussions with the community(ies). • Identify key individuals within the communities to participate in the study.
Develop mitigation measures	Mitigation measures may include: • Timing windows for construction (e.g., from June 1 – 15 and August 1 – 15); • Avoidance; and, • Seed collection and re-planting.
Validate mitigation measures	Validate the proposed mitigation measures with key stakeholders (i.e., regulators and local communities).
Forested / Treed	
Assess need for timber salvage	• For projects traversing forested lands, and when volumes dictate (i.e., there is salvageable timber), a Timber Salvage Plan is prepared that details how TransCanada will manage the timber. • For projects traversing other lands (e.g. grasslands with scrub brush), a formal plan is not required unless specified by the governing body or landowner. Nonetheless, TransCanada takes the appropriate steps to salvage the resource properly.
(Yes) Develop Timber Salvage Plan	• A Timber Salvage Plan is a formal plan that: - Provides an analysis of the timber within the area. - Identifies its commercial merchantability. - Specifies TransCanada's plans for salvage, transportation and utilization of timber as a result of construction activities. - Identifies potential users of merchantable timber along the rights-of-way. - Identifies the process for removing and utilizing the resource.
Submit Timber Salvage Plan for approval	• The plan is submitted to regulatory officials for their review and approval prior to construction.
(No) Develop timber handling plan as per landowner / regulatory requirements	• If a formal Timber Salvage Plan is not required: - TransCanada ensures waivers from the governing bodies are issued, if required. - TransCanada disposes of the timber in accordance with the terms and conditions outlined in the land agreement(s) issued for the construction and operation of the pipeline. • If there are timber salvage requirements on freehold land, TransCanada identifies any land that may require timber salvage.
Communicate and Implement Plan	• The plan is communicated through the environmental and construction alignment sheets, as well as in the environmental protection plan, which are all included in the construction contract. • Further communication occurs at the pre-job meetings and during construction.
Conduct traditional plant study (if required)	See above.
Develop mitigation measures for traditional	See above.

Activity	Description
plants	
Agricultural	
Develop plan for vegetation management with landowner	• TransCanada will develop a pro-active vegetation management plan as part of the environmental protection plan and post-construction monitoring process, in consultation with the landowner. • Mitigative measures are also included in the plan.
All areas	
Communicate and Implement Vegetation Management Plan	• Pre-construction surveys may be communicated at the pre-job meeting and during construction. Locations that require specific handling methods (e.g., Cleaning of equipment, plant salvage, etc.) are documented in the surveys and become part of the environmental protection plan. • The plan can also be communicated through the alignment sheets, as well as in the environmental protection plan. • Specific issues that occur during landowner or public consultation or during actual construction, are documented in the Environmental Commitments Tracking List.

ROLES & RESPONSIBILITIES:

The Environmental Advisor and Environmental Consultant gather the historical and baseline vegetation information and use this information, in consultation with key stakeholders, to determine the need for various vegetation surveys. The Environmental Consultant executes the survey(s) under the direction of the Environmental Advisor.

Using the baseline, historical, and survey information, a vegetation management plan is developed, validated, and communicated amongst the Environmental Advisor, Environmental Consultant, Environmental Inspector (when required), Project Manager and Construction Manager, in consultation with the identified key stakeholders.

In the operational phase of a facility, the Operations staff are responsible for vegetation management.

4.1.3. WILDLIFE

PHILOSOPHY:

TransCanada identifies and evaluates wildlife resources and their habitats within the area of the proposed project (on, as well as adjacent to, the route / site). TransCanada supports the conservation and sustainable use of wildlife resources achieved through a co-operative approach to management involving multiple stakeholders in the assessment of its projects. Scientific information, and in some situations traditional knowledge, is used to assess and manage potential impacts upon wildlife resources.

SCOPE:

All projects where there is the potential to have an effect on wildlife, and / or those requiring an assessment of environmental effects as required by the NEB and/or CEAA.

PROCESS:

Identifying and evaluating wildlife species/populations and wildlife habitat of concern in the area of the project is key to finalizing the route or site and the activity schedule.

As part of the identification and assessment of the wildlife resources within an area, the wildlife assessment addresses migratory birds, and species of concern (e.g. endangered, threatened, listed, etc.), as well as other local wildlife species. Any habitats associated with wildlife resources or, any habitats that may be of concern within the project area, are also assessed. The overall framework for assessing wildlife resources is outlined in Figure 9.

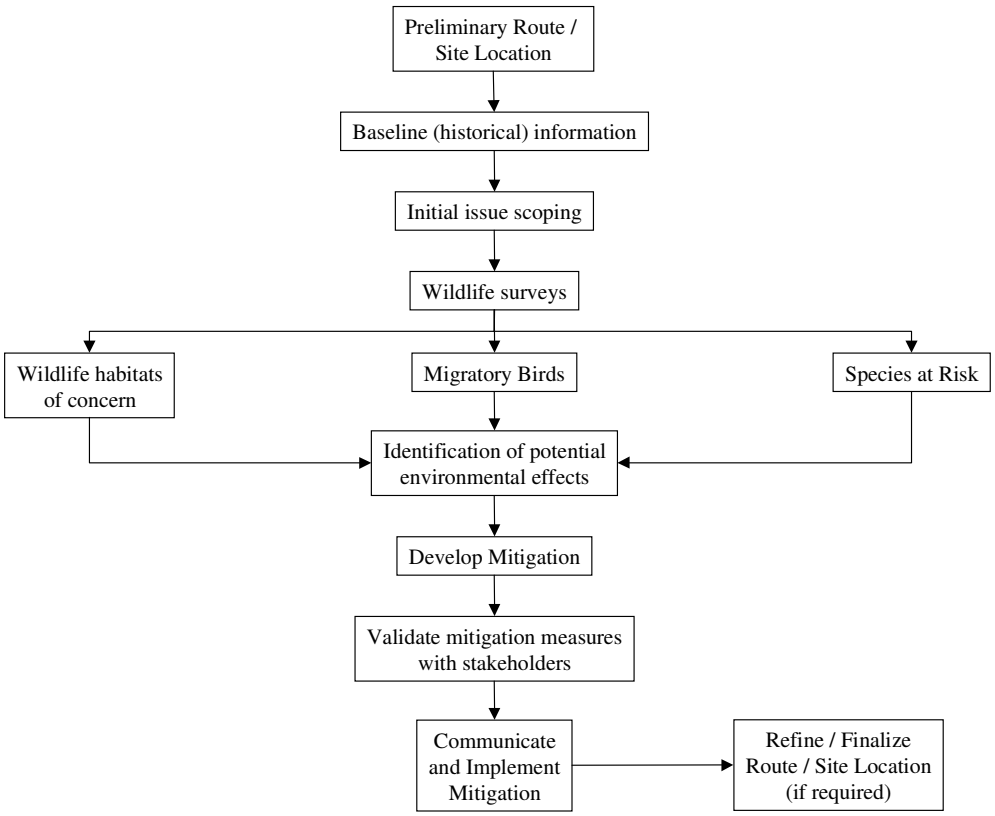

Figure 9: Assessment of wildlife resources.

Migratory Birds

Migratory birds in North America are an international resource, with numerous species breeding throughout Canada. Because of the migratory nature of these species and their interprovincial and international movements, management authority lies with the federal and provincial governments. Migratory bird treaties with other countries govern the management of migratory birds in Canada.

At the federal level, the Canadian Wildlife Service (CWS) of Environment Canada is responsible for the implementation of the *Migratory Birds Convention Act* (MBCA) and provides for the protection of migratory birds. CWS works with other federal and provincial government agencies, industry, aboriginal groups, and non-government organizations in carrying out this mandate.

TransCanada's environmental planning process takes into account issues related to migratory birds including, but not limited to:

- potential species and habitat (including for all potential life stages) in the project area;
- local variation in habitat and seasonal conditions that may influence when and where migratory bird species will be found;
- timing of activities;
- species' sensitivity to human disturbance;
- sensory disturbance during different life stages and seasons (e.g., breeding, fledging, over-wintering); and,
- potential mitigative measures (e.g., use of vegetation buffers, and daily timing of activities).

In scheduling field activities (e.g., construction), TransCanada takes steps to minimize disturbance and destruction of migratory birds and their nests. Essentially no disturbance to nests or nesting birds is allowed during the nesting/breeding period (typically mid-spring through early summer in most parts of Canada).

The primary challenge in planning a project in an area where migratory birds are located, is the timing of activities. The most favourable construction season (in non-muskeg areas) is summer. However, the summer occurs in the middle of the migratory bird nesting/breeding period. As such, TransCanada strives to schedule its activities outside of this sensitive window. However, there is often conflict in scheduling work this way as TransCanada also needs to manage other resource concerns such as fisheries and other wildlife timing constraints, seasonal farming practices, and soil conservation.

As a result, construction and operational activities often get ‘squeezed’ in between available timing windows which may push the limits of current, best available, and economically-feasible technology, or may significantly extend the duration of an activity or disturbance, creating both economic and potential environmental impacts.

Species at Risk

TransCanada currently identifies and assesses species at risk and their habitats in its environmental assessments of proposed projects. Federal and provincial jurisdictions share responsibility for the protection of species at risk and are required to prevent impacts to species and their habitat. The federal *Species At Risk Act* (SARA) covers all national wildlife species at risk and their critical habitat and applies to all federal lands in Canada. Wildlife species at risk include species of birds, fish, reptiles, amphibians, molluscs, mammals and insects.

To identify and assess the species at risk along and adjacent to a proposed project, TransCanada refers to the criteria provided by SARA and the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). COSEWIC is the legally recognized and constituted committee that provides for rigorous, independent and public scientific assessments of species at risk. COSEWIC is an independent organization of wildlife experts comprising members from various organizations, institutions, and government departments and agencies.

Definitions of Terms used by COSEWIC include:

- **Extinct -** Species no longer exists.
- **Extirpated -** Species no longer exists in the wild in Canada, but occurs elsewhere.
- **Endangered -** Species facing imminent extinction or extirpation.
- **Threatened -** Species likely to become endangered if limiting factors are not reversed.
- **Special Concern -** Species are of special concern because of characteristics that make them particularly sensitive to human activities or natural events.

TransCanada incorporates the information from this assessment with information obtained during the identification of other wildlife and wildlife habitat (i.e., other than species at risk).

Table 13: Assessment of wildlife resources.

Activity	Description
Baseline Information	To identify the wildlife within the construction area and the potential impacts of construction to wildlife resources, TransCanada reviews the following: • Federal and provincial wildlife maps. • Literature references. • Local wildlife expertise • Provincial and Federal regulators • Provincial and Federal lists
Initial issue scoping	TransCanada considers factors such as: • winter range and calving grounds for ungulates • breeding and dancing grounds of gallinaceous birds • nesting and staging areas for waterfowl, migratory birds, and protected species • wildlife timing constraints • short term and long-term access considerations (i.e., use of rollback for access control, signage, doglegs in routing) • migration patterns and wildlife movement corridors The following experts are also consulted: • Academic professionals. • Environmental interest groups. • Aboriginal communities. • Regulators.
Wildlife surveys	Depending on the nature and scope of the project, TransCanada may also need to undertake wildlife surveys. If required, TransCanada would gather wildlife and habitat information from field surveys to: • Identify the status of critical and key wildlife species and their habitat (i.e., endangered, threatened or vulnerable); • Ensure potential for effect is understood and considered in environmental protection plans; • Meet the requirements of applicable regulations; and, • Ensure that its projects have a minimal impact on wildlife resources and their habitat. The wildlife surveys are planned and undertaken using external wildlife expertise and professional judgement to ensure timely assessment (i.e., surveys are undertaken at the most appropriate time given the nature of the species and the schedule of the project).

Activity	Description
Wildlife habitats of concern	An assessment of critical habitats in the area is undertaken, including an assessment of: • Wetlands • Wildlife trees • Nesting areas • Calving grounds • Breeding areas • Overwintering areas • Migration routes
Migratory birds	TransCanada reviews migratory birds and habitat information to: • Identify the status of critical and key wildlife species and their habitat (i.e., endangered, threatened or vulnerable); • Ensure potential for effect is understood and considered in environmental protection plans; • Meet the requirements of applicable regulations; and, • Ensure that its projects have a minimal impact on wildlife resources and their habitat. TransCanada reviews the following to identify and evaluate the migratory birds within the area of the proposed project and the potential impacts of construction to migratory bird resources: • federal and provincial key migratory birds maps • literature references • academic professionals • environmental interest groups
Species at Risk	• To identify and assess the species at risk along and adjacent to a proposed project, TransCanada refers to the criteria provided by SARA and COSEWIC. • TransCanada incorporates the information from this assessment with information obtained during the identification of other wildlife and wildlife habitat.
Identification of potential environmental effects	TransCanada considers potential environmental effects, whether direct impacts or due to the modification of habitat potential on: • individual species and community levels impacts - spring winter range and nesting grounds for migratory birds - breeding and dancing grounds of migratory birds - nesting and staging areas for migratory birds - migratory birds timing constraints - migration patterns and migratory birds movement corridors • change in competition with other species of birds or other animals as a result of habitat change • predation or parasitism • quantitative or qualitative (e.g., contaminants, species shifts) changes to food sources • disturbances, such as: - noise (i.e., frequency, duration, and intensity); - structures that could become obstructions - visual changes - human use • aboriginal or local subsistence users of the wildlife resource • habitat fragmentation • wildlife mortality due to collisions with traffic • short term and long-term access considerations (i.e., use of signage, control

Activity	Description
	access, routing considerations) Consideration is also given to the potential effects of wildlife on the project (e.g., timing restrictions).
Develop mitigation measures	With a clear understanding of the wildlife (incl. Migratory birds and endangered species) within the area, TransCanada then determines the most appropriate route alignment. If possible, TransCanada avoids routing through critical and/or key habitat, unless it is possible for TransCanada to implement appropriate mitigative measures that will minimize the impact and are acceptable to regulators. If endangered or threatened species are encountered, TransCanada may consider: • identifying and implementing mitigative measures to address species-specific habitat and concerns; or • re-routing the pipeline to avoid potential impacts.
Validate mitigation measures with stakeholders	Discussion with key stakeholders is undertaken to ensure mitigative measures are appropriate to the situation, constructable, and sustainable.
Communicate and Implement Mitigation	• The measures are communicated through the alignment sheets and the environmental protection plan. • Further communication occurs at the pre-job meetings and during construction.

ROLES & RESPONSIBILITIES:

The Environmental Advisor and Environmental Consultant gather the historical and baseline wildlife information and use this information, in consultation with key stakeholders, to determine the need for wildlife surveys. The Environmental Consultant executes the survey(s) under the direction of the Environmental Advisor.

Using the baseline, historical, and survey information, mitigation measures are developed, validated, and communicated amongst the Environmental Advisor, Environmental Consultant, Environmental Inspector (when required), Project Manager and Construction Manager, in consultation with the identified key stakeholders.

4.1.4. PROTECTED AREAS, LAND USE

PHILOSOPHY:

Whenever possible, TransCanada avoids routing new lines through environmentally sensitive sites and special sites such as provincial parks, natural areas and ecological reserves. When it is not possible to avoid these areas, or if TransCanada has an established corridor through a protected landscape, TransCanada:

- Conducts an environmental assessment on the impacted VECs to evaluate the potential impacts on the ecological integrity or value of these protected landscapes.
- Determines the necessary requirements to minimize and mitigate potential environmental impacts.
- Discusses the existing use/goals of the site with the appropriate regulatory representatives to determine whether facility construction and reclamation are compatible with these goals (i.e., does the protected area allow for infrastructure development, including pipelines).

SCOPE:

All projects where there is the potential to have an environmental effect and / or those requiring an assessment of environmental effects as required by the NEB and/or CEAA.

PROCESS:

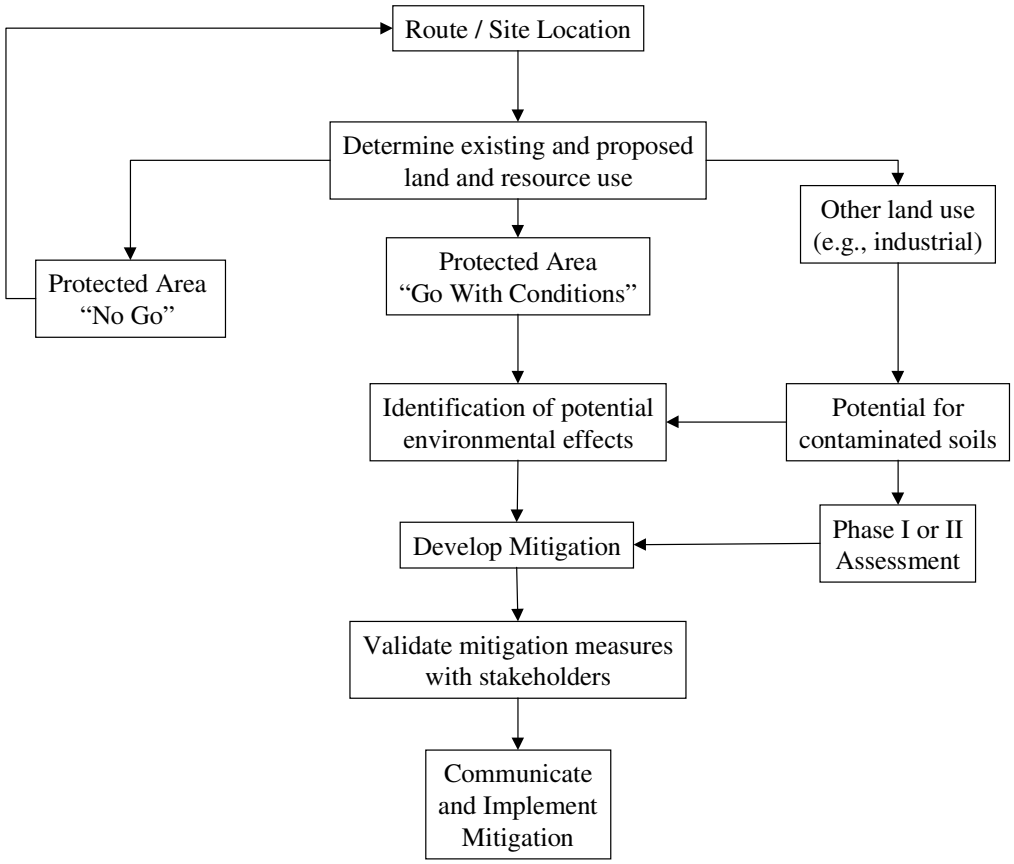

Figure 10: Assessment of land and resource use and protected areas.

Table 14: Land and resource use assessment.

Activity	Description
Determine existing and proposed Land & Resource Use	The land and resource use of an area can include: • rural and urban residential areas • reserve lands • agricultural areas • recreational areas • provincial and national parks • industrial and commercial areas • conservation areas • international Biological Program sites or other ecological reserves or preserves • paleontological, archaeological and historical sites or areas • controlled or managed forest areas • hunting, trapping or guiding areas • commercial, aboriginal and sport fishing areas • recognized scenic areas • water reserves and licenses • water supply sources • transportation infrastructure • traditional uses (e.g., berry picking) Some of the above are considered to be "protected areas" which have specific management plans and goals. Protected areas may include: • wilderness areas; • ecological reserves; • natural areas; • provincial parks; • wildland parks; • provincial recreation areas; • national parks; • historic sites; • bird sanctuaries; and, • conservation easements
Protected Area "No Go"	If it is determined that the management goals of an area are not compatible with facility construction / expansion, TransCanada must re-route or choose another site.
Protected Area "Go With Conditions"	• Identify stakeholder concerns associated with the proposed routing through protected and/or restricted areas. • Determine, with key stakeholders, what conditions might be placed on facility construction / expansion. Incorporate these conditions into the development of mitigation. • Discuss the existing use/goals of environmentally sensitive sites and specific sites such as provincial parks, natural areas and ecological reserves with the appropriate regulatory representatives to determine whether pipeline construction and reclamation are compatible with these goals.
Other land use	• Determine legislation and policies that are in place to address land use management conflicts. • Determine, with key stakeholders, what conditions might be placed on facility construction / expansion. Incorporate these conditions into the development of mitigation.
Potentially contaminated	• Special consideration for conducting Phase I or II site assessments should be

Activity	Description
sites	given when the proposed facility or pipeline transects industrial land use (chemical or manufacturing plants, oil and gas facilities such as wellsites, production plants, pipelines, etc.) • However, constraints may be imposed on TransCanada by third parties that could affect the comprehensiveness of the assessments completed (screening assessment).
Identification of potential environmental effects	• Consider the use of existing access to minimize interference with surrounding land use(s) when selecting a route. TransCanada prefers to locate valves sites at locations that are easily accessible by vehicle traffic to allow for day to day operation and maintenance. • Consider the possibility of future expansion of TransCanada's system. If such a potential exists, the project team should consider the land use as a constraint that may affect future looping of the pipeline. • Identify the potential conflicts between designated land uses and TransCanada's proposed pipeline routing. (e.g., multiple use of sensitive landscapes and environmentally significant sites)
Develop mitigation	• Identify requirements for specific or special mitigative measures for the conservation of the goals and land uses of the area. • Mitigation will be dependent on the use of the area and may include: - Access management measures (e.g., sight blocks, roll back); - Habitat enhancement; and - Narrowing of the right-of-way.
Validate mitigation measures with stakeholders	Discussion with key stakeholders is undertaken to ensure mitigative measures are appropriate to the situation, constructable, and sustainable.
Communicate and implement mitigation	• The measures are communicated through the alignment sheets and the environmental protection plan. • Further communication occurs at the pre-job meetings and during construction.

ROLES & RESPONSIBILITIES:

The Environmental Consultant gathers the historical and baseline information to identify existing land use and protected areas under the direction of the Environmental Advisor. If there are "no-go" areas identified, the Project Team needs to identify another possible route that would avoid these areas.

Using the historical, and current information, mitigation measures are developed, validated, and communicated amongst the Environmental Advisor, Environmental Consultant, Environmental Inspector (when required), Project Manager and Construction Manager, in consultation with identified key stakeholders.

