



CN Milton Logistics Hub

**Fish and Fish Habitat Follow-Up
Program– Construction Monitoring
Report 2022**

Final Report

December 22, 2022

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Limitations and Sign-off

The conclusions in the Report titled Fish and Fish Habitat Follow-Up Program– Construction Monitoring Report 2022 are Stantec’s professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient’s own risk.

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Acronyms / Abbreviations

CISEC	Certified Inspector of Sediment and Erosion Control
CPUE	catch per unit effort
DFO	Department of Fisheries and Oceans
EIS	Environmental Impact Statement
ESC	erosion and sediment control
IAAC	Impact Assessment Agency of Canada
LAA	Local Assessment Area
MNRF	Ministry of Natural Resources and Forestry
PDA	Project Development Area
TDR	Technical Data Report



1 Introduction

Stantec Consulting Ltd. (Stantec) was retained by the Canadian National Railway Company (CN) to conduct a fish and fish habitat follow-up program (FUP) for the Milton Logistics Hub (the Project) in the Town of Milton, within the Regional Municipality of Halton (Halton Region), Ontario.

This report documents the implementation of the Fish and Fish Habitat FUP (Stantec, 2021) during the 2022 construction year. The report also serves as the construction monitoring report for Fisheries and Oceans Canada (DFO), which is a condition of Authorization 15-HCAA-00402 issued on July 23, 2021.

With construction activities to realign Tributary A and Indian Creek still underway but not yet complete, this report provides an update on the progress of that work and the mitigation measures implemented in 2022 to mitigate potential effects on fish and fish habitat.

1.1 Program Design Considerations

The FUP for fish and fish habitat was developed to be implemented during construction and operation to verify the accuracy of the environmental assessment and determine the effectiveness of proposed mitigation measures.

The program consists of two components:

1. Monitoring of construction activities and channel construction as it relates to the protection of fish and fish habitat.
2. Post-construction and operations monitoring to confirm that created fish habitat in the realigned portions of Indian Creek and Tributary A is functioning as intended.

Post construction monitoring is to take place during Years 0 through 5 following construction. As construction is still ongoing, no post-construction monitoring of created habitat in the realigned portions of Indian Creek and Tributary was completed for 2022. This report is intended to provide the reviewer with information related to the progress of construction, consistency with the approved plans and of the efficiency of mitigation measures employed thus far in the construction of the Project.



1.2 Activities Undertaken During Reporting Year

Project construction commenced on January 17, 2022. During the first few months, CN undertook site preparation activities including:

- surveying, delineating construction site boundaries, and installing site fencing
- installation of monitoring equipment
- placement of stakes/demarcation materials for site safety
- clearing and grubbing of vegetated areas
- access road and laydown area construction
- installation of construction site offices and other components

Site construction activities included:

- excavation of stormwater management (SWM) pond #2
- preparation of the enhancement areas accessible during the spring
- continued excavation work
- removal of CN-owned buildings
- initiation of grading activities on the realignment of Indian Creek and Tributary A
- work on access roads, including the installation of a temporary bridge (access road) over Indian Creek.

Following the fisheries timing window (March 15 to June 30), CN commenced construction of the portion of the Tributary A realignment channel within the existing agricultural pond (following fish removal and relocation) and continued with construction of the associated Tributary A habitat structures and offline portions of culvert 2A and 2B. Other activities included:

- site grading activities
- continued construction of SWM pond 2, including the outlet structure, and initiation of SWM pond 1
- site grading and earth moving activities
- continued offline construction of the Indian Creek realignment channel and associated habitat structures
- construction of an interim noise berm along Lower Base Line and the eastern property boundary near lay down area 1.



Finally, during the last months of 2022, CN connected the downstream portion of the new realigned portion of Tributary A, as well as Culvert 2B and the downstream portion of culvert 2A, to the existing Tributary A. Other activities included:

- realignment of the Sun-Canadian pipeline
- removal of the temporary bridge over Indian Creek
- completion of in-water and bank enhancements along Indian Creek
- continued offline construction of the Indian Creek realignment channel and associated habitat structures
- initiation of the realignment of the existing mainline, including grading and drainage and completion of site stabilization measures in preparation for winter period.

