



Ministry of Transportation and Infrastructure
Kicking Horse Canyon Improvement Project
Phase 4

Delivery Options Assessment

October 13, 2016





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1 EXECUTIVE SUMMARY

The Trans-Canada Highway (or Highway #1) through the Kicking Horse Canyon is a 26km section of highway (the KHC Highway) located between Golden, BC and Yoho National Park. The Province, represented by the Minister of Transportation and Infrastructure, (the Ministry) as part of Phase 2 of the Kicking Horse Canyon Highway Project entered into a concession agreement (the Phase 2 Concession Agreement) with Trans-Park Highway General Partnership (Concessionaire, TransPark) to design and construct the Phase 2 highway improvements and to operate, maintain and rehabilitate the entire KHC Highway until the year 2030. The KHC Highway is a key section of the Trans-Canada highway network and plays an important role in interprovincial and international trade and tourism. It is a vital link connecting Vancouver's ports with the rest of Canada. Phase 4 of the Kicking Horse Canyon Project, West Portal to Yoho Bridge (the Project) represents the last section of the KHC Highway that has not been upgraded to four lanes of travel and current design standards. The Phase 4 section of highway currently experiences poor vehicle operating conditions, collision rates, and closures due to natural hazards well above the provincial average. The Project will provide the following improvements to the KHC Highway:

- Upgrade the final section of the 26km KHC Highway to a 4 lane divided highway meeting 100km/hr. design criteria;
- Improve average operating speeds from ~60km/hr. to >90km/hr. for passenger vehicles;
- Improve travel reliability by including works to address rock fall, avalanche, debris flow hazards and accidents which is expected to result in an estimated reduction in highway closures from 11.7 to 0.83 closures per year;
- Safety improvements that will result in an estimated 66% reduction in collisions, 13 fewer fatalities and 194 fewer injuries over the next 30 years; and
- Construction of a wildlife exclusion system that will result in further reductions of vehicle – wildlife collisions.

A range of feasible procurement models was examined in November 2014 as part of a Multiple Criteria Analysis (MCA) that shortlisted two (2) procurements models as the preferred options. This procurement options assessment report compares the MCA preferred procurement options, a Design Build (DB) and a Design Build Finance (DBF).

The quantitative and qualitative analyses show that the DB model is expected to:

- Manage and mitigate key project risks;
- Draw the interest of many large market participants, providing innovation and efficiencies; and

- Successfully deliver the Project in a cost effective and efficient manner.

Under the recommended DB delivery model, the Project can be successfully delivered while meeting the Project and procurement criteria listed in the business case and the MCA in an efficient and cost effective manner.

It is recommended that the Project's procurement proceed under a DB model.

2 OVERVIEW AND PURPOSE

The Province's Capital Asset Management Framework (CAMF) (brought into force by Treasury Board Directive 1/03) and Capital Standard (related policy) set out expected due diligence in capital planning, including the analysis of procurement options and development of concept plans and business cases for capital projects.

The Ministry has developed a business case for the Project. The Project is expected to be developed in partnership with the federal government under the New Building Canada Fund – National Infrastructure Component as the Project forms part of the Trans-Canada Highway.

The Ministry has engaged Partnerships BC (PBC) and Ernst & Young (EY) to review the Project scope and business case and identify a preferred option for implementation, as well as a recommended procurement approach. In the fall of 2014, PBC working with EY, the Project team and the Ministry developed a MCA which assessed multiple procurement options against procurement criteria, identifying two procurement models that should be further evaluated for delivering the Project. This procurement options assessment was developed to assess the two preferred models identified and complements the work done in the MCA. This assessment should be reviewed in combination with the MCA dated November 27, 2014. Please see Section 6.1 of this report for more information on the MCA.

This assessment also provides advice on interfacing with the existing Concessionaire. Phase 2 of the Kicking Horse Canyon Highway Project was delivered as a Public-Private-Partnership (P3) with a Concession Agreement in place to have the Concessionaire operate, maintain and rehabilitate the entire 26 kilometre KHC Highway, including the current Phase 4 project limits, until the year 2030. This Concession Agreement was executed on October 28, 2005.

The terms of the existing Concession Agreement need to be considered in the development of the Project delivery options. Capitalized terms used in this report that are not otherwise defined herein have the meaning set out in the Concession Agreement.

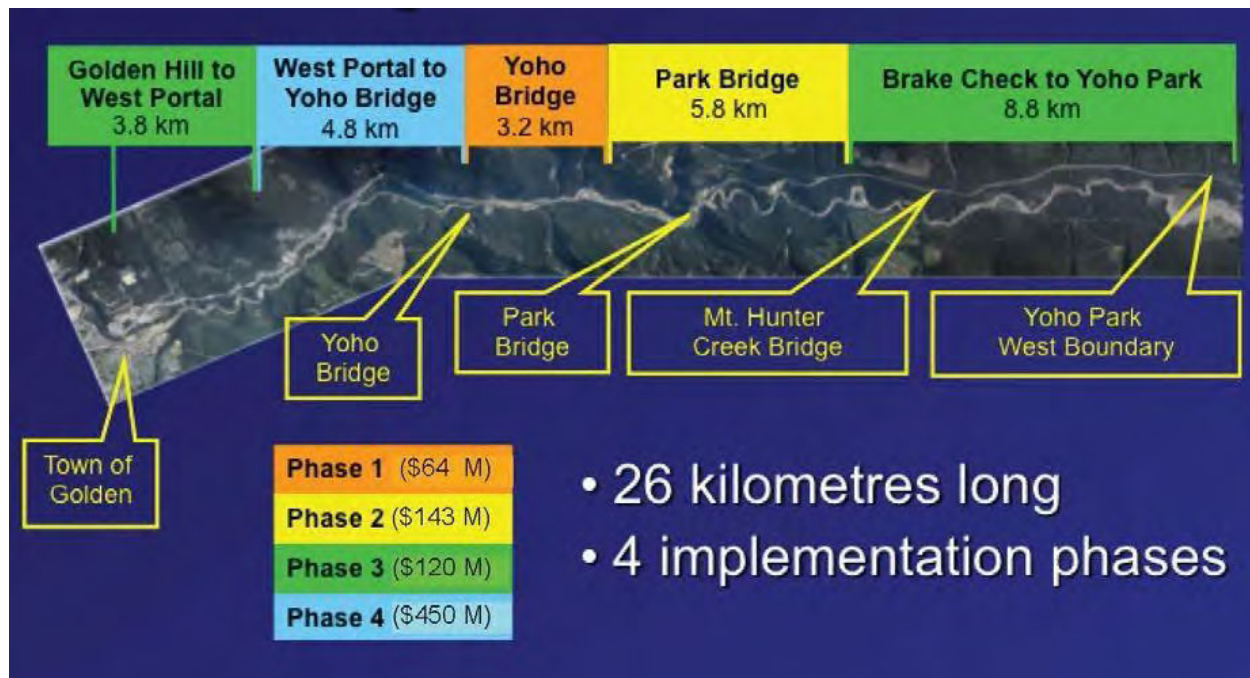
3 PROJECT DESCRIPTION

The Trans-Canada Highway is the most important highway in Canada's Core National Highway System. It links all of the ten provinces, it facilitates east-west trade and commerce, and it is the backbone for most

north-south provincial highways. British Columbia's long-term strategy is to four-lane Highway 1 between Kamloops and Yoho National Park. Nowhere is this more challenging than in the Kicking Horse Canyon located east of the Highway 95 junction at Golden and west of Yoho National Park near the Alberta border. Here the highway was, and parts of it remain, a narrow, winding two-lane highway with steep rock faces on one side, and a drop-off to the CP Rail main line and the Kicking Horse River on the other. Posing significant construction, maintenance and operational challenges, it had no major upgrading since it was built in the 1950s until improvements started in 2000 with the work on the Yoho Bridge and approaches. These improvements have been funded through partnership funding agreements between the Provincial and Federal governments to revitalize this critical corridor and to move traffic more safely and efficiently. Average daily traffic is well over 5,000 vehicles per day with commercial carriers making up nearly 25% of this traffic. It is also the favoured route for tourists with traffic averaging over 10,000 vehicles per day during the peak summer period.

The area is subject to many rockslides, debris torrents and avalanches. Improvements to the Trans-Canada Highway in the Kicking Horse Canyon are providing a safer and more efficient journey for all travelers, and a competitive corridor for the movement of goods to and from the Pacific Gateway ports in Metro Vancouver. As part of the multi-phased Kicking Horse Canyon Project, the highway is being improved to a modern four-lane standard with a design speed of 100 km/hour to move traffic more safely and efficiently. Sharp curves and steep grades are being reduced, and narrow bridges are being replaced to increase capacity, improve traffic operations and reduce hazards. Improvements will result in reduced vehicle emissions, fuel consumption and enhanced bicycle use, and will thereby have a positive effect on the environment.

The total cost of the overall Kicking Horse Canyon improvement program is estimated at \$777 million, a significant investment that reflects both the enormity of the task and the importance of the corridor. As such, KHC Highway route improvements are being carried out in four major phases (see Figure 1). The first three phases of the project (now complete), cost-shared by the Government of British Columbia and the Government of Canada, brought the total length of four lane improvements to 21 kilometres out of the 26-kilometres total KHC Highway. The Phase 4 Canyon section will complete the four laning of this massive undertaking. The preliminary design of Phase 4 is complete and tackles the most difficult KHC Highway section. Completing the Phase 4 improvements will not only improve the safety, reliability and operational challenges of this section of the KHC Highway itself but completing this Project will maximize the benefits of the work completed in the previous phases of the Kicking Horse Canyon improvement program.



Phase 4 extends from the east limits of the Phase 3 Golden Hill to West Portal Project to the Yoho Bridge, upgrading approximately 4.8 kilometres through the most challenging section of the canyon. Alternative alignment studies, preliminary design, archeological, environmental and geotechnical studies have been completed. Four lane widening, alignment improvements and mitigation of rock fall hazards and avalanches can be achieved using a combination of bridges, wide ditches, catchment benches, retaining walls, high energy rock fall attenuation mesh and other measures.

Many procurement alternatives were assessed for the Project; however the current estimate of \$450 million is based on a Design-Build delivery model.

Construction of the Project would commence in fiscal year 2019/20 and the Project would be complete in fiscal year 2023/24.

4 KICKING HORSE PHASE 2 CONCESSION AGREEMENT CHANGE PROVISIONS

When considering procurement options, the existing Phase 2 Concession Agreement needs to be taken into consideration. Regardless of the option selected, unless the existing Phase 2 Concession Agreement is terminated, the existing Concessionaire will have a role in the implementation of the Phase 4 work. It should be noted that during the planning for the Phase 3 works and during the MCA process for the Project, the Ministry, PBC and EY evaluated the cost implications of termination and determined that it would not be cost effective to terminate the Phase 2 Concession Agreement.

After making the decision to keep the Concession Agreement in place, the Ministry chose to deliver the Phase 3 improvements itself under competitive bid processes rather than having the Concessionaire

manage the procurement, design and construction of the Phase 3 works. The most significant reasons for the Ministry's decision were that:

- the Phase 3 improvements were carried out in partnership with the Federal government under a Provincial-Federal funding agreement;
- the Ministry could manage the schedule and funding of the improvements;
- the Ministry would reduce Concessionaire management costs for overseeing the work; and
- the Phase 3 improvements were typical highway improvement projects with typical risk profiles that could be procured using the Ministry's standard procurement method.

