

Table 4.3 Mitigations for Reducing Potential Impacts of Project Activities

| Activity  | Potential Impacts  | Best Management Practices  |
|---|--|--|
| Site investigation, including geotechnical investigation  | Runoff / sedimentation; Erosion; Soil compaction; Loss / damage to vegetation / soil; Wildlife sensory disturbance / mortality | <ul style="list-style-type: none"> <li>• Conduct site surveys, test pits, bore holes using appropriate excavation mitigation measures for geotechnical investigation (see mitigations for “Grading, excavation and materials stripping”).</li> <li>• Minimize the time boreholes or test pits remain open in order to reduce small terrestrial wildlife mortality. Properly seal boreholes and fit PVC pipes.</li> <li>• Avoid site investigations during dusk and dawn in order to reduce human presence and wildlife disturbance during hunting/foraging or movement through areas.</li> </ul>   |
| <ul style="list-style-type: none"> <li>• Vegetation clearance</li> <li>• Grading, excavation &amp; material stripping</li> <li>• Building construction</li> <li>• Trenching &amp; backfilling</li> <li>• Replacement or modification of culverts &amp; ditches</li> <li>• Utilities / foundation removal</li> </ul> | Runoff / sedimentation   | <ul style="list-style-type: none"> <li>• Prepare a Sediment and Erosion Control Plan satisfactory to Park Superintendent.</li> <li>• Acquire necessary sediment control equipment (i.e., straw bales, landscaping fabric, sediment fences, etc.) and install prior to construction.</li> </ul> <p>In all ecosites, on areas with a slope class of 5 (5-15%) or greater and sites close to waterbodies, but not closer than 30 m:</p> <ul style="list-style-type: none"> <li>• Assess slopes stability (based on slope length, soil texture, steepness, soil depth).</li> <li>• Use appropriate geo-technical control measures to stabilize slopes.</li> <li>• Filter or settle out sediment before the water enters any drainage pathway.</li> <li>• Halt construction activity on exposed soil during events of high rainfall intensity.</li> <li>• Periodically inspect erosion control structures for effectiveness.</li> <li>• Minimize vegetation cover removal.</li> <li>• To ensure that site runoff is minimized, control overland flow up gradient and down gradient of exposed areas by use of diversion ditches, bales, vegetative filter strips, and/or sediment traps.</li> <li>• When possible, hand clear slopes &gt; 35%. Wait to clear steep sloped areas until immediately before scheduled construction and reclaim immediately afterwards.</li> <li>• Stockpiles related to excavations will be stored a minimum of 2 m from embankments, slumps, water bodies and containment sources to prevent material loss or degradation.</li> <li>• Following excavations, lightly tamp disturbed areas to minimize slumping and potential pooling of water and leave a crown when tamping down to allow for settling.</li> </ul> |

| Activity  | Potential Impacts   | Best Management Practices  |
|---|---|--|
| <ul style="list-style-type: none"> <li>• Vegetation clearance</li> <li>• Grading, excavation &amp; material stripping</li> <li>• Building construction</li> <li>• Trenching &amp; backfilling</li> <li>• Replacement or modification of culverts &amp; ditches</li> <li>• Utilities / foundation removal</li> </ul> <p><i>(continued)</i></p> | Wind and water erosion  | <p>All Ecosites, especially VL3:</p> <ul style="list-style-type: none"> <li>• Protect exposed soils with coarse granular materials, mulches, straw, or landscaping fabric along drainage pathways.</li> <li>• Minimize grubbing.</li> <li>• Clear minimum area necessary. Where possible, leave stumps and roots in place.</li> <li>• Cover stockpiles of soil with polyethylene sheeting, tarps, or vegetative cover.</li> </ul>  |
|   | Compaction of soils   | <ul style="list-style-type: none"> <li>• Identify soils susceptible to compaction (fine textured and organic soils).</li> <li>• In sensitive areas, use equipment of low bearing weight, low PSI tires, or tracked vehicles.</li> </ul>  |
|   | Dust production   | <ul style="list-style-type: none"> <li>• Wet down dry, exposed soils, particularly during windy periods.</li> <li>• Ensure materials being stored or transported are covered with tarps or equivalent material.</li> </ul>   |
|   | <p><i>All wildlife:</i><br/>Wildlife habitat loss and fragmentation; or encroachment on wildlife movement corridor; or increased wildlife predation as a result of cleared areas; or habituation.</p> | <ul style="list-style-type: none"> <li>• Identify wildlife habitat that may be impacted by activities and avoid sensitive areas, including wetlands.</li> <li>• When working adjacent to undisturbed areas and areas bordering natural habitat, especially wildlife movement corridors and natural wetlands: minimize activity to daylight hours, as dusk/dawn times are critical for wildlife life stages (breeding, nesting, rearing, migration).</li> <li>• Clear only the minimum area required for construction activities.</li> <li>• Minimize barriers to movement including equipment and human presence during daylight hours. Restrict activity during dusk and dawn.</li> <li>• Keep site free of garbage and dispose of garbage in bear proof containers or haul from site daily.</li> <li>• Retain vegetation barriers where possible, especially trees and shrubbery.</li> <li>• Communicate potential problem and/or habituated wildlife to Parks Canada (403-762-1416).</li> <li>• Investigate for presence of amphibians in manholes before commencing work.</li> <li>• Sweep for bird nests before commencing work. Young birds must be allowed to fledge before nests are disturbed.</li> </ul> |