The new constructed Tributary A channel was activated on December 22, 2022 in the presence of DFO, CN and Stantec staff. Prior to activation, the Tributary A channel was field reviewed on December 1, 2022 with DFO staff who indicated their satisfaction with the vegetative growth within the realigned channel and riparian area, and that activation of the channel would be in compliance with the *Fisheries Act* authorization.



2 Methods of Monitoring

2.1 Erosion and Sediment Control

Prior to construction activities, erosion and sediment controls (ESC) measures were installed by Dufferin Construction Company (DCC) and inspected by qualified Stantec Certified Inspector of Sediment and Erosion Control (CISEC) staff. Various ESC measures were installed around aquatic features to help protect aquatic habitat from unintentional sedimentation during construction activities or major precipitation events. Stantec's environmental inspectors were on site weekly to monitor ESC measures for any deficiencies, such as improperly installed or compromised measures, and to document follow-up that may include repairs and/or modifications, as required. If a deficiency was found, Stantec reported the deficiency to DCC within 24 hours through Stantec's daily inspection report. If the deficiency was urgent, it was reported to DCC by calling the foreman on duty immediately for a repair or modification.

Global Environment Monitoring System (GEMS) , who has been retained by DCC to act as their environmental inspector, also regularly monitors ESC measures and works directly with DCC to resolve any issues. CN, DCC, Stantec and GEMS participate in weekly meetings to review site conditions, plan upcoming activities, and resolve any outstanding issues.

2.2 Water Quality Monitoring

Throughout the year, *In-situ* water quality was monitored and field analyzed with a LaMotte 2020 field meter three times per week, depending on construction activities that involve in-water work, near-water work, or during moderate to major precipitation events. Designated pre-determined *in-situ* water quality stations on Indian Creek and Tributary A captured areas upstream (reference) of the construction zone, within the construction zone, and downstream of the construction zone.

The field meter was calibrated on a daily basis. Turbidity readings were measured using nephelometric turbidity units (NTU) and are an optic measure of the haziness or cloudiness of a liquid caused by suspended particles. NTU values collected upstream acted as the reference and were compared to station values in the construction zone and downstream of the construction zone. If downstream values exceeded the upstream values by 8 NTU or more, the Stantec inspector on site that day investigated the potential exceedance source and recommended additional or modified ESC measures if required.



2.3 Construction / Environmental Inspection

Stantec’s environmental monitors were on site daily during construction activities. They were on site to collect *in-situ* water quality samples, inspect ESC measures for any repairs that may be required and recommend modifications if needed, and they also acted as a main contact for additional Stantec staff to complete fish removals and relocations when necessary.

In addition, Stantec field and office staff were available when concerns or questions arose as in relation to designed aquatic habitat features during all phases of construction. Stantec channel monitoring staff regularly visited the site to review existing channel construction activities in order to compare the approved drawings to the real time constructed habitat features. They worked closely with the channel contractors and provided recommendations for adjustments or modifications, if required. Regular communication with GEMS took place to coordinate daily inspection and response items, in addition to the weekly meetings attended by CN, DCC, Stantec and GEMS to review site conditions, plan upcoming activities, and resolve any outstanding issues.

2.4 Fish Removals/Rescues

Once a waterbody was adequately isolated by the contractor, a fish removal was completed by qualified Stantec staff trained as Class 2 electrofishing operators. A 2022 MNRF Licence to Collect Fish for Scientific Purposes (LCFSP) was obtained by Stantec and is currently active (Permit #1099952). Depending on the size of the isolated area, multiple electrofishing passes were used to remove fish from the work area. In some cases, areas are small and shallow in which only dip netting was used to complete the removal. All fish captured were identified to species, enumerated, visually inspected for deformations or disease and recorded. Once recorded and recovered, fish were released downstream of the isolated area. If dewatering was required post-fish removal, Stantec staff remained on site to capture any missed fish. These additional fish species were accounted for and released downstream of the isolated area. A 2022 Mandatory Collection Report will be completed and submitted to the MNRF no later than January 31, 2022 as outlined in condition 11a of the LCFSP.

