



**Environmental Assessment Addendum for the
Niagara Falls Water Treatment Plant
Raw Water Intake Relocation**

November 21, 2019

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1.0 Introduction and Study Area

1.1 Introduction

This document is an addendum to the Environmental Study Report (ESR) completed by Hatch Mott MacDonald (HMM) in 2008, documenting the Class Environmental Assessment (Class EA) Study addressing Phases 1 through 4 of the Class EA Process for the proposed relocation of the intake at the Niagara Falls Water Treatment Plant (WTP) in the City of Niagara Falls, Ontario (see Appendix A). This addendum identifies a new preferred alternative solution based on recently developed project constraints and evaluates the environmental, social, and technical impacts resulting from the project in the study area and community. The publication of this EA Addendum satisfies the requirements of the “Municipal Engineers Association Municipal Class Environmental Assessment for Water and Wastewater Projects” (June 2000, as amended in 2007) (MEA Class EA guidelines) and the Ontario Environmental Assessment (EA) Act.

1.2 Background and Study Area

The background and study area of this project has remained the same as when the original ESR was conducted in 2008 (refer to Appendix A). For the purposes of this addendum, it should be noted that the design concept of one of the alternative solutions results in relocating the intake approximately 190 m away from the Eastern border of the original study area (Refer to Figure 5.2-1 in Section 5). While there is a lack of environmental receptors of concern in this additional area, the additional land that the alternative solution passes through will be discussed in Section 3.2.1 of this addendum. Refer to figure 1.2-1 to see the study area and intake relocation alignments as presented within the original ESR.

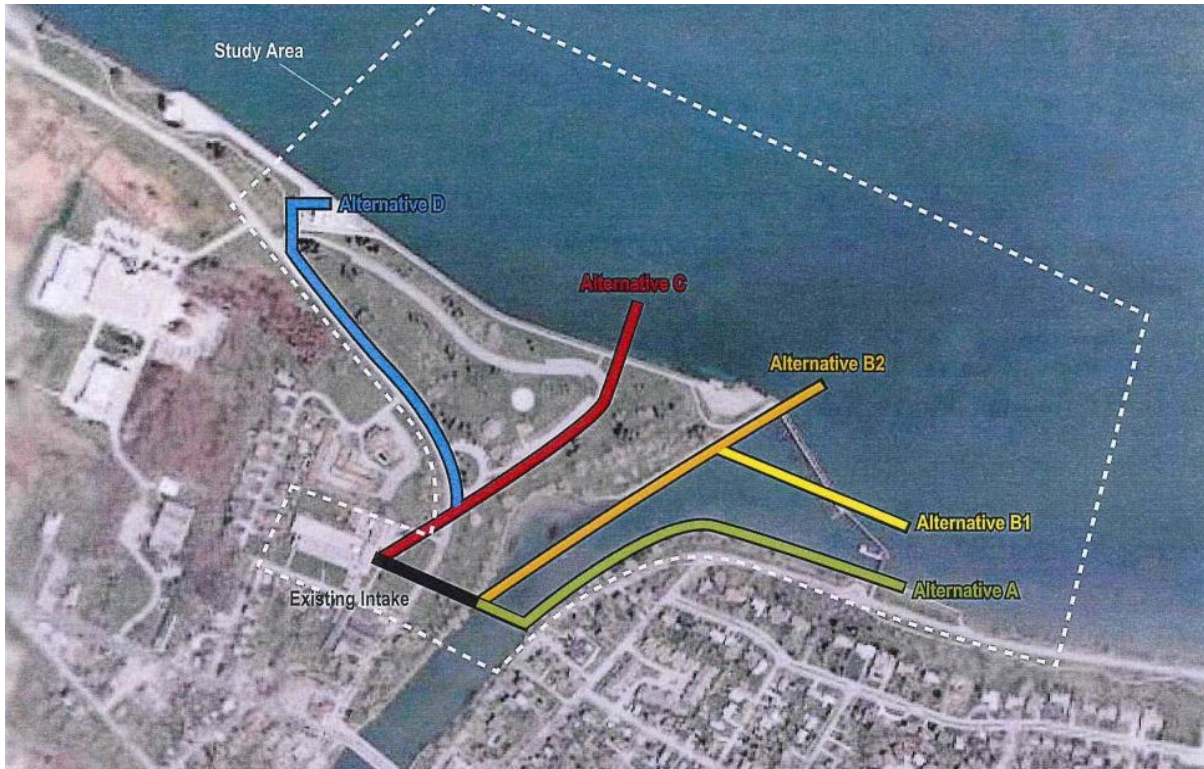


Figure 1.2-1 – Study Area and Intake Relocation Alignments as presented in the original ESR

1.3 Purpose and Rationale of the Undertaking

The purpose of the ESR was to undertake a Schedule ‘C’ Class Environmental Assessment under the guidelines of the MEA EA guidelines and the EA Act. The original ESR was to identify and assess alternatives for the relocation of the water intake at the Niagara Falls WTP. The purpose of this addendum is to identify and examine a new preferred alternative solution for the relocation of the water intake at the Niagara Falls WTP. This work is required to ensure reliable, high quality, and consistent raw water to the NFWTP during future OPG canal maintenance and shutdowns. Based on the preferred alternative identified in the original ESR, the Regional Municipality of Niagara (the Region) had initially planned to construct a temporary intake and pumping station north of the Ontario Power Generation’s (OPG) Sir Adam Beck (SAB) Tunnel 2 intake. However, OPG has recently expressed some concerns with a temporary intake at this location due to some additional factors associated with the commissioning of the Niagara Tunnel in 2013, and therefore, were not present in 2008. These factors include:

- The SAB power canal outage may span over the winter months, which means any temporary works in the areas, including the originally proposed platform, would be impacted by and interfere with normal ice discharges and ice breaking operations.
- An emergency boat refuge immediately downstream of the SAB Tunnel 2 intake serves as a safe haven for ice breaking vessels, in addition to being designed with the intention of being an emergency launch point for first responders during all seasons.
- A permanent solution outside the OPG lands and with minimal disruption to the OPG facilities is preferred by the OPG. This would reduce OPG's high risk of having work activities and future maintenance activities by other within their operating facility lands.

