APPENDIX H

Natural Sciences Report

LCA Environmental Consultants

Natural Sciences Report

Derry Road (Regional Road 7) Transportation Corridor Improvements
Class Environmental Assessment Study
Regional Municipality of Halton

Prepared for:

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1.0 INTRODUCTION

The Regional Municipality of Halton requires completion of a Class Environmental Assessment (Class EA) Study to consider road improvements to a portion of Derry Road (Regional Road 7) from Milburough Line (Regional Road 24) to McNiven Road within the City of Burlington and the Town of Milton. R and R Associates Inc. is conducting the Class EA study on behalf of the Regional Municipality of Halton. LCA Environmental Consultants, a sub-consultant to R and R Associates Inc., is completing all aspects of the natural environment component with the exception of air quality. The study area limits are identified in **Figure 1**.

Figure 1: Derry Road Study Area

1.1 Background

The study area for the Derry Road (Regional Road 7) Transportation Corridor Improvements extends from Milburough Line (Regional Road 24) to McNiven Road within the City of Burlington and the Town of Milton, extending over a length of approximately 1.36 kilometers. The predominant land uses within the study area are a mix of agricultural, rural residential and natural lands. The study area is located within the lower portion of the Kilbride Creek subwatershed within the larger Bronte Creek Watershed. In the northern portion of the study area, Derry Road is traversed by two tributaries of Kilbride Creek just south of McNiven Road.

A portion of the main branch of Kilbride Creek travels along the northwest side of Derry Road for approximately 100 metres immediately before exiting the study area via a double span structure at McNiven Road.

Halton Region requires a Class EA Study be completed for anticipated road improvements to the portion of Derry Road located within the study area limits. The Class EA Terms of Reference identified existing and future structural and capacity deficiencies of Derry Road, as well as, approved and proposed land use changes in the area as factors leading to the initiation of the study. Further, the document indicates that the anticipated road improvements could include a combination of a two-lane reconstruction, intersection improvements, and improvements to the horizontal and vertical alignments. The Natural Sciences Report component of the EA is required in order to determine if the proposed improvements will have any impact on the natural environment. From this perspective, the study area was reviewed in general with specific criteria evaluated for the recommended alternative including the following:

- Aquatic Habitat and Fisheries (including significant species);
- Terrestrial Features (valleylands, wetlands, significant woodlots, ANSIs, ESAs & Greenlands, and significant species);
- Wildlife (birds, herpetofauna, mammals); and
- Natural Heritage System (Greenbelt Plan Area, core areas, natural corridors, potential linkages, secondary linkages, other woodlots/wetlands and potential (unevaluated) wetlands.

Due to landowner restrictions, the majority of the lands adjacent to Derry Road could not be accessed for comprehensive inventory beyond the road allowance. As such, the study area was evaluated through a combination of roadside surveys and a review of background studies. This approach was deemed sufficient as the proposed improvements are largely limited to the existing road footprint and any necessary site alterations will be limited to within a few metres of the road.

Supporting documents that have been consulted for relevant natural heritage data include:

- ✓ Bronte Creek Hydrology and Stream Morphology Study (PEIL, 2003);
- ✓ Bronte Creek Watershed Study (Conservation Halton, 2002); and
- ✓ Halton Natural Areas Inventory (NAI) Volumes 1 and 2 (Dwyer, 2006).

The Ministry of Natural Resources and Conservation Halton were contacted for existing natural heritage information which has been incorporated into this report.

1.2 Fieldwork

The natural environment in and adjacent to the study area was assessed and documented by LCA Environmental Consultants through the summer and fall of 2009 and summer of 2010. **Table 1** summarizes all of the fieldwork completed for this report. The field protocols utilized for data

collection are detailed in Appendix C of this report. Following, is a discussion outlining the existing environmental conditions within the study area including significant and/or sensitive natural areas and species.

Table 1: Summary of Fieldwork Completed for this Report

Date	Time	Weather	Purpose	Staff
July 15, 2009	12:30 – 1:30 pm	~ 23°C; mix of sun and clouds	• Reconnaissance • Study area characterization (natural areas, roadside vegetation, watercourses etc.)	• Lisa Campbell – Principal • Jason Elliott – Natural Heritage Biologist • Natalie Kiers – Field Technician
October 20, 2009	11:00am - noon	~ 17°C; mix of sun and clouds	• ELC verification • Habitat and wildlife assessment • Watercourse assessment	• Scott Campbell – GIS • Jason Elliott – Natural Heritage Biologist • Nadine Litwin – Bird and Amphibian Naturalist
June 3, 2010	12:30 pm – 2:30 pm	~ 23°C; mix of sun and clouds	• Vegetation inventory • Habitat and wildlife assessment • Watercourse assessment	• Lisa Campbell – Principal • Andrea Sinclair – Botanist • Natalie Kiers – Field Technician • Nadine Litwin – Bird and Amphibian Naturalist
June 8, 2010	9:00 pm – 9:40 pm	~ 17°C; overcast	• Marsh Monitoring Protocol • Breeding Birds	• Lisa Campbell – Principal • Nadine Litwin – Bird and Amphibian Naturalist

2.0 EXISTING STUDY AREA CONDITIONS

2.1 Physiography and Soils

An assessment of the physiography in the study area was conducted by reviewing the relevant background documents noted above. The documents used for each part of the following discussion are referenced at the end of each paragraph.

The physiography of the Bronte Creek Watershed is dominated by the Niagara Escarpment which runs on a north–south axis through the Halton Region and divides many of the watercourses in the area into lower and upper reaches. In terms of bedrock geology, three formations make up the watershed. The Queenston Formation, comprised of red shale, underlies the lower portion of the watershed below the escarpment and forms the scarp's lower slopes. The Cataract Group, comprised of sandstone, dolostone, and shale, overlies the Queenston Formation and is exposed on the escarpment face. The Amabel Formation, comprised of erosion resistant dolostone, overlies the other formations, forms the upper scarp face, and underlies the upper portion of the watershed above the escarpment (Conservation Halton, 2002; Dwyer, 2006; PEIL, 2003).

The majority of the study area is located within the Norfolk Sand Plain physiographic region that lies in the south-central portion of the Bronte Creek Watershed. The permeable soils (sands and silts) that make up this feature confer excellent drainage permitting extensive agricultural land usage throughout the area, such that woodlands are typically limited to low lying wetlands. Further, the permeable soils permit groundwater recharge across the feature which contributes to the coldwater habitat present in Bronte Creek (the receiving waters of Kilbride Creek). The northernmost portion of the study area in the vicinity of Kilbride Creek (near McNiven Road) is located within a Spillway physiographic region. This feature contains deep sand and gravel accumulations deposited along glacial spillways which allow groundwater discharge into Bronte Creek and the downstream reaches of Kilbride Creek (Conservation Halton, 2002).

An assessment of the soils and drainage in the study area was conducted by reviewing the relevant soils map for the area (Canada Department of Agriculture; 1971). According to the soils mapping, eight different soil types traverse the subject lands. Five of the soil types comprising the majority of the study area are moderately well to well drained sandy loams while one soil type that occurs in the central portion of the study area is imperfectly drained sandy loam. Additionally, a relatively narrow swath of very poorly drained organic mesisol extends north from Derry Road in the east central portion of the study area. Finally, variably drained loam is present on the south side of Derry Road at McNiven Road. The soils on the eastern portion of the subject lands are slightly to moderately stony and are present on complex topography with 2 – 9% slopes; the soils in the central portion are stone free and are present on simple topography with 0 – 2% slopes; and the soils on the western portion are slightly to moderately stony and are present on simple or complex topography with 2 – 5% slopes.

2.2 Aquatic Habitat and Fisheries

As noted above, a tributary of Kilbride Creek traverses Derry Road in the northern portion of the study area via relatively small culverts and a portion of the main branch of Kilbride Creek travels along the northwest side of Derry Road for approximately 100 metres immediately before exiting the study area via a double concrete span structure at McNiven Road. Mapping contained in the Bronte Creek Watershed Study (Conservation Halton, 2002) displays one crossing of Derry

Road by a tributary of the creek that originates southeast of the road and joins the main branch on the northwest side of the road. However, correspondence from Conservation Halton to R and R Associates Inc. pertaining to the Class EA study (dated January 4, 2010; Appendix A) suggests that there are two tributaries crossing Derry Road within the study area. Mapping contained in the Halton NAI (Dwyer, 2006) also displays the two crossings but shows the smaller tributary on a different alignment, south of the junction with the main tributary. The smaller tributary crossing located farther south on Derry Road appears to be associated with a large residential pond west of Derry Road and picks up roadside drainage.

2.2.1 Historical Data

The Bronte Creek Watershed, which includes the Kilbride Creek subwatershed, has been evaluated in several studies dating back to 1960. The Bronte Creek Watershed Study (BCWS) prepared by Conservation Halton in 2002 provided a comprehensive evaluation of the watershed and its aquatic habitat through the incorporation of historical findings as well as new data gathered from 1998 – 2001 in support of the study. In 2003, Planning & Engineering Initiatives completed the Bronte Creek Hydrology and Stream Morphology Study (BCHMS) on behalf of Conservation Halton. Following, is a discussion of the aquatic conditions present in Kilbride Creek based on a review of the 2002 and 2003 reports.

Kilbride Creek begins above the Niagara Escarpment within the Guelph Junction Provincially Significant Wetland (PSW) Complex and is fed by groundwater discharge beginning near Highway 401. Further south, the watercourse travels through the Guelph Junction Woods ESA, flows over a natural fish barrier posed by the escarpment downstream of Kilbride, and enters the Bronte Creek Valley ESA/ANSI joining Bronte Creek just upstream of the Dakota Mills Dam. Flows through the reach immediately upstream of Kilbride (in the study area) can be intermittent during periods of drought; however, flows are restored via groundwater inputs in the vicinity of the settlement (Conservation Halton, 2002; PEIL, 2003).

An instream temperature survey conducted for the BCWS at seven stations in Kilbride Creek indicated that, although the upper reaches of the watercourse exhibit warm temperatures, the groundwater inputs into the creek near the 401 soon result in marginal coolwater/warmwater habitat conditions that extend downstream past Steeles Avenue. South of Steeles Avenue, a large online pond complex warms the temperatures in the creek until the creek reaches Kilbride where the groundwater inputs once again result in coolwater habitat that extends downstream to Bronte Creek. It was noted in the study that "*the [measured] coolwater temperature regime does not correspond with the healthy Brook Trout populations (coldwater temperature regime indicator) which characterize much of Kilbride Creek*" (Conservation Halton, 2002).

Fish community sampling was conducted at three stations in Kilbride Creek (two upstream and one downstream of the study area) for the BCWS in order to "*…qualitatively assess changes in fish community composition from the headwaters of [the creek] to [its] confluence with the main branch of Bronte Creek*" (Conservation Halton, 2002). Additionally, the data was used to

evaluate changes in the fish community over time through comparison with historical studies. According to the report, the coolwater habitat present in Kilbride Creek from Bronte Creek to the escarpment supports Brook Trout, Brown Trout, and Rainbow Trout. Brook Trout were also found in the reaches upstream of the escarpment and the report indicated that the Brook Trout habitat likely extends north of the 401. In terms of the upper portion of the subwatershed, the report indicates that the online Burns Reservoir was stocked with Rainbow Trout until the early 1990's, supported a centrachid fishery until a near total winterkill event in 1999, and was restocked with Black Crappie, Pumpkinseed, and Largemouth Bass in 2000. The reaches upstream of the reservoir were not sampled. Forage fish species such as Rainbow Darter, Johnny Darter, White Sucker, Creek Chub, and Blacknose Dace were found throughout the watercourse. The full fish community data presented in the BCWS has been included in Appendix B for reference purposes.

