

Guidelines for the preparation of a Comprehensive Study Report Perth-Andover to Woodstock Twinning of Route 2 –Trans Canada Highway, New Brunswick

INTRODUCTION

Purpose

Transport Canada and Fisheries and Oceans Canada has prepared these “Guidelines for the Preparation of a Comprehensive Study Report for the Perth-Andover to Woodstock Twinning of Route 2 – Trans Canada Highway Project” (“Guidelines”) pursuant to their authority as responsible authorities under the *Canadian Environmental Assessment Act*. This has been done, in consultation with other federal and provincial authorities. These Guidelines include the information requirements of the New Brunswick Department of Environment and Local Government with respect to the registration of the Project pursuant to the New Brunswick *Environmental Impact Assessment Regulation*. These Guidelines set the scope of the project, the scope of the environmental assessment, including the key factors and valued environmental components that must be considered in the environmental assessment.

The document is divided into two key parts: the content of the comprehensive study report and its presentation. In addition, the introduction describes the project, the responsible authorities, the application of the environmental assessment processes, the scope of the project, and the requirements for public participation.

Background

The Trans-Canada Highway (Route 2) through New Brunswick is 519 km in length from Nova Scotia to Quebec. Approximately 130 km or 25 % remains to be twinned.

On August 14, 2002, the federal and provincial governments committed to the twinning of the Trans Canada Highway, the Route 2, in New Brunswick. The proposed Highway Upgrade from Perth-Andover to Woodstock will be approximately 70 kilometres in length and will be funded under the Canadian Strategic Infrastructure Fund (CSIF) program. The federal government will share 50% of the estimated cost of \$400 million. The CSIF was announced in Budget 2001. The Canadian Strategic Infrastructure Fund Agreement between Infrastructure Canada, Transport Canada and the Province of New Brunswick was signed on April 30, 2003.

The proposed undertaking will commence just south of the Trans-Canada Highway/Route 190 Interchange in the Village of Perth-Andover, will continue past River

de Chute, Florenceville, Hartland, and terminate in the vicinity of the intersection of the Trans-Canada Highway/Route 550 (Connell Road) in the town of Woodstock.

The proponent of the project is the New Brunswick Department of Transportation that will oversee the construction and operation of this road project.

Application of federal and provincial environmental assessment processes

The proposed Project is “project” as defined under the Canadian Environmental Assessment Act (CEAA) and “undertaking” as defined in the New Brunswick Environmental Impact Assessment Regulation. Given the fact that the federal government will be funding 50% of the project through the CSIF program, the project will require an environmental assessment pursuant to CEAA (funding “trigger” pursuant to Section 5 (1) (b) if the Environmental Assessment determines that the project has significant adverse environmental effects, Transport Canada may choose not to support the project or may refer the project to a panel review. Transport Canada, which will be responsible for the attribution of this funding through the Infrastructure Canada, will be a responsible authority for the application of CEAA. Transport Canada will consult fully with Infrastructure Canada during the process so that Infrastructure Canada can also address any obligations as a Responsible Authority in respect to this project. Fisheries and Oceans Canada (DFO) determined that some of the larger watercourse crossings required for the highway project may require approvals pursuant to section 5 (1) of the *Navigable Waters Protection Act*. Additionally, the construction of some of the watercourse crossings may result in the harmful alteration, disruption, or destruction of fish habitat and may require authorizations pursuant to section 35 (2) of the *Fisheries Act*. Both of these regulatory requirements are included in the CEAA, *Law List Regulations*. DFO is responsible for the delivery of these authorizations and as such, DFO will also be a responsible authority for the application of the CEAA. The Responsible Authorities agreed that Transport Canada would be the lead RA.

Since this project involves the construction of an all-season public highway which will be more than 50 km in length and which will be located on a new right-of-way, it will require the conduct of a comprehensive study as specified by section 29 (b) of the *Comprehensive Study List Regulations*.

Transport Canada and Fisheries and Oceans have notified the New Brunswick Department of Transportation of the application of CEAA. Both responsible authorities have agreed to delegate the conduct of the environmental assessment and the preparation of the comprehensive study report to the New Brunswick Department of Transportation, pursuant to subsection 17(1) of the CEAA.

The proponent of the project will have to provide a draft of the comprehensive study report to Transport Canada, which will transmit the report to other federal and provincial authorities for review and comments and will ensure that the proponent responds adequately to those questions and comments. Prior to finalizing the report, both

responsible authorities will have to ensure that they are satisfied with the mitigation measures and recommendations. proposed, and the conclusion of the report. As well, the proponent must ensure that the latest versions of the NBDOTs *Environmental Protection Plan* and *Environmental Field Guide* are followed and referenced in the final CSR. The final report will then be transmitted to the Minister of the Environment and the Canadian Environmental Assessment Agency who will manage a public consultation to obtain comments on the report. Following this consultation, the Minister will determine, pursuant to section 23 of the CEEA, whether the project requires further assessment through a mediation or panel review, or whether the responsible authorities can provide the funding and federal permits which would allow the project to proceed.

Pursuant to the *Federal Coordination Regulations* under CEEA, the following federal departments have indicated that they can provide expertise in the review of this environmental assessment: Environment Canada, Natural Resources Canada, and Indian and Northern Affairs Canada.

