

Appendix B

Site-specific Environmental Assessment

Basic Impact Analysis

Clyburn Bridge Replacement Project

Cape Breton Highlands National Park of Canada
Ingonish Beach, Nova Scotia



By: Archie Doucette

Environmental Assessment & Ecosystem Restoration

Cape Breton Field Unit

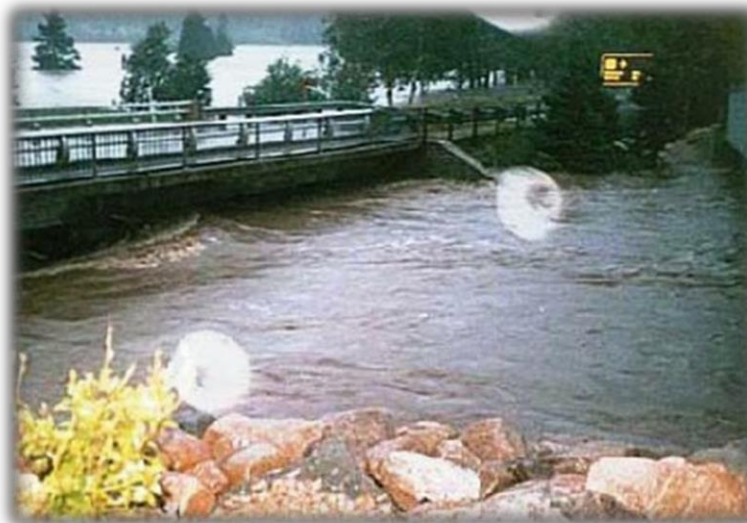
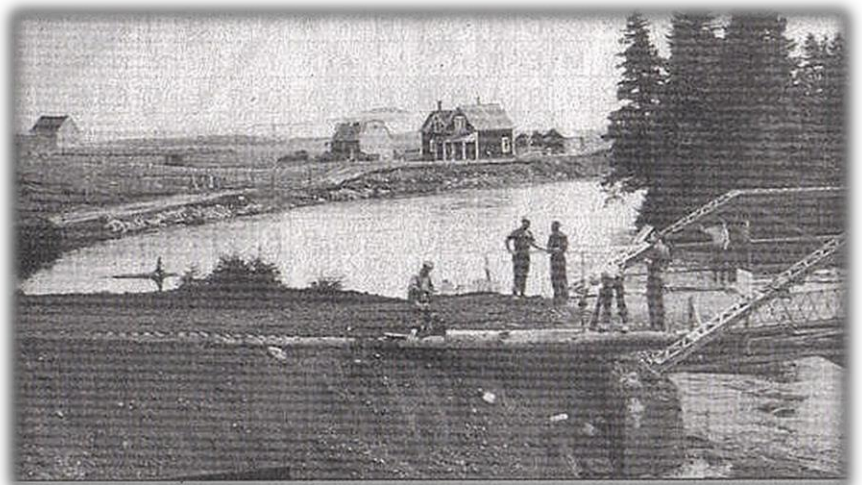
File #: CBHNPC-2015-001

February 2016

PROJECT TITLE	Clyburn Brook Bridge Replacement Project
PROJECT LOCATION	Cape Breton Highlands National Park of Canada (Ingonish Beach)
PROJECT SITE	Cabot Trail adjacent to the Clyburn Day Use Area.
PROPONENT	Audrey Buchanan – General Works Manager (CBFU) 902.733.3520
PROJECT DATES	2016/05/15 to 2018/03/30
INTERNAL PROJECT #	CBHNPC-2015-001

PROJECT DESCRIPTION

Built in 1951, the Clyburn Brook Bridge is a double span bridge with concrete abutments, steel girders and an instream pier. The bridge has undergone numerous repairs over the years to the extent that now full replacement is deemed necessary. Examples of defects - repaired and ongoing, include permanent rail and post deformations, cracking of deck surface/ underside, and loose or missing joint plates.



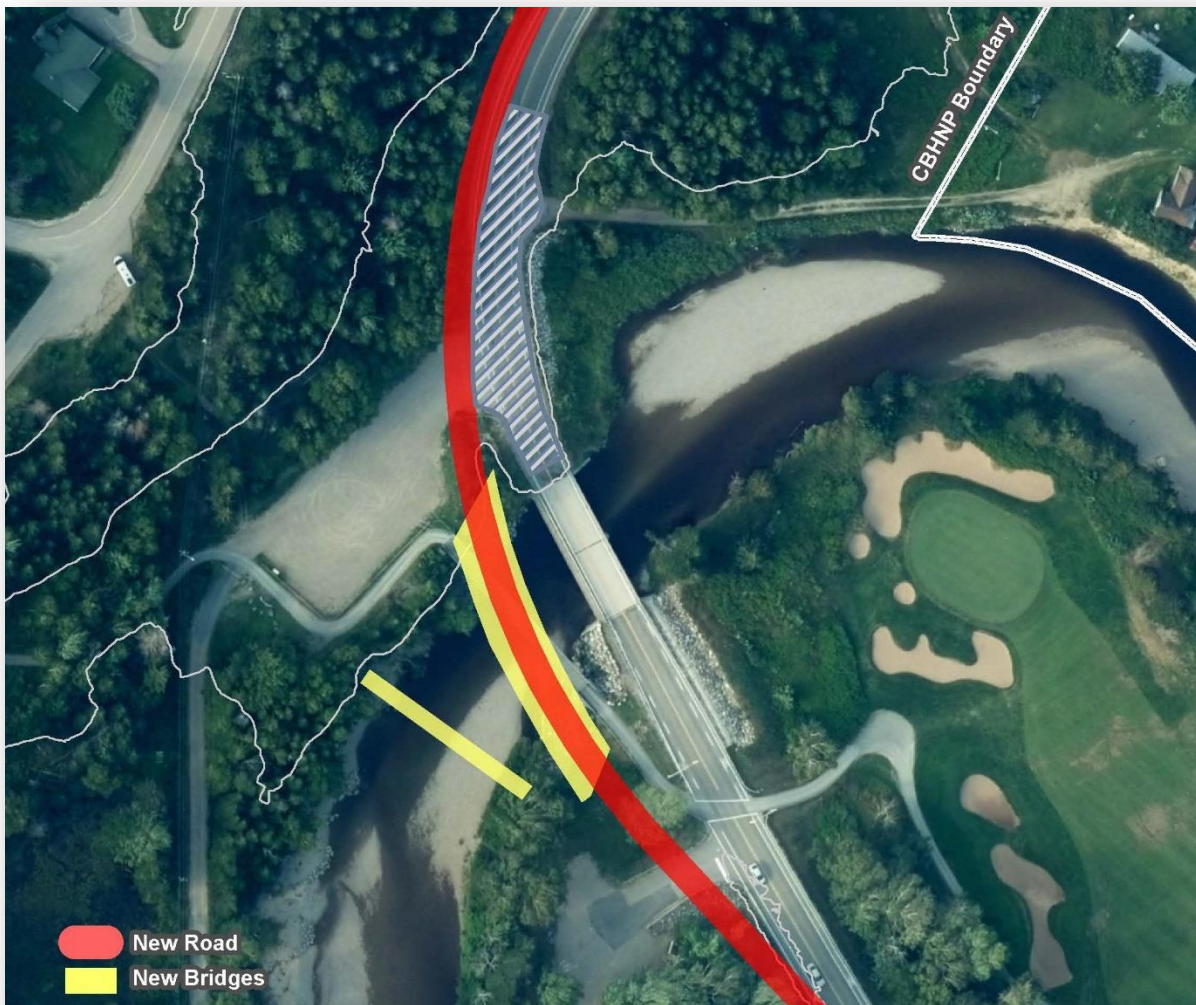
The bridge opening is significantly undersized with physical evidence of embankment erosion, and permanent deformation of girders - temporarily remedied by restraints.

