

ENVIRONMENTAL MITIGATION MEASURES

The bridge site is in the same place as the original bridge. Minor adjustments to the alignment, abutments and span design will allow the bridge to be rebuilt and will reduce the project impact. The trail re-route will arc away from the river and will ascend onto and descend from a higher bench, thereby avoiding wet areas adjacent to the river that are also likely to be prone to future washout. Ultimately, keeping the project footprint as small as possible will further reduce potential effects. It is expected that all staff and contractors will understand and comply with all National Park regulations within the Park. Pre-work briefings/meetings are recommended to address environmental sensitivities within the Project Area, such as erosion and sedimentation, wildlife interaction and equipment spills, leaks and cleanup. Trail construction, including clearing, grubbing and vegetative debris disposal, will be undertaken in accordance with the Parks Canada Trail and Back Country Facility Design Guidelines, Appendix 4: Environmental Best Practices (Attachment 4).

An Environmental Protection Plan (EPP) will be prepared in accordance with the measures outlined in this report, as well as DFO's *Measures to Avoid Harm to Fish and Fish Habitat* (Attachment 2) and the Parks Canada Directive 17: Environmental Guidelines for Development Projects (Attachment 3). To ensure mitigation of potential adverse effects identified, the EPP shall be available to all staff during project activities and will include:

- An access plan that outlines the proposed access route(s), types of equipment to be used for various phases and locations/sizes of lay-down areas in order to prevent/minimize disturbance to vegetation and soils. This will include details on how the work limits will be marked out and what procedures will be employed to ensure trespass outside these limits does not occur and to ensure that the environment is not impacted or damaged by works or construction equipment beyond the work limits.
- Details of the containment systems proposed for use in preventing any debris from entering the Cascade River during break-up and removal of the south abutment and during construction/installation of the bridge.
- An Erosion and Sediment Control Plan to the satisfaction of the Departmental Representative and Environmental Surveillance Officer (ESO). The plan shall detail appropriate work methods, best practices for working around water, proposed erosion control methods and containment methodology for break-up and removal of the south abutment. Parks Canada's desired end result is to allow no release of sediments into any water body in levels that are deleterious to fish or fish habitat or wildlife habitat or that would alter growing or hydraulic conditions;
- An Emergency Response Plan that outlines procedures to follow in the case of a spill or other type of emergency (wildlife encounter, fire, equipment malfunction/failure), including appropriate spill kit requirements and spill and emergency response contacts. The Spill Response Plan will detail the containment and storage, security, handling, use and disposal of all hazardous materials, including empty containers, surplus product or waste generated in the application of these products, to the satisfaction of the Departmental Representative and the ESO and in accordance with all applicable federal and provincial legislation. The EPP shall include a list of products and materials to be used or brought to the construction site that are considered or defined as hazardous or toxic to the environment, including but not limited to, sealer, grout, cement, concrete finishing agents and adhesives;

- A snow clearing plan if required; and
- Provisions to reduce human-wildlife interactions.

All staff employed at the construction site shall be instructed by the ESO during an Environmental Briefing regarding their individual and collective responsibilities to ensure avoidable adverse environmental impact does not arise from their activities and personal choices.

Surface Water Quality

- Limit machinery fording of the watercourse to a one-time event (i.e., over and back), and only if no alternative crossing method is available. If repeated crossings of the watercourse are required, construct a temporary crossing structure. Parks Canada Aquatics department to advise on best location for fording.
- Conduct in-stream work (i.e., removal of south abutment and old bridge superstructure from the riverbed and placement of riprap on the south bank) during fish timing windows (i.e., May 1 to May 15 and/or Aug 15 to 31) and/or in the dry (i.e. when water levels have dropped below these areas). If in-stream work is required when these conditions do not apply, a worksite isolation, fish salvage and water quality monitoring plan must be submitted to Parks Canada for review by the Environmental Assessment and Aquatics departments prior to in-stream work commencing.
- A containment system must be in place during break-up and removal of the south abutment and the old bridge superstructure to catch all debris.
- A containment system must be installed during installation of the new bridge to prevent deleterious substances from entering the Cascade River. The containment system (shrouding) should be permeable to allow rain to pass through. If welding is used, welding solder must be contained locally or a containment system used that is capable of trapping welding solder and preventing it from entering the Cascade River during welding activities.
- All demolition, construction debris and other waste materials will be disposed of at an approved landfill facility outside the park.
- The Contractor will provide drip and spill containment for portable generators and equipment used or parked overnight on-site, as permitted by the ESO. Mechanized equipment will be stored 30 m from watercourses with an impermeable containment.
- Monitoring for grout breakout will be undertaken during micro-pile installations and appropriate action will be taken to prevent/contain any breakouts.
- Vegetation removal will be minimized as much as possible, especially in riparian areas.
- No excavation or removal of material from the riverbed will be allowed.
- An erosion and sediment control plan will be prepared to prevent/minimize erosion and sedimentation and will outline appropriate dewatering and erosion and sediment control measures for the project.

- Install effective erosion and sediment control measures before starting work to prevent the entry of sediment into the watercourse. Erosion and sediment control measures shall be inspected regularly during the course of construction and repairs shall be made as necessary.
- The site will be secured against erosion during any periods of construction inactivity or shutdown.