There are specific provisions within the Phase 2 Concession Agreement that govern a "Province Change" and "Additional Works". Schedules 13 and 14 of the Phase 2 Concession Agreement provide details and procedures for implementing changes to the existing agreement. Prior to the Phase 3 improvements being initiated the Ministry issued a Province Change Notice and an Additional Works Notice to the Concessionaire in accordance with the provisions of the Concession Agreement.

The Additional Works Notice provided a description of the planned changes and improvements to the KHC Highway, the scheduling of the work, a description of Additional Work Services to be provided by the Concessionaire and the method of procurement of the Additional Works. Since the Ministry chose to deliver the Phase 3 work, the Additional Works Services carried out by the Concessionaire during delivery of the Phase 3 work consisted of providing review and comments during design and having an on-site representative during construction so that the Concessionaire could assess its Operation, Maintenance and Rehabilitation (OM&R) obligations of the new section of highway after construction was complete.

The Province Change Notice provided the Concessionaire with notice that the Province was initiating a change to the KHC Highway and the Concessionaire's obligations to fulfill the terms of the Concession Agreement. In the case of the Phase 3 improvements the change was a removal of required OM&R activities on the old two lane Phase 3 highway infrastructure, and the addition of new OM&R activities on the new four lane Phase 3 highway for the relevant periods of time after the improvements were constructed. The Province Change Notice provided a description of the change to the Concessionaire's obligations, schedule of when these obligations would change and a request for the Concessionaire to provide an estimate of their costs for the changes to its obligations.

During construction of the Phase 3 improvements, the Concessionaire was provided various opportunities to examine and comment on the work. The Concessionaire's involvement ensured they had full knowledge of the work and its quality in order to provide a price to fulfill its new obligations under the terms of the Concession Agreement. The Phase 3 East Concession Agreement Amendment #4 has been successfully executed by the Concessionaire and the Ministry and the Phase 3 West amendment is currently being negotiated.

Phase 4

The Ministry will have to complete negotiations and come to a mutual agreement with the Concessionaire on the impacts that the additional Phase 4 infrastructure will have on the existing OM&R scope of the Phase 2 Concession Agreement. The Ministry plans to engage the Concessionaire for the Phase 4 work using the same process used to deliver the Phase 3 work as described in the previous section of this report. This could result in a significant amendment (addition or a subtraction) to the current scope of the Phase 2 Concession Agreement.

The Concessionaire will need to be engaged and consulted with by the Ministry in the design and construction of the Project and should have the opportunity to review and comment on the design and the construction. The Project contractor will also need to coordinate his work with the Phase 2 Concessionaire but commercial decisions related to the Project will remain with the Ministry. The Ministry will be required to manage the relationship between the Phase 2 Concessionaire and the Phase 4 contractor to ensure the terms and obligations of both the Project agreement and the Phase 2 Concession Agreement are being met by all parties, including the Ministry.

5 KICKING HORSE PHASE 3 - CONCESSION AGREEMENT MODIFICATION AGREEMENTS

Prior to start of the Phase 3 works, the Ministry undertook a study to determine the best option on delivering that project including the financial impact of terminating the Phase 2 Concession Agreement. At that time, terminating the concession was deemed to be not cost effective due to the estimated large break costs that would need to be paid and therefore traditional P3 procurement options were not viable. Additionally the organizational structure of the Concessionaire's parent company is such that having the Phase 2 Concessionaire deliver Phase 3 was not feasible. Consequently, Phase 3 was procured as two (2) separate projects, Phase 3 East and Phase 3 West, through a Design Build Agreement (part of the Phase 3 West works); Design-Bid-Build contracts and day labour work (Phase 3 West). The resulting new Phase 3 East infrastructure assets' OM&R requirements were then successfully negotiated with the Concessionaire under the terms of the Phase 2 Concession Agreement, and resulted in Concession Agreement Modification Agreement #4, which was agreed to in the fall of 2015 and executed in early 2016 with an Order In Council.

The Concessionaire was consulted with on the design and construction of the Phase 3 improvements and provided Additional Works Services as described in Section 4 but was excluded from the procurement process. Although the Concession Agreement, Schedule 14, Part 1, Section 3.3 specifically states the Concessionaire and its affiliates will not be disqualified from bidding on Additional Works, the Concessionaire did not elect to bid on any of the Phase 3 contracts.

During construction of the Phase 3 work, Concessionaire representatives were provided opportunity to observe and independently test the quality of the work.

The Phase 3 East negotiation process required extensive time to develop a detailed model that followed the Phase 2 Concession Agreement change principles, to ensure that the Province received value for money through a fair and responsible amendment. This approach will also be used for the required Phase 3 West Province Change amendment and the future changes to the Phase 4 highway portion.

As indicated in the timelines in the table below, major changes to a concession agreement are lengthy and should be entered in as early as possible.

Phase 3 Works	Province Change Notice	Completion of Construction	Amendment Signed
Phase 3 East	2008	2010	2016
Phase 3 West	2009	2013	TBD

During the MCA and Delivery Options Assessment work, the Project team and PBC did not identify any differences between the two procurement models with regard to the approach required to engage the Concessionaire.

6 DELIVERY OPTIONS

6.1 MCA - NOVEMBER 27, 2014

During the Project planning process, prior to the development of the business case, the Ministry engaged PBC to conduct an MCA, to qualitatively determine the most suitable procurement model(s) for the Project. The full MCA report is included in an Appendix A to this report; please refer to this report for more detail.

The analytical framework for assessing the relative qualitative merits of each procurement option is based on a multiple criteria analysis approach. The qualitative assessment sets out criteria based on the procurement objectives for the Project. Each criterion represents a desired outcome for the Project and is then assessed on the extent to which the procurement option achieves the desired outcome.

The assessment criteria and associated procurement objectives are summarized below.

	Qualitative Criteria	Objectives and Goals
1	Market Interest and Capacity	<ul style="list-style-type: none"> Ability of the Project to attract enough competition to ensure the best possible outcome to the overall project objectives. Ensure attractive and marketable transaction. Ensure a fair and transparent procurement process.
2	Cost & Schedule Certainty are Maximized	<ul style="list-style-type: none"> Timely and efficient project delivery. Transfer the risk associated with delays in the schedule. Achieve Value for Money.
3	Integration with Existing	<ul style="list-style-type: none"> Ensure seamless delivery of systems maintenance

Qualitative Criteria		Objectives and Goals
	Concession	throughout the operating period.
4	Asset Performance throughout Life Cycle	<ul style="list-style-type: none"> • Improve reliability, safety and accessibility for all corridor users. • Ensure effective asset performance. • Minimize traffic impacts during construction and operations. • Operational effectiveness.
5	Capital Cost and Operating Cost Optimization	<ul style="list-style-type: none"> • Ability to address the construction and long-term performance goals at the best value for the province.
6	Schedule Optimization	<ul style="list-style-type: none"> • Deliver the benefits of the Project to the stakeholders and users the quickest.
7	Responsive to Stakeholder Issues	<ul style="list-style-type: none"> • Ensure Public and Stakeholder Input; • Meet Environmental Obligations. • Minimize or have no Utilities disruptions and ensure maintenance of an effective utility corridor.
8	Allocation and Management of Risk	<ul style="list-style-type: none"> • Allocate risk to the party that is best able to manage the risk and find the optimal risk balance for the Project.

The following six (6) procurement models were identified and evaluated in the MCA report.

Options	Options
Design-Bid-Build	Concessionaire Delivered
Design-Build	Design-Build-Finance-Rehabilitate (5km)
Design-Build Finance	Design-Build-Finance-Operate (5km)

The MCA results suggest that the DB and DBF procurement options offer the best opportunity to achieve the desired qualitative outcomes for the Project, as measured in terms of the qualitative assessment criteria.

6.2 CONCESSIONAIRE INVOLVEMENT IN DELIVERY

Regardless of the procurement methodology (DB or DBF) the Project team concluded that the process of how to engage the Phase 2 Concessionaire is as follows.

The Ministry's current intended approach is to run a competitive procurement process, regardless of procurement model, with little or no involvement of the Concessionaire, therefore not restricting the Concessionaire or their subcontractors and sub-consultants from participating as a bidder for the Project.

The Concessionaire will have access to Project information at the same time as other bidders. If the Concessionaire does not participate as a bidder, or is not the successful bidder, the Ministry intends to engage the Concessionaire for Additional Works Services to provide review and comments on the design and construction work using the same process that was used for the delivery of the Phase 3 work.

With the completion of the Phase 2 design and construction work currently the active Concessionaire consists of the Concessionaire Manager (Bilfinger Berger BOT Inc.) and its maintenance provider (EMCON Services Inc.). Since neither these companies submitted bids on any of the Phase 3 work packages, it is not expected that they will elect to bid on this Project directly.

Given the impacts on the Phase 2 Concession Agreement, the implementation of the Project would require the use of the Additional Works and Province Change processes. Due to a number of considerations, including the significant value of the Phase 4 improvements, the impacts on the Phase 2 Concession Agreement and the potential amendments that may be required to the Phase 2 Concession Agreement, it is likely that an Order in Council will be required pursuant to Section 2 of the Transportation Investment Act. This approval would be required irrespective of the DB or DBF procurement model.

The Ministry would need to serve TransPark a Province Change Notice(s) and Additional Works Notice(s) to address the particular arrangements required for its involvement, and for pricing the change in the OM&R scope as a result of the Phase 4 works.

In the Additional Works Notice and the Phase 4 contract, the responsibilities of the existing Concessionaire and the Project contractor during construction should be clearly defined.

6.3 OPERATIONS AND MAINTENANCE SCOPE – DURING AND POST PHASE 4 WORKS

During and after construction of the Phase 4 work, the Ministry intends to have all operational scope such as snow plowing and salting, shoulder graveling, accident clearing, as well as maintenance of electrical, signage, culverts, line painting etc. for all phases except Phase 4 remain the responsibility of the Concessionaire consistent with the current Concession Agreement.

During construction of Phase 4, the Ministry intends to have the operational scope of work for Phase 4 shared between the Phase 4 contractor and the Concessionaire. Consistent with the delivery of the Phase 3 work the Phase 4 contractor will assume most of the maintenance responsibility for the Phase 4 work site. The Phase 4 contractor's responsibilities on the Phase 4 work site include becoming the Prime Contractor for site safety, traffic management, and maintaining all facilities except for routine winter maintenance on the publically travelled highway. The Phase 4 contractor will also be required, through the Ministry, to allow the Concessionaire access to the work site, its construction test results and records, and allow the Concessionaire to take its own test results. During the Phase 4 construction, the Concessionaire will not be responsible for maintenance on the Phase 4 site and will no longer be

responsible for site safety on the site, but will continue to be required to conduct routine winter maintenance activities on the publically travelled highway through the site.

The Ministry will clearly define the O&M scope in the Phase 4 contract, and work with the Concessionaire to ensure that there is a clear distinction of responsibilities between the Phase 4 contractor and the Concessionaire.

After substantial completion of the Phase 4 construction work it is expected that the Concessionaire will assume full operations and maintenance responsibilities of the Phase 4 section of highway, excluding rehabilitation works as indicated in Section 6.4 of this report.

Using the final negotiated value of Concession Agreement Modification Agreement #4 for Phase 3 East, the Project team is anticipating that the additional O&M works for the 4.8km length of Phase 4 scope will cost approximately \$ [REDACTED] in total for the 6 years remaining of the Phase 2 Concession Agreement. This is a preliminary estimate based on the expected additional lane kilometres that will be created through the Phase 4 works and does not include escalation for inflation.

6.4 REHABILITATION SCOPE – POST PHASE 4 WORKS

The advantage of assigning rehabilitation responsibility to a third-party as in the case of Public Private Partnership (P3) projects is the assignment of operation period risks, such as latent defects and life cycle performance, to the party best capable of managing them.

