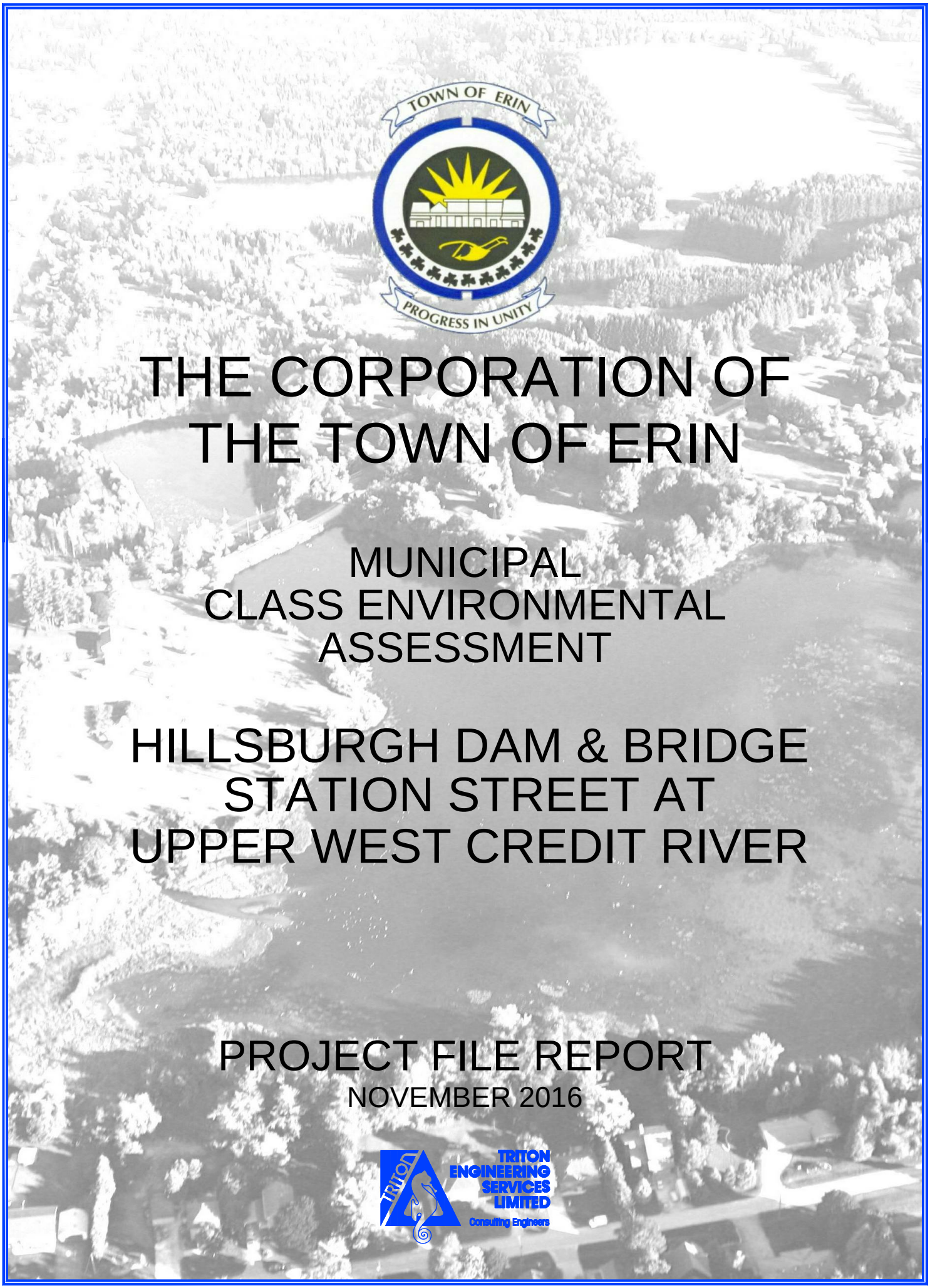

THE CORPORATION OF THE TOWN OF ERIN

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

HILLSBURGH DAM & BRIDGE STATION STREET AT UPPER WEST CREDIT RIVER

PROJECT FILE REPORT

NOVEMBER 2016

TRITON ENGINEERING SERVICES LIMITED
Consulting Engineers

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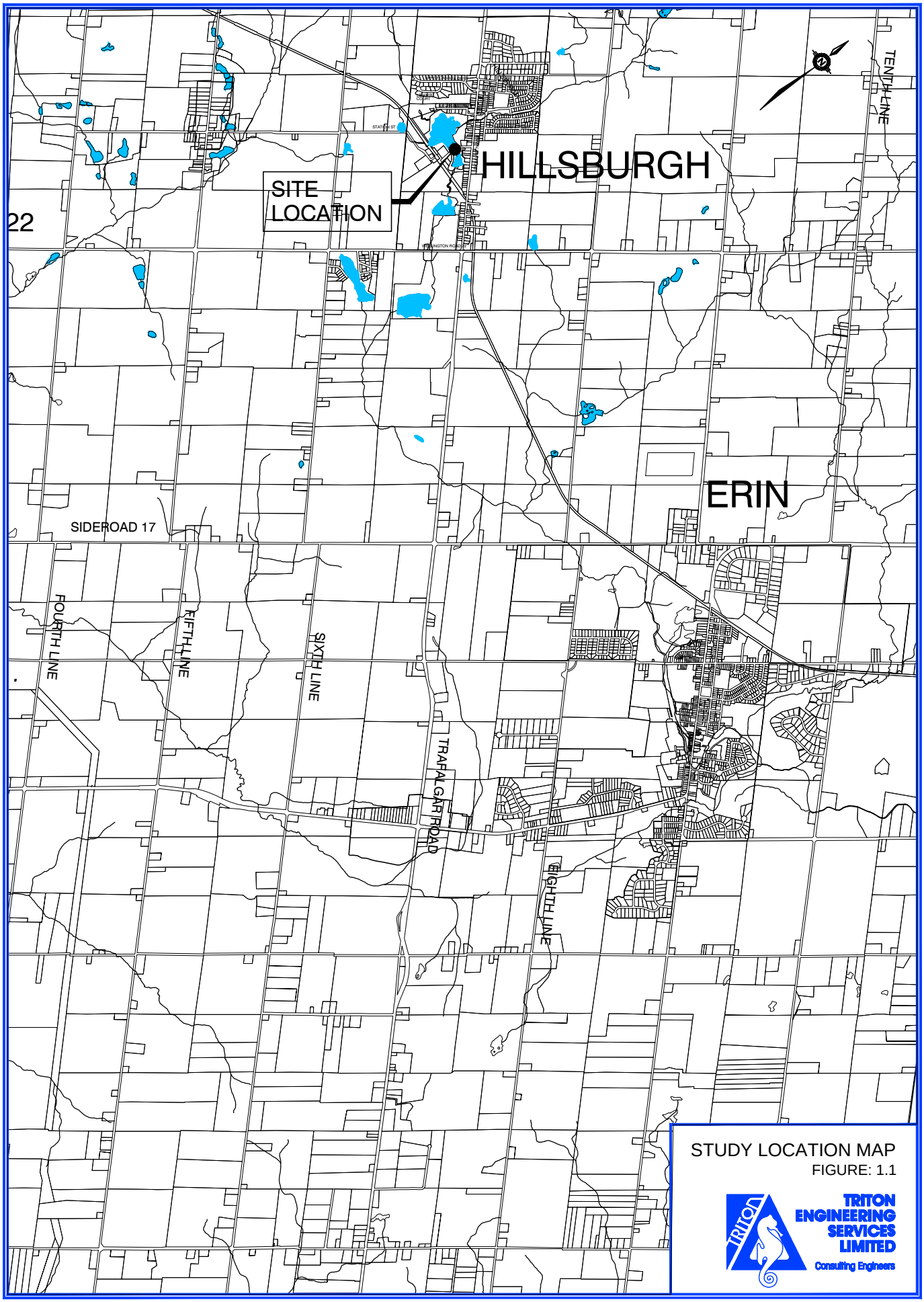
1.0 Introduction

Under direction by the Ministry of Natural Resources and Forestry (MNRF) under the Lakes and Rivers Improvement Act (LRIA), the Town of Erin has initiated a study to investigate the possible long term alternatives to improve dam safety, ultimately reducing the risk to loss of life and property of the Hillsburgh Dam and Bridge. Both structures are depicted in the photos below and are located along Station Street, approximately 150m west of Trafalgar Road, crossing the Upper West Credit River in Hillsburgh, Ontario; refer to Figure 1.1 – Study Location Map. In addition, the bridge is nearing the end of its design life and is in need of upgrades to reduce the risk to traffic using the structure. Due to their close proximity and interdependence, the dam and bridge structure will both be evaluated as part of this study.

Photo 1 - Station Street Bridge, Structure 2064 – Looking west toward Cedar Valley

Photo 2 - Hillsburgh Dam – Looking south from east shoreline



STUDY LOCATION MAP

FIGURE: 1.1

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1.1 Project Background - Pre-Study

In 2011, the pond's outlet pipe, within the earthen dam failed, forming a sink hole within the Station Street roadway. Station Street was subsequently closed and the Town initiated contact with the Credit Valley Conservation Authority (CVC) and MNRF to resolve this issue. A title search was conducted and a legal opinion of ownership was provided by the Town's Solicitor. The search confirmed the Town holds ownership of the dam (the earthen berm structure and bridge) whiles the original monk riser outlet and stop-log control structures are privately owned. Refer to Appendix A for the legal survey which depicts the Town's road right-of-way and shows the separation of the monk and stop-log control structures.

Photo 3 – Stop Log Control Structure and Spillway– Looking upstream under Bridge

Photo 4 – Stop Log Control Structure – Looking downstream from east shoreline

Photo 5 – Monk Riser Structure – Looking upstream from Station Street

The following is a timeline of work that was completed after the Station Street road closure:

- CCTV investigation of outlet culvert with submersible camera - December 15, 2011
- 2 - stop-logs were removed by the private property owner to the north in order to lower water levels in the upstream pond to reduce the risk in the event of a dam failure - Late December 2011
- Geotechnical Investigation of the Earthen Dam was completed - March 6, 2012
- Topographical survey of the dam, road, outlet structures and bottom of the pond upstream of the dam was completed to estimate the volume of water being retained

With guidance from the CVC and MNRF, in 2012, emergency repairs were completed to fix the problem using the LRIA's Non-Application Emergency Repair process.

The emergency repairs included the removal of the existing outlet pipe and installation of a new ditch inlet. This process decommissioned the existing monk-riser structure within the Hillsburgh Pond. The ditch inlet was set within the Town's road right-of-way. The new outlet pipe was encased with concrete and the section of excavated earthen berm dam was filled using blue clay fill to reinforce the dam's core at this section. The upstream face of the dam was lined with metal sheet piles, temporarily improving this section of the earthen berm.

Photo 6 – New Ditch Inlet – Within Town road right-of-way installed as part of the Non-Application Emergency Repairs

Photo 7 – Corrugated Metal Sheet Piles – Installed along the upstream side of the Hillsburgh Dam within repaired area as part of the Non-Application Emergency Repairs.

All repair work was approved by MNRF and CVC agencies. A condition of approval under the LRIA for the Non-Application Emergency Repair requires that the Town develop and implement a permanent solution for the dam. Appendix A contains the MNRF notice of extension to complete the selection of a permanent solution by December 1, 2016. As stated above, the Town has initiated a study and has opted to do so under the process of a Schedule "B" Municipal Class Environmental Assessment. Details as to how this process is to be undertaken are outlined in the following section.

2.0 Municipal Class Environmental Assessment

This project has been completed in accordance with the Municipal Class Environmental Assessment (Class EA) document dated October 2000 (as amended in 2007 and 2011) prepared by the Municipal Engineers Association (MEA) and is an approved process under the Ontario Environmental Assessment Act.

2.1 Classification of Projects

The Class EA applies to municipal infrastructure projects including roads, water and wastewater. Municipal projects environmental impacts can vary; therefore the Class EA classifies the projects and activities under the following schedules:

Schedule A – Includes normal or emergency operational and maintenance activities, with minimal adverse environmental effects. These projects undergo pre-approval without further assessment and approval.

Schedule A+ – MEA introduced this schedule. These projects are pre-approved. The public is to be notified prior to project implementation.

Schedule B – Includes projects that have a potential for adverse environmental impacts, generally projects which include improvements and minor expansions to existing facilities. These projects are subject to approval once they have gone through the screening process, including consultation with stakeholders who may be directly affected and pertinent review agencies.

Schedule C – Includes the construction of new facilities and major expansions to existing facilities. These projects have the potential for significate environmental effects and therefore need to proceed through the environmental assessment planning process outlined in the Municipal Class EA document.

2.2 The Process

Based on the review of the viable alternatives as well as consultation with the MNRF and CVC, this project proceeded as a Schedule “B”, and followed Phases 1 and 2 of the Class EA process as shown in Figure 2.1.

A Schedule “B” Class EA process involves Phases 1 and 2 which includes; identification of the problem statement, public and agency consultation, an evaluation of alternatives, an assessment of potential environmental effects, and identification of reasonable measures to mitigate any adverse impacts that may result.

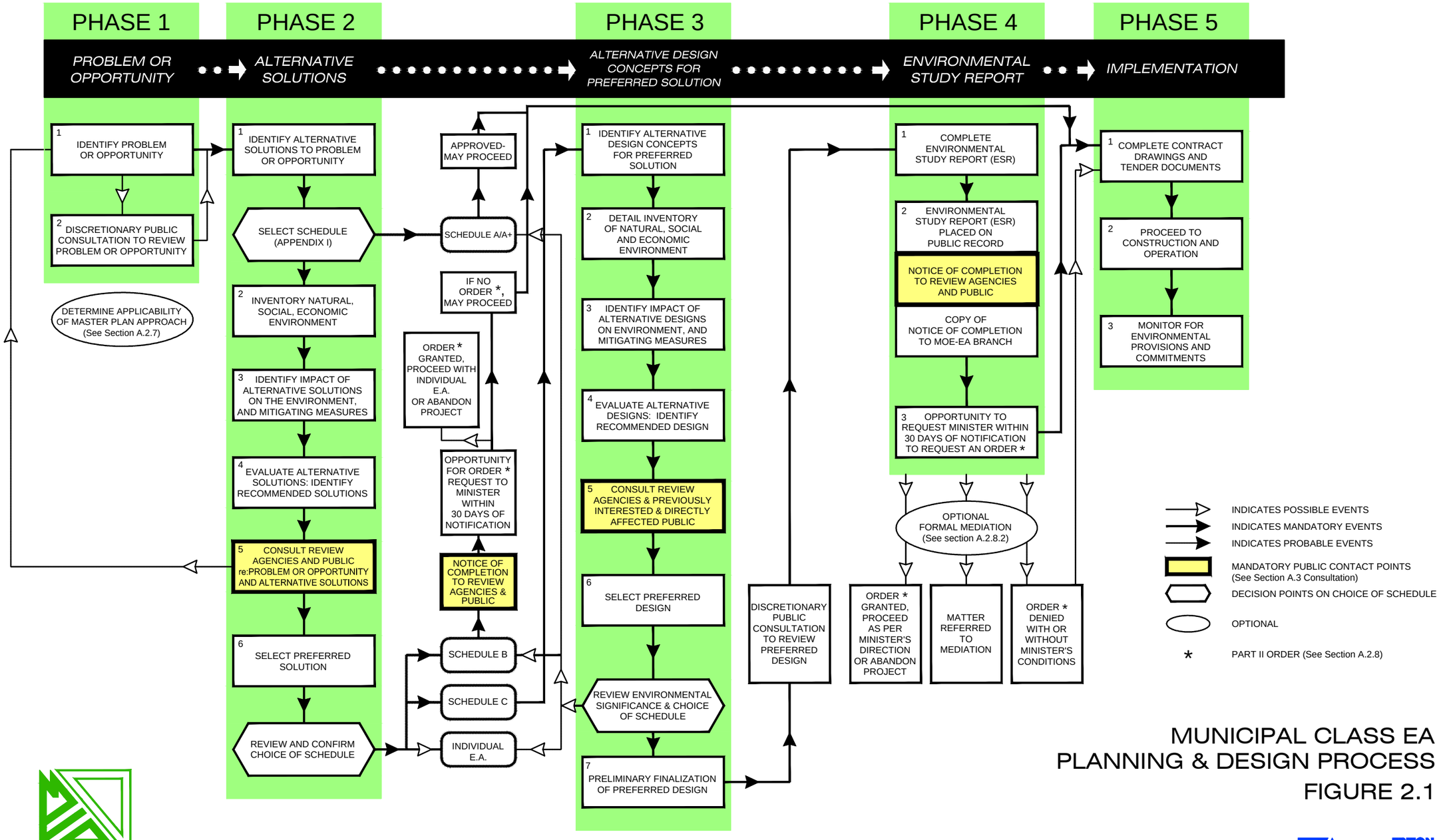
Once the preferred alternative is selected and approved, all documentation including methods of consultation, background information and study conclusions and recommendation are compiled within a Project File Report (PFR). Following the completion of the PFR a Notice of Study Completion is issued and circulated to the public and review agencies. At this time, the PFR is available for review and comment for the minimum period of 30 days.

