

MITIGATION MEASURES

1. Environmental Protection Plan

- 1.1. An Environmental Protection Plan (EPP) describing protection actions and responsibilities to implement mitigations measures is required prior to construction. The EPP must include an erosion and sediment management plan, as well as an emergency spill response plan to detail the containment and storage, security, handling, use, and disposal of empty containers, surplus product, or waste generated in the application of these products in accordance with all applicable deferral and provincial legislation. The plan must include a list of products and materials to be used or brought to the site that are considered or defined as hazardous or toxic to the environment. Such products include, but are not limited to, waterproofing agents, grout, cement, concrete finishing agents, etc.

2. Planning, Site Prep, & Mobilisation

- 2.1. All crew members who will be working on site must attend a briefing with PCA staff before beginning work at the site to review and explain the environmental mitigations that are a condition of work and other site-specific environmental considerations.
- 2.2. Machinery must arrive on site in a clean condition, free of fluid leaks, invasive species, noxious weeds, and soils from off-site. Equipment will be inspected by PCA staff for dirt and debris prior to entering park. Equipment with dirt and debris will not be allowed in to park. Please provide PCA 24 hours notice before mobilising equipment to site so that PCA can arrange an inspection.
- 2.3. Works are preferably undertaken during periods of dry weather to reduce rutting, erosion, and working in waterways during high flows.
- 2.4. Minimise vegetation clearing and ground disturbance by staging on the existing road as much as possible.
- 2.5. All staging and laydown areas should be at least 100 m from waterway.
- 2.6. Any staging or laydown areas not on the road must be identified and approved by PCA staff prior to mobilisation to site. Ripping up the sod layer in staging or laydown areas must be avoided, either by project timing, use of rig mats, or other industry standard practice. Topsoil salvage and replacement may be required where off-road ground disturbance cannot be avoided.

3. Equipment Operations

- 3.1. Operate machinery on land above the high water mark, on ice, or in another manner that minimises disturbance to the banks and bed of any waterbody.
- 3.2. Use designated crossings for fording equipment across waterways.
- 3.3. Vehicles and equipment will not be operated off of designated road or outside of the staging/laydown area.
- 3.4. Vehicles may be parked on or alongside the road within 5 m of the road edge. Do not park in areas of tall grass and wet ground. Do not park within 10 m of waterways.
- 3.5. Do not haul materials or mobilise equipment/machinery when ground conditions are wet to avoid rutting, erosion, and ground disturbance.
- 3.6. Vehicles and machinery must be equipped with working fire extinguishers.

- 3.7. The work area is remote and it is possible work may occur in moderate-extreme fire risk conditions. Additional fire response equipment should be kept accessible on site during work. Parks Canada will provide water source.
- 3.8. These waterways offer important habitat for fish and other aquatic and semi-aquatic species. New low-level crossings will be installed such that they allow fish passage when water is flowing.
- 3.9. Keep materials that might attract wildlife (e.g. petroleum products, food, garbage) in secure, wildlife resistant containers and remove from site in a timely manner.
- 3.10. Notify PCA immediately of any dens, litters, nests, carcasses (e.g. roadkills), or wildlife encounters on or around the site. If wildlife displays aggressive behaviour or persistent intrusion, vacate the area and notify PCA.
- 3.11. Work will not occur on site between April 1 and August 15. This will ensure compliance with the Emergency Order for the Protection of the Greater Sage Grouse (seasonal noise prohibitions from April 1st to May 30th), as well as prevent harm or destruction of breeding birds, their nests, or eggs.
- 3.12. Peak spring or fall reptile/amphibian migrations and hatching are somewhat dependant on temperature and moisture, and vary year to year. If mass movements of reptiles/amphibians through the work area are observed, cease work until reptiles/amphibians have moved out of the work area.

