GENERAL REVIEW STATEMENT

NB DEPARTMENT OF SUPPLY AND SERVICES
MODIFICATIONS TO THE PETITCODIAC RIVER CAUSEWAY

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Prepared by:
Department of Environment & Local Government

New Nouveau Brunswick

Environment and Local Government

1. INTRODUCTION

This General Review Statement represents the opinions of the Technical Review Committee (TRC) regarding the Environmental Impact Assessment (EIA) of a proposal by the Department of Supply and Services (DSS) to evaluate The Modifications to the Petitcodiac River Causeway Project at the Petitcodiac River Causeway between Moncton and Riverview, New Brunswick.

The Petitcodiac River causeway ("causeway") is a gated dam structure with an installed vertical slot fishway that was built across the Petitcodiac River between the City of Moncton and the Town of Riverview. Completed in 1968, the causeway was intended to create a second transportation link between the two communities, offer flood protection for farmland between the causeway and the head of tide at Salisbury, and create a freshwater headpond with potential for recreation and as an industrial water source. A bridge would have achieved the transportation objective, but not the other benefits.

The Petitcodiac River estuary is unique. The estuary is macro-tidal (i.e., with tides averaging 11 m) with suspended sediment loading typically in the order of up to 30,000 mg/L. The causeway is located in the middle of the estuary (20 km from the head of tide). There are very few similar examples elsewhere in the world where fish passage facilities are incorporated in the facility at midpoint in a macro-tidal estuary. The physical nature of the estuary and the presence of the headpond and gates in the causeway, present challenges for the management of sedimentation and results in the potential for ice jamming and operational issues. Consequently, a complex Gate Management Plan is in place to ensure safe operation of the facility, and in an effort to improve opportunities for passage of some fish species. The Gate Management Plan is reviewed yearly and has been in place since 1999.

The Project purpose is to evaluate four Project Options recommended by the Niles Report as well as consider other relevant options identified during the course of the EIA. These options were evaluated against the Project Objectives. Eugene Niles, Special Advisor to the Minister of Fisheries and Oceans Canada, had a mandate to conduct a review of all issues and existing information concerning the causeway, consult stakeholders, meet with the Aboriginal Community, and seek appropriate expert opinion on a course of action to restore fish passage in relation to the causeway. The four options recommended by Niles were as follows:

- Replacing the fishway (Project Option 1);
- Gates open during peak migration (Project Option 2);
- Gates open permanently (Project Option 3); and
- Replace the causeway with a partial bridge (Project Option 4).

The Status Quo, although not considered an option, was also assessed to provide a baseline condition against which to evaluate the Project Options.

The Project Objectives were to achieve a long-term solution to fish passage (i.e., achieve compliance with the intent of the original DFO requirement to provide a fishway at the causeway) and other ecosystem issues related to the causeway, including tidal exchange, sediment transport and other physical processes and biophysical functions (e.g., wetlands, populations of flora and fauna, fish habitat).

The principal purpose of the EIA was to evaluate and compare the potential environmental effects of the Project Options that meet the fish passage Project Objective (a long-term solution to fish passage; the unimpeded and safe movement, upstream or downstream, of fish between aquatic habitats required for their life cycle), determine if the selected Project Options also meet the other Project Objectives (i.e., ecosystem issues), analyze proposed mitigation and determine significance of the residual environmental effects and compare those to current conditions and the Status Quo (i.e., the current causeway conditions continued into the future). The fish species that were determined to require passage at the causeway were as follows: Atlantic tomcod, rainbow smelt, gaspereau (both alewife and blueback herring), brook trout, American shad, American eel, sea lamprey, Atlantic sturgeon and Atlantic salmon.

An EIA report, entitled "ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR MODIFICATIONS TO THE PETITCODIAC RIVER CAUSEWAY" was prepared pursuant to the *Environmental Impact Assessment Regulation (87-83)* of the Clean Environment Act and is the supporting document for the Screening Report (to be prepared by the Responsible Authorities) under the Canadian Environmental Assessment Act (*CEAA*). The EIA Report was based on Terms of Reference developed by DSS, which were reviewed by the TRC and provided to the public (by DSS) for input. The EIA Report must fulfil the Final Guidelines, issued by the Minister of the Environment and Local Government on July 26, 2002. The first draft EIA Report was submitted by DSS on February 5, 2005 for review by the TRC. As a result of deficiencies noted, clarifications sought and additional work identified by the TRC, the Report has been revised in order to satisfy the EIA Guidelines.

