



Basic Environmental Impact Analysis

Highways Rock Scaling Program, Jasper National Park

Jasper National Park

File: J13-006

Date: January 31, 2013





| | | |
|---|--|--------------------------|
| 1. PROJECT TITLE | Highways Rock Scaling Program | |
| 2. PROJECT LOCATION (Park, Site, Canal, NMCA) | Jasper National Park of Canada | |
| 3. PROJECT SITE(S) | <p>The original scope of the project (J06-023 Highways Rock Scaling Program, Jasper National Park) assessed rock scaling activities at the following locations:</p> <ul style="list-style-type: none"> • Hwy 93 – Tangle Hill, Beauty Flats, Sunwapta Resort and Hardisty Hill. • Hwy 16 – portions of most rock cuts from the west boundary to the Hwy 93 junction and Disaster Point. <p>And rock disposal at:</p> <ul style="list-style-type: none"> • Marmot Pit • Site opposite Tangle Camp access • Maligne Pit • Roche Miette Pit • Ranger Pit | |
| 4. PROPONENT | Parks Canada Highways Service Centre | |
| 5. PROPONENT CONTACT INFORMATION | Marion Lee, Parks Canada Highway Manager, Jasper, 780.852.6101 Ryan Syme, Project Manager, Banff, 403-760-1334 | |
| 6. PROJECT DATES | Commencement: it is anticipated that project activities will be conducted during the Spring/Summer and Fall of 2013 | Completion: Fall of 2013 |
| 7. INTERNAL PROJECT FILE # | J13-006: Amendment of J06-023 | |
| 8. PROJECT DESCRIPTION (For help completing this section see instructions at end of document) | | |
| <p>The areas identified for rock scaling have all been scaled in the past and are part of an ongoing scaling program to maintain the highway infrastructure and ensure public safety.</p> <p>Planning</p> <p>Work is based on 2012 field assessment of slope stability (<i>Re-inspection of rock cuts and soil slopes – Jasper National Park</i>, EBA Engineering, 2012). Areas scheduled for work are of high or moderate priority. Recommended actions include scaling, trimming, bolting and ditch cleaning. A qualified engineer has inspected the sites and the proposed work is feasible. Fewer or more sites may be completed depending on bids received.</p> <p>Mobilization</p> <p>Due to budget and scheduling consideration the Highway Service Centre is proposing to complete urgent rock scaling at various locations. The work would only include sections that are a safety concern, as determined by a consultant field review. 2013 work to be completed during the spring, summer and fall.</p> <p>Crew of up to 10 will be on-site, including supervisor, scalers, equipment operator, blaster, flag people. Equipment required will be loader, excavator, dump-trucks, rock drill, compressors, generators, traffic control vehicle, support trucks, ropes and hand tools.</p> <p>All equipment will be brought to site via most direct route. Equipment will be staged in gated areas or pull-outs. If public</p> | | |





areas are used a safety assessment will be done and if necessary the area will be closed to the public for the duration of work at that location. Temporary roadside signage will be installed. **Contractors working within the National Park are prohibited from using or staying in public campground facilities, within the National Park.** A pre-work briefing will be held to ensure familiarity with the job, safety and environmental concerns.

Slope Stabilization

Scaling – loose rock will be hand scaled using pry- bars and other hand tools. Workers will be roped and harnessed and work the slope from top anchors. Anchors will be rock when possible; trees may be used as well. Scaling will include removal of deadfall, shrubs and trees from the slope being cleaned. Small hand-placed explosives may be used to loosen larger rock masses. Crew size will be a minimum of 4 scalers and supervisor. Highway closures will be required to protect public. Closures will generally be limited to 20 minutes or less. Trained and certified flag persons will provide traffic control. Crews and equipment may set up temporary work space in ditch areas and road-side pull-outs.

Trimming

Larger masses of rock with the potential to release and land on the Highway will be removed using mechanical equipment or explosives.

