Kicking Horse River Access Feasibility Study

Feasibility Study Examining Proposed Options for Accessing the Lower Canyon of the Kicking Horse River for Whitewater Rafting

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Town of Golden

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Sign-off Sheet

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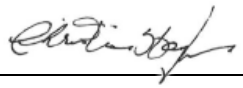
Prepared by 

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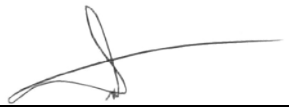
Reviewed by 

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Executive Summary

Commercial whitewater rafting on the KHR has been an ongoing activity for several decades and forms an important component of tourism revenues in the Golden, BC region. Rafting of the Lower Canyon on the Kicking Horse, a stretch separated from the Upper by an impassable section of whitewater, has been historically carried out by accessing the river at a location that requires crossing of CPR tracks. This use of CPR property for this purpose and in this manner is no longer permitted by the owners and so an alternative access solution is required.

This report aims to provide a preliminary analysis that explores options for a, cost-effective, long-term solution for access to the Lower Canyon.

After consultation with rafting industry stakeholders and CPR, a series of options was analyzed and discussed, with various criteria considered to determine a recommended option. These options include modifying the existing access route with safety-enhancing infrastructure; modifying the river bed to remove obstacles to safer rafting; and constructing an alternative highway egress point that avoids conflict with CPR tracks.

The preliminary feasibility of all options is analyzed to determine their relative value in terms of five factors: safety, economics, engineering, recreation, and tourism.

Limitations of the report include stakeholder engagement limited to the commercial rafting industry and CPR; and site survey limitations based on river flows and weather conditions.

The recommendation of this report is to further investigate the implementation of a modified stream channel between the Upper and Lower Canyon, with the aim of creating an unhindered stretch of whitewater for use by highly-skilled rafters and recreational kayakers.

The conclusions of this report and its related engineering modeling analyses are subject to further study. This includes further stakeholder engagement, detailed design, bathymetric survey, validated hydraulic modeling, and regulatory approval. Further environmental studies are also required to support regulatory approval.

Prior to, and concurrent with any further study, meaningful and comprehensive engagement with First Nations must be undertaken in accordance with all Provincial and Federal requirements.

Abbreviations

CPR	Canadian Pacific Rail
TCH	TransCanada Highway
KHCH	Kicking Horse Canyon Highway 1 Improvements
KHR	Kicking Horse River
MOTI	British Columbia Ministry of Transportation and Infrastructure

Glossary

Put-In	Access point to beginning of river trip
Take-out	Egress point at end of river trip
River-left	Left bank of river, looking downstream
River-right	Right bank of river, looking downstream
Historic put-in	Site features and procedures used by commercial rafting and private recreational kayakers up until 2016

1.0 INTRODUCTION

Stantec Consulting Ltd (Stantec) was retained by the Town of Golden (Golden) to complete a feasibility study (the study) for access options to the Lower Canyon of the Kicking Horse River (KHR). The study was initiated by Golden in response to safety concerns regarding the current access to the KHR.

This report aims to provide a preliminary analysis that explores options for a cost-effective, long-term solution for access to the Lower Canyon.

GOLDEN'S COMMERCIAL RAFTING INDUSTRY

Whitewater rafting on the KHR is a major tourism and economic driver in the Golden, BC area, attracting an estimated 40,000 visitors annually, 15,000 of whom specifically raft the Lower Canyon.[i]

The Kicking Horse River, for the purposes of whitewater recreation, is divided into three main sections: the Upper, the Middle, and the Lower Canyon. See Figure 1 - Kicking Horse River.

Figure 1 - Kicking Horse River

- The "Upper" has a flow ranging from Class I (lazy-flow) to Class III+, which typically begins at the Beaverfoot Road Bridge over the KHR, just outside of the western boundary of Yoho National Park.
- The "Middle" is a Class III/IV section that ends at the Rafters' Pull-Out.

- The "Lower Canyon" is a Class IV run that is typically only run as a high-adventure trip by rafting companies, and experienced recreational kayakers. The historic put-in has been via the maintenance road. Access to the river from the road requires crossing the CP tracks at an uncontrolled level crossing, the location known as "Mile 30."

Figure 2 - Existing Rafting Access shows the location of the Lower Canyon access relative to the Yoho Bridge along TransCanada Highway 1 (TCH).

Between the Middle and Lower canyons is a section of Class IV-V whitewater that is only run by very experienced kayakers, at certain flows. The crux of this section is a rapid called "Bridge Drop," located approximately under the Yoho Bridge.

A typical rafting trip includes the Upper and Middle Canyon sections of the Kicking Horse, with the addition of a Lower Canyon run, which is more advanced whitewater. All trips take out at the Rafters' Take-out, with Lower Canyon clients transported by bus to the existing highway egress point (Figure 2) while rafts and equipment are transported with truck and trailer. The clients exit at the highway and walk down to the river, whereupon the trip proceeds downstream to Golden. This access point and road are used by CPR as a Hi-Rail access point, as well as by BC Hydro. Clients and equipment are picked up in town and transported back to the rafting basecamp near Beaverfoot Flats.

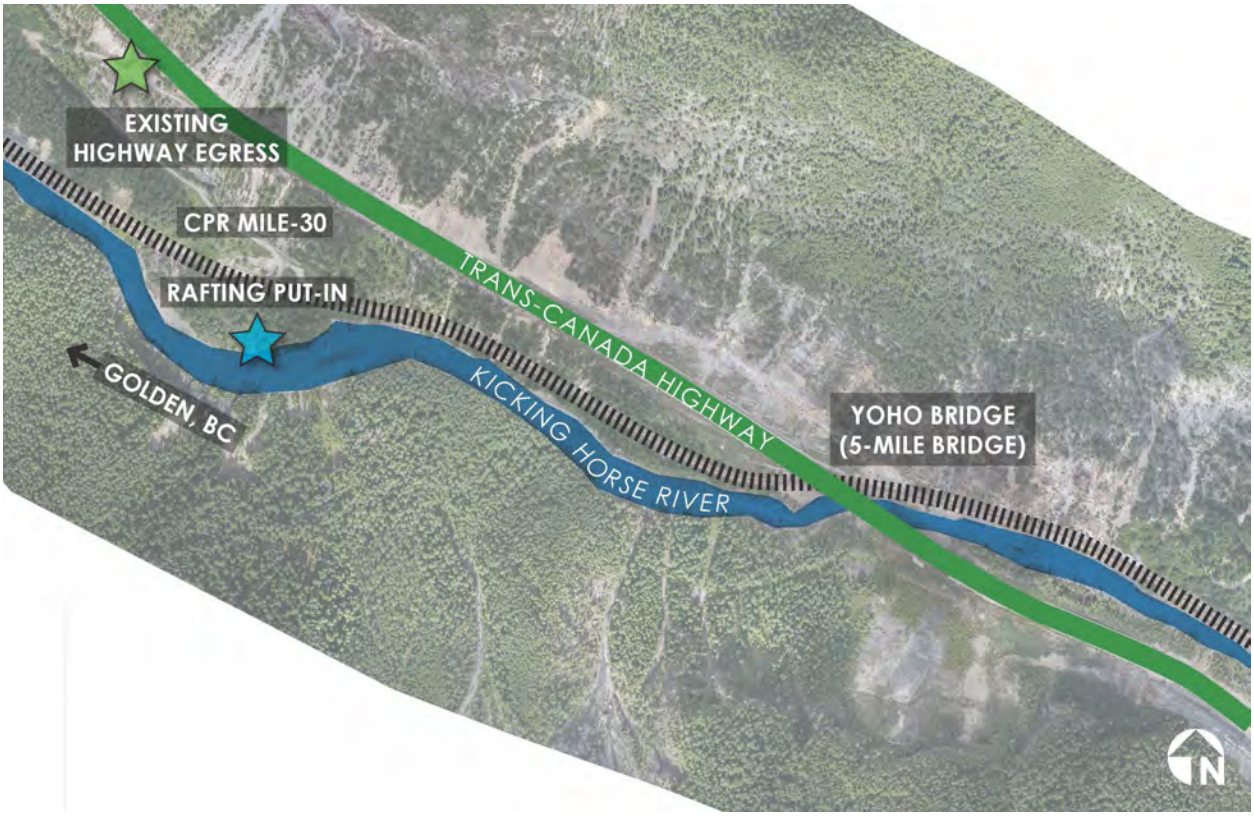


Figure 2 - Existing Rafting Access

2016 CRISIS OF ACCESS

In late summer of 2015, Transport Canada conducted an inspection of the tracks, at which time CPR and rafting companies in Golden, BC were notified of safety concerns related to public access of the tracks at Mile 30. By spring 2016, the six local rafting companies were notified by CPR that they would no longer be allowed access the KHR by crossing CPR land and rail lines. On May 20, 2016, a locked gate was installed at the top of the maintenance road, barring access to the CPR maintenance road, and by extension access to the Lower Canyon.

For the 2016 rafting season, commercial rafting on the Lower Canyon was carried out by a single company as temporary access option, accomplished by putting-in via helicopter adjacent to CPR lands at Mile 30.

2.0 PROJECT SCOPE

METHODOLOGY

Objective

The objective of this study was to evaluate the feasibility of KHR Lower Canyon access options identified through stakeholder consultation. The options were evaluated based on five criteria chosen as being representative of the qualities necessary to determine a long-term solution for access to the KHR. The purpose of the study was to recommend an option feasible for further analysis and preliminary design.

This study does not include detailed analysis of the regulatory, environmental, and social limitations. Further consultation with larger stakeholder groups, First Nations, regulatory agencies, and other proponents should be undertaken.

Stakeholder Consultation

The access options identified within this report were determined through a limited stakeholder consultation was conducted on August 25, 2016 at the Golden Council Chambers in Golden. Appendix A – What we heard outlines the findings of that process. This document was used to inform the options assessment, and was a catalyst for further collaboration between the study's authors, the Ministry of Transportation and Infrastructure, and members of the whitewater community. Resulting from this meeting was a list of possible modifications to the existing rafting access, as well as alternative options to access the Lower Canyon.

Additionally, a meeting with CPR Director of Government Affairs, Mike LoVecchio, occurred August 18, 2016 whereby the history of the site conflict was discussed, as well as possible solutions.

It is recognized that this consultation was not comprehensive of all stakeholders, but was intended to identify options that could provide an access solution for commercial rafting companies in Golden.

Options Assessment

Options brought forward at the stakeholder meeting were examined, with additional details discussed further. The criteria against which each option is examined were:

- Safety implications, referring to the safety of rafting clients, staff, and the general public not directly involved in river recreation.

- Economic implications including capital construction costs, engineering design costs, permitting costs and costs associated with maintenance and economic risks posed by naturally-occurring destructive forces.

- Engineering feasibility, examining the technical complexity of design, permitting, and construction required to carry out the implementation of the option.

- Recreational values, referring to the increase or loss of commercial recreation value of the option being examined relative to the current rafting logistics.

- Tourism values, examining the added value brought by the option with regard to broader tourism initiatives. It will put forward opportunities to expand the value of lower canyon rafting with value-added activities.

The next steps in options assessment would include project analysis for further feasibility, regulatory and environmental limitations, and potential consultations with a larger stakeholder group, First Nations, Ministry of Forest Lands and Natural Resources, Departments of Fisheries and Oceans in accordance with all regulatory and social licensing requirements.

3.0 OPTIONS ANALYSIS

The three primary options brought forward during stakeholder consultation in Golden, BC and their variations are discussed below.