According to the January 4, 2010 correspondence from Conservation Halton (Appendix A), the Ontario Ministry of Natural Resources may have concerns regarding Redside Dace (*Clinostomus elongatus*; S2, END), Atlantic Salmon (*Salmo salar*; SX, EXP), and American Eel (*Anguilla rostrata*; S1?, END) populations in Kilbride Creek. According to the BCWS, Redside Dace was relatively common in the upper portions of the Bronte Creek Watershed until the early 1970s; however, the resident population appears to have declined and contracted since then as only three records of the species have been recorded since 1990 despite sampling at former known sites. The report indicated that, presently, Redside Dace appears to be limited to a reach of Bronte Creek and one of its tributary systems southwest of Kilbride Creek. Atlantic Salmon, which used to be abundant in the Bronte Creek Watershed, has been extirpated from Lake Ontario and its tributaries since the late 1800s (BCWS, 2002). According to the BCWS, Atlantic Salmon fry were stocked in Bronte Creek and Willoughby Creek from 1997 – 2000 in an effort to re-establish the population in the watershed. However, no indication was given as to the success of the program. The status of American Eel in the watershed is unclear as there is no discussion of the species in the BCWS. No past or present records for any of the three fish species are included in the BCWS fisheries data for Kilbride Creek (Appendix B).

Correspondence from OMNR dated June 7, 2010 (Appendix A) indicated that there are no fish species of concern within the study area. Species and their respective habitat that receive protection under the *Endangered Species Act 2007* may require a permit should the proposed alternative cause harm to these species or their habitat. Fisheries data provided by Conservation Halton (2010) indicated current records (2007) of a variety of fish species immediately downstream of the study area, just east of McNiven Road. These species included the presence of Brook Trout (*Salvelinus fontinalis*) which is typically classified as a coldwater fish, suggesting that the temperature regime is suitable to support a population. There were no current records of aquatic species of concern within or near the study area based on the historical data provided. A copy of the historical data provided by Conservation Halton has been included in Appendix B1.

Benthic invertebrate sampling conducted for the BCWS according to the BioMAP protocols (Griffiths, 1999) at the same three stations used for the fish community sampling indicated that

the "*water quality within the subwatershed was generally non-impaired to slightly impaired*" (Conservation Halton, 2002). However, it was noted that the benthic indices used in the evaluation may not be entirely appropriate given the characteristics of the creek (low gradient, non-gravel bottom) and a reference condition approach was recommended for future monitoring. Nevertheless, the benthic study results in Kilbride Creek appeared to correlate well with the instream temperature and fish community studies as healthy, diverse fish communities such as that found in Kilbride Creek were generally found in reaches with non-impaired or slightly impaired water quality throughout the watershed (BCWS, 2002).

Overall aquatic ecosystem health in the Bronte Creek Watershed was evaluated in the BCWS using the factors outlined above as well as water chemistry, instream habitat, and riparian cover parameters. Although the majority of Kilbride Creek was rated as having high aquatic ecosystem health, a short section in the northern portion of the subwatershed and the section from Steeles Avenue downstream to the escarpment (which includes the study area) were rated as having moderate health. The warming influence of the online ponds just south of Steeles Avenue, as well as, channel alterations downstream of the ponds (upstream of the study area) were given as the reason for the reduced rating through the Derry Road area. Removal or reconfiguration of the online ponds and riparian plantings and/or natural channel design in the altered section was recommended to enhance the degraded coolwater habitat in this reach.

A fluvial geomorphological assessment of Kilbride Creek conducted for the BCHMS indicated that, although there are relatively few concerns for the creek on the whole, the section of the main branch in the study area where the watercourse bends 90^{o} and travels beside Derry Road for about 100 m is identified as an area of concern. The report indicated that the very small distance between the creek and the road in this area increases the possibility of increased sediment and contaminant loadings into the creek. Additionally, an adjacent landowner reported increased erosion and fallen trees in this area subsequent to construction on Derry Road in 2000. The study recommended monitoring this location for erosion to avoid loss of the narrow buffer or roadway. As well, it was recommended that the area be monitored for sedimentation accumulation. The reach of the creek upstream of the bend was given an A4 Rosgen classification in the report. This classification indicates a totally confined, well entrenched channel with slopes of 4 – 10%, a low width/depth ratio, gravel substrate, and bankfull flows described as step/pools with associated plunge or scour pools (USEPA, 2008). Although the study reach along Derry Road was not classified, the reach downstream of the study area was given an A5 classification indicating similar channel characteristics as the upstream reach but with sandy substrate.

Flow, sediment transport, and erosion were also studied throughout the watershed in the BCHMS. In terms of flow and sediment transport, the study found that, in general, bankfull dimensions were as expected, bedloads in the watershed are made up of many different materials, suspended solids concentrations in the creeks are relatively low, and the watercourses were transporting sediment efficiently. Further, the report indicated that as suspended sediment is being transported through the watercourses, it is not collecting on the creek beds where it

could degrade aquatic habitat. It was concluded that the watercourses are in equilibrium with the current flow regimes. Results of the erosion analysis from the study indicated little bank retreat in the watercourses over the study period. However, the reach of the main branch in the study area was assigned a High Erosion Sensitivity rating while the reach immediately downstream was given a Moderate rating.

2.2.2 Field Assessment

The fisheries habitat and channel morphology of the main branch of Kilbride Creek (adjacent to Derry Road) was assessed during field visits conducted for this report. The smaller channel located south of the main tributary was not assessed in terms of habitat or morphology as the channel was dry and fully vegetated during the field site visits completed for this study. As well, the channel extends onto private property beyond the road allowance.

The main branch of Kilbride Creek enters the study area from the northwest bends 90^{o} to the northeast at Derry Road, flows along the north side of the road for approximately 100 m, and exits the study area via a concrete span structure along McNiven Road approximately eight metres wide. The watercourse, which exhibits relatively uniform width in this area, flows within approximately two metres from the road edge along most of this reach but angles northward as it approaches McNiven Road (Appendix D, Photographs 1 & 2). Substrate in the channel was comprised mainly of cobble with some boulders, gravel, and sand during the site visits. The southern bank (along Derry Road) is comprised of boulders and hunks of concrete and is relatively high in comparison to the northern bank. Near McNiven Road, an approximately ten metre wide manicured floodplain area is present at the northern top of bank beyond which the ground slopes up to a manicured front yard. The entire width of the span structure at McNiven Road was wet during the 2009 and 2010 site visits suggesting the floodplain area may be inundated during peak flow events (Appendix D, Photograph 3). The bankfull width and wetted width, measured in October of 2009, were 8.60 metres and 6.10 metres, respectively with a maximum depth of 0.22 metres. These dimensions suggest a channel that has widened as compared to the data presented in the BCHMS (2006), however, those measurements were taken upstream of the 90^{o} bend in the channel. Mean flow was measured at 0.34 m/s. Within the main tributary, there do not appear to be any impediments to flow or fish movement into the upstream reaches. The culverts beneath Derry Road and the wooden weir structure maintaining the wetland pond on the southern side of Derry Road may prohibit fish movement into the smaller secondary tributary. Small fish were observed within the wetland pond south of Derry Road.

Riparian cover on the south bank is severely limited (Appendix D, Photograph 1) and is comprised mainly of weedy herbaceous species with a few small trees and shrubs close to McNiven Road. Notably, a few standing snags were observed in this area. Riparian cover on the northern bank is comprised of a narrow swath of mature trees and shrubs approximately ten metres wide, beyond which is manicured lawn. Instream cover is present in the form of boulders and coarse woody debris.

As discussed above, a tributary of Kilbride Creek joins the main channel near McNiven Road. Site visits confirmed the confluence which is represented by three culverts under Derry Road (Appendix D, Photograph 4). One relatively large culvert (800 mm D) appears to carry the bulk of the flow but two smaller culverts (200 mm D) were present as well. The culverts were perched approximately 5 – 20 cm above the surface of the main channel during the fall 2009 site visit; however, it is not clear if they are perched during higher flow events. Notably, a wooden weir structure has been placed at the upstream end of the culverts resulting in a relatively large pond that is located within approximately 1.5 m of the south side of the road (Appendix D, Photograph 5). Very little riparian cover is present between the pond and Derry Road; however, trees shade the north side of the pond. Cattails (*Typha sp.)* dominate the upstream end of the pond.

Although the lands could not be accessed for this study, mapping contained in the BCWS and the Halton NAI (Dwyer, 2006) indicates the tributary flows through the wetland present on the south side of Derry Road. Recent correspondence from Conservation Halton (January 4, 2010; Appendix A) identifies the wetland as part of the Kilbride Swamp PSW Complex. The NAI classified the wetland as Mixed Swamp (SWM) under the Ecological Land Classification for Southern Ontario (ELC) protocols (Lee et. al., 1998). The roadside surveys conducted for this report confirmed this classification and noted birch (*Betula sp.*) as the dominate tree species in the wetland in association with willow (*Salix sp.*) and conifers. Poplar (*Populus sp.*), Sugar Maple (*Acer saccharum var. saccharum*), Green Ash (*Fraxinus pennsylvanica*), and Staghorn Sumac (*Rhus typhina*) were identified from Derry Road along the northern limit of the wetland. A roadside ditch is present in this area which may contribute to the inputs into the main tributary of Kilbride Creek (Appendix D, Photograph 6).

The mapping contained in various sources display the tributary on different alignments. Although the lands could not be accessed, it appears based on the field site visits and 2009 aerial imagery (Google, 2009) that the alignment contained in the NAI mapping is most accurate south of Derry Road. This alignment indicates two channels that converge at the aforementioned pond; one that extends south into the wetland and another that meanders west through the wetland before bending north and crossing Derry Road. Site visits confirmed a culvert crossing in the vicinity of 1275 Derry Road, however, the contribution of roadside drainage and the upstream catchment area could not be confirmed. Cattails and Reed Canary Grass (*Phalaris arundinacea)* are present along the road at the downstream end of the culvert (south side of Derry Road) while Swamp Milkweed (*Asclepias incarnata*) and Spotted Joe-pye Weed (*Eupatorium maculatum*) were identified at the upstream end of the culvert where a roadside ditch is present. Upstream of the culvert, the tributary appears to be connected to a private (online) pond with abundant Common Reed (*Phragmites australis*). The lands upstream of the pond could not be accessed; however, it appears on aerial imagery that the channel continues northwest on a line perpendicular to Derry Road which corresponds to the alignment displayed in the mapping contained within the recent correspondence from Conservation Halton (Appendix A).

Roadside drainage is variable along Derry Road ranging from defined swales to leveled shoulders. Based to the topography of the road and variability in roadside drainage, it is difficult to determine the hydrologic surface linkage between the roadside runoff and the existing surface water hydrologic features. However, given the proximity of the wetland pond feature and the main tributary of Kilbride Creek to the road, it should be presumed that there is direct runoff from the road into both the wetland and the tributary crossing beneath Derry Road. General water quality parameters were measured during the site visits completed for this study as presented in **Table 2**.

Table 2: General Water Quality Data from the portion of the Main Branch of Kilbride Creek in the Study Area

Parameter	LCA (10/20/2009)*	LCA (06 03/10)
Temperature (^{o}C)	10.3	20.1
Conductivity (µS/cm)	742.4	652.3
TDS (ppm)	516.9	446.3
pH	7.05	8.11
Dissolved Oxygen (mg/L)	12.02	6.49

* measurements taken approximately 10 m upstream of McNiven Road

In general, aquatic organisms require pH levels between 5 and 9, dissolved oxygen levels above 5 mg/L, conductivity levels below 1600 µS/cm, and TDS levels below 1000 ppm although fish spawning can be affected by lower levels of conductivity and TDS. The general water quality appears to fall within the preferred range for aquatic organisms despite proximity to the road. Sampling following or during a major rain event may provide some information regarding the impact of the roadside drainage on the watercourse.

2.2.3 Summary

Based on the historical data provided by Conservation Halton and the field assessments completed for this study, both the wetland system and the main tributary of Kilbride Creek appear to be productive in terms of fish habitat, provide suitable aquatic habitat for a variety of species and are not limited by surrounding land uses or existing riparian buffer. The close proximity of the main tributary to Derry Road and potential instability of the banks should be considered in the design alternatives as there may be opportunities to improve the aquatic habitat.

2.3 Terrestrial Ecosystems

The portion of Derry Road within the Study Area extends from Milburough Line (Regional Road 24) to McNiven Road within the City of Burlington and the Town of Milton, encompassing both natural conservation lands with mature riparian features in the northern portion of the study area

and open, active agricultural areas with limited tree cover and rural residential development in the southern portion of the study area.