The Technical Review Committee (TRC) for this project consists of representatives from the following agencies:

NB Department of the Environment and Local Government
NB Department of Agriculture, Fisheries and Aquaculture
NB Department of Natural Resources
NB Department of Health and Wellness
NB Department of Transportation
NB Department of Public Safety
NB Culture and Sport Secretariat
New Brunswick Museum
Greater Moncton Planning District Commission
Beaubassin Planning Commission
Royal District Planning Commission
Tantramar Planning District Commission

Canadian Environmental Assessment Agency
Environment Canada
Fisheries and Oceans Canada
Transport Canada
Natural Resources Canada
Canadian Coast Guard
Bedford Institute of Oceanagraphy
Natural Resources Canada

The principle objective of the EIA Report is to predict the environmental effects, which could be expected should the project proceed and to ensure adequate mitigation is developed.

If, in consideration of the advice of the TRC, the federal Responsible Authorities under CEAA and the provincial Minister of the Environment and Local Government are satisfied that the EIA Report is complete, the next step is, through consultation, to involve the public in evaluating the potential environmental effects anticipated from this project and their significance.

The General Review Statement summarizes the opinions of the TRC regarding the EIA Report.

This General Review Statement identifies potential impacts that should be brought to the attention of the Minister and the public. Most projects have the potential to produce some level of impact on one or more Valued Environmental Components (VECs). The information in the EIA Report must identify areas or actions, which have impacts that are considered significant as well as those that are considered insignificant. Thus, a scale of reference is required for determining the significance of environmental impacts in order to compare their relative importance. This is called “Criteria for Establishing Threshold of Significance” and is presented for each of the VECs in Section 9.0 of the EIA Report. The effects analysis, mitigation and follow-up and monitoring proposed for each of the VECs are also documented in Section 9.0 and 13.0.

2. REVIEW OF THE STUDY

In general, the EIA Report is considered acceptable as having addressed the issues outlined in the Final EIA Guidelines.

2.1 PROJECT ALTERNATIVES

The EIA Guidelines required that four Project Options be assessed pursuant to Section 15(1) of CEAA and Regulation 87-83 and would include: the construction, operation, and decommissioning of the Petitcodiac River Causeway Project, plus the Status Quo (to provide a baseline condition against which to evaluate the Project Options). The following is an overview of these options as well as their acceptability in relation to the Project Objectives:

Project Option 1 - It was concluded that a new fishway or further enhancement to the gate management strategy was not feasible to provide upstream and downstream passage for the fish species requiring passage to complete their life cycle. Hence, it was determined that Project Option 1 did not meet the fish passage Project Objective of providing unimpeded and safe movement of fish, upstream or downstream, between aquatic habitats required to complete their life cycle (see Fish and Fish Habitat section below for additional information).

Project Option 2 - Opening the gates in the spring and fall only would not provide passage opportunities for all of the identified fish species requiring migration at the causeway. Therefore, it was concluded that Project Option 2, with gates open in the spring and fall, would not meet the fish passage Project Objective of providing unimpeded and safe movement of fish, upstream or downstream, between aquatic habitats required to complete their life cycle (see Fish and Fish Habitat section below for additional information).

Project Option 3 - Opening the gates permanently and allowing free tidal flow at the causeway structure would provide for upstream and downstream fish passage opportunities for all fish species requiring migration at the causeway. Therefore, Project Option 3 would meet the fish passage Project Objective and address all of the fish passage issues presented above. However, this Project Option requires some modifications to address concerns related to ice jamming and associated flooding. A modified Project Option 3 was developed to adequately address this concern by providing a sufficient opening to allow passage of ice during spring ice break-up.

Project Option 4 - Three alternative means for carrying out this Project Option were developed and are outlined below. They are considered distinct ways of engineering a partial bridge.