4.1.5. WATER CROSSINGS AND AQUATIC RESOURCES

PHILOSOPHY:

TransCanada conducts watercourse crossing assessments to determine appropriate crossing methodologies that prevent or reduce the impact of construction activities on fish and fish habitat. These assessments are based on site-specific environmental parameters, geotechnical considerations, construction timing and economic factors.

In assessing the environmental, geotechnical and hydrological information and construction timing, TransCanada determines the most appropriate crossing methodology for each watercourse crossing. This information provides documentation to meet the intent of all applicable legislative and regulatory requirements. Further, this information can be used to determine the best water source for hydrostatic testing.

SCOPE:

Applies to all projects with water crossings where there is the potential to have an effect on fish or fish habitat, including those requiring an assessment of environmental effects as required by the NEB and/or CEAA.

PROCESS:

TransCanada collects environmental information in the assessment of each watercourse crossing. At select watercourses geotechnical and hydrological information is also collected. This information is used to determine criteria and constraints upon which water crossing methodologies are considered.

The environmental information collected may include, but is not limited to:
- common fish and wildlife species;
- rare and endangered species;
- timing constraints / sensitive windows;
- fisheries and wildlife habitat (quantity and quality);
- sensitive habitats; and
- other activities at or near the crossing location.

The environmental information allows TransCanada to:
- meet regulatory requirements;
- meet the DFO *Fisheries Act* policy of 'No Net Loss' of habitat; and,
- judge whether a proposed pipeline crossing could potentially cause harmful alteration, disruption or destruction (HADD) to fish habitat.

The geotechnical and associated hydrological factors that may be assessed include, but are not limited to:
- river or creek hydrology, including seasonal and design flows;
- surficial and/or bedrock geology of the approach slopes, bed and banks;
- drainage control on the approach slopes; and,
- slope and bank stability.

A geotechnical assessment also identifies the type of substrate material that may be encountered at trench depth.

As a result of the environmental and geotechnical assessments, TransCanada determines the most appropriate crossing methodologies to maintain environmental protection, pipe integrity and approach slope stability and to provide:

- the most practical crossing techniques, including contingency plans, and crossing locations (the preferred technique is usually the technique that provides environmental protection as well as being technically feasible and cost-effective);

- appropriate mitigative measures to prevent or reduce the impacts of construction on the aquatic and riparian communities, the watercourse and its approach slopes;
- an appropriate crossing schedule that corresponds to the lowest period of environmental and watercourse parameter sensitivity (e.g. identifying fisheries and wildlife construction timing windows);
- contingency plans for fuel and hazardous waste spills;
- mitigative measures to minimize equipment activity within the perimeter of the watercourse crossing location;
- monitoring plans (e.g., sediment monitoring);
- mitigative measures to ensure noxious weeds are not transferred from construction equipment into the crossing habitat;
- when required, sources of clean gravel, cobble and rip-rap, prior to construction, to use for site and habitat re-stabilization and reclamation; and
- sufficient workspace on the approach slopes and the watercourse crossing to ensure surface material and spoil material removal does not impact fisheries resources and habitat.

TransCanada documents the evaluations and assessments to demonstrate due diligence in determining impacts associated with a crossing technique and/or proposed mitigation measures.

TransCanada attempts to install each crossing as quickly as possible to minimize potential environmental impacts during construction.

The following diagram (Figure 11) illustrates the process that is used to evaluate potential environmental effects on aquatic resources from a water crossing and describes:

- The key environmental and geotechnical considerations of the crossing;
- The possible crossing techniques and considerations for choosing a method;
- The contents of the Water Crossing Plan (more details are found in section 5.2);
- Regulatory approvals (see also section 1.3); and
- Implementation of the plan (see also section 7.0).

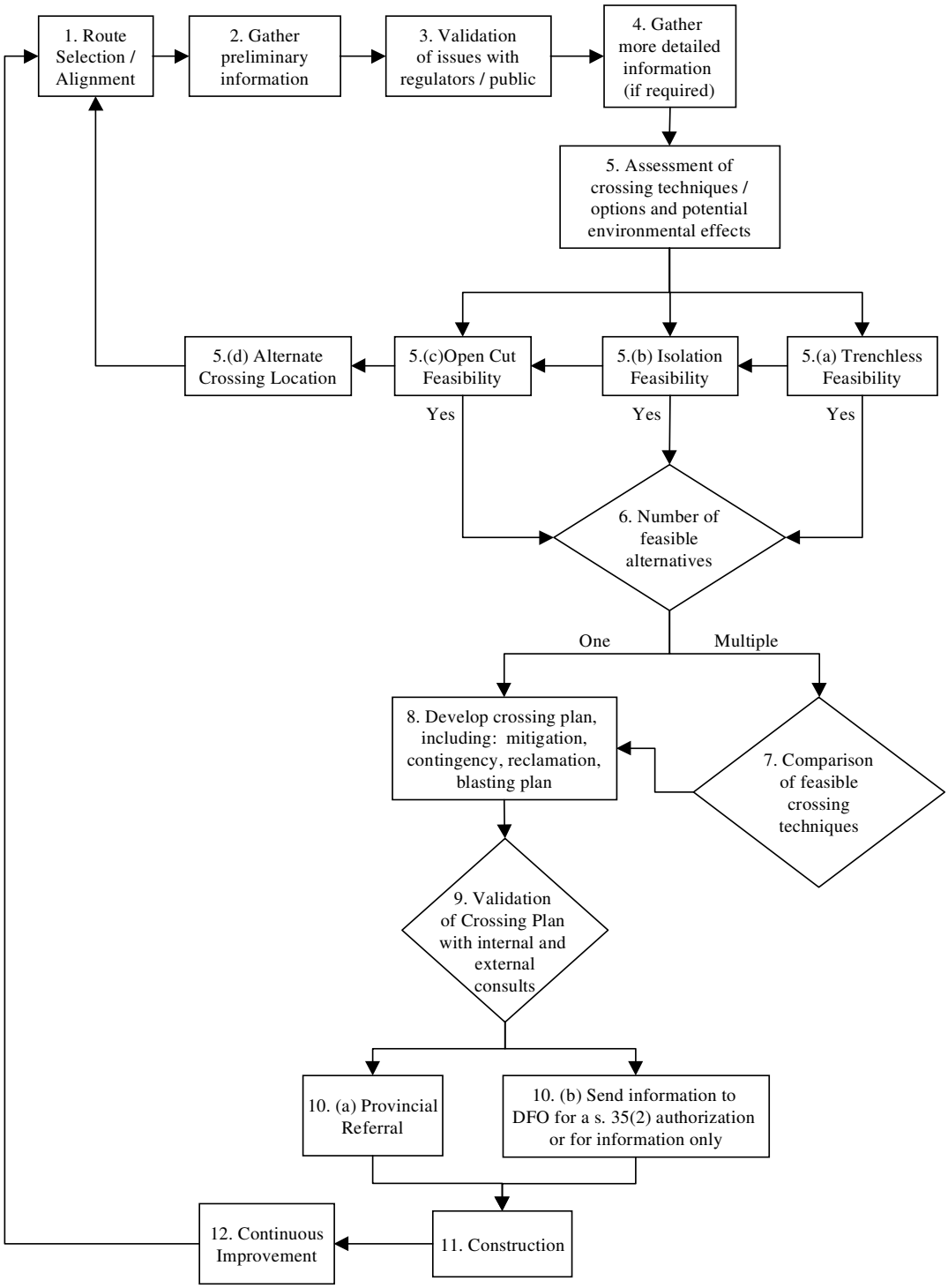

Figure 11: TransCanada's watercourse crossing decision-making framework

Table 15: Steps to TransCanada's watercourse crossings decision-making framework.

Activity	Description
Route Selection	When choosing a pipeline water crossing location a route is selected: • That minimizes the number of sensitive water crossings and is economically viable, (i.e., does not add substantial length to the pipeline). • That is adjacent to an existing right-of-way or linear disturbance, if practical and where thresholds will not be exceeded (i.e. minimize cumulative effects). • With consideration of the geotechnical, environmental, land use, reclamation, or other water use (e.g. downstream users) concerns and the potential to mitigate these concerns. To finalize the route selection, an assessment is conducted to determine the feasibility of the crossing (i.e., can it be built) and to identify a crossing methodology that would create minimal impact to the environment.
Gathering Biophysical Information	A biophysical assessment is conducted to identify the level of sensitivity of the watercourse and aquatic resources. The information collected may include, but is not limited to: • common fish and wildlife species • rare and endangered species • timing constraints / sensitive windows • fisheries and wildlife habitat (quantity and quality) • sensitive habitats • other activities at or near the crossing location • rare and endangered species • width of the current corridor and incremental impact to the environment at this location (i.e. how will these crossing impacts "cumulatively" with other crossings?) • impact of sediment load on fish and fish habitat • recreational, domestic or commercial fishery presence • heritage resources • traditional land use • designated areas of significance • downstream water users (e.g. licensees, domestic/municipal water supply) • previous reclamation experience • habitat maps • presence or absence of species • the identification of critical fisheries habitat features (e.g. spawning, overwintering, rearing, nursery, migration) • ability to reclaim the crossing to acceptable condition, consistent with previous condition
Gathering Geotechnical Information	At select crossings, a geotechnical evaluation may also be undertaken. The objective of the geotechnical assessment is to provide information for the engineering design and to identify long and short-term processes that could affect fish, fish habitat, water quality, and pipe integrity. The geotechnical and associated hydrological factors that are assessed may include, but are not limited to: • river or creek hydrology, including seasonal and design flows • surficial and/or bedrock geology of the approach slopes, bed and banks • drainage control on the approach slopes • slope and bank stability • type of substrate material that may be encountered at trench depth • watershed characteristics (e.g., drainage area, special wildlife/fisheries habitat designations)

Activity	Description
	• historical data (e.g., past bore hole or construction data, geological maps, air photos); • surface assessment of substrate (sand, clay, gravels) • visual presence of bedrock; • presence of unconsolidated material • unstable terrain • constructability concerns • watercourse characteristics (e.g. stream gradient, stream morphology, substrate characteristics) • watercourse valley characteristics (e.g. approach slope stability, drainage area) • watercourse navigation
Borehole Investigation	If a more comprehensive picture of the location is required, a borehole investigation may be supplemented with a geophysical assessment, which could include: • refractive seismic • reflective seismic • ground penetrating radar • transient electromagnetic sounding
Other Considerations	The following factors are also considered: • Contractor/equipment availability, size/weight of equipment and assessment of risk. • Life Cycle Cost (including construction, inspection, remediation, maintenance and operational costs). • Construction schedule (e.g., season and seasonal accessibility). • Available work space. • Landowner, community, and regulatory issues. • Pipeline diameter. • Pipe integrity hazards and risks. • Possible pipeline profiles across the watercourse and valley. • Likelihood of success of a trenchless crossing (i.e., technical feasibility, risk of failure).
Documenting Assessments	TransCanada documents the evaluations and assessments to ensure and demonstrate due diligence in determining impacts associated with a crossing technique and/or proposed mitigation measures.
Validation of issues with key stakeholders	As part of the Stakeholder Consultation process, TransCanada ensures that all concerns/issues related to the watercourse crossings have been captured and considered in the decision-making process.
Assessment of Crossing Techniques / Options and Potential Environmental Effects	• Based on the results of the assessment, each of the following crossing techniques is analyzed to select the most appropriate method. • The preferred technique is generally the technique that provides environmental protection as well as being technically feasible and cost-effective.
Trenchless Technique	The following factors are considered to determine if a trenchless crossing is feasible: • Where isolation is a requirement, consideration is given to whether water flows are too great to allow for a standard isolated crossing. • If there is a high quality of fisheries habitat at or near the crossing. • The restoration/reclamation capability (e.g., unstable slopes that could be hard to reclaim or could have long-term erosion problems). • Water quality concerns. • Long-term pipeline integrity concerns. • Pipeline and water crossing construction schedule (including timing windows and access timing). • Availability of work space at the crossing, including space for the trenchless pipe string. • Presence of substrate materials, and/or the reliability/variability of the subsurface

Activity	Description
	information. • The risk(s) / effect(s) of a mud "frac-out". • Availability of an experienced contractor and equipment.
Isolation Technique	The following factors are considered to determine if an isolation crossing is feasible: • Flows are low enough to effectively isolate the crossing from the watercourse. • Banks can be reclaimed with known technologies, while considering the existing riparian habitat aesthetics. • Sensitive fisheries habitat near the crossing. • There would be minimal to no effect on downstream water users.
Open Cut Technique	The following are some of the factors considered to determine if an open cut crossing is feasible: • If at the time of the crossing, there would be no flowing water in the watercourse (i.e., dry or frozen). • Trenchless crossing and isolation techniques are deemed unsuitable, or are not feasible based on an engineering assessment. • This approach may be considered a contingency plan to another technique in the event that the primary crossing technique fails during construction, if other contingencies are not feasible. Mitigative measures, such as high volume pumping or partial water diversions, may be incorporated into the open cut option to minimize environmental impacts.
Mitigative Measures	The following are some of the mitigative measures taken into account in selecting and implementing a watercourse crossing. • An appropriate crossing schedule that corresponds to the lowest period of environmental and watercourse parameter sensitivity (e.g., identifying fisheries and wildlife construction timing windows). • Contingency plans for fuel and hazardous waste spills. • Minimize equipment activity within the perimeter of the watercourse crossing location. • Ensure noxious weeds are not transferred from construction equipment into the crossing habitat. • Sources of clean gravel, cobble and rip-rap, prior to construction, to use for site re-stabilization and restoration (i.e., habitat). • Sufficient workspace on the approach slopes and the watercourse crossing to ensure surface material and spoil material removal does not impact fisheries resources and habitat.
Alternate Crossing Location	If it is apparent that there are critical concerns (e.g., constructability, environmental, pipeline integrity, public, etc.) with the crossing location, another location would be considered.
Develop and Document Watercourse Crossing Plan	Depending on the nature and scope of the crossing, TransCanada may prepare a Watercourse Crossing Plan. The watercourse crossing plan should include the following at a minimum: • Fisheries, wildlife, watercourse and geotechnical information • Primary crossing technique • Contingency method and its timing to be used in the event the primary crossing technique is unsuccessful • Details on any requirements for blasting (Note: if blasting is required, DFO must be notified) • Mitigative measures • Reclamation plans • Construction schedule • Drawings stamped by a Professional Engineer (P. Eng.) (for designed crossings) • Letter from P. Eng. stating that design meets applicable industry and regulatory guidelines (for designed crossings) • Maps, drawings • Monitoring plan (e.g. suspended sediment) where appropriate • Inspection plan at the crossing during construction

Activity	Description
Permits And Approvals	The appropriate provincial and federal permits and approvals are obtained. (Refer to section 1.3)
Construction Of Crossing	• TransCanada attempts to install each crossing as quickly as possible to minimize potential environmental impacts during construction. • TransCanada's standard construction practices are outlined in the following two documents: - TES-PROJ-PCS Pipeline Construction Specification (003745282); and - TES-PROJ-WTR Water Body Crossing Specification (003748064). • During construction, TransCanada ensures that the EPP is followed and any other mitigation that is included in the watercourse crossing plan and permit/approval conditions are incorporated into construction documents and enforced during construction. • TransCanada also assigns appropriate inspection to the watercourse crossing to ensure the watercourse crossing plan and associated protection measures are implemented.
Blasting	Where blasting is required, TransCanada will ensure that the federal and any provincial blasting guidelines are adhered to. If these guidelines cannot be met, an authorization must be obtained from DFO (*Fisheries Act, s.32*).
Continuous Improvement	Where appropriate, TransCanada conducts post-construction meetings with personnel (internal and contractor) and key stakeholders (e.g. regulators, public), involved with the crossing to assess the success of the crossing and to capture learnings and areas for improvement.

ROLES & RESPONSIBILITIES:

The Environmental Advisor and Environmental Consultant gather the historical and baseline aquatic and watercourse information and use this information, in consultation with the Project Manager and key stakeholders, to determine the need for biophysical surveys. The Project Manager and Engineering would determine the need for geotechnical surveys. The Environmental Consultant executes the biophysical survey(s) while a Geotechnical Consultant executes the geotechnical surveys, with the Environmental Advisor, Project Manager and other key stakeholders as consults.

Using the baseline, historical, and survey information, the Environmental Advisor, Environmental Consultant, Environmental Inspector, Project Manager and Construction Manager assess the potential crossing techniques and propose preferred crossing methods. These methods are then validated with key stakeholders, when required, prior to applying for approvals.

When required, based on the nature and scope of the project and water crossings, a final Watercourse Crossing Plan may be developed, validated, and communicated amongst the Environmental Advisor, Environmental Consultant, Environmental Inspector (if available), Project Manager, Construction Manager, and Contractor, in consultation with identified key stakeholders.

4.1.6. AIR

PHILOSOPHY:

Dust and emissions from equipment are the primary air quality concerns during construction. Measures are taken to ensure the highest air quality possible during construction. Ambient air quality assessments are also undertaken to assess impacts from compressor station facilities.

TransCanada complies with national and applicable provincial ambient air quality objectives and any permits or approvals granted for a facility or project.

TransCanada also has a proactive program for monitoring and reducing greenhouse gas emissions from its facilities during operation which can be found in the Fugitive Emissions Management Technical Operating Procedure (TOP) (ID# 003691772).

SCOPE:

All projects that have the potential to impact air quality (e.g., right-of-way construction, operation and construction of compression facilities, blow-downs), including those requiring an assessment of environmental effects by the NEB and/or CEAA.

PROCESS:

When identified as an issue, TransCanada assesses the potential for air quality impacts on surrounding land uses (i.e. roads and highways, agricultural land uses, sensitive wildlife habitat, water quality) that may occur from any proposed projects.

Examples of potential air quality impacts during construction include:

- NO_X, CO and CO_2 from construction equipment exhaust;
- Emissions from welding and clearing activities (if brush is burned);
- Emissions during initial purging and commissioning of the pipeline;
- Dust generated during construction;
- Methane emissions from blowdowns and purging; and
- Fugitive methane emissions.

For compression facilities, TransCanada may also undertake baseline air quality monitoring and modelling to aid in the prediction of potential environmental effects of its proposed project (i.e., compression facilities). These baseline studies may be done when TransCanada is proposing to add a new compressor station, increase horsepower (i.e. new or bigger units), re-commission a unit, or increase frequency of the use of a unit (e.g., from 75% to 100%).

Mitigation measures that may be applied to minimize potential air quality impacts from construction include:

- Providing dust suppression when required using water or other approved methods;
- Minimizing burning (of cleared, non-merchantable vegetation) where and when necessary; and
- Providing appropriate air protection devices for contractors if necessary.

ROLES & RESPONSIBILITIES:

The Environmental Advisor and Environmental Consultant are responsible to undertake the ambient air quality assessments. Based on these assessments and the proposed project activities, mitigation measures are developed by the Environmental Advisor, Environmental Consultant, Project Manager, Environmental Inspector, and Construction Manager, in consultation with other key stakeholders.

The monitoring of air quality during construction and the successful implementation of mitigation measures is the responsibility of the Environmental Inspector and the Construction Manager.

4.1.7. NOISE

PHILOSOPHY:

TransCanada's Noise Management Program is designed to responsibly and cost-effectively manage noise issues across TransCanada's system, taking into account safety issues, regulatory compliance, community impacts, technical limitations, cost, service to TransCanada's customers and the diversity of the facilities and communities in which TransCanada does business.

SCOPE:

Applies to all projects where noise may be an issue (e.g., construction of new facilities and modification and operation of existing facilities), including those requiring an assessment of environmental effects by the NEB and/or CEAA.

PROCESS:

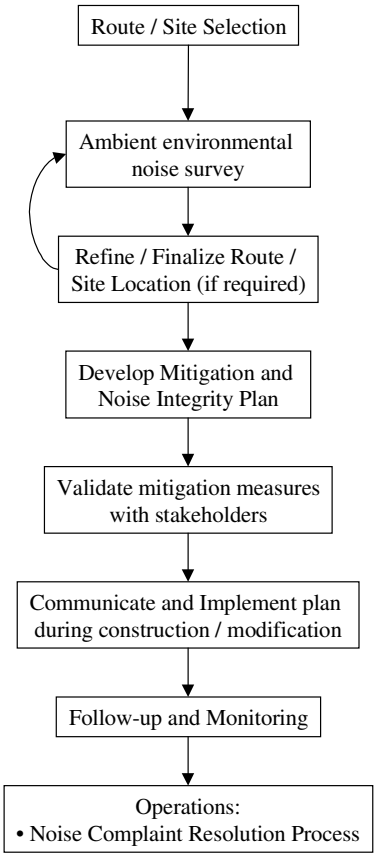

Figure 12: Noise management process.

Table 16: Details of the noise management process.