2.3.1 Historical Data

The Halton Natural Areas Inventory (2006) and the Bronte Creek Watershed Study (2002) have completed extensive evaluation and mapping of the vegetation communities throughout the Bronte Creek watershed which includes the vegetation communities within the Kilbride Creek subwatershed. The Lowville-Bronte Creek Escarpment Valley Extension (NAI-9/9A) is located within the northern portion of the study area and to the south of the study area while Calcium Pits (NAI-19) is located northwest of the study area and the Guelph Junction Woods and Extension (NAI-20) is located west of the study area, supporting the headwaters of a tributary of Kilbride Creek. The study area is specifically located within NAI 9A. As per the information provided in the Halton Natural Areas Inventory (2006) report, the vegetation communities for this area were determined based on aerial photograph interpretation. As such, the field investigations completed for this report sought to verify the vegetation community data presented in the NAI (Map Sheet BR080, 2005) based on roadside surveys.

The NAI report (2006) documented twenty-two plant communities in NAI-9. Given the proximity between NAI-9 and NAI-9A and the soils, topography and land uses, it can be presumed that there are similar vegetation types and communities in NAI-9A.

2.3.2 Field Assessment

Field investigations and air photo interpretation determined the geographical extent, composition, structure and function of vegetation communities on and adjacent to the study area. A review of vegetation communities presented in the Halton Natural Areas Inventory-Detailed ELC Mapping (2005) was undertaken for the study area. Air photos were also used to interpret and determine the limits and characteristics of vegetation communities found abutting Derry Road.

The wooded natural areas along Derry Road in the northern portion of the study area include several ELC polygons, specifically identified in map sheet BM080 (see Appendix B). The predominant polygons adjacent to Derry Road within the study area are: Deciduous Forest, Mixed Forest, Mixed Thicket Swamp and Cultural Meadow. The field evaluations completed for this study confirmed the ELC designations that had been assigned to the various areas along Derry Road and the dominant and abundant species within these areas were documented. Along the southern portions of the study area, the vegetation consisted primarily of roadside trees and sporadic hedgerows amidst agricultural and rural residential lands. The mature roadside trees were individually identified as the road works may require selective removal of trees within the road allowance.

A roadside vegetation inventory was conducted for all lands within ten to twenty metres from the existing road in fall of 2009 and in June of 2010 where access was possible. Private land ownership prohibited the ability to completed comprehensive surveys beyond the road allowance in most areas. No additional ecological land classification (ELC) was completed for this report as the proposed road improvements are primarily limited to the existing road footprint such that the ELC polygons identified in the historical reports are of sufficient size that they will remain intact following the road improvements. It was noted that within the wetland area south of Derry Road, there were a significant number of dead and dying trees, specifically Elm and Beech species.

An inventory of the vegetation identified during the field site visits has been included in Appendix B2 for reference purposes. A table detailing the tree species and relative sizes for those trees located within the road allowance on the southern portion of the study area has also been included in Appendix B2. There were no federally or provincially threatened or endangered vegetation species identified within the right of way. However, Swamp White Oak (*Quercus bicolor*) was noted at the McNiven culvert. This species is considered regionally rare.

2.4 Wildlife and Wildlife Habitat

2.4.1 Historical Data

The BCWS Natural Heritage Report (Appendix B) lists rare species occurrences for all NAI's within the Halton Region. Although flora inventories were not conducted for NAI-9A, incidental observations of local fauna were reported and a list of rare species potentially found in the vicinity of the study area were listed. Significant species identified within the area included one butterfly, two dragonflies, and the Jefferson/blue-spotted salamander complex (*Ambystoma jeffersonianum-laterale*) which is considered *Threatened* provincially and nationally, however, the presence of the salamander was not noted in the correspondence received from the Ministry of natural Resources.

The study area is divided by anthropogenic uses of rural farmland and rural residential which extend through the southern portion of the study area. The northern portion of the study area is of ecologically sensitive origin with multiple significant natural heritage features. Wildlife habitat within the northern portion of the study area is typical of undisturbed forest and interior forest habitat. The most significant habitat consists of Kilbride Creek and the associated Kilbride Creek Provincially Significant wetlands. The natural areas surrounding the watercourses and the woodlot provide nesting and dwelling habitat for many wildlife species including birds, mammals and herpetofauna. Wildlife expected to be found within the study limits include wildlife species that exhibit a tolerance for human activity. The Fauna Inventory presented in Appendix B1 and B2 details the species of wildlife that were documented within the project limits based on the current study and historical records.

Correspondence from the Ministry of Natural Resources dated June 7, 2010 (Appendix A) indicated that there were historical records of a number of Species at Risk recorded within the study area. Species at Risk identified included the Milksnake (*Lampropeltis triangulum triangulum*) and Northern Bluet (*Enallagma cyanthigerum*). The natural heritage features recorded in the study area include the Provincially Significant Kilbride Swamp Wetland Complex. With the exception of these species, no bird, amphibian or mammal species located within the study area are considered to be of provincial or regional significance according to the Natural Heritage Information Centre (NHIC) Provincial Rankings (SRANK) and the OMNR status list.

According to the Halton Natural Areas Inventory (2006), NAI-9/9A, defined as the Lowville-Bronte Creek Escarpment Valley and Extension, provides interior forest and moderate habitat for flora and fauna, many of which are native. In terms of species richness, NAI-9/9A supports twenty species of butterflies in NAI-9 and thirty-nine species in NAI-9A, nineteen native species of dragonflies and damselflies, nineteen native herptofaunal and seventy-six species of breeding birds, including fourteen interior species. Seventeen native mammal species were also recorded in NAI-9 and two in NAI-9A. The significant species within this area have been summarized in the NAI (2006) report (pages 58-64, Appendix B1).

2.4.1 Field Assessment

Field surveys conducted in June 2010 confirmed the presence of American Toad (*Bufo americanus*), Western Chorus Frog (*Pseudacris triseriata*), and Green Frog (*Rana clamitans*) based on the field surveys. Western Chorus Frog (Great lakes-St. Lawrence Canadian Shield population) is classified as a Threatened species according to the COSEWIC status report. As the field inventories were initiated in the summer of 2009, the timing was late for amphibian surveys in 2009. However, amphibians were noted on the various field days and the historical data for this area was reviewed. The Marsh Monitoring Program was initiated in June of 2010 but the initial surveys confirmed that completion of the protocol would not provide additional data and the designs were such that the amphibian habitat was not being altered in terms of size or quality. As such, more extensive field data collection was not warranted.

Raccoon tracks were recorded during the site visits completed in fall of 2009 and summer of 2010. A local resident also reported a high population of muskrat in the area and noted significant muskrat roadkill although none was observed on the field site visits (Personal communication). Standing snags and tree cavities were also observed in the woodland indicating current and potential habitat for nesting birds. Although no deer were observed directly, White-tailed Deer (*Odocoileus virginianus*) are also utilizing the property as evidenced by their tracks in various locations. Mast and berry producers in the woodlot and thicket areas provide a food source for various mammalian and avian species.

Along the southern portion of Derry Road within the study area, the landscape transitions to agricultural uses, including active fields, mowed lawns and fallow fields. While these areas

provide suitable habitat for a variety of small mammals and a variety of birds, there are no water features or wooded areas within the southern portion of the study area.

Avifaunal surveys were completed in the fall of 2009 and the spring of 2010 and included an assessment of the potential habitat along Derry Road. The surveys were limited the areas along the road in order to determine which species are actively utilizing the lands adjacent to the road and those that may be impacted by the proposed road works. The avifaunal species present in the study area are a mixture of open country and woodland species. The observed woodland species were at the edge of their habitat in the large woodlot.

Twenty-seven avian species, three herptofaunal species, and two mammalian species were observed or heard during the site visits completed for this study. The majority of species identified were ranked as common nationally, provincially, and regionally according to the Natural Heritage Information Centre (2008) and supporting documentation. The species lists presented in this report include those fauna identified on the site and on adjacent lands and include species expected but not observed based on range and habitat availability. Additionally, historical data for the area from the Ontario Breeding Bird Atlas (OBBA), Ontario Partners in Flight (PIF), the SARO and NHIC databases, Bird Studies Canada and the Audobon Christmas Bird Count (CBC) databases is presented in the bird inventory. A search of the NHIC database confirmed historical records of rare, threatened or extirpated wildlife species within an approximately one kilometre radius of the subject lands. The NHIC database information is presented in Appendix B. The bird survey confirmed the presence of Barn Swallow, a high priority candidate due for assessment in April of 2011. Eastern Wood-Peewee is also identified as high priority candidates, while the Belted Kingfisher is classified as mid-priority. All wildlife data and historical information are presented in Appendix B for reference purposes.

Several avifaunal species identified within the study area are candidates for assessment by COSEWIC. This designation indicates that they are species of concern but require further evaluation. Of the candidate species, Eastern Wood-Pewee (*Contopus virens)* is a High Priority Candidates. Eastern Wood-Pewee belongs to the aerial insectivore group of birds which have undergone dramatic declines in population numbers over the last twenty years. The reason for the decline is not clear. Several aerial insectivore species were observed in the study area due to the presence of habitat that supports diverse food sources. Other woodland area-sensitive birds observed included the Veery (*Catharus fuscescens*). Species of interest utilizing the wetland area included the Barn Swallow (*Hirundo rustica*) which is a COSEWIC High Priority Candidate under review. Area-sensitive species either require a large area of suitable habitat for breeding or breed in higher densities in such areas. These species generally will not breed in what appears to be suitable habitat if it is not part of a much larger tract, irrespective of the size of their home ranges which can be quite small. The significance of area-sensitive species is that they act as indicators of the overall health of the landscape, and quality of the habitat (Environment Canada, 2007). One of the observed bird species, the Eastern Wood Peewee, has been identified by Ontario Partners in Flight (OPIF) or Bird Studies Canada (BSC) as species of conservation concern. It is important to note however, that both the OPIF and BSC rankings, in and of

themselves, confer no protection under the PPS or other applicable regulations and policies. Rather, they are meant to be used as guides in identifying habitat and features that may be subject to the policies and regulations.

Partners in Flight (PIF), established in 1990 as a response to declining neotropical bird species, now includes all landbirds and PIF partnerships now extend throughout North and Central America. The PIF mission is to keep common birds common, to help species at risk, and to work in partnership for birds, habitat, and people. Assessment scores and prioritization methods are provided by the PIF Science Committee (Canada, USA, Mexico). In Canada PIF activities are coordinated by a National Working Group. In Ontario this conservation initiative began in 1995. A partnership of government and nongovernmental agencies produced a bird conservation plan for Ontario that was published in 1997 as the Ontario "Flight Plan". Priority species lists for southern Ontario were subsequently produced by Bird Studies Canada (Couturier, 1999). The current plan, OPIF, builds on these earlier efforts with data provided by the Canadian Wildlife Service, the Breeding Bird Survey, the Ontario Breeding Bird Atlas, Christmas Bird Counts, and others. The plan is positioned within the North American Bird Conservation Initiative (NABCI) Bird Conservation Region (BCR) planning framework where southern Ontario is identified as BCR 13. OPIF identifies 42 species that regularly breed and/or winter in ON BCR13. For each species the OPIF plan identifies a category (forest, grassland/agricultural, shrub/successional, and/or aerial insectivore), lays out reasons for concern, sets overall conservation objectives, and recommends action. The intent is to both facilitate and evaluate implementation of landbird conservation efforts in ON BCR 13.

The purpose of the Bird Studies Canada rankings is to assist municipalities in identifying natural heritage features, in particular significant wildlife habitat and significant woodlands, by using bird species that have been deemed of conservation concern. A species level of conservation concern was arrived at by a screening process through three main criteria: its range distribution and importance of a particular region to the overall range; the biological characteristics that make it vulnerable; and its habitat area requirements. Species are separated into three broad categories: forest, marsh, and open country, and within each category are four levels of conservation priority with Level 1 being the highest level of concern. All species within each category are considered to be of equal conservation importance. These conservation priorities were incorporated into OPIF.

2.5 Designated Natural Areas

2.5.1 Greenbelt and Niagara Escarpment Plans

According Schedule 4: Natural Heritage System of the Greenbelt Plan (2005), the study area is located within the Niagara Escarpment Plan Area. All existing, expanded or new infrastructure approved under the Environmental Assessment Act is permitted within the Protected Countryside provided it meets on of two objectives contained within Policy 4.2.1.1 of the Pal. According to the Niagara Escarpment Plan (2008), Map 3 Regional Municipality of Halton, a

portion is designated as Escarpment Rural Area and Area of Development Control. Transportation facilities are permitted in the Escarpment Rural Area according to the policies contained within the Niagara Escarpment Plan.

