Appendix G:
Natural Heritage Assessment Technical Memorandum

Planning Level Environmental Impact Study

for the City of Barrie

Drainage Master Plan

Prepared for:
City of Barrie

Prepared by:
Azimuth Environmental
Consulting, Inc.

January 2019

AEC 17-092

AZIMUTH ENVIRONMENTAL CONSULTING, INC.
Environmental Assessments & Approvals

January 25, 2019 AEC 17-092

C.C. Tatham & Associates Ltd.
115 Sandford Fleming Drive, Suite 200
Collingwood, Ontario
L9Y 5A6

Attention: Daniel Twigger, B.Sc. Eng., P.Eng

Re: **Planning Level Environmental Impact Study**
City of Barrie Drainage Master Plan

Dear Mr. Twigger:

As requested, Azimuth Environmental Consulting, Inc. has prepared a final version of the *planning level* Environmental Impact Study related to the City of Barrie's proposed drainage improvements pertaining to their Drainage Master Plan, based on the Preliminary Preferred Alternative Solutions provided by C.C. Tatham & Associated Ltd. in September 2018. The report includes minor revisions to the text and data tables recommended by C.C. Tatham & Associates Ltd.

The report evaluates the current Preliminary Preferred Alternative Solutions being investigated as part of a Municipal Class Environmental Assessment for drainage infrastructure upgrades and channel improvement work in the City of Barrie. The Environmental Impact Study identifies potential terrestrial and fisheries constraints regarding Natural Heritage Features and Functions associated with the defined study area, including Species at Risk and general characterization of vegetation communities, fish and fish habitat. The provisional assessment provided is based on a review of background natural heritage information and general site information collected during the 2017 field surveys.

Based on fieldwork conducted, review of available background information and consideration of Preliminary Preferred Alternative Solutions, our preliminary constraints analysis has identified a number of Natural Heritage Features and Functions. At this time, the anticipated natural heritage sensitivities have been considered to range from low to high risk, depending on the identified feature. Additional surveys have been

recommended at select locations to be completed during Detailed Design, with attention to the mitigation/avoidance/enhancement measures recommended.

If you require additional information, please do not hesitate to contact the undersigned.

Yours truly,

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Dr. Scott Tarof, Ph.D.
Terrestrial Ecologist

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Aquatic Ecologist/Partner

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1.0 INTRODUCTION

Azimuth Environmental Consulting, Inc. (Azimuth) was retained by C. C. Tatham & Associates Ltd. (CCTA) as a sub-consultant to conduct a *planning level* Environmental Impact Study (EIS) for the City of Barrie's (City) Drainage Master Plan (DMP). The geographic scale of the EIS encompasses deficient culvert improvements associated with watercourse/drainage areas, construction of Low Impact Developments (LIDs) in municipal parks, retrofitting/construction of Storm Water Management Facilities (SWMFs), watercourse channel improvements and improvements to trunk storm sewers located throughout the City limits (Figure 1a, b).

The purpose of this EIS is fourfold: (1) identify preliminary terrestrial and fisheries constraints related to Natural Heritage Features and Functions (NHFFs) that should be considered in regards to planned drainage improvements; (2) provide a general review of Preliminary Preferred Alternative Solutions (PPAS) developed by CCTA and assess potential NHFF impacts, (3) recommend additional field surveys that may be required during Detailed Design and (4) make recommendations for impact avoidance/mitigation, habitat enhancement and monitoring during and post-construction.
The preliminary natural heritage assessment includes general characterization of terrestrial habitat, fish and fish habitat, and evaluation of the possible presence of Species at Risk (SAR) and SAR habitat. The assessment is provisional and will require updating based on additional information collected during Detailed Design and the ultimate resulting footprint of the drainage improvement works. Azimuth has maintained consultation with the Lake Simcoe Region Conservation Authority (LSRCA), Nottawasaga Valley Conservation Authority (NVCA) and the Ministry of Natural Resources and Forestry (MNRF) regarding consideration of environmental sensitivities throughout this project.

A combination of background information and, where possible, data collected by Azimuth ecologists during 2017 field reconnaissance surveys are used to assess the potential for direct and indirect impacts on NHFFs associated with the proposed PPAS. Policies and guidelines considered are derived from the Provincial Policy Statement (PPS) (Ministry of Municipal Affairs and Housing, 2014), Ontario's *Endangered Species Act*, 2007 (ESA), *Fisheries Act*, 2013 (FA) and the City's Official Plan (OP).

2.0 PLANNING CONTEXT

2.1 Provincial Policy Statement (2014)

The PPS outlines policies related to natural heritage features. Ontario's *Planning Act* (2001) requires that planning and development decisions be consistent with the PPS. The following policies are relevant to this project.

According to Section 2.1.4, "development and site alteration shall not be permitted in:

- Significant wetlands in Ecoregions 5E, 6E and 7E; and
- Significant coastal wetlands."

According to Section 2.1.5, unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions, development and site alteration shall not be permitted within:

- Significant woodlands in Ecoregions 6E and 7E;
- Significant valleylands Ecoregions 6E and 7E;
- Significant Wildlife Habitat (SWH); and
- Significant Areas of Natural and Scientific Interest (ANSI).

No development and site alteration will be permitted on lands adjacent to the areas defined above unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated there will be no negative impacts on the natural features and ecological functions. The PPS definition of development does not include activities that create or maintain infrastructure authorized under the *Planning Act* authorized under an environmental assessment process. This project is being completed as a part of a Municipal Class Environmental Assessment, therefore, the provisions of the PPS are not applicable.

As per Section 2.1.7, development and site alteration shall not be permitted in habitat of Endangered (END) or Threatened (THR) species, except in accordance with federal and provincial policy.

2.2 Endangered Species Act (2007)

Ontario's ESA provides regulatory protection to END and THR species, prohibiting harassment, harm and/or killing of individuals and destruction of their habitats. Habitat is broadly characterized within the ESA as the area prescribed by a regulation as the habitat of the species or an area on which the species depends, directly or indirectly, to carry on its life processes including reproduction, rearing of young, hibernation, migration or feeding.

The various schedules of the ESA identify SAR in Ontario. These include species listed as Extirpated (EXP), END, THR and Special Concern (SC). As noted above, only species listed as END or THR receive protection through the ESA from harm and destruction to habitat on which they depend. Species designated as SC may receive protection under the SWH provisions of the PPS.

According to Section 9.(1)(a), no person shall kill, harm, harass, capture or take a living member of a species that is listed in Ontario Regulation (O. Reg.) 230/08 as an EXP, END or THR species.

Section 10.(1) of the ESA prohibits damage to habitat stating that no person shall damage or destroy the habitat of a species that is listed in O. Reg. 230/08 as an END or THR species.

As per Section 17.(1), the Minister may issue a permit to a person that, with respect to a species specified in the permit that is listed in O. Reg 230/08 as an EXP, END or THR species, authorizes the person to engage in an activity specified in the permit that would otherwise be prohibited by Section 9 or 10.

2.3 Federal Fisheries Act (2013)

In 2013, amendments to the *Fisheries Act* were made, including the Applications for Authorization (under Paragraph 35(2) (b) of the *Fisheries Act* Regulations) and Information Requirements Regulations that came into force. Under this process, for all *Fisheries Act* requirements, reviews and/or approvals, projects are to be screened using Fisheries and Oceans Canada's (DFO's) Self Assessment guidance platform, 'Projects Near Water'. In accordance with that process, projects are to be evaluated under the Self-Assessment process to determine whether a project has the potential to result in 'serious harm to fish' and whether DFO review is required to obtain either a Letter of Advice or Authorization. Projects are only to be submitted to DFO for review if the project type of the guidance document does not match the project activity or criteria specified.

On February 6, 2018, the federal government announced that the *Fisheries Act* will be overhauled through Bill C-68. Once approved, Bill C-68 will supersede the 2012 *Fisheries Act* and will change aspects of the approvals process currently being followed. At this point in time, those changes remain unclear. As such, it is advised that at the time of development/detail design/construction, that the status of Bill C-68 be confirmed, to reaffirm the process of fisheries review in cooperation with professional ecologists to determine if recommendations for reviewing projects under the Act, as provided herein, require updating accordingly.

2.4 City of Barrie Official Plan (2017)

Where appropriate, the OP classifies the location of watercourses, associated minimum vegetation protection zones and connectivity linkages in addition to other natural heritage features as being Level 1-3 Natural Heritage Resources (Schedule H, Appendix A). It is at these watercourse locations that the deficient culverts have been identified. The sites surveyed are designated in the OP as Environmental Protection Area, Open Space, City Centre, General Industrial, General Commercial, Residential and Highway 400 Industrial (Schedule A, Appendix B). Conservation Authority Regulation Limits are shown in Schedule F (Appendix C). The following OP policies pertain to the study area.

Section 3.5.2.4 (a) states the following:

i. *Level 1 resources represent critical components of the Natural Heritage Resource network. No development shall be permitted within these areas.*
    - *Environmental Protection Area policy 4.7.2.2 would apply to all properties identified as Level 1.*
    - *The City will strive to designate all properties identified as having a Level 1 Natural Heritage Resource as Environmental Protection.*
    - *An Environmental Impact Study (EIS) will be required for any development or site alteration within 120 metres of an area identified as Level 1 on Schedule H.*

ii. *Level 2 resources represent significant components of the Natural Heritage Resource network. The features and function of these areas should be retained, however, there is potential for development if no negative impact can be demonstrated or mitigated.*
    - *An EIS will be required to be completed for any development or site alteration in or within 120 metres of an area identified as Level 2 on Schedule H.*

iii. *Level 3 resources represent significant and supporting components of the Natural Heritage Resource network. There is opportunity for development if the proposal ensures the protection and buffering of the significant feature and/or retains the supporting function of the feature.*
    - *An EIS will be required to be completed for any development or site alteration in or within 30 metres of an area identified as Level 3 on Schedule H.*

As per Section 3.5.2.4 (d) "Notwithstanding the land use limitations applicable to properties identified as Level 1 in Section 3.5.2.4 (a) i), where an existing designation permits other forms of development, such development may proceed subject to the policies of Level 2 in Section 3.5.2.4 (a) ii) and the appropriate planning application processes."

As per Section 4.7.2.1, "Lands designated as Environmental Protection Areas on Schedule A include, but are not limited to:

(a) Provincially or locally significant features or functions such as those areas containing the following:
    i. aquifer recharges, headwaters;
    ii. wetlands;
    iii. rare species including unique plants;
    iv. important ecological functions;
    v. significant habitat of threatened and endangered species;
    vi. areas of natural and scientific interest life science and earth science;
    vii. significant woodlands;
    viii. significant valleylands;
    ix. significant wildlife habitat;
    x. surface water features, valley and stream corridors; and
    xi. fish habitats."

As per Section 4.7.2.2, where Environmental Protection Areas have been designated:

a) Environmental Protection Areas are intended primarily for preservation and conservation in their natural state. Such uses as passive outdoor recreation, forestry, and wildlife management may be permitted where appropriate.

b) No buildings or structures shall be permitted in Environmental Protection Areas other than those necessary for flood or erosion control or for conservation purposes as approved by the City in consultation with the applicable agencies. Ancillary or accessory uses to permitted uses shall be located on adjacent lands outside of Environmental Protection Areas, unless their location within the Environmental Protection designation is efficient, cost effective and in the public interest, and consistent with protection of the environment; in all cases ancillary and accessory uses shall be developed in accordance with Provincial Policy.

As per Section 4.7.2.3, where Environmental Protection Areas have been designated:

a) Development and site alteration in Provincially Significant Wetlands and the significant habitat of threatened and endangered species is contrary to the Provincial Policy Statement and will not be considered with the exception of public works/utilities subject to Section 5.1.2.1 of this Plan.

b) The redesignation of Environmental Protection Areas to a designation that permits development and site alteration shall be discouraged.

c) Where an application is made to redesignate Environmental Protection lands other than Provincially Significant Wetlands and the habitat of threatened and endangered species, the City shall require the completion of an Environmental Impact Study to the satisfaction of the City in consultation with the Ministry of

Environment, the applicable Conservation Authority and any other relevant agency.

d) *An amendment to the Environmental Protection Area designation shall only be considered where the results of an environmental study clearly demonstrate that there will be no negative impacts on the natural features or ecological functions for which the Environmental Protection Area has been identified with the exception of provincially significant wetlands and habitat of threatened and endangered species.*

e) *Development and site alteration shall not be permitted in fish habitat areas except in accordance with Provincial and Federal requirements.*

Section 4.7.2.4 states that, where Environmental Protection Areas have been designated:

a) *Development and/or site alteration may be permitted on lands adjacent to Environmental Protection Areas if it has been demonstrated through an Environmental Impact Study (EIS) that it will not negatively impact the natural features or ecological functions for which the area is identified. The diversity of natural features in the area and the natural connections between them should be maintained and improved where possible.*

b) *Adjacent lands are defined by the MNR Natural Heritage Reference Manual as being located 120 metres from a provincially significant wetland and endangered and threatened species habitat, 50 metres from significant woodlands, significant valleylands, significant wildlife habitat, and areas of natural and scientific interest and 30 metres from fish habitat.*

c) *Where the Conservation Authorities have undertaken mapping and regulations are in place, approval for any development must be obtained from the relevant Authority.*

d) *The City may consider the reduction or re-allocation of development densities in order to preserve existing woodlots, mature trees and other natural areas and features which are not identified within the Environmental Protection Area designation.*

e) *Where additional buffer areas or connecting links required to maintain ecological function outside of lands designated Environmental Protection are recommended to protect the natural features and functions within lands designated Environmental Protection, these lands shall be designated and zoned Environmental Protection.*

Section 4.7.2.5 states that, where Environmental Protection Areas have been designated:

a) *Development and site alteration shall be restricted in or near sensitive surface water features and their related hydrological functions will be protected, improved, or restored.*

b) *Mitigating measures and/or site alternative development approaches may be required in order to protect, improve, or restore sensitive surface water features, sensitive ground water features, and their hydrologic functions.*
c) *Valley and stream corridors shall be protected from development and integrated as part of the natural heritage system network accommodating wildlife and pedestrian movement and passive areas.*
d) *In reviewing any development proposal adjacent to a valley and stream corridor, the City will require the protection and/or enhancement of the feature and its functions to facilitate a natural, open space corridor. The feasibility of rehabilitating watercourses to a natural state will be considered at the time of such review.*
e) *Development limits shall be established by the limit of the valley or stream corridor which shall include the watercourse, and associated riparian vegetation, floodplain or erosion hazard lands, top of bank and any additional lands, such as buffers deemed necessary to protect ecological functions. All lands associated with the valley and stream corridor shall be zoned Environmental Protection and shall not form part of the development.*
f) *Where a watercourse supports warm or cold water fish habitat, an appropriate riparian vegetation zone shall be required. Land uses within the vegetation zone shall be restricted to those which maintain or enhance the natural features and ecological functions of the area.*
g) *Emphasis shall be placed on the potential development of Lovers, Bear, Hewitt's, Sophia, Kidd's, Bunkers, Dyments, Hotchkiss and Whiskey Creeks, as linear open space corridors. As part of the municipal approvals process, the City shall seek to acquire these areas.*
h) *Development and site alteration shall not be permitted in significant valleylands unless it has been demonstrated by the proponent, to the satisfaction of the City, that there will be no negative impacts on their natural features and ecological functions.*

As per Section 4.7.2.6, where Environmental Protection Areas have been designated:

a) *Development and site alteration shall not be permitted in significant woodlands unless it has been demonstrated that there will be no negative impacts on the natural features and ecological functions.*
b) *Woodlands shall generally be defined as a contiguous wooded area, of no less than 0.2 ha, irrespective of ownership, maturity, composition, and density in accordance with the City's Tree Preservation By-law.*
c) *Where an Environmental Protection Area consists of a woodland, the City will control development adjacent to this area to prevent destruction of trees.*

As per Section 4.7.2.7 (a), "Development and site alteration shall not be permitted in significant wildlife habitat unless it has been demonstrated by the proponent, to the satisfaction of the City, that there will be no negative impacts on their natural features and ecological functions."

Section 5.1.2.1(a) states that "Public Utilities, including sanitary sewage facilities, stormwater management facilities, municipal water, the electrical power utility, the TransCanada Pipeline, telecommunications/communications infrastructure, or any other utilities shall be permitted within any land use designation of this Plan. Wherever possible, public utilities/facilities shall not be located on lands designated Environmental Protection or Open Space. Where the location of public utilities on lands designated Environmental Protection or Open Space is efficient, cost effective and in the public interest, an EIS shall be undertaken in accordance with the policies of Section 6 of this Plan."

Section 5.3.2.2(e) states that "Stormwater management facilities for development proposals shall not be located on lands designated Environmental Protection or Open Space unless in accordance with provincial policy. Existing stormwater management facilities that are located on lands designated Environmental Protection or Open Space may be recognized in the implementing Zoning By-law."

As per Section 5.3.2.2(f), "Where lands are under private ownership, reasonable access shall be provided to watercourses for maintenance purposes. The City shall seek to acquire lands through which a watercourse flows as a condition of development approval."

As per Section 5.3.2.2(h), "The City shall continue to control watercourse areas to allow for maintenance operations and will require the dedication of such areas as a condition of development approval."

2.5 Conservation Authorities

Lands within the study area fall within two conservation authority jurisdictions (Schedule F, Appendix C). Seven subwatershed systems, in addition to the Johnson Drainage Area, are within LSRCA regulated lands and are therefore regulated under Ontario Regulation 179/06 - Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation (Bunkers Creek, Dyments Creek, Hewitt's Creek, Hotchkiss Creek, , Kidd's Creek, Lovers Creek and Whiskey Creek). Three subwatershed systems are located within NVCA regulated lands and are therefore regulated under Ontario Regulation 172/06 - Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation (Bear Creek, Georgian Creek and Little Lake).

Therefore, a work permit will be required from the respective conservation authorities for development at PPAS in the study area.

As per Section 1.0 in the LSRCA's Ecological Offsetting Plan, "Infrastructure proposals, such as new roads, are examples where the loss of features is sometimes unavoidable. Infill development within settlement areas in isolated natural heritage features is another example. In these situations, where compensation is the only option, a 'net gain' in natural heritage features must be pursued. The LSRCA will work with the proponent or developer to ensure that any unavoidable loss of feature is appropriately compensated for."

3.0 STUDY APPROACH

3.1 Study Area

The study area is defined as within the City of Barrie limits and includes 10 subwatersheds (Bear Creek, Bunkers Creek, Dyments Creek, Georgian Creek, Hewitt's Creek, Hotchkiss Creek, Kidd's Creek, Little Lake, Lovers Creek, Whiskey Creek) plus the Johnson Drainage Area (Figure 1b). Seven of the subwatersheds are contained within the larger Barrie Creeks, Lovers Creek, Hewitt's Creek and Innisfil Creek subwatersheds and drain into Lake Simcoe. Bear Creek, Georgian Creek and Little Lake subwatersheds are contained within the larger Middle Nottawasaga River and Willow Creek subwatersheds that occur within the Nottawasaga Valley Watershed and drain towards Georgian Bay. Within the defined study area 185 drainage improvement PPAS have been recommended by CCTA, as listed in Table 1 and shown in Appendix D.

Based on Natural Heritage Information Centre (NHIC) mapping, the study area is within EcoRegion 6E.

3.2 Background Data

Background information review for this *planning level* EIS report included data from:

- Aerial images (Google, VuMap);
- MNRF's NHIC Make-A-Map: Natural Heritage Areas application [website];
- MNRF SAR and Background Information Request;
- MNRF Land Information Ontario (LIO) database;
- Atlas of the Breeding Birds of Ontario (OBBA) [website];
- Cadman M. *et al.* (2007) - Atlas of the Breeding Birds of Ontario;
- MNRF's Species at Risk in Ontario (SARO) list (updated to November 28, 2018);
- Ontario Nature – Ontario Reptile and Amphibian Atlas [website];
- Dobbyn J. (1994) – Atlas of the Mammals of Ontario;
- Allan B. *et al.* (2005) - Midhurst District Deer Yard Survey Huronia Area 2004.

- County of Simcoe Interactive Mapping [website];
- City of Barrie Official Plan (January 2017);
- Barrie Creeks, Lovers Creek, and Hewitt's Creek Subwatershed Plan (LSRCA 2012);
- Innisfil Creeks Subwatershed Plan (LSRCA 2012);
- Middle Nottawasaga River Subwatershed Health Check (NVCA 2013); and
- LSRCA and NVCA Interactive Mapping [websites].

3.3 General Site and Habitat Characterization

3.3.1 Background Information

To complete general habitat characterization and provide a preliminary assessment of constraints, the 185 PPAS were organized by subwatershed, type [*i.e.* deficient culvert (DC), park LID (LID), SWMF, channel improvement (CI) or trunk storm sewer (TSS)], location name and survey date. This reference information was then tabulated using CCTA's Location Identification Numbers (Location ID, Table 1). The IDs were used to identify each PPAS in subsequent data Tables and mapping.

Of the 185 PPAS in Table 1 and mapped in Appendix D, background information and general survey data are presented for 56 of the 185 locations (non-highlighted rows in Table 1). One hundred and twenty-nine of the locations were incorporated into the project after fieldwork was completed (gray highlighted rows in Table 1); for these 129 locations, only natural heritage background information is available. The 185 recommended improvements are situated within municipal road Right of Ways (ROWs), municipal parks, private property or are SWMFs located on municipal property.

Available background information was compiled from the City OP, LSRCA, NVCA and the MNRF's NHIC database to create a general characterization of PPAS based on major relevant descriptive categories (Table 2). Descriptive categories were developed in consultation with the City and CCTA. Background data were used to help identify preliminary constraints and assess potential impacts.

3.3.2 Terrestrial and Aquatic Habitat Surveys

General terrestrial and fisheries habitat surveys were conducted at the DCs on August 16 – 18, 2017. Due to the locations of the LIDs, only terrestrial surveys were deemed appropriate, however, where applicable, notes were recorded in regards to recommended LID proximity to nearby watercourses and/or existing SWMFs that could be impacted by LID construction. Terrestrial LID surveys were conducted on September 6, 2017 and September 8, 2017. Surveys involved systematic roadside attendance at the PPAS by two Azimuth ecologists (Terrestrial - Scott Tarof, Fisheries - Roger Holmes). At each DC,

the survey area footprint was limited to the ROW and extended approximately 5m out from the culvert opening. Park LID surveys were limited to mapped LID footprints provided by CCTA. Aside from the tree inventory (Section 3.3.3), no species-specific plant or fish/wildlife surveys were conducted as part of field investigations. Surveys were conducted under warm, sunny conditions with no/minimal precipitation and survey parameters were developed in consultation with the City, CCTA, LSRCA and NVCA (Appendix E).

Terrestrial surveys involved habitat characterization of the following parameters: nature of the surrounding area (*i.e.* residential, industrial, commercial, agricultural fields); generalized habitat type/ELC vegetation community resemblance descriptors; presence of trees within the proposed work area; and the potential for SAR habitat amphibian breeding habitat and/or woodland area-sensitive breeding bird habitat to occur at each location. While formal ELC surveys (Lee 2009, Lee *et al.* 1998) were not part of the defined scope of work, habitat characterization included general application of ELC community codes to convey overall habitat resemblance (Table 3).

Characterization of aquatic fish habitat involved the following survey parameters: type of fish habitat present; thermal regime; fish species observed/known to be present based on field data and available background information from the MNRF and Conservation Authorities and presence of fish barriers (*i.e.* perched culverts, water control structures, debris, dams). Fish habitat characterization also considered whether or not the watercourse was within CA-regulated lands and whether or not the habitat was online or offline (see Section 4.4 for additional details regarding fish habitat and sensitivity rankings).

In addition to presenting data under the aforementioned terrestrial habitat parameters, information regarding anticipated natural heritage sensitivities has been identified. Ranking of anticipated sensitivities for terrestrial natural heritage features is based on the following risk categories:

- High - presence of a PSW, Level 1 "Critical" Natural Heritage Resource (NHR) (as designated by the City), known Significant Woodland or two or more SAR/SAR habitat potential considerations;
- Medium - presence of non-PSW wetlands, non-Level 1 NHRs (as designated by the City), one SAR/SAR habitat potential consideration, amphibian breeding wetland habitat potential or area-sensitive breeding bird habitat potential; or
- Low - other natural heritage features that remain.

Relevant natural heritage comments were noted (Tables 2 and 3).

3.3.3 Tree Inventory

A tree inventory was completed on August 21, 23 and 24, 2017 at the 56 DCs and LIDs where terrestrial surveys were conducted. The tree inventory involved identifying trees to species, assigning a tree ID to each tree inventoried and measuring diameter at breast height (DBH) of each tree (≥ 10cm DBH). General health condition of each tree was not documented, although dead trees were noted (Tables 5a and b).

3.4 Species at Risk

A SAR Background Information Request was submitted to the MNRF on October 3, 2017; a response was received on December 28, 2018 (Appendix F). Within this request, is a summary list of SAR having potential to occur in the general area has been provided. To further refine this information, Azimuth ecologists conducted a preliminary SAR assessment (Table 6) to evaluate the potential for the locations and/or adjacent lands to function as SAR habitat based on existing documented habitat characteristics. The SAR identified in the MNRF Information Request, plus one additional species (Bank Swallow), were included in Table 6 for a comprehensive assessment. Bank Swallows were encountered during field surveys and we had regard for the possible occurrence of this species (Appendix F).

4.0 EXISTING CONDITIONS

4.1 Land Use

4.1.1 On-site Land Use

The study area is an urban landscape with a mosaic of natural heritage features including wetlands, ponds, deciduous and mixed woodlands, riparian woodlands, meadows, the Kempenfelt Bay region of Lake Simcoe and shorelines. Residential, industrial and commercial land uses, with manicured lawns and hardscape surfaces, dominate developed regions of the study area. The subject parks are located in open areas within primarily residential communities with existing SWMFs or natural heritage features nearby. In DC areas where natural heritage features occur, the features are generally situated adjacent to the ROWs (*i.e.* share common boundaries).

4.1.2 Adjacent Land Use

Aerial imagery shows that lands beyond the defined study area to the north, west and south are largely mosaics of forest and agriculture interspersed by small urban communities. Kempenfelt Bay is the dominant feature east of the study area.

4.2 General Topography

Topography in the study area generally slopes gently toward Lake Simcoe from approximately 290m Above Sea Level (MASL) at Highway 400 and Big Bay Point Road to 220 MASL where Big Bay Point Road intersects the western shore of Lake Simcoe (VuMap).

4.3 Terrestrial Resources

4.3.1 Habitat Surveys

Deficient culvert locations surveyed represent several general habitat types resembling different ELC communities. Table 3 also indicates areas of potential NHFF sensitivities regarding possible SAR habitat at certain PPAS. Park LIDs consisted primarily of manicured grass with potential for adjacent natural heritage habitat sensitivities associated with some of the parks. Deficient culvert or LIDs were often associated with existing SWMFs located adjacent to the deficient culvert or park feature. The SWMFs varied in size and shape, and were generally surrounded by Cultural Meadow (CUM) or Cultural Thicket (CUT) vegetation communities.

Common native herbaceous or woody shrub vascular plant species observed included Canada Goldenrod (*Solidago canadensis*), Common Milkweed (*Asclepias syriaca*), Teasel (*Dipsacus fullonum*) and Red Osier Dogwood (*Cornus stolonifera*). Several non native herbaceous or woody shrub vascular plant species were observed to be associated with the PPAS, including Queen Anne's Lace (*Daucus carota*), Purple Cow Vetch (*Vicia cracca*) and European Buckthorn (*Rhamnus cathartica*).

4.3.2 Tree Inventory

The tree species inventory is presented in Tables 5a and 5b. No Butternut was found at the surveyed locations.

4.3.3 Terrestrial Species at Risk

Since no species-specific surveys were conducted as part of the Study Approach, SAR wildlife (*i.e.* THR or END species) were not identified formally in the field, however, if SAR were observed as part of general surveys they were recorded. While DC #105 in the Lovers Creek subwatershed was observed to potentially provide nesting habitat function for Bank Swallow (*Riparia riparia*) (THR), the species was not observed.

Several locations were noted as having the potential to provide maternity roost function for SAR bats (Table 3). Several species of END bats are known to occur in Southern Ontario (https://www.ontario.ca/page/species-risk-ontario), including Little Brown

Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*) and Tri-colored Bat (*Perimyotis subflavus*).

Occurrences of Blanding's Turtle (*Emydoidea blandingii*) (THR) have been documented within the City of Barrie and may occur within 2km of several of the drainage improvement PPAS. Several PPAS were found to have the potential to provide habitat function for SAR turtles (Table 3).
In addition to general field investigations, SAR and SAR habitat with potential to occur in the proposed improvement areas were screened to provide a preliminary assessment as to whether or not they may occur in the study area for the SAR listed in Table 6. This assessment indicated the following THR or END species have the potential to occur or carry out activities associated with their life history in or adjacent to the study area:

- Bank Swallow (THR) – Potential to occur;
- Barn Swallow (THR) – Potential to occur;
- Butternut (END) – Potential to occur;
- Blanding's Turtle (THR) – Potential to occur; and
- Three species of bats (END) – Potential to occur.

4.4 Fisheries and Aquatic Resources

4.4.1 Habitat Surveys

Table 2 and Table 4 characterize existing conditions regarding fish and fish habitat. There are 10 subwatersheds (Bear Creek, Bunkers Creek, Dyments Creek, Georgian Creek, Hewitt's Creek, Hotchkiss Creek, Kidd's Creek, Little Lake, Lovers Creek, Whiskey Creek), as well as the Johnson Drainage Area, within the study area. Seven of the subwatersheds are contained within the larger Barrie Creeks, Lovers Creek, Hewitt's Creek and Innisfil Creek subwatersheds and drain into Lake Simcoe. Bear Creek, Georgian Creek and Little Lake subwatersheds are contained within the larger Middle Nottawasaga River and Willow Creek subwatersheds that occur within the Nottawasaga Valley Watershed and drain towards Georgian Bay.

Several locations were deemed to host direct fish habitat. All fish habitat recognized within the study area was assigned one of the following designations:

- Permanent direct fish habitat - sites where flowing or standing water are sufficient enough to provide year round habitat for fish;
- Seasonal direct fish habitat: - sites that are inundated in the spring and provide direct habitat for fish under elevated water levels, but not under low water conditions, due to insufficient open water and refuge habitat or anoxic water quality conditions;

- Indirect fish habitat - sited where there is sufficient water to sustain aquatic life (aquatic invertebrates and plants) however, fish cannot directly access the area as a result of a barrier to upstream fish movement (i.e. steep channel grade, low water levels or perched culvert) and/or water at the site is ultimately discharging to an area of direct fish habitat downstream;
- Unknown - presence of fish habitat not clear; and
- None - no fish habitat present (direct or indirect).

Once fish habitat was deemed as Permanent/Seasonal Direct, Indirect, Unknown or None, thermal classification – both water temperature, and fish species found within (*i.e.* Brook Trout and Mottled Sculpin) was evaluated to designate a thermal regime for each location.

The following parameters were utilized to determined thermal regime of the various fish habitat. Thermal preference was assigned as "warm" if the preferred temperature was > 25°C, "cool" if it was 19-25°C, and "cold" if it was less than 19°C. Thermal preference was assigned in accordance with the preferred summer water temperature of a fish species known to be found within the individual watercourses within the study area.

The Sensitivity of Fish and Fish Habitat utilized for the assessment is a method to classify or rate the fish and fish habitat at a specific site. Azimuth utilized DFO's four criteria for assigning a fish and fish habitat sensitivity rating. To more accurately reflect the City of Barrie study area and scope of work that was completed, slight modifications were made to the DFO descriptions of the four criteria.

- Species Sensitivity - Sensitivity of fish species/community to changes in environmental conditions (*i.e.* suspended sediments, water temperature, and oxygen);
- Species Dependence on Habitat - Use of habitat by fish species. Some species may have very specific habitat requirements;
- Rarity - The relative strength of a fish population or prevalence of a specific habitat type; and
- Habitat Resiliency - The ability of an aquatic ecosystem to recover from changes in environmental conditions.

Sensitivity was then assigned as:

- High - Serious Harm likely; broad-scale and/or long term and/or high sensitivity habitat present. (*i.e.* Coldwater, Brook Trout, *etc.*);
- Medium - Serious Harm potential, however small-scale and/or temporary duration; applied mitigation utilized to avoid; or

- Low - Serious Harm unlikely.

Existing conditions and fish habitat sensitivity results are reported in Tables 2 and 4.

4.4.2 Aquatic Species at Risk

Previous fish sampling by others identified the presence of Silver Shiner (*Notropis photogenis*, THR) in Lovers Creek (Table 4). However, it should be noted that the capture of Silver Shiner within Lovers Creek is not recognized by either DFO or MNRF Species at Risk occurrence mapping and species documentation, therefore further evaluation of Silver Shiner as a fish SAR occurring within the study area is not provided throughout.

5.0 NATURAL HERITAGE FEATURES AND FUNCTIONS

The following sections present an examination of our preliminary findings as they relate to potential NHFFs in the study area.

5.1 Wetlands

5.1.1 Provincially Significant Wetlands

Background mapping available through NHIC and VuMap shows 12/185 PPAS (6%) are associated with or adjacent to mapped Provincially Significant Wetlands (PSWs) – Bear Creek DCs #80, 90, 134; Lovers Creek DCs #89-92, 97, 108, 125, 126, 127 (Table 2). The City OP seeks to protect all PSWs.

5.1.2 Other Wetlands

Sixteen PPAS (9%) are mapped as being associated with or adjacent to mapped wetlands designated as either non-PSWs by the MNRF or unevaluated wetlands, as listed in Table 2. The City OP seeks to recognize and protect all wetland features >0.5ha in size.

5.2 Topography

5.2.1 Valleyland

Whiskey Creek DC #63 has a valleyland feature (Table 3).

5.2.2 Steep Slopes

Lovers Creek DC #105 is associated with a steep slope feature (Table 3).

5.3 Woodlands

Based on the relatively large spatial extent of woodlands mapped in the NHIC database and field observations, three locations (Bear Creek DCs #78, 80, 134) may have the potential to be associated with Significant Woodlands (Tables 2 and 3). Other woodland features may be considered Level 2 or Level 3 woodlands as per the City's OP.

5.4 Significant Wildlife Habitat

Azimuth's consideration of potential natural heritage constraints includes a general preliminary assessment of the possible presence of SWH based on criteria outlined in the Ecoregion 6E Significant Wildlife Habitat Criteria Schedule. Significant Wildlife Habitat features and functions may occur in the study area, including:

- Waterfowl Stopover and Staging Areas (Terrestrial);
- Waterfowl Stopover and Staging Areas (Aquatic);
- Bat Maternity Colonies;
- Colonially-Nesting Bird Breeding Habitat (Bank Swallow);
- Waterfowl Nesting Area;
- Turtle Nesting Areas;
- Amphibian Breeding Habitat (Wetlands);
- Woodland Area-Sensitive Bird Breeding Habitat; and
- Special Concern and Rare Wildlife Species;
    - Snapping Turtle (*Chelydra serpentina*, SC); and
    - Monarch Butterfly (*Danaus plexippus*, SC).

5.5 Areas of Natural and Scientific Interest

The Ardagh Bluffs in the western portion of the study area are mapped by the NHIC as a Provincially Significant Life Science ANSI. No Provincially Significant Earth Science ANSI are mapped within the study area, based on the NHIC database.

5.6 Fish Habitat

The study area includes Sophia Creek and Kidds Creek in the northern portion of the study area, as well as Bunker's Creek, Hotchkiss Creek, Dyments Creek, Bear Creek, Whiskey Creek and Lovers Creek in the central portion of the study area (Appendix B). There are also several unnamed watercourse features, particularly in the northern and southern regions of the study area (Appendix B). These waterbodies function to provide diversified habitat for a variety of fish species. Table 2 and 4 describes the general characteristics of fish and fish habitat considerations. Project planning should consider fisheries and mitigation measures during Detailed Design for avoiding direct or indirect impacts to fish and fish habitat during implementation of drainage improvements.

5.7 Habitat of Threatened and Endangered Species

In MNRF's reply to Azimuth's SAR Background Information Request, the MNRF noted the presence of a restricted plant species, however, given the level of urbanization in the PPAS areas where historic occurrences of the restricted plant species exist, the MNRF concluded that "it is highly unlikely the species will be of concern" (Appendix F).

Based on results of our preliminary assessment of potential habitat for THR and END species (Table 6), habitat for the following SAR was identified as having the potential to be associated with one or more PPAS based on criteria outlined in Table 6:

- Bank Swallow (THR) – DC #105;
- Barn Swallow (THR);
- Blanding's Turtle (THR) – DCs #24, 35, 36, 62, 80, 88, 90, 91 and 92; park LIDs #25, 26 and 31;
- Butternut (END);
- Little Brown Myotis (END) – DCs #18, 20, 22-24, 28, 35, 37, 38, 39, 44, 47, 48, 50, 53, 62, 66, 91 and 92; park LIDs #2, 7 and 13;
- Northern Myotis (END) – DCs #18, 20, 22-24, 28, 35, 37, 38, 39, 44, 47, 48, 50, 53, 62, 66, 91 and 92; park LIDs #2, 7 and 13; and
- Tri-colored Bat (END) – DCs #18, 20, 22-24, 28, 35, 37, 38, 39, 44, 47, 48, 50, 53, 62, 66, 91 and 92; park LIDs #2, 7 and 13.

5.8 Significant Natural Heritage Features/Functions Summary

To summarize, results of our field surveys, review of background information and analysis indicate the potential for the following NHFFs as possible constraints:

- Wetlands;
- Topography;
    - Valleyland Feature;
    - Steep Slope Feature;
- Woodlands;
- Significant Wildlife Habitat; and
- Potential Habitat of Threatened and Endangered Species;
    - Bank Swallow (THR);
    - Barn Swallow (THR);
    - Blanding's Turtle (THR);
    - Butternut (END);
    - Little Brown Myotis (END);
    - Northern Myotis (END); and
    - Tri-colored Bat (END).

The possible NHFF constraints summarized here are discussed in Section 7.0. The impact assessment provided in Section 7.0 is in the context of potential constraints and impact considerations related to the alternative solutions.

6.0 PRELIMINARY PROPOSED ALTERNATIVE SOLUTIONS

An updated list of PPAS was provided by CCTA on September 27, 2018 for Azimuth to provide a preliminary assessment of potential natural heritage impacts. Below we summarize the PPAS by type (see Appendix D).

6.1 Deficient Culverts

The DC improvements are recommended at locations where improvements to water quantity flow during storm events could be achieved by upgrading existing culvert infrastructure (*i.e.* increasing culvert size, correcting perched culverts).

6.2 Low Impact Development Measures

The purpose of the LIDs would primarily be to emulate natural physical and hydrological processes to better manage stormwater runoff, thereby improving and protecting water quality and habitat.

6.3 Storm Water Management Facilities

The recommended upgrades to existing SWMFs and construction of new SWMFs would serve to better mitigate peak storm flows for the City.

6.4 Channel Improvements

Improvements to existing watercourse channels would involve construction activities geared toward increasing channel size, resolving issues pertaining to erosion and removing debris in the watercourses. The CIs would improve water quality and quantity, thereby protecting fish and wildlife habitat.

6.5 Trunk Storm Sewers

The purpose of the TSSs would be to better mitigate peak storm flows using underground infrastructure improvements, thus reducing problems associated with sediment erosion and habitat degradation.

7.0 PRELIMINARY IMPACT ASSESSMENT AND ADDITIONAL SURVEYS

Background information and field survey results were used to evaluate possible preliminary impacts pertaining to the proposed five types of design alternatives. Tables 2 through Table 4 summarize potential constraints that could be associated with the proposed drainage improvements, depending on work footprints determined during Detailed Design. The Tables also rank the anticipated natural heritage sensitivity related to each potential constraint identified. The main intent of these tables is to note possible sensitivities for the proponent's knowledge as the project progresses to Detailed Design. A more detailed impact assessment may be needed during Detailed Design once more information is available. Constraints deemed worthy of further consideration are discussed below.

7.1 Deficient Culverts

Deficient culvert improvements in the study area have been proposed (Appendix D). The DC improvements would generally occur within ROWs in areas of watercourses/drainage features with existing culvert crossings, wetland habitat and/or treed habitat. Work proposed at DC #80 in the Bear Creek subwatershed may be associated with impacts to a PSW that is adjacent to the anticipated work footprint.

Table 3 lists additional proposed DC improvements with potential for impacts to possible SAR bat maternity roosting habitat, SAR turtle habitat (*i.e.* feeding, basking, nesting), and/or potential for impact to possible Bank Swallow nesting habitat (DC #105 with a steep valley/embankment in Lovers Creek subwatershed). More detailed surveys have been recommended to further evaluate potential SAR bird habitat at DC #96 and DC #105. Should additional field data confirm the presence of SAR bird habitat, the potential for impacts to the NHFFs at these locations should be further evaluated to ensure compliance with Ontario's ESA. Potential impacts related to other potential SAR habitat (*i.e.* bats and turtles) can likely be avoidable/mitigable/minimal providing the recommended avoidance/mitigation measures in Section 8.0 below are followed. In the Whiskey Creek subwatershed, the presence of a valleyland feature at DC #63 may warrant consideration as a Hazard feature which may require geotechnical consideration. This is beyond the scope of an EIS (Table 3).

Culvert designs at locations where fisheries considerations have been identified (Tables 2 and 4) should be evaluated by a qualified fisheries ecologist in Detailed Design to provide confirmation of the extent of impacts to fish habitat (including fish passage requirements) and confirm permitting requirements. If review of the work plan can conclude that the project will not result in 'serious harm to fish' under the *Fisheries Act*,

then there is potential that improvement works can be Self-Assessed in accordance with DFO's project screening process. Alternatively, if the project includes works that have the potential to cause serious harm (*i.e.* any channel realignment or habitat loss), then submission to DFO may be required.

7.2 Low Impact Development Measures

Low Impact Developments in municipal parks have been proposed for construction in the study area (Appendix D). Some of the LID locations, such as LID #31 in the Georgian Creek subwatershed, LID #25 in the Hewitt's Creek subwatershed and LID #7 in the Lovers Creek subwatershed, have the potential to provide habitat function for SAR turtles and bats (Table 3). Potential impacts related to potential SAR bat and turtle habitat can likely be avoidable/mitigable/minimal providing the recommended avoidance/mitigation measures in Section 8.0 below are followed. Park LID #20 (Lovers Creek) may also be associated with possible impacts to the nearby PSW and should be evaluated once the full extent of the proposed works is known (Table 3).

7.3 Storm Water Management Facilities

Storm Water Management Facilities have been proposed for upgrading/construction in the study area as part of the PPAS (Appendix D). Our preliminary constraints assessment identified the presence of a mapped PSW adjacent to SWMF #90 in the Bear Creek subwatershed (Table 2). Further investigation may be warranted in regards to this feature to minimize possible impacts. We also note the presence of mapped Natural Heritage Resource (NHR) and/or non-PSW wetland features in relation to many SWMF locations (Table 2).

7.4 Channel Improvements

Channel improvements have been proposed (Appendix D). Consideration should be given to erosion and sedimentation concerns related to proposed CI work in terms of control measures. Any works occurring within the floodplain of a waterbody should be screened for fish and fish habitat to identify possible impacts, mitigation requirements, and permitting accordingly. The sites identified in Table 2 and 4 that exhibited characteristics that deemed them fish habitat at the time study should be reaffirmed prior to construction. Natural channel design and potential fluvial geomorphology may be required for channel improvements that host or have the potential to impact downstream fish habitat.

7.5 Trunk Storm Sewers

The proposed PPAS include locations for construction of TSSs (Appendix D). We anticipate that installations would be underground and would connect to existing storm

sewer infrastructure within ROWs. As a result, these proposed drainage improvements may pose temporary negative environmental impacts associated with the installation of the TSS where NHR exist in proximity to the proposed works (Table 2). Depending on the resulting footprint of the proposed works, mitigation measures may be required to limit the potential impacts to the identified natural heritage features. This can be further assessed at Detail Design stage.

7.6 General Impact Considerations

Regarding the potential for the presence of SWH function, formal ELC evaluations would be required to confirm whether or not the ELC communities are actually present in the study area and that the associated specific habitat requirements are met. A number of PPAS are in areas adjacent to potential amphibian breeding (wetland) habitat, potential woodland area-sensitive breeding bird habitat, and/or may pose risks related to erosion into hydrologic features (Table 2). Consequently, additional surveys may be warranted, and if so, these surveys could be conducted as part of Detailed Design. Consideration of the need for permits from the LSRCA or NVCA is required (Table 2), as are concerns regarding the potential for erosion into hydrologic features (Table 3). Review of the work plan at the Detail Design stage to conform to the *Fisheries* Act. There is potential that improvement works proposed can be Self-Assessed in accordance with DFO's project screening process. Alternatively, if the project includes works that have the potential to cause serious harm (*i.e.* any channel realignment or habitat loss), then submission to DFO may be required.

8.0 RECOMMENDATIONS

This section provides general mitigation recommendations related to the proposed improvements, and may need modification once additional information is available.

8.1 General Mitigation

8.1.1 Timing Restrictions and General Considerations

Terrestrial

If construction activities related to proposed improvements involve removal/limbing of trees, such activities should be restricted from occurring during the bird breeding season. Migratory birds, nests, and eggs are protected by the *Migratory Birds Convention Act*, 1994 and the *Fish and Wildlife Conservation Act,* 1997. Environment Canada outlines dates when activities in any region have potential to impact nests at the Environment Canada Website (http://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=4F39A78F-1#_03).

In nesting zone C2, tree clearing/limbing should be avoided between April 5 and August 25 of a given year. This timing restriction will mitigate the risk of possible impacts to the habitat of nesting migratory birds that may be nesting in the study area during proposed works. If work requires such activities be completed during the active breeding season for birds, screening by a professional ecologist with knowledge of bird species present in the area should be undertaken to ensure that the risk to impacting nesting birds has been evaluated and assumed to be low to non-existent.

To mitigate the potential for impact to SAR bats and their habitat, tree clearing/limbing should be avoided between April 1 and October 31 of a given year. This timing restriction will minimize possible impacts to maternity roosting habitat that may be present, and/or to habitat that may be in use by male bats passing through the study area.

In summary, the recommended 'no vegetation removal' window is April 1 to October 31 to protect migratory breeding birds and SAR bats collectively. These recommended timing restrictions pertaining to birds and bats may require that the proponent clear/limb trees during the preceding winter season to avoid contravention of Sections 9 and 10 of the ESA.

Attention to OP policies pertaining to valleylands and steep slopes is warranted.

Fisheries

Any work proposed in proximity to watercourses with fish sensitivities must adhere to coldwater and warmwater fisheries timing restrictions as mandated by the MNRF and DFO. For coldwater systems, no in-water work is permitted between September 30 and July 15 of the following year. For warmwater systems, timing restrictions depend on the watercourse, region and fish species. Timing restrictions should be followed as a general rule, but a site-by-site evaluation based on the detailed work plan and PPAS in Detailed Design is recommended to confirm timing restrictions regarding fish and fish habitat (see also MNRF reply in Appendix F).

Ultimately, any drainage improvements that have the potential to discharge stormwater to a waterbody will require re-evaluation in future design stages to confirm permitting requirements from GSCA, MNRF, and if a fisheries assessment is required under the *Fisheries Act.*

8.1.2 Erosion and Sediment Controls

Prior to any mobilization/land clearing/earth works for the proposed improvements, the proponent should develop and implement an ESC Plan for the study area to avoid/minimize risk of sedimentation into any waterbody during all phases of

construction, including in the areas discussed above and other areas where contractors deem that erosion may be a concern. Erosion controls to prevent sediment deposition into aquatic areas would mitigate general impacts to potential SAR turtle habitat and wetlands, and help prevent SAR turtles from entering the work area accidentally. Erosion and sediment controls would also be warranted to protect possible amphibian breeding habitat identified. Install ESCs based on BMPs in place at the time. Monitor and maintain the ESC fencing throughout construction activities to ensure a protective barrier against sedimentation/erosion between any exposed excavation and adjacent lands/water/sensitivities. The ESC measures should be monitored and maintained until all disturbed ground has been stabilized permanently.