Figure 3 - Access Options

OPTION 1 – MODIFICATIONS TO THE EXISTING PUT-IN

Highway Egress

Summary

The historic commercial rafting put-in at Mile 30 has significant safety concerns on two fronts: access from the TCH to the CPR maintenance road, and the unsanctioned level crossing at the CPR tracks. Therefore, any safe alternative proposed in this report will need to address both aspects.

The egress from the TCH to the CPR maintenance road is unsafe for school bus use, with insufficient room to turn the bus around as it arrives westbound, limited visibility for oncoming

traffic, and narrow shoulders. Client buses typically pull off the highway on the south shoulder, facing westbound against oncoming traffic, with clients unloaded facing traffic. A rafting company employee stands between the bus door and TCH traffic, directing clients to the highway shoulder. From there, clients are walked down the maintenance road to the rafting staging area. Rafts and other on-water equipment are driven to the staging area with pickup truck/trailer combination. The coordination of client buses between and within company trips occurs via radio, with waiting buses remaining at the Rafter's Take-Out, located approximately 3km east, until notified.

The client unloading process places both rafting company employees and clients in conflict with TCH traffic. Bus drivers execute difficult/illegal maneuvers with large vehicles, while clients are required to navigate a busy highway shoulder as part of a larger group. To date, there have been no reported incidents of conflict between highway traffic and rafters (both employees and clients); but the situation is acknowledged, by all parties, as being unsafe and undesirable.

For KHR access options that include exiting the TCH near the current location, highway egress options include:

1. Maintaining the currently-used method with few, if any, modifications to the egress point;
2. Upgrading and utilizing the wider pull-out area uphill to the west of the current access point, connecting it to the CPR access road with a constructed gravel road connection

This upgraded access point has been identified as part of the construction works for the planned Kicking Horse Canyon Highway Improvement project (KHC) Phase 4. The completion of this work is several years away, but preliminary analysis indicates that a road could be constructed from the new highway alignment. The highway realignment has not been fully engineered and is subject to further geotechnical, environmental and archaeological assessment.

Figure 4 - Highway Egress Options depicts the two options of exiting the highway and connecting with the CPR maintenance road.

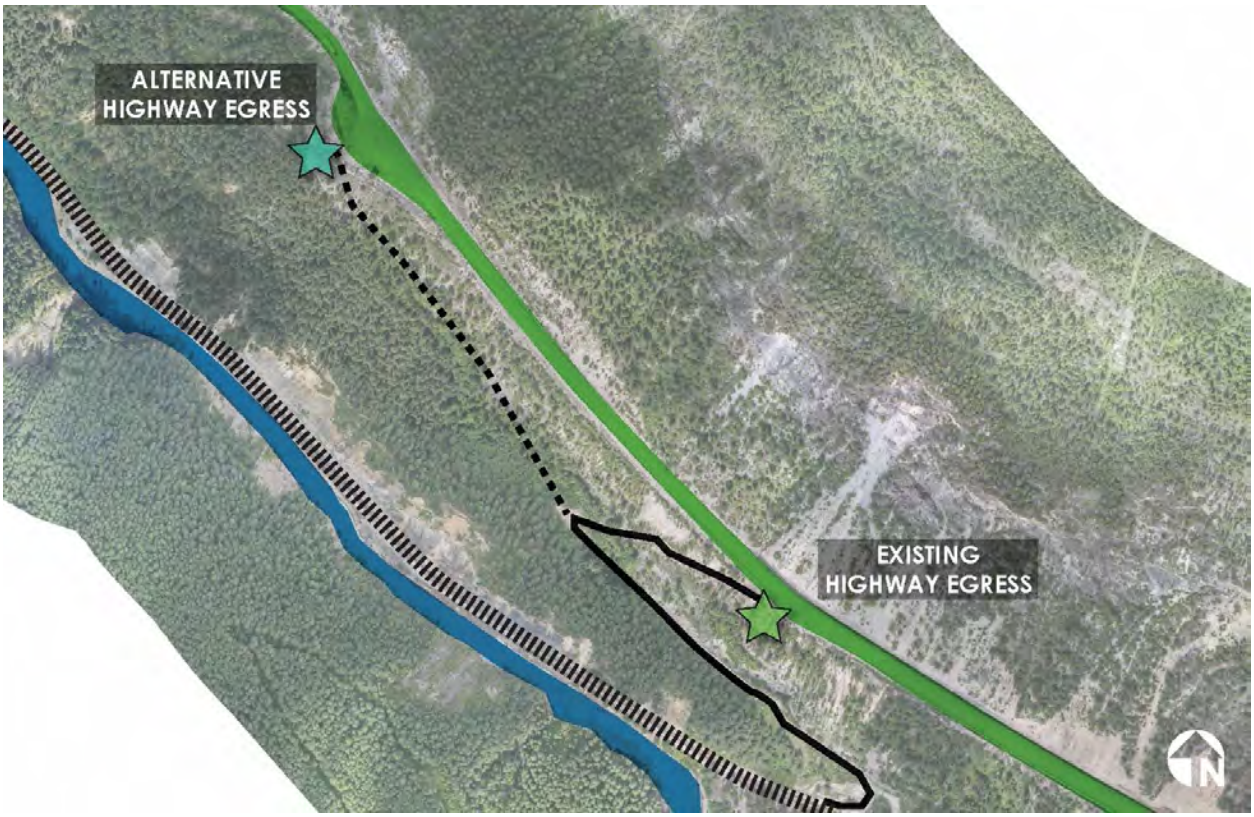


Figure 4 - Highway Egress Options

Evaluation

Safety

The safety deficits of the current highway egress are discussed above, and are significant. In addition, BC Ministry of Transportation and Infrastructure (MOTI) representatives have indicated that it does not meet current design standards for sightlines and space to execute a safe left-hand turn either existing traffic westbound, or entering traffic.

Development of a new road connection beginning at the wider pull-out presented above, could be designed to an acceptable level of safety for highway users, rafting clients and rafting company staff, with the expectation that it would still function as a right-in, right-out pull-off accessed from the west. It is expected that the development of this road would be undertaken concurrent with KHC Phase 4 improvements.

In either scenario, the access road would not be designated for general highway users. Access to the road would be gated to support restricted access for CPR, and commercial rafters only. This option would require further consultation between proponents and access permits from CPR.

Economic

The use of existing infrastructure poses the smallest economic impediment in terms of capital costs. Future costs associated with this option could include but are not limited to greater maintenance costs for the pull-outs and increased signage to help mitigate safety concerns.

The capital costs associated with upgrading the wider pull-out and constructing a connecting road to the existing CPR maintenance road could be incorporated into the KHC Phase 4 works. Adding the pull-out widening to the larger KHCH Phase 4 project would increase efficiency in design and construction and may decrease overall cost versus design and construction of the pull-out widening and road connection alone as a separate project.

Engineering

There are no engineering implications associated with the use of the existing infrastructure. However, as previously mentioned the existing access was never intended for commercial use.

Modification of the highway egress for the access road would require detailed engineering design, tendering and construction, and a completion date that is tied to the larger KHC Phase 4 highway improvement project would be preferable.

This option will also require consultation MOTI to determine if modification of the highway egress at this location will be feasible.

Recreation

The existing highway access presents a challenging, unsteady, and long walk down a steep, uneven road. As such, it depletes the recreation value of the river trip.

A modified access would enhance this experience significantly, leaving more space to exit the bus and continue on down the hill. This access road is estimated to have a gradient of as much as 14%, and would be unsuitable for bus travel.

A facility that allows for medium-term (several hours) parking for a small number of passenger vehicles would be an added benefit for recreational kayakers who typically leave a car at the put-in to be retrieved after the run is complete.

Tourism

There is currently no capacity for increasing use or creating value-added opportunities for tourism at the existing access, and is intended only for use by commercial rafting companies. It requires radio communication between rafting companies to ensure only one bus arrives at a time, and therefore limits use.

A modified access road constructed as part of the KHC Phase 4 works would likely have the same restrictions on access by the public or other unauthorized users.

Table 1: TransCanada Highway Egress Options Evaluation Summary

Evaluation Criteria	Existing Access	Modified Access
Safety	Unsafe for operators, clients, and motorists	A solution whereby no pedestrians are on the highway is preferred. Still requires tight turn on narrow maintenance road
Economic	This is the least expensive, as it requires no more than paving, signage and a gate	To be determined when KHC Phase 4 highway works are finalized.
Engineering	Existing	A short but challenging road to build on steep slopes
Recreation	Uncomfortable for clients and guides, diminishes wilderness experience for clients	Increased comfort and safety for clients and guides
Tourism	No net value for tourism goals of region	Limited value for wider tourism industry as there is no room for parking or other amenities

Option 1a – Level Grade Crossing

Summary

The current CPR crossing at the Mile 30 track location is not a controlled public crossing. It has not been subject to engineering review, nor the provision of safety measures to ensure the safety of the public, as it is part of the private rail operations of CPR. As such, CPR has the responsibility of securing their site and ensuring that no conflicts between the public and rail operations persist.

The provision of a safe, controlled grade crossing requires the adherence to Transport Canada's Grade Crossings Regulations, which form part of the *Railway Safety Act* implemented in November 2014.

Stantec conducted a preliminary review of the Mile 30 site and consultation with affected stakeholders, and it has been determined that an level-grade crossing is not feasible at this location. Based on initial stakeholder feedback, the level-grade crossing option was not reviewed against the five selection criteria. This option may be revisited in the future depending on the outcome of this study.

Option 1b - Pedestrian Bridge Over CPR Tracks

Summary

This option assumes a suitable highway egress point to the existing CPR maintenance road and that CPR will allow use of their maintenance road. It addresses the need for passage over the CPR tracks by the construction of a pedestrian bridge from the maintenance road over the

tracks to a developed staging area as shown in Figure 5 - Pedestrian Bridge Over Tracks Alignment.

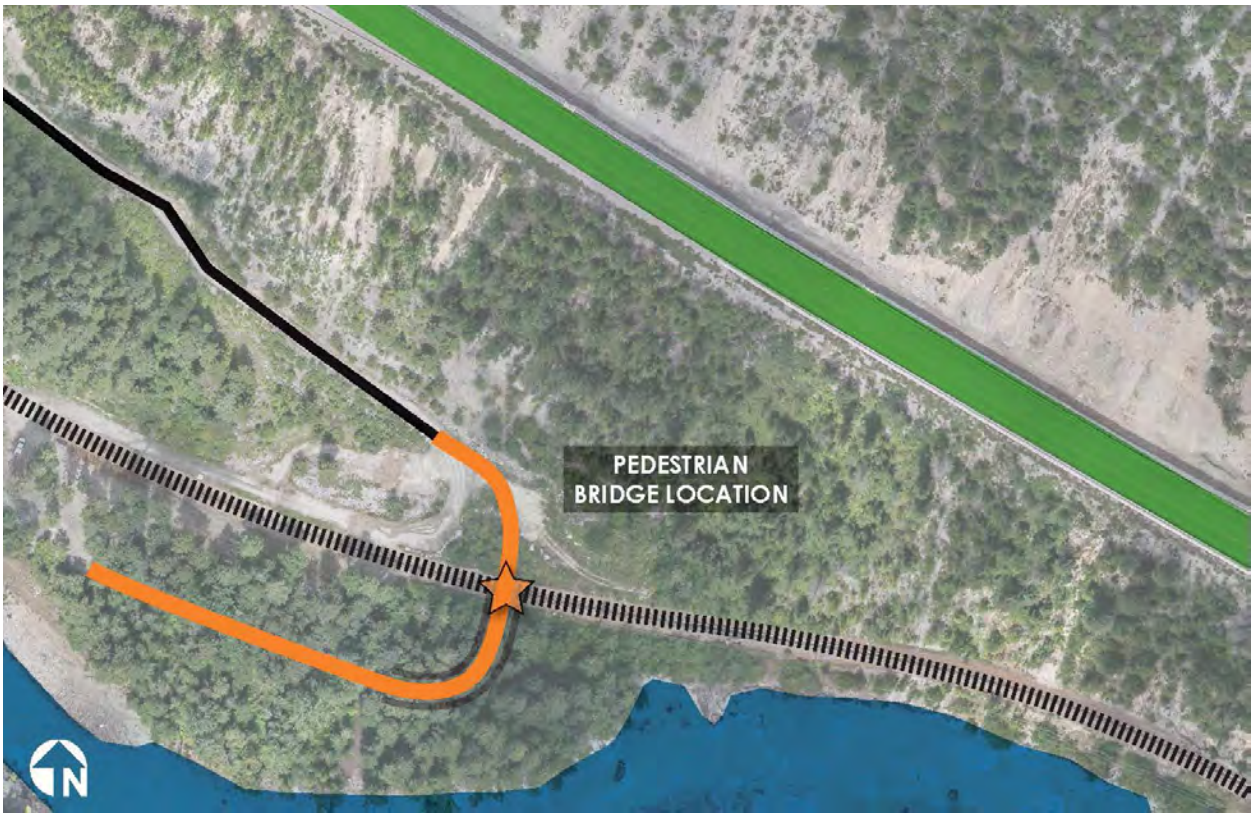


Figure 5 - Pedestrian Bridge Over Tracks Alignment

The possible bridge construction includes an uphill abutment, bridge deck, downhill abutment and ramp to the staging area. The staging area would require grading and vegetation removal. For this option consultation with CPR will be required to determine if the construction of the pedestrian bridge is feasible on what is likely CPR right of way.