- 4A is the construction of a new 170 m long bridge downstream of the existing gates and removal of the entire gate structure fish passage facility. This Project Option entails removing a portion of the causeway and constructing a bridge structure over the opening;
- 4B is the construction of a new 280 m long bridge downstream of the existing gates;
- 4C is the construction of a new 315 m long bridge structure in the central portion of the causeway and filling in the existing control structure.

The TRC is generally satisfied that the information presented provided an adequate basis for comparison.

2.2 POTENTIAL IMPACTS

This section describes the environmental effects analysis for the Project Options (that meet the fish passage Project Objective as stated above) and the Status Quo. Note that the term "Project Options" includes Project Options 3, 4A, 4B and 4C. As stated previously Project Options 1 and 2 were fully evaluated but do not meet the fish passage Project Objective.

Atmospheric Environment (Climate, Air Quality, Odour and Sound Quality):
The TRC is generally satisfied with the information presented in the atmospheric environment section and generally agrees with the findings of the EIA Report.

Climate:
From a climate point of view there is not expected to be any negative environmental effects of the Status Quo and Project Options on climate. There may be some nominal changes on a localized scale from the Project Options but these changes are not expected to be measurably or substantially different than 2005 baselines conditions.

Air Quality:
This Project is not expected to result in any changes in air quality in the area. During construction of the Project Options there could be a change in localized traffic patterns but as a result of the new Petitcodiac River Bridge (to replace the adjacent Gunningsville Bridge), which is scheduled to be open in the fall of 2005, this should be minimal. The completion of this new bridge is likely to result in localized air quality benefits near the causeway due to changes in traffic patterns. Construction equipment may result in a nominal increase in emissions during the short term but these are not expected to be significant.

Noise:
Noise would be generated during the construction from vehicle traffic and construction activities and equipment and during the operation phase of the project. The noise would be temporary in nature and would not be significant.

Odours:
A field odour survey was conducted in June 2004. No perceptible odours were observed at any of the monitoring sites. There are not expected to be any significant environment effects as a result of the Project Options, however as a result of these options the headpond would be replaced with a narrow and free flowing river channel, and any previously submerged vegetation and mudflats would be exposed during construction and potentially cause odours. This odour would be localized and would occur over a relatively short period, after which new vegetation growth would replace the decaying vegetation previously submerged. In the event that odour complaints were reported after the implementation of Project Options, then a qualitative odour survey would be undertaken to verify the complaint and assess the nature, character, intensity, frequency and duration of the odour. After evaluation it may be determined that ambient air monitoring is required to adequately assess the impacts and further action may be required. As a result of the subjectivity of odours the TRC required that a public relations plan be developed to address any odour complaints. The Proponent provided an acceptable approach to this issue.

Fish and Fish Habitat:
The focus of this study is to resolve the issue of fish passage at the causeway. In this regard, the fish passage Project Objective was defined in consultation with the TRC as the "unimpeded and safe movement, upstream and downstream, of fish between aquatic habitats required to complete their life cycle." One of the key elements of this section was to determine the fish species having and currently using the Petitcodiac River and the species that required fish passage based on their migration requirements. A field program was undertaken to determine the fish species upstream and downstream of the causeway. In consultation with the TRC along with the public, stakeholders and aboriginal community a list of species requiring fish passage was determined and accepted.

In addition, the TRC raised the issue that the problem with fish passage at the causeway involved more than passing fish through the fishway and that this needed to be evaluated as part of this assessment. The existing fish passage issues include a number of impediments directly related to fish passage. These include predation, difficulties in negotiating the fishway, gate management, dissolved oxygen (DO) barriers, seasonal sediment plug that extends several kilometres downstream of the causeway, and lack of attraction flow (i.e.: freshwater flowing through the fishway providing a signal to fish to migrate upstream) for fish due to water level elevations lower than highest tide. The EIA Report was revised to clearly identify and evaluate these concerns.

A number of key elements related to fish and fish habitat were evaluated based on the above and are as follows: sediment quality, water quality, fish and other aquatic animal species including species at risk and fish habitat. An extensive field survey was undertaken to determine the existing conditions in the Petitcodiac River with respect to these elements and to evaluate the environmental effects of the Project Options with respect to these elements.

