



Parks Canada Basic Impact Analysis

1. PROJECT TITLE & LOCATION

Project Title: Sault Ste. Marie Canal NHS – Emergency Swing Dam Improvements

The Sault Ste. Marie Canal National Historic Site of Canada is located in the city of Sault Ste. Marie, Ontario. Located on the international border of the St. Mary's River between Lake Superior and Lake Huron, the site spans North and South St. Mary's Islands and includes the historic ship canal that separates them. The Emergency Swing Dam is located approximately 350 m west (downstream) of the canal's lock. This structure is a few meters from the St. Mary's River (Sault Ste. Marie canal) (See picture 1 in Appendix 2)

2. PROPONENT INFORMATION

Parks Canada is the proponent.

Project Sponsor: Parks Canada

Project Lead: Parks Canada

Project Manager: Parks Canada

Consultant: Parks Canada

3. PROPOSED PROJECT DATES

Planned commencement: Summer 2018

Planned completion: 2019

4. INTERNAL PROJECT FILE

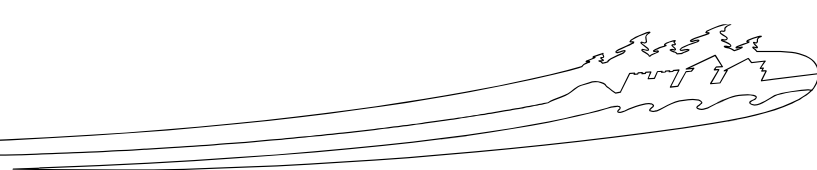
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5. PROJECT DESCRIPTION

The Sault Ste. Marie (SSM) emergency swing bridge dam (see picture 2 in Appendix 2) was built by the Dominion Bridge Company in 1895 and it is a cultural resource of national historic significance. For the past 10 years, however, the bridge has been in a non-operational/closed condition due to safety concerns related to the deferred maintenance. Work of this project comprises repairs and renovations of the Sault Ste. Marie Emergency Swing Dam (further identified as Swing Dam) and included the following steps:

Site preparation/access activities:

- General Contractor will propose its method of site preparation prior to commencing the project.
- This project will have minimum mobilization and demobilization.
- Staging area will be determined by the contractor.





Construction activities, methods, materials, equipment to be used:

The work will focus on the Swing Dam itself including, but not limited to, construction of decking, railing and concrete pads. The dam dimensions are roughly 150 m x 10 m. Excavation of the six piers will be about 2.5 x 2.5 x 2 m depth each. The work will be according to design¹, but the main steps are:

- Remove temporarily the existing maintenance shed.
- Remove and dispose of the existing decking and equipment.
- Sandblast and paint existing structure.
- Replace existing decking and railing with treated wood in accordance with the PCA Guidelines for Use, Handling and Disposal of Treated Wood.
- Re-install existing maintenance shed and equipment.
- Excavate and install 6 new concrete support piers. The piers will measure 600 x 600 mm and be supported on 1.8 x 1.8 m footings “set below the frost grade”².
- Repair cracks in center pivot track steel with metal filled epoxy.
- Concrete cast and install new wicket chain stop blocks

Site restoration:

- The final footprint will be the same as existing bridge.
- Disturbed green area under and around the dam will be reinstated.

6. VALUED COMPONENTS LIKELY TO BE AFFECTED

Potentially affected ecological and/or cultural resources were used to determine the valued environmental components (VECs) and identified using the Environmental Effects Identification Grid (Appendix C).

In scoping the factors, it was determined that the following valued components (VCs) should be considered:

Cultural and Archaeological Resources:

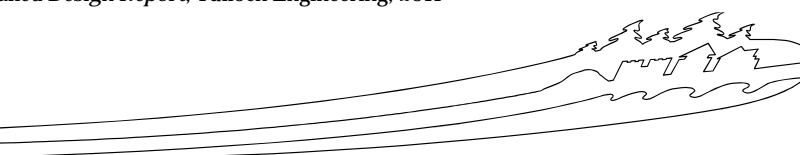
The Emergency Swing Bridge Dam is a cultural resource of national historic significance for the Sault Ste. Marie Canal.

Erected from August to December 1895, this movable dam was a novel structure, only one of which had ever been constructed previously. Owing to several innovative features, it soon became established as the design prototype and standard for its type. This cultural resource is valued for its innovative technology incorporated in the design and operation of the dam which proved its effectiveness during the accident in 1909 (the only swing bridge dam to be operated under extreme emergency conditions). It is also valued for its surviving original form, fabric and function, most of which is intact.