2.5.2 Greenlands

The Halton Regional Official Plan (Office Consolidation, 2006) identifies the Escarpment Rural Area in the study area and identifies the portion of the study area within the Protected Countryside of the Greenbelt Plan Area as Agricultural Rural Area. Additionally, the Official Plan identifies Greenlands A and Greenlands B in the study area. The Greenlands A areas appear to correspond with the main channel and portions of the tributary of Kilbride Creek while the Greenlands B area corresponds with a wetland polygon identified in the Official Plan on the south side of Derry Road. The goal of the Greenlands System is to maintain as a permanent landform of an interconnected system of natural areas and open space that will preserve areas of significant ecological value while providing, where appropriate, some opportunities for recreation. According to Table A1 in the Appendix to the Plan, transportation and utilities are permitted in Agricultural Rural Area and Greenlands B while essential transportation and utilities are permitted in Greenlands A.

2.5.3 Environmentally Sensitive Areas (ESAs) and ANSIs

The Region of Halton designates Environmentally Sensitive Areas based on criteria contained in the Regional Official Plan (Office Consolidation, 2006). There are no designated Environmentally Sensitive Areas (ESAs) in the study area, however, this area was recommended for a possible extension to the Lowville-Bronte Creek Escarpment Valley Environmentally Sensitive Area in the 2006 Halton Natural Areas Inventory. There are no ANSI's located in or adjacent to the study area (50 m).

2.5.4 Valleylands

There are no significant valleylands associated with the watercourses within the study area. However, topographical relief associated with the main channel of Kilbride Creek near McNiven Road appears to define a relatively small floodplain area on the north side of the watercourse. The valleylands associated with Kilbride Creek are located beyond the study area limits.

2.5.5 Wetlands

Figure A1 from the Appendix to the Regional Official Plan (Office Consolidation, 2006) identifies a wetland polygon in the study area on the south side of Derry Road labeled 'Other Wetlands'. Mapping in the BCWS identifies a similar polygon designated as Locally Significant Wetland. However, recent correspondence dated January 4, 2010 from Conservation Halton (Appendix A) indicated that the study area contains portions of the Kilbride Swamp Provincially

Significant Wetland (PSW) Complex. Correspondence from MNR (dated June 7, 2010) confirmed the wetland designation.

2.5.6 Significant Wildlife Habitat

Four general types of significant wildlife habitat may be designated according to the PPS: migration corridors, seasonal concentration areas, rare or specialized habitat, and habitat for species of conservation concern. The OMNR description of the four categories is presented in Table 3 below.

Table 3: OMNR Descriptions of Significant Wildlife Habitat

Category	Description
Habitats of Seasonal Concentrations of Animals	• areas where animals occur in relatively high densities for that species at specific periods in their life cycles and/or in particular seasons • seasonal concentration areas tend to be localized and relatively small in relation to the area of habitat used at other times of the year
Rare Vegetation Communities or Specialized Habitat for Wildlife	Rare Vegetation Communities include: • areas that contain a provincially rare vegetation community • areas that contain a vegetation community that is rare within the planning area Specialized Wildlife Habitats include: • areas that support wildlife species that have highly specific habitat requirements • areas with exceptionally high species diversity or community diversity • areas that provide habitat that greatly enhance species' survival
Habitat of Species of Conservation Concern	• includes the habitat of species that are rare, substantially declining, or have a high percentage of their global population in Ontario • includes special concern species identified under the Endangered Species Act, 2007 which were formally referred to as vulnerable in the Significant Wildlife Habitat Technical Guide • excludes habitats of endangered and threatened species covered under PPS policy 2.1.3 a)
Animal Movement Corridors	• habitats that link two or more wildlife habitats that are critical to the maintenance of a population of a particular species or group of species • habitats with a key ecological function to enable wildlife to move between areas of significant wildlife habitat or core natural areas with a minimum of mortality

Source: Natural Heritage Reference Manual 2nd Edition (OMNR, 2009)

Based on the OMNR defined criteria, the wetland areas, localized vernal pools and the surrounding woodland areas provide for seasonal concentration areas, habitat of species of conservation concern and animal movement corridors. However, as these features are outside of the proposed work area, the relatively impacts are deemed negligible as none of the identified features or functions will be altered.

2.5.7 Significant Woodlands

The OMNR Natural Heritage Reference Manual (2010) details the criteria which define the relative significance of woodland features according to the Natural Heritage Policies of the Provincial Policy Statement (2005). The benefits include soil erosion protection, nutrient cycling, hydrological cycling, flood and erosion reduction, clean air and carbon storage, wildlife habitat, outdoor recreational opportunities and sustainable harvest of woodland products. According to the Manual, those woodlands that meet the size criteria or the criteria for ecological function or uncommon characteristics or provide for economic and social function are to be considered significant. The woodlands within the study area meet numerous of the criteria defined by the OMNR Natural Heritage Reference Manual (2010). As such, the woodlands within the study area should be considered Significant provincially.

Figure A2 from the Appendix to the Regional Official Plan (Office Consolidation, 2006) displays Derry Road west of McNiven Road as traversing a woodland greater than 0.5 ha in size. Recent correspondence from Conservation Halton (Appendix A), indicates these woodlands have been designated as Significant Woodlands by Halton Region. Notably, the Halton NAI (2006) recommended that the woodlands be considered an extension to the Lowville-Bronte Creek Escarpment Valley ESA located south of the study area.

3.0 PROPOSED ROAD IMPROVEMENTS

Derry Road (Regional Road 7) is classified as a “Major Arterial Roadway” in the Region of Halton Official Plan (Amendment 23, 2003, Map 3), providing a northwest/southeast traffic route crossing through the Town of Milton and City of Burlington. The portion of Derry Road within the defined study area extends southwest from McNiven Road to Milborough Line, and is currently a two-lane roadway with a rural cross-section and gravel and/or paved shoulders on both sides. Two tributaries of Kilbride Creek cross Derry Road in the north central portion of the study area. The predominant land uses consist of open space wooded lands, agricultural, and rural single family residences.

Derry Road has a number of existing structural and capacity deficiencies which can be improved to increase overall safety, capacity, and roadside drainage. The recommended planning solution includes a combination of roadway shoulder widening and supporting measures to widen Derry Road, provide local intersection improvements for safety and traffic operation, and implement storm water collection capabilities. Several design alternatives were considered based on a series of investigations as required by the EA process. Given the close proximity of the watercourse

and wetland near McNiven Road, the study area was reviewed in sections that incorporated the existing features and land uses. The road widening alternatives were then evaluated against the Evaluation Criteria for Derry Road and the Preferred Design Alternative was established as detailed below. It is anticipated that the Preferred Design Alternative will have the least impact on the adjacent properties and the surrounding natural areas. A summary of the proposed road changes for each alternative is presented in Table 4 below.

TABLE 4: Derry Road Improvement Alternatives

Proposed Alternative	Alternative Details
Alternative 1 (Preferred)	Maintain the current horizontal roadway alignment with a rural road cross-section including 3.65 metre lanes, 2.5 metre partially paved shoulders (1.0 metre paved: 1.5 metres granular) West of McNiven Road and adjacent to the Kilbride Creek tributary, provide a wider urban roadway cross-section including 3.65 metre lanes, 1.0 metre paved shoulders with curb and gutter, guiderail protection, and retaining walls
Alternative 2	Centre the roadway alignment within the existing right-of-way limits and provide 250 metre radii curves at the S-bend while maintaining a rural road cross-section with 3.65 metre lanes, 2.5 metre partially paved shoulders (1.0 metre paved; 1.5 metre granular) West of McNiven Road and adjacent to the Kilbride Creek tributary, provide a wider rural roadway cross-section including 3.65 metre lanes, 1.0 metre partially paved shoulders, guiderail protection, and granular shoulder side slopes matching into the existing creek location
Proposed Alternative	**Alternative Details**
Alternative 3	Centre the roadway alignment within the existing right-of-way limits and provide a tangent section to separate the S-bend while maintaining a rural road cross-section with 3.65 metre lanes, 2.5 metre partially paved shoulders (1.0 metre paved; 1.5 metre granular) West of McNiven Road and adjacent to the Kilbride Creek tributary, provide a wider urban roadway cross-section including 3.65 metre lanes, 1.0 metre paved shoulders with curb and gutter, guiderail protection, and retaining walls

4.0 IMPACT ASSESSMENT AND RECOMMENDED MITIGATION

It is anticipated that the proposed road improvements for Derry Road will be accommodated within the existing right-of-way wherever possible in order to minimize changes to the current road footprint and potentially reduce impacts on the adjacent lands and natural heritage features and functions. The preferred design alternative incorporates potential geometric restrictions based on the location of the existing residences, wetlands, natural areas, and watercourses.

There are a number of culvert replacements proposed to accommodate the road improvements that will assist with improved roadside drainage. These include the replacement of two smaller culverts located within the southern portion of the study area, neither of which is associated with fish habitat. In the northern portion of the study area, the existing 600 mm CSP culvert that conveys the water from the western side of Derry Road to the eastern side upstream of wetland area is proposed to be increased to an 800 mm CSP culvert. As well, the existing 800 mm concrete and two-200 mm CSP pipes that convey the waters from the wetland area into the main tributary of Kilbride Creek will be replaced with a 1000 mm concrete structure. Both of these proposed culvert improvements involve recognized fish habitat, such that a permit from Halton Conservation will be required to proceed with an in-water works and Authorization from Fisheries and Oceans Canada may also be required.

4.1 Fisheries and Aquatic Ecosystems

The secondary tributary of Kilbride Creek provides direct fish habitat as evidence by the fish observed within the wetland pond. However, the current weir structure on the south side of Derry Road may limit fish movement into the main tributary of Kilbride Creek. The main tributary of Kilbride Creek located adjacent to Derry Road also provides direct coolwater fish habitat as indicated in the BCWS (2002). Conservation Halton has confirmed that the main tributaries are designated as cool and coldwater fisheries. The conclusions of the field evaluations completed for this report and the information provided in the BCWS (2002) also suggest that these tributaries currently support and/or contribute to coldwater fishery, and that watercourse conditions are non-impaired/minimally impaired.

Based on the proposed design alternatives and current orientation of the watercourses, there does not appear to be any requirement to alter the existing channel orientation. However, improving the stability of the channel banks along Derry Road was identified as a priority in the Bronte Creek Hydrology and Stream Morphology Study (PEIL, 2003). The preferred design alternative (Alternative 1), proposes a retaining wall, guiderail protection and curb and gutter along both the northern and southern sides of Derry Road adjacent to the wetland feature and main tributary of Kilbride Creek. While the proposed retaining wall will maintain the current orientation of the channel, the works will require in-water construction which will be regulated under a CH permit and DFO Authorization and will be subject to timing restrictions for completion of the construction.

As previously discussed, the wetland located along the southern side of Derry Road is currently maintained with a weir structure at the inlet to the existing culvert. While water could be heard moving through the culvert, the weir is functioning to maintain the water levels within the pond/wetland feature and release water into the channel at a reduced and/or controlled rate. Both the wetland and the channel have adapted to these flows. As such, in order to maintain the wetland hydrology and rate of flow into the main tributary of Kilbride Creek, a similar flow control may be required at the inlet of the proposed culvert. It is assumed that such a structure will be included in the detailed design phase once the preferred alternative has been determined.

Alternatives 2 and 3 propose an earthen slope from the road to the meeting the existing channel toe of slope. While the earthen slope would allow for vegetation planting along the slope, it is likely that in order to achieve a stable slope grade, the earthen slope would likely extend into the existing channel and wetland feature, resulting in a loss of area in the wetland and may affect the channel cross-section and hydraulic behavior.