While all four Project Options as well as the Status Quo were thoroughly evaluated it was concluded that Project Options 1 and 2 (as well as the Status Quo) did not meet the fish passage Project Objective - see below for further details.

Evaluation of the Project Options in Achieving the Fish Passage Project Objective
The TRC required that an exhaustive evaluation of fish passage facilities in New Brunswick, Canada and elsewhere in the world be conducted to identify potential fishway solutions. It was evident that the issues associated with the causeway fish passage facility were difficult to overcome at the Petitcodiac River Causeway.

With respect to Project Option 1, the TRC required that a thorough evaluation of other fish passage facilities and technologies be undertaken. Fish passage technologies that have been applied at other facilities were evaluated in detail and determined to not be applicable to the Petitcodiac River facility. This is mainly due to the unique characteristics of the Petitcodiac River (low and highly variable rate of freshwater flow, high tidal range, and high suspended sediment concentrations) and the variety of fish species requiring migration. None of the other facilities examined could provide fish passage, upstream or downstream, for all of the fish species requiring passage at the causeway (Atlantic tomcod, rainbow smelt, gaspereau, brook trout, American shad, American eel, sea lamprey, Atlantic sturgeon, and Atlantic salmon). It was concluded that a new fishway or gate management strategy was not feasible to provide upstream and downstream passage for these fish species. Hence, Project Option 1 does not meet the fish passage Project Objective.

Fish migration for the nine key species noted above occurs year round. Project Option 2 considered opening the gates only in the spring and fall, thus preserving the headpond for the summer months. But this would not provide passage for all of the identified fish species requiring migration at the causeway. Therefore, Project Option 2 does not meet the fish passage Project Objective. Project Option 2 is also burdened with other issues such as continued sediment accumulation in the headpond, ice-jamming at the gate piers, and the summer and winter headpond would be brackish and unsuitable for freshwater fish species.

Project Options 3 and 4 both meet the fish passage Project Objective as they allow free tidal exchange and the upstream and downstream movement of fish species that require passage.

The TRC agreed with these findings and it was agreed that Project Options 1 and 2 had been evaluated fully with respect to the Project Objectives and could not meet the objective of fish passage. They were therefore not considered further in the assessment.

Sediment Deposition
The TRC required details and predicted impacts related to sediment deposition in the Chigneto and Shepody Bays and the potential impacts to the existing commercial fisheries in that area. Also included in the assessment are the existing and past recreational and commercial fisheries in the Petitcodiac River. Two main fisheries currently exist in Chignecto and Shepody Bay near the mouth of the Petitcodiac River. Most of this fishery is based in the Alma area and consist of lobster and scallops. The amount of material predicted to be released in Chignecto and Shepody Bays as a result of a Project Options is considered to be not significant. Any significant effect would be reflected in landings of lobster and scallop in the area. Monitoring of the landings in the

Upper Bay for both lobster and scallops has been proposed and any loss of landings would form the basis of compensation to fishers for loss of livelihood.

Invasive Species
The smallmouth bass and chain pickerel are not native to the Petitcodiac River or to New Brunswick and are therefore considered to be invasive species. Under the Project Options these invasive species would be lost. It is felt that the loss of these freshwater aquatic species in the headpond area will be compensated for by the overwhelmingly positive environmental effects on estuarine, marine and diadramous fish species.

Water Quality
The Proponent initially indicated that under the Project Options the existing sewage plant would not require upgrading as the water quality in the river would be improved as a result of increased assimilative capacity which would enable the river to more effectively dilute and flush effluents from the river channel. The TRC indicated that a Canadian Strategy for the management of wastewater effluents is currently being developed by CCME and that improved treatment may be required at the Greater Moncton Sewage Commission wastewater treatment facility regardless of the presence or absence of the causeway. The EIA Report was revised to reflect the above.

Monitoring Program
An extensive monitoring program is proposed to evaluate fish and fish habitat, including fish passage, sediment and water quality, and bioaccumulation of metals in fish tissue as part of the implementation of the Project Options.

<u>Terrestrial and Wetland Environment:</u>
A number of components were assessed in this section. These include wetlands, wildlife and vegetation, terrestrial species at risk and species of conservation concern, migratory birds and mudflat productivity.

