

**THE TWINNING OF THE TRANS-CANADA HIGHWAY
THROUGH THE PROVINCE OF NEW BRUNSWICK AND THE
CONTRACTING OF OPERATIONS, MAINTENANCE, AND
REHABILITATION TO THE PRIVATE SECTOR**

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ABSTRACT

In response to the growth in traffic, the high proportion of commercial vehicles, the need to improve highway safety and the demands of the economy, the Province decided to twin the Trans-Canada Highway (TCH) from Quebec to Nova Scotia in the early 1990's.

The first projects were built using a traditional model where the New Brunswick department of Transportation (NBDOT) managed the work at all stages of design and construction and then undertook the operation and maintenance.

On the Fredericton-Moncton Highway Project (204 km), NBDOT retained a Developer/Operator to design, build, finance, operate, maintain and rehabilitate the highway for a thirty-year period.

NBDOT has recently retained a Developer/Operator to design, build and finance 98 km of TCH, and to operate, maintain and rehabilitate a total of 275 km for 28 years. This new highway is scheduled to open in November 2007 and will complete the twinning of the TCH in New Brunswick from Quebec to Nova Scotia.

This approach has required careful attention to the process of selecting suitable contractors for the work, and to the development of standards, specifications and performance indicators which ensure the quality of highway service and the appropriate transfer of risk and responsibility.

On both projects, ISO compliant Quality and Environmental management systems are required. The Province has limited its role to auditing the performance of the developers and operators.

This transfer of risk and responsibility has required NBDOT staff to adjust to a new way of managing the highway system.

Background

New Brunswick is the transportation hub of the Atlantic Provinces. The Trans-Canada Highway (Route 2) and the other provincial highways that form part of the National Highway System connect the major cities of New Brunswick, the adjoining provinces of Québec, Prince Edward Island, Nova Scotia, Newfoundland and the U.S.A. (at St. Stephen and Woodstock) to each other.

In response to the growth in traffic, the high proportion of commercial vehicles (see Table 1), the need to improve highway safety and the demands of a growing economy, the Province identified the need to twin the Trans-Canada Highway (TCH) between Québec and Nova Scotia.

Table 1 – Showing actual traffic volumes and growth on the Trans-Canada Highway

Location	AADT 2003	% annual growth since 1991	AADTT 2003	% annual growth since 1991	2003 - % AADTT/AADT
Québec border	5580	2.94	1520	4.74	27.2
River de Chute	4780	3.75	1590	5.09	33.3
Oromocto	16970	n/a	2060	n/a	12.1
Moncton	15710	6.70	2450	4.85	15.6
Aulac	13030	3.48	2350	4.55	18.0

Planning for a new Trans-Canada Highway from Québec to Nova Scotia began in the late 1980's starting with the Moncton to Nova Scotia section where most of the four-laning would be accomplished by twinning the existing highway.

Between Fredericton and Moncton, a more direct alignment was required. Also, as through much of the Province, the existing roadside development with frequent residential and commercial entrances and at grade intersections made it impossible to design a safe high-speed highway using the existing alignment. This led to the decision to construct most of the new Trans-Canada Highway between the Québec border and Moncton on new alignment.

Having identified the corridor for the highway, environmental assessments were carried out to satisfy both provincial and federal environmental requirements. These studies refined the route location so as to minimize impacts on the physical and social environment by avoiding such features as wetlands, farms, rare plants, or known archeological sites.

In the early 1990's, the New Brunswick Department of Transportation (NBDOT) began construction of the four-lane Trans-Canada Highway, beginning with the sections from Moncton to Nova Scotia and from the Québec border south towards Grand Falls. These sections have been designed and built by NBDOT using a traditional model whereby NBDOT either designs the work directly or selects consultants to do the design and then tenders the construction in numerous small contracts. In this model, the Department retains strong day-to-day control of the management of the work at all stages. Following construction, the Department undertakes and assumes responsibility for all future repairs, operations, maintenance and rehabilitation.

In September 1993, the Province issued a White Paper outlining the need to rebuild Routes 1, 2 (TCH), 15, 16 (TCH), and 95 as controlled access highways meeting RAD 110 or RAU 110 standards, and the need to investigate options for financing these improvements. A number of alternative financing and implementation options were investigated including the use of tolls and design/build/finance projects.

In June 1996, a plan to invest \$1.4 billion in the highway system including the construction of the Fredericton-Moncton Highway was announced by the provincial government. These highway investments were to be paid for by the taxpayer and in the case of the Fredericton-Moncton Highway, also partly by the highway's users through tolls. Subsequently, a decision was made to replace the user tolls with shadow tolls paid by the Province based on highway usage. These shadow tolls are used to repay the toll-based debt lenders.