TABLE 5: Summary of Alternative 1 Work Proposed and Potential Impacts

Natural Heritage Feature	Existing Culvert/Structure or Conditions	Habitat Type	Proposed Work Required	Potential Impact and/or Changes
Wetland adjacent to Derry Road	-Wetland buffer limited to road should and 2:1 gravelly vegetated slope to water's edge (approximately 1.5 m from road edge); - Direct road runoff input in to wetland	Fish, amphibian, mammalian and avifaunal	- Retaining wall constructed at pond (east) and wetland (west) edge with a guiderail protection and curb and gutter - Urban cross-section	- Marginal loss of existing wetland edge vegetation and habitat - Increased sedimentation during construction -Temporary noise disturbance through construction period - Loss of direct road drainage input - Potential change in wetland hydrology based on control structure
Natural Heritage Feature	**Existing Culvert/Structure or Conditions**	**Habitat Type**	**Proposed Work Required**	**Potential Impact and/or Changes**
Main Tributary of Kilbride Creek	- Stable channel bed with gravel/cobble substrate - Steep slope adjacent to Derry Road - Multiple culverts from wetland area	Direct fish, amphibian, and benthic invertebrate	- Replace culvert with 1000 mm concrete culvert - Retaining wall constructed at pond (east) and wetland (west) edge with a guiderail protection and curb and gutter - Urban cross-section	- Potential change to the channel morphology - Increased sedimentation during construction - Potential increased flow capacity in culvert post-construction
Woodlands and Roadside Trees	- Woodlands within northern portion of study area adjacent to wetland and watercourse - Mature canopy and diverse habitat for wildlife	Avifaunal, mammals, amphibians	- Minor tree removal of street trees along the southeastern edge of the Derry Road (southern portion of study area), outside of the natural wooded areas	- No change in woodland function or wildlife habitat in proximity to the wetlands or watercourses - Temporary disturbance during construction - no additional fragmentation of habitat

A summary of the potential impacts to the watercourse, wetland and adjacent woodland habitat is presented in **Table 5** above. The proposed changes are primarily focused on the Preferred Alternative (Alternative 1) as the culvert replacement, curb and gutter requirements and minor tree clearing is consistent among the proposed alternatives. The preferred alternative was selected in order to minimize the proposed road footprint beyond the existing road. As there are no anticipated loss to habitat as a result of the road improvements, the impacts to local wildlife, specifically breeding birds, are deemed negligible. Timing windows around breeding season should be considered as per the requirements of the Migratory Bird Act.

Installation of a retaining wall adjacent to the watercourse and wetland features at the northern end of study area in combination with the urban cross-section will reduce the existing vegetation coverage. However, improved channel bank stability and reduced direct runoff will also result from the proposed alternative. Once the retaining wall is installed, aquatic plantings at the base of the wall is recommended to increase the in-water shade and habitat for aquatic organisms. As well, the substrate within the channel should not be altered. The proposed curb and gutter will minimize erosion and runoff directly into the wetland and watercourse, redirecting the runoff into the channel downstream. Potential impacts and habitat loss in the wetland and watercourse associated with the retaining wall can be addressed through additional plantings and habitat edge creation along the base of the wall.

Harmful alteration to fish habitat can be reduced through appropriate construction practices and through use of bioengineering strategies for bank stabilization. The following mitigation measures will further assist in reducing a potential HADD to fish habitat:

- ✓ All work areas should be delineated with construction fencing to restrict the equipment and construction from potentially sensitive areas;
- ✓ All in-water construction activities should be implemented in the permitted time period to ensure that spawning fish and spawning habitat, eggs and fry are protected through the critical period. No work should occur in the water between September 15 to June 30 in any calendar year or as determined by the review agencies;
- ✓ Heavy equipment should be limited to stable areas and away from potentially soft banks;
- ✓ All culvert extensions should be countersunk to the depth of the existing culvert and backfilled with native material;
- ✓ All work should be completed under low flow and dry conditions and work areas should be isolated from flows during the construction phase;
- ✓ Fish should be removed from any area that may be isolated the during construction phase and released in the watercourse beyond the work area;
- ✓ Best management practices related to materials storage, machinery operation and the movement of earth should be implemented during construction

Although, the mitigation strategies detailed above will assist in reducing the potential harm to fish habitat, replacement of the culvert will not likely result in a loss to fish habitat. As such, compensation should not be required.

4.2 Stormwater Management and Erosion and Sedimentation Control

Currently, the stormwater from Derry Road enters the unnamed watercourse and wetland via direct runoff where there is no roadside ditch. The proposed road improvements will increase the amount of impermeable surface throughout the study reach. The preferred alternative design incorporates the installation of a curb and gutter collection system adjacent to the natural features. In order to control the runoff and maintain water quality, it would be beneficial for the road runoff to pass through a vegetated area prior to reaching the wetland and watercourse. A combination of engineered works and natural drainage attenuation on the downstream outlet portion of the watercourse may be effective in treating the excess storm water.

Increased erosion due to the exposure of soil is common through the construction phase, resulting in increased suspended sediments, which can have detrimental effects on the watercourse and wetland if conveyed by surface water runoff. Suspended and deposited sediment can have negative impacts on amphibian breeding pools, fish, fish habitat, and spawning areas. As well, increased sediments loads can result in changes in the channel equilibrium that may translate into downstream problems. For these reasons it is important that erosion and sediment control practices are clearly established and practiced throughout the construction phases to minimize the construction-related impacts on aquatic habitats and water quality.

Temporary erosion and sedimentation control measures may include, but are not limited to the following:

- ✓ Soils exposure time should be kept to a minimum;
- ✓ Silt fencing should be installed along the stream margins in areas of soil disturbance to minimize disturbance of these areas and restricted the dumping of waste/fill materials in a potential erosion zone;
- ✓ Use of an erosion control blanket in areas of soil disturbance should be used to provide slope protection and stabilization; seeding, sodding, and mulching material can also be effective if applied appropriately;
- ✓ In sensitive areas associated with the riparian buffers, the placement of the vegetation mats of native materials is effective at reducing erosion while quickly establishing stability to the bank;

Long-term strategies that control the overland flows, such as vegetated swales, rock checks and rip-rap linings in ditches can also be effective at controlling excessive sediments from reaching the watercourses and will provide continued maintenance of the fish habitat and water quality for the watercourses within the study limits.

All temporary measures should remain in place until the natural vegetation is established on any exposed soils. As well, measures aimed at establishing bank vegetation and improved riparian function should be incorporated into the design specifics for any portions of the watercourses that may require realignment. Provided that the erosion and sedimentation control strategies are established before construction begins, maintained throughout the construction phase and removed once the system is stable, there should only be minor effects on the surface water quality.

4.3 Terrestrial Ecosystems and Wildlife Habitat

There are no significant changes in the ecological form and function of the wetland and watercourse anticipated as a result of the proposed road widening and improvements, and no rare, threatened or endangered plant species were identified directly within the proposed road improvements along Derry Road. Installation of the retaining wall at the wetland will incur minimal loss of habitat for local flora and fauna. A Species at Risk (SAR) permit may be required from OMNR given the confirmation of the Western Chorus frog in proximity to the study area. Consultation with OMNR is recommended through the detailed design phase to ensure that the design meets the permitting requirements, if needed.

Based on field assessments, trees within NAI 9A will not be impacted by the proposed road improvements. The Preferred Design Alternative suggests that some trees in the southern portion of the study area may require trimming to accommodate the road improvements. Roadside trees consist primarily of sugar maple, Green Ash, Red Oak and Basswood. Given that the mature roadside trees are relatively close together, tree removal should be completed in a manner such that residual trees are not impacted through the removal phase.

The Migratory Bird Convention Act is federal legislation that is intended to protect and conserve migratory birds — as populations and individual birds — and their nests. Under the legislation, the protection of migratory birds and their nesting sites is regulated and may impact the construction windows for this project, specifically avoid the spring months when most birds are nests. Should the construction require the removal of a tree, it should be verified prior to removal that the tree does not provide for migratory bird nesting habitat.

5.0 MONITORING

Monitoring would occur in response by request of applicable agencies and stakeholders association with the in-water works to ensure compliance with Fisheries Act authorization and permits from Halton Conservation. It is recommended that the all interested parties discussed the detailed design as they pertain to the potential alteration of fish habitat prior to initiating the construction phase of this project.

We trust that this report thoroughly addresses the existing natural heritage features and functions within the study area. Should you require any additional information, please contact our office.

Sincerely,

Lisa Campbell, M.Sc., C.C.E.P.

6.0 LITERATURE REVIEWED

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APPENDIX A

Project Correspondence

PROTECTING THE NATURAL ENVIRONMENT FROM LAKE TO ESCARPMENT

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BY MAIL AND EMAIL

January 4, 2010

Mr. Rick Hein
R and R Associates
600 Ontario Street
P.O. Box 28058
St. Catharines, ON
L2N 7P8

Dear Mr. Hein:

Re: Derry Road Transportation Corridor Improvements
Municipal Class Environmental Assessment
Halton Region
CH File: MPR 527

Staff of Conservation Halton has reviewed the following documents in relation to the above-noted EA:

- Notice of Commencement and Study Outline,
- Technical Agencies Committee Meeting No. 1 materials, dated November 10, 2009.

During our meeting on November 9, 2009, staff provided a brief overview of Conservation Halton's interests with respect to the above-referenced EA Study. Further, it was noted that additional information would be provided to assist in the study team's decision-making and study process. Outlined below is a brief overview of the items that Conservation Halton believes warrant consideration in the study process. (N.B. this is not an exhaustive list of items for consideration, but rather those items that staff is aware of at this time.)

General Comments:

Natural Heritage

1. Please note that the study area is within the Bronte Creek watershed. Within the study area, Derry Road is traversed by two branches of Kilbride Creek, a tributary Bronte Creek. Pursuant to Ontario Regulation 162/06, permits from Conservation Halton will be required for any works within the regulated areas associated with the watercourse. This should be specified in the EA and included in the list of future commitments.

2. Please note that Derry Road, west of McNiven Road, crosses through lands that have been designated Significant Woodlands by Halton Region. This area was also recommended as a possible extension to the Lowville-Bronte Creek Escarpment Valley Environmentally Sensitive Area in the 2006 Halton Natural Areas Inventory. Given the proposed status of these lands, field surveys should be undertaken to determine the presence of threatened species or endangered species.

3. The study area contains portions of the Kilbride Swamp Complex, a provincially-significant wetland. Conservation Halton regulates these lands pursuant to Ontario Regulation 162/06. Staff recommends that a detailed vegetation inventory be undertaken within 50 metres of any proposed works in the study area. The EA should recommend protection/mitigation measures for any vegetation impacts.

4. Staff suggests that the study area encompass a minimum of 120 metres around the potential works area to reflect direction regarding adjacent lands in the updated draft Natural Heritage Reference Manual.

5. All field work should be conducted at the appropriate time of year. Staff recommends that you consult Conservation Halton's Environmental Impact Study Guidelines. The guidelines are available on CH's website at http://www.conservationhalton.ca/ShowCategory.cfm?subCatID=1168.

6. The Environmental Study Report should include a table in the methodology section showing staff, date, time, weather conditions and purpose of all fieldwork. All ELC data sheets should be included as an appendix in the document.

7. The impacts of any utility relocation on natural heritage features and/or functions should be considered when evaluating alternatives.

Fish Habitat

8. Kilbride Creek is known to support a diverse cool and cold water fish community, including Brook Trout, a native salmonid species which is sensitive to thermal impacts and turbidity. As such, in-water works are discouraged. It is requested that proposed works be planned to take place outside of the bankfull channel of the watercourse if at all possible.

9. Because of the sensitive nature of the fish community in the adjacent creeks, tree removal is discouraged wherever possible. Tree cover is important in this area as it keeps the water in the creeks cooler in the hot summer months.

10. Conservation Halton has a Level II Agreement with Fisheries and Oceans Canada (DFO) to administer the review of projects under section 35(1) of the *Fisheries Act*. Section 35 (1) of the Act states that no person shall carry on any work or undertaking that results in the harmful alteration, disruption or destruction of fish habitat (HADD).

Under this agreement Conservation Halton will assess the alternatives within our watershed, regardless of other permitting requirements.

11. The Ontario Ministry of Natural Resources (OMNR) may have outstanding concerns with respect to Redside Dace (*Clinostomus elongatus*), Atlantic Salmon (*Salmo salar*) and American Eel (*Acipencer fulvescens)* populations in Kilbride Creek. The OMNR has recently upgraded the status of this species provincially from Threatened to Endangered under the Endangered Species Act (ESA). Pursuant to the ESA, the OMNR has recently made changes to the way that projects potentially impacting Redside Dace populations or habitat are being reviewed and thus, the OMNR may need to screen this project. Once more information is available on the location and nature of the proposed works, staff of Conservation Halton may need to initiate the ESA screening process. We encourage the proponent to direct inquiries regarding the ESA screening process to Melinda Thompson-Black, Species at Risk Biologist (melinda.thompson-black@ontario.ca).