The Emergency Swing Bridge Dam is also part of a cultural landscape (a cultural resource of other heritage value) that is valued for the cohesive, aesthetic and functional design of the buildings, the engineering works, and grounds of the canal.

¹ Detailed design and tender package was completed in 2011, See supplied design drawings for more details of the above work.

² *Emergency Swing Dam Improvements – Detailed Design Report*, Tulloch Engineering, 2011





Visitor Experience/Visitor Safety:

The Swing Dam had been swung twice a year to create a unique visitors experience at the only swing bridge of this type remaining in the world. For the past 10 years, however, the Swing Dam has been in a non-operational/closed condition due to safety concerns related to the deferred maintenance. The visitors visit Sault Ste. Marie NHS for other reasons, including to boat in the recreational lock through the canal or to watch the lock in action from the observation deck, to do cycling, hiking, bird watching, geocaching, or to explore the historic machinery.

Water Resources:

The historical Sault Ste. Marie Canal is located a few meters away of the Swing Dam. The St. Mary's River has been identified as a Great Lakes Areas of Concern in The Great Lakes Water Quality Agreement between the United States and Canada.

Species of Concern:

Monarch butterflies (Special Concern) and Harlequin Duck (Special Concern) have been previously observed at the site. Little Brown Myotis (Endangered), Northern Myotis (Endangered) and Tri-colored Bat (Endangered) are expected to be present in the region and could be found at the site. The shed had holes that bats could get through, but visual inspection in December 2017 didn't reveal any evidence of bat usage for the purposes of a maternity roost. Barn swallows (Threatened) are protected federally, and could be found nesting on the Swing Bridge along with cliff swallows (protected only under the Migratory Birds Convention Act). There are many nooks and crannies on the bridge that could potentially be used as nesting areas, including the underside of the beams beneath the decking. However, no nests were found on the beams during the partial visual inspection done in December 2017. Most of the west half of the bridge was too close to the ground for an inspection, which also makes it unlikely the swallows would nest on this part of the bridge.

Land Fauna, Flora and Habitat:

The construction of the canal resulted in the destruction of the original landscape and the creation of the site as it exists today. The landscape is composed mainly of manicured lawns, gardens, hedges and a few planted trees. Where the Swing Dam is located, the landscape is composed of very little vegetation and very poor wildlife habitat (see picture 2 in Appendix A).

Aquatic Fauna, Flora and Habitat:

The adjacent St. Mary's Rapids, on the other side of the island, serves as an important habitat for many salmonid and other fish species. However, the bed of the length of the manmade canal infrastructure beside the project is composed of a concrete floor with scattered grates, and therefore it is considered poor fish habitat. Similarly, as the lock gates remain closed, except for short periods during operation, the channel is not considered an important area for fish migration (unlike the rapids to the south).

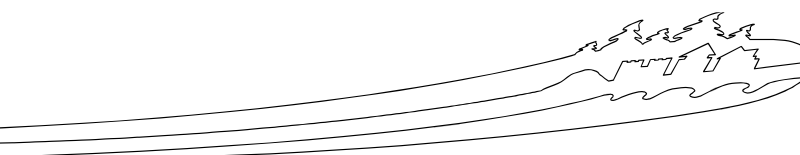
Soil/Land Resources:

There is no history of contamination in that area.

7. EFFECTS ANALYSIS

Cultural and Archaeological Resources:

- A change of form and material could have a negative impact on the heritage value and the character-defining elements of the Emergency Swing Bridge Dam





- Carrying out excavations without recognizing the possibility of discovering archaeological resources could result in the loss of heritage value.
- Damage to vestiges and archaeological resources during excavations.

Visitor Experience/ Visitor Safety:

- Reduced quality of visitor experience due to noise and presence of construction equipment.
- Visual impacts and landscape changes.
- Reduced accessibility to portions of the site where work is taking place.
- Hazard to visitors and staff due to construction activities.