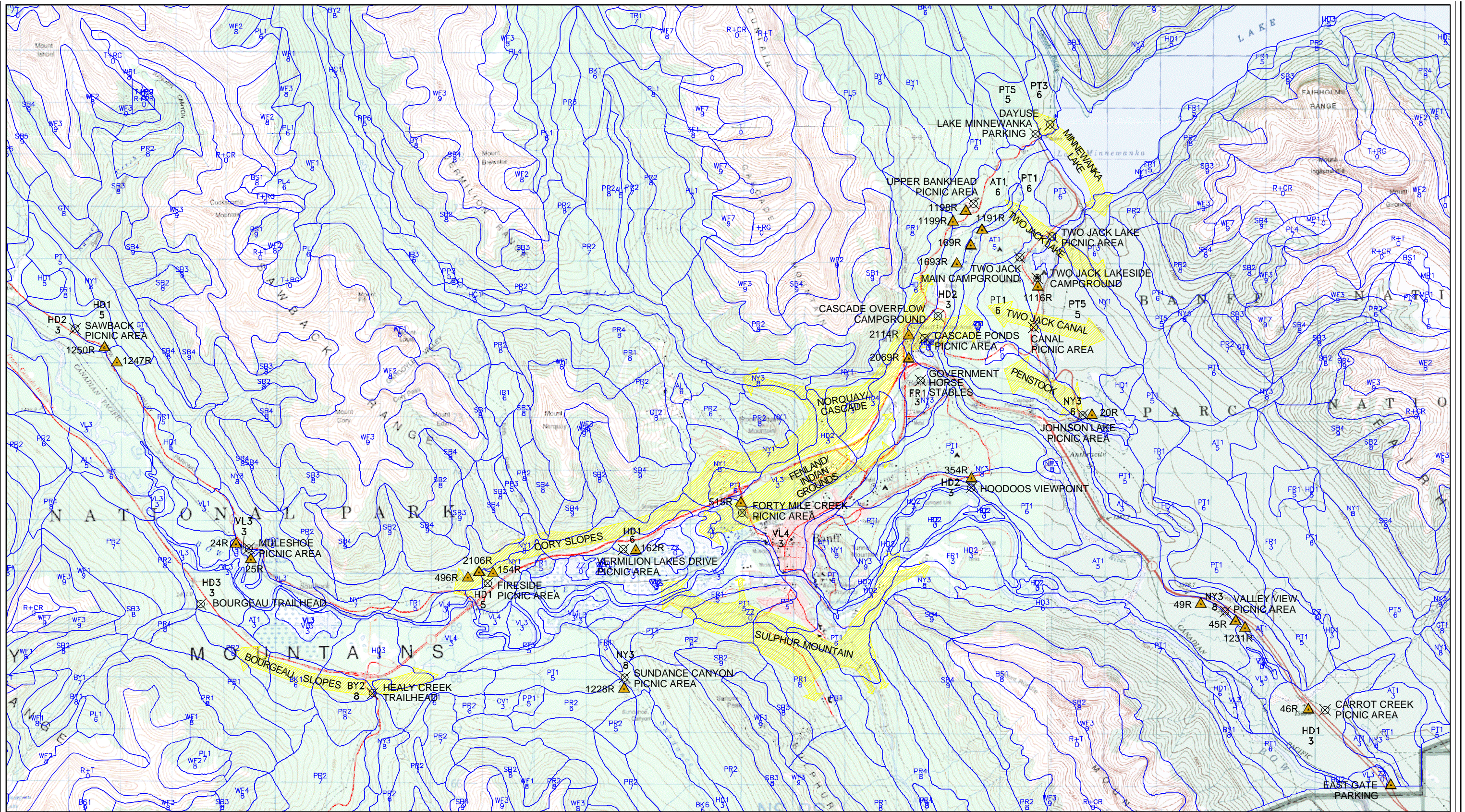
| Activity  | Potential Impacts  | Best Management Practices  |
|---|--|--|
| <ul style="list-style-type: none"> <li>• Vegetation clearance</li> <li>• Grading, excavation &amp; material stripping</li> <li>• Building construction</li> <li>• Trenching &amp; backfilling</li> <li>• Replacement or modification of culverts &amp; ditches</li> <li>• Utilities / foundation removal</li> </ul> <p><i>(continued)</i></p> | <p><i>Species at Risk / of Special Concern:</i></p> <p>Habitat destruction, sensory disturbance, mortality and increased predation of amphibians</p> | <p><i>Species at Risk / of Special Concern</i></p> <p>Grizzly bears</p> <ul style="list-style-type: none"> <li>• Be aware of critical foraging times (dusk and dawn) particularly post hibernation when bears and cubs are leaving dens in the spring (April/May) and prior to hibernation (July to September).</li> <li>• Trail density should be minimized to allow bears better opportunity to access habitat at greater distances from trails.</li> <li>• Management of attractants around trails and facilities (including removal of berry shrubs like Canada buffaloberry) should be combined with restoration of alternative food sources in alternative suitable habitats.</li> </ul> <p>Western (boreal) toad</p> <ul style="list-style-type: none"> <li>• Investigate for presence of toads in manholes before commencing work.</li> <li>• Protect wetlands from human encroachment</li> </ul>  |
|   | <p>Loss of or damage to vegetation, weed invasion</p>  | <p>To protect undisturbed areas adjacent to project site:</p> <ul style="list-style-type: none"> <li>• Minimize area cleared. Clearly mark area to be cleared with biodegradable flagging tape and/or temporary fences.</li> <li>• Ensure vertical (Rocky Mountain) juniper, Douglas fir and limber pine are protected.</li> <li>• For every tree removed, two native trees of same species must be planted on site if possible.</li> <li>• Hoarding around trees to be retained must be installed at the tree's drip line prior to commencement of site work.</li> <li>• Ensure excavated material does not damage or bury plant material that is to be retained on the site or in adjacent areas.</li> <li>• Trees are to be cut so that they fall inside the cleared perimeters.</li> <li>• Care must be taken during grubbing and stripping to ensure that trees and roots on the edge of the cleared area are not disturbed.</li> <li>• Grubbing and stripping may not be permitted on steep slopes to reduce the potential for erosion.</li> <li>• Sites will be reclaimed as soon as possible and seeded with a Parks Canada approved seed mix (see Appendix B).</li> </ul> |