Bolting

Potentially unstable masses of rock can sometimes be stabilized using rock bolts, long steel rods drilled into the rock to bind it together. Rods are grouted in place using resin or cement. Steel plates are sometimes placed over the end of the bolt to provide a larger surface area.

Ditch Cleaning

Accumulations of debris in ditch reduce their effectiveness at trapping rockfall and reduce public safety. Ditches will be cleaned using a loader and hoe. Guardrails and rock fences may be temporarily removed to permit this activity. Rock disposal via dump truck will be at previously disturbed and identified locations: Marmot Pit, opposite Tangle Maintenance Camp, Ranger Pit, Maligne Pit and Roche Miette Pit depending on budget and scope. At night or on weekends equipment will be placed well off highway or into nearby pull-outs. There may be closures of some pull-out areas for storage of equipment and materials.

Clean-up

All scaled rock will be removed to disposal locations, guard-rails and fences replaced. Highway will be cleared of any residual debris and temporary signage removed. Damage to road surface will be patched and repaired if required, **by the contractor.**

9. ENVIRONMENTAL COMPONENTS LIKELY TO BE AFFECTED (For help completing this section see instructions at end of document)

This basic impact analysis will consider environmental impacts at the immediate area (site) level. Socio-economic and cumulative effects will be at the regional (park) level.

Environmental effects on vegetation (Haller's Apple Moss, a SARA species) have the highest potential significance during this project. In a survey done in August 2007, no Haller's Apple moss or suitable habitat were found in the rock scaling areas or approaches. Minor adverse effects on air quality and wildlife disturbance are anticipated during the period of work, with no residual impacts expected. No impacts are considered likely to cultural or aquatic resources.

.1 Overview

The rock cut stabilization work will be dealing primarily with unstable sedimentary rock formations. These slopes are





actively eroding, have been scaled before and have very little vegetation. The slopes are high angle with little forage value, therefore see little use by large or small mammals. Access to work areas will use adjacent less steep and less disturbed areas with greater potential for environmental impacts. Waste rock disposal sites are previously disturbed, unvegetated areas, immediately adjacent existing linear disturbances such as the Hwy and Railway. The Hwy 93 slopes are west facing and approaching tree-line. Summers are short and snow depths in winter may exceed 1.0m. Hwy 16 slopes are north facing and receive no sunlight several months of the year. Snow depths in winter rarely exceed 0.5m.

.2 Eco-Sites / Vegetation

Work associated with this project will take place within the lower sub-alpine (Hwy 93) and montane (Hwy 16) ecoregions. Eco sites are the Panorma Ridge 2 and Norquay 1 sites. The primary forest vegetation is Lodgepole Pine/Buffaloberry and Englemann Spruce or Douglas Fir.

Haller's Apple Moss, a federally listed Species at Risk (threatened) is found in two locations within Jasper National Park. These locations are steep rocky ledges some distance (1km+) from either end of the proposed rock scaling work on Hwy 16. Haller's Apple Moss grows on ledges, in crevices of shaded, forested cliffs, at the base of overhangs and where rock slides of acidic bedrock occur at lower elevations in the mountains. It is unlikely to be encountered along the actively scaled slopes. It may be found in narrow gullies adjacent to or above slopes being scaled and could be impacted during site access.

Botanists (Peter Achuff and Rene Belland) surveyed the scaling sites and approaches along Highway 16 west of Jasper in August of 2007 – no Haller's Apple Moss populations or suitable habitat were found within the project area or approaches.



Haller's Apple Moss

The species is a medium-sized moss found in tufts 4 to 13 cm high, green to yellow or brownish-green in colour. The capsules are on very short seta (stalks), and immersed among the leaves.

.3 Wildlife

Although the Parks' Ecological (Biophysical) Land Classification rates affected ecosites as being only moderately important to ungulates, it is known the Hwy 93 site at Tangle Hill, is heavily used by Bighorn sheep and mountain goats throughout the year. The area is also of considerable importance to smaller carnivores such as lynx, martens and weasels. Elk and Moose are known to frequent areas downslope of the Hwy 16 sites, but generally avoid the Hwy and rock cut areas.