During the period 1987 to 2004, the province signed a number of agreements with the federal government for sharing the cost of highway improvements on National Highway System routes. Five hundred and ninety million dollars has been spent under these agreements for four-laning the TCH up to the end of 2004.

Fredericton-Moncton Highway Project

As mentioned above, in 1996, the provincial government decided to accelerate the reconstruction of the TCH by proceeding with an alternative service delivery model for the design and construction of the Fredericton-Moncton Highway (between Longs Creek, north of Fredericton, and Moncton) including financing. This financing was to be raised in part against the future toll revenue stream. These initial decisions led to a review of how best to implement the project and ensure its quality and value to the taxpayer. It was decided that contracting the future operation, maintenance and rehabilitation of the highway to the same developer/operator would encourage the developer to design and build a project which best balanced the initial investment in design and construction with future maintenance and rehabilitation costs. It would also encourage the developer to build in quality so as to reduce future maintenance and rehabilitation costs.

The province had in place legislation, the New Brunswick Highway Corporation Act, which provided the mechanism to allow the province to collect tolls and have the

flexibility to contract for a project such as this one with fewer constraints in regard to the selection and contracting process. The New Brunswick Highway Corporation (NBHC) (a crown corporation) created a project company which is not a crown agency to carry out the project on its behalf. This project company is a single purpose not-for-profit company which is responsible for administering the contract. This project company has two members appointed by the province, two members appointed by the Developer/Operator and an independent chair. The project company retained NBDOT to carry out its responsibilities on a day-to-day basis.

The Fredericton-Moncton Highway Project consists of 204 kilometres of highway, of which 29 kilometres had been built by NBDOT and transferred to the developer/operator for future operation, maintenance and rehabilitation. The project includes two major river crossings of about one kilometre each, and a total of 21 interchanges including four high speed interchanges. The highway is designed to RAD 120 standards and is posted at 110 km/h. A wide, 80 metre, median is provided through most of the project. Other features include rumble strips, energy absorbing guide rail end treatments, wildlife fencing and wildlife passages under the highway, clear recovery zones and open abutment structures.

Agreements were signed with Maritime Road Development Corporation (MRDC), the developer and operator, in January 1998. Construction began that same spring. The highway opened to traffic in October 2001, less than four years later. The developer was paid a fixed bid price adjusted only for quality payments and agreed scope changes. Payment was made monthly on the basis of work progress.

The Operation, Management and Maintenance (OMM) agreement assigns responsibility for all management, operations, maintenance and rehabilitation for the highway to the operator for a thirty-year period. The operator bid a fixed year-by-year price for the work for the first twenty-year period. The price for the last ten years is to be negotiated at that time. The bid price is subject to increases based on the New Brunswick Consumer Price Index (NBCPI). This price covers the cost of all operations, maintenance and rehabilitation of the highway during the term of the agreement.

The operation, management and maintenance of the toll collection system including the actual collection of the tolls were addressed separately in the agreements. A price was bid for ten years, with an option to renew. This was done to allow renegotiation of the tolling requirements at that time, on the assumption that changes in technology might require a review of toll collection methodology in the nearer future. As we mentioned above, the user tolls were later replaced with shadow tolls.

A set of objectives (Appendix 1) for the project was established. These objectives formed the basis for developing the business model and subsequently the agreements for the project. A risk allocation model (Appendix 2) was developed which assigned risks to the developer, operator or the province on the basis of who could better manage that risk. In assigning risks, NBDOT was also mindful of the need to ensure the marketability of the project. Risks assigned to the developer/operator include all risks associated with the design or quality of the work, defective materials, the weather, and acquisition of all

permits. The risks retained by the province included the risks of land acquisition, environmental assessment approval, and future changes in standards of maintenance.

An important consideration in developing the terms of the contract was the need to ensure not only that the risks associated with the quality of the work were transferred to the developer and the operator, but that these risks would be effectively managed. The agreements established requirements for the deployment of ISO 9001 compliant quality management systems. The operator recently obtained ISO 9001 certification for its quality management system.

The agreements also provide for quality payments based on a sliding scale reflecting the quality performance of the developer or operator and the achievement of certain milestone dates. Initially, the agreements provided for a formulaic calculation of the quality payments based on the percentage of non-conformances identified and other criteria. However, the calculation approach set out in the agreements failed to adequately consider the relative importance of the non-conformances identified. Following discussion with the developer, a more subjective approach was agreed. In the revised approach, the Independent Agent reported to a Management Review and Assessment Committee (MRAC) regarding the Developer's performance. MRAC then determined the level of quality performance, based upon which the quality payment would be calculated.