Water Resources:

- Limited impact on the shoreline and canal (few meters away) as they are strongly artificial, made of concrete slab and concrete wall (See pictures 1 and 2 in Appendix 2).
- Contamination from different toxic or hazardous materials such as sandblasting and paint dust, in place concrete for the six piers, treated wood will be used for work on wicket chain stop blocks and decking, and metal filled epoxy will be used to fix cracks in the turntable.
- Contamination of the waterbody from machinery leaks or spills, discharges or spills of toxic or deleterious substances like concrete or cement (i.e. high alkalinity) products, equipment oils and fuels, and sediment which can kill aquatic organisms.
- Potential for sediments, debris or other harmful substances to enter storm water runoff and/or the waterbody if stock piled outside or improperly disposed of.
- Changes to surface runoff/drainage due to construction, heavy equipment and vehicles if they are operated beyond established trails/roads.

Species of Concern, Terrestrial Wildlife, Vegetation and Habitat:

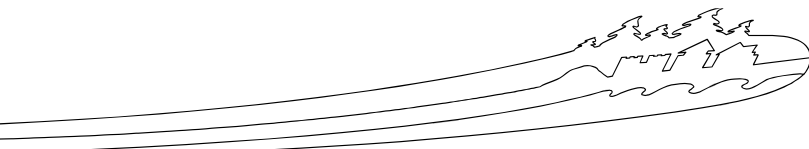
- Potential impacts on migratory birds /Species at Risk birds if they are nesting on the Swing Dam.
- Potential impact on bats if they are present in the shed.
- Short term potential for impacts to terrestrial fauna or migratory birds opportunistically using the existing mowed areas near the Swing Dam.
- Small potential impacts to any terrestrial fauna or migratory birds in the area due to noise and disturbance from construction activities.
- Minimal risk given the scope of work, however should damage to natural vegetation occur, a potential habitat destruction or alteration exists.
- Potential for damage to mowed areas in the immediate vicinity of the work site.

Aquatic Fauna, Flora and Habitat:

- Potential for impact to fish, and other aquatic fauna, flora or habitat during project activities as a result of a release of hazardous materials and/or due to accidents or malfunctions of machinery and equipment or the improper disposal of construction wastes.
- No timing windows for shoreline works has been identified for this project as no fish or fish habitat have been identified for the area. If mitigation measures are followed, no adverse effects to fish and fish habitat are anticipated to occur.

Soil/Land Resources:

- Excavation work will disrupt the soil
- Soil contamination from hazardous materials (e.g., construction waste, treated wood, fuel).
- Soil compaction and rutting to lawns in the immediate area of the work site, in staging area and along the access routes.





- Potential change in slopes, landforms and landscape.

8. MITIGATION MEASURES

Project Planning/General:

- 1) The contractor will prepare an Environmental Protection Plan and submit it to Parks Canada for approval, demonstrating how the mitigation requirements will be implemented during the project. The plan must include emergency spill plans; environmental protection measures, site cleanup and any other mitigation requirements.
- 2) Maintain compliance with the *Species at Risk Act*; identify Species at Risk, critical habitat and residences.
- 3) Maintain compliance with the *Migratory Birds Convention Act*, consult the *Parks Canada Guidance on Managing Migratory Birds*.
- 4) Follow Parks Canada Guidelines for the Use, Handling and Disposal of Treated Wood (<http://intranet2/our-work/environmental-management/bois-traite-treated-wood/>).

Work Site Conditions/Staging/Laydown:

- 5) Key contacts and their respective roles and responsibilities must be identified prior to work starting and communicated to all on-site workers.
- 6) People working on the project/activities must review the mitigation measures and any site specific considerations with designated Parks Canada staff before work begins.
- 7) Clearly mark the work site and restricted areas with stakes, biodegradable flagging tape or other means to minimize the disturbance footprint; remove when the project is completed.
- 8) Staging areas, material/equipment drop sites, and parking areas must be identified, including duration of use, within an existing disturbed footprint (e.g., roadway, gravel surface, previously disturbed area with high resiliency) or approved by designated Parks Canada staff.
- 9) Use existing roadways, trails, disturbed areas or other areas as approved by designated Parks Canada staff for site access, travel within the site and construction activities.
- 10) Wet down dry materials, if appropriate, and cover waste to prevent the wind from blowing dust and debris. Control dust on roads used by the on-site workers (including temporary roads).