| Activity  | Potential Impacts  | Best Management Practices  |
|---|--|--|
| <ul style="list-style-type: none"> <li>• Vegetation clearance</li> <li>• Grading, excavation &amp; material stripping</li> <li>• Building construction</li> <li>• Trenching &amp; backfilling</li> <li>• Replacement or modification of culverts &amp; ditches</li> <li>• Utilities / foundation removal</li> </ul> <p><i>(continued)</i></p> | <p>Reduction of or disturbance to character of FHBRO listed heritage buildings</p> | <ul style="list-style-type: none"> <li>• All building over 40 years old, including picnic shelters, are to be reviewed by FHBRO prior to work commencing.</li> <li>• All maintenance measures should be non-abrasive, non-destructive and environmentally benign.</li> <li>• Replacement should only occur where the major part of an element is decayed beyond repair.</li> <li>• The substitution of maintenance-free materials such as aluminium, fibreglass or vinyl for existing materials is not recommended.</li> <li>• The design of additions or alterations to a building must respect its heritage character.</li> <li>• Where the integrity of the relationship between a building and its associated landscape is relatively unaltered, strong efforts should be made to retain this relationship and the materials that contribute to it.</li> <li>• Consult FHBRO Code of Practice for complete details.</li> </ul> |
|   | <p>Disturbance of archaeological resources</p>                                     | <ul style="list-style-type: none"> <li>• Determine if project activities have the potential to disturb a site or sites of archaeological or historic interest (see Table 3.3).</li> <li>• Consult with Parks Canada (403-762-1416) to discuss if consultation with the Park's archaeologist is required.</li> <li>• If it is deemed that potential archaeological sites may be subject to ground disturbance, activities should be adapted to avoid them if possible. Monitoring by an archaeologist, and possibly preliminary archaeological work, may also be required.</li> <li>• Work must be stopped immediately and the site supervisor notified if any archaeological artefacts are found and workers must be educated accordingly.</li> </ul>  |
| <ul style="list-style-type: none"> <li>• Grading, excavation &amp; material stripping</li> <li>• Digging holes for replacement utility or fence poles</li> </ul>  | <p>Slope failure</p>   | <ul style="list-style-type: none"> <li>• Avoid work on steep slopes unless absolutely necessary, including areas with slopes of Class 6 (15-30%) or greater, especially where shallow soils overlie bedrock.</li> <li>• Use appropriate geo-technical control measures to stabilize slopes. Consult occupational health and safety guidelines.</li> </ul>  |