Provincially, the Technical Review Committee (TRC) of the New Brunswick Department of the Environment has reviewed the project registration information and provided the proponent with a list of information requirements. It has indicated that the issues and questions identified should be addressed during the conduct of the CEEA comprehensive study report. The TRC further indicated that they wish to review the draft of any iterations of the comprehensive study report as it becomes available. Following a review of the final comprehensive study report, a provincial Environmental Impact Assessment Determination will be issued on the project.

Scope of the project

The scope of the project refers to the various components of the proposed undertaking that will be considered as the project for the purpose of the environmental assessment. The scope of the project must include the principal undertaking and any accessory activities or works that are directly linked to, or interconnected with, the construction and operation of the principal project. The principal project is the one for which a federal attribution is being exercised. For this project the funding which is to be provided by the Office of Infrastructure relates to the entire construction of the highway between Perth-Andover and Woodstock.

The scope of the project is therefore defined as: the construction, operation and maintenance of the 70 km highway to be constructed between Perth-Andover and Woodstock and any required ancillary works associated with those phases. Specifically the scope of the project includes the construction, operation and maintenance of all required interchanges, new road connections, modifications to existing roads to ensure proper integration with the new highway, watercourse crossings and bridges, modification, relocation or removal of any existing structures, operation/closure/restoration of borrow areas, waste rock and storage areas, and if required, the construction and operation of rest areas and weighstations. The scope of the project does not include the decommissioning (with the exception of temporary

structures during construction) of the highway as this is not currently contemplated. The scope of the project does not include the transportation of personnel or materials to the project location for either construction or operation. The scope of the project does not include the manufacture of project materials (e.g., culverts, pre-cast bridge elements, etc.) that are manufactured at existing facilities that exist or operate irrespective of this project.

Public Involvement

It is recognized that the proponent, in designing its project, has conducted several consultation sessions with the public most likely to be directly affected by the project. The proponent is encouraged to continue such consultations and to inform the affected individuals and communities of the progress of the project and of any modifications to the project as well as measures designed to mitigate the potential environmental effects of the project.

In addition, during the conduct of the environmental assessment, the proponent is encouraged to consult with special interest groups from within New Brunswick that may have interests in the protection of specific environmental components that may be affected by the Project. These groups should be provided with information on the project and given an opportunity to express specific concerns and to provide their views on alternatives means of carrying out the project and appropriate mitigation measures.

First Nations Involvement

In addition to consulting the general public, the proponent is required to contact First Nation representatives to inform them about the project. To the extent that it can be identified the proponent shall make efforts to work with First Nations to identify any current use of land and resources for traditional purposes by Aboriginal persons that may be affected by the project. The First Nations that may be affected should be given an opportunity to express their views about the project and should be provided with an opportunity to participate in the development of measures to mitigate potential environmental effects of the project. Indian and Northern Affairs Canada (INAC) is to be contacted for the specific First Nations Bands that need to be consulted.

Part 1 CONTENT OF THE COMPREHENSIVE STUDY REPORT

1.0 Introduction

1.1 Project Overview

This section is to introduce the reader to the comprehensive study report and to the proposed project. The intent of this section is to provide context rather than description since a more detailed description of the project will follow. The proposed project should be briefly described, including location, project components, associated activities, scheduling details, cost, and other key features. The project should be described in the context of the overall completion of the Trans Canada Highway twinning projects. This section should also identify the project proponent.

1.2 Purpose and Need for the Project

In recognition of the fact that the project has may cause adverse environmental effects , this section shall discuss the purpose of the project and the public need for it.

The proposed project will be designed to achieve certain specific objectives. The objectives should be described.

1.3 Regulatory Context

Describe why the environmental assessment is being carried out, including which triggers have led to it. This section should also describe the regulations, acts, policies and plans (e.g. land or resource use) that have a bearing on the project. In this case the project is being assessed under more than one project review process (federal and provincial), the different jurisdictions and processes involved should be listed.

2.0 Project Alternatives

2.1 Alternatives to the Project

This section of the Report shall describe functionally different alternatives to the Project . This discussion shall address but not necessarily be limited to other modes of transportation, upgrading of existing roadway and the null (do nothing) alternative. The feasibility of alternatives to the project should be discussed and their ability to meet the purpose and need for the Project should be considered. The discussion should include some consideration of the environmental implications of selecting the proposed project over other alternatives, including the a number of more key environmental effects of any such alternatives.

2.2 Alternative Means of Carrying Out the Project

This section of the report should outline the alternative means of carrying out the project that are technically and economically feasible and that can reasonably meet the project objectives, including the alternative that is preferable from an environmental perspective. To that end, the analysis should evaluate the preferred alternative and at least one other alternative route that is technically and economically feasible. The process for selecting alternative routes should be described, including the engineering, environmental, and socioeconomic constraints that were considered.

Specifically this section should describe the process taken to select the preferred route alignment and discuss the rationale/support for selecting the preferred alignment. A map should show the preferred alignment, alternate alignments that were considered, and environmental constraints used in the analysis. The proponent should describe any alignment refinements that resulted from public and special interest group consultation.

For significant watercourse crossings, indicate any alternative means of carrying out the crossings that were considered. Provide the rationale for selecting the preferred methods. Regulatory requirements may constrain the alternatives that are feasible or permitted. If this is the case, it should be clearly indicated in the report. If the final design of some of the watercourse crossings are not yet known, the proponent will need to describe in more detail, each potential watercourse crossing technique that may be used. The potential environmental effects associated with each technique, benefits and disadvantages, and the mitigation measures that would be associated with their implementation should also be described. The reader should clearly understand which techniques would be used in what circumstances.