Wetlands
The TRC agreed with the proponent and determined that a significant negative environmental effect to wetlands would be one that results in a net reduction of wetland area below that which existed before the causeway was built as documented in 1962 air photos. Wetland surveys were conducted to identify the type of wetlands in the study area and to confirm the interpretation of the aerial photographs. Large maps were produced and were requested by the TRC for reference.

The construction of the causeway resulted in the infilling of much of the river channel with sediment. Much of this infilled material was subsequently colonized by wetland vegetation. As a result, the overall area of wetlands along the Petitcodiac River had increased substantially by 2005. However, while there is more wetland area at baseline conditions (2005) than there was pre-causeway (1965) and it is likely this trend will continue under the Status Quo, the type and characteristics of the wetlands have changed substantially since causeway construction. There are now freshwater wetlands upstream of the causeway, rather than saltwater marshes. In addition, the saltwater marshes that have formed downstream do not have the same characteristics (i.e., species diversity, tidal influence) as the saltwater marshes that were lost upstream or as the downstream

saltwater marshes in place prior to construction of the causeway.

The Project Options will result in wetland distribution, quality and function that are more similar to pre-causeway conditions, and are therefore considered to have a positive environmental effect. Prior to construction of the selected Project Option, there may be a need to restore/improve some of the dykes surrounding Ducks Unlimited wetlands as well as agricultural land upstream of the causeway.

Bioaccumulation
Chemical bioaccumulation on wildlife, including migratory birds was raised by the TRC and was addressed by the proponent by proposing a monitoring program that would establish baseline and follow-up monitoring of concentrations of metals after the implementation of Project Options.

Dredge Disposal
In addition to the above, the issue of dredging and dredge disposal as a result of the implementation of the Project Options was raised by the TRC. The Proponent indicated that the DELG Guidelines for the Siting and Operations of a Dredging Material Site on Land would be followed as appropriate. This issue was adequately addressed in the EIA Report.

Other
The wildlife and vegetation, terrestrial species at risk and species of conservation concern, migratory birds and mudflat productivity are all predicted to be not significant in light of proposed mitigation. The TRC is satisfied that these components have been adequately addressed in the report and the monitoring as proposed for wetlands, mudflat productivity and managed areas is adequate.

<u>Municipal Services and Infrastructure:</u>
The components assessed in this section include water distribution systems, sanitary sewer and stormwater system, dykes and aboiteaux, wharves, walking trails, utilities and former landfills. Key issues regarding infrastructure are erosion, sedimentation, ice jamming, ice damming and increased flooding associated with the environmental effects of the Status Quo and Project Options.

Dykes and Aboiteaux
The dykes and aboiteaux upstream of the causeway have fallen into disrepair since protection from flooding is currently provided by the causeway. The Project Options have the potential to flood dyked lands upstream of the causeway; however, mitigation would ensure that the environmental effects of the Project Options are adequately addressed. The TRC indicated that a detailed plan would be required to be developed in consultation with the appropriate regulatory agencies, landowners and Ducks Unlimited that would address any repair/upgrading of dykes and aboiteaux or compensation for the loss of agricultural land prior to Project Option implementation.

Former Moncton Landfill
The former Moncton Landfill located just downstream of the causeway on the Moncton side was partially constructed in the Petitcodiac River floodplain. Based on numerical modelling and trend analysis it was determined that the Project Options are not expected to result in erosion of the former Moncton Landfill. However, protection of the landfill has been identified as a precautionary measure and will be undertaken to prevent any potential issues. This was a key issue of concerns from the public and stakeholders.

Tri Community Marina and Sea Cadet Training Facility
The Project Options will restore tidal flow upstream of the causeway and will result in the loss of the headpond and subsequently the Tri Community Marina as well as the Sea Cadet Training Facility. As a result, compensation has been identified for these facilities.

Road Transportation Network:
The main areas of concerns assessed in this section are related to traffic flows, level of service and accident rates. The Project Options will affect traffic patterns during construction activities. Since the new Petitcodiac River Bridge will be opened to traffic in 2005 it is felt that the disruption to local users will be minimal, as the new bridge will easily accommodate any extra traffic.