12. Fish Habitat mapping as per MTO Protocol "Environmental Guide for Fish and Fish Habitat, 2006" is requested. This mapping should be undertaken for a distance of 40 meters upstream and downstream of the subject water crossings.

13. If culvert replacements are proposed, the use of open bottom crossing structures is requested on any tributaries of Bronte Creek, including Kilbride Creek, to maintain or enhance groundwater seepage into subject watercourses. It is also requested that any replacement culverts pass a 25 year flow event to ensure optimal fish passage and optimal conveyance of sediment.

14. If culvert extensions are proposed, it is requested that they span at a minimum the bankfull channel width of the creek, however a wider extension would be preferable. It is also requested that any lengthening of culverts be kept to a minimum to minimize cumulative effects of transportation crossings on the subject watercourses. Any extensions should entail an open bottom design to avoid any interruptions of groundwater seepage into the subject watercourses.

15. Please confirm that no new water crossings or creek realignments are to be examined as a component of the EA Study.

Natural Hazards

16. There are two regulated watercourse crossings of Derry Road within the study area. Conservation Halton regulates, pursuant to Ontario Regulation 162/06, all hazardous lands (i.e., Regional Storm flood plain, meander belt, wetlands), as well as the lands that are adjacent to these hazard lands. Development within Conservation Halton's regulated area requires permission pursuant to Ontario Regulation 162/06 and must meet the policies within Conservation Halton's *Policies, Procedures and Guidelines for the Administration of Ontario Regulation 162/06 and Land Use Planning Policy*

Document, April 27, 2006. A copy of this document can be found on the CH website at http://www.hrca.on.ca/uploads//Final_Policy_Document_162-06.pdf

11. Per Procter and Redfern's 1986 "Flood Risk Mapping Report" a portion of Derry Road (extending approximately 160 m west of McNiven Road to McNiven Road) will be flooded under the regional storm event. Any proposed works must not negatively impact this flooding hazard by increasing flood elevations on or off site. Existing access and egress must be maintained, and opportunities to improve access and egress should be investigated, particularly if this portion of Derry Road is to be considered an Emergency Access Route.

17. A portion of Derry Road is also subject to risk associated with the meander belt width of Bronte Creek. Bronte Creek runs parallel to the road for a distance of approximately 100 m west of McNiven Road, and appears to have been straightened and re-aligned.

18. Given that modification to Derry Road will impact Bronte Creek's floodplain and meander belt, a permit will be required for both creek crossings as well as any road works within the regulated limit.

19. Mapping of Conservation Halton's Approximate Regulation Limit is included with this letter. Please note that all areas regulated by Conservation Halton need to be plotted on drawings. Digital information requests can be made to Conservation Halton with the Data Request Form available on the CH website at http://www.conservationhalton.ca/ShowCategory.cfm?subCatID=1321.

Stormwater Management/Drainage

20. Although PEIL's April 2003 "Bronte Creek Hydrology and Stream Morphology Study" stated that stormwater and land development control measures and a full fluvial geomorphological and hydrogeological study would be required prior to any future development, the report did not provide specific recommendations for Kilbride Creek. Given the limited scale of the proposed re-development, completion of such a study is not warranted, therefore we recommend that the specific stormwater management targets that were included in the study for Indian Creek be adapted to the site, as is feasible. These include controlling post development flows to pre-development levels for all storms up to and including the 1:100 year design storm, a 48 hour draw down time for the quality storm event, and provision of Enhanced Level quality control. The use of a treatment train approach including conveyance controls that promote filtration and infiltration is also recommended.

21. Drainage Patterns: both existing and proposed catchment areas will need to be identified.

22. Stormwater Quantity: post to pre quantity control will be required for all design storms.

23. Stormwater Quality Control: Enhanced Level quality control for all catchments draining to Bronte Creek or its tributaries will be required.

24. Stormwater Management should be considered as it pertains to fish habitat, including treatment level and potential direct impacts from construction.

25. The Ministry of Transportation's B-100 Directive should be referenced.

Other Information

26. The *Bronte Creek Watershed Study* (Conservation Halton, 2002) is a good source for background information. A hardcopy of this document is available and staff would be happy to provide you with a copy, should you require it. Please advise accordingly.

Staff of Conservation Halton looks forward to working with the study team through the Class EA process and welcome the opportunity to participate on the Technical Advisory Committee. We trust the above is of assistance. If you require additional information please contact the undersigned at extension 225.

Yours truly,

Kim Peters
Environmental Planner

cc: Alicia Jakatis, Halton Region, by email
David Lukezic, Halton Region, by email
Melinda Thompson-Black, MNR, by email

Encl.

20080128

PROTECTING THE NATURAL ENVIRONMENT
FROM LAKE TO ESCARPMENT

2596 Britannia Road West
R.R. # 2 Milton, Ontario L9T 2X6

Phone: (905) 336-1158
Fax: (905) 336-7014

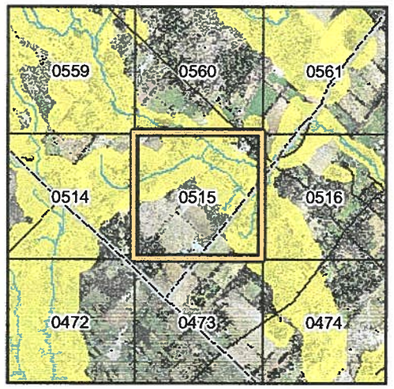
Internet Address:
www.conservationhalton.on.ca

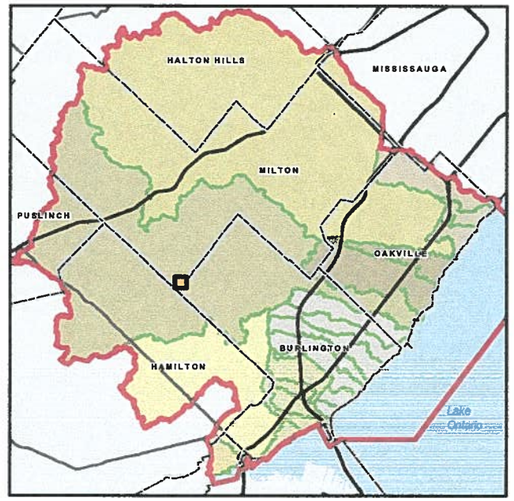
Email Address:
admin@hrca.on.ca

(ONTARIO REGULATION 97/04)
REGULATION FOR DEVELOPMENT, INTERFERENCE WITH WETLANDS AND ALTERATIONS TO SHORELINES AND WATERCOURSES

(ONTARIO REGULATION 162/06) APPROXIMATE REGULATION LIMIT

Map Sheet - 0515





LEGEND

- Approximate Regulation Limit / Screening Area
- Regulated Watercourse
- Hydrologic Connection
- HRCA Jurisdiction Limit
- Teranet Property Boundary

N

0 50 100 150 200
Metres

Map Scale: 1:4000

Note on Stream Type Definitions:
'Regulated Watercourses' identify surface and subsurface water features that are regulated by Conservation Halton under Ont. Reg. 162/06. 'Hydrologic Connections' identify creek features that may/may not be considered fish habitat (direct or indirect) as defined by the Fisheries Act. Conservation Halton does not regulate these connections under Ont. Reg. 162/06.

Revision History:
Last Update: January 28th, 2008 - A.R.L.
Print Date: January 29th, 2008

Previous Updates:
- Approximate Regulation Limit - June 7th, 2007
- Approximate Regulation Limit - July 25th, 2006
- Approximate Regulation Limit - April 24th, 2006

0515

20080128

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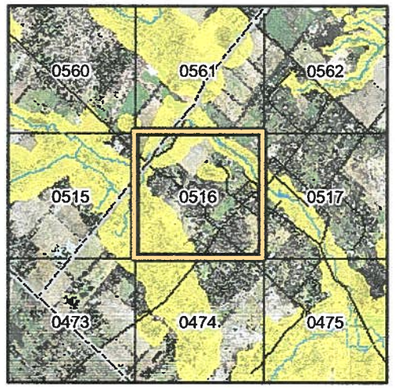
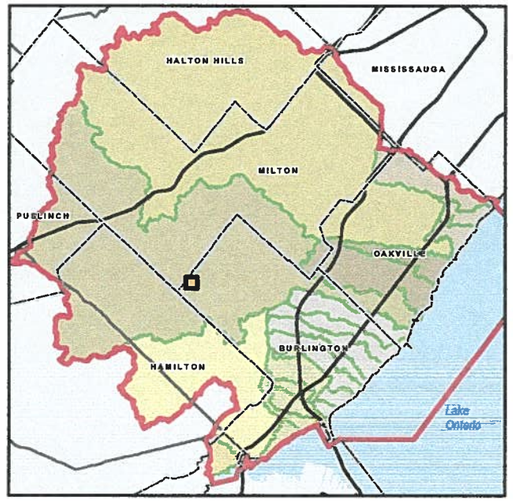
(ONTARIO REGULATION 97/04)
REGULATION FOR DEVELOPMENT, INTERFERENCE WITH WETLANDS AND ALTERATIONS TO SHORELINES AND WATERCOURSES

(ONTARIO REGULATION 162/06) APPROXIMATE REGULATION LIMIT

Map Sheet - **0516**





LEGEND

- Approximate Regulation Limit / Screening Area
- Regulated Watercourse
- Hydrologic Connection
- HRCA Jurisdiction Limit
- Teranet Property Boundary

N

0 50 100 150 200
Metres

Map Scale: 1:4000

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The text of the Regulation takes precedence over the Approximate Regulation Limit. Some regulated features may not appear on the Approximate Regulation Limit mapping. This mapping should be used for information purposes only. The data displayed are derived from sources with different accuracies and all boundaries should therefore be considered approximate. Data on this map is used under license and is protected by copyright for different organizations, including but not limited to Teranet Enterprises Inc. and other agencies.

Revision History:
Last Update: January 28th, 2008 - A.R.L.
Print Date: January 29th, 2008

Previous Updates:
- Approximate Regulation Limit - June 7th, 2007
- Approximate Regulation Limit - July 25th, 2006
- Approximate Regulation Limit - April 24th, 2006

0516

20080128

CONSERVATION HALTON

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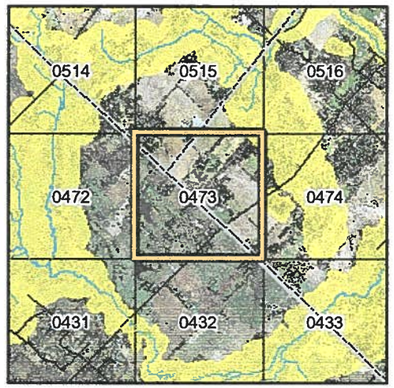
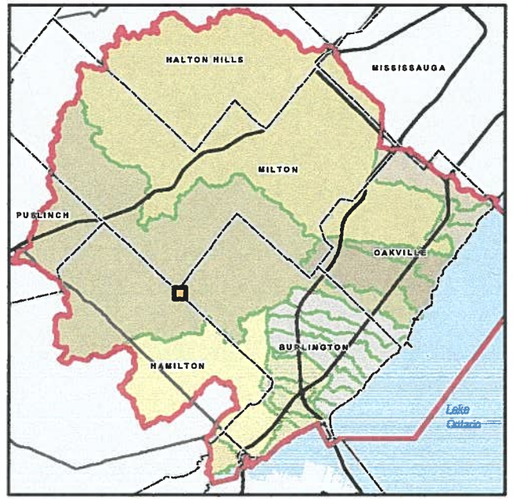
REGULATION FOR DEVELOPMENT, INTERFERENCE WITH WETLANDS AND ALTERATIONS TO SHORELINES AND WATERCOURSES

(ONTARIO REGULATION 162/06) APPROXIMATE REGULATION LIMIT

Map Sheet - **0473**





LEGEND

- Approximate Regulation Limit / Screening Area
- Regulated Watercourse
- Hydrologic Connection
- HRCA Jurisdiction Limit
- Teranet Property Boundary

N

0 50 100 150 200
Metres

Map Scale: 1:4000

Note on Stream Type Definitions:
'Regulated Watercourses' identify surface and subsurface water features that are regulated by Conservation Halton under Ont. Reg. 162/06. 'Hydrologic Connections' identify creek features that may/may not be considered fish habitat (direct or indirect) as defined by the Fisheries Act. Conservation Halton does not regulate these connections under Ont. Reg. 162/06.