The project company retained the Independent Agent to monitor the developer's progress. The Independent Agent was responsible for approving all payment requests, for monitoring the developer and operator's work and for auditing both the developer's quality management systems and its work in the field against the requirements. The Independent Agent was also responsible for advising the project company regarding change requests submitted by the Developer. Following the completion of construction, NBDOT took on the roles of monitoring and auditing the operator's performance and advising the project company.

The agreements (which extend to 10 binders) outline the obligations of the signatories. In addition to describing the quality management requirements, they establish the minimum design criteria for the highway (including the structures), the construction specifications, the environmental requirements, the safety requirements and all operation, maintenance and rehabilitation requirements. Standards have also been established for the condition of the highway at hand-back in 2027. Standards and specifications are written as end result or performance specifications rather than method specifications. It is important that these standards and specifications be readily auditable, to avoid disagreement over interpretation as much as possible. In addition, the developer agreed to have an independent safety audit carried out at various stages of the design and immediately prior to opening of the highway to traffic.

Early in the operation and maintenance period, some issues were noted regarding the interpretation of some maintenance standards. As a result, NBDOT and the operator jointly reviewed and revised these standards as necessary to clarify the requirements.

The standards as they now exist generally outline a series of inspection requirements, minimum condition requirements and correction timeframes (see example in Appendix 3).

With a long-term contract like this one, it was essential to provide a mechanism for changing the details of the scope or the requirements of the contract. A change order and change request process was established to allow changes which did not substantially alter the nature of the contract. A change order, a change request or other defined event could result in a scope change which might change either the timing of a deliverable or the cost of the work. The agreements specified that a scope change would only occur if the change were material.

In order to protect the province in the case of default or other events of non-performance by the developer or operator, or claims by third parties, both the developer and the operator were required to obtain bonding and insurance in accordance with minimum requirements specified by the province.

In addition, guarantors who would be obligated to perform the developer and operator's obligations in the case of non-performance were identified and included as signatories to the project agreements.

The operator agreed to assume operation, maintenance and rehabilitation responsibility for the entire highway including all works constructed by the developer and those sections previously built by NBDOT. In the case of the NBDOT built sections, provision was made for the developer and operator to inspect the highway following signing of the agreements and identify issues where NBDOT work did not meet previously defined requirements.

Following completion of construction and after three years of operation and maintenance on the Fredericton-Moncton Highway Project, are there any lessons to be learnt? Yes, of course there are. But to date, we have to say that overall this has been a successful project. About fifteen months after opening the highway, NBDOT conducted a review of the project to see what lessons had been learnt and to identify options for applying these lessons to any future projects of this nature. This review and other observations raised a number of items which are discussed below.

The Partnering Agreement:

This was a non-binding agreement that was supposed to set out ground rules for how the various parties to the agreements should manage their relationship. Unfortunately, it distracted from the other agreements by proposing that the signatories should work together when other agreements clearly and specifically set out the obligations and responsibilities of the various parties. As in all things clearly defined responsibilities help to make things run smoothly.

The Independent Agent:

The Independent Agent was supposed to be an independent authority who would audit the developer's work, assess progress for payment purposes and interpret the engineering requirements or advise on engineering issues as necessary. However, the Independent Agent whose fees were paid by the project company was not seen to be independent.

Materiality of Scope Changes:

By failing to define in the agreements what was "material" in regard to scope changes, the province and the developer spent a lot of effort disagreeing over changes to the project, such as revisions to sign messages. A clear definition of the quantum would have resolved many disagreements and allowed for more informed and timely decision-making.

Transfer of existing NBDOT built work:

Because of the timing of the project and of the completion of certain NBDOT built work, it was not possible to allow the bidders to view and price all issues associated with these NBDOT built sections. So provision was made for the developer to inspect and identify any issues following signing. Resolution of these became a problem that was not resolved until after completion of construction. Completion of these works in time to allow bidders to properly price any issues or risks would have eliminated this problem.

Dispute Resolution:

The agreements provided for a stepped approach to resolving issues, starting with the respective project managers, and moving up through the two organizations. If the issue was not resolved, then either party could refer the issue in dispute to an arbitrator. Under this process both sides established their position when discussing the issue at the project manager level and no further progress was made toward resolution as the issue moved through the various steps. Both sides avoided referring what were in some cases minor items to an arbitrator. As a result, many issues continued unresolved until the end of the construction period. An alternative system of resolution might have resulted in more timely resolution of issues.

Other items:

Other items noted for improvement included the need to have the OMM price established up-front for the duration of the project. This would avoid having to negotiate a cost for the last ten years during the term of the agreement.