Vessel Traffic and Navigation:
Vessel traffic and navigation was evaluated to address any potential changes that have occurred in the past and in changes in navigational opportunities and vessel traffic on the Petitcodiac River and the headpond, which will occur as a result of the potential interactions between the Status Quo and Project Options and the Petitcodiac River, upstream and downstream of the causeway.

The TRC felt that this issue should be evaluated from the standpoint of vessel traffic and navigation above the causeway, vessel traffic and navigation at the causeway and vessel traffic and navigation below the causeway. This was undertaken by the Proponent and felt to be acceptable to the TRC.

The current but limited opportunities for vessel traffic and navigation will be maintained under the Status Quo, but with increasing limitations on navigability due to continued infilling of the river.

Construction activities may temporarily affect vessel traffic and navigation above and/or below the causeway, but these disturbances are felt to be temporary and of short duration. During operation, navigation along the Petitcodiac River will resemble pre-causeway conditions (Project Option 3 would present limited navigational opportunities at the causeway during some tidal cycles as a result of the remaining concrete sill). The Project Options and subsequent restoration of the tidal prism is anticipated to provide or increase the opportunity for recreational boating throughout the Petitcodiac River as far upstream as the Village of Salisbury (at the head of tide). The opportunity for commercial vessel traffic will return as far upstream as the City of Moncton.

The causeway and associated changes to the Petitcodiac River that have occurred since its construction have resulted in changes to navigation and navigability. Since construction of the causeway, the downstream river channel has narrowed, become

shallower and thus more difficult to navigate. Currently the causeway is an obstruction to vessel navigation as no vessels can pass upstream or downstream of the causeway. Downstream river navigation since the completion of the causeway has been affected negatively by sedimentation and regulation of flow. Upstream, construction of the causeway established a shallow headpond. The creation of the headpond has facilitated some recreational boating activity on this part of the river that has included sailing, canoeing, kayaking, hydroplaning and windsurfing. Currently there is no commercial vessel traffic associated with the transportation of freight both upstream and downstream of the causeway.

Due to continued infilling of the river downstream of the causeway and the obstruction to navigation at the causeway, the Status Quo is predicted to have a significant potential negative environmental effect on vessel traffic and navigation. The Project Options are predicted overall to have positive environmental effects on (i.e.: removal of the obstruction to navigation at the causeway and the improvement in navigation conditions in the estuary between Salisbury and Hopewell Cape).

A Navigable Waters Protection Act authorization will be required from Transport Canada prior to the implementation of the Project Options. The TRC agreed with the EIA Report but a detailed review of the Project Options and a public notification process will be required prior to start of construction as part of the Navigable Waters Protection Act approval process.

A follow up monitoring program is proposed in the EIA Report with respect to vessel traffic and navigation.

Land Use and Value:

The concerns associated with land use and value are associated with the potential for interaction between the Project Options and the Status Quo and market value along the Petitcodiac River, both upstream and downstream of the causeway. The key issue regarding land use and value is in regard to potential changes in property market value and use that may occur as a result of changes in aesthetic quality, landowner access to land and to the Petitcodiac River, and loss of agricultural land as a consequence of the Project Options and Status Quo.

An evaluation was undertaken and it was demonstrated that the value of vacant lots above the causeway exceed the value of similar vacant lots below the causeway by 5%. However, the value of developed residential lots above and below the causeway was determined to be the same in value. Therefore it was concluded and accepted by the TRC that the headpond does not appear to have resulted in an increase to developed property value above the causeway, as the value continues to be the same as below the causeway. However, the causeway may have contributed to a 5% increase in the value of vacant lots upstream of the causeway.

The Petitcodiac River has experienced a significant amount of infilling downstream of the causeway since construction. As a result this has resulted in flooding and foreclosure of commercial property, which may have resulted in a diminishing of vacant lot values, and increased insurance rates downstream of the causeway (as a result of the increased flood risk). The Project Options would result in a decreased flood risk and the potential

for an increase in market value as a result of restoration of the natural estuarine ecosystem, which would provide views of more natural estuarine conditions. Any loss of agricultural productivity as a result of the Project Options would be compensated.

Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons:
Several presentations and meetings were held with the Fort Folly First Nation in order to gather information related to current use of land and resources for traditional purposes by Aboriginal Persons. According to the sources available with the Aboriginal Community, the construction of the causeway resulted in the decline of availability of resources that were used for traditional purposes by Aboriginal Persons such as hunting and gathering of various wildlife species in the shoreline wetlands, and the fishing species in the Petitcodiac River. The modelling results have indicated that there will be an opportunity for the reversal of some these negative trends under the Project Options. This was agreed to and accepted by the TRC.

Tourism:
Tourism is considered to be an important economic sector to New Brunswick and the Greater Moncton Area. The Bay of Fundy tides and/or the tidal bore are tourism attractions that have drawn visitors from around the world to see the unique and extreme tidal flows. Since the construction of the causeway and as a result of infilling the tidal bore has been reduced to a very minor phenomenon and will be diminished even further with the Status Quo.

Additional evaluation (through modelling) was requested by the TRC with respect to the tidal bore under the Project Options. The modelling component of this study determined that the Project Options would allow for tidal exchange in the headpond along with the potential to increase the tidal bore. An increase in the tidal bore could have the potential to create more tourism opportunities for the Greater Moncton Area and could also increase tourism levels and provide spin-off business for the retail and service industries of the area. This issue was discussed in detail by the TRC and in the findings presented were accepted.

The initial draft EIA Report stated that there was the potential for infilling at the Hopewell Rocks (which is considered a popular tourist attraction in the area) with the Status Quo. Further evaluation by the Proponent indicated that the Status Quo or the Project Options would likely not negatively impact the Hopewell Rocks.

Recreation:
Recreation was defined as any physical activity and supporting infrastructure located on the Petitcodiac River, along the shores of the river, or the headpond, that are reliant on the river for the enjoyment of those activities. The main recreational activities that were considered are swimming, boating, canoeing, kayaking, recreational fishing and bird watching and any supporting infrastructure such as riverside trails and boat facilities.

As a result of the construction of the causeway a headpond was formed which plays a role in recreation opportunities for residents in the Greater Moncton Area. However, sedimentation of the headpond since construction has imposed limitations on navigation in the headpond and navigation is restricted to shallow-draft watercraft. The Project Options will result in negative effects on the Tri Community Marina, public boat launch

and Sea Cadet Training Facility but these are felt to be offset by the positive environmental effects overall due to increased recreational and navigational opportunity afforded by the changes to the Petitcodiac River (increase in tidal bore, removal of navigational obstruction at causeway, improved navigational opportunity, opportunity for the return of fish stocks). Compensation has been identified for the Tri Community Marina and Sea Cadet Training Facility.

Labour and Economy:
The main issue of concern related to labour and economy is the potential loss in the commercial fisheries as a result of the Project Options. The environmental assessment concluded that the Project Options would result in increased employment and business opportunities as a result of construction associated with the options and increased tourism opportunities. The commercial fisheries (American Eel, lobster and scallop) are not expected to decrease as a result of the Project Options but a monitoring program was proposed and any decrease in these fisheries would be compensated.

Heritage and Archaeological Resources:
While it is agreed that a number of unrecorded and/or unidentified archaeological sites still remain along the Petitcodiac River after the construction of the causeway it was determined that the Project Options would not return the width of the river to pre-causeway conditions. Therefore it is not anticipated that there will be any erosion to pre-causeway shorelines, which is where heritage and archaeological resources are thought to be located. Nonetheless, a follow-up program will be implemented to verify this conclusion and manage any concerns that may arise from unanticipated changes to the river. The TRC is satisfied that this issue has been adequately evaluated and addressed.

Public Health and Safety:
The public health and safety concerns resulting from the Status Quo and Project Options would likely arise from accidents and unplanned events, or through changes in the environment that may have implications for public health and safety (i.e.: groundwater quality and quantity, contaminated effluents, disease vectors and flooding).