Activity	Description
Route / Site Selection	• Make site selections considering surrounding land uses, the location of occupied residence(s), and the impact of construction- and operations-related noise. • Not all projects will require this step as some will occur completely within the existing station yard.
Ambient environmental noise survey	• Evaluate new facilities and modifications of existing facilities using the *Environmental Noise Management Program* (Sections 5.2.1.2 and 5.2.1.3) (ID# 003722176) • When required, perform an *Environmental Survey* to compare current noise emissions to Noise Management Program engineering directives (Section 5.2) • When required (i.e. new site or expansion of an existing site), conduct surveys to determine the locations of wildlife habitat and associated buffer and timing restrictions (see section 4.1.3).
Develop Mitigation and Noise Integrity Plan	• When required, a *Noise Integrity Plan* is implemented to identify and monitor sites with higher environmental noise risks – consult TransCanada's database of current and historical complaints and historical monitoring to assess a site's noise impacts and relative risks. • If critical wildlife habitat is present (i.e.: waterfowl, raptor or heron breeding and nesting areas) prepare an assessment outlining the mitigation techniques required to ensure adequate protection of the habitat • Mitigation techniques may include provisions such as: - Observing noise buffer zones - Scheduling construction times to minimize short-term impacts to habitat - Additional consultation with government agencies - Comply with all applicable regulatory requirements
Implement plan during construction / modification	• Ensure that heavy equipment and other construction related vehicles are equipped with properly functioning mufflers • Confine significant noise-generating construction to daytime hours (e.g., 7 am-10 PM)) whenever possible • Set up appropriate signage, traffic controls and blast mats for projects requiring blasting near roads or highways • Notify landowners, neighbouring residents, farm operators and appropriate authorities prior to blasting according to TransCanada's *Public Consultation Program* and *Construction Specifications*. • Comply with all applicable regulatory requirements
Follow-up and Monitoring	• Perform an *Acoustic Performance Survey* to determine how noise attenuation measures and silencing systems (if installed) perform relative to the design requirements and associated manufacturer specifications. • Perform an *Occupational Noise Survey* for potential employee noise hazards: - Every 3 years or when process, operational or structural changes occur - When audiometric data indicates incidence of abnormal shifts in the hearing of employees within a given work location which may be occupationally related - When a noise-exposed employee meets the Worker's Compensation Board criteria for compensable occupational noise induced hearing loss • Perform *Regularly Scheduled/Ongoing Environmental Noise Monitoring* surveys to identify any significant changes to the noise impacts of operating facilities • Comply with all applicable regulatory requirements
During Operations	• Ensure that facility noise emissions under normal operating conditions do not exceed the applicable federal, provincial or municipal noise control by-laws, guidelines and regulations (Noise Management Program, Section 6.2) • Make considerations to mitigate noise impacts to a reasonable level during compressor start-up, scheduled maintenance and emergency shutdown procedures

Activity	Description
	• Utilize engineering and administrative controls whenever feasible to mitigate noise impacts from operations activities • Respond to all noise-related complaints according to TransCanada's *Noise Complaint Resolution Process:* - Acknowledge receipt of a complaint with the landowner within three (3) working days - Gather detailed information from the landowner using a standard Complaint Investigation Form - Gather operational data to determine any changes in operation that may have led to the complaint - Develop and communicate an action plan to the landowner and other key stakeholders within fifteen (15) days of receiving specific complaint information - Ensure that the facility was operating in compliance with the most recent regulatory requirements regarding noise emissions - Identify and evaluate noise management/mitigation options - If the landowner is satisfied with the action plan, implement the proposed mitigative measures - Follow up with the landowner to determine if the problem is resolved • Conduct hearing tests and provide education and training for employees at risk of noise-related impacts

ROLES & RESPONSIBILITIES:

The ambient environmental noise surveys are undertaken by an Environmental or Engineering Consultant under the direction of Engineering in consultation with the Environmental Advisor.

Engineering and the Environmental / Engineering Consultant then develop the mitigation and Noise Integrity Plan, based on the baseline information and proposed project, in consultation with the Environmental Advisor, Project Manager and key stakeholders.

The implementation of the plan during the project is the responsibility of Engineering, the Environmental / Engineering Consultant, the Environmental Inspector, and the Construction Manager. Plant Engineering also takes the lead to follow-up during operations to assess the effectiveness of the plan.

4.1.8. HERITAGE RESOURCES

PHILOSOPHY:

Heritage resources include any structure, site or artifact that is of value for its paleontological, archaeological, or cultural importance. TransCanada takes steps at the start of each project to identify whether heritage resources are an issue and if so, whether they may be present in the immediate area of the project (i.e., on the proposed route or site). If heritage resources are present, TransCanada takes the necessary mitigative steps during its project activities to protect the area.

SCOPE:

Applies to all projects where effects to heritage resources may occur, including those requiring an assessment of effects by the NEB and/or CEAA.

PROCESS:

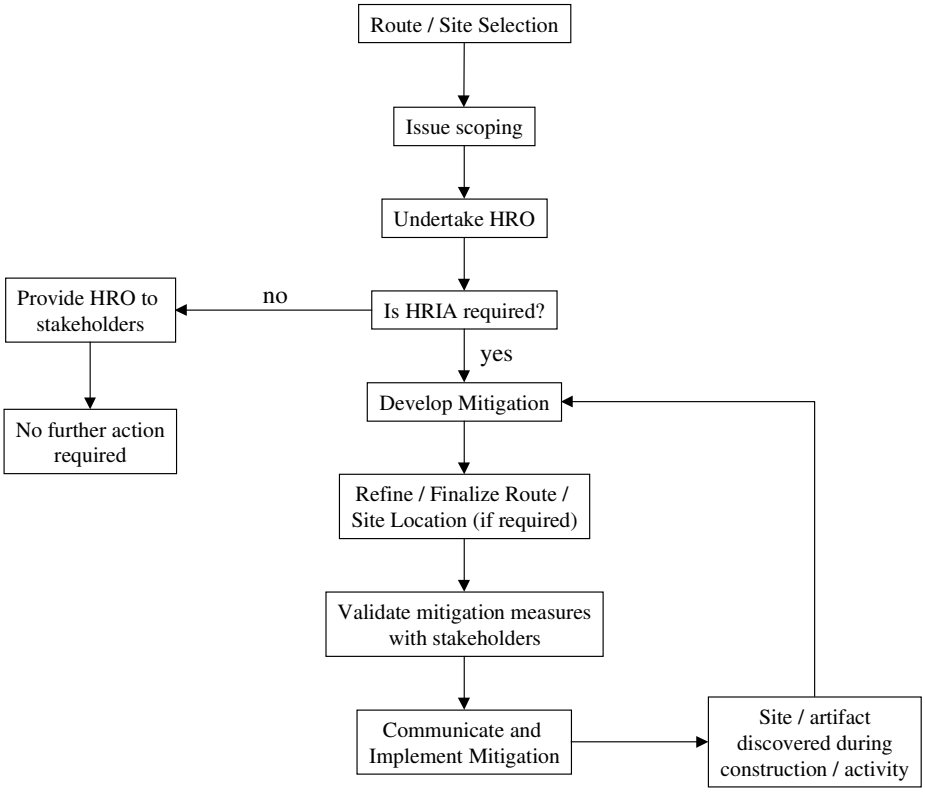

Figure 13: Process for assessing heritage resources.

Table 17: Heritage resources assessment process.

Activity	Description
Issue Scoping	• If heritage resources are identified as a potential issue, TransCanada employs a qualified archaeologist or palaeontologist, and consults with representatives from aboriginal communities, to identify any heritage resources that would be affected by the project. • Issues concerning heritage resources are initially identified: - Through stakeholder consultation, including consultation with aboriginal communities and regulators; and, - By undertaking a Heritage Resources Overview (HRO), conducted by a qualified archaeologist.
Undertake HRO	• Conducted by a qualified archaeologist.
HRIA not required	• TransCanada files the HRO with its application and provides a copy to stakeholders if requested.
HRIA required	• If further assessment is required, a Heritage Resources Impact Assessment (HRIA) is conducted to determine whether paleontological, archaeological, or historical artifacts exist at the construction site and therefore must be protected.
Develop mitigation	• Depending on the outcome of the HRIA, TransCanada may be required to implement specific mitigative measures, which can include re-routing or a comprehensive site dig.
Communicate and implement mitigation	• TransCanada provides the HRIA report in its application and to stakeholders involved in compiling the HRIA. • Any mitigation measures developed are included in the EPP and construction contract. • Implementation is monitored by the Environmental Inspector, Construction Manager, and, where required, a qualified archaeologist or representative from the local community.
Site / artifact discovered during construction	• If sites or artifacts are discovered during construction, all construction activities at that location cease until the proper authorities are notified and approval to proceed is granted.

ROLES & RESPONSIBILITIES:

The consultant (Archaeologist) undertakes the HRO in consultation with the local communities, regulators and the Environmental Advisor. Upon completion of the HRO, the regulators determine whether an HRIA is required. If an HRIA were required, the Archaeologist would undertake the HRIA again in consultation with the local communities and the regulators.

Often the regulators and communities will request specific mitigation. The Project Manager, Environmental Advisor and Archaeologist would then discuss what mitigation would work best given the project parameters. The final mitigation plan is then validated with the community(ies) and regulators and implemented by the Archaeologist, Environmental Inspector, and Construction Manager in the field. If a site or artifact is discovered during construction, activity is stopped until the Archaeologist can assess the site.

4.2. SOCIO-ECONOMIC ASSESSMENT

PHILOSOPHY:

As part of the NEB regulatory process, TransCanada may be required to undertake a socio-economic assessment to:

- define the socio-economic impact area;
- describe existing socio-economic conditions that may be affected by the proposed project; and
- describe general and specific mitigation that is technically and economically feasible, including measures to promote positive, project-related socio-economic effects.

Socio-economic conditions can include:

- local and special group employment opportunities and interactions with other industrial and resource development activities;
- demographic effects;
- fiscal effects of government programs; and
- health effects.

SCOPE:

Applies to projects requiring an approval under the NEB.

PROCESS:

The focus of the discussion in this section will be on the project-environment interactions that may have an impact on the socio-economic conditions within the project area, whether positive or negative.

The relationship between the assessment of socio-economic factors and environmental and heritage resources is demonstrated in Figure 14.

The assessment of the socio-economic factors provides the land use and economic setting for the project area (e.g., oil and gas operations, timber harvesting, trapping, Land and Resource Management Plans (LRMPs), community profiles and services, access, recreational activities, etc.). The assessment will also identify the economic and other direct effects of the project on these activities. The socio-economic assessment also provides relevant trapping and guide/outfitting information gathered during the course of consultation. This information is also utilized in the assessment of potential environmental effects (e.g., species harvested, important hunting/trapping areas, etc.). The SEIA can also provide information on projects that may occur in the reasonably foreseeable future.

The environmental effects assessment in turn, provides information that can be used in the socio-economic assessment. Section 4.1 discusses the processes for describing and assessing the biophysical conditions in the project area. Project-related effects on these resources that have the potential to influence land use practices (and associated economics) are identified and then addressed in the SEIA. The SEIA then assesses the economic implications of those effects on land uses (e.g., the EA will quantify the change in habitat availability of marten resulting from the project. The SEIA would discuss the effects of this change on trapping potential and associated revenues).

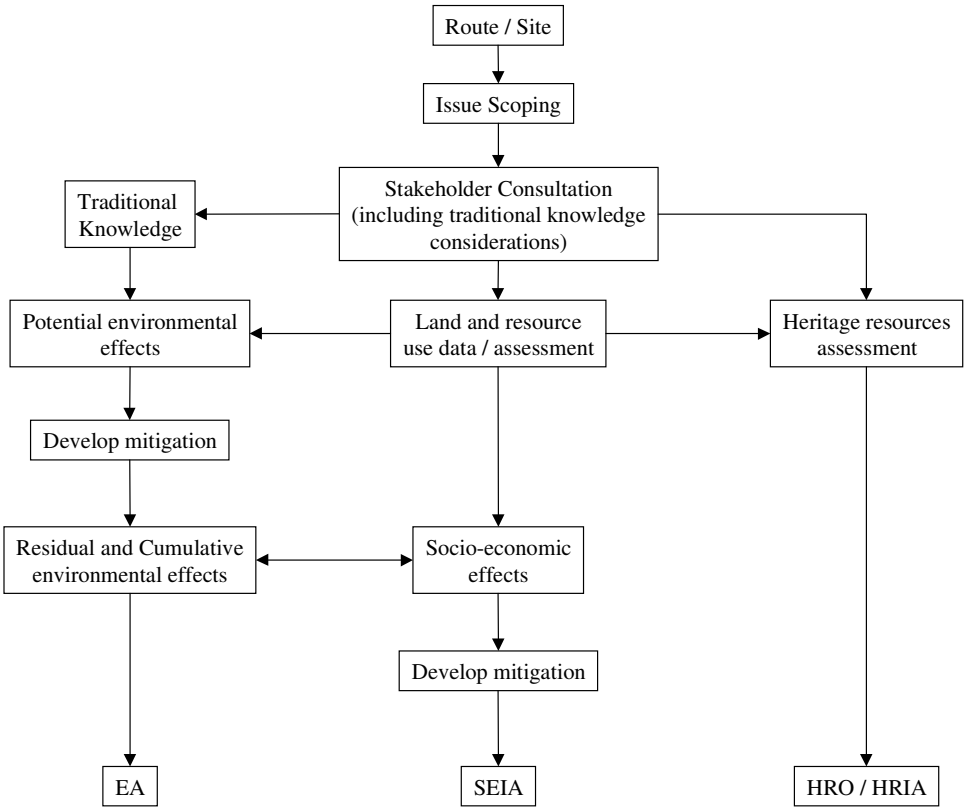

Figure 14: Assessing potential effects and the interaction between SEIA, EA and HRIA.

During the stakeholder consultation process and the assessment of heritage resources, TransCanada gathers Traditional Knowledge along and in the general vicinity of the pipeline route or site (e.g., important hunting or gathering areas, mineral licks, key game trails, perceived historical trends in wildlife abundance). This Traditional Knowledge can then be used in both the SEIA and EA.

ROLES & RESPONSIBILITIES:

The assessment of socio-economic effects (both positive and negative) depends on a multi-disciplinary and multi-stakeholder approach. Within TransCanada, the LCA Representative leads the SEIA, often working with a SEIA Consultant. Key inputs into the SEIA however, occur from the EA and HRIA that are the responsibility of the Environmental Advisor.

5.0 DEVELOPMENT OF MITIGATION

TransCanada identifies technically and economically feasible mitigation measures identified as industry best practice that are appropriate to eliminate, minimize, or manage any effects identified through the analysis of potential environmental effects. The majority of these mitigation measures are part of TransCanada's standard construction and operation practices and are included in TransCanada's generic and site-specific Environmental Protection Plans (EPPs) and project-specific environmental alignment sheets.

Mitigation measures are developed using a multi-disciplinary, and often multi-stakeholder, team. TransCanada begins discussing potential mitigation measures very early in the issues scoping phase of a project.

TransCanada's mitigation measures are found in the following documents:

- generic and site-specific EPPs;
- environmental alignment sheets;
- Erosion and Sediment Control Plans (which include the Water Crossing Plan);
- Reclamation Plan; and
- Adverse Weather Contingency Plan.

The above documents are described in more detail below. TransCanada's *Pipeline Construction Specification* (2001) and *Water Body Crossing Specification* (2001) also provide mitigation measures but will not be described here in detail.

5.1. ENVIRONMENTAL PROTECTION PLAN (EPP)

PHILOSOPHY:

The Environmental Protection Plan (EPP) outlines the environmental mitigation measures to promote maintaining equivalent land capability over the life of a pipeline and that there is no net loss to VECs. The protection measures defined within an EPP are determined based on the:

- scope of the project;
- landscape features (e.g., spatial boundaries);
- identified VECs;
- analysis of potential environmental effects; and,
- stakeholder consultation

SCOPE:

Applies to all projects. However, there may be certain measures that will not apply to a given project based on the scope of the proposed work, including schedule and location (e.g., there may not be a water crossing). Further, the amount of detail and mitigation measures is dependent on the nature and scope of the project.

PROCESS:

The main goal of the EPP is to ensure equivalent land capability is maintained and that there is no net loss to VECs. To achieve this the EPP:

- identifies the environmental mitigation measures to be implemented during construction;
- outlines mitigation measures to ensure that land surface reclamation is implemented after construction;
- incorporates the resource and habitat criteria of the VEC assessments;
- integrates regional goals and objectives;
- meets regulatory requirements; and
- incorporates public input.

The outline of the EPP follows construction activity processes. This enables users to define specific mitigative measures for each phase of activity within the construction sequence.

Table 18 identifies each section within the EPP and the objectives of the associated mitigative measures. The table provides examples of mitigation for each construction method but is a guide only (i.e., not inclusive of all potential mitigation measures). Site-specific EPPs are developed as required for projects.

ROLES & RESPONSIBILITIES:

The development of the EPP is dependent on clear communications between TransCanada and its stakeholders. The main roles responsible for the development, communication and implementation of the EPP are the Environmental Advisor, Environmental Consultant, Environmental Inspector, Project Manager, and Construction Manager.

Table 18: Objectives of mitigative measures found in the EPP.

Construction Phase / Topic	Description of Mitigation	Objectives
GENERAL MEASURES	The General Measures section outlines standard specifications and best practices that can be utilized during all aspects of construction. These measures include, but are not limited to: • Access Management / Control; • Livestock management; and, • Staking / flagging key areas.	• Where possible, existing access will be used for construction and operations to minimize TransCanada's environmental footprint and minimize habitat fragmentation. • Where possible, access routes are selected that avoid sites susceptible to severe erosion. • Where possible, access across watercourses is timed to avoid impacts during sensitive fisheries windows.
CLEARING AND GRUBBING	• **Clearing** is the process of removing all material on the right-of-way that may impede construction activities. • During clearing activities, merchantable and non-merchantable timber, agricultural crops, building and refuse are removed from the right-of-way. • Clearing of the right-of-way may take place in advance of the Pipeline Construction and either the Clearing or Pipeline Contractor may perform the work. • All construction practices must meet fire protection regulations. Fire-fighting equipment must be maintained on site, and burning permits obtained as required. During times of extreme fire hazard, open fires are forbidden on the rights-of-way and vehicles and machinery must be equipped with spark arrestors. • **Grubbing** is the process of removing stumps, rocks and woody material from the construction right-of-way. • Depending on the land use along an existing or adjacent to a new right-of-way, grubbed material may be completely removed or spread back across the disturbed area during cleanup activities. • Grubbing is performed by the Pipeline Contractor and takes place during the surface soils stripping and grading phase of the construction project.	• Decrease erosion potential through minimal disturbance of the surface organics and roots systems. • Conserve surface materials to promote successful reclamation. • Promote natural encroachment of vegetation in selected areas. • Where TransCanada cannot locate rights-of-way through forests of relatively low value, merchantable timber is salvaged as specified by the landowner or cutting license. • Avoid damaging bark or breaking limbs on trees along the edges of the rights-of-way. • In key wildlife habitat areas, the right-of-way clearing widths are reduced to preserve wildlife cover and line-of-sight blocks may be planted. • Avoid building push-outs whenever possible by getting rid of slash in other ways, such as by chipping or disposal at approved fill sites. If this is not possible, push-outs are to: - avoid wetland areas; - be located away from watercourses or well-travelled roads; - minimize visual impact; - be cleared of woody vegetation prior to storage of timber or graded materials; and - allow easy access for later timber removal.

Construction Phase / Topic	Description of Mitigation	Objectives
SURFACE MATERIAL / TOPSOIL STRIPPING	• Surface material/topsoil stripping is a primary environmental consideration in pipeline construction. • TransCanada recognizes that surface material/topsoil stripping and salvaging is the first step in maintaining equivalent soil capability. • To avoid mixing soils, topsoil is stripped to the locally defined depth, stored separately from subsoil, and later replaced with a minimum of handling. • Construction is scheduled for periods when soils are normally dry, to avoid soil mixing or compaction and leaving ruts from equipment. • Projects in agricultural areas are scheduled as little as possible during the winter to minimize impact to soil productivity. • Contingency plans are employed to protect the integrity of the soil during adverse weather situations. • Final clean-up of a winter pipeline operation is left until conditions are conducive in the spring or summer. • ***Blasting*** procedures are controlled to protect operating mainline loops, to reduce fly-rock, and minimize disturbance to surrounding land uses (e.g., livestock).	• Conserve surface material for future replacement and reclamation and to maintain equivalent land capability • Employ mitigative measures that minimize the degradation of surface material/topsoil through compaction, rutting, loss of surface organic material, and soil mixing • Ensure surface material/topsoil stripping techniques enhance and promote successful reclamation.
GRADING	• Grading activities are undertaken to construct a right-of-way that meets the bending limitations of the pipe and to allow safe passage of equipment. • TransCanada attempts to minimize grading on the rights-of-way, where deemed necessary. • Grading is undertaken by the Pipeline Contractor and is normally carried out concurrently with surface material/topsoil stripping. • Site grading plans may also be necessary to maintain the operational integrity of the pipeline where sub-surface conditions dictate (i.e. identified slope failures, blasting, high water table, springs).	• Implement detailed plans for minimal grading as identified in the issue scoping process, where environmentally sensitive areas (i.e. approach slopes to water crossings, wind/ water erosion concerns, wetlands) dictate the need. • Ensure that subsoil is removed and stockpiled in a manner that prevents soils mixing or loss of surface material/topsoil
DITCHING	• Ditching activities ensure sufficient width of trench and burial depth for the pipe (i.e., dependent on pipe size and diameter)	• Ensure that subsoil is removed and stockpiled in a manner that prevents soils mixing or loss of surface material/topsoil

Construction Phase / Topic	Description of Mitigation	Objectives
	as indicated in applicable regulations and TransCanada specifications. • Public safety and pipeline integrity are also key issues in scoping ditching requirements. • TransCanada also watches for other material that may be encountered during ditching (e.g., cultural resources, and hazardous materials).	• Appropriate pipe burial depths are key in maintaining pipeline integrity and mitigating environmental issues at water crossings (i.e. scour potential during flood events, downstream sedimentation).
LOWERING AND BACKFILL	• This activity is considered complete when the subsoil material is roached or crowned over the trench to allow for subsidence. • Under dry or non-frozen soil conditions, (i.e. summer construction) the subsoil material is compacted and the residual soils remaining from pipe displacement are feathered across the stripped area prior to final cleanup (i.e. topsoil/surface materials replacement). • Under frozen soil conditions all available soil from the ditching activities is back-filled in a loose manner and roached to account for anticipated ditchline subsidence from thawing and moisture from spring runoff and precipitation.	• Maintain pipe integrity • Ensure subsoil material is properly replaced and compacted to minimize the potential for ditchline subsidence and the resulting mixing and loss of topsoil/surface materials
WATER CROSSINGS	• TransCanada collects environmental information in the assessment of each watercourse crossing. This information (i.e. fisheries resource and habitat, hydrological) is used to determine criteria and constraints upon which water crossing methodologies are considered. • When constructing water crossings, impacts are minimized by completing work, including bank stabilization, as expeditiously as possible. • TransCanada uses the most appropriate crossing method possible to minimize impacts to fish and fish habitat, including impacts from sedimentation. • TransCanada develops site-specific ESCPs to identify mitigation for minimizing sediment inputs, from all sources, at water crossings. • Banks are seeded and erosion control mats are installed as soon as possible after construction.	All work at crossings shall be performed with maximum consideration for the following: • The downstream populations of aquatic life shall not be impacted. • The extent and duration of sedimentation from construction activities shall be minimized, by minimizing the duration of instream activities and by taking the necessary precautions to minimize impacts to the fisheries resource and water quality and quantity. • Any deleterious material shall be prevented from entering the water body. • An unimpeded flow of water shall be maintained. • Safe passage of river traffic on navigable waterways. • The integrity of the streambed and banks shall be maintained or reclaimed. • The aesthetics of the area shall be conserved.