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.4 Aquatics

There are no directly affected water courses at any of the slopes or disposal sites. The closest water to Hwy 16 site is the Miette River, approximately 400m distant. A small unnamed stream flows adjacent the rock disposal area at Geikie Siding. The Sunwapta River is approximately 500m from the Hwy 93 site. Tangle Creek flows approximately 100m from the Hwy 93 rock disposal area.

.5 Cultural Resources

The Hwy 16 sites fall within the *Yellowhead Pass National Historic Site*. The cultural resources in the historic site are not under threat from routine highway maintenance provided established protocols are followed to safeguard the resources including consultation with Cultural Resource Specialists. The Jasper National Park Cultural Resource Specialist (Mike Dillon) was consulted as part of this environmental assessment review (May 2008) and had no concerns with the scope of work.

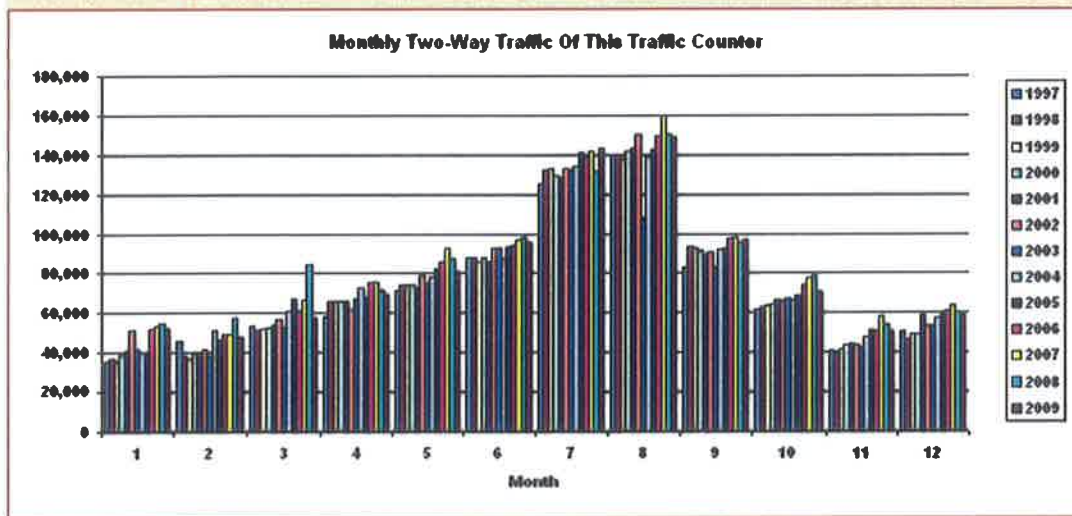
No cultural resources were identified within the project area for the Hwy 93 sites.

.6 Human Use

Sites are adjacent busy highways and the work is necessary to prevent damage or injury to Highway users caused by uncontrolled rock-fall from the slopes. The Highways Service Centre is aware of traffic volumes on these highways during the summer months, the importance of positive visitor experience and the problems that closures can cause on a busy highway.

Highway 16 West is a busy inter-provincial road with approximately 140,000 vehicles in August to 90,000 in September. Traffic includes commercial transports, the travelling public and park visitors.

Counter Location DSE TO JASPER PARK WEST GATE, 19.1 KM W OF 16 & 93 W JASPER TOWNSITE



Hwy 16 West Traffic Counter Data.

Hwy 93 is a scenic parkway, frequented by tourists, tour buses and the travelling public. Traffic on Hwy 93 ranges from 80,000-110,000 vehicles in August to 50,000-65,000 in September.