Where appropriate, site location and design alternatives for ancillary facilities that are technically and economically feasible should also be presented. Note: this is required more for the key aspects of the project, not the ancillary facilities.

Alternatives should be listed and described in sufficient detail so that the environmental effects associated with each alternative and the rationale for selecting the preferred ones are apparent to the reader. The criteria for the selection of the alternatives should be identified, together with the importance attributed to each criterion. The selection of the preferred alternative(s) must be based on a clearly described method that comprises at least the following criteria :

- the ability to meet the purpose of the project
- option must be technically, legally and economically feasible
- the ability to limit the scope of the adverse effects on the natural (e.g. avoidance of wetland areas, environmentally sensitive areas, and significant habitat for migratory birds and species of special conservation concern) and human environment and to maximize the positive environmental effects

3.0 Description of Project and Activities

This section of the comprehensive study report shall describe the project particularly as it is planned to progress through the construction, operation and maintenance phases of its life. The description should also address modifications to existing roads, removal of any existing structures along the proposed highway route, and all proposed ancillary facilities which will be required to construct and operate the highway. In defining the project and describing activities, the comprehensive study report should focus on those project activities that are most likely to lead to environmental effects. The project description is limited to the preferred alternative means of carrying out the project as determined in Section 2.2.

The detailed description of the project should include a description of the following project components and activities:

- Location and ownership of land affected by the different project components. A location map should be provided showing the highway alignment, major existing infrastructure, affected and adjacent land uses, waste disposal areas, borrow areas and any important environmental features;
- Design features of the project (traffic operating speed, traffic volume, safety features, links to existing road infrastructure, how the environment has influenced the design of the project e.g. grade of slopes, flooding considerations);
- Construction, installation and operation of ancillary facilities such as rest areas, weigh scales, and weather monitoring equipment as applicable;
- Site preparation and clearing (vegetation, soil and rock removal, associated disposal or storage methods, removal or modification of any existing structures, infilling, location of borrow pits and quarries, blasting activities);
- Acid producing bedrock. Rock types in the project areas and their associated potential for acid producing should be provided Provide the location and an estimate of the volume of net acid producing bedrock to be disturbed, if any;
- Construction and demolition waste disposal (in accordance with the provincial *Construction and Demolition Debris Guidelines*);
- Forest clearing, recovery and elimination of wood wastes for all project areas;
- Cut and fill (volume, source, transportation, storage and disposal);
- All watercourse crossings, and any water diversions and channel realignments;
- All wetland crossings that cannot be avoided,
- Proposed artificial wildlife corridors;
- Use, transportation and storage of hazardous materials and bulk materials required to complete the project (including paving materials);
- Equipment receiving, handling and storage areas;
- Machinery and fuel storage;
- Construction methods, scheduling details (timing, frequency, duration of project activities and components);

- Types of maintenance required under normal conditions and maintenance/emergency repairs anticipated under extreme weather conditions; and
- Decommissioning plan shall be provided for all structures that are of a temporary nature, including : access roads, borrow areas, petroleum storage areas, equipment receiving, handling and storage, disposal sites.

It may be difficult to separate project components and activities from mitigation since many mitigation measures are sometimes part of standard practice. Include those standard mitigation practices that are applied regardless of location as part of the project description in this section. Those mitigation measures that are site or project-specific should be included in the section on mitigation.

4.0 Existing Environment

The purpose of this section is to describe the environment that could potentially be affected by the project. The existing environment shall be described in sufficient detail and to the extent necessary to support the evaluation of potential environmental effects and to develop mitigation that may be required. The section should identify the study area and describe the existing environmental components, their interrelationship and their sensitivity to disturbance. If the data held by government, municipalities, Aboriginal or other organizations (see Annex 1) is inadequate or not representative, the proponent shall complete the description of the environment using inventories carried out in accordance with generally accepted methods. The report should provide all information required to understand or interpret the data (methodology, inventory dates, location of sampling sites, etc.).

The proponent's description of the existing environment should be in sufficient detail to permit the identification, assessment and determination of the significance of potentially adverse environmental effects that may be caused by the project and to adequately identify and characterize the beneficial effects of the project. Where necessary, the proponent is expected to conduct surveys. In terms of wetlands, migratory birds, and species of special conservation concern (including rare vascular plants) in the project area, surveys are to be conducted in accordance with methods acceptable to Environment Canada and the New Brunswick Department of Natural Resources and Energy. If the background data have been extrapolated or otherwise manipulated to depict environmental conditions in the project area, modelling methods and equations shall be described and shall include calculations or qualitative characterizations of margins of error, if and as applicable.

The proponent is encouraged to focus the environmental assessment on the valued environmental components (VECs). This description should include, but not necessarily be limited to those VECs, processes, and interactions likely to be affected by the proposed project as identified by the public, government departments and agencies, other interested parties, and the proponent itself. The location of these VECs should be indicated on maps or charts. The proponent should indicate the methods used to identify the VECs, to whom these VECs are important, and the rationale and the justification for

selecting some VECs while excluding others.

In addition to describing VECs, the proponent must provide baseline information on the existing conditions of the VECs. In providing this information, the proponent should present a sufficient time-depth of data and information to establish norms, trends, and extremes, to the extent that such information is available or necessary to understand the potential environmental effects of the project.. The proponent should comment on the quality and reliability of these data and their applicability for the purpose used, and clearly identify gaps, insufficiencies, and uncertainties, especially those that should be remedied for follow-up purposes.