Based on this information, it was determined that the preferred alternative identified in the 2008 EA study is no longer feasible. For this reason, the Region has reviewed the original ESR and is proposing a new preferred alternative. This is the primary driver of this EA addendum and the new preferred alternative solution. Refer to Appendix B for a letter from the OPG in which concerns regarding the original preferred solution are discussed in greater detail.

Completion of this ESR addendum, once approved, will allow the Region to proceed with preparation of the detailed design for the Niagara Falls WTP intake, to obtain other environmental permits and approvals required to implement the project, and upon completion of these tasks, to proceed with the relocation of the intake.

1.4 Environmental Assessment Addendum Process

This EA Addendum is required as per Section 4.3 of the MEA Class EA guideline, which states that the filing of an addendum is suitable in the case of a 'Change in the Project or Environment' or a 'Lapse of Time'. For the Niagara Falls WTP Intake project, both addendum triggers have been encountered; the modified proposed alignment of the relocated water intake represents the 'Change in the Project or Environment' and the 10 years since the filing of the Notice of Completion of ESR of the original ESR represents the 'Lapse of Time'.

As per Section 4.3 of the Municipal Class EA guidelines, the following components are required to be included in the addendum:

- A description of the proposed changes to the recommended alternative solution;
 - Refer to Section 4.1.2 and Section 5.2 of this addendum.
- A description of the circumstances necessitating the change;
 - Refer to Section 1.3 of this addendum.
- The environmental implications of the change; and

- Refer to Section 4.3.2 of this addendum.
- Mitigation measures for any negative environmental impacts.
 - Refer to Section 5.3 of this addendum.

Additionally, as per the MEA Class EA document, it should be noted that only items constituting the addendum are open to review, and not the entirety of the project.

Finally, a period of 30 calendar days following the issue of the Notice of Filing of Addendum shall be allowed for review and response by affected parties, during which time no work is to be undertaken that may adversely affect the project and findings of this addendum.

1.5 Project Team

The Region has retained Environmental Infrastructure Solutions Inc. (EIS) to complete the EA Addendum.

Key Project team members include:

Lisa Vespi, P.Eng.	Region of Niagara
Horia Ispas, P.Eng.	EIS
Ronnie Wang, P.Eng.	EIS
Rob Frizzell	Palmer Environmental Consulting Group (Palmer)

2.0 Problem and Opportunities Addressed by the Study

2.1 Problem Statement and Opportunities

No changes to the corresponding section in the original ESR (HMM, 2008). See Appendix A.

2.2 Needs and Justification

No changes to the corresponding section in the original ESR (HMM, 2008). See Appendix A.

2.3 Stakeholder and Public Consultation

At the outset of this EA Study Report addendum, the list of potentially affected agencies identified in the original EA Study Report were reviewed and a consultation program to involve the individuals, stakeholders, and agencies which showed interest in the original EA was developed. Throughout the EA Addendum study, the Region conducted significant consultation through meetings and reviews with City of Niagara Falls, Niagara

Parks Commission, Ontario Power Generation, Ministry of Environment, Conservation and Parks and Ministry of Natural Resources and Forestry.

The public was notified by means of advertisements in the Niagara This Week on November 21, 2019 and Niagara Falls Review on November 23, 2019. A complete description of the agencies and public consultation is included in Section 6.0 of this addendum.

3.0 Existing Conditions

3.1 Natural Environment

Please refer to the characterization of the existing natural environmental conditions described in Section 3.1 of the original ESR completed by HMM (2008) (see Appendix A). Additional field investigations, analysis and information review conducted for the new preferred alternative solution in 2018-2019 is included in the applicable sections below which illustrates present day characterizations of the natural environment.

3.1.1 Surface Water Resources

Based on a desktop review, there are no changes to the corresponding section in the original ESR (HMM, 2008) regarding the characterization of surface water resources including the Niagara River and the Welland River.

3.1.2 Existing River Flows and Current

Based on a desktop review, there are no changes to the corresponding section in the original ESR (HMM, 2008) regarding the characterization of existing and future river flows and current.

3.1.3 Aquatic Environment

Ecologists conducted an assessment of the existing aquatic habitat and riparian conditions on November 29, 2018. The aquatic habitat assessment documented existing habitat features, as well as gave consideration to their preservation or enhancement during design and construction. Morphological habitat units, bed and bank materials, in-stream habitat cover (e.g., woody debris), general flow conditions, general water quality, and riparian vegetation were documented.

Welland River

There was a sandy bottom soil substrate with a fairly shallow bay inlet on the east side on the Welland River, north of the Niagara Falls Water Treatment Plant. The banks are vertical in shape with boulders at the edge (**Photo 1**). Based on the late fall survey, there was no evidence of in-water vegetation visible, just canopy cover from overhanging trees such as Crack Willow (*Salix fragilis*). There were two species of waterfowl observed at the site during the assessment, Mallard (*Anas platyrhynchos*), and Common Goldeneye (*Bucephala clangula*), but no fish. Based on habitat availability, upstream and

downstream connectivity, it can be assumed that fish and fish habitat are present throughout.