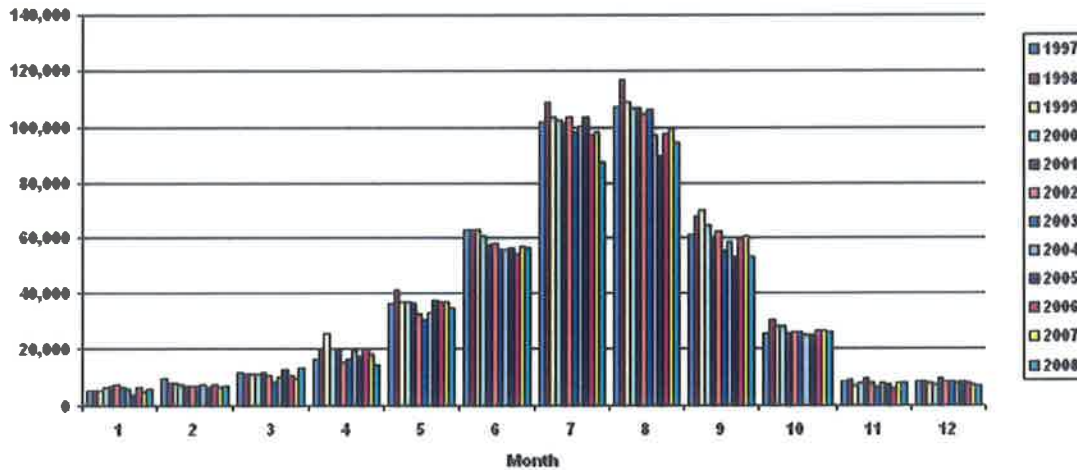




Counter Location

CLOSE TO JASPER PARK SOUTH GATE, 0.3 KM S OF BANFF-JASPER BORDER

Monthly Two-Way Traffic Of This Traffic Counter



Hwy 93 West Traffic Counter Data.

All sites are highly visible from the highway and will be observed by millions of people each year.

Two pipelines and a railway run below the Hwy 16 sites, approximately 150m and 200m distant respectively.

There is no traditional use, resource extraction use in the area of the proposed work. There is a public viewpoint near the Hwy 93 site.





10. EFFECTS IDENTIFIED (For help completing this section see instructions at end of document)

Please refer to Appendix 1: EFFECTS IDENTIFICATION MATRIX. Most project effects are expected to be minor, temporary and of limited spatial extent. Work will proceed in cycles of activity at a given location, providing pauses in impacts throughout a working day and over the length of the project (4-6 weeks).

.1 Vegetation

1. There is limited vegetation present on slopes to be scaled. Isolated clumps of trees, shrubs, grasses, mosses, lichens may be damaged or removed by project activities.
2. Vegetation along worker access routes to the top of slopes will be trampled and compacted.
3. Vegetation in disposal areas will be covered by rock debris.
4. Vegetation in the area around work site may be impacted by blast-rock and dust accumulation.
5. Haller's Apple Moss is **not present**, therefore no impacts are expected to this SARA listed species.

.2 Wildlife

1. There is some wildlife use of slopes to be scaled and access routes.
2. Habitat of some small mammals may be affected by scaling and disposal activity.
3. Wildlife will likely be displaced from area due to noise of equipment operating, workers and blasting.
4. Wildlife could experience increased mortality due to workers driving along highway.

Wildlife could become habituated to human presence through worker presence, through traffic stoppages, or public exiting their vehicles in atypical locations.

5. Wildlife could access food, garbage or toxic substances.

6. Goat kidding in the Tangle area may be affected. *avoided through mitigation - see measure #19)*

Plantiff

.3 Aquatics

1. There are no aquatic resources in the project area, therefore no impacts are anticipated.

.4 Cultural Resources

1. The project activities and area were reviewed by the JNP Cultural Resource Specialist and no cultural resources were identified, therefore no impacts are anticipated.

.5 Human Use

1. This work will require road closures, causing travellers delays.
2. Noise impacts and potential closure will occur at the Tangle Hill scenic viewpoint on Hwy 93 and at the Tangle Falls viewpoint.
3. Public will be exposed to increased risk of rockfall during project activities, decreased risk subsequent to project completion. Explosive storage may have safety implications.
4. Potential for impact on pipeline integrity with blasting operations.
5. No impacts are anticipated on railway operations, traditional use or cultural sites.
6. Minor impacts are expected to air quality due to dust, vehicle and equipment emissions.
7. Potential for spill of hazardous substances from equipment such as fuel, oil, hydraulic fluid.
8. Potential for spill of cement grout if rock bolts are used.