The certification of ISO 9001 Quality and ISO 14001 Environmental Management systems would pass on the responsibility for ensuring the adequacy of the management systems to a qualified third party.

It was also concluded that certain key performance measures for operation and maintenance would have been better defined on the basis of a graduated scale to provide for the entire system to be maintained in a good overall condition while recognizing that good management will result in some sections being in good condition while others are in a poorer condition (but still meeting the minimum standard).

If there is a way to summarize how to avoid these issues, it is very simply – Keep It Simple. Do not create opportunities for disagreement or for different interpretations. These will happen anyway. Why create the opportunity?

Trans-Canada Highway Project

NBDOT is currently constructing 35 kilometres of new four-lane Trans-Canada Highway from Longs Creek north and will shortly begin construction on 12 kilometres of Route 95 to complete the twinning of this highway between the U.S. border and Woodstock.

In February of this year (2005), the province signed agreements with Brun-Way Group, the developer and operator for the design, construction and financing of 98 kilometres of new four-lane highway between Grand Falls and Woodstock, and the operation, maintenance and rehabilitation of 275 kilometres of the Trans-Canada Highway from the Québec border to Longs Creek, and Route 95.

Construction by both NBDOT and the developer is to be completed, and the highway fully opened to traffic by November 1, 2007. This will complete the twinning of the TCH through New Brunswick between the Québec and Nova Scotia borders with the exception of 2 km at the Québec border which will require realignment when the province of Québec completes the four-laning of Route 185 between New Brunswick and Rivière du Loup.

The developer/operator is assuming responsibility for the operation, maintenance and rehabilitation of the 98 km of highway being built under this contract, the 47 kilometres of highway under construction by NBDOT and the previously completed 130 km of highway until June 2033.

The new sections of highway will be designed and built to meet TAC guidelines for an RAD 120 highway and will be posted at 110 km/h. The developer is required to carry out selected upgrades to the existing sections to bring them up to current safety standards. In the Edmundston area, because of geometric and right of way limitations, the highway will continue to be posted at 100 km/h. A wide, 80-100 metre, median is to be provided along 37 km where environmental and other planning considerations allow. Elsewhere, the median is generally 30 metres in width. The highway is to be designed and built with the safety features expected of a highway of this nature, including energy absorbing guide rail end treatments, rumble strips, and clear recovery zones for errant vehicles.

As with the Fredericton-Moncton Highway Project, NBHC was given responsibility for implementing this project. NBHC created a wholly owned subsidiary – the Trans-Canada Highway Project Co. Ltd. (TCHPCo.) to administer the contract with the developer/operator. However, unlike on the Fredericton-Moncton Highway Project, because of the different business model, this project company has a board of directors entirely appointed by NBHC.

Early in the project, a set of objectives was established. These objectives incorporate the direction of government and NBDOT's strategic plan. Using the Fredericton-Moncton Highway Project as a guide, a business model and risk allocation model were then developed.

A key element of the business model is that the province will only "buy" the highway improvements and pay for the design and construction when the highway is opened to traffic and meets all the requirements specified for that event including completion of all work within the clear recovery zone. The Province does not approve any plans or make any progress or interim payments during construction. This model strengthens the transfer of all responsibility for the scheduling and quality of work to the developer and operator.

The risk allocation model was similar to that used on the Fredericton-Moncton Highway Project.

On the Fredericton-Moncton Highway Project the developer and operator were both required to implement ISO 9001 compliant quality management systems. On this project, the requirements were expanded by requiring implementation and certification of ISO 9001 Quality Management Systems, ISO 14001 Environmental Management Systems and Safety Management Systems. TCHPCo. audits the developer and operator to ensure that these management systems are effective and that TCHPCo. can rely on the quality of the work being carried out by either the developer or the operator.

As a further precaution, since the TCHPCo. is not approving any plans, and because structures have a design life in excess of the term of the agreement, the developer is required to have the design of all bridges reviewed and certified by an independent third party engineer prior to the start of construction.

The design requirements for the project were established such that the highway would form a seamless link in the provincial highway system. That is to say, a driver should not notice any change in design standards as he or she drives from one section of the TCH to another section of the TCH, no matter who designed and built the section.

NBDOT construction specifications formed the basis for the construction specifications on this project, but were edited to ensure an end result focus on the quality of the product without establishing how work should be carried out.