During and prior to the end of this 30 day period, if concerns are raised that cannot be resolved through methods of negotiations with the Municipality, the person(s) or agencies with the concern can make a request (in writing) to the Minister of Environment and Climate Change to issue a Part II Order. A Part II Order request has the potential to elevate the scope of the study and the decision is substantiated by the Minister of Environment and Climate Change. Additional information related to the Part II Order process is available on the Ministry of Environment and Climate Change website at the following link: https://www.ontario.ca/page/class-environmental-assessments-part-ii-order

Furthermore, in the event there are no issues or Part II Order request within the 30 day minimum review period, the project will have met the requirements of the Class EA process. At this time, the Municipality may wish to proceed with the final detailed design and construction phases of the Recommended Preferred Alternative. It should be noted however, this process does not include the need for obtaining any required approvals and permits from regulatory agencies.

MUNICIPAL CLASS EA PLANNING AND DESIGN PROCESS

NOTE: *This flow chart is to be read in conjunction with Part A of the Municipal Class EA*



MUNICIPAL CLASS EA PLANNING & DESIGN PROCESS

FIGURE 2.1

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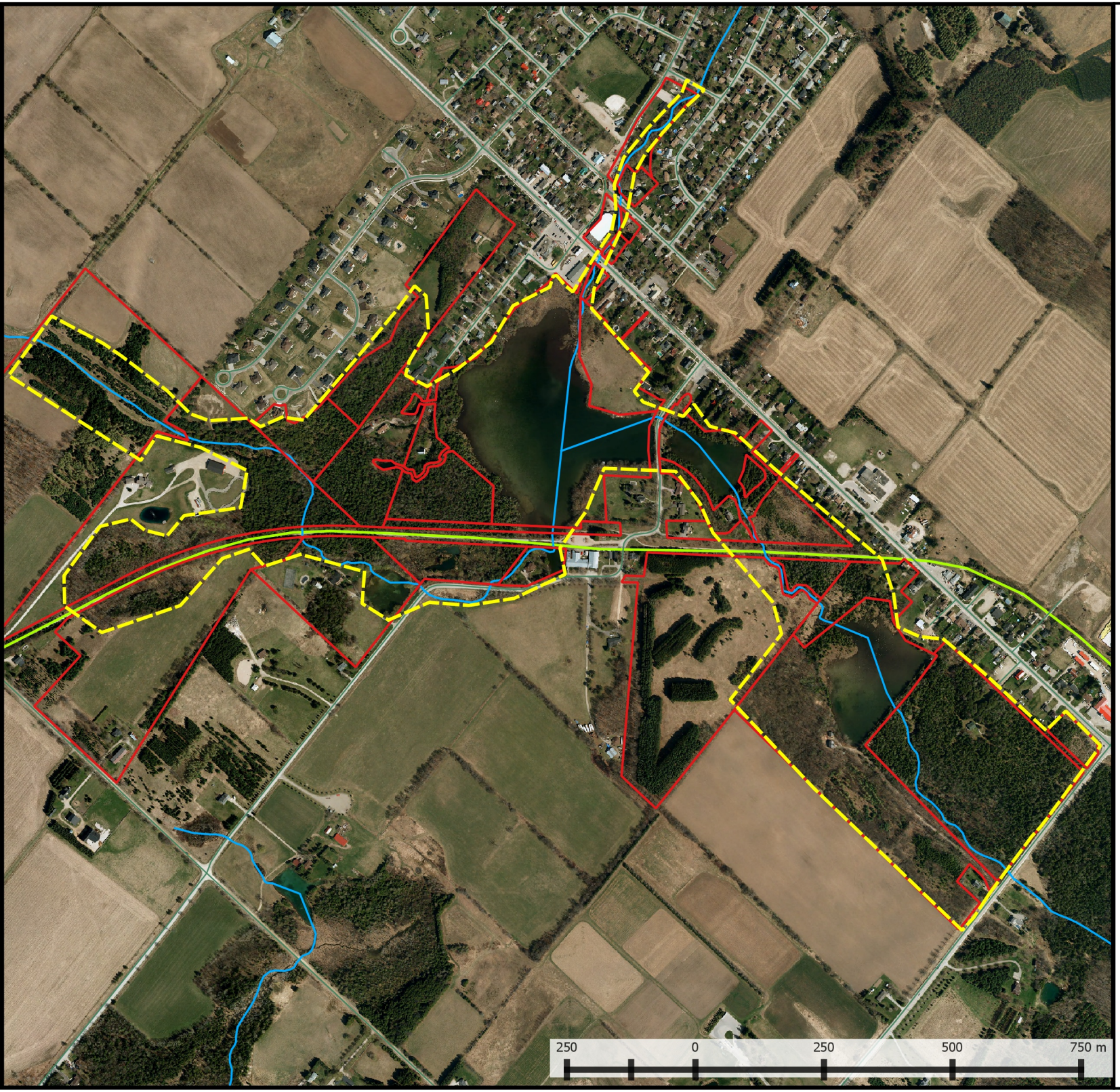
3.0 Project File Class EA

This section outlines the steps which were taken in order to satisfy the requirements of this Schedule "B" Class EA process.

3.1 Project Study Area / Terms of Reference

The project study area, as represented on Figure 3.1, was developed to encompass the immediate areas of impact upstream and downstream of the Hillsburgh Dam and Bridge. The Project Team comprised of Town staff, Triton Engineering Services Limited (TESL) and their sub-consultants. CVC and MNRF staff also collaborated to establish the study area. As a majority of the study area is located on private land, a letter was circulated to each land owner to obtain permission to access property for required field studies. The Request for Access to Private Property letter and all correspondence is included in Appendix B. Based on consent from various private landowners, the study area map in Appendix B shows the properties which the project team could access to complete the required field studies. The field studies were focused primarily on documenting the Natural Heritage features, completed by Aboud and Associates. The extent of the required field studies was based on the study's Terms of Reference (ToR) as generated by the Project Team along with input and review from the CVC and MNRF. The project ToR and correspondence with CVC and MNRF is defined in Appendix A.



Legend

Study Area

Erin Parcel Fabric

In Study Area

FIGURE: 3.1

Study Area

Information Sources:

1. Wetland boundaries accessed from Land Information Ontario
   Data accessed October 15, 2014
2. Waterbodies, Watercourses, and County Trails provided by Wellington County
   Date: October 2, 2014
3. Fish Communities recreated from the Erin Service and Settelment Master Plan
   Date: November 14, 2014

TOWN OF ERIN
PROGRESS IN UNITY

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Title: Existing Natural Features

Project: Hillsburgh Dam
Municipal Class EA

Date: December 8, 2014
Scale: 1:10000
Project:

3.2 Problem/Opportunity Statement

Once the project's ToR and study area was defined, the Project Team was able to clearly identify the Problem/Opportunity Statement. This statement was encompassed within the Notice of Study Commencement which was issued to the public and various government agencies. This was completed as part of Phase 1 of the Class EA and includes input from the MNRF and CVC. The studies Problem/Opportunity Statement is defined as follows:

> "The Hillsburgh Dam, its pond and associated bridge (Structure 2064) are historical landmarks in the community of Hillsburgh. In 2011, the pond's outlet pipe, within the earthen dam structure, failed. Structural and hydrotechnical reviews concluded that the dam structure does not meet minimum safety criteria and therefore, it is at an unacceptably high likelihood of failure. In the event of a dam failure, there is a potential for loss of life and appreciable downstream property damage. In 2012, emergency repairs were completed to mitigate the outlet pipe failure. The regulatory approval, under the Lakes and Rivers Improvement Act (LRIA), for the emergency repairs requires the Town of Erin to develop and implement a permanent solution for the dam. In addition, the bridge is nearing the end of its design life and is in need of upgrades to reduce the risk to traffic using the structure. Due to their close proximity and interdependence, the dam and bridge structure will both be evaluated under this Class EA. This project is being undertaken to ensure the long term safety of the dam and bridge with due consideration for the natural environment and the interests of various stakeholders within the community."

3.3 Background Studies

As part of Phase 2 of the Class EA, a number of studies were completed to inventory the technical, natural, social and economic environments and ultimately support the selection of the studies preferred alternative. These studies provide information on the surrounding existing conditions of the Hillsburgh Dam and Bridge as well as some input as to possible mitigation measures as they relate to the various alternative solutions. The background studies were completed within the accessible lands of the study area. As the pond and its surrounding shoreline property had restricted access, studies such a Geomorphological investigation or sediment survey to physically analyze the impacts to sediment transport and erosion was not possible. The studies which were attainable either through field or desktop investigations are as follows:

- C-1 - Hydrologic Investigation Technical Memorandum (Appendix C-1)
- C-2 - Embankment Dam Assessment (Appendix C-2)
- C-3 - Hydrogeological Assessment Technical Memorandum (Appendix C-3)
- C-4 - Natural Environment Report (Appendix C-4)
- C-5 - Stage 1 Archaeological Assessment (Appendix C-5)

- C-6 - Cultural Heritage Evaluation and Heritage Impact Assessment Hillsburgh Dam Bridge and Heritage Impact Assessment Hillsburgh Dam and Pond (Appendix C-6)
- C-7 – Bridge Inspection Report

4.0 Summary of Existing Conditions

As outlined in Section 3.3, background studies were completed to observe and document the Class EA study's existing conditions as well as provide recommendations to move forward in the event an alteration or change is proposed to those conditions.

4.1 Technical/Functional Aspects

4.1.1 Hydrology and Hydraulics

Triton Engineering Services Limited completed a preliminary hydrologic analysis to assess the existing dam and bridge hydraulics for various scenarios, see Appendix C-1. It should be noted; the hydraulic study was meant to be preliminary and evaluated four hypothetical scenarios. The scenarios are not reflective of detailed design nor do they outline any potential design constraints. The four scenarios which were analyzed are as follows:

- Scenario 1 – Existing Structures
- Scenario 2 – Existing Bridge No Stop-log Control
- Scenario 3 – Increase Bridge Span with Stop-log Control
- Scenario 4 – Increase Bridge Span No Stop-log Control

In order to evaluate the hydraulic characteristics of the Hillsburgh Dam and Bridge for the purposes of the Class EA's comparison of alternatives, the HEC-RAS hydraulic modeling software was utilized. The four scenarios were simulated and are a representation of each Class EA Alternative. When a change to the design of the dam and bridge was made, the overall impact to floodlines was found to be minimal and were only encountered directly upstream and downstream of the bridge and dam. When the bridge span and road/dam height was increased (Scenario 3 and 4), the Regional flood event was conveyed through the bridge structure.

The study concluded, if mitigation measures were taken with respect to the design of a new bridge and rehabilitated dam there is potential to fulfill the regulatory requirements under the MNRF (LRIA) and CVC (Conservation Act).

4.1.2 Embankment Dam Assessment

As noted in the Embankment Dam Assessment, dated July 30, 2012 prepared by CMT Engineering Inc. (Appendix C-2) the dam foundation comprises of compacted gravel and very

dense sand. The foundation of the dam is capable of providing a very high bearing capacity, while acting as a natural drainage layer to dissipate potential excess pore pressure. The earth fill embankment dam's upper layer is comprised of compacted dry soils and lower layer dense soil with very high moisture content/saturation conditions. Soils below the phreatic surface are very moist/saturated. Test pits in the core of the dam revealed soils with higher bearing strength, which provides evidence as to the structures longevity and consolidation activity under its own weight and vehicle loading. As such it is difficult to find fault with the structure.

At the time of the investigation, the dam featured a stop-log outlet control structure as well as a monk feature, which also had stop logs that regulated flow. The Monk facility was in poor condition and was abandoned in favour of a new outlet control structure with a front mounted sluice gate. At this time there have been no reported failures or distress to the dam as a result of overtopping. As a result of the temporary repairs the Monk facility has since been abandoned.

The installation of a cut-off wall in the form of metal sheet piles, installed on the upstream side of the dam, would reduce/eliminate the potential for erosion to occur. This would also minimize the potential for slope failure in the event of a rapid draw down condition. It is recommended to extend a sheet pile cut-off wall across the front of the dam since the presence of the cut-off feature appears to be lacking.

It is recommended at all vegetation including root system, be removed from both upstream and downstream sides of the dam, as they can create water pathways into the dam. Upstream face should be inspected to ensure that face has total coverage with durable rip rap material.

It is also recommended that a new pavement structure be installed to replace the roadway on the existing structure.

Provided the above recommendations are followed the dam will generally meet the required 2011 dam safety standards as set out by the Ontario Ministry of Natural Resources and Forestry.

4.1.3 Hydrogeology

As indicated in the Hydrogeology Assessment, dated September 28, 2016 prepared by Blackport Hydrogeology Inc. (Appendix C-3). The assessment was focused on the potential for hydraulic connection between the pond and private water wells in the vicinity of the pond, in particular shallow dug wells and any impacts that could occur if the pond was modified.

Most water wells obtain water from the underlying bedrock aquifer. The bedrock aquifer is separated from the shallow groundwater system and Hillsburgh pond, typically by a least 10 m of overburden, some of which is silt/clay till, so the two ground water systems should be relatively isolated hydraulically. Therefore based on this information no issues are anticipated with the bedrock wells, if the Hillsburgh pond is altered.

Some shallow dug wells along Trafalgar Road are more susceptible to fluctuations in the water table, depending on the depth of the well. Lowering the Hillsburgh pond and/or dredging of the

underlying sediment could locally impact the water table immediately adjacent to the pond. Given that the Hillsburgh pond has been slowly infilling with sediment it has likely created a hydraulic seal in the bottom of the pond limiting the hydraulic connection between the pond and the shallow aquifer, including the water levels in the dug wells.

Should the Hillsburgh pond be removed and the underlying sediment dredged, it is recommended that shallow monitoring wells be installed around the perimeter of the pond prior to any changes in the pond. Water levels will need to be monitored in these wells prior to and during any modifications to the Hillsburgh pond to assess and determine if there are any impacts to the local water table as a result of changes to the pond.

4.1.4 Sediment Transport

As access to the pond and surrounding shoreline property was not granted, physical analysis of sediment quantity and quality was unattainable. Sediment quantity, although not physically measured was observed visually by means of aerial photography and adjacent accessible properties. From these visual observations, there does appear to be a significant amount of sediment build-up behind the stop-logs and at the inlet to the pond. As sediment from upstream sources will continue to enter the Hillsburgh Pond, a strategy will need to be implemented, regardless of the preferred alternative, to address and manage sediment accumulation.

If an option is selected which involves rehabilitating the dam and keeping the pond the impacts to sediment and erosion would be minimal in the short-term, however; the long-term implications would be negative as there would be minimal natural sediment transport. Natural sediment transport supports river system stability. It is recommended that a sediment survey be implemented to measure the quantity and quality of sediment within the pond. A strategy should be implemented to improve the volume of sediment which enters the Hillsburgh Pond.

Alternatively, if the dam was decommissioned and pond removed there would be short-term impacts with the potential creation or naturalization of a new channel. This natural process could result in mass sediment transport and creation of erosion hazards. However, this option would be beneficial to the river system in the long-term as it would promote natural sediment transport. Prior to proceeding with any construction which involves decommissioning the dam and removal of the pond, it is recommended that a sediment survey and a Geomorphological investigation be initiated to examine the quantity and quality of sediment within the Hillsburgh Pond as well as the impacts with the introduction of a naturalized channel.