4. Fuel Storage and Refueling

- 4.1. Spill kits need to be provided at re-fuelling, lubrication, and repair locations that are capable of dealing with 110% of the largest potential spill, and need to be maintained in good working order. Site staff need to be informed of the location of the spill response kits and be trained in its use.
 - 4.2. If potentially hazardous materials (e.g. sealants, paints) are used on site ensure raw materials, mixed compounds, and wash water are not released to any watercourse or soils.
 - 4.3. Hazardous or toxic products will not be stored within 100 m of a watercourse.
 - 4.4. Timely and effective action must be taken to stop, contain, and clean-up all spills as long as the site is safe to enter. Notify PCA immediately of any spill. In the event of a major spill, all other work must stop while the spill is contained and cleaned up.
5. Vegetation Removal and Invasive Species Management
- 5.1. The work area will be surveyed for non-native vegetation. If priority invasive weeds are identified, PCA will assign additional mitigations to prevent the spread of those weeds (e.g. avoiding that area or brushing off equipment).
 - 5.2. Cleared vegetation and debris will not be deposited in water bodies.

6. Work in Water

- 6.1. Any work in the riparian zone will adhere to applicable provincial permits.
- 6.2. Prior to any work in the crossings, the work site must be surveyed to assess whether work in water is required.
- 6.3. Provincial authorities must be contacted prior to any withdrawals in Grasslands National Park to determine whether provincial permitting is required.
- 6.4. Do not work in water during the fish breeding window of April 1 – August 31.

- 6.5. If flowing water is present in the crossing where work will occur, the area must be isolated and fish salvaged from work area before dewatering. A permit for fish salvage from the provincial authorities is required before starting work in the crossing. Permit conditions apply.

7. Dewatering

- 7.1. Screen any water intakes or outlet pipes to prevent entrapment or impingement of fish, amphibians, and/or reptiles. Entrapment occurs when a fish or amphibian is drawn into a water intake and cannot escape. Impingement occurs when an entrapped fish, reptile or amphibian is held in contact with the intake screen and is unable to free itself.
- 7.2. For the design and installation of intake end-of-pipe fish screens:
- 7.3. Locate and screen in areas and depths of water with low concentrations of fish throughout the year, and away from natural or artificial structures that may attract fish that are migrating, spawning, or in rearing habitat.
- 7.4. Orient the screen face in the same direction as the flow of water.
- 7.5. Ensure openings in the guides and seals are less than the opening criteria to make "fish tight".
- 7.6. Screens must stay above the bottom of the watercourse to prevent entrainment of sediment and aquatic organisms.
- 7.7. Provision should be made for the removal, inspection, and cleaning of screens.
- 7.8. Ensure regular maintenance and repair of cleaning apparatus, seals, and screens to prevent debris fouling and impingement of fish.
- 7.9. Pumps must be shut down when fish screens are removed for inspection and cleaning.
- 7.10. A site-specific dewatering plan is required before commencing a pump-out sump to dewater excavation sites with specific details on how and where the water will be discharged.
- 7.11. Water containing suspended materials must not be pumped into watercourses, drainage systems, or on to land, except with the permission of PCA.

8. Culverts

- 8.1. The culvert, inlet(s) and outlet(s) should be adequately protected with rip-rap to prevent erosion and scour around the culvert during high runoff events. The following measures should be incorporated when using replacement rock to stabilize the culvert:
- 8.2. Place appropriately-sized, clean rocks into the eroding bank area by hand or machinery operating outside the water course.
- 8.3. Do not obtain rocks from below the ordinary high water mark of any water body.
- 8.4. Where possible, install rock at a slope similar to the stream bank to maintain a uniform stream profile and natural stream alignment. Otherwise, install the rock at the closest slope required to ensure it is stable.
- 8.5. Ensure rock does not interfere with fish passage or constrict the channel width.
- 8.6. Maintain effective sediment and erosion control measures until complete re-vegetation of disturbed areas is achieved.
- 8.7. Remove any old structures to a suitable upland disposal facility away from the riparian area and floodplain to avoid waste material from re-entering the watercourse