Tension braces have also been installed on each girder to prevent uplift from high water.

The deck is estimated to have approximately five (5) years of useful life remaining.

Clyburn Bridge

The general proposal calls for a complete replacement of the Clyburn Bridge to slightly upstream from where the current Golf Cart Bridge is situated. The existing bridge will remain open to traffic while the new bridge is being constructed. Upon completion (tentatively fall 2018), highway traffic will be rerouted at that time. The existing bridge will be fully removed and the site decommissioned. Initially, installation of a small parking lot was considered, however upon further review development was deemed not feasible due to limited sightlines within this relatively confined area.

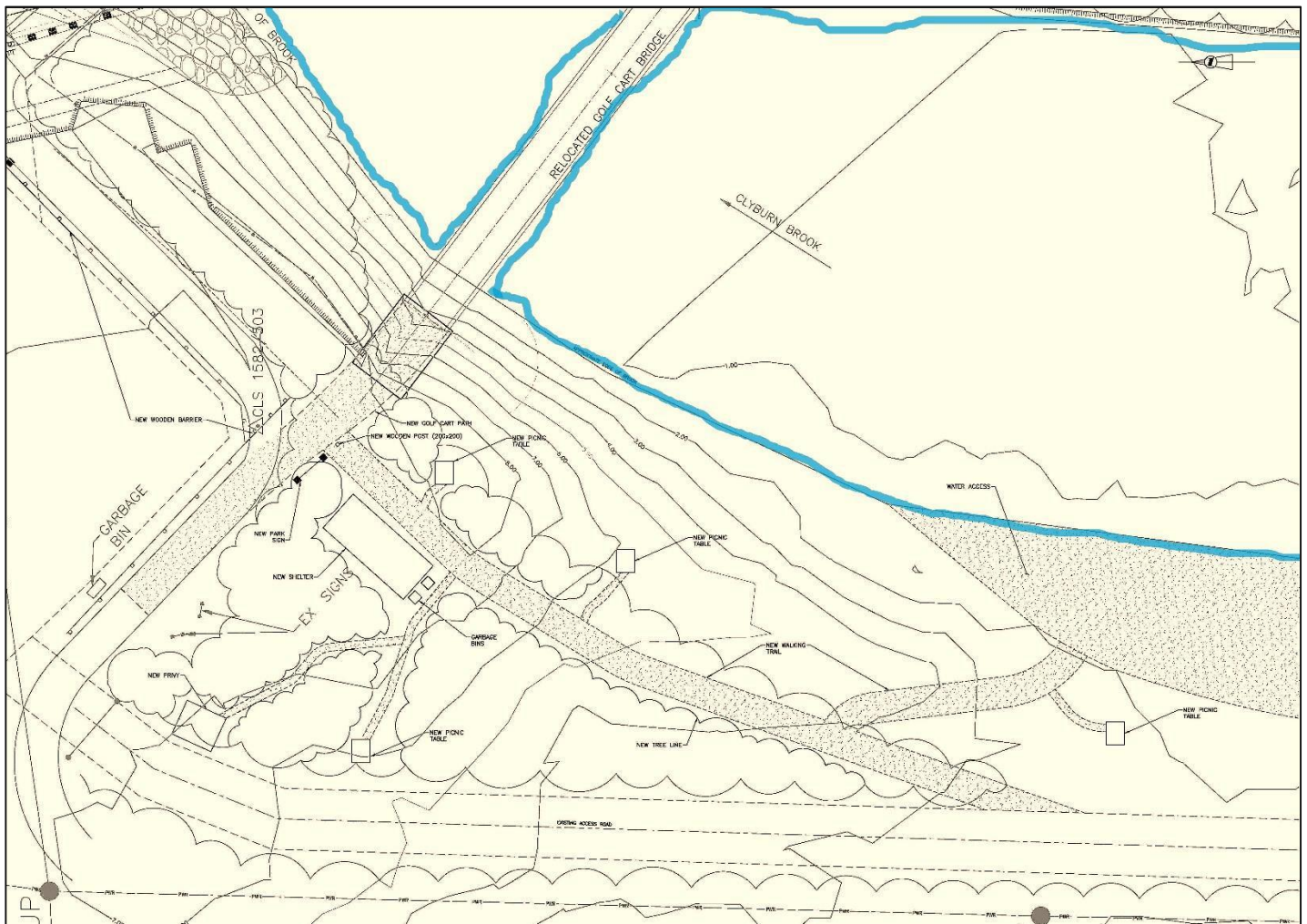


Golf Cart Bridge

The golf cart bridge will be relocated 30m upstream from its present location. This bridge access approach will be reconfigured to facilitate safe and efficient passage for golfers travelling from Hole 6 to 7. Although this design has yet to be finalized, the anticipated route is expected to be within close proximity of existing pathway. There are no plans at this time for reduced golf course activities during construction. Further planning and careful consideration is currently underway.

Clyburn Day Use Area

Relocation of both bridges will result in the decommissioning of the present Clyburn Day Use (DUA). The need to relocate is due footprint encroachment onto an already limited spatial area. Unlike the current location, the replacement location, planned for the far side of the Clyburn Brook, is much more stable for planned infrastructure. For example, associated DUA infrastructure (e.g., trails, privies, shelter, garbage cans, etc.) will be constructed in a manner that avoids impacts from natural environmental sources such as flooding, ice production and associated erosion. Upon bridge completion, the Hole 7 parking lot situated to the north will be fully operational but at a reduced spatial capacity.



Summer visitors frequent the current DUA for such recreational purposes as picnicking, swimming, fishing, hiking, etc. Every effort will be made to ensure a continuance of these activities in a safe and efficient manner. This project is expected to begin in the spring 2016 and completed by late fall 2018. Even though construction will occur during the busy season, traffic disruption is expected to be minimal because the existing bridge will remain open and operational.

PROJECT DESCRIPTION

Bridge replacement involves:

- Delineation of buffer zones;
- Installation of environmental protection measures such as terrestrial silt controls and aquatic turbidity curtain(s);
- Installation of abutments, formation and casting of concrete in the dry;
- Placement of riprap for slope protection in accordance with project specification;
- Erection of infrastructure support and forming and placing concrete deck on the steel plate girders;
- Construction of approach alignments at each end of the bridge;
- Placement sub-grade granular material, & asphalt pavement on approaches and bridge deck;
- Removal of existing piers and abutments;
- When ready, remove temporary detour; sediment control fences and other environmental protection devices;
- Demobilization of equipment and temporary infrastructure; and,
- Site remediation of slopes and impacted areas that may involve use of topsoil, mulch, hydro-seed, sod shrubs and small trees as per specifications.