Although this may not be possible for the Town to implement as the pond and its shorelines are under different ownership, there are various techniques for sediment removal including dredging with the use of a drag line or vacuum type system or; staged sediment stabilization. Sediment stabilization would involve the staged removal of stop-logs over a 3 – 6 month period. The extent of time would depend on the conclusions and recommendations of the Geomorphological investigations.

4.1.5 Transportation

A bridge inspection report was completed in 2014 and is included in Appendix C-7. In terms of vehicle movement and safety, the bridge is a narrow double lane structure, generating a traffic barrier to motorists which is operationally unsafe and creates delays. This is especially apparent with the proximity of the fire hall located approximately 30m east of the bridge. The 6.0m deck width is less than the Town's Municipal Standard of 9.0m. The deck, soffit and abutments exhibit major deterioration with exposed corroded rebar and concrete spalls and delaminations. At this point, structure rehabilitation would be extensive and costly. It is recommended the bridge be replaced with a concrete rigid frame or concrete girder type structure to satisfy the current regulatory and municipal standard requirements.

4.2 Natural Environment

A Natural Environmental Report (NER), see Appendix C-4, was completed to investigate and record the significant natural features within the study area. Species at Risk (SAR), Fish Habitat, Significant Wildlife Habitat, Rare Species, Landscape-level Features, and a Provincially Significant Wetland were identified in the study area. The details of each of these features are summarized in the following section.

4.2.1 Species at Risk (SAR)/Rare Species

The presence of Species at Risk was investigated through background screening and field observations. Background screening identified ten wildlife, one fish, and three plant Species at Risk with the potential to occur within the study area.

Field investigations identified six wildlife Species at Risk; Bald Eagle (*Haliaeetus leucocephalus*), Bobolink (Dolichonyx oryzivorus), Eastern Wood-pewee (*Contopus virens*), Eastern Meadowlark (*Sturnella magna)*, Little Brown Myotis (*Myotis lucifugus*) and Common Snapping Turtle (*Chelydra serpentine*), in the study area; no fish or plant Species at Risk were identified. Of the identified wildlife species, it was determined that Little Brown Myotis and Common Snapping Turtle actively use the Hillsburgh pond for foraging and overwintering habitat respectively, and could potentially to be impacted by changes to the existing nature conditions. All other identified Species at Risk within the study area were observed incidentally with no evidence of using the pond for essential life processes or where observed in habitats that are not likely to be impacted by changes in the existing condition of the pond.

Little Brown Myotis is listed as Endangered provincially and federally. Potential habitat was identified in the study area for this species. The Peterborough district MNRF have been conducting surveys and banding Little Brown Myotis at a property adjacent to the study area since 2012 (pers. comm., Lesley Hale, 2015). Little Brown Myotis are afforded general habitat

protection. Over the course of the surveys, the maternity population has increased, and the Hillsburgh Pond has been identified as providing important foraging habitat for this maternity colony of Little Brown Myotis.

Common Snapping Turtle is listed as Special Concern provincially (ESA 2007) and federally (Species at Risk Public Registry 2014), general habitat protection is not afforded to Special Concern species. However, species listed as Special Concern and their habitat is protected under the PPS (2014). Snapping Turtle were observed throughout the study area in ponds, wetlands, and creeks. This species is confirmed as overwintering, nesting, and breeding in the study area.

Two Rare species; Trumpeter Swan (*Cygnus buccinator*) and Great Egret (*Ardea alba*) and their associated habitat, were identified within the study area. Great Egret is ranked S2B (Imperiled) in Ontario (NHIC, 2015) and CVC Tier 1 (CVC 2010) and was observed foraging in the Hillsburgh Pond. Trumpeter Swan is ranked as a CVC Species of Conservation Concern Status Tier 1. Both species were identified within the Hillsburgh Pond during surveys conducted during the spring migration season.

The identified Species at Risk and Rare species which use the Hillsburgh pond benefit from the presence of the open water community.

Common Snapping Turtle overwinter in the mud or silt layer at the bottom of the pond. The decommissioning of the Hillsburgh Pond and establishment of naturalized watercourse will permanently remove overwintering habitat for Common Snapping Turtle and cause negative long-term impacts to the population.

Little Brown Myotis are known to forage over the pond and adjacent wetlands, which likely provide important foraging resources. Initial draining of the Hillsburgh Pond may affect populations of aquatic insects in the short term, and result in reduced feeding opportunities for the Little Brown Myotis colony during critical life stages. It is anticipated that a naturalized watercourse and associated wetland would provide suitable foraging habitat in the long term for the species. Any impacts to the habitat of Little Brown Myotis may require authorization under the ESA, in consultation with the MNRF.

Draining of the Hillsburgh Pond and loss of an open water community will reduce feeding and staging opportunities for Great Egret and Trumpeter Swan, in the long term. Both species are intolerant to changes in habitat.

From a Species at Risk / Rare species perspective, decommissioning the dam and draining the pond is considered negative, as important habitat to the life cycle of these species would be lost. Construction of an off-line pond could partly compensate for this loss and mitigate impacts to the Species at Risk and Rare species. Maintaining the Hillsburgh pond through rehabilitation of the dam is considered positive-neutral, as it will maintain high-quality habitat known to be used by Species at Risk and Rare species.

If the Hillsburgh dam is decommissioned and the watercourse reestablished, the following mitigation recommendations should be investigated to determine the efficacy and feasibility.

- **Offline Pond** construction to provide open water habitat, foraging habitat and overwintering habitat for Species at Risk and Rare species.

4.2.2 Aquatic/Fish Habitat

The watercourses within the study area were investigated through background review and a field Aquatic Habitat Assessment to characterize the system and to identify significant features.

The watercourses are part of the West Credit River, which is a natural, cold water system fed primarily by groundwater. The West Credit River is managed as a coldwater system, with Brook Trout as a target management species within the Credit River Fisheries Management Plan (CRFMP 2002).

Through background resources and CVC temperature monitoring, the Hillsburgh Pond and the other online ponds in the study area have been identified as causing a negative thermal influence on the watercourse. As such, cold water fish communities are generally found within the tributary, while the online ponds within the study area contain primarily warm water fish communities. The existing online ponds are considered anthropogenically created warmwater environments within a coldwater system. Anything that contributes to the warming of the watercourse is considered as a negative influence on the system.

The Aquatic Habitat Assessment of the watercourse was completed for all open water communities and stream reaches within the study area. The assessment identified areas of potential Trout spawning habitat throughout the watercourses of the study area, and immediately upstream and downstream of the study area. Through the assessment, three full and two partial barriers to fish passage were identified within the study area. The Hillsburgh Dam is identified as one of the full barriers to fish passage. Barriers to fish passage reduce or prevent movement of fish to adjacent suitable habitats and cause populations fragmentation.

Decommissioning of the Hillsburgh Pond and establishment of a naturalized watercourse would provide positive impacts to the managed cold water fish species. Removal of the dam would decrease barriers to fish passage and reduce thermal impacts to the watercourse. General water quality would be improved through reduced coliform bacteria levels, resulting from the decreased temperatures. Sediment and nutrient transport and naturalized flow patterns would be restored to the downstream section of the watercourse. Warm water fish species, which are not managed, would be negatively impacted through the loss of habitat with the removal of the Hillsburgh Pond.

Maintaining the Hillsburgh dam and pond would continue to have negative impacts on the aquatic environment and fish habitat.

Through background review, four species of interest were identified as occurring within the study area. These included Brook Trout, Banded Killifish, and Slimy Sculpin which are considered CVC Tier 2 Species of Interest. The invasive Round Goby has also been identified within the study area, including within the Hillsburgh pond. Round Goby is an invasive species that is known to impact native fish communities through competition and predation.

Decommissioning of the Hillsburgh Pond would benefit Brook Trout and Slimy Sculpin, which are both cold water species, through increased habitat availability, removal of barriers and establishment of a more favorable coldwater environment.

Banded Killifish are Species of Interest and are Rare in the Credit River Watershed. Decommissioning of the Hillsburgh Pond would negatively impact this species through the loss of the anthropogenic slow moving, warm water system within the pond environment.

Round Goby are an undesirable invasive species within the West Credit Watershed. Decommissioning of the Hillsburgh Pond would reduce habitat availability and suitability through the removal of the anthropogenic slow moving, warm water system with the pond environment. This would likely lead to lower population size and reduced impacts from the Round Goby.

From an Aquatic/Fish Habitat perspective, decommissioning of the Hillsburgh pond and establishment of a coldwater watercourse is considered positive as this option would allow for the restoration of the managed coldwater system and removal of fish barriers.

If the Hillsburgh dam is rehabilitated and the pond maintained, the following mitigation recommendations should be investigated to determine the efficacy and feasibility.

- **Bottom Draw** dam design to minimize thermal impacts to the downstream watercourse.
- **Fishway** to allow fish passage and mitigate the impact of fish barriers.

4.2.3 Significant Wildlife Habitat (SWH)

With guidance from the *Significant Wildlife Habitat Technical Guide* (2000) and the SWH EcoRegion Criterion Schedule 6E (2015), six types of Significant Wildlife Habitat (SWH) were identified in the study area and confirmed or assumed significant based on the results of field surveys completed and background resources.

Identified SWH include

- **Waterfowl Stopover and Staging (Aquatic)** - Large shallow, open water feature, with abundant aquatic vegetation and soft muck bottom.

- **Turtle Wintering Area -** Large shallow ponds with muck bottoms.

- **Habitat for Special Concern and Rare Wildlife Species (Snapping Turtle) -** Three of the pond features and one of the stream/meadow marsh features in the study area had observations of Snapping Turtles, either through surveys or incidentally.

- **Habitat for Special Concern and Rare Wildlife Species (Eastern Wood-pewee) -** Deciduous woodland features with probable breeding evidence of Eastern Wood-pewee during breeding bird surveys.

- **Bat Maternity Habitat -** Forest and swamp communities with trees >25cm DBH, meeting the criteria for bat habitat, as listed in the MNRF Guelph District guidelines,

- **Amphibian Breeding Habitat (Woodland) -** Areas identified as candidate habitat in the study area that met the criteria for significance.

Studies to confirm Bat Maternity Habitat have not been completed in the study area. Following the MNRF Guelph District Protocol (2014), all Candidate Bat Maternity Habitat was assumed significant.

Of the identified SWH, three types were determined to have the potential to be impacted by changes to the Hillsburgh Pond and Dam; Overwintering Turtles, Amphibian Breeding Habitat (Woodland), and Waterfowl Stopover and Staging (Aquatic).

If the Hillsburgh dam is rehabilitated and the pond maintained, No long-term impacts would be anticipated to overwintering turtles. Any eventual dredging of the pond to remove accumulated sediment is likely to impact overwintering turtle habitat. No long-term impacts would be anticipated to Amphibian Breeding Habitat by maintaining the existing dam and pond. No long-term impacts would be anticipated to Waterfowl Stopover and Staging by maintaining the existing pond.

If the Hillsburgh Dam is decommissioned and the pond drained, loss or impacts to Overwintering Turtles, Amphibian Breeding Habitat (Woodland), Waterfowl Stopover and Staging (Aquatic) are anticipated.

From the perspective of SWH, decommissioning the dam and draining the pond is considered negative, as confirmed SWH would be negatively impacted or destroyed. Construction of an off-line pond could partly compensate for this loss and mitigate impacts to Significant Wildlife Habitat. Maintaining the Hillsburgh Pond through rehabilitation of the dam is considered positive-neutral, as it will maintain confirmed SWH within and around the Hillsburgh Pond.

If the Hillsburgh dam is decommissioned and the watercourse reestablished, the following mitigation recommendations should be investigated to determine the efficacy and feasibility.

- **Offline Pond** construction to provide Significant Wildlife Habitat for Overwintering Turtles, Amphibian Breeding, Waterfowl Stopover and Staging.

4.2.4 Provincially Significant Wetlands (PSW)/Landscape Features

The Provincially Significant West Credit Wetland Complex is partly within the study area and comprises a large portion of the natural feature upstream and downstream of the Hillsburgh Dam. The wetland was first evaluated under the Ontario Wetland Evaluation System (OWES) in 1995 by the MNRF, with updates in 2005 (NRVIS 2010). The mapped wetland boundary was obtained from the Land Information Ontario (LIO) database. The accuracy of the boundary was confirmed through a combination of desktop analysis and field surveys. The boundaries review determined that the provided wetland boundary was generally accurate with only a few minor deviations from the actual boundary in the field.

Review of the Wetland Evaluation Data and Scoring Record identified that the wetland complex scored the maximum points for flood attenuation and erosion control, indicating that the wetland is an important feature for reducing the risk of flooding and erosion.

Within the study area, the wetland is comprised of Coniferous Swamp, Mixed Swamp, Deciduous Swamp, Thicket Swamp, Treed Fen, Meadow Marsh, Shallow Marsh, Submerged Shallow Aquatic, Mixed Shallow Aquatic, and Open Aquatic communities.

Rehabilitating the dam and maintaining pond in the current state is not anticipated to result in significant changes to the hydrology or the upstream and downstream extent and quality of the wetland. Any impacts would likely be minor and short-term and associated with temporary fluctuation in the water level to accommodate construction.

If the dam were decommissioned, changes to hydrology could impact the upstream and downstream extent and /or quality of the wetland. Decommission the dam and draining the pond may result in a lower water table and could reduce the upstream extent and quality of the Provincially Significant Wetland, however detailed hydrological changes are unknown at this time. It is anticipated that if the dam were decommissioned, the current extent of the pond would be maintained as a wetland, but would become established as a marsh or swamp community rather that the existing open water community. The open and shallow water communities of the Hillsburgh Pond are not inherently more valuable from an ecological perspective than a marsh or swamp environment.

Landscape Features:

Two rare landscape features were identified within the study area. The open water aquatic community of the Hillsburgh Pond is considered to be rare in the landscape, with only 2.8% of the subwatershed consisting of open water aquatic communities (ESSMP 2011). The Treed Fen community within the study area (FETC1-2) is considered a rare community within the landscape, with only 0.3% coverage of fens identified in the ESSMP (2011). The fen also contains a number of plant species considered Tier 2 Species of Interest by CVC. The Treed Fen community was not previously identified as a fen community by CVC.

Rehabilitation or reconstruction of the dam will retain the rare open water community of the Hillsburgh Pond. Maintaining the Hillsburgh Pond is not expected to result in hydrological changes and no impacts to the rare Treed Fen community downstream of the pond are anticipated.

Draining of the Hillsburgh Pond and establishment of a watercourse would result in the loss of the open water community, which is identified as rare in the Town of Erin Servicing and Settlement Master Plan. Creation of an offline pond would compensate for the loss of the Hillsburgh Pond and maintain the rare open water community within the landscape, although at a smaller scale.

Draining of the Hillsburgh Pond and establishment of a watercourse could result in impacts to the rare Treed Fen community downstream of the pond through changes in the sedimentation, flow rate, flood frequency, or groundwater level; specific hydrological changes are unknown.

From a Provincially Significant Wetland Land / Landscape Features perspective, rehabilitation of the dam and maintenance of the pond is considered neutral relative to the current condition. Rehabilitating the dam is not anticipated to negatively impact the wetland or landscape features, whereas the impacts of decommissioning the dam is currently unknown and could impact the extent or quality of the wetland and could negatively impact the downstream Treed Fen. Decommissioning of the dam will result in the loss of the open water community of the Hillsburgh Pond, although this can be partly compensated for through the construction of an offline pond. Decommissioning of the dam is considered negative-neutral due to the expected loss of the open water community and potential impacts to the extent and quality of the Provincially Significant Wetland and Treed Fen.

If the Hillsburgh dam is decommissioned and the watercourse reestablished, the following mitigation recommendations should be investigated to determine the efficacy and feasibility.

- **Offline Pond** construction to provide open water community, which is rare in the landscape.