The primary rehabilitation responsibilities retained by TransPark as part of the Phase 2 Concession Agreement pertain to the pavement conditions which include scheduled pavement overlays and periodic milling and filling operations. Operations such as potholes and crack sealing fall under the O&M scope.

As stated in Section 1 of this report, the Phase 2 Concession Agreement will end in 2030. The estimated construction completion of the Project will occur in 2024. For the remaining six (6) years of the concession period there are no major components requiring lifecycle replacements or major rehabilitation works anticipated for the newly completed Phase 4 works. For example scope elements such as bridge and retaining wall components, gabion baskets, culverts, and concrete barriers have a design life of 75-100 years. The asphalt pavement structure specification for the Phase 4 work requires six (6) inch thickness total, which has an expected lifecycle of approximately 10 years before significant rehabilitation work such as a pavement overlay is required, depending on the traffic volumes and usage during winter months. Therefore the Ministry is considering retaining the majority of the rehabilitation scope for this 4.8km section of the KHC Highway, for the remainder of the Phase 2 concession period.

Additionally, traditional Ministry Design-Build contracts have a two (2) year warranty period to ensure the risk of latent defects are not transferred to the owner prior to the assets undergoing a couple of full operational cycles. In the case of the Project, the warranty period would reduce the Ministry's risk exposure to four (4) years of the remaining six (6) of the concession period. The Ministry could reduce

this risk further still by requesting a longer warranty period as part of the Phase 4 procurement process. Although longer warranty periods are not standard for Design-Build transportation projects in BC, it is not uncommon in other jurisdictions and industries to use five (5) and ten (10) year warranties in projects with higher latent defects risk.

An example of an approach undertaken by the Ministry toward securing latent defects risk, the Port Mann Bridge Highway 1 Improvement design-build agreement includes a seven (7) year warranty period for latent defects on the main bridge structure.

7 DB VS DBF

7.1 QUALITATIVE TEST

The Ministry has only delivered one project under a DBF model, the Evergreen Rapid Transit Line, and the primary drivers for the value for money that was quantified for that project was the risks related to owner initiated changes and schedule delay related risks.

Owner Changes

The private financing requires a higher level of discipline on the owner's team to initiate changes post financial close, due to the complexity of the scope change process and added costs of financing involved in a DBF agreement and therefore less non-essential changes are implemented in a DBF project than a DB project. Unlike the Evergreen project, which is an urban transit system expansion, the Project is located in an isolated stretch of the KHC Highway with little stakeholder and user group involvement in the planning and execution of the work, which reduces the expected amount of owner/3rd party initiated changes. In reviewing the previous three phases of the KCH Highway improvements, the Ministry has been able to deliver these projects close to or at the approved budgets. Therefore the Project team does not anticipate the risk of changes after contract award to be significant on the Project.

Schedule Delays

The private financing offers an additional incentive of avoiding construction delays. Due to the additional cost of the delay in repayment of the privately financed bond, the private partner is encouraged to implement mitigation measures, at their cost, to reduce the incurred delay. The financial impact due to the delayed repayment of the private financing is greater than the liquidated damages that the Ministry could justify on a typical DB project. In the case of the Project, the Project team does not consider schedule to be a critical risk on this Project. The base schedule has sufficient flexibility to accommodate any expected delays.

Major Risks

The largest risk on the Project is the steep terrain and associated geotechnical risks. Although the risk of occurrence is known, the frequency and severity of these risks are unpredictable. Based on the risk

assessment carried out by the Ministry these risks have been quantified at \$ [REDACTED] in total, and the delivery model is not expected to make a significant difference in risk quantification.

7.2 RISK ANALYSIS

This report relies on the Project risk assessment carried out by the Ministry, prior to the involvement of PBC and EY, in September of 2014 and updated in May 2016 in advance of submission of the Project business case. The risk quantification was carried out on the basis that the Project would be delivered through a DB model using the Ministry's standard methodology.

As part of the Delivery Options Assessment, PBC, EY and the Project team undertook a comparative risk assessment using the May 2016 risk matrix as the baseline. This comparative risk assessment involved a detailed review of the May 2016 risk matrix to identify and quantify risks that would be impacted from the inclusion of private finance under a DBF model compared to the base assessment of DB.

The following sections describe the work to date, the adjustments under a DBF model, and the final outputs of the risk analysis.

Overview

Using the updated May 2016 risk matrix, PBC and EY met in late June 2016 to review and discuss, through a line by line analysis of the risk matrix, risks that were likely to change under a DBF model. In addition to a review of the May 2016 risk matrix, a number of risks that have been quantified on other projects that include finance were also discussed to ensure that the risk analysis was as complete and robust as possible. The risks identified as those that could be impacted by inclusion of finance are set out in Appendix B.

A risk workshop was conducted on July 11th, 2016 which was facilitated by EY and included all key Project team members (See Appendix C for a background on workshop participants). The purpose of the risk workshop was to review the risks and to assess the costs and probabilities of each risk that was assessed that could be impacted by the inclusion of finance under a DBF procurement model.

Risk Assessment

Following the detailed review of the risk matrix seven risks were adjusted to reflect a DBF model. The rationale for the changes was that the Project team believed that the addition of private finance typically results in additional oversight and/or due diligence on behalf of lenders which results in improved performance around key risk areas such as site conditions, technical requirements and schedule. The Project team applied a reduced probability to the risks identified as being impacted by the higher level of due diligence while the consequences remained the same. However, the Project team recognised that this additional oversight and due diligence increases the overall costs of the Project. The table below shows the impact of the changes in the Project risk around the seven risks that were assumed to change:

Risk Category	DB (\$M)	DBF (\$M)
Project Schedule		
Materials Supplies and Cost		
Quantities		
Wall Foundations		
Bridge Foundations		
Unknown Ground Conditions		
Suitability of Rock Fall Protection Measures		
Total Adjusted Project Risks		
Difference		

As can be seen, the risk quantification indicated that the DBF model has a lower risk profile than the DB model by approximately \$[REDACTED].

7.3 LEVEL OF PRIVATE FINANCING

The private financing component of the DBF model brings 3rd party lender discipline and effective risk transfer through the private partner's and lenders' financial exposure. It is important, however, to consider the advantages of private sector financing in balance with the cost of that financing, and to determine the appropriate amount of private capital needed to optimize the value of the risk transfer.

A number of factors are taken into account when determining the optimal amount of private finance for any particular public private partnership project. Key considerations include:

- Sufficient financing to secure the intended risk transfer
There should be sufficient financing to protect the Owner from anticipated risk events as well as lower probability of high impact risks, and to ensure that the lenders have sufficient incentive to address any issues arising in the project.
- Efficient financing in the market
Generally there should be sufficient financing to allow Proponents to access a variety of potential financing approaches, and to ensure that pricing will be competitive (the lower the proportion of private finance the greater the perceived risk, potentially affecting pricing).
- Overall affordability and value for money
The amount of private finance should also take into consideration market considerations including the availability and cost of finance, and any impacts on overall project affordability.

In the case of the Project, consideration of these factors has resulted in a target amount of private finance in the region of \$[REDACTED]. The amount suggested by the Project team, PBC and EY is not risk driven

but as discussed below, it is driven by the market and the need to secure the risk transfer through the involvement of 3rd party lenders to the Project.

- Based on experience with the market through previous projects, 3rd party lenders are unlikely to be interested in investing amounts smaller than \$ [REDACTED] unless receiving a larger than market returns to ensure adequate return on their investment;
- The amount of private financing is considered to be manageable in current financial markets; and
- If the amount of private financing is less than \$ [REDACTED], large design build firms with equity investment branches may opt to finance the project from their balance sheet rather than take on the potential risk associated with 3rd party lenders, and thereby reducing the benefits of 3rd party lender oversight.

Consistent with typical construction financing, the Ministry will not require the private partner to provide an equity contribution towards the financing of the Project. It is possible that lenders to the Project may require an equity contribution from the primary contractor to provide a level of protection to the debt. However in this analysis we have not assumed that any equity will be required as has been the case in all Canadian DBF projects to date.

7.4 FINANCING ASSUMPTIONS

The estimated total cost of the Project, including planning, construction, set up and monitoring costs, and honorarium is in the order of \$ [REDACTED] for the DBF option and \$ [REDACTED] for the DB option (both nominal) which are broken down is as follows:

Total Project Cost	DB (\$M)	DBF (\$M)
Cost estimate project costs (DB)	[REDACTED]	[REDACTED]
Additional Lender Set up and due diligence		
Additional Lender Monitoring costs		
Additional Honorarium for DBF		
Total Project Period Costs		

In addition to the costing assumptions described above, the following financial assumptions below have been used to evaluate the incremental cost of private financing for both the DB and the DBF options.

¹ Value calculated as \$ [REDACTED] per year for 4 years.

² The capital estimate provided by MOTI includes \$ [REDACTED] in honorarium split between the two unsuccessful bidders.

Variable	Assumption – DB	Assumption – DBF
Financing Amount ³	\$██████ (Public)	\$██████ (Private)
Debt to Equity Ratio	100% grant financed	100% debt financed
Financing Term	N/A	4 years construction period
Terms of Senior Debt	Base Rate	0.5-3.6 ⁵ %
	+Credit Margin	0.1%
	Total Borrowing Rate	0.6-3.7%
Terms of Senior Debt	Base Rate	1.2% ⁶
	+Credit Margin	1.0%
	Total Borrowing Rate	2.2%
Arrangement Fees	N/A	1.25%
Interest on GIC	N/A	25% of all-in rate (0.55%)
Due diligence and set up fees	N/A	\$1.8 million
Annual monitoring fees during construction	N/A	\$0.3 million

7.5 VALUE FOR MONEY ASSESSMENT

Based on the assumptions above the estimated costs of the two options can be summarised as:

Total Project Cost	DB - \$M	DBF - \$M
Cost estimate project costs		
Due diligence and lender monitoring costs		
Finance set up costs		
Interest during construction		
Additional Honorarium for DBF		
Total Project Period Costs		
Incremental cost of DBF		

The estimated additional costs of including finance into the Project procurement model is approximately \$██████ and, as can be seen from the Risk Assessment Table in section 7.2 above, the incremental risk transfer benefit is approximately \$██████. Therefore the additional costs of pursuing the DBF outweigh the quantification of the risks intended to be transferred.

³ For the purpose of the analysis it is assumed that the \$██████ of finance accrues interest at the cost of borrowing for the Province.

⁴ The amount indicated is for comparative purposes and does not reflect the total amount of public financing.

⁵ Short term rates and credit spread for the Province have been provided on a fiscal year basis by Provincial Treasury

⁶ The current 2 & 3 year GoC rates are approximately 0.6%. An additional 0.6% has been added as a buffer. A large buffer has been included as the actual rate will not be determined until financial close following procurement and the forecast rates from Provincial Treasury are higher than the current market rates.

⁷ IDCs under DB model calculated for the purposes this comparative analysis and not for budgeting purposes.

8 INTEGRATED RECOMENDATION

Given the analysis described above, the results of this assessment indicate that a DB model would be an appropriate procurement method to deliver the Project.

The Ministry should carefully consider the following factors moving forward:

- Retain the current Project team and supplement as needed with members and firms with demonstrated experience in delivering DB projects and developing the statement of requirements;
- Explore the availability and potential financial impacts of an extended warranty or security provision;
- Regarding the existing Concession:
 - Ensure that the existing Concessionaire or their subcontractors do not become restricted parties through involvement in the Project, by clearly defining their role in the procurement and implementation process;
 - Once the Project has been announced and there is a funding commitment, the Ministry should submit a Province Change Notice and an Additional Works Notice to TransPark, under the provisions of the Phase 2 Concession Agreement;
 - Due to the expected minimum rehabilitation works over the remaining six years of the Concession, the Ministry should retain the rehabilitation risk for the Phase 4 works; and
 - Incorporate lessons learned from Phase 3 East negotiations.