Specific terms and conditions of project activities are available upon request.

VALUED ECOSYSTEM COMPONENTS

Valued Ecosystem Components (VECs) are environmental elements with scientific, social, cultural, economic, archaeological or aesthetic importance. VECs with potential to interact with project components are listed below:

BIOPHYSICAL

Vegetation (activities: *clearing shoreline vegetation, vehicle use in peripheral zones*)

- Loss of riparian habitat undermines channel stability, alters cover and protection from predators, and creates physical disturbances;
- Riparian clearing leads to water temperature increases affecting fish (i.e., reduced reproductively or direct mortality);
- Planting vegetation adjacent to a watercourse may involve the use of fertilizers, and increases the risk of non-native introductions.

Aquatic habitat (activities: *equipment use and the potential for spills*)

- Direct injury or mortality of fish eggs, larvae, invertebrates, etc.;
- Increased streambank erosion and siltation of waterbody; and,
- Increased pollutants can breach the range of chemical parameters that support healthy aquatic communities and seriously affect fish and fish habitat (i.e., direct fatality, ecosystem alteration, changes in the abundance, composition, diversity of communities and habitats.

Avifaunal (activities: *bridge demolition and nearby construction activities*)

- Construction and demolition activities could disturb nesting migratory birds;
- Construction could disrupt waterfowl (e.g. mergansers, goldeneye) using water areas near bridge;
- During construction, lights can adversely impact birds especially night-flying birds attracted to lights during fog, drizzle, haze, storm, etc. This may result in collisions or their support structures;
- Disoriented birds are prone to circling a light source and may deplete their energy reserves and either die of exhaustion or drop to the ground where they are at risk of predation; and,
- Vehicle and pedestrian traffic on shorelines and beaches loosens sand, damages the plant cover and disrupts or displaces avifaunal.

Fish (activities: *in-water structures and other physical barriers, accidental spills, etc.*)

- Improper timing may impact sensitive stages for fish, especially during larval and hatching;
- Channel modification promotes resurgence of invasive species or non-native aquatic species;
- Fish may become entrained through intakes or impinged at screens resulting in injury or mortality; and,
- Alteration to water depth, flows or substrate can cause a disruption to fish habitats essential during various life processes as spawning and rearing.

Terrestrial landforms (activities: *shoreline excavations, trenching, ditching, etc.*)

- Altered flows lead to changes land surface characteristics;
- Change in water temperature directly affects physical, biological and chemical characteristics;
- Increased streambank erosion results in excess of organic and inorganic materials; and,
- Removal of riparian vegetation reduces channel stability, cover and protection from predators and physical disturbances.

Aquatic debris (activities: *direct removal of shoreline debris, aquatic debris, instream travel, etc.*)

- Ecological effects can range from direct fatality to ecosystem alteration with changes to species abundance, composition, diversity of communities;
- Eroded soils can affect the watercourse's capacity to maintain a diverse community of aquatic organisms by restricting habitat connectivity and opportunities for aquatic organisms;
- Removal of riparian vegetation could reduce channel stability, cover and protection from predators and the availability of diverse and stable habitats; and,
- An increase or decrease in the quantity or composition of the food supply can alter the structure of the aquatic community.

Flow - timing, duration, frequency (activities: *installation of erosion control devices in waterbodies*)

- Instream infrastructure can prevent fish migration between feeding, rearing and spawning areas;
- Excessive flow velocities can create migration barriers, and displace fish from habitat;
- Reduced flow can result in the stranding of fish; and
- Deposition of eroded soil from instream and adjacent infrastructures can restrict habitat connectivity and the opportunities for organisms to use, colonize, and move between existing aquatic environments.

CULTURAL RESOURCES (activities: *during excavations, trenching, contouring, etc.*)

- Archeological resources could be damaged or destroyed. The significance of which is unknown but the risk is considered low.

VISITOR EXPERIENCE (activities: *general construction and replacement*)

- During construction, aesthetic and noise impacts are anticipated for this high visibility, high visitor use area even in the off season; and,
- Visitor safety concerns for the travelling as they travel through the construction zone, especially for golfers, pedestrians, cyclists, motorcyclists and the general motorists.

ENVIRONMENTAL ELEMENTS & EFFECTS ANALYSIS

The key environmental elements to be implemented during the construction of the replacement structure and realigned approaches include, but are not limited to, the following components:

1. Implementation of perimeter controls prior to any excavation to prevent the release of sediment-laden runoff offsite.
2. Diversion of surface runoff directed at the worksite so that construction can be constructed in the dry.
3. Implementation of a Work Progression Schedule that limits the amount and time that exposed soils is left exposed, including all work conducted during the grubbing and grading sequencing of work.
4. Final stabilization conducted immediately once sections of the site are brought to final grade.
5. Removal of the existing Clyburn Brook Bridge and the stabilization of the decommissioned approaches to eliminate any future sediment impacts to the watercourse.

The most important **positive** environmental effect improved aquatic habitat associated with the removal of the existing undersized bridge only to be replaced by a larger new bridge thus more accommodating to high flow periods. Through replacement, regulatory deficiencies associated with its current geometry and condition will be corrected. Bridge replacement will improve safety for both visitors to the park as well as local residents many of whom use the bridge on a regular basis.

The most important **negative** effect could be the potential impacts to fish and fish habitat during construction phase of the undertaking from accidents and malfunctions.

Refer to Appendix 1 Effects Matrix Analysis for detailed information.

MITIGATION MEASURES

Planning

1. As much as possible, design alignment at right angles for stream crossings to minimize span length, number of bridge piers, etc. and thus minimize instream habitat loss;
2. As much as possible, situate abutments back against the slope to minimize the need for instream causeway construction and encroachment;
3. Plan to maintain existing riparian habitat as much as possible – consider alternative locations - alignments, designs, etc. to minimize environment footprint; and,
4. Consider compensation for situations involving a net loss of aquatic habitat. PCA should identify candidate locations of already impacted park aquatic ecosystems for restoration in exchange for lost habitat with bridge project. Restore such areas to a scale equal to or greater than subject habitat loss.

Surveying

5. Clearing is to be carried out manually (e.g., chainsaws, axes, chippers etc.);
6. Equipment used for the surveying process shall be in good working order;
7. No trees or bushes shall be felled across or into a watercourse;
8. Place cut vegetation where it cannot be washed into a watercourse;
9. Fuels required during surveying will be stored at least 30m from watercourse;
10. Work will be carried out in a manner that minimizes ground disturbance, soil exposure and not result in noticeable suspended sediment in a watercourse; and,
11. Vegetation shall be maintained along waterbodies to provide bank stability and adequate shade for fish, especially around pool areas.

Geotechnical investigations

12. All access roads shall remain unobstructed;
13. Test pits shall be backfilled and smooth-graded immediately following data collection;
14. Exposed soils from drill holes, test pits and drill rig tracks must be stabilized (e.g., hay);
15. Watercourse crossings shall be avoided – consider existing or alternate routes;
16. No in-channel test pits shall be excavated at any time;
17. All equipment shall be in good working order and free of deleterious substances;
18. Any equipment leaking fluids/ fuels shall be immediately and appropriately cleaned up;
19. All equipment shall have a spill kit readily available and re-fuelled at least 30m from watercourse.