9. Excavations, Grading, Gravel and Earth Materials

- 9.1. All sediment control measures must be in place before starting work in the vicinity of rivers, water bodies, watercourses, and wetlands.
- 9.2. Do not excavate or move gravel, fill, or other earth materials outside of the existing designated roadways and crossings.
- 9.3. During grade construction, ensure earth materials are not pushed, fall, or eroded into the water or wetlands.
- 9.4. Do not build grade outside of the delineated work area.
- 9.5. Materials must be placed at storage sites or on the grade at least 100 m from waterways, without spillage outside the work limits.
- 9.6. Any material falling outside of the work limits will be removed promptly in a manner that does not damage vegetation.
- 9.7. Ensure gravel or road bed material is free of weeds and comes from an approved operational gravel source free of other contaminants.
- 9.8. Indicate gravel source to PCA as early as possible. Notify PCA a minimum of 2 weeks prior to bringing gravel on site to allow time for PCA to inspect pit or request an approved gravel pit prior to sourcing gravel.
- 9.9. Where possible within engineering constraints, gravel should be recycled to reduce the need for new gravel.
- 9.10. Trucks hauling gravel must arrive on site in a clean condition, free of dirt and debris. Trucks must be inspected by PCA prior to entering the park. Please provide PCA with a minimum 24 hours notice before hauling gravel so that a vehicle inspection can be arranged.
- 9.11. Minimise changes to the ground surface that affects its infiltration and runoff characteristics and maintain/re-establish effective surface drainage on completion of project.
- 9.12. Backfill and compact excavations as soon as possible. Optimise degree of compaction to minimise erosion and allow for revegetation.

10. Soil Stripping, Top Soil Salvage

- 10.1. Strip topsoil under dry conditions.
- 10.2. Do not strip soil outside of delineated work area.
- 10.3. In the event of a work program shut down during inclement weather, erosion control of bared soils or excavated material stockpiles is required.
- 10.4. Work within 100 m of the high water mark of waterways or wetlands will require a site-specific sediment and erosion plan.
- 10.5. Salvage topsoil at all excavation sites for reclamation purposes.
- 10.6. Allow space for separate storage of topsoil and spoil; where space is available separate stored topsoil from spoil by at least 1m. Use appropriate material (e.g. geotextile) to separate soil components where space is limited.
- 10.7. Remove excess excavated material from site where it cannot be used for the final grading of the area.

11. Topsoil Replacement

- 11.1. Replace topsoil to all areas immediately following fine grading.
- 11.2. Do not compact topsoil. Handle it minimally, even if it is in clumps.

12. Site Clean up and Waste Disposal

- 12.1. Clean tools and equipment off-site to prevent the release of wash water that may contain deleterious substances.
- 12.2. Where possible, sweep up loose material or debris. Any material thought to pose a risk of contamination to soils, surface water, or groundwater should be disposed of appropriately off-site.
- 12.3. Construction, trade, hazardous waste, and domestic waste materials must not be burned, buried, or discarded at the site or elsewhere in Parks Canada protected heritage places. These wastes must be contained and removed in a timely and approved manner and disposed at an appropriate waste facility site. Construction waste storage containers should be emptied when 90% full. Waste containers must have lids, be wildlife proof, and waste loads must be covered while being transported.

13. Cultural Resource Mitigations

- 13.1. Confine the movement of heavy equipment to within 15m of the edge of the existing road.
- 13.2. Any additional aggregate/fill needed to backfill excavated areas or to remediate the approaches to the crossings should be sourced from outside the park. Additional material should not be excavated from areas bordering the road allowance inside the park.
- 13.3. Laydown/staging/turnaround areas should be at least 100m from the mapped edges of any of the archaeological sites shown in figure 1.