Analysis of the existing slopes and accommodation of CPR tracks yields a conceptual design shown in Appendix B – Pedestrian Bridge Over Tracks Concept. This design assumes a bridge with 3.5 m concrete deck and railings high enough to inhibit falling objects onto the CPR tracks. This width of deck allows for a commercial raft to be carried by a person on each side. The conceptual bridge design is not expected to accommodate vehicle traffic, which would be required to park above the bridge. Traffic management would be in the form of fencing along the CPR right of way for a suitable distance, and signage explaining the expected behaviours of commercial rafting and CPR traffic on the site.

The staging area between the bridge and the water is subject to periodic spring floods and it is therefore unsuitable for development. All works require collaboration with CPR.

Evaluation

Safety

Notwithstanding the safety considerations of the highway egress, the safety mitigations provided by this option include:

- Reduced walking along the gravel maintenance road for clients, and;
- Reduction of conflicts between CPR operations and the public (assuming full compliance by the public with all safety measures).

The safety concerns for this option include the ongoing, although reduced, risk of conflict with CPR operations. These potential conflicts include the possibility of trespassers bypassing the bridge and circumventing safety measures such as fencing, and entering into conflict with rail traffic. As described above, the consequences of a conflict between rail traffic and a member of the public on the tracks could be extremely hazardous to all parties.

The remote location and difficult terrain of the crossing reduces the ability of emergency crews to respond to any incidents related to conflicts with CPR operations or other safety- or medical-related incidents that may arise as rafting trips are staging.

Economics

A Class D (+/- 50%) preliminary costing of construction works follows:

Table 2: Pedestrian Bridge Conceptual Opinion of Probable Costs

	Cost	Price
Highway egress construction	lump	$4,000,000
Bridge, abutments, road surfacing	lump	$2,000,000
TOTAL		**$6,000,000**[1]

1. This estimate is for construction costs only and is not reflective of total project cost. Additional costs associated stakeholder consultation and coordination with CPR, project management, engineering, environmental, geotechnical, civil, property acquisition (if required), and overall project contingency have not been accounted for in this estimate.

Engineering

The design of this bridge and its requisite supporting infrastructure is relatively uncomplicated, with significant civil engineering works already carried out in the vicinity, though the steep slopes and remote location pose logistical challenges, as well as the span of the bridge which is currently unknown.

Of note, Stantec conducted preliminary analysis on flood levels, and it is expected that the 1:200 year flood event would produce water levels that would reach the bridge embankments. This is important to note when considering alternative methods for crossing the tracks, specifically the

construction of culverts underneath, as they would be subject to flooding at this statistical frequency.

Recreation

The recreation value of this option is moderately greater than Option 1a, with gains made in the form of a more comfortable walk to the water and possible increased amenity value for the staging area. By providing a dedicated walking route and track crossing, the commercial rafting client experience is enhanced by no longer crossing at an unsanctioned rail crossing with difficult footing and direct proximity to moving trains.

Tourism

The intention of any use of this site is to maintain its existing function for CPR and BC Hydro, while providing safe access for commercial rafting operations. It is not intended to become a public park or to encourage use by members of the public, therefore any additional amenities that would do so are discouraged.

OPTION 2 – MODIFICATIONS TO RIVER BED

Channel modification

Summary

Rafting industry stakeholder feedback identified an option to modify the channel bed, and ultimately the hydraulics within the most challenging section the KHR, location as shown in Figure 6 - Option 2, Riverbed Modification.

This section of the river is characterized by its confinement between the steep valley walls of Navvy Mountain to the north and Beaverhead Mountain to the south. These valley walls contain the CPR tracks on the overbank of river right (north bank), and the TransCanada Highway on river left (south). The reach boasts Class IV rapids in its upstream end that are present due to the river's morphology. The river's boulders likely sit upon the bedrock and may be glacial deposits, remnants from mass wasting or possibly the spoil from construction or maintenance activities within this section of the corridor. Downstream, the rapids are largely formed by bedrock outcrops, the Split Rock, and some boulders beginning in the most downstream end of the reach shown in Figure 6.

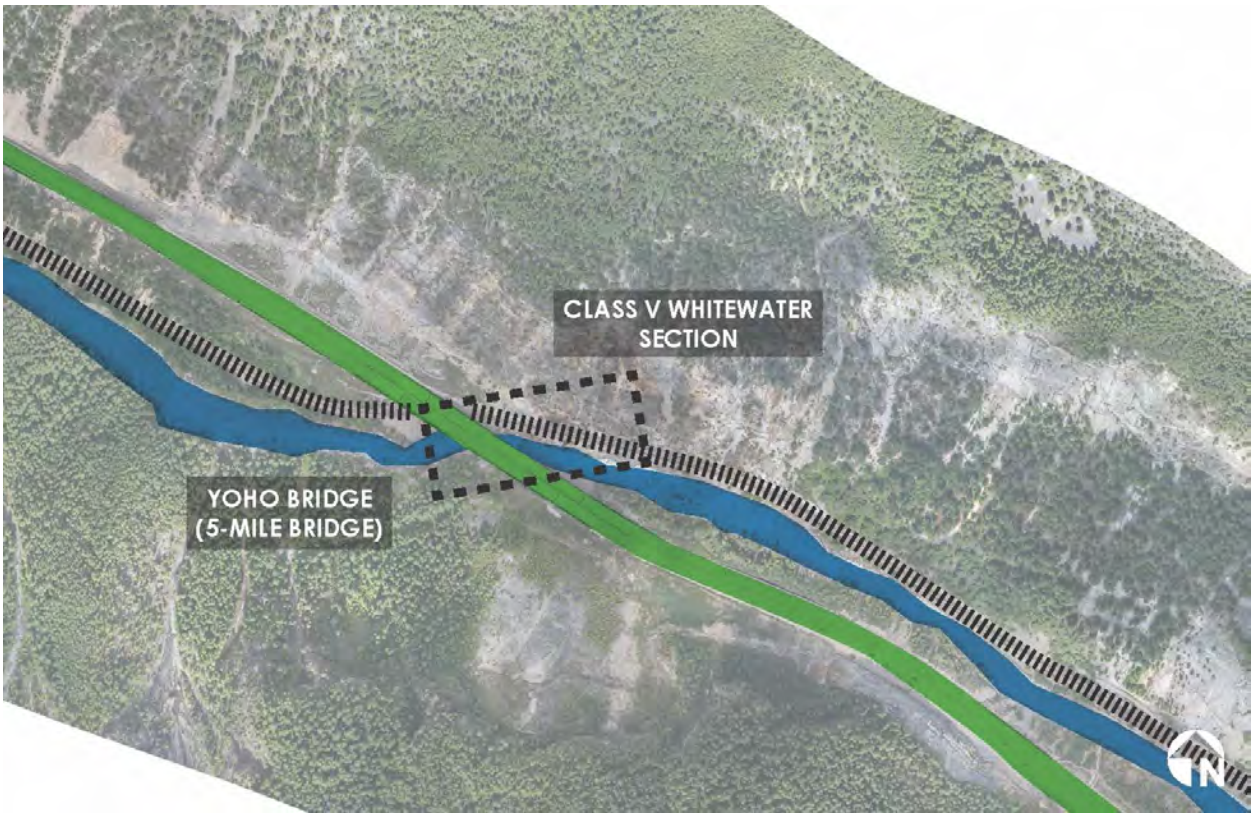


Figure 6 - Option 2, Riverbed Modification

On the immediate upstream side of the Yoho Bridge (Five Mile Bridge) on the TCH, there is an angled bedrock outcrop in the bed of the KHR and another in the right bank that create hazardous whitewater conditions. Stakeholder feedback suggests this reach is impassible to commercial rafting and all but the expert recreational users.

Stantec's river engineer visited the site on December 19, 2016 when river flows were estimated to be 15 m^3/s. Additional information was gathered from two videos taken by kayakers. One video is believed to have been take at around 40-50 m^3/s while the second video (posted publicly on YouTube) is claimed to have been taken at 150 m^3/s. Stantec notes that there are differences in the magnitude and shape of the hydraulics formed at these different flows and the videos supplemented the site observations and were later used to validate the hydraulic modelling of this reach.

The hazardous conditions are comprised of short series of three challenging hydraulics features over a horizontal length of 200 m (Figure 7).

<u>Feature 1: The Angled Roller and Bedrock Outcrop</u>

The first of the features is an angled roller extending out from river left into a bedrock outcrop on river right as shown in Figure 7. The angled roller turns, and then pulls vessels towards river right,

and into a complex hydraulic jump that is formed by the confinement from the bedrock outcrop that is protruding from the right bank. This feature can flip even large rafts left-over-right while they are in the angled hydraulic and possibly a downstream flip as they hit the complex hydraulic jump. This feature is understood to be only passable by expert whitewater users in smaller vessels who can actively maintain a path along river left.

Stantec's observed that the angled roller is likely formed by an angled bedrock protrusion on river left (Figure 8 and Figure 9). The bedrock is an impact hazard but the more likely danger is that there is a large hole (estimated 2.5 m deep) under the outcrop that can serve as a trap. Observations in a video of the site at 150 m^3/s suggests a boil forms in this hole and if large enough can push vessels back upstream or more generally complicates the already dangerous hydraulics downstream of the angled roller.