Vegetation

20. Chipped material will be evenly dispersed or used as fill for ruts and exposed soils;
21. No trees or chipped waste will be felled or disposed of into watercourse;
22. If it cannot be achieved, disposal will then occur at PCA approved landfill; and,
23. Stockpiled or disposed material shall be kept 30m from watercourse.

Watercourse diversions

24. Field staff must be familiar with the requirements as outlined in the BIA and DFO Letter of Advice;
25. Pumps & hoses fitted with screens are required when pumping directly from the river;
26. Two pumps are required: one to pump water, another for back up;
27. Pumps, when in use, should be monitored to ensure that they are functioning properly;
28. If water does not naturally flow from diverted area, then remaining water must be pumped; and,
29. If water has a high concentration of sediments, pumped water must be filtered to a vegetated area at least 30m from watercourse.

Sediment

30. Prior to ground disturbance, sediment controls will be installed downslope of disturbed areas;
31. Sediment controls will not be installed across areas with a concentrated channel flow;
32. Sediment controls will be located in a continuous fashion, perpendicular to the direction of flow.
33. Sediment must be removed after it has exceeded ½ the height of the fence;
34. Removed sediment must be disposed of at least 30m from watercourse;
35. Sediment control fence shall be inspected daily to ensure materials do not damage fence;
36. If repairs to existing fence are impractical, another line of fencing will be installed;
37. Sediment control fence shall be removed once permanent stabilization has been carried out; and,
38. Avoid continued activity during extreme wet conditions as this may cause unacceptable disturbance and subsequent discharges of sediment into a watercourse or wetland.

Dust

39. When pumping watercourses, all hoses must be fitted with screens according to DFO's *"Freshwater Intake End-of-Pipe Fish Screen Guideline – DFO mitigation section."*
40. Trucks shall have application controls to avoid wastage and excess flowing to watercourse;
41. Water withdrawal shall be limited to approved locations **outside** the national park;
42. When withdrawing, ensure sufficient flow and depth remains to protect fish and fish habitat;
43. Water trucks shall not be driven near a watercourse unless firm support is available; and,
44. Tankers using liquid calcium chloride shall not be washed within 30m of a watercourse.

Bridge Demolition

45. Construction and demolition material will be sorted and disposed of at an approved C&D landfill;
46. Hazardous waste (creosote posts) shall be disposed of off-site at a certified disposal facility.
47. An invoice will be submitted to the proponent verifying that contaminated material has been properly disposed of; and,
48. Consider reuse of material where feasible.

Abutments

- 49. Ensure work activities does not obstruct fish or boat passage;
- 50. Erosion and sediment control measures will be in place prior to commencing work;
- 51. Vegetation will be maintained as much as possible;
- 52. The work shall be performed during low flow and/or dry weather as much as possible;
- 53. Foundation excavation shall be done in a manner that minimizes release of sediment to watercourse;
- 54. Excavated material shall be disposed of offsite at a PCA approved location;
- 55. High noise periods may require scheduling restrictions (Consult with PCA); and,
- 56. Fresh concrete shall not be discharged into a watercourse.

Riprap

- 57. Riprap will be properly sized and based on intended use and proper application;
- 58. Riprap will not be obtained from a source that has the potential to be acid generating;
- 59. Excavated material must be disposed of at least 30m away from the watercourse/wetland;
- 60. Riprap shall be inspected prior to, during and after any rainfall event; and,
- 61. Any damaged areas will be repaired immediately.

Stockpiles

- 62. Stockpiled materials shall be located at least 30m away from a watercourse or wetland;
- 63. Sediment controls shall be installed around the perimeter to contain erodible material; and,
- 64. In dry, windy conditions, stockpiles may require wetting to reduce off-site impacts.

Decommissioning of temporary facilities

- 65. Sites containing temporary facilities shall be cleaned up, and stabilized by seeding and mulching, placing of riprap, or a combination thereof;
- 66. Erosion and sediment control measures shall be maintained until which time vegetation has been established and protection measures are no longer warranted; and,
- 67. Soils affected by construction activities (e.g., compaction) soil shall be restored and adequately prepared or amended with topsoil.

Hydroseed

- 68. Only PCA-approved hydroseed mix will be used;
- 69. Hydroseeding will not be carried out on harden, crusted or eroded soils;
- 70. Areas will be shaped or completed to the final grade prior to hydroseeding;
- 71. Hydroseeding will not be carried out during windy conditions or during heavy rainfall;
- 72. Hydroseed shall be monitored and maintained from the time of application until vegetation is established as an effective erosion and sedimentation control; and,
- 73. Areas not receiving proper coverage and/ or areas with bare spots will be repaired immediately.

Trees and shrubs

- 74. Only native trees and shrubs will be considered for planting - consult PCA;
- 75. Trees and shrubs will only be planted if there is enough growing season left for vegetation to establish and in accordance according to suppliers recommendations; and,
- 76. Trees and shrubs shall be monitor and maintained from the time of planting until they become established.

Accidents and malfunctions

- 77. The contractor shall develop an Environmental Protection Plan(s) to cover project components in need of special environmental protection, especially for work near sensitive or unique areas not identified within this BIA;
- 78. EPP(s) will be communicated to machine operator(s), site supervisors, and other onsite personnel;
- 79. WHMIS sheets will be made available informing of the product, precautions, etc.;
- 80. Report **all** spills to Project Engineer or Supervisor as required.
- 81. Onsite fuelling must not occur within 30m of a watercourse or wetland;
- 82. Construction and maintenance areas must be equipped with at least one spill kit;
- 83. Control and contain spilled product using onsite spill kit materials; and,
- 84. Material for rapid containment and clean-up of spills must be available during any activity in or near any watercourse/wetland or environmentally significant area.

Archaeological

- 85. In the event of archaeological resource discovery, all work shall cease in the immediate area until such time as FOL personnel have been notified.
- 86. Authorize resumption of work when deemed necessary by Cultural Resource personnel
Maura.McKeough@pc.gc.ca (902.733.3530)

Wildlife

- 87. Consult with PCA to address wildlife concerns;
- 88. Schedule construction around sensitive periods for wildlife, especially during nesting, denning, migration etc.; and,
- 89. During construction, only designated roadway accesses shall be used to limit off-road interactions with wildlife.
- 90. If a structure is being used for nesting migratory birds, PCA will not issue a permit to destroy nests should these birds take aggressive measures to protect their eggs/chicks;
- 91. Lights can result in adverse impacts on birds. In assessing the impacts of lights, a focus should be placed on the most vulnerable species and the occurrence of infrequent, but potential risk for large-scale collision events.