Equipment Operations:

- 11) Use low pressure or rubber tracked equipment or access matting where feasible to minimize soil compaction and ground disturbance.
- 12) Select equipment appropriate to the nature of work being conducted (e.g., avoid using large scale machinery when hand tools or smaller scale machinery could be used).
- 13) Equipment must be properly tuned, clean and free of contaminants, in good operating order, free of leaks (e.g., fuel, oil or grease), and fitted with standard air emission control devices and spark arrestors prior to arrival on site.
- 14) Machinery must be stored, maintained and refuelled on a flat surface, and a minimum of 30 m from waterbodies, as measured from the High Water Mark.
- 15) Refueling must take place on an impermeable fuel mat with a berm or within a container. Leaks and spills during refueling must be cleaned up and contaminated materials must be disposed of appropriately. Fuel must never be spilled or deposited into the environment or any water body.
- 16) Any required cleaning of tools and equipment should be done off-site. If it must be on-site, it must be in an appropriate area at least 30 m from a waterbody.





- 17) Gas generators must be secured to prevent movement during operation and set up on an impermeable fuel mat with a berm or within a container that can contain 110% of the volume of fuel in the generator.

Painting, Staining and Resurfacing:

- 18) Introduce adequate recovery and containment measures to minimize release of contaminants into the water, air and soil. For example:
 - a. install a shelter or tarp to collect sandblast particles, paint dust, and concrete residue generated by cleaning work.
 - b. the shelter must be waterproof to prevent leaching in the event of rain and have a mechanism for capturing soil and preventing discharge into the waterbody.
- 19) Comply with allowable levels of silica in the abrasive, as specified in applicable Regulations. To the extent possible, use an abrasive with a less significant impact than silica.
- 20) Attach drop cloths to prevent materials such as paint, timbers, concrete, solvents, and sandblast material from entering the water.
- 21) Paints and solvents shall be stored, mixed and transferred at a suitable location upland, away from the watercourse.
- 22) Sealants or other compounds shall be utilized according to the appropriate Product Technical Data Sheet, stated guidelines and methods for proper use provided by the manufacturer of the product.

Site Clean-up and Waste Management:

- 23) Contain and stabilize waste material (e.g., construction waste and materials, vegetation) at a minimum of 30 m from a waterbody.
- 24) All waste, should be sent to an approved waste landfill site and contaminated materials disposed of at provincially or territorially certified disposal sites outside of Parks Canada land; cover waste loads during transportation. All construction materials must be removed from the site upon project completion.
- 25) During and after construction, all remaining treated wood scraps, cuttings, wood chips and sawdust must be collected efficiently and in a timely manner. All wood waste must be disposed of in accordance with the manufacturer's guidelines and with local and provincial regulations.
- 26) Burning is not permitted within the protected heritage place unless approved by Parks Canada.
- 27) Concrete mixing activities must take place over tarps and a minimum of 30 m from waterbodies. Fresh, wet, uncured concrete and concrete dust must not come into contact with waterbodies.
- 28) Secondary containment measures such as collection/drip trays and berms lined with air and water-tight material such as plastic and a layer of sand, and double-lined fuel tanks are required.
- 29) Excess concrete must be disposed of at an appropriate facility outside of the Parks Canada protected heritage place. If excess concrete from pump trucks must be dumped prior to transport outside the protected heritage place, it must be deposited in a location approved by Parks Canada and removed following hardening for disposal at an approved facility.
- 30) Concrete debris shall be stored in an enclosed container and transported to an approved disposal facility.

Water Resources Management:

- 31) Erosion and sediment control measures that cover all construction and restoration periods will be installed if needed. It should be scaled to the scope and associated risks of the project and be adapted to the worksite, timing of work, site condition and equipment used.
- 32) Excavated material and debris must be stored in a stable area, above the HWM or active floodplain and, where possible, 15 m from drainage features and/or the top of steep slopes. Protect excavated





material from re-entering the waterbody, (i.e. cover with erosion blankets, seed or plant with native vegetation).

- 33) Any concrete wash water shall be directed to a collection basin to effectively remove all suspended solids, dissipate velocity and prevent deleterious substances from entering the waterbody.
- 34) Canal water cannot be used in any way.