The text of the Regulation takes precedence over the Approximate Regulation Limit. Some regulated features may not appear on the Approximate Regulation Limit mapping. This mapping should be used for information purposes only. The data displayed are derived from sources with different accuracies and all boundaries should therefore be considered approximate. Data on this map is used under license and is protected by copyright for different organizations, including but not limited to Teranet Enterprises Inc. and other agencies.

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Last Update: January 28th, 2008 - A.R.L.
Print Date: January 29th, 2008

Previous Updates:
- Approximate Regulation Limit - June 7th, 2007
- Approximate Regulation Limit - July 25th, 2006
- Approximate Regulation Limit - April 24th, 2006

0473

March 6, 2010 Our File: RR-09-019

2596 Britannia Road West
RR2, Milton, Ontario L9T 2X6

Attention: **Kim Peters, MES (Planning)**
Environmental Planner

Re: **Derry Road Transportation Corridor Improvements**
Municipal Class Environmental Assessment (Class EA)
Halton Region, CH File: MPR 527
Comments to CH January 4, 2010 Letter

Dear Ms. Peters:

Thank you for your recent letter and input related to the Derry Road Transportation Corridor Improvements Class EA study. We have reviewed Conservation Halton's (CH) letter dated January 4, 2010, Points 1 through 26 as they relate to the above noted Class EA study. Our response/ comments addressing each of the Conservation Halton points are provided in the attached table for your review.

As a follow up to this response letter, we would like to schedule a meeting with CH for the first week of April 2010 to discuss any further issues related to the above noted study. We will contact you separately to set an agreeable meeting date and time.

We look forward to moving ahead with the Class EA process and continue to encourage Conservation Halton staff's input throughout the EA process. In the meantime, if you have any questions or comments related to the aforementioned information provided, we would be pleased to hear from you either by phone at 289-241-2624 or via e-mail at RHein@RandR-Associates.com. As always, please feel free to contact either Mr. David Lukezic or myself at your convenience.

Sincerely,

R and R Associates Inc.

Rick Hein, P. Eng., PTOE, AVS
Principal

cc: David Lukezic, Halton Region
Jeff Reid, Halton Region

600 Ontario Street, PO Box 28058, St. Catharines, Ontario L2N 7P8 | Phone: 905-937-1708 | Fax: 905-937-4384 | E-mail: info@RandR-Associates.com

No.	Conservation Halton Comments	Response/Comment
Natural Heritage		
1.	Please note that the study area is within the Bronte Creek watershed. Within the study area, Derry Road is traversed by two branches of Kilbride Creek, a tributary Bronte Creek. Pursuant to Ontario Regulation 162/06, permits from Conservation Halton will be required for any works within the regulated areas associated with the watercourse. This should be specified in the EA and included in the list of future commitments	As part of the Environmental Study Report (ESR) documentation, a description of the applicable permits required (to be obtained as part of implementation) for any works within the regulated areas associated with the noted watercourse crossings including a list of mitigation/protection measures associated with such works will be provided
2.	Please note that Derry Road, west of McNiven Road, crosses through lands that have been designated Significant Woodlands by Halton Region. This area was also recommended as a possible extension to the Lowville-Bronte Creek Escarpment Valley Environmentally Sensitive Area in the 2006 Halton Natural Areas Inventory. Given the proposed status of these lands, field surveys should be undertaken to determine the presence of threatened species or endangered species	While Conservation Halton has indicated that the "field surveys should be undertaken to determine the presence of threatened species or endangered species", the lands in question that are adjacent to Derry Road were identified via the ELC (ELC – *Ecological Land Classification system which is the standard method for defining vegetation communities in southern Ontario*) and addressed through the Natural Areas Inventory. We have verified the ELC classification for the lands along Derry Road. Lands that were not classified in the NAI (NAI – *Natural Areas Inventory which was completed by Halton Conservation as part of their Natural heritage and Cultural studies for the general area*) are south of Derry Road in excess of 150+ metres. Additional inventory work outside of the 30 to 50 metre zone that would be affected by construction is not required to evaluate the impacts related to the proposed road works
3.	The study area contains portions of the Kilbride Swamp Complex, a provincially-significant wetland. Conservation Halton regulates these lands pursuant to Ontario Regulation 162/06. Staff recommends that a detailed vegetation inventory be undertaken within 50 metres of any proposed works in the study area. The EA should recommend protection/mitigation measures for any vegetation impacts	We would suggest that the limits of the detailed vegetation inventory should be limited to the extent that would be directly impacted by any future road widening and realignment. Mitigating measures will be noted as part of the ESR
4.	Staff suggests that the study area encompass a minimum of 120 metres around the potential works area to reflect direction regarding adjacent lands in the updated draft Natural Heritage Reference Manual	Access beyond the road allowance for flora and fauna surveys is very difficult given the private land ownership along the road and it would be excessive in terms of measuring impacts related to alternatives. We would suggest that the limits be limited to the extent that would be directly impacted by any future road improvement
5.	All field work should be conducted at the appropriate time of year. Staff recommends that you consult Conservation Halton's	Noted for information purposes

No.	Conservation Halton Comments	Response/Comment
	Environmental Impact Study Guidelines. The guidelines are available on CH's website at: http://www.conservationhalton.ca/ShowCategory.cfm?subCatID=1168	
6.	The Environmental Study Report should include a table in the methodology section showing staff, date, time, weather conditions and purpose of all fieldwork. All ELC data sheets should be included as an appendix in the document	The Ecological Land Classification (ELC) for the lands along Derry Road was completed as part of the Natural Areas Inventory (NAI). We have completed fall inventories along the road allowances and have verified the existing ELC classifications assigned to adjacent lands. We will not be completing additional ELC classifications as this would be redundant and access to private lands in order to evaluate the polygons is limited. The impacts from the proposed road alternatives will be assessed in terms of how the widening will affect the existing vegetation communities
7.	The impacts of any utility relocation on natural heritage features and/or functions should be considered when evaluating alternatives	The evaluation of alternative design concepts will consider and weigh the impacts of any utility relocations as part of the Class EA process for this study
Fish Habitat		
8.	Kilbride Creek is known to support a diverse cool and cold water fish community, including Brook Trout, a native salmonid species which is sensitive to thermal impacts and turbidity. As such, in-water works are discouraged. It is requested that proposed works be planned to take place outside of the bankfull channel of the watercourse if at all possible	(CH Points 8 through 12) - The information has been noted and will be included as part of the ESR documentation, where applicable, including any required regulations and construction timing issues. We will contact MNR regarding the Redside Dace. In general, the majority of requirements have already been accounted for as part of the original natural sciences work program for the Derry Road Class EA study
9.	Because of the sensitive nature of the fish community in the adjacent creeks, tree removal is discouraged wherever possible. Tree cover is important in this area as it keeps the water in the creeks cooler in the hot summer months	
10.	Conservation Halton has a Level II Agreement with Fisheries and Oceans Canada (DFO) to administer the review of projects under section 35(1) of the Fisheries Act. Section 35 (1) of the Act states that no person shall carry on any work or undertaking that results in the harmful alteration, disruption or destruction of fish habitat (HADD). Under this agreement Conservation Halton will assess the alternatives within our watershed, regardless of other permitting requirements	
11.	The Ontario Ministry of Natural Resources (OMNR) may have outstanding concerns with respect to Redside Dace (Clinostomus	

No.	Conservation Halton Comments	Response/Comment
	elongatus), Atlantic Salmon (Salmo salar) and American Eel (Acipencer fulvescens) populations in Kilbride Creek. The OMNR has recently upgraded the status of this species provincially from Threatened to Endangered under the Endangered Species Act (ESA). Pursuant to the ESA, the OMNR has recently made changes to the way that projects potentially impacting Redside Dace populations or habitat are being reviewed and thus, the OMNR may need to screen this project. Once more information is available on the location and nature of the proposed works, staff of Conservation Halton may need to initiate the ESA screening process. We encourage the proponent to direct inquiries regarding the ESA screening process to Melinda Thompson-Black, Species at Risk Biologist (melinda.thompson-black@ontario.ca)	
12.	Fish Habitat mapping as per MTO Protocol "Environmental Guide for Fish and Fish Habitat, 2006" is requested. This mapping should be undertaken for a distance of 40 meters upstream and downstream of the subject water crossings	
13.	If culvert replacements are proposed, the use of open bottom crossing structures is requested on any tributaries of Bronte Creek, including Kilbride Creek, to maintain or enhance groundwater seepage into subject watercourses. It is also requested that any replacement culverts pass a 25 year flow event to ensure optimal fish passage and optimal conveyance of sediment	Generally, the existing culverts on Derry Road currently have the capacity to convey the 25-year storm design event without surcharging. The replacement of any culverts within the study limits will be reviewed and evaluated under the Class EA process as part of recommended design. As part of future works to be carried out in the detail design phase of the project, the ESR will note that any culvert replacements should consider open bottom designs to allow for natural substrate and fish passage
14.	If culvert extensions are proposed, it is requested that they span at a minimum the bankfull channel width of the creek, however a wider extension would be preferable. It is also requested that any lengthening of culverts be kept to a minimum to minimize cumulative effects of transportation crossings on the subject watercourses. Any extensions should entail an open bottom design to avoid any interruptions of groundwater seepage into the subject watercourses	Due to the nature of the roadway alignment in relationship to the existing watercourses, we do not anticipate the need for any bankfull channel width crossings. Any recommended future culvert extensions or replacements needed to accommodate a future road will be designed to minimize any impacts to the watercourses
15.	Please confirm that no new water crossings or creek realignments are to be examined as a component of the EA Study	At this time, the Project Team is not considering any new watercourse crossings or creek realignments as part of the Class EA study. The need for any potential new watercourse crossings will be reviewed as part of the alternative design concepts

No.	Conservation Halton Comments	Response/Comment
Natural Hazards		
16.	There are two regulated watercourse crossings of Derry Road within the study area. Conservation Halton regulates, pursuant to Ontario Regulation 162/06, all hazardous lands (i.e., Regional Storm flood plain, meander belt, wetlands), as well as the lands that are adjacent to these hazard lands. Development within Conservation Halton's regulated area requires permission pursuant to Ontario Regulation 162/06 and must meet the policies within Conservation Halton's Policies, Procedures and Guidelines for the Administration of Ontario Regulation 162/06 and Land Use Planning Policy Document, April 27, 2006. A copy of this document can be found on the CH website at http://www.hrca.on.ca/uploads//Final_Policy_Document_162-06.pdf	At this time, it is anticipated that the area of future construction disturbance will be kept to a minimum and within current roadway right-of-way limits where possible, thereby minimizing any environmental impacts within the study limits. As part of the evaluation of the various alternative design concepts the potential impacts of the various alternatives will be measured in terms of their potential environmental impacts. Where applicable to the recommended design, the policies of Ontario Regulation 162/06 will be noted in the ESR documentation as required
11.[1]	Per Procter and Redfern's 1986 "Flood Risk Mapping Report" a portion of Derry Road (extending approximately 160 m west of McNiven Road to McNiven Road) will be flooded under the regional storm event. Any proposed works must not negatively impact this flooding hazard by increasing flood elevations on or off site. Existing access and egress must be maintained, and opportunities to improve access and egress should be investigated, particularly if this portion of Derry Road is to be considered an Emergency Access Route	All drainage issues will be reviewed as part of the Class EA process
17.	A portion of Derry Road is also subject to risk associated with the meander belt width of Bronte Creek. Bronte Creek runs parallel to the road for a distance of approximately 100 m west of McNiven Road, and appears to have been straightened and re-aligned	This has been noted as part of the technical EA process and will be taken into consideration during the development of the alternative design concepts
18.	Given that modification to Derry Road will impact Bronte Creek's floodplain and meander belt, a permit will be required for both creek crossings as well as any road works within the regulated limit	Any required permits needed for future road works associated with the Bronte Creek crossings and with regulated limits will be noted as part of the ESR documentation
19.	Mapping of Conservation Halton's Approximate Regulation Limit is included with this letter. Please note that all areas regulated by Conservation Halton need to be plotted on drawings. Digital information requests can be made to Conservation Halton with the	The Approximate Regulation Limit is based on available digital information from CH and Halton Region and will be shown on all relevant base plans associated with the development of alternative design concepts as required

[1] Point "11" as referenced in Conservation Halton's (CH) letter dated January 4, 2010.