Niagara River

The water of the Niagara River is opaque likely due to suspended sediment. A pebble and stone bottom exists along the shoreline that quickly drops off to greater depths. The banks are vertical in shape and the height of the bank is roughly 2.5 m tall (**Photo 2**). Some hardening of the shoreline with loosely placed stone and boulders is present. There are few signs of erosion. The bank is naturally vegetated roughly 2-3 m in width (**Photo 3**). The dominant herbaceous riparian vegetation was comprised of Canada Goldenrod (*Solidago canadensis*), Wild carrot (*Daucus carota*), and Orchard grass (*Dactylis glomerata*). There was no in-water vegetation visible with only canopy cover from overhanging Bur Oak (*Quercus macrocarpa*), American Elm (*Ulmus americana*) and Sugar Maple (*Acer saccharum*). There was a group of Horned Grebe (*Podiceps auritus*) and Common Mergansers (*Mergus merganser*) observed at the site during the assessment, but no fish. Based on habitat availability, upstream and downstream connectivity, it can be assumed that fish and fish habitat are present throughout.



Photo 1. Shallow Bay inlet with vertical boulder banks on the Welland River



Photo 2. Vertical bank of the Niagara River, west of Ives Gateway



Photo 3. Vegetated banks of the Niagara River

3.1.4 Terrestrial Environment

Ecologists undertook field investigations on November 29th, 2018 to inventory the flora and vegetation communities where present of the site, record incidental wildlife observations, conduct a general assessment of wildlife habitat opportunities, assess physical terrain characteristics, and to provide an assessment of the ecological features and functions within the study area of the new preferred alternative solution. Ecological field investigations were conducted outside of the optimal window for vegetation surveys due to the overall project schedule and timing of the EA Addendum submission. Based on the availability of ecological information in the original ESR and the limited presence of natural vegetation communities, this timing for ecological field investigations is considered sufficient. The upland areas are largely anthropogenic and therefore vegetation was primarily maintained parkland and old field meadow with scattered tree cover. Limit flora representation can be expected in these areas, which we believe to be captured in the fall survey. A Species at Risk (SAR) screening was completed to identify potential habitat opportunities for key species identified through background review and agency consultation.

3.1.4.1 Vegetation

Vegetation communities were mapped and described following the Ecological Land Classification (ELC) System for Southern Ontario (Lee *et al.* 1998). Vegetation community boundaries were delineated on field maps through the interpretation of recent aerial photographs and refined in the field. Information collected during ELC surveys includes dominant species cover, community structure, as well as level of disturbance, presence of indicator species, and other notable features. Searches for Butternut (*Juglans cinerea*), an Endangered tree, were completed during the botanical surveys.

Most of the landscape throughout the study area consists of parkland with sparsely planted mid-aged trees throughout and riparian vegetation community. Areas of anthropogenic land use occur throughout the study area, including the Niagara Falls Water Treatment Plant property, residential developments and the shoreline parkland.

Field investigations identified one vegetation community type on the site, consisting of riparian vegetation along the Niagara River. The riparian community through the study area is generally anthropogenic parkland characterized by a mid-aged canopy of Bur Oak, American Elm and Sugar Maple providing less than 10% cover. The sub-canopy consists of Basswood (*Tilia americana*), Paper Birch (*Betula papyrifera*), American Elm and White Ash (*Fraxinus americana*), providing 10-25% cover. The understorey is composed European Buckthorn (*Rhamnus cathartica*), Gray Dogwood (*Cornus racemosa*) and Staghorn Sumac (*Rhus typhina*), providing 25-60% cover. The ground cover contains Orchard grass, Canada Goldenrod and Wild Carrot, providing greater than 60% cover.

Based on a late fall inventory, a total of 44 species of vascular plants was recorded within the site, 18 (or 40%) of which are known to be non-native to Ontario. Several highly invasive species were observed in the study area, including Tartarian Honeysuckle (*Lonicera tatarica*) and European Buckthorn. The recorded presence of non-native

species is indicative of disturbance on site in the past. Provincial (SRANKS) ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. All of the plants have an S5 or S4 ranking, indicating that they are common within Ontario. No provincial or federal Species at Risk were observed.

3.1.4.2 Wildlife

Wildlife habitat opportunities within the site are generally limited due the large areas of open spaces and parkland and extensive anthropogenic influences to habitats. Wildlife expected to be present consists of common, generalist and urban-adapted species such as Grey Squirrel (*Sciurus carolinensis*) and urban bird species. Several waterfowl and bird species were observed, which include a flock of Canadian Geese (*Branta canadensis*) foraging in the park, and a Blue Jay (*Cyanocitta cristata*) foraging and flying overhead. Numerous Horned Grebe (*Podiceps auritus*), a designated species of Special Concern, were observed on the Niagara River near the east bank of the Niagara River.

3.1.5 Species at Risk

SAR awareness and legislation has increased extensively in recent years. The Ontario Endangered Species Act came into force in June 2008, just before the submission of the original ESR (HMM, 2008).

For the purposes of this report, SAR include species listed as Endangered, Threatened or Special Concern under Ontario's Endangered Species Act (ESA). The protection provisions for species and their habitat within the ESA apply only to those species listed as Endangered or Threatened on the Species at Risk in Ontario (SARO) list. Special Concern species may be afforded protection through policy instruments respecting significant wildlife habitat as defined by the Province or other relevant authority, or other protections contained in OP policies.

Prior to fieldwork, existing SAR records were queried through correspondence with the Ministry of Natural Resources and Forestry (MNRF) and the NHIC database. Habitat opportunities for SAR were then assessed by comparing habitat preferences of species deemed to have potential to occur, against current site conditions. The SAR identified during the NHIC search, through correspondence with the MECP and others known through professional experience to have potential to occur were considered in the assessment. A brief discussion of the status, habitat requirements, and assessment of likely presence on the subject property for each of these species is provided below.

The NHIC database contains records of the following species in the general area:

Plants

- Pink Milkwort (*Polygala incarnata*) – Endangered
- American Water-willow (*Justicia americana*) – Threatened

Birds

- Northern Bobwhite (*Colinus virginianus*) – Endangered

Fish

- Lake Sturgeon (Great Lakes – Upper St. Lawrence River Population (*Acipenser fulvescens*) -Threatened

Invertebrates

- Fawnsfoot (*Truncilla donaciformis*) – Endangered
- Eastern Pondmussel (*Ligumia nasuta*) – Endangered
- Kidneyshell (*Ptychobranhus fasciolaris*) – Endangered
- Round Pigtoe (*Pleurobema sintoxia*) – Endangered
- Round Hickorynut (*Obovaria subrotunda*) – Endangered

Additionally, Horned Grebe (*Podiceps auritus*), a species of Special Concern, was observed during field investigations. Table 3.1.5-1 presents the habitat screening for these SAR species records.