2.5 Reporting / Communication

As previously noted, GEMS was contracted by DCC to provide environmental inspection services during construction. Stantec was retained by CN to monitor DCC’s activities for compliance with the conditions of approval and implementation of mitigation measures during construction. Both GEMS and Stantec completed daily inspections while on site to document and record real time construction activities and to communicate issues if they arise. The main objective of the daily inspections is to help facilitate compliance for CN during construction.



Daily reports are comprised of and report on, but are not limited to, updating CN with activities to date, reporting deficiencies in ESC measures or recommending modifications, status of previous recommendations, design and construction status updates (realignments, water pumping, fish removals, etc.), informing CN and its contractor of the results of *in-situ* water quality readings and work/construction activity forecasts and scheduling. The reports are supported by a photo log that documents the associated topics.



3 Results

3.1 Erosion and Sediment Control

Since construction commenced on January 17, 2022, there have been no major sedimentation events recorded in Indian Creek or any tributaries associated with the project footprint. Throughout the construction year, numerous ESC deficiencies and recommended modifications were recorded and these matters were communicated to the contractor for repairs or modifications. Deficiencies identified that were repaired and addressed included, but were not limited to:

- improperly installed silt fencing (i.e., sagging or low-lying wildlife and silt fencing, improperly keyed-in wildlife and silt fencing)
- damaged silt fencing (i.e., silt fence blowdowns, material tears and rips, or broken fence stakes)
- improperly staked silt sox
- stockpiled soil touching or too close to silt fencing
- full silt bags used for dewatering, and
- missing secondary containment under gas powered equipment.

These issues were communicated to DCC and CN, discussed during weekly meetings, and remedied by DCC.

To stabilize disturbed areas in a timely manner, hydroseeding, hand-cast seeds and coir matting were installed around waterbodies and along slopes where erosion potential was greatest. Due to dry conditions this summer, monitoring of these areas identified deficiencies in seed growth and recommendations for additional watering of these areas and/or additional seeding were implemented.

3.2 Water Quality Monitoring

As mentioned previously, turbidity readings are an optic measure of the cloudiness of water caused by suspended particles. There are a wide variety of causes for increased turbidity, including some that are natural. Elevated turbidity readings during construction monitoring prompted a search response to determine the cause of the elevation and to adapt to the situation by applying a mitigation approach that will return turbidity readings back to acceptable background levels.

Table 1 provides a summary of typical scenarios that have caused increased turbidity readings in Tributary A and Indian Creek.



Table 1: Recorded Elevated Turbidity Events in 2022

Date	Sample Points (NTU) 2022										Treatment	Outcome
	Trib. A u/s PL	Trib. A d/s PL	IC u/s	IC MidPt	IC u/s RBD	IC d/s RBD	Comment					
05/04	171	175	145	-	-	237	Turbid water entering Trib. A from disturbed farmland	Additional ESC measures added and existing ESC modified	Resolved			
05/05	10	82	66	-	-	61	Turbid water from Trib. A realignment work backflowing over rock check dam into existing Trib. A.	Replaced permeable rock check with impermeable earth berm and stabilized disturbed spoils	Resolved			
05/16	4.74	28.2	8.10	-	-	14.3	Eroding banks at existing farm pond discharge point	Removed unstable bank and eroded section of berm, regraded and stabilized	Resolved			