For operations, maintenance and rehabilitation, similar maintenance standards to those used on the Fredericton-Moncton Highway Project were used. These were modified by establishing operational performance measures which are readily auditable and provide a clear statement of inspection requirements, conditions which trigger remedial action and timeframes for correction. In addition, key performance indicators (KPI's) are defined. These set minimum conditions for such things as pavement rutting or roughness. Not only are minimum condition levels set, but cumulative distribution curves have been established to ensure that not all of the highway is allowed to deteriorate to the minimum

condition. For each indicator, these curves establish a range of higher condition requirements applicable to decreasing percentages of the total asset such that overall, the highway is in, at least, a range of conditions stretching from acceptable (the minimum requirement) to very good.

The operator is also required to establish an asset management plan which will ensure that the highway is maintained so as to meet the KPI's at all times and also meet the hand-back standards at the end of the contract term.

Payment for the operation, maintenance and rehabilitation (OMR) work is made monthly on the basis of a fixed constant annual price for the full 28 years, adjusted for inflation based on the NB CPI. This price is full compensation for all OMR work for the term of the contract.

A penalty payment system sets penalties for failing to meet completion deadlines, for failing to implement and maintain the management systems, for failing to comply with the KPI's and for a high incidence of other non-conformances.

Agreements are key to any contract of this length and complexity. There are a number of agreements for the work on this project. The two main agreements are a Design-Build Agreement and an Operation, Maintenance and Rehabilitation Agreement which together with the schedules to these agreements set out all the obligations of the parties for the Project.

These agreements include insurance and bonding requirements and the obligations of the guarantors who also signed. A Dispute Resolution Board is established to resolve issues arising during the Design-Build phase in the case that the respective Project Managers can not find a resolution. During the OMR phase, disputes are referred to the Project Managers and if no resolution is found, then they are referred to an arbitrator for a decision. In each case, an issue may be referred to the courts if the decision of the Dispute Resolution Board or the Arbitrator as the case may be is unacceptable to one of the parties.

Implementing Alternative Service Delivery (ASD) - Key Decisions

So how should one go about implementing alternative service delivery mechanisms in highway transportation? What are the important issues to be addressed?

Whether or not you choose to implement ASD is a high level policy decision which we will not discuss here. Assuming that the decision to use an ASD approach has been made, there are a number issues that need to be addressed.

The first decisions are those which define the scope of the project, such as:

- What work will be included? – design-build, finance, operate-maintain, rehabilitate, or some combination?
- How will the design-build work be linked to the OMR work?

- What are the physical limits of the project?

Next, what sort of business model and risk sharing should be adopted?

- What will the payment stream look like?
- Do you want the developer/operator to finance some aspect of the work?
- Who should assume what risks?
- Who will assume inflation risks for example?
- How much control of the work, does the owner want? Or want to transfer?

How will you define your requirements?

- Will the requirements be prescriptive? or
- Will you describe only the level of service required?
- How will you ensure that at the end of the contract, the owner has an appropriately valued asset?

How will you try to make sure that the contractor does the quality work you require?

- Will you require the contractor to have a quality management system?
- Will you inspect? Or audit?
- Are the requirements auditable? (Can you say yes it meets, or no it does not meet a requirement?)
- What sort of incentive payment or non-conformance penalty system do you want?

How will you make sure that the owner's interests are protected?

- What insurance will you require?
- What bonding do you want the contractor to post?
- Will you seek a guarantor?
- Will you look for some other security?
- What are the risks? And how much are you willing to pay for the security?

How will you manage the transfer of risk and responsibility for existing improvements, or sections of existing infrastructure?

- Will you transfer all the risk?
- Will you retain responsibility for future rehabilitation?
- How much testing and inspection will the bidders be able to do?
- Will you do some inspection and testing to provide to all bidders?

How will changes to the agreements be made? There will be a need to change over time, and the agreements must provide a mechanism and approval process that fits.

From the discussion earlier in this paper, you will have seen some of the decisions that New Brunswick has made. It is our opinion, that if you are going to pursue an ASD project, the appropriate risks must be transferred to the contractor. The contractor must have the responsibility and authority to make decisions on how to do the work. The owner must decide what result it wants.

Process for selecting a Developer / Operator

If an ASD option for delivering highway services is to be successful, then great care must be given to the process of selecting a developer/operator. It is essential that the selected developer/operator have the financial capability as well as the technical expertise to deliver the service and manage the risks.

The selection process, depending on the scope and complexity of the project can take 12 to 20 months. If it is necessary to develop all performance standards and specifications as well, then the process could take longer. In the case of the two projects discussed above, it took 18 months for the Fredericton-Moncton Highway Project and 15 months for the Trans-Canada Highway Project from the date of approval to proceed to the signing of agreements. In both cases, most of the planning and environmental assessment had been completed prior to the start of the selection process.