8.1.3 Habitat Restoration

Limit tree/vegetation clearing to that required for construction and to the recommended timing windows. Protection of any trees to be retained near work areas should be conducted in accordance with the appropriate policies. Areas disturbed during construction should be restored immediately following completion of improvements. Habitat restoration should include re-vegetation efforts of all excavated and erodible soils. Removal of invasive plant species, wherever possible, would provide habitat enhancement. All disturbed areas should be re-vegetated with native trees/plants, combined with a native or naturalized/non-exotic grass mix suitable for urban applications. Native forbs should be incorporated into the landscaping design as a habitat enhancement for pollinator species.

8.2 Species at Risk and Additional Surveys

8.2.1 Barn Swallow

Species-specific surveys related to Barn Swallow nesting in box culverts are recommended to avoid possible contravention of the ESA in regards to this species. Under the ESA, these structures would be considered habitat in situations of active nesting and would, thus, be protected. Appropriate nesting surveys are therefore warranted. Alternatively, suitable netting could be placed at the ends of box culverts in early spring to prevent potential nesting. A nesting survey would be recommended prior to installation of any preventative netting to ensure no nesting activity is associated with the structures at the time of installation.

8.2.2 Bank Swallow

Depending on the footprint of the drainage improvements at DC #105, additional survey (s) may be required to confirm the presence/absence of Bank Swallow. Review of the proposed works will be required to ascertain subsequent steps related to potential Bank Swallow habitat and any ESA requirements. Opportunity may exist to employ mitigation

strategies which may include the restriction of works during the period where Bank Swallows may be present within the general area.

8.2.3 Butternut

Prior to any tree clearing/limbing, a survey for the presence of Butternut trees is recommended within areas of PPAS that were not previously surveyed by Azimuth to avoid the possibility of impacting this SAR. Should Butternut trees be identified during this survey, a Butternut Health Assessment of identified individual trees may be required if impacts are anticipated.

8.2.4 SAR Bats

As highlighted above, to mitigate the potential for impact to SAR bats and their habitat, tree clearing/limbing should be avoided between April 1 and October 31 of a given year. This timing restriction will minimize possible impacts to maternity roosting habitat that may be present, and/or to habitat that may be in use by male bats passing through the study area. Following recommended mitigation measures is anticipated to minimize potential for impact regarding SAR bats; as such, additional SAR bat surveys would not be anticipated at this time unless otherwise indicated by agencies.

8.2.5 SAR Turtles

Areas associated with high potential for turtle use may be required to have exclusion fencing installed. The requirement for such fencing will depend on the overall footprint of the proposed drainage improvements at locations identified as having potential SAR turtle habitat. Details related to the specifications related to the fence can be provided prior to works but should adhere to MNRF's Reptile and Amphibian Exclusion Fencing: Best Practices (2013). Where turtle exclusion fencing is appropriate, the fencing should be installed during the active turtle season when turtles are no longer hibernating, and monitored regularly during construction to maintain proper function. If a SAR turtle is encountered, appropriate measures should be taken to protect the species. Following recommended mitigation measures is anticipated to minimize the potential for impact regarding SAR turtles. Consequently, additional SAR turtle surveys would not be anticipated at this time unless otherwise indicated by agencies.

8.2.6 General SAR Habitat Assessments

General SAR habitat surveys are recommended at locations not surveyed as part of the 2017 preliminary survey effort (*i.e.* grey shaded PPAS listed in Table 2).

In summary, additional SAR surveys are recommended for:

- Box culverts with potential for Barn Swallow nesting;

- Bank Swallow potential at Lovers Creek DC #105;
- Butternut (tree inventory) at PPAS not surveyed; and
- General SAR habitat surveys at PPAS not surveyed in 2017.

As noted in Appendix G, the MNRF may require additional detailed surveys pertinent to evaluating potential impacts to SAR, as well as to watercourses and wetlands, once additional information is available during Detailed Design.

8.2.7 SAR Training

General SAR training for workers is recommended, including the SAR identified above. The potential risks pertaining to the presence of SAR could vary with timing of project implementation and construction activities.

In the event that a SAR is found during construction, consideration should be given to possible applicable ESA registration or permitting requirements (*e.g.* Butternut Registry, permits for removal of Butternut).

8.2.8 Fisheries Surveys

For locations where direct, indirect or unknown fish habitat has been identified, the locations will require additional field surveys by a fisheries ecologist as part of Detailed Design to better evaluate existing conditions, possible timing restrictions and agency requirements in regards to fish and fish habitat. Evaluating locations with direct, indirect or unknown fish habitat by a fisheries ecologist is also recommended to determine possible DFO requirements (*e.g.* Self-Assessment, DFO Request for Review or Request for Authorization). Locations indicated in Table 4 as having no fish habitat are not considered to have fish habitat present under the *Fisheries Act*, and thus, additional fisheries surveys would not be required at those particular locations.

8.2.9 General

It should be noted that the absence of a protected species within the study area does not indicate that they will never occur within the area. Given the dynamic character of the natural environment, there is constant variation in habitat use. Care should be taken in the interpretation of presence of species of concern. Changes to policy, or the natural environment, could result in shifts, removal, or addition of new areas to the list of areas currently considered potential habitat. This report provides a preliminary SAR assessment of the study area as it relates to current conditions and the level of field surveys; it is not intended to provide long term 'clearance' for SAR. While there is no expectation that the assessment should change significantly, it is the responsibility of the proponent to ensure that they are not in contravention of the ESA at the time that site works are undertaken. A review of the assessment provided in this report by a qualified

person should be sufficient to provide appropriate advice at the time of the onset of future site works.

Appropriate caution should be exercised by workers at all times in terms of the potential for SAR to be encountered proximal to roadside construction activities (*i.e.* Butternut, Barn Swallows, Bank Swallows, turtles, bats), including, for example, tree removal/limbing prior to excavation. We note that SAR receive general or regulated habitat and species protection under the ESA.

9.0 CONCLUSIONS

The proponent plans to implement proposed municipal drainage system improvements to address water quality and quantity issues in Barrie, Ontario. The identified potential NHFFs evaluated in our preliminary assessment included identification of wetlands, woodlands, valleylands and steep slopes, possible SWH, potential for fish habitat, and potential for SAR and SAR habitat. Results of this *planning level* EIS are preliminary and subject to change based on additional information gathered during Detailed Design, including consideration of additional surveys recommended.

Ultimately, considering the conditions of the locations surveyed and our understanding of the proposed drainage improvements, potential impacts to NHFFs associated with this project may be considered minimal and mitigable, providing the recommendations are followed and pending outcomes of the Detailed Design stage.

Consideration for potential SAR and SAR habitat will be required for the proposed drainage improvements which would include implementation of the recommended mitigation measures and potential additional survey work for SAR as discussed within this preliminary report. Ultimately, the footprint of the proposed works in relation to the potential SAR habitat features will dictate the degree of effort required. Therefore, it is recommended that the SAR review continues through to the Detailed Design stage so that the appropriate steps are taken in order to remain in compliance with Ontario's ESA.

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Figure 1a City of Barrie Drainage Master Plan Regional Study Location

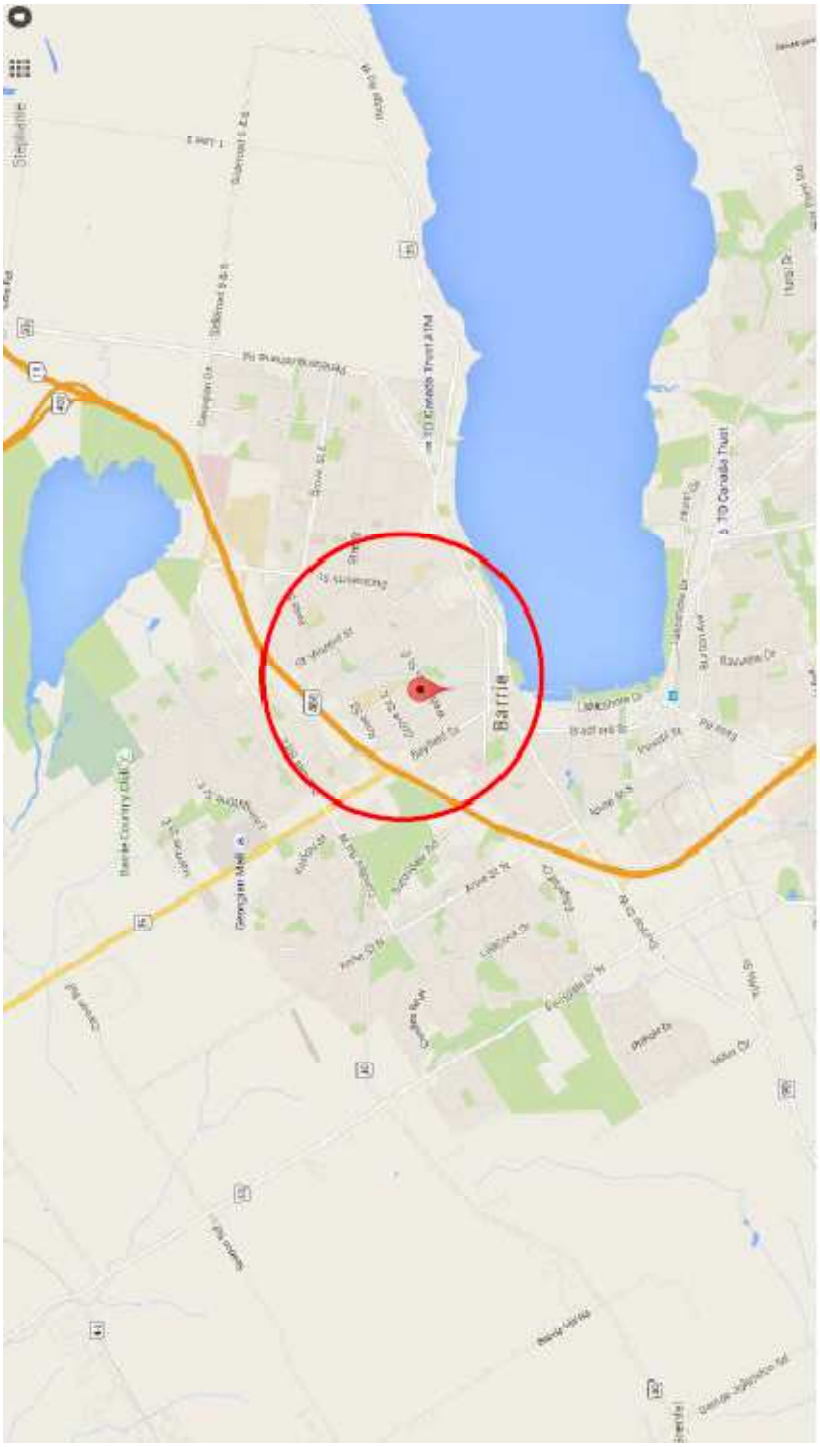

Figure 1b City of Barrie Drainage Master Plan Study Area Limits (Red Polygon)

Source: Google Earth

Table 1. Reference Table for Locations of Preliminary Preferred Alternative Solutions, City of Barrie Drainage Master Plan, 2017

Subwatershed[1]	PPAS Type[2]	Location Name	Date of 2017 General Survey	Azimuth Location ID	CC Tatham Location ID[3]
Bear Creek	DC	County Road 27	August 18	80	80
Bear Creek	DC	Ardagh Road	N/A		78
Bear Creek	DC	Salem Road	N/A		114
Bear Creek	DC	BCRY Railway Crossing	N/A		134
Bear Creek	CI	Downstream of Ardagh Rd. (Reach Be-14)	N/A		33
Bear Creek	SWMF	Between Red Oak Dr. and County Rd. 27 (BR08B)	N/A		61
Bear Creek	SWMF	Between Red Oak Dr. and County Rd. 28 (BR05)	N/A		62
Bear Creek	SWMF	Snowshoe Park (BR13)	N/A		69
Bear Creek	SWMF	North of Bishop Dr. (BR14)	N/A		90
Bear Creek	LID	Harvie Park	N/A		N/A
Bear Creek	LID	Bear Creek Park	September 6	22	28
Bear Creek	LID	Lougheed Park	September 6	27	35
Bear Creek	LID	Wessenger Park	September 6	29	38
Bunkers Creek	DC	Innisfil Street	August 16	22	22
Bunkers Creek	DC	Sandford Street	August 16	23	23
Bunkers Creek	DC	Bradford Street	August 16	24	24
Bunkers Creek	DC	Highway 400 - Bunkers Creek (South Branch)	N/A		141
Bunkers Creek	DC	Highway 400 - Bunkers Creek (Central Branch)	N/A		142
Bunkers Creek	DC	Highway 400 - Bunkers Creek (North Branch)	N/A		143
Bunkers Creek	CI	Bunkers Creek downstream of Shirley Ave. (Reach Bu-03)	N/A		4
Bunkers Creek	CI	Bunkers Creek downstream of Edgehill Rd. (Reach Bu-07)	N/A		5
Bunkers Creek	CI	Dunlop St. W. and Anne St. S. (new channel)	N/A		7
Bunkers Creek	CI	Bunkers Creek between Anne St. S. and Innisfil St. (Reaches Bu-11 and Bu-15)	N/A		8
Bunkers Creek	CI	Bunkers Creek downstream of Commercial Plaza Entrance Rd. to Lakeshore Dr. (Reach Bu-16)	N/A		27
Bunkers Creek	SWMF	Shelley Ln. and Anne St. N. (BK03)	N/A		10
Bunkers Creek	SWMF	Between Highway 400 and Dunlop St. W. (new SWMF)	N/A		94
Bunkers Creek	SWMF	Between Boyz St. and Innisfil St. Milligan's Pond	N/A		95
Bunkers Creek	TSS	Anne St. N. from BK03 to Edgehill Dr.	N/A		1
Bunkers Creek	LID	Gibbon Park	September 8	6	6
Dyments Creek	DC	Dunlop Street West	August 16	28	28
Dyments Creek	DC	Ferndale Drive North	August 16	29	29
Dyments Creek	DC	Sarjeant Drive	August 16	30	30
Dyments Creek	DC	Hart Drive	August 16	33	33
Dyments Creek	DC	George Street	August 16	34	34
Dyments Creek	DC	Victoria Street	August 16	35	35
Dyments Creek	DC	John Street	August 16	36	36
Dyments Creek	DC	Innisfil Street	August 16	37	37
Dyments Creek	DC	Sandford Street	August 16	38	38
Dyments Creek	DC	Bradford Street	August 16	39	39
Dyments Creek	DC	Highway 400 E/W-S and N-E/W Ramps	N/A		31
Dyments Creek	DC	Hart Dr.	N/A		32
Dyments Creek	CI	Dunlop St. W. to Ferndale Dr. N. (Reach Dy-2a)	N/A		9
Dyments Creek	CI	Ferndale Dr. N. to Sarjeant Dr. (Reach Dy-2b)	N/A		10
Dyments Creek	CI	Downstream of Hart Dr. (Reach Dy-3)	N/A		11
Dyments Creek	CI	Dyments Creek between Anne St. S. and Innisfil St. (Reach Dy-5)	N/A		12
Dyments Creek	CI	Dyments Creek downstream of Bradford St. to Lakeshore Dr. (Reach Dy-06)	N/A		28
Dyments Creek	CI	Downstream of Sproule Dr. to SWMF Retrofit No. 78	N/A		29
Dyments Creek	SWMF	McVeigh Dr. and Cundles Rd. W. (Dy02)	N/A		15
Dyments Creek	SWMF	Between Sproule Dr. and Dunlop St. W. (new SWMF)	N/A		78
Dyments Creek	SWMF	Between George St. and Anne St. S. (Dy01)	N/A		79
Dyments Creek	LID	Cloughley Park	September 8	4	4
Georgian Creek	DC	Penetanguishene Road	August 16	82	82
Georgian Creek	SWMF	Between Hickling Tr. And Penetanguishene Rd. (GR01)	N/A		75
Georgian Creek	SWMF	Douglas Dr. and Johnson St. (GR04)	N/A		76
Georgian Creek	TSS	SWMF GR04 to SWMF GR01	N/A		3
Georgian Creek	TSS	Dunsmore Park to Penetanguishene Rd.	N/A		4
Georgian Creek	LID	Dunsmore Park	September 8	24	31
Georgian Creek	LID	Strabane Park	September 8	28	37
Hewitt's Creek	DC	Mapleview Drive East	N/A		83
Hewitt's Creek	DC	Lockhart Road	N/A		130
Hewitt's Creek	DC	Lockhart Road	N/A		131
Hewitt's Creek	SWMF	Walnut Crescent (new SWMF)	N/A		27

Subwatershed[1]	PPAS Type[2]	Location Name	Date of 2017 General Survey	Azimuth Location ID	CC Tatham Location ID[3]
Hewitt's Creek	TSS	Princess Margaret Gate and Camelot Sq. from Loyalist Crt. To SWMF HW06	N/A		6
Hewitt's Creek	LID	Kuzmich Park	N/A		N/A
Hewitt's Creek	LID	Queensway / Hyde Park	September 6	18	24
Hewitt's Creek	LID	Sandringham Park	September 6	19	25
Hotchkiss Creek	DC	Mayfair Drive	August 18	41	41
Hotchkiss Creek	DC	Ardagh Road	August 18	42	42
Hotchkiss Creek	DC	Morrow Road	August 18	43	43
Hotchkiss Creek	DC	Essa Road	August 18	44	44
Hotchkiss Creek	DC	Tiffin Street	August 18	48	48
Hotchkiss Creek	DC	Anne Street South	August 18	49	49
Hotchkiss Creek	DC	Innisfil Street	August 18	50	50
Hotchkiss Creek	DC	Highway 400	N/A		46
Hotchkiss Creek	DC	BCRY Railway Crossing (between Wood St. and Tiffin St.)	N/A		135
Hotchkiss Creek	CI	Hotchkiss Creek between Tiffin St. and Anne. St. S. (Reach Ho-8)	N/A		6
Hotchkiss Creek	CI	Hotchkiss Creek between Anne. St. S. and Innisfil St. (Reach Ho-9)	N/A		13
Hotchkiss Creek	CI	Hotchkiss Creek between Innisfil St. and Bradford St. (Reach Ho-9)	N/A		14
Hotchkiss Creek	SWMF	Bryne Dr. (HT06)	N/A		3
Hotchkiss Creek	SWMF	85 Morrow Rd. (new SWMF)	N/A		44
Hotchkiss Creek	SWMF	50 Wood St. (new SWMF)	N/A		81
Hotchkiss Creek	SWMF	50 Wood St. (new SWMF)	N/A		96
Hotchkiss Creek	SWMF	Between Anne St. S. and Innisfil St. (new SWMF)	N/A		48
Hotchkiss Creek	TSS	Essa Rd. (Fairview Rd. to Gowan St.)	N/A		10
Hotchkiss Creek	LID	Allandale Heights Park	September 8	1	1
Huronia Creek Drainage Area	SWMF	265 Burton Ave. (HR03)	N/A		85
Huronia Creek Drainage Area	SWMF	279 Yonge St. (HR01)	N/A		28
Huronia Creek Drainage Area	LID	Greenfield Park	N/A		N/A
Johnson Drainage Area	TSS	Johnson St. from Steel St. to Kempenfelt Bay	N/A		8
Johnson Drainage Area	LID	Shoreview Park	September 8	12	14
Kidd's Creek	DC	Wellington Street	August 16	18	18
Kidd's Creek	DC	Cundles Road West	N/A		13
Kidd's Creek	DC	Thomson Street	N/A		16
Kidd's Creek	DC	Dunlop Street West	N/A		145
Kidd's Creek	DC	Bradford Street	N/A		146
Kidd's Creek	CI	Kidd's Creek between Lillian Cres. and Cundles Rd. W. (Reach Ki-01 through Ki-2)	N/A		1
Kidd's Creek	CI	Kidd's Creek between Thomson St. and Eccles St. (Reach Ki-08A)	N/A		2
Kidd's Creek	CI	Kidd's Creek between Eccles St. and Henry St. (Reach Ki-10B through Ki-10C)	N/A		3
Kidd's Creek	CI	Kidd's Creek between Eccles St. and Dunlop St. W. (Reach Ki-11)	N/A		25
Kidd's Creek	CI	Kidd's Creek between Dunlop St. W. and Bradford St. (Reach Ki-11)	N/A		26
Kidd's Creek	SWMF	Livingstone St. W. and Ford St. (KD06)	N/A		11
Kidd's Creek	SWMF	Between Irwin Dr. and Sunnidale Rd. (KD03)	N/A		13
Kidd's Creek	SWMF	Livingstone St. W. and Neelands St. (KD05)	N/A		18
Kidd's Creek	SWMF	Between Coulter St. and Highway 400 (New SWMF)	N/A		17
Kidd's Creek	TSS	Thomson St., Sophie St. W. and Florence St.	N/A		9
Kidd's Creek	LID	Sunnidale Park	September 8	13	15
Little Lake	CI	Downstream of Livingstone St. E. (Reach Li-1)	N/A		24
Little Lake	SWMF	Between Cardinal St. and St. Vincent St. (LT01)	N/A		77
Little Lake	SWMF	509 Bayfield St. (LTGM)	N/A		84
Little Lake	SWMF	Osprey Ridge Rd. (LT05)	N/A		89
Little Lake	SWMF	Hanmer St. E. (LT04)	N/A		91
Little Lake	TSS	SWMF LT02 to SWMF LT01	N/A		5
Little Lake	LID	Cartwright Park	September 8	23	29
Lovers Creek	DC	Lockhart Road	August 16	89	89
Lovers Creek	DC	Huronia Road	August 16	90	90
Lovers Creek	DC	Lockhart Road	August 16	91	91
Lovers Creek	DC	Huronia Road	August 16	92	92
Lovers Creek	DC	Welham Road	August 16	94	94
Lovers Creek	DC	Mapleview Drive	August 16	95	95
Lovers Creek	DC	Huronia Road	August 17	97	97
Lovers Creek	DC	Tollendal Mill Road	August 17	105	105
Lovers Creek	DC	Ellis Drive	N/A		99
Lovers Creek	DC	Welham Road	N/A		98

Subwatershed[1]	PPAS Type[2]	Location Name	Date of 2017 General Survey	Azimuth Location ID	CC Tatham Location ID[3]
Lovers Creek	DC	Huronia Road	N/A		108
Lovers Creek	DC	Huronia Road	N/A		110
Lovers Creek	DC	BCRY Railway Crossing (south of Mapleview Dr. E.)	N/A		123
Lovers Creek	DC	Lockhart Road	N/A		125
Lovers Creek	DC	BCRY Railway Crossing (north of Lockhart Rd.)	N/A		126
Lovers Creek	DC	BCRY Railway Crossing (south of Lockhart Rd.)	N/A		127
Lovers Creek	DC	BCRY Railway Crossing (north of McKay Rd. E.)	N/A		128
Lovers Creek	CI	Between Yonge St. and Hurst Dr. (Reach Lo-19)	N/A		22
Lovers Creek	CI	Upstream of Tollendal Mill Rd. (Reach Lo-20)	N/A		23
Lovers Creek	SWMF	East of Welham Rd. (LV02)	N/A		30
Lovers Creek	SWMF	East of Welham Rd. (LV03)	N/A		31
Lovers Creek	SWMF	East of Welham Rd. (LV12)	N/A		32
Lovers Creek	SWMF	North of Mary Anne Dr. (LV10)	N/A		37
Lovers Creek	SWMF	Between Highway 400 and Bayview Dr. (LV05)	N/A		45
Lovers Creek	SWMF	Between Bayview Dr. and Saunders Rd. (LV07)	N/A		65
Lovers Creek	SWMF	East of Welham Rd. (LV01)	N/A		68
Lovers Creek	SWMF	East of Bryne Dr. (LV16)	N/A		86
Lovers Creek	SWMF	East of Bryne Dr. (LV17)	N/A		87
Lovers Creek	TSS	Esther Dr. from Dean Ave. to SWMF LV19	N/A		7
Lovers Creek	LID	Golden Meadow Park	N/A		N/A
Lovers Creek	LID	Carter Park	N/A		N/A
Lovers Creek	LID	Madelaine Park	September 6	17	23
Sandy Cove	DC	20 Sideroad			119
Sandy Cove	DC	20 Sideroad			120
Thornton Creek	DC	McKay Rd.			118
Whiskey Creek	DC	Harvie Road	August 17	53	53
Whiskey Creek	DC	Bayview Drive	August 17	57	57
Whiskey Creek	DC	Huronia Road	August 17	60	60
Whiskey Creek	DC	Little Avenue	August 17	62	62
Whiskey Creek	DC	Yonge Street	August 17	63	63
Whiskey Creek	DC	Hurst Drive	August 17	64	64
Whiskey Creek	DC	The Boulevard	August 17	65	65
Whiskey Creek	DC	Brennan Avenue	August 17	66	66
Whiskey Creek	DC	Highway 400	N/A		55
Whiskey Creek	DC	Fairview Rd.	N/A		56
Whiskey Creek	DC	Metrolink Railway Crossing (between Yonge St. and Tollendal Mill Rd	N/A		138
Whiskey Creek	DC	BCRY Railway Crossing	N/A		147
Whiskey Creek	CI	From Harvie Rd. to Highway 400 (Reach Wh-3)	N/A		15
Whiskey Creek	CI	Downstream of Bayview Dr. (Reach Wh-4a)	N/A		16
Whiskey Creek	CI	Downstream of Bayview Dr. (Reach Wh-5)	N/A		17
Whiskey Creek	CI	Downstream of Bayview Dr. (Reach Wh-6)	N/A		18
Whiskey Creek	CI	Between Tollendale Mill Rd. and The Boulevard (Reach Wh-10)	N/A		19
Whiskey Creek	CI	Between The Boulevard and Brannan Ave. (Reach Wh-10)	N/A		20
Whiskey Creek	CI	Downstream of Brannan Ave. to Kempenfelt Bay (Reach Wh-10)	N/A		21
Whiskey Creek	CI	Downstream of Bayview Dr. (Reach Wh-4a through 4C)	N/A		30
Whiskey Creek	CI	Downstream of Huronia (Reach Wh-7b through 7c)	N/A		31
Whiskey Creek	CI	Downstream of Little Ave. (Reach Wh-9)	N/A		32
Whiskey Creek	SWMF	South of Tollendale Mill Rd. (WK04)	N/A		20
Whiskey Creek	SWMF	Little Ave. and Firman Dr. (WK01)	N/A		25
Whiskey Creek	SWMF	East of Huronia Rd., north of Big Bay Point Rd. (new SWMF)	N/A		26
Whiskey Creek	SWMF	Chieftain Cres. (new SWMF)	N/A		40
Whiskey Creek	SWMF	Between Beacon Rd. and Montserrand St. (new SWMF)	N/A		42
Whiskey Creek	SWMF	Between Beacon Rd. and Harvie Rd. (WK05)	N/A		92
Whiskey Creek	LID	Assikinack Park	September 8	2	2
Whiskey Creek	LID	Mapleton Park	September 8	8	10
Whiskey Creek	LID	Monsterrand Park	September 8	9	11
Bear Creek	LID	Batteaux Park	September 6	21	27
Bear Creek	LID	Ferndale Park	September 8	26	34
Dyments Creek	DC	Sproule Drive	August 16	27	27
Dyments Creek	LID	Pringle Park	September 8	10	12
Hewitt's Creek	LID	Bayshore Park	September 6	14	17
Hotchkiss Creek	DC	Wood Street	August 18	47	47
Hotchkiss Creek	DC	Bradford Street	August 18	51	51
Hotchkiss Creek	LID	Blair Park	September 8	3	3
Hotchkiss Creek	LID	Elizabeth Park	September 8	5	5
Hotchkiss Creek	LID	Shear Park	September 8	11	13

Subwatershed[1]	PPAS Type[2]	Location Name	Date of 2017 General Survey	Azimuth Location ID	CC Tatham Location ID[3]
Kidd's Creek	DC	Eccles Street A	August 16	17	17
Kidd's Creek	DC	Donald Street	August 16	20	20
Little Lake	LID	East Bayfield Park	September 8	25	32
Lovers Creek	DC	Bayview Drive	August 16	88	88
Lovers Creek	DC	Mapleview Drive	August 18	96	96
Lovers Creek	LID	Greenfield Park	September 8	7	7
Lovers Creek	LID	Catherine Park	September 6	15	19
Lovers Creek	LID	D'Ambrosio Park	September 6	16	20
Lovers Creek	LID	Shalom Park	September 6	20	26
Whiskey Creek	DC	Harvie Road	August 17	54	54
Whiskey Creek	DC	McConkey Place	August 17	59	59

Grey shading = Preliminary Preferred Alternative Solutions (PPAS) added in fall 2018 by CCTA post-fieldwork by Azimuth (no field surveys conducted)

Orange shading = Locations of PPAS originally assessed but subsequently removed from consideration by CCTA post-Azimuth fieldwork; CCTA requested these locations be retained in report data tables

[1]Subwatersheds within Nottawasaga Valley Conservation Authority (NVCA) jurisdiction: Bear Creek, Little Lake, Georgian Creek; others are within Lake Simcoe Region Conservation Authority (LSRCA) jurisdiction. Ministry of Transportation Ontario (MTO), Sophia Creek Subwatershed, Mulcaster Drainage Area and annexation lands sites excluded from general surveys and tree inventory

[2]DC - Deficient Culvert, LID - Park LID, SWMF - SWMF Retrofit/Creation, CI - Channel Improvement, TSS - Trunk Storm Sewer Improvements

[3]Column used as location identifier in other tables; N/A - CCTA Location ID Number Not Available

Table 2. Background Information for Preliminary Preferred Alternative Solutions, City of Barrie Drainage Master Plan, 2017

Subwatershed[1]	PPAS Type[2]	CC Tatham Location ID	Land Use Designation[3]	LSRCA or NVCA[4]	In CA Regulation Limit[5]	Level 1 NHR[6]	Level 1 NHR with Existing Development Designation Subject to 3.5.2.4 d[6]	Level 2 NHR[6]	Level 3 NHR[6]	Provincially Significant Wetland (PSW)[7]	Non-Provincially Significant Wetland (PSW)[7]	Unevaluated Wetland[7]	Significant Woodlands (as per City of Barrie OP)	Fish Habitat (Direct/Indirect/ Unknown/None	Watercourse Thermal Regime (Cold/Cool/Warm/ Unknown)	Fisheries Level of Sensitivity (High/Medium/Low/ Unknown)	Anticipated Natural Heritage Sensitivity[8]
Bear Creek	CI	33	Environmental Protection Area	NVCA	Y	Y	N	N	N	N	N	N	N	Direct	Cold	High	High
Bear Creek	DC	78	Environmental Protection Area, Future Urban	NVCA	Y	Y	N	N	N	N	N	N	Potential	Direct	Cold	High	High
Bear Creek	DC	80	Environmental Protection Area	NVCA	Y	Y	N	N	N	Y	N	N	Potential	Direct	Cold	High	High
Bear Creek	DC	114	Environmental Protection Area	NVCA	Y	N	N	N	N	N	N	Y	N	Direct	Cold	High	High
Bear Creek	DC	134	Environmental Protection Area	NVCA	Y	Y	N	N	N	Y	N	N	Potential	Unknown	Cold	High	High
Bear Creek	LID	28	Open Space	NVCA	N	N	N	N	Y	N	N	N	N	None	Not Applicable	Not Applicable	Not Applicable
Bear Creek	LID	35	Open Space, Environmental Protection Area	NVCA	Y	Y	N	N	Y	N	N	N	N	None	Not Applicable	Not Applicable	Not Applicable
Bear Creek	LID	38	Open Space	NVCA	N	N	N	N	N	N	N	N	N	None	Not Applicable	Not Applicable	Not Applicable
Bear Creek	LID	N/A	Open Space	NVCA	N	N	N	N	N	N	N	N	N	None	Not Applicable	Not Applicable	Low
Bear Creek	SWMF	61	Environmental Protection Area	NVCA	Y	Y	N	N	Y	N	N	N	N	Direct	Unknown	Low	High
Bear Creek	SWMF	62	Environmental Protection Area	NVCA	Y	Y	N	N	N	N	Y	N	N	Direct	Unknown	Low	High
Bear Creek	SWMF	69	Open Space	NVCA	Y	Y	N	N	Y	N	N	N	N	Unknown	Unknown	Unknown	High
Bear Creek	SWMF	90	Open Space	NVCA	Y	N	N	N	Y	Y adjacent	N	N	N	Unknown	Unknown	Unknown	High
Bunkers Creek	CI	4	Residential	LSRCA	Y	Y	Y	N	N	N	N	N	N	Indirect	Warm/Cool	Low	High
Bunkers Creek	CI	5	Residential	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Warm/Cool	Low	Medium
Bunkers Creek	CI	7	General Commercial	LSRCA	Y	N	Y	N	N	N	N	N	N	Indirect	Warm/Cool	Low	Medium
Bunkers Creek	CI	8	Environmental Protection Area, Waste Disposal Area	LSRCA	Y	Y	N	N	N	N	N	Y	N	Direct	Warm/Cool	Low	High
Bunkers Creek	CI	27	City Centre, Environmental Protection	LSRCA	Y	Y	N	N	N	N	N	N	N	Direct	Warm/Cool	Low	High
Bunkers Creek	DC	22	City Centre, Environmental Protection	LSRCA	Y	Y	Y	N	Y	N	Y	Y	N	Direct	Warm/Cool	Low	High
Bunkers Creek	DC	23	City Centre	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Warm/Cool	Low	Low
Bunkers Creek	DC	24	City Centre	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Warm/Cool	Low	Low
Bunkers Creek	DC	141	General Commercial	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Warm/Cool	Low	Medium
Bunkers Creek	DC	142	General Commercial	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Warm/Cool	Low	Medium
Bunkers Creek	DC	143	General Commercial, Residential	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Warm/Cool	Low	Medium
Bunkers Creek	LID	6	Open Space	LSRCA	N	N	N	N	N	N	N	N	N	None	Not Applicable	Not Applicable	Not Applicable
Bunkers Creek	SWMF	10	Open Space	LSRCA	Y	Y	N	N	N	N	N	N	N	None	Unknown	Low	High
Bunkers Creek	SWMF	94	General Commercial	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Warm/Cool	Low	Medium
Bunkers Creek	SWMF	95	Environmental Protection	LSRCA	Y	Y	N	N	N	N	N	N	N	Direct	Warm/Cool	Low	High
Bunkers Creek	TSS	1	Residential, Environmental Protection Area	LSRCA	Y	Y	Y	N	N	N	N	N	N	None	Unknown	Low	High
Dyments Creek	CI	9	General Industrial, General Commercial	LSRCA	Y	N	Y	N	N	N	N	Y	N	Direct	Cool	Low	Medium
Dyments Creek	CI	10	General Industrial, General Commercial	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cool	Low	Medium
Dyments Creek	CI	11	General Commercial	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cool	Low	Medium
Dyments Creek	CI	12	Environmental Protection Area	LSRCA	Y	Y	Y	N	N	N	N	N	N	Direct	Cool	Low	High
Dyments Creek	CI	28	Water Treatment Area	LSRCA	Y	Y	N	N	N	N	N	Y	N	Direct	Cool	Low	High
Dyments Creek	CI	29	Environmental Protection	LSRCA	Y	Y	Y	N	Y	N	N	Y	N	Direct	Cool	Low	High
Dyments Creek	DC	28	General Industrial, General Commercial	LSRCA	Y	N	Y	N	N	N	N	Y	N	Direct	Cool	Low	Low
Dyments Creek	DC	29	General Industrial, General Commercial	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cool	Low	Low
Dyments Creek	DC	30	General Industrial, General Commercial	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cool	Low	Low
Dyments Creek	DC	31	General Commercial	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cool	Low	Medium
Dyments Creek	DC	32	General Commercial	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cool	Low	Medium
Dyments Creek	DC	33	General Commercial	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cool	Low	Low
Dyments Creek	DC	34	General Industrial	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cool	Low	Low
Dyments Creek	DC	35	Environmental Protection Area	LSRCA	Y	Y	N	N	Y	N	N	Y	N	Direct	Cool	Low	High
Dyments Creek	DC	36	General Commercial, Environmental Protection Area, General Industrial	LSRCA	Y	Y	Y	N	Y	N	N	N	N	Direct	Cool	Low	High
Dyments Creek	DC	37	Residential, Environmental Protection Area	LSRCA	Y	Y	Y	N	N	N	N	N	N	Direct	Cool	Low	High
Dyments Creek	DC	38	Residential, Environmental Protection Area	LSRCA	Y	Y	Y	N	N	N	N	N	N	Direct	Cool	Low	High
Dyments Creek	DC	39	City Centre	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cool	Low	Low
Dyments Creek	LID	4	Open Space	LSRCA	N	N	N	N	N	N	N	N	N	None	Not Applicable	Not Applicable	Not Applicable
Dyments Creek	SWMF	15	Open Space	LSRCA	N	N	N	N	Y	N	N	N	N	Unknown	Unknown	Low	Medium
Dyments Creek	SWMF	78	General Industrial	LSRCA	Y	Y	N	N	N	N	N	Y	N	Direct	Cool	Low	High
Dyments Creek	SWMF	79	Highway 400 Industrial, Environmental Protection Area	LSRCA	Y	Y	Y	N	Y	N	N	N	N	Direct	Cool	Low	High
Georgian Creek	DC	82	Open Space	NVCA	Y	N	N	N	N	N	N	N	N	Indirect	Unknown	Low	
Georgian Creek	LID	31	Open Space	NVCA	Y	Y	Y	N	Y	N	Y	N	N	None	Not Applicable	Not Applicable	Not Applicable
Georgian Creek	LID	37	Open Space	NVCA	N	N	N	N	N	N	N	N	N	None	Not Applicable	Not Applicable	Not Applicable
Georgian Creek	SWMF	75	Residential, Open Space	NVCA	Y	N	N	N	N	N	N	N	N	Unknown	Unknown	Low	Low
Georgian Creek	SWMF	76	Residential	NVCA	N	N	N	N	N	N	N	N	N	None	Unknown	Low	Low

Subwatershed[1]	PPAS Type[2]	CC Tatham Location ID	Land Use Designation[3]	LSRCA or NVCA[4]	In CA Regulation Limit[5]	Level 1 NHR[6]	Level 1 NHR with Existing Development Designation Subject to 3.5.2.4 d[6]	Level 2 NHR[6]	Level 3 NHR[6]	Provincially Significant Wetland (PSW)[7]	Non-Provincially Significant Wetland (PSW)[7]	Unevaluated Wetland[7]	Significant Woodlands (as per City of Barrie OP)	Fish Habitat (Direct/Indirect/ Unknown/None	Watercourse Thermal Regime (Cold/Cool/Warm/ Unknown)	Fisheries Level of Sensitivity (High/Medium/Low/ Unknown)	Anticipated Natural Heritage Sensitivity[8]
Georgian Creek	TSS	3	General Commercial, Residential, Open Space	NVCA	Y	N	N	N	N	N	N	N	N	None	Unknown	Low	Low
Georgian Creek	TSS	4	Open Space, Residential	NVCA	Y	N	N	Y	N	N	N	N	N	None	Unknown	Low	Medium
Hewitt's Creek	DC	83	Environmental Protection Area	LSRCA	Y	Y	N	N	N	N	N	N	N	Direct	Cold	High	High
Hewitt's Creek	DC	130	Environmental Protection Area	LSRCA	Y	N	N	N	N	N	Y	N	N	Direct	Cold	High	High
Hewitt's Creek	DC	131	Environmental Protection Area	LSRCA	Y	N	N	N	N	N	N	N	N	Direct	Cold	High	High
Hewitt's Creek	LID	24	Open Space, Environmental Protection Area	LSRCA	Y	Y	N	N	Y	N	N	N	N	None	Not Applicable	Not Applicable	Not Applicable
Hewitt's Creek	LID	25	Open Space	LSRCA	N	N	N	N	N	N	N	N	N	None	Not Applicable	Not Applicable	Not Applicable
Hewitt's Creek	LID	N/A	Open Space	LSRCA	N	N	N	N	N	N	N	N	N	None	Not Applicable	Not Applicable	Low
Hewitt's Creek	SWMF	27	Environmental Protection Area, Residential	LSRCA	Y	Y	N	N	N	N	N	Y	N	Unknown	Unknown	Low	High
Hewitt's Creek	TSS	6	Environmental Protection Area, Residential	LSRCA	N	Y	N	N	N	N	N	N	N	Unknown	Unknown	Low	High
Hotchkiss Creek	CI	6	General Industrial	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cool/Cold	Medium	Medium
Hotchkiss Creek	CI	13	General Industrial	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cool/Cold	Medium	Medium
Hotchkiss Creek	CI	14	Residential, City Centre	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cool/Cold	Medium	Medium
Hotchkiss Creek	DC	41	Residential	LSRCA	Y	Y	N	N	N	N	N	N	N	Indirect	Cool/Cold	Medium	High
Hotchkiss Creek	DC	42	Institutional, General Industrial	LSRCA	Y	Y	N	N	N	N	N	N	N	Indirect	Cool/Cold	Medium	High
Hotchkiss Creek	DC	43	Highway 400 Industrial, Residential	LSRCA	Y	Y	Y	N	N	N	N	N	N	Seasonal	Cool/Cold	Medium	High
Hotchkiss Creek	DC	44	None	LSRCA	Y	Y	N	N	N	N	N	N	N	Indirect	Cool/Cold	Medium	High
Hotchkiss Creek	DC	46	Highway 400 Industrial	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cool/Cold	Medium	Low
Hotchkiss Creek	DC	48	General Industrial	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cool/Cold	Medium	Low
Hotchkiss Creek	DC	49	General Industrial	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cool/Cold	Medium	Low
Hotchkiss Creek	DC	50	Residential	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cool/Cold	Medium	Low
Hotchkiss Creek	DC	51	City Centre	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cool/Cold	Medium	Low
Hotchkiss Creek	DC	135	Highway 400 Industrial	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cool/Cold	Medium	Medium
Hotchkiss Creek	LID	1	Open Space	LSRCA	N	N	N	N	N	N	N	N	N	None	Not Applicable	Not Applicable	Not Applicable
Hotchkiss Creek	SWMF	3	General Industrial	LSRCA	Y	N	Y	N	N	N	N	N	N	Unknown	Unknown	Low	Medium
Hotchkiss Creek	SWMF	44	Highway 400 Industrial	LSRCA	N	N	N	N	N	N	N	N	N	Indirect	Cool/Cold	Medium	Medium
Hotchkiss Creek	SWMF	48	City Centre, General Industrial, Residential	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cool/Cold	Medium	Medium
Hotchkiss Creek	SWMF	81	Highway 400 Industrial, General Commercial	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cool/Cold	Medium	Medium
Hotchkiss Creek	SWMF	96	50 Wood St. Industrial, General Commercial	LSRCA	N	N	N	N	N	N	N	N	N	Direct	Cool/Cold	Medium	Medium
Hotchkiss Creek	TSS	10	General Commercial, Residential, City Centre	LSRCA	N	N	N	N	N	N	N	N	N	Indirect	Unknown	Low	Low
Huronia Creek Drainage Area	LID	N/A	Open Space	LSRCA	N	N	N	N	N	N	N	N	N	None	Not Applicable	Not Applicable	Low
Huronia Creek Drainage Area	SWMF	28	General Commercial	LSRCA	Y	N	N	N	N	N	N	N	N	Indirect	Unknown	Low	Low
Huronia Creek Drainage Area	SWMF	85	General Commercial	LSRCA	Y	Y	Y	N	N	N	N	N	N	Indirect	Unknown	Low	High
Johnson Drainage Area	LID	14	Open Space	LSRCA	N	N	N	N	N	N	N	N	N	None	Not Applicable	Not Applicable	Not Applicable
Johnson Drainage Area	TSS	8	Residential, General Commercial, Educational Institutional	LSRCA, NVCA	N	N	N	N	N	N	N	N	N	None	Unknown	Low	Low
Kidd's Creek	CI	1	Environmental Protection Area	LSRCA	Y	Y	N	N	N	N	N	N	N	Indirect	Cold	Low	High
Kidd's Creek	CI	2	Residential, Open Space	LSRCA	Y	Y	Y	N	N	N	N	N	N	Direct	Cold	High	High
Kidd's Creek	CI	3	Residential	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cold	High	High
Kidd's Creek	CI	25	City Centre	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cold	High	High
Kidd's Creek	CI	26	City Centre	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cold	High	High
Kidd's Creek	DC	13	Environmental Protection Area	LSRCA	Y	N	N	Y	N	N	N	N	N	Indirect	Cold	Low	High
Kidd's Creek	DC	16	Residential	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cold	High	High
Kidd's Creek	DC	18	Environmental Protection Area, Residential	LSRCA	Y	Y	Y	N	N	N	N	N	N	Direct	Cold	High	High
Kidd's Creek	DC	145	City Centre	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cold	High	High
Kidd's Creek	DC	146	City Centre	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cold	High	High
Kidd's Creek	LID	15	Open Space, Environmental Protection Area	LSRCA	Y	Y	N	Y	Y	N	N	Y	N	None	Not Applicable	Not Applicable	Not Applicable
Kidd's Creek	SWMF	11	Open Space	LSRCA	N	N	N	N	N	N	N	N	N	None	Unknown	Low	Low
Kidd's Creek	SWMF	13	Open Space	LSRCA	N	N	N	N	N	N	N	N	N	Indirect	Cold	Low	Low
Kidd's Creek	SWMF	17	Environmental Protection Area	LSRCA	Y	Y	N	N	N	N	N	N	N	Indirect	Cold	Low	High
Kidd's Creek	SWMF	18	Open Space	LSRCA	N	N	N	N	N	N	N	N	N	Indirect	Cold	Low	Low
Kidd's Creek	TSS	9	Residential	LSRCA	Y	N	Y	N	N	N	N	N	N	Indirect	Unknown	Unknown	Medium
Little Lake	CI	24	Environmental Protection Area	NVCA	Y	Y	N	N	N	N	N	N	N	Indirect	Unknown	Low	High
Little Lake	LID	29	Open Space	NVCA	N	N	N	N	N	N	N	N	N	None	Not Applicable	Not Applicable	Not Applicable
Little Lake	SWMF	77	Open Space, Residential	NVCA	Y	N	N	N	N	N	N	N	N	Indirect	Unknown	Low	Low
Little Lake	SWMF	84	Regional Centre Commercial	NVCA	N	N	N	N	N	N	N	N	N	Indirect	Unknown	Low	Low
Little Lake	SWMF	89	Environmental Protection Area	NVCA	Y	Y	N	N	N	N	N	Y adjacent	N	Indirect	Unknown	Low	High
Little Lake	SWMF	91	Environmental Protection Area	NVCA	Y	Y	N	N	N	N	N	N	N	Direct	Unknown	Low	High
Little Lake	TSS	5	Residential, Open Space	NVCA	N	N	N	N	N	N	N	N	N	Indirect	Unknown	Low	Low
Lovers Creek	CI	22	Environmental Protection Area	LSRCA	Y	Y	N	Y	N	N	N	N	N	Direct	Cold	High	High
Lovers Creek	CI	23	Environmental Protection Area	LSRCA	Y	Y	N	Y	N	N	N	N	N	Direct	Cold	High	High