Spill Response Plans and Hazardous Material Management:

- 35) A Spill Response Plan should be developed prior to work starting.
- 36) Ensure that all on-site workers receive a briefing about the Spill Response Plan and are aware of the location and use of spill kits and containment devices.
- 37) Spill containment equipment must be present on-site. A spill contingency response kit including sorbent material and berms to contain 110% of the largest possible spill related to the work must be available on site at each location of potential spills (sites where equipment is working and at re-fuelling, lubrication, and repair locations).
- 38) All spills must be contained and cleaned-up as soon as it is possible to safely do so. In the event of a major spill, all other work must stop until the spill has been adequately contained and cleaned up.
- 39) Notify the designated Parks Canada staff and the emergency contact immediately of any spill. In the event of a major spill, call the first contact authority.
- 40) Contaminants must be recovered at source and disposed of according to applicable laws, policies and regulations. The site will be inspected by Parks Canada staff to ensure completion to expected standards.
- 41) Petrochemical products, paints and chemicals must be stored a minimum of 30 m away from waterbodies and, if left overnight, they must be secured.
- 42) All construction sites must be equipped with containers suitable for the secure, temporary storage of hazardous wastes, separated by type.
- 43) If hazardous waste or potentially contaminated material is uncovered during excavation/construction, work must stop and excavated materials must be secured on site in a manner that prevents contamination of the surrounding environment, including leaching. The designated Parks Canada staff must be contacted for further direction.

Visitor Experience and Safety:

- 44) As much as possible, schedule noisy activities to minimise impacts to visitors.
- 45) Close and mark the work site with appropriate signage while active construction, repair or maintenance is underway; consider temporary detours or re-routes as appropriate.
- 46) Secure and clearly mark unattended safety hazards (e.g., excavations, debris piles) with fencing, warning signs, area closures or combination thereof.
- 47) If closing the area is not possible, maintain a safe working distance between work activities and visitors. If traffic control is required, a flag person should manage traffic through the construction/hazard area.
- 48) Visitor access trails and roads outside the construction area must be free of construction materials, waste, machinery and equipment.

Cultural and archeological Resources:

- 49) Apply any mitigation measures identified in the Statement of Cultural Resource Impact Analysis (See *“Recommendations” section in the Statement of CRIA*) or by a Parks Canada archaeologist. Parks





Canada's project manager should ensure that on-site workers are aware that they are working on cultural heritage and a national historic site of Canada.

- 50) Work with a CRM Advisor and CRM specialists (archaeologists, historians, and built heritage advisors) to assess the impact of intervention to cultural resources (CRIA process) and identify necessary and on-going mitigation measures.
- 51) Archaeological monitoring is not required, yet Terrestrial Archaeology recommends that:
 - Main vehicular access routes and staging areas be restricted to present-day roadways and parking lots.
 - If this is not possible, the use of a protective covering such as geotextile protective mats with a wood chip lift or granular "A" gravel is required. All protective covering must be removed following construction and the area restored to pre-construction state. Excavation is not permitted during installation or removal of protective covering.
- 52) If unrecorded archaeological resources (e.g. structural features or artifact concentrations) are encountered during construction activities, work will cease in the immediate area, the findings photographed, and the Parks Canada Project Manager informed. The Project Manager should then contact Parks Canada's Terrestrial Archaeology section for advice and assessment of significance, which will in turn determine what will be required to mitigate the find.
- 53) If the scope of work changes, the project team will provide updates/new information and the appropriate documentation describing the change(s) so that a follow-up CRM analysis can be completed.

Wildlife Management:

- 54) If breeding activity or nesting activity is identified during the construction phase, stop work and contact designated Parks Canada staff immediately for direction. Immediate action during the early stage of nesting may prevent work delays.
- 55) If feasible, conduct work to the bridge structure outside of the bird nesting period (prior to May 1 and after Aug 31) to avoid all likelihood of encountering nesting birds.
- 56) If work must be conducted during bird nesting period, consider using deterrents to prevent nesting from occurring on the bridge structure prior to or during work.
- 57) On-site workers must be made aware of and subsequently report any incidental sightings of Species at Risk immediately to designated Parks Canada staff.
- 58) Should conditions at the work site indicate there are unforeseen negative impacts to fish, Species at Risk, wildlife, migratory birds, cultural or visitor experience resources, all work shall cease immediately, and the designated Parks Canada staff consulted to determine next steps.
- 59) If a bat is encountered in the shed while work is taking place, do not to handle the individual, stop work and notify the designated Parks Canada contact. Leave the bat to exit on its own; ensure it has access to the outside via open door(s) and/or window(s). The designated Parks Canada contact will need to evaluate whether the bat is passing through or using the location as a maternity roost to determine next steps.
- 60) Cover or fence hazardous areas when left unattended to reduce the potential for wildlife injury.
- 61) If wildlife is observed at or near the work site, allow the animal(s) the opportunity to leave the work area.