4.3 Social Environment

4.3.1 Cultural Heritage Features

As the Hillsburgh Dam and Bridge structures are greater than 40 years of age the Ministry of Tourism, Culture and Sport (MTCS) required the Municipality to complete a Cultural Heritage Evaluation Report (CHER) to assess both structures potential to exhibit cultural significance. Archaeological Services Incorporated (ASI) was retained to complete the CHER which concluded the bridge, dam and pond retained cultural significance. As such, a Heritage Impact Assessment (HIA) was completed for the bridge, dam and pond to provide recommendations for conservation options as they relate to the Class EA alternatives. Both the CHER and HIA are located in Appendix C-6. A summary of the recommendations of the bridge and dam and pond are detailed in the following sections.

4.3.1.1 Built Heritage (Bridge)

The Cultural Heritage Evaluation and Heritage Impact Assessment, dated November 2014 has assessed the cultural heritage significance of the existing bridge structure and the impacts of the proposed alternatives in consideration of the determined cultural heritage value. The reports examined; archival research, analysis of other bridge design and construction in Ontario, field investigations and heritage evaluation. It was determined to preserve cultural heritage value following application of Regulation 9/06 of the *Ontario Heritage Act.* The bridge structure meets at least one of the criteria of Regulation 9/06 under the Ontario Heritage Act and may therefore be considered for municipal designation under this Act.

The potential impacts of bridge improvements based on the Class EA alternatives on the cultural heritage resource and identified heritage attributes was broken down into the following 9 conservation alternatives:

1. Retention of existing bridge and restoration of missing or deteriorated elements where physical or documentary evidence can be used for their design;
2. Retention of existing bridge with no major modifications undertaken;
3. Retention of existing bridge with sympathetic modifications;
4. Retention of existing bridge with sympathetic designed new structure in proximity;
5. Retention of existing bridge no longer in use for vehicle purposes but adapted for pedestrian walkways, cycle paths, scenic viewing etc.;
6. Relocation of bridge to appropriate new site for continued use or adaptive re-use;
7. Retention of bridge as heritage monument for viewing purposes only;
8. Replacement/removal of existing bridge with salvage elements/members of heritage bridge for incorporation into new structure or for future conservation work or display;
9. Replacement/removal of existing bridge with full recording and documentation of the heritage bridge.

Based on the above conservation alternatives, alternatives 1-3 are the preferred. Given that no impacts to heritage resource and its identified heritage attributes are expected with alternative 1, this would be the most preferred.

Due to the given identified heritage value of the bridge, the following recommendations and mitigation measures are to be considered and implemented:

- A report should be completed which clearly identifies the preferred alternative and the proposed course of action. This is to be filed with the MTCS, heritage staff at the Town of Erin, Wellington County Museum and Archives, The Archives of Ontario and any other local heritage stakeholders with interest in this project.
- If retention of the bridge is chosen as the preferred alternative (one of Alternatives 1-7), one of the following character-defining elements should be retained and treated sympathetically: location of the bridge; historical associations with mill owned by Gooderham and Worts;

spindled concrete railing system; early construction date; and association with the settlement, growth and economic development of Hillsburgh.

- If replacement/removal of existing bridge and construction of new bridge is chosen as the preferred alternative (Alternative 8 or 9) the following three (3) mitigation options should be considered:
  - Replication of the appearance of the heritage bridge in the new design with allowances for the use of modern materials. The character-defining elements (mentioned above) should be considered for replication.
  - Historically sympathetic design qualities to the heritage bridge, with allowances for the use of new technologies and materials.
  - Along with the above, development of a commemorative strategy, such as a plaque should be considered.
- If replacement of the bridge is chosen, a documentation report is to be completed by a Cultural Heritage Specialist and filed with the Town of Erin, the Archives of Ontario and any other local heritage stakeholders with interest in this project.

4.3.1.2 Built Heritage (Dam and Pond)

The HIA for the Hillsburgh Dam and Pond evaluated the possible impacts and recommended mitigation measure strategies. Upon examination, including archival research, field investigations and heritage evaluation, the Pond and Dam was determined to preserve cultural heritage value following application of Regulation 9/06 of the *Ontario Heritage Act*. The following recommendations were provided based on the heritage value of the resource along with consideration of the overall impacts of the various alternatives of the Class EA:

- Preservation of the Hillsburgh Pond is the preferred conservation strategy. Alternative B2 (Rehabilitate Station Street Dam and Reconstruct Bridge) can best achieve this from both a cultural heritage perspective.
- Should it be determined that Alternative C1 (Rehabilitate Station Street Bridge and Decommission Hillsburgh Dam) or Alternative D1 (Reconstruct Station Street Bridge and Decommission Hillsburgh Dam) are a better option then proper documentation and commemoration measures should be undertaken. These measures could include, but are not restricted to; documentation report comprising of photographic, textual and graphic descriptions associated with heritage attributes or commemoration strategies which explains the area's lost heritage value.

4.3.2 Archaeological Significance

As a requirement of the MTCS, a Stage 1 Archaeological Assessment (Appendix C-5) was completed by ASI to determine the possibility for significant archaeological resources within the defined bridge and dam right-of-way. The outcome of the assessment determined that there are no previously registered archaeological sites located within 1 Km of the study area. However, based on the geography and history of the study area there is potential for identification of

Aboriginal and Euro-Canadian archaeological resources. Upon site inspection it was determined that the majority of the study area has been disturbed and therefore, only small areas within the study area were documented to possess archaeological potential.

The following recommendations were made based on the results of the Stage 1 assessment:

- Archaeological potential existing in small parts of the study area, therefore a Stage 2 archaeological assessment is required for these areas prior to any construction. Test pit surveys at an interval of five (5) metres are proposed.
- A large portion of the study area has been identified as being previously disturbed. These areas do not have any archaeological potential and therefore do not require any further archaeological assessment.
- Should the proposed work expand passed the current study area, then additional Stage 1 assessment will need to be conducted to determine the archaeological potential of the surrounding lands.

4.3.3 Community Value

The Hillsburgh Dam and its associated pond are considered a landmark feature within the community of Hillsburgh representing a large part of the village's history dating back to as early as 1867. The Pond has since held aesthetic value within the community and also serves as habitat for a wide range of wildlife species. Additional information can be found in the CHER and HIA in Appendix C-6.

Throughout the process of the dam's temporary repair works as well as this Class EA, many residences have expressed their concern regarding the decrease in surrounding land value with the potential removal of the pond.

4.3.4 Public Safety

As a municipality, the Town of Erin owns an assortment of infrastructural assets which hold a certain amount of liability and ensuing risk to public safety. This is also true with the` current state of the Hillsburgh Dam and Bridge. The structure as a whole is considered, under the LRIA legislation, to contain a "High" hazard potential classification (HPC) meaning, there exists a high risk to the loss of life and property. This is due to its size and its proximity upstream of a series of downstream dams. During a "consequence event" that being, a major flood or earthquake, which results in a dam breach or failure of the Hillsburgh Dam could cause a cascading dam failure. A cascading dam failure would result in the ultimate failure of the downstream dams located along the Upper West Credit River through to the Village of Erin. Any dam breach or failure has the potential to pose a significant risk to life and property.

The removal of the dam (stop-log controls) and draining of the pond would remove the current risk of a dam failure and ultimately to life and property. The bridge, whether it is reconstructed or rehabilitated, will remain some level of risk. However, a reconstruction will reduce the risk as the

new structure will be upgraded to current road safety standards. Likewise, if the dam is rehabilitated the risk to loss of life and property would remain, however; it would be improved and considered lessened as it would be upgraded to a current dam safety standard.

4.4 Economic Environment

When examining the economics of owning a dam the total life cycle costs including capital replacement costs and annual operation and maintenance costs must be considered. As holds true with any municipal infrastructure the dam and bridge have a quantifiable liability cost attributed which are also examined. An assessment of the capital/replacement costs, operation and maintenance costs as well as potential liability costs are detailed in Section 5.2.

5.0 Alternative Solutions

5.1 Introduction to Alternatives

The Municipal Class EA process requires that all reasonable alternatives are considered to ensure that there is adequate evidence to proceed with project improvements. These alternatives are used to assess their ability to address the identified needs. The alternative solutions being considered are as follows:

- Alternative A: Do Nothing
- Alternative B: Option 1 - Rehabilitate Dam and Reconstruct Bridge
- Alternative B: Option 2 - Rehabilitate Dam and Rehabilitate Bridge
- Alternative C: Option 1 - Rehabilitate Bridge and Decommission Dam
- Alternative C: Option 2 - Rehabilitate Bridge and Decommission Dam Construct Offline Pond
- Alternative D: Option 1 - Reconstruct Bridge and Decommission Dam
- Alternative D: Option 2 - Reconstruct Bridge and Decommission Dam Construct Offline Pond

5.1.1 Alternative A – “Do Nothing”

This is the “null” alternative, against which all others will be measured. If nothing is done to repair or replace the dam and bridge, the bridge will continue to deteriorate and eventually fail. If a

"consequence event" ie, Regional Storm event occurs (selected as the Inflow Design Flood (IDF) based on corresponding "High" Hazard Potential Classification), the dam could potentially fail in its current condition. If nothing is completed the Town is susceptible to the issuance of an "Order" under the LRIA, see Figure 5.1.

5.1.2 Alternative B: Option 1 – Rehabilitate Dam and Reconstruct Bridge

Construct a new bridge at the same location or new location along the dam to contain the Regional storm to within a tolerable standard to comply with Lakes and Rivers Improvement Act requirements. The dam will be rehabilitated to meet the MNRF's current dam safety standards, see Figure 5.1.

5.1.3 Alternative B: Option 2 – Rehabilitate Dam and Rehabilitate Bridge

Rehabilitate the existing bridge at the same location. The dam will be rehabilitated to meet the MNRF's current dam safety standards, see Figure 5.1.

5.1.4 Alternative C: Option 1 – Rehabilitate Bridge and Decommission Dam

Rehabilitate the existing bridge at the same location. The dam will be decommissioned, altering the pond to a watercourse, see Figure 5.2.

5.1.5 Alternative C: Option 2 – Rehabilitate Bridge and Decommission Dam Construct Offline Pond

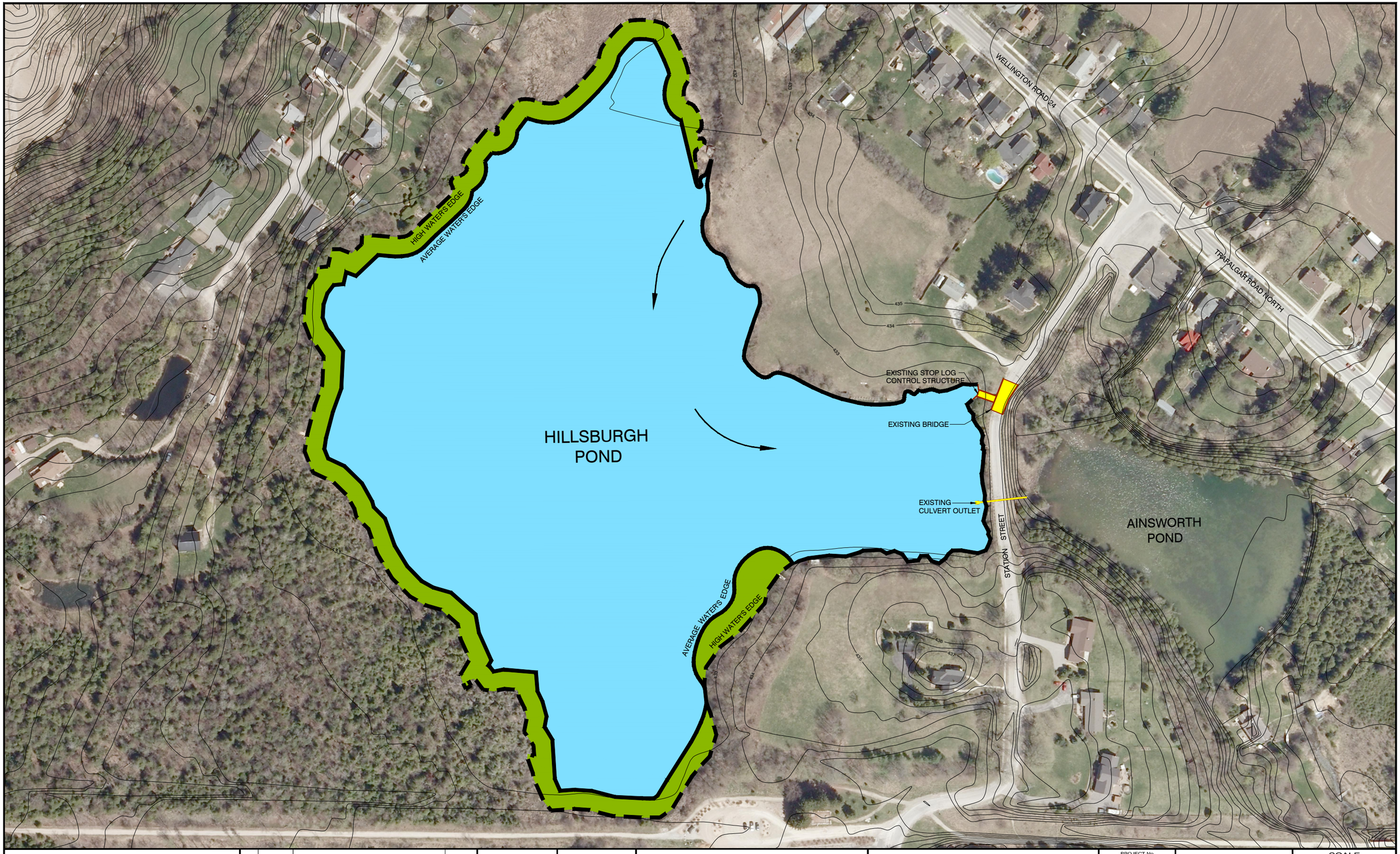
Rehabilitate the existing bridge at the same location. The existing dam will be decommissioned, decreasing the existing pond to a smaller offline pond, primarily separating the pond and diverting upstream watercourses, see Figure 5.3.

5.1.6 Alternative D: Option 1 – Reconstruct Bridge and Decommission Dam

Construct a new bridge at the same location or new location along the existing dam/roadway. The new bridge will be constructed under the MTO Highway Drainage Design Standards. The dam will be decommissioned, altering the pond to a watercourse, see Figure 5.2.

5.1.7 Alternative D: Option 2 – Reconstruct Bridge and Decommission Dam Construct Offline Pond

Construct a new bridge at the same location or new location along the existing dam/roadway. The new bridge will be constructed under the MTO Highway Drainage Design Standards. The existing dam will be decommissioned, decreasing the existing pond to a smaller offline pond, primarily separating the pond and diverting upstream watercourses, see Figure 5.3.