Subwatershed[1]	PPAS Type[2]	CC Tatham Location ID	Land Use Designation[3]	LSRCA or NVCA[4]	In CA Regulation Limit[5]	Level 1 NHR[6]	Level 1 NHR with Existing Development Designation Subject to 3.5.2.4 d[6]	Level 2 NHR[6]	Level 3 NHR[6]	Provincially Significant Wetland (PSW)[7]	Non-Provincially Significant Wetland (PSW)[7]	Unevaluated Wetland[7]	Significant Woodlands (as per City of Barrie OP)	Fish Habitat (Direct/Indirect/ Unknown/None	Watercourse Thermal Regime (Cold/Cool/Warm/ Unknown)	Fisheries Level of Sensitivity (High/Medium/Low/ Unknown)	Anticipated Natural Heritage Sensitivity[8]
Lovers Creek	DC	89	Environmental Protection Area	LSRCA	Y	Y	N	N	N	Y	N	N	N	Direct	Cold	High	High
Lovers Creek	DC	90	Environmental Protection Area	LSRCA	Y	N	N	N	N	Y	N	N	N	Direct	Cold	High	High
Lovers Creek	DC	91	Environmental Protection Area	LSRCA	Y	Y	Y	N	N	Y	N	N	N	Direct	Cold	High	High
Lovers Creek	DC	92	Environmental Protection Area	LSRCA	Y	Y	N	N	N	Y	N	N	N	Direct	Cold	High	High
Lovers Creek	DC	94	Environmental Protection Area	LSRCA	Y	Y	Y	N	N	N	N	N	N	Direct	Cold	High	High
Lovers Creek	DC	95	Environmental Protection Area	LSRCA	Y	Y	Y	N	N	N	N	N	N	Direct	Cold	High	High
Lovers Creek	DC	97	Environmental Protection Area	LSRCA	Y	Y	N	N	N	Y	N	N	N	Direct	Cold	High	High
Lovers Creek	DC	98	Environmental Protection Area, General Industrial	LSRCA	Y	Y	N	N	N	N	N	N	N	Indirect	Cold	Medium	High
Lovers Creek	DC	99	General Industrial	LSRCA	N	N	N	N	Y	N	N	N	N	Indirect	Cold	Medium	Medium
Lovers Creek	DC	105	Environmental Protection Area	LSRCA	Y	Y	Y	Y	Y	N	N	N	N	Direct	Cold	High	High
Lovers Creek	DC	108	Environmental Protection Area	LSRCA	Y	N	N	N	N	Y	N	N	N	Indirect	Cold	Medium	High
Lovers Creek	DC	110	Environmental Protection Area	LSRCA	Y	N	N	N	N	N	N	N	N	Indirect	Cold	Medium	Low
Lovers Creek	DC	123	Environmental Protection Area	LSRCA	Y	Y	N	N	N	N	N	N	N	Indirect	Cold	Medium	High
Lovers Creek	DC	125	Environmental Protection Area	LSRCA	Y	N	N	N	N	Y	N	N	N	Direct	Cold	High	High
Lovers Creek	DC	126	Environmental Protection Area	LSRCA	Y	Y	N	N	N	Y	N	N	N	Direct	Cold	High	High
Lovers Creek	DC	127	Environmental Protection Area	LSRCA	Y	N	N	N	N	Y	N	N	N	Indirect	Cold	Medium	High
Lovers Creek	DC	128	Special Rural Area	LSRCA	Y	N	N	N	N	N	N	N	N	Indirect	Cold	Medium	Low
Lovers Creek	LID	23	Open Space	LSRCA	N	N	N	N	N	N	N	N	N	None	Not Applicable	Not Applicable	Not Applicable
Lovers Creek	LID	N/A	Open Space (Golden Meadow)	LSRCA	N	N	N	N	N	N	N	N	N	None	Not Applicable	Not Applicable	Low
Lovers Creek	LID	N/A	Open Space (Carter Park)	LSRCA	N	N	N	N	N	N	N	N	N	None	Not Applicable	Not Applicable	Low
Lovers Creek	SWMF	30	Environmental Protection Area	LSRCA	Y	Y	N	N	Y	N	N	N	N	Direct	Cold	High	High
Lovers Creek	SWMF	31	General Industrial	LSRCA	Y	N	N	N	N	N	N	N	N	Indirect	Cold	Medium	Low
Lovers Creek	SWMF	32	General Industrial	LSRCA	N	N	N	N	N	N	N	N	N	Indirect	Cold	Medium	Low
Lovers Creek	SWMF	37	Residential	LSRCA	N	N	N	N	N	N	N	N	N	Indirect	Unknown	Low	Low
Lovers Creek	SWMF	45	Environmental Protection Area	LSRCA	Y	Y	N	N	N	N	N	N	N	Indirect	Cold	Medium	High
Lovers Creek	SWMF	65	General Industrial	LSRCA	Y	Y	N	N	N	N	N	N	N	Indirect	Cold	Medium	High
Lovers Creek	SWMF	68	Open Space	LSRCA	N	N	N	N	N	N	N	N	N	Indirect	Unknown	Low	Low
Lovers Creek	SWMF	86	General Commercial	LSRCA	Y	Y	N	N	N	N	N	N	N	Indirect	Cold	Medium	High
Lovers Creek	SWMF	87	General Commercial	LSRCA	Y	Y	N	N	N	N	N	N	N	Indirect	Cold	Medium	High
Lovers Creek	TSS	7	Residential, Education Institutional	LSRCA	N	N	N	N	N	N	N	N	N	Indirect	Unknown	Low	Low
Sandy Cove	DC	119	Environmental Protection Area	LSRCA	Y	N	N	N	N	N	N	N	N	Unknown	Cold	High	High
Sandy Cove	DC	120	Environmental Protection Area	LSRCA	Y	N	N	N	N	N	N	Y	N	Indirect	Cold	Medium	Medium
Thornton Creek	DC	118	Environmental Protection Area	LSRCA	Y	N	N	N	N	N	N	Y	N	Indirect	Unknown	Medium	Medium
Whiskey Creek	CI	15	General Commercial	LSRCA	Y	Y	N	N	Y	N	N	N	N	Indirect	Cold	Medium	High
Whiskey Creek	CI	16	General Industrial	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cold	High	High
Whiskey Creek	CI	17	Environmental Protection Area	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cold	High	High
Whiskey Creek	CI	18	Environmental Protection Area	LSRCA	Y	Y	N	N	N	N	N	N	N	Direct	Cold	High	High
Whiskey Creek	CI	19	Residential	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cold	High	High
Whiskey Creek	CI	20	Residential	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cold	High	High
Whiskey Creek	CI	21	Open Space, Residential	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cold	High	High
Whiskey Creek	CI	30	General Industrial	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cold	High	High
Whiskey Creek	CI	31	Residential	LSRCA	N	N	N	N	N	N	N	N	N	Direct	Cold	High	High
Whiskey Creek	CI	32	Environmental Protection Area	LSRCA	Y	Y	N	N	N	N	N	N	N	Direct	Cold	High	High
Whiskey Creek	DC	53	General Industrial	LSRCA	Y	N	Y	N	Y	N	N	N	N	Indirect	Cold	Medium	Low
Whiskey Creek	DC	55	Highway 400 Industrial	LSRCA	Y	N	Y	N	N	N	N	N	N	Indirect	Cold	Medium	Medium
Whiskey Creek	DC	56	Highway 400 Industrial, General Industrial	LSRCA	Y	N	Y	N	N	N	N	N	N	Indirect	Cold	Medium	Medium
Whiskey Creek	DC	57	General Industrial	LSRCA	Y	N	Y	N	N	N	N	N	N	Indirect	Cold	Medium	Low
Whiskey Creek	DC	60	Open Space, Residential	LSRCA	Y	Y	N	N	N	N	N	N	N	Direct	Cold	High	High
Whiskey Creek	DC	62	Environmental Protection Area, Open Space	LSRCA	Y	Y	N	N	N	N	N	N	N	Direct	Cold	High	High
Whiskey Creek	DC	63	Environmental Protection Area, General Commercial	LSRCA	Y	Y	Y	N	N	N	N	N	N	Direct	Cold	High	High
Whiskey Creek	DC	64	Environmental Protection Area, Residential	LSRCA	Y	Y	Y	N	N	N	N	N	N	Direct	Cold	High	High
Whiskey Creek	DC	65	General Industrial, Residential	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cold	High	Low
Whiskey Creek	DC	66	Residential	LSRCA	Y	N	Y	N	N	N	N	N	N	Direct	Cold	High	Low
Whiskey Creek	DC	138	General Commercial, Environmental Protection Area	LSRCA	Y	Y	N	N	N	N	N	N	N	Direct	Cold	High	High
Whiskey Creek	DC	147	Open Space	LSRCA	Y	Y	N	N	N	N	N	N	N	Direct	Cold	High	High
Whiskey Creek	LID	2	Open Space	LSRCA	N	N	N	N	N	N	N	N	N	None	Not Applicable	Not Applicable	Not Applicable
Whiskey Creek	LID	10	Open Space	LSRCA	N	N	N	N	N	N	N	N	N	None	Not Applicable	Not Applicable	Not Applicable
Whiskey Creek	LID	11	Open Space	LSRCA	N	N	N	N	N	N	N	N	N	None	Not Applicable	Not Applicable	Not Applicable
Whiskey Creek	SWMF	20	Residential	LSRCA		N	N	N	N	N	N	N	N	Unknown	Unknown	Medium	Low

Subwatershed[1]	PPAS Type[2]	CC Tatham Location ID	Land Use Designation[3]	LSRCA or NVCA[4]	In CA Regulation Limit[5]	Level 1 NHR[6]	Level 1 NHR with Existing Development Designation Subject to 3.5.2.4 d[6]	Level 2 NHR[6]	Level 3 NHR[6]	Provincially Significant Wetland (PSW)[7]	Non-Provincially Significant Wetland (PSW)[7]	Unevaluated Wetland[7]	Significant Woodlands (as per City of Barrie OP)	Fish Habitat (Direct/Indirect/ Unknown/None	Watercourse Thermal Regime (Cold/Cool/Warm/ Unknown)	Fisheries Level of Sensitivity (High/Medium/Low/ Unknown)	Anticipated Natural Heritage Sensitivity[8]
Whiskey Creek	SWMF	25	Open Space	LSRCA	Y	Y	N	N	Y	N	N	N	N	Direct	Cold	High	High
Whiskey Creek	SWMF	26	General Commercial, General Industrial	LSRCA		N	N	N	N	N	N	N	N	Indirect	Unknown	Low	Low
Whiskey Creek	SWMF	40	General Industrial	LSRCA	N	N	N	N	N	N	N	N	N	None	Unknown	Low	Low
Whiskey Creek	SWMF	42	General Industrial	LSRCA	Y	N	N	Y	N	N	N	N	N	Indirect	Cold	Medium	Medium
Whiskey Creek	SWMF	92	Environmental Protection Area	LSRCA	Y	Y	N	N	N	N	N	N	N	Indirect	Unknown	Medium	High
Bear Creek	LID	27	Open Space	NVCA	N	N	N	N	N	N	N	N	N	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Bear Creek	LID	34	Open Space	NVCA	N	N	N	N	N	N	N	N	N	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Dyments Creek	DC	27	Environmental Protection	LSRCA	Y	Y	Y	N	Y	N	N	Y	N	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Dyments Creek	LID	12	Open Space	LSRCA	N	N	N	N	N	N	N	N	N	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Hewitt's Creek	LID	17	Environmental Protection Area	LSRCA	N	Y	N	N	N	N	N	N	N	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Hotchkiss Creek	DC	46	Highway 400 Industrial	LSRCA	Y	N	Y	N	N	N	N	N	N	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Hotchkiss Creek	DC	47	Highway 400 Industrial	LSRCA	Y	N	Y	N	N	N	N	N	N	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Hotchkiss Creek	LID	3	Open Space	LSRCA	N	N	N	N	N	N	N	N	N	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Hotchkiss Creek	LID	5	Open Space	NVCA	N	N	Y	N	Y	N	N	N	N	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Hotchkiss Creek	LID	13	Open Space	LSRCA	N	N	N	N	Y	N	N	N	N	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Kidd's Creek	DC	17	Residential	LSRCA	Y	N	Y	N	N	N	N	N	N	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Kidd's Creek	DC	20	Open Space, Residential	LSRCA	Y	Y	Y	N	N	N	N	N	N	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Little Lake	LID	32	Open Space	NVCA	N	N	N	N	N	N	N	Y	N	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Lovers Creek	DC	88	General Industrial	LSRCA	Y	Y	N	N	N	N	N	N	N	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Lovers Creek	DC	96	Environmental Protection Area	LSRCA	Y	Y	N	N	Y	Y	N	N	N	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Lovers Creek	LID	7	Open Space	LSRCA	N	N	N	N	N	N	N	N	N	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Lovers Creek	LID	19	Open Space	LSRCA	N	N	N	N	N	N	N	N	N	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Lovers Creek	LID	20	Open Space, Environmental Protection Area	LSRCA	Y	N	N	Y	Y	Y	N	N	N	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Lovers Creek	LID	26	Open Space	LSRCA	Y	Y	N	N	N	N	N	N	N	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Whiskey Creek	DC	54	Environmental Protection Area	LSRCA	Y	Y	N	N	Y	N	N	N	N	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Whiskey Creek	DC	59	Environmental Protection Area, Open Space	LSRCA	Y	Y	N	N	N	N	N	N	N	Not Assessed	Not Assessed	Not Assessed	Not Assessed

Grey shading = Preliminary Preferred Alternative Solutions (PPAS) added in fall 2018 by CCTA post-fieldwork by Azimuth; available data based on background mapping only

Orange shading = Locations of PPAS originally assessed but subsequently removed from consideration by CCTA post-Azimuth fieldwork; CCTA requested these locations be retained in report data tables

[1]Subwatersheds within Nottawasaga Valley Conservation Authority (NVCA) jurisdiction: Bear Creek, Little Lake, Georgian Creek; others are within Lake Simcoe Region Conservation Authority (LSRCA) jurisdiction. Ministry of Transportation Ontario (MTO), Sophia Creek Subwatershed, Mulcaster Drainage Area and annexation lands sites excluded from general surveys and tree inventory

[2]DC - Deficient Culvert, LID - Park LID, SWMF - SWMF Retrofit/Creation, CI - Channel Improvement, TSS - Trunk Storm Sewer Improvements

[3]City of Barrie Official Plan (2017) Schedule A Land Use

[4]City of Barrie Official Plan (2017) Schedule F Conservation Authority Regulation Limits

[5]CA = Conservation Authority; Lake Simcoe Region Conservation Authority Regulation Mapping website, Nottawasaga Valley Conservation Authority Regulation Mapping website

[6]City of Barrie Official Plan (2017) Schedule H Natural Heritage Resource (NHR) Classification: Level 1 - critical NHR components; Level 2 - significant NHR components; Level 3 - significant and supporting NHR components

[7]Ministry of Natural Resources and Forestry (MNRF) Natural Heritage Information Centre (NHIC) Database, VuMap

[8]Anticipated Natural Heritage Sensitivity: High - presence of a PSW, Level 1 NHR, known Significant Woodland, or two or more SAR/SAR habitat potential considerations, or coldwater fish habitat; Medium - presence of other wetlands, other NHR levels, one SAR/SAR habitat potential consideration, amphibian breeding wetland habitat potential, area-sensitive breeding bird habitat potential; Low - remaining locations; PPAS locations not surveyed in the field are ranked in Table 2 only; see main text for risk mitigation details

rankings for the other PPAS locations appear in Table 3 (terrestrial) or Table 4 (fisheries) and consider the data presented in Table 2 for those locations

Applicable designation indicated with Y - Yes, N - No

For LIDs in this Table, fish and terrestrial natural heritage sensitivities are considered "Not Applicable" other than those mapped by the City

Table 3. General Terrestrial Habitat Survey for Preliminary Preferred Alternative Solutions, City of Barrie Drainage Master Plan, 2017

Subwatershed[1]	PPAS Type[2]	CC Tatham Location ID	Surrounding Area[3]	Generalized Habitat Type(s)/ELC Community Resemblance[4]	Trees Within Proposed Work Area	Barn Swallow Nesting Habitat Potential?[3]	Potential Bat Maternity Roost Habitat[5]	Potential SAR Turtle Habitat[5]	Potential Amphibian Breeding (Wetland) Habitat[5]	Potential Woodland Area-Sensitive Breeding Bird Habitat[5]	Potential for Erosion into Hydrologic Features?	Comments[6]	Anticipated Natural Heritage Sensitivity[7]	Recommended Additional SAR Surveys?[8]	Possible ESA Permitting[9]
Bear Creek	DC	80	Com, Rural	W	N	N	N	Y	Y	N	N	Sporadic woody shrubs on west side of culvert	High	Not Anticipated	Not Anticipated
Bear Creek	LID	28	Res	MG	Y	N	N	N	N	N	N		Low	Not Anticipated	Not Anticipated
Bear Creek	LID	35	Res	MG	Y	N	N	N	N	N	Y	Woodlands and watercourse adjacent but likely outside proposed LID area	Low	Not Anticipated	Not Anticipated
Bear Creek	LID	38	Res	MG	Y	N	N	N	N	N	N		Low	Not Anticipated	Not Anticipated
Bunkers Creek	DC	22	Com, Res	R, CUT	Y	N	Y	N	N	N	N		Medium	Not Anticipated	Not Anticipated pending mitigation
Bunkers Creek	DC	23	Ind, Res	R, CUM	Y	N	Y	N	N	N	N		Medium	Not Anticipated	Not Anticipated pending mitigation
Bunkers Creek	DC	24	Com	R, CUT, small W	Y	N	Y	Y	Y	N	N	Small wetland upstream of proposed work area	High	Not Anticipated	Not Anticipated pending mitigation
Bunkers Creek	LID	6	Res	MG	Y	N	N	N	N	N	N	Woodlands adjacent but likely outside proposed work area	Low	Not Anticipated	Not Anticipated
Dyments Creek	DC	28	Com	R, small W, CUM	N	N	Y	N	Y	Y	N	One Monarch Butterfly	Medium	Not Anticipated	Not Anticipated pending mitigation
Dyments Creek	DC	29	Ind	R, MG	N	N	N	N	N	N	N		Low	Not Anticipated	Not Anticipated
Dyments Creek	DC	30	Com	Ditch, small W, CUM	N	N	N	N	Y	N	N		Low	Not Anticipated	Not Anticipated
Dyments Creek	DC	33	Ind	MG	N	N	N	N	N	N	N		Low	Not Anticipated	Not Anticipated
Dyments Creek	DC	34	Ind	CUT	Y	N	N	N	N	N	N		Low	Not Anticipated	Not Anticipated
Dyments Creek	DC	35	Ind	R, CUT, SWMP	Y	N	Y	Y	Y	N	Y	Dyments Pond with riparian habitat area; Canada Geese and Mallard Ducks abundant; duck boxes; one Blue Heron	High	Not Anticipated	Not Anticipated pending mitigation
Dyments Creek	DC	36	Ind	R, W	Y	N	Y	Y	Y	N	N		High	Not Anticipated	Not Anticipated pending mitigation
Dyments Creek	DC	37	Res	R, CUT	Y	N	Y	N	N	N	N		Medium	Not Anticipated	Not Anticipated pending mitigation
Dyments Creek	DC	38	Res	R, CUT	Y	N	Y	N	N	N	N		Medium	Not Anticipated	Not Anticipated pending mitigation
Dyments Creek	DC	39	Com/Res	R, CUT (east side); small W, CUM (west side)	Y	N	Y	N	Y	N	N		Medium	Not Anticipated	Not Anticipated pending mitigation
Dyments Creek	LID	4	Res	MG	Y	N	N	N	N	N	N		Low	Not Anticipated	Not Anticipated
Georgian Creek	DC	82	Res, Agr	R, CUT	N	N	N	N	N	N	N		Low	Not Anticipated	Not Anticipated
Georgian Creek	LID	31	Res	MG	N	N	N	Y	Y	N	N		Medium	Not Anticipated	Not Anticipated pending mitigation
Georgian Creek	LID	37	Res	MG	Y	N	N	N	N	N	N		Low	Not Anticipated	Not Anticipated
Hewitt's Creek	LID	24	Res	MG	Y	N	N	N	N	N	N		Low	Not Anticipated	Not Anticipated
Hewitt's Creek	LID	25	Res	Construction	N	N	N	Y	Y	N	Y	Near tributary of Hewitts Creek; potential bat and/or area-sensitive bird habitat adjacent but likely outside proposed work area	Medium	Not Anticipated	Not Anticipated pending mitigation
Hotchkiss Creek	DC	41	Res	MG	N	N	N	N	N	N	N		Low	Not Anticipated	Not Anticipated
Hotchkiss Creek	DC	42	Res	MG (south side), CUT (north side)	N	N	N	N	N	N	N		Low	Not Anticipated	Not Anticipated
Hotchkiss Creek	DC	43	Ind	Small W, MG, CUM	N	N	N	N	N	N	N		Low	Not Anticipated	Not Anticipated
Hotchkiss Creek	DC	44	Com	CUM	N	N	Y	N	N	N	N		Medium	Not Anticipated	Not Anticipated pending mitigation
Hotchkiss Creek	DC	48	Ind	CUT	N	N	Y	N	N	N	N		Medium	Not Anticipated	Not Anticipated pending mitigation
Hotchkiss Creek	DC	49	Ind	CUT	N	N	N	N	N	N	N	Large pile of dumped cinder blocks in culvert work area	Low	Not Anticipated	Not Anticipated
Hotchkiss Creek	DC	50	Ind	R, CUT	Y	N	Y	N	N	N	N		Medium	Not Anticipated	Not Anticipated pending mitigation
Hotchkiss Creek	LID	1	Res	MG	N	N	N	N	N	N	N		Low	Not Anticipated	Not Anticipated
Johnson Drainage Area	LID	14	Res	MG	Y	N	N	N	N	N	N	Woodlands adjacent but likley outside proposed LID area	Low	Not Anticipated	Not Anticipated
Kidd's Creek	DC	18	Res	R, CUT	Y	N	Y	N	N	N	N		Medium	Not Anticipated	Not Anticipated pending mitigation
Kidd's Creek	LID	15	Res	MG	Y	N	N	N	N	N	Y	Proximal to Kidds Creek	High	Not Anticipated	Not Anticipated
Little Lake	LID	29	Res	MG	Y	N	N	N	N	N	N		Low	Not Anticipated	Not Anticipated
Lovers Creek	DC	89	Ind	CUM, CUT, W	N	N	N	N	Y	N	N		High	Not Anticipated	Not Anticipated
Lovers Creek	DC	90	Com, Ind	CUT, CUM, W	N	N	N	Y	Y	N	N		High	Not Anticipated	Not Anticipated pending mitigation
Lovers Creek	DC	91	Ind	CUM, W	N	N	Y	Y	Y	Y	N		High	Not Anticipated	Not Anticipated pending mitigation
Lovers Creek	DC	92	Ind	CUW, CUT, W	N	N	Y	Y	Y	Y	N		High	Not Anticipated	Not Anticipated pending mitigation
Lovers Creek	DC	94	Ind	CUT, CUW, small W	Y	N	Y	N	Y	Y	N		High	Not Anticipated	Not Anticipated pending mitigation
Lovers Creek	DC	95	Ind	CUM, CUW, CUT	N	N	N	N	Y	Y	N		High	Not Anticipated	Not Anticipated
Lovers Creek	DC	97	Com/Ind	W, CUW	Y	N	N	N	Y	N	N	Woodland area dominated by cedars, flooded	High	Not Anticipated	Not Anticipated
Lovers Creek	DC	105	Res	R/CUW (south side); R/MG (north side) at Brentwood Marine	Y	N	N	N	N	N	Y	Steep valley/embankment feature on south side with exposed sand face may provide habitat for Bank Swallows	High	Bank Swallows	Not Anticipated
Lovers Creek	LID	23	Res	MG	Y	N	N	N	N	N	N		Low	Not Anticipated	Not Anticipated
Whiskey Creek	DC	53	Res	CUM	N	N	Y	N	N	N	N		Medium	Not Anticipated	Not Anticipated pending mitigation
Whiskey Creek	DC	57	Res	CUM	N	N	N	N	N	N	N		Low	Not Anticipated	Not Anticipated
Whiskey Creek	DC	60	Res	MG, R	Y	N	N	N	N	N	Y	Riparian habitat on west side	High	Not Anticipated	Not Anticipated
Whiskey Creek	DC	62	Res	R (north side), W (south side)	Y	N	Y	Y	Y	N	N		High	Not Anticipated	Not Anticipated pending mitigation

Subwatershed[1]	PPAS Type[2]	CC Tatham Location ID	Surrounding Area[3]	Generalized Habitat Type(s)/ELC Community Resemblance[4]	Trees Within Proposed Work Area	Barn Swallow Nesting Habitat Potential?[3]	Potential Bat Maternity Roost Habitat[5]	Potential SAR Turtle Habitat[5]	Potential Amphibian Breeding (Wetland) Habitat[5]	Potential Woodland Area-Sensitive Breeding Bird Habitat[5]	Potential for Erosion into Hydrologic Features?	Comments[6]	Anticipated Natural Heritage Sensitivity[7]	Recommended Additional SAR Surveys?[8]	Possible ESA Permitting[9]
Whiskey Creek	DC	63	Com	CUT/MG (east side), R (west side)	Y	N	Y	N	N	N	N	Presence of valleyland feature	High	Not Anticipated	Not Anticipated pending mitigation
Whiskey Creek	DC	64	Com	R, CUW	Y	N	N	N	N	Y	N	Private property limited site access	High	Not Anticipated	Not Anticipated
Whiskey Creek	DC	65	Res	R, CUW	Y	N	N	N	N	N	N		Low	Not Anticipated	Not Anticipated
Whiskey Creek	DC	66	Res	R	Y	N	Y	N	N	N	N		Medium	Not Anticipated	Not Anticipated pending mitigation
Whiskey Creek	LID	2	Res	MG	Y	N	N	N	N	N	N		Low	Not Anticipated	Not Anticipated
Whiskey Creek	LID	10	Res	MG	N	N	N	N	N	N	N		Low	Not Anticipated	Not Anticipated
Whiskey Creek	LID	11	Res	MG	Y	N	N	N	N	N	N	Woodlands adjacent but likely outside proposed LID area	Low	Not Anticipated	Not Anticipated
Bear Creek	LID	27	Res	MG	N	N	N	N	N	N	N	Coniferous woodlands adjacent but likely outside proposed LID area	Low	Not Anticipated	Not Anticipated
Bear Creek	LID	34	Res	MG	Y	N	N	N	N	N	N	Woodlands adjacent but likely outside proposed LID area	Low	Not Anticipated	Not Anticipated
Dyments Creek	DC	27	Res	R, CUM	N	N	N	N	N	N	N		Low	Not Anticipated	Not Anticipated
Dyments Creek	LID	12	Res	MG	Y	N	N	N	N	N	N			Not Anticipated	Not Anticipated
Hewitt's Creek	LID	17	Res	MG	Y	N	N	N	N	N	N		Low	Not Anticipated	Not Anticipated
Hotchkiss Creek	DC	47	Ind	CUM (west side), CUW (east side)	N	N	Y	N	N	Y	N		Medium	Not Anticipated	Not Anticipated pending mitigation
Hotchkiss Creek	DC	51	Com/Ind	R, CUT, CUM	Y	N	N	N	N	N	Y	Mallard Ducks	Low	Not Anticipated	Not Anticipated
Hotchkiss Creek	LID	3	Res	MG	N	N	N	N	N	N	N		Low	Not Anticipated	Not Anticipated
Hotchkiss Creek	LID	5	Res	MG	N	N	N	N	N	N	N		Low	Not Anticipated	Not Anticipated
Hotchkiss Creek	LID	13	Res	MG	Y	N	N	N	N	N	N	Woodlands adjacent but likley outside proposed LID area	Low	Not Anticipated	Not Anticipated
Kidd's Creek	DC	17	Res	R, Cultural	N	N	N	N	N	N	N		Low	Not Anticipated	Not Anticipated
Kidd's Creek	DC	20	Res	R, CUT, MG	Y	N	Y	N	N	N	N		Medium	Not Anticipated	Not Anticipated pending mitigation
Little Lake	LID	32	Res	MG	Y	N	N	N	N	N	N		Low	Not Anticipated	Not Anticipated
Lovers Creek	DC	88	Ind	CUM, W	N	N	N	Y	Y	N	N		High	Not Anticipated	Not Anticipated pending mitigation
Lovers Creek	DC	96	Res	MG, construction	N	Y	N	N	N	N	Y	Bridge/culvert area may confer barn swallow nesting habitat	High	Not Anticipated	Not Anticipated
Lovers Creek	LID	7	Res	MG	N	N	Y	N	N	N	N		Medium	Not Anticipated	Not Anticipated pending mitigation
Lovers Creek	LID	19	Res	MG	N	N	N	N	N	N	N	Minor drainage feature running north-south in LID area	Low	Not Anticipated	Not Anticipated
Lovers Creek	LID	20	Res	MG	Y	N	N	N	N	N	Y	Proximal to Lovers Creek; woodlands to the east and south but likely outside proposed work area	High	Not Anticipated	Not Anticipated
Lovers Creek	LID	26	Res	MG	N	N	N	N	N	N	Y	Proximal to Lovers Creek	High	Not Anticipated	Not Anticipated
Whiskey Creek	DC	54	Res	CUM	N	N	Y	N	N	N	N		High	Not Anticipated	Not Anticipated pending mitigation
Whiskey Creek	DC	59	Res	R, small W, CUW	Y	N	N	N	Y	N	N		High	Not Anticipated	Not Anticipated

Orange shading = Locations of PPAS originally assessed but subsequently removed from consideration by CCTA post-Azimuth fieldwork; CCTA requested these locations be retained in report data tables

[1]Subwatersheds within Nottawasaga Valley Conservation Authority (NVCA) jurisdiction: Bear Creek, Little Lake, Georgian Creek; others are within Lake Simcoe Region Conservation Authority (LSRCA) jurisdiction. Ministry of Transportation Ontario (MTO), Sophia Creek Subwatershed, Mulcaster Drainage Area and annexation lands sites excluded from general surveys and tree inventory

[2]DC - Deficient Culvert, LID - Park LID

[3]Res = Residential, Ind = Industrial, Com = Commercial, Agr = Agricultural fields

[4]R = Riparian, W = Wetland, MG = Manicured Grass, CUT = Cultural Thicket, CUM = Cultural Meadow, CUW = Cultural Woodland, SWMP = Stormwater Management Pond. ELC codes used for general characterization only; formal ELC survey not conducted

[5]Based on general visual inspection only; species-specific surveys required to obtain more detailed information. Potential habitat sensitivities within and/or adjacent to general work area are noted as possible constraints.

[6]Habitat description outside general work area included in Comments as point of information where considered relevant.

[7]Anticipated Risk of Impact Ranks: High - presence of a PSW, Level 1 Natural Heritage Resource (NHR), known Significant Woodland, or two or more SAR/SAR habitat potential considerations; Medium - presence of non-PSW wetlands, non-Level 1 NHRs, one SAR/SAR habitat potential consideration, amphibian breeding wetland habitat potential or area-sensitive breeding bird habitat potential; Low - remaining features

[8]Additional SAR surveys not anticipated, except where indicated, based on mitigation recommended

[9]Pending additional information provided during Detailed Design, but MNRF permits not anticipated based on mitigation recommended; should permit(s) be required, Azimuth would be pleased to provide application service under separate scope

Anecdotal bird species observations from overall survey area: American Crow, American Goldfinch, Black-capped Chickadee, Blue Jay, Canada Goose, Cedar Waxwing, Gray Catbird, Great-crested Flycatcher, Mallard Duck, Mourning Dove, Northern Cardinal

Table reflects information available at the time. Field data are point-in-time assessments at one specific location along watercourse/in park and should not be interpreted otherwise. See tree inventory (to be provided) for additional information

Applicable designation indicated with Y - Yes, N - No

Table 4. General Fisheries Habitat Survey for Preliminary Preferred Alternative Solutions, City of Barrie Drainage Master Plan, 2017

Subwatershed[1]	PPAS Type[2]	CC Tatham Location ID	Fish Habitat Present (Direct, Seasonal, Indirect)[5]	Thermal Regime	Fish Community Present[5]	Water Temperature (°C)[5]	Perched Culvert/Barrier to Fish Passage (Yes/No)[5]	Anticipated Natural Heritage Sensitivity
Bear Creek	DC	80	Direct	Unknown	Common White Sucker, Mottled Sculpin, Brook Stickleback, Johnny Darter/Tesselated Darter, Brassy Minnow, Pearl Dace, Common Shiner, Rainbow Trout, Northern Redbelly Dace, Fathead Minnow, Eastern Blacknose Dace, Longnose Dace, Brown Trout, Brook Trout, Creek Chub[4]	15.1	No	High
Bear Creek	LID	28	Parks not assessed for fish/fish habitat.					
Bear Creek	LID	35	Parks not assessed for fish/fish habitat.					
Bear Creek	LID	38	Parks not assessed for fish/fish habitat.					
Bunkers Creek	DC	22	Direct	Northern and southern branches are coldwater, but southern main branch changes to warmwater downstream of Hwy 400[3]	Northern Pike, Common White Sucker, Northern Redbelly Dace, Finescale Dace, Brassy Minnow, Emerald Shiner, Spottail Shiner, Blacknose Dace, Creek Chub, Brook Stickleback, Trout-Perch, Rock Bass, Pumpkinseed, Yellow Perch[3]	17.4	No	Medium
Bunkers Creek	DC	23	Direct			17.9	No	Medium
Bunkers Creek	DC	24	Direct			17.4	No	Medium
Bunkers Creek	LID	6	Parks not assessed for fish/fish habitat.					
Dyments Creek	DC	28	Direct			16.8	No	Medium
Dyments Creek	DC	29	Direct			17.9	No	Medium
Dyments Creek	DC	30	Direct			19.1	No	Medium
Dyments Creek	DC	33	Direct			18.8	No	Medium
Dyments Creek	DC	34	Direct			18.5	No	Medium
Dyments Creek	DC	35	Direct			19.0	Yes	Medium
Dyments Creek	DC	36	Direct			18.9	No	Medium
Dyments Creek	DC	37	Direct			18.2	No	Medium
Dyments Creek	DC	38	Direct			18.2	Yes	Medium
Dyments Creek	DC	39	Direct			16.7	No	Medium
Dyments Creek	LID	4	Parks not assessed for fish/fish habitat.					
Georgian Creek	DC	82	Indirect	Unknown	Unknown	20.7	Yes	Low
Georgian Creek	LID	31	Parks not assessed for fish/fish habitat.					
Georgian Creek	LID	37	Parks not assessed for fish/fish habitat.					
Hewitt's Creek	LID	24	Parks not assessed for fish/fish habitat.					
Hewitt's Creek	LID	25	Parks not assessed for fish/fish habitat.					
Hotchkiss Creek	DC	41	Indirect	Coldwater[3]	Common White Sucker, Northern Redbelly Dace, Finescale Dace, Brassy Minnow, Hornyhead Chub, Sand Shiner, Blacknose Dace, Creek Chub, Pearl Dace, Stoneroller, Brook Stickleback, Trout-Perch, Mottled Sculpin. Before 1990 - Brook Trout, Emerald Shiner, Bluntnose Minnow, Fathead Minnow, Longnose Dace, Pumpkinseed[3]	(dry feature)	-	Medium
Hotchkiss Creek	DC	42	Indirect			(dry feature)	-	Medium
Hotchkiss Creek	DC	43	Seasonal			14.2	No	Medium
Hotchkiss Creek	DC	44	Indirect			14.4	No	Medium
Hotchkiss Creek	DC	48	Direct			15.3	No	High
Hotchkiss Creek	DC	49	Direct			15.3	No	High
Hotchkiss Creek	DC	50	Direct			15.5	No	High
Hotchkiss Creek	LID	1	Parks not assessed for fish/fish habitat.					
Johnson Drainage Area	LID	14	Parks not assessed for fish/fish habitat.					
Kidd's Creek	DC	18	Indirect			14.8	No	Low
Kidd's Creek	LID	15	Parks not assessed for fish/fish habitat.					
Little Lake	LID	29	Parks not assessed for fish/fish habitat.					
Lovers Creek	DC	89	Direct	Coldwater[3]	Rainbow Trout, Brook Trout, Central Mudminnow, Common White Shiner, Northern Redbelly Dace, Brassy Minnow, Hornyhead Chub, River Chub, Emerald Shiner, Common Shiner, Blackchin Shiner, Blacknose Shiner, Rosyface Shiner, Bluntnose Minnow, Fathead Minnow, Blacknose Dace, Longnose Dace, Creek Chub, Pearl Dace, Silver Shiner (THR), Brown Bullhead, Brook Stickleback	23.1	No	High
Lovers Creek	DC	90	Direct			14.6	No	High
Lovers Creek	DC	91	Direct			19.3	No	High
Lovers Creek	DC	92	Direct			13.9	No	High
Lovers Creek	DC	94	Direct			11.6	No	High
Lovers Creek	DC	95	Direct			12.2	No	High

Subwatershed[1]	PPAS Type[2]	CC Tatham Location ID	Fish Habitat Present (Direct, Seasonal, Indirect)[5]	Thermal Regime	Fish Community Present[5]	Water Temperature (°C)[5]	Perched Culvert/Barrier to Fish Passage (Yes/No)[5]	Anticipated Natural Heritage Sensitivity
Lovers Creek	DC	97	Direct		Silver Shiner (THR), Brown Bullhead, Brook Stickleback, Rock Bass, Pumpkinseed, Smallmouth Bass. Before 1990 - Finescale Dace.[3] Common White Sucker, Mottled Sculpin, Central Mudminnow[4]	13.7	No	High
Lovers Creek	DC	105	Direct			18.4	Yes	High
Lovers Creek	LID	23	Parks not assessed for fish/fish habitat.					
Whiskey Creek	DC	53	Seasonal	Coldwater[3]	Brook Trout, Rainbow Smelt, Golden Shiner, Emerald Shiner, Spottail Shiner, Bluntnose Minnow, Blacknose Dace, Longnose Dace, Creek Chub, Rock Bass, Pumpkinseed, Smallmouth Bass, Black Crappie, Iowa Darter, Logperch, Mottled Sculpin, Slimy Sculpin. Before 1990 - Central Mudminnow, Common White Sucker, Northern Redbelly Dace.[3] White Sucker, Yellow Perch[4]	14.9	No	Medium
Whiskey Creek	DC	57	Indirect			17.9	No	Medium
Whiskey Creek	DC	60	Direct			12.8	No	High
Whiskey Creek	DC	62	Direct			14.4	No	High
Whiskey Creek	DC	63	Direct			14.7	No	High
Whiskey Creek	DC	64	Direct			14.5	Yes	High
Whiskey Creek	DC	65	Direct			14.7	No	High
Whiskey Creek	DC	66	Direct			14.7	No	High
Whiskey Creek	LID	2	Parks not assessed for fish/fish habitat.					
Whiskey Creek	LID	10	Parks not assessed for fish/fish habitat.					
Whiskey Creek	LID	11	Parks not assessed for fish/fish habitat.					

[1]Subwatersheds within Nottawasaga Valley Conservation Authority (NVCA) jurisdiction: Bear Creek, Little Lake, Georgian Creek; others are within Lake Simcoe Region Conservation Authority (LSRCA) jurisdiction. Ministry of Transportation Ontario (MTO), Sophia Creek Subwatershed, Mulcaster Drainage Area and annexation lands sites excluded from general surveys and tree inventory

[2]DC - Deficient Culvert, LID - Park LID

[3]The Barrie Creeks, Lovers Creek and Hewitts Creek Subwatershed Plan. 2012. Lake Simcoe Region Conservation Authority. 324 pp.

[4]Ministry of Natural Resources and Forestry. Land Information Ontario

[5]Based on general visual inspection completed by Azimuth from August 16-18, 2017. MNRF background information will be incorporated into the habitat assessment once received. Additional surveys may be required to obtain more detailed information. Water temperature data recorded in the field based on a single location near the culvert

[6]Anticipated Natural Heritage Sensitivity: High - High risk of impact to fish/fish habitat sensitivities; Medium - moderate risk of impact to fish/fish habitat sensitivities; Low - Low risk of impact to fish/fish habitat sensitivities

Note: Correspondence with relevant agencies is anticipated to determine possible permit needs based on more information provided during Detailed Design;
Table reflects information available at the time. Field data are point-in-time assessments at one specific location along watercourse and should not be interpreted otherwise

Table 5a. Tree Inventory Table, City of Barrie Drainage Master Plan (Deficient Culverts), 2017

Culvert ID	Subwatershed	Tree ID	Common Name	Scientific Name	DBH (cm)	Observations
17	Kidds Creek	131	Manitoba Maple	*Acer negundo*	16	
		132	Norway Maple	*Acer platanoides*	76	
		133	Norway Maple	*Acer platanoides*	30	
18	Kidds Creek	134	European Buckthorn	*Rhamnus cathartica*	13 + 10 + 10	3 Stems
		135	White Ash	*Fraxinus americana*	15	
20	Kidds Creek	n/a	n/a	n/a	n/a	No trees at culvert
22	Bunkers Creek	130	Willow spp.	*Salix spp.*	30	
23	Bunkers Creek	125	Siberian Elm	*Ulmus pumila*	43	
		126	Siberian Elm	*Ulmus pumila*	10	
		127	Siberian Elm	*Ulmus pumila*	28	
		128	Siberian Elm	*Ulmus pumila*	18	
		129	Siberian Elm	*Ulmus pumila*	10 + 10	2 Stems
24	Bunkers Creek	122	Siberian Elm	*Ulmus pumila*	15 + 14 + 10	3 Stems
		123	Siberian Elm	*Ulmus pumila*	11 + 11	2 Stems
		124	Siberian Elm	*Ulmus pumila*	13	
27	Dyments Creek	84	Willow spp.	*Salix spp.*	18	
		85	White Birch	*Betula papyrifera*	14	
28	Dyments Creek	n/a	n/a	n/a	n/a	No trees at culvert location
29	Dyments Creek	n/a	n/a	n/a	n/a	No trees at culvert location
30	Dyments Creek	n/a	n/a	n/a	n/a	No trees at culvert location
33	Dyments Creek	n/a	n/a	n/a	n/a	No trees at culvert location
34	Dyments Creek	86	Manitoba Maple	*Acer negundo*	21	
		87	Manitoba Maple	*Acer negundo*	10	
		88	Manitoba Maple	*Acer negundo*	20	
		89	Manitoba Maple	*Acer negundo*	24 + 21 + 12	3 Stems
		90	Manitoba Maple	*Acer negundo*	14	
35	Dyments Creek	n/a	n/a	n/a	n/a	No trees at culvert location
36	Dyments Creek	91	Manitoba Maple	*Acer negundo*	24 + 19 + 14	3 Stems
		92	Manitoba Maple	*Acer negundo*	29 + 24 +17 + 15	4 Stems
		93	Manitoba Maple	*Acer negundo*	10	
		94	Manitoba Maple	*Acer negundo*	17	
		95	Manitoba Maple	*Acer negundo*	10 + 10	2 Stems
		96	Manitoba Maple	*Acer negundo*	23	
		97	Manitoba Maple	*Acer negundo*	24	
		98	Manitoba Maple	*Acer negundo*	20 + 11	2 Stems
		99	Manitoba Maple	*Acer negundo*	17	
		100	Manitoba Maple	*Acer negundo*	15	
		101	Manitoba Maple	*Acer negundo*	24	
		102	Manitoba Maple	*Acer negundo*	15	
		103	Manitoba Maple	*Acer negundo*	20	
		104	Manitoba Maple	*Acer negundo*	13	
		105	Manitoba Maple	*Acer negundo*	13	
		106	Manitoba Maple	*Acer negundo*	24	
		107	Manitoba Maple	*Acer negundo*	15	
		108	Manitoba Maple	*Acer negundo*	22	
37	Dyments Creek	109	Manitoba Maple	*Acer negundo*	25 + 24	2 Stems
		110	Manitoba Maple	*Acer negundo*	60 + 55 + 30	3 Stems
		111	Siberian Elm	*Ulmus pumila*	17 + 17 + 14 + 10	4 Stems
		112	Siberian Elm	*Ulmus pumila*	10	
		113	Siberian Elm	*Ulmus pumila*	11	
38	Dyments Creek	114	Manitoba Maple	*Acer negundo*	22	
		115	Manitoba Maple	*Acer negundo*	15	
		116	Manitoba Maple	*Acer negundo*	18	
		117	Willow spp.	*Salix spp.*	90	
		118	Siberian Elm	*Ulmus pumila*	92	

Culvert ID	Subwatershed	Tree ID	Common Name	Scientific Name	DBH (cm)	Observations
		119	Manitoba Maple	*Acer negundo*	45	
39	Dyments Creek	120	Black Locust	*Robinia pseudoacacia*	10	
		121	Black Locust	*Robinia pseudoacacia*	16	
137	Dyments Creek	n/a	n/a	n/a	n/a	No trees at culvert location
41	Hotchkiss Creek	83	White Spruce	*Picea glauca*	36	
42	Hotchkiss Creek	81	Manitoba Maple	*Acer negundo*	28	
		82	Common Pear	*Pyrus communis*	33	
43	Hotchkiss Creek	n/a	n/a	n/a	n/a	No trees at culvert location
47	Hotchkiss Creek	73	Manitoba Maple	*Acer negundo*	32 + 16	2 Stems
		74	Norway Maple	*Acer platanoides*	10	
		75	Manitoba Maple	*Acer negundo*	19	
		76	Manitoba Maple	*Acer negundo*	13	
		77	Manitoba Maple	*Acer negundo*	25 + 24 + 20 + 20	4 Stems
		78	Manitoba Maple	*Acer negundo*	17 + 13 + 11	3 Stems
		79	Manitoba Maple	*Acer negundo*	26 + 22 + 22	3 Stems
		80	Balsam Poplar	*Populus balsamifera*	39	
48	Hotchkiss Creek	72	Black Walnut	*Juglans nigra*	16	
49	Hotchkiss Creek	71	American Elm	*Ulmus americana*	17	
50	Hotchkiss Creek	56	Siberian Elm	*Ulmus pumila*	45	
		57	Siberian Elm	*Ulmus pumila*	10	
		58	Siberian Elm	*Ulmus pumila*	27	
		59	Siberian Elm	*Ulmus pumila*	34	
		60	Manitoba Maple	*Acer negundo*	30	
		61	Manitoba Maple	*Acer negundo*	14	
		62	Manitoba Maple	*Acer negundo*	37	
		63	Manitoba Maple	*Acer negundo*	35	
		64	Manitoba Maple	*Acer negundo*	13	
		65	Manitoba Maple	*Acer negundo*	55 + 39	2 Stems
		66	Manitoba Maple	*Acer negundo*	13	
		67	Manitoba Maple	*Acer negundo*	47	
		68	Manitoba Maple	*Acer negundo*	41	
		69	Manitoba Maple	*Acer negundo*	34	
		70	Manitoba Maple	*Acer negundo*	10	
51	Hotchkiss Creek	55	White Spruce	*Picea glauca*	13	
53	Whiskey Creek	n/a	n/a	n/a	n/a	No trees at culvert location
54	Whiskey Creek	n/a	n/a	n/a	n/a	No trees at culvert location
57	Whiskey Creek	6	Manitoba Maple	*Acer negundo*	55	
59	Whiskey Creek	7	Balsam Poplar	*Populus balsamifera*	15 + 15 + 14	3 Stems
		8	Balsam Poplar	*Populus balsamifera*	16 + 14	2 Stems
		9	Balsam Poplar	*Populus balsamifera*	14	
		10	Balsam Poplar	*Populus balsamifera*	16	
		11	Balsam Poplar	*Populus balsamifera*	15	
		12	Balsam Poplar	*Populus balsamifera*	12	
		13	Manitoba Maple	*Acer negundo*	18	
		14	Eastern White Cedar	*Thuja occidentalis*	18	
		15	Eastern White Cedar	*Thuja occidentalis*	14 + 12 + 11 + 10	4 Stems
		16	Eastern White Cedar	*Thuja occidentalis*	19	
		17	Eastern White Cedar	*Thuja occidentalis*	18	
		18	Eastern White Cedar	*Thuja occidentalis*	16 + 12 + 10	3 Stems
		19	Eastern White Cedar	*Thuja occidentalis*	19 + 17	2 Stems
		20	Manitoba Maple	*Acer negundo*	19 + 19	2 Stems
		21	Trembling Aspen	*Populus tremuloides*	11	
		22	White Spruce	*Picea glauca*	20 + 18	2 Stems
60	Whiskey Creek	23	Trembling Aspen	*Populus tremuloides*	12	
		24	Trembling Aspen	*Populus tremuloides*	18	
		25	Trembling Aspen	*Populus tremuloides*	26	Dead Tree
		26	American Elm	*Ulmus americana*	17	
		27	Eastern White Cedar	*Thuja occidentalis*	12	