Table 3.1.5-1. SAR Habitat Screening for NHIC SAR Records

Species	Habitat Requirement Overview	Habitat Suitability
Pink Milkwort	The Pink Milkwort grows in open, mesic to dry mesic sand prairie. The species is closely associated with Little Bluestem (<i>Schizachyrium scoparium</i>).	Absent
American Water-willow	The American Water-willow grows along shorelines and sometimes in nearby wetlands, as well as along streams where the bottom is composed of gravel, sand or organic matter. It prefers areas of hard water; it either grows above the water or is submerged.	Absent
Northern Bobwhite	The Northern Bobwhite requires open habitats that provide a mixture of grasslands, croplands and brush.	Absent
Lake Sturgeon	This fish lives on soft bottoms of mud, sand or gravel of lakes and rivers. They are usually found at depths of 20 m and spawn in fairly shallow, fast-flowing water (e.g., below waterfalls, rapids, or dams) with gravel and boulder bottoms. They may spawn in deeper water where habitat is available	Potential
Fawnsfoot	The Fawnsfoot is generally found in the lower portion of medium to large rivers, at depths ranging from less than one to over five metres. This mussel is usually associated with substrates of mud, soft sand or even gravel.	Absent (According to distribution and population – COSEWIC)
Eastern Pondmussel	Eastern Pondmussel prefer sediment composed of clay, silt/organics and/or sand/gravel where macrophytes are absent or at low densities. The species occurs in sheltered areas of lakes or in slack-water areas of rivers at depths ranging from 0.3 to 4.5 m	Absent (According to distribution and population – COSEWIC)
Kidneyshell	The Kidneyshell is most often found in small to medium-sized rivers and streams, where it prefers shallow areas with clear, swift-flowing water and substrates of firmly packed coarse gravel and sand. It is rarely found in either large rivers or headwater creeks. It is often found near beds of Water Willow, an aquatic plant. It is usually found deeply buried in the substrate	Absent (According to distribution and population – COSEWIC)
Round Pigtoe	In small rivers, this species can be found in areas of moderate flow on substrates of gravel, cobble and boulder. In larger rivers, it is found in mud, sand and gravel at varying depths.	Absent (According to distribution and population – COSEWIC)
Round Hickorynut	The preferred habitat of the Round Hickorynut is generally described as freshwater with steady, moderate flows and sand and gravel bottoms, at depths of up to 2m. In southeastern Michigan and southwestern Ontario, however, it has mainly been found in murky, low-gradient river with clay/sand or clay/gravel substrates.	Absent (According to distribution and population – COSEWIC)
Horned Grebe	The Horned Grebe typically nests in small ponds, marshes and shallow bays that contain areas of open water and emergent vegetation. Nests are usually located within a few meters of open water. This vegetation provides adults with nest materials, concealment and protection for their young. This species occupies natural habitat more often than man-made reservoirs and artificial ponds.	Present/Species Observed

Based on SAR information from the NHIC database and the results of field investigations and habitat screening, confirmed and potential SAR habitat has been identified within the project study area.

3.1.6 Soils

Within the original EA (2008), soil/geotechnical investigations were conducted west of the Welland River only. To minimize the risk of selecting a new preferred alternative, additional geotechnical investigations were conducted in fall 2018/winter 2019 along the new preferred alternative solution (see Section 5) by Palmer Environmental Consulting Group Inc. Twelve (12) boreholes were advanced to depths ranging from 6.7 m to 9.8 m (for pipe installation by open-cut) and from 13.9 m to 23.8 m (for shafts construction) below existing ground surface to determine subsurface conditions. The site generally consists of 130 mm to 300 mm topsoil, underlain by fill materials extending up to 2.4 m, underlain by clayey silt/silty clay (till) native soils. Dolostone bedrock was encountered in five (5) boreholes at depths ranging from 12.2 m to 15.3 m below ground surface. Seven (7) monitoring wells were installed in the boreholes and the measured groundwater level ranges from 1.5 m to 3.1 m below ground surface.

Considering the subsurface soil/rock condition, the transmission main undercrossing the Welland River is proposed to be constructed likely within bedrock by trenchless methods. The fresh dolostone bedrock underneath the river is capable of supporting the transmission tunnel with adequate rock cover. A copy of the geotechnical data report is located in Appendix C.

3.2 Social Environment

3.2.1 Existing Land Use

The existing land use as described in the original ESR completed in 2008 (refer to Appendix A) has remained largely the same, except for the Inn on the Parkway Motel now being abandoned. The alignment of the new proposed alternative will follow the existing Niagara Parkway to its intersection with Ives Gateway, where the proposed pumping station will be built (refer to Figure 5.2-1 in Section 5). This entire area is east of the Welland River and just south of the shore of the Niagara River, is zoned as Open Space, and is owned by Niagara Parks. The area just south of the Niagara Parkway is Sarah Street and the surrounding neighborhood, which is zoned as Residential. The proposed pumping station for the new alternative is proposed to be constructed on the portion of Ives Gateway that is zoned as Open Space. Refer to the map in figure 3.2.1-1.