No	DATE	REVISION	INITIAL

HILLSBURGH DAM CLASS EA

ALT. A - DO NOTHING
ALT. B1 - REHAB. DAM, RECON. BRIDGE
ALT. B2 - REHAB. DAM, - REHAB. BRIDGE

TOWN OF ERIN
5684 TRAFALGAR ROAD
HILLSBURGH, ONTARIO, N0B 1Z0

CONCEPTUAL PLAN

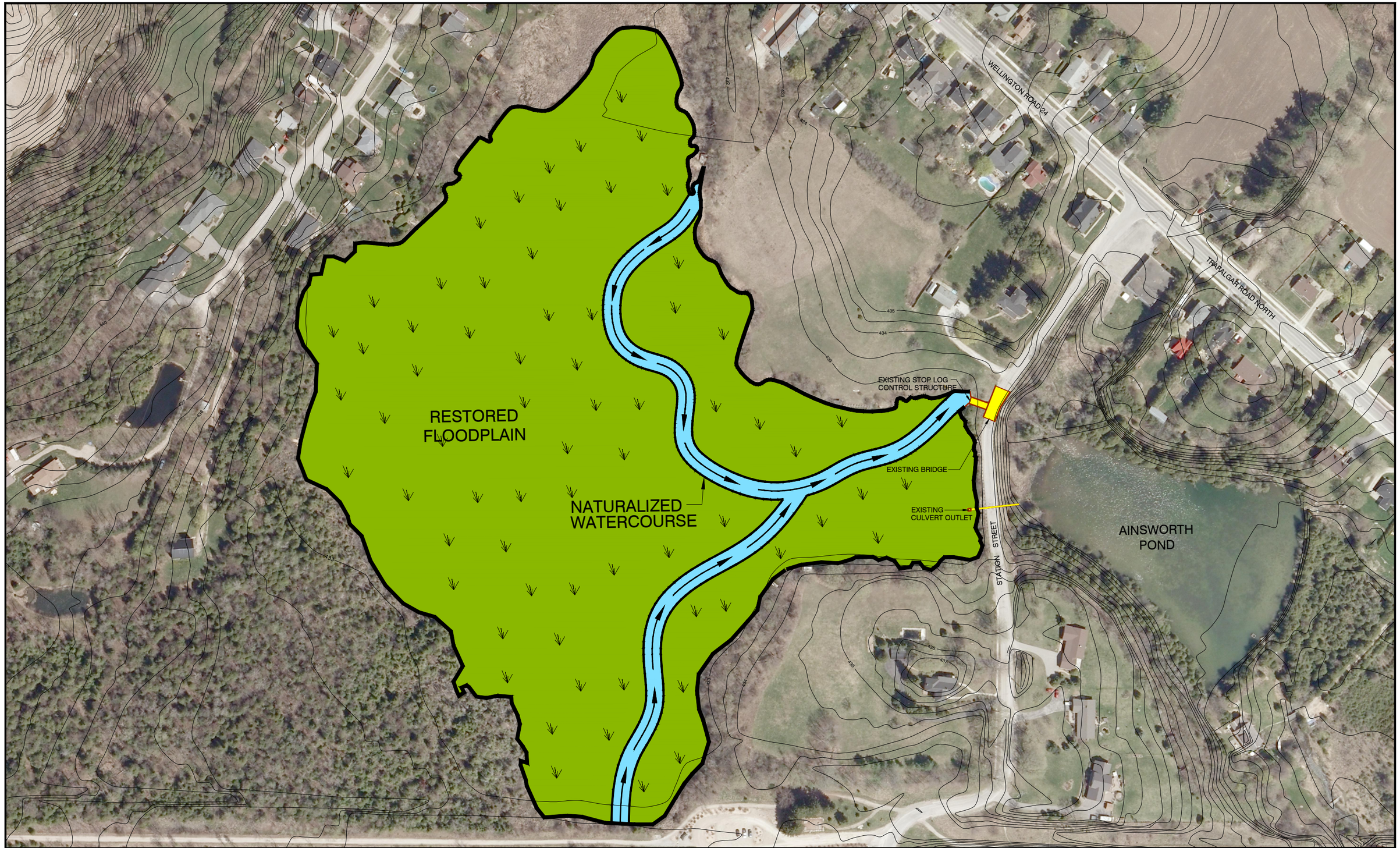
PROJECT No A4685E

DRAWN BY: d.r.t. (AutoCAD)
CHECKED BY: C.P.C.
APPROVED BY: P.F.Z.
DATE: NOV. 2016

TRITON ENGINEERING SERVICES LIMITED
Consulting Engineers

SCALE
1:2,000

DRAWING NUMBER **FIGURE 5.1**



No	DATE	REVISION	INITIAL

HILLSBURGH DAM CLASS EA

ALT. C1 - REHABILITATE BRIDGE, DECOMMISSION DAM
ALT. D1 - RECONSTRUCT BRIDGE, DECOMMISSION DAM

TOWN OF ERIN
5684 TRAFALGAR ROAD
HILLSBURGH, ONTARIO, N0B 1Z0

CONCEPTUAL PLAN

PROJECT No A4685E

DRAWN BY: d.r.t. (AutoCAD)
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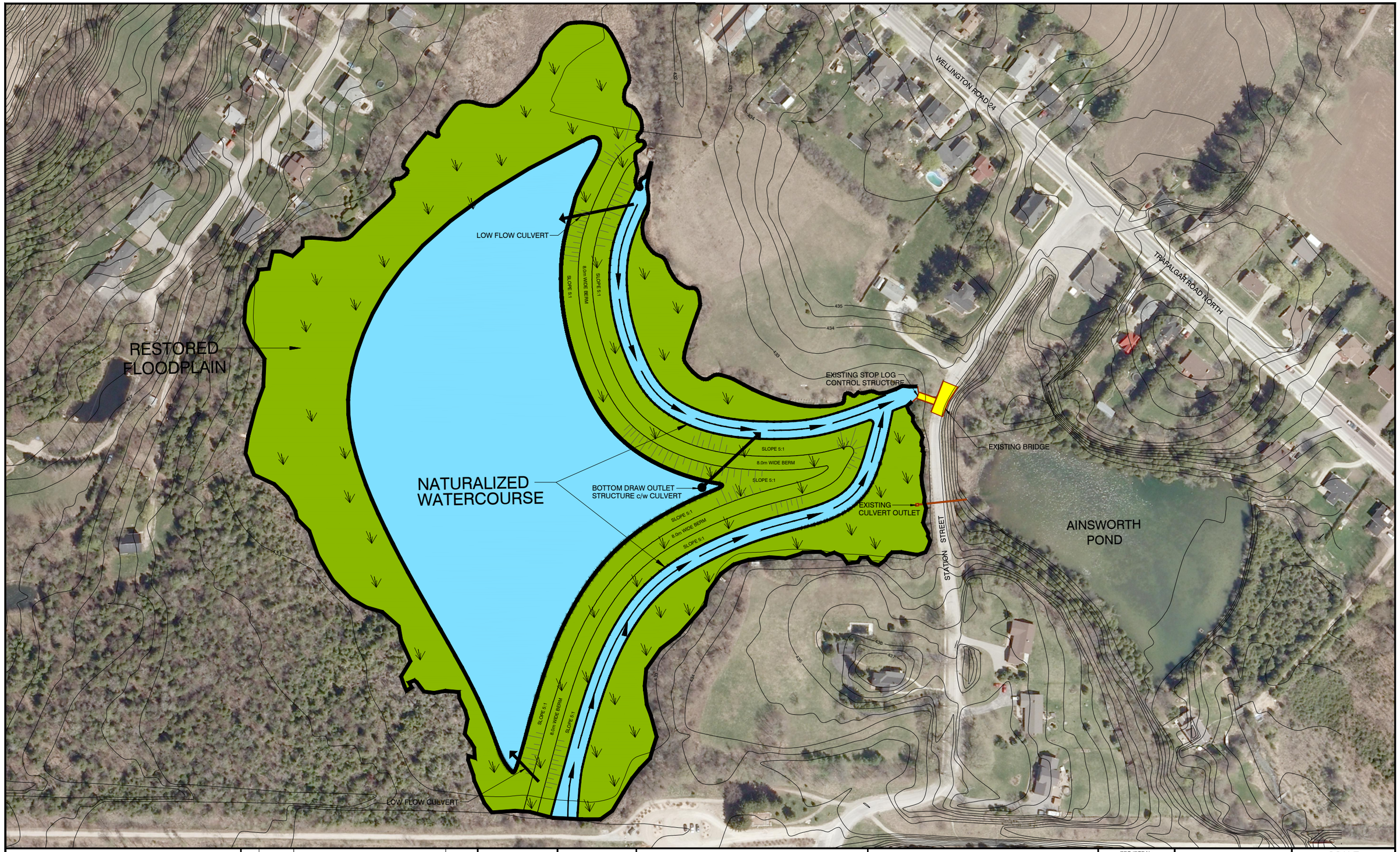
APPROVED BY: P.F.Z.
DATE: NOV. 2016

TRITON ENGINEERING SERVICES LIMITED
Consulting Engineers

SCALE
1:2,000

DRAWING NUMBER **FIGURE 5.2**



No	DATE	REVISION	INITIAL

HILLSBURGH DAM CLASS EA

ALT. C2 - REHABILITATE BRIDGE, CONSTRUCT OFFLINE POND
ALT. D2 - RECONSTRUCT BRIDGE, CONSTRUCT OFFLINE POND

TOWN OF ERIN
5684 TRAFALGAR ROAD
HILLSBURGH, ONTARIO, N0B 1Z0

CONCEPTUAL PLAN

PROJECT No A4685E

DRAWN BY: d.r.t. (AutoCAD)
CHECKED BY: C.P.C.
APPROVED BY: P.F.Z.
DATE: NOV. 2016

TRITON ENGINEERING SERVICES LIMITED
Consulting Engineers

SCALE
1:2,000

DRAWING NUMBER **FIGURE 5.3**

5.2 Economic Assessment

When evaluating the economic aspects of the Alternatives, the dam and bridge are assessed based on a defined life cycle. Since the current bridge and earthen berm structure surpass 100 years of age, an assumed 100 year life cycle was used for evaluation purposes. The following Sections summarize the total life cycle costs of the dam and bridge as well as the potential liability associated with dam ownership.

5.2.1 Capital/Replacement Costs

The capital costs associated with the dam and bridge represent the costs for replacement, rehabilitation and mitigation costs as well as pond landscape restoration in the event of a dam decommissioning. The pond restoration costs were reviewed by Aboud and Associates and are explained in Appendix A. Table 5.1provides a breakdown of assessed costs direct to the Town of Erin as well as total costs which may or may not be shared among dam owners. This Class EA does not assess or direct any amount of cost-sharing should it be warranted.

Table 5.1 - Associated Capital / Replacement Costs

ASSOCIATED CAPITAL / REPLACEMENT COSTS							
COST COMPONENT	**ALTERNATIVE A "Do Nothing"**	**ALTERNATIVE B Rehabilitate Hillsburgh Dam and;**		**ALTERNATIVE C Rehabilitate Station Street Bridge and;**		**ALTERNATIVE D Reconstruct Station Street Bridge and;**	
		OPTION 1 Reconstruct Station Street Bridge	**OPTION 2 Rehabilitate Station Street Bridge**	**OPTION 1 Decommission Dam**	**OPTION 2 Decommission Dam Construct Offline Pond**	**OPTION 1 Decommission Dam**	**OPTION 2 Decommission Dam Construct Offline Pond**
Station Street Road Rehabilitation		$470,000.00	$470,000.00	$470,000.00	$470,000.00	$470,000.00	$470,000.00
Emergency Dam Decommissioning [1]	$900,000.00						
Bridge Replacement (Increased Size) [2]	$850,000.00	$850,000.00				$850,000.00	$850,000.00
Eventual Bridge Replacement (Increased Size) [3]			$850,000.00	$850,000.00	$850,000.00		
Bridge Rehabilitation (Existing Capacity)			$450,000.00	$450,000.00	$450,000.00		
Dam Rehabilitation [4]		$750,000.00	$750,000.00				
Dam Decommissioning /Restoration [5]				$1,285,000.00	$865,000.00	$1,285,000.00	$865,000.00
SUBTOTAL COST	$1,750,000.00	$2,070,000.00	$2,520,000.00	$3,055,000.00	$2,635,000.00	$2,605,000.00	$2,185,000.00
Engineering 10%	$175,000.00	$207,000.00	$252,000.00	$305,500.00	$263,500.00	$260,500.00	$218,500.00
Contigency Allowance 10%	$175,000.00	$207,000.00	$252,000.00	$305,500.00	$263,500.00	$260,500.00	$218,500.00
HST - 1.76% [9]	$36,960.00	$43,718.40	$53,222.40	$64,521.60	$55,651.20	$55,017.60	$46,147.20
TOWN TOTAL ESTIMATED COST	**$2,136,960.00**	**$2,527,718.40**	**$3,077,222.40**	**$3,730,521.60**	**$3,217,651.20**	**$3,181,017.60**	**$2,668,147.20**
POTENTIAL ADDITIONAL COSTS							
Mitigation Measures [6]		$500,000.00	$500,000.00				
Offline Pond Construction [7]					$900,000.00		$900,000.00
Eventual Dam Decommissioning /Restoration [8]	$1,285,000.00	$1,285,000.00	$1,285,000.00				
SUBTOTAL COST	$1,285,000.00	$1,785,000.00	$1,785,000.00	$0.00	$900,000.00	$0.00	$900,000.00
Engineering 10%	$128,500.00	$178,500.00	$178,500.00	$0.00	$90,000.00	$0.00	$90,000.00
Contigency Allowance 10%	$128,500.00	$178,500.00	$178,500.00	$0.00	$90,000.00	$0.00	$90,000.00
HST - 1.76% [9]	$27,139.20	$37,699.20	$37,699.20	$0.00	$19,008.00	$0.00	$19,008.00
TOTAL ESTIMATED ADDITIONAL COST	**$1,569,139.20**	**$2,179,699.20**	**$2,179,699.20**	**$0.00**	**$1,099,008.00**	**$0.00**	**$1,099,008.00**

NOTES:
1 - Cost attributed to an emergency replacement and repair to Station Street road
2 - Cost attributed to a new bridge up to a 12 metre span
3 - Deferred cost to replace the rehabilitated bridge with a new bridge up to a 12.0 metre span
4 - Cost to sheet pile and protect both sides of dam as well as replacement of dam's earthen core with suitable blue clay material
5 - Cost to create naturalized watercourse and restore the pond landscape - work completed by the Town will affect the adjacent landowner - restoration costs would be at the Town's expense
6 - An assumed cost to use as an order of magnitude for evaluation purposes - if pond remains certain mitigation strategies will likely need to be considered.
7 - Cost to create naturalized watercourse and berms for smaller offline pond approximately 1/3 in size
8 - Deferred cost for pond restoration in the event of an eventual dam failure and ensuing decommissioning
9 - Municipal portion of the 13% Harmonized Sales Tax (HST)

ASSUMPTIONS:
- Above noted capital / replacement costs are preliminary and do not reflect detailed design costs or costs associated with obtaining regulatory agency approvals/permits.
- Direct capital costs to the Town of Erin are highlighted in yellow and reflect costs within the right-of-way and does not account for any cost sharing among dam owners.
- Total cost pertains to the costs prescribed to all dam owners over the life cycle of the dam, bridge and pond.

5.2.2 Operation and Maintenance Costs

The operation and maintenance costs are summarized and explained in Table 5.2 below.

Table 5.2 - Estimated Life Cycle Costs

ESTIMATED TOTAL LIFE CYCLE COSTS					
Alternative		Capital / Replacement	Operation & Maintenance		Total Life Cycle Cost
A	— Do Nothing	$ 2,136,960.00	$ -		$ 2,136,960.00
B1	— Rehabilitate Dam - Reconstruct Bridge	$ 2,527,718.40	$2,527,718.40	1	$ 5,055,436.80
B2	— Rehabilitate Dam - Rehabilitate Bridge	$ 3,077,222.40	$3,077,222.40	1	$ 6,154,444.80
C1	— Rehabilitate Bridge - Decommission Dam	$ 3,730,521.60	$ -		$ 3,730,521.60
C2	— Rehabilitate Bridge - Decommission Dam Construct Offline Pond	$ 3,217,651.20	$ 723,825.60	2	$ 3,941,476.80
D1	— Reconstruct Bridge - Decommission Dam	$ 3,181,017.60	$ -		$ 3,181,017.60
D2	— Reconstruct Bridge - Decommission Dam Construct Offline Pond	$ 2,668,147.20	$ 674,073.60	2	$ 3,342,220.80

NOTES/ASSUMPTIONS:

Total Life Cycle Costs are indicative of the costs over a 100 year life cycle and encompasses operation and maintenance of the earthen berm dam, control structures and head pond.

1 - As per MNRF correspondence Assumes 100% of replacement cost/service life of 100 years is equal to 1% per annum. This includes activities such as regular operation, sediment removal practices as well as future investigative studies. Note, these studies are considered a Best Management Practice and are not a requirement.

2 - Assumes 50% replacement cost/service life of 100 years is equal to 0.5% per annum. This cost is less than a dam due to the relatively simple nature of the required inlet and outlet infrastructure. This does not include the O&M of the bridge or Station Road as the Hillsburgh Dam is no longer the control structure.

5.2.3 Liability Costs

As mentioned previous, the dam and bridge hold a certain level of risk to life and property which translates into liability to the Town of Erin and adjacent dam owner. For evaluation purposes the level of liability has been quantified and detailed in Table 5.3, below. For simplicity, the table shows only the Do Nothing option and alternatives which involve the reconstruction of the bridge as the product of liability for a rehabilitated bridge would be similar.