On both projects, NBDOT created a small group of about ten people to manage the project, and then retained a number of consultants to assist the group. These included process consultants who also provided assistance with the business model and acted as the fairness monitor, engineering consultants to prepare the technical standards and specifications, and environmental consultants to define the environmental requirements. Legal counsel was retained to draft the agreements and provide legal advice throughout the selection process. Other consultants provided advice on such matters as insurance requirements and bonding.

NBDOT issued requests for qualification as the first step in the selection process. The objective at this stage is to, in part, advertise the owners' intentions and more importantly to select a shortlist of the two or three most qualified bidders. This process involves reviewing, with regard to the scope of the proposed project, the financial capability of the bidders, the technical expertise and capacity of the firms and the expertise of the staff proposed for assignment to the project. The evaluation of submissions was carried out by teams of four or five persons from the Department and the consultants based on evaluation criteria developed and approved prior to the receipt of submissions. This phase of the process results in the development of a shortlist of preferred bidders who are invited to respond to a request for proposals (RFP).

The RFP lays out the requirements for the project and the requirements for the bidders to follow in submitting proposals. Prior to submitting proposals, the bidders must have a clear understanding of the project requirements. This means having available a copy of the draft legal agreements which the successful bidder will have to sign, all of the technical requirements clearly set out and access to all relevant available information. On the TCH project, the RFP consisted of a total of six binders. The bidders' proposals should outline their plans for implementing the project. Those plans submitted by the successful bidder will become part of the final agreements.

As with the responses to the request for qualifications, a careful evaluation of the proposals by a number of appropriately qualified technical teams is required. Evaluation

criteria were clearly defined prior to receipt of the proposals. Where the evaluation teams were unsure regarding whether a proposal satisfied the criteria or not, questions were asked of the proponents. All questions were reviewed, prior to issue, to ensure conformity with the process and the RFP. The work of the evaluation teams was reviewed by a Technical Review Panel and a Due Diligence panel which satisfied themselves that the evaluation had been properly carried out in accordance with the process and the pre-approved evaluation criteria.

On both projects, NBDOT decided that the selection criteria should be kept as simple as possible. From a technical perspective, the bidders had to pass the minimum requirements established. Selection of the preferred bidder was then made on the basis of the lowest net cost of the work to the owner. In the case of a tie, the economic and industrial benefits plans of the bidders would be evaluated to select the preferred bidder.

This simple decision process helps ensure the fairness of the process and makes the selection decision simple and easy to explain.

In order to confirm the reasonableness of the bid price, a reference case was prepared. This reference case answered the question: what would it cost the owner to complete the project if a decision were made to reject all bids and to proceed using an alternative approach which most closely adhered to the requirements of the RFP?

It is important for the bidders, the owner and the general public to be assured that the selection process is fair to all the participants. A fairness monitor who observes the entire process and can attest, following selection of a successful bidder, that the process was fair and that it conformed with the pre-defined process and fairness principles is an essential member of the team.

A fair process requires a combination of transparency, together with strict security and confidentiality to ensure that no bidder gains an advantage over another.

Experience to Date

The transfer of risk and responsibility results in a different approach to managing a highway system. Traditionally in the government environment, while there is considerable effort made to plan ahead, to adopt asset management practices, to set priorities and to try to meet a set of objectives, ultimately, decisions regarding highway construction, highway maintenance or rehabilitation are based on the available funds and a list of priorities.

With an alternative service delivery model as adopted on these two projects, the cost to the government is set. However the developer/operator, no matter what the revenue from the government that year may be, is obligated to meet the specified standards. The developer/operator's objective is to maximize its total profit over the contract period by controlling and scheduling expenditures to its best advantage. While there is considerable pressure on the operator to economize, in the end it is more economical to make the right

investments at the right time so as to minimize total costs. The developer/operator's work plan is driven by the project requirements including the maintenance standards.

Since the opening of the Fredericton-Moncton Highway Project in October 2001, the operator has performed the work satisfactorily. At this point, the highway is still relatively new and major rehabilitation has not been required. However, some larger investments have been made, such as the reconstruction of an older structure, and the correction of embankment failures.

NBDOT has an ongoing full time audit program monitoring the performance of the operator. The primary effort of this audit program is to gain assurance that the operator's quality management system is functioning and that issues are properly addressed as they arise.

A number of the lessons learned on the first project are discussed earlier in this paper. These and many smaller items were considered when setting up the Trans-Canada Highway Project.

These projects have provided opportunities to look at how the NBDOT manages the remainder of the highway system. For example, it has forced NBDOT to review its standards for items such as frangible bases. It has pointed out the need for more formalized and documented procedures in the NBDOT.