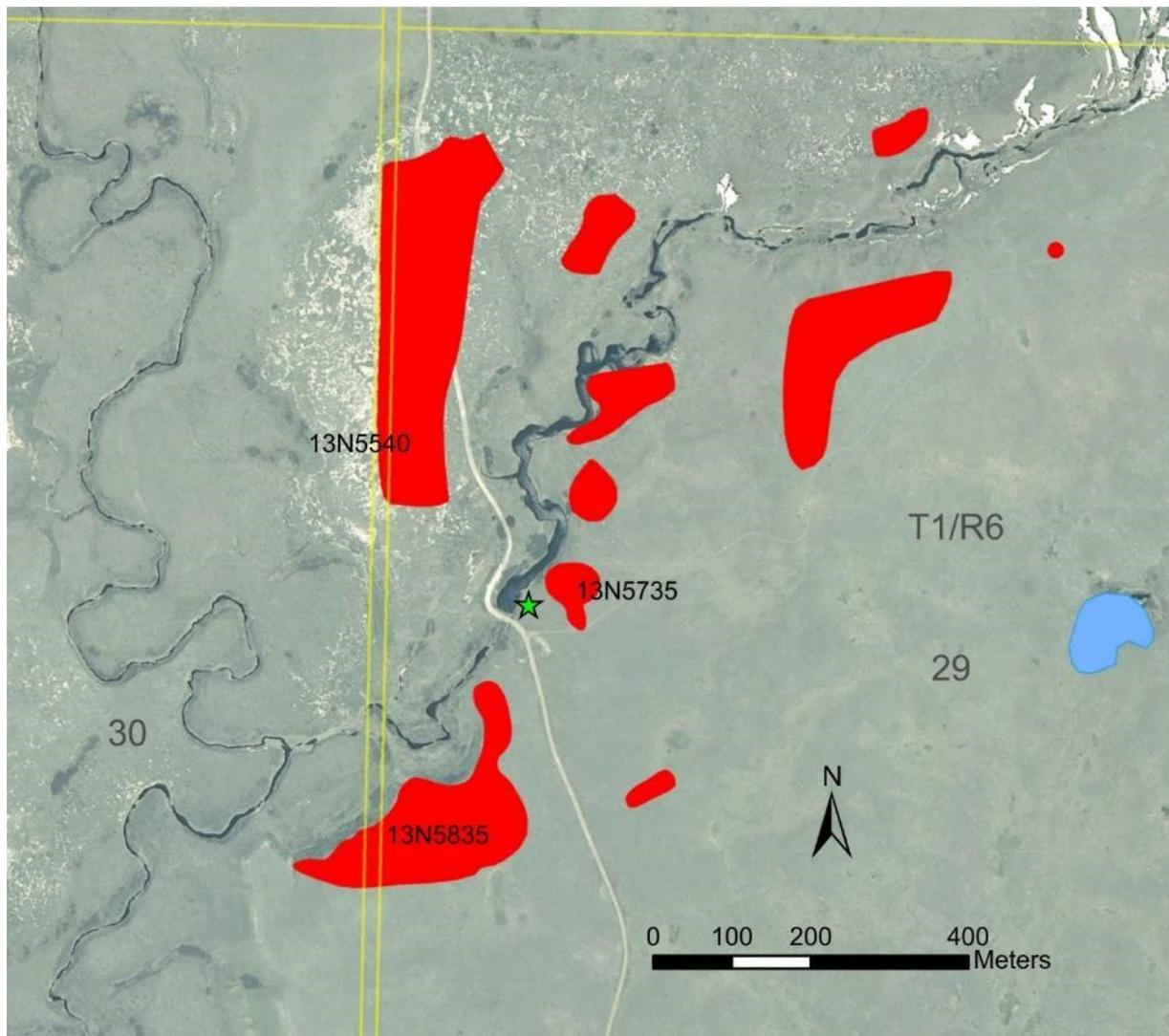


Figure 1: Location of Southview Creek road crossing #5 (star), showing known archaeological sites in red.