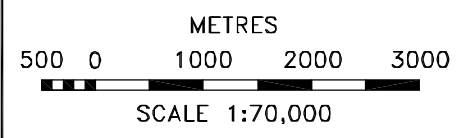
| Activity   | Potential Impacts  | Best Management Practices   |
|--|--|---|
| <ul style="list-style-type: none"> <li>• Grading, excavation &amp; material stripping</li> <li>• Digging holes for replacement utility or fence poles</li> </ul> <p><i>(continued)</i></p> | Loss of or damage to vegetation, weed invasion                         | <ul style="list-style-type: none"> <li>• Protect undisturbed land by only stockpiling materials on heavy canvas, plywood or polypropylene tarpaulins to protect native vegetation. Excavated material should not be permitted to damage or bury plant material that is to be retained on the site or in adjacent areas.</li> <li>• Sites will be reclaimed as soon as possible and seeded with a Parks Canada approved seed mix (see Appendix B).</li> </ul>  |
|  | Loss of organic matter, topsoil and/or topsoil-subsoil mixing          | <ul style="list-style-type: none"> <li>• Use separate lifts and storage of topsoil and subsoil horizons, replacing them in the same order after completion of activity, wherever practical.</li> <li>• Topsoil will be stored away from any slopes, subsoils, spoil material, construction activities and day-to-day operations.</li> <li>• Select appropriate equipment, especially in erosion/slump prone areas Use wide tracked equipment, rubber tired vehicles and low bearing pressure weight equipment in sensitive areas or avoid vehicle use.</li> <li>• Compact soil to approximate precondition conditions while allowing for settling.</li> </ul>   |
|  | Disturbance of archaeological resources                                | <ul style="list-style-type: none"> <li>• Determine if project activities have the potential to disturb a site or sites of archaeological or historic interest (see Table 3.3).</li> <li>• Consult with Parks Canada (403-762-1416) to discuss if consultation with the Park’s archaeologist is required.</li> <li>• If it is deemed that potential archaeological sites may be subject to ground disturbance, activities should be adapted to avoid them if possible. Monitoring by an archaeologist, and possibly preliminary archaeological work, may also be required.</li> <li>• Educate workers to stop work immediately and to notify site supervisor upon finding any archaeological artefacts. Not to resume work in that area until Parks gives approval.</li> </ul> |
|  | Sensory disturbance and mortality of wildlife due to increased traffic | <ul style="list-style-type: none"> <li>• According to the wildlife that may be present, schedule high noise level activities and other intrusive construction activities to avoid critical life stages (breeding, nesting, rearing, migration). Consult with Parks Canada (403-762-1416) to discuss any localized wildlife concerns.</li> <li>• Consider posting wildlife signs to reduce vehicle speeds and increase driver awareness near construction areas were wildlife mortality has or is likely to occur.</li> <li>• Educate workers to not harass or attract wildlife, keep the site free of food scraps, and dispose of garbage in bear proof containers.</li> </ul>  |