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Date	Sample Points (NTU) 2022								
	Trib. A u/s PL	Trib. A d/s PL	IC u/s	IC MidPt	IC u/s RBD	IC d/s RBD	Comment	Treatment	Outcome
06/08	Dry	Dry	6.72	-	18.7	20.0	Rain event	Natural occurrence	Continue to monitor
07/14	Dry	Dry	8.63	-	-	34.08	Recently removed beaver dam and beaver	Continue to monitor. Banks stabilized and vegetated	Continue monitoring
9/26	7.07	-	8.37	11.0	15.5	21.1	Carp activity	Natural occurrence	Continue to monitor

Note: PL (Property Line); FP (Farmer's Pond); IC (Indian Creek); MidPt (Mid-Point); RBD (Removed Beaver Dam)



The presence of carp within Indian Creek was the main cause for elevated turbidity levels in the downstream location. They were frequently observed within the backwater area upstream of the beaver dam prior to and following its removal. No in-water work or runoff from the construction site were observed at the time of these exceedances.

While efforts to reduce erosion and migration of material downstream were employed during removal of the beaver dam, including sequentially v-notching the dam to allow for slow drawdown, elevated turbidity levels were observed during and immediately following the beaver dam removal. The exposed sediment within the impoundment area is expected to re-vegetate, which will help stabilize this material and further reduce turbidity levels over time.

In some cases, elevated turbidity levels could not be linked to a specific construction-related event, erosional area, or ESC failure, and were not obvious as a visible increase in silt-laden water. It is important to remember that other natural occurrences can cause elevated turbidity levels. For example, algal blooms in the water column can increase turbidity readings but are not readily apparent during visual inspection.

3.3 Construction / Environmental Inspection

Stantec staff continuously worked with the contractor and sub-contactors on site to help facilitate the construction of various project tasks as outlined in the approved design drawings. Stantec staff were readily available to assist with decision-making and offer suggestions when issues came up where a field-fit solution was required in a timely manner. In addition, Stantec staff communicated with contracting staff to reaffirm the importance of mandatory as well as due diligence measures related to in-water works or near water works.

Examples are:

- educating contractors on site about the restricted in-water works timing window (March 15 to June 30)
- having adequately sized secondary containment for gas powered machinery and fuel storage containers in place at all times,
- having adequately supplied spill kits in designated areas available,
- if dewatering, ensuring that discharge location is a minimum of 30 metres away from a waterbody, in a vegetated area and equipped with a diffuser type setup to help reduce erosion and sedimentation,
- constructing adequately designed and sized dewatering containment basin to help isolate sedimentation if a vegetated area is not available,
- replacing filter bags when at approximately 80% capacity and removing silt from behind a silt fence when at approximately 80% capacity (from top of fence),



- using appropriately sized fish screens installed on intake hoses when dewatering,
- advising contractor to contact Stantec staff when a fish removal/rescue is required.

3.4 Fish Removals/Rescues

To assist with bank stabilizing and regrading of Indian Creek and realigning Tributary A, sections of the creek and its tributary were diverted using flumes to maintain flows downstream while isolating specific work areas. Prior to scheduled works, fish rescues were completed in these isolated areas. Table 2 provides a summary of fish removals that have taken place on Indian Creek and Tributary A in 2022.

Table 2: Fish Relocations Undertaken in 2022

Location	Date	Number of Species	Number of Fish	Comments
Indian Creek Fish Relocations				
Indian Creek	November 7, 2022	4	15	Fished prior to bank stabilization work
Indian Creek	November 21, 2022	9	315	Fished prior to bank stabilization work
Indian Creek	December 9, 2022	5	30	Fished prior to bank stabilization work
Tributary A Fish Relocations				
Tributary A	October 19, 2022	6	317	Fished isolated area prior to downstream connection for the channel realignment work
Tributary A	December 14, 2022	0	0	Fished prior to culvert 2A installation. No catch.
Tributary A	December 20, 2022	0	0	Fished isolated area for diversion into Culvert 2A and abandoned section of Tributary A to prepare for commissioning of new Tributary A channel. No catch.