Human waste will be generated by staff at sites and potentially by tourists stuck in closures as well.

11. MITIGATION MEASURES (For help completing this section see instructions at end of document)

1 Project Specific Mitigations:

1. In order to identify potential impacts to Haller's Apple Moss, a site survey was requested and conducted in August 2007. No Haller's Apple Moss or suitable habitat was found within the rock scaling areas or approaches.





2. Store explosives in accordance with all applicable regulations. Explosives shall be stored outside the Park.
3. The visiting public and commercial operators will experience delays of up to 20 minutes and/or a line-up no longer than 1 km (unless previously agreed upon with the FU). Delays may affect emergency response of resource conservation service staff from Sunwapta Station or town to public safety emergencies in the Icefields Area. Any emergency vehicles with lights and sirens activated will be let through as soon as the worksite is safe – they will not be held in the line up.
4. Jasper FU will be given advance notice of all planned traffic delays. The work in the Tangle area will be coordinated with the Glacier Discovery Walk project.
5. Jasper Emergency Services (Police, Fire Ambulance) will be made aware of proposed closures. All regular commercial users of Hwy 93, such as tour operators, buses, and operations based along Hwy 93 will be contacted about proposed work. Updates will continue to be provided for the duration of the project. An onsite meeting, between Kinder Morgan pipeline staff and a representative from Parks Canada, will be held prior to the contract being tendered.
6. The contractor will obtain the services of a certified traffic control crew who are efficient and competent when dealing with high traffic volumes.
7. The contractor will provide a traffic control plan, for review and approval by the HSC, prior to work taking place. The plan will include ample warning to motorists to ensure that drivers are informed of work zone.
8. The plan will include a commitment to a three person traffic control team, two to flag and one to monitor the status of the signs and the length of lineups.
9. No stoppage of traffic will be allowed on Friday (all day) before a long weekend through to 7:00am on Tuesday morning following a long weekend.
10. All signage that includes words (as opposed to symbols) must be bilingual, English and French.
11. There will be full time on-site project supervision by an Engineering Consultant retained by the Highway Service Centre. Highway Service Centre engineers will also be involved in the project and will make periodic trips to the site to review progress, safety, environmental compliance, traffic accommodation, etc.
12. A comprehensive pre-job meeting will be scheduled including the work supervisor, project managers from the Highway Service Centre and Consultant and the Environmental Surveillance Officer.
13. Electronic signage may be used in advance of the work zone.
14. During blasting, trees and other vegetation will be protected as much as possible by containing fly rock with blasting mats and/or laying charges to direct explosions away from trees.
15. Rock from scaling will be disposed of in pre-designated areas established for that purpose. Acceptable locations are: Marmot Pit, Ranger Pit, Maligne Pit, Roche Miette Pit and opposite the entrance to Tangle Camp on Hwy 93. Rock disposal will not occur at any other location.
16. Material from rock scaling is particularly suitable for rip rap and embankments because of its sharp edges. Separation of fly rock from other waste materials should be considered, so that it can be recycled for future use.
17. Measures shall be taken to control dust as much as possible during the removal and falling of rock materials down slope. Slopes with particularly dry site conditions may be sprayed with water to reduce dust.
18. There will be no rock work in the Tangle area from May 15 through July 15 due to goat kidding.
19. If confirmed by resource conservation staff that there is a significant goat population in Disaster Point, there will be no rock work in this area from May 15 through July 15 due to goat kidding.

.2 Standard Mitigations:

1. The Project Manager is responsible to ensure compliance by Contractor and employees with the environmental protection requirements identified for this project as well as the approved terms and conditions outlined in this agreement. Failure to comply with the terms and conditions herein may result in cancellation of all permits and approvals issued for the project pending rectification of the problem.