Table 5.3 – Potential Liability and Risk

POTENTIAL LIABILITY AND RISK			
Alternative		**Estimated Liability Cost ($)**	**Risk to Life & Property Rank**
A	— Do Nothing	$4,589,475 [2]	1
B1	— Rehabilitate Dam - Reconstruct Bridge	$7,342,575 [1]	2
D1	— Reconstruct Bridge - Decommission Dam	$0	4
D2	— Reconstruct Bridge - Decommission Dam with Offline Pond	$2,447,525 [3]	3

NOTES/ASSUMPTIONS:

Estimated number of residential structures within the floodway is based on aerial photography review. Approximately 135 residential structures will be impacted. Flood damage amount based on MNRF Flood Damage Estimation Guide, (June, 2007) with an assumed flood depth of 0.30m and is equal to $22,885/structure (Two Storeys with Basement). Total damage cost is estimated to equal $3,089,475.
Risk to Life is scored as follows: 1 - 4 = lowest to highest risk

1 - Assumes replacement of dam and damage to residential buildings within the floodway due to cascading dam breach.
- Dam/Bridge replacement = $2,753,100
- Building damage = $3,089,475
- Damage to downstream road crossing structures = $1,500,000 (assumed)
Total = $7,342,575

2 - Same as liability cost for Alternative B1 minus excepted cost of dam/bridge replacement.
3 - Assumed 1/3 the cost of Alternative B1 as offline pond will store significant amount less water than existing pond

5.3 Evaluation of Alternatives

In order to evaluate the preferred alternative, the overall impacts and benefits of each alternative were balanced against the technical, natural, social and economic factors. These four main aspects were further divided into a series of weighted criteria.

5.4 Preliminary Preferred Alternative

In order to initiate discussions and receive public and agency comment, a Preliminary Preferred Alternative was selected and presented on May 19, 2016 via Public Information Centre (PIC). The Preliminary Preferred Alternative was based on background information collected at the time. A copy of the PIC information is presented in Appendix D. Following the PIC, agency and public comments were considered and incorporated into the Preliminary Comparison and Ranking of Alternatives. The Preliminary Preferred Alternative was Alternative B1 –Rehabilitate Dam and Reconstruct Bridge. This Alternative was presented to Council on October 18, 2016 where a decision to move forward to a Recommended Preferred Alternative was deferred on the basis for Council to receive additional information and justification for certain aspects.

The breakdown of the criteria and their weighting is found in Table 5.4. An explanation as to the method of measurement of each criterion as well as how each alternative benefited or impacted that particular criterion, is explained.

Table 5.4 – Assessment of Alternatives

ASSESSMENT OF ALTERNATIVES

CRITERIA	Summary of Weighted / Measured Criteria	Weighting	ALTERNATIVE A "Do Nothing"	ALTERNATIVE B Rehabilitate Hillsburgh Dam and;		ALTERNATIVE C Rehabilitate Station Street Bridge and;		ALTERNATIVE D Reconstruct Station Street Bridge and;	
				OPTION 1 Reconstruct Station Street Bridge	OPTION 2 Rehabilitate Station Street Bridge	OPTION 1 Decommission Dam	OPTION 2 Decommission Dam Construct Offline Pond	OPTION 1 Decommission Dam	OPTION 2 Decommission Dam Construct Offline Pond
TECHNICAL/FUNCTIONAL ASPECTS									
Hydrology and Hydraulics	The impact each alternative has to the hydrology and hydraulics of the river system. The alternative must conform to regulatory standards for a dam with "High Hazard Classification". Bridge should convey the "Regulatory Flood". This is measured through engineering analysis and interpretation.	HIGH	Current Dam and Bridge do not meet hydraulic requirements and risk uncontrolled dam failure in a major storm event. The dam owners are obliged to determine a "long term" solution for the Dam and Bridge.	Dam will be upgraded to meet requirements for dam safety. Bridge will be reconstructed to convey the "Regulatory Flood" event and meet hydraulic requirements. Impacts to upstream and downstream flood levels are negligible.	Dam will be updated to meet requirements for dam safety; bridge will not convey the "Regulatory Flood" and will not meet hydraulic requirements. Impacts to upstream and downstream flood levels are negligible.	Station Street will not be considered a dam. Upstream flood levels will be reduced. Bridge will be rehabilitated to existing size and hydraulic capacity. Bridge will not convey the "Regulatory Flood" event.	Station Street will not be considered a dam. Upstream flood levels will be reduced. Bridge will be rehabilitated to existing size and hydraulic capacity. Bridge will not convey the "Regulatory Flood" event.	Station Street will not be considered a dam. Bridge will be reconstructed to meet the hydraulic capacity requirements. Bridge will be reconstructed to convey the "Regulatory Flood" event and meet hydraulic requirements. Impacts to upstream and downstream flood levels are negligible.	Station Street will not be considered a dam. Bridge will be reconstructed to meet the hydraulic capacity requirements. Bridge will be reconstructed to convey the "Regulatory Flood" event and meet hydraulic requirements. Impacts to upstream and downstream flood levels are negligible.
Sediment Transport	Each alternative has a potential effect on the accumulation and transport of sediment. Sediment accumulation can reduce river system stability.	MED	Eventual dam failure would allow for uncontrolled release of sediment negatively impacting river system stability.	Stop-logs will provide a barrier allowing for sediment accumulation. Dredging and regular pond maintenance will reduce sediment accumulation. However; natural sediment transport within the river system will be restricted.	Stop-logs will provide a barrier allowing for sediment accumulation. Dredging and regular pond maintenance will reduce sediment accumulation. However; natural sediment transport within the river system will be restricted.	Controlled release of sediment downstream may result in short-term impacts to river system stability during dam decommissioning. Sediment monitoring programs and mitigation measures will be implemented. Normal sediment transport will be restored.	Controlled release of sediment downstream may result in short-term impacts to river system stability during dam decommissioning. Sediment monitoring programs and mitigation measures will be implemented. Normal sediment transport will be restored.	Controlled release of sediment downstream may result in short-term impacts to river system stability during dam decommissioning. Sediment monitoring programs and mitigation measures will be implemented. Normal sediment transport will be restored.	Controlled release of sediment downstream may result in short-term impacts to river system stability during dam decommissioning. Sediment monitoring programs and mitigation measures will be implemented. Normal sediment transport will be restored.
Hydrogeology	The effects each alternative has on the local hydrogeology including water tables and local feature ponds. This is measured through desktop investigations and professional recommendations.	LOW	No impacts to surrounding dug wells in the vicinity of the pond are anticipated. This will not address the current state of the bridge and dam.	Eventual dredging of sediment in pond has the potential to affect water quality of shallow dug wells.	Eventual dredging of sediment in pond has the potential to affect water quality of shallow dug wells.	No impacts to shallow dug wells water quality and quantity in the vicinity of the pond are anticipated under the assumption existing sediment is not being removed.	No impacts to shallow dug wells water quality and quantity in the vicinity of the pond are anticipated under the assumption existing sediment is not being removed.	No impacts to shallow dug wells water quality and quantity in the vicinity of the pond are anticipated under the assumption existing sediment is not being removed.	No impacts to shallow dug wells water quality and quantity in the vicinity of the pond are anticipated under the assumption existing sediment is not being removed.
Transportation	The effects each alternative has on the operational safety and structural integrity of the dam and bridge. The alternatives must meet design standards for traffic and pedestrian crossing. These are measured through engineering investigations, inspections and assessments.	LOW	Current dam structure does not meet requirements for dam safety. Bridge is experiencing deterioration and does not meet lane or pedestrian design standard requirements which will lead to eventual road closure.	Dam will be upgraded to meet requirements for dam safety. However; Bridge will be reconstructed to allow 2-lane traffic and sidewalk for pedestrian crossing to meet current transportation design standards. Long term risk to traffic still exists with the existence of the dam.	Dam will be updated to meet requirements for dam safety. Bridge will not meet current transportation design standards. Long term risk to traffic still exists with the existence of the dam.	Station Street considered a "local" roadway. Bridge will not meet current transportation design standards. Dam is decommissioned and will not pose a long-term risk to traffic.	Station Street considered a "local" roadway. Bridge will not meet current transportation design standards. Dam is decommissioned and will not pose a long-term risk to traffic.	Station Street considered a "local" roadway. Bridge will be reconstructed to allow for 2-lane traffic and pedestrian crossing to meet current transportation design standards. Dam is decommissioned and will not pose a long-term risk to traffic.	Station Street considered a "local" roadway. Bridge will be reconstructed to allow for 2-lane traffic and pedestrian crossing to meet current transportation design standards. Dam is decommissioned and will not pose a long-term risk to traffic.
Feasibility of Construction	The Town is limited to performing any construction of mitigation measures within the Station Street road right-of-way. The stop-log control structure and the Pond are not on Town property. The outcome of the alternative must allow the Town to implement a solution that will reduce their liability caused by owning a dam.	HIGH	Although this Alternative is feasible for the Town, they are obliged under the LRIA to determine a "long term" solution for the Dam.	The earthen berm portion of the dam and the bridge structure is within the Town's road right-of-way and can be rehabilitated to reduce the liability risk of owning a dam.	The earthen berm portion of the dam and the bridge structure is within the Town's road right-of-way and can be rehabilitated to reduce the Town's liability risk of owning a dam.	Decommissioning the dam requires the removal of the stop-log control structures which is not within the Town's property.	Decommissioning the dam requires the removal of the stop-log control structures which is not within the Town's property. An off-line pond would have to be constructed within the current pond area which is not on Town property.	Decommissioning the dam requires the removal of the stop-log control structures which is not within the Town's property.	Decommissioning the dam requires the removal of the stop-log control structures which is not within the Town's property. An off-line pond would have to be constructed within the current pond area which is not on Town property.
NATURAL ENVIRONMENT									
Species at Risk (SAR)/ Rare Species	The effects each alternative has on the native (SAR) within the project study area. The destruction of SWH due to change or alteration can have negative impacts on the natural habitat features and ecological functions of the identified species. This is measured through the desktop and field investigations which assess the types of species present.	HIGH	No impacts are anticipated under current state. Uncontrolled dam failure has the potential to cause significant negative impacts to Species at Risk.	No long term impacts are anticipated following rehabilitation of the dam and reconstruction of the bridge. Current SAR and rare species will continue to thrive within the Pond and study area.	No long term impacts are anticipated following rehabilitation of the dam and bridge. Current SAR and rare species will continue to thrive within the Pond and study area.	Long term impacts to the habitat through permanent removal of overwintering habitat for Common Snapping Turtle, and changes during construction to foraging habitat for Little Brown Myotis (bat). Impacts to Rare species are expected during construction, and long term impacts include permanent changes to potential foraging/stopover habitat for Great Egret and Trumpeter Swan.	If appropriate design and mitigation measures are put in place, no long term impacts are anticipated following construction and restoration.	Long term impacts to the habitat through permanent removal of overwintering habitat for Common Snapping Turtle, and changes during construction to foraging habitat for Little Brown Myotis (bat).Impacts to Rare species are expected during construction, and long term impacts include permanent changes to potential foraging/stopover habitat for Great Egret and Trumpeter Swan.	If appropriate design and mitigation measures are put in place, no long term impacts are anticipated following construction and restoration.
Aquatic/Fish Habitat	The effects each alternative has on the native fish species and their habitat. Fish barriers reduce ability for fish passage and diversity. The West Credit River is managed as a Cold Water Fishery. This is measured through the desktop and field investigations which assess the types of fish species present as well as, the presence of barriers.	HIGH	No impacts are anticipated under current state. Uncontrolled dam failure could cause significant negative impacts to Fish and Fish Habitat	A desired Cold Water Fishery cannot be established and fish barriers are maintained.	A desired Cold Water Fishery cannot be established and fish barriers are maintained.	Positive impacts to the managed Cold Water Fishery are anticipated from removing the dam provided suitable ecological restoration is implemented. Fish barriers will be removed.	Positive impacts to the managed Cold Water Fishery are anticipated from removing the dam provided suitable ecological restoration is implemented. Fish barriers will be removed.	Positive impacts to the managed Cold Water Fishery are anticipated from removing the dam provided suitable ecological restoration is implemented. Fish barriers will be removed.	Positive impacts to the managed Cold Water Fishery are anticipated from removing the dam provided suitable ecological restoration is implemented. Fish barriers will be removed.
Significant Wildlife Habitat (SWH)	The effects each alternative has on SWH within the project study area. The destruction of SWH due to change or alteration can have negative impacts on the natural habitat features and ecological functions. This is measured through desktop and field investigations.	MED	No impacts are anticipated under current state. Uncontrolled dam failure could cause significant negative impacts to SWH.	No long term impacts are anticipated following rehabilitation of the dam and reconstruction of the bridge. Current SWH will continue to thrive within the Pond and study area.	No long term impacts are anticipated following rehabilitation of the dam and bridge. Current SWH will continue to thrive within the Pond and study area.	Long term negative impacts on the features and functions of the following SWH: Waterfowl Stopover and Staging, Turtle overwintering, and Habitat for Special Concern Species and Rare Wildlife Species.	If appropriate mitigation measures are put in place, no long term impacts are anticipated following construction and restoration.	Long term negative impacts on the features and functions of the following SWH: Waterfowl Stopover and Staging, Turtle overwintering, and Habitat for Special Concern Species and Rare Wildlife Species.	If appropriate mitigation measures are put in place, no long term impacts are anticipated following construction and restoration.
Provincially Significant Wetlands (PSW)/Landscape Features	The effects each alternative has on PSW within the project study area. Changes to the limit and extent of the PSW can cause negative impacts to the local ecologies interdependencies. This is measured through desktop and field investigations which quantify and assess the current limit and extent of PSW.	MED	No impacts are anticipated under current state. However; uncontrolled dam failure could cause significant negative impacts to the PSW or landscape features.	Impacts to upstream and downstream hydrology is negligible. No impacts are anticipated.	Impacts to upstream and downstream hydrology is negligible. No impacts are anticipated.	Potential changes to hydrology could impact the upstream and downstream extent and quality of wetland. Pond will naturalize into new wetland. Possible negative impact to the Treed Fen Community if hydrological changes (e.g. lower water table) are associated with the decommissioning of the dam.	Potential changes to hydrology could impact the upstream and downstream extent and quality of wetland. The construction of an offline pond will maintain some open water community within the existing PSW. Possible negative impact to the Treed Fen Community if hydrological changes (e.g. lower water table) are associated with the decommissioning of the dam.	Potential changes to hydrology could impact the upstream and downstream extent and quality of wetland. Pond will naturalize into new wetland. Possible negative impact to the Treed Fen Community if hydrological changes (e.g. lower water table) are associated with the decommissioning of the dam.	Potential changes to hydrology could impact the upstream and downstream extent and quality of wetland. The construction of an offline pond will maintain some open water community within the existing PSW. Possible negative impact to the Treed Fen Community if hydrological changes (e.g. lower water table) are associated with the decommissioning of the dam.