To date, a total of 677 individual fish comprised of 14 species have been safely relocated. Fish species caught on the individual rescue dates are summarized in Table 3.

Table 3: Fish Species Caught During Relocations

Location	Date	Common Name	Scientific Name
Indian Creek	November 7, 2022	Pumpkinseed Bluntnose Minnow Rock Bass Brook Stickleback	<i>Lepomis gibbosus</i> <i>Pimephales notatus</i> <i>Ambloplites rupestris</i> <i>Culaea inconstans</i>
Indian Creek	November 21, 2022	Rock Bass Emerald Shiner Pumpkinseed Bluntnose Minnow Creek Chub Rainbow Darter Smallmouth Bass Lepomis sp.	<i>Ambloplites rupestris</i> <i>Notropis atherinoides</i> <i>Lepomis gibbosus</i> <i>Pimephales notatus</i> <i>Semotilus atromaculatus</i> <i>Etheostoma caeruleum</i> <i>Micropterus dolomieu</i>
Indian Creek	December 9, 2022	Rainbow Darter Rock Bass Longnose Dace Emerald Shiner Lepomis sp.	<i>Etheostoma caeruleum</i> <i>Ambloplites rupestris</i> <i>Rhinichthys cataractae</i> <i>Notropis atherinoides</i>
Tributary A	October 19, 2022	Pumpkinseed Green Sunfish Common Shiner Creek Chub Fathead Minnow White Sucker Lepomis sp.	<i>Lepomis gibbosus</i> <i>Lepomis cyanellus</i> <i>Luxilus cornutus</i> <i>Semotilus atromaculatus</i> <i>Pimephales promelas</i> <i>Catostomus commersonii</i>
Tributary A	December 14, 2022	No Catch	No Catch
Tributary A	December 20, 2022	No Catch	No Catch



3.5 Reporting / Communication

Daily and weekly reports are prepared by Stantec and GEMS staff. The collaboration between GEMS and Stantec staff has resulted in timely responses for various construction activities.

Stantec staff have been recording and filing daily reports since the start of construction. Stantec's daily activities for the week are summarized in a final weekly report that is distributed to CN, DCC and GEMS. These reports are filed in Stantec's electronic project file and can be referenced later as required. Similarly, GEMS prepares weekly reports summarizing the observations and tracking resolution of issues, which are raised and discussed during the weekly calls.

Photographs are taken daily as a form of visual documentation of the progress of construction and will eventually form an important part of the post-construction monitoring program. The photo log provided in **Appendix A** contains several representative shots of pre-construction conditions as well as during construction progress.



4 Discussion

4.1 Effectiveness of Mitigation Measures

Based on daily monitoring, inspections and reporting to date on the mitigation measures implemented prior to and during construction, there has been no adverse effect on fish and fish habitat within or downstream of the project footprint. This is attributed to having qualified monitoring staff on site during construction, especially during any sensitive (i.e., in-water) activities, and working with contractors and sub-contractors who are receptive to suggestions and recommendations to issues or potential issues as they arise associated with the projects design, construction activities and ESC measures in and around waterbodies.

Although 2022 was considered a relatively dry year with infrequent rain events over the summer and fall period, some larger events were observed. While efforts to resolve issues in advance of anticipated rain events were completed, increased diligence on a regular basis to maintain ESC measures and resolve identified issues improved site readiness when such storms, including unexpected storms, occurred.

4.2 Adaptive Management

Site-specific adaptive management approaches were relatively minor in 2022 and focused primarily on adjusting ESC measures to prevent or address minor erosion issues. This is common practice during any construction activity, where adjustments to the approach to ESC are made to resolve issues that arise. The following are examples where issues potentially affecting fish and fish habitat were employed as adaptive management measures:

- additional coir matting was recommended by Stantec and implemented by DCC along the slopes of stormwater management (SWM) pond 2 to help stabilize slopes
- additional seeding and watering of stabilized areas was similarly recommended and implemented where it was observed that progressive reclamation was not successful
- additional coir matting was recommended and implemented to stabilize the area disturbed during the beaver dam removal
- various efforts employed to resolve elevated turbidity levels in Tributary A and Indian creek, as summarized in Table 1



Collaboration between GEMS and Stantec has resulted in large areas of the construction workspace being visually inspected and documented on a regular basis during construction throughout the projects large footprint.