92. To minimize the risk of destroying bird nests, including nesting waterfowl, avoid certain activities which would disturb birds during the nesting period.
93. For active nests, or birds caring for chicks discovered outside the breeding season, risks may be minimized by measures such as the establishment of buffer zones around nests, and minimization, or rescheduling, of high disturbance activities in the immediate area until nesting is complete and chicks have naturally migrated.
94. Activities such as cleaning, application and removal of protective coatings (e.g. paints), and demolition should not take place during the breeding season on structures where migratory birds are known to nest, since there is a risk of disturbing or destroying eggs or nestlings.
95. Concentrations of birds (e.g. waterfowl, seabirds and shorebirds) should not be approached when accessing a project site from water or from land.
96. Engines should be properly maintained, and well muffled to reduce disturbance due to noise. Other measures may include reducing travel speeds around potentially sensitive habitats or colonies and using alternative travel routes.
97. Food scraps and other wastes can attract predators of eggs and chicks. Proponents are encouraged to take steps that would help ensure waste is minimized and is not left behind as “litter”.

DFO MITIGATION

The remaining section involves DFO recommended measures to avoid causing harm to fish and fish habitat (<http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/index-eng.html>). Adherence will help avoid causing harm to fish and comply with the Act.

Planning (DFO recommendations)

1. Time work inwater to respect timing windows (June 1 to September 30) to protect fish, including their eggs, juveniles, spawning adults and/or the organisms upon which they feed;
2. Minimize duration of in-water work;
3. Conduct instream work during periods of low flow, or at low tide, to further reduce the risk to fish and their habitat or to allow work in water to be isolated from flows;
4. Schedule work to avoid wet, windy and rainy periods that may increase erosion and sedimentation;
5. Design and plan activities and works in waterbody such that loss or disturbance to aquatic habitat is minimized and sensitive spawning habitats are avoided;
6. Design and construct approaches to the waterbody such that they are perpendicular to the watercourse to minimize loss or disturbance to riparian vegetation;
7. Avoid building structures on meander bends, braided streams, alluvial fans, active floodplains or any other area that is inherently unstable and may result in erosion and scouring of the stream bed or the built structures;
8. Undertake all instream activities in isolation of open or flowing water to maintain the natural flow of water downstream and avoid introducing sediment into the watercourse;
9. Plan activities near water such that materials such as paint, primers, blasting abrasives, rust solvents, degreasers, grout, or other chemicals do not enter the watercourse;

10. Develop a response plan that is to be implemented immediately in the event of a sediment release or spill of a deleterious substance and keep an emergency spill kit on site;
11. Ensure that building material used in a watercourse has been handled and treated in a manner to prevent the release or leaching of substances into the water that may be deleterious to fish;
12. Develop and implement an *Erosion and Sediment Control Plan* for the site that minimizes risk of sedimentation of the waterbody during all phases of the project. Erosion and sediment control measures should be maintained until all disturbed ground has been permanently stabilized, suspended sediment has resettled to the bed of the waterbody or settling basin and runoff water is clear. The plan should, where applicable, include:
 - a. Installation of effective erosion and sediment control measures before starting work to prevent sediment from entering the water body;
 - b. Measures for managing water flowing onto the site, as well as water being pumped/diverted from the site such that sediment is filtered out prior to the water entering a waterbody. For example, pumping/diversion of water to a vegetated area, construction of a settling basin or other filtration system;
 - c. Site isolation measures (e.g., silt boom or silt curtain) for containing suspended sediment where in-water work is required (e.g., dredging, underwater cable installation);
 - d. Measures for containing and stabilizing waste material (e.g., dredging spoils, construction waste and materials, commercial logging waste, uprooted or cut aquatic plants, accumulated debris) above the high water mark of nearby waterbodies to prevent re-entry;
 - e. Regular inspection and maintenance of erosion and sediment control measures and structures during the course of construction;
 - f. Repairs to erosion and sediment control measures and structures if damage occurs; and,
 - g. Removal of non-biodegradable erosion and sediment control materials once site is stabilized.

Shorelines

13. Clearing of riparian vegetation should be kept to a minimum: use existing trails, roads or cut lines wherever possible to avoid disturbance to the riparian vegetation and prevent soil compaction. When practicable, prune or top the vegetation instead of grubbing/uprooting;
14. Minimize the removal of natural woody debris, rocks, sand or other materials from the banks, the shoreline or the bed of the waterbody below the ordinary high water mark. If material is removed from the waterbody, set it aside and return it to the original location once construction activities are completed;
15. Immediately stabilize shoreline or banks disturbed by any activity associated with the project to prevent erosion and/or sedimentation, preferably through re-vegetation with native species suitable for the site;
16. Restore bed and banks of the waterbody to their original contour and gradient; if the original gradient cannot be restored due to instability, a stable gradient that does not obstruct fish passage should be restored.
17. If replacement rock reinforcement/armoring is required to stabilize eroding or exposed areas, then ensure that appropriately-sized, clean rock is used; and that rock is installed at a similar slope to maintain a uniform bank/shoreline and natural stream/shoreline alignment; and,
18. Remove all construction materials from site upon project completion.

Fish

19. Ensure all in-water activities, or associated in-water structures, do not interfere with fish passage, constrict the channel width, or reduce flows.
20. Retain a qualified environmental professional to ensure applicable permits for relocating fish are obtained and to capture any fish trapped within an isolated/enclosed area at the work site and safely relocate them to an appropriate location in the same waters. Fish may need to be relocated again, should flooding occur on the site.
21. Screen any water intakes or outlet pipes to prevent entrainment or impingement of fish. Entrainment occurs when a fish is drawn into a water intake and cannot escape. Impingement occurs when an entrapped fish is held in contact with the intake screen and is unable to free itself. In freshwater, follow these measures for design and installation of intake end of pipe fish screens to protect fish where water is extracted from fish-bearing waters:
 - I. Screens should be located in areas and depths of water with low concentrations of fish throughout the year.
 - II. Screens should be located away from natural or artificial structures that may attract fish that are migrating, spawning, or in rearing habitat.
 - III. The screen face should be oriented in the same direction as the flow.
 - IV. Ensure openings in the guides and seals are less than the opening criteria to make “fish tight”.
 - V. Screens should be located a minimum of 300 mm (12 in.) above the bottom of the watercourse to prevent entrainment of sediment and aquatic organisms associated with the bottom area.
 - VI. Structural support should be provided to the screen panels to prevent sagging and collapse of the screen.
 - VII. Large cylindrical and box-type screens should have a manifold installed in them to ensure even water velocity distribution across the screen surface. The ends of the structure should be made out of solid materials and the end of the manifold capped.
 - VIII. Heavier cages or trash racks can be fabricated out of bar or grating to protect the finer fish screen, especially where there is debris loading (woody material, leaves, algae mats, etc.). A 150 mm (6 in.) spacing between bars is typical.
 - IX. Provision should be made for the removal, inspection, and cleaning of screens.
 - X. Ensure regular maintenance and repair of cleaning apparatus, seals, and screens is carried out to prevent debris-fouling and impingement of fish.
 - XI. Pumps should be shut down when fish screens are removed for inspection and cleaning.

Machinery

22. Ensure that machinery arrives on site in a clean condition and is maintained free of fluid leaks, invasive species and noxious weeds.
23. Whenever possible, operate machinery on land above the high water mark, on ice, or from a floating barge in a manner that minimizes disturbance to the banks and bed of the waterbody.