Construction Phase / Topic	Description of Mitigation	Objectives
	• Final reclamation and stabilization are done as soon as ground conditions permit.	• Select a crossing technique based on watercourse features and parameters (i.e., Sedimentation, bank stability, and hydrology). • Minimize conflict with other water users.
HYDROSTATIC TESTING	• TransCanada ensures the integrity of the pipeline system and that its operation meets or exceeds regulated requirements through Hydrostatic testing. • For hydrostatic testing of pipeline facilities, TransCanada requires the short term use of relatively large volumes of water. • An energy diffuser is used to prevent erosion of soils at the discharge site. • Containment of fuels and pumps near watercourses follows standard TransCanada procedures that includes berming of pumps and fuel containers, and ensuring absorbent materials are available in case of spills.	• Water withdrawal from streams, ponds or lakes should not unduly impact fish habitat or disturb onshore and benthic soils. • In forested areas, care is taken to ensure that spray from the discharge does not coat or otherwise damage the trees. • Prevent erosion of soils at the discharge site.
CLEAN-UP	During this phase of pipeline construction, TransCanada: • replaces contours; • re-establishes drainage patterns; • alleviates compaction; • replaces topsoil/surface materials; • reduces any visual impact of the construction activities; • provides a seedbed for reclamation; and • replaces other features (i.e. fences, trails) impacted by construction.	• Prepare the right-of-way and other disturbed areas to promote reclamation. • Replace topsoil/surface materials properly to maintain equivalent land capability. • Minimize impacts and inconvenience to landowners, public and other affected parties.
LAND SURFACE RECLAMATION	Reclamation is achieved through the conservation, replacement, and preparation of surface materials/topsoil and subsoil, as well as the establishment of a protective and compatible vegetative cover. • If required, subsurface tile drainage systems are repaired, replaced, or modified to ensure they are working properly.	• Control erosion of right-of-way and potential threats to pipeline integrity • Increase the potential to maintain equivalent land capability of disturbed lands. • Conserve and handle surface material/topsoil to ensure reconstructed soils have an equivalent soil capability relative to pre-disturbance conditions. • Contour the land surface to ensure soil stability and to protect surface material/topsoil against wind and water erosion. • Re-establish surface drainage.

Construction Phase / Topic	Description of Mitigation	Objectives
		• Re-vegetate the land to address land capability objectives and minimize erosion potential

5.2. ADVERSE WEATHER CONTINGENCY PLAN

PHILOSOPHY:

In order to maintain and stabilize the right-of-way during periods of adverse weather, and still meet the objective for equivalent land capability, TransCanada develops and implements contingency plans to be applied under adverse conditions.

SCOPE:

Applies to all proposed projects.

PROCESS:

Adverse weather contingency plans are incorporated into the site-specific EPP. These contingency plans are dependent upon specific right-of-way conditions and the project schedule.

Where adverse weather conditions and activities have the potential to, or are causing wind erosion, water erosion, the ability to maintain equivialent soil capability and/or the potential for Harmful Alteration, Disruption or Destruction (HADD) of fish and fish habitat, TransCanada's authorized representative will suspend that phase of the operation until weather conditions abate or effective mitigation procedures have been implemented.

Table 19 describes some of the mitigative measures that may be applied during adverse weather conditions.

ROLES & RESPONSIBILITIES:

The development of the adverse weather contingency plans forms a part of the site-specific EPP. Therefore, its development and implementation is dependent on clear communications between TransCanada and its stakeholders.

The development of the adverse weather contingency plans is the responsibility of the Environmental Advisor, Environmental Consultant, Project Manager, Environmental Inspector, and Construction Manager. The communication and implementation of the plans in the field are the responsibility of the Environmental Advisor, Project Manager, Environmental Inspector, Construction Manager, and Contractor.

Table 19: Adverse weather contingency measures.

Condition / Option	Description	Materials	Activation
Wind Erosion			
1. Mulch and/or tackifier application to topsoil piles	Uniform application of mulch and/or tackifier to topsoil piles and/or other areas affected by wind erosion.	Hydromulch, tackifier or approved equivalent.	TransCanada's authorized representative will: • initiate application to areas where sufficient winds have created the potential for topsoil erosion; and • notify the appropriate Regulatory Representatives at the commencement and completion of the application. • monitor the effectiveness of the application and apply remedial measures until the erosion potential subsides.
2. Watering	Watering of the topsoil pile and other areas affected by wind erosion.	Water.	TransCanada's authorized representative will: • initiate watering of identified areas when activities or sufficient winds have created the potential for topsoil erosion; and • notify the appropriate Regulatory Representatives at the commencement and completion of watering.
3. Straw Application	Application of straw to topsoil and/or other areas where winds have created the potential for soil erosion.	Straw from local sources acceptable to the landowner, subject to availability, and approved by TransCanada's Authorized Represetative.	TransCanada's authorized representative will: • monitor for erosion, and initiatie application where and when required; and • consult with regulator(s) regarding straw source.
Water Erosion			
1. Temporary Berms / Silt Fence	• Temporary berms and/or silt fence and/or other appropriate mitigative measures (e.g., log bundle trenches), will be implemented along the trench roach, topsoil piles, and/or other areas where the potential for water erosion has been identified. • To prevent ponding and/or erosion, cross right-of-way	Topsoil and subsoil available in-situ or other specified material.	Apply to highly erodible and sensitive areas, and/or other areas identified by TransCanada's authorized representative, the Contractor, or the appropriate Regulatory Representatives.

Condition / Option	Description	Materials	Activation
	drainage will be maintained. • Appropriate measures (e.g., sumps, pumping excess water) to prevent deleterious material from entering a watercourse will be implemented, when and where required at direction of TransCanada Inspector.		
2. Straw Application	Placement of bales or the spreading of straw along erosion prone areas.	Straw from local sources acceptable to the landowner, subject to availability, and approved by regulatory agency's representative and TransCanada's authorized representatives	Erosion prone areas identified by landowners or TransCanada's authorized representative during routine right-of-way monitoring.
Right-Of-Way Maintenance/ Stabilization	Recommended activities that may be applied during construction to maintain and / or stabilize the right-of-way.	Various, depending on recommendation. Mostly requires alteration to traffic patterns and some changes to construction techniques.	During adverse weather conditions, TransCanada's authorized representative may direct the Contractor to: • reduce unnecessary traffic and the number of vehicles on the right-of-way; • improve planning of activities to either tighten up, or spread out the work crews as warranted (e.g., close proximity of ditching, lower in, and backfill operations); • reduce impact -- a one trip in, one trip out philosophy will be implemented for all right-of-way access; • change the traffic pattern on the right-of-way to avoid repeated driving in the same ruts; • spread snow over the workside (when available) to reduce the daily potential for surface rutting; • back-blade the right-of-way at the end of the day (back-blading of the right-of-way fills in ruts, thereby assisting in the prevention of water erosion and re-establishing a firm working right-of-way

Condition / Option	Description	Materials	Activation
			surface); • in areas of where stripping has been minimized initially, strip topsoil/surface material and/or subsoil and place it at the edge of the right-of-way, to be re-distributed evenly across the right-of-way during clean-up; • modify winter bridging techniques and/or replace them with other appropriate and approved bridging techniques; • use tracked equipment for specific activities; • stop work in highly sensitive areas; and • if necessary (i.e., where all other mitigation fails), shutdown the project until adverse weather conditions abate. (Project shutdown will be based upon discussions between TransCanada and the appropriate Regulatory Representatives.)

5.3. EROSION AND SEDIMENT CONTROL PLAN

PHILOSOPHY:

An Erosion and Sediment Control Plan (ESCP) is prepared for each water body crossing installation. The ESCP describes construction methods and activities within the Construction Plan, and the measures to be employed to control sediment, including temporary and permanent sediment control installations, both upland and in-stream.

The objective of the ESCP is to describe how the minimization of in-stream sedimentation downstream of the construction site is to be accomplished, in order to minimize the impact on the aquatic environment and water quality, and meet any objectives set out in the environmental assessment and regulatory approvals.

SCOPE:

Applies to the construction of pipelines across all water bodies including, lakes, rivers, creeks and streams.

Further details for water crossings, including vehicle crossings of water bodies, can be found in the TransCanada specification TES-PROJ-WTR *Water Body Crossing Specification* (003748064).

The information provided here, as well as in the *Water Body Crossing Specification*, is to be used in conjunction with TransCanada specification TES-PROJ-PCS *Pipeline Construction Specification* (003745282).

PROCESS:

TransCanada works with its Contractors to develop the ESCP. The ESCP shall include all of the information detailed below.

Information supplied by TransCanada:

TransCanada provides the Contractor with the environmental assessment information for all the crossings, including fish and fish habitat assessments, existing vegetation, and adjacent land use. Further, at major watercourse crossings, TransCanada provides the following information:

- Drawing or sketch of the location and the structure to be installed;
- Hydraulic calculations, including:
  - Calculated flows
  - Profile of the stream bed
  - Bank slopes
  - Site drainage patterns
  - Water Body width, bank to bank and wetted area
  - Depth of stream
  - Velocity of flow
  - Watershed area
  - Flume sizing calculations
- Geotechnical data including substrate material within depth of excavation, within the banks, and prediction of sediment transportability;
- A detailed description of long term erosion control measures that will be undertaken, both on the stream banks and on the hill slope leading down to the creek/river. Measures to consider include:
  - silt fences
  - erosion control blankets
  - gravel sheeting
  - rip rap
  - seed and mulch

  - diversion berms or check dams
  - sediment traps
- Number, location and configuration of proposed instream silt fences;
  - Specifications for geotextile material(s) used,
  - Method of anchoring fence to streambed and water body bank (e.g. chains, cable, pipe, deadman).
- Removal methods for trapped sediment and removal of silt fencing after construction completion;
- Alternative, approved contingency plan(s);
- Photos of the crossing and area; and
- Reclamation plans.

Information supplied by the Contractor:

At all water crossings, the Contractor shall provide a description of any operations that may cause sediment to enter the water, including measures proposed for erosion and sediment control. TransCanada and regulatory requirements must be complied with in the development of these plans.

- Pre-Construction Preparations;
  - Describe any in-water dykes, silt curtains, work pads, etc.,
  - Describe access to the water's edge,
  - Describe access over the water,
  - Prepare a contact list including; the Authorities, the Company representatives, and the Contractor.
- Sequential descriptions of proposed construction from start to finish including detailed time frames for each item of the plan;
  - Clearing and grubbing near the crossing,
  - Access route(s) preparation and access type(s) to and over the Water Body,
  - Grading of slopes and banks,
  - Erosion control devices, installation, quantities, and locations,
  - Excavation method(s) including blasting,
  - Installation and backfilling procedures and material to be used,
  - Bank replacement and stabilization including any armouring,
  - Installation of erosion control measures.
- A sketch of the location and dimensions of additional temporary work room including that required for;
  - Pipe string make-up,
  - Backslopes for grading,
  - Topsoil and grade material storage,
  - Storage of the excavated materials,
  - Imported Backfill material,
  - Equipment and miscellaneous construction materials,
  - Any water storage containment ponds,
  - Bank or bed armament material.
- Proposed in-stream construction methodology including;
  - List of equipment for excavation method(s),
  - Expected excavation cycle times and overall duration of excavation operations,
  - Instream spoil storage,
  - Sediment mitigation techniques,
  - List of equipment for backfilling and backfill method(s),
  - Expected backfill cycle times and overall duration of backfill operations,
  - A sketch of the proposed equipment layout.
- Water Body traffic management including signage and watercraft support
- Permanent spoil disposal, proposed volumes and disposal sites
- Type, material, and location of stream bank containment berm(s) for excavated sediment, and plan for disposal of excavated sediment
- Pipe buoyancy control, type and application method including any required hoarding and heating

- Pipe installation method
- Type and size of backfill material, source, and haul method for backfill material
- Any water diversion methods, materials, and required equipment, i.e. sheet piles, coffer dam material, water filled barriers, pumps, screens, diffusers
- Bank replacement and stabilization methods and imported materials (if required)
- Short-term storm water control including a description of the measures for erosion control between the time of grubbing until final site reclamation measures are effective
- Erosion control materials and quantity

As generic in-stream methods for pipe installation cannot necessarily be applied to all water body crossings, a written description of the proposed *Construction Plan* for each water body crossing, is prepared and then incorporated into the ESCP for the crossing. Additional information found in the Construction Plan that is incorporated into the ESCP includes:

- Water diversion methods, materials, and required equipment
- Water pumping requirements, pump sizes, types, and quantities
- Screens, diffusers, and sediment traps
- Selection of isolated water and ditch pumping discharge areas

At locations where construction traffic and/or equipment must cross a water body, crossing methods as appropriate shall be implemented. The method and procedure of crossing shall be in accordance with applicable regulatory requirements and TransCanada's policies and specifications.

Contingency Plans:

In consultation with the Contractor, TransCanada develops contingency plans and measures for its proposed water crossings. These plans and measures may include, but are not limited to:

- Alternative crossing plans if the first crossing method should be unsuccessful, including Construction Plans and ESCP;
- Requirements for additional equipment and resources if weather conditions differ from those expected;
- Sufficient quantities of materials such as sandbags, filter cloth, snow fencing, fence posts, straw bales, etc. kept on-site or readily available upon short notice, as required.

A copy of the ESCP is kept at the crossing site during all phases of construction. If there are any changes to the ESCP, the regulatory authorities are informed with reasons for the change.

ROLES & RESPONSIBILITIES:

The ESCP (including Construction Plan) is developed by the Environmental Advisor, Project Manager, Environmental Consultant, Environmental Inspector, Construction Manager, and finalized with the Contractor.

The ESCP is communicated and implemented through various means (e.g., pre-job meetings, incorporation into the construction contract) by the Project Manager, Environmental Advisor, Environmental Inspector, Construction Manager, and Contractor.

5.4. RECLAMATION PLAN

PHILOSOPHY:

Returning land to "equivalent capability" is the primary objective of land surface reclamation. The intention of reclamation is to ensure that throughout construction, maintenance, and other activities completed by TransCanada, the capability of the land is conserved to support pre-disturbance land uses. Reclamation is conducted with the goal of conserving and maintaining a similar land capability that existed prior to the disturbance, although subsequent end land uses may not be identical to those prior to the disturbance.

The objectives of TransCanada's reclamation plan are to:

- return the land to equivalent capability to the surrounding land use;
- effectively use reclamation techniques that will prevent topsoil loss from wind and water erosion;
- establish vegetation cover as soon as possible after construction; and
- to ensure the proposed vegetation cover is compatible with the surrounding vegetation and land use.

TransCanada has established activities, based on land use, which will help to achieve the above objectives, including:

- establishing reclamation activities based upon a continuous improvement process;
- providing self-sustaining vegetative cover in order to:
  - control erosion,
  - prevent weed invasion,
  - provide vegetation cover compatible with off right-of-way vegetation and land uses, and
  - stabilize and prevent erosion at water crossings;
- conserving topsoil and stabilizing wind erosion prone soils;
- conserving moisture and retarding evapotranspiration;
- protecting steep slopes from water erosion due to high, rapid storm events;
- avoiding invasive agronomic species;
- conserving and preserving native range;
- evaluating and addressing specific topsoil conservation requests and concerns from landowners;
- researching initiatives and findings that result in changes in methodology and philosophy; and
- incorporating grazing activities to ensure that a grazing imbalance does not occur.

SCOPE:

Reclamation activities apply to any project where the soils have been disturbed, there is a need to provide erosion protection, and/or to enhance the site for wildlife and/or fisheries habitat.

PROCESS:

Land surface reclamation initiatives should be practical, feasible, and cost effective in attaining the objective of equivalent land capability. Reclamation efforts focus on reducing long-term risk and mitigating environmental concerns through following well-developed reclamation plans.

An initial reclamation assessment is completed by qualified individuals to assess project needs, provide reclamation options, assess the success of previous reclamation work (if any has been done), and oversee all reclamation tasks. These are all critical in order to develop and execute a successful plan.

There are typically three different stages of land reclamation (see Table 20). TransCanada develops a reclamation plan to address these stages. TransCanada's reclamation plans characterize and quantify changes in site conditions (i.e., soil, vegetation, landscape, and habitat) and are based on recognized field assessment techniques.

Table 20: Description of reclamation stages.

Reclamation Stage	Description
Interim Reclamation	• During construction activities there is a period of time between construction and final reclamation when resources, such as soil piles or berms, must be conserved. • Reclamation measures during the interim period can include: - soil compaction, - fencing, - reseeding, - tarping, or - other methods of controlling erosion or conserving topsoil and subsoil. • There is no formal soil reclamation investigation or report although reclamation activities are documented. • Interim reclamation is done to leave the property in a condition that is acceptable to TransCanada, adjacent landowners and regulatory agencies that have jurisdiction until final clean up is completed.
Final Reclamation Site Investigation and Planning	• A typical reclamation investigation involves an evaluation of various parameters to determine the degree and extent of any alterations within the ecosystem and provide insight or direction for re-establishing the site to an equivalent land use. • A qualified specialist (e.g. pedologist, horticulturist, agronomist, and biologist) may be retained to conduct specific site investigations.
Implementation	• Once a reclamation plan has been completed, physical site reclamation can occur (See TransCanada Reclamation TOP). • Typical site reclamation work can include: - Re-establishing soil quality to the previous natural physical, chemical and biological characteristics through the implementation of soil amendments, tillage techniques, removal of organic contaminated material and inorganic debris, and minimizing wind and water erosion potential, - re-establishment of site-appropriate vegetative cover (reseeding), habitat, etc., - implementing temporary or permanent access control, if needed, - site monitoring for supplemental reclamation work if necessary (e.g. soil subsidence and bare areas), - streambank stabilization, (e.g. revegetation, armouring)

Typically, TransCanada's reclamation plans consider:

- year and season (i.e., summer or winter) of construction activities;
- construction practices and methodologies;
- land uses;
- procedures to conserve and re-establish those VECs impacted by TransCanada's activities (see Table 21);
- landowner management practices;
- surface improvements, developed with stakeholders; and
- specific mitigative measures that can be implemented during construction or remediation projects.

Table 21: Reclamation measures and objectives for potentially-impacted VECs.

VEC	Reclamation Measures and Objectives
Landscape	• Landscape re-contouring is defined as the process of returning surface drainage and topographical features to pre-disturbance landforms. • This can include removing rocks, gravel, organic and inorganic debris, and anything that was not present prior to the disturbance.
Soil	• Soil reclamation requires the replacement of the soil strata if it has been disturbed. • If the subsurface and surface soil horizons are not replaced, the site may not sustain the level of productivity that was previously available. • Soil horizons are reclaimed and the original topsoil depths are then replaced in order to maintain the integrity of the soil and its productivity. • Soil textures and tilth (aggregate size and strength) at all strata must be consistent with surrounding undisturbed soil characteristics.
Vegetation	• Vegetation is reclaimed to a similar growth regime and composition as the pre-disturbed site. • Assessment of vegetation success typically measures plant density, cover, height, and health. • Species composition is relevant in that vegetation is an indicator of soil productivity. • In addition, weed species require control in the reclaimed area, so that aggressive, intrusive, non-native species or weeds do not become dominant. • Weeds or other aggressive species can be controlled with applications of suitable herbicides or via mechanical control methods. • Another requirement of vegetation species is to control soil erosion in the short and long term. • Reclamation seed mixes are usually designed to include species that grow quickly to prevent soil erosion by creating a stable root zone in the soil. However, native species may also be used in specific areas (e.g., native prairie) and their establishment occurs over a longer term. • Seed mixes also include slower growing species that will germinate and mature in stable soils to create a long-term stable soil zone.
Watercourse	• Pipeline water crossings are carefully reclaimed to protect the water resource and adjacent soil and vegetation. • During right of way construction, erosion control measures such as silt fences are placed to safeguard the water resource from excessive siltation and debris inclusion. • Streambank reclamation procedures are designed to minimize erosion of streambanks and conserve fish habitat. • Specific erosion control methods can include streambank revegetation and/or a mechanical stabilization method. • Streambank armouring using rocks or concrete, or introducing vegetation along with natural materials (live willows, root balls, felled trees) can also be used to stabilize streambanks at right of way crossings, access road crossings, or any other construction which requires bridging.
Habitat	• Site reclamation will take into account habitat requirements of local species.

TransCanada has also developed recommended platform seed mixes in order to achieve its reclamation objectives and goals. A recommended seed mix has been developed for each natural region in Canada based on soil type, existing vegetation and land use. These recommended seed mixes might vary depending on the availability of seed and TransCanada's field performance evaluations (conducted prior to construction). For further information, please refer to TransCanada's draft document "*Natural Region/Ecoregion Reseeding Guidelines*".

Further, TransCanada uses primarily Certified Canada No. 1 seed in its mixes, with a Certificate of seed analysis requested for purchased seed allotments, as a means to limit the introduction of prohibited and noxious weeds on TransCanada's rights-of-way.

ROLES & RESPONSIBILITIES:

The Reclamation Plan is developed by the Environmental Advisor, Project Manager, Environmental Consultant, Environmental Inspector, Construction Manager, and finalized with the Contractor.

The Reclamation Plan is communicated and implemented through various means (e.g., pre-job meetings, incorporation into the construction contract) by the Project Manager, Environmental Advisor, Environmental Inspector, Construction Manager, and Contractor.

5.5. ENVIRONMENTAL PROGRAMS

To ensure the environmentally responsible management of TransCanada's facilities, TransCanada has developed and implemented various environmental programs and tools, of which the Environmental Design Standard is one.

These programs are implemented in conjunction with the Environmental Protection Plan for the development, expansion and maintenance of TransCanada's facilities.