ASSESSMENT OF ALTERNATIVES CON'T

CRITERIA	Summary of Weighted / Measured Criteria	Weighting	ALTERNATIVE A "Do Nothing"	ALTERNATIVE B Rehabilitate Hillsburgh Dam and;		ALTERNATIVE C Rehabilitate Station Street Bridge and;		ALTERNATIVE D Reconstruct Station Street Bridge and;	
				OPTION 1 Reconstruct Station Street Bridge	OPTION 2 Rehabilitate Station Street Bridge	OPTION 1 Decommission Dam	OPTION 2 Decommission Dam Construct Offline Pond	OPTION 1 Decommission Dam	OPTION 2 Decommission Dam Construct Offline Pond
SOCIAL ENVIRONMENT									
Cultural Heritage	The Pond, Dam and the associated Bridge structure are considered heritage resources in the community. The level of heritage significance is measured by the resources artistic merit and historical and contextual value.	HIGH	No immediate impacts are anticipated. However; if left unmaintained, the artistic merit and contextual value can be lost through eventual deterioration.	The cultural value of the dam and in-situ pond will be least impacted through rehabilitation of the existing dam. Reconstruction of the bridge, although not most preferred, can be achieved through proper documentation and commemoration strategies.	The cultural value of the dam and in-situ pond will be least impacted through rehabilitation of the existing dam. Rehabilitation of the bridge will best preserve the heritage resource.	The cultural value of the dam and in-situ pond will be lost. Rehabilitation of the bridge will best preserve the heritage resource.	The cultural value of the existing dam and in-situ pond will be lost. Rehabilitation of the bridge will best preserve the heritage resource.	The cultural value of the existing dam and in-situ pond will be lost. Reconstruction of the bridge, although not most preferred, can be achieved through proper documentation and commemoration strategies.	The cultural value of the existing dam and in-situ pond will be lost. Reconstruction of the bridge, although not most preferred, can be achieved through proper documentation and commemoration strategies.
Archaeological Significance	The surrounding areas of the Dam and Bridge may hold archaeological significance within the footprint of the construction area. This is measured through site and desktop investigations.	MED	No impacts are anticipated.	No impacts are anticipated. Will require a Stage 2 archaeological assessment based on proposed footprint of new bridge.	No impacts are anticipated. Will require a Stage 2 archaeological assessment.	No impacts are anticipated.	No impacts are anticipated.	No impacts are anticipated. Will require a Stage 2 archaeological assessment.	No impacts are anticipated. Will require a Stage 2 archaeological assessment.
Analysis of Water Rights	The affects each alternative has on Riparian Water Rights, Mill Privileges, and Mill Rights. This is measured by professional legal opinions.	LOW	No impacts are anticipated.	No impacts are anticipated.	No impacts are anticipated.	No impacts are anticipated.	No impacts are anticipated.	No impacts are anticipated.	No impacts are anticipated.
Community Value	The general consensus is the existing pond holds an aesthetic value as well as potential for educational and recreational purposes. This has been measured through written and verbal characterization of the local residents/businesses and interested members of the community.	LOW	Eventual dam failure will eliminate the pond and its value to the community,	The pond will be maintained along with its aesthetic value and potential recreational and educational purposes.	The pond will be maintained along with its aesthetic value and potential recreational and educational purposes.	The pond will not be maintained. The aesthetic value and potential recreational and educational purposes will be lost.	A portion of the pond will remain along with the aesthetic value. The potential for recreational and educational uses remain.	The pond will not be maintained. The aesthetic value and potential recreational and educational purposes will be lost.	A portion of the pond will remain along with the aesthetic value. The potential for recreational and educational uses remain.
Public Safety	The potential risk each alternative has to public safety. This is measured and quantified through professional judgement.	HIGH	High risk of dam failure due to a consequence or flooding event. High risk of bridge failure due to poor structural integrity.	Dam and Bridge will be upgraded to meet current safety standards to improve pedestrian access and public safety. The risk of dam failure during a consequence event is still present. However; improvements to the earthen	Dam will be rehabilitated to meet current dam safety standards to improve public safety. The risk of dam failure during a consequence event is still present. The Bridge will not meet current transportation standards for 2-lane traffic and safe	Pond will be removed, greatly reducing the risks caused by the earthen berm dam. The Bridge will not meet current standards for 2-lane traffic and safe pedestrian access.	Pond will be removed, greatly reducing the risks caused by the earthen berm dam. Offline Pond still poses a risk of overtopping during a consequence event. The Bridge will not meet current industry standards for 2-lane traffic and safe pedestrian access.	Pond will be removed, greatly reducing the risks caused by the earthen berm dam. Bridge will be upgraded to meet current industry and safety standards to improve public safety.	Pond will be removed, greatly reducing the risks caused by the earthen berm dam. Offline Pond still poses a risk of overtopping during a consequence event. Bridge will be upgraded to meet current industry and safety standards to improve public safety.
ECONOMIC ENVIRONMENT									
Capital/Replacement Costs	Overall construction capital costs including replacement and mitigation costs throughout the life cycle of each alternative. This is measured through standard engineering benchmark cost estimates and assumptions based on background research.	HIGH	Estimated cost attributed to an emergency dam decommissioning and restoration and bridge replacement = $4,036,550 This is not considered a "long term" solution and will not satisfy Provincial legislation.	Estimated cost includes the rehabilitation of the earthen berm dam, reconstruction of a bridge to convey the "Regulatory Flood" and rehabilitation of Station Street = $5,127,150	Estimated cost includes the rehabilitation of the earthen berm dam, rehabilitation of the existing bridge, eventual replacement of the bridge and rehabilitation of Station Street = $5,725,650	Estimated cost includes dam decommissioning and restoration, rehabilitation of the existing bridge, eventual replacement of the bridge and rehabilitation of Station Street = $4,063,150	Estimated cost includes dam decommissioning and restoration, construction of new earthen berm for offline pond, rehabilitation of the existing bridge, eventual replacement of the bridge and rehabilitation of Station Street = $4,701,550	Estimated cost includes dam decommissioning and restoration, replacement of the existing bridge, eventual replacement of the bridge and rehabilitation of Station Street = $3,464,650	Estimated cost includes dam decommissioning and restoration, construction of new earthen berm for offline pond, replacement of the existing bridge and rehabilitation of Station Street = $4,103,050
Regular Operations and Maintenance	Overall cost for operation and maintenance of each alternative based on engineering cost estimates for regular dam and bridge operations and maintenance	HIGH	No operational or maintenance costs. This is not considered a "long term" solution and will not satisfy Provincial legislation.	Dam will be rehabilitated to an acceptable standard but will require long term maintenance for operation of stop-log control structures and pond dredging. New bridge will have no long term maintenance requirements.	Dam will be rehabilitated to an acceptable standard but may require long term maintenance for operation of stop-log control structures. Bridge will require regular assessments and maintenance every 5-7 years.	Dam will be eliminated with no associated maintenance costs. Bridge will require regular assessments and maintenance every 5-7 years.	Dam will be eliminated with no associated maintenance costs. Maintenance of offline pond controls will be required. Bridge will require regular assessments and maintenance every 5-7 years.	Dam will be eliminated with no associated maintenance costs. New bridge will have no anticipated long term maintenance requirements.	Dam will be eliminated with no associated maintenance costs. New bridge will have no anticipated long term maintenance requirements. Maintenance of offline pond controls will be required.
Economic Liability	In the event of a dam failure, dam owners can be held liable for damage inflicted upon persons or property. This is measured by professional judgement related to the potential for and quantification of damage to persons or property.	HIGH	Dam owners will be held liable for associated costs inflicted to persons or property due to an uncontrolled dam or bridge failure.	Dam owners will be held liable for associated costs inflicted to persons or property due to an uncontrolled dam or bridge failure. Risk of dam or bridge failure will be reduced due to Dam rehabilitation.	Dam owners will be held liable for associated costs inflicted to persons or property due to an uncontrolled dam or bridge failure. Risk of dam failure will be reduced due to Dam rehabilitation. Bridge will eventually fail.	Dam owner's liability is greatly reduced with the elimination of the head pond and rehabilitation of the existing bridge. Bridge will eventually fail.	Dam owner's liability is greatly reduced with the elimination of the head pond and rehabilitation of the existing bridge however; a liability remains as offline pond's earthen berm is still considered a dam.	Dam owner's liability is greatly reduced with the elimination of the head pond and reconstruction of a new bridge.	Dam owner's liability is greatly reduced with the elimination of the head pond and reconstruction of a new bridge however; a liability remains as offline pond's earthen berm is still considered a dam.

5.4.1 Method of Scoring and Ranking

The ranking of study alternatives was completed using a logic based approach with a scoring system that applies a multiplier of 1, 2 and 3 to a low, medium and high weighting, respectively. Subsequently, the original scoring matrix was adapted to include positive and negative multipliers based on comments received from the MNRF and CVC after the PIC. The Comparison and Ranking of Alternatives and the Ranking Matrix as displayed at the PIC can be found in Appendix D. Table 5.5 summarizes the revised adapted methodology used within the scoring matrix, post PIC.

Table 5.5 – Scoring Matrix

SCORING MATRIX						
	Multiplier	**Negative**	**Negative-Neutral**	**Neutral**	**Positive-Neutral**	**Positive**
WEIGHTING		**SCORING**				
LOW	**1**	**-2**	**-1**	**0**	**1**	**2**
MED	**2**	**-4**	**-2**	**0**	**2**	**4**
HIGH	**3**	**-6**	**-3**	**0**	**3**	**6**

The ranking system was divided into five categories which were used to score each criterion and ultimately rank each alternative in the following manner:

Neutral – applied to those criteria where the alternative does not positively or negatively impact the overall outcome.

Positive-Neutral – applied to those criteria where the alternative results in no change to the existing conditions but maintains an overall positive outcome.

Positive – applied to criteria where the alternative provides a change from the existing conditions which results in a positive outcome.

Negative-Neutral – applied to those criteria where the alternative results in no change to the existing conditions but maintains an overall negative outcome.

Negative – applied to criteria where the alternative applies a change to the existing conditions which results in a negative outcome.

5.4.2 Criteria Weighting

The criteria under the technical, natural, social and economic factors were ranked either a low, medium or high weighting. The weighting was based on the existing conditions information developed from recommendations in the various background studies as well as; benchmark cost estimates and comments received from agencies and the public during the consultation process. It is important to note that benchmark costs are preliminary and are meant to provide an order of magnitude for evaluation purposes; the assessed costs are not reflective of any detailed design or regulatory permits.

5.5 Shortlisted Alternatives

Prior to the public meeting on May 19,' 2016, the Hillsburgh Pond property changed ownership. As the dam's earthen berm structure is traversed by the Town's municipal right-of-way and the adjacent pond property, the ownership of the dam is considered shared by both land owners. The stop-log control structure which controls the level of water in the pond and against the dam is located within the pond property.

Subsequent to the May 19, 2016 meeting, the new pond owner has provided written correspondence in support of retaining the pond. This letter is found in Appendix F. Therefore, as the Town does not have access to this property, it is impractical for the Town to proceed with considering Alternatives which will require access to and impact the pond property. Based on this, the Project Team reassessed the list of alternatives to include only those options which remain feasible for the Town to implement without impacting the adjacent pond owner. This will allow the Town to determine a permanent solution for the Hillsburgh Dam and its associated bridge without affecting the pond property and ultimately select an alternative solution for which they have the ability to implement and construct.

As a result, the Project Team proceeded with redeveloping the list of alternatives to remove the options which involved decommissioning the dam or the creation of an offline pond. The study's alternatives were shortlisted as follows:

- Alternative A: Do Nothing
- Alternative B: Option 1 - Rehabilitate Dam and Reconstruct Bridge
- Alternative B: Option 2 - Rehabilitate Dam and Rehabilitate Bridge

Through much consideration within the Project Team as well as correspondence with MNRF and CVC staff, the shortlisted alternatives were scored and ranked using the above Scoring Matrix. The results are found in Table 5.6.

Table 5.6 – Shortlisted Comparison and Ranking of Alternatives

SHORTLISTED COMPARISON AND RANKING OF ALTERNATIVES

CRITERIA	Summary of Weighted / Measured Criteria	Weighting	ALTERNATIVE A "Do Nothing"	ALTERNATIVE B Rehabilitate Hillsburgh Dam and; OPTION 1 Reconstruct Station Street Bridge	ALTERNATIVE B Rehabilitate Hillsburgh Dam and; OPTION 2 Rehabilitate Station Street Bridge
TECHNICAL/FUNCTIONAL ASPECTS					
Hydrology and Hydraulics	The impact each alternative has to the hydrology and hydraulics of the river system. The alternative must conform to regulatory standards for a dam with "High Hazard Classification". Bridge should convey the "Regulatory Flood". This is measured through engineering analysis and interpretation.	HIGH	Current Dam and Bridge do not meet hydraulic requirements and risk uncontrolled dam failure in a major storm event. The dam owners are obliged to determine a "long term" solution for the Dam and Bridge.	Dam will be upgraded to meet requirements for dam safety. Bridge will be reconstructed to convey the "Regulatory Flood" event and meet hydraulic requirements. Impacts to upstream and downstream flood levels are negligible.	Dam will be updated to meet requirements for dam safety; bridge will not convey the "Regulatory Flood" and will not meet hydraulic requirements. Impacts to upstream and downstream flood levels are negligible.
Ranking			**-6**	**3**	**-6**
Sediment Transport	Each alternative has a potential effect on the accumulation and transport of sediment. Sediment accumulation can reduce river system stability.	MED	Eventual dam failure would allow for uncontrolled release of sediment negatively impacting river system stability.	Stop-logs will provide a barrier allowing for sediment accumulation. Dredging and regular pond maintenance will reduce sediment accumulation. However; natural sediment transport within the river system will be restricted.	Stop-logs will provide a barrier allowing for sediment accumulation. Dredging and regular pond maintenance will reduce sediment accumulation. However; natural sediment transport within the river system will be restricted.
Ranking			**-4**	**-2**	**-2**
Hydrogeology	The effects each alternative has on the local hydrogeology including water tables and local feature ponds. This is measured through desktop investigations and professional recommendations.	MED	No impacts to surrounding dug wells in the vicinity of the pond are anticipated. This will not address the current state of the bridge and dam.	Eventual dredging of sediment in pond has the potential to affect water quality of shallow dug wells.	Eventual dredging of sediment in pond has the potential to affect water quality of shallow dug wells.
Ranking			**-4**	**-2**	**-2**
Transportation	The effects each alternative has on the operational safety and structural integrity of the dam and bridge. The alternatives must meet design standards for traffic and pedestrian crossing. These are measured through engineering investigations, inspections and assessments.	MED	Current dam structure does not meet requirements for dam safety. Bridge is experiencing deterioration and does not meet lane or pedestrian design standard requirements which will lead to eventual road closure.	Dam will be upgraded to meet requirements for dam safety. However; Bridge will be reconstructed to allow 2-lane traffic and sidewalk for pedestrian crossing to meet current transportation design standards. Long term risk to traffic still exists with the existence of the dam.	Dam will be updated to meet requirements for dam safety. Bridge will not meet current transportation design standards. Long term risk to traffic still exists with the existence of the dam.
Ranking			**-4**	**2**	**-2**
Total Ranking			**-18**	**1**	**-12**
NATURAL ENVIRONMENT					
Species at Risk (SAR)/ Rare Species	The effects each alternative has on the native (SAR) within the project study area. The destruction of SAR and their habitat due to change or alteration can have negative impacts on the natural habitat features and ecological functions of the identified SAR. This is measured through desktop and field investigations which assess the types of species present.	HIGH	No impacts are anticipated under current state. Uncontrolled dam failure has the potential to cause significant negative impacts to Species at Risk.	No long term impacts are anticipated following rehabilitation of the dam and reconstruction of the bridge. Current SAR and rare species will continue to thrive within the Pond and study area.	No long term impacts are anticipated following rehabilitation of the dam and bridge. Current SAR and rare species will continue to thrive within the Pond and study area.
Ranking			**-6**	**3**	**3**
Aquatic/Fish Habitat	The effects each alternative has on the native fish species and their habitat. Fish barriers reduce ability for fish passage and diversity. The West Credit River is managed as a Cold Water Fishery. This is measured through the desktop and field investigations which assess the types of fish species present as well as, the presence of barriers.	HIGH	No impacts are anticipated under current state. Uncontrolled dam failure could cause significant negative impacts to Fish and Fish Habitat	A desired Cold Water Fishery cannot be established and fish barriers are maintained.	A desired Cold Water Fishery cannot be established and fish barriers are maintained.
Ranking			**-6**	**-6**	**-6**
Significant Wildlife Habitat (SWH)	The effects each alternative has on SWH within the project study area. The destruction of SWH due to change or alteration can have negative impacts on the natural habitat features and ecological functions. This is measured through desktop and field investigations.	MED	No impacts are anticipated under current state. Uncontrolled dam failure could cause significant negative impacts to SWH.	No long term impacts are anticipated following rehabilitation of the dam and reconstruction of the bridge. Current SWH will continue to thrive within the Pond and study area.	No long term impacts are anticipated following rehabilitation of the dam and bridge. Current SWH will continue to thrive within the Pond and study area.
Ranking			**-4**	**2**	**2**
Provincially Significant Wetlands (PSW)/Landscape Features	The effects each alternative has on PSW within the project study area. Changes to the limit and extent of the PSW can cause negative impacts to the local ecologies interdependencies. This is measured through desktop and field investigations which quantify and assess the current limit and extent of PSW.	LOW	No impacts are anticipated under current state. However; uncontrolled dam failure could cause significant negative impacts to the PSW or landscape features.	Impacts to upstream and downstream hydrology is negligible. No impacts are anticipated.	Impacts to upstream and downstream hydrology is negligible. No impacts are anticipated.
Ranking			**-2**	**0**	**0**
Total Ranking			**-18**	**-1**	**-1**