The main issue that was discussed by the TRC, as part of this section was the continued flooding associated with the Status Quo. The conveyance capacity of the river continues to decrease, adjacent creeks will continue to narrow, and marshlands and drainage ditches will continue to fill in as deposition of sediments associated with the Status Quo continues. This situation is also further complicated by related ice accumulation in the narrower channels. The Status Quo also poses the risk of catastrophic failure of the causeway (i.e.: breach of causeway) as sediments accumulate against the gates in periods when gates are not operated and estuarine or river ice result in ice jams at or in the vicinity of the gates. The issues associated with the potential for increased flooding as a result of the Status Quo were thoroughly evaluated and the findings were felt to be acceptable to the TRC.

The issue of West Nile Virus was raised by the public and evaluated as part of this assessment. It was determined that the Culex mosquito, a human disease vector for the West Nile Virus, can breed in saltmarsh habitats, but prefers freshwater impoundments. Should the virus occur in the Greater Moncton Area, the Status Quo has the potential for environmental effects while the Project Options are expected to decrease the amount of

habitat available to the Culex mosquito and consequently have a positive environmental effect on public health and safety.

The issue of the potential erosion at the former Moncton Landfill (which is located just downstream of the causeway and approximately 30% of the landfill footprint was built over sediment that was deposited after installation of the causeway) was raised by the public at a number of occasions. The issue in question is the leaching and erosion of potentially toxic substances into the river. This concern was evaluated as part of this section and erosion protection was identified as a precautionary measure.

It was accepted by the TRC that the Status Quo and the Project Options would not have significant negative residual environmental effects on the redistribution of contaminants with the former Moncton Landfill. A follow-up program will provide seasonal inspection of erosion protection measures at the landfill for a minimum of five years after the implementation of a Project Option.

Contaminated effluents and redistribution of contaminants was also evaluated and it was determined that the water quality conditions downstream of the causeway are expected to continue to deteriorate with the Status Quo as the river continues to infill and decrease in assimilative capacity, and upstream of the causeway, water quality is expected to remain questionable and continue to be unsuitable for many recreational purposes. In contract, the Project Options are expected to improve water quality conditions upstream and downstream of the causeway by restoring tidal flow, increasing the assimilative capacity of the river.

Effects of the Environment on the Project:

The aspects of the environment that may cause a change in the design or construction of the Project Options and the Status Quo include the following: sediment transport process, tidal prism, weather, flooding, ice, climate change and earthquake activity.

In order to mitigate for potential effects of the environment on the Project Options a number of measures have been proposed (e.g., rip rap of erodible shorelines) as part of the planning and engineering design presented in the EIA Report. In addition, the Proponent has indicated that Stage 1 of the Project Options implementation plan will further define the mitigation for construction and operation of the Project Options and monitoring and follow-up will further minimize the likelihood of a substantive effect of the environment on the Project Options from occurring.

One of the main areas of concern and discussion by the TRC related to the effects of the environment on the Project is the issue of flooding. As stated previously, it was identified that the issue of flooding downstream of the causeway is worse due to channel restrictions from sediment infilling. The effects of climate change may further increase the future risk of flooding. The Proponent evaluated the issue of flooding in relation to the Status Quo and Project Options to determine the extent of environmental impacts associated with the issue.

Another issue that was raised by the TRC is the ice on the upstream side of the causeway,

which will continue to gather under the Status Quo. The Project Options would reduce this risk significantly.

Cumulative Environmental Effects Assessment

The TRC provided suggestions with respect to the Cumulative Environmental Effects Assessment in order to better focus the analysis of the effects. The Proponent re-evaluated their approach and modified this section. These revisions were acceptable to the TRC.

2.3 FOLLOW-UP AND MONITORING

The Proponent has proposed an extensive follow-up monitoring program. This monitoring program is divided into three stages that correspond with the implementation strategy that has been developed for each Project Option. Should modification of the monitoring program be required through the course of the various programs (based on the above environmental components) the appropriate authorities will be notified and adjustments to the program will be made. The monitoring proposed was acceptable to the TRC.

3. SUMMARY

It is concluded that the EIA Report is a satisfactory document on which to base a public discussion of the Project and its impacts.

The Technical Review Committee generally agrees that the Project Options could be constructed and operated in an environmentally acceptable manner. The nature of the impacts is such that they can be addressed in the context of subsequent regulatory approval processes or as conditions to be applied to the Project as part of the final decision by the Lieutenant Governor in Council, should the Government of New Brunswick approve the project.