Culvert ID	Subwatershed	Tree ID	Common Name	Scientific Name	DBH (cm)	Observations
		28	Norway Spruce	*Picea abies*	66	Tree possibly on private property
62	Whiskey Creek	n/a	n/a	n/a	n/a	No trees at culvert location
63	Whiskey Creek	29	Willow spp.	*Salix spp.*	15 + 13 + 10	3 Stems
64	Whiskey Creek	30	Balsam Poplar	*Populus balsamifera*	23	
		31	Balsam Poplar	*Populus balsamifera*	22	
		32	Eastern White Cedar	*Thuja occidentalis*	18	
		33	Eastern White Cedar	*Thuja occidentalis*	18	
		34	Balsam Poplar	*Populus balsamifera*	10	
		35	Balsam Poplar	*Populus balsamifera*	15	
		36	Balsam Poplar	*Populus balsamifera*	12	
		37	Balsam Poplar	*Populus balsamifera*	12	
		38	Balsam Poplar	*Populus balsamifera*	15	
		39	Balsam Poplar	*Populus balsamifera*	15	
		40	Manitoba Maple	*Acer negundo*	25	
		41	White Birch	*Betula papyrifera*	10	
		42	Manitoba Maple	*Acer negundo*	29	
		43	Manitoba Maple	*Acer negundo*	17	
		44	Manitoba Maple	*Acer negundo*	13	
		45	Trembling Aspen	*Populus tremuloides*	14	Dead Tree
		46	Trembling Aspen	*Populus tremuloides*	22	Dead Tree
		47	Trembling Aspen	*Populus tremuloides*	14	
		48	Trembling Aspen	*Populus tremuloides*	28	
65	Whiskey Creek	49	Balsam Poplar	*Populus balsamifera*	25	
		50	Norway Maple	*Acer platanoides*	15	
		51	Manitoba Maple	*Acer negundo*	12	
66	Whiskey Creek	n/a	n/a	n/a	n/a	No trees at culvert location
80	Bear Creek	n/a	n/a	n/a	n/a	No trees at culvert location
82	Georgian Creek	n/a	n/a	n/a	n/a	No trees at culvert location
88	Lovers Creek	n/a	n/a	n/a	n/a	No trees at culvert location
89	Lovers Creek	n/a	n/a	n/a	n/a	No trees at culvert location
90	Lovers Creek	1	White Ash	*Fraxinus americana*	21	Dead Tree
91	Lovers Creek	n/a	n/a	n/a	n/a	No trees at culvert location
92	Lovers Creek	n/a	n/a	n/a	n/a	No trees at culvert location
94	Lovers Creek	n/a	n/a	n/a	n/a	No trees at culvert location
95	Lovers Creek	n/a	n/a	n/a	n/a	No trees at culvert location
96	Lovers Creek	n/a	n/a	n/a	n/a	No trees at culvert location
97	Lovers Creek	2	Eastern White Cedar	*Thuja occidentalis*	30 + 25	2 Stems
		3	Eastern White Cedar	*Thuja occidentalis*	18	Dead Tree
		4	Eastern White Cedar	*Thuja occidentalis*	20	
		5	Eastern White Cedar	*Thuja occidentalis*	18	
105	Lovers Creek	52	Red Oak	*Quercus rubra*	30	
		53	White Ash	*Fraxinus americana*	24	
		54	Willow spp.	*Salix spp.*	42	

Table 5b. Tree Inventory Table, City of Barrie Drainage Master Plan (Park LIDs), 2017

Park ID	Subwatershed	Park Name	Tree ID	Common Name	Scientific Name	DBH (cm)	Observations
1	Hotchkiss Creek	Allandale Heights Park	77	Sugar Maple	*Acer saccharum*	14	
			78	Sugar Maple	*Acer saccharum*	16	
			79	Sugar Maple	*Acer saccharum*	54	
			80	Green Ash	*Fraxinus pennsylvanica*	66	
			81	Sugar Maple	*Acer saccharum*	50	
			82	Sugar Maple	*Acer saccharum*	65	
			83	Green Ash	*Fraxinus pennsylvanica*	63	
			84	Green Ash	*Fraxinus pennsylvanica*	55	
			85	Sugar Maple	*Acer saccharum*	43	
			86	Sugar Maple	*Acer saccharum*	43	
2	Whiskey Creek	Assikinack Park	90	Norway Maple	*Acer platanoides*	29	
			91	White Birch	*Betula papyrifera*	16	
			92	Blue Spruce	*Picea pungens*	32	
3	Hotchkiss Creek	Blair Park	74	Norway Maple	*Acer platanoides*	12	
			75	Littleleaf Linden	*Tilia cordata*	40	
			76	Norway Maple	*Acer platanoides*	17	
4	Dyments Creek	Cloughley Park	39	Honey Locust	*Gleditsia triacanthos*	18	
			40	Honey Locust	*Gleditsia triacanthos*	23	
			41	Honey Locust	*Gleditsia triacanthos*	25	
5	Hotchkiss Creek	Elizabeth Park	n/a	n/a	n/a	n/a	No trees in area of proposed LID feature
6	Bunkers Creek	Gibbon Park	42	Red Oak	*Quercus rubra*	8	
			43	Red Oak	*Quercus rubra*	6	
			44	Red Oak	*Quercus rubra*	6	
			45	Red Oak	*Quercus rubra*	6	
7	Lovers Creek	Greenfield Park	87	Common Hackberry	*Celtis occidentalis*	17	
			88	Norway Maple	*Acer platanoides*	46	
			89	Silver Maple	*Acer saccharinum*	49	
10	Whiskey Creek	Mapleton Park	n/a	n/a	n/a	n/a	No trees in area of proposed LID feature
11	Whiskey Creek	Montserrand Park	73	Sugar Maple	*Acer saccharum*	26	
12	Dyments Creek	Pringle Park	46	White Spruce	*Picea glauca*	3	
			47	Eastern White Pine	*Pinus strobus*	5	
			48	Horse Chestnut	*Aesculus hippocastanum*	3	
			49	Eastern White Pine	*Pinus strobus*	20	
			50	White Spruce	*Picea glauca*	4	
			51	Sugar Maple	*Acer saccharum*	21	
			52	Sugar Maple	*Acer saccharum*	4	
			53	Horse Chestnut	*Aesculus hippocastanum*	3	
			54	Sugar Maple	*Acer saccharum*	11	
			55	Red Maple	*Acer rubrum*	3	
			56	Eastern White Pine	*Pinus strobus*	21	
13	Hotchkiss Creek	Shear Park	n/a	n/a	n/a	n/a	No trees in area of proposed LID feature
14	Johnson Drainage Area	Shoreview Park	16	Sugar Maple	*Acer saccharum*	12	
			17	Sugar Maple	*Acer saccharum*	14	
			18	Sugar Maple	*Acer saccharum*	23	
			19	Sugar Maple	*Acer saccharum*	27	
			20	Sugar Maple	*Acer saccharum*	25	
15	Kidd's Creek	Sunnidale Park	37	Eastern White Cedar	*Thuja occidentalis*	22+22+2(	5 Stems
			38	White Spruce	*Picea glauca*	47	
17	Hewitt's Creek	Bayshore Park	93	Littleleaf Linden	*Tilia cordata*	10	
			94	Norway Spruce	*Picea abies*	50	
			95	Norway Spruce	*Picea abies*	45	
			96	Black Walnut	*Juglans nigra*	3	
19	Lovers Creek	Catherine Park	128	Blue Spruce	*Picea pungens*	12	
			129	Blue Spruce	*Picea pungens*	15	
			130	Red Maple	*Acer rubrum*	10	
			131	Red Maple	*Acer rubrum*	10	
			132	Honey Locust	*Gleditsia triacanthos*	14	
			133	Honey Locust	*Gleditsia triacanthos*	12	
			134	Honey Locust	*Gleditsia triacanthos*	10	
			135	Honey Locust	*Gleditsia triacanthos*	10	
			136	Austrian Pine	*Pinus nigra*	20	
			137	Austrian Pine	*Pinus nigra*	12	
			138	Austrian Pine	*Pinus nigra*	18	
			139	Honey Locust	*Gleditsia triacanthos*	11	
			140	Honey Locust	*Gleditsia triacanthos*	11	
			141	Honey Locust	*Gleditsia triacanthos*	12	
			142	Austrian Pine	*Pinus nigra*	15	
			143	Austrian Pine	*Pinus nigra*	10	
			144	Austrian Pine	*Pinus nigra*	13	
20	Lovers Creek	D'Ambrosio Park	n/a	n/a	n/a	n/a	No trees in area of proposed LID feature
23	Lovers Creek	Madeline Park	120	Blue Spruce	*Picea pungens*	25	
			121	Blue Spruce	*Picea pungens*	25	
			122	Blue Spruce	*Picea pungens*	25	
			123	Sugar Maple	*Acer saccharum*	21	
			124	Sugar Maple	*Acer saccharum*	20	
			125	Sugar Maple	*Acer saccharum*	15	
			126	Blue Spruce	*Picea pungens*	28	
			127	Blue Spruce	*Picea pungens*	28	

Park ID	Subwatershed	Park Name	Tree ID	Common Name	Scientific Name	DBH (cm)	Observations
24	Hewitt's Creek	Queensway/Hyde Park	100	Littleleaf Linden	*Tilia cordata*	10	
			101	Littleleaf Linden	*Tilia cordata*	9	
			102	Littleleaf Linden	*Tilia cordata*	8	
			103	Red Oak	*Quercus rubra*	7	
			104	Honey Locust	*Gleditsia triacanthos*	8	
			105	Honey Locust	*Gleditsia triacanthos*	9	
			106	Red Oak	*Quercus rubra*	10	
			107	Red Oak	*Quercus rubra*	11	
			108	Red Oak	*Quercus rubra*	5	
			109	Sugar Maple	*Acer saccharum*	12	
			110	Sugar Maple	*Acer saccharum*	9	
			111	Red Oak	*Quercus rubra*	11	
			112	Red Oak	*Quercus rubra*	12	
			113	Red Oak	*Quercus rubra*	12	
			114	Red Oak	*Quercus rubra*	11	
			115	Red Oak	*Quercus rubra*	9	
			116	Sugar Maple	*Acer saccharum*	9	
			117	Red Maple	*Acer rubrum*	7	
			118	Silver Maple	*Acer saccharinum*	8	
			119	Silver Maple	*Acer saccharinum*	6	
25	Hewitt's Creek	Sandringham Park	97	Scotch Maple	*Pinus sylvestris*	19	
			98	White Ash	*Fraxinus americana*	16	
			99	Common Apple	*Malus pumila*	16	
26	Lovers Creek	Shalom Park	145	Red Maple	*Acer rubrum*	7	
			146	Red Maple	*Acer rubrum*	6	
			147	Red Maple	*Acer rubrum*	5	
			148	White Spruce	*Picea glauca*	6	
			149	White Spruce	*Picea glauca*	8	
			150	White Spruce	*Picea glauca*	9	
27	Bear Creek	Batteaux Park	n/a	n/a	n/a	n/a	No trees in area of proposed LID feature
28	Bear Creek	Bear Creek Park	65	Sugar Maple	*Acer saccharum*	20	
			66	Green Ash	*Fraxinus pennsylvanica*	22	
			67	White Ash	*Fraxinus americana*	17	
			68	Sugar Maple	*Acer saccharum*	12	
			69	Green Ash	*Fraxinus pennsylvanica*	15	
29	Little Lake	Cartwright Park	21	Norway Maple	*Acer platanoides*	28	
			22	Eastern White Pine	*Pinus strobus*	32	
			23	Eastern White Pine	*Pinus strobus*	26 + 16	2 Stems
			24	Eastern White Pine	*Pinus strobus*	21	
			25	Common Hackberry	*Celtis occidentalis*	14	
			26	Blue Spruce	*Picea pungens*	28	
			27	Eastern White Pine	*Pinus strobus*	18	
			28	Sugar Maple	*Acer saccharum*	32	
31	Georgian Creek	Dunsmore Park	n/a	n/a	n/a	n/a	No trees in area of proposed LID feature
32	Little Lake	East Bayfield Park	29	Green Ash	*Fraxinus pennsylvanica*	12	
			30	Green Ash	*Fraxinus pennsylvanica*	11	
			31	Green Ash	*Fraxinus pennsylvanica*	10	
			32	Red Oak	*Quercus rubra*	10	
			33	Red Oak	*Quercus rubra*	8	
			34	Red Oak	*Quercus rubra*	8	
			35	Horse Chestnut	*Aesculus hippocastanum*	11	
			36	Horse Chestnut	*Aesculus hippocastanum*	10	
34	Bear Creek	Ferndale Park	57	Blue Spruce	*Picea pungens*	25	
			58	Blue Spruce	*Picea pungens*	22	
			59	Blue Spruce	*Picea pungens*	21	
			60	Red Maple	*Acer rubrum*	12	
			61	Sugar Maple	*Acer saccharum*	23	
			62	Blue Spruce	*Picea pungens*	20	
			63	Blue Spruce	*Picea pungens*	25	
			64	Blue Spruce	*Picea pungens*	25	
35	Bear Creek	Lougheed Park	n/a	n/a	n/a	n/a	No trees in area of proposed LID feature
37	Georgian Creek	Strabane Park	1	Sugar Maple	*Acer saccharum*	11	
			2	Red Oak	*Quercus rubra*	10	
			3	Sugar Maple	*Acer saccharum*	10	
			4	Red Oak	*Quercus rubra*	10	
			5	Sugar Maple	*Acer saccharum*	5	
			6	Sugar Maple	*Acer saccharum*	5	
			7	Sugar Maple	*Acer saccharum*	14	
			8	Sugar Maple	*Acer saccharum*	10	
			9	Sugar Maple	*Acer saccharum*	5	
			10	White Oak	*Quercus alba*	15	
			11	White Oak	*Quercus alba*	10	
			12	Red Maple	*Acer rubrum*	10	
			13	Red Maple	*Acer rubrum*	10	
			14	Red Maple	*Acer rubrum*	10	
			15	Sugar Maple	*Acer saccharum*	5	
38	Bear Creek	Wessenger Park	70	Sugar Maple	*Acer saccharum*	10	
			71	Sugar Maple	*Acer saccharum*	14	
			72	Sugar Maple	*Acer saccharum*	7	

Table 6. Provisional Species at Risk Assessment for Locations of Preliminary Proposed Alternative Solutions, City of Barrie Drainage Master Plan, 2017

Common Name	Species Name	ESA	Key Habitats Used By Species [1]	Preliminary Assessment [2]
Bank Swallow	*Riparia riparia*	THR	Nests in burrows excavated in natural and human-made settings with vertical sand and silt faces. Commonly found in sand or gravel pits, road cuts, lakeshore bluffs, and along riverbanks (COSEWIC, 2013b). ESA Protection: Species and general habitat protection	**Species has potential to occur in area of culvert 105 where there is an exposed sand cliff face. Species not expected to occur at other PPAS locations. Additional detailed surveys and appropriate avoidance/mitigation measures are recommended.**
Barn Swallow	*Hirundo rustica*	THR	Ledges and walls of man-made structures such as buildings, barns, boathouses, garages, culverts and bridges. Also nest in caves, holes, crevices and cliff ledges (COSEWIC, 2011). ESA Protection: Species and general habitat protection	**Species has potential to occur in in large open span culverts. Additional detailed surveys and appropriate avoidance/mitigation measures are recommended.**
Blanding's Turtle	*Enydoidea blandingii*	THR	Blanding's Turtles are a primarily aquatic species that prefer wetland habitats, lakes, ponds, slow-moving streams, etc., however they may utilize upland areas to search for suitable basking and nesting sites. In general, preferred wetland sites are eutrophic and characterized by clear, shallow water, with organic substrates and high density of aquatic vegetation (COSEWIC, 2005). ESA Protection: Species and general habitat protection	**Potential for summer or nesting habitat for the species in area of culverts 24, 35 (Dyments Pond), 36, 62, 80, 88, 90, 91 and 92, or park LIDs 25, 26 and 31. Appropriate avoidance/mitigation measures are recommended.**
Butternut	*Juglans cinerea*	END	Commonly found in riparian habitats, but is also found in rich, moist, well-drained loams, and well-drained gravels. Butternut is intolerant of shade (COSEWIC, 2003). ESA Protection: Species and general habitat protection	**Species not observed during tree inventory. A search for Butternut should occur at any sites that were not a part of Azimuth's 2017 field investigations.**
Chimney Swift	*Chaetura pelagica*	THR	Nests primarily in chimneys though some populations (*i.e* . in rural northern areas) may nest in cavity trees (COSEWIC, 2007g). Recent changes in chimney design may be a significant factor in recent declines in numbers (Cadman *et al* ., 2007d). ESA Protection: Species and general habitat protection	Species not expected to occur; habitat not representative of key habitat requirements. Work is expected to remain within ROWs.
Common Nighthawk	*Chordeiles minor*	SC	Open habitats including sand dunes, beaches, recently logged/burned over areas, forest clearings, short grass prairies, pastures, open forests, bogs, marshes, lakeshores, gravel roads, mine tailings, quarries, and other open relatively clear areas (COSEWIC, 2007a). ESA Protection: N/A	Species not expected to occur; habitat not representative of key habitat requirements. The work area is anticipated to remain within ROWs.

Common Name	Species Name	ESA	Key Habitats Used By Species [1]	Preliminary Assessment [2]
Eastern Ribbonsnake	*Thamnophis sauritus*	SC	Found in wetland habitats with both flowing and standing water such as marshes, bogs, fens, ponds, lake shorelines and wet meadows. Most sightings occur near the water's edge (COSEWIC, 2012a). ESA Protection: N/A	While there is potential for the species to occur in area of culverts 24, 35 (Dyments Pond), 36, 62, 80, 88, 90, 91 and 92, or park LIDs 25, 26 and 31, the PPAS locations are generally in developed areas with heavy traffic - not considered ideal habitat for the species. As such, the species would not be expected to occur. The work area is anticipated to remain within ROWs.
Eastern Wood-pewee	*Contopus virens*	SC	Mostly in mature and intermediate-age deciduous and mixed forests having an open understorey. It is often associated with forests dominated by Sugar Maple and oak. Usually associated with forest clearings and edges within the vicinity of its nest (COSEWIC, 2012c). ESA Protection: N/A	While there is potential for the species to occur in area of culverts 28, 64, 91, 92, 94 and 95, or park LID 13, the areas would not be considered ideal habitat due to the extent of development. As such, the species would not be expected to occur. Work is anticipated to be limited to ROWs.
Grasshopper Sparrow *pratensis* subspecies	*Ammodramus savannarum pratensis*	SC	Typically breeds in large human-created grasslands (≥5 ha), such as pastures and hayfields, and natural prairies, such as alvars, characterized by well-drained, often poor soil dominated by low, sparse perennial herbaceous vegetation (COSEWIC, 2013c). ESA Protection: N/A	Species not expected to occur; habitat not representative of key habitat requirements. The work area is anticipated to remain within ROWs.
Little Brown Myotis	*Myotis lucifugus*	END	Forests and regularly aging human structures as maternity roost sites. Regularly associated with attics of older buildings and barns for summer maternity roost colonies. Overwintering sites are characteristically mines or caves, but can often include buildings (MNRF, 2014) (COSEWIC, 2013a). ESA Protection: Species and general habitat protection	**Potential for the species to occur in area of culverts 18, 20, 22-24, 28, 35, 37, 38, 39, 44, 47, 48, 50, 53, 62, 66, 91 and 92, or in the areas of park LIDs 2, 7 and 13. The prevalence of clusters of large, mature trees suitable for roosting may be limited. Appropriate avoidance/mitigation measures are recommended.**
Monarch	*Danaus plexippus*	SC	Breeding habitat is confined to sites where milkweeds, the sole food of caterpillars, grow. Milkweeds grow in a variety of environments, including meadows in farmlands, along roadsides and in ditches, open wetlands, dry sandy areas, short and tall grass prairie, river banks, irrigation ditches, arid valleys, and south-facing hills (COSEWIC, 2010). ESA Protection: N/A	One Monarch Butterfly observed at culvert 28 but no milkweed observed at time of survey. Species not anticipated to actively use habitat within ROWs of busy, developed areas.
Northern Myotis	*Myotis septentrionalis*	END	Maternity roost sites are generally located within deciduous and mixed forests and focused in snags including loose bark and cavities of trees. Overwintering sites are characteristically mines or caves (COSEWIC, 2013a). ESA Protection: Species and general habitat protection	**Potential for species to occur in area of culverts 18, 20, 22-24, 28, 35, 37, 38, 39, 44, 47, 48, 50, 53, 62, 66, 91 and 92, or park LIDs 2, 7 and 13. The prevalence of clusters of large, mature trees suitable for roosting may be limited. Appropriate avoidance/mitigation measures are recommended.**

Common Name	Species Name	ESA	Key Habitats Used By Species [1]	Preliminary Assessment [2]
Olive-sided Flycatcher	*Contopus cooperi*	SC	Natural forest openings, forest edges near natural openings (such as wetlands) or open to semi-open forest stands. Occasionally human made openings (such as clear cuts). Presence of tall snags and residual live trees is essential (COSEWIC, 2007e). ESA Protection: N/A	Species not expected to occur; habitat not representative of key habitat requirements.
Peregrine Falcon	*Falco peregrinus*	SC	Most nest on cliff ledges or crevices, but some will use tall buildings or bridges near good foraging areas. Nests are typically close to bodies of water (COSEWIC, 2007b). ESA Protection: N/A	Although the species has potential to occur in area of park LID 31 (proximal to tall buildings at Royal Victoria Hospital), nearby availability of good foraging areas and sufficiently large bodies of water would be considered limited. As such, the species would not be expected to occur. Work is anticipated to be limited to within the ROWs.
Red-headed Woodpecker	*Melanerpes erythrocephalus*	SC	Occurs in open deciduous forests, particularly those dominated by oak and beech, grasslands, forest edges, orchards, pastures along rivers and roads, urban parks, golf courses, cemeteries, beaver ponds and timber stands that have been treated with herbicides (COSEWIC, 2007c). ESA Protection: N/A	Although the species has potential to occur in the area of culvert 37 (Dyments Creek), the work is anticipated to be limited to within the ROWs. Species not expected to occur at other sites.
Snapping Turtle	*Chelydra serpentina*	SC	Habitat is characterized by slow-moving water with a soft mud bottom and dense aquatic vegetation. Often located in ponds, sloughs, shallow bays or river edges and slow streams, or areas combining several of these wetland habitats (COSEWIC, 2008). ESA Protection: N/A	**Potential for species to occur in area of culverts 24, 35 (Dyments Pond), 36, 62, 80, 88, 90, 91 and 92, or park LIDs 25, 26 and 31. Appropriate avoidance/mitigation measures are recommended.**
Tri-colored Bat	*Perimyotis subflavus*	END	Maternity roost sites include forests and modified landscapes (barns or human-made structures). Overwintering sites include mines and caves (COSEWIC, 2013a). ESA Protection: Species and general habitat protection	**Potential for species to occur in area of culverts 18, 20, 22-24, 28, 35, 37, 38, 39, 44, 47, 48, 50, 53, 62, 66, 91 and 92, or park LIDs 2, 7 and 13. Appropriate avoidance/mitigation measures are recommended.**
Wood Thrush	*Hylocichla mustelina*	SC	Found in moist, deciduous hardwood or mixed stands, often previously disturbed, with a dense deciduous undergrowth and with tall trees for singing perches (COSEWIC, 2012d). ESA Protection: N/A	Species not expected to occur; habitat not representative of key habitat requirements.

[1] Habitat as outlined within the MNRF's Species at Risk in Ontario website files (https://www.ontario.ca/environment-and-energy/species-risk-ontario-list), or Species Specific COSEWIC Reports referenced in this document.

Species at Risk in Ontario List (June 13, 2017)
Best, T., and J. Jennings. 1997. Mammalian Species, *Myotis leibii* . The American Society of Mammalogists. No. 547, pp. 1-6, 5 figs.

Common Name	Species Name	ESA	Key Habitats Used By Species [1]	Preliminary Assessment [2]

[1] Cadman, M., D. Sutherland, G. Beck, D. Lepage and A. Couturier. 2007. Atlas of the Breeding Birds of Ontario 2001-2005. Bird Studies Canada, Environment
COSEWIC 2003. COSEWIC assessment and status report on the Butternut *Juglans cinerea* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 32 pp.
COSEWIC. 2005. COSEWIC assessment and update status report on the Blanding's Turtle *Enydoidea blandingii* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa.viii +40 pp.
COSEWIC. 2007a. COSEWIC assessment and status report on the Common Nighthawk *Chordeiles minor* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 35 pp.
COSEWIC. 2007b. COSEWIC assessment and status report on the Peregrine Falcon *Falco peregrinus* (*pealei* subspecies - *Falco peregrinus* and *pealei anatum/tundrius* - *Falco peregrinus anatum/tundrius*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 45 pp.
COSEWIC. 2007c. COSEWIC assessment and status report on the Red-headed Woodpecker *Melanerpes erythrocephalu* s in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 27 pp.
COSEWIC. 2007d. COSEWIC assessment and update status report on the Chimney Swift *Chaetura pelagic* a in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 49 pp.
COSEWIC. 2007e. COSEWIC assessment and status report on the Olive-sided Flycatcher *Contopus cooperi* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 25 pp.
COSEWIC. 2008. COSEWIC assessment and status report on the Snapping Turtle *Chelydra serpentina* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 47 pp.
COSEWIC. 2010. COSEWIC assessment and status report on the Monarch *Danaus plexippus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 43 pp.
COSEWIC. 2011. COSEWIC assessment and update status report on the Barn Swallow *Hirundo rustica* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 37 pp.
COSEWIC. 2012a. COSEWIC assessment and status report on the Eastern Ribbonsnake *Thamnophis sauritus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xii + 39 pp.
COSEWIC. 2012b. COSEWIC assessment and status report on the Northern Map Turtle *Graptemys geographica* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 63 pp.
COSEWIC. 2012c. COSEWIC assessment and status report on the Eastern Wood-pewee *Contopus virens* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 39 pp.
COSEWIC. 2012d. COSEWIC assessment and status report on the Wood Thrush *Hylocichla mustelina* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 46 pp.
COSEWIC. 2013a. COSEWIC assessment and update status report on the Little Brown Myotis *Myotis lucifugus* , Northern Myotis *Myotis septentrionalis* and Tri-colored Bat *Perimyotis subfalvus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xxiv + 93 pp.
COSEWIC. 2013b. COSEWIC assessment and update status report on the Bank Swallow *Riparia riparia* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 48 pp.

COSEWIC. 2013c. COSEWIC assessment and status report on the Grasshopper Sparrow pratensis subspecies *Ammodramus savannarum pratensis* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 36 pp.
Ministry of Natural Resources and Forestry (MNRF). 2014. Eastern Small-footed Bat. Queen's Printer for Ontario. https://www.ontario.ca/environment-and-energy/eastern-small-footed-bat
Ministry of Natural Resources and Forestry (MNRF). 2016. Species at Risk in Ontario. http://www.ontario.ca/environment-and-energy/species-risk
[2]Detailed species surveys will be required to determine whether the species indicated are present; SWMP - Stormwater Management Pond; assessments may be modified as additional information becomes available

APPENDICES

APPENDIX A

OP Schedule H - Natural Heritage Resources

Township Of Springwater

Township Of Oro-Medonte

Township Of Essa

Little Lake

Kempenfelt Bay

Refer to the Hewitt's Secondary Plan and associated schedules in Section 9 of this Plan

Refer to the Salem Secondary Plan and associated schedules in Section 8 of this Plan

Natural Heritage Resource Classifications

SCHEDULE H - NATURAL HERITAGE RESOURCES

Level 1 resources are critical components of the Natural Heritage Resource network within the City including:

a) Provincially significant wetlands
b) Non-Provincially significant wetlands greater than 0.5 hectares
c) Significant woodlands greater than 10 hectares
d) Significant habitat of endangered and threatened species
e) Watercourses, minimum vegetation protection zones and connectivity linkages
f) Lands through the site specific planning and development process identified as Environmental Protection

Level 2 resources are significant components of the Natural Heritage Resource network within the City including:

a) Significant valleylands
b) Provincially significant life science ANSI
c) Significant wildlife habitat, including but not limited to core winter deer yards, colonial water-bird nesting sites, rare vegetation communities (i.e. tall grass prairies), and significant areas of vernal pools
d) Watercourses, minimum vegetation protection zones and connectivity linkages
e) Woodlands greater than 4 hectares and less than 10 hectares

Level 3 resources are significant and supporting components of the Natural Heritage Resource network within the City including:

a) Regionally significant life science ANSI
b) Woodlands greater than 0.5 hectares and less than 4 hectares
c) Woodlands within 30 metres of a Level 1 or 2 feature
d) Cultural thicket or cultural meadow communities contiguous with woodland or wetland patches
e) Connectivity linkages

OFFICIAL PLAN
Schedule H
Natural Heritage Resources

March 2017

Natural Heritage Resource Classification

- Level 1
- Level 1 With Existing Development Designation Subject to 3.5.2.4 d
- Level 2
- Level 3

The City of BARRIE

1:20,000

0 0.5 1 2 km

N

GIS Branch 4/5/2017

APPENDIX B

OP Schedule A – Land Use

OFFICIAL PLAN

Schedule A
Land Use

March 2017

Refer to the Salem Secondary Plan and associated schedules in Section 8 of this Plan

Refer to the Hewitt's Secondary Plan and associated schedules in Section 9 of this Plan

- Residential
- City Centre
- General Commercial
- Community Centre Commercial
- Regional Centre Commercial
- Business Park
- General Industrial
- Highway 400 Industrial
- Restricted Industrial
- Institutional
- Educational Institutional
- Major Institutional
- Open Space
- Environmental Protection Area
- Water Treatment Centre
- Waste Management Facility
- Future Urban
- Waste Disposal Area - Non decision per section 4.7.2.8
- Application Before the Ontario Municipal Board (OMB)
- Secondary Plan Boundary
- City Boundary

The City of BARRIE

1:20,000

0 0.5 1 2 km

N

GIS Branch 4/5/2017

OFFICIAL PLAN
Schedule F
Conservation Authority Regulation Limits
Office Consolidation
January 2018

Watercourse

30 Metre Watercourse Setback

Waterbody

Lake Simcoe Region Conservation Authority Regulation Limits

Nottawasaga Valley Conservation Authority Regulation Limits

Lake Simcoe Regional Conservation Authority

Nottawasaga Valley Conservation Authority

Barrie

1:20,000

0 0.5 1 2 km

N

GIS Branch 4/26/2018

APPENDIX C

OP Schedule F – Conservation Authority Regulation Limits

OFFICIAL PLAN
Schedule F
Conservation Authority Regulation Limits
March 2017

Watercourse

30 Metre Watercourse Setback

Waterbody

Lake Simcoe Region Conservation Authority Regulation Limit

Nottawasaga Valley Conservation Authority Regulation Limit

Lake Simcoe Region Conservation Authority Boundary

Nottawasaga Valley Conservation Authority Boundary

The City of BARRIE

1:20,000

0 0.5 1 2 km

N

GIS Branch 4/5/2017

APPENDIX D

PPAS Mapping From CCT

DISCLAIMER

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GENERAL RECOMMENDATIONS

AS PART OF ROAD RENEWAL PROJECTS, MAJOR OVERLAND FLOW DEFICIENCIES ARE TO BE EVALUATED AND ADDRESSED WHERE FEASIBLE THROUGH OVERSIZING STORM SEWERS, ADJUSTING ROAD PROFILES/CROSS-SECTIONS OR OTHER MAJOR OVERLAND FLOW ROUTE IMPROVEMENTS.

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DEFICIENT CULVERTS / CROSSINGS

100 YEAR DESIGN STORM CAPACITY

82 PENETANGUISHENE ROAD

SWMF RETROFIT/CREATION

75 SWMF GR01

76 SWMF GR04

77 SWMF LT01

84 SWMF LTGM

89 SWMF LT05

91 SWMF LT04

CHANNEL IMPROVEMENTS

24 REACH LI-1 (STABILIZE EXISTING BANK EROSION/FAILURE)

TRUNK STORM SEWER IMPROVEMENTS

3 JOHNSON ST., GROVE ST. E. AND HICKLING TRAIL (FROM SWMF GR04 TO SWMF GR01)

4 HARROGATE CT., JOHNSON ST., CHELTENHAM RD., LARKEN DR. AND QUINTIN RD. (FROM 165 DUNSMORE TO PENETANGUISHENE RD.)

5 LIVIA HERMAN WAY., SIMPSON ST. AND CARDINAL ST. (SWMF LT02 TO SWMF LTO1)

8 JOHNSON ST. (FROM STEEL ST. TO KEMPENFELT BAY)

CENTRALIZED LID'S

STRABANE PARK (UNDERGROUND INFILTRATION SYSTEM)

CARTWRIGHT PARK (UNDERGROUND INFILTRATION SYSTEM)

DUNSMORE PARK (UNDERGROUND INFILTRATION SYSTEM)

SHOREVIEW PARK (UNDERGROUND INFILTRATION SYSTEM)

LITTLE LAKE WATERSHED

GEORGIAN CREEK WATERSHED

SOPHIA CREEK WATERSHED

JOHNSON DRAINAGE AREA

MULCASTER DRAINAGE AREA

RODNEY DRAINAGE AREA

ST. VINCENT DRAINAGE AREA

NELSON DRAINAGE AREA

CARTWRIGHT PARK

DUNSMORE PARK

STRABANE PARK

SHOREVIEW PARK

LTGM LT01 LT04 LT05 GR01 GR04

CITY OF BARRIE

KEY PLAN

LEGEND

- EXISTING STORM MAINTENANCE HOLE
- EXISTING STORM SEWER
- CULVERT
- DITCH
- WATERCOURSE
- ROAD
- RAILWAY
- TRUNK STORM SEWER IMPROVEMENTS
- CULVERT IMPROVEMENTS
- EXISTING SWMF
- PROPOSED SWMF RETROFIT/EXPANSION
- CENTRALIZED LID
- BUILDINGS
- WATERSHED/DRAINAGE AREA BOUNDARY
- MUNICIPAL BORDER
- EROSION SITE (BED AND BANK)

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie

Barrie

SCALE = 1:10,000

0 125 250 500 750 1,000 Meters

DRAINAGE MASTER PLAN

SOPHIA CREEK, GEORGIAN CREEK & LITTLE LAKE WATERSHEDS;

JOHNSON, MULCASTOR, NELSON, RODNEY & ST VINCENT DRAINAGE AREAS

FIGURE 17 - PRELIMINARY PREFERRED ALTERNATIVE SOLUTIONS

DATE: APRIL 2018

CULVERT IMPROVEMENTS

- 13 CUNDLES ROAD
- 16 THOMSON STREET
- 18 WELLINGTON STREET
- 141 HIGHWAY 400
- 142 HIGHWAY 400
- 143 HIGHWAY 400
- 22 INNISFIL STREET
- 23 COMMERCIAL PLAZA ENTRANCE ROAD
- 24 BRADFORD STREET
- 28 DUNLOP STREET WEST
- 145 DUNLOP STREET WEST
- 29 FERNDALE DRIVE NORTH
- 30 SARJEANT DRIVE
- 31 HIGHWAY 400 E/W-S AND N-E/W RAMPS
- 33 HIGHWAY 400
- 34 GEORGE STREET
- 35 VICTORIA STREET
- 36 ANNE STREET SOUTH AND JOHN STREET
- 37 INNISFIL STREET
- 38 SANFORD STREET
- 39 BRADFORD STREET
- 146 BRADFORD STREET

SWMF RETROFIT/CREATION

- 10 SWMF BK03
- 11 SWMF KD06
- 78 NEW SWMF
- 17 NEW SWMF
- 94 NEW SWMF
- 13 SWMF KD03
- 15 SWMF DY02
- 79 SWMF DY01
- 18 SWMF KD05
- 95 MILLIGAN'S POND

CHANNEL IMPROVEMENTS

- 1 REACH Ki-01 THROUGH Ki-2 (STABILIZE EXISTING BANK EROSION/FAILURE)
- 2 REACH Ki-08A (STABILIZE EXISTING BANK EROSION/FAILURE)
- 3 REACH Ki-10B THROUGH Ki-10C (STABILIZE EXISTING BANK EROSION/FAILURE)
- 4 REACH Bu-03 (STABILIZE BED AND BANK EROSION)
- 5 REACH Bu-07 (STABILIZE BED AND BANK EROSION)
- 7 CONSTRUCT NEW CHANNEL
- 8 REACHES Bu-11 & Bu-1S (TOE TREATMENT TO STABILIZE BANK SCOUR)
- 9 REACH Dy-2A (CHANNEL REALIGNMENT)
- 10 REACH Dy-2B (CHANNEL RE-GRADING/SHAPING)
- 11 REACH Dy-03 (DAYLIGHT CHANNEL)
- 12 REACH Dy-05 (TOE TREATMENT TO STABILIZE BACK SCOUR)
- 25 REACHES Ki-11 (DAYLIGHT CHANNEL)
- 26 REACHES Ki-11 (DAYLIGHT CHANNEL)
- 27 REACH Bu-1S (CHANNEL RE-GRADING/SHAPING)
- 28 REACH Dy-06 (CHANNEL RE-GRADING/SHAPING)
- 29 REACH Dy-01 (CHANNEL REALIGNMENT)

TRUNK STORM SEWER IMPROVEMENTS

- 1 ANNE ST. N. (FROM SWMF BK03 TO EDGEHILL DR.)
- 2 ANNE ST. S. (FROM DUNLOP ST. W. TO PERRY ST.)
- 9 THOMSON ST., SOPHIA ST. W. AND FLORENCE ST. (FROM THOMPSON ST. TO ECCLES ST.)

CENTRALIZED LID'S

CLOUGHLEY PARK (UNDERGROUND INFILTRATION SYSTEM)

GIBBON PARK (UNDERGROUND INFILTRATION SYSTEM)

SUNNIDALE PARK (UNDERGROUND INFILTRATION SYSTEM)

50 YEAR DESIGN STORM CAPACITY

141 142 143

100 YEAR DESIGN STORM CAPACITY

13 16 18 22 23 24 28 29 145

30 33 34 37 38 31 36 146

REGULATORY FLOW CAPACITY

39

GENERAL RECOMMENDATIONS

AS PART OF ROAD RENEWAL PROJECTS, MAJOR OVERLAND FLOW DEFICIENCIES ARE TO BE EVALUATED AND ADDRESSED WHERE FEASIBLE THROUGH OVERSIZING STORM SEWERS, ADJUSTING ROAD PROFILES/CROSS-SECTIONS OR OTHER MAJOR OVERLAND FLOW ROUTE IMPROVEMENTS.

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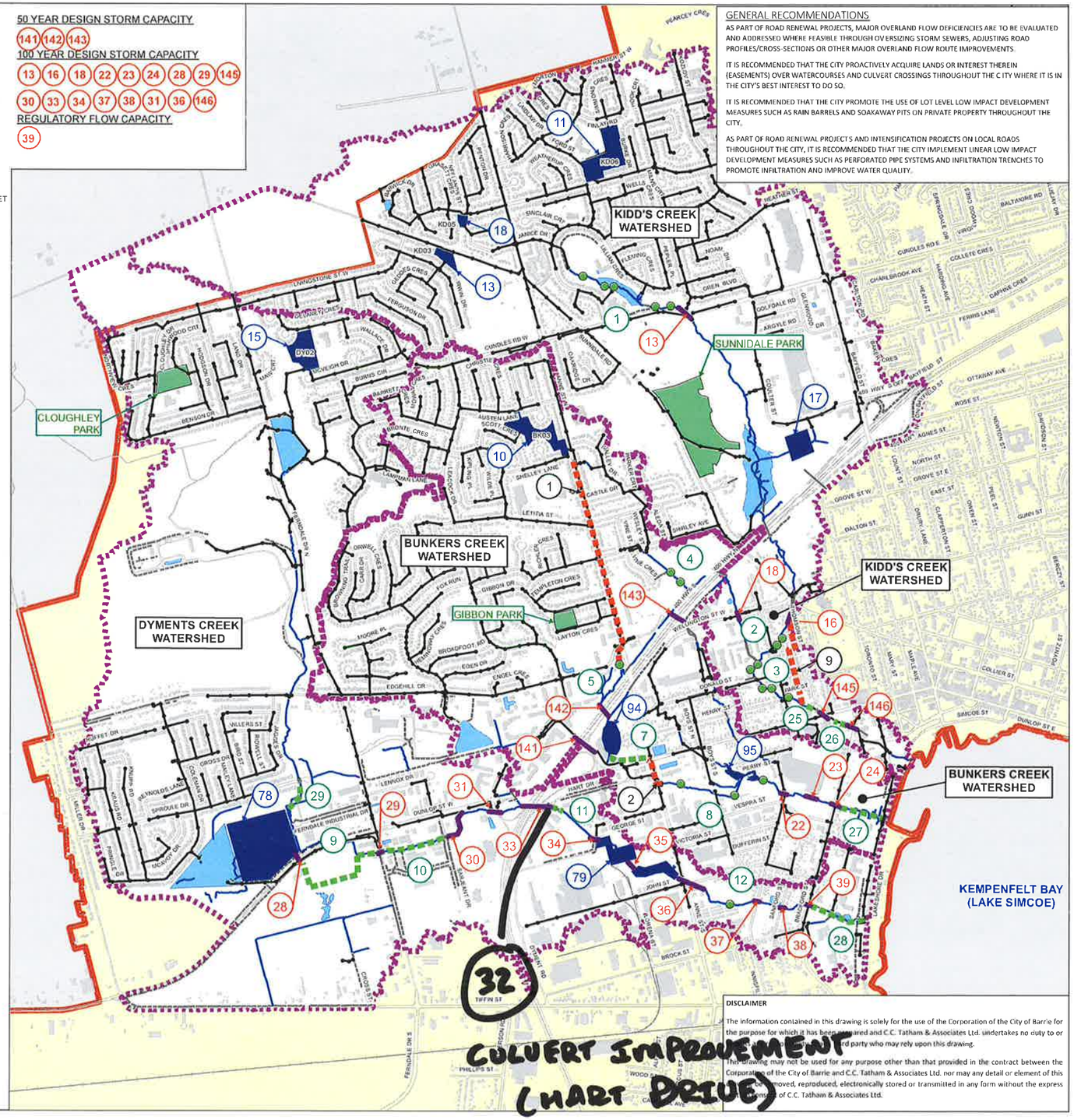
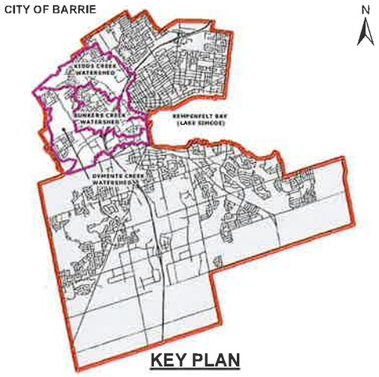


CITY OF BARRIE



KEY PLAN

LEGEND

- EXISTING STORM MAINTENANCE HOLE
- EXISTING STORM SEWER
- CULVERT
- DITCH
- WATERCOURSE
- ROADS
- RAILWAY
- TRUNK STORM SEWER IMPROVEMENTS
- PROPOSED CHANNEL REALIGNMENTS
- CULVERT IMPROVEMENTS
- EXISTING SWMF
- PROPOSED SWMF RETROFIT/EXPANSION
- PARKLAND CONSIDERED FOR CENTRALIZED LID
- CENTRALIZED LID
- BUILDINGS
- WATERSHED/DRAINAGE AREA BOUNDARY
- MUNICIPAL BORDER
- EROSION SITE (BED AND BANK)

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Barrie

SCALE = 1:10,000

0 125 250 500 750 1,000 Meters

DRAINAGE MASTER PLAN

BUNKERS CREEK, DYMENTS CREEK & KIDDS CREEK WATERSHEDS

FIGURE 18 - PRELIMINARY PREFERRED ALTERNATIVE SOLUTIONS

DATE: APRIL 2018

CULVERT IMPROVEMENTS

53	HARVIE ROAD	65	THE BOULEVARD	92	HURONIA ROAD
55	HIGHWAY 400	66	BRENNAN AVENUE	125	LOCKHART ROAD
56	FAIRVIEW ROAD	126	RAILWAY CROSSING	99	ELLIS DRIVE
57	BAYVIEW DRIVE	89	LOCKHART ROAD	98	WELHAM ROAD
60	HURONIA ROAD	90	HURONIA ROAD	97	HURONIA ROAD
63	YONGE STREET	91	LOCKHART ROAD	105	TOLLENDAL MILL ROAD
138	RAILWAY CROSSING	94	WELHAM ROAD	110	HURONIA ROAD
64	TOLLENDALE MILL ROAD	95	MAPLEVIEW DRIVE EAST	128	RAILWAY CROSSING
62	LITTLE AVENUE	123	RAILWAY CROSSING	127	RAILWAY CROSSING
108	HURONIA ROAD	147	RAILWAY CROSSING		

50 YEAR DESIGN STORM CAPACITY

126 94 123 99 98 110 147

100 YEAR DESIGN STORM CAPACITY

53 55 56 60 138 65 66 57 62 89 90 91 95 92 125 97 105 108

25 YEAR DESIGN STORM CAPACITY

127 63 128 64

CHANNEL IMPROVMENTS

15	REACH Wh-3 (CHANNEL REALIGNMENT)
16	REACH Wh-4 (CHANNEL REALIGNMENT)
17	REACH Wh-5 (STABILIZE EXISTING BANK EROSION/FAILURE)
18	REACH Wh-6 (STABILIZE EXISTING BANK EROSION/FAILURE)
19	REACH Wh-10 (STABILIZE EXISTING BANK EROSION/FAILURE)
20	REACH Wh-10 (CHANNEL RE-GRADING/RESHAPING)
21	REACH Wh-10 (CHANNEL RE-GRADING/RESHAPING)
22	REACH Lv-19 (STABILIZE EXISTING BED AND BANK EROSION)
22	REACH Lv-20 (STABILIZE EXISTING BED AND BANK EROSION)
30	REACH Wh-4A THROUGH Wh-4C (CHANNEL RE-GRADING/RESHAPING)
31	REACH Wh-7B (CHANNEL REALIGNMENT)
32	REACH Wh-9 (CHANNEL RE-GRADING/RESHAPING)

CENTRALIZED LID'S

MAPLETON PARK (UNDERGROUND INFILTRATION SYSTEM)

MADELAINE PARK (UNDERGROUND INFILTRATION SYSTEM)

GOLDEN MEADOW PARK (UNDERGROUND INFILTRATION SYSTEM)

ASSIKINACK PARK (UNDERGROUND INFILTRATION SYSTEM)

MONTSERRAND PARK (UNDERGROUND INFILTRATION SYSTEM)

CARTER PARK (UNDERGROUND INFILTRATION SYSTEM)

SWMF RETROFIT/CREATION

42	NEW SWMF	32	SWMF LV12	20	SWMF WK04
40	NEW SWMF	30	SWMF LV02	86	SWMF LV16
92	SWMF WK05	31	SWMF LV03	87	SWMF LV17
25	SWMF WK01	37	SWMF LV10		
65	SWMF LV07	68	SWMF LV01		
45	SWMF LV05	26	NEW SWMF		

TRUNK STORM SEWER IMPROVEMENTS

7 ESTHER DRIVE (FROM DEAN AVE. TO SWMF LV19)

GENERAL RECOMMENDATIONS

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MINETS DRAINAGE AREA

KEMPENFELT BAY (LAKE SIMCOE)

ROYAL OAK DRAINAGE AREA

GRAY LANE DRAINAGE AREA

WHISKEY CREEK WATERSHED

LOVERS CREEK WATERSHED

ASSIKINAK PARK

MONTSERRAND PARK

MAPLETON PARK

CARTER PARK

GOLDEN MEADOW PARK

MADELAINE PARK

CITY OF BARRIE

KEY PLAN

LEGEND

- EXISTING STORM MAINTENANCE HOLE
- EXISTING STORM SEWER
- CULVERT
- DITCH
- WATERCOURSE
- ROAD
- RAILWAY
- TRUNK STORM SEWER IMPROVEMENTS
- PROPOSED CHANNEL IMPROVEMENTS
- CULVERT IMPROVEMENTS
- PROPOSED SWMF RETROFIT/EXPANSION
- EXISTING SWMF
- CENTRALIZED LID
- BUILDINGS
- WATERSHED/DRAINAGE AREA BOUNDARY
- MUNICIPAL BORDER
- EROSION SITE (BED AND BANK)