A summary of these programs is provided in Table 22. However, for a complete copy of the program document, please either go to the Electronic Document Management System (EDMS) number referenced, or request one from TransCanada.

Two other important documents that are applied in the implementation of the environmental design and protection planning process are:

- TES-PROJ-WTR *Water Body Crossing Specification* (EDMS 003748064); and
- TES-PROJ-PCS *Pipeline Construction Specification* (EDMS 003745282).

The information in these documents sets out the requirements for the Contractor during construction, and are used in conjunction with the information provided in the EA and EPP.

Table 22: TransCanada's Environmental Programs that may be referenced during the environmental design phases of a project.

Program (EDMS Ref. #)	Description	Objectives / Principles
Climate Conscious Program	• The Climate Conscious Program is a pilot program that has been designed to educate TransCanada employees about the issue of Climate Change. • Provides: - a plan to communicate TransCanada's climate change policy and strategies to its employees; - a context for the emission reduction programs employees are engaged in.	TransCanada's Climate Change Principles: • TransCanada believes in promoting global solutions to this global challenge. • TransCanada supports a unified response to climate change that maintains or enhances Canada's competitiveness with our major trading partners. • TransCanada believes governments should recognize and give credit for early actions to mitigate emissions. • TransCanada believes governments should establish achievable targets and schedules that balance economic health with environmental concerns. • TransCanada acknowledges the science as uncertain, but believes prudent action is required. • TransCanada believes natural gas is part of the global solution for climate change. • TransCanada believes in a strong commitment to technological innovation.
Decommissioning and Facility Modification Program (003726950)	• This program applies to all employees, consultants and contractors at TransCanada involved with the decommissioning or modification of TransCanada's facilities. • This program can apply to many types of projects at various TransCanada facilities, ranging from pipeline abandonment and meter station removal to different types of asset recovery projects. • The decommissioning or facility modification process involves a sequential series of activities including: phased HS&E site assessments; removal of infrastructure and contaminated materials (if present); reclamation of soils; landscaping; and, the re-establishment of vegetation.	• To provide a functional framework to ensure that decommissioning and facility modification projects are completed in a safe, environmentally sound, efficient and timely manner. • To ensure project compliance with all applicable health, safety and environmental regulations and/or other legal requirements. • To ensure that processes, procedures and guidelines for all potential health, safety and environmental issues associated with facility decommissioning or modification activities are

Program (EDMS Ref. #)	Description	Objectives / Principles
		in place. • To ensure that all actions taken in relation to these projects are consistent with TransCanada's HS&E commitment statement.
Emergency Management System (003671823)	• An "emergency" is an unforeseen or imminent event which requires prompt co-ordination of resources, special communications, and heightened lines of authority for employees: - to protect the health, safety, and welfare of people; or - to limit damage to property, the environment or company operations. • Each major people facility, Power Generating Station, Compressor Station, Sensitive Area and Meter Stations deemed critical has a written emergency preparedness program based on site-specific risks.	• Emergency preparedness and response plans are developed and implemented: - to protect the health, safety or welfare of people, or - to limit damage to property, company operations and the environment. • Emergency preparedness and response plans and procedures recognize the needs of TransCanada, its employees, and the community-at-large as well as regulatory and legislative requirements.
Environmental Noise Management Program (003706272): • Environmental Noise Complaint Screening / Investigation (003695506)	• The Environmental Noise Management Program addresses environmental noise as it pertains to impacted residences around TransCanada's facilities, including: - continuous and intermittent noise sources; and - new facility design, construction, commissioning and operational requirements. • The elements of the program include the implementation of: - Proactive programs to manage noise emissions and minimize the number of related complaints; - A noise complaint resolution process for existing facilities; and - Processes and programs to ensure the appropriate implementation of the Environmental Noise Management Program.	To ensure: • effective programs and processes are in place and consistently applied to proactively identify, evaluate, mitigate and manage risks associated with environmental noise emissions from our facilities; and • compliance with corporate noise directives and upholds TransCanada's commitment to protect our employees, the public, and the environment from adverse noise impacts resulting from our operations.
Incident Management Process	• To ensure incident response, notification, investigation, documentation, follow-up and sharing of learnings is completed in a uniform, thorough and timely manner to prevent recurrence of a similar incident. • This process applies to all incidents arising from TransCanada business operations, employees and contractors. • An "incident" is an unplanned event that results in undesirable consequences or an unplanned event which, under slightly different	TransCanada's Incident Management Process is designed: • To ensure workers are capable of recognizing and acknowledging when an incident has occurred; • To encourage notification of all incidents, with the understanding investigations are completed to identify facts not place blame;

Program (EDMS Ref. #)	Description	Objectives / Principles
	circumstances, could have resulted in undesirable consequences (Near Hit). • All incidents (Minor, Serious, Major, Critical) including Near Hits, must lead to the implementation of corrective and preventive measures to eliminate recurrence.	• To ensure a thorough, consistent investigation of all incidents, to identify root causes which permit the development and implementation of appropriate corrective and preventive measures, eliminating the potential for recurrence; • To facilitate continual performance improvement, to share key learnings and to prevent loss.
Reclamation Program (see also section 5.4)	• Reclamation responsibilities focus on returning land to its previous land capability, addressing: - Landscape - Soil quality - Vegetation - Water resources - Wildlife habitat • Reclamation plans are developed: - in the planning and design stage of projects; - during construction; and - once again following disturbance to reduce any long-term risks and mitigate any possibility for environmental concerns. • Reclamation plans are created to characterize and quantify either existing ecological resources or alterations to resources through recognized field assessment theories and techniques.	The objectives of TransCanada's reclamation program are to: • return the land to equivalent capability to the surrounding land use; • effectively use reclamation techniques that will prevent topsoil loss from wind and water erosion; • establish vegetation cover as soon as possible after construction; and • to ensure the proposed vegetation cover is compatible with the surrounding vegetation and land use.
Vegetation Management Program: • Brush Control Procedure (003674638); • Weed Control Decision Matrix (draft); and • Vegetation Management Procedure (draft)	• Vegetation management is the control of undesired plant growth and the maintenance of adequate and appropriate vegetation cover. • Encompasses the activities of weed control, brushing, and a component of reclamation. • Designed to assess, prioritize, and respond to vegetative growth issues on operating pipeline right-of-ways and facility sites. • Vegetation management activities are driven by operational and compliance requirements to minimize the risks of restricted visibility, impeded access, and limited operation practices along right-of-way or at facility locations caused by the presence of undesired vegetation.	While complementing other land uses on and adjacent to the right-of-way, TransCanada's Vegetation Management Program is intended to: • Control the development of undesirable vegetative growth (weeds, trees, and brush); • Promote the establishment of desired species; • Allow access for pipeline operations and maintenance; • Enable aerial surveillance for detection of leaks, surface erosion and slope failure; and • Address regulatory requirements and

Program (EDMS Ref. #)	Description	Objectives / Principles
		expectations – i.e. be complementary to, and enhance where possible, other land uses such as wildlife, fisheries, and forestry on and adjacent to right-of-ways.
Waste and Hazardous Materials Management Program (003697278)	• This program applies to all employees, consultants and contractors at TransCanada who are involved in waste and hazardous materials management activities. • Guides the safe use, handling, storage, transportation and disposal/recycling of wastes or hazardous materials used or generated by TransCanada's operations. • This program combines Waste Management with Hazardous Materials Management. From a new product versus a waste perspective, there is little difference between the two pertaining to issues of classification, handling, storage, transportation, disposal and hazards. Therefore, both topics have been combined under one program document.	• To ensure a comprehensive waste and hazardous materials management system is in place that provides procedures and instructions pertaining to: - characterization and classification; - handling and storage; - transportation; - disposal/recycling; and - record management. • To demonstrate that TransCanada is committed to reduce, reuse, recover and recycle all waste materials. • To ensure waste and hazardous materials management activities are in compliance with all applicable regulations.

6.0 ASSESSMENT OF RESIDUAL & CUMULATIVE EFFECTS AND DETERMINATION OF SIGNIFICANCE

After determining the potential environmental effects of a proposed project (see section 4.0), and identifying potential measures to mitigate those identified effects (see section 1.0), TransCanada completes the assessment of residual and cumulative effects. "Residual environmental effects" are those effects that remain after the application of mitigation. The "cumulative environmental effects" are those residual environmental effects of the project that act cumulatively with the residual environmental effects of other actions, either past, existing, or in the reasonably foreseeable future.

If the project will not create residual environmental effects, then there is no expected contribution to other potential cumulative effects on a regional scale. However, in order to have no residual effects, mitigation must be completely effective. Typically pipeline work results in very minimal residual effects (i.e., effects are limited in extent, duration, and severity). However, consideration still must be given to the potential for contribution to regional effects that may act cumulatively with other past, present, or future activities in the area. The significance of this contribution should also be considered in the cumulative effects assessment (CEA).

The assessment of the significance of residual and cumulative environmental effects is then undertaken. Significance is based on the criteria identified in Table 25 and assessed using professional judgement.

Once the determination of significance has been made, the Environmental Assessment (EA) report is prepared. The Responsible Authority (RA) under the *Canadian Environmental Assessment Act* is responsible for preparing the EA. However, in practice, the RA delegates the preparation of the EA to the proponent. The EA report contains all of the information described in sections 1 through 6 in the EDS as well as a discussion of how the implementation of the mitigation and monitoring will occur (i.e., section 7.0). Generally, TransCanada prepares either a screening report or a comprehensive study report for its projects requiring federal approval (see section 1.3 for a description of the requirements for an NEB Approval, screening and comprehensive study). The overall process is shown in Figure 15 with each step described further in the following sections.

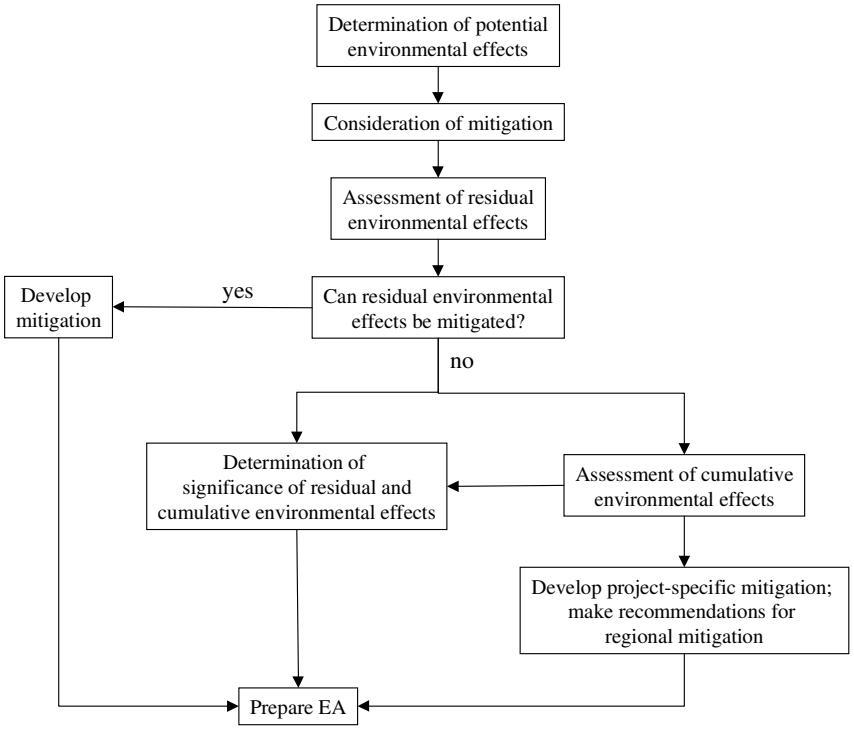

Figure 15: Determination of residual and cumulative environmental effects, and significance, in preparation of the EA.

6.1. RESIDUAL ENVIRONMENTAL EFFECTS ANALYSIS

PHILOSOPHY:

Most potential environmental effects can be mitigated to prevent them from leaving lasting impacts on the environment. However, effects that remain after mitigation, i.e., residual effects, must be assessed to complete the environmental assessment.

With the use of professional judgement, TransCanada ensures the assessment of the potential residual environmental effects is undertaken for its proposed projects.

SCOPE:

Applies to all projects requiring an environmental assessment (i.e., NEB and/or CEAA).

PROCESS:

The potential environmental effects for each VEC identified in section 3.2 are assessed in consideration of the proposed mitigation. Professional judgement is then used to determine if there would be any residual effects remaining after the application of mitigation. Discussion of further mitigation measures (i.e., in addition to those identified in section 1.0) will also occur here to determine if there is any way of eliminating the identified residual effects.

The significance of the residual environmental effects is then determined in section 6.3.

ROLES & RESPONSIBILITIES:

The assessment of residual environmental effects is undertaken using accepted environmental assessment methodology and professional judgement based on the potential environmental effects and proposed mitigation. To this end, TransCanada typically hires the services of an experienced external consultant to undertake the assessment of residual environmental effects in consultation with the Environmental Advisor.

6.2. CUMULATIVE EFFECTS ASSESSMENT

PHILOSOPHY:

The residual environmental effects of TransCanada's activities can combine with the residual environmental effects of other past, existing, or proposed (i.e., in the reasonably foreseeable future) activities, to result in cumulative environmental effects on the VECs within an area. While the residual environmental effects may be insignificant by themselves, there may be the potential to exceed defined thresholds when these residual effects are combined with the residual effects of other activities in the area. Identifying and evaluating cumulative environmental effects of the construction, operation and maintenance in the area of a project is a key part of assessing the potential impacts of TransCanada's activities. TransCanada seeks to minimize or eliminate the negative cumulative effects while at the same time accentuating the positive cumulative effects when present.

SCOPE:

Applies to all projects requiring an environmental assessment (i.e., NEB and CEAA regulated).

PROCESS:

The assessment of cumulative environmental effects reflects a broadened perspective on the nature of human-environment interactions. This perspective acknowledges:

- Sources of cumulative environmental effects: environmental changes may originate not only from single projects, but also from interactions of multiple projects, similar or different in kind.
- Pathways of accumulation: environmental changes may accumulate through additive or interactive processes. Additive processes are those in which one unit of environmental change may be added, or subtracted, from a previous unit. Processes are interactive (synergistic) when net accumulation is more, or less, than the sum of all-environmental changes.

TransCanada considers:
- spatial and temporal boundaries;
- possible mitigation;
- the interactions between the residual environmental effects of its project on VECs;
- the interactions between the residual environmental effects of its project in combination with the residual environmental effects of other projects in order to determine the sum total of all residual environmental effects and their significance.

When considering cumulative effects, there are several project effects that are most commonly considered:
- air and noise emissions from ancillary facilities (e.g., compressor stations);
- alteration of fisheries habitat quantity and quality;
- alteration of native vegetation;
- alteration of wildlife habitat quantity and quality;
- development of new access potential and associated increased recreational pressures on important resources; and,
- socio-economic effects, such as interactive and long-term strain on existing local infrastructure.

Although cumulative effects assessment is an iterative process, there are some defined steps in the assessment as outlined in Table 23. A detailed discussion of the cumulative effects assessment process can be found in the "*Cumulative Effects Assessment Practitioners Guide*" (CEAA, 1999).

Table 23: Process for assessing cumulative environmental effects.

Activity	Description
Scoping	Cumulative effects are addressed only for those residual effects identified in section 6.1. Following this identification, the steps involved in scoping include: • defining the assessment goals; • establishing the spatial and temporal boundaries (may be larger than in the assessment of environmental effects under section 4.1); and • identifying other actions affecting the VECs.
Assessing the cumulative environmental effects	TransCanada assesses VECs in the context of cumulative effects by considering: • the vulnerability of the resource to incremental effects; • whether the proposed action is one of several similar actions in the same geographic area; • whether other projects in the area have similar effects on the resource; • whether these effects have been historically significant for this resource; • the significant cause and effect relationships(i.e. the pathways) between the proposed project and the VECs; and • other assessments in the area have identified a cumulative effects concern.
Identification of Mitigation	• Mitigative measures for cumulative environmental effects are included as a component of a project-specific EPP and will address, at a minimum, the proposed project's contribution to the cumulative effects of the area. • In addition, appropriate mitigation recommendations will be included which will address the larger cumulative effects. These may include forming partnerships with different stakeholder and governmental agencies to address the more regional measures that can be taken to mitigate the many activities on the landscape.

ROLES & RESPONSIBILITIES:

The assessment of cumulative environmental effects is undertaken using accepted methodology and professional judgement based on the assessment of remaining residual environmental effects. To this end, TransCanada hires an experienced external consultant to undertake the assessment of cumulative environmental effects in consultation with the Environmental Advisor.

Development of regional-scale mitigation needs to involve a multi-stakeholder team, including the land use manager of an area.

6.3. DETERMINATION OF SIGNIFICANCE

PHILOSOPHY:

TransCanada applies accepted methodology and professional judgement in determining the significance of residual and / or cumulative environmental effects. The following questions need to be answered in order to determine significance (CEAA, 1994; CEAA, 1999):

- Are the environmental effects adverse;
- Are the adverse environmental effects significant; and,
- Are the significant adverse environmental effects likely.

SCOPE:

Applies to all projects requiring an environmental assessment (i.e., NEB and CEAA regulated).

PROCESS:

The assessment of significance is undertaken only on residual and cumulative environmental effects and takes any mitigation measures into consideration. Table 24 outlines the process steps when making a determination of significance.

It is important to note, that even though the determination of a residual environmental effect on a VEC is found to be insignificant, the cumulative effect to that VEC from the project in combination with other activities in the project area, could be found to be significant.

Table 24: Determining significance of environmental effects (CEAA, 1994).

Activity	Description
Determination of "adverse"	Comparing the existing condition of a VEC to the predicted condition can make the determination of whether an effect is "adverse". Some criteria for determining this can include: • Loss of rare or endangered species; • Reductions in species diversity; • Loss of critical / productive habitat; • Transformation of natural landscapes; • Toxicity effect on human health; and • Loss of current use of lands and resources for traditional purposes by aboriginal persons.
Determination of "significance"	A "significant" effect is judged to be one of sufficient magnitude, duration, frequency, geographic extent, and reversibility to alter the status or integrity of the VEC as defined by the environmental effects rating criteria in Table 25.
Determination of "likely"	The determination of whether the significant adverse effects are likely is made by determining: • The probability of occurrence; and • The scientific uncertainty.

Table 25: Environmental effects rating criteria or "significance attributes" (CEAA, 1999; AXYS, 2002).

Criterion	Description
Direction	• Positive: beneficial effect on VEC; • Neutral: no measurable effect on VEC. • Negative: adverse effect on VEC;
Scope	• Site: effect restricted to a small site; • Local: effect restricted to the project footprint; • Sub-regional: effect extends to area within a few kilometers of the project footprint; • Regional: effect extends throughout regional assessment area.
Frequency	• Once: occurs only once; • Sporadic: occurs rarely and at regular or irregular intervals; • Continuous: occurs on a regular basis at regular intervals.
Duration	• Short-term: effect of residual impact persists < 1 year; • Medium-term: effect of residual impact persists 1 to 10 years; • Long-term: effect of residual impact persists > 10 years.
Reversibility	• Reversible: effect of residual impact will be assimilated in time either during the life of the facility or after its abandonment; • Irreversible: effect of residual impact is permanent.
Magnitude	• Low: minimal or no impairment of component's function or process (e.g., for wildlife, a species' reproductive capacity, survival or habitat suitability); • Moderate: measurable change in component's function or process, however, recovery is expected to be at pre-project level; • High: measurable change in component's function or process and recovery is not expected to be at pre-project level (e.g., for wildlife, serious impairment to species productivity or habitat suitability).

ROLES & RESPONSIBILITIES:

The determination of likely significant environmental effects is undertaken using accepted methodology and professional judgement based on the assessment of residual and cumulative environmental effects. To this end, TransCanada hires an experienced external consultant to undertake this assessment in consultation with the Environmental Advisor.

7.0 IMPLEMENTATION AND MONITORING OF MITIGATION

Once TransCanada has obtained all required consents and approvals, the implementation phase of a project is undertaken. The process for implementing the overall environmental protection plan is identified in Figure 16. The construction plans and specifications will not be discussed in further detail here, but have been referenced throughout this document.

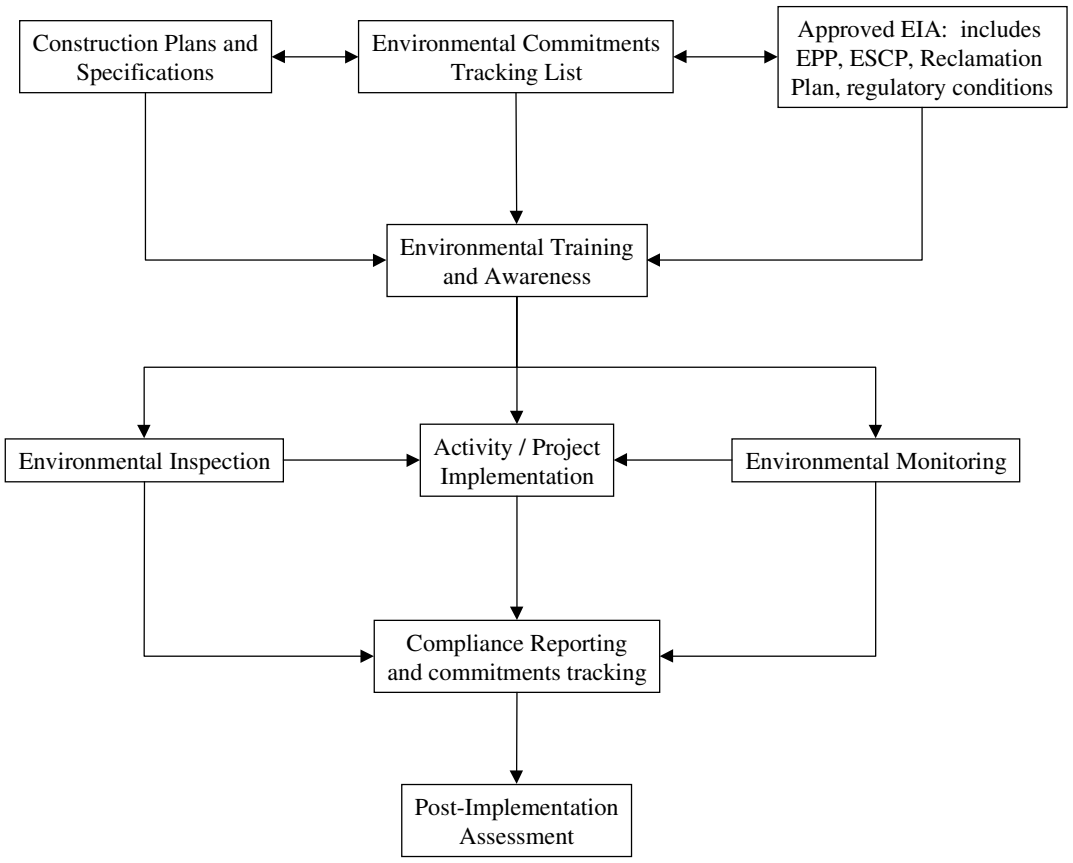

Figure 16: Implementation and monitoring activities for environmental protection.