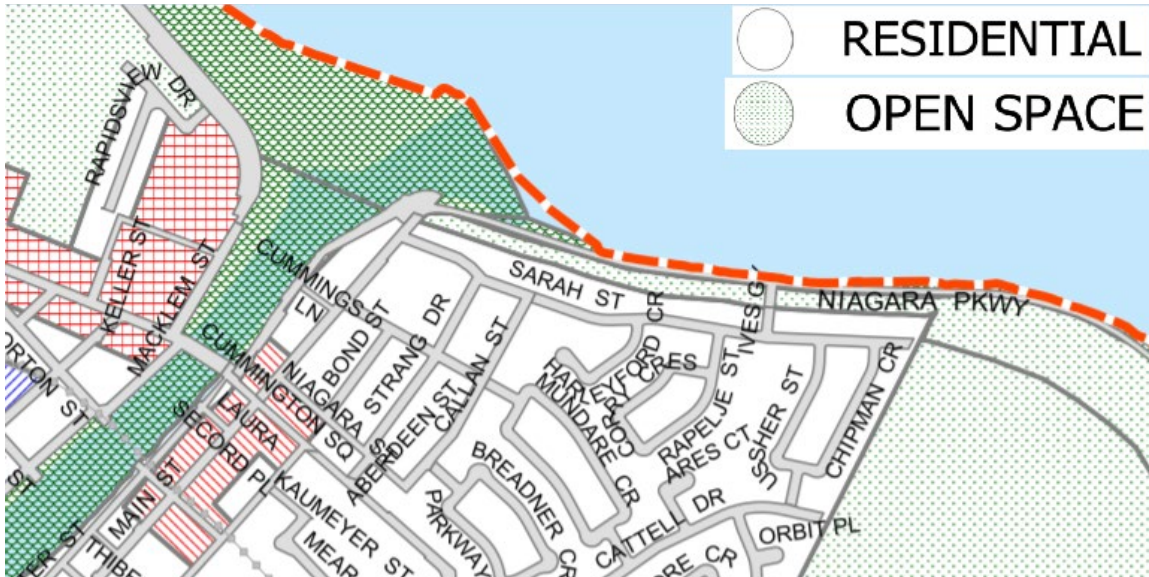


Figure 3.2.1-1 Residential/Open Space Zoning East of the Welland River

3.2.2 Archaeological Assessment

The study area was declared clear with no further archeological concern upon the completion of a Stage 2 archaeological assessment. (see Appendix D).

4.0 Alternative Solutions

4.1 Identification of Possible Alternative Solutions

4.1.1 Alternative 1 – Do Nothing

No changes to the corresponding section in the original ESR (HMM, 2008). See Appendix A.

4.1.2 Alternative 2 – Relocate the Intake to the Niagara River

This possible alternative solution requires the examination of a series of alternative locations and alignments for a new intake to the Niagara Falls WTP. While the locations and alignments of alternatives B through D have not changed (they may be found in the corresponding section in the original ESR in Appendix A), the alignment for Alternative A has been examined in greater detail as part of the conceptual design.

Alternative A

Alternative A will draw raw water from the Niagara River upstream of the future confluence of the Welland River flows. To ensure the impact of the confluence is minimized, several design concepts will be presented in Section 5.0 that will take

the confluence into account. The proposed intake pipe would follow the Niagara Parkway alignment on the south side of the Niagara River by method of trenching and tunneling when crossing underneath the Welland River in the proximity of the existing intake.

4.1.3 Alternative 3 – Addition of Pre-treatment Process to the Plant

No changes to the corresponding section in the original ESR (HMM, 2008). See Appendix A.

4.1.4 Alternative 4 – Temporary Pumping

No changes to the corresponding section in the original ESR (HMM, 2008). See Appendix A.

4.2 Evaluation of Alternatives

4.2.1 Environmental Impacts

No changes to the corresponding section in the original ESR (HMM, 2008). See Appendix A.

4.2.2 Evaluation Method

No changes to the corresponding section in the original ESR (HMM, 2008). See Appendix A.

Refer to table 4.2-1 on the following page for the evaluation of alternatives.

Table 4.2-1 Evaluation of Alternatives

Criteria		Do Nothing Alternative	Relocate Intake to the Niagara River Alternative			Temporary Pumping Alternative	Pre-Treatment Alternative		Alternative A Preferred Design Concept*
			Alternatives A, B, and C		Alternative D		Actiflo™	Pre-Sedimentation Tank	
			Trenching	Tunneling					
Natural Environment Impacts	Construction	NOT A VIABLE OPTION	High	Moderate	Low	Low	Moderate	Moderate	Moderate
	Operations		Low	Low	Low	Low	Low	Low	Low
Social Environment Impacts	Construction		Moderate	Moderate	Moderate	Low	Moderate	Moderate	Moderate
	Operations		None	None	None	Moderate	None	None	Low
Technical & Operational Concerns	Construction		High	Moderate	Low	Low	Low	Low	Moderate
	Operations		Low	Low	Low	Moderate	Low (During normal operation, large sludge volume when turbidity high)	Low (During normal operations, large sludge volumes when turbidity is high)	Low
OPG Concerns	Construction		High	High	High	Low	None	None	None
	Operations		High	High	High	Moderate	None	None	None
Cost	Construction		High	High	Low	Moderate	Moderate	Moderate	High
	Operations		None	None	None	High	Moderate	Moderate	Low

*Note: Alternative A Preferred Design Concept appended to original ESR Table 4.1

4.3 Evaluation of Alternatives

4.3.1 Alternative 1 - Do Nothing

No changes to the corresponding section in the original ESR (HMM, 2008). See Appendix A.

4.3.2 Alternative 2 - Relocate the Intake to the Niagara River

This alternative involves relocating the existing Niagara Falls WTP intake from its current location in the Welland River into the Niagara River east of the mouth of the Welland River. This alternative's construction will utilize a tunneling method while crossing the Welland River and either a tunneling or trenching method based on the design review while following the Niagara Parkway to its endpoint at the pumping station. Again, there are no changes to Alternatives B-D with respect to their alignments and intake locations.

The following sections will discuss the construction and operational impacts of this alternative on various aspects of the environment.