Figure 7 - Hazardous Hydraulic Conditions Approaching Five Mile Bridge Looking Downstream (Image courtesy of Mikkel St. John-Duncan)

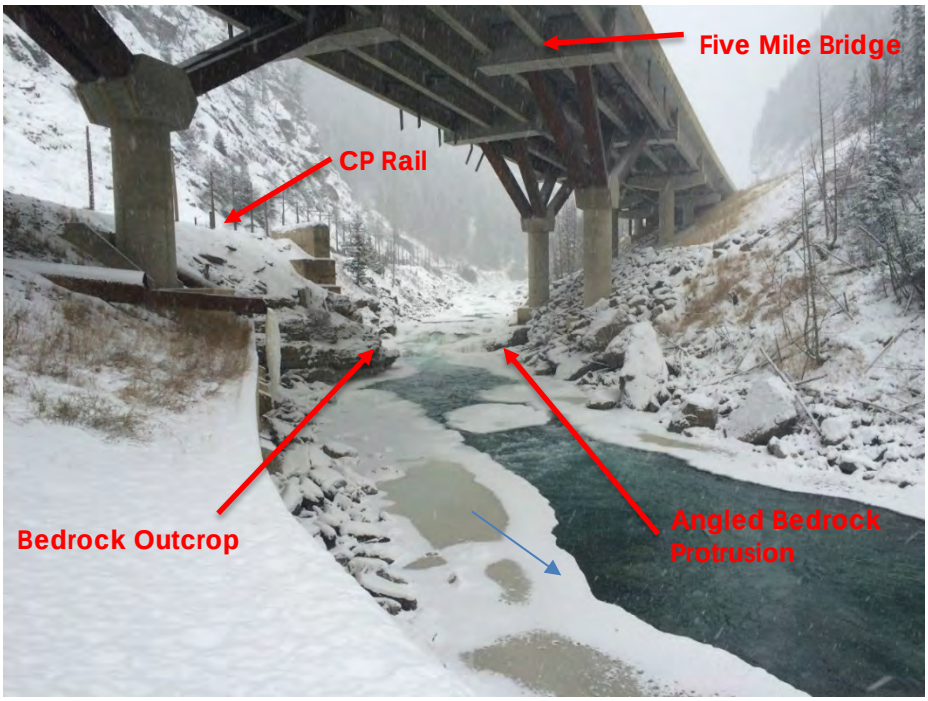


Figure 8 - Looking upstream at Angled Roller and Bedrock Outcrop (Stantec, December 2016)

Figure 9 - Looking upstream at Angled Roller and Bedrock Outcrop (Image courtesy of Ryan Johanneson April 13, 2016)

Feature 2: The Split Rock

The Split Rock feature is located 70 m downstream of Feature 1 (Figure 10). This feature is a large fragment of rock that is split along 3 large fracture planes and causes a constriction in the river channel (Figure 11 and Figure 12).

Constrictions are generally not too hazardous but the split-rock was described as one of the hazards on the reach. Observation suggests the hazard formed by the Split-Rock is less from the constriction and more because of its angle towards river left. Figure 12 shows the downstream face of the Split-Rock and the hazards immediately downstream of its constriction. The two large boulders located downstream river left, and the accumulations of woody debris that can form on (and near) this boulder potentially increase the safety hazards of the Split-Rock. The chute formed by the Split-Rock's constriction sends users river left into the hydraulics around the boulders. This may pose the hazard, but it is believed to be compounded by The Drop (Feature 3) located downstream.

Figure 10 - Approaching the Split Rock Looking Downstream (Image courtesy of Mikkel St. John-Duncan)

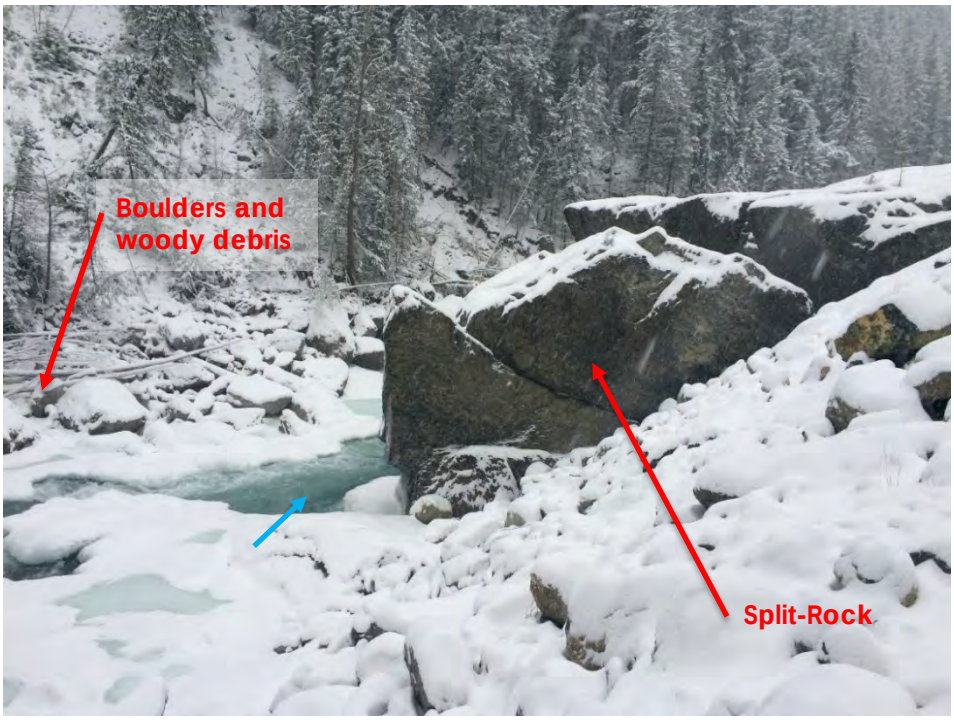


Figure 11 - Upstream Face of Split-Rock and its Constriction on Channel (Feature 2) – Looking Downstream

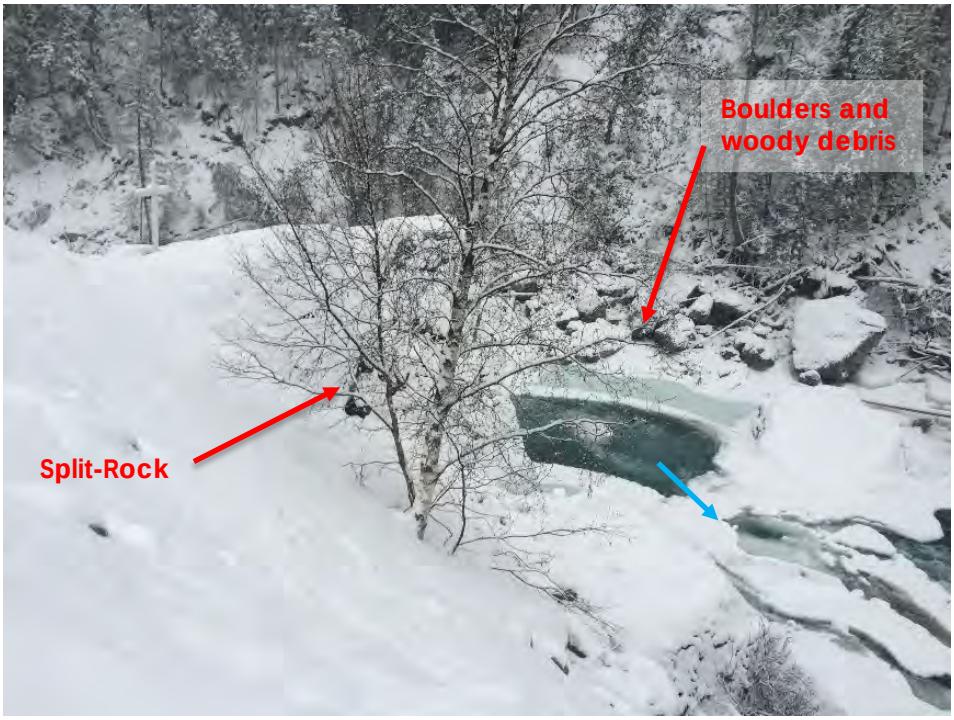


Figure 12 - Downstream Face of Split-Rock and Hazards on River Left (Feature 2) – Looking Upstream. Not shown to right of photo and 80m downstream is The Drop (Feature 3)

Feature 3: The Drop

The Drop is located 80 m downstream of the Split Rock and appears to be a convergent feature and may not form a hydraulic trap in itself but if users are in distress from passing the Split-Rock (Feature 2) then they may not approach The Drop at the correct angle, or with appropriate preparedness.

Figure 13 - Approaching the Drop Looking Downstream (Image courtesy of Mikkel St. John-Duncan)

This option includes the selective addition and/or removal of material to modify the river bed profile. The benefit to this option is that it could allow commercial and recreational whitewater users to run the reach of river and effectively eliminate the need for commercial outfits and many recreational users to pull-out of the river at the Kicking Horse Rest Area and bypass these features.

Evaluation

Safety

The goal of this option is to make this river segment navigable within prescribed flow parameters for commercial rafting operations.

Both upstream and downstream of these features are very hazardous whitewater conditions. It is our understanding from stakeholder feedback that the hydraulic features that are addressed by this option are those which make this section of the river impassable to commercial outfits, and most recreational whitewater users. It is our opinion that the modifications of the riverbed features can improve the safety on this reach of the river, but, the overall reach will maintain its Class 4 designation and should only be navigated by those who are trained and/or skilled enough to do so. It will not make this reach of the river safe for all users, at any time.

Engineering

Stakeholder communications and engagement will be an important part of the development of this option, with further engagement with regulatory agencies, First Nations in the area, commercial rafting operators, and recreational whitewater groups.

Stantec used a hydraulic model to evaluate three potential river bed modification strategies to develop a recommended option.

The first concept was the removal of the bedrock features that are creating the dangerous hydraulics. The hydraulic model indicated that this strategy would have less effect in improving the hydraulics than first anticipated, and that it would need to be combined with additional downstream and upstream bed modification works. An additional concern was in the potential stability concerns related to the proximity of the bedrock outcrop to existing CPR infrastructure.

The second concept was the installation of a series of small convergent weirs installed within the reach to backflood the hazardous features and stabilize the hydraulics. Hydraulic modelling of this concept indicated that the channel is too steep and the energy grade is too high for this solution. There is some merit in this concept as a designer could angle convergent weirs in a step to guide users around hazards at certain flows, however, at 150 m^3/s the jumps were still very large and may not be deemed passable. The weir configuration might also have serviceability issues in this environment as they protrude from the bed grade and will be subjected to very high forces in flood.

The third concept, and the concept that is recommended should this option be pursued further, involves filling of the holes in the river bed to mute the plunging of the supercritical flows off the drops. This fill would also level the grades at the drops to match the overall bed grade and lessen the formation of hydraulics. Though this option will require more rock material than the other two options, the hydraulic model shows it to be the most effective at muting hydraulic jumps. The downstream ends of the fill locations at the Angled Roller (Feature 1) and The Drop (Feature 3) should be finished with a very low profile convergent weir to create a hydraulic that will reduce the potential for river users to become trapped. The hydraulic model indicates that this concept will not only smooth out the hydraulic profile through the reach but also provides a net reduction in river velocity. A plan and profile of a general arrangement for this option is provided in Appendix C – Channel Modification Concept.

A technical memo (Stantec, 2017) has been prepared with additional information regarding each of these options and the hydraulic modelling results.

This option will require regulatory approval under the *Water Sustainability Act* Section 11 and potentially Authorization from the Department of Fisheries and Oceans (DFO) under the *Fisheries Act*, dependent upon the existing fish habitat and the nature of the removal works. Both approval and authorization applications will require extensive environmental studies and engineered plans for the stream channel modifications that are based on sound assessment

and proof the proposed activities will meet the stated goals. Infrastructure owned by CPR and MOTI are very close to the proposed works and modifications of the river bed has the potential to destabilize this infrastructure.

Stantec recommends that a bathymetric survey and subsequently an update to the hydraulic model be completed to validate the feasibility of this option and better quantity its anticipated effects. This hydraulic model should be used to detail the design with respect to developing an estimate of the depth of fill (and ultimately, material volumes) and to size the rock to be installed.

Engineering drawings of the stream channel modification would need to be prepared to support the environmental permit applications, tender and construction

Economic

Our conceptual planning level assessment suggests that this option would require no construction of additional infrastructure, apart from potential for shoring of existing infrastructure should it be deemed impacted by the required extents of the riverbed modification. This infrastructure includes the eastern upstream pier of the Yoho Bridge Five Mile Bridge, and the historic bridge abutment that is connected to the right bank outcrop and may provide support to a portion of the CP tracks.