| Activity   | Potential Impacts  | Best Management Practices   |
|--|--|---|
| <ul style="list-style-type: none"> <li>• Grading, excavation &amp; material stripping</li> <li>• Digging holes for replacement utility or fence poles</li> </ul> <p><i>(continued)</i></p> | Decreased aesthetics   | <ul style="list-style-type: none"> <li>• Evaluate the site layout, access routes and construction activities to minimize their visual impact.</li> <li>• Materials to be stored within the confines of the work site.</li> </ul>  |
|  | Public safety  | <ul style="list-style-type: none"> <li>• Outline traffic control measures and assess the need for flagging personnel.</li> <li>• Call utility line companies to identify infrastructure locations (Alberta One Call: 1-800-242-3447).</li> </ul>  |
| Construction (painting and paint stripping)  | Contamination of soil and water from accidental spill of paint, stripping compounds, or thinners | <ul style="list-style-type: none"> <li>• Prepare an appropriate Spill Response Plan.</li> <li>• Ensure paint is stored appropriately to prevent spillage.</li> <li>• Dispose of contaminated materials at provincially certified disposal sites outside of the Park. No treatment of contaminated soils (e.g., bioremediation) is allowed in the Park. All applicable documentation demonstrating proper disposal should be obtained. Alternatively, use the paint exchange program in Banff.</li> </ul>                              |
| Right-of-way (ROW) maintenance   | Dust production  | <ul style="list-style-type: none"> <li>• Wet down dry, exposed soils, particularly during windy periods.</li> <li>• Ensure materials being stored or transported are covered with tarps or equivalent material.</li> </ul>  |
|  | Loss of wilderness quality   | <ul style="list-style-type: none"> <li>• Retain vegetation barriers where possible, especially trees and shrubbery.</li> <li>• Minimize the amount of vegetation removed.</li> <li>• Restore vegetation where required.</li> </ul>  |
|  | Contamination from fertilizers and herbicides  | <ul style="list-style-type: none"> <li>• Accurately assess the need for chemicals during right-of-way maintenance. Use products and methods identified in Parks Canada Management Directive 2.4.1 (1985).</li> <li>• A Parks Canada permit must be obtained for herbicide use.</li> <li>• Avoid herbicide/fertilizer use in proximity to, or where runoff may enter a waterbody or drainage pathway.</li> <li>• Ensure adjacent natural areas are not affected by herbicide use.</li> <li>• Do not use near or over water.</li> </ul> |

| Activity                        | Potential Impacts            | Best Management Practices  |
|---------------------------------|------------------------------|--|
| Light installation (10 or more) | Runoff / sedimentation       | <ul style="list-style-type: none"> <li>• Minimize the amount of disturbed soil.</li> <li>• Minimize the time that bare soil is exposed and the excavation remains open. If deemed necessary, use site-specific erosion control methods (see mitigations for “Grading, excavation &amp; materials stripping”).</li> <li>• Stop work during wet weather</li> </ul>   |
| Fence installation              | Barrier to wildlife movement | <ul style="list-style-type: none"> <li>• Evaluate the need for all fences.</li> <li>• Construct fences and orient in such a manner to reduce impacts on wildlife movement. Consult with Parks staff to determine appropriate fence designs and locations (403-762-1416).</li> </ul>  |
| Hazardous materials management  | Potential contamination      | <ul style="list-style-type: none"> <li>• Prepare an appropriate Spill Response Plan. In the event of emergency operations, call 911. The Warden Dispatch can also be contacted (available 24 hours/day) at (403) 762-4506 or the Wardens Office at (403) 762-1470 to notify of any emergency procedures required.</li> <li>• All toxic/hazardous materials will be identified and will be handled as required under the Canadian Environmental Protection Act, Transportation of Dangerous Goods Act and Workplace Hazardous Materials Information Service.</li> <li>• Dispose of contaminated materials at provincially certified disposal sites outside of the Park. No treatment of contaminated soils (e.g., bioremediation) is allowed in the Park. All applicable documentation demonstrating proper disposal should be obtained. Alternatively, use the paint exchange program in Banff.</li> <li>• All hazardous materials and wastes will be clearly labelled with WHMIS labels and information.</li> <li>• Spill contingency plans, equipment and supplies will be present on-site at all times and employees trained in their use.</li> <li>• Fuels, oils, lubricants and other petrochemical products will not be stored within 100 meters of any waterbody (including wetlands).</li> <li>• On-site storage of fuels is not permitted.</li> <li>• If any contamination is found, cease work immediately. Inform the building site supervisor and, if necessary, implement Emergency Response Plan.</li> <li>• Where demolition is involved, check for hazardous materials including asbestos, PCBs, etc.</li> </ul> |