4.3.2.1 Aquatic Impacts

The original ESR (HMM, 2008) provides an assessment of construction (trenching and tunneling) and operational impacts to the aquatic environment. The identified aquatic impacts are applicable to the new preferred alternative solution. No new impacts have been identified.

4.3.2.2 Terrestrial Impacts

The original ESR (HMM, 2008) provides an assessment of construction (trenching and tunneling) and operational impacts to the terrestrial environment. The identified terrestrial impacts are applicable to the new preferred alternative solution. No new impacts have been identified.

4.3.2.3 Species at Risk

Based on SAR data from the NHIC and on the results of field investigations and habitat screening, confirmed and potential SAR habitat has been identified within the project study area. Following the selection of the preferred alternative, potential direct and indirect impact will be assessed, and species-specific protection and mitigation plans will be developed, in consultation with the MECP, as required to avoid contravention of the ESA.

4.3.2.4 Social Impacts

The proposed pumping station for the new alternative is to be placed on the portion of Ives Gateway that is zoned as Open Space, but outside the limits of Riverview Park. As such, there are no changes from the corresponding section in the original ESR completed by HMM in 2008, which can be found in Appendix A.

4.3.2.5 Technical and Operational Concerns

Some operational concerns, such as the level of maintenance required and the necessity of an on-site operator, will be considered as part of a further evaluation of the alternative 2A design concepts presented in Section 5.0.

4.3.2.6 OPG Concerns

As part of pre-design consultation with OPG in 2018, OPG identified that there are significant concerns with placing an intake near their existing control structures as shown in the preferred alternative of the original ESR.

4.3.3 Alternative 3 - Addition of Pre-treatment Process to the Plant

No changes to corresponding section in the original ESR (HMM, 2008). See Appendix A.

4.3.4 Alternative 4 - Temporary Pumping

No changes to corresponding section in the original ESR (HMM, 2008). See Appendix A.

4.4 Preliminary Recommendation of Preferred Solution

The original ESR had identified Alternative D as the preferred alignment for a permanent intake relocation for the Niagara Falls WTP. However, due to significant concerns expressed by the OPG, the four (4) alternative solutions were re-evaluated. It was determined that the Alternative 2A solution is the preferred alternative due to the lack of interference with OPG complex operations and maintenance, lower operating and maintenance risks to the Region, lower capital cost, avoidance of significant archaeological areas and avoidance of the International Niagara Control Works (INCW).

The next steps are a preliminary design of the preferred solution, as well as an assessment of the environmental effects and mitigation measures of the preferred alternative. These items are discussed in Section 5.0.

5.0 Selected Design, Environmental Effects and Mitigation Measures

The following section provides a more detailed look at some design concepts for the preferred alternative solution, as well as identifying some potential environmental effects and the respective mitigation measures to be taken.

5.1 Potential Design Concepts

Several different design concepts based on Alternative 2A as presented in the original ESR were identified and examined to determine the preferred design concept based on a variety of factors. The potential design concepts reviewed are presented in Table 5.1-1 on the following page. Key considerations for potential design concepts included the modification to the environment required by the design, the construction duration and cost, and the required level of maintenance for the proposed design.

Table 5.1-1 Alternative 2A Design Concepts

Items	Design Concept 1	Design Concept 2	Design Concept 3
	New Intake and New LLPS Outside the Plant	New Intake and Service Station Outside the Plant and New LLPS at the Plant	New Intake and New LLPS at the Plant
Summary of Scope	- Construct twinned suction lines equipped with cross bar screens from the new intake opening on the side bank of the river to the new LLPS; - Construct a new LLPS with traveling fine screens on shore near the intake structure complete with chlorine injection system; - Construct a new raw water transmission main from the new LLPS to the existing water treatment plant; - Construct a new tunnel underneath Welland River complete with maintenance chambers.	- Construct new passive intake screens with air scouring system/chamber in close proximity of the side bank of the river; - Construct a new service station on shore near the intake structure providing air compressor, pre-chlorine injection system and other auxiliary services; - Construct a new gravity raw water intake line from the new intake location to the plant; - Construct a new air pipe from the service station to the submersed passive intake screens for air scouring purposes; - Construct a new LLPS with traveling fine screens on the existing plant's property; - Construct a new tunnel underneath Welland River complete with maintenance chambers.	- Construct new passive intake screens with air scouring system/chamber near the side bank of the river; - Construct a new gravity raw water intake line complete with pre-chlorine injection line from the new intake location to the plant; - Construct an independent air pipe complete with maintenance chambers and condensation drains from the existing plant the new passive intake screens for air scouring purposes; - Construct a new LLPS at the plant complete with a new air blower for air scouring purposes; - Construct a new tunnel underneath Welland River complete with maintenance chambers.
Modification to the Natural River Bank	Minor	Significant	Significant
Permitting Duration	Approximate 6 months	Approximate 8-10 months	Approximate 8-10 months
Construction Duration	2 years	2 years	2 years
Required maintenance	Standard	Extensive	Extensive
Estimated Construction Cost (+/- 35% level of accuracy)	\$20 million	\$21 million	\$25 million

5.2 Selected Design Concept

Based on a comparative analysis of the potential design concepts based on Alternative 2A, the preferred design concept, design concept 1, consists of the following components:

- Twinned suction lines equipped with cross bar screens from the new intake opening on the side bank of the Niagara River to the new Low Lift Pumping Station (LLPS);
- A new LLPS with traveling fine screens on shore near the intake structure, complete with chlorine injection system;
- A new raw water transmission main from the new LLPS to the existing water treatment plant; and
- A new tunnel underneath the Welland River, complete with maintenance chambers.

A conceptual drawing of the design components and alignment is presented in Figure 5.2-1 on the following page. To be noted, the exact location of the LLPS will be finalized with Niagara Parks Commission and City of Niagara Falls during future design stages.