7.1. ENVIRONMENTAL COMMITMENTS TRACKING

PHILOSOPHY:

TransCanada tracks its environmental commitments throughout the life-cycle of its facilities (development, construction, reclamation, operation and abandonment). One tool used for this purpose is the Environmental Commitments Tracking List (ECTL). The ECTL documents all environmental commitments (e.g., regulatory requirements, environmental issues identified in the EA, and landowner requests related to reclamation issues) for a proposed project and is used to ensure all commitments are addressed and any variances explained.

Another more specific tool that is filed with the NEB is the Environmental Issues List (EIL). The EIL is provided in the environmental assessment submission and is subsequently incorporated into the ECTL.

SCOPE:

Applies to all projects that have environmental issues or requirements.

PROCESS:

The ECTL document is created during the environmental design phase for a proposed project and captures the following information:

- commitments made during stakeholder consultation;
- environmental issues identified in the environmental assessment (as listed in the EIL);
- specific mitigation measures unique to the project;
- regulatory conditions and requirements;
- commitments made during the hearing process; and
- environment-related landowner requests as identified in the landowner line-list (e.g., seeding requests).

The ECTL is continuously modified and updated through implementation of the project and until all issues and commitments have been addressed.

Responsibility for the ECTL will be transferred to the appropriate person at different stages of the project. For example, when the Environmental Advisor has completed the pre-implementation phase (i.e. environmental design through to approval), the ECTL is saved electronically and a hard copy of the ECTL is signed. The signed list will then be filed with the project files. The electronic copy will remain within the electronic section of the project and passed on to the Environmental Inspector for the implementation phase.

It should also be noted that an Environmental Issues List (EIL) is a requirement of a Section 52 or a Section 58 NEB application. The EIL is an external document that is given to regulatory personnel and incorporates all the environmental issues associated with a project, but does not necessarily incorporate other conditions and commitments (e.g., landowner commitments). The EIL is incorporated into the ECTL to ensure all issues are tracked and addressed.

ROLES & RESPONSIBILITIES:

The responsibility for developing, updating, and forwarding / communicating the ECTL changes depending on the phase of the life cycle of a facility. The responsibilities are outlined below:

- Environmental Design and Approval (Environmental Advisor);
- Construction (Environmental Inspector);
- Initial Reclamation (Environmental Inspector, Reclamation Co-ordinator);
- Post-Construction (Environmental Advisor);
- Operations (Regional HS&E Co-ordinator); and
- Abandonment (Environmental Advisor).

7.2. ENVIRONMENTAL TRAINING AND AWARENESS

PHILOSOPHY:

Training and awareness ensures that the appropriate training is identified and made available based on the scope of the proposed project. All employees and contractors, whose activities could have an impact on the environment, require appropriate training. Further, TransCanada ensures that employees and contractors assigned to a particular project are provided with the applicable information prior to undertaking any project. This information can include, but is not limited to:

- the environmental assessment;
- the Environmental Protection Plan (including the environmental alignments, the ESCP and the Reclamation Plan);
- the Environmental Commitments Tracking List; and
- any other documentation and procedures required for the protection of the environment (e.g., regulatory requirements, permits, etc.).

SCOPE:

Applies to any project that has the potential to cause environmental impacts.

PROCESS:

The Environmental Advisor, in conjunction with the Environmental Inspector, Construction Manager, and Project Manager, co-ordinates pre-construction meetings, to ensure that construction inspection staff, and contractors' construction supervisory staff, are aware of the environmental requirements of the construction project. Pre-Job meetings may cover such areas as: landowner access and reclamation concerns; specific construction techniques; environmental mitigation measures; and, landowner and regulatory agency communication.

TransCanada also has Pre-Job Regulatory Meetings on major projects with the Environmental Advisor, Environmental Inspector, Construction Manager, Project Manager and government agency representatives to review the environmental aspects of construction in detail and discuss any final mitigation measures.

Prior to contractor mobilization, the Environmental Inspector conducts a pre-construction survey of the right-of-way. The inspector flags sensitive environmental areas, watercourses or construction areas (such as push-outs) to provide awareness of these areas to anyone working in the area.

More formal Environmental Inspector training (i.e., away from a project) is provided in conjunction with TransCanada's third party Inspection Contractor. TransCanada has developed an "Inspector's Training Manual" to provide training on TransCanada's internal requirements such as TransCanada Technical Operating Procedures (TOPs). However, it is the responsibility of each Environmental Inspector to maintain appropriate training. TransCanada hires individuals for environmental inspection based on their competencies, training, and experience levels.

ROLES & RESPONSIBILITIES:

The Environmental Advisor and Environmental Inspector identify training needs and develop the project-specific training. The pre-job meetings are lead by the Project Manager and require input from the Environmental Advisor, Environmental Inspector, and Construction Manager. There is a pre-job meeting for the Contractor and a separate one for the environmental regulators.

During construction, the Environmental Inspector, Construction Manager, and Contractor all have responsibility for environmental awareness (e.g., flagging, communications, and daily meetings).

Inspector Training (outside of a project) is lead by the Environmental Advisor and Construction Services.

7.3. ENVIRONMENTAL INSPECTION

PHILOSOPHY:

TransCanada's commitment to diligence and process ensures that on-site personnel are trained and have adequate experience to undertake a lead role in the implementation of the EPP.

The main objective of environmental inspection is to ensure the overall protection of the environment and implementation of commitments. Further, the Environmental Inspector provides feedback to TransCanada on the Environmental Protection Plan including:

- implementation of the plan;
- site problem solving;
- site interpretation;
- issue resolution;
- success of the EPP;
- communication with regulators; and
- documentation that contributes to process compliance.

SCOPE:

Applies to all Environmental Inspectors on TransCanada's facilities.

PROCESS:

The main role of the Environmental Inspector is to provide recommendations and advice to construction management so management can ensure diligence in meeting the environmental commitments and conditions of approvals. Some of the key responsibilities of the Environmental Inspector include:

- Communication with on-site personnel (i.e., Contractor, Construction Management), TransCanada, and key stakeholder groups (i.e. regulators, landowners);
- Reporting and documentation (i.e., EPPs, contract documents, technical specifications, project specific requirements, daily reports, field regulatory approvals, project summaries, and Contractor evaluations) to ensure compliance and due diligence; and
- Training and awareness of on-site personnel and key stakeholder groups.

Environmental Inspector Qualifications

Environmental Inspectors are chosen based on the necessary skills, experience and technical background required to properly carry out the environmental inspection responsibilities. Among other attributes, the following is a list of skills and abilities the inspector should possess:

- Self and time management skills;
- Organizational skills;
- Decision-making skills;
- Problem solving and negotiating skills;
- Interpersonal and public relations skills;
- Written and oral communication skills;
- Environmental management skills;
- Ability to learn and apply new concepts quickly and easily;
- Ability to professionally resolve conflicts;
- Awareness of the industry and applicable construction experience; and,

- Knowledge of local, provincial and federal environmental regulations and TransCanada policies, practices and procedures.

General Responsibilities

The tasks that the Environmental Inspector must fulfil on all construction projects are described, in general, below.

- Ensure compliance with all work permits, contract documents, Company environmental policies, TOPs and commitments made during and after the planning process.
- Provide day-to-day advice to the Construction Manager on the implementation of recommendations made in pertinent environmental documentation applicable to the project.
- Provide day-to-day advice to the Activity Inspectors for the specific construction phases and any issues that may arise.
- Provide advice on major decisions such as wet weather shutdowns or courses of action to deal with major unexpected environmental conditions.
- Ensure all effluents and wastes generated by construction are disposed of in an authorized manner.
- Report all spills in accordance with the Incident Management System.
- Conduct water, soil and biological sampling as required.
- File daily and supplemental reports to document all procedures, discussions and conditions regarding environmental matters.
- Act as liaison with local, provincial and federal regulatory agencies.
- Maintain a close communication link with the Construction Manager and the Environmental Advisor to provide advise on activities that may cause adverse effects on the environment or require a change in mitigation or remediation strategies.
- Participate in discussions with landowners as requested by the land agent.

Reporting Protocol (Communication) and Documentation

Defined lines of communication exist between the Environmental Advisor and the Environmental Inspector. The same lines of communication exist between the Environmental Advisor and the Construction Manager and the Project Manager. The Advisor serves in a technical support capacity to the Environmental Inspector. The Advisor is the primary contact with the Environmental Inspector and provides support and advice on environmental issues and policies.

There are also defined lines of communication between the Construction Manager and the Environmental Inspector as well. The relationship and reporting etiquette between the Environmental Inspector and the Construction Manager are captured below.

- The Environmental Inspector reports to the Construction Manager on a daily basis throughout the construction portion of the work assignment.
- The Construction Manager may direct the Environmental Inspector to investigate a particular aspect of the construction project or to advise on a recommendation in any of the pertinent environmental documentation applicable to the project.
- The Construction Manager has the final authority on the project and therefore all decisions regarding the construction or maintenance of the pipeline and the clean up.
- If the Environmental Inspector feels that an issue that has been brought to the Construction Manager's attention is not being adequately addressed, the Environmental Inspector will contact the Environmental Advisor.

In the field, lines of communication exist between the Environmental Inspector and the Activity Inspectors, Land Agent, Contractor Foreman and the Construction Superintendent. The Environmental Inspector liases with these individuals on a regular basis throughout the project providing advice and recommendations specific to the environment for the ongoing construction phases. The Environmental Inspector should ensure that the Land Agent is informed of all environmental issues on private land and/or issues that may affect negotiations with landowners.

The Land Agent is also responsible to keep the Environmental Inspector informed of specific landowner requirements or requests that may have an impact on the environment or Company environmental policies.

All projects on TransCanada's facilities will be regulated by federal, provincial and/or local government agencies. The Environmental Inspector is to liase with the regulatory agencies and individuals as required throughout the project, to keep them informed as to the progress of the project and proactively discuss foreseen difficulties that may require alterations or amendments to existing permits or authorizations. Any contraventions to previous commitments, permits or authorizations are to be brought to the attention of the governing authority in a timely manner.

Environmental Conditions of Approval

The Environmental Inspector must have a copy of all of the environmental permits, authorizations and approvals pertaining to the project the inspector is assigned to. These documents may include, but are not limited to:

- NEB Certificate or Order;
- All Information Requests (IRs) and responses generated between the NEB and TransCanada;
- All other documentation generated between the NEB and TransCanada referencing the environment for the project;
- Environmental Assessment (EA);
- Heritage Resources Impact Assessment (HRIA);
- Socio-Economic Impact Assessment (SEIA);
- Environmental Commitments Tracking List (ECTL); and
- All other permits and approvals required for the project (e.g., Permit to Take Water (PTTW), Shoreland Alteration Permit (SAP), water diversion and discharge permits, etc.)

Inevitably, revisions or changes to permits, approvals or authorizations are required, as a construction job progresses and time schedules and/or construction methods are refined. The Environmental Inspector must review the permits regularly to ensure that all aspects of the permit are accurate. The duration, volumes, locations and any other particulars that were approved as part of the permit must be completed as indicated or a revision must be requested, otherwise the permit is no longer valid.

The Environmental Inspector should immediately notify the Environmental Advisor when a permit revision is required. The Environmental Inspector must take a proactive approach to the terms and conditions of the permit and ensure the terms are accurate well in advance of the permit being required and must notify the Environmental Advisor accordingly.

Daily Reports

The Daily Environmental Inspection Report is to be completed by each Environmental Inspector every day and submitted to the Construction Manager. The daily reports are sent weekly to the Environmental Advisor who in turn will report to the Project Manager.

The Daily Environmental Inspection Report should include:

- The date of the report;
- Weather conditions;
- Relevant information on the implementation of environmental specifications and regulatory conditions;
- Any non-compliance or non-conformance with environmental conditions found in the documentation applicable to the project; and
- General observations throughout the day pertaining to the phases of construction and the environmental implications, if any, of each.

Photographs

The Environmental Inspector is to keep a colour photographic record (not digital) of construction in order to provide firm evidence of certain events and activities. Pre-construction photos should be taken of environmental issue-related sites and a few "typical" sites. Representative photos depicting the various phases of construction should also be obtained. Photos should be taken of relevant construction and reclamation activities where environmental specifications are either being implemented properly or improperly. All photographs must be dated and annotated as to where the photos were taken and what the photos are depicting.

As-Built Reports

The submission of an environmental as-built report is a certificate condition on some NEB Approvals and the reports must therefore be in a format suitable for filing with the NEB. The environmental as-built report shall set out the environmental issues that have risen to the date on which the report is filed and shall:

- indicate the issues resolved and those unresolved;
- describe the measures TransCanada proposes to take in respect of the unresolved issues; and,
- any specific issues as indicated in the NEB approval.

In addition to the above specific activities, a site as-built form shall be completed for any project causing small-scale disturbance during programs such as hydrostatic re-tests, launcher/receiver installations, small pipe replacements, and valve maintenance. Excavations at valves, farm taps, centre cuts, etc., shall be documented in this manner as well.

ROLES & RESPONSIBILITIES:

Assigning the appropriate (i.e., trained, competent) Environmental Inspector for a project is the main responsibility of the Environmental Advisor in consultation with the Construction Manager and Project Manager.

All roles (e.g., Environmental Advisor, Environmental Inspector, Construction Manager, and Project Manager) all have responsibility for effective and timely communication pre-, during, and post-construction.

Ensuring compliance with environmental conditions during construction is a shared responsibility between the Environmental Advisor, Environmental Inspector, Construction Manager, and Contractor.

The Environmental Inspector is responsible for providing daily reports, photographs and as-built reports for all projects (to various degrees depending on the scope of the work).

7.4. ENVIRONMENTAL MONITORING

PHILOSOPHY:

TransCanada monitors different variables of VECs that are identified as potentially being affected by the proposed project. The monitoring requirements are identified through the environmental assessment process from the assessment of environmental effects and through regulatory requirements. The objectives of monitoring during the implementation phase include:

- To ensure effective implementation of mitigation;
- To assess the impacts of the project;
- To facilitate environmental protection through immediate adaptation of mitigation measures (e.g., modifying water crossing activities based on turbidity measurements);
- To meet regulatory compliance;
- To demonstrate due diligence; and
- To support continuous improvement on subsequent projects.

SCOPE:

Applies to construction activities where monitoring has been identified as a requirement through regulatory conditions or TransCanada procedures.

PROCESS:

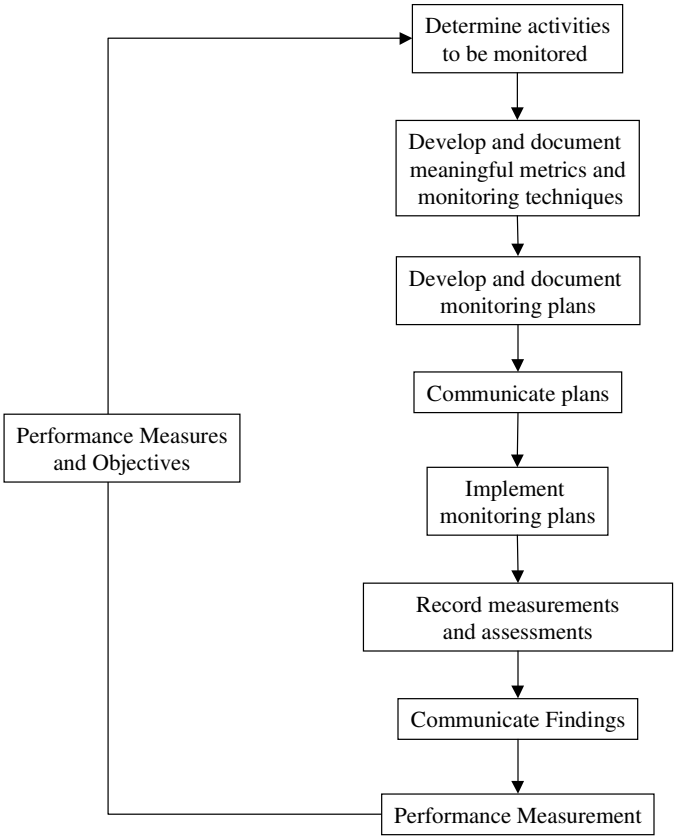

Figure 17: Process for determining monitoring requirements.

TransCanada develops its monitoring plan in consultation with its key stakeholders and by using professional judgement (i.e., hiring a third party consultant).

Table 26: Steps used in determining monitoring requirements.

Activity	Description
Determine activities to be monitored	Consider: • Regulatory requirements; • Objectives of mitigation measures • Environment objectives and targets; • whether a new modelling technique or an untried mitigation measure introduces a level of uncertainty into the project
Develop and document meaningful metrics and monitoring techniques	• Baseline biophysical data • Prediction of change to VEC through assessment of residual and cumulative effects • Available indicators and thresholds • Assess existing monitoring/measurement practices;
Develop and document monitoring plans	Include: • Timing • Resources • Communication • Reporting • Methodology • Metrics
Communicate plans	Ensure on-site personnel (i.e., Environmental Inspector, Construction Manager) know about any consulting personnel that may be on-site for monitoring
Implement monitoring plans	Ensure consulting personnel have been provided with appropriate training for on-site conditions
Record measurements and assessments	• Collect data; • Compare to baseline • Assess potential effects
Communicate findings	As a condition of regulatory requirements
Performance Measurement	Use the monitoring studies as feed-back on how mitigative measures worked; Where and how can measures be improved See section 8.2

ROLES & RESPONSIBILITIES:

The Environmental Advisor and Environmental Consultant determine the activities to be monitored and develop and document the monitoring metrics, techniques and plans.

The Environmental Advisor, Environmental Inspector, and Construction Manager communicate the monitoring plans.

The implementation of the monitoring plans is the responsibility of the Environmental Consultant, Environmental Inspector, and Environmental Advisor.

The Environmental Advisor, Regulatory Co-Ordinator, and Legal Counsel then communicate the findings.

7.5. COMPLIANCE REPORTING

PHILOSOPHY:

TransCanada monitors its compliance to all of its environmental commitments using the Environmental Commitments Tracking List (ECTL) as a tool. If a variance to a commitment occurs, TransCanada will communicate the reason for the variance to the appropriate stakeholder (e.g., regulator, landowner) and work with that stakeholder to determine the implications of the variance and how it can be mitigated, if necessary.

Other objectives for monitoring and reporting compliance to commitments are to improve TransCanada's overall environmental performance and ensure due diligence.

SCOPE:

Applies to any project where TransCanada has made environmental commitments (e.g., regulatory permits or approvals have been granted).

PROCESS:

The compliance reporting process throughout the life of a facility. Requirements which TransCanada monitors and tracks includes those commitments identified in:

- all regulatory permits and approvals;
- the ECTL (see section 7.1);
- the EPP (see section);
- construction plans and specifications; and
- the construction contract.

Compliance reporting can take various forms and may include:

- incident report using the TransCanada Incident Management Process;
- written and photographic documents;
- daily environmental inspection reports;
- regulatory field approvals/permits;
- a daily project summary;
- updated ECTLs;
- formal regulatory reports;
- site visits for interested parties (i.e., regulatory, TransCanada, landowners, outside stakeholders); and
- presentations to internal and external parties.

Awareness is another key component of TransCanada's compliance reporting process. Training and education of TransCanada employees, Contractors, regulators, and landowners is essential to maintaining compliance and identifying non-compliances before a detrimental impact to the environment can occur.

ROLES & RESPONSIBILITIES:

Everyone has a responsibility for compliance. However, specific to the process identified here, the key roles for compliance reporting include: Environmental Advisor, Environmental Inspector, Construction Manager, Project Manager, Regulatory Co-ordinator, Legal Counsel, and Management.

8.0 POST-IMPLEMENTATION ASSESSMENT

The main objectives of the post-implementation phase are:

- to assess the effectiveness of the mitigation measures;
- to evaluate performance measures and identify new measures or modify existing measures;
- to review the EDS and communicate changes to the EDS;
- to ensure all records have been filed; and
- continuous improvement to integrate learnings into subsequent projects.

8.1. POST-CONSTRUCTION MONITORING

PHILOSOPHY:

TransCanada undertakes post-construction monitoring to:

- Comply with specific post-construction reclamation performance expectations/conditions within the NEB approval;
- Comply with specific clauses within TransCanada's current easement and lease agreements; and
- Determine the success of mitigation measures applied during construction and reclamation measures.

SCOPE:

All facilities where a disturbance required reclamation measures (e.g., NEB regulated pipeline construction projects).

PROCESS:

Post construction monitoring of TransCanada's rights-of-way is performed for one to four years after the first growing season on all NEB regulated pipeline construction projects. The monitoring measures the progress of reclamation towards achieving a target of equivalent land capability. The post-construction monitoring program has established objectives for erosion control, soil capability, weed control, rare/significant plant community (where required), and revegetation success.

A preliminary assessment is conducted each spring identifying deficiencies and proposing recommendations for corrective actions. The remedial actions are to be implemented during the summer and a final assessment is conducted in the fall.