Ministry of Transportation and Infrastructure
Kicking Horse Canyon Improvement Project
Phase 4

Multiple Criteria Analysis

Report

November 27, 2014

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1 QUALITATIVE ANALYSIS OF PROCUREMENT OPTIONS

1.1 PROCUREMENT MULTIPLE CRITERIA ANALYSIS ASSESSMENT

The analytical framework for considering the relative merits of the procurement options is based upon a Multiple Criteria Analysis (MCA) approach. MCA is an evaluation method that brings together a range of qualitative criteria into a single framework for easier assimilation by decision-makers.

1.2 MCA ASSESSMENT FRAMEWORK

The assessment framework of the qualitative criteria requires judgments to be made on the magnitude of the relative benefits, or impacts, of each option for a particular criterion. In order to discuss criteria and judge their values on a consistent basis, the assessment framework shown in Table 1 has been used to assess how well each option achieves the stated objective.

Table 1: MCA Assessment Framework

√	√√	√√√	√√√√
Model fails to meet basic requirements of the Program and the Ministry.	Minimally meets requirements of the program and the Ministry.	Adequately meets the requirements of the program and the Ministry.	Provides a highly efficient and effective delivery solution for the Ministry or the program.

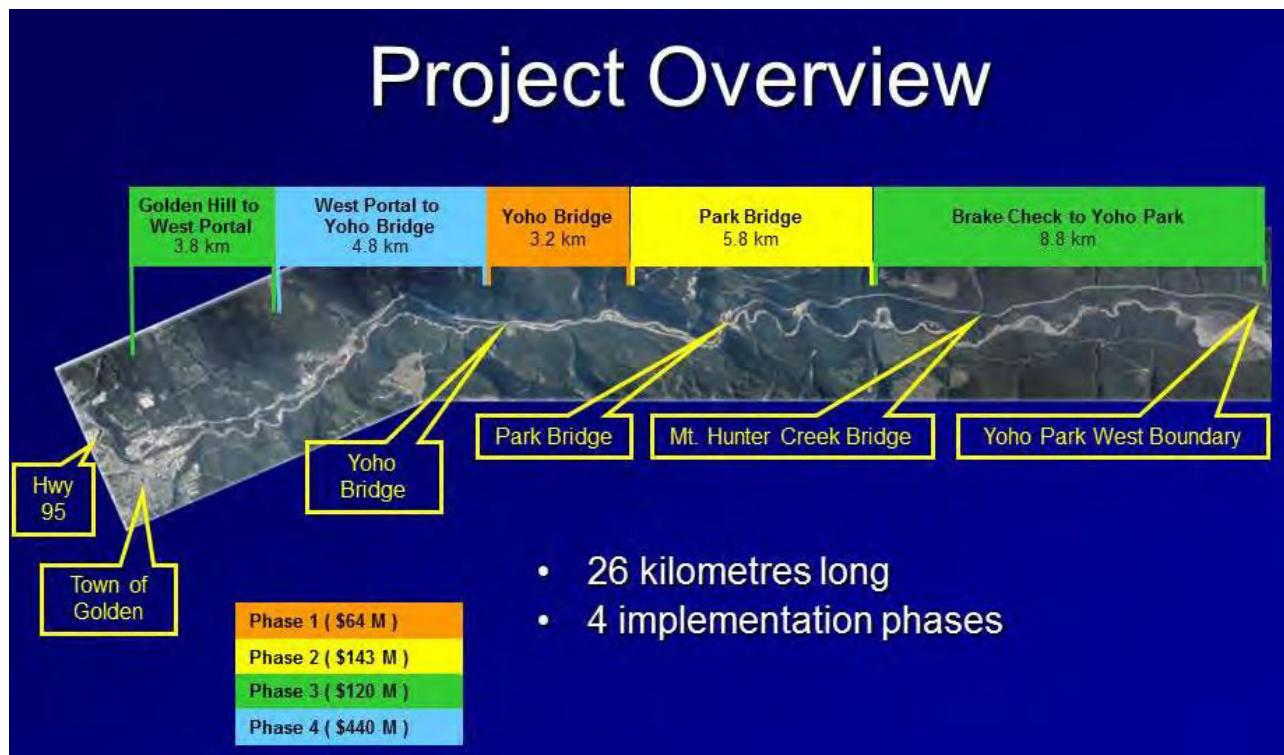
1.3 PROJECT DESCRIPTION

Highway 1, the Trans-Canada Highway, is the most important highway in Canada's Core National Highway System. It links all of the ten provinces, it facilitates east-west trade and commerce, and it is the backbone for most north-south provincial highways. British Columbia's long-term strategy is to four lane Highway 1 between Kamloops and Yoho National Park. Nowhere is this more challenging than in the Kicking Horse Canyon located east of the Highway 95 junction at Golden and west of Yoho National Park near the Alberta border. Here the highway was, and parts of it remain, a narrow, winding two-lane highway with steep rock faces on one side, and a drop-off to the CP Rail main line and the Kicking Horse River on the other. Posing significant construction, maintenance and operational challenges, it had no major upgrading since it was built in the 1950s until improvements started in 2000 with the work on the Yoho Bridge and approaches. These improvements have been funded through partnership funding agreements between the Provincial and Federal governments to revitalize this critical corridor and to move traffic more safely and efficiently. Average daily traffic is well over 5,000 vehicles per day with commercial carriers making up nearly 25% of this traffic. It is also the favoured route for tourists with traffic averaging over 10,000 vehicles per day during the peak summer period.

The engineering and construction challenges are immense. The area is subject to many rockslides, debris torrents and avalanches. Improvements to Highway 1 in the Kicking Horse Canyon are providing a

safer and more efficient journey for all travelers, and a competitive corridor for the movement of goods to and from the Pacific Gateway ports in Metro Vancouver. The highway is being improved to a modern four-lane standard with a design speed of 100 km/hour to move traffic more safely and efficiently. Sharp curves and steep grades are being reduced, and narrow bridges are being replaced to increase capacity, improve traffic operations and reduce hazards. Improvements will result in reduced vehicle emissions, fuel consumption and enhanced bicycle use, and will thereby have a positive effect on the environment.

The total cost of the project is estimated at \$767 million, a significant investment that reflects both the enormity of the task and the importance of the corridor. As such, Kicking Horse Canyon route improvements are being carried out in four major phases (see Figure 1). The first three phases of the project, cost-shared by the Government of British Columbia and the Government of Canada, have four lanes open to traffic bringing the total length of four lane improvements to 21 kilometres out of the 26-kilometres Kicking Horse Canyon Project total. The Phase 4 Canyon section will complete the four laning of this massive undertaking. It is in the preliminary design phase and will tackle the difficult canyon section. Completing the improvements in the Canyon section will not only improve the safety, reliability and operational challenges of the Canyon section itself but completing this link in the Kicking Horse Canyon section will result in the full benefits of the previous work completed in the Kicking Horse Canyon being realized throughout the Trans-Canada Highway System.



Phase 4 extends from the east limits of the Phase 3 Golden Hill to West Portal Project to the Yoho Bridge, upgrading 5 kilometres through the most challenging section of the canyon. Alternative alignment studies, preliminary design, archeological, environmental and geotechnical studies have been completed.

Four lane widening, alignment improvements and mitigation of rock fall hazards and avalanches can be achieved using a combination of bridges, wide ditches, catchment benches, retaining walls, high energy rock fall attenuation mesh and other measures.

The first three phases of the project have involved significant contributions from the Government of Canada:

- Phase 1, replacement of the 5-Mile (Yoho) Bridge, was supported by the Strategic Highway Infrastructure Program using conventional project delivery.
- Phase 2, replacement of the 10-Mile (Park) Bridge, was supported by the Canada Strategic Highway Infrastructure Fund using a Public-Private Partnership delivery.
- Phase 3 West, Golden Hill to West Portal and Phase 3 East, Brake Check to Yoho Park, was supported by the Building Canada Fund using Design-Build (DB), conventional and Day Labour project delivery.

Phase 2 was delivered as a Public-Private-Partnership (P3) with a concession agreement in place to have the Concessionaire operate, maintain and rehabilitate the entire 26 kilometre Kicking Horse Canyon corridor, including the existing Phase 4 Canyon limits, until the year 2030. This concession agreement was executed on October 28, 2005

The final decision of whether the project will be split up into work packages or delivered as one large project will affect the decision on the project delivery model.

Many procurement alternatives are available for Phase 4 Canyon, but the project cost estimate could be sensitive to which method is selected. The current estimate of \$440 million is based on conventional delivery.

Based on delivery as a single project, procurement of the project would commence in fiscal year 2015/16 and the project would be complete in fiscal year 2019/20.

1.4 PROCUREMENT OPTIONS

When considering procurement options, the existing concession agreement needs to be taken into consideration. Regardless of the option (DBB, DB, DBFOM), unless the existing Concession is terminated, the existing Concessionaire (TransPark), and more specifically the existing Operation and Maintenance (O&M) Services Provider, will have a stakeholder role in the input of the procurement and implementation process. Furthermore, the Ministry will have to complete negotiations to some level of mutual agreement as to the impacts of the additional infrastructure will have on the Operation Maintenance and Rehabilitation (OM&R) scope. This could result in a significant addition or a subtraction to the current scope of the Concession Agreement.

TransPark may need to be consulted with in the development of the procurement documents, the design review process and as part of the quality assurance during construction. The contractor (builder or design-builder as the case may be) will also be required to treat TransPark as a stakeholder and a

member of the user group. The Ministry will be required to manage this relationship to ensure all parties remain satisfied.

Prior to start of the Phase 3 works, the Ministry undertook a study to determine the financial impact of terminating the concession. At that time, terminating the concession was deemed to be not cost effective and Phase 3 was procured as 2 separate projects through Design Build, Design-Bid-Build agreements and day labour work, with the resulting new infrastructure assets' OM&R requirements negotiated with the Concessionaire as change orders to their agreement. In the intervening period of time, there were some internal corporate structure changes to the Concessioner's parent company, and as a result the negotiations for the additional scope of work have been challenging and lengthy.

Similarly as part of the Procurement Options Analysis for Phase 4, the Ministry has again undertaken the evaluation of the financial impacts for terminating the existing Concession with TransPark. Therefore as part of this MCA, it was decided to consider all options under 2 scenarios.

- Scenario 1, development of Phase 4 while retaining the existing concession; and
- Scenario 2, terminating the existing concession at the start or the completion of the Phase 4 construction.

1.4.1 Scenario 2 Consideration

During the Phase 3 planning the termination of the existing concession was reviewed under a P3 procurement option, and it was determined not to be financially cost effective. Although the concessionaire's O&M provider's operation of the highway has been smooth, there are several reasons that termination needs to be assessed when considering the procurement of Phase 4. The following is a brief list of discussion points considered during the procurement options assessment.

- Ongoing cost of negotiating each additional phase. The Ministry is still in negotiations with TransPark for the Phase 3 East works. They will additionally need to negotiate the Phase 3 West and then the Phase 4 works. To date the ministry has spent approximately three years and \$█ on the negotiations of the Phase 3 East works which is nearing finalization.
- Delay in the start of procurement/construction due to negotiations with the Concessionaire.
- Potential risks of the Service Provider's involvement during the procurement and implementation process. These could result in delays, scope increases, and the added cost to the Owner's project team to manage this complex relationship.
- There is █ and the benefits of having an engaged O&M provider as part of the Owner's team and / or the Design-Builder's team is not there.
- The capital value of Phase 4 more than doubles the original capital value of the existing concession capital improvements.