The VECs considered by the proponent should include, but not necessarily be limited to, the following:

- Moose and moose habitat
- Species of special conservation concern¹
- Fish and fish habitat
- Agricultural land
- Appalachian Hardwood Forest
- Migratory birds
- Wetlands
- Water quality
- Atmospheric quality

The description of baseline condition should include information on all identified VECs and the following environmental components:

Physical Environment

- a) bedrock geology and hydrogeology (including information on the potential for acid producing bedrock);
- b) surface geology and soils;
- c) sensitive slopes, and stream-banks;
- d) areas of ground instability and flood zones;
- e) local microclimate and regional climate change and meteorology;
- f) special, sensitive, or unique geological or landform features (e.g. wetlands, stream and riparian zones within a minimum of 500 m of the centreline);
- g) location and condition of existing contaminated sites, including all known landfills and points of sewage contamination within the study area;
- h) water quality; important physical and chemical parameters of ground and surface waters, at the sub-watershed and watershed level including:
 - baseline water quality and quantity survey data;

¹ species of special conservation concern include species listed by the Committee on the Status of Endangered Wildlife in Canada [COSEWIC], identified as S1, S2, and S3 by the Atlantic Canada Conservation Data Centre [AC CDC], designated in provincial listings, or considered to be “sensitive”.

- existing uses and users of the water resources; and,
 - estimated salt loading data for the area.
- i) ambient noise levels should be characterized for various locations along the corridor where traffic noise on the proposed highway could be an important environmental effect on the human environment and sensitive wildlife species.
- j) atmospheric conditions;
- Describe the air quality to include, but not necessarily be limited to, wind speeds and directions, precipitation amounts and precipitation chemistry. Attention is to be paid to ambient particulate matter (PM) levels in areas where construction, operation and maintenance activities may exacerbate existing conditions. (Note: PM less than or equal to 10 microns, and PM less than or equal to 2.5 microns are toxic substances under the *Canadian Environmental Protection Act*).
 - Describe the weather patterns along the proposed route as they relate to highway construction, operation, and maintenance, taking into account extreme conditions that could be encountered and climate change scenarios as applicable. Include how snow, ice and wind conditions may be expected to change with geographic conditions and seasons, and how these relate to the proposed project.
 - Describe what Probable Maximum Precipitation levels are used and how they relate to the proposed project

Biological Environment

- a) vegetation of aquatic, riparian and terrestrial environments, including a forest inventory (species, areas, volumes and commercial value) , focusing particular attention on species of special conservation concern or species likely to be designated as such and to species of economic and cultural importance;
- b) wildlife species (migratory, terrestrial, semi-aquatic, and aquatic species) and their habitat (in terms of abundance, distribution, diversity, productivity and health), focusing particular attention on species of special conservation concern, species of recreational and commercial value, and species used by Aboriginal communities for purposes of food, social and ceremonial purposes. Surveys and investigations required to supplement the available data shall be completed for migratory birds including forest birds and waterfowl. The methods for these studies must be acceptable to appropriate provincial departments and Environment Canada;
- c) wetland within the predicted zone of influence, identify the location, size and class of and conduct a wetland evaluation (Ms. Lee Swanson, NBDNRE, at (506) 453-2440 can provide a digital wetlands inventory). The true ecosystem value and function of each wetland shall be examined through on-site investigations using comprehensive valuation methods that assess component, functional and attribute values. Field surveys and investigations required to supplement the available data shall be completed in a manner that is acceptable to the appropriate provincial departments and Environment Canada. The Federal Government's goal for No Net Loss of wetland function, as described in the Federal Policy on Wetland Conservation and related Implementation Guide, will form the basis for all evaluations of wetlands which will be potentially affected directly or indirectly;

- d) fish and fish habitats found in all watercourses directly and / or indirectly associated with the project must be assessed. These assessments must be based on the established '*DNR&E / DFO Stream Survey and Habitat Assessment*' methodology.

Socio-economic Environment

- a) the social, economic and cultural setting of the project area;
- b) population and community distribution;
- c) current attitudes and concerns of the local and regional population, highway users and recreational facility users and others towards the project;
- d) planning strategies or proposed development within the project area pertaining to land or water use;
- e) present and potential conflicts or restrictions in terms of existing land use patterns (e.g. aboriginal persons, contaminated sites, utilities);
- f) historical, archaeological, cultural and paleontological sites of the area (A detailed assessment, including field investigation, of potential environmental effects on these sites to be completed by a licensable archaeologist)
- g) architectural heritage, (provide additional information on the 21 buildings that will be impacted by the project – contact Mr. Richard Phillips, Heritage Officer at (506) 453-8125 for information requirements);
- h) protected areas such as parks, sanctuaries or wetlands, whether established or proposed
- i) level and value of recreational, educational, scenic and other social uses of the project area, (e.g. use of parks, fishing, hunting, trapping, trails-specifically the International Appalachian Trail).

Note: The following environmentally Significant Areas are located near the proposed project

- Saint John River and Estuary;
- Perth-Andover Hardwood Forest;
- Summerfield Hardwood Forest;
- Ketch Lake;
- Clarks Brook Bog;
- Woodstock-Meduxnekeag Bridge;
- Moody (Iron Ore) Hill Deciduous Stand;
- Payson Lake;
- Upper Woodstock Hardwood Slope;
- Highway 95 Hardwoods; and
- Bedell Settlement Woods.