2. All activities pursuant to the project shall be governed by and carried out in accordance with the Canada National Parks Act and Regulations and with all other laws of Canada and the Province of Alberta.
3. The proponent is responsible to obtain all necessary permits and approvals before any project activities start. No work will take place until appropriate permits are issued and a start-up meeting with the Environmental Surveillance Officer (J. Deagle, JNP (780) 852-6224) has occurred.
4. Permits required:
 - a. Park Business licence for contractor and sub contractors,
 - b. Disturbance of natural objects,
 - c. Travel in restricted area (disposal sites),
 - d. Overweight vehicle on Icefields Parkway.

- Permit Contact - J. Deagle, JNP (780) 852-6224.
5. Under *Section 112 of the National Energy Board Act*, permission from a pipeline company is required prior to excavating using power –operated equipment or explosives within 30 metres (100 ft) of a federally regulated pipeline right-of-way. Although work is outside these limits, Kinder Morgan Canada will be notified of proposed blasting on Hwy 16 and their recommendations, if any, implemented. - Contact Claude Saunders, 780-852-8566.
6. Parks Canada will assign an ESO (J. Deagle, JNP (780) 852-6224) to the project to ensure compliance with the identified environmental protection measures. In addition to measures identified in this document the ESO, in consultation with the Project Manager, may require other mitigation in response to any unforeseen environmental impacts. The ESO may suspend work that is in non-compliance of this approval.
7. The ESO must be contacted at least two weeks prior to project start-up to arrange contractor start-up briefing and site surveillance.
8. The ESO and Project Manager will identify and delineate the designated work areas for vehicle access, parking, equipment, material storage and disposal before work begins. No work will be carried out beyond these limits.
9. The Project Manager is responsible to provide advance notification of the project in local media advising the local community of where and when the work will occur and shall be responsible for addressing any public inquiries. (This is generally done by local Parks Communication staff utilizing information provided by the Project Manager).
10. Public access to the project will be prevented with appropriate signing and fencing. If necessary to protect the public, pullouts or other areas may be closed. Appropriate traffic management system needs to be implemented prior to project start-up and continued until project completion. Signs must be bilingual or symbolic to warn motorists of equipment and men working.
11. All workers must have the required protective equipment for the job and be trained in accordance with the provisions included in the *Alberta Occupational Health and Safety Act* and *Workers Compensation Board*. All sites must have a first aid kit, fire extinguisher and a list of emergency contact numbers.
12. Noise and air pollution on site from equipment and trucks will be kept to a minimum by shutting off all motors while not in use.
13. Equipment will be inspected daily for fluid/fuel leaks and kept in good working order. Drips will be immediately treated with absorbent spill pads and leaks repaired.
14. The contractor must have an emergency response plan and spill kit available at each work site and all staff shall be aware of its location and trained in its use in case of spill or leak. In the event of any fuel/lubricant leaks, absorbent material will be provided for clean up and any contaminated soils will be hauled to an appropriate disposal facility.
15. Parks Canada Dispatch (911 or 852-6155) should be notified immediately of any fluid spills or leaks exceeding 5 litres. ESO should be informed of all spills.
16. Equipment will be fuelled on hardened surfaces. Overnight, equipment will be parked on plastic tarps or other impervious surface.
17. All stationary stores of liquid hazardous material (e.g. fuel) and stationary operating equipment with fuel tanks or hydraulic systems (e.g. pumps) will be located in a impervious secondary containment area (e.g. a bermed area





with impervious liner) capable of holding 110% of the contents of the largest container in the area. Refueling may be done from a slip tank in the back of a pick-up. All tanks will be equipped with automatic shut off nozzles and break away couplings.