24. 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.
25. Use temporary crossing structures or other practices to cross streams or waterbodies with steep and highly erodible (e.g., dominated by organic materials and silts) banks and beds. For fording equipment without a temporary crossing structure, use stream bank and bed protection methods (e.g., swamp mats, pads) if minor rutting is likely to occur during fording.
26. Wash, refuel and service machinery and store fuel and other materials for the machinery in such a way as to prevent any deleterious substances from entering the water.

CONSIDERATION OF THE NEED FOR PUBLIC PARTICIPATION & ABORIGINAL CONSULTATION

Due to the limited scope, public participation is not warranted.

During implementation, the project will cause temporary delays and inconveniences for travelling visitors. However, upon completion, motorists will benefit through increased roadway safety and greater convenience (e.g., reduced need for continual/ ongoing maintenance).

Formal Aboriginal Consultation on this project was initiated with the representatives of the Mi'kmaq of Nova Scotia. Based on the Mi'kmaq response, several measures to mitigate impacts on archeological resources are set out in this BIA.

EFFECT SIGNIFICANCE

Taking into account the specific mitigation measures mentioned above, the project is not likely to cause significant residual environmental effects. Implementation of the chosen alternative would have a limited effect on natural resources and therefore no cumulative environmental impacts are forecasted.

SITE INSPECTION

Periodic surveillance monitoring is required by qualified PCA personnel and may include daily site visits during work activity, attending related meetings and briefings, evaluating effectiveness of mitigation measures, and consultation with staff and work crews during work activity.

The PCA environmental protection officer shall be continuously updated on project developments as they unfold.

DECISION

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

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

SIGNATURES AND APPROVAL

BIA Author

Name: Archie Doucette *Environmental Assessment Coordinator, CBFU*

Signature: Archie Doucette **Date:** February 2016

BIA Recommender

Name: Maura McKeough, *A/ Cultural Resource Manager, CBFU*

Signature: Maura McKeough **Date:** February 2016

BIA Recommender

Name: Derek Quann, *Resource Conservation Manager, CBHNPC*

Signature: _____ **Date:** _____

Approved by:

Name: Le Bel *Éric La Belle, CBHNPC Superintendent*

Signature: É. La Belle **Date:** 29/03/16

Project Manager (Functional)

Name: Kate McCarthy, *Highway Engineering Services (PWGSC)*

Signature: Kate McCarthy **Date:** 2016.3.22

I have read and commit to following the mitigations set out in this report

Comment:

APPENDIX 1

Effects Identification Matrix: *Bridge Replacement Project*



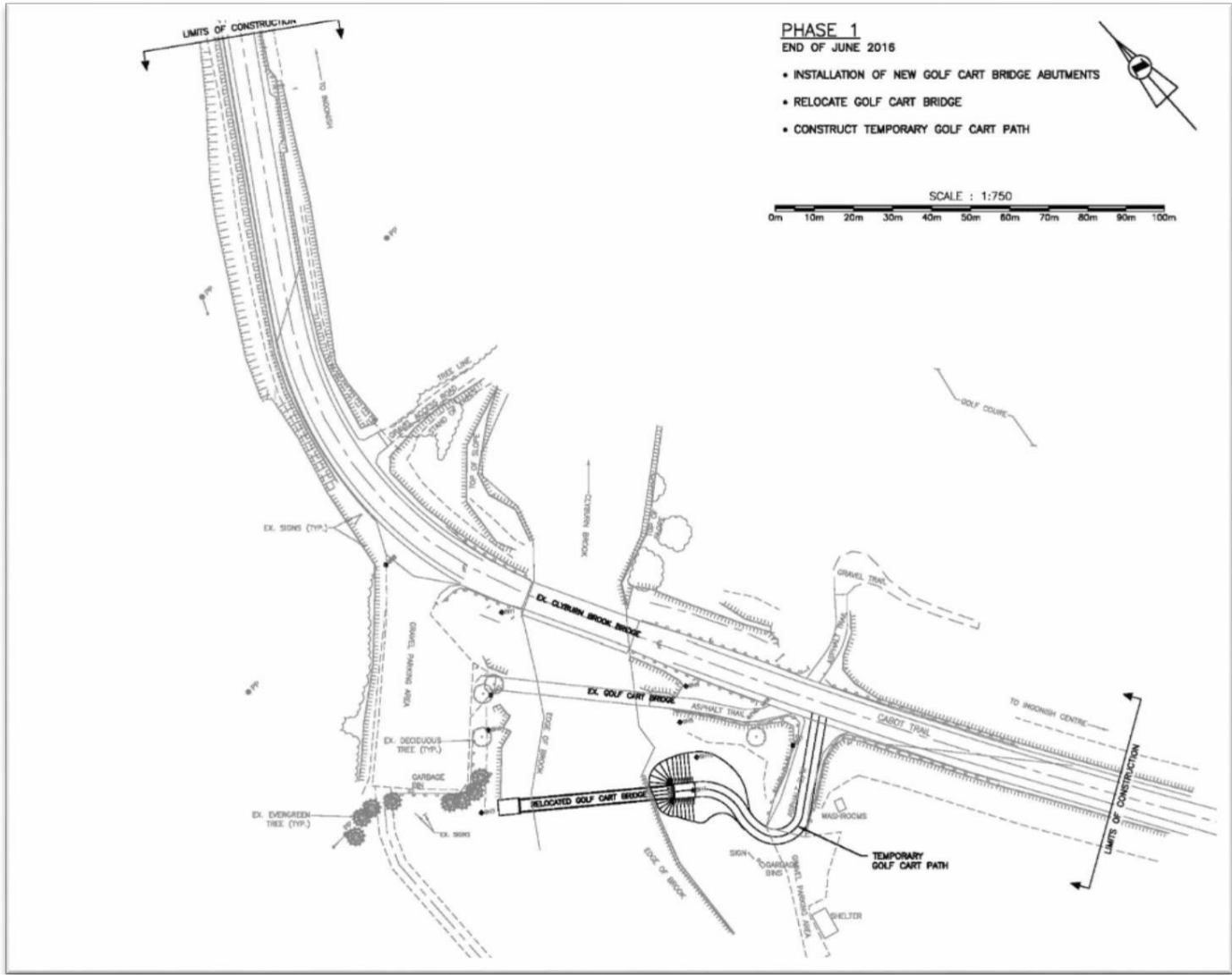
Effects Identification Matrix: *Clyburn Bridge Replacement Project*