SHORTLISTED COMPARISON AND RANKING OF ALTERNATIVES CON'T

CRITERIA	Summary of Weighted / Measured Criteria	Weighting	ALTERNATIVE A "Do Nothing"	ALTERNATIVE B Rehabilitate Hillsburgh Dam and;	
				OPTION 1 Reconstruct Station Street Bridge	OPTION 2 Rehabilitate Station Street Bridge
SOCIAL ENVIRONMENT					
Cultural Heritage	The Pond, Dam and the associated Bridge structure are considered heritage resources in the community. The level of heritage significance is measured by the resources artistic merit and historical and contextual value.	HIGH	No immediate impacts are anticipated. However; if left unmaintained, the artistic merit and contextual value can be lost through eventual deterioration.	The cultural value of the dam and in-situ pond will be least impacted through rehabilitation of the existing dam. Reconstruction of the bridge, although not most preferred, can be achieved through proper documentation and commemoration strategies.	The cultural value of the dam and in-situ pond will be least impacted through rehabilitation of the existing dam. Rehabilitation of the bridge will best preserve the heritage resource.
Ranking			**-3**	**3**	**6**
Archaeological Significance	The surrounding areas of the Dam and Bridge may hold archaeological significance within the footprint of the construction area. This is measured through site and desktop investigations.	MED	No impacts are anticipated.	No impacts are anticipated. Will require a Stage 2 archaeological assessment based on proposed footprint of new bridge.	No impacts are anticipated. Will require a Stage 2 archaeological assessment.
Ranking			**0**	**0**	**0**
Community Value	The general community consensus is the existing pond holds an aesthetic value as well as potential for educational and recreational purposes. This has been measured through written and verbal characterization of local residents/businesses and interested members of the community.	LOW	Eventual dam failure will eliminate the pond and its value to the community,	The pond will be maintained along with its aesthetic value and potential recreational and educational purposes.	The pond will be maintained along with its aesthetic value and potential recreational and educational purposes.
Ranking			**-2**	**2**	**2**
Public Safety	The potential risk each alternative has to public safety. This is measured and quantified through professional judgement.	HIGH	High risk of dam failure due to a consequence or flooding event. High risk of bridge failure due to poor structural integrity.	Dam and Bridge will be upgraded to meet current safety standards to improve pedestrian access and public safety. The risk of dam failure during a consequence event is still present. However; improvements to the earthen dam structure and increased hydraulic capacity of the bridge will moderately reduce present risk to public safety.	Dam will be rehabilitated to meet current dam safety standards to improve public safety. The risk of dam failure during a consequence event is still present. The Bridge will not meet current transportation standards for 2-lane traffic and safe pedestrian access.
Ranking			**-6**	**3**	**-3**
Total Ranking			**-11**	**8**	**5**
ECONOMIC ENVIRONMENT					
Capital/Replacement Costs	Overall construction capital costs including replacement and mitigation costs throughout the life cycle of each alternative. This is measured through standard engineering benchmark cost estimates and assumptions based on background research.	HIGH	Estimated cost attributed to an emergency dam decommissioning and restoration and bridge replacement = $4,036,550 This is not considered a "long term" solution and will not satisfy Provincial legislation.	Estimated cost includes the rehabilitation of the earthen berm dam, reconstruction of a bridge to convey the "Regulatory Flood" and rehabilitation of Station Street = $5,127,150	Estimated cost includes the rehabilitation of the earthen berm dam, rehabilitation of the existing bridge, eventual replacement of the bridge and rehabilitation of Station Street = $5,725,650
Ranking			**-6**	**-6**	**-6**
Regular Operations and Maintenance	Overall cost for operation and maintenance of each alternative based on engineering cost estimates for regular dam and bridge operations and maintenance	HIGH	No operational or maintenance costs. This is not considered a "long term" solution and will not satisfy Provincial legislation.	Dam will be rehabilitated to an acceptable standard but will require long term maintenance for operation of stop-log control structures and pond dredging. New bridge will have no long term maintenance requirements.	Dam will be rehabilitated to an acceptable standard but may require long term maintenance for operation of stop-log control structures. Bridge will require regular assessments and maintenance every 5-7 years.
Ranking			**-6**	**-6**	**-6**
Economic Liability	In the event of a dam failure, dam owners can be held liable for damage inflicted upon persons or property. This is measured by professional judgement related to the potential for and quantification of damage to persons or property.	HIGH	Dam owners will be held liable for associated costs inflicted to persons or property due to an uncontrolled dam or bridge failure.	Dam owners will be held liable for associated costs inflicted to persons or property due to an uncontrolled dam or bridge failure. Risk of dam or bridge failure will be reduced due to Dam rehabilitation.	Dam owners will be held liable for associated costs inflicted to persons or property due to an uncontrolled dam or bridge failure. Risk of dam failure will be reduced due to Dam rehabilitation. Bridge will eventually fail.
Ranking			**-6**	**3**	**-3**
Total Ranking			**-18**	**-9**	**-15**
OVERALL RANKING			**-65**	**-1**	**-23**

6.0 Consultation Process

6.1 Mandatory Points of Contact

As part of the consultation process all stakeholders were contacted throughout the study. A list of all agencies, interested members of the public and all other stakeholders is found in Appendix B. Table 6.1 below, describes the methods and purpose in which all stakeholders were contacted throughout the Class EA process.

Table 6.1 – Summary of Key Points of Contact

Method of Contact	Type of Contact	Purpose
Notice of Study Commencement	• Erin Advocate November 26 and December 3, 2014 • Wellington Advertiser November 28 and December 5, 2014 • Posted on Towns website • Notice Letter to Agencies and residents in vicinity of study area • Mass mailer flyer to all residents within village of Hillsburgh	To inform all stakeholders of the study's problem statement and methods of project contact.
Request for Property Access to Private Property	• Letter dated February 6, 2015 requesting access to private properties within the study area	To obtain access to property within the study area to complete field studies.
Discretionary Public Information Centre (PIC) (May 19, 2016)	• Erin Advocate April 27 and May 4, 2016 • Wellington Advertiser April 29 and May 6, 2016 • Posted on Towns website • Notice Letter to Agencies and residents in vicinity of study area	To allow for public input regarding; background investigative studies, evaluation of alternatives and selection of the preliminary preferred alternatives.
Notice of Study Completion	• Erin Advocate and Wellington Advertiser Early December 2016 • Posted on Towns website • Notice Letter to Agencies and residents in vicinity of study area	To inform all stakeholders of the study's completion and 30 day review period of the Project File Report.

6.2 Public Consultation

6.2.1 Methods of Public Contact

The Notice of Study Commencement was mailed out to agencies, utilities, municipalities and other stakeholders as well as property owners in the direct vicinity of the study area on November 28, 2014. The Notice was also sent out as a mass mailer for all residents with Hillsburgh addresses. In order to access lands within the study area, a letter to each land owner was sent to request access to perform field investigation. All public consultation letters and notices can be found in Appendix B.

6.3 Agency Consultation

Consultation with MNRF and CVC staff has been constant throughout this Class EA study. A total of 3 meetings have taken place to-date. A summary of meeting records were documented in minutes which are found in Appendix F. Both MNRF and CVC provided comments, post PIC, with respect to the Preliminary Preferred Alternative and the ranking and evaluation of alternatives which followed. Agency comments and correspondence can be found in Appendix F.

Correspondence was made with the MTCS to document and register the bridge and dam as a requirement of the Cultural Heritage Act.

6.4 Aboriginal/First Nations

The Notice of Study Commencement and Notice of Public Information Centre were circulated to Mississaugas of the New Credit First Nations and the Haudenosaunee Confederacy Chiefs Council. At present, there has been no contact or correspondence from these organizations with the Project Team. Should these organizations express any interest in the Class EA or the study and the preferred alternatives, the municipality would be open to discussions.

6.5 Public Information Centre

Under a Schedule “B” Class EA a Public Information Centre (PIC) is discretionary based on the decision of the Project Team. Due to the size of the study and the potential ensuing impacts to the public and agencies a PIC was held on Thursday May 19, 2016 from 6:30 p.m. to 8:30 p.m. at the Town of Erin Head Office.

Display boards and Project Tem members were available to answer questions, attendees were encouraged to complete written comments on sheets provide. Display Boards are provided in Appendix D.

The purpose of the PIC was to allow for public and agency input regarding; background investigative studies, preliminary evaluation of alternatives and selection of the preliminary preferred alternatives.

Forty-six individuals signed in and attended the PIC, although there may have been individuals who attended the meeting that did not sign in. Attendees included; interested community members within the Town of Erin, public interest groups and Municipal and Wellington County staff.

Written comments were received following the PIC on May 19, 2016 and are found in Appendix F. A summary of comments are provided in the Table 6.2 below.

Table 6.2 – Summary of Public Information Centre Comments Received

Comment Reference No. and Location of Source	Comments	Comment Consideration
1 Hillsburgh Resident	Would like feedback on opinion of the study group as to how water rights are being addressed for the pond above Station Road. Suggested the old water raceway south of Station Road be made available to redirect water while repair or restoration works being done on the bridge.	Comments were noted and response given to resident based on a legal opinion which is privileged to Town Council
2 Hillsburgh Resident	Prefers Alternative B, Option 1 Opposed to any plan that would result in draining the pond. Enjoys watching the wildlife that uses the pond. Believes the pond could be a large focal point for Hillsburgh, especially with the location to the new library	Comments were noted and evaluated as part of the Social Environment criteria within the evaluation matrix
3 Hillsburgh Resident	Opposed to draining the pond. Considers it valuable to the wildlife and the heritage in the area. Alternative B, Option 1 chosen	Comments were noted and evaluated as part of the Social Environment criteria within the evaluation matrix

4 Hillsburgh Resident	Believes pond owner should assume all responsibilities including costs associated with repairs/replacement and move dam onto their property. Not at the Towns best interest to own the dam (is there documents stating the Town owns the dam?).	Comments were noted
5 County of Wellington	Prefers rehabilitation of the dam and reconstruction of the bridge in a means that retains the pond in its current state.	Comments were noted and evaluated as part of the Social / Technical Environment criteria within the evaluation matrix
6 Ontario Rivers Alliance	Sees a "win-win" with the implication of an offline pond. Comments directed toward decreasing the thermal warming of the system, improve water quality, restore sediment transport and stream ecology, removal of fish barrier and provide long term sustainability to the coldwater brook trout fishery	Considered within the evaluation of alternatives and Agency responses in Appendix F
7 Trout Unlimited Canada	Comments centred on the long-term health of the Upper West Credit River and long-term liability associated to the Town if the dam remains. Alternative B, Option 1 or 2 is not a sound long-term solution for Town and Community Provided specific breakdown and comments to the assessment of Alternatives	Considered within the evaluation of alternatives and Agency responses in Appendix F
8 Ministry of Natural Resources and Forestry	See Appendix F for Comments	Considered within the evaluation of alternatives and response letter in Appendix F
9 Credit Valley Conservation Authority	See Appendix F for Comments	Considered within the evaluation of alternatives and response letter in Appendix F

7.0 Recommended Preferred Alternative

In summary, based on the existing conditions; a balanced weighting of the technical/functional, natural, social and economic environments were accounted for and evaluated. As concluded within the Shortlisted Comparison and Ranking of Alternatives, Section 5.3, the Recommended Preferred Alternative for presentation at Dec 6, 2016 Council is Alternative B1 – Rehabilitate Dam and Reconstruct Bridge.

At present, the Town holds ownership of the road and majority of the earthen berm but not the stop-log control structures. Therefore, this Alternative remains the best option for the Town to move forward in reducing the risk to loss of life and property while limiting their liability as an owner of the Dam. This Alternative will be presented to the MNRF to satisfy the condition of the Non-Application Emergency Repair to determine a permanent solution for the Hillsburgh Dam and its associated Bridge.

7.1 Considerations of Permanent Solution

Under the LRIA legislation, due to the current physical layout of the dam relative to the pond, the Town and adjacent pond owner are considered co-owners of the dam. As the stop-logs controls are physically attached to the existing bridge and dam the structures are considered to be "logically connected" therefore, any work completed to these structures will require involvement and cooperation between the Town and pond owner. As part of the implementation of the Recommended Preferred Alternative B1, it is recommended that the Town, pond owner and involved government agencies come to an agreement as to a suitable "permanent" pond water level which will aid to reduce the risk with the existence of a dam and aid in reducing erosion and flood hazards.

In the event there is a change in ownership of the pond property and/or if the current owner changes their position related to keeping and maintaining the pond, it is recommended that the information provided in this Class EA study be used for re-evaluation purposes.

7.2 Legislative and Regulatory Requirements

In order to proceed with the implementation and eventual construction of Recommended Preferred Alternative B1, there will be mandatory permit and regulatory requirements from various government agencies. Appendix E provides a technical guide for the alterations, improvements and repairs to existing dams. The potential legislative approval or permit requirements are as follows:

Ministry of Natural Resources and Forestry (MNRF) under the Lakes and River Improvement Act (LRIA) - *Work Permit for dam rehabilitation*

Ministry of Natural Resources and Forestry (MNRF) under the Endangered Species Act/Species at Risk Act – *Project Registration/Notice*

Credit Valley Conservation Authority (CVC) under the Conservation Act – *Application for Development, Interference with Wetlands and Alterations to Shorelines and Watercourses*

Department of Fisheries & Oceans (DFO) under the Fisheries Act – *DFO Self-Assessment and/or Request for Review with the potential for a Work Permit acquisition*

Ministry of Tourism, Culture and Sport (MTCS) under the Cultural Heritage Act – *General Approval requirement attributed to proper documentation and commemorative strategies for the Bridge*

8.0 Potential Impacts and Mitigating Measures

The potential impacts to the surrounding environmental factors which may arise as a result of the implementation of the Recommended Preferred Alternative would be considered short-term. The exception to this is the reconstruction of the bridge whereby the heritage value of the existing bridge would be lost. Recommended conservation and/or commemorative strategies as well as documentation techniques with respect to the heritage value of the bridge are outlined in the Cultural Heritage Evaluation Report and Heritage Impact Assessment, see Appendix C-6.

The implementation of the Recommended Preferred Alternative has the potential to provide long-term improvements to existing conditions. The reconstruction of the new bridge will provide additional hydraulic capacity to improve the conveyance route of a Regional Flood event.

As noted in Section 4.1.4, it is recommended that a sediment survey be implemented to calculate the quantity and quality of sediment within the pond. A mitigation strategy should be implemented to improve the volume of sediment which enters the Hillsburgh Pond. In order to improve upon the current sediment conditions, the Town and adjacent pond owner would be required to negotiate and work together to implement the sediment survey and any potential improvement strategies.

Similarly, there is mitigation strategies outlined in the Natural Environment Report (Appendix C-4) with respect to improving the aquatic habitat of the Hillsburgh Pond and downstream, reaches. Provided construction of these mitigating measures are financially and practically feasible, it is recommended that the Town and pond owner work together to review and implement these improvements at the time of dam rehabilitation.

9.0 Project Next Steps

9.1 Initial Steps

In order to finalize the Class EA study a Notice of Study Completion will be issued for which there will be a minimum 30 day review period. If there are questions or concerns raised during this time, the Project Team will respond accordingly.

9.2 Future Considerations

The completed Class EA holds a 10 year implementation period. It is recommended that Town Staff and Council implement a practical timeline and budget to move forward with the construction of the Recommended Preferred Alternative. A practical timeline for ensuing processes is necessary for the completion of a successful project. These processes include but are not limited to; preparation of a request for proposal (RFP) for engineering services, detailed engineering design, agency approval processes, construction tender package and physical construction and inspection of the works.