18. All equipment is to be steam cleaned or pressure washed prior to arrival in Jasper N.P to prevent the introduction of non-native vegetation into the park. Once final work locations have been identified, the sites will be inspected by Jasper Non-Native Plant Control staff. Should non-native species of concern be identified at a work site, equipment will be re-washed before being relocated to a new site to prevent the spread of non-native plants within the park.
19. Daylight operation of all mechanised equipment will be respected.
20. Observations of wildlife-vehicle collisions, carcasses or other wildlife encounters will be reported to Jasper Dispatch immediately (852-6155).
21. Feeding or harassment of wildlife is prohibited. Any problems including aggressive encounters with wildlife (e.g. bears, sheep, elk, and coyotes) will be reported to the Jasper Dispatch immediately (852-6155).
22. All garbage will be stored and handled in compliance with the National Park Garbage Regulations.
23. Burning or burial of waste is not permitted.
24. Portable toilets are required at job-sites for workers and for tourists along highway during closures.
25. The Contractor assumes all risk to public safety and personal injury resulting from the project activities.

12. IMPACT SIGNIFICANCE (For help completing this section see instructions at end of document)

Assuming that mitigating measures are adhered to, there is not expected to be any ongoing impact.

.1 Temporary Impacts

- Noise and disturbance of wildlife – short-term and localized – **not significant**.
- Disturbance of vegetation on slopes and access routes- medium to long term, localized – **not significant**.
- Disturbance and inconvenience of Park visitors. – short-term delays and inconvenience, minor impairment of park experience to visitors – **not significant**. Work will increase public safety along the highway corridors.
- Potential spills during work – unlikely, localized and reversible – **not significant**.

.2 Residual Impacts

- Accelerated mass wasting of the rock slopes above Hwy 16, Maligne Road, Miette Road and Hwy 93. This will result in the removal of several hundred cubic meters of rock material and placing it in disposal sites.
- Loss of some limited vegetation, expansion of disposal area – minor negative environmental impacts – **not significant**.

.3 Cumulative Impacts

Other projects known or anticipated to occur in close proximity to this work are: on-going highway operation and maintenance; continued railway operation and maintenance; continued operation and maintenance of TransMountain Pipeline and TMX restoration activities; future twinning of Hwy 16; and redevelopment of the scenic viewpoint at Tangle Hill, Hwy 93.

Rock scaling will continue to be a routine maintenance activity throughout the Park and is not expected to contribute significantly to cumulative environmental effects.

13. SITE INSPECTION (For help completing this section see instructions at end of document)

☐ Site inspection not required

☒ Site inspection required

Site Inspection program details





This project has potential for limited environmental effects when all mitigations in screening report are adhered to. Inspection is required to ensure compliance with recommended mitigations. Inspection will consist of a pre-work start-up briefing by the Environmental Surveillance Officer (ESO) to project manager, crew foremen, and crew members. On-going compliance monitoring will be responsibility of the project manager. Occasional spot checks of compliance will be performed by ESO or designate.

ESO: Jurgen Deagle, Environmental Management Specialist, Jasper National Park (780) 852-6224

Project Manager: Ryan Syme, Parks Canada, Banff National Park (403) 760-1334

14. EXPERTS CONSULTED (Including PCA Experts)

| | |
|-------------------------------|---|
| Department/Agency/Institution | Parks Canada |
| Contact Information | Mabaye Dia |
| Date of Request | 2012-11-29 |
| Expertise Requested | Environmental Assessment Scientist |
| Response | Revised and amended the original environmental assessment (J06-023) under the <i>Parks Canada Interim Directive on implementation of the Canadian Environmental Assessment Act 2012</i> . |
| Department/Agency/Institution | Parks Canada |
| Contact Information | Marion Lee and Ryan Syme |
| Date of Request | 2013-01-25 |
| Expertise Requested | Highway Service Centre |
| Response | Reviewed and amended the document from a public safety point of view. |
| Department/Agency/Institution | Parks Canada |
| Contact Information | Mark Bradley |
| Date of Request | 2012-12-04 |
| Expertise Requested | Wildlife Biologist |
| Response | Don't think there would be any goats close enough to the highway near the Sunwapta Falls area to be of concern |
| Department/Agency/Institution | Parks Canada |
| Contact Information | Jurgen Deagle |
| Date of Request | 2013-01-22 |
| Expertise Requested | Environmental Management Specialist |
| Response | Author of the Original EA. Blasting activities timing: Preferably not in June, July and August. But if required, should take place from Monday and Friday and not in long weekends. Pointed out that Disaster Point could be added as an area for work. |