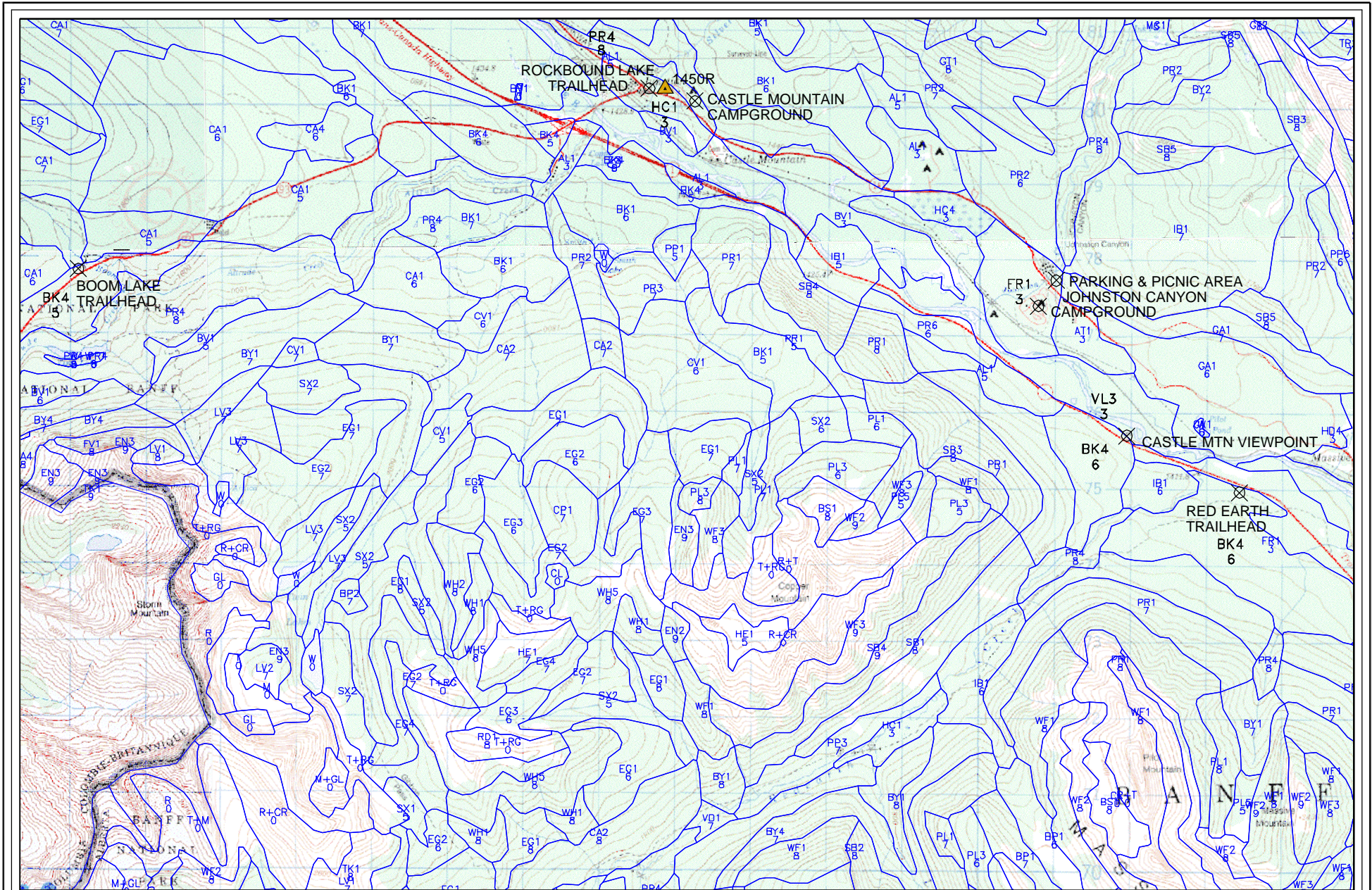


- LEGEND**
-  HISTORIC SITE
  -  WILDLIFE CORRIDOR



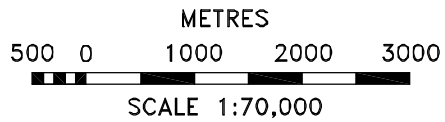
**FIGURE 1A**  
**CLASS SCREENING AREA FOR BANFF**  
**NATIONAL PARK FRONT COUNTRY**  
**ROUTINE MAINTENANCE**





**LEGEND**

 HISTORIC SITE



**FIGURE 1B**  
**CLASS SCREENING AREA FOR**  
**BANFF NATIONAL PARK FRONT**  
**COUNTRY ROUTINE MAINTENANCE**

Table 3.2 Sensitive Resources in Class Screening Area

| <b>Sensitive Resources in Class Screening Area</b> |
|--|
| <b>Species at Risk Act</b>                         |
| Western (boreal) toad – listed on Schedule 1       |
| Grizzly bear – Species of Special Concern          |
| <b>Wildlife Movement Corridors</b>                 |
| Two Jack Lake Corridor                             |
| Two Jack Canal Corridor                            |
| Minnewanka Lake Corridor                           |
| Penstock Corridor                                  |
| Norquay/Cascade Corridor                           |
| Fenland/Indian Grounds Corridor                    |
| Sulphur Mountain Corridor                          |
| Bourgeau Slopes Corridor                           |
| Cory Slopes Corridor                               |
| <b>Environmentally Sensitive Sites</b>             |
| Vermilion Lakes Wetlands ESS                       |
| The Fairholme-Carrot Creek Benchlands ESS          |
| Johnson Lake                                       |
| The Hoodoos  |
| Lake Minnewanka                                    |
| Johnston Canyon                                    |
| Mount Norquay                                      |
| Sawback Range                                      |
| Sunshine Meadows                                   |
| Tunnel Mountain                                    |
| The Norquay/Cascade Wildlife Corridor              |
| <b>Special Resources</b>                           |
| Douglas fir  |
| Trembling aspen                                    |
| Limber pine  |
| Rocky Mountain juniper                             |