5.3 Environmental Effects and Mitigation Measures

In addition to the environmental effects and mitigation measures described in the original ESR (HMM, 2008), the following general mitigation enhancement measures are recommended for consideration through subsequent study phases:

- In compliance with the *Migratory Bird Convention Act*, vegetation removal is to be avoided within the “regional nesting period” for this area (generally late April to late July) unless a survey by a qualified avian biologist indicates an absence of actively nesting breeding birds.
- Trees that are located in close proximity to the construction area but not identified for removal should be protected with temporary tree protection fencing. Temporary tree protection fencing should be installed more than 1 m from the existing dripline of the tree or to the extent possible.
- Tree protection barriers will be installed using best practices and approved by a certified arborist. Regular inspection of the Tree Protection Zone (TPZ) areas will be used to ensure integrity of the protection measures and confirm that these areas remain healthy and undisturbed.
- MECP should be consulted during detailed design regarding proposed mitigation and enhancement relating to SAR ensure compliance to the ESA.
- In the unlikely event that SAR are encountered, work will stop and the MECP will be contacted.



Figure 5.2-1 Niagara Falls WTP - Raw Intake Relocation – Alternative 2A Preferred Design Concept

- To prevent adverse impacts on the reproductive activities of fish, MNRF timing restrictions with respect to in-water work would be between March 1 and July 15 in order to avoid disrupting the reproductive periods of warm water species, known to inhabit the Niagara River and Welland River. These dates represent when work should be avoided. MNRF timing restriction dates should be confirmed with MNRF.
- To minimize the potential for erosion and off-site transport of sediment into surface water features and the natural environment, the project will implement Best Practices related to erosion and sediment control (ESC). ESC measures used by the contractor on all construction must meet guidelines as outlined in Erosion and Sediment Control Guideline for Urban Construction, December 2006 (ESC Guideline), prepared by the Greater Golden Horseshoe Area Conservation Authorities (GGHACA).
- A blasting mitigation plan should be developed in accordance with *Guidelines for the use of Explosives in or near Canadian Fisheries Waters* (DFO 1998).
- The design and implementation of intake end-of-pipe fish screens should follow the *Freshwater Intake End-of-Pipe Fish Screen Guideline* (DFO 1995).
- All exposed and newly constructed surfaces should be stabilized using appropriate means in accordance with the characteristics of the exposed soils. These surfaces should be fully stabilized and re-vegetated as quickly as possible following the completion of the works.
- All activities, including the maintenance of construction machinery, should be controlled to prevent the entry of petroleum products, debris, rubble, concrete or other deleterious substances into the natural environment. Refueling should not occur within 30 m of any watercourse.

5.4 Source Water Protection Considerations

The existing NFWTP intake is located on the west bank of the Welland River at a depth of 5.5 meters. The existing intake is part of the Niagara Peninsula Source Protection Area, and is described in Chapter 9, of the 2013 Niagara Peninsula Source Protection Area Assessment Report (Assessment Report) with applicable policies identified with the Approved Source Protection Plan (2013). The current Intake Protection Zone (IPZ) mapping is shown in Figure 5.4-1. The existing IPZ-1 has a vulnerability score of 8.0 (moderate) largely due to its proximity to land, as it is located on the bank of the river, while the IPZ-2 has a vulnerable score of 6.4 (low).

The new intake location will require a Drinking Water Works Permit and updates/changes to the Source Protection Plan as required under the Clean Water Act. The Source Protection Plan will need to be revised and updated by the Source Water Protection Committee to reflect the new IPZ locations and Vulnerability Scores, Identification of Threats, and Evaluation of Drinking Water Quality Issues. The addition of new, or changes in vulnerable areas will likely result in the extension of source protection policies to areas where they previously did not apply.

The delineation of the new IPZ's will be based on the classification of the intake, and final approved location of the intake itself. The current intake is considered a Type B -

Connecting Channel, and it is expected that the proposed alternative intake location would also be considered a Type B. Under this scenario, the IPZ-1 will likely be delineated based on the same technical rules used for the existing intake, which would extend 100 m downstream and 1,000 m upstream. The IPZ may also be truncated, similar to the existing intake IPZ-1, within the Niagara River based on hydrodynamic effects (limited lateral movement of water due to high flows). The current IPZ-1 was truncated at a distance of 450 m's from the Niagara River bank (Figure 5.4-1). Where the IPZ-1 touches land, appropriate setbacks (ie. the greater of 120 m's or the conservation authority regulatory limit) will need to be included. There may also be changes to upstream IPZ-2 areas associated with tributaries to the Niagara River (up-tributary pathways) and an extension of the IPZ-2 to the south within the Niagara River (approximately 1000 m downstream). No significant changes in land uses or drinking water threats relative to the existing intake are anticipated to occur within the new potential IPZ's.

Source Water Protection policies will apply to new landowners in the newly delineated IPZ-1 areas (likely within a 120 m buffer on land). There are currently 7 Significant Threat Policies that apply to the existing intake IPZ-1. These include no new waste disposal sites, no new combined sewers, wastewater treatment facilities, stormwater management facilities, or industrial effluent systems, no new industrial or commercial land uses, no new agricultural land uses, no new Category 3 Non-Agricultural Source Material application, required outreach program, and appropriate signage requirements. Updated Source Protection Plan policies for the new intake are expected to be similar to those listed above. The current Source Protection Plan does not include policies for threats within the IPZ-2 areas.

Once confirmation of the new intake IPZ-1/2 and Vulnerabilities has been completed as part of the updates to the Source Water Protection Plan, consultation on the impacts of the Plan policies should be undertaken with the newly affected landowners. Landowners will have the opportunity provide input and review the new Source Water Protection Plan as part of that process.