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Barrie

SCALE = 1:10,000

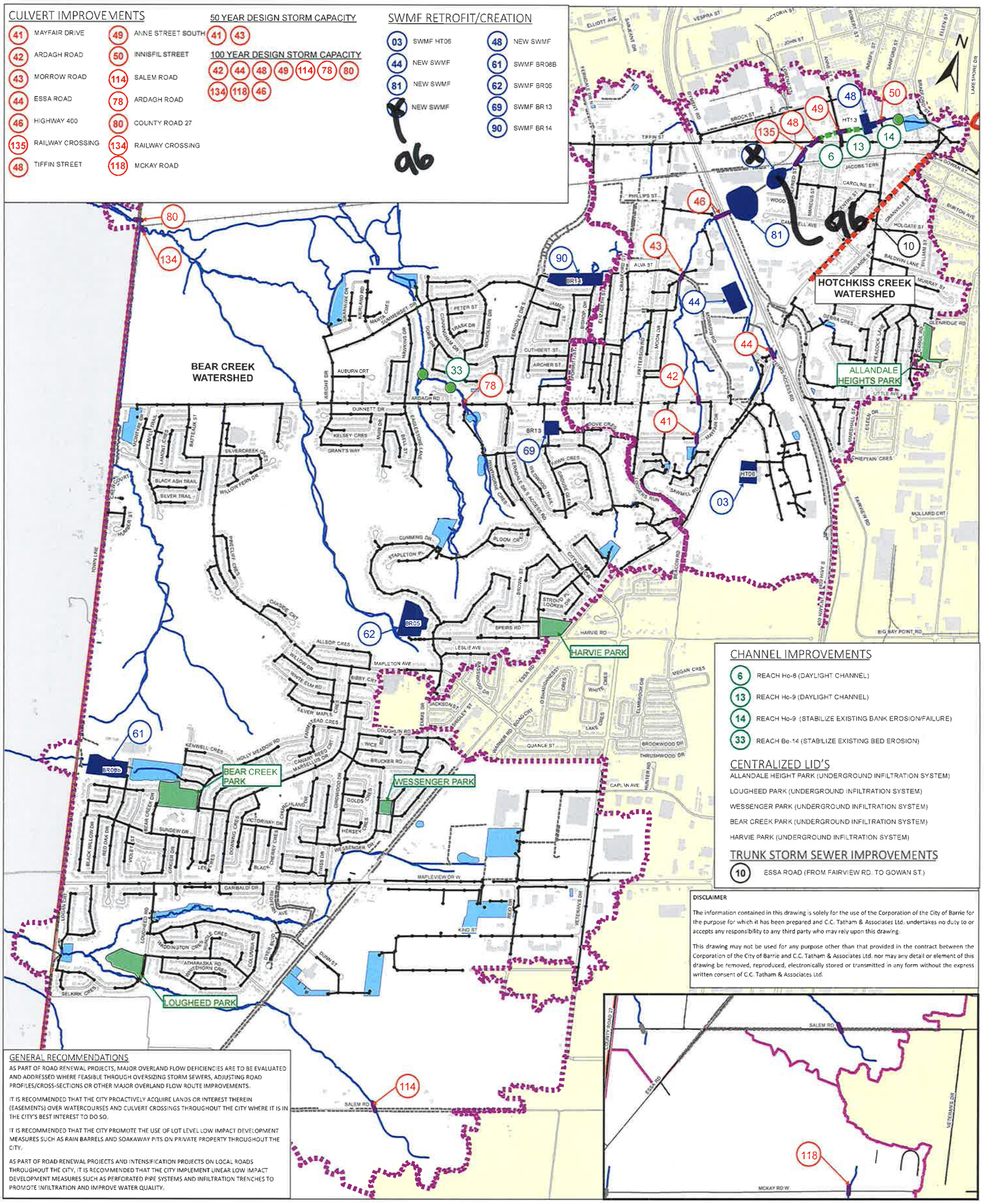
0 125 250 500 750 1,000 Meters

DRAINAGE MASTER PLAN

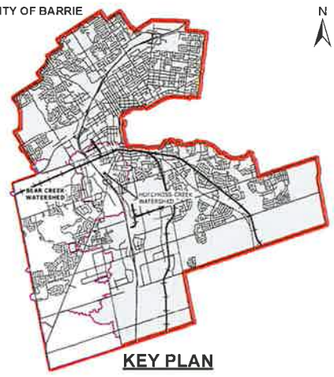
LOVERS CREEK & WHISKEY CREEK WATERSHEDS;
MINETS, ROYAL OAK & GRAY LANE DRAINAGE AREAS

FIGURE 19 - PRELIMINARY PREFERRED ALTERNATIVE SOLUTIONS

DATE: APRIL 2018



CITY OF BARRIE



KEY PLAN

LEGEND

- EXISTING STORM MAINTENCE HOLE
- EXISTING STORM SEWER
- CULVERT
- DITCH
- WATERCOURSE
- ROADS
- RAILWAY
- TRUNK STORM SEWER IMPROVEMENTS
- PROPOSED CHANNEL IMPROVEMENTS
- CULVERT IMPROVEMENTS
- PROPOSED SWMF RETROFIT/EXPANSION
- EXISTING SWMF
- CENTRALIZED LID
- BUILDINGS
- WATERSHED/DRAINAGE AREA BOUNDARY
- MUNICIPAL BORDER
- EROSION SITE (BED AND BANK)

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie

Barrie

SCALE = 1:10,000

0 125 250 500 750 1,000 Meters

DRAINAGE MASTER PLAN

BEAR CREEK & HOTCHKISS CREEK WATERSHEDS

FIGURE 20 - PRELIMINARY PREFERRED ALTERNATIVE SOLUTIONS

DATE: APRIL 2018

WILLIAMS & HOLGATE CREEK DRAINAGE AREAS

HURONIA CREEK DRAINAGE AREA

KEMPENFELT BAY
LAKE SIMCOE

BAYSHORE DRAINAGE AREA

GREENFIELD PARK

KUZMICH PARK

SANDRINGHAM PARK

QUEENSWAY/HYDE PARK

HEWITTS CREEK WATERSHED

85 28 HR01 27 6 83 130 131 120 119

20 SIDEROAD

LOCKHART RD

CULVERT IMPROVEMENTS

- 83 MAPLEVIEW DRIVE EAST
- 130 LOCKHART ROAD
- 131 LOCKHART ROAD
- 119 20 SIDEROAD
- 120 20 SIDEROAD

SWMF RETROFIT/CREATION

- 85 SWMF HR03
- 28 SWMF HR01
- 27 NEW SWMF

100 YEAR DESIGN STORM CAPACITY

83 130 131 120 119

TRUNK STORM SEWER IMPROVEMENTS

6 PRINCESS MARGARET GATE AND CAMELOT SQUARE (LOYALIST COURT TO SWMF HW06)

CENTRALIZED LID'S

GREENFIELD PARK (UNDERGROUND INFILTRATION SYSTEM)

QUEENSWAY/HYDE PARK (UNDERGROUND INFILTRATION SYSTEM)

SANDRINGHAM PARK (UNDERGROUND INFILTRATION SYSTEM)

KUZMICH PARK (UNDERGROUND INFILTRATION SYSTEM)

GENERAL RECOMMENDATIONS

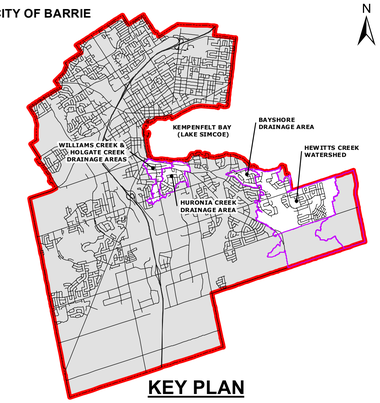
AS PART OF ROAD RENEWAL PROJECTS, MAJOR OVERLAND FLOW DEFICIENCIES ARE TO BE EVALUATED AND ADDRESSED WHERE FEASIBLE THROUGH OVERSIZING STORM SEWERS, ADJUSTING ROAD PROFILES/CROSS-SECTIONS OR OTHER MAJOR OVERLAND FLOW ROUTE IMPROVEMENTS.

IT IS RECOMMENDED THAT THE CITY PROACTIVELY ACQUIRE LANDS OR INTEREST THEREIN (EASEMENTS) OVER WATERCOURSES AND CULVERT CROSSINGS THROUGHOUT THE CITY WHERE IT IS IN THE CITY'S BEST INTEREST TO DO SO.

IT IS RECOMMENDED THAT THE CITY PROMOTE THE USE OF LOT LEVEL LOW IMPACT DEVELOPMENT MEASURES SUCH AS RAIN BARRELS AND SOAKAWAY PITS ON PRIVATE PROPERTY THROUGHOUT THE CITY.

AS PART OF ROAD RENEWAL PROJECTS AND INTENSIFICATION PROJECTS ON LOCAL ROADS THROUGHOUT THE CITY, IT IS RECOMMENDED THAT THE CITY IMPLEMENT LINEAR LOW IMPACT DEVELOPMENT MEASURES SUCH AS PERFORATED PIPE SYSTEMS AND INFILTRATION TRENCHES TO PROMOTE INFILTRATION AND IMPROVE WATER QUALITY.

CITY OF BARRIE



KEY PLAN

LEGEND

- STORM MAINTENANCE HOLE
- EXISTING STORM SEWER
- CULVERT
- DITCH
- WATERCOURSE
- ROADS
- RAILWAY
- CULVERT IMPROVEMENTS
- TRUNK STORM SEWER IMPROVEMENTS
- PROPOSED SWMF RETROFIT/EXPANSION
- EXISTING SWMF
- CENTRALIZED LID
- BUILDINGS
- WATERSHED/DRAINAGE AREA BOUNDARY
- MUNICIPAL BORDER

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie

Barrie

SCALE = 1:10,000

0 125 250 500 750 1,000 Meters

DRAINAGE MASTER PLAN

HEWITTS CREEK WATERSHED;
BAYSHORE, WILLIAMS, HOLGATE & HURONIA CREEKS DRAINAGE AREAS

FIGURE 21 - PRELIMINARY PREFERRED ALTERNATIVE SOLUTIONS

DATE: APRIL 2018

APPENDIX E

LSRCA/NVCA Email – Terms of Reference

From: Daniel Twigger [DTWIGGER@cctatham.com]
Sent: Monday, August 7, 2017 11:46 AM
To: Scott Tarof
Subject: Fwd: FW: Barrie Drainage Master Plan - Natural Heritage Assessment

---

From: Dave Featherstone [mailto:dfeatherstone@nvca.on.ca]
Sent: July 20, 2017 7:22 AM
To: Tom Reeve <Tom.Reeve@barrie.ca>
Cc: Renata Sadowska <rsadowska@nvca.on.ca>; Barbra Perreault < bperreault@nvca.on.ca>; Lee Bull <lbull@nvca.on.ca>
Subject: RE: Barrie Drainage Master Plan - Natural Heritage Assessment

Hi Tom. My sincere apologies for not getting to this sooner. General approach is satisfactory. I concur with LSRCA's comments (below).

Best regards,

David Featherstone, B.Sc.
Manager, Watershed Monitoring Program
Nottawasaga Valley Conservation Authority
8195 8th Line, Utopia, ON
L0M 1T0
(705) 424-1479 Ext. 242
dfeatherstone@nvca.on.ca

From: Kate Lillie
Sent: Wednesday, June 28, 2017 4:02 PM
To: Melinda Bessey
Cc: Kenneth Cheney
Subject: Barrie Drainage Master Plan - Natural Heritage Assessment

Hi Melinda,

I've reviewed the proposed Study Scope for the Natural Heritage Assessment for the Barrie Drainage Master Plan as described in the June 6, 2017 memo prepared by CC Tatham & Associates (attached).

While I am in general agreement with the proposed approach, I've included a few points of clarification for consideration below:

1. For the field work component, a general survey for habitat of endangered and/or threatened species should also be completed.
2. As the field surveys will not include species inventories, the assessment should provide direction for the completion of further surveys/studies where required. For example, where impacts to natural heritage features are anticipated, additional field studies may be required to fully understand the extent of these impacts.

3. The assessment should provide general recommendations for appropriate avoidance, mitigation, restoration and/or offsetting strategies to address any known or potential impacts to natural heritage features.

If there are any questions regarding what I've provided above, please let me know.

Thanks,

Kate Lillie, HBSc, EP, ISA
Natural Heritage Ecologist
Lake Simcoe Region Conservation Authority
120 Bayview Parkway,
Newmarket, Ontario L3Y 3W3
905-895-1281, ext. 527 | 1-800-465-0437
k.lillie@LSRCA.on.ca | www.LSRCA.on.ca

APPENDIX F

MNRF SAR and Background Information Request

AZIMUTH ENVIRONMENTAL CONSULTING, INC.
Environmental Assessments & Approvals

October 3, 2017 AEC 17-092

Ministry of Natural Resources and Forestry
Midhurst District
2284 Nursery Road
Midhurst, Ontario
L0L 1X0

Attention: District Planner - Midhurst District

Re: Species at Risk and Background Information Request for an Environmental Impact Study for a Drainage Master Plan, City of Barrie, Ontario (RFP# FIN 2017-030P)

To Whom It May Concern:

Azimuth Environmental Consulting, Inc. (Azimuth) has been retained to complete a planning level Environmental Impact Study (EIS) for the City of Barrie's (City) Drainage Master Plan. At this stage of the plan, the City is interested in evaluating opportunities for improving the drainage system within the City to better handle large storm events. Areas of the City have been selected to identify the terrestrial and aquatic environmental constraints within proximity to culverts that are deemed deficient and parks where the City is interested in installing Low Impact Development (LID) measures to minimize environmental impacts from storm events. We are sending this letter as a component of the terrestrial and fisheries Species at Risk (SAR) screening for this Plan, as well as a general background information request. We request that the information outlined herein be considered and that any additional considerations/information which is deemed relevant to the project be provided to allow for a thorough screening.

1.0 CULVERTS

EXISTING CONDITIONS

The study area for this scope is within the City of Barrie limits and includes the following 11 subwatersheds: Bear Creek; Bunkers Creek; Dyments Creek; Georgian Creek; Hewitt's Creek; Hotchkiss Creek; Kidds Creek; Lovers Creek; Sophia Creek; Sandy Cove Creek and Whiskey Creek. These subwatersheds are contained within the larger Barrie

Creeks, Lovers Creek, Hewitt's Creek and Innisfil Creek subwatersheds, all of which are within the Lake Simcoe Watershed aside from Bear Creek, which is within the Middle Nottawasaga River subwatershed and drains towards Georgian Bay. Subwatershed specific information, including thermal regimes and aquatic species composition, is presented below and in the attached table. Aerial photo interpretation indicates that prominent features in the study area include wetlands, deciduous and mixed woodlands, manicured lawns, residential dwellings, commercial buildings, meadows, agricultural fields, and Kempenfelt Bay and shoreline areas.

BACKGROUND SAR DATA

Fisheries

A search for information on aquatic SAR has been completed. SAR mapping from Fisheries and Oceans Canada (DFO) and the Natural Heritage Information Centre (NHIC) do not indicate the presence of aquatic SAR (Threatened or Endangered) within the study area. According to The Barrie Creeks, Lovers Creek and Hewitt's Creek Subwatershed Plan [Lake Simcoe Region Conservation Authority (LSRA), 2012], Silver Shiner, an aquatic SAR, was captured in Lovers Creek after 1991. No further information was provided regarding the location where Silver Shiner was captured.

We request that MNRF complete the attached fisheries table to identify any available information on fish communities and aquatic habitat. The table includes a request for any historical fish community data, fish habitat sensitivity, aquatic SAR, permanency, thermal regime, and MNRF fisheries timing restrictions that should be considered for this project.

Terrestrial

Ontario Breeding Bird Atlas

A search of the Ontario Breeding Bird Atlas has been completed. Squares 17PK00, 17PK01 and 17PK11 were queried and it was determined that several SAR bird species recorded demonstrate probable or confirmed breeding evidence within the 10 x 10 km data squares. These species include Bank Swallow, Barn Swallow, Bobolink, Cerulean Warbler, Chimney Swift, Common Nighthawk, Eastern Meadowlark, Eastern Whip-poor-will, Eastern Wood-pewee, Grasshopper Sparrow, Olive-sided Flycatcher, Peregrine Falcon, Red-headed Woodpecker and Wood Thrush.

Ontario Reptile and Amphibian Atlas
Available information from Ontario Reptile and Amphibian Atlas shows that Blanding's Turtle, Common Five-lined Skink, Northern Map Turtle and Snapping Turtle need to be considered (Squares 17PK00, 17PK01, 17PK11).

Azimuth Preliminary Assessment
Our preliminary habitat assessment suggests that the following species should be considered in addition to those identified above: Butternut, Little Brown Myotis, Monarch, Northern Long-eared Myotis and Tri-colored Bat.

Below we consider additional focal species that may be unique to each of the subwatersheds within the limits of the City's Drainage Master Plans.

SUBWATERSHED SPECIFIC SPECIES AT RISK AND FISHERIES INFORMATION

Sophia Creek
Available information from the NHIC shows that one SAR species, a Restricted Species, has been recorded within 1 km of the drainage improvements proposed within Sophia Creek subwatershed (Squares 17PK0517 and 17PK0417).

Sophia Creek is a warmwater system within the Barrie Creeks subwatersheds. According to The Barrie Creeks, Lovers Creek and Hewitt's Creek Subwatershed Plan (LSRA, 2012), no fish species are present within this watercourse, which is likely due to multiple fish barriers and anthropogenic impacts.

Georgian Creek
Available information from the NHIC shows that one SAR species, a Restricted Species, has been recorded within 1 km of the drainage improvements proposed within Georgian Creek subwatershed (Squares 17PK0717 and 17PK0718).

No fisheries information was available for Georgian Creek subwatershed.

Dyments Creek
Available information from the NHIC shows that one SAR species, Henslow's Sparrow, has been recorded within 1 km of the drainage improvements proposed within Dyments Creek subwatershed (Squares 17PK0214, 17PK0314, 17PK0414, 17PK0717 and 17PK0718). This observation r is considered to be a historic record as it was made in 1960.

Dyments Creek is within the Barrie Creeks subwatershed and is a coldwater system upstream of Highway 400 and a warmwater system downstream of Highway 400 to the mouth (LSRCA, 2012). Fisheries information from MNRF's Land Information Ontario (LIO) database and The Barrie Creeks, Lovers Creek and Hewitt's Creek Subwatershed Plan indicates that Central Mudminnow, Common White Sucker, Northern Redbelly Dace, Common Shiner, Bluntnose Minnow, Fathead Minnow, Blacknose Dace, Creek Chub, Pearl Dace, Brook Stickleback and Pumpkinseed are present within Dyments Creek. None of these fish species are considered to be SAR.

Kidds Creek

Available information from the NHIC shows that one SAR species, a Restricted Species, has been recorded within 1 km of the drainage improvements proposed within Kidds Creek subwatershed (Squares 17PK0315 and 17PK0316). This observation is considered to be a historic record as it was made in 1877.

Kidds Creek is a coldwater system (LSRCA, 2012) within the Barrie Creeks subwatershed. Fisheries information from LIO and The Barrie Creeks, Lovers Creek and Hewitt's Creek Subwatershed Plan indicates Brook Trout, Creek Chub, Northern Pike, Pumpkinseed, Rock Bass and Yellow Perch are present within Kidds Creek. None of these fish species are considered to be SAR.

Bunkers Creek

Available information from the NHIC shows that one SAR species, a Restricted Species, has been recorded within 1 km of the drainage improvements proposed within Bunkers Creek subwatershed (Squares 17PK0315 and 17PK0316). This observation is considered to be a historic record as it was made in 1877.

Bunkers Creek is within the Barrie Creeks subwatershed and is a coldwater system in the northern and southern branches, and changes to a warmwater system downstream of Highway 400 in the southern, main branch (LSRCA, 2012). Fisheries information from LIO and The Barrie Creeks, Lovers Creek and Hewitt's Creek Subwatershed Plan indicates Blacknose Dace, Brassy Minnow, Brook Stickleback, Creek Chub, Common White Sucker, Emerald Shiner, Finescale Dace, Northern Pike, Northern Redbelly Dace, Pumpkinseed, Spottail Shiner, Trout-perch, Rock Bass and Yellow Perch are present within Bunkers Creek. None of these fish species are considered to be SAR.

Lovers Creek

Available information from the NHIC shows that three SAR species, Bobolink, Henslow's Sparrow and Snapping Turtle, have been recorded within 1 km of the drainage

improvements proposed within Lovers Creek subwatershed (Squares 17PK0509, 17PK0609, 17PK0610, 17PK0611 and 17PK0710). The observation for Henslow's Sparrow was made in 1960 and is considered to be a historic record.

Our preliminary habitat assessment suggests that Eastern Ribbonsnake should also be considered within Lovers Creek subwatershed.

Lovers Creek is a coldwater system (LSRCA, 2012) within the Lovers Creek subwatershed. Fisheries information from LIO and The Barrie Creeks, Lovers Creek and Hewitt's Creek Subwatershed Plan indicates Blackchin Shiner, Blacknose Dace, Blacknose Shiner, Bluntnose Minnow, Brassy Minnow, Brook Stickleback, Brook Trout, Brown Bullhead, Central Mudminnow, Common Shiner, Common White Shiner, Creek Chub, Emerald Shiner, Fathead Minnow, Hornyhead Chub, Longnose Dace, Northern Redbelly Dace, Pearl Dace, Pumpkinseed, Silver Shiner, Smallmouth Bass, Rainbow Trout, River Chub, Rock Bass and Rosyface Shiner are present within Lovers Creek. Silver Shiner is considered to be SAR.

Whiskey Creek

Available information from the NHIC shows that one SAR species, Henslow's Sparrow, has been recorded within 1 km of the drainage improvements proposed within Whiskey Creek subwatershed (Squares 17PK0513, 17PK0613 and 17PK0614). This observation is considered to be a historic record as it was made in 1960.

Whiskey Creek is a coldwater system (LSRCA, 2012) within the Barrie Creeks subwatershed. Fisheries information from LIO and The Barrie Creeks, Lovers Creek and Hewitt's Creek Subwatershed Plan indicates Black Crappie, Blacknose Dace, Bluntnose Minnow, Brook Trout, Common White Sucker, Creek Chub, Emerald Shiner, Golden Shiner, Iowa Darter, Logperch, Longnose Dace, Mottled Sculpin, Pumpkinseed, Rainbow Smelt, Rock Bass, Slimy Sculpin, Smallmouth Bass, Spottail Shiner and Yellow Perch are present within Whiskey Creek. None of these fish species are considered to be SAR.

Hotchkiss Creek

Available information from the NHIC shows that one SAR species, Henslow's Sparrow, has been recorded within 1 km of the drainage improvements proposed within Hotchkiss Creek subwatershed (Squares 17PK0312, 17PJ0313, 17PK0314 and 17PK0414). This observation is considered to be a historic record as it was made in 1960.

Hotchkiss Creek is a coldwater system (LSRCA, 2012) within the Barrie Creeks subwatershed. Fisheries information from LIO and The Barrie Creeks, Lovers Creek and

Hewitt's Creek Subwatershed Plan indicates Blacknose Dace, Brassy Minnow, Brook Stickleback, Creek Chub, Common White Sucker, Finescale Dace, Hornyhead Chub, Mottled Sculpin, Northern Redbelly Dace, Pearl Dace, Sand Shiner, Stoneroller and Trout-perch are present within Hotchkiss Creek. None of these fish species are considered to be SAR.

Bear Creek

Available information from the NHIC shows that three SAR species, Cerulean Warbler, Henslow's Sparrow and Snapping Turtle, have been recorded within 1 km of the drainage improvements proposed within Bear Creek subwatershed (Squares 17NK9912 and 17PK0012). The observations for Cerulean Warbler and Henslow's Sparrow are considered to be historic records as they were made before 1975.

Bear Creek is within the Middle Nottawasaga subwatershed within the Nottawasaga Valley watershed. Fisheries information from LIO indicates Brassy Minnow, Brook Stickleback, Brook Trout, Brown Trout, Common Shiner, Common White Sucker, Creek Chub, Eastern Blacknose Dace, Fathead Minnow, Johnny Darter/Tesselated Darter, Longnose Dace, Mottled Sculpin, Northern Redbelly Dace, Pearl Dace and Rainbow Trout are present within Bear Creek. None of these fish species are considered to be SAR.

Hewitt's Creek

Available information from the NHIC shows that one SAR species, Snapping Turtle, has been recorded within 1 km of the drainage improvements proposed within Hewitt's Creek subwatershed (Square 17PK1011).

Our preliminary habitat assessment suggests that Eastern Ribbonsnake should also be considered within Hewitt's Creek subwatershed.

Hewitt's Creek is a coldwater system (LSRCA, 2012) within Hewitt's Creek subwatershed. Fisheries information from LIO and The Barrie Creeks, Lovers Creek and Hewitt's Creek Subwatershed Plan indicates Blacknose Dace, Blacknose Shiner, Bluntnose Minnow, Brassy Minnow, Brook Stickleback, Brook Trout, Common Shiner, Common White Sucker, Creek Chub, Fathead Minnow, Finescale Dace, Hornyhead Chub, Iowa Darter, Johnny Darter, Largemouth Bass, Longnose Dace, Mottled Sculpin, Northern Redbelly Dace, Pearl Dace, Pumpkinseed, Rock Bass and Slimy Sculpin are present within Hewitt's Creek. None of these fish species are considered to be SAR.

Sandy Cove Creek
The NHIC does not indicate the presence of SAR within 1 km of the drainage improvements proposed within Sandy Cove Creek subwatershed (Squares 17PK1211 and 17PK1212).

Our preliminary habitat assessment suggests that Eastern Ribbonsnake should also be considered within Sandy Cove Creek subwatershed.

Sandy Cove Creek is within the Innisfil Creeks subwatershed. Fisheries information from LIO indicates Brook Stickleback, Brook Trout, Central Mudminnow, Common White Sucker, Creek Chub, Eastern Blacknose Dace, Emerald Shiner, Fathead Minnow, Longnose Dace, Mottled Sculpin, Northern Redbelly Dace, Pearl Dace, and Sand Shiner are present within Sandy Cove Creek. None of these fish species are considered to be SAR.

2.0 PARKS

In regards to the City's Drainage Master Plan upgrade work in the 29 selected parks, the following factors are considered in determining an appropriate scope of SAR information requested from the MNRF for terrestrial species. Potential fisheries impacts are not anticipated in relation to park LIDS. First, the nature of the work in the parks involves only activities related to underground installation of LID facilities. No surface activities are being considered. Second, the specific areas within the 29 parks where LID work has been proposed are comprised of manicured grass. Third, the level of mobility of potential terrestrial SAR is considered sufficient for movement patterns to have equal probability of coverage of culvert and park areas. Consequently, we anticipate that the subwatershed information gathered for the culverts above also applies to the parks in those same subwatersheds. Four of the parks being considered by the City are located in three additional subwatersheds (Huronia, Little Lake, Johnson) not described previously in this letter, and thus, we queried those three additional subwatersheds separately in regards to the potential for impacts to SAR.

Huronia Subwatershed
The NHIC does not indicate the presence of SAR within 1 km of the proposed installation of park LIDs within Huronia subwatershed (Square 17PK0513).

Little Lake and Johnson Subwatershed
Information from the NHIC database for the specific 1km grid squares for the parks in these subwatersheds is currently unavailable despite multiple attempts over several days

to retrieve the data. The NHIC has been contacted and technical staff are investigating the problem with their server, however, it is unclear when the issue will be resolved. As such, these data cannot be included in this letter but the data would not be anticipated to significantly influence our list of species for consideration.

3.0 SUMMARY

In summary, based on information reviewed, the following SAR are being considered in our assessment:

- Mammals: Little Brown Myotis, Northern Long-eared Myotis and Tri-colored Bat;
- Reptiles and Amphibians: Blanding's Turtle, Common Five-lined Skink, Eastern Ribbonsnake, Northern Map Turtle and Snapping Turtle;
- Birds: Bank Swallow, Barn Swallow, Bobolink, Cerulean Warbler, Chimney Swift, Common Nighthawk, Eastern Meadowlark, Eastern Whip-poor-will, Eastern Wood-pewee, Grasshopper Sparrow, Henslow's Sparrow, Olive-sided Flycatcher, Peregrine Falcon, Red-headed Woodpecker and Wood Thrush;
- Plants and Lichens: Butternut;
- Fish and Fish Habitat; Silver Shiner; and,
- Insects: Monarch.

Given our understanding of the habitat requirements of the above-noted species our screening will focus on Barn Swallow, Blanding's Turtle, Butternut, Chimney Swift, Common Nighthawk, Eastern Ribbonsnake, Eastern Wood-pewee, Grasshopper Sparrow, Little Brown Myotis, Monarch, Northern Long-eared Myotis, Northern Map Turtle, Olive-sided Flycatcher, Peregrine Falcon, Red-headed Woodpecker, Silver Shiner, Snapping Turtle, Tri-colored Bat and Wood Thrush.

There is currently no indication that potential habitat for Bank Swallow, Bobolink, Cerulean Warbler, Common Five-lined Skink, Eastern Meadowlark, Eastern Whip-poor-will and Henslow's Sparrow on or adjacent to the study area. Azimuth is aware that these species have been identified in the area historically and will continue to be mindful of them during the site assessment. We propose that these species will not be considered in our EIS unless our on-site evaluation or MNRF response provides information indicating potential habitat for these species in the surrounding area.

If the District's files contain additional or contradictory information, we would appreciate your input at this time.

It is generally our intention to append this correspondence in the resulting EIS. If restricted species occur in the area and the MNRF determines that these need to be considered in our review, please provide two copies of the response - one with the species name replaced with (Restricted Species) for inclusion within Azimuth's natural heritage review report, and the other retaining the identity of the species for Azimuth's internal use only.

Thank you very much for your assistance in this matter. If you have any questions regarding this project please do not hesitate to contact us.

Yours truly,

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Alexa Pompilio, H.B.Sc.
Terrestrial Ecologist

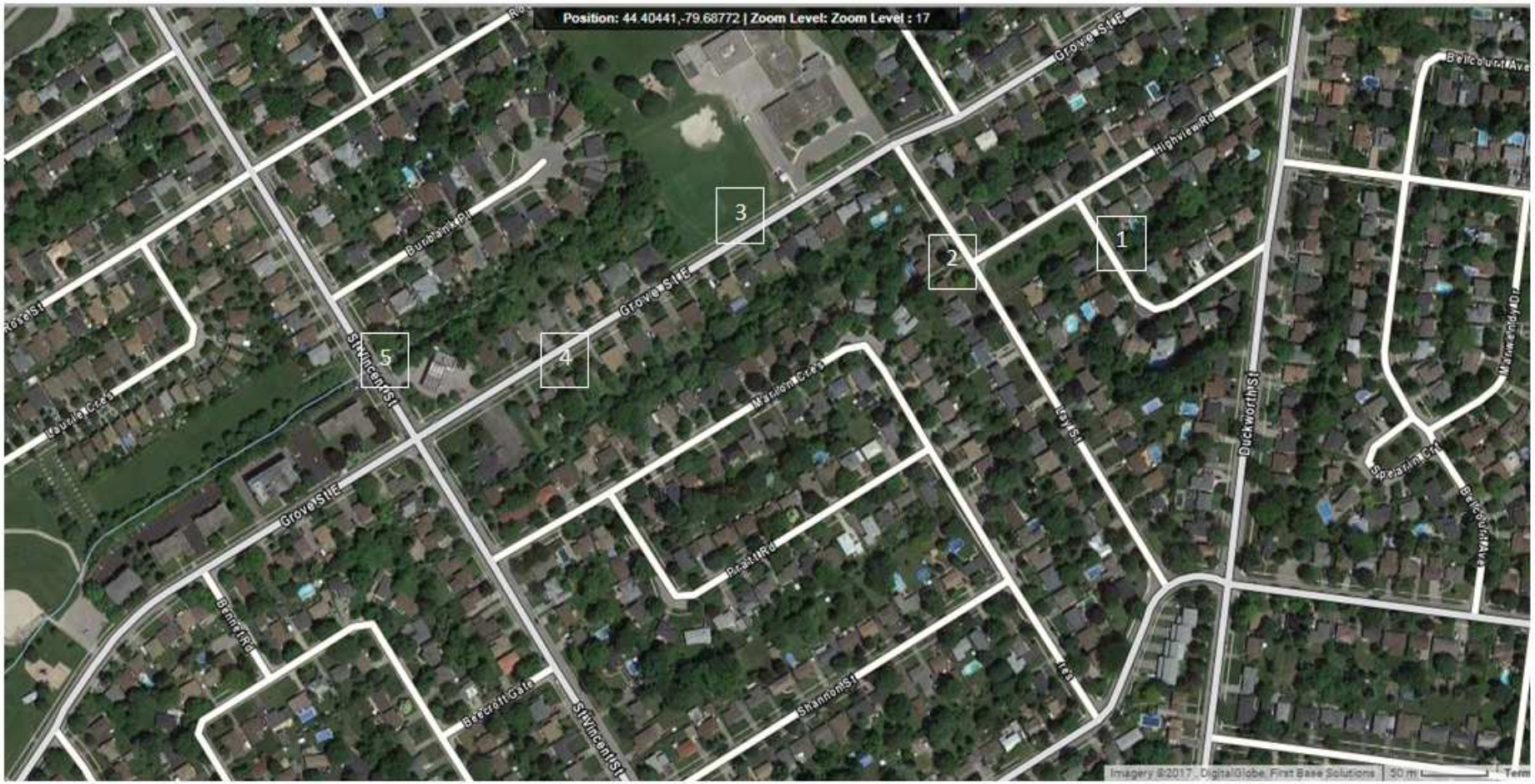
Attach: AEC 17-092 Deficient Culvert Locations
AEC 17-092 Park Locations and Parks LID Summary
AEC 17-092 Natural Heritage Information Centre Data Summary
AEC 17-092 Ontario Breeding Bird Atlas Data Summary (17PK00, 17PK01 and 17PK11)
AEC 17-092 DFO Aquatic SAR Mapping

References

Lake Simcoe Region Conservation Authority (LSRCA). 2012. Barrie Creeks, Lovers Creek, and Hewitt's Creek Subwatershed Plan.

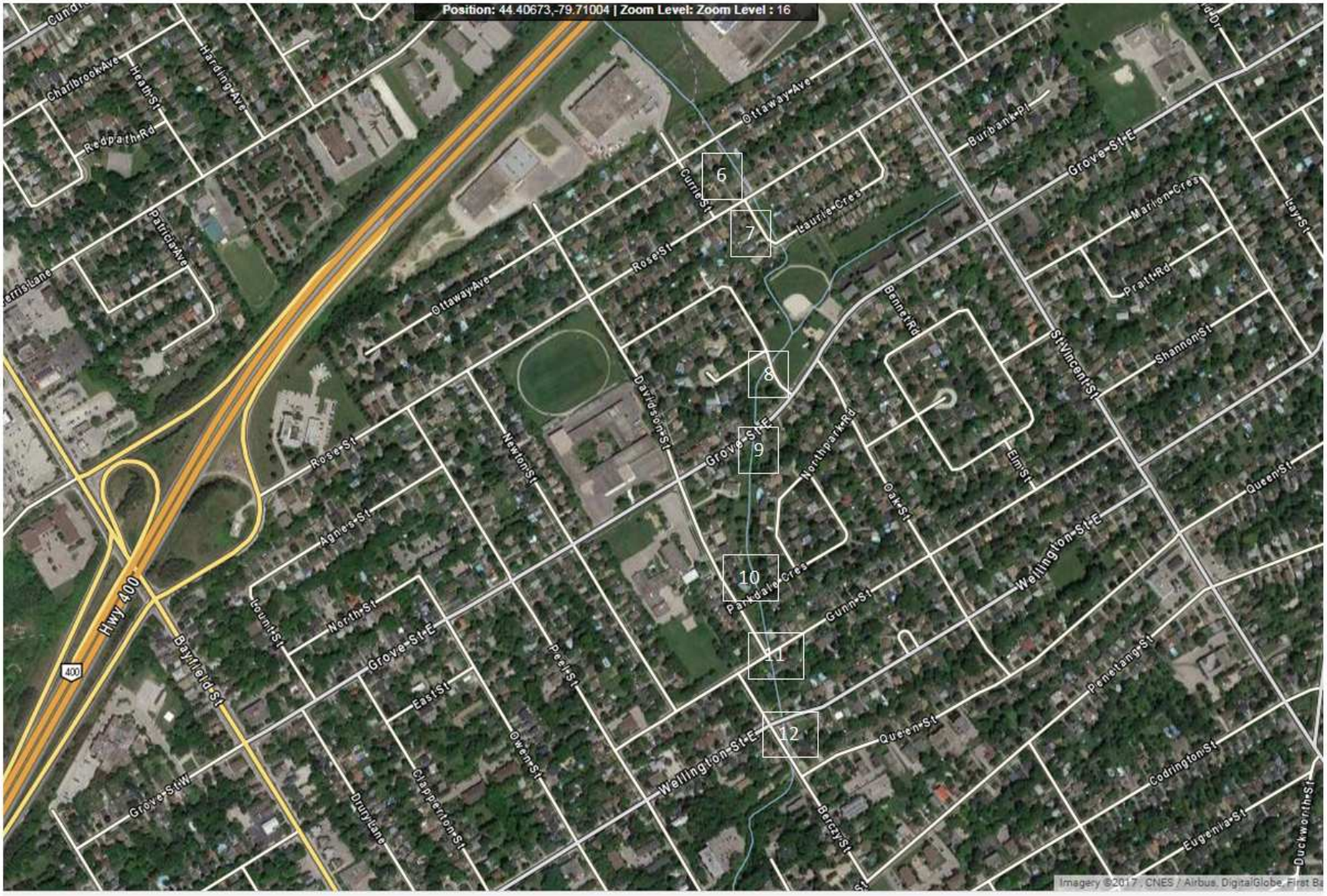
Deficient Culvert Locations. 17-092 City of Barrie Drainage Master Plan

Sophia Creek Subwatershed Culverts 1-5



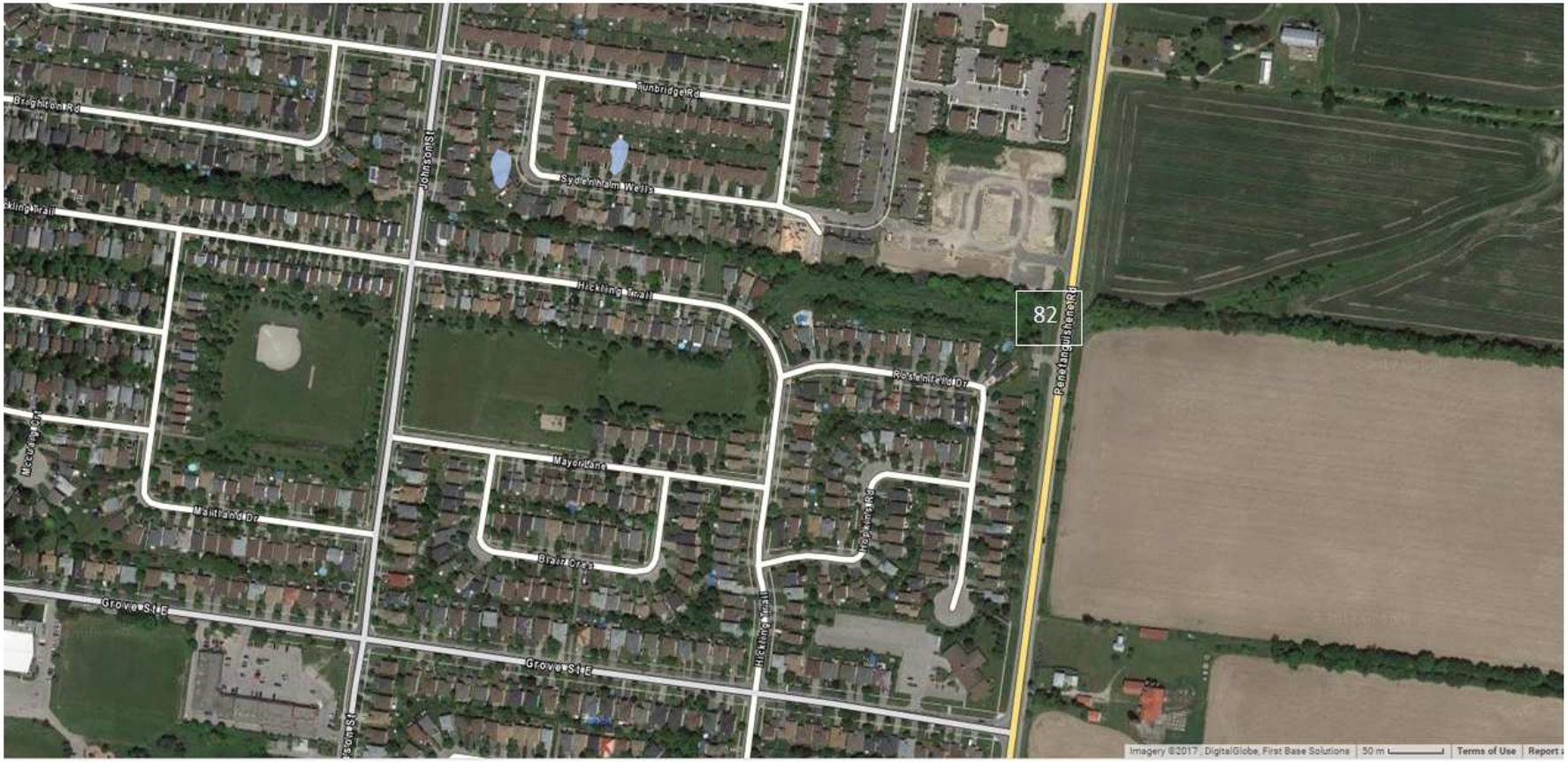
Source: VuMap

Sophia Creek Subwatershed Culverts 6-12



Source: VuMap

Georgian Creek Subwatershed Culvert 82



Source: VuMap

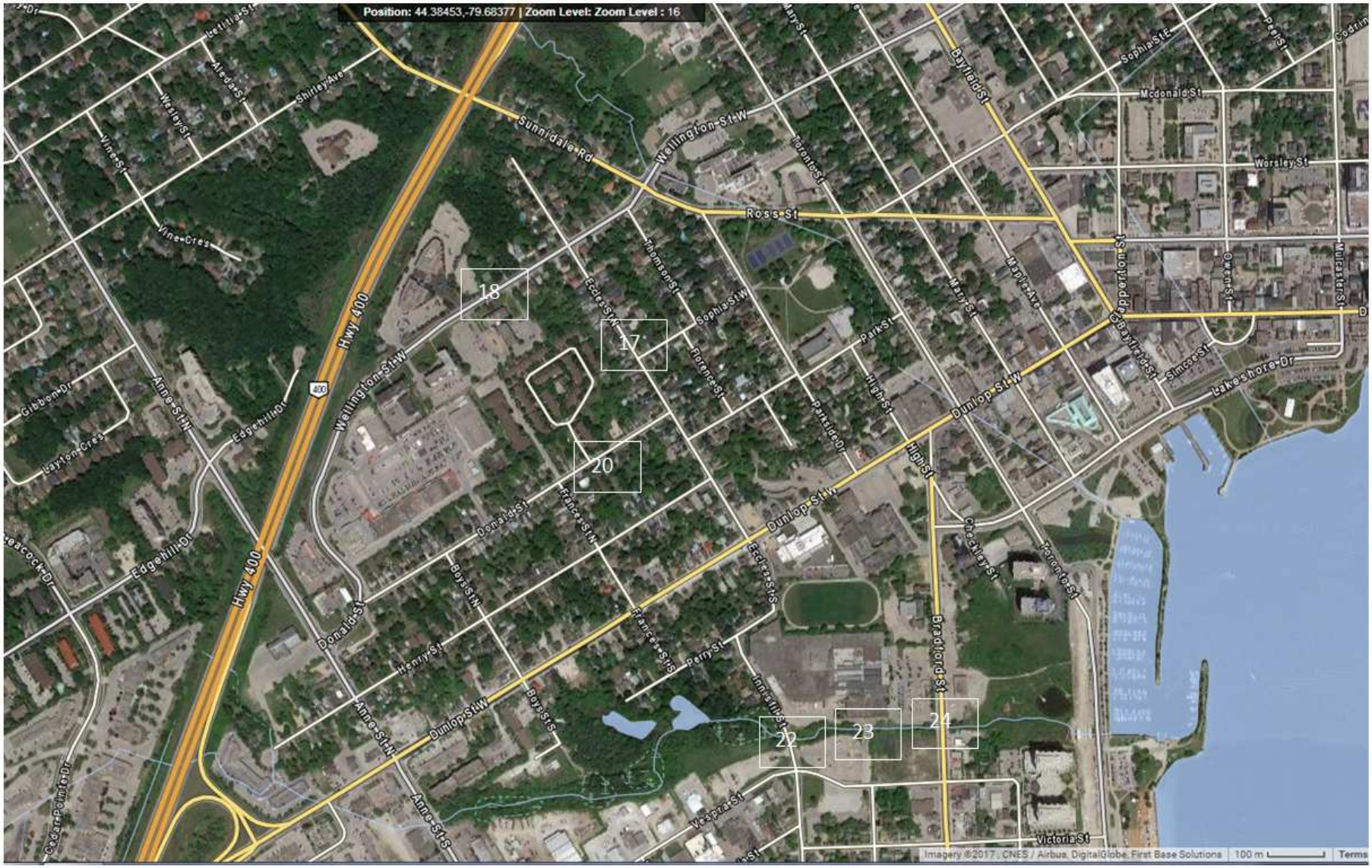
Dyments Creek Subwatershed Culverts 27-33

Source: VuMap

Dyments Creek Subwatershed Culverts 34-39

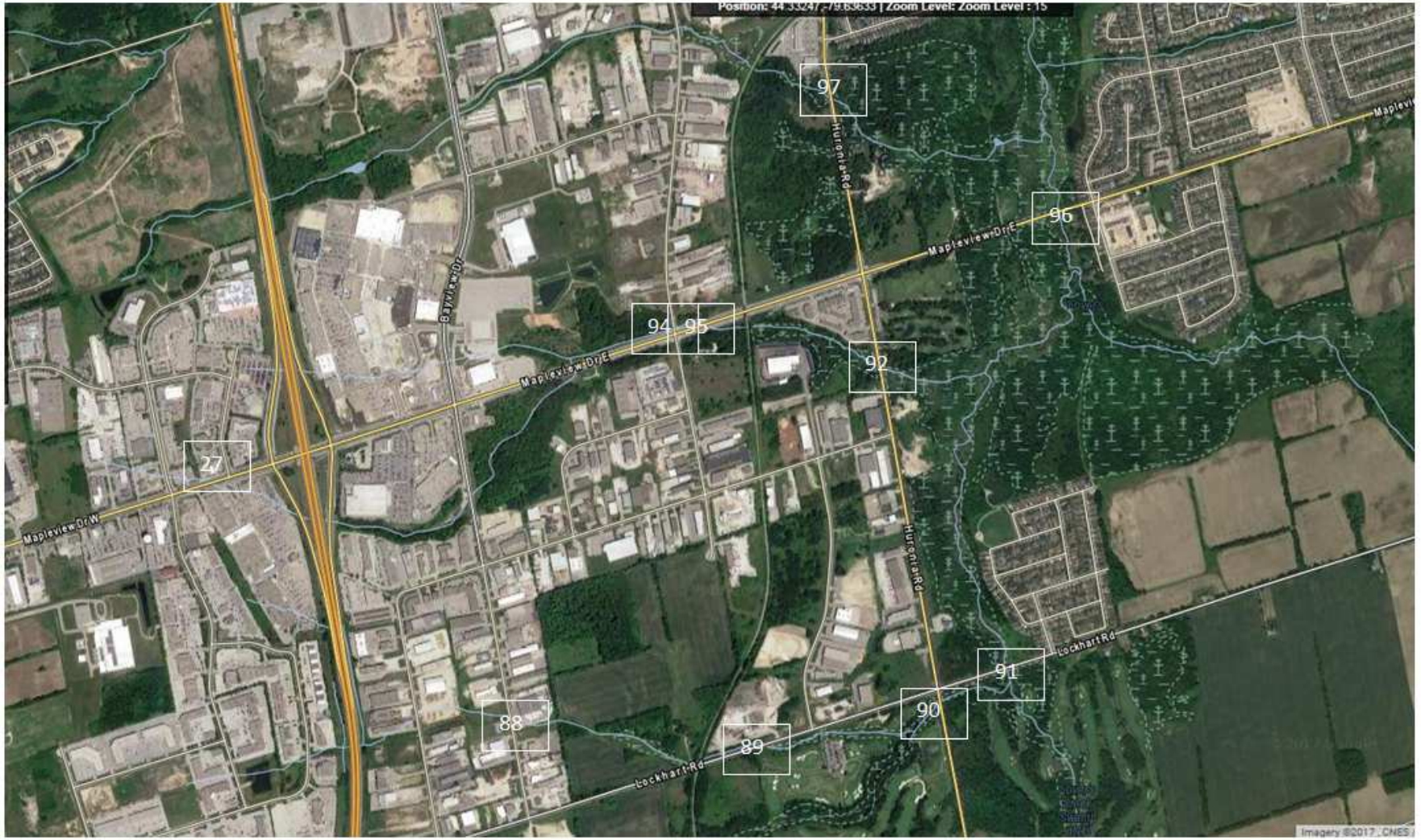
Source: VuMap

Kidds Creek Subwatershed Culverts 17, 18, 20 and Bunkers Creek Watershed Culverts 22, 23, 24