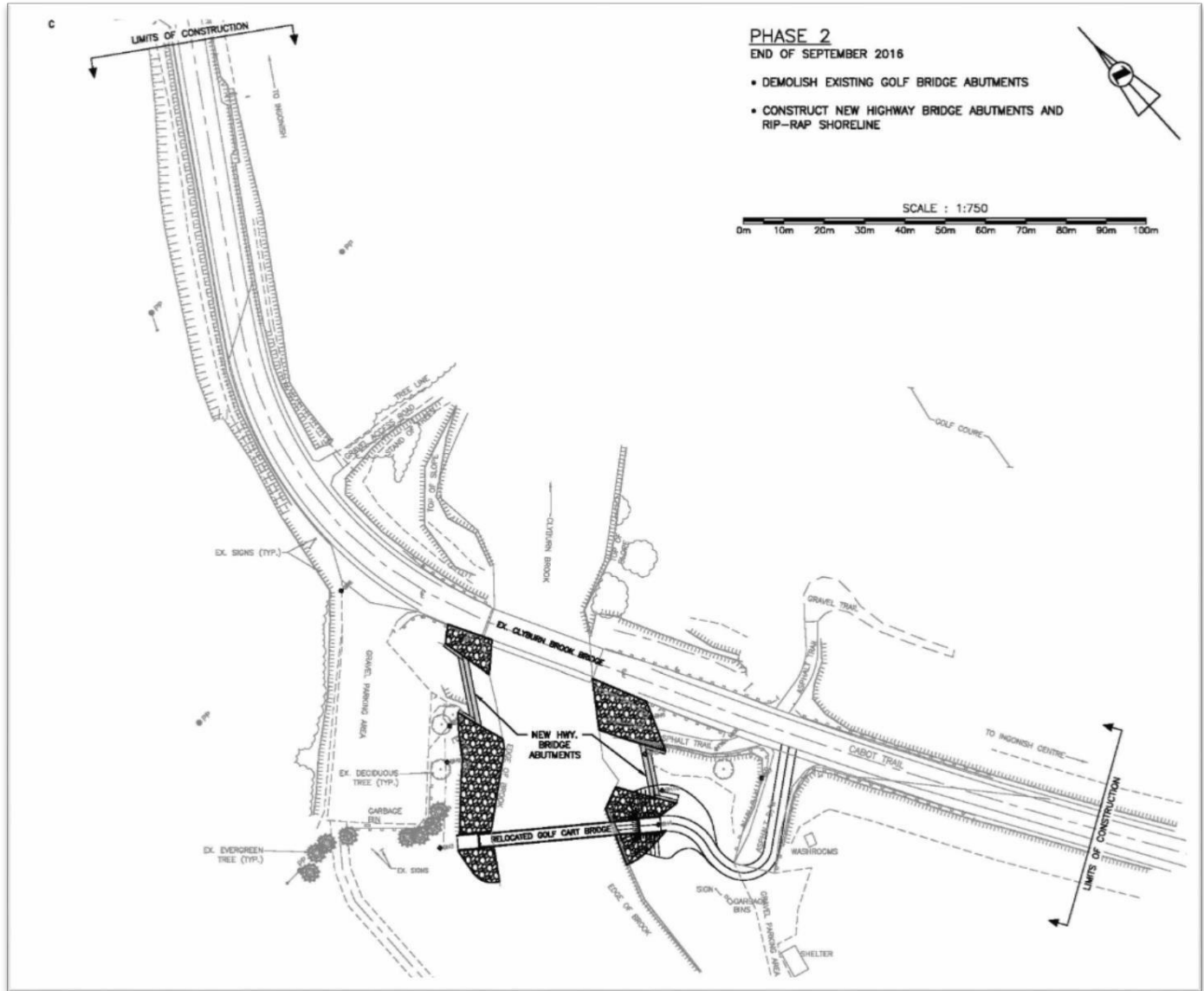
A. Direct Effects (during preparation/construction phases)													
			Components potentially directly affected by the proposed project										
			Natural Resources					Cultural Resources		Visitor Experience			
			Air	Soil & geology	Hydrology	Flora	Fauna	~ Landscapes	~ Resources	Visitor access	Recreational	Viewscapes	Soundscape
	Phase	Associated Activities											
Project Components	Preparation / construction	Material storage	√	√	√	√	√					√	√
		Clearing	√	√	√	√	√			√	√	√	√
		Detour set up	√	√	√	√	√			√	√	√	√
		Waste disposal	√	√	√	√	√					√	√
		Dredging	√	√	√	√	√			√	√	√	√
		Drainage	√	√	√	√	√			√	√	√	√
		Excavation	√	√	√	√	√	√	√	√	√	√	√
		Grading	√	√	√	√	√	√	√	√	√	√	√
		Backfilling	√	√	√	√	√	√	√	√	√	√	√
		Machinery use	√	√	√	√	√	√	√	√	√	√	√
		Transport - materials & equipment	√	√	√	√	√			√	√	√	√
		Sedimentation	√	√	√	√	√	√	√	√	√	√	√
		Use of chemicals	√	√	√	√	√			√	√	√	√
		Temporary facilities	√	√	√	√	√			√	√	√	√
		Vehicle traffic	√	√	√	√	√			√	√	√	√
		Decommissioning	√	√	√	√	√			√	√	√	√
		Remediation	√	√	√	√	√			√	√	√	√