This alternative approach to delivering highway services has required NBDOT staff to adjust to a new way of managing the highway system. The traditional hands-on approach is no longer possible with projects like these. NBDOT's role is to audit, to stay aware of potential issues and to make sure that the developer/operator carry out the terms of the contract.

In summary, the use of an alternative service delivery mechanism is a feasible approach to delivering highway service. A developer/operator can and does bring new ideas to the highway management business. The private sector can quickly mobilize resources to implement priority projects, while government continues to focus on carrying out routine activities and implementing incremental improvements. Economies of scale can be realized on larger projects, and at the same time the focused management of a project such as those discussed above can lead to the delivery of quality highway improvements and services within a defined time frame.

Appendix 1

FMHP Project Objectives

NB DOT has established a number of objectives for the Project that are presented below not in any specific order:

- to ensure the safety of the travelling public;
- to ensure that the Highway is developed, designed, constructed, operated, managed, maintained and rehabilitated in a manner that meets or exceeds current Provincial standards;
- to ensure that the Highway is developed, designed, constructed, operated, managed, maintained and rehabilitated in an environmentally responsible manner;
- to share the risks of the Project between the private and public sectors;
- to obtain optimal value for money for NBHC;
- to minimize the financial contribution of NBHC to the Project;
- to open the entire Highway for safe operation by November 30, 2001 and to fully complete the Highway by June 30, 2002;
- to defer payments by NBHC for the Project (other than on account of highway operations and maintenance) until after the opening of the completed Highway;
- to maximize the economic and industrial benefits to the citizens and industries of New Brunswick;
- to provide a high level of service to the Highway users at a low cost.

NB DOT recognizes that some of these objectives are competing and that the selection process will determine the optimal mix.

Appendix 2

General Summary of Project Risk Allocation - FMHP

	Primary Responsibility	
	NBHC	Successful Proponent
DEVELOPMENT, DESIGN AND CONSTRUCTION RISKS		
Concept approvals - environmental - Provincial EIA	•	•
Concept approvals - environmental - Federal EARP	•	
Concept approvals - environmental - Federal CEAA	•	
Design & construction approvals - environmental		
Watercourse alteration		•
Archeological - Jemseg	•	
Archeological finds (known)		•
Archeological finds (unknown)	•	
Land acquisition	•	
Land transfer approvals - CFB Gagetown	•	
Inability to acquire land causing a route change	•	
Delays by outside agencies (utilities & permitting)		•
Delays by the Province	•	
Insurance and bonding requirements	•	
Adequacy of insurance and bonding requirements	•	•
Confirmation of insurance and bonding		•
Sub-contractor insolvency		•
Design error		•
Changes in standards imposed by Province	•	•
Changes in standards imposed by others	•	•
NB DOT supplied data - accuracy		•
NB DOT supplied data - sufficiency		•
NB DOT supplied data - interpretation		•
Patent infringement		•
Weather		•
Strikes		•
Fire		•
Vandalism		•
Damage to works		•
Traffic accidents		•
Damage/injury to third parties		•
Damage/loss to utilities		•
Defective materials		•
Water/air/soil pollution - pre-existing and unknown	•	
Water/air/soil pollution - pre-existing and known or arising from work		•

	Primary Responsibility	
	NBHC	Successful Proponent
Quality assurance/quality control		•
Quality audits	•	
Public interface		•
Workplace Health and Safety		•
Utilities		•
Unexploded Ordinance CFB Gagetown	•	
DEMAND RISKS		
Traffic - quantum		•
Traffic - mix		•
Toll revenue		•
Competition - other roads		•
Competition - other modes		•
Technology		•
Ancillary revenue		•
Changes in consumption taxes imposed on tolls	•	
OPERATION AND MAINTENANCE RISKS		
Changes in standards - imposed by Province	•	•
Changes in standards - imposed by others	•	•
Inflation		•
Weather		•
Strikes		•
Toll technology changes		•
Actual maintenance costs higher than anticipated		•
Damage/injury to third parties		•
Damages to works		•
Water/air/soil pollution		•
Vandalism		•
Meeting hand back standards		•
FINANCING RISKS		
Interest rates	•	•
Inflation	•	•

Appendix 3

TRAFFIC SERVICES STANDARD 706

STEEL BEAM GUIDE RAIL

706.1 OBJECTIVES

The objective of this standard is to ensure that steel beam guide rail is maintained to an adequate level to provide a safe driving condition for motorists and ensure that the system will restrain and redirect vehicles coming into contact with it.