The Project team engaged Ernst & Young (E&Y) to review the Phase 2 concession agreement, financial models and market conditions to determine a value range for the termination fee. See Appendix A for the memo from E&Y detailing their calculation of the fee range. The following table summarises the results of the termination fee assessment and the effects on the Province's debt.

Assumed Termination Date	Termination Fee Range (\$ millions)	Current Province P3 Liability for Phase 2 (\$ millions)	Increase in Provincial Debt (\$ millions)

In order for the termination of the existing concession agreement to be cost neutral there would need to be a demonstrated saving of at least \$ [REDACTED] net present value under a 30 year P3 solution. This means the financial model comparison between the preferred procurement model under Scenario 2 (e.g. Design-Build-Finance-Operate) versus the procurement model under Scenario 1 (e.g. DB or DBF) would need to result in value for money (VFM) greater than [REDACTED]% in order to be considered financially viable.

There have been several transportation projects procured in BC under the P3 model that have achieved a greater than 10% VFM, when compared to a traditional non P3 Design-Bid-Build model. The major contributors to these high VFM values have been the risk profile where the majority of the design and construction risks are transferred to the private partner, and the synergy/efficiency of the designers and the constructors working together to develop innovative design solutions.

As indicated in section 1.7 of this report, the likely procurement options for Phase 4 under Scenario 1 would be either a Design-Build or Design-Build-Finance model. A Design-Bid-Build option will not merit further consideration beyond this report. High VFM values seen on past projects have reflected the benefit of combining design and construction. In a comparison of DB and DBF models the VFM is expected to be significantly lower than a Design-Bid-Build model, and is unlikely to achieve the required savings to make the termination of the existing concession financially feasible.

Based on the added capital cost to Scenario 2 for termination and TransParks acceptable performance of the O&M services to date, further analysis of Scenario 2 is not recommended.

1.5 PROCURMENT OPTIONS

The procurement options considered are listed in the table below. All the procurement options evaluated in this report utilize Scenario 1, retaining the existing concession.

Option	Description
Design-Bid-Build (Option A)	<ul style="list-style-type: none"> At \$ [REDACTED] construction cost, this would be the largest project to be tendered out under this procurement method in the Province's recent history. Project construction start date would be later; because the procurement wouldn't start until a detailed design and tender documents were completed. Project could be procured as a single contract or multiple contracts. The added scope for maintenance would need to be negotiated with the maintenance contractor through the Concessionaire.
Design-Build (Option B)	<ul style="list-style-type: none"> At \$ [REDACTED] engineering and construction costs, this would be one of the largest projects to be procured under this procurement method in the Province. Project could go to market considerably sooner since little or no additional design is needed in this procurement method. Increased opportunity for innovation because design is carried out with contractor input. Reduced MOTI input and control over detail design and ability to address issues, especially OM&R. Depending on the Scenario, the added scope for maintenance would need to be negotiated with the maintenance contractor through the Concessionaire.
Design-Build Finance (Option C)	<ul style="list-style-type: none"> Short term financing with balance payment at Final Completion. The agreement would be structured with sufficient private finance at risk to ensure the private partners have incentives to deliver the project on time or better. Slightly longer procurement schedule than design-build because of the financing aspect. Lender oversight. See discussion under Design-Build option which is applicable to this option.

Option	Description
Concessionaire Delivered	<ul style="list-style-type: none"> • The existing Concessionaire (TransPark) would act as owner's procurement agent and construction manager. • Tendered out under a DBB (single or multiple) or DB procurement model. • Similarly to the preceding Options MOTI would need to negotiate the added maintenance scope with TransPark. • See discussion under Design-Bid-Build and Design-Build options which is applicable to this option.
Design-Build-Finance-Rehabilitate (5km) (Option D)	<ul style="list-style-type: none"> • Remove the rehabilitation scope for these 5km of existing highway from TransPark concession. • Would have an independent P3 bookended by an existing P3. • MOTI would need to negotiate: <ul style="list-style-type: none"> ○ a credit from TransPark for life cycle costs; and ○ the handover conditions. • DBFR provider would be responsible to coordinate with the O&M provider's activities in the Phase 4 concession area. <ul style="list-style-type: none"> ○ The Province would own the interface risk between the two entities • Transfer as much rehabilitation/lifecycle risk, as the marketplace accepts, to the new concession. • Rehabilitation items would include items with a design life less than the proposed concession period, such as pavement, pavement markings, signage, drainage works, etc. <ul style="list-style-type: none"> ○ These items represent a small portion of the overall lifecycle/rehabilitation costs of the asset. • There are grounds to consider a short 10 year DBFR. (See Section 1.5.2) <ul style="list-style-type: none"> ○ Existing concession agreement is complete in 2030, approximately 10 years after the expected completion of Phase 4.

Option	Description
Design-Build-Finance-Operate (5km) (Option E)	<ul style="list-style-type: none"> • Would have independent P3 bookended by existing P3. • New 5km long independent DBFO within the existing TransPark 26km concession. • Would require removal of 5km of existing highway from TransPark concession. <ul style="list-style-type: none"> ○ This would be a significant modification to TransPark concession; ○ MOTI would need to negotiate a credit from TransPark; ○ The handover conditions would need to be determined preferably prior to completion of Phase 4 construction. • Difficult if not impossible to get competitive bids for operations and maintenance. <ul style="list-style-type: none"> ○ The section is remote with little available resources to constitute an O&M contractor. • Improved ability for innovation, with input from the O&M service provider. • There are grounds to consider a short 10 years concession. (See Section 1.5.2) <ul style="list-style-type: none"> ○ Existing concession agreement is complete in 2030, 10 years after the expected completion of Phase 4.

1.5.1 Concession Delivered

The existing concession agreement includes clauses enabling MOTI to procure further highway improvement projects through the Concessionaire. With this procurement model, MOTI would retain the majority of the risk, develop all the procurement documents and the Concessionaire would act as procurement agency and construction manager in a time and material type of arrangement.

In the event that the existing Concessionaire is not the delivery agent for the P4 works, the Province's ability to rely upon:

- the Concessionaire's indemnity in favour of the Province in the CA; and
- certain liability exclusions in the Transportation Investment Act,

may be prejudiced in certain circumstances.

Based on the following discussion points, this procurement option is not recommended for further evaluation.

- The estimated construction cost of Phase 4 is greater than the capital cost of the existing concession agreement capital improvements.
- [REDACTED]
- [REDACTED]
- [REDACTED]
Negotiations for Concessionaire delivery would be much more complex and would most likely result in significant schedule challenge.
- Likely very high management costs to deliver, with little to no benefit to MOTI.
 - Due to the size and complexity of the Project, MOTI would still need a similar size oversight team to ensure project implementation.
- Provincial competitive procurement requirements may not be met utilizing a concessionaire delivered approach.

1.5.2 Alternate Procurement Term (P3)

Assuming the expected completion of Phase 4 construction is 2020, there will only be 10 years remaining in the existing Kicking Horse Concession Agreement. Therefore, should any procurement options with an extended warranty or rehabilitation period be considered for Phase 4, a term of up to 10 years should be considered. This would result in the Phase 4 P3 procurement options ending at the same time as the Phase 2 agreement, thereby transferring the entire 26km corridor back to MOTI operations at the same time.

1.6 QUALITATIVE CRITERIA

Under the current project scope, the qualitative criteria can be described as shown in the following table.

	Qualitative Criteria	Objectives and Goals
1	Market Interest and Capacity	<ul style="list-style-type: none"> Ability of Project to attract enough competition to ensure the best possible outcome to the overall project objectives. Ensure attractive and marketable transaction. Ensure a fair and transparent procurement process.
2	Cost & Schedule Certainty are Maximized	<ul style="list-style-type: none"> Timely and efficient project delivery. Transfer the risk associated with delays in the schedule. Achieve Value for Money.
3	Integration with Existing Concession	<ul style="list-style-type: none"> Ensure seamless delivery of systems maintenance throughout the operating period.
4	Asset Performance throughout Life Cycle	<ul style="list-style-type: none"> Improve reliability, safety and accessibility for all corridor users. Ensure effective asset performance. Minimize traffic impacts during construction and operations. Operational effectiveness.
5	Capital Cost and Operating Cost Optimization	<ul style="list-style-type: none"> Ability to address the construction and long-term performance goals at the best value for the province.
6	Schedule Optimization	<ul style="list-style-type: none"> Deliver the benefits of the project to the stakeholders and users the quickest.
7	Responsive to Stakeholder Issues	<ul style="list-style-type: none"> Ensure Public and Stakeholder Input; Meet Environmental Obligations. Minimize or have no Utilities disruptions and ensure maintenance of an effective utility corridor.
8	Allocation and Management of Risk	<ul style="list-style-type: none"> Allocate risk to the party that is best able to manage the risk and find the optimal risk balance for the project.

1.7 PROCUREMENT OPTIONS MCA RESULTS

The MCA results indicate that a further quantitative analysis should be carried out on Scenario 1 Options B and C and D. Please see section 1.7.1 and 1.7.2 for discussion on options A & E respectively.

The results of the MCA analysis for the five procurement options are summarized in Table 2.

Table 2: Summary of Procurement Options MCA Results

Scenario 1 Criteria	Option A - DBB	Option B - DB	Option C - DBF	Option D - DBFR	Option E - DBFO
1) Market Interest and Capacity	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓	✓
2) Cost & Schedule Certainty are Maximized	✓	✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓
3) Integration with Existing Concession	✓✓✓	✓✓	✓✓	✓	✓
4) Asset Performance throughout Life Cycle	✓✓	✓	✓	✓✓✓	✓✓✓
5) Capital Cost and Operating Cost Optimization	✓✓	✓✓	✓✓	✓✓✓	✓✓✓
6) Schedule Optimization	✓	✓✓✓✓	✓✓✓	✓	✓
7) Responsive to Stakeholder Issues	✓✓✓✓	✓✓✓	✓✓✓	✓	✓
8a) Allocation and Management of Risk (Construction)	✓	✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓
8b) Allocation and Management of Risk (Operations)	✓✓✓	✓✓✓	✓✓✓	✓✓✓✓	✓✓✓

1.7.1 Option A – DBB

Option A and B are both classified as conventional procurement methods under the New Build Canada Fund. Option A, design-bid-build, scores high in market interest and stakeholder responsiveness, but the low marks in cost and schedule certainty and risk management make it a less desirable option in comparison with Option B, design-build. Therefore Option B was chosen over Option A as the conventional, non-PPP option in the next step of the procurement option analysis, which entails a quantitative comparative assessment of a short list of at least one PPP and one non-PPP procurement method.

1.7.2 Option E – DBFO

Although Option E, a 5km DBFO within the existing concession, did receive a high marks, the challenge of attracting multiple O&M service providers for a short isolated stretch of highway, seems unlikely. Lack of land for a dedicated maintenance yard, distance from the nearest residential area and experience from the Phase 2 procurement process are the main reasons why competitions for service providers is seen as

unlikely. Competition in the area is also limited because the MOTI regional maintenance contractor and TransPark's service provider are the same company, which means that a competing firm would not be as competitive to provide O&M services in this geographic area.