Table 3.3 Archaeological / Historic Sites and Concerns

| Type of Project Site        | Name              | Site Type and #  | Findings  | Concerns   |
|-----------------------------|-------------------|--|---|--|
| <b>Picnic/Day-use Areas</b> |                   |  |   |  |
|                             | East Gate         | The gate houses are listed as Federal Heritage Buildings.                              |   | Maintenance repairs or changes to these buildings must follow FHBRO's Code of Practice for Federal Heritage Buildings. |
|                             | Carrot Creek      | 46R, Pre-contact site of limited archaeological significance.                          | A light surface scatter was present on an old fluvial terrace but subsurface tests recovered no further materials.  | No known concerns.   |
|                             | Valleyview        | 45R, 49R, 1231R, Pre-contact site (arbitrarily divided).                               | Artefacts, likely representing small campsites, right at ground level all along terrace edge and close to ground surface in vicinity of picnic tables and informal trails.  | Site is vulnerable if activities occur outside of the existing parking area.   |
|                             | Johnson Lake      | 20R, Pre-contact site.   | Artefacts were found in the 70s and 80s, however area developments and a dam failure have written off much of the site.   | Site is vulnerable if activities occur outside of the existing paved and gravelled area and trails.                    |
|                             | Two Jack Canal    | No known sites.  |   | No known concerns.   |
|                             | Two Jack Lakeside | No known sites.  |   | No known concerns.   |
|                             | Upper Bankhead    | 1198R, Historic site.<br>1199R, Pre-contact site.                                      | Major historic site of the former town of Upper Bankhead, with depressions, ruins and artefacts scattered all through the area.   | Site is vulnerable if activities occur outside of the existing paved area.   |
|                             | Lake Minnewanka   | No known sites in day-use area, but significant pre-contact sites nearby on lakeshore. |   | Unlikely any sites will be affected unless activities occur outside of existing day-use area.                          |
|                             | Cascade Ponds     | 2114R, 2069R, Historic sites located west of picnic area.                              |   | No known concerns.   |
|                             | Forty Mile Creek  | 515R, Pre-contact site.  | Highly significant because in addition to an excellent Late Pre-historic record, affords evidence of a well-stratified Besant component which, at present is unique in this area of the Northern Rockies. Site holds considerable interpretive potential. | Site is vulnerable if activities occur outside of the existing paved area.   |
|                             | Sundance Canyon   | 1228R, Pre-contact site nearby.  |   | No known concerns.   |
|                             | Vermillion Lakes  | 162R, Pre-contact site nearby, and others on other side of TCH.                        |   | No known concerns.   |

| Type of Project Site                            | Name                      | Site Type and #   | Findings  | Concerns  |
|---|---------------------------|---|---|---|
| <b>Picnic/Day-use Areas</b><br><i>continued</i> |                           |   |   |   |
|   | Fireside                  | 154R, Pre-contact site.<br><br>496R, 2106R, Pre-contact and historic site nearby. | Pre-contact site 154R has artefacts right at ground surface. Site is already much disturbed by picnic area.   | Site is vulnerable if activities occur outside of the existing paved area.                          |
|   | Muleshoe                  | 25R, Pre-contact site<br>24R, Pre-contact site nearby.                            | Excavation of 25R was undertaken for installation of the day-use area and results indicated a major occupation ca. 3000 – 1000 B.C. Site 24R also of high significance and probably related to 25R. | Site is vulnerable if activities occur outside of the existing paved area.                          |
|   | Sawback                   | 1247R, 1250R, Pre-contact sites nearby.   |   | No known concerns.  |
|   | Johnston Canyon           | No known sites.   |   | No known concerns.  |
| <b>Campgrounds</b>                              |                           |   |   |   |
|   | Two Jack Lake Main        | 1191R, 169R, 1693R, Historic sites nearby.  |   | No known concerns.  |
|   | Two Jack Lakeside         | 1116R, Historic site.   | Masonry fireplace structure of historic value.  | Historic fireplace must not be disturbed.   |
|   | Cascade Overflow          | No known sites.   |   | No known concerns.  |
|   | Johnston Canyon           | No known sites.   |   | No known concerns.  |
|   | Castle Mountain           | No known sites.   |   | No known concerns.  |
| <b>Trailheads</b>                               |                           |   |   |   |
|   | Healy Creek Trailhead     | No known sites.   |   | No known concerns.  |
|   | Bourgeau Trailhead        | No known sites.   |   | No known concerns.  |
|   | Red Earth Trailhead       | No known sites.   |   | No known concerns.  |
|   | Rockbound Lake Trailhead  | 1450R, Historic site nearby.  | Structural remains demolished and plowed in. Telephone wire, insulators, asphalt shingles, old rails, and privy and corral remains.   | No known concerns.  |
|   | Boom Lake Trailhead       | No known sites.   |   | No known concerns.  |
| <b>Highway Pullouts</b>                         |                           |   |   |   |
|   | Hoodoos Viewpoint         | 354R, Pre-contact site.   | Artefacts scattered throughout picnic area.   | Site is vulnerable if activities occur outside of the existing paved and gravelled area and trails. |
|   | Castle Mountain Viewpoint | 572R, Palaeontological site.  | Triassic fossil fish remains present in rock slabs in area and along waterline. Has been pothunted and vandalised.  | Site is unlikely to be affected if activities are restricted to the existing paved area.            |
| <b>Other</b>                                    |                           |   |   |   |
|   | Government Horse Stables  | No known sites.   |   | No known concerns.  |