5.0 Public Participation

Each aspect of the public involvement program should be identified and the results documented in this section of the comprehensive study report. The Proponent should discuss how it has consulted with residents and organizations that are likely to be affected by the Project, and other parties who may be interested in the Project. Describe who was consulted, the objectives of these consultations, the methodology used, and the results. The result of the public participation and information sessions must detail how public comments were addressed, including any modifications and additional mitigation measures or commitments that resulted from these consultations.

A separate sub-section should provide the same type of information specifically to document the First Nations consultations.

Expert Department Consultation

Provide a listing of expert federal/provincial departments/agencies consulted during the environmental assessment. A record of consultation with the federal/provincial departments/agencies, issues raised by them and how these were addressed, as well as discussion of any unresolved issues raised during consultations should be provided in this section of the report.

Possible Groups to consult

The following are some of the groups that should be consulted:

- Meduxnekeag River Association - Mr. Stephen Wells, (506) 325-1100
- Ducks Unlimited
- Nature Trust of New Brunswick – contact at NBDOE is Nelda Craig (506) 457-4846

6.0 Environmental Effects, Proposed Mitigation and Significance of Residual Effects

This section should:

- a) identify any adverse environmental effects that the project will cause to the identified VECs, and the effects of these changes on human health, socioeconomic conditions, physical and cultural heritage and on current use of lands and resources for traditional purposes by aboriginal persons.
- b) identify cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out, and the environmental effects of possible malfunction or accidents
- c) describe and justify the proponent's plans to mitigate the adverse environmental

- effects of the project and assess the likely effectiveness of those plans;
- d) identify any residual environmental effects (including the permanent loss of habitat) of the project, and the proponent's plans to compensate for these; and,
 - e) assess the residual environmental effects and their significance.
 - f) consider the capacity of renewable resources that are likely to be significantly affected by the project to meet the needs of the present and those of the future.

For ease of review, the CSR should include a table setting out the environmental effects, proposed mitigation, and residual adverse environmental effects.

Methods

This section should include a description of the methods used to develop the strategy for investigating the interactions between the project and each VEC, and the methods used to predict and evaluate the potential environmental effects of project activities. If a detailed description of a particular method (such as a computer model used to predict emission dispersion or assimilative capacity) is required, it should be placed in a supporting document.

These methods will be used to judge the validity and accuracy of the predicted environmental effects. For quantitative modeling and predictions, a discussion of the model assumptions, the data quality and the confidence levels should be included in this section.

Predictions may be made by other than technical scientific or engineering methods. Consultations or the incorporation of traditional knowledge may have played a role in determining and predicting environmental effects. If so, those methods should be documented here.

Available guidance which is to be considered in the assessment of environmental effects is outlined in Appendix 1.

Environmental Assessment Boundaries

This section should define the environmental assessment boundaries. By defining the spatial and temporal boundaries of the project (e.g., project footprint, zones of influence, and schedule) and the VEC (e.g., distribution of the affected population in time and space), the proponent will establish a frame of reference for identifying and assessing the environmental effects associated with the project. The environmental assessment boundaries should be defined for the project and each VEC.

Describe rational/methodology in defining the zone of influence boundaries, both special and temporal.

In describing and predicting the environmental effects of the project, the proponent shall cover the period from the start of any pre-construction activity associated with the

project through construction, operation, including maintenance and repairs.

The report should contain a rationale for all boundaries and scales chosen.

Environmental Effects

In predicting and evaluating the potential adverse and beneficial environmental effects of the project, the proponent should provide substantial detail and state clearly what elements and functions of the environment may be lost or enhanced, where, how much, for how long, and with what overall effect. The proponent should characterize the magnitude, geographic extent, duration, frequency, reversibility and ecological/socio-cultural and economic context for each environmental effect to assist in the evaluation of the significance of those environmental effects.

The environmental effects of the project on the existing physical, biological and socio-economic environments should be identified and assessed, the proposed mitigation and compensation measures described, the residual environmental effects and their significance identified and assessed. The key focus of this assessment should be on the VECs identified in the previous section. However, the proponent should also ensure the analysis of environmental effects includes a consideration of the following:

- a) releases of pollutants during all phases of the scoped project such as acid rock drainage, and including any substances considered to be toxic under the *Canadian Environmental Protection Act (CEPA)* such as road salt and particulate matter;
- b) water quality and quantity, including groundwater (particularly the effects on wells that may result from blasting activity within 500 m of the proposed RoW), runoff, and surface water in the watershed; Note: decommissioning of wells must be done in accordance with the *Water Well Regulation* of the NB Clean Water Act.
- c) fish and fish habitat, especially at watercourse crossings (impairment of ecosystem function, or changes in productivity);
- d) other water users/supplies such as hatcheries;
- e) vegetation, wildlife and birds and their habitat, with attention to species of special conservation concern or species likely to be designated as such and species of economic and cultural importance (impairment of ecosystem function, or changes in productivity);
- f) atmospheric conditions and modification of local air quality, its potential effect on health, microclimates and climate (e.g. particulates, greenhouse gases) within the study area as affected by the project during peak traffic and other periods;
- g) noise and possible increase of background noise levels from highway construction activity and from traffic on sensitive wildlife species.
- h) changes in greenhouse gas emissions resulting from deforestation and from loss of soil carbon. Discuss the potential loss of carbon sinks (e.g. immature trees). A recommended source of information to support these calculations is the report,