MOTI has the option to make the existing O&M provider a common resource for the Phase 4 procurement; however due to the short length of the project any value added to the design by their involvement could be achieved as a stakeholder or as part of a user consultation process. However due to the lack of direct service provider involvement, there could be missed opportunities for innovation in the design and construction and operations phases. The lack of a competitive market for O&M service providers may not result in the lowest overall whole life costs for the project.

For these reasons Option E was not considered a viable candidate for further assessment.

1.7.3 Option D – DBFR

The greatest benefit of this Option is the ability to transfer rehabilitation risk to the private partner. By transferring the rehabilitation risk without the O&M scope, this Option becomes more of an extended warranty. The largest remaining risk to the Province in this Option is that O&M works or lack thereof, could impact the rehabilitation requirements. Although some of this risk can be transferred by making the private partner responsible to coordinate the O&M provider and ensure the proper maintenance of the asset, the Province will still be ultimately responsible for the interface between the two agreements and resolving any disputes.

When taking into account the proposed short 10 year concession period, by adjusting the performance specifications the design life of the majority of the project elements can be greater than 10 years. However the adjustments to the specification would result in some increase to the capital cost, which would be offset in whole or in part by some O&M savings and elimination of P3 specific financing and management costs over the 10 year agreement.

Only being able to transfer rehabilitation risk over 10 years, the Province retaining the interface risk between the O&M provider and the DBFR entity, and being able to limit the rehabilitation scope through the PA requirement, makes Option D less attractive than Options B & C, Therefore further analysis of the DBFR option is not recommended.

1.8 QUALITATIVE ANALYSIS: SCENARIO 1 – WITHIN EXISTING CONCESSION

MCA with 4 options with and 5 options without termination

Criteria	Option A – DBB	Option B - DB	Option C - DBF	Option D – DBFR (5km)	Option E - DBFO (5km)
<p>Market Interest and Capacity</p> <p>(market sounding to be carried out later in the assessment process)</p>	<p>✓✓✓✓</p> <p>Due to the capital size of the project (>\$[REDACTED]) it is likely that large national and international firms will be the only contractors with the financial and managerial capacity to provide the needed security for the project (Bond, Insurance, Letter of Credit)</p> <p>Under this option market interest in the O&M services is not being considered as the O&M services will be provided by the existing Concessionaire.</p>	<p>✓✓✓✓</p> <p>Similar to Option A however this option provides large contracting firms with large amounts of scope and room for creativity and hence profit incentives with no financing risk.</p> <p>Under this option market interest in the O&M services is not being considered as the O&M services will be provided by the existing Concessionaire.</p>	<p>✓✓✓✓</p> <p>Same as Option B, the interested players are the same and the financing will not affect the interested parties.</p> <p>Under this option market interest in the O&M services is not being considered as the O&M services will be provided by the existing Concessionaire.</p>	<p>✓✓</p> <p>Similar to Option E.</p> <p>The rehabilitation scope will be determined based on consultation with technical advisors and market consultations prior to the completion of the procurements options analysis.</p> <p>In this Option the O&M services will be provided by TransPark's O&M provider, rather than the private partner.</p> <p>There is a level of risk for the private partner to accept the Rehabilitation scope without control of the O&M services.</p>	<p>✓</p> <p>Same as Option B, the interested parties for the design and construction phase will be the same; there contractual relationship would be with the equity provider rather than directly with MOTI.</p> <p>With a private financing requirement of >\$[REDACTED], and a 30 years investment term is likely the most desirable options for private sector partners who are able to manage complex works and provide large amounts of financing.</p> <p>Due to the short section of the corridor and the isolated area (maintenance yards, residential developments), it is unlikely that there would be enough competition to the existing O&M provided to achieve value for money in the O&M service payments. Therefore it is assumed the same O&M provider would be made available to be carried by all bidders.</p>
<p>Cost & Schedule Certainty are Maximized</p>	<p>✓</p> <p>Under a DBB, MOTI negotiates a unit price contract with some stipulated sum items; however, in a DBB, the least amount of risk is transferred. As MOTI retains all the design risk the quantities and the stipulated sum items are more susceptible to change and claims.</p> <p>The schedule is based upon a series of complex, consecutive tasks, and there is little opportunity to shorten the schedule by implementing these tasks (i.e., design, tendering, and construction) in parallel. Delivery of the final project will be 6 to 12 months later than all other options.</p> <p>MOTI retains a significant portion of schedule risk associated with the design phase; MOTI is able to transfer a moderate level of construction schedule risk to the construction contractor.</p>	<p>✓✓✓</p> <p>Under a DB, MOTI negotiates a fixed cost in a stipulated sum contract. In a DB, less schedule risk then options involving financing, is transferred and the fixed cost is more susceptible to change orders and claims.</p> <p>This process allows the design and the construction to occur in parallel.</p> <p>MOTI is able to transfer a moderate level of schedule risk, primarily the risk associated with the design phase, to the design-builder.</p> <p>Since the design-builder is paid in full for all works completed and accepted by MOTI to date, there is less incentive to meet or beat the contract schedule.</p>	<p>✓✓✓✓</p> <p>Under a DBF, MOTI negotiates the terms of the contract which would include provisions for the transfer of risks associated with schedule and cost certainty.</p> <p>MOTI is able to transfer a significant portion of schedule risk to the private partner following execution of the contract. Typically a large substantial completion payment provides the private partner with a significant incentive to complete the project on schedule in order to receive full payment.</p> <p>As schedule and cost associated risks are transferred to the private partner, there is a reduced likelihood of costly change orders and unnecessary delays over the design and construction period.</p>	<p>✓✓✓✓</p> <p>Same as Option E, however due to the fact that the regional maintenance contractor and TransPark's service provider are the same company, negotiations for the credit and scope increase in the respective agreements may add a greater level of complexity.</p> <p>As they are the same party in theory it should be simpler, however there is still no incentive for their cooperation or speedy completion of the transaction.</p>	<p>✓✓✓</p> <p>Same as Option C.</p> <p>MOTI is able to transfer a significant portion of schedule risk to the private partner following execution of the Concession Agreement. As service payments do not begin until completion is achieved, the private partner has significant incentive to complete the project on schedule in order to begin to receive a return on their investment.</p> <p>[REDACTED] The value of the credit and timeline will be impacted by the added complexity in negotiating the terms of the interface agreement between existing and new concessionaires.</p> <p>MOTI will need to negotiate with two separate parties, one for the credit and one as part of the new concession for the same scope.</p>

Criteria	Option A – DBB	Option B - DB	Option C - DBF	Option D – DBFR (5km)	Option E - DBFO (5km)
Integration with Existing Concession	<p>✓✓✓</p> <p>MOTI would need to negotiate the additional scope (OMR) into the existing concession agreement.</p> <p>MOTI has laid the foundation for such negotiations with Phase 3 East & West.</p> <p>████████████████████</p> <p>████████████████████</p> <p>████████████████████</p> <p>The existing Concessionaire and OM&R provider will need to be engaged during the design development and be involved during the construction process.</p> <p>As the design is finalized prior to procurement, the negotiations can be completed prior to procurement as well.</p>	<p>✓✓</p> <p>Similar to Option A, however due to the innovative nature of design-build, MOTI will not have a completed design until part way during construction of Phase 4. Any upfront negotiations with the existing Concessionaire and OM&R provider will need to be amended once the design is complete.</p>	<p>✓✓</p> <p>Same as Option B</p>	<p>✓</p> <p>MOTI would need to negotiate the removal of the rehabilitation scope from the 5km section of the existing 26km concession including the expected handover condition and any related credits, prior to the completion of construction for Phase 4 RFP.</p> <p>The risk of not having established a hand over criteria does open MOTI to potential change requests, however any delay in negotiations would cause subsequent delays in the start and completion of the construction and therefore increased in capital cost due to inflation.</p> <p>████████████████████</p> <p>████████████████████</p> <p>An alternate approach is to use as as-is-where-is approach to the DBFO procurement. The transferring of this risk will most likely have an impact to the projects finances.</p> <p>There is additional risk for MOTI in relation to the interface agreement between the two concessionaires as there will be more interaction between parties under this Option for O&M scope.</p>	<p>✓</p> <p>Similar to Option D, however MOTI would need to negotiate the complete removal of OM&R scope from the 5km section of the existing 26km concession including the expected handover condition and any related credits, prior to the completion of construction for Phase 4 RFP.</p> <p>There is additional risk taken on by MOTI under this Option for the interface agreement between the two concessions, as there will be some overlap in scope.</p>
Asset Performance throughout Life Cycle	<p>✓✓</p> <p>MOTI will hold long-term risk associated with the design, including structures (mesh, catchment walls) that were prescribed during the procurement process.</p> <p>Lifecycle cost, of the mesh and catchment walls, will be driven by the number and severity of events. Generally the major component parts (other than paving) have a design life of 75 to 100 years. As this time line exceeds the typical concession period, MOTI hold the life cycle risk of the mesh and catchment walls regardless of procurement method.</p> <p>Majority of the life cycle costs are associated with the pavement structure and that is transferred to the Concessionaire.</p> <p>████████████████████</p> <p>████████████████████</p> <p>████████████████████</p> <p>████████████████████</p>	<p>✓</p> <p>Similar to Option A, however there is some inherent risk with transferring design risk with little or no operations input beyond the performance specification development.</p>	<p>✓</p> <p>Same as Option B.</p>	<p>✓✓✓</p> <p>Similar to Option E, with the O&M being provided by the regional maintenance contractor rather than the private partner.</p> <p>Although in this Option MOTI retained some of the O&M risk that under Option D would be transferred to the private partner, the rehabilitation risk (signage, pavement, pavement marking, concentrate barriers, culverts, etc.) would still be transferred.</p>	<p>✓✓✓</p> <p>Under a DBFO, MOTI's project team solicits input from maintenance staff and includes this input in the development of performance specifications.</p> <p>The Concession Agreement will also include significant penalty provisions that enforce the facility's performance requirements over the full length of the contract period.</p> <p>In response to these requirements, the private partner adopts a more integrative design process and includes the contractor and facility maintenance partner in the design phase to ensure that the maintenance implications of early design decisions are fully analyzed and considered.</p> <p>The private partner also commits to a life cycle and facility maintenance plan and associated costs during the proposal call which are incorporated into the</p>