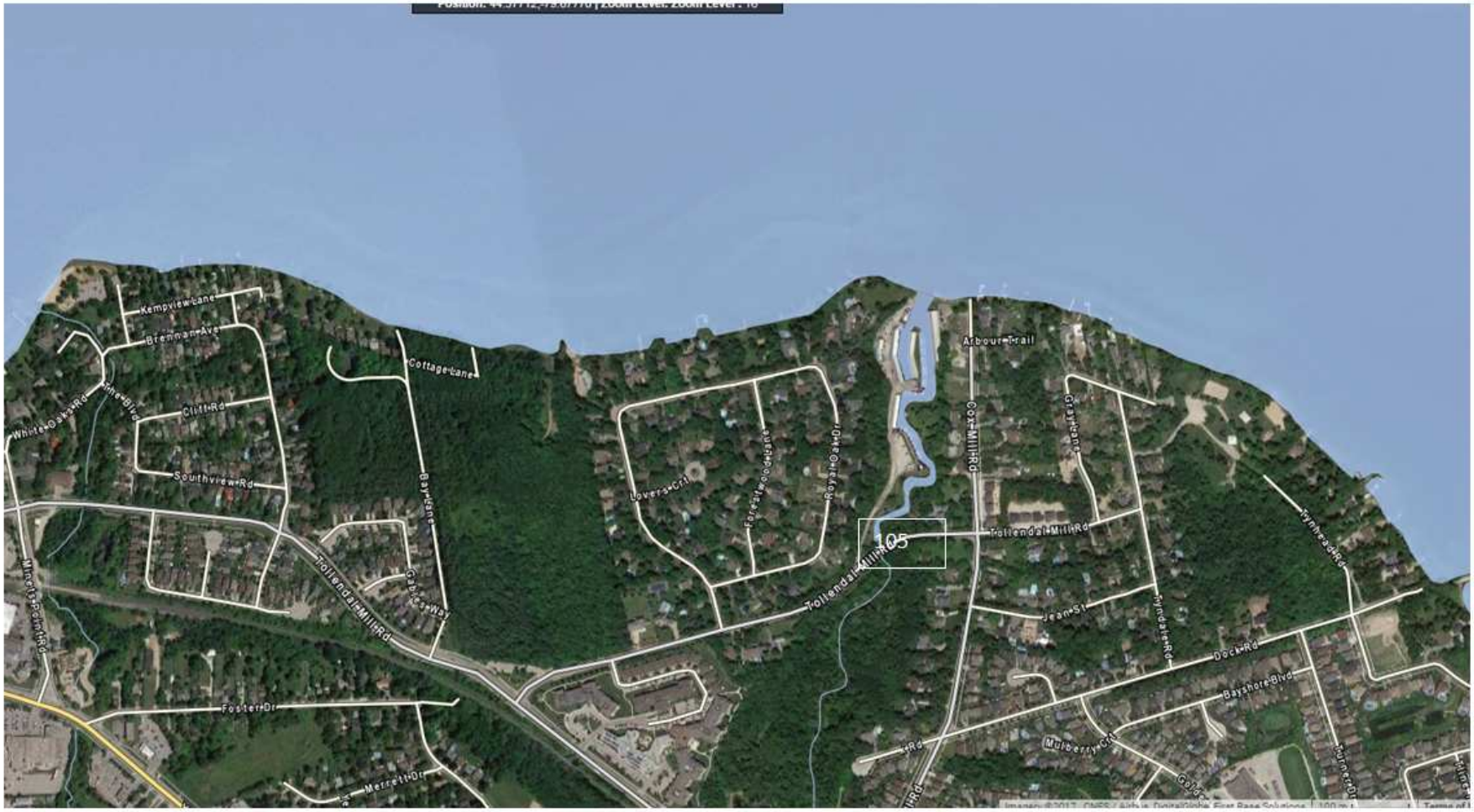
Source: VuMap

Lovers Creek Subwatershed Culverts 88-97



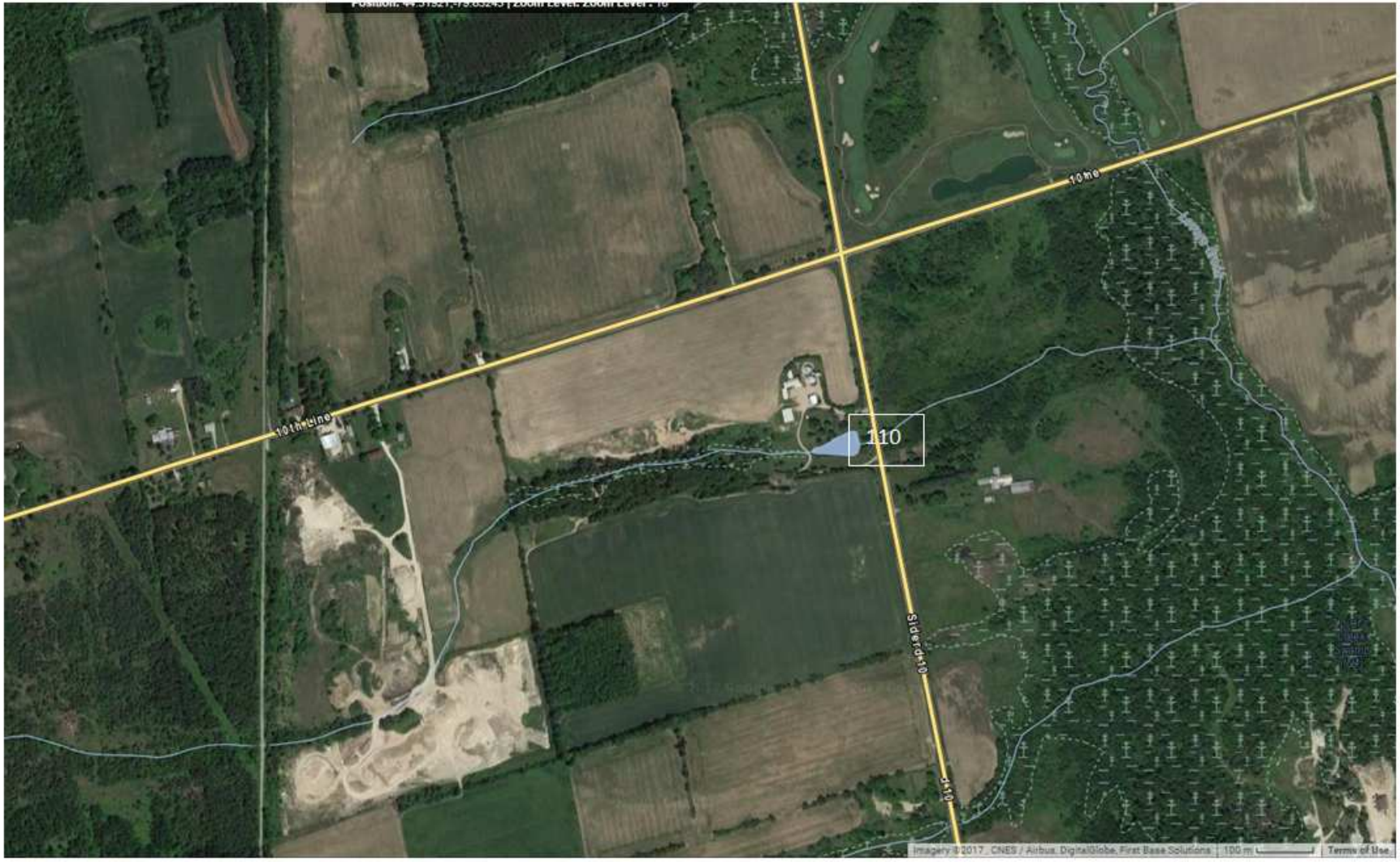
Source: VuMap

Lovers Creek Subwatershed Culvert 105



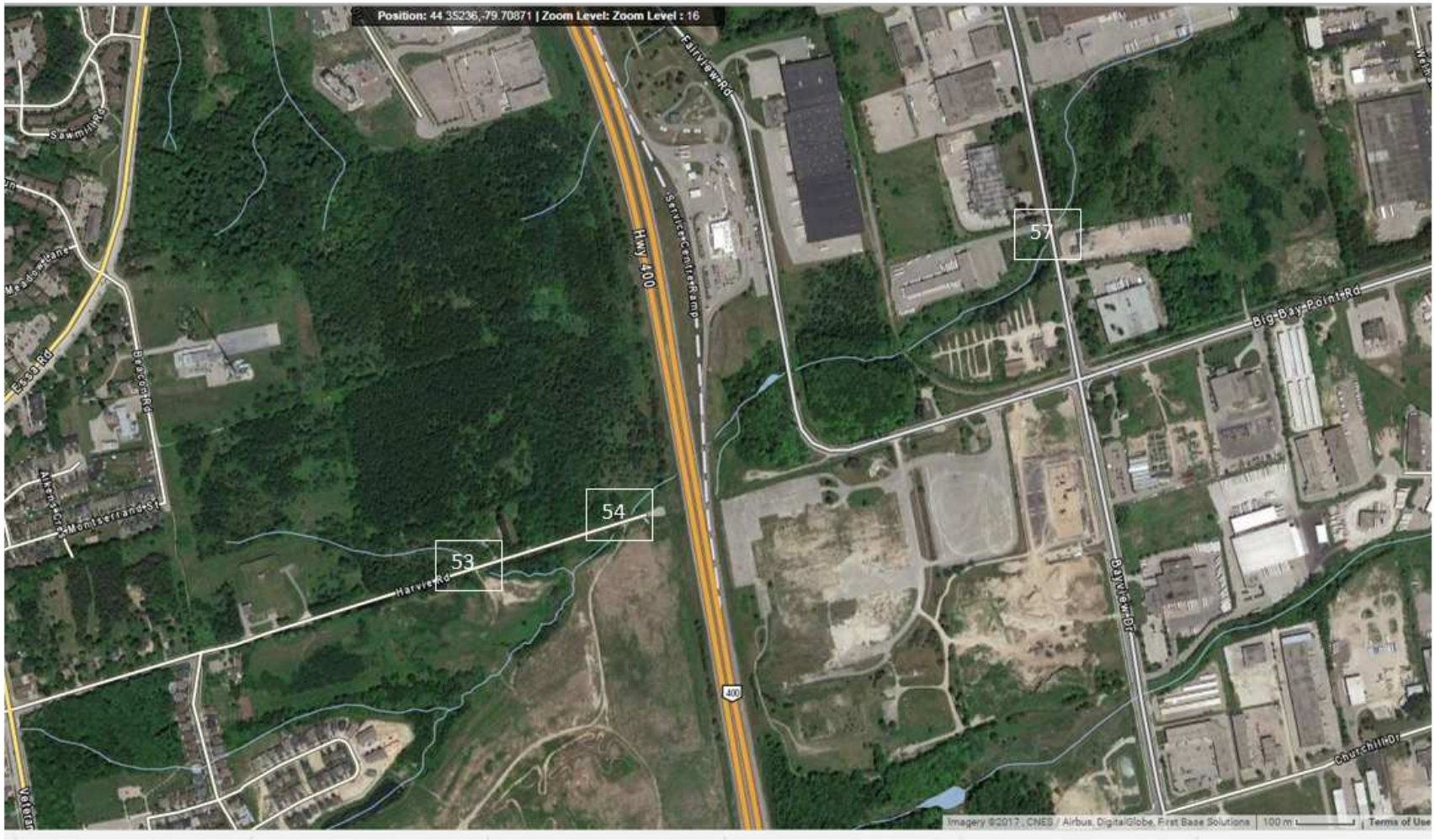
Source: VuMap

Lovers Creek Subwatershed Culvert 110



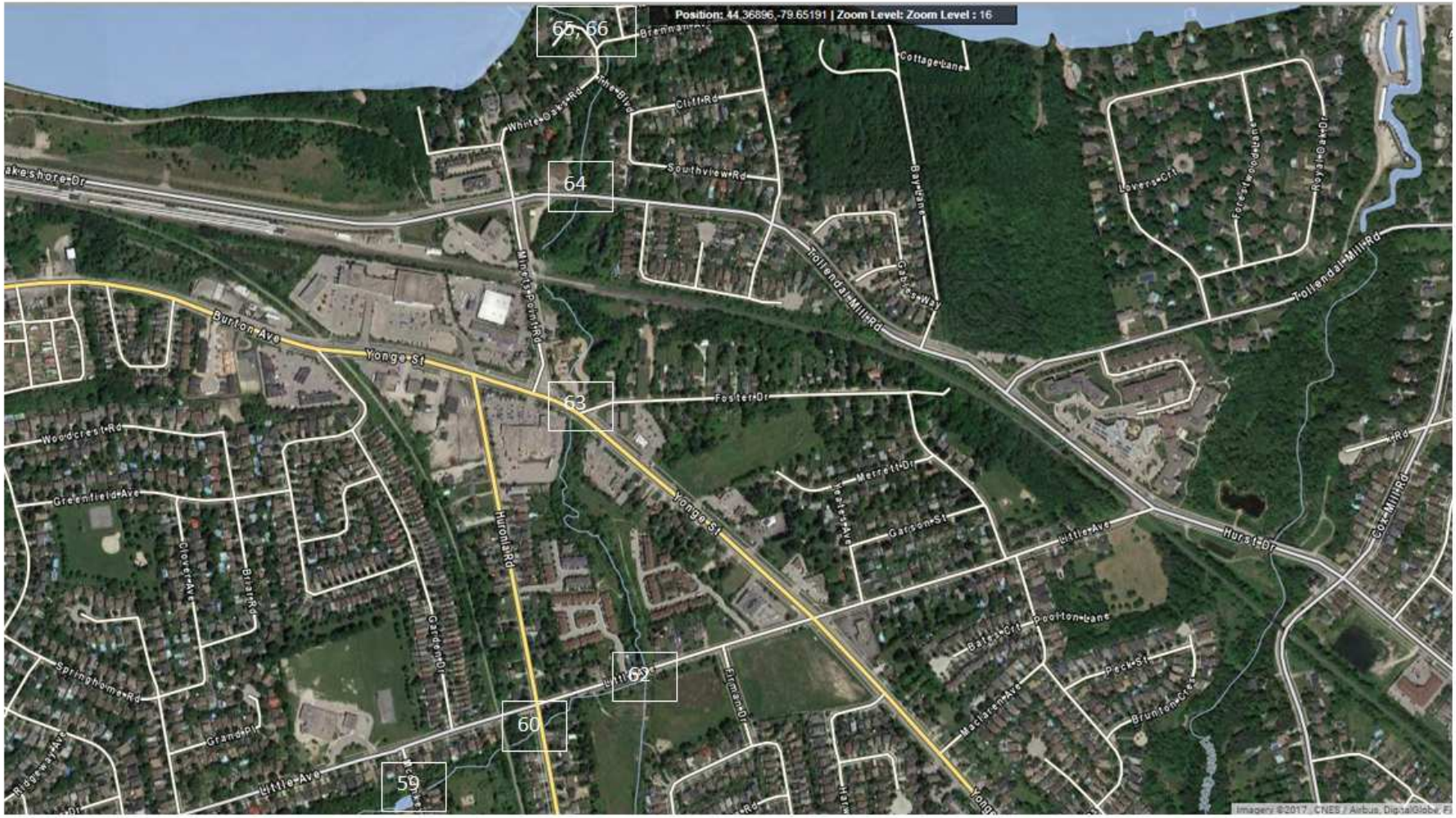
Source: VuMap

Whiskey Creek Subwatershed Culverts 53-57



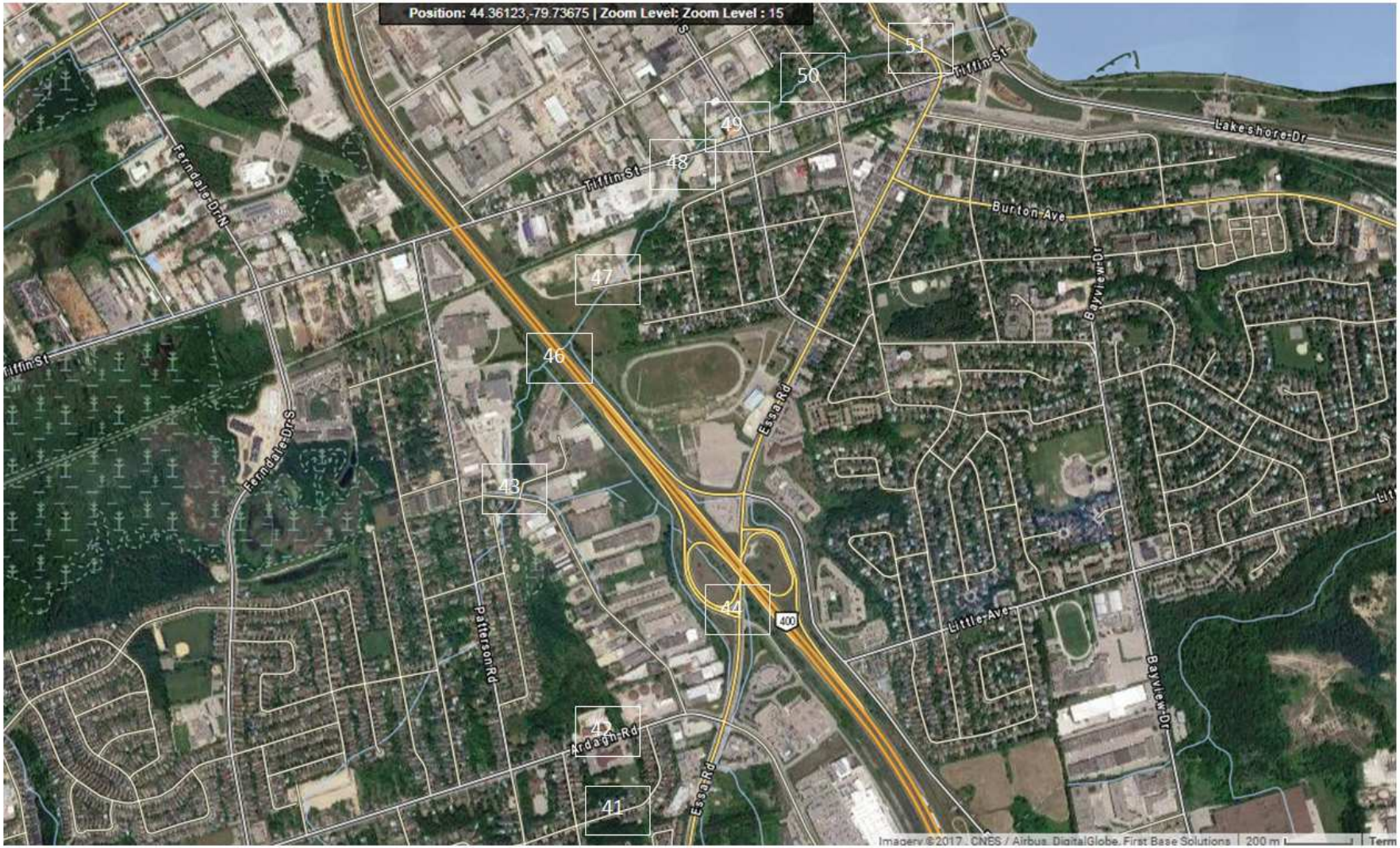
Source: VuMap

Whiskey Creek Subwatershed Culverts 59-66



Source: VuMap

Hotchkiss Creek Subwatershed Culverts 41-51

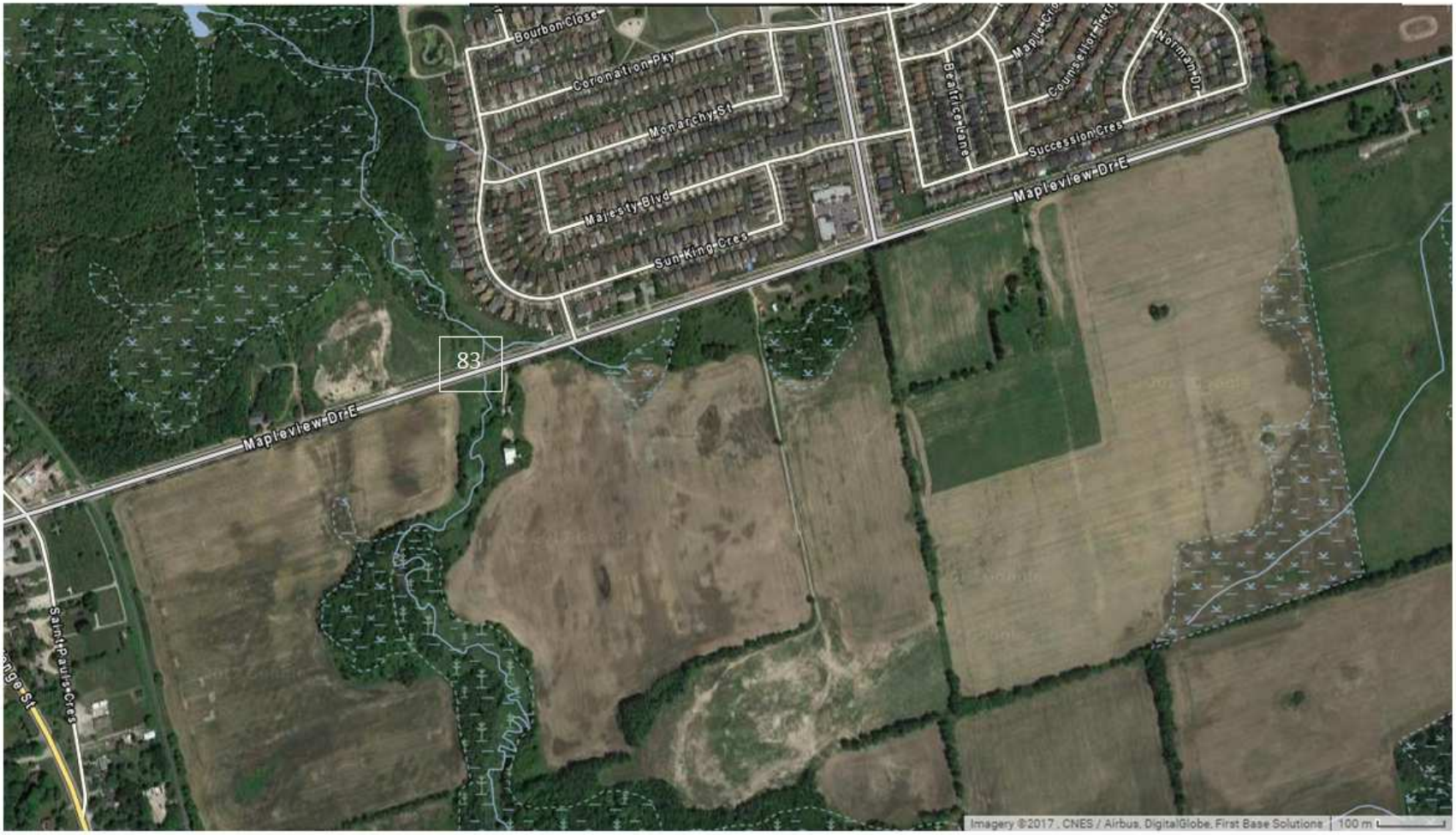


Source: VuMap

Bear Creek Subwatershed Culvert 80

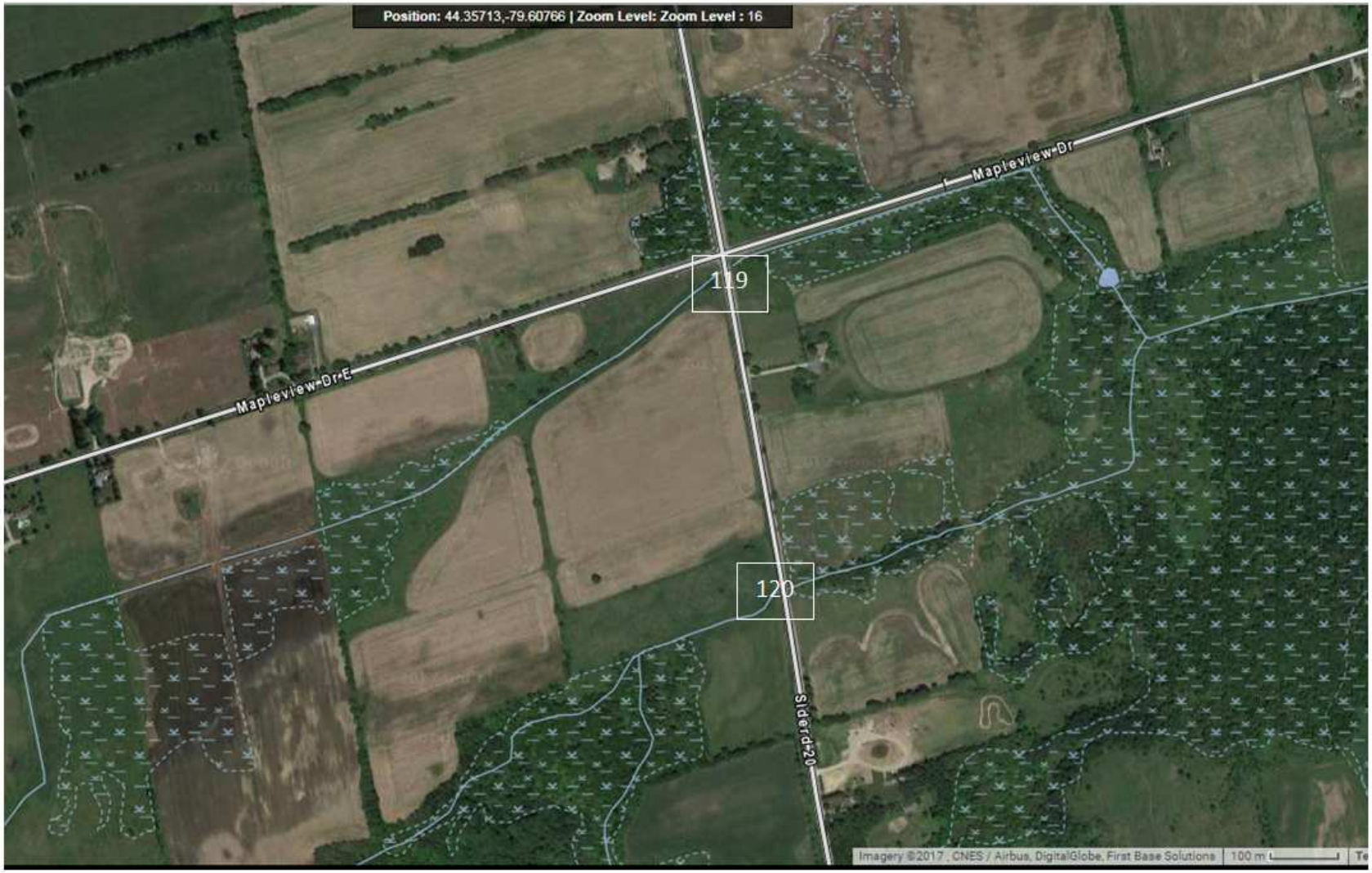
Source: VuMap

Hewitt's Creek Subwatershed Culvert 83



Source: VuMap

Sandy Cove Creek Subwatershed Culverts 119-120



Source: VuMap

The City of BARRIE

Facilities, Parks, Trails, Road Network, and Schools

Selected parks for LID works are depicted by purple boxes

TO CITY OF BARRIE COMMUNITY SPORTS COMPLEX

TO ELMVALE

TO MIDHURST

TO PARRY SOUND

TO ORILLIA

TO SHANTY BAY

TO LAKE COUNTRY ORO-MEDONTE RAIL TRAIL

TO FORT WILLOW

TO ANGUS AND CFB BORDEN

TO BIG BAY POINT

TO BRADFORD

TO TORONTO

TO THORTON - COOKSTOWN TRANS CANADA TRAIL

LITTLE LAKE

KEMPENFELT BAY

HIGHWAY NO. 400

HIGHWAY NO. 400 (MIDLAND BYPASS)

HIGHWAY 11

PENETANGUISHENE ROAD

SHANTY BAY ROAD

COUNTY ROAD NO. 93

COUNTY ROAD NO. 90

COUNTY ROAD NO. 27

DUNLOP STREET WEST

BIG BAY POINT ROAD

LOCKHART ROAD

TOWN LINE ROAD

CITY LIMITS

TOWNSHIP OF SPRINGWATER

TOWNSHIP OF ESSA

TOWNSHIP OF ORO-MEDONTE

TOWNSHIP OF INNISFIL

City Facilities

1. ALLANDALE RECREATION CENTRE....D6
2. BARRIE COMMUNITY SPORTS COMPLEX...A1
3. BARRIE MARINA....D5
4. BARRIE MOLSON CENTRE....D8-E8
5. BARRIE POLICE SERVICES....D3
6. CITY OPERATIONS CENTRE....B5
7. CITY HALL....D4
8. DORIAN PARKER CENTRE....B4
9. MADY CENTRE FOR PERFORMING ARTS....D4
10. EAST BAYFIELD CENTRE/SPORTS DOME...C2
11. EASTVIEW ARENA....A4
12. ENVIRONMENTAL CENTRE....A4-5
13. FIRE HALL #1....C4
14. FIRE HALL #2....D3
15. FIRE HALL #3....E7
16. FIRE HALL #4....B7
17. GEORGIAN COLLEGE THEATRE....E3
18. HOLLY COMMUNITY CENTRE....B8
19. LAMPMAN LANE CENTRE....C4
20. LIBRARY - DOWNTOWN BARRIE....D4
21. LIBRARY - PAINSWICK BRANCH....F7
22. MACLAREN ART CENTRE....D4
23. PARKVIEW SENIORS CENTRE....E4
24. SANDY HOLLOW LANDFILL....A4-5
25. SKATEBOARD PARK....C4
26. SOUTHSHORE COMMUNITY CENTRE....D5
27. SURFACE WATER TREATMENT PLANT....G6
28. TIFFIN BOAT LAUNCH....D5
29. TRANSIT TERMINAL....D4
30. WATER POLLUTION CONTROL CENTRE....D5

Parks

ALLANDALE HEIGHTS....D6
ALLANDALE STATION....D5
ARBORETUM....B3
ARCHIE GOODAL....D3-4
ASSIKINACK....E6
BMC DOLRA....E8
BATTEAUX....A7
BAYSHORE....G6-7
BAYVIEW....D4
BEAR CREEK....B8
BERCZY STREET....D4
BLAIR....C6
BROCK....C5
BROWNWOOD....D2
BRUNTON....F6
CAPILANO....D2
CARTER....F6
CARTWRIGHT....C3
CATHERINE....F7-8
CEDAR GROVE....F6
CENTENNIAL....D5
CHALMERS....F7
CHELTENHAM....F2-3
CITY MARINA....D4
CLOUGHLEY....A4
COLLEGE HEIGHTS....E3
COMMUNITY GARDEN....C4
CORONATION....H6
CUDIA....F6
CUMMINGS....B7
CUNDLES WEST....A4
D & J FRALICK....G7
D'AMBROSIO....F6
DOCK ROAD....F5
DONALD STREET....C4
DUNSMORE PARK....F3
DYMENTS POND....D5
EAST BAYFIELD....C2
EASTVIEW....E3
ELIZABETH....C6
EMMS....B7
FERNDALE....B6
FERRIS....D3
GARABALDI LOOKOUT....B9
GEORGIAN FIELDS....E3
GIBBON....B4
GOLDEN MEADOW....F6
GREENFIELD....D6
HANMER....B3
HARVIE....C7
HERITAGE PARK....D4
H.G. ROBERTSON....D3
HICKLING....F3
HIGHLAND....E6
HOLLY....B8
HURONIA NORTH....E6-7
HURST....G6
HYDE....H6
IRWIN....B4
J. GIBBINS....F8
JOHN EDWIN COUPE....D4
JOHNSONS BEACH....E4
KEARSY....C4
KEMPENFELT....E4
KUZMICH....G6
LAMPMAN LANE....B4
LEACOCK....C7
LENNOX....E7
LIONS....D4
LITTLE LAKE....C1-2,F1-2
LIVINGSTONE....B3
LONSDALE....E3
LOUGHEED....B9
LOYALIST....G6
MACMORRISON....D3
MADELAINE....F7
MAPLETON....C8
MARSELLUS....B8
MAYFAIR....C7
MCCONKEY....E6
MEMORIAL SQUARE....E4
MINETS POINT....E5
MONSERRAND....C7
NELSON LOOKOUT....E4
NELSON SQUARE....E4
OATES....B5
OSPREY RIDGE....D2
PAINSWICK....F6
PATRICIA....C3
PATTERSON PLACE....C6
PIONEER....F5
PRINGLE....A5
QUEEN'S....C4
RADENHURST....F3
REDFERN....B9
REDPATH....C3
RIVERWOOD....C3
ROBIN COURT....D2-3
SANDRINGHAM....H6
SCOTT....B4
SHALOM....F8
SHEAR....C6
SHEPPARD....F5
SHOREVIEW....F4
SNOWSHOE....C7
SPROULE PARK....B5
ST. VINCENT....E4
STEEL STREET....E3
STOLLAR....D2
STRABANE....E3
SUMMERSET....B7
SUNNIDALE....B3-4,C3-4
SURREY....B4-5
THE GABLES....E5
TIFFIN BOAT LAUNCH....D5
TOLLENDAL WOODS....F5
TYNDALE....F5
VALLEYVIEW....G6
VANCOUVER LOOKOUT....E4
VETERANS WOODS....C7
VICTORIA WOODS....B3
WESSENGER....B8
WALNUT CRESCENT....G6
WILKINS BEACH....G6
WILLOUGHBY....E6

Splash Pad

LAMPMAN LANE PARK....B4

Disc Golf Course

SANDY HOLLOW DISC GOLF....A4

Community Gardens

GOLDEN MEADOW....F6
SUNNIDALE PARK....C4

Dog Parks

BARRIE MOLSON CENTRE DOG OFF LEASH RECREATION AREA (DOLRA)....E8
SUNNIDALE PARK DOG OFF LEASH RECREATION AREA (DOLRA)....C4

Natural Areas

ARDAGH BLUFFS....B7-8,C7
AUDREY MILLIGAN POND....C5
AUSTIN RAVINE....B4
BALDWIN LANE (VACANT LOT)....D6
BARWICK....A3
BEAR CREEK ECOPARK....B-C6
BROWNS BUSH....C3
BRUNTON TO SHEPPARD PARK....F6
BUNKER'S CREEK ECOPARK....D5
D'AMBROSIO....F6-7
DYMENT'S POND....D5
EAST OF WILDWOOD TRAIL....C7
ECCLES PARK....C4
FERNDALE PARK....B6
GARIBALDI LOOKOUT....B9
HANMER....B3
HOGAN'S WOODS....C2
HOLLYWOODS RAVINE....A9-B9
HURONIA BUFFER....E6-7
IRWIN....B4
LACKIE'S BUSH....D6-7,E6
LAMPMAN LANE....B4
LILLIAN CRESCENT....B3
LOVERS CREEK RAVINE....E7-F7
LOYALIST FOREST....G6
MAYFAIR PARK....C7
MELINDA WOODS....D6
NORTH OF CITYVIEW CIRCLE....C7
NORTH OF LAKESHORE DRIVE....D5,E5
NORTH OF MAPLETON AVENUE....B8
RIVERWOOD RAVINE....B3
SANDY HOLLOW BUFFER....A4-5
SANDY HOLLOW RAVINE....A4-B4-5
SHEAR....D6
SOUTHSHORE....D5-E5
SUNNIDALE....C3-4
TALL TREES....C3
TYNDALE....F5
VETERANS WOODS....C7
VINE CRESCENT RAVINE....C4
WALNUT CRESCENT....G6
WILKINS WALK....G6
WILLOUGHBY....E6
WOODCREST RAVINE....D6

Accessible Playgrounds (A)

EAST BAYFIELD COMMUNITY PARK....C2
EASTVIEW COMMUNITY PARK....C5
FERNDALE PARK....B6
HOLLY COMMUNITY PARK....B4
LAMPMAN LANE PARK....F6
PAINSWICK PARK....A3
QUEENS PARK....C4
SUNNIDALE PARK....B3-4

Park By-law 2010-033

Please refer to barrie.ca for complete municipal by-laws.

DOGS

1. Dogs must be leashed in all Barrie parks unless in designated Off-Leash Areas.
2. Owners must remain in control of their dog and leashes must not exceed six (6) feet.
3. Dogs must have a City of Barrie dog licence and current rabies vaccination tag affixed to the dog. Owners are to clean up after their dogs.
4. No owner shall allow his dog in any waterfront park, except on the park walkways in Heritage Park, Allandale Station Park and Centennial Park as per Animal Control By-law 2010-035.

PARKS

5. Setting and kindling fires are prohibited. Gas source fires are not permitted due to explosion hazard.
6. Camping is not permitted.
7. Bicycles are to remain on pathways and be equipped with a bell or horn.

Schools

P — SIMCOE COUNTY BOARD OF EDUCATION

P4. ALLANDALE HEIGHTS SCHOOL - 124 BAYVIEW DR....D6
P5. INNISDALE SECONDARY SCHOOL - 95 LITTLE AVENUE....D6
P6. PRINCE OF WALES SCHOOL - 50 BRADFORD ST....C4,5
P7. BARRIE CENTRAL COLLEGIATE - 125 DUNLOP STREET WEST....C4,5
P8. HILLCREST PUBLIC SCHOOL - 184 TORONTO ST....C4
P9. OAKLEY PARK SCHOOL - 22 DAVIDSON ST....D3,4
P10. BARRIE NORTH COLLEGIATE - 110 GROVE STREET EAST....D3
P11. MAPLE GROVE SCHOOL - 242 GROVE ST E....D3
P12. CODRINGTON PUBLIC SCHOOL - 217 CODRINGTON ST....E4
P13. JOHNSON STREET PUBLIC SCHOOL - 105 JOHNSON ST....F3
P14. STEEL STREET SCHOOL - 36 STEEL ST....E3
P15. EASTVIEW SECONDARY SCHOOL - 421 GROVE STREET EAST....E3
P18. PORTAGE VIEW SCHOOL - 124 LETITIA ST....B4
P19. ANDREW HUNTER ELEMENTARY SCHOOL - 59 LAMPMAN LANE....B4
P20. EMMA KING ELEMENTARY SCHOOL - 383 CUNDLES ROAD WEST....A4
P21. WEST BAYFIELD ELEMENTARY SCHOOL - 49 FORD ST....B3
P32. CUNDLES HEIGHTS PUBLIC SCHOOL - 60 CUNDLES RD E....C3
P33. TERRY FOX ELEMENTARY SCHOOL - 100 LIVINGSTONE EAST....C2
P34. KING EDWARD PUBLIC SCHOOL - 19 BURTON AVE....D6
P35. ALGONQUIN RIDGE ELEMENTARY SCHOOL -191 GOLDEN MEADOW RD....F6
P36. ASSIKINACK PUBLIC SCHOOL - 226 LITTLE AVE....E6
P37. MAPLEVIEW HEIGHTS ELEMENTARY SCHOOL - 160 ESTER DRIVE....F7
P38. WARNICA PUBLIC SCHOOL - 211 WARNICA RD....F6
P39. W.C. LITTLE ELEMENTARY SCHOOL -11 BEAR CREEK DRIVE....B8,9
P40. BEAR CREEK SECONDARY SCHOOL - 100 RED OAK DRIVE....A,B8
P41. HOLLY MEADOWS ELEMENTARY SCHOOL - 151 MAPLETON AVENUE....B8
P42. FERNDALE WOODS ELEMENTARY SCHOOL - 17- FERNDALE DRIVE....B6
P54. TRILLIUM WOODS ELEMENTARY SCHOOL - 20 ELMBROOK DRIVE....C8
P60. WILLOW LANDING ELEMENTARY SCHOOL - 330 BIG BAY POINT ROAD....E7
P61. HEWITTS CREEK PUBLIC SCHOOL- 41 SANDRINGHAM DR....G,H6
P62. ARDAGH BLUFFS PUBLIC SCHOOL - 159 SUMMERSET DR....B7
P63. HYDE PARK PUBLIC SCHOOL - 72 THE QUEENSWAY....H6

C — SIMCOE MUSKOKA CATHOLIC DISTRICT SCHOOL BOARD

C3. MONSIGNOR CLAIR SCHOOL - 230 CUNDLES RD E....D2,3
C17. SISTER CATHERINE DONNELLY CATHOLIC SCHOOL - 123 HANMER ST E....C2
C22. THE GOOD SHEPHERD CATHOLIC SCHOOL - 23 CLOUGHLEY DR....A4
C23. ST. MARY'S SCHOOL - 340 LEACOCK DR....B4
C24. ST. NICHOLAS ELEMENTARY SCHOOL - 100 LOUGHEED RD....B9
C25. ST. BERNADETTE ELEMENTARY SCHOOL - 101 MARSELLUS DR....B8
C26. ST. JOHN PAUL II SCHOOL - 211 ASHFORD DR....F6,7, G6,7
C27. ST. PETER'S SECONDARY SCHOOL - 201 ASHFORD DRF....G7
C28. ST. MICHAEL THE ARCHANGEL ELEMENTARY SCHOOL - 349 BIG BAY POINT RD....E3
C29. ST. JOHN VIANNEY SCHOOL - 393 INNISFIL ST....D6
C30. ST. CATHERINE OF SIENA SCHOOL - 111 SUMMERSET DR....B6,7
C31. ST. JOAN OF ARC SECONDARY SCHOOL - 460 MAPLETON AVE....A7
C51. ST. MONICA'S SCHOOL - 90 STEEL ST....E3
C52. ST. JOSEPH'S HIGH SCHOOL - 243 CUNDLES RD E....D2,3
C53. ST. MARGUERITE D'YOUVILLE CATHOLIC SCHOOL - 240 KOZLOV ST....B3
C56. ST. GABRIEL THE ARCHANGEL CATHOLIC SCHOOL 130 PRINCE WILLIAM WAY....H6

F — CONSEIL SCOLAIRE PUBLIC DE DISTRICT DU CENTRE-SUD-OUEST

F48. ÉCOLE ÉLEMENTAIRE LA SOURCE - 70 PROMENADE MADELAINE DR....F7

CONSEIL SCOLAIRE DE DISTRICT CATHOLIQUE CENTRE-SUD

F49. ÉCOLE SECONDAIRE CATHOLIQUE NOUVELLE ALLIANCE - 249 ANNE ST N....B4
F50. ÉCOLE ÉLÉMENTAIRE CATHOLIQUE FRÈRE ANDRÉ - 273 CUNDLES RD....D2,3
F55. ÉCOLE SECONDAIRE ROMÉO-DALLAIRE - 736 CHEMIN ESSA RD....B9

PR — PRIVATE SCHOOL

PR1. VICTORY ACADEMY - 155 FERRIS LANE....D3
PR2. THE CHILDREN'S ACADEMY - 565 BRYNE DR....D9
PR43. TIMOTHY CHRISTIAN SCHOOL - 750 ESSA RD....B9
PR44. KEMPENFELT BAY SCHOOL - 576 BRYNE DR....D9
PR45. BLYTHE ACADEMY - 147 TORONTO ST....C4
PR46. GEORGIAN OAKS ACADEMY - 94 PATTERSON RD....C6
PR47. SOUTH SIMCOE MONTESSORI SCHOOL - 45 COMMERCE PARK DR....D9
PR57. CHILDREN'S MONTESSORI SCHOOL - 161 HANMER ST W....E4
PR58. TREE TOP SCHOOL - 175 ESSA ROAD....C6
PR59. HERITAGE CHRISTIAN ACADEMY - 79 ARDAGH....C7

PS — POST SECONDARY

PS16. GEORGIAN COLLEGE AND LAURENTIAN UNIVERSITY SATELLITE CAMPUS 1 GEORGIAN DRIVE....E3

Legend

- Parks
- Natural Areas
- Water body
- Major Institutions
- Municipal Parking Lot
- Roads
- Trans Canada Trail (15 km)
- Trans Canada Trail - Interim Route
- Nine Mile Portage Heritage Trail (5 km)
- North Shore Trail (3 km)
- Waterfront Trail (3.6 km)
- Parkland Trails and Walkways

Ardagh Bluffs Trails

- ARDAGH -East Creek Trail (1.3 km)
- ARDAGH - West Creek Trail (2.2 km)
- ARDAGH - Central Creek Trail (1.9 km)
- ARDAGH - Ring Trail (5 km)

- (F) Future Park
- (A) Accessible Playground
- Splash Pad
- Dog Park

FIND PARK INFORMATION ONLINE AT barrie.ca/parks

BAR SCALE
0 .5 1 1.5 2 km

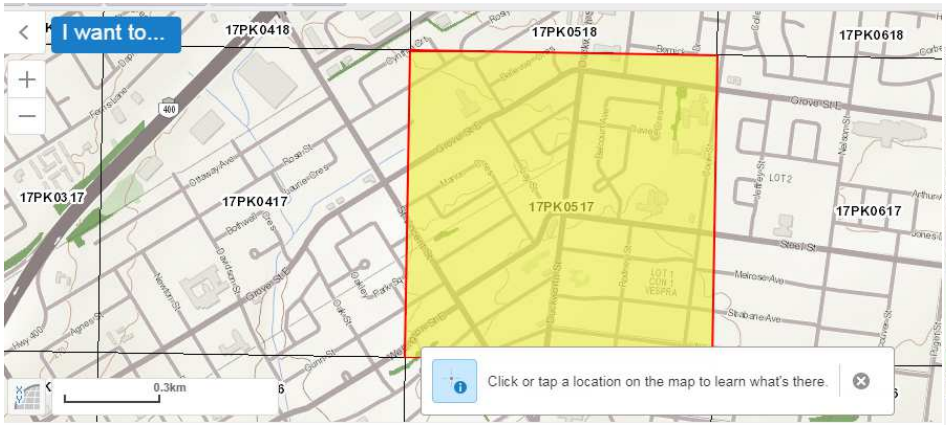
Barrie Parks LID Summary			
UICS ID	Park Name	Study Area	Watershed
1	Allandale Heights Park	Barrie Creeks	Hotchkiss Creek
2	Assikinack Park	Barrie Creeks	Whiskey Creek
3	Blair Park	Barrie Creeks	Hotchkiss Creek
4	Cloughley Park	Barrie Creeks	Dyments Creek
5	Elizabeth Park	Barrie Creeks	Hotchkiss Creek
6	Gibbon Park	Barrie Creeks	Bunkers Creek
7	Greenfield Park	Barrie Creeks	Huronia
10	Mapleton Park	Barrie Creeks	Whiskey Creek
11	Montserrand Park	Barrie Creeks	Whiskey Creek
12	Pringle Park	Barrie Creeks	Dyments Creek
13	Shear Park	Barrie Creeks	Hotchkiss Creek
14	Shoreview Park	Barrie Creeks	Johnson
15	Sunnidale Park	Barrie Creeks	Kidds Creek
17	Bayshore Park	Lovers, Hewitts and Sandy Cove	Hewitts Creek
19	Catherine Park	Lovers, Hewitts and Sandy Cove	Lovers Creek
20	D'Ambrosio Park	Lovers, Hewitts and Sandy Cove	Lovers Creek
23	Madelaine Park	Lovers, Hewitts and Sandy Cove	Lovers Creek
24	Queensway/Hyde Park	Lovers, Hewitts and Sandy Cove	Hewitts Creek
25	Sandringham Park	Lovers, Hewitts and Sandy Cove	Hewitts Creek
26	Shalom Park	Lovers, Hewitts and Sandy Cove	Lovers Creek
27	Batteaux Park	NVCA	Bear Creek
28	Bear Creek Park	NVCA	Bear Creek
29	Cartwright Park	NVCA	Little Lake
31	Dunsmore Park	NVCA	Georgian Creek
32	East Bayfield Park	NVCA	Little Lake
34	Ferndale Park	NVCA	Bear Creek
35	Lougheed Park	NVCA	Bear Creek
37	Strabane Park	NVCA	Georgian Creek
38	Wessenger Park	NVCA	Bear Creek

Notes:

* Only a portion of the park is within the specified area classification.