“Estimating the Carbon Losses from Deforestation in Canada” by D. Robinson, W.A. Kurz, and C. Pinkham, which is available at www.nccp.ca/NCCP/pdf/Deforest_Canada.pdf.);

- i) drainage patterns, erosion, and stream flows;
- j) slope stability and flood zones;
- k) functional changes in wetlands;
- l) adverse economic changes including, but not limited to, loss of property values and the loss of revenue caused by a change in the environment (trapping, hunting, recreational potential, etc.);
- m) changes in lot size, proximity of houses and buildings and set backs from the new right-of-way, required modifications to building access, required community or household relocation and expropriation, and property splitting including changes to the size/area of land “remnants” in the context of future development potential.;
- n) changes in quality of life caused by the construction, operation and modification of the project including, but not limited to, issues such as, noise, dust and traffic levels, lowered air and water quality, alteration of visual and topographic characteristics of the area;
- o) present and future land and water use, including, changes in aesthetics and/or economic, education and recreational opportunities caused by the construction, operation and modification of the project;
- p) agricultural lands (in terms of lost area, lost revenue, required modification of agricultural drainage, access issue to the land and for machinery, and for farm animals);
- q) productive woodlots (lost of forested area, productivity and economic value);
- r) existing infrastructure, such as existing roads, electrical transmission lines, existing rights-of-way, distances from hospital and public protection services;
- s) archeological, historical, cultural, and scenic sites;
- t) temporary and permanent restrictions on land use during construction, operation and modification;
- u) local and regional transportation pattern shifts including, but not limited to shifts in traffic flows, average speeds, timing of traffic, sources and destinations, accident rates, induced traffic and vehicle mix;
- v) navigation where the highway will cross navigable watercourses; and
- w) current use of lands and resources for traditional purposes by Aboriginal people.

To the extent that is possible, the discussion of these environmental effects and their proposed mitigation should give full consideration to community knowledge of the environment and of appropriate and effective mitigation measures.

Mitigation

The proponent should describe general and specific measures intended to mitigate the potentially adverse environmental effects of the project. Mitigation is defined as the

elimination, reduction or control of the adverse environmental effects of the project, and includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means.

Mitigation measures should be consistent with the requirements of all relevant legislation, regulations, guidelines, policies, management plans, specifications, and best management practices (including those identified in Annex 1). Mitigation should be considered in a hierarchical manner with environmental effects avoidance measures identified first, reduction measures second and compensation last.

Mitigation measures are to be outlined for all VECs within the physical, biological and socio-economic environment where required. All proposed components of mitigation should be described by phase, timing and duration. Information must be provided on methods, equipment, procedures, and policies associated with the proposed mitigation or restitution. Standard management strategies are to be identified and established where none exist. The proponent should discuss and evaluate the effectiveness of the proposed measures and assess the risk of mitigation failure and the potential severity of the consequences. Information should be provided on similar mitigation methods used with similar projects and the degree of success achieved.

Where appropriate, The proponent should indicate what other mitigation measures were considered (including the various components of mitigation) and explain why they were rejected. Trade-offs between cost savings and effectiveness of the various forms of mitigation should be justified. The proponent should identify who is responsible for the implementation of these measures and the system of accountability

Compensation

As part of the proposed measures to mitigate potentially adverse environmental effects, the proponent should outline its compensation plans and policies for addressing adverse residual environmental effects, including compensation for:

- a) loss of fish habitat in accordance with Fisheries and Oceans Canada's policy for the Management of Fish Habitat;
- b) damage caused by the proponent's activities to the environment, to property, or to the land and resource use of others; and
- c) loss of wetland function in accordance with the Federal Policy on Wetland Conservation where avoidance of impacts is not possible.

The proponent should also include a discussion of past compensation measures taken for other infrastructure projects, and the successes of such measures.

Significance

The report should contain a detailed analysis on the significance of the potential adverse residual environmental effects it predicts. Residual effects include the adverse effects

that may remain at each stage of the project after proposed mitigation or enhancement measures are implemented, including emergency response and contingency plans. It should contain sufficient information to enable the reviewers to understand and review the proponent's judgment of the significance of environmental effects. The proponent should define the terms used to describe the level of significance. The proponent could use the following criteria to assess the significance of effects:

- a) magnitude;
- b) geographic extent;
- c) timing, duration and frequency;
- d) degree to which effects are reversible or can be mitigated;
- e) ecological and social/cultural context;
- f) probability of occurrence;
- g) the capacity of renewable and non-renewable resources (including but not limited to recreational areas) to meet the needs of the present and those of the future; and,
- h) standards, guidelines or objectives.

The determination of significance and likelihood of significant residual environmental effects are at the core of the decision about the project. It will dictate whether a responsible authority can take a course of action with respect to the project, or whether additional consideration of the project is needed through public review. For this reason, the CSR must include clear statements of whether the adverse environmental effects, taking into account any mitigation measures, are significant, not significant or uncertain. It should be noted that a determination of significant environmental effects or uncertainties (associated with the significance) would lead to a public review of the project through a mediation or a panel review as specified by section 23 of the *Canadian Environmental Assessment Act*.