Criteria	Option A – DBB	Option B - DB	Option C - DBF	Option D – DBFR (5km)	Option E - DBFO (5km)
	██████████ ██████████				<p>Concession Agreement. The private partner accepts the long-term asset management risk.</p> <p>The private partner's commitment to adhere to the performance specifications, in addition to government approval for the stream of annual service payments, minimizes the overall risk of deferred maintenance and its impact upon the facility over the contract period.</p> <p>Based on experience on Phase s and also on the results of the future market sounding, it is contemplated that some structures may be excluded from rehabilitation requirements. The Market appetite will determine the rehabilitation scope.</p>
Capital Cost and Operating Cost Optimization	<p>✓✓</p> <p>In a project delivered by DBB, it is expected that MOTI will consider long-term operating costs versus upfront capital costs. MOTI's designer will try to design a facility with the right balance between capital costs and expected operating cost.</p> <p>MOTI would be accountable for the ongoing maintenance and life cycle consequences associated with its design decisions.</p> <p>A lack of integration between design and construction, and a lack of contractual performance requirements for the facility, make it more challenging to create an optimal balance between capital costs and long- term operating cost.</p>	<p>✓✓</p> <p>In a DB, the private partner commits to a design, and construction costs during the proposal call which are incorporated into the contract. The design-builder does not accept the long-term asset management risk.</p> <p>MOTI would be accountable for the ongoing maintenance and life cycle consequences associated with the design-builder's design decisions.</p> <p>There is no incentive for the private partner to consider the long-term operating costs versus capital costs.</p>	<p>✓✓</p> <p>Same as Option B.</p>	<p>✓✓✓</p> <p>Same as Option E, but with the exception of the O&M providers input into the design. Under this Option the O&M provider will be the existing concessionaire's O&M provider, however since the rehabilitation will be part of the project agreement, there will be opportunity for innovations and synergies in the design. However these benefits may be limited by the shorter (10year) concession period.</p>	<p>✓✓✓</p> <p>In a DBFO, the private partner commits to a design, construction, life cycle and facility maintenance plan and associated costs during the proposal call which are incorporated into the Concession Agreement. The private partner accepts the long-term asset management risk.</p> <p>The private partner's requirement to adhere to the performance specifications, in addition to government approval for the stream of annual service payments, minimizes the risk of deferred maintenance.</p> <p>The Concession Agreement includes significant penalties for poor (or non-) performance by the private partner so the private partner will carefully consider the long-term operating costs versus capital costs and put forward a proposal which seeks to optimize this balance. However these benefits may be limited by the shorter (10year) concession period.</p>
Schedule Optimization	<p>✓</p> <p>Due to the requirement for a more detailed design development, the Option could take 8-14 months longer to enter procurement.</p>	<p>✓✓✓✓</p> <p>Of the 5 Options under review DB would be quickest to market and quickest to completion.</p>	<p>✓✓✓</p> <p>Due to the addition of the financing aspect, the procurement duration for a DBF would be slightly longer then Option B.</p>	<p>✓</p> <p>Similar to Option C, ██████████ ██████████ ██████████ in comparison to Options B&C.</p>	<p>✓</p> <p>Same as Option D.</p>
Responsive to Stakeholder Issues	<p>✓✓✓✓</p>	<p>✓✓✓</p>	<p>✓✓✓</p>	<p>✓</p>	<p>✓</p> <p>Same as Option D</p>

Criteria	Option A – DBB	Option B - DB	Option C - DBF	Option D – DBFR (5km)	Option E - DBFO (5km)
<ul style="list-style-type: none"> CP Rail Truck Drivers Environmental Emergency Services Etc. 	<p>MOTI has greater flexibility to meet stakeholder issues with more direct influence during design, construction and operations.</p> <p>MOTI retains most of the operations and rehabilitation risk in this model and enters into shorter term contracts, which enables this additional level of flexibility.</p>	<p>MOTI has some flexibility to meet stakeholder issues with less direct influence during design and construction, but retains influence during operations.</p> <p>Appropriate incentive will be included in the design-build agreement to provide incentive with respect to addressing stakeholder issues in a timely manner.</p> <p>MOTI retains most of the operations and rehabilitation risk in this model and enters into shorter term contracts, which enables this additional level of flexibility.</p>	<p>Stakeholder consultations will be performed prior, during and after procurement.</p> <p>Appropriate incentive will be included in the contract to provide incentive with respect to addressing stakeholder issues in a timely manner.</p> <p>MOTI retains most of the operations and rehabilitation risk in this model and enters into shorter term contracts, which enables this additional level of flexibility.</p>	<p>Stakeholder consultations will be performed prior, during and after procurement.</p> <p>Appropriate incentive will be included in the new Concession Agreement to provide incentive with respect to addressing stakeholder issues in a timely manner.</p>	<p>There is additional risk to MOTI, during operations and with specific reference to emergency services, due to the interface agreement between the two concessionaires. There will have to be a clear assignment of responsibilities.</p>
Allocation and Management of Risk (Construction)	<p>✓</p> <p>Least construction risk transfer and performance incentives of the 5 models evaluated.</p>	<p>✓✓✓</p> <p>Less construction risk transfer and performance incentives than the P3 models up to and including project commissioning.</p> <p>Public sector to initiate and pursue actions against the security package provided by the contractor.</p>	<p>✓✓✓✓</p> <p>Improved risk transfer and performance incentives up to and including project commissioning.</p> <p>As the DB agreement is between the Lenders and the contractor, Lenders initiate and pursue actions against the security package provided by the contractor (as costs are privately financed)</p>	<p>✓✓✓✓</p> <p>Same as DBF with an added improvement in risk transfer in that the OM&R contractor is a member of consortium rather than a stakeholder. Any comments or design preference, and issues arising from construction oversight will be dealt with internally within consortium.</p>	<p>✓✓✓✓</p> <p>Same as Option D</p>
Allocation and Management of Risk (Operations)	<p>✓✓✓</p> <p>MOTI would retain some operations and most rehabilitation risks for this 5km portion of the roadway for the remainder of the existing concession timeline.</p> <p>MOTI would negotiate with TransPark for the additional scope to their existing OM&R contract. All costs associated with TransPark's involvement in the negotiations, design development, and in the procurement and implementation process will be borne by the Province.</p> <p>The Province could retain all rehabilitation risk for the remaining term of the concession (10 years) and only negotiate the O&M scope with TransPark. To Province could mitigate the rehabilitation risk through design and specification development as an increase in capital cost.</p>	<p>✓✓✓</p> <p>Same as DBB with the exception that TransPark's will be more heavily involved in the spec development and design review process rather than being directly involved in the design development.</p>	<p>✓✓✓</p> <p>Same as Option B</p>	<p>✓✓✓✓</p> <p>Similar to Option E, however with the O&M transferred to the existing regional maintenance contractor, it will be more likely that firms would be willing to take on rehabilitation scope. Rehabilitation and life cycle scope on a set schedule does not require a full time site based presence and can be undertaken by local construction outfits.</p> <p>Majority of the life cycle costs are associated with the pavement structure and that is transferred to the Private Partner.</p> <p>Lifecycle cost, of the mesh and catchment walls, will be driven by the number and severity of events. Generally the major construction components (other than paving) have a design life of 75 to 100 years. As this exceeds any contemplated contract period, the life cycle risk remains with MOTI under all scenarios for such items.</p>	<p>✓✓✓</p> <p>Same as DBF with a portion of the rehabilitation risk, such as pavement life cycle, bridges and MSE walls being transferred to Project Co.(new concessionaire for 5 km section)</p> <p>Similarly to Item 1 of the MCA "Market Interest", it may become a challenge to find enough interest from OM&R contractor for a short and geographically isolated portion of highway.</p>

1.9 RECOMMENDATION

After consideration of 2 scenarios and 5 procurements options, Options B & C were deemed as good candidates for further assessment.

However, due to the fact that Phase 4 is situated in the middle of the existing Concession, any improvements will have a direct impact on the existing Concession. Therefore careful consideration and upfront planning in developing a strategy for interfacing with the existing Concessionaire will be necessary to ensure successful implementation.

The next step in the Procurement Options Evaluation should be to carry out a market sounding, risk assessment and financial analysis for the following 2 options:

- Option B – Design Build; and
- Option C – Design Build Finance.

Future analysis for Options B & C needs to consider some adjustments to the typical procurement methodology to address the weakness to the methodology (low scoring items) identified in this report. Adjustment to the Project requirements could help address some of the retained risks such as life cycle and O&M risk.

Regardless of the Options, additional analysis will be required to define the optimum interface between the existing concession and the Phase 4 improvements.

APPENDIX A



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Draft Memorandum

To: Partnerships BC

16 September 2014

From: EY Orenda Corporate Finance

Kicking Horse Canyon Project termination payment estimate

Introduction

Partnerships BC ("PBC") requested Ernst & Young Orenda Corporate Finance ("EY") to consider the potential termination payment based on the contractual documents provided for the Kicking Horse Project ("Project") in the event that the Ministry of Transportation and Infrastructure ("MOTI") decides to terminate, without default, the current Project Agreement with the operating consortia, Trans-park Highway General Partnership ("Transpark" or "Consortium"). This draft memorandum is for discussion purposes only and is subject to further review and finalization.

EY was provided the following documents to consider the potential range of the termination payment:

- Project Concession Agreement dated October 28, 2005;
- Lender Agreements from the Financial Close;
- O&M Agreement dated October 28, 2005 and related changes to the agreement; and
- Latest financial model [REDACTED]

EY has reviewed the materials provided, identified components of the projected termination amounts and has indicated an expected range for each component based on certain assumptions outlined. For the purposes of the analysis, the following alternative Termination Dates have been assumed as requested by Partnerships BC:

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

Unless otherwise defined in this memorandum, capital terms and expressions used in this memorandum have the meaning given in the document provided.

Limitations

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Basis of Analysis

The analysis outlined within this memorandum is based on our review of the Project Concession Agreement, Section 42.5, which states “The Province may in its absolute and unfettered discretion and for any reason whatsoever terminate this Agreement at any time on 90 days’ notice to the Concessionaire. In the event of any termination pursuant to [such section], the Province will pay to the Concessionaire the amounts determined in accordance with Section 44.1”

Under Section 44.1 of the Project Concession Agreement, the Province is required to pay to Transpark, upon termination of the contract, the Province Default Termination Sum which is based on the following components:

1. the Base Senior Debt Termination Amount; (Item 1)

1A all amounts of the Third Party Junior Debt outstanding at the Termination Date (including accrued interest, but not capitalized interest or interest on overdue interest), but excluding any breakage or other costs payable as a result of a prepayment of the Third Party Junior Debt; (Item 2)

2. Employee Termination Payments (Item 3) and any Subcontractor Breakage Costs (Item 4); and

3. the amount, if any, which, when taking into account:

- a. *any refund of Taxes paid or payable to the Concessionaire or a Partner on or before the Termination Date or payable by the Concessionaire or a Partner after the Termination Date because of circumstances arising on or before the Termination Date; or*
- b. *any amount paid or distributed by the Concessionaire to a Partner on or before the Termination Date or payable or distributable after the Termination Date because of circumstances arising on or before the Termination Date including, for greater certainty only:*
 - i. *payments in specie; and*
 - ii. *Distributions or capital repayments to the Partners; and*
- c. *any Taxes paid by the Concessionaire or a Partner on or before the Termination Date or payable by the Concessionaire or a Partner after the Termination Date because of circumstances arising on or before the Termination Date;*

gives an IRR on the Partners’ Equity equal to the Financial Base Case Equity IRR, together with such reasonable costs as may be incurred by the Concessionaire, acting in a commercially reasonable manner, directly arising out of the termination of this Agreement by the Concessionaire pursuant to Section 41.2 [Termination Procedure].” (Item 5)

Each of the above components is considered further below:

Components of the Termination Payment

1 Base Senior Debt Termination Amount

As per Schedule 1 of the Concession Agreement, the Base Senior Debt Termination Amount is defined as the aggregate of:

1. *all amounts outstanding at the Termination Date (including interest and Default Interest accrued as at that date) from the Concessionaire to the Senior Funders under the Senior Funding Agreements including in respect of Permitted Borrowing; and*
2. *all amounts (including Hedge Termination Amounts and other breakage costs) payable by the Concessionaire to the Senior Funders as a result of a prepayment under the Senior Funding Agreements including in respect of Permitted Borrowing, subject to the Concessionaire and the Senior Funders mitigating all such costs to the extent reasonably possible,*

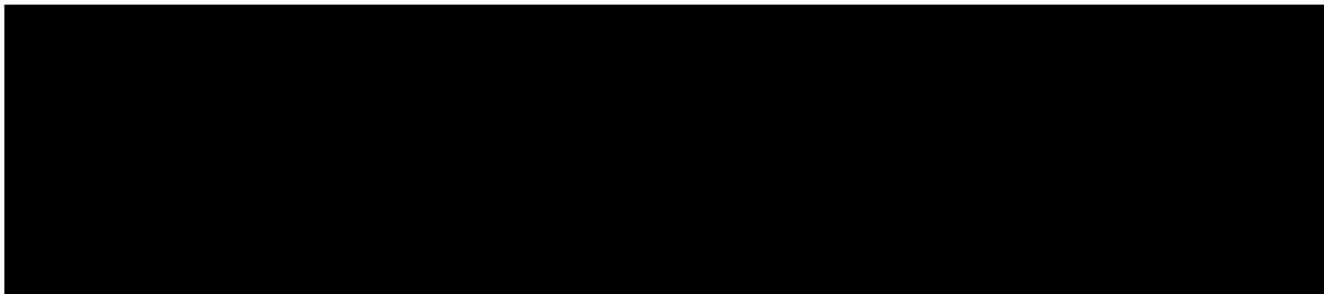
LESS, to the extent it is a positive amount, the aggregate of (without double-counting in relation to the calculation of the Base Senior Debt Termination Amount or the amounts below):

3. *all credit balances on any bank accounts held by or on behalf of the Concessionaire on the Termination Date;*
4. *any amounts claimable on or after the Termination Date in respect of Contingent Funding Liabilities;*
5. *all amounts, including Hedge Termination Amounts and other breakage costs, payable by the Senior Funders or others to the Concessionaire as a result of prepayment of amounts outstanding under the Senior Funding Agreements including in respect of Permitted Borrowing; and*
6. *all other amounts received by the Senior Funders on or after the Termination Date and before the date on which any compensation is payable by the Province to the Concessionaire as a result of enforcing any other rights they may have.*

1.1 Subsection 1 – all amounts outstanding at Termination Date

1.2 Subsection 2 – Hedge Termination Amount

As per Schedule 1 of the Project Concession Agreement, the Hedge Termination Amounts refers to amount payable under Senior Lender Agreements.