A Class D (+/- 50%) preliminary costing of construction works follows:

Table 3: Riverbed Modification Conceptual Planning Opinion of Probable Costs

	Cost	Price
Riverbed Modification	lump	**$1,600,000**[1]

1. This opinion of probable cost is for construction only and is not reflective of total project cost.
   Additional costs associated stakeholder consultation, coordination with CPR and MOTI, project management, engineering, geotechnical, civil, environmental costs associated with assessment and regulatory permitting, construction of habitat offsetting (if required), and overall project contingency have not been accounted for in this estimate.
   Refinement of the opinion of probable costs will require the execution of the additional engineering and environmental studies described above.

Recreation

The recreation value of this option is considerable, as it creates a single navigable stretch of the KHR, from put-in at Beaver Flats to the Town of Golden, with more river time and less time spent executing the shuttle from the Rafters' Take-out to the Lower Canyon put-in.

Of note, though, is that even once the significant hazards are mitigated, the section of river downstream of the Rafter's Take-Out/Yoho Rest Stop will still be considered Class IV, and expert-only. For rafters desiring a safer or quieter experience, an Upper Canyon trip that ends at the Rafters' Take-Out is still possible.

By removing the significant impediment between the Upper and Lower Canyons of the river, the logistical challenges incurred by having to take-out and put-in an entire trip are eliminated. This removes the need for delays and waiting for other rafting companies to use the highway egress point, and the discomfort of hiking down the access road to the current put-in, and the safety concerns of crossing the railroad.

Tourism

The enhanced commercial rafting experience benefits wider regional tourism efforts by creating a more desirable product to market, enhancing the region as a greater whitewater destination. While this study is limited to effects on the commercial rafting industry, the opportunity still exists to build upon this recreation and tourism experience.

OPTION 3 – YOHO BRIDGE RIVER-LEFT ACCESS

Highway Pull-Off

Summary

The BC MOTI completed preliminary design and analysis for an alternative exit off the TCH, located at the southeast side of the Yoho Bridge (Figure 14 - Option 3, Highway Pull-Off at Yoho Bridge). It encompasses an exit ramp, barricade, parking lane, driving lane and re-entry ramp, located between the bridge and rock cut face to the east. Appendix D shows the possible alignment of the pull-off.

From the pull-off area, a 3.5-metre wide pathway would be built along the highway and down the embankment to the river. Given the challenging and steep terrain, the pathway may need to be combined with a narrow trail for rafting clients with a hoist system for equipment. In-stream work along the bank would be required to create a safe entry into the river for rafters and other whitewater recreationists.

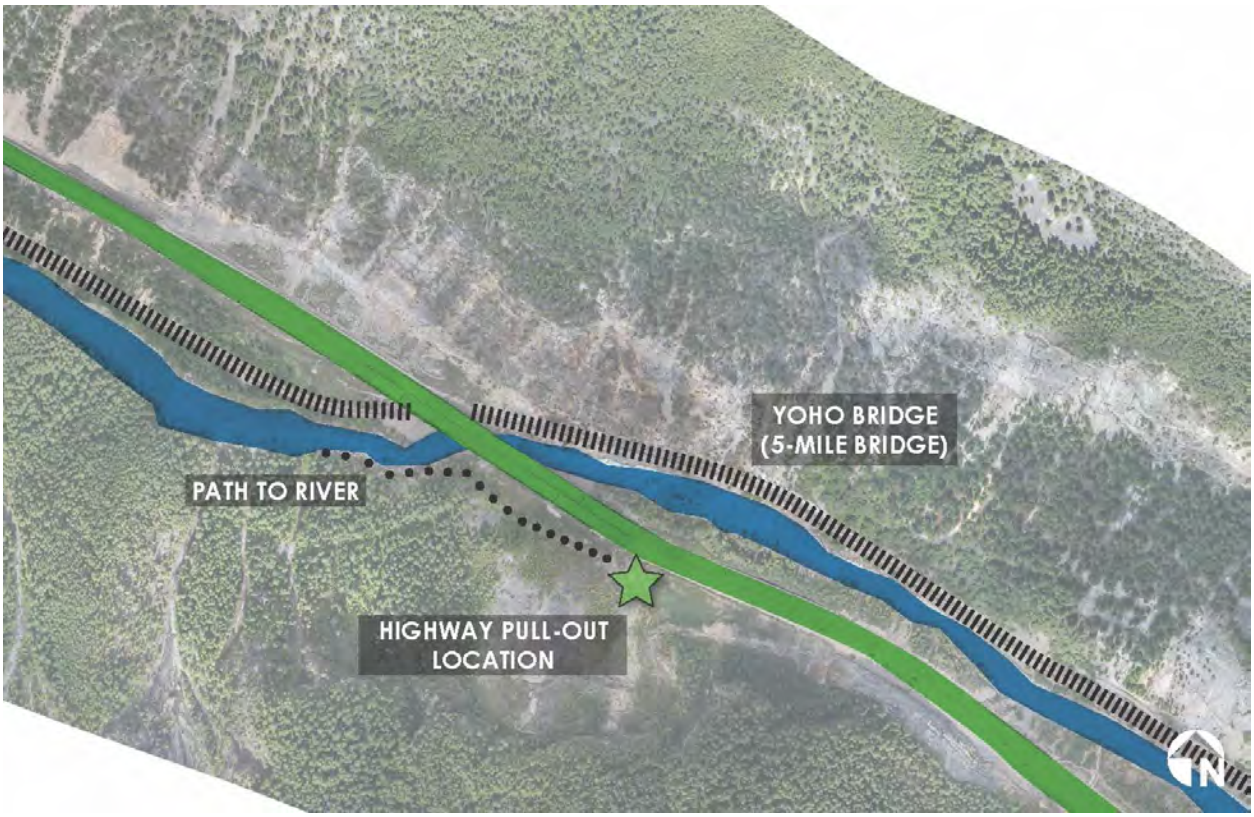


Figure 14 - Option 3, Highway Pull-Off at Yoho Bridge

Safety

There are three major safety concerns associated with this option. Firstly, there is currently insufficient room east of the Yoho Bridge to construct a pull-out that would meet engineering standards for a 100 km/hr highway alignment. The design of the highway pull-out, is constricted by the rock cut face to the east, and Yoho Bridge to the west. To design and construct a suitable highway pull-off at this highway speed, more room is required. The current concept design is suitable for highway speeds of 70km/h, less than the current TCH speeds of 100km/h. In order to mitigate this deficit, highway speeds could be reduced for this stretch of the highway, but this is not considered enforceable or desirable as driver expectations would not encourage speed reduction compliance. This is compounded by the location of the pull-out at the base of a hill on either side, increasing the likelihood of traffic acceleration.

The second safety concern is related to the risk of rock fall along the trail. This stretch of valley, formed by Beaverhead Mountain, poses significant instability, with risks to pathway users from the adjacent rock and terrain, as well as up-slope rock instability. The risks for both construction crews and trail users have been confirmed by Stantec engineers as being of considerable hazard, despite possible rockfall protection measures.

The third safety concern is the unstable terrain for the pathway itself, which could cause serious injury for rafting clients and guides as they make their way from the highway down to the river. The rock slope is known by Stantec and MOTI as being unstable and unpredictable, and is considered a significant risk both for construction crews and the ongoing use of the trail by rafters.

Economic

A Class D (+/- 50%) preliminary costing of construction works follows:

Table 4: Highway Pull-Off at Yoho Bridge Conceptual Planning Opinion of Probable Costs

	Cost	Price
Highway Pull-Off at Yoho Bridge	lump	**$15,000,000**[1]

1. This opinion of probable cost is for construction only and is not reflective of total project cost. Additional costs associated stakeholder consultation, coordination MOTI, project management, engineering, geotechnical, civil, environmental property acquisition (if required), and overall project contingency have not been accounted for in this estimate.

   Refinement of the opinion of probable costs will require the execution of the additional engineering and environmental studies described above.

Engineering

The analysis, design and construction of the pathway portion is the most significant engineering consideration for Option 3. The terrain is extremely steep, and the material on which the path would be built is very unstable, requiring significant care when operating machinery during construction. This area has a history of slope movement and significant further geotechnical investigation is required to assess suspected slope instabilities.

The approvals process would likely be relatively straightforward, with most works being carried out within the TCH right-of-way. Modification to the river bank to construct a launch eddy for rafting would require approval under the *Water Sustainability Act*, and the results of any environmental and archaeological assessments completed to prove the feasibility of this option is unknown.

Recreation

The recreation value of this option is similar to that of the current access. The staging area at the river's edge would be significantly diminished, and would likely result in bottlenecking and group management concerns for larger trips.

Tourism

Of significant concern for the workability of the pull-off is its attractiveness to motoring tourists who typically stop at all highway pull-offs along this stretch of the TransCanada. The site is extremely visible on approach from both directions and provides a pathway to the river, which further increases the chances that it will be overused by the non-rafting public, leaving little room for commercial rafting equipment trucks/trailers, and client buses. Congestion at this site,

with the resultant parking overflow onto the highway, is a significant safety concern, as it would interfere with rafting operations as well as TCH traffic.

The option would be restricted to use by commercial rafting companies, and is not intended for the general public. Unauthorized use would pose a significant hazard to the motoring public.

4.0 CONCLUSIONS

Additional Consultation

For all options evaluated in this report additional consultation with regulatory agencies, proponents, and stakeholders is recommended. In addition, the Province of British Columbia and the Government of Canada each have a duty to consult and where necessary, accommodate Aboriginal groups whenever a decision or activity could impact Aboriginal rights and title. While the Province of British Columbia and the Government of Canada are responsible for ensuring that adequate and appropriate consultation and accommodation takes place, they often delegate procedural aspects of consultation to project proponents and may ask the proponent to:

- Provide information about the proposed project to Aboriginal groups early in planning process;
- Obtaining and discussing information about specific Aboriginal rights and interests that may be impacted;
- Considering modifications to plans to avoid or mitigate impacts to Aboriginal rights and interests; and
- Documenting engagement, specific Aboriginal rights and interests that may be impacted and any modifications to address concerns and providing this record.

Evaluation

Safety

The safety concerns associated with the current highway egress are significant. This portion of rafting logistics is the source of the greatest safety concern for operators and clients. Option 1 will require modification to the existing highway egress to address these safety issues and is vital for public safety and commercial rafters, with potential wider implications for CPR and BC Hydro access.

Rail safety and the avoidance of any conflict with rail traffic are also paramount. A grade-separated crossing (pedestrian bridge over the tracks), presented in Option 1, provides significant mitigation of these concerns. This option, however is unworkable without a safe solution to highway egress and CPR sanction for use of the maintenance road.

Option 2 avoids all conflict with CPR operations, and does not require access to the TransCanada Highway. Modification of the river bed can be completed to allow for the passage of commercial rafts, however the expected resultant class of whitewater is still considered expert-level (IV or greater).

With the implementation of Option 2 access to the Lower Canyon may only be accessed at certain water levels. Overall, the rafting operators and participants must weigh rafting client safety and risks. These risks are expected to be commensurate with those already posed by the downstream Lower Canyon stretch of the KHR. It is therefore the option of this report that at this

level of analysis, Option 2 is the safest solution for accessing the Lower Canyon by commercial rafting operations.

Option 3 has significant risk to safety because of its location at a known rock-fall location, and the design deficiencies of the highway pull-off. The safety concerns associated with implementation of Option 3 are greater than the other two options presented in this report and will likely require extensive mitigation.