No.	Conservation Halton Comments	Response/Comment
	Data Request Form available on the CH website at http://www.conservationhalton.ca/ShowCategory.cfm?subCatID=1321	
Stormwater Management/Drainage		
20.	Although PEIL's April 2003 "Bronte Creek Hydrology and Stream Morphology Study" stated that stormwater and land development control measures and a full fluvial geomorphological and hydrogeological study would be required prior to any future development, the report did not provide specific recommendations for Kilbride Creek. Given the limited scale of the proposed re-development, completion of such a study is not warranted, therefore we recommend that the specific stormwater management targets that were included in the study for Indian Creek be adapted to the site, as is feasible. These include controlling post development flows to pre-development levels for all storms up to and including the 1:100 year design storm, a 48 hour draw down time for the quality storm event, and provision of Enhanced Level quality control. The use of a treatment train approach including conveyance controls that promote filtration and infiltration is also recommended	We will review PEIL's April 2003 "Bronte Creek Hydrology and Stream Morphology Study" relating to the specific stormwater management targets included in the study for Indian Creek to determine if these same targets are relevant and feasible for the study area
21.	Drainage Patterns: both existing and proposed catchment areas will need to be identified	As part of the stormwater review the existing storm drainage areas have been determined. The proposed drainage areas are anticipated to remain the same as the existing drainage areas except for where new cross culverts are recommended. No stormwater diversions are expected. Culverts will be replaced where the existing structure is deficient either hydraulically, structurally or does not meet current minimum size criteria
22.	Stormwater Quantity: post to pre quantity control will be required for all design storms	Controlling the post-flows to pre-flow levels should not be an issue since we are not widening the roadway beyond its current two-lane configuration. Quantity control will therefore not be required as there is no major increase in impervious area. Localized lane/shoulder widening would be considered insignificant in terms of generating additional stormwater flows. If only minor roadway geometric improvements are carried forward during the selection of the preferred alternative design concept then the need for formal stormwater management facilities are not anticipated
23.	Stormwater Quality Control: Enhanced Level quality control for all catchments draining to Bronte Creek or its tributaries will be	(CH Point 23 and 24) – Quality control will be incorporated where feasible through enhanced grassed swales. Major stormwater

No.	Conservation Halton Comments	Response/Comment
	required	management facilities will not be required as part of this study as there is no increase in impervious coverage proposed; however, given the sensitivity of the area it is recommended that minor stormwater management will be provided as an enhancement where feasible
24.	Stormwater Management should be considered as it pertains to fish habitat, including treatment level and potential direct impacts from construction	
25.	The Ministry of Transportation's B-100 Directive should be referenced	The Ministry of Transportation's B-100 Directive is currently followed by Halton Region
Other Information		
26.	The Bronte Creek Watershed Study (Conservation Halton, 2002) is a good source for background information. A hardcopy of this document is available and staff would be happy to provide you with a copy, should you require it. Please advise accordingly	Noted for information purposes

Southern Region
Aurora District Office
50 Bloomington Road West
Aurora, ON L4G 0L8

Ontario

Ministry of Natural Resources | **Ministere des Richesses Naturelles**

June 7, 2010

Lisa Campbell, M.Sc., C.C.E.P.
LCA Environmental Consultants
104-155 Main Street East, Suite 234
Grimsby, ON
L3M 1P2
Phone: 905-945-4700
Fax: 905-945-3747

Re: Derry Road - from Milburough Townline (Regional Road 24) to McNiven Road within the City of Burlington and the Town of Milton

Dear Ms. Campbell,

In your email dated May 20, 2010 you requested information on natural heritage features and element occurrences occurring on or adjacent to the above mentioned location.

There are a number of Species at Risk recorded from your study area. We have records of Milksnake and Northern Bluet (S3) from your study area. Some of these species may receive protection under the *Endangered Species Act 2007* and thus, a permit may be required if the work you are proposing could cause harm to these species or their habitat.

Natural heritage features recorded for your area include the Provincially Significant Kilbride Swamp Wetland Complex.

This species at risk information is highly sensitive and is not intended for any person or project unrelated to this undertaking. Please do not include any specific information in reports that will be available for public record. As you complete your fieldwork in these areas, please report all information related to any species at risk to the NHIC and to our office. This will assist with updating our database.

If you have any questions or comments, please do not hesitate to contact me at 905-713-7425.

Sincerely,

Melinda Thompson-Black

Melinda Thompson-Black
Species at Risk Biologist
Ontario Ministry of Natural Resources, Aurora District

APPENDIX B1

Historical Data and Information

Table 1. Fish Community Summary (various data sources). 1990-present.

Common Name	Scientific Name	Lower Bronte Creek	Middle Bronte Creek	Upper Bronte, East Branch	Upper Bronte, Main Branch	Upper Bronte, North-East Branch	Upper Bronte, West Branch	Bronte Harbour	Flamboro	Indian	Kilbride, downstream of escarpment	Kilbride, upstream of escarpment	Limestone, downstream of escarpment	Limestone, upstream of escarpment	Lowville	Mount Nemo	Mountsberg, upstream of Reservoir	Mountsberg, downstream of reservoir	Mountsberg Reservoir	Strabane	Willoughby
American Brook Lamprey	*Lampetra appendix*		X																		
Sea Lamprey	*Petromyzon marinus*	X																			
Alewife	*Alosa pseudoharengus*	X						X													
Coho Salmon	*Oncorhynchus kisutch*	X						X					X								
Chinook Salmon	*Oncorhynchus tshawytscha*	X						X													
Rainbow Trout	*Oncorhynchus mykiss*	X	X					X	X		X		X								X
Atlantic Salmon	*Salmo salar*	X	X																		X
Brown Trout	*Salmo trutta*	X	X					X	X			X	X								X
Brook Trout	*Salvelinus fontalis*		X		X				X		X	X	X	X			X			X	X
Rainbow Smelt	*Osmerus mordax*							X													
Central Mudminnow	*Umbra limi*			X	X	X	X		X		X	X	X	X			X	X		X	
Northern Pike	*Esox lucius*							X									X	X			
Northern Redbelly Dace	*Phoxinos eos*			X	X	X				X		X		X				X		X	
Finescale Dace	*Phoxinos neogaeus*																			X	
Redside Dace	*Clinostomus elongatus*			X	X																
Spotfin Shiner	*Cyprinella spiloptera*	X																			
Carp	*Cyprinus carpio*	X						X		X			X								
Brassy Minnow	*Hybognathus hankinsoni*			X		X						X					X	X			
Hornyhead Chub	*Nocomis biguttstus*	X																			
River Chub	*Nocomis micropogon*	X																			
Golden Shiner	*Notemigonus crysoleocas*							X		X											
unknown Chub	*Nocomis spp.*	X																			
Striped Shiner	*Luxilus chrysocephalus*	X																			
Common Shiner	*Luxilus cornutus*	X	X	X	X			X		X		X	X			X		X			
Gizzard Shad	*Notemigonus crysoleucas*	X																X			
Emerald Shiner	*Notropis atherinoides*	X						X													
Blacknose Shiner	*Notropis heterolepis*																	X		X	
Spottail Shiner	*Notropis hudsonius*	X						X													
Silver Shiner	*Notropis photogenis*	X																X			
Rosyface Shiner	*Notropis rubellus*	X			X																
Spotfin Shiner	*Notropis spilopterus*	X																			
Mimic Shiner	*Notropis volucellus*								X												
Bluntnose Minnow	*Pimephales notatus*	X	X	X	X				X	X		X	X					X			X
Fathead Minnow	*Pimephales promelas*	X			X		X		X	X		X	X		X	X	X	X			
Blacknose Dace	*Rhinichthys atratulus*	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X		X	X
Longnose Dace	*Rhinichthys cataractae*	X	X		X					X	X		X					X			X
Creek Chub	*Semotilus atromaculatus*	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X		X	X
Pearl Dace	*Margariscus margarita*			X	X	X	X					X					X	X		X	
White Sucker	*Catostomus commersoni*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 1 continued. Fish Community Summary (various data sources). 1990-present.

Common Name	Scientific Name / Creek	Lower Bronte Creek	Middle Bronte Creek	Upper Bronte, East Branch	Upper Bronte, Main Branch	Upper Bronte, North-East Branch	Upper Bronte, West Branch	Bronte Harbour	Flamboro	Indian	Kilbride, downstream of escarpment	Kilbride, upstream of escarpment	Limestone, downstream of escarpment	Limestone, upstream of escarpment	Lowville	Mount Nemo	Mountsberg, upstream of Reservoir	Mountsberg, downstream of reservoir	Mountsberg Reservoir	Strabane	Willoughby
Northern Hog Sucker	*Hypentelium nigricans*	X	X		X						X	X	X				X	X		X	X
Shorthead Redhorse	*Moxostoma macrolepidotum*	X														X					
Brown Bullhead	*Amelurus nebulosus*	X		X	X			X					X			X		X	X		
Stone Cat	*Noturus flavus*	X											X								
Tadpole Madtom	*Noturus gyrinus*	X																			
Trout Perch	*Percopsis omiscomaycus*	X																			
American Eel	*Anguilla rostrata*							X					X			X					
Brook Stickleback	*Culea inconstans*	X	X	X	X	X	X			X		X		X		X	X			X	X
Threespine Stickleback	*Gasterosteus aculeatus*	X						X								X					
White Perch	*Morone americana*							X								X					
Rock Bass	*Ambloplites rupestris*	X		X	X			X		X						X		X	X	X	
Sunfish	*Lepomis*							X								X					
Green Sunfish	*Lepomis cyanellus*	X														X		X	X	X	
Pumpkinseed	*Lepomis gibbosus*	X	X	X	X			X	X	X		X				X	X	X	X	X	
Bluegill	*Lepomis macrochirus*	X														X		X	X		
Small Mouth Bass	*Micropterus dolomieu*	X			X			X		X						X			X		
Large Mouth Bass	*Micropterus salmoides*	X	X	X	X			X		X			X			X	X	X	X	X	X
Black Crappie	*Poxomis nigromaculatus*							X								X		X	X		
Yellow Perch	*Perca flavescens*	X						X	X							X					
Rainbow Darter	*Etheostoma caeruleum*	X	X		X					X	X		X								X
Iowa Darter	*Etheostoma exile*													X		X					
Fantail Darter	*Etheostoma flabellare*	X	X							X	X	X	X								X
Johnny Darter	*Etheostoma nigrum*	X	X	X	X			X		X	X		X					X		X	X
Log Perch	*Percina caprodes*	X						X								X					
Blackside Darter	*Percina maculata*				X								X			X					X
Freshwater Drum	*Aplodinotus grunniens*							X								X					
Molted Sculpin	*Cottus bairdi*															X					
Slimy Sculpin	*Cottus cognatus*							X								X					
unknown Cyprenid	*Unknown Cyprenid*					X										X				X	

Table 2. Summary of Fish Community Sampling (Conservation Halton). 1998-2001.

Scientific Name	Common Name	K1	K4	K6
Poxomis nigromaculatus	Black Crappie			
Rhinichthys atratulus	Blacknose Dace	X	X	X
Notropis heterolepis	Blacknose Shiner			
Pimephales notatus	Bluntnose Minnow		X	
Hybognathus hankinsoni	Brassy Minnow		X	X
Culea inconstans	Brook Stickleback		X	X
Salvelinus fontalis	Brook Trout	X	X	X
Amelurus nebulosus	Brown Bullhead			
Salmo trutta	Brown Trout			
Umbra limi	Central Mudminnow	X	X	X
Luxilus cornutus	Common Shiner		X	
Semotilus atromaculatus	Creek Chub	X	X	X
Etheostoma flabellare	Fantail Darter	X	X	X
Pimephales promelas	Fathead Minnow		X	X
Phoxinos neogaeus	Finescale Dace			
Notemigonus crysoleocas	Golden Shiner			