In the comprehensive study report, the methods used to determine significance should be clearly documented and the results of that determination should be easily linked to these methods. These methods should include not only an analysis of the results and professional judgment, but also consultations with both the public and appropriate experts. This section of the report should document the assumptions that entered into the determination of significance and where environmental effects are predicted to be significant, the uncertainty that surrounds those predictions should be clearly stated. If those results or predictions are later found to be incorrect, the determination of significance may no longer apply. The report should convey the level of confidence associated with the predictions since this reflects upon the validity of the significance determination. The report should also note dissenting opinions.

Effects on the Sustainable Use of Renewable Resources

The proponent should include a consideration of the potential adverse environmental effects on the capacity of renewable resources that are likely to be significantly affected by the project to meet the needs of the present and those of the future. The proponent should clearly identify the renewable resources that may be affected by the project and

the criteria used in determining whether their sustainable use will be affected significantly.

The sustainable use of renewable resources is closely linked to the consideration of cumulative environmental effects. For example, an adverse effect on the sustainable use of a renewable resource, such as a fishery, may be caused by a cumulative environmental effect of a project, or it may be a cumulative environmental effect in its own right.

Possible Malfunctions or Accidents

The proponent should identify and describe the probability of possible malfunctions or accidents associated with the project, and the potential adverse environmental effects of these events. The description should include the safeguards that have been established by the proponent to protect against such occurrences and the contingency procedures in place. Leaks and spills both during construction and operation, collisions and other accidents should be considered.

Effects of the environment on the project

Environmental hazards potentially affecting the project should be described and the predicted effects from these hazards on the proposed project should be documented. This section of the report should discuss the effect the environment may have on the construction and operation phases of the project, including weather and climate elements. Any necessary climate information to validate statements made in the assessment should be provided. Issues such as erosion, wind, floods, severe precipitation events, land or rock slides, unstable soils, seismic events, or soil contamination should be addressed. In addition, the proponent should discuss how the project will address these potential effects in its design considerations. The significance of the effects of the environment on the project should be determined.

A reasonable determination of potential climate change is to be made based on information of past and future trends. One important source of climatological data is Environment Canada's Climate Centre:

Environment Canada
Atlantic Climate Centre
77 Westmorland Street, Suite 400
Fredericton, New Brunswick E3B 6Z3
Phone: New Brunswick: (506) 451-6006
Fax: (506) 451-6010
E-Mail: climate.atlantic@ec.gc.ca

Cumulative Environmental Effects

The proponent should identify and assess the cumulative adverse environmental effects of the project in combination with other past, present projects that will be carried out. The approach and methodologies used to identify and assess cumulative effects should be explained.

Guidance on how to consider cumulative environmental effects in an environmental assessment is provided in the Reference Guide entitled *Cumulative Effects Assessment Practitioners Guide*, Canadian Environmental Assessment Agency, February 1999. Consideration of cumulative environmental effects shall be limited to other projects or activities that are now taking place, or have taken place within the study area since 1981. It also should include future projects that will happen (*i.e.* are currently in the review process, with a high probability of receiving funding) within the next 5 years (before 2008).

The cumulative effects assessment should be focused on, the following VECs:

- Moose and moose habitat
- Species of special conservation concern (including migratory birds) and their habitat
- Fish habitat and water quality
- Agricultural land
- Appalachian Hardwood Forest
- Wetlands

7.0 Follow Up Programs

This section of the report should outline the need for and requirements of a follow-up program. A follow-up program is a formal, ongoing process to verify the accuracy of the environmental assessment of the project and determine the effectiveness of mitigation measures. If the follow-up program identifies unforeseen adverse effects, then the existing mitigation measures should be adjusted or, if necessary, new mitigation or compensation measures should be developed.

In the report, it is important that the objectives of the program be clearly defined and be as specific as possible since they will form the basis for the detailed monitoring and follow-up program that will be designed and carried on after the project is approved. The program should include the establishment of baseline conditions prior to disturbance, which will allow for comparison with the conditions after construction and restoration.

The critical question regarding implementation of a follow-up program is one of uncertainty or unfamiliarity -- in either the analysis and predictions of the environmental assessment, or in the mitigation measures. The assessment must consider, for

example, whether a new modeling technique or an untried mitigation measure introduces a level of uncertainty into the project and, if so, what are the corresponding risks of an inaccurate analysis or ineffective mitigation measure?

This section of the report should provide enough information on the follow-up and monitoring programs to allow the reviewer to determine whether these programs are likely to be effective in meeting the objectives defined above. The focus of the monitoring and follow-up program should be on those potential environmental effects associated with the greatest risk and uncertainty.

The report should identify:

- a) the need for such a follow-up program and its objectives;
- b) how it will be structured including enforcement;
 - the elements of the environment (i.e. air emissions, erosion, habitat use, etc.) that are to be monitored;
 - where monitoring will occur;
 - the frequency and duration of monitoring; and
 - protocols for the interpretation of follow-up results and actions to be taken based on findings.
- a) penalties for non-compliance;
- b) the roles to be played by the proponent, regulatory agencies, and others in such a program;
- c) the sources of funding for the program; and
- d) reporting.

8.0 Conclusion and Recommendation

This section of the report should outline the responsible authorities conclusion about the nature of the project's environmental effects.

One of four conclusions are possible.

1. The project is not likely to cause significant adverse environmental effects, taking into account appropriate mitigation measures, if necessary.
2. The project is likely to cause significant adverse environmental effects that cannot be justified.
3. The project is likely to cause significant adverse environmental effects and it is uncertain whether these can be justified in the circumstances.
4. It is uncertain whether the project is likely to cause significant adverse environmental effects.