Economic

At this level of evaluation, costs presented in this report are conceptual planning level and do not reflect the overall project costs Additional costs associated stakeholder consultation, coordination CPR and MOTI, project management, engineering, geotechnical, civil, environmental property acquisition (if required), and overall project contingency have not been accounted for in the estimates presented above. Refinement of theses opinion of probable costs will require the execution of the additional engineering and environmental studies.

Based on the construction estimates in this report, Option 2, the modified river channel, is expected to be most cost-effective. However, this option has many variables that could significantly affect the overall project costs including additional costs for what could be a complex process for regulatory and proponent approvals

Engineering

Engineering of Option 1 and 1a will required modification of the current highway egress. This option will require further clarity about when and how works related to KHC Phase 4 will take place, and consultation MOTI to determine if modification of the highway egress at this location will be feasible. Depending on the KHC Phase 4 schedule, realignment of the access road independent of additional highway works could be considered.

In terms of technical investigations required, complexity of regulatory approvals and degree of technical complexity Option 2 is associated with the most unknowns. Detailed modeling of this option will need to be completed. This option will require extensive consultation the outcome of which is unknown and somewhat difficult to predict. Stakeholder approvals and regulatory permits will also be required prior to moving forward with this option.

Engineering requirements for Option 3 will require more analysis to prove the feasibility of a highway pull out to meet TCH design criteria and construction of a geotechnical stable trail down to the KHR.

Recreation

The ideal resolution of the need to shuttle commercial rafting trips around a section of the river is to avoid having to do the shuttle in the first place. This reduces the amount of time “hurrying up and waiting,” eliminates the disruption to a day in the wilderness, and mitigates the safety concerns posed by accessing the highway.

The resultant rafting experience as presumed in Option 2, will be one of continuous river travel, finishing in the Town of Golden.

Tourism

Tourism in the Golden area is centered on activities that connect people to the landscape, through athletic outdoor pursuits and cultural experiences. Any access solution for the Lower Canyon should add value to the wider Golden tourism objectives by enhancing the river experience itself.

Option 2 would provide the ability for river recreationists to travel the KHR, at certain water levels, continuously, a major enhancement of the rafting experience.

Summary

The following table aims to assign a value for each option, using the criteria discussed in the assessment portion of this report. This table assigns values that are subjective and intended to be qualified by the above discussion, and is intended to be a summary of the discussion above, not a replacement for it.

0- The value of this criteria is so low to be prohibitive of further investigation into the option

1- The value of this criteria is extremely low, or the criteria is extremely difficult to execute

2- The value of this criteria is less than the current access model, or poses difficulty in execution

3- The value of this criteria is unchanged from the current access model, or it is of average difficulty in execution

4- The value of this criteria is enhanced from the current model, or the criteria is straightforward in its technical feasibility

5- The value of this criteria is exceptional, or the criteria will be easy to achieve

	Option 1a	Option 1b	Option 2	Option 3
Safety	1	2	4	0
Economics	2	2	5	1
Engineering	2	2	2	2
Recreation	2	3	5	2
Tourism	2	2	4	1
TOTAL	**9**	**11**	**20**	**6**

Recommendation

It is the recommendation of this report that further study and attention be focused on Option 2, modifications to river bed.

Although this option is associated with many unknowns, it is also associated with the greatest potential for long-term recreation and tourism benefit. This recommendation is based on a preliminary feasibility and a planning conceptual level of and is contingent upon the validation of engineering assumptions through further modeling and design, additional environmental studies and consultation to determinate the feasibility of approvals and permits, outside of the scope of this report.

MOVING FORWARD

Current Scope

The following activities are part of the current scope of works, and will be appended to this report following their completion:

1. Channel survey and survey of features to be removed, to be completed when water level drops to 18 m^3/s.

2. Preliminary geotechnical investigation to be completed by Stantec concurrent to channel survey.

3. Hydraulic Model to validate assumed effects of rock removal.

4. Channel Modification Option Feasibility Report. A very brief report describing the results of the above and with a more refined Opinion of Probable Cost. This report should be the basis for Golden's and additional stakeholder decision to proceed.

Next Steps

Consultation and Collaboration

Consultation with First Nations in the area should be conducted and will be compulsory for environmental permit applications. Additional consultation with regulatory agencies, proponents and stakeholders should be conducted at the conceptual stage. The outcome of the consultation process could largely determine the feasibility of this option. In addition, opportunities to collaborate with interested parties should be reasonably explored during all stages of design, construction, and operation of any facilities contemplated. An ongoing dialogue is encouraged.

Preliminary Engineering Report

The provision of a Preliminary Engineering report, which will build upon the feasibility report and provide more detailed drawings, and is the next stage in obtaining approval for the construction of Option 2. It will also be the basis for regulatory consultation to determine the feasibility of obtaining approvals and will also be included in the regulatory applications.

Environmental Requirements and Regulatory Permit Applications

An environmental assessment is recommended at the conceptual stage of this option. This environmental assessment will serve to inform the likelihood of approval of environmental permit applications (i.e. Section 11 approval, and DFO Authorization), and potential environmental works and habitat offsetting associated with this option.

Potential environmental requirements (not comprehensive)

- Full review of existing desktop information (Preliminary review complete. See Appendix E)
- Fish and fish habitat surveys to determine current aquatic habitat and potential habitat loss.
- Fisheries habitat modeling to determine proposed habitat loss for fish.
- Riparian area surveys to determine current riparian habitat and riparian loss.
- Environmental monitoring on site during construction will be a condition of approvals
- Post-construction assessment and/or monitoring will also be a condition of approvals
- Potential construction of habitat offsetting to compensate of habitat loss during construction.

Fisheries Act

The application follows one of three routes:

- Self-Assessment: no submission to DFO; completed internally.
- Request for Review: If a request for review is recommended or required, DFO typically takes 3 months to complete their review and issue a response.
- Authorization: If an Authorization is required, DFO as legal timelines that they have to meet, including

Timing:

- 60 days to determine if the application is complete; and following this

- 90 days for the Minister to issue an Authorization

At this early stage of the project, we anticipate that a request for review by DFO will be recommended.

Water Sustainability Act (WSA).
"Changes in and about a stream" is defined in the WSA as:

- Any modification to the nature of a stream, including any modification to the land, vegetation and natural environment of a stream or the flow of water in a stream, or
- Any activity or construction within a stream channel that has or may have an impact on a stream or a stream channel

Based on Stantec's recent communication and experience, a minimum of 6 months should be expected. However, the process can take be up to a year.

It is imperative that the application be prepared and submitted as soon as feasible in order to secure a place in the review queue.

Navigation Protection Act
Stantec does not believe the KHR is a scheduled waterway that requires a formal submission to Transport Canada; however, it might be prudent to notify them, as well as the rafting companies as part of a wider engagement protocol.

Land ownership
The client/contractor must provide the names and addresses of any landowners at and upstream of the site. Potential land acquisition and land use/access agreements must be in place prior to construction.

Construction

- Completion of detailed design
- Preparation of tender documents.
- Establish ongoing environmental monitoring as required.
- Carry out ongoing construction supervision as per contracts.

5.0 DISCLAIMER

Whitewater recreational activities are inherently dangerous and hazards in natural systems like the Kicking Horse River cannot be fully mitigated. The recommendations herein do not aim to provide recreational features or features which can be deemed safe to users, or clients of commercial operations. Access to the site is uncontrolled. Stantec assumes no responsibility for the recreational or commercial use of the river at the location of these proposed modifications.

Concepts provided herein are based upon the following hydraulic principles:

- Eliminate the large hydraulic jumps; or, adjust the location and angle where hydraulic jumps occur to improve navigation.
- At locations where jumps may occur then direct flow to the center of the channel through convergent features.

Concepts provided herein are not deemed 'safe' cannot completely prevent death, injury or damage to property including, but not limited to:

- Drowning though means of hydraulic or physical entrapment;
- Impact with rocks, logs, or other objects;
- Impingement on rocks, logs, or other objects;
- The results of negligent use, or use beyond experience level; and,
- Performance above 150 m^3/s (or below 50m^3/s), which was not assessed as part of this stage in the design.

6.0 APPENDICES

APPENDIX A – WHAT WE HEARD

Golden Kicking Horse River Access– August Engagement Session Summary Report

116500403

Prepared for:
Jon Wilsgard
Chief Administrative Officer / Corporate Officer
Town of Golden

Prepared by:
Stantec Consulting Ltd.

September 12, 2016

GOLDEN KICKING HORSE RIVER ACCESS– AUGUST ENGAGEMENT SESSION SUMMARY REPORT

Golden Kicking Horse River Access Feasibility Study – 116500403

1.0 PURPOSE

The aim of this summary report is to capture the directed discussions had with key stakeholders identified by the Town of Golden client, including rafting operators, political representatives from Town, Regional and Provincial governments, and technical experts from the Ministry of Transportation and Infrastructure (MOTI) at an engagement session held on Thursday, August 25, 2016 for the Kicking Horse River Access Feasibility Study.

Directed discussions were guided by a set of questions for three different themes, including:

PART 1: NEEDS ASSESSMENT

1.1 What goes into a Lower Canyon raft trip?
1.2 Where do key activities occur?

PART 2: ACCESS OPTIONS

2.1 How could the existing access road be used for a modified put-in?

- *How will this impact: Safety (Clients, Guides, Public); Business/costs; Trip Logistics (shuttle, staging, parking, etc.); and Client Experience.*

2.2 What alternative opportunities exist for access to the lower canyon?

- *How will this impact: Safety (Clients, Guides, Public); Business/costs; Trip Logistics (shuttle, staging, parking, etc.); and Client Experience.*

PART 3: BEYOND THE RAFT

3.1 What other complementary activities could enhance the rafting experience?
3.2 What site amenities or site enhancements could support this activity?

2.0 KEY THEMES

Responses received were diverse, insightful and extremely valuable to the overall process. Following a review of the responses received at August 26, 2016 engagement session, a set of high-level themes emerged. Detailed responses are provided in Appendix A.

EXISTING SAFETY ISSUES

A constant theme throughout the discussion was the issue of safety. In particular, discussions of the current access raised a number of safety issues, including crossing the highway, the door of raft client buses opening up on to the highway side, the variable terrain of the Canadian Pacific (CP) maintenance road, and the state of the 30 Mile crossing. Participants were in agreement

that modifications to the existing access or the development of an alternative access must address these safety issues for all involved.

ACCESS OPTIONS

While discussions were diverse and covered a range of ideas as highlighted in Appendix A, participants were able to identify four potential access options to be explored by the project team based on their knowledge of the Kicking Horse River and Lower Canyon. This key theme and the four individual access options discussed will inform the project team in their own analysis of the feasibility of certain options.

1. ***Modifications to Current Access***
   Relative to other topics covered during the afternoon session, modifications to the current access occupied a short period of time. This was largely due to the fact that participants were skeptical of CP and willingness to allow for a potentially precedent-setting private crossing. However, individuals were able to identify that the development of a pedestrian bridge from the existing access road may be a possible option. The bridge design and location would have to account for land ownership and mitigate any interference with the existing CP tracks. Modifications to the current access may also require a certain degree of political involvement from Provincial Ministers as identified by participants at the session.

2. ***Managing the River***
   Certain participants had a clear interest in examining the topography and hydrology of the Lower Canyon along the Kicking Horse River with a hydrologist to see if any modifications could be made. This could lead to opportunities to connect the Upper and Lower stretches of the river, which would enhance the overall experience for rafters. However, the topic of managing the river led to others in the room identifying that altering the river with the existing gradient may lead to additional boulders returning the next year the portion of river.