5 Summary and Conclusions

This report summarizes the results of the Fish and Fish Habitat FUP for 2022 and also serves as an interim report to meet the reporting deadline of December 31, 2022, as stipulated in *Fisheries Act* Authorization 15-HCAA-00402.

While some activities will have been completed at the time of submission (i.e., cutover of the realigned portion of Tributary A), many of the activities affecting fish and fish habitat for which the Authorization was obtained remain in progress (i.e., Indian Creek realignment, culvert 2A). Therefore, we anticipate that the 2023 annual report will represent the Year 0 site conditions and requirements outlined in the Authorization.

This current report serves as an update on the progress of construction. As construction is still ongoing, no post-construction monitoring of created habitat in the realigned portions of Indian Creek and Tributary was completed for 2022. This report is intended to provide the reviewer with information related to the progress of construction, consistency with the approved plans and performance of mitigation measures employed thus far in the construction of the project.

As per the commitments outlined in the Fish and Fish Habitat FUP, a copy of this report will be provided to the Impact Assessment Agency of Canada (IAAC) in accordance with Condition 7.12, as well as to DFO, Conservation Halton, Mississaugas of the Credit First Nation and Six Nations of the Grand River. In addition, this report will be posted to CN's project website (www.cn.ca/en/about-cn/milton-logistics-hub/) and a summary will be included in CN's 2022 Annual Report.



6 References

Stantec, 2021. CN Milton Logistics Hub: Follow-up Program for Fish and Fish Habitat. Final Follow-up Program. Prepared for CN.



Appendices



Appendix A Photolog





Photo 1: Pre-construction Tributary A (2020). Approximately 200 metres south of existing rail line. Facing upstream (north).



Photo 2: Pre-construction Tributary A (2020). Facing downstream (south).



Photo 3: Pre-construction Tributary A (2020). Approximate mid-point between existing rail line and Tremaine Road. Facing west.



Photo 4: Pre-construction Tributary A (2020). At culverts under Tremaine Road facing upstream (north)



Photo 5: During construction Tributary A (2022). At new culvert downstream of existing main line. Facing west.



Photo 6: During construction Tributary A (2022). Downstream section facing downstream (southeast).



Photo 7: During construction Tributary A. South end of realignment. Off-line floodplain



Photo 8: During construction Tributary A. South end of realignment facing Tremaine Road (southeast). Off-line floodplain



Photo 9: During construction Tributary A. Rock lined channel facing north.



Photo 10: Pre-construction Indian Creek (2014). At Tremaine Road approximately 1 km northwest of Lower Baseline Road. Facing downstream (east)



Photo 11: Pre-construction Indian Creek (2014). Approximately 300 metres downstream (east) of Tremaine Road. Facing west.



Photo 12: Pre-construction Indian Creek (2014). Approximately 300 metres downstream (east) of Tremaine Road. Facing downstream (east)



Photo 13: Pre-construction Indian Creek (2014). Approximately 250m downstream (east) of Tremaine Road. Facing the downstream left eroded bank.



Photo 14: During construction Indian Creek (2022). Approximately 1 km northwest of Lower Baseline at Tremaine Road. Downstream left bank rehabilitation. Facing upstream (southwest)



Photo 15: During construction Indian Creek (2022). Stabilized upstream right bank. Facing upstream (southwest)



Photo 16: During construction Indian Creek (2022). Approximately 200 downstream (northeast) of Tremaine Road. Regrading downstream left eroding bank. Facing upstream (southwest).



Photo 17: During construction Indian Creek floodplain (2022). Hydroseeding and tree planting