A report is prepared on the status of the reclamation and filed with the Board each January of the following year. The process is repeated until satisfactory reclamation is achieved, a minimum of two years is specified in the Conditions, however a significant problem may extend the cycle to four years or more.

ROLES & RESPONSIBILITIES:

The Environmental Advisor (Post-Construction Monitoring Co-Ordinator) is responsible for undertaking the post-construction assessments. Legal Counsel and the Regulatory Co-Ordinator assist with the filing of the reports to the regulator.

8.2. PERFORMANCE MEASUREMENT

PHILOSOPHY:

TransCanada identifies and measures performance indicators to work towards continuous improvement of its practices and procedures. The performance indicators are developed by evaluating:

- Objectives identified in the development of mitigation (e.g., reclamation plans);
- Stakeholder input and commitments;
- Regulatory requirements; and
- Criteria established for monitoring, including thresholds.

SCOPE:

Applies to all of TransCanada's projects.

PROCESS:

TransCanada identifies and measures performance indicators in support of its continuous improvement process. The continuous improvement process ensures:

- Incidents and non-conformances are identified, documented and assessed for appropriate learnings to engage corrective and/or preventive action;
- Environmental practices and procedures are regularly assessed through independent audit activities;
- Operational and regulatory requirements are assessed through ongoing self assessments;
- The achievement of objectives and targets are measured and evaluated indicating progress towards improved performance;
- Results of measurement, monitoring and performance evaluations are collected, documented and communicated to address the possible need for changes to practices and procedures, or the need for corrective and preventive action.

ROLES & RESPONSIBILITIES:

TransCanada takes a multi-stakeholder and multi-disciplinary approach to the identification and assessment of performance measures. The lead for this process however, is the Environmental Advisor responsible for the environmental design process.

8.3. DOCUMENT / PROGRAM REVIEW

PHILOSOPHY:

The Environmental Design Standard will be modified and reviewed annually within the context of:

- changes in legislation;
- internal and external audit findings;
- performance measurement evaluations; and
- stakeholder feedback, including construction Contractors, Environmental Inspectors, and regulators.

SCOPE:

Applies to the EDS document.

PROCESS:

TransCanada will review the EDS document annually based on the above philosophy. The steps involved in the review include:

- Developing and implementing a schedule to review the effectiveness of the document;
- Identify and implement changes; and
- Communicate the changes.

Developing and Implementing the Schedule for Review

The EDS will be reviewed annually.

Identifying and Implementing Changes

TransCanada has an on-going review process in which users of the documents and stakeholders can provide feedback on the document and its contents. These changes are tracked and addressed during the annual review. If the change requires immediate action, it will be reviewed and implemented immediately.

The steps involved in implementing the changes in the document are identified in Table 27.

Table 27: Document control process for the EDS.

Activity	Description
Acquire, Create or Change Document	• Consult stakeholders affected by the potential change. • Determine changes and edit or update document. • Denote changes within document and update document revision indicator • Complete Notification Form • Electronically forward document and Notification Form to Department Document Co-ordinator
Review	• Review document in accordance with Document Review Checklist • Sign document • Forward (with Notification Form) to next Reviewer listed or Approver
Approve	• Approve document in accordance with Document Approval Checklist • Sign document • Forward to next Approver listed or to Department Document Co-ordinator
Make Accessible	Notify stakeholders of changes.

Communicating Changes

The EDS document resides in an electronic format and therefore the latest revision is available for use by TransCanada personnel and readily available to distribute to contract personnel and other stakeholders as required. The date of the review will be listed in the document and therefore, individuals will be able to know when changes may be made to the document. However, if changes are made prior to the annual review, TransCanada will communicate to key stakeholders.

ROLES & RESPONSIBILITIES:

The Environmental Advisor takes the lead in the review process for the EDS.

8.4. CONTROL OF RECORDS

PHILOSOPHY:

All records within TransCanada are managed in a consistent manner to meet the company's due diligence requirements. Company records provide evidence of the policies, procedures, decisions, operations and other activities of TransCanada. They are the property of TransCanada and are an important asset that requires management and protection.

Records reflect a specific moment in time and are not changed or enhanced in any way. A change results in a new business record. Environmental records may include:

- Regulatory permits and approvals;
- Daily environmental inspection reports;
- Environmental monitoring data; and
- Photographs.

SCOPE:

This procedure applies to all records, regardless of media, generated or received by TransCanada, providing evidence of business transactions.

PROCESS:

Records are classified in accordance with TransCanada's Corporate Classification System.
The record is then indexed and filed electronically in EDMS or as a hardcopy in TransCanada's Automated Records Management System (ARMS).

ROLES & RESPONSIBILITIES:

The responsibility for creating and / or identifying records resides with many individuals within TransCanada. For example:

- The Regulatory Co-Ordinator, with the Project Team, creates the NEB Application;
- The Environmental Inspector creates many records including daily reports and photographs; and
- The Environmental Advisor may receive various permits that constitute records to be managed.

9.0 REFERENCES

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10.0 APPENDIX 1: FEDERAL LEGISLATION / REGULATION

Federal Legislation / Regulation

The following table provides a high level overview of the federal regulations that govern TransCanada's environmental design activities and should be used as a guide only. There may be other legislative requirements that have not been captured here.

Table 28: Federal legislative requirements.

Administering Agency	Act / Regulations	Regulatory Requirement	Associated Activity	Comments
EA / Project Approval:				
Various Responsible Authorities (e.g., NEB)	CEAA: • Exclusion List, • Inclusion List, • Law List, • Comprehensive Study List	CEAA Screening, Comprehensive Study, or Panel Review	Associated with obtaining another Federal Approval (e.g., NEB s. 58)	Any activity that triggers the Act as per Inclusion List and Law List (e.g.. NEB s.52 and s.58)
National Energy Board (NEB)	NEB Act	Section 52	Facility construction, operation	Certificates (incl. IR's, hearing, transcripts/minutes)
NEB	NEB Act	Section 58	Facility construction, operation	Order (incl. IR's, hearing, transcripts/minutes)
NEB	Canada Oil and Gas Operations Regulations	Section 74	Facility construction, operation	Any activity that triggers the Act as per Inclusion List and Law List (e.g.. NEB s.52 and s.58)
NEB	Onshore Pipeline Regulations		Facility construction, operation	These are the regulations to be followed for a s. 52 and s. 58 project; there are also guidance notes
Fisheries / Water:				
Fisheries and Oceans Canada (DFO)	Fisheries Act	Section 35 (2) - Authorization	TransCanada sends watercourse-crossing plans to DFO for information purposes or approval, depending on whether or not the crossing will result in a HADD (harmful alteration, disruption, or destruction) that cannot be mitigated. This referral occurs in parallel to the provincial approval process and	See DFO HADD Guidelines

Administering Agency	Act / Regulations	Regulatory Requirement	Associated Activity	Comments
			the Navigable Waters approval process.	
DFO	Fisheries Act	Section 32 - Killing fish by means other than fishing	For blasting where blasting guidelines cannot be met	See DFO Blasting Guidelines (1998)
Environment Canada	Fisheries Act	Section 36(3) - Release of deleterious substance		
DFO-Coast Guard	Navigable Waters Protection Act	Section 5 (1), 5 (2)	Requires approval of Minister of Fisheries to all works in or under navigable waters, except a work, which does not interfere with navigation.	Directional drills are exempt unless there are works associated with the drill that could be an issue (e.g. navigation wires, contingency crossing method); bridges are also an issue
Waste Management:				
Transport Canada	Dangerous Goods Act	Transportation of Dangerous Goods - permit for exception	Facility construction and operation	Transport of Dangerous Goods
Natural Resources Canada	Canada Oil and Gas Operations Act	Oil and Gas Spills and Debris Liability Regulations	Limits $ value of liability for spills, etc…	Any activity that triggers the Act as per Inclusion List and Law List (e.g.. NEB s.52 and s.58)
Wildlife:				
Environment Canada, Canadian Wildlife Service	Species At Risk Act	None	Provides protection for species at risk on federal lands	
Environment Canada, Canadian Wildlife Service	Migratory Birds Convention Act		Prohibits interference with migratory birds and their habitat	No brushing/clearing from Apr 15 - July 15 in many areas and even to Aug 30 in others

11.0 APPENDIX 2: PROVINCIAL LEGISLATION / REGULATION

Provincial legislation / regulation

The following tables provide information concerning some of the provincial environmental and associated land legislation and guidelines that may apply to the construction and operation of TransCanada's facilities. These tables should be used as a guide only. There may be other legislative requirements that have not been captured here.

Table 29: British Columbia legislative requirements.

Administering Agency	Act / Regulations	Regulatory Requirement	Associated Activity	Comments
EA/Project Approval:				
Environmental Assessment Office (EAO)	Environmental Assessment Act Bill 38	"Project Approval Certificate" or "Environmental Assessment Certificate"	Project Clearance	Certificate is required if a project is designated as "reviewable" by the EAO
Agricultural Lands:				
Agricultural Land Commission	Agriculture Land Commission Act S. 25	Approval to use land in the Agriculture Land Reserve for other than farm use	Facility construction and operation	Requires submission of a pre-site assessment of the project area and a comprehensive reclamation plan. Submission includes facilities and pipeline.
Forestry:				
B.C. Ministry of Forests (MOF)	Forest Practices Code of British Columbia Act	License to Cut	Facility construction and operation	Crown lands only
MOF	Forest Practices Code of British Columbia Act	Forest Licenses	Facility construction and operation	Consent required if we go through an initial cut base.
MOF	Forest Practices Code of British Columbia Act	Woodlot Licenses/Small Business Timber Sales	Facility construction and operation	Require 1:20,000 plot to identify individual woodlots, also identified on Crown search.
MOF	Forest Practices Code of British Columbia Act, Forest Fire Prevention and Suppression Regulations	Forest Fire Prevention Plan	Facility construction and operation	Must abide by regulations. Prepare and obtain a designated MOF approval of a Forest Fire Prevention Plan if activity is carried out between April 1 and Oct 31 to be submitted to the local Forest District.
MOF	Forest Practices Code of	Timber Mark	Facility construction and	Logs are stamped with owner's

Administering Agency	Act / Regulations	Regulatory Requirement	Associated Activity	Comments
	British Columbia Act		operation	timber mark prior to hauling to the mill
MOF	Forest Practices Code of British Columbia Act, Forest Fire Prevention and Suppression Regulations	Burning Permit	Facility construction and operation	Contractor will be responsible to obtain proper authority prior to any burning. A phone call required to Forestry for a burning authorization number.
MOF	Forest Land Reserves Act		Activity in Forest Land Reserves	
Heritage Resources:				
Ministry of Small Business, Tourism and Culture Archaeology Branch	Heritage Conservation Act	Section 14	Heritage Resource Impact Assessment	Require approval based on findings of Heritage Resources Overview
Ministry of Small Business, Tourism and Culture Archaeology Branch	Heritage Conservation Act	Heritage Inspection Permit Section 12	Facility construction and operation	Require approval based on findings of overview assessment.
Ministry of Small Business, Tourism and Culture Archaeology Branch	Heritage Conservation Act	Archaeological Assessment Report (AOA, PFR or AIA)	Applies to most projects that are reviewable under the Environmental Assessment Act	Applies to development on private and public land
Lands / Roads:				
BC Assets and Land Corporation	Land Act	Section 14 Permit and Statutory Right-Of-Way	Facility construction and operation	Traditional Land Use study may be required.
BC Assets and Land Corporation	Land Act	Crown *Land Act* Lease/License tenure holder crossing agreement	Required when crossing Crown land which is leased to a different party	Has to be signed by both parties Applies to Crown Land only
Ministry of Transportation and Highways (MOTH)	Highway Act	Road Crossing Agreements	All roads must be applied for. Submit an "Application To Construct Works Within Highway Right of Way" providing a typical road crossing has a minimum cover of 1.10 meters below the existing road ditch.	Also requirements for over-dimensional load permits
Wildlife:				

Administering Agency	Act / Regulations	Regulatory Requirement	Associated Activity	Comments
Ministry of Water, Lands and Air	Wildlife Act	Permision to operate in Access Management Area		Letter required just prior to construction, and a construction schedule – no permit required
Ministry of Water, Lands and Air	Wildlife Act	Permit to destroy nest/eggs, den, beaver dam,	clearing	
Waste Management:				
Ministry of Water, Lands and Air Protection, Waste Management	Waste Management Act	Oil and Gas Waste Regulation Section 7 Approval for testing and disposing of test water with additives	Facility construction and operation	Check with Region regarding Waste Management Permit
Ministry of Water, Lands and Air Protection, Waste Management Branch	Waste Management Act	Oil and Gas Waste Regulation Section 6 Approval for emissions from compressor station >4,000 bhp	Facility construction and operation	Permit required for TransCanada Compressor Stations
Insurance Bureau of British Columbia	Dangerous Goods Act	Transportation of Dangerous Goods - permit for exception	Facility construction and operation	Transporting dangerous goods
Ministry of Water, Lands and Air Protection, Waste Management Branch	Waste Management Act	Refuse Permit	Facility construction and operation	A refuse permit will be needed for disposal of construction materials.
Water / Water Crossings:				
Ministry of Water, Lands and Air Protection, Land Branch	Water Act	Section 9 approval for modification of stream channel (Regulation 7)	Facility construction and operation	Submitted with Section 14 Permit application. Geo-tech required for directional-drilled crossings. Consents required from landowners on private water crossings.
Ministry of Water, Lands and Air Protection, Water Management	Water Act	Section 8 approval for short-term use of water	Facility construction and operation	Permit is required.
Miscellaneous:				
Municipal Affairs and Housing	Fire Services Act		Facility construction and	Approval will be required if more

Administering Agency	Act / Regulations	Regulatory Requirement	Associated Activity	Comments
			operation	than 22.5 litres of fuel are stored onsite and if there are onsite fuel dispensing facilities.

Table 30: Saskatchewan legislative requirements.

Administering Agency	Act / Regulations	Regulatory Approval	Associated Activity	Comments
Agricultural Lands:				
Saskatchewan Agriculture and Food	Land Surveys Regulation s.127	Restoration Plan	Restoration in agricultural rangelands	
Saskatchewan Agriculture and Food	S. 15 (1) Wildlife Habitat, Lands Disposition and Alterations Regulation		Facility construction and operation	
Fisheries / Water:				
Saskatchewan Environment and Resource Management (SERM)	s.36 Environmental Management & Protection Act	Aquatic Habitat Protection Permit	Watercourse Crossing Construction	Pipelines Access Roads Stream Crossings Gravel and Borrow Pits Camps
Saskatchewan Environment and Resource Management (SERM)	Environmental Management and Protection Act s.35	Hydrostatic Test - Permit to Discharge into water	Discharge of Hydrostatic test water	
Saskatchewan Water	Saskatchewan Watershed Authority Act (2002)	Hydrostatic Test - Temporary approval to operate works for the removal of water	Withdrawal of water for purposes of hydrostatic testing	
Forestry:				
Saskatchewan Environment and Resource Management (SERM)	The Forest Regulations s.6	Timber License	Clearing	
Saskatchewan Environment and Resource Management (SERM)	The Forest Resource Management Regulations (1999) s. 13	Timber Salvage Permit (Forest Product Permit in association with authorised right of way construction activity)		Pipelines Access Roads Gravel and Borrow Pits Camps
Heritage Resources:				
Archaeological Resource Management Branch of Saskatchewan Culture, Youth and Recreation	S.63 Heritage Property Act	Heritage Resources Impact Assessment (HRIA)	Project Clearance	
Archaeological Resource		Flowline/Gathering		Pipelines

Administering Agency	Act / Regulations	Regulatory Approval	Associated Activity	Comments
Management Branch of Saskatchewan Culture, Youth and Recreation		System and Major Pipelines Heritage Resources Review Referral Form		Access Roads Gravel and Borrow Pits Camps
Vegetation:				
Saskatchewan Environment and Resource Management (SERM)		Rare Plant Survey		
Waste Management:				
Saskatchewan Environment and Resource Management (SERM)	Environmental Management and Protection Act		Spills and Wastes	
Wildlife:				
Saskatchewan Environment and Resource Management (SERM)	Wild Species at Risk Regulations	Wildlife Habitat Lands	Species and areas indicating timing constraints for construction	
Saskatchewan Environment and Resource Management (SERM)		Wildlife Habitat Alteration Permit		Pipelines Access Roads Gravel and Borrow Pits Camps
Saskatchewan Environment and Resource Management (SERM)	Wildlife Act (1998) -- The Wild Species at Risk Regulations (1999)	License to remove or destroy den, nest, house, dam or usual place of habitation		Pipelines Access Roads Gravel and Borrow Pits Camps
Miscellaneous:				
Saskatchewan Environment and Resource Management (SERM)		Notice of fire or release of gas greater than 28,000 m^3		
Saskatchewan Environment and Resource Management (SERM)		Burning Permit		

Table 31: Manitoba legislative requirements.

Administering Agency	Act / Regulations	Regulatory Approval	Associated Activity	Comments
Agricultural Lands:				
	Conservation Agreements Act			
Forestry:				
Prov. Of Manitoba Department of Natural Resources Forestry Branch	Forestry Branch	Timber Permit	Clearing	
Prov. Of Manitoba Department of Natural Resources Forestry Branch	The Wildfires Act s.19	Burning Permit	Clearing	Required in Burning Permit Area during Wildfire season
Prov. Of Manitoba Department of Natural Resources Forestry Branch	The Wildfires Act s.23	Work Permit	Working in Burning Permit Areas	Required to work in a Burning Permit Area, expires March 31 after issuance
Fisheries / Water:				
Manitoba Department of Natural Resources	The Water Resources Administration Act s. 14 DFO (Manitoba)	Water Crossing Authorisation	Water Crossing on Crown Land	
Manitoba Department of Natural Resources	The Water Resources Administration Act -- Water Rights Regulation	Permit to carry out Preliminary Work	For working before License is issued	
Manitoba Department of Natural Resources	The Water Resources Administration Act -- Water Rights Regulation	License to Divert and Use Water	Withdrawal of water for purposes of hydrostatic testing	
Heritage Resources:				
Manitoba Culture, Heritage and Tourism	The Heritage Resources Act s.12(2)	Heritage Resource Impact Assessment	Project Clearance	
Manitoba Culture, Heritage and Tourism	The Heritage Resources Act s.12(1)	Application for a Heritage Permit and/or Development Plan	Permit to undertake any activity within Heritage Sites	
Wildlife:				

Administering Agency	Act / Regulations	Regulatory Approval	Associated Activity	Comments
	Wild Species at Risk Regulations		Species and areas indicating timing constraints for construction	

Table 32: Ontario legislative requirements.

Administering Agency	Act / Regulations	Regulatory Approval	Associated Activity	Comments
Agricultural Lands:				
Forestry:				
Ontario Ministry of Natural Resources (OMNR)		License to cut on Crown Land		Authorize the cutting of trees on crown land.
Ontario Ministry of Natural Resources (OMNR)	Forest Fires Prevention Act	Permit for fires	inside or outside of a restricted fire zone	April 1 to October 31 (during fire season)
Ontario Ministry of Natural Resources (OMNR)	Trees Act	Clear Land	Clearing, destruction of trees by cutting, burning or other means.	
Ontario Ministry of Natural Resources (OMNR)	Forest Fires Prevention Act	Permit for Travel in restricted fire zones		Fire Regions defined in Outdoor Fires – Ontario Regulation 207/96 (Amended by Ontario Regulation 230/00)
Fisheries / Water:				
Ontario Ministry of Natural Resources (OMNR)	Public Lands Act	Work Permit (shorelands)		
Ontario Ministry of the Environment (MOE)		Hydrostatic Test - Notification	When polluting material is discharged into a water body	
Ontario Ministry of the Environment (MOE)	Ontario Water Resources Act	Hydrostatic Test - (Permit to Take Water)		For diversion of water (> 50,000 l/d)
Ontario Ministry of Natural Resources (OMNR)		Hydrostatic Test - Discharge permit/approval		
Ontario Ministry of Natural Resources (OMNR)	Public Lands Act 335/00 s.2	Watercourse crossings construction permit	Water crossing on Public Lands	
DFO, administered by the Ontario Ministry of Natural Resources and Federal Department of Environment in Ontario.	Fisheries Act	Permits or approval are required for any alterations that may affect fish or fish habitat.	Activities which occur near or in water and have the potential to harm or disturb fish habitat such as the discharge of pollutants or stream alterations.	
Ontario Ministry of Natural Resources (OMNR)	Lakes and Rivers Improvement Act - O. Reg. 454/96 s.2	Watercourse crossings approval	Water Crossing on Municipal or Private Land	Provide verbal confirmation one day in advance of the scheduled crossing (Part of the TransCanada /DFO Notice)

Administering Agency	Act / Regulations	Regulatory Approval	Associated Activity	Comments
Ontario Ministry of Environment (MOE)	Environmental Protection Act			Guidelines for Evaluating Construction Activities Impacting on Water Resources
Heritage Resources:				
	Ontario Heritage Act	Permit	Excavate or alter property of archaeological or historical significance	
Lands:				
Ontario Ministry of Natural Resources (OMNR)		Permit to Work	Work outside RoW on Crown Lands (e.g. access (shooflies) water crossing activities of RoW)	
Ontario Ministry of Natural Resources (OMNR)		Land Use Permit or Lease	Use of Public Lands	
Ontario Energy Boad (OEB)	Ontario Energy Boad Act s.101(1)	Crossings	Construction upon, under or over a highway, utility line or ditch	
Ontario Ministry of Agriculture and Food.	Municipal Act	Permits are required for the removal of topsoil.	Grading, trenching	
Waste Management:				
Ontario Ministry of Environment (MOE)	Environmental Protection Act	Director's Instructions	Shipping of liquid P{1} waste	P{1} waste = P{1} > 50 ppm
Wildlife:				
Ontario Ministry of Natural Resources (OMNR)		License to Trap		
Ontario Ministry of Natural Resources (OMNR)	Fish and Wildlife Conservation Act, 1997 s.7	Authorization to destroy nest/eggs	clearing	
Ontario Ministry of Natural Resources (OMNR)	Fish and Wildlife Conservation Act, 1997 s.8	Authorization to destroy habitual dwelling or den of a furbearing mammal/black bear	clearing	
Ontario Ministry of Natural Resources (OMNR)		Endangered Species potential timing restrictions	Prohibits interference with the habitat of endangered flora or fauna	

Table 33: Quebec legislative requirements.