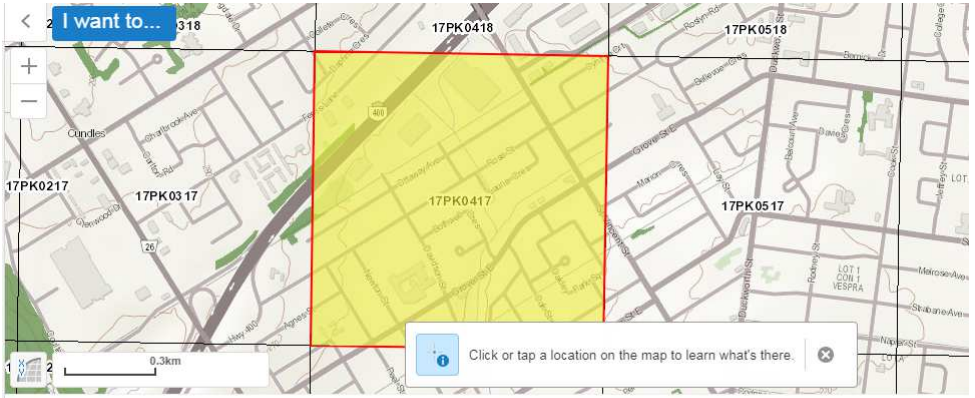
NHIC Background Data. 17-092 City of Barrie Drainage Master Plan

Sophia Creek Subwatershed Culverts 1-5 (Squares 17PK0517 and 17PK0417)



NHIC Data -- Grid ID = 1008291

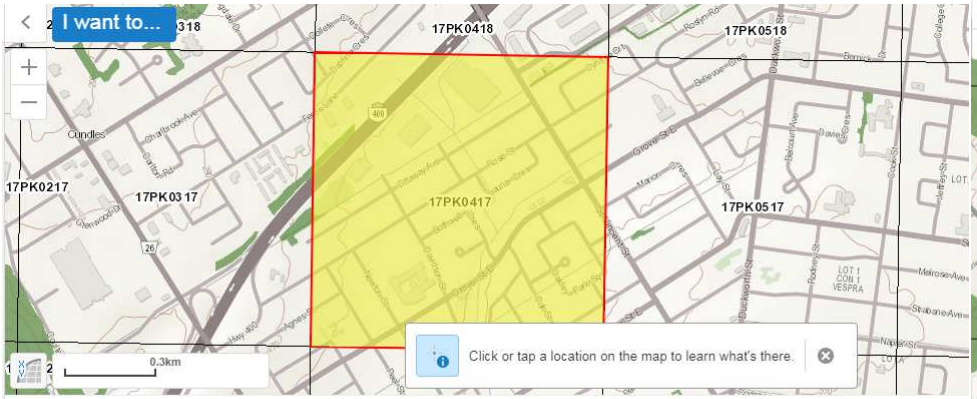
Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206



NHIC Data -- Grid ID = 1008281

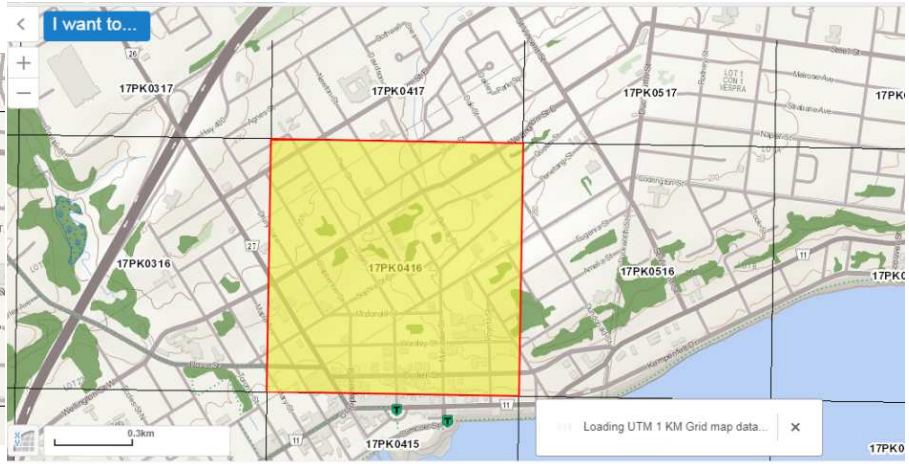
Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date
RESTRICTED SPECIES	RESTRICTED SPECIES	RESTRICTED SPECIES				1877-08-20
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15

Sophia Creek Subwatershed Culverts 6-12 (Squares 17PK0416 and 17PK0417)



NHIC Data -- Grid ID = 1008281

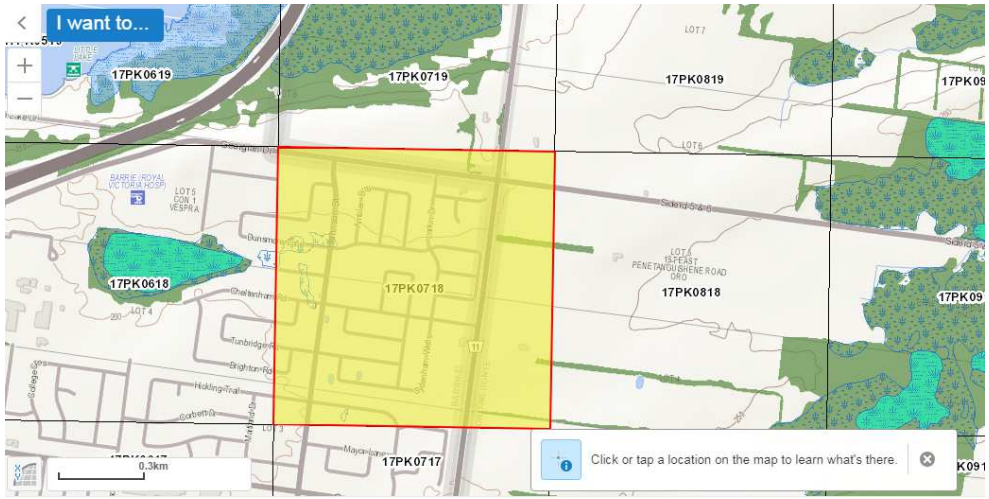
Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date
RESTRICTED SPECIES	RESTRICTED SPECIES	RESTRICTED SPECIES				1877-08-20
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15



NHIC Data -- Grid ID = 1008280

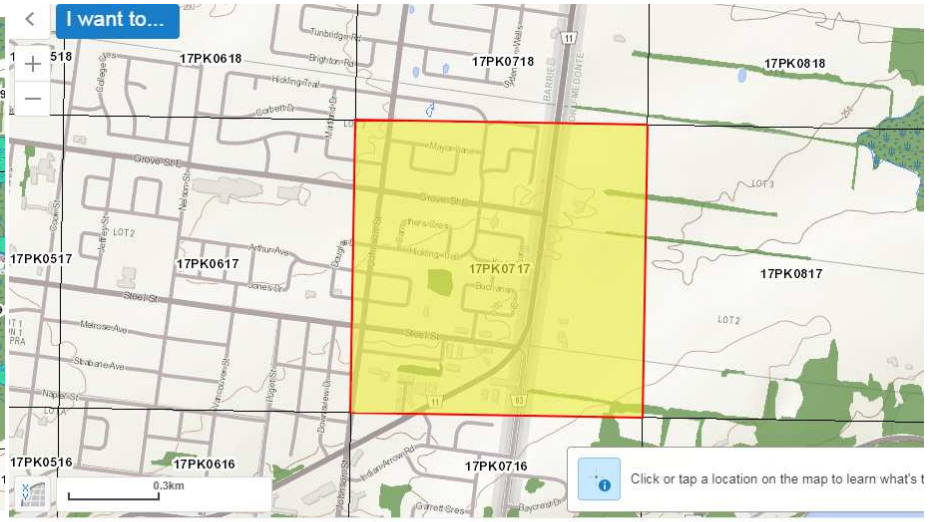
Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID
RESTRICTED SPECIES	RESTRICTED SPECIES	RESTRICTED SPECIES				1877-08-20	16459
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206

Georgian Creek Subwatershed Culvert 82 (Squares 17PK0717 and 17PK0718)



NHIC Data -- Grid ID = 1008312

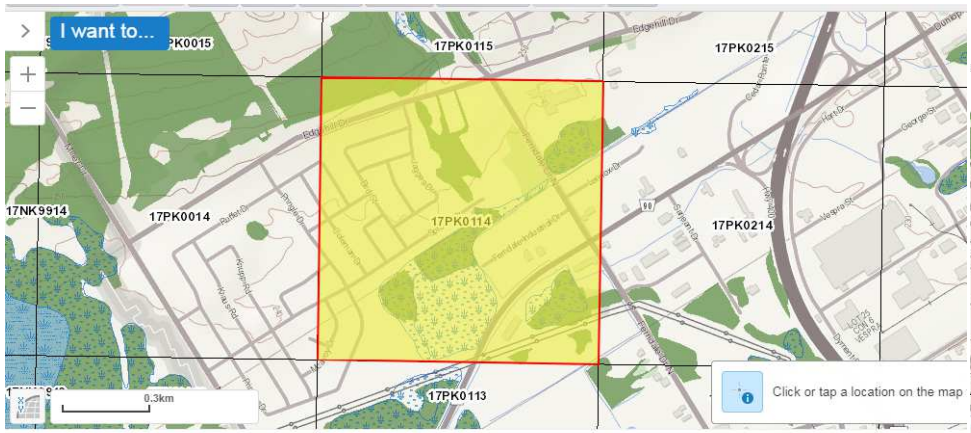
Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID
RESTRICTED SPECIES	RESTRICTED SPECIES	RESTRICTED SPECIES				1877-08-20	16459
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206

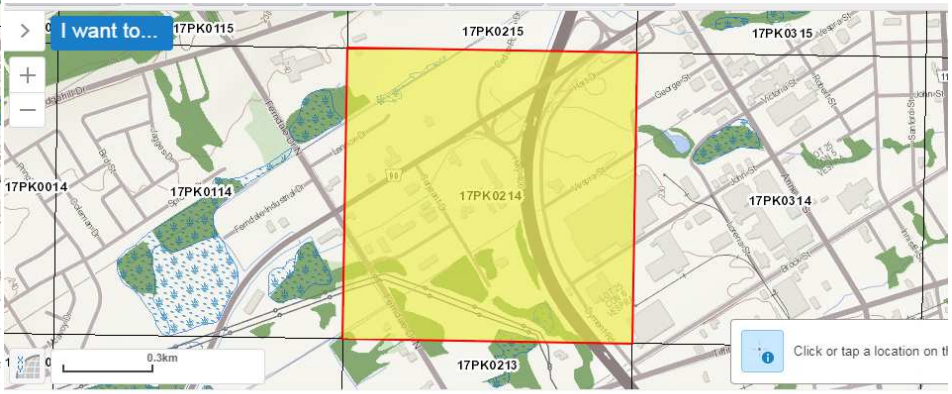


NHIC Data -- Grid ID = 1008311

Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206

Dyments Creek Subwatershed Culverts 27-33 (Squares 17PK0114 and 17PK0214)





NHIC Data -- Grid ID =

Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID	De
SPECIES	Henslow's Sparrow	Ammodramus henslowii	SHB	END	END	1960-05-29	13045	htt
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206	htt
SPECIES	Ram's-head Lady's-slipper	Cypripedium arietinum	S3			1967	22217	htt
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08	41250	htt
SPECIES	Houghton's Flatsedge	Cyperus houghtonii	S3			1972-10-07	59355	htt
SPECIES	Houghton's Flatsedge	Cyperus houghtonii	S3			1972-10-07	59356	htt

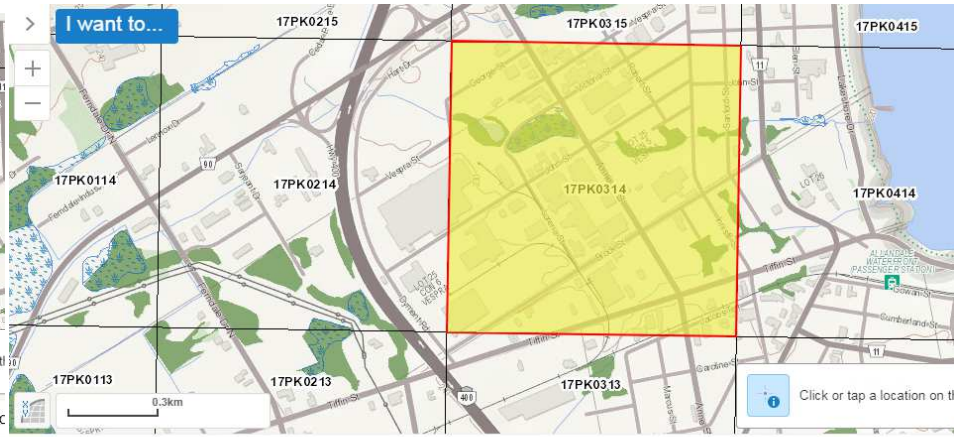
NHIC Data -- Gric

Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID
SPECIES	Henslow's Sparrow	Ammodramus henslowii	SHB	END	END	1960-05-29	13045
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08	41250
SPECIES	Houghton's Flatsedge	Cyperus houghtonii	S3			1972-10-07	59355
SPECIES	Houghton's Flatsedge	Cyperus houghtonii	S3			1972-10-07	59356

Dyments Creek Subwatershed Culverts 34-39 (Squares 17PK0214, 17PK0314 and 17PK0414)

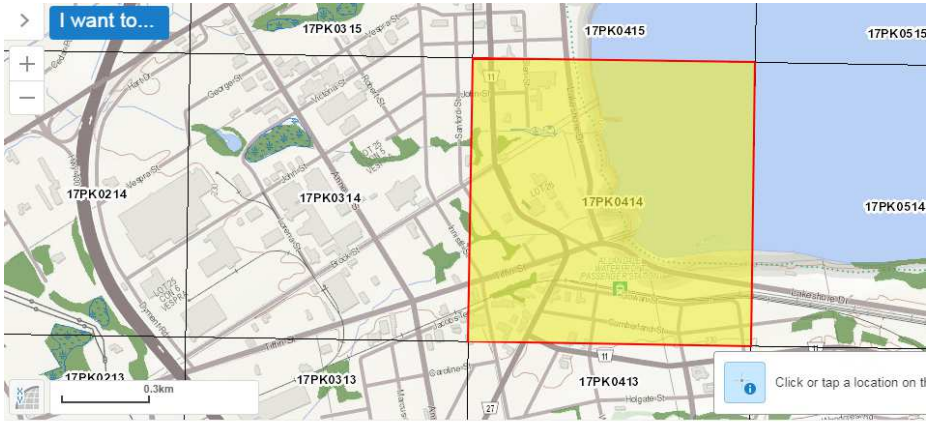
NHIC Data -- Gric

Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID
SPECIES	Henslow's Sparrow	Ammodramus henslowii	SHB	END	END	1960-05-29	13045
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08	41250
SPECIES	Houghton's Flatsedge	Cyperus houghtonii	S3			1972-10-07	59355
SPECIES	Houghton's Flatsedge	Cyperus houghtonii	S3			1972-10-07	59356



NHIC Data -- Gric

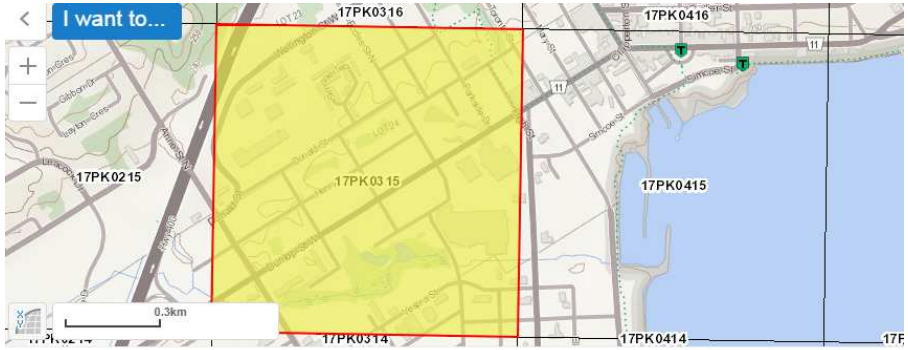
Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID
SPECIES	Henslow's Sparrow	Ammodramus henslowii	SHB	END	END	1960-05-29	13045
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08	41250
SPECIES	Houghton's Flatsedge	Cyperus houghtonii	S3			1972-10-07	59355



NHIC Data -- Gric

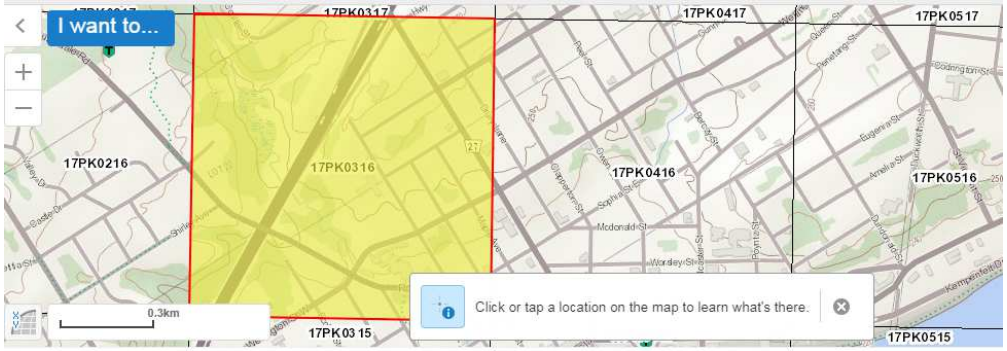
Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206
SPECIES	Fogg's Goosefoot	Chenopodium foggii	S2?			2003-09-17	32733
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08	41250

Kidds Creek Subwatershed Culverts 17, 18, 20 and Bunkers Creek Watershed Culverts 22, 23, 24 (Squares 17PK0315 and 17PK0316)



NHIC Data -- Grid ID = 1008269

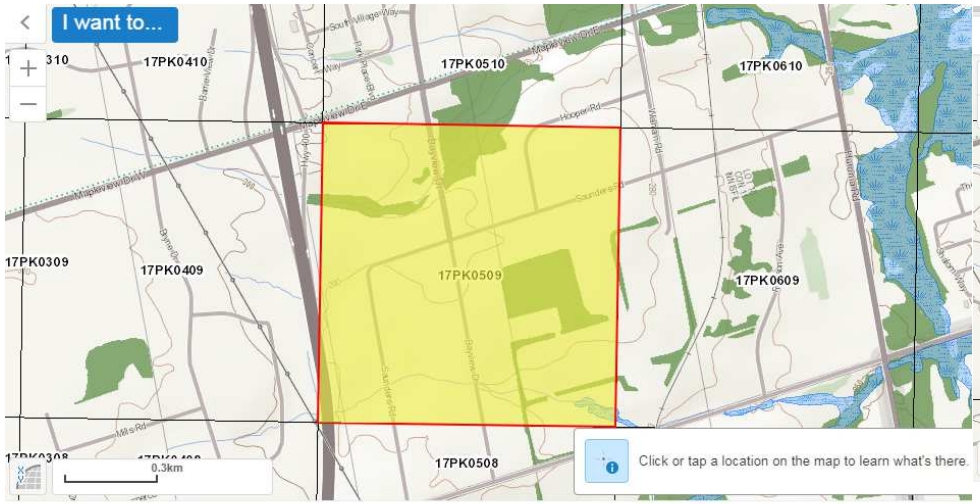
Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08
SPECIES	Houghton's Flatsedge	Cyperus houghtonii	S3			1972-10-07



NHIC Data -- Grid ID = 1008270

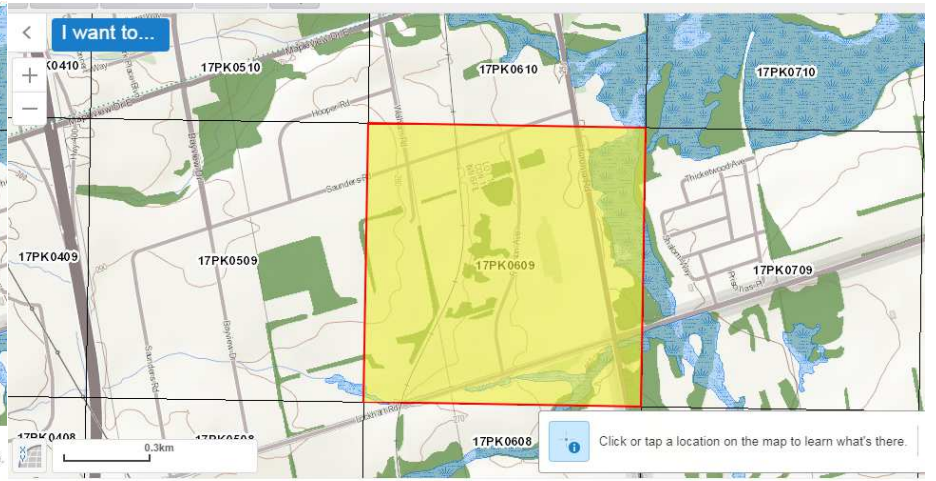
Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date
RESTRICTED SPECIES	RESTRICTED SPECIES	RESTRICTED SPECIES				1877-08-20
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15
SPECIES	Houghton's Flatsedge	Cyperus houghtonii	S3			1972-08-08

Lovers Creek Subwatershed Culverts 88-97 (Squares 17PK0509, 17PK0609, 17PK0610, 17PK0611 and 17PK0710)



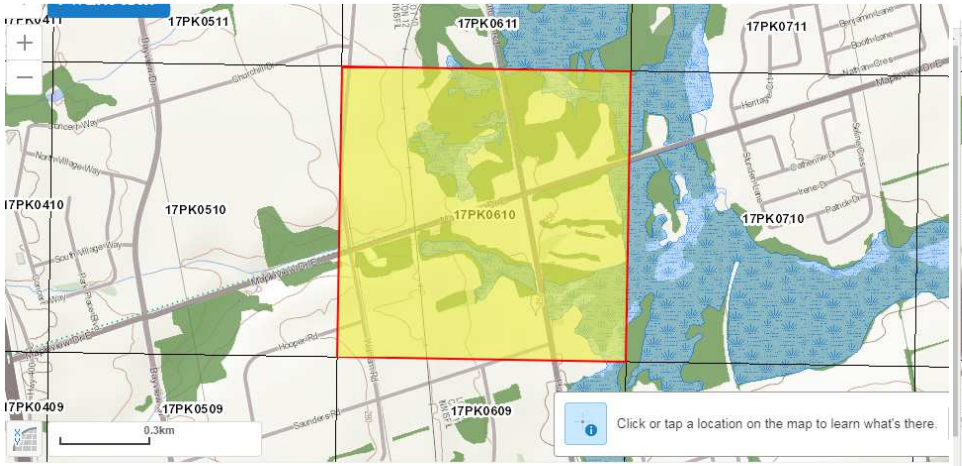
NHIC Data -- Grid ID = 1008193

Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID
SPECIES	Henslow's Sparrow	Ammodramus henslowii	SHB	END	END	1960-05-29	13045
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08	41250



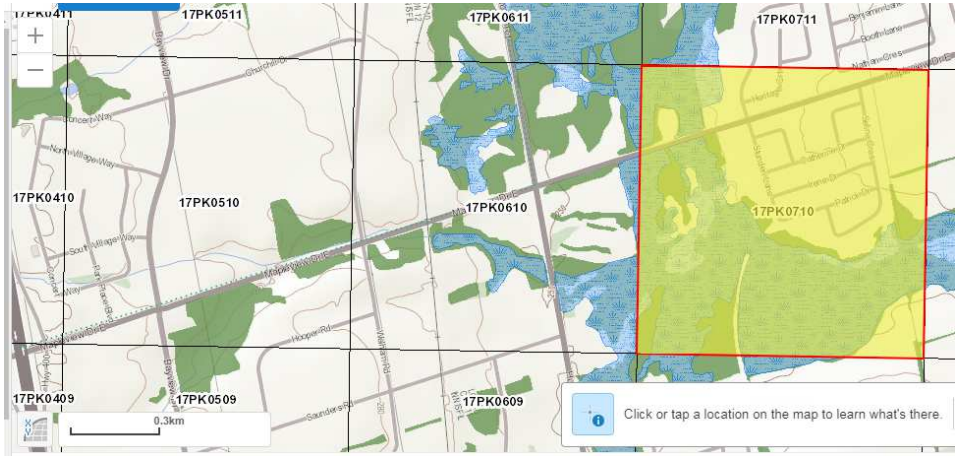
NHIC Data -- Grid ID = 1008203

Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID	D
SPECIES	Henslow's Sparrow	Ammodramus henslowii	SHB	END	END	1960-05-29	13045	ht
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206	ht
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08	41250	ht
SPECIES	Eastern Red Damsel	Amphiagrion saucium	S4			1939-07-01	91825	ht



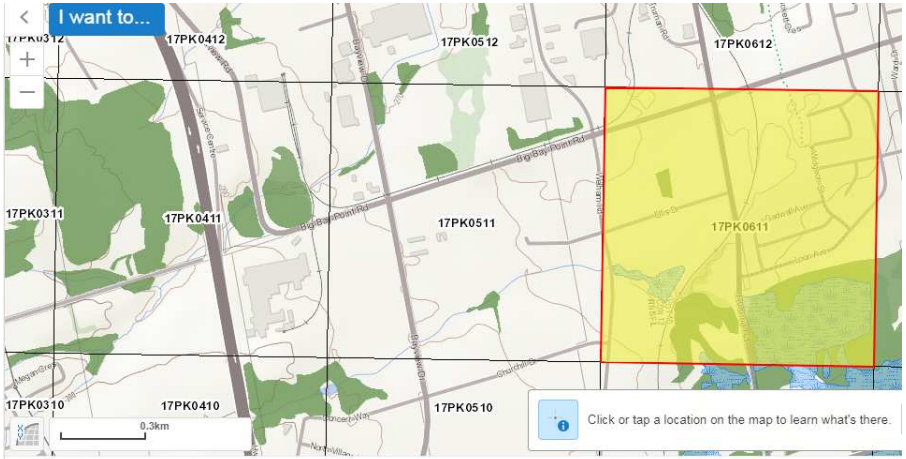
NHIC Data -- Grid ID = 1008294

Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID
SPECIES	Henslow's Sparrow	Ammodramus henslowii	SHB	END	END	1960-05-29	13045
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08	41250
SPECIES	Snapping Turtle	Chelydra serpentina	S3	SC	SC	1994-00-00	96210



NHIC Data -- Grid ID = 1008304

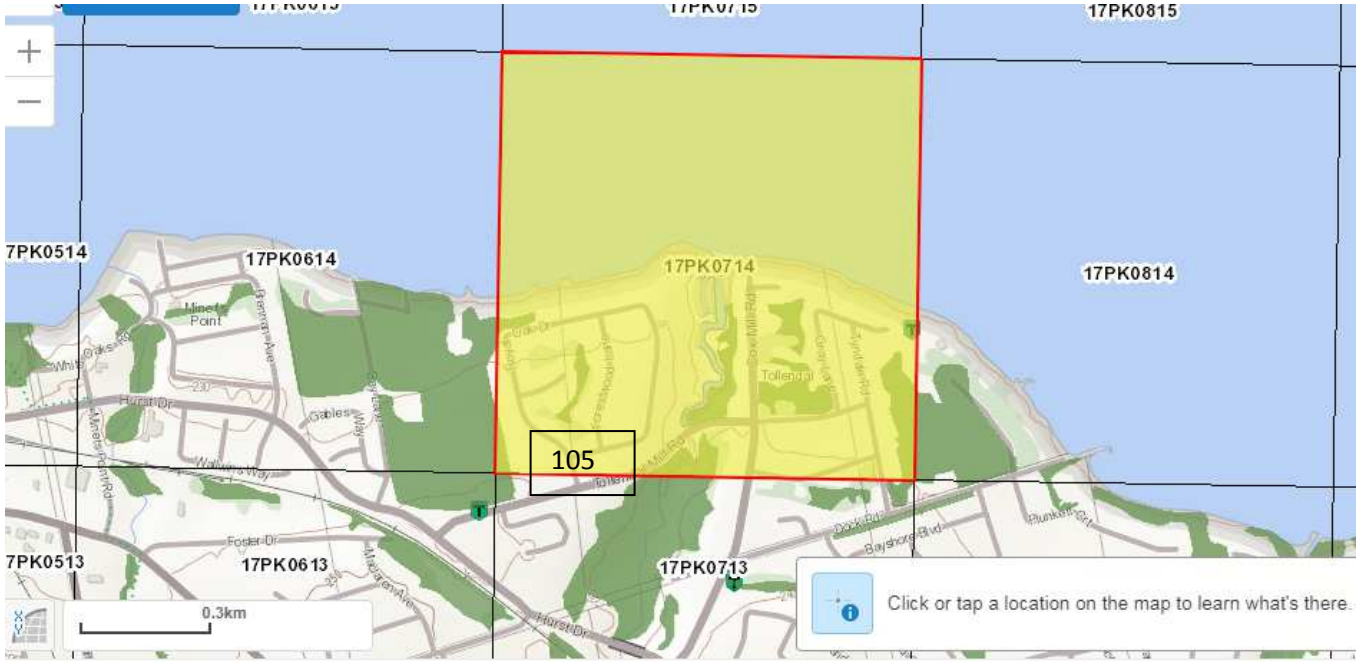
Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID	D
SPECIES	Henslow's Sparrow	Ammodramus henslowii	SHB	END	END	1960-05-29	13045	h
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206	h
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08	41250	h
SPECIES	Eastern Red Damsel	Amphiagrion saucium	S4			1939-07-01	91825	h



NHIC Data -- Grid ID = 1008295

Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID	
SPECIES	Henslow's Sparrow	Ammodramus henslowii	SHB	END	END	1960-05-29	13045	
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206	
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08	41250	
SPECIES	Snapping Turtle	Chelydra serpentina	S3	SC	SC	1994-00-00	96210	

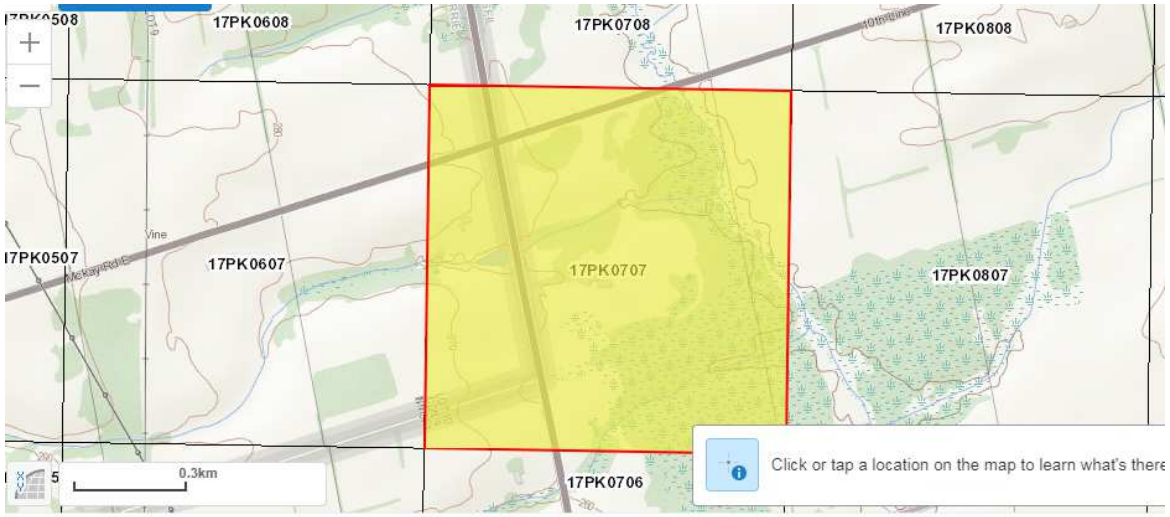
Lovers Creek Subwatershed Culvert 105 (Square 17PK0714)



NHIC Data -- Grid ID = 1008308

Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08	41250
SPECIES	Zebra Mussel	Dreissena polymorpha	SNA			2007-08-11	94697

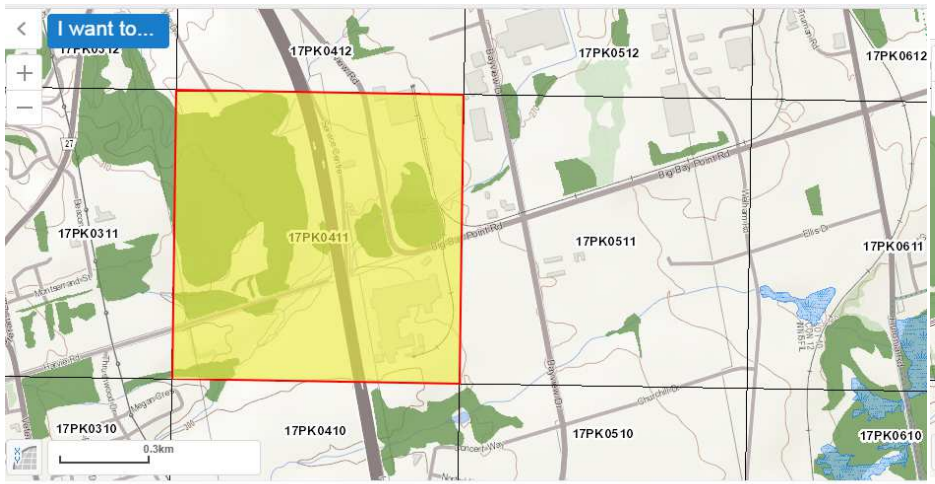
Lovers Creek Subwatershed Culvert 110 (Square 17PK0707)



NHIC Data -- Grid ID = 1008211

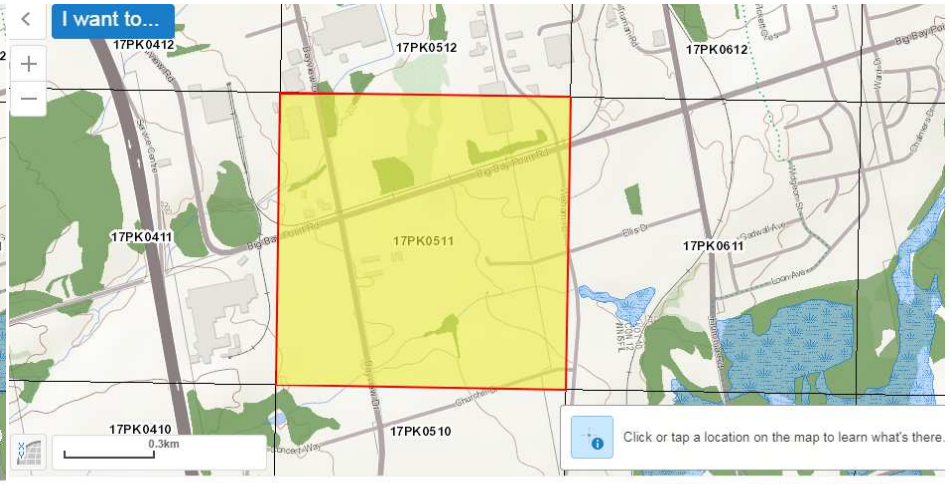
Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID
SPECIES	Henslow's Sparrow	Ammodramus henslowii	SHB	END	END	1960-05-29	13045
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08	41250
SPECIES	Eastern Red Damsel	Amphiagrion saucium	S4			1939-07-01	91825
SPECIES	Snapping Turtle	Chelydra serpentina	S3	SC	SC	1994-00-00	96210
SPECIES	Bobolink	Dolichonyx oryzivorus	S4B	THR	THR	2004-06-20	99330

Whiskey Creek Subwatershed Culverts 53-57 (Squares 17PK0411 and 17PK0511)



NHIC Data -- Grid ID = 1008275

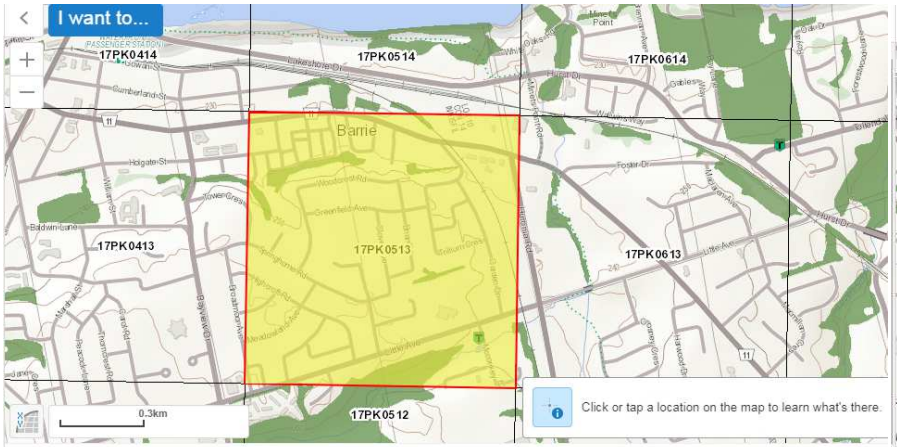
Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID
SPECIES	Henslow's Sparrow	Ammodramus henslowii	SHB	END	END	1960-05-29	13045
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08	41250



NHIC Data -- Grid ID = 1008285

Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID
SPECIES	Henslow's Sparrow	Ammodramus henslowii	SHB	END	END	1960-05-29	13045
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08	41250

Whiskey Creek Subwatershed Culverts 59-66 (Squares 17PK0513, 17PK0613 and 17PK0614)

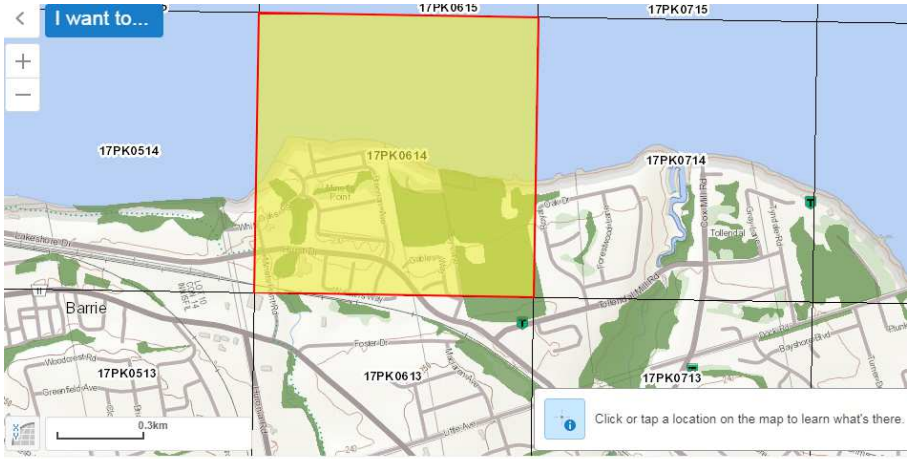


NHIC Data -- Grid ID = 1008287

Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID
SPECIES	Henslow's Sparrow	Ammodramus henslowii	SHB	END	END	1960-05-29	13045
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206
SPECIES	Fogg's Goosefoot	Chenopodium foggii	S2?			2003-09-17	32733
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08	41250

NHIC Data -- Grid ID = 1008297

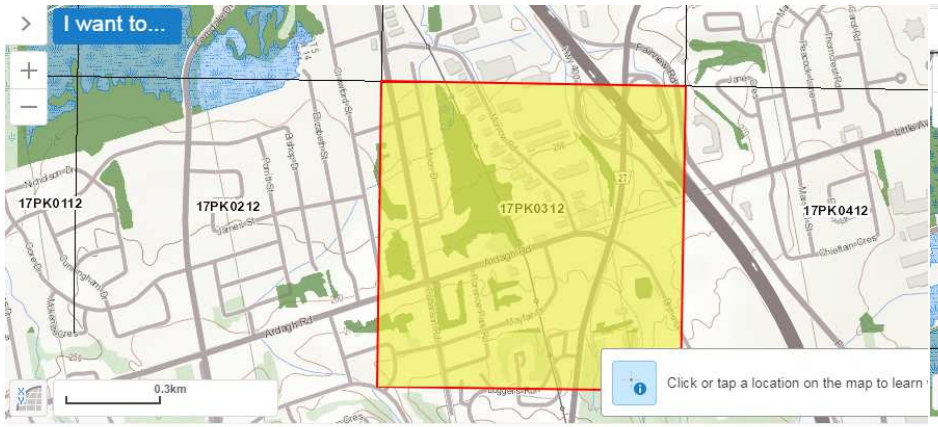
Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID	De
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206	htt
SPECIES	Fogg's Goosefoot	Chenopodium foggii	S2?			2003-09-17	32733	htt
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08	41250	htt



NHIC Data -- Grid ID = 1008298

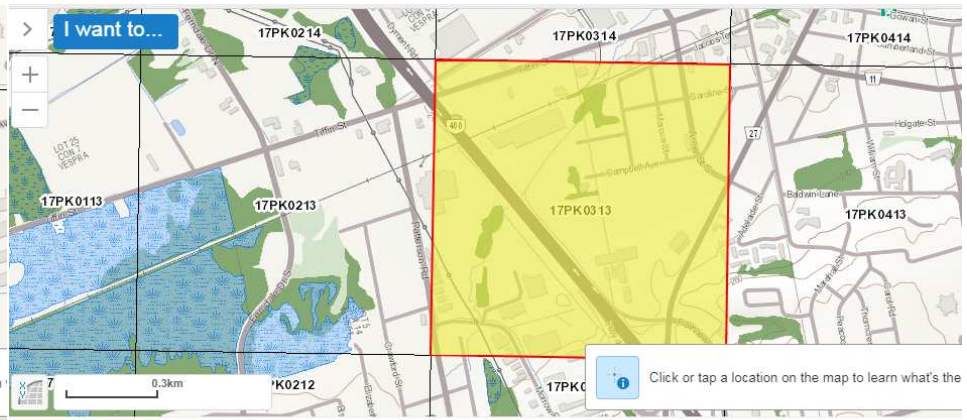
Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206
SPECIES	Fogg's Goosefoot	Chenopodium foggii	S2?			2003-09-17	32733
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08	41250

Hotchkiss Creek Subwatershed Culverts 41-51 (Squares 17PK0312, 17PJ0313, 17PK0314 and 17PK0414)



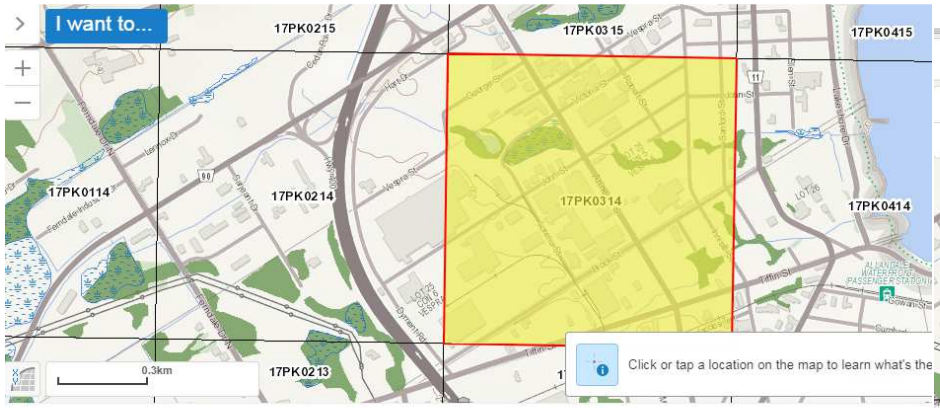
NHIC Data -- Grid ID = 10082

Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date
SPECIES	Henslow's Sparrow	Ammodramus henslowii	SHB	END	END	1960-05-29
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08



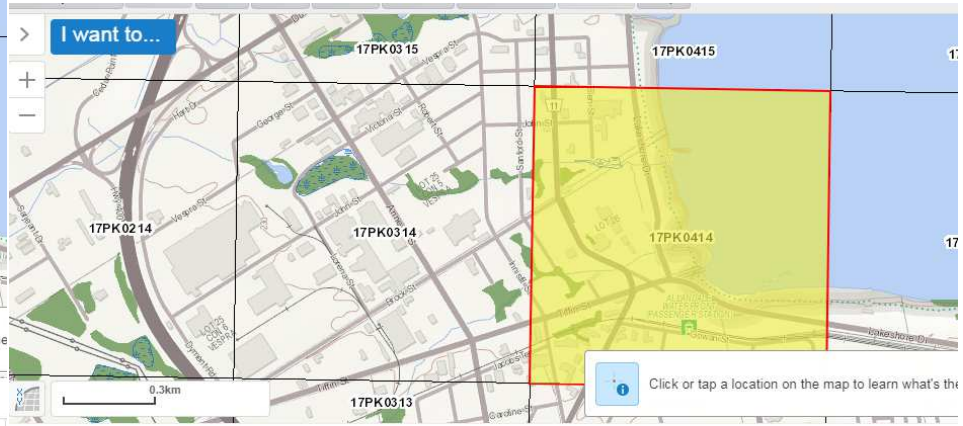
NHIC Data -- Grid ID = 1008267

Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID
SPECIES	Henslow's Sparrow	Ammodramus henslowii	SHB	END	END	1960-05-29	13045
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08	41250



NHIC Data -- Grid ID = 1008268

Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID
SPECIES	Henslow's Sparrow	Ammodramus henslowii	SHB	END	END	1960-05-29	13045
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08	41250
SPECIES	Houghton's Flatsedge	Cyperus houghtonii	S3			1972-10-07	59355



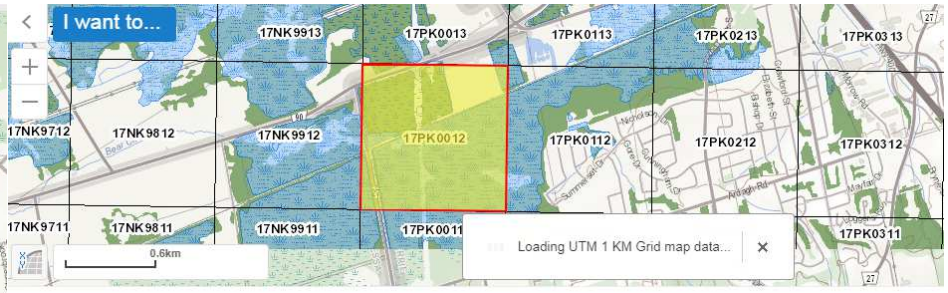
NHIC Data -- Grid ID = 1008278

Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206
SPECIES	Fogg's Goosefoot	Chenopodium foggii	S2?			2003-09-17	32733
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08	41250

Bear Creek Subwatershed Culvert 80 (Squares 17NK9912 and 17PK0012)

NHIC Data -- Grid ID = 998226

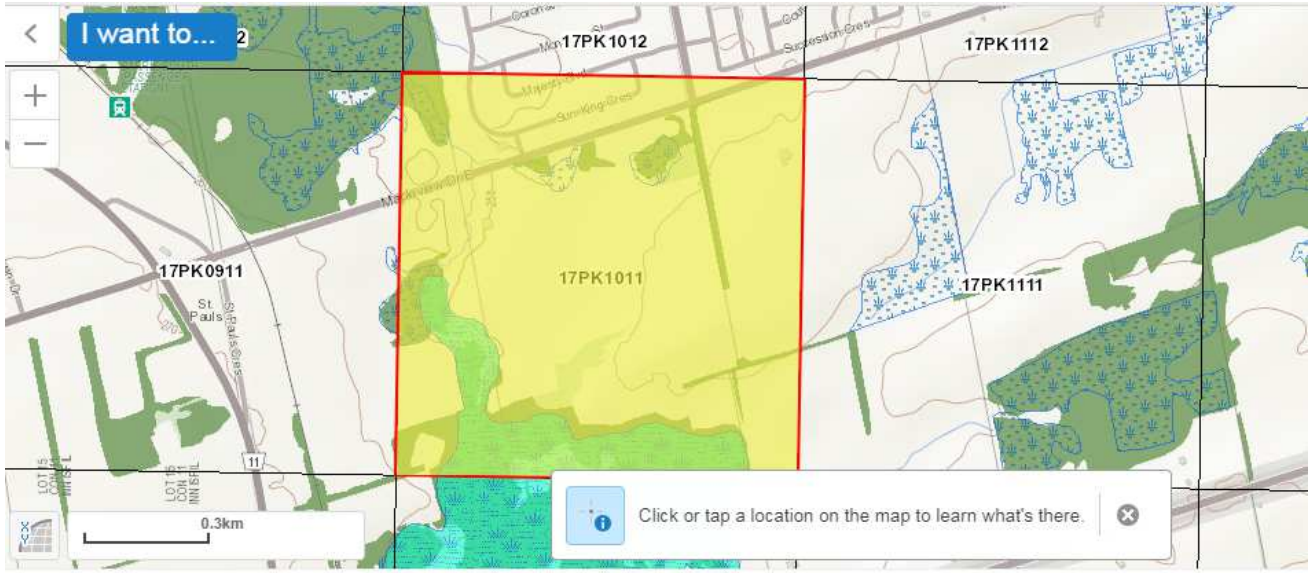
Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID
SPECIES	Houghton's Flatsedge	Cyperus houghtonii	S3			1972-10-07	5901
SPECIES	Henslow's Sparrow	Ammodramus henslowii	SHB	END	END	1960-05-29	13045
SPECIES	Cerulean Warbler	Setophaga cerulea	S3B	THR	END	1974-06-14	13762
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206
SPECIES	Hackberry Emperor	Asterocampa celtis	S2			1997-08-16	22748
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08	41250
SPECIES	Snapping Turtle	Chelydra serpentina	S3	SC	SC	2009-10-12	95737