706.2 END RESULT SPECIFICATIONS

706.2.1 General Specifications

The Operator shall ensure that guiderail systems installed on the highway under the operators care and control are maintained in compliance with this standard. Any new, repaired or replacement guide rails shall conform to the design and installation specifications for these devices as presented in the CSFMHP.

The objective of these specifications shall be met primarily through two types of inspections, detailed annual inspections, and daily routine inspections.

Where winter conditions prevent the Operator from completing permanent repairs to damaged guiderail, temporary measures shall be implemented by the Operator to protect the public. Permanent repairs delayed by winter conditions shall be repaired no later than April 30th.

706.2.2 Detailed Specifications

- a) Routine Visual Guiderail Inspections
 - i. The Operator, as part of the routine patrolling operation of the Facility, shall undertake visual inspections of guiderail systems
 - ii. Deficiencies noted shall be recorded in DD&MS identifying their location, condition observed, date, urgency for repair, and action taken to address the problem. Inspections shall be focused on, but not limited to conditions, which could affect the intended operation of the guiderail system.
 - iii. Any deficiency noted that affects the safe operation of the guiderail system shall be repaired within two working days.

- iv. Conditions considered hazardous to the user, employees or the general public shall be addressed as per OMM Standard 005, Safety.
- b) Annual Detailed Guiderail Inspections
- i. The Operator shall undertake a detailed inspection of all guiderail systems annually. The inspection shall be completed not later than June 30.
 - ii. During the annual inspection, all guiderail systems within the Facility are to be inspected to ensure their compliance with this standard. Deficiencies are to be recorded in the DD&MS with repairs or rehabilitation scheduled within the time periods stipulated within this standard.
 - iii. Deficiencies noted that affect the safe operation of the guiderail system are to be scheduled for immediate repair, but in no case later than (10) working days from the time of completion of the annual inspection.
 - iv. Deficiencies noted that do not affect the safe operation of the guiderail system are to be scheduled for repair, with such repairs to be completed prior to September 30 of the calendar year.
 - v. Conditions considered hazardous to the user, employees or the general public shall be addressed as per OMM Standard 005, Safety.

c) Guiderail Deficiencies

It is recognized that deficiencies relating to individual components of guiderail system do not necessarily affect its overall effectiveness, as guiderail strength is developed from multiple supports throughout its length. Typical deficiencies are noted below and grouped by those requiring immediate or scheduled repair.

Defects requiring immediate repair (within 2 working days or within (10) working days of the annual detailed inspection):

- i. Multiple missing, broken, loose or insecurely set posts
- ii. Multiple excessively split, cracked or rotted posts or blocks
- iii. Multiple posts out of plumb perpendicular to the direction of travel by more than 50 mm over the height of the post
- iv. Protrusions towards the flow of traffic caused by ripped, torn or cut segments of guiderail
- v. Multiple guiderail that are not bolted securely to the mounting posts (via blocks)
- vi. Multiple guiderail that have missing bolts or nuts
- vii. Guiderail that are overlapped in the direction against the flow of traffic.

Defects to be scheduled for repair and corrected prior to September 30 of each calendar year

- i. Single missing, broken, loose or insecurely set post

- ii. Single excessively split, cracked or rotted post or block
- iii. Single post out of plumb by more than 50 mm over the height of the post perpendicular to the direction of travel or multiple rotated blocks
- iv. Perforated, ripped, torn or cut segments of guiderail
- v. Guiderail that are bent or twisted, exhibiting a flange to flange differential measurement exceeding 40 mm spread or a closure in excess of 20 mm from the adjacent undamaged guiderail
- vi. Single guiderail that are not bolted securely to the mounting posts (via blocks)
- vii. A single guiderail segment that has missing bolts or nuts
- viii. Guiderail that are misaligned vertically or horizontally by more than plus or minus 50 mm from the established height or alignment.

Aesthetic defects, which do not affect the safe operation of the guiderail system, shall be recorded and monitored by the Operator. Where aesthetic defects are exhibited over more than 50% of the guiderail surface, the guiderail will be scheduled for replacement within the following calendar year.

Aesthetic Defects include such items as:

- i. Rust
- ii. Rippling
- iii. Staining

706.3 NON-COMPLIANCE

706.3.1 Definition

The Operator shall be considered to be in Non-Compliance when an audit reveals that the End Result Specifications detailed in 706.2.2 have not been achieved. Without limiting the generality of the foregoing, specific indications of Non-Compliance for steel beam guiderail include:

- a) Conditions requiring corrective action exist on the Facility which have not been observed and documented by the Operator.
- b) Conditions requiring corrective action exist on the Facility, which have been observed and documented by the Operator but repairs were not performed within the allowed time.