3. ***Yoho Bridge Pull-Off***
   This preliminary access option emerged as a direct result of the efforts of MOTI staff to develop a preliminary idea and willingness to share with the group at the session. While the option had not yet received approvals, had no costs associated with it and had potential safety constraints associated with it due to speed of traffic near the pull-off, participants took interest in this option. Individuals also highlighted potential opportunities and issues with it, including avoiding congestion, limiting traffic speeds seasonally or temporally through the area and different ways to access the river from the highway.

4. ***Enhanced 'Aerial' Modifications***
   When discussing how to access the river from both the existing access and the preliminary Yoho Bridge pull-off, certain participants identified that one value-added means to do so could be the introduction of a zipline in combination with

stairs or pathways. Using this enhanced 'aerial' modification could avoid the CP 30 Mile rail crossing all together. In terms of potential locations, participants identified that a zipline could be located: from just after the bridge and run to Split Rock on the other bank; from the other side of the proposed Yoho Bridge pull-off location; or over CP property and on to the riverbank where helicopters have been landing. For each option, further analysis of land ownership, safety and costs would have to be completed.

RIVER-FOCUSED ENHANCEMENTS

During the final portion of the afternoon session, it became clear when asked about site amenities and site enhancements, that the 'biggest enhancement is adding a new piece of river to the rafting experience'. Participants did not want a series of additional amenities added to a new access beyond simple interventions to enhance the rafting experience for users, such as a new staging area or site-specific modification to the river. Modifications to the existing eddy before the Yoho Bridge was identified as one important river-focused enhancement that could benefit the enjoyment and safety of rafting client as the eddy is too weak and not large enough to accommodate a safe put-in.

MANAGING INCREASED ACCESS

Certain participants were cautious about any new amenity that could attract a large influx of the general public and create congestion or safety issues for commercial and recreational rafters trying to access the river by 'attracting more people to an area that is already tight'. As one participant indicated, 'I don't want options that encourage the public to run across the highway'. Participants acknowledged during the session that a new access, such as the Yoho Bridge pull-off, could also result in smaller trips, and this may require a '[…] change in price to reflect exclusivity.' As a result, there was a general agreement that a change is capacity on the site may be require to accommodate the infrastructure needed for the new access.

3.0 NEXT STEPS

The findings of this report will be shared internally with all participants in order to validate 'what was heard' and finalize the report. The report will then be revised and used by the project team as a key reference point in assessing the feasibility of potential access options for the Lower Canyon of the Kicking Horse River.

APPENDIX A: DETAILED FINDINGS

DETAILED FINDINGS

The detailed responses to each set of questions that formed the basis of the key themes are documented below. The use of quotations marks indicates a direct quote. Where there are no quotations, the discussion has been paraphrased.

PART 1: NEEDS ASSESSMENT

1.1 What goes into a Lower Canyon raft trip?
1.2 Where do key activities occur?

During the initial segment of the needs assessment, participants clarified for the project team that the Lower Canyon trips are typically an 'add-on' trip to the Upper Canyon. All detailed safety briefings are typically done in advance of the Upper Canyon trip at the Beaverfoot Road put-in. Clients who opt to also do the Lower Canyon trip, after the take-out from the Upper Canyon segment, are shuttled by a bus that crosses the highway to the CP access road at 30 Mile Crossing. Individuals then exit the bus at the pull-off for the CP access road with the door facing traffic. Historically clients have walked down the road and trucks were used to transport the rafts down the access road prior to being carried over the tracks whereupon clients walked over the tracks to the river bank and the rafts were launched. Currently, one operator transports clients and equipment directly to the riverbank via helicopter. All Lower Canyon Trips bring clients directly into Town with the take-out at the Kicking Horse Pedestrian Bridge at 8th Ave North.

1.3 Is there anything about the current access that negatively affects trips?

- ***Safety of clients and guides***
- ***Client enjoyment***
- ***Trip logistics***
- ***Business operations***

General Responses:

- **Highway Experience + Safety -** 'Crossing the highway is not an ideal situation' – nor is 'door [of the bus] opening on to the highway side'
- **State of CP Tracks and Access** - 'The CP tracks are in an appalling state' – used as an informal garbage dump of construction materials
- 'Road turn out is bad and the road is fairly steep' – loose gravel prevents school buses from traveling down further along the existing road.
- 'We are carrying boats through variable terrain'
- 'We drive boats down to tracks and guides take them across the tracks. Clients carry boats across the rocks'
    - Rocks at existing Lower Canyon put-in are relatively jagged and slippery
- 'Rare to see client turn around because of steep road' – however, if they find road physically demanding, they likely should not be rafting Lower Canyon.
- **Client Enjoyment + Changing State of Rafting** - 'Historically buses would go all the way down, but usage has changed significantly. Intensity and number of boats has increased'

- 'Nature of adventure traveler has changed as well as the risk we can take on'
    - 'We started with non-self-bailers. Now we can manage risk better'
    - 'Demands have also increased for level of adventure. We as operators have pushed that demand, but also societal shift'
    - 'Everyone needs an adrenaline fix'
- **Continued use of access** – 'Recreational kayakers are still trespassing across the CP tracks'
- **Trip Logistics** – 'With highway being tiered, the existing maneuver may not be feasible'
- Operators cannot make turn heading east with trucks and trailer and have to go all the way to the rafters take-out to turn around
- MOTI staff then identified they were 'concerned about getting out on the highway side' and would prefer that people getting out facing traffic is avoided.
- To date, operators have been managing that risk among others given the existing conditions of the access.
- As identified by one operator, 'we'd love not to have to drive across like that'
- **Business Operations + Permits** - currently, general river access permit is 'all part of the package and renewed every 5 to 10 years'. There is also a permit for accessing on and off the highway, but doesn't have any costs associated with it.

1.4 How could a site be ideally designed to enhance safety, client experience and trip logistics?

General Responses:

- A good staging area at the river is a necessary component
- 'Don't need a lot of space' – a portable toilet may be a good addition to a site, but don't need a lot of other amenities.
- 'Safety briefing is done prior to getting down there; only specific protocols related to the tracks and put-in are used'
- 'No one does lunch hour than around Hunter Creek'
- 'Sometimes lunch happens after the trip'
- 'Ideal site would be able to get on and off bus safely'
- 'Also a porta-potty facility would be ideal'

PART 2: ACCESS OPTIONS

2.1 How could the existing access road be used for a modified put-in?

- ***How will this impact: Safety (Clients, Guides, Public); Business/costs; Trip Logistics (shuttle, staging, parking, etc.); and Client Experience.***

General Responses:

Discussions for this question focused on CP cooperation, ownership of the lands south of the tracks and the extent of the right-of-way of 30 Mile crossing. General skepticism was observed from the entire group with respect to this question. Everyone acknowledged challenges, and then agreed to move on to other solutions. Specific responses documented during this brief discussion include:

- 'Say CP allows us to access it now and then 10 years down the line they say no thanks – that is a huge issue'
- 'Trust is a major issue with CP'
- 'Does CP have a minimum set of conditions for an access?'
- 'Surprised there isn't a crossing arm in that area'
    - 'this is a non-existing crossing to CP – not a public crossing, therefore doesn't exist'
- 'Larger issue is that CP has to deal with thousands of public crossings across Canada and changing regulations'
- 'We need a conversation of that's more painful than this' – need CP to weigh out options and trade-offs
- 'Garneau has been involved – says we have to put safety first. It would take a political effort to squeeze CP. Hammer I can think of is to change taxation'
- 'It would be interested to have a conversation with Transport Canada – could be an ally'
- **Pedestrian Bridge** - While potentially hard to implement, one solution identified by the group for the existing access road was a pedestrian bridge with appropriate clearances that is not on CP property.
    - 'What are the parameters of a pedestrian bridge?'

2.2 What alternative opportunities exist for access to the lower canyon?

- ***How will this impact: Safety (Clients, Guides, Public); Business/costs; Trip Logistics (shuttle, staging, parking, etc.); and Client Experience.***

General Responses:

1. Managing the River Morphology

- 'The river is a managed watercourse'
    - 'We need to look with the hydrologist at the river'
    - One participant asked for clarification by stating 'is this where we are talking about blowing up the river?'
    - 'Need to look at topography and hydrology'
    - 'At low water you can see the boulders. Biggest issue will be the gradient with managing the river. If you move them [boulders], they may return next year.'
- **Just Before the Bridge** – 'squeak a pull-out just before the bridge, but could be tough' and poses some safety risk should the rafts fail to exit in time.
- **Connecting upper and lower trips together with a path** – 'it's a long portage. Would need quads and a retaining wall for pathways'

2. Yoho Bridge Pull-Off

- MOTI representatives then presented a preliminary idea to the group involving a highway pull-off just east of the Yoho Bridge and emphasized that there is not approval yet, costs are to be determined and there are constraints with it in terms of safety and design due to speed of traffic near the approach. This led other participants to identify:
        1. 'Could you slow down traffic? 80 zone through there'
        2. 'Could it have seasonal use?' – this could mitigate potential concerns of a deceleration zone and acceleration zone
    - Potential issues with preliminary Yoho Bridge pull-off option:
        1. 'How do you limit non-commercial rafters use to avoid congestion?'

2. ‘How do you ensure RVs and leisure kayakers are not stopping?’
3. ‘How do you get down from the highway?’

- **Before the Bridge** – ‘might not be pretty, might not be cheap – but only way’
- **Changing trips to account for new access –** ‘the nature of the trip may change. May need to make trip smaller [capacity]’
    - ‘Value added? You get the Lower Canyon, but costs more.’
    - ‘Giving rafting away is not creating value’
    - ‘May need to change price to reflect exclusivity’
    - ‘We have a premium product here’
    - ‘Need to market the river as a whole and have a price point that reflects the premium nature of the rafting’
    - If access changes, you may need to cap how many people you can take’
    - ‘Limit capacity may create demand, not a bad thing for us operators’ – similar to the nightclub analogy – given the option of A or B in a town you are visiting, ‘you always go to the one with the lineup’
    - ‘Okay with a cap on the site to accommodate the infrastructure you need for the new access’
- **Hiking Trails** – ‘there is capacity to the community to assist in building hiking trails. Trail builder alliance is working to build out parks plan through mostly trails’
    - ‘Hiking trails could be difficult with grades on non-CP side’
- **Potential Risks –** ‘every time you take someone in and out of a raft is when risks are highest’ – large reason for why clients wear helmets to avoid issues when moving outside the raft along the shorelines.
- **Other Options –** ‘I don’t see any other options to the east of the bridge.’
    - ‘Always nice to have buffer between where you eddy out and crazy piece.’
    - ‘Raft waterslide along the edge?’

3. Zipline

- Discussions then shifted to one participant identify if it is feasible to introduce an ‘aerial option’ by asking the following question to the group - ‘Could you zipline over CP tracks?’
    - ‘Lots of places zipline rafts into canyons’
    - ‘It’s another enhancement to the product. Could be more difficult, but that may be much cooler for clients’
    - ‘Other side of the bridge is an extremely useable area’ – could be a combination of stairs and a zipline
    - ‘Ziplines may have two highway pull-offs so could be more expensive’
    - Potential zipline options discussed included:
        1. Zipline from after the bridge to Split Rock on the other bank
        2. Zipline from the other side of the MOTI preliminary Yoho Bridge pull-off option
        3. Zipline over CP property and land on split along river where helicopters have been landing
    - However, for option 3 would need to know where the property ends and would also need to know what clearance is required.