The final decision on the project will be made after the Agency and the public have reviewed the comprehensive study report and the Minister of the Environment has made a decision on the next step in the process.

This section should summarize the predicted adverse environmental effects of the project, outstanding issues or concerns, any terms and conditions deemed appropriate, or other aspects of the proposal relevant to the decision.

PART II PRESENTATION OF THE COMPREHENSIVE STUDY REPORT

The comprehensive study report is to be a single stand-alone document that provides sufficient information to allow a decision to be taken on the likelihood of significant environmental effects or the need for further assessment. Enough detail should be included to permit the reader to understand the connections between the project, environmental components, potential effects, mitigation and the conclusions posed in the report.

The report should include a table that cross-references these Guidelines. If additional information is provided to respond to reviewers questions, it should be integrated in the final version of the comprehensive study report. A cross-reference table should be provided with each iteration of the report.

Since the report is intended for public review, the information should be presented in non-technical language wherever possible and appropriate, including a non-technical executive summary. Where the complexity of the issues addressed requires the use of technical language, a glossary defining technical words and acronyms should be included. The proponent shall provide charts, diagrams and maps wherever useful to clarify the text, including perspective drawings that clearly convey what the developed site would look like. Maps shall be of a limited number of common scales to allow for comparison and overlay of mapped features.

The proponent will have to provide 15 copies of a draft of the comprehensive study report to Transport Canada which will potentially be the lead responsible authority for the project. Transport Canada will transmit the report to other federal and provincial authorities for review and comments. The draft comprehensive study report should be submitted to:

Debbie deGrasse
Highway Programs Manager
Transport Canada
Place de Ville, 330 Sparks St.
Ottawa ON K1A 0N5

Upon finalization, the proponent will be required to submit an electronic copy of the report in English and in French, in PDF format, for publication on the CEAA's website. The proponent will also be required to submit 25 copies of the report (in English and in French) for distribution to provincial and federal authorities, for placement on the public registry and in viewing centres.

Annex 1 - DATABASES TO CONSULT

Selection of Published Information and Guidance Related to Migratory Birds

- Atlas of Breeding Birds of the Maritime Provinces (1992)
- Migratory Birds Environmental Assessment Guideline (1998)
- Environmental Assessment Guideline for Forest Habitat of Migratory Birds (1998) (available at www.cws-scf.ec.gc.ca/publications/eval/index_e.cfm)
- Important Bird Areas of Canada (available at www.ibacanada.com/main.htm)
- Atlantic Canada Conservation Data Centre (www.accdc.com)
- Local naturalist groups

Selection of Published Information and Guidance Related to Wetlands

- *Federal Policy on Wetland Conservation and associated Implementation Guide for Federal Land Managers* (available at www.cws-scf.ec.gc.ca/habitat/ramsar/docs/FPWC.pdf and www.cws-scf.ec.gc.ca/habitat/ramsar/docs/FPWCIG.pdf)
- North American Wetlands Conservation Council (Canada) (NAWCCC) *Wetland Evaluation Guide*
- NAWCCC *No Net Loss* implementation guide
- NAWCCC *Wetland Mitigation in Canada* framework
- *Wetlands Environmental Assessment Guideline* (1998) (available at www.cws-scf.ec.gc.ca/publications/eval/wetl/index_e.cfm)
- New Brunswick Wetlands Inventory
- Wetlands of the Maritime Provinces: Revised Documentation for the Wetlands Inventory (1996)

Selection of Published Information and Guidance Related to Toxic Substances and Environmental Quality

- CEPA Toxic Substances and Priority Substances Lists (accessible at www.ec.gc.ca/CEPARRegistry/subs_list/ToxicList.cfm) and related assessment reports (accessible at www.ec.gc.ca/substances/ese/eng/psap/final/main.cfm)
- The following guidelines published under authority of CEPA (accessible at www.ec.gc.ca/CEPARRegistry/guidelines/Guidelines.cfm)
 - Canadian National Ambient Air Quality Objectives
 - Canadian Water Quality Guidelines for the Protection of Aquatic Life
 - Canadian Sediment Quality Guidelines for the Protection of Aquatic Life
 - Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health
- Canada-Wide Standards (available at www.ccme.ca/initiatives/standards.html)
 - EC's EnviroDat database should be included as a source for surface water and

groundwater quality data. Information about this data and contact information are available at EC's EnviroDat Data Archive website (www.msc-smc.ec.gc.ca/climate/data_archives/envirodat/index_e.cfm)

- All sources of information regarding species of special conservation concern including the Atlantic Canada Conservation Data Centre (AC CDC), provincial agencies, and the latest Committee on the Status of Endangered Species (COSEWIC) lists and related species status reports (www.cosewic.gc.ca/eng/sct5/index_e.htm), should be given consideration in the comprehensive study. All species found in the project area which are listed by the COSEWIC, identified as S1, S2, and S3 by the AC CDC, or designated to be at risk by the Government of New Brunswick should be identified for attention in the comprehensive study.
- *Air Quality Monitoring Results in New Brunswick* available from the New Brunswick Department of Environment and Local Government (NB DELG)

National Air Pollution Surveillance (NAPS) Network, which can be obtained from:

Environmental Protection Publications
Environmental Protection Service
Environment Canada
Ottawa, Ontario
K1A 0H3