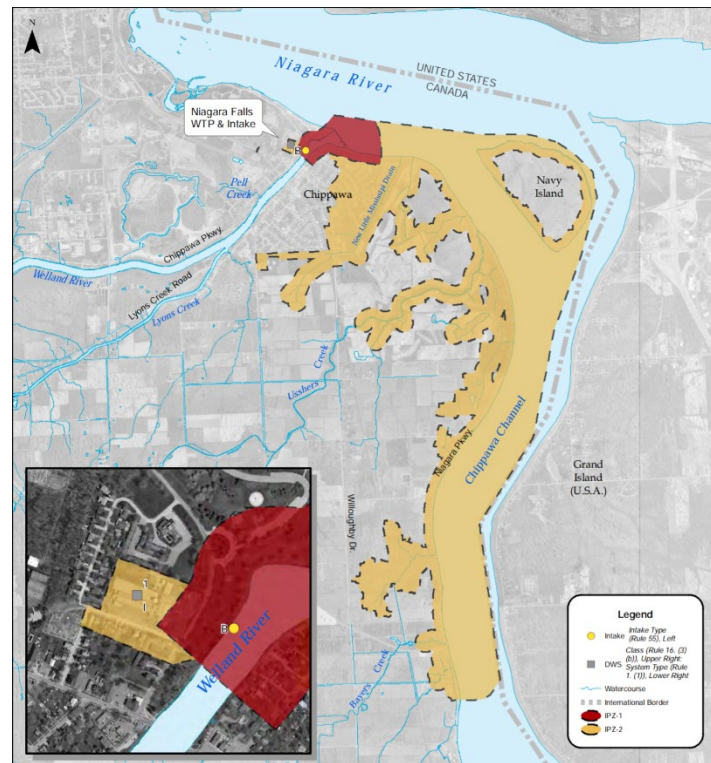


Figure 5.4-1. Niagara Falls WTP Intake Intake Protection Zone Map

6.0 Agency and Public Consultation

6.1 Agency Consultation

In addition to the 2008 consultation, a Notice letter was sent to various review agencies and stakeholders on June 14, 2019; refer to Appendix E for a copy of the Notice letter.

The following agencies and stakeholders were contacted for their comments via Notice letter:

- Ministry of the Environment, Conservation and Parks
- Ministry of Natural Resources and Forestry
- Ontario Power Generation
- City of Niagara Falls
- Niagara Peninsula Conservation Authority
- Niagara Parks Commission

6.2 Other Consultation

The public and additional stakeholders will be consulted by means of a Notice of Filing of Addendum published in the Niagara Falls Review and Niagara This Week. A copy of the Notice of Filing of Addendum is included in Appendix E.

Additional stakeholders to be notified during the public review period are as follows:

- Indigenous Communities (Mississauga of the Credit First Nation, Haudenosaunee, Six Nations of the Grand River)
- International Joint Commission
- Niagara River Remedial Action Plan Team
- New York Department of Environmental Conservation
- Department of Fisheries and Oceans
- Transport Canada

Additional consultation with the community affected by the design concept will be conducted during the design phase to review project information, design layouts, renderings and to be able to ask questions pertaining to the design.

7.0 Environmental Monitoring Program

7.1 Preconstruction Monitoring

No changes to the corresponding section in the original ESR (HMM, 2008). See Appendix A.

7.2 Construction Monitoring

No changes to the corresponding section in the original ESR (HMM, 2008). See Appendix A.

8.0 Conclusions and Recommendations

8.1 Recommendations

This addendum for the Schedule “C” Municipal Class EA for the Intake Relocation has found that the preferred alternative is a new intake and new LLPS outside of the plant, with the raw water transmission main following the Alternative 2A preferred design concept. Permits and approvals may be required as follows:

- MECP – DWWP/MDWL Amendment (Schedule C)
- MECP – Permit to Take Water for (Construction, WTP intake operation)
- MECP – Environmental Activity Sector Registry
- MECP – Consultation regarding ESA requirements
- NPCA – Source water planning and approval
- Clean Water Act and Ontario Regulation 287/07 – Authorization required for new intake protection zone
- NPCA – Ontario Regulation 155/06 for Development, Interference with Wetlands and Alternations to Shorelines and Watercourse for construction works inside Regulated Limits. A Work Permit from the NPCA will be required prior to commencement.
- MNRF – Crown Easement for the Welland River crossing (interim Land Use Permit may also be required prior)

- MNRF – Crown land work permit and tenure
- DFO – Review/authorization or self-assessment under the Federal Fisheries Act
- Navigation Protection Act – Approval under the Navigation Protection Act is required
- International Joint Commission – notification / consultation on project
- Niagara Parks Commission – Property easements, tree compensation plan

8.2 Implementation

This Class EA Project Addendum File is being made available for the stipulated review period to fulfill the public screening requirements. As a Schedule “C” project, approval of this project is obtained once a 30-day public review process is completed without an objection to the Minister of the Environment, Conservation and Parks. The new intake is anticipated to be in service by 2022.

8.3 Approval Process

No changes to the corresponding section in the original ESR (HMM, 2008). See Appendix A. Please note that written comments and Part II order request letter copies should now instead be directed to:

Ms. Lisa Vespi, P.Eng.
Senior Project Manager
Public Works Department
Water and Wastewater Services Division
3501 Schmon Parkway, P.O. Box 1042
Thorold, ON L2V 4T7
Phone: 905-980-6000 ext. 3640
Email: lisa.vespi@niagararegion.ca

Mr. Horia Ispas, P.Eng.
Project Manager
Environmental Infrastructure Solutions
Inc. (EIS)
600 Alden Road, Suite 300
Markham, ON L3R 3T7
Phone: 905-205-0536
Email: horia.ispas@eisgroup.ca

8.4 Next Steps

If no concerns are expressed by the conclusion of the 30-day review period, the Region may proceed with the design of the project. The Region anticipates subsequent public consultation throughout the design and construction phases of the project.

The project is expected to proceed as follows:

Notice of Filing of Addendum	November 21, 2019
Project File Available for Public Review	December 20, 2019
Design	2020
Construction (Anticipated)	2021/2022
Commissioning (Anticipated)	2022