4. Modifying Current Access

- **Current Access** – 'Something will have to be done eventually and current access will have to be modified down the line to be certified as safe.'
    - 'When four lanes happens – that issue has to be resolved'
- **Phase 4 Road Widening** – 'so far off in implementation, no secured funding and we'd still be crossing tracks'
- **Political Approach –** 'get Minister Bond and meet with CP in Calgary. Could be in September, and wouldn't be a waste of time.'
    - 'Minister Bond running again and she is very senior. Could also bring Minister Stone as well to meeting.'
    - 'CP goes to government all the time and asks for favours.'
    - 'It's a critical piece to finding and implementing a solution'

PART 3: BEYOND THE RAFT

3.1 What other complementary activities could enhance the rafting experience?
3.2 What site amenities or site enhancements could support this activity?

General Responses:
To begin discussions, it was identified by the Project Manager that 'many successful Ottawa River companies have different pieces. As such, how do we support an alternative put-in area through other tourism components?' This generated a number of responses that largely focused on ensuring a new area doesn't create more issues by 'attracting more people to an area that is already tight'. Other responses included:

- 'Don't want public to linger there'
- 'View point could be nice with CP engine, the bridge and the surrounding landscape'
- 'Have big enough staging area for commercial and recreational rafters'
- 'If ideal solution could add access for kayakers, that would be great'
- 'Low-impact walking path/trail could also be nice'
- 'Greater access may result in putting in more parking, trash cans and maintenance'
    - 'Trucks and fifth wheels will likely park there'
    - 'Guy who stops at every single pull-out for a photo is also an issue'
    - 'Do not enter sign won't stop them'
- While ideal complimentary activities may be difficult to identify - 'need to consider Golden - show thousands of guests Golden and push them into Town'
- Higher put-in could allow individuals to 'raft from bridge to beach then go into Golden'
- 'Biggest enhancement is adding new piece of river to rafting experience'
- Greater access mitigation strategy – 'could use barriers/gate to limit access for rafters'
    - 'Unfortunately our capacity is limited and influence on highway traffic is hugely problematic'
    - 'Coming in at certain time of day – so not out of the realm to staff it with a person to keep it moving'
    - 'Pull-off for trucks just up the highway and past the Kicking Horse rest stop isn't heavily used by the public' – likely as a result of the steep slope and that they just passed a rest stop

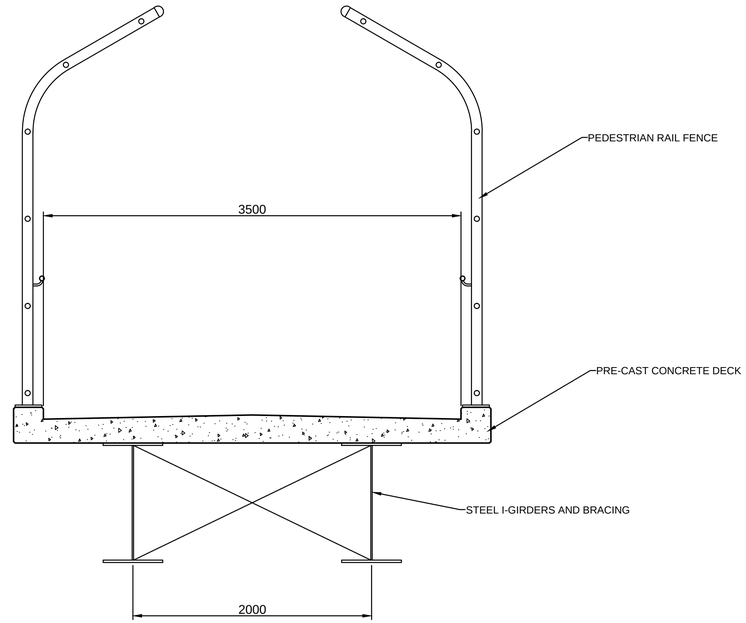
- 'Enhancements should enhance rafting experience and not attract others'
    - 'Make eddy near new bridge better. Rafters getting thrown into it from the start.'
    - Currently, eddy is too weak and not large enough to accommodate a safe put-in. Further, rapids start as soon as you get into the river. Modifying eddy could enable clients to build confidence before being thrown into it.
- 'I don't want options that encourage the public to run across the highway'

FINAL COMMENTS

To conclude, participants were encouraged to share final thoughts to relay back to the entire project team. During this final portion of the afternoon session, attendees praised and thanked MOTI staff for their efforts to develop a preliminary alternative solution. Final thoughts included:

- 'Don't be concerned about throwing new ideas at us. We want creative solutions'
- 'Great river around us – so don't hesitate to be thinking outside of the box when you discover new information as part of your study'
- 'This is an amazing collaborative project – the community support locally, provincially, nationally and internationally through Facebook responses has been great'
- 'CP may be missing – but the collaboration is the upside'
- 'It is wonderful that the Province is supporting these efforts'
- 'If politicians knew where and how we wanted to access the river as rafters it would be easier for them to have a political conversation'
- 'Fly over CP tracks could get political support if they [Provincial Ministers] know what exactly we want'
- 'Interesting to see if we went to CP and provided clear direction, what their response might be'
- 'We don't want to chase that CP carrot constantly' – need to confirm if CP is willing to have a conversation at all

APPENDIX B – PEDESTRIAN BRIDGE OVER TRACKS CONCEPT



A — TYPICAL BRIDGE SECTION
1:25

ELEVATION
SCALE 1:150

Revision	By	Appd.	YY.MM.DD

Issued	By	Appd.	YY.MM.DD

Consultants

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Client/Project
TOWN OF GOLDEN

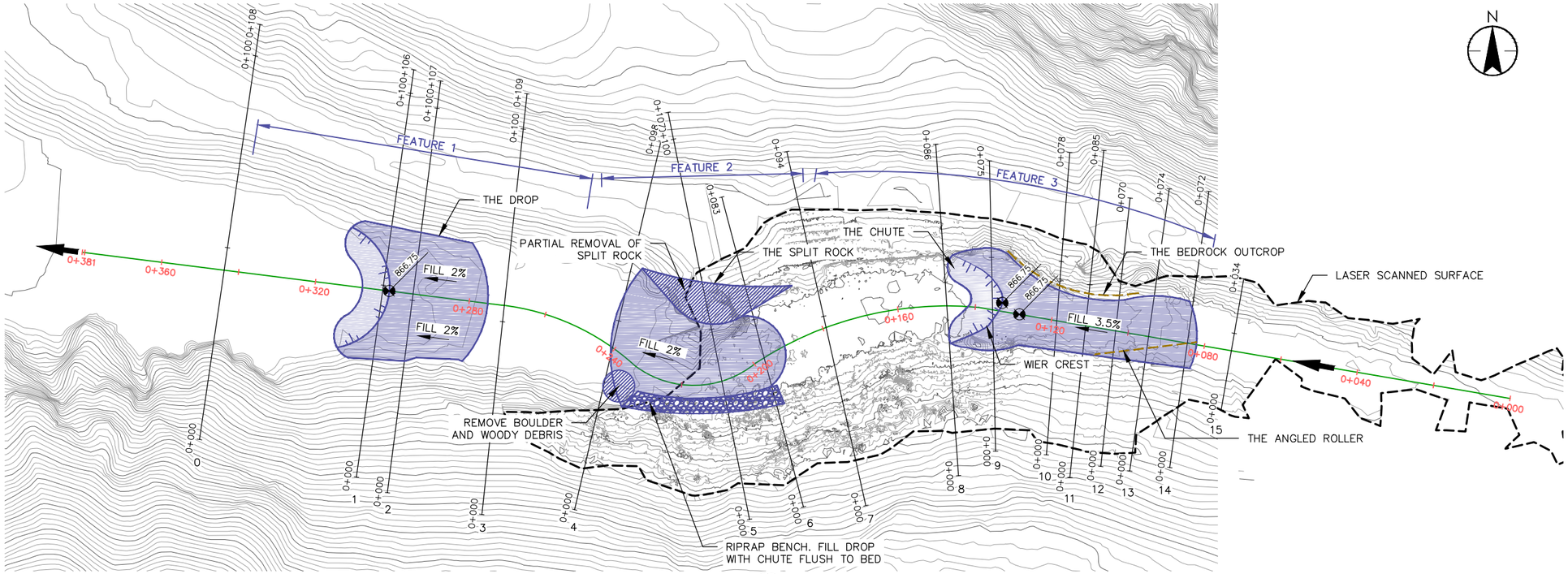
KICKING HORSE CANYON
RAFTERS PULLOUT RAILWAY CROSSING
GOLDEN, BC

File Name: 116500403-S1.dwg	MAU Dwn.	Chkd.	LMC Dsgn.	16.10.12 YY.MM.DD

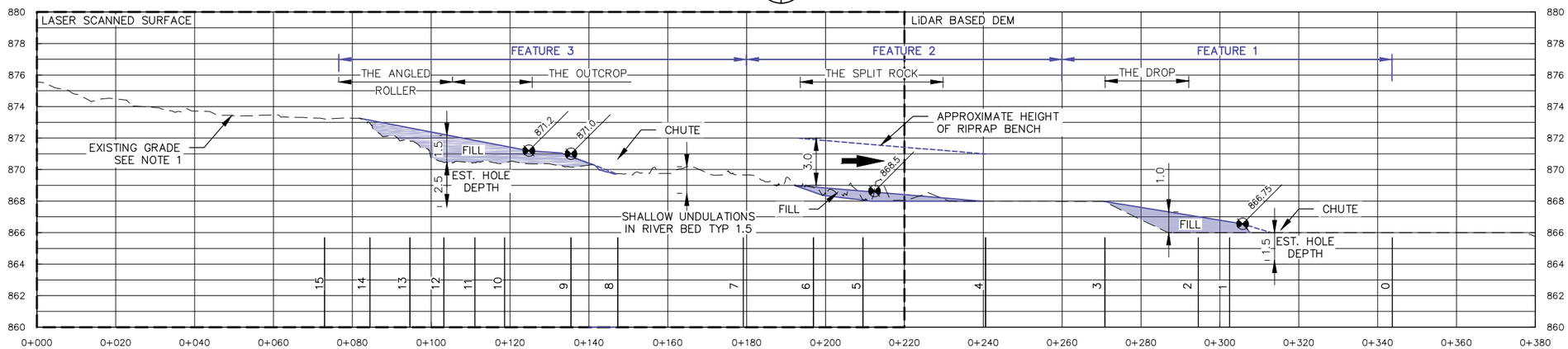
Title
RAILWAY CROSSING
RAILWAY CROSSING OPTIONS
AT-GRADE VS. GRADE SEPARATED

Project No.	Scale	
116500403.592	AS SHOWN	
Drawing No.	Sheet	Revision
S1	1 of 1	-

APPENDIX C – CHANNEL MODIFICATION CONCEPT



1 PLAN
1:1250



2 KICKING HORSE RIVER PROFILE
H 1:1250 V 1:200

ORIGINAL SHEET - ANSI B

JANUARY, 2017
116500403

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Notes

1. EXISTING GRADE SHOWN IS A COMBINATION OF THE SUPPLIED LiDAR BASED DEM AND LIMITED LASER SCAN TAKEN BY STANTEC ON DECEMBER 19, 2016.
   - 1.1. BATHYMETRY (GROUND SURFACE BELOW THE WATER) IS NOT REPRESENTED.
   - 1.2. SURVEY REQUIRED IN EARLY APRIL TO VALIDATE MATERIAL QUANTITIES AND FEATURE GRADES. SCOUR HOLES AND BED UNDULATIONS SHOWN ARE FROM SURFACE OBSERVATIONS AND ARE FOR CONCEPT PURPOSES ONLY.

Scale: 1:1250 0 12.5 37.5 62.5m

Client/Project
THE TOWN OF GOLDEN
KICKING HORSE RIVER
ACCESS ASSESSMENT

Figure No.
A1

Title
CHANNEL MODIFICATION
CONCEPT - PLAN

[i] Kicking Horse River Access Feasibility Study: Request for Proposals 2016