1.2.1 Reimbursement Costs

[Redacted]

[Redacted]

[Redacted]

1.2.2 Interest and Principal

- The principal due on the Bond is discussed in Item 1.1 above.

- [Redacted]

[Redacted]

1.2.3 Makewhole premium

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

Treasury of BC forecasts

The Treasury of BC provides the forecasts based on the analysis of the current market and trading activity, reflecting current market expectations for the GOC yields in the future years. The following rates were provided by the Treasury of BC.

Termination Date	Average Life remaining	Relevant GOC	GOC yield
[Redacted]	[Redacted]	10 yr GOC	246 bps
		10 yr GOC	246 bps
		7 yr GOC	301 bps
		Average on 5 and 7 yr GOCs	297 bps

In addition, a sensitivity analysis for 100bps for the bonds has been included to provide a range for the Makewhole premium calculation.

The table below summarizes the assumptions of the Makewhole premium calculation for all four Termination Dates.

The table below summarizes the results of the Makewhole premium calculation

Termination Date				
PV at Base Discount Rate				
PV at Base Discount Rate + 100 bps				
PV at Base Discount Rate - 100 bps				
Less Principal Repayment				
Makewhole Premium at Base Discount Rate				
Makewhole Premium at Base Discount Rate + 100bps				
Makewhole Premium at Base Discount Rate - 100 bps				

2 Third Party Junior Debt

[REDACTED]

3 Employee Termination payments

In the Project Concession Agreement, the Employee Termination payments are defined as “termination payments which are required under applicable Laws and Regulations to be made to employees of the Concessionaire reasonably and properly incurred by the Concessionaire arising as a direct result of termination of this Agreement”.

[REDACTED]

The Project Concession Agreement does not provide details on the specific amount associated with the employee termination payments.

[REDACTED]

[REDACTED]

4 Subcontractor Breakage Costs

[REDACTED]

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

4.1 Item 1 - Instalments of the Operator Fee

[REDACTED]

4.2 Item 2 – Demobilisation Costs

[REDACTED]

4.3 Item 3 - Compensating Operator Fees

[REDACTED]

5 Equity Compensation

The Project Concession Agreement provides that the termination payment includes a payment to equity partners in the Project Co such that post-tax IRR remains at the IRR level agreed at the Financial Close and amended for related Project scope changes. [REDACTED]

[REDACTED]

¹ As based on common industry practice as stated by Partnerships BC

Date	Amount Transpark is to receive after tax	Amount Transpark is to receive before tax

** See discussion on tax below*

Tax

Other notes

In accordance with the Project Concession Agreement, MOTI has to pay the Province Default Termination Sum within 60 days of providing notice of termination.

Summary

The following table summarizes the anticipated amounts (in \$ millions) and respective ranges to be included in the Province Default Termination Sum amount:

Ref #	Component				
1	Base Senior Debt Termination Amount				
1.1	Principal Outstanding				
1.2	Hedge Termination Amounts				
1.2.1	Reimbursement Costs				
1.2.2	Principal and Interest – incl in other amounts				
1.2.3	Makewhole premium*				
2	Third Party Junior Debt				
3	Employee Termination Payments*				
4	Subcontractor Breakage Costs				
4.1	Instalments of Operator Fees – incl in service payment before termination				
4.2	Demobilisation Costs				
4.3	Compensating Operator Fees				
5	Equity Compensation				
Total Termination Payment before tax effect					
	Tax of 26%²				
Total Termination Payment with tax effect					

*maximum amounts in the range included

MOTI Costs

As per discussion with Partnerships BC, [REDACTED] is budgeted for negotiations costs associated with termination for MOTI. This amount is estimated based on previous MOTI negotiations experience, and includes various expenses anticipated by MOTI, such as administration, legal, consulting and other fees.

The table below is updated to include MOTI costs in addition to anticipated termination payment.

Ref #	Component				
	Total Termination Payment				
	MOTI negotiations costs				
Total Amount to reserve for termination					

² Included on items 1.2 (Hedge Termination amounts); 3 (Employee Termination Payments); 4 (Subcontractor Breakage Costs); 5 (Equity Compensation)

APPENDIX B – REVIEWED RISKS

The following is an overview of the risks that were tabled for discussion during the risk workshop on July 11, 2016. The workshop aimed to quantify the incremental difference between DBF vs DB procurement.

Risk Category	Adjusted (Y/N)	Project Team Rationale
Industry Availability		
Schedule Delay – Cost Escalation		
Project Schedule		
Utility Relocation		
Bids Exceed Project Budget		
Materials Supplies and Cost		
Quantities		
Wall Foundations		

Risk Category	Adjusted (Y/N)	Project Team Rationale
Bridge Foundations		
Level of Quality Surveillance		
Unknown Ground Conditions		
Design and Spec Definition in CA		
Design Criteria Approval & Design Alignment		
Suitability of Rock Fall Protection Measures		
Additional Risks Tabled		
Ambiguities in Legal Agreements		
Delay in Contract Award / Financial Close		

APPENDIX C – RISK WORKSHOP PARTICIPANTS**Murray Tekano**

Murray Tekano is the Director for Major Projects with the Ministry of Transportation and Infrastructure. Over 35-years with the British Columbia Ministry of Transportation and Infrastructure, Murray has had many challenging assignments, including Project Manager, Communications Manager and Assistant Project Director for the Vancouver Island Highway Project. Since 2003, Murray has been the Project Director of the Kicking Horse Canyon Project, which has won many industry awards for innovation, financing, engineering and environmental achievement, delivering one of the province's first P3 highway concession projects. In addition he currently leads the Okanagan Lake Second Crossing Project, the Trans-Canada Highway (Kamloops to Alberta) Program, and the Okanagan Highway improvement program. Murray has been involved in several Alternate Delivery projects provincially and until recently was also the District Manager, Transportation for the Okanagan-Shuswap District.

Darcy Grykuliak

Darcy Grykuliak works for WSP Canada Inc. and has been the Senior Project Manager for the Kicking Horse Canyon Highway Project (Project) since 2011. From 1994 to 2011 Darcy was the Lead Engineer for the Project. As Lead Engineer Darcy was responsible for managing the Owner's Engineer team, a multi-disciplinary team of experts providing technical support, advice and project management support to the Owner, the British Columbia Ministry of Transportation. Darcy has over 25 years of experience in the civil engineering and construction industry and has undertaken design and project management duties on numerous projects for government agencies, municipalities, First nations and private industry. His strengths include managing large transportation projects and he has worked on all aspects of assignments from conceptual studies and procurement through to the construction and commissioning of completed facilities. Darcy has a wealth of experience delivering projects using various delivery methods including P3, Design-Build, Design-Bid-Build and Day Labour.

George Kyriakelis

George Kyriakelis is a Project Director at Partnerships BC, with a focus on the transportation and energy sectors. George joined Partnership BC in May 2013 and has been involved in the planning, procurement and implementations of several health, education, transportation, and energy projects, at various roles such as financial modeller, evaluation manager, procurement director and owner's compliance manager. George joined Partnerships BC from Peter Kiewit Infrastructures Group where he worked in various management capacities on some of the largest transportation projects in BC, including the Port Mann Highway 1 signature span, the Pitt River Bridge, and the Sea to Sky Highway Improvement Work Package 2 and the Sea to Sky Highway Improvement DBFO projects. George brings strong practical knowledge of planning, procurement and implementation of large heavy civil projects from both the owner's and contractor's side.

Tim Philpotts

Tim Philpotts is a Partner with EY and National head of the firm's project finance group. Tim is a Fellow of the Chartered Accounts of England and Wales and has been involved in infrastructure and P3 work for more than 20 years. Tim has advised on over 60 projects with total capital value of over \$30 billion that have reached financial close including many award winning projects in Canada, the US and in Europe. He has advised Partnerships BC, SaskBuilds and Infrastructure Ontario on many of their pathfinder transactions helping to develop the P3 model across Canada including projects such as; Sea-to-Sky Highway Improvement Project, 407 Phase 2, Regina Bypass, Kicking Horse Canyon, Golden Ears Bridge, Fredericton-Moncton Highway, Nova Scotia Highways.

Bruce McAllister

Bruce McAllister is a Director in KPMG's Global Infrastructure Group. He previously held senior positions with the BC government at Treasury Board Staff, Partnerships BC, and the Ministry of Transportation and Infrastructure where, for over a decade, he was concurrently the Director of P3 Operations and Procurement and a Project Director.

Bruce was a senior member of the joint BC MoTI and PBC team that concurrently planned, procured, and delivered BC's first 3 DBFO / P3 Concession Highways. Some of Bruce's non-P3 projects include; the Transportation Management Centre, the MV Columbia, and Kicking Horse Phase 3 West. Bruce performed Due Diligence for the \$1.4B Evergreen Line Rapid Transit Project procurement <http://www.evergreenline.gov.bc.ca>. Bruce was one of BC's two founding Board members of the West Coast Infrastructure Exchange (WCX) established by the Governors of California, Oregon, Washington, and the Premier of BC to serve as the senior forum for sharing innovative methods of public infrastructure finance and delivery <http://westcoastx.com/>

Bruce's recent engagements include being the independent reviewer for the commercial terms for the +\$3B Main Civil Works contract for the Site C dam project <https://www.sitecproject.com/>; advising on the \$1.4B Regina Bypass P3 Project http://www.highways.gov.sk.ca/Regina_bypass ; assisting a public sector owner resolve a +\$200M contract dispute; and providing advice to DND HQ L1 staff on a variety of topics.

Nathan Salomon

Nathan Salomon joined Partnerships BC in December 2008. He is a Project Director and has led the development of the business case and procurement on a number of large infrastructure PPP projects. Nathan brings expertise in project management, strategic assessment and financial and business analysis.

Nathan holds a Bachelor of Commerce degree from the University of British Columbia and earned his designation as a Chartered Financial Analyst (CFA) charter holder in 2010.