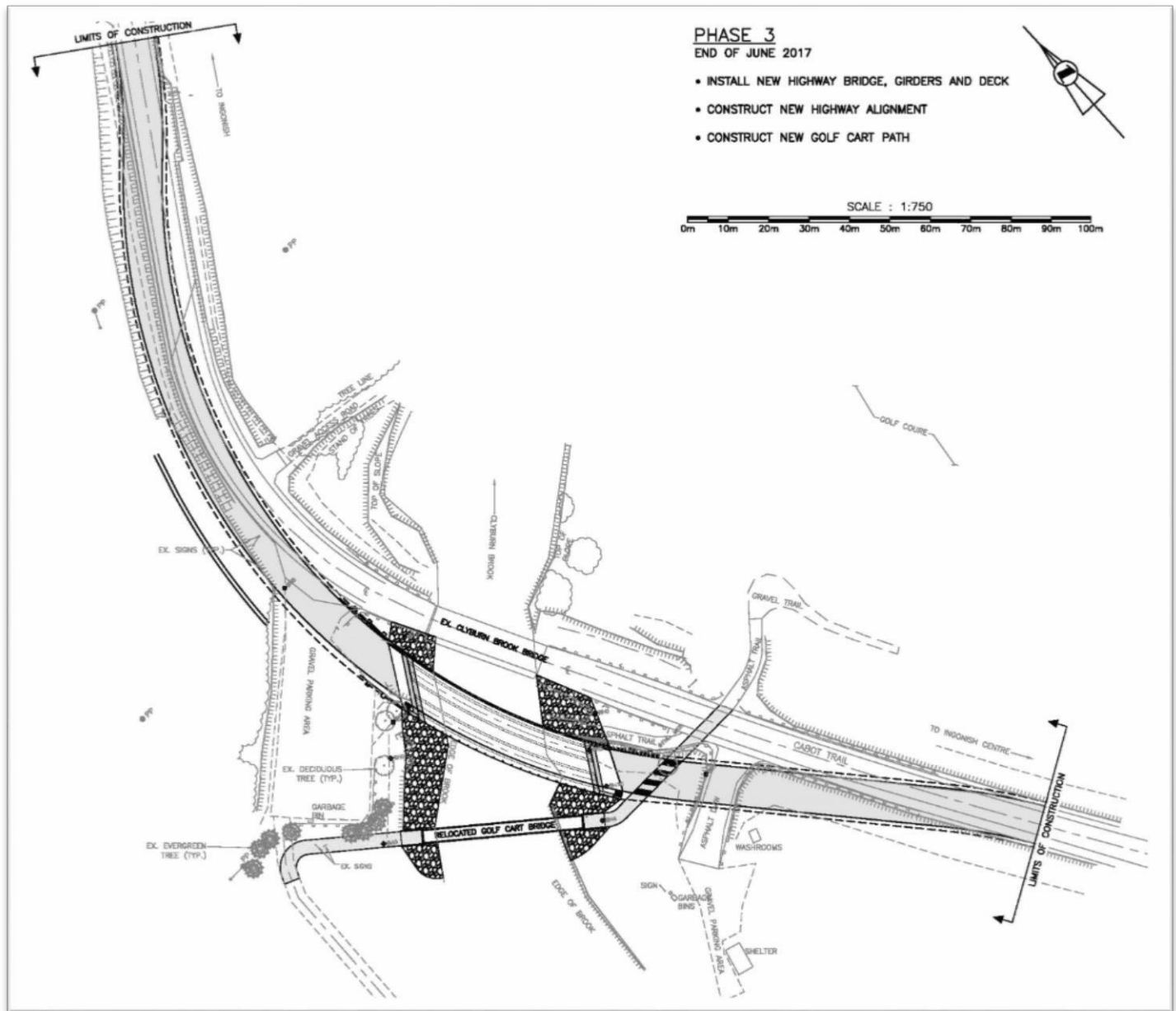


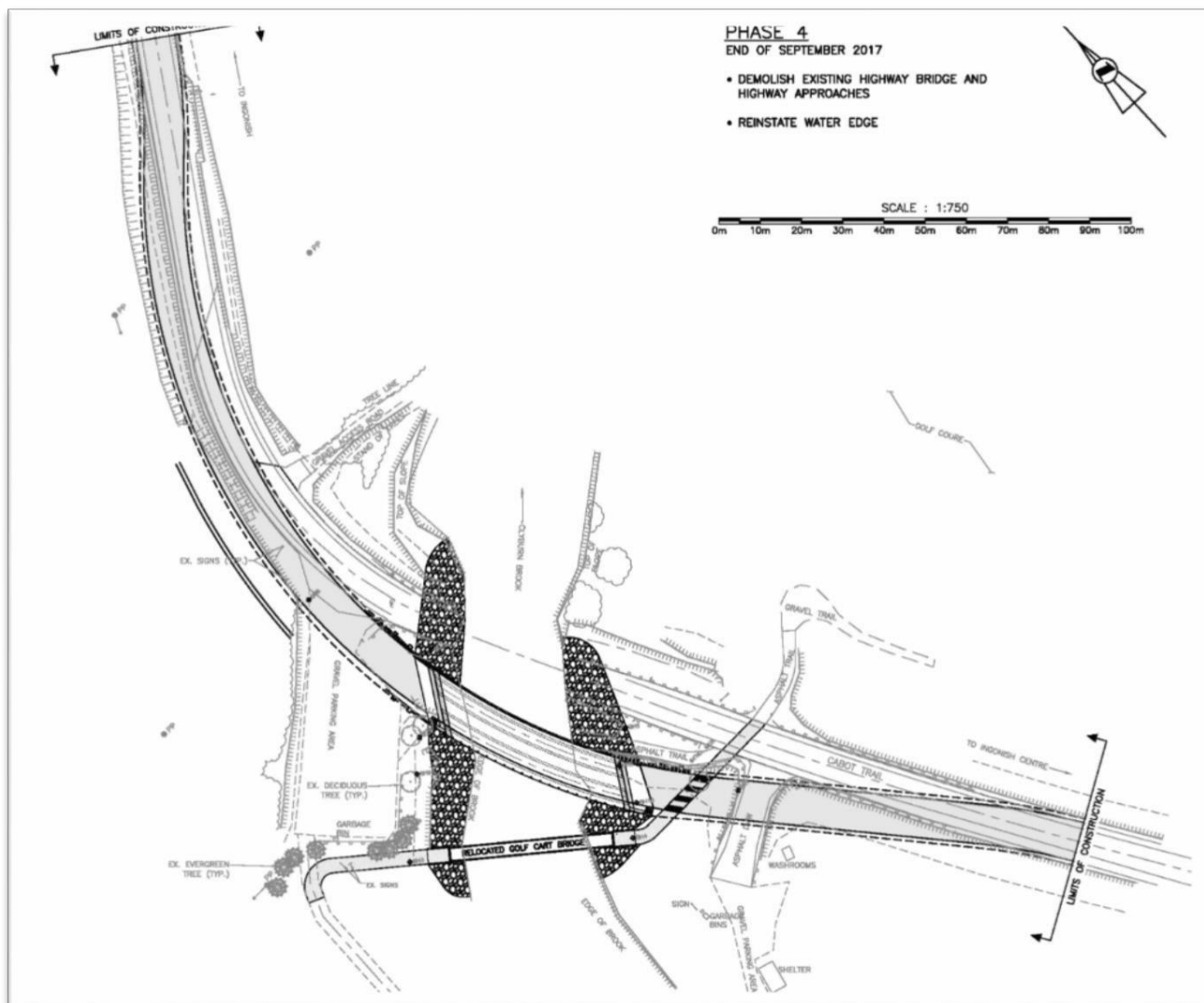
APPENDIX 2

Project Phasing











APPENDIX 3

Federal Coordination Request: Request for Review (DFO)



Bedford Institute of Oceanography
1 Challenger Drive
P.O. Box 1006
Station B410
Dartmouth, N.S.
B2Y 4A2

Your file Votre référence

March 31, 2016

CBHNPC-2015-001

Our file Notre référence
15-HMAR-00024

Archie Doucette
Environmental Assessment & Ecosystem Restoration
Parks Canada Agency
PO Box 158, 16648 Cabot Trail
Cheticamp, NS B0E 1H0

Dear Mr. Doucette:

**Subject: Serious harm to fish can be avoided or mitigated
 Clyburn River – Bridge Replacement, Victoria County, N.S.**

The Fisheries Protection Program (the Program) of Fisheries and Oceans Canada received a proposal on February 02, 2015.

Based on the information provided, the proposal has been identified as a project where a *Fisheries Act* authorization is not required given that serious harm to fish can be avoided by following standard measures. Proposals in this category are not considered to need an authorization from the Program under the *Fisheries Act* in order to proceed. In order to comply with the Act, it is recommended that the guidance tools, which can be found at the website (<http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/index-eng.html>), be followed.

Should the plans change or if there is omitted information in the proposal such that the proposal meets the criteria for a site specific review, as described on our website (<http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html>), the request for review form that is also available on the website should be completed and submitted.

Should the proponent have any questions or concerns about the compliance of their proposal with the *Fisheries Act* (and/or those prohibitions of the *Species at Risk Act* that apply to listed aquatic species)* they may wish to engage an environmental professional

*Those sections most relevant to the review of development proposals include 20 and 35 of the *Fisheries Act* and sections 32, 33 and 58 of the *Species at Risk Act*. For more information please visit www.dfo-mpo.gc.ca.

familiar with measures to avoid impacts to fish and fish habitat (<http://www.dfo-mpo.gc.ca/pnw-ppe/env-pro-eng.html>).

Yours sincerely,

A handwritten signature in black ink, appearing to read "Craig Hominick". The signature is fluid and cursive, with the first name "Craig" being more legible than the last name "Hominick".

Craig Hominick
A/Team Leader, Regulatory Reviews
Fisheries Protection Program

cc.: Kate McCarthy - PWGSC