NHIC Data -- Grid ID = 1008236

Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID
SPECIES	Houghton's Flatsedge	Cyperus houghtonii	S3			1972-10-07	5901
SPECIES	Henslow's Sparrow	Ammodramus henslowii	SHB	END	END	1960-05-29	13045
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206
SPECIES	Hackberry Emperor	Asterocampa celtis	S2			1997-08-16	22748
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08	41250
SPECIES	Houghton's Flatsedge	Cyperus houghtonii	S3			1972-10-07	59356
SPECIES	Snapping Turtle	Chelydra serpentina	S3	SC	SC	2009-10-12	95737

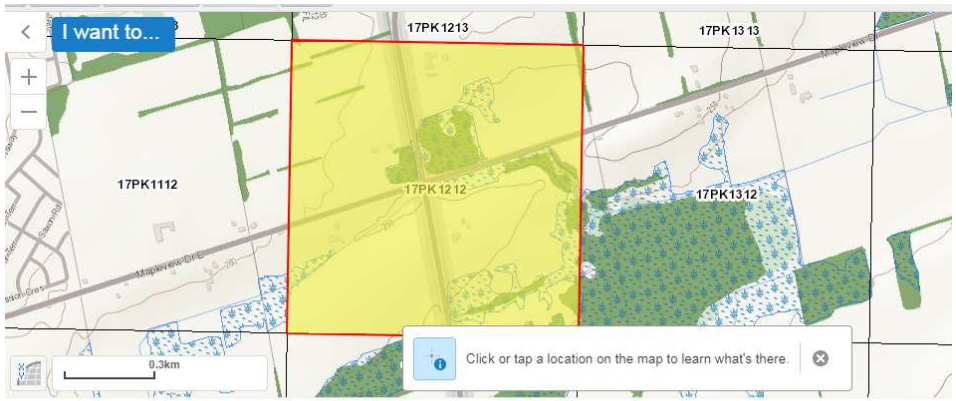
Hewitt's Creek Subwatershed Culvert 83 (Square 17PK1011)



NHIC Data -- Grid ID = 1018235

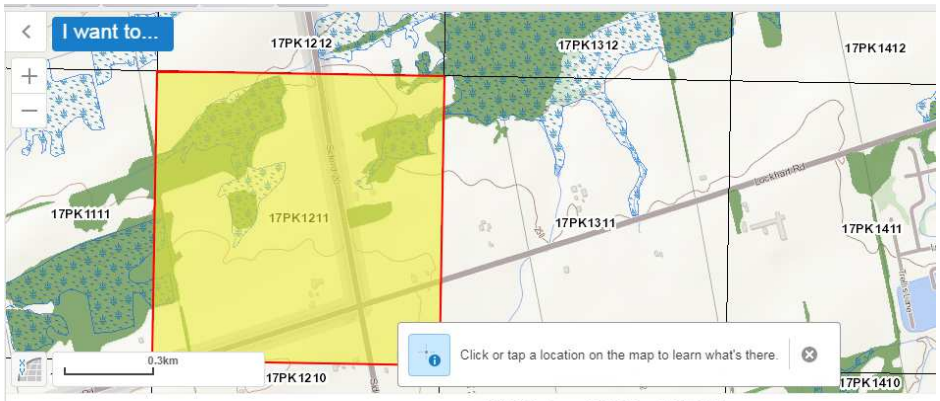
Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08	41250
SPECIES	Snapping Turtle	Chelydra serpentina	S3	SC	SC	1994-00-00	96210

Sandy Cove Creek Subwatershed Culverts 119-120 (Squares 17PK1211 and 17PK1212)



NHIC Data -- Grid ID = 1018256

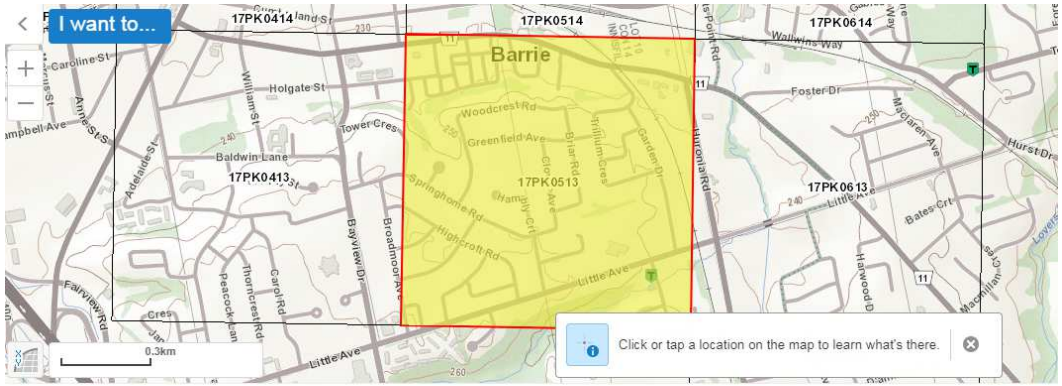
Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08	41250



NHIC Data -- Grid ID = 1018255

Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID
SPECIES	Red-shouldered Hawk	Buteo lineatus	S4B	NAR	NAR	1940-05-15	21206
SPECIES	Plains Emerald	Somatochlora ensigera	S1			1959-08-08	41250

Huronia Subwatershed - Greenfield Park



NHIC Data -- Grid ID = 1008287

Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	Last Obs Date	EO ID	Details URL
SPECIES	Fogg's Goosefoot	Chenopodium foggii	S2?			2003-09-17	32733	http://nhic.mnr.gov.on.ca/r

OBBA Background Data. 17-092 City of Barrie Drainage Master Plan

SC THR END

Square Summary (17PK00)

#species (1st atlas)				#species (2nd atlas)				#hours		#pc done	
poss	prob	conf	total	poss	prob	conf	total	1st	2nd	road	offrd
12	22	48	82	24	27	59	110	35	61	37	3

Region summary (#13: Simcoe County)

#squares	#sq with data		#species		#pc done	target #pc
	1st	2nd	1st	2nd		
68	63	65	181	190	2075	850

Target number of point counts in this square: 22 road side, 3 off road (1 in deciduous forest, 1 in coniferous forest, 1 in mixed forest). Please try to ensure that each off-road station is located such that the entire 100m radius circle is within the prescribed habitat.

SPECIES	Code		%	
	1st	2nd	1st	2nd
Canada Goose		FY	58	95
Trumpeter Swan †			0	43
Wood Duck		P	76	78
Gadwall ‡			6	4
American Wigeon			6	12
American Black Duck		H	44	47
Mallard	FY	FY	93	95
Blue-winged Teal	H	H	79	53
Northern Shoveler			11	10
Northern Pintail			14	7
Green-winged Teal			0	18
Redhead †			3	1
Ring-necked Duck			4	21
Lesser Scaup ‡			1	1
Hooded Merganser		H	25	30
Common Merganser			36	46
Red-breast Merganser			9	20
Gray Partridge ‡			0	1
Ring-necked Pheasant			15	10
Ruffed Grouse	H	S	92	81
Wild Turkey		FY	0	81

SPECIES	Code		%	
	1st	2nd	1st	2nd
Black-crown N.-Heron † §			12	9
Yellow-crn N.-Heron †			0	0
Turkey Vulture		H	77	84
Osprey			42	53
Northern Harrier	FY	H	76	66
Sharp-shinned Hawk		H	50	60
Cooper's Hawk		A	17	47
Northern Goshawk	S		15	27
Red-should Hawk †		H	17	44
Broad-winged Hawk		H	58	66
Red-tailed Hawk	NY	AE	92	81
American Kestrel	FY	FY	85	76
Merlin ‡			1	21
Yellow Rail †			3	3
King Rail †			3	3
Virginia Rail	FY	T	36	47
Sora		H	31	43
Common Moorhen			17	12
American Coot			15	12
Coot/Moorhen			0	0
Sandhill Crane ‡			0	21

SPECIES	Code		%	
	1st	2nd	1st	2nd
Caspian Tern †			1	3
Black Tern † §			30	21
Common Tern §			34	23
Forster's Tern † §			0	1
Mourning Dove	FY	NE	95	95
Yellow-billed Cuckoo		NY	6	18
Black/Yell-billed Cuckoo			0	18
Black-billed Cuckoo	P	CF	58	75
Eastern Screech-Owl		S	12	49
Great Horned Owl	H	H	74	55
Barred Owl			20	49
Long-eared Owl ‡			3	4
Short-eared Owl †			1	4
North Saw-whet Owl			9	12
Common Nighthawk	I	H	63	40
Whip-poor-will			60	38
Chimney Swift	I	H	63	32
Ruby-thr Hummingbird	N	D	88	95
Belted Kingfisher	V	AE	95	92
Red-headed Woodpecker †	S	NY	65	29
Yellow-bellied Sapsucker	FY	P	80	95

Common Loon			28	52	Killdeer	DD	DD	96	96	Downy Woodpecker	T	FY	95	96
Pied-billed Grebe			22	32	Rock Dove	AE	NB	87	84	Hairy Woodpecker	A	NY	95	93
Double-crest Cormorant §			11	27	Spotted Sandpiper	DD	H	95	78	Northern Flicker	FY	AE	98	95
American Bittern		H	50	44	Upland Sandpiper	FY		60	38	Pileated Woodpecker	S	NY	80	93
Least Bittern †			12	23	Common Snipe			79	61	Olive-sided Flycatcher		T	22	20
Great Blue Heron §			77	63	American Woodcock	H	T	79	72	Eastern Wood-Pewee	T	T	96	96
Great Egret †			0	1	Ring-billed Gull §			6	33	Alder Flycatcher		NE	47	76
Green Heron §	H	P	84	70	Herring Gull §			49	38	Willow Flycatcher	T	T	42	55

Ontario Breeding Bird Atlas - Summary Sheet for Square 17PK00 (page 2 of 3)

SPECIES	Code		%		SPECIES	Code		%		SPECIES	Code		%	
	1st	2nd	1st	2nd		1st	2nd	1st	2nd		1st	2nd	1st	2nd
Least Flycatcher	T	S	88	89	Marsh Wren			42	33	Kirtland's Warbler †			1	0
Eastern Phoebe	NY	NY	95	96	Golden-crown Kinglet		FY	7	21	Prairie Warbler †			6	9
Gr Crested Flycatcher	AE	T	98	96	Ruby-crown Kinglet			6	7	Bay-breasted Warbler ‡			1	3
Eastern Kingbird	NE	AE	98	95	Blue-gr Gnatcatcher ‡			14	24	Cerulean Warbler †			12	16
Loggerhead Shrike †			15	3	Eastern Bluebird		FY	57	73	Black-white Warbler	P	T	84	93
Yellow-throated Vireo ‡			30	26	Veery	A	T	95	96	American Redstart		T	85	90
Blue-headed Vireo			9	38	Swainson's Thrush			14	20	Ovenbird	A	T	98	96
Warbling Vireo	AE	T	92	93	Hermit Thrush		S	39	69	North Waterthrush	A	CF	61	86
Philadelphia Vireo ‡			1	4	Wood Thrush	A	T	90	92	Mourning Warbler	CF	T	63	81
Red-eyed Vireo	CF	T	93	96	American Robin	NY	NY	98	96	Common Yellowthroat	FY	CF	92	95
Blue Jay	FY	FY	96	96	Gray Catbird	NY	CF	98	96	Canada Warbler	H		46	56
American Crow	FY	CF	98	96	Northern Mockingbird			6	18	Eastern Towhee	P		53	73
Common Raven			7	55	Brown Thrasher	CF	NY	96	92	Chipping Sparrow	FY	CF	96	96
Horned Lark	P	T	68	47	European Starling	NY	CF	98	96	Clay-colored Sparrow			14	36
Purple Martin	H		61	27	Cedar Waxwing	AE	D	98	96	Field Sparrow	A	FY	84	87
Tree Swallow	AE	AE	98	96	Blue-winged Warbler			4	24	Vesper Sparrow	FY	CF	84	70
North Rgh-wing Swallow	AE	AE	68	56	Golden-winged Warbler			30	43	Savannah Sparrow	FY	CF	88	81
Bank Swallow §	AE	AE	88	58	Blue/Gold-wing Warbler ‡			0	15	Grasshopper Sparrow		CF	38	41
Cliff Swallow §	FY	AE	82	63	Brewster's Warbler †			0	3	Song Sparrow	CF	NE	98	96
Barn Swallow	AE	NE	96	95	Nashville Warbler	P	T	74	84	Swamp Sparrow	FY	T	84	86
Black-capped Chickadee	FY	CF	96	96	Northern Parula			12	21	White-throat Sparrow	A	T	95	87

Tufted Titmouse †			1	0	Yellow Warbler	NY	CF	98	92	Dark-eyed Junco			25	21
Red-breast Nuthatch		FY	52	90	Chestn-sided Warbler	A	T	68	95	Scarlet Tanager		P	79	86
White-breast Nuthatch	P	AE	87	93	Magnolia Warbler		S	20	58	Northern Cardinal	H	CF	66	84
Brown Creeper		CF	55	60	Black-thr Blue Warbler		S	22	63	Rose-breast Grosbeak	NE	CF	95	93
Carolina Wren ‡			1	6	Yellow-rumped Warbler		CF	41	78	Indigo Bunting	FY	FY	90	93
House Wren	FY	AE	87	95	Black-thr Green Warbler		S	34	90	Bobolink	FY	T	87	83
Winter Wren	A	S	68	95	Blackburnian Warbler			28	58	Red-wing Blackbird	CF	NE	96	96
Sedge Wren	H		19	20	Pine Warbler		CF	26	80	Eastern Meadowlark	CF	CF	88	83

Ontario Breeding Bird Atlas - Summary Sheet for Square 17PK00 (page 3 of 3)

SPECIES	Code		%	
	1st	2nd	1st	2nd
Western Meadowlark ‡			6	1
Yellow-h Blackbird †			1	0
Rusty Blackbird ‡			1	1
Brewer's Blackbird ‡			3	7
Common Grackle	CF	CF	96	96
Brown-head Cowbird	FY	NE	98	95
Orchard Oriole ‡			0	1
Baltimore Oriole	NY	CF	96	96
Purple Finch		S	66	73
House Finch		AE	3	72
Red Crossbill ‡			7	1
White-winged Crossbill ‡			1	3
Pine Siskin			17	18
American Goldfinch	T	NE	98	96
Evening Grosbeak		H	15	15
House Sparrow	AE	AE	88	75

This list includes all species found during the Ontario Breeding Bird Atlas (1st atlas: 1981-1985, 2nd atlas: 2001-2005) in the region #13 (Simcoe County). Underlined species are those that you should try to add to this square. They have not yet been reported during the 2nd atlas, but were found during the 1st atlas in this square or have been reported in more than 50% of the squares in this region during the 2nd atlas so far. In the species table, "BE 2nd" and "BE 1st" are the codes for the highest breeding evidence for that species in square 17PK00 during the 2nd and 1st atlas respectively. The % columns give the percentage of squares in that region where that species was reported during the 2nd and 1st atlas (this gives an idea of the expected chance of finding that species in region #13). Rare/Colonial Species Report Forms should be completed for species marked: § (Colonial), ‡ (regionally rare), or † (provincially rare). Current as of 7/09/2017. An up-to-date version of this sheet is available

from http://www.birdsontario.org/atlas/summaryform.jsp?squareID=17PK00

Square Summary (17PK01)

#species (1st atlas)				#species (2nd atlas)				#hours		#pc done	
poss	prob	conf	total	poss	prob	conf	total	1st	2nd	road	offrd
24	28	34	86	18	40	52	110	92	87	20	2

Region summary (#13: Simcoe County)

#squares	#sq with data		#species		#pc done	target #pc
	1st	2nd	1st	2nd		
68	63	65	181	190	2075	850

Target number of point counts in this square: 21 road side, 4 off road (2 in deciduous forest, 1 in coniferous forest, 1 in mixed forest). Please try to ensure that each off-road station is located such that the entire 100m radius circle is within the prescribed habitat.

SPECIES	Code		%	
	1st	2nd	1st	2nd
Canada Goose		NY	58	95
Trumpeter Swan †			0	43
Wood Duck	S	FY	76	78
Gadwall ‡			6	4
American Wigeon			6	12
American Black Duck		FY	44	47
Mallard	FY	NY	93	95
Blue-winged Teal	DD	H	79	53
Northern Shoveler			11	10
Northern Pintail			14	7
Green-winged Teal			0	18
Redhead †			3	1
Ring-necked Duck			4	21
Lesser Scaup ‡			1	1
Hooded Merganser			25	30
Common Merganser		P	36	46
Red-breast Merganser			9	20
Gray Partridge ‡			0	1
Ring-necked Pheasant			15	10
Ruffed Grouse	FY	H	92	81
Wild Turkey		FY	0	81
Common Loon			28	52
Pied-billed Grebe			22	32

SPECIES	Code		%	
	1st	2nd	1st	2nd
Black-crown N.-Heron † §			12	9
Yellow-crn N.-Heron †			0	0
Turkey Vulture	T	P	77	84
Osprey		FY	42	53
Northern Harrier			76	66
Sharp-shinned Hawk	S		50	60
Cooper's Hawk		NY	17	47
Northern Goshawk			15	27
Red-should Hawk †			17	44
Broad-winged Hawk		H	58	66
Red-tailed Hawk	NU	H	92	81
American Kestrel	T		85	76
Merlin ‡		T	1	21
Peregrine Falcon †		T	0	1
Yellow Rail †			3	3
King Rail †			3	3
Virginia Rail		A	36	47
Sora		T	31	43
Common Moorhen			17	12
American Coot			15	12
Coot/Moorhen			0	0
Sandhill Crane ‡			0	21
Killdeer	FY	D	96	96

SPECIES	Code		%	
	1st	2nd	1st	2nd
Herring Gull §			49	38
Caspian Tern †			1	3
Black Tern † §			30	21
Common Tern §	A		34	23
Forster's Tern † §			0	1
Mourning Dove	NY	NY	95	95
Yellow-billed Cuckoo			6	18
Black/Yell-billed Cuckoo			0	18
Black-billed Cuckoo	A	H	58	75
Eastern Screech-Owl		FY	12	49
Great Horned Owl		S	74	55
Barred Owl	FY	H	20	49
Long-eared Owl ‡			3	4
Short-eared Owl †			1	4
North Saw-whet Owl			9	12
Common Nighthawk	S	T	63	40
Whip-poor-will		T	60	38
Chimney Swift	T	T	63	32
Ruby-thr Hummingbird	A	T	88	95
Belted Kingfisher	T	AE	95	92
Red-headed Woodpecker †	H	CF	65	29
Yellow-bellied Sapsucker	S	FY	80	95
Downy Woodpecker	T	FY	95	96

Double-crest Cormorant §			11	27
American Bittern		H	50	44
Least Bittern †			12	23
Great Blue Heron §	H	NY	77	63
Great Egret †			0	1
Green Heron §	H	FY	84	70

Rock Dove	NE	AE	87	84
Spotted Sandpiper	P	FY	95	78
Upland Sandpiper			60	38
Common Snipe		D	79	61
American Woodcock	H	S	79	72
Ring-billed Gull §		H	6	33

Hairy Woodpecker	S	FY	95	93
Northern Flicker	AE	T	98	95
Pileated Woodpecker	V	S	80	93
Olive-sided Flycatcher			22	20
Eastern Wood-Pewee	S	T	96	96
Alder Flycatcher		T	47	76

Ontario Breeding Bird Atlas - Summary Sheet for Square 17PK01 (page 2 of 3)

SPECIES	Code		%	
	1st	2nd	1st	2nd
Willow Flycatcher		T	42	55
Least Flycatcher	T	T	88	89
Eastern Phoebe	NY	NY	95	96
Gr Crested Flycatcher	NY	T	98	96
Eastern Kingbird	CF	NY	98	95
Loggerhead Shrike †			15	3
Yellow-throated Vireo ‡	S		30	26
Blue-headed Vireo		S	9	38
Warbling Vireo	T	CF	92	93
Philadelphia Vireo ‡			1	4
Red-eyed Vireo	A	AE	93	96
Blue Jay	FY	CF	96	96
American Crow	NY	CF	98	96
Common Raven		P	7	55
Horned Lark	S	D	68	47
Purple Martin	P	H	61	27
Tree Swallow	NU	AE	98	96
North Rgh-wing Swallow	FY	H	68	56
Bank Swallow §	FY	AE	88	58
Cliff Swallow §	FY	P	82	63
Barn Swallow	NY	FY	96	95
Black-capped Chickadee	NY	NY	96	96
Tufted Titmouse †			1	0
Red-breast Nuthatch		P	52	90

SPECIES	Code		%	
	1st	2nd	1st	2nd
Sedge Wren			19	20
Marsh Wren			42	33
Golden-crown Kinglet			7	21
Ruby-crown Kinglet			6	7
Blue-gr Gnatcatcher ‡			14	24
Eastern Bluebird	S		57	73
Veery	S	T	95	96
Swainson's Thrush			14	20
Hermit Thrush			39	69
Wood Thrush	S	T	90	92
American Robin	CF	CF	98	96
Gray Catbird	P	NY	98	96
Northern Mockingbird			6	18
Brown Thrasher	T	P	96	92
European Starling	CF	NY	98	96
Cedar Waxwing	FY	AE	98	96
Blue-winged Warbler			4	24
Golden-winged Warbler			30	43
Blue/Gold-wing Warbler ‡			0	15
Brewster's Warbler †			0	3
Nashville Warbler			74	84
Northern Parula		T	12	21
Yellow Warbler	T	CF	98	92
Chestn-sided Warbler	T	T	68	95

SPECIES	Code		%	
	1st	2nd	1st	2nd
Pine Warbler	T	NY	26	80
Kirtland's Warbler †			1	0
Prairie Warbler †			6	9
Bay-breasted Warbler ‡			1	3
Cerulean Warbler †			12	16
Black-white Warbler		T	84	93
American Redstart	S	AE	85	90
Ovenbird	T	DD	98	96
North Waterthrush		T	61	86
Mourning Warbler		A	63	81
Common Yellowthroat		DD	92	95
Canada Warbler			46	56
Eastern Towhee	S	S	53	73
Chipping Sparrow	A	CF	96	96
Clay-colored Sparrow			14	36
Field Sparrow	T	T	84	87
Vesper Sparrow	CF	T	84	70
Savannah Sparrow	FY	CF	88	81
Grasshopper Sparrow			38	41
Song Sparrow	NY	CF	98	96
Swamp Sparrow		CF	84	86
White-throat Sparrow	P	FY	95	87
Dark-eyed Junco			25	21
Scarlet Tanager	N	T	79	86

White-breast Nuthatch	S	NE	87	93	Magnolia Warbler			20	58	Northern Cardinal	FY	NY	66	84
Brown Creeper		P	55	60	Black-thr Blue Warbler			22	63	Rose-breast Grosbeak	V	T	95	93
Carolina Wren ‡			1	6	Yellow-rumped Warbler	S	T	41	78	Indigo Bunting	V	A	90	93
House Wren		CF	87	95	Black-thr Green Warbler	S	S	34	90	Bobolink	AE	T	87	83
Winter Wren	S	T	68	95	Blackburnian Warbler	S	S	28	58	Red-wing Blackbird	AE	CF	96	96

Ontario Breeding Bird Atlas - Summary Sheet for Square 17PK01 (page 3 of 3)

SPECIES	Code		%	
	1st	2nd	1st	2nd
Eastern Meadowlark	T	T	88	83
Western Meadowlark ‡			6	1
Yellow-h Blackbird †			1	0
Rusty Blackbird ‡			1	1
Brewer's Blackbird ‡			3	7
Common Grackle	CF	CF	96	96
Brown-head Cowbird	V	NE	98	95
Orchard Oriole ‡			0	1
Baltimore Oriole	CF	NY	96	96
Purple Finch	S	S	66	73
House Finch		AE	3	72
Red Crossbill ‡	H		7	1
White-winged Crossbill ‡			1	3
Pine Siskin	AE		17	18
American Goldfinch	NY	NY	98	96
Evening Grosbeak			15	15
House Sparrow	AE	FY	88	75

This list includes all species found during the Ontario Breeding Bird Atlas (1st atlas: 1981-1985, 2nd atlas: 2001-2005) in the region #13 (Simcoe County). Underlined species are those that you should try to add to this square. They have not yet been reported during the 2nd atlas, but were found during the 1st atlas in this square or have been reported in more than 50% of the squares in this region during the 2nd atlas so far. In the species table, "BE 2nd" and "BE 1st" are the codes for the highest breeding evidence for that species in square 17PK01 during the 2nd and 1st atlas respectively. The % columns give the percentage of squares in that region where that species was reported during the 2nd and 1st atlas (this gives an idea of the expected chance of finding that species in region #13). Rare/Colonial Species Report Forms should be completed for species marked: § (Colonial), ‡ (regionally rare), or † (provincially rare). Current as of 7/09/2017. An up-to-date version of this sheet is available from http://www.birdsontario.org/atlas/summaryform.jsp?squareID=17PK01

Square Summary (17PK11)

#species (1st atlas)				#species (2nd atlas)				#hours		#pc done	
poss	prob	conf	total	poss	prob	conf	total	1st	2nd	road	offrd
15	12	50	77	13	23	77	113	78	215	34	2

Region summary (#13: Simcoe County)

#squares	#sq with data		#species		#pc done	target #pc
	1st	2nd	1st	2nd		
68	63	65	181	190	2075	850

Target number of point counts in this square: 22 road side, 3 off road (2 in deciduous forest, 1 in mixed forest). Please try to ensure that each off-road station is located such that the entire 100m radius circle is within the prescribed habitat.

SPECIES	Code		%	
	1st	2nd	1st	2nd
Canada Goose		NY	58	95
Trumpeter Swan †		FY	0	43
Wood Duck	FY	P	76	78
Gadwall ‡			6	4
American Wigeon	FY		6	12
American Black Duck	FY	P	44	47
Mallard	FY	NY	93	95
Blue-winged Teal	FY	H	79	53
Northern Shoveler	FY		11	10
Northern Pintail			14	7
Green-winged Teal			0	18
Redhead †			3	1
Ring-necked Duck			4	21
Lesser Scaup ‡			1	1
Hooded Merganser		NY	25	30
Common Merganser		FY	36	46
Red-breast Merganser		NY	9	20
Gray Partridge ‡			0	1
Ring-necked Pheasant	H		15	10
Ruffed Grouse	H	H	92	81
Wild Turkey		FY	0	81
Common Loon		T	28	52
Pied-billed Grebe			22	32
Double-crest Cormorant §		H	11	27
American Bittern			50	44

SPECIES	Code		%	
	1st	2nd	1st	2nd
Black-crown N.-Heron † §			12	9
Yellow-crn N.-Heron †			0	0
Turkey Vulture	T	NY	77	84
Osprey			42	53
Northern Harrier			76	66
Sharp-shinned Hawk			50	60
Cooper's Hawk		NY	17	47
Northern Goshawk		FY	15	27
Red-should Hawk †			17	44
Broad-winged Hawk		V	58	66
Red-tailed Hawk	NY	T	92	81
American Kestrel	NY	P	85	76
Merlin ‡		T	1	21
Yellow Rail †			3	3
King Rail †			3	3
Virginia Rail			36	47
Sora			31	43
Common Moorhen			17	12
American Coot			15	12
Coot/Moorhen			0	0
Sandhill Crane ‡			0	21
Killdeer	NE	NY	96	96
Rock Dove	AE	FY	87	84
Spotted Sandpiper	FY	T	95	78
Upland Sandpiper			60	38

SPECIES	Code		%	
	1st	2nd	1st	2nd
Caspian Tern †			1	3
Black Tern † §			30	21
Common Tern §			34	23
Forster's Tern † §			0	1
Mourning Dove	NY	FY	95	95
Yellow-billed Cuckoo			6	18
Black/Yell-billed Cuckoo		P	0	18
Black-billed Cuckoo	CF	T	58	75
Eastern Screech-Owl		T	12	49
Great Horned Owl		AE	74	55
Barred Owl			20	49
Long-eared Owl ‡			3	4
Short-eared Owl †			1	4
North Saw-whet Owl		S	9	12
Common Nighthawk		AE	63	40
Whip-poor-will		S	60	38
Chimney Swift			63	32
Ruby-thr Hummingbird	T	NY	88	95
Belted Kingfisher	NY	AE	95	92
Red-headed Woodpecker †	FY	NY	65	29
Red-bell Woodpecker ‡		D	0	1
Yellow-bellied Sapsucker	S	FY	80	95
Downy Woodpecker	T	NY	95	96
Hairy Woodpecker	P	NY	95	93
Northern Flicker	NY	NY	98	95

Least Bittern †			12	23
Great Blue Heron §	H	H	77	63
Great Egret †			0	1
Green Heron §	H	FY	84	70
Common Snipe			79	61
American Woodcock		AE	79	72
Ring-billed Gull §		H	6	33
Herring Gull §			49	38
Pileated Woodpecker	P	FY	80	93
Olive-sided Flycatcher			22	20
Eastern Wood-Pewee	NY	T	96	96
Alder Flycatcher		S	47	76

Ontario Breeding Bird Atlas - Summary Sheet for Square 17PK11 (page 2 of 3)

SPECIES	Code		%	
	1st	2nd	1st	2nd
Willow Flycatcher			42	55
Least Flycatcher		AE	88	89
Eastern Phoebe	S	FY	95	96
Gr Crested Flycatcher	T	CF	98	96
Eastern Kingbird	NY	NY	98	95
Loggerhead Shrike †			15	3
Yellow-throated Vireo ‡			30	26
Blue-headed Vireo			9	38
Warbling Vireo	DD	AE	92	93
Philadelphia Vireo ‡			1	4
Red-eyed Vireo	S	CF	93	96
Blue Jay	A	NY	96	96
American Crow	FY	NY	98	96
Common Raven			7	55
Horned Lark	P	AE	68	47
Purple Martin	NY	NY	61	27
Tree Swallow	NY	NY	98	96
North Rgh-wing Swallow	NY	FY	68	56
Bank Swallow §	NY	AE	88	58
Cliff Swallow §	FY	NB	82	63
Barn Swallow	NY	NY	96	95
Black-capped Chickadee	FY	NY	96	96
Tufted Titmouse †			1	0
Red-breast Nuthatch		AE	52	90
White-breast Nuthatch	FY	NY	87	93
Brown Creeper	H	AE	55	60
Sedge Wren			19	20
Marsh Wren			42	33
Golden-crown Kinglet			7	21
Ruby-crown Kinglet			6	7
Blue-gr Gnatcatcher ‡		T	14	24
Eastern Bluebird	CF	CF	57	73
Veery	S	AE	95	96
Swainson's Thrush			14	20
Hermit Thrush			39	69
Wood Thrush	T	AE	90	92
American Robin	NY	NY	98	96
Gray Catbird	CF	CF	98	96
Northern Mockingbird			6	18
Brown Thrasher	CF	AE	96	92
European Starling	CF	NY	98	96
Cedar Waxwing	NY	NY	98	96
Blue-winged Warbler			4	24
Golden-winged Warbler		S	30	43
Blue/Gold-wing Warbler ‡			0	15
Brewster's Warbler †			0	3
Nashville Warbler		S	74	84
Northern Parula			12	21
Yellow Warbler	CF	AE	98	92
Chestn-sided Warbler	S	T	68	95
Magnolia Warbler			20	58
Black-thr Blue Warbler		S	22	63
Pine Warbler		AE	26	80
Kirtland's Warbler †			1	0
Prairie Warbler †			6	9
Bay-breasted Warbler ‡			1	3
Cerulean Warbler †	I	T	12	16
Black-white Warbler	S	T	84	93
American Redstart		AE	85	90
Ovenbird	S	CF	98	96
North Waterthrush		AE	61	86
Mourning Warbler		S	63	81
Common Yellowthroat		T	92	95
Canada Warbler		T	46	56
Eastern Towhee			53	73
Chipping Sparrow	CF	CF	96	96
Clay-colored Sparrow			14	36
Field Sparrow	NY	AE	84	87
Vesper Sparrow		S	84	70
Savannah Sparrow	CF	NY	88	81
Grasshopper Sparrow			38	41
Song Sparrow	NE	NY	98	96
Swamp Sparrow		T	84	86
White-throat Sparrow	FY		95	87
Dark-eyed Junco			25	21
Scarlet Tanager	S	CF	79	86
Northern Cardinal	T	NY	66	84
Rose-breast Grosbeak	T	AE	95	93

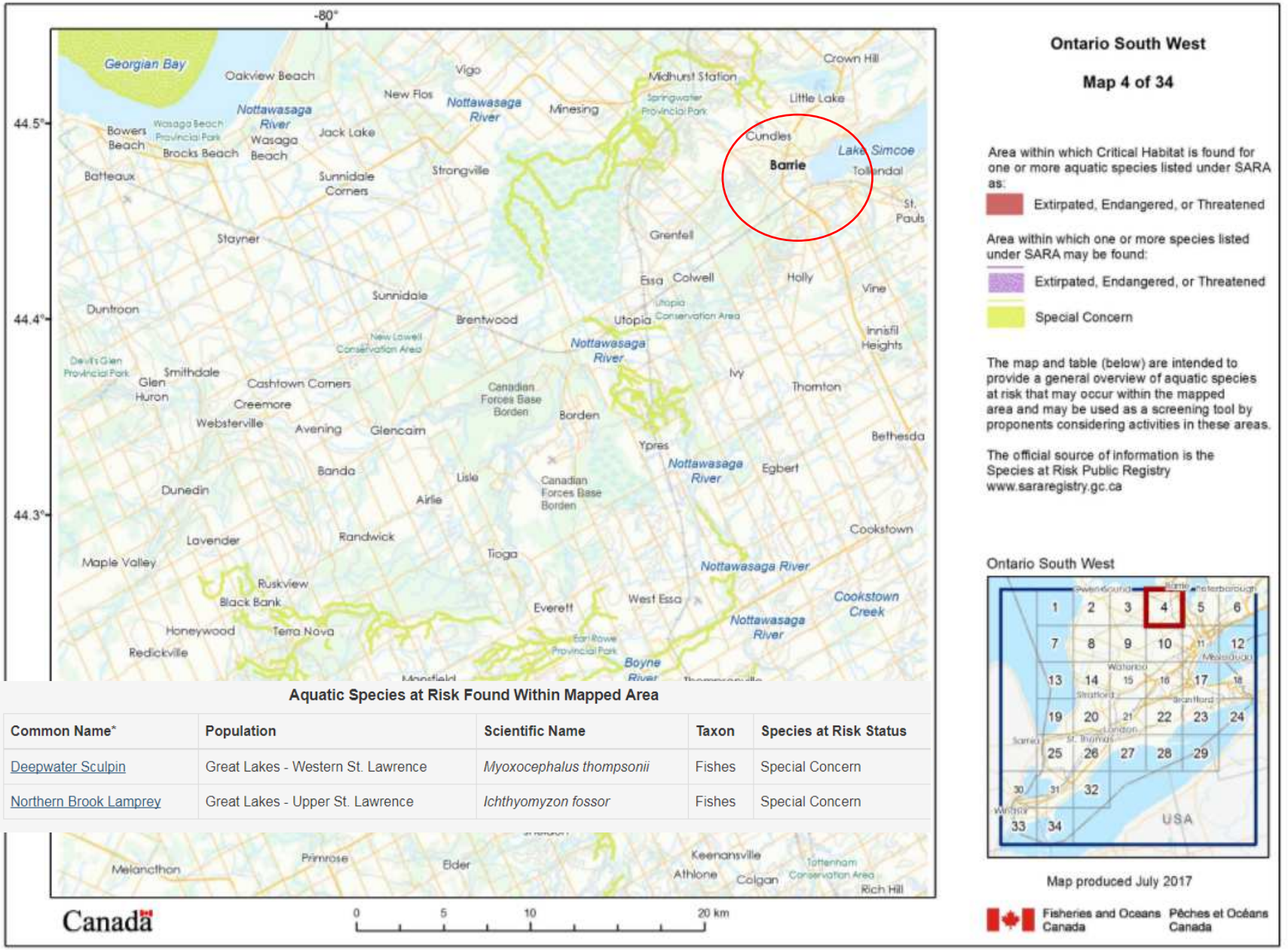
Carolina Wren ‡			1	6	Yellow-rumped Warbler		CF	41	78	Indigo Bunting	CF	AE	90	93
House Wren	DD	AE	87	95	Black-thr Green Warbler		T	34	90	Bobolink	AE	AE	87	83
Winter Wren	S	T	68	95	Blackburnian Warbler		T	28	58	Red-wing Blackbird	CF	NY	96	96

Ontario Breeding Bird Atlas - Summary Sheet for Square 17PK11 (page 3 of 3)

SPECIES	Code		%	
	1st	2nd	1st	2nd
Eastern Meadowlark	FY	AE	88	83
Western Meadowlark ‡			6	1
Yellow-h Blackbird †			1	0
Rusty Blackbird ‡			1	1
Brewer's Blackbird ‡			3	7
Common Grackle	CF	NY	96	96
Brown-head Cowbird	FY	FY	98	95
Orchard Oriole ‡			0	1
Baltimore Oriole	CF	NY	96	96
Purple Finch		AE	66	73
House Finch		NY	3	72
Red Crossbill ‡			7	1
White-winged Crossbill ‡			1	3
Pine Siskin			17	18
American Goldfinch	N	NY	98	96
Evening Grosbeak	H		15	15
House Sparrow	CF	NY	88	75

This list includes all species found during the Ontario Breeding Bird Atlas (1st atlas: 1981-1985, 2nd atlas: 2001-2005) in the region #13 (Simcoe County). Underlined species are those that you should try to add to this square. They have not yet been reported during the 2nd atlas, but were found during the 1st atlas in this square or have been reported in more than 50% of the squares in this region during the 2nd atlas so far. In the species table, "BE 2nd" and "BE 1st" are the codes for the highest breeding evidence for that species in square 17PK11 during the 2nd and 1st atlas respectively. The % columns give the percentage of squares in that region where that species was reported during the 2nd and 1st atlas (this gives an idea of the expected chance of finding that species in region #13). Rare/Colonial Species Report Forms should be completed for species marked: § (Colonial), ‡ (regionally rare), or † (provincially rare). Current as of 7/09/2017. An up-to-date version of this sheet is available from http://www.birdsontario.org/atlas/summaryform.jsp?squareID=17PK11

DFO SAR Mapping. 17-092 City of Barrie Drainage Master Plan *(approximate study area in red circle)*



Aquatic Species at Risk Found Within Mapped Area

Common Name*	Population	Scientific Name	Taxon	Species at Risk Status
Deepwater Sculpin	Great Lakes - Western St. Lawrence	*Myoxocephalus thompsonii*	Fishes	Special Concern
Northern Brook Lamprey	Great Lakes - Upper St. Lawrence	*Ichthyomyzon fossor*	Fishes	Special Concern

Ontario South West

Map 4 of 34

Area within which Critical Habitat is found for one or more aquatic species listed under SARA as:

Extirpated, Endangered, or Threatened

Area within which one or more species listed under SARA may be found:

Extirpated, Endangered, or Threatened

Special Concern

The map and table (below) are intended to provide a general overview of aquatic species at risk that may occur within the mapped area and may be used as a screening tool by proponents considering activities in these areas.

The official source of information is the Species at Risk Public Registry www.sararegistry.gc.ca

Ontario South West

Map produced July 2017

Fisheries and Oceans Canada / Pêches et Océans Canada

Scott Tarof

From: Findlay, Graham (MNRF) [graham.findlay@ontario.ca]
Sent: Friday, December 28, 2018 3:37 PM
To: Scott Tarof
Subject: RE: Background Species at Risk and Fisheries Information Request

Hello Scott, please consider the following in response to the request for background information.

We do not have additional species recommendations beyond the species noted in the request letter. Regarding the referenced restricted species, we believe that to be related to a restricted plant species. Given the observation dates noted and degree of urbanization in the areas of potential historic occurrences it is highly unlikely the species will be of concern. However, as you are likely aware, the species at risk records found in the NHIC database are not exhaustive and are based on **known** occurrences only. As a result, although there may be no record (or confirmation) of a species at risk on a specific site it does not mean that they are not present if appropriate habitat exists. Due diligence is therefore still required and would include an appropriate consideration of what species could be present based on available habitat on and adjacent to your study sites. Your field work should inform you on what species on the Species at Risk in Ontario (SARO) list (link below) could possibly be encountered based on available habitats in the area of the study as well as the possible species and seasonally appropriate survey methodologies required during your site assessments.

SARO List: https://www.ontario.ca/environment-and-energy/species-risk-ontario-list

Regarding the table of fisheries values, given the number of culverts identified within the various watercourses it was not practical to complete the table as provided. It appears the referenced fish species represent the documented fish communities for the entire watercourses. The challenge in providing appropriate direction in the table lies in depending on where specific culverts are situated along a watercourse the habitats and fish communities could present differing constraints given the local fish community and thermal and habitat characteristics, which in turn might influence the recommended timing restrictions for in-water work. Note the Aquatic Resource Areas – Survey Point (non-sensitive) data layer in Land Information Ontario will provide available fish community data collected at specific survey points. Your project planning will largely benefit the most from site specific evaluations. If additional fish community sampling is considered necessary a Licence to Collect Fish for Scientific Purposes will be required, and can be obtained from this office.

Do call with any further questions.

Regards,

Graham Findlay
Management Biologist
Huronia Resources Management Team,
Midhurst, MNRF
705-725-7530
705-725-7584 (fax)
graham.findlay@ontario.ca

From: MIDHURSTINFO (MNRF)
Sent: December 24, 2018 12:13 PM
To: Findlay, Graham (MNRF) <graham.findlay@ontario.ca>
Subject: FW: Background Species at Risk and Fisheries Information Request
Importance: High

From: Scott Tarof <starof@azimuthenvironmental.com>
Sent: December-02-18 3:03 PM
To: MIDHURSTINFO (MNRF) <MIDHURSTINFO@ontario.ca>
Subject: FW: Background Species at Risk and Fisheries Information Request

Hi.

Azimuth is following up again on this MNRF SAR Information Request, submitted originally on October 3, 2017 and followed up on on January 3, 2018. We look forward to receiving your reply with any additional SAR information relevant to this project.

Thank you.
Scott

From: Alexa Pompilio
Sent: Wednesday, January 3, 2018 10:14 AM
To: Midhurst MNRF SAR Request (midhurstinfo@ontario.ca)
Cc: Scott Tarof
Subject: RE: Background Species at Risk and Fisheries Information Request

Good morning and Happy New Year!

I'm following up regarding a Background Species at Risk (SAR) and Fisheries Information Request for a Drainage Master Plan in the City of Barrie (RFP# FIN 2017-030P). I realize that this is a large SAR request but I wanted to confirm that the initial request was received.

Thanks in advance,

Alexa Pompilio H.B.Sc.
Ecologist

Azimuth Environmental Consulting, Inc
642 Welham Road
Barrie, Ontario, L4N 9A1

Phone: (705) 721-8451 ext. 225
Cell: (705) 794-2233
apompilio@azimuthenvironmental.com
www.azimuthenvironmental.com

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From: Alexa Pompilio
Sent: Tuesday, October 3, 2017 10:14 AM
To: Midhurst MNRF SAR Request (midhurstinfo@ontario.ca)

Cc: Scott Tarof
Subject: Background Species at Risk and Fisheries Information Request

Good morning.

Attached please find a Background Species at Risk and Fisheries Information Request for a Drainage Master Plan, City of Barrie, Ontario (RFP# FIN 2017-030P). I have also attached a Fisheries Background Information Request table and would appreciate if this could be completed for the watercourses within the study area.

We look forward to hearing back from you.

Thanks in advance,

Alexa Pompilio H.B.Sc.
Ecologist

Azimuth Environmental Consulting, Inc
642 Welham Road
Barrie, Ontario, L4N 9A1

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APPENDIX G

MNRF Email – Additional Surveys

Scott Tarof

From: Findlay, Graham (MNRF) [graham.findlay@ontario.ca]
Sent: Thursday, October 12, 2017 2:32 PM
To: Scott Tarof
Subject: RE: 17-092 City of Barrie Drainage Master Plan
Attachments: MNRF Survey Protocol for Blanding's Turtle.pdf

Hello Scott your request for direction on wildlife/habitat specific surveys is difficult to answer at this time as you note your present work will be limited to a broad level natural heritage assessment. Further the lack of specific survey locations and detail regarding the nature of and potential impacts from future work (culvert and LID works) does not lend to scoping meaningful direction at this time.

Regarding direction on Blanding's turtle surveys that might be required to inform the City's project planning the attached Survey Protocol for Blanding's Turtle in Ontario will inform on the types of surveys and the conditions necessary to optimize the results from future surveys. For the reasons noted we cannot advise at this time on which survey methods or effort might be required for specific locations. It is up to the planning team to complete whatever work might be necessary to ensure the fulsome review required to inform on potential authorization requirements under the *Endangered Species Act, 2007*. What habitats exist on site for what species? Are there occurrence records for species of concern at a location, if not but potential habitats exist what work might be required to demonstrate absence of a species from a site. The attached speaks to some of those considerations.

Similarly, for watercourses and wetlands we cannot speculate at this time on what work might be required to address potential impacts from proposed works at unknown locations. Once more details are known on the natural heritage features and functions, and the proposed works at a site then a discussion can occur to better inform on what might need to be done to identify and address potential impacts from future works.

Do call with any further questions.

Regards,

Graham Findlay
Management Biologist
Huronia Resources Management Team,
Midhurst, MNRF
705-725-7530
705-725-7584 (fax)
graham.findlay@ontario.ca

From: Scott Tarof [mailto:starof@azimuthenvironmental.com]
Sent: October 5, 2017 10:47 AM
To: Findlay, Graham (MNRF)
Subject: 17-092 City of Barrie Drainage Master Plan

Hi Graham.

I am working on a project involving terrestrial and fisheries general surveys for the City of Barrie. The project is essentially a Phase 1 EA where Azimuth has been retained to perform general habitat surveys (no species-specific surveys at this point) at 48 deficient culvert locations and 29 municipal parks (underground LIDs planned for these parks) to provide a report on potential preliminary constraints. The City would like to make improvements as part of their efforts to address storm water and drainage issues. Our report will be used to inform what the potential NH issues

would be at each location were the improvements to be undertaken. More detailed species surveys would follow as part of a separate project.

The survey locations are spread across the City in all subwatersheds except Sophia Creek.

Several culvert locations are close to wetlands/ponds. In regards to Blanding's turtles, what extent of surveys (e.g. detailed habitat surveys, visual encounter surveys, nesting surveys?) would the MNRF likely require (in the event that the City proceeds with species-specific surveys under a separate project) to be done to avoid contravention of the ESA? In addition, what work would the MNRF likely want to see in regards to watercourses and wetlands that are in proximity to proposed culvert and LID work? Your input would help inform recommendations in my report for the City of Barrie.

Thank you. I look forward to your reply.

Dr. Scott Tarof (PhD Biology)
Terrestrial Ecologist

Azimuth Environmental Consulting, Inc.
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