Administering Agency	Act / Regulations	Regulatory Approval	Associated Activity	Comments
EA / Project Approval:				
	Environmental Quality Act	Environmental Impact Assessment (EIA)	Pipeline Construction	A report has to be sent to the minister describing the general nature of the project. The minister then indicates to the initiator of the project nature, the range and the extent of the evironmental impact assessment that the company must prepare. Required if pipeline is >30cm in diameter and > 8km in length
Agricultural Areas:				
	Law on the protection of the territory and the agricultural activities s.70 Loi sur la protection du territoire et des activités agricoles	License of Removal of the Arable Ground	Removal of the arable ground in an agricultural zone	
Forestry:				
Ministère des Ressources naturelles	Law on the forests Loi sur les forêts	License for Forest Intervention	Applies to the establishment and the maintenance of infrastructures and the execution of forestry treatments including the afforestation and the use of fire on Public Lands	
Ministère des Ressources naturelles	Law on the forests Loi sur les forêts	License to start fire	clearing	Between April 1 and November 15
		Authorization for Herbicide spraying	Vegetation Control	Only needed for chemical vegetation control, no permit needed for mechanical control
Fisheries / Water:				
Ministère du Loisir, Chasse et			Provides for enforcement of the	

Administering Agency	Act / Regulations	Regulatory Approval	Associated Activity	Comments
Pêche			federal *Fisheries Act* for all freshwater fisheries within the province.	
Ministère de l'Environnement	Environmental Quality Act	Authorization	Pipeline water crossings, and water intakes and outfalls, are reviewed under the *Fisheries Act* and related provincial regulations, agreements, and protocols.	For any ground disturbing activity within 50m of a river, lake, or swap, pond, a marsh, or a peat
Ministère de l'Environnement	Environmental Quality Act	Permits to "take water"	Hydrostatic testing of pipelines or commissioning of facilities and for long-term, ongoing needs for potable and industrial water supplies at facilities	
Ministère de l'Environnement	Environmental Quality Act		Disposing of wastewater, particularly when discharging to a water body, discharge of hydrostatic test waters, or to longer term, continuous cooling and/or process water from station facilities such as power plants	
Ministère de l'Environnement	Loi sur le régime des eaux	Permit to alter the banks of a river	Alienation of river and ocean banks and beds (watercrossing)	Send letter or call
	Loi sur la qualité de l'environnement	Permit to work within 60m of the banks of a river with salmon		
Wildlife:				
Ministère de l'Environnement	Loi sur la conservation et la mise en valeur de la faune s.26	Permit to destroy nest/egg/den/dam	Clearing	
Ministère de l'Environnement	Société de la faune et des parcs du Québec c. 36, a. 105	Authorization to Modify Wildlife Habitat	Clearing	
Waste Management:				
Ministère de l'Environnement			The handling, storage,	

Administering Agency	Act / Regulations	Regulatory Approval	Associated Activity	Comments
			transportation, and disposal of waste material from TransCanada 's operations is regulated through the applicable provincial waste regulations	

12.0 APPENDIX 3: ABBREVIATIONS

CEAA	*Canadian Environmental Assessment Act*
CEA	Cumulative Effects Assessment
COSEWIC	The Committee on the Status of Endangered Wildlife in Canada
DFO	Fisheries and Oceans Canada
ECTL	Environmental Commitments Tracking List
EA	Environmental Assessment
EIL	Environmental Issues List
EPP	Environmental Protection Plan
ESCP	Erosion and Sediment Control Plan
HADD	Harmful Alteration, Disruption, or Destruction
HRIA	Heritage Resources Impact Assessment
HRO	Heritage Resources Overview
LRMP	Land and Resource Management Plan
NEB	National Energy Board
OMOE	Ontario Ministry of the Environment
OMNR	Ontario Ministry of Natural Resources
SARA	*Species At Risk Act*
SEIA	Socio-Economic Impact Assessment
VEC	Valued Ecosystem Component

13.0 APPENDIX 4: DEFINITIONS

Comprehensive Study: Required where the project is of a class set out in the Comprehensive Study List Regulations under the Canadian Environmental Assessment Act (GFFRs)

Cultivation: Tillage to prepare land for seeding or transplanting and later to control weeds and loosens the soil. (Canada Department of Agriculture, 1976)

Degradation: The changing of a soil to a more highly leached and weathered state, usually accompanied by morphological changes such as the development of an eluviated, light-coloured A (Ae) horizon. (Canada Department of Agriculture, 1976)

Diversion Dam: A structure or barrier that diverts part of or all the water of a stream to a different course. (Canada Department of Agriculture, 1976)

Duff: The partly decayed organic matter on the forest floor (Merriam-Webster Inc., 1991).

Dunes: Wind-built ridges and hills of sand formed in the same manner as snowdrifts. They are started by some obstruction, such as a bush, boulder, or fence that causes an eddy or otherwise thwarts the sand-laden wind. Once begun, the dunes themselves offer further resistance and they grow to form various shapes. (Canada Department of Agriculture, 1976)

Ecoregion: An area characterized by a distinctive regional climate as expressed by vegetation. Repeated vegetation/ site condition sequences and distinctive ecological relationships can be found within an individual ecoregion. (Strong, 1992)

Endangered: Species facing imminent extinction or extirpation.

Environmental Effect: Means, in respect of a project,

(a) any change that the project may cause in the environment, including any effect of any such change on health and socio-economic conditions, on physical and cultural heritage, on the current use of lands and resources for traditional purposes by aboriginal persons, or on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance, and

(b) any change to the project that may be caused by the environment. (NEB, CEAA)

Equivalent Capability: After successful conservation and reclamation, the ability of the land to support various lands uses similar to that which existed before disturbance, but not necessarily the same land use. (APESC, 1996)

Erodible: Susceptible to erosion. It is expressed by terms such as highly erodible and slightly erodible. (Canada Department of Agriculture, 1976)

Erosion: (i) The wearing away of the land surface by running water, wind, ice, or other geological agents, including such processes as gravitational creep.

(ii) Detachment and movement of soil or rock by water, wind, ice or gravity. (Canada Department of Agriculture, 1976)

Evapotranspiration: The loss of water from a given area during a specified time by evaporation from the soil surface and by transpiration from plants. (Canada Department of Agriculture, 1976)

Extinct:	Species no longer exists.
Extirpated:	Species no longer exists in the wild in Canada, but occurs elsewhere.
Extra Depth:	Deeper than standard burial; deep ditch.
Flow Velocity:	The volume of water transferred per unit of time and per unit of area in the direction of the new flow of water in soil. (Canada Department of Agriculture, 1976)
Foreign Line Crossing:	Any crossing of another pipeline, including TransCanada pipelines. (APESC, 1996)
Horizontal Deflection:	Bends to the left or the right; side bends.
Impeded drainage:	A condition that hinders the movement of water by gravity through soils. (Canada Department of Agriculture, 1976)
Landforms:	The various shapes of the land surface resulting from a variety of actions such as deposition, erosion, and earth crust movements. (APESC, 1996)
Landscape:	All the natural features such as fields, hills, forests, and water that distinguished one part of the earth's surface from another part. (Canada Department of Agriculture, 1976)
Looping:	Construction of a pipeline paralleling an existing TransCanada pipeline. The loop provides additional transportation capacity and may or may not extend the full length of the previous pipeline.
Minimum Disturbance:	The least possible disturbance, while meeting both environmental mitigation procedures and construction requirements.
Mulch:	Any material such as straw, sawdust, leaves, or loose soil that is spread on the surface of the soil to protect the soil and the plant roots from the effects to rain, soil crusting, freezing, and evaporation. (Canada Department of Agriculture, 1976)
New Corridor:	Construction of the first TransCanada pipeline along a specific alignment. This routing may or may not parallel non-TransCanada existing rights-of-way.
Organic Matter:	The organic fraction of the soil; includes plant and animal residues at various stages of decomposition, cells and tissues of soil organisms, and substances synthesized by the soil population. It is usually determined on soils that have been sieved through a 2.0 mm sieve. (Canada Department of Agriculture, 1976)
Organic:	An order of soils that have developed dominantly from organic deposits. The majority of Organic soils are saturated for most of the year. (Canada Department of Agriculture, 1976)
Overstrip:	A soil handling procedure where surface material, surface soil or the topsoil layer is removed together with subsoil material to a specified depth. This procedure may be suitable for areas with a shallow layer of surface material, surface soil or topsoil and a good quality upper subsoil layer. (APESC, 1996)
Permanent right-of-way:	Right-of-ways for which NGTL acquires and maintains lease agreements for the life of the pipeline.
Philosophy:	Describes the basis, i.e. the concepts and/or beliefs, for TransCanada's environmental design criteria.
Photomosaic:	A mosaic map made from aerial photographs showing physical and cultural

	features as on a planimetric map. (Canada Department of Agriculture, 1976)
Pipe size:	Base Table shows both Nominal Pipe Sizes and the actual outside diameter.
Problem Soils:	A soil unit where there is a significant difference in sol quality between the upper subsoil and the spoil, including the lower subsoil.
Process:	Provides the series of actions or operations necessary for the environmental design or TransCanada's facilities as listed in the Scope.
Project:	any proposed construction, maintenance, decommissioning, or abandonment of TransCanada's pipeline facilities which has the potential to affect the environment
Reference site:	Climatic classification to facilitate the recognition and characterization of ecoregions. The primary environmental influence is regional climate that results in unique biological and/or pedological responses in each ecoregion. (Strong, 1992)
Roles and Responsibilities:	Lists the individuals or teams responsible for actions within the Process.
Scope:	TransCanada's facilities include pipeline, compressor stations, meter stations, and other related facilities (e.g. valves, sales taps, and cathodic protection). Each of these facilities can be in one of the following **states**: "existing"; "new"; or, "expansion". The **phase** of the facility can be described as: "construction"; "operations"; "maintenance"; "decommissioned"; or, "abandoned". The scope will provide an explanation of which state and/or phase to which the process applies.
Site:	(i) In ecology, an area described or defined by its biotic, climatic, and soils conditions in relation to its capacity to produce vegetation. (ii) An area sufficiently uniform in biotic, climatic, and soil conditions to produce a particular vegetation. (Canada Department of Agriculture, 1976)
Soil Conservation:	(i) Protection of the soil against physical loss by erosion against chemical deterioration: that is, excessive loss of fertility by either natural or artificial means. (ii) A combination of al methods of management and land use that safeguard the soil against depletion or deterioration by natural or man-induced factors. (iii) The division of soil science dealing with soil-conservation (i) and (ii). (Canada Department of Agriculture, 1976)
Soil Handling Procedure:	Surface material is selectively removed in one lift and spoil material is removed in a second lift. following pipe installation the surface material and subsoil materials are replaced in their pre-construction order and depth. See also two-lift. (APESC, 1996)
Soil Survey:	The systematic examination, description, classification and mapping of soils in an area. (APESC, 1996)
Special Concern	Species are of special concern because of characteristics that make them particularly sensitive to human activities or natural events.
Species:	Any indigenous species, subspecies, variety, or geographically defined population of wild fauna and flora. (COSEWIC)
Spoil side:	That portion of the right-of-way allocated for storage of material excavated from the ditch as well as for duff and/or surface material.

Spoil: Excavated rock waste, and subsoil material.

Staging Area: Area for the Contractor to off-load and assemble equipment and store materials.

Threatened: Species likely to become endangered if limiting factors are not reversed.

Toxic Substance: Means a substance which on entering the environment is of a quantity or concentration that:

(a) may have an immediate or long-term adverse effect on the environment;

(b) may constitute a danger to the environment on which human life depends; or

(c) may constitute a danger to human life or health. (GFFRs)

Standard Soil Handling: Surface material is selectively removed in one lift and spoil material is removed in a second lift. Following pipe installation the surface material and subsoil materials are replaced in their pre-construction order and depth. (APESC, 1996)

Subsoil: Soil material found below surface soil, surface material or topsoil layer and above the bedrock, that contains roots or the root zone and is typically lighter in colour than the surface soil or topsoil layer. (Canada Department of Agriculture, 1976)

Surface Soil: The uppermost part of the soil that is ordinarily moved in tillage, or its equivalent in uncultivated soils. It ranges in depth from 7.5 cm to 25 cm (3 in to 10 in) and is frequently designated as the “plow layer”, the “Ap layer”, or the “Ap horizon.” (APESC, 1996)

Surface material: (i) The layer of soil moved in cultivation (Ap horizon).

(ii) The Horizon.

(iii) The Ah (Ahe, Ahg) horizon.

(iv) Presumably fertile soil material used to topdress road banks, gardens and lawns. (Canada Department of Agriculture, 1976)

Topsoil: On arable land (i.e., cultivated, hay land, improved pasture, etc.), the uppermost layer of soil that is ordinarily moved in tillage, or its equivalent on range land or non-arable land. Topsoil is normally referred to as the “A” horizon or the plough layer and is typically darker in colour than the subsoil layer. (APESC, 1996)

Transition soil: A soil with properties intermediate between those of two different soils and genetically related to them. (Canada Department of Agriculture, 1976)

Temporary Workspace: Additional right-of-way required for specific circumstances such as the storage of surface material, grade material, timber salvage or construction activities such as road bores and water crossings.

Three-Lift: A soil handling procedure used for problem soils where the soil is selectively removed, stored and replaced in three layers; surface soil or topsoil layer, upper subsoil; and spoil material including the lower subsoil layer. (APESC, 1996)

Two-Lift: A soil handling procedure where the soil is selectively removed, stored and replaced in two layers; surface soil, surface material or topsoil layer; and spoil material including the subsoil layer. (APESC, 1996)

Two Toning: A step change in the grade elevation across the right-of-way width, splitting the equipment and travel lanes.

Valued Ecosystem Components: Each of the environmental attributes or components identified as a result of a social scoping exercise is referred to as a *valued ecosystem component*. These may be determined on the basis of perceived public concerns related to social, cultural, economic or aesthetic values. They may also reflect the scientific concerns of the professional community as expressed through the social scoping procedures (i.e., public hearings, questionnaires, interviews, workshops, media reports, etc.). (Beanlands and Duinker, 1983)

Water Table: Elevation at which the pressure in the water is zero with respect to the atmospheric pressure. (Canada Department of Agriculture, 1976)

Working Side: That portion of the right-of-way designated for construction activities, access and construction materials (e.g. pipe, swamp weights).

14.0 APPENDIX 5: RESPONSIBILITIES CHART

The Responsibilities Chart reflects the roles & responsibilities sections in the main body of the document.

Section	Activity	Engineering Design	Project Manager	Environmental Advisor	Environmental Inspector	Environmental Consultant	Project Team[1]	Regulatory Co-ordinator	System Design	Plant Engineering	Management	Legal Counsel	Geotechnical Consultant	LCA Representative	Regional CS&E Co-ordinator	Reclamation Co-ordinator	Construction Manager	Contractor
2.1 Project Scope	• Determine the need for project/activity		R						R									
	• Determine the principal project		R						R									
	• Determine the associated works/activities		R						R									
	• Determine other undertakings in relation to the principal project and associated works/activities		R						R									
	• Determine alternatives to the project						R											
	• Determine alternative means to the project						R											
	• Determine the scope of the project						R											
2.2 Route/Site Selection	• Identify constraints						R											
	• Determine the preliminary route/site selection						R											
	• Undertake stakeholder consultation						R											
	• Identify baseline studies						R											
	• Determine preferred and alternative routes/sites						R											
	• Finalize applied-for route(s) or site(s)						R											
2.3 Right-of-Way Width	• Determine Right-of-Way Width						R											
3.0 Stakeholder Consultation	• Stakeholder Consultation						R											
3.1.1 Public Consultation	• Undertake early scouting and research						C							R				
	• Develop action plan						C							R				
	• Implement action plan						C							R				
	• Monitoring, evaluating, following-up and documenting the consultation process and plan						C							R				
3.2 Valued Ecosystem Component Selection	• Selection of Valued Ecosystem Components (VECs)			R		R	C											
4.0 Analysis of potential environmental effects	• Assessment of environmental effects		R	R		R												
4.1 Baseline Studies	• Develop and implement the plans for baseline studies (including establishing boundaries)			C		R												
4.1.1 Soil	• Gather historical and baseline soils information and determine the need for soils survey			R		R												
	• Conduct soils survey			C		R												
	• Develop, validate, and communicate soils handling plan		A	A	R	R											R	
4.1.2 Vegetation	• Gather historical and baseline vegetation information and determine the need for various vegetation surveys			R		R												
	• Conduct vegetation survey			C		R												
4.1.3 Wildlife	• Gather historical and baseline wildlife information and determine the need for wildlife surveys			R		R												
	• Conduct vegetation survey			C		R												
	• Develop, validate, and communicate mitigation measures		A	A	R	R											R	
4.1.4 Protected Areas, Land Use	• Gather historical and baseline information to identify existing land use and protected areas			R		R												
	• Identify alternative routes if there are “no-go”areas						R											
	• Develop, validate, and communicate mitigation measures		A	A	R	R											R	
4.1.5 water Crossings and Aquatic Resources	• Gather historical and baseline aquatic and watercourse information to determine the need for biophysical and geotechnical surveys		C	R		R												
	• Conduct biophysical survey(s)					R												
	• Conduct geotechnical survey(s)												R					
	• Assess potential crossing techniques and propose preferred crossing methods		A	R	R	R											R	
	• Develop, validate, and communicate Watercourse Crossing Plan		A	A	R	R											R	R

[1] Includes the Project Manager, the Environmental Advisor, the Regulatory Co-Ordinator, System Design, Plant Engineering, Legal Counsel, and the Construction Manager.

Section	Activity	Engineering Design	Project Manager	Environmental Advisor	Environmental Inspector	Environmental Consultant	Project Team[1]	Regulatory Co-ordinator	System Design	Plant Engineering	Management	Legal Counsel	Geotechnical Consultant	LCA Representative	Regional CS&E Co-ordinator	Reclamation Co-ordinator	Construction Manager	Contractor
4.1.6 Air	• Undertake ambient air quality assessment			R		R											R	
	• Develop mitigation measures		A	R	R	R												
	• Monitor air quality during construction and implement mitigation measures				R	R											R	
4.1.7 Noise	• Undertake ambient environmental noise survey			C		R				R								
	• Develop mitigation and Noise Integrity Plan		C	C		R				R								
	• Implement plan				R	R				R							R	
	• Assess the effectiveness of the plan									R								
4.1.8 Heritage Resources	• Undertake Historical Resources Overview			C		R												
	• Determine if Historical Resources Impact Assessment is required							R										
	• Undertake Historical Resources Impact Assessment (if required by the regulators)					R												
	• Determine mitigation techniques and develop mitigation plan		R	R		R												
	• Implement mitigation plan				R	R											R	
4.2 Social Assessment	• Undertake Socio-Economic Impact Assessment (input from EIA and HRIA)			R										R				
5.1 Environmental Protection Plan	• Development, communication and implementation of the Environmental Protection Plan		R	R	R	R											R	
5.2 Adverse Weather Contingency Plan	• Development of the Adverse Weather Contingency Plan		R	R	R	R											R	
	• Communication and implementation of the Adverse Weather Contingency Plan		R	R	R												R	R
5.3 Erosion and Sediment Control Plan	• Development of the Erosion and Sediment Control Plan		R	R	R	R											R	C
	• Communication and implementation of the Erosion and Sediment Control Plan		R	R	R												R	R
5.4 Reclamation	• Development of the Reclamation Plan		R	R	R	R											R	C
	• Communication and implementation of the Reclamation Plan		R	R	R												R	R
6.1 Residual Environmental Effects Analysis	• Assessment of Residual Environmental Effects			C		R												
6.2 Cumulative Effects Assessment	• Assessment of Cumulative Environmental Effects			C		R												
6.3 Determination of Significance	• Determination of likely significant environmental effects			C		R												
7.1 Environmental Commitments Tracking	• Develop, update, and forward/communicate the ECTL during Environmental Design and Approval			R														
	• Develop, update, and forward/communicate the ECTL during Construction				R													
	• Develop, update, and forward/communicate the ECTL during initial Reclamation				R											R		
	• Develop, update, and forward/communicate the ECTL during Post-Construction			R														
	• Develop, update, and forward/communicate the ECTL during Operations														R			
	• Develop, update, and forward/communicate the ECTL during Abandonment			R														
7.2 Environmental Training and Awareness	• Identify training needs and develop project-specific training			R	R													
	• Pre-job Meeting		R	C	C												C	
	• Environmental awareness during construction				R												R	R
	• Inspector Training (partly led by construction services)			R														
7.3 Environmental Inspection	• Assign the appropriate Environmental Inspector		C	R													R	
	• Effective and timely communication during pre-, during, and post-construction		R	R													R	
	• Ensure compliance with environmental conditions during construction			R	R												R	R
	• Provide daily reports, photographs and as-built reports for all projects				R													
7.4 Environmental Monitoring	• Determine the activities to be monitored and develop and document the monitoring metrics, techniques and plans			R		R												
	• Communicate monitoring plans			R	R												R	
	• Implement monitoring plans			R	R	R												
	• Communicate findings			R				R				R						

Section	Activity	Engineering Design	Project Manager	Environmental Advisor	Environmental Inspector	Environmental Consultant	Project Team[1]	Regulatory Co-ordinator	System Design	Plant Engineering	Management	Legal Counsel	Geotechnical Consultant	LCA Representative	Regional CS&E Co-ordinator	Reclamation Co-ordinator	Construction Manager	Contractor
7.5 Compliance Reporting	• Compliance reporting		R	R	R			R			R	R					R	
8.1 Post-Construction Monitoring	• Undertake post-construction assessments			R														
	• File reports to the regulator							R				R						
8.2 Performance Measurement	• Identification and assessment of performance measures			R														
8.3 Document/ Program Review	• EDS Review			R														
8.4 Control of Records	• Create NEB Application						R	R										
	• Create daily reports and photographs				R													