15. PUBLIC PARTICIPATION ☒ No
☐ Yes

16. DECISION

Taking into account implementation of mitigation measures outlined in the analysis, the project is:

- ☒ Not likely to cause significant adverse environmental effects.
- ☐ Likely to cause significant adverse environmental effects.





Environmental Impact Reviewer

Title: Environmental Assessment Scientist

Date: 2013-01-31

Title: Parks Canada Highway Manager

Date 2012-11-31

Name: Shawn Cardiff

Title: JNP, Integrated Land Use Policy & Planning Manager

~~Dec.~~ Feb 15/13 Date

Title: JNP, Field Unit Superintendent

Date 15-02-17

Parks Canada Agency (2012) *Parks Canada Interim Directive on implementation of the Canadian Environmental Assessment Act 2012*.

Axys Environmental Consulting Ltd. and David Walker & Associates. 1998. *Best Available Methods for Common Leaseholder Activities*. Prepared for Line Leaseholders Working Group, Jasper National Park. Calgary.

Delcan Corporation, Environmental Systems Group. 1989. *Environmental Standards for Road Maintenance Functions in National Parks*. Submitted to Natural Resources Branch, Canadian Parks Service, Environment Canada, Ottawa.

Dobson, B., 2005, Locations of Haller's Apple Moss in Jasper National Park, personal communication.

EBA Engineering. 2006. *Re-inspection of rock cuts and soil slopes – Jasper National Park.*

Holland and Coen 1983, *Biophysical Inventory of Jasper and Banff National Parks*, Banff, AB

Jasper Environmental Assessment Services. 2003. *Standard Mitigations For Environmental Assessments*, Jasper, AB.

Rissling-Wynn, L., 2003, *Class Screening For Routine Hwy Maintenance Activities* (DRAFT), Jasper, AB.

18. ATTACHMENTS LIST

| APPENDIX 1: EFFECTS IDENTIFICATION MATRIX | | | | | | | | | | | | | | |
|---|------|--|---|------|-------|--------|-----------------------------------|--------------------------|-----------------------------|--------------------------|-------------------------------|-----------------------------------|--------------------------|--|
| | | Use the following matrix to identify if your project may have potential impacts on components of the environment | Components of Environment and Mandate Elements Affected by Environmental Change | | | | | | | | | | | |
| | | | Natural Resources | | | | | Cultural Resources | | Visitor Experience | | | | |
| | | | Air | Soil | Water | Flora | Fauna | Historic Value | Character defining elements | Viewscape | Visitor appreciation & access | Recreational /other opportunities | Public Safety | Unique character & connection to place |
| Pro | ject | ctio | n/p | rep | | Phases | Examples of Associated Activities | | | | | | | |
| | | | | | | | Scaling | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | x | x | <input type="checkbox"/> | <input type="checkbox"/> |
| | | | | | | | Trimming/blasting | x | <input type="checkbox"/> | <input type="checkbox"/> | x | x | <input type="checkbox"/> | <input type="checkbox"/> |



| | | | | | | | | | | | | | | |
|--|----------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | Bolting | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | Ditch cleaning | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | x | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | Clean-up | x | <input type="checkbox"/> | <input type="checkbox"/> | x | x | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | x | <input type="checkbox"/> | x | <input type="checkbox"/> | <input type="checkbox"/> |

19. ADDITIONAL CONSIDERATIONS / COMMENTS

The potential impacts described in this environmental impact analysis are part of an on-going disturbance regime which has been occurring for years. The mitigation measures identified are designed to reduce the magnitude of impacts. The adverse effects identified are reversible and human-use management actions can be undertaken to reduce or eliminate the effects.