Stream Hydrology

- The new bridge will be aligned perpendicular to the river flow and has been designed to address river and channel processes at the 1:100 year flood return. There will be a minimum freeboard of 2 m to accommodate floods and debris passage.
- Riprap will be installed at a stable gradient that does not constrict the river flow and maintains a uniform bank/shoreline that blends with the natural river alignment.
- Appropriately sized, clean rock will be used. The rock will not be acid containing or poor quality limestone rock that fractures or breaks down quickly when exposed to the elements.
- Riprap will be placed in a controlled manner and will not be dumped down the bank.

Fish and Fish Habitat

- See measures identified above under Surface Water Quality.
- Removal of natural woody debris, rocks, sand or other materials from the banks and shoreline of the river will be minimized as much as possible. If material has to be moved (e.g., during removal of the former south abutment and old bridge superstructure), it should be placed on dry portions of the streambed downstream of the bridge site.
- If blasting is proposed in order to break up the south abutment, this must be done in accordance with the relevant DFO *Measures to Avoid Harm to Fish and Fish Habitat* (see Attachment 2).
- All other work for the bridge is to occur above the wetted stream and in a manner that minimizes disturbances to the banks of the watercourse.
- Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks.
- Machinery is to be washed, refueled and serviced and fuel is to be stored at least 100 m away from the river to prevent any deleterious substance from entering the water.
- In the event of a major spill, all other work shall be stopped and all personnel devoted to spill containment and cleanup.
- Wet and uncured concrete is an acutely toxic substance for an aquatic environment. Extra care not to introduce these materials into the environment is required. The Contractor's EPP shall address concrete plant location, operation and reclamation where required, to the satisfaction of the Departmental Representative and the ESO.

- Water contaminated in the placing of cement and curing of concrete shall be contained and removed from the site to an approved disposal facility.

Vegetation and Soils

- Equipment and materials lay down areas will use existing trails, roads and hard surfaces wherever possible to avoid disturbance to native vegetation, especially riparian vegetation.
- The contractor shall ensure that all soil, seeds and any debris attached to construction equipment to be used on the project site has been removed (e.g. power washing) outside the Banff National Park before delivery to the work site to limit introduction of non-native or invasive vegetation species.
- If fill brought into the site for use on building the ramps will be clean and free of weeds/weed seeds.
- Fill that is sourced locally, borrow areas must be located such that they can be properly rehabilitated and re-contoured so that they blend naturally into the landscape and so that aesthetic impacts to areas used for recreation, especially the nearby campground, are avoided. The following mitigation measures will apply:
 - Wherever possible the trail bed that is to be abandoned will be dug back to prepare for restoration and re-used for the new trail.
 - Any borrow sites outside the new trail footprint will have the top layer stripped prior to excavation. Wherever possible, store vegetation on already disturbed areas. After excavation, the pit will be contoured to blend with existing areas and the duff/organic materials, debris and salvaged vegetation will be used to rehabilitate the site;
 - The site will not exceed 5% slope;
 - Excavation beyond the footprint of the new trail will not be greater than 2 m in diameter or deeper than 1 m;
 - Excavation will not go below the water table; and
 - No holes or craters will be created.
- Stripped soil (including fine forest litter) materials shall be placed and stored at locations, for later reclamation use on graded slopes (eg. Trail to be abandoned). Stripping piles may require erosion control depending on the location and anticipated duration of storage.
- Restoration of disturbed areas will be undertaken as soon as possible following construction and will include seeding with an appropriate native seed mix for the site, as well as live staking of shrub species in any riparian areas that have been disturbed by project activities. Site-specific restoration requirements will be determined in consultation with the ESO following completion of construction. The live stakes will be harvested from willow and/or dogwood shrubs growing in the riparian area of the Cascade River, preferably within 0.5 km of the bridge site.

Wildlife and Wildlife Habitat

- The trail re-route will avoid any ponds or wet areas and therefore should not affect potential amphibian breeding habitat.
- During the Environmental Briefing, all personnel shall be instructed by the ESO on procedures to follow in the event of wildlife appearance near or within the work site and any other wildlife concerns.
- Avoid or terminate activities on site that attract or disturb wildlife and vacate the area and stay away from the immediate location if bears, cougars, wolves, elk or moose that display aggressive behaviour or persistent intrusion. Extra care to control materials that might attract wildlife (e.g. lunches and food scraps) must be exercised at all times.
- Notify the ESO and Departmental Representative immediately about dens, litters, nests, carcasses (road kills), bear activity or encounters on or around the site or crew accommodation. Other wildlife related encounters are to be reported within 24 hours. If the ESO or Departmental Representative are not available, Banff Dispatch will be contacted at (403) 762-4506.
- Care will be taken to prevent the disturbance of nesting birds and/or the destruction of bird nests during construction activities. General breeding bird windows occur from April 1 to August 31 and any proposed tree felling or shrub removal during this period will require nest surveys.

Cultural Resources

- Artifacts, relics, antiquities and items of historical interest such as cornerstones, commemorative plaques, inscribed tablets and similar objects found on the work site shall be reported to the ESO or the Departmental Representative immediately. The Contractor and workers shall wait for instructions before proceeding with their work.
- All historical or archaeological objects found in Banff National Park are protected under the National Parks Act and Regulations and are the property of Parks Canada. The Contractor and workers shall protect any artifacts found and request direction from the ESO or the Departmental Representative.

Visitor Experience

- A construction traffic safety or management plan shall be incorporated into the EPP to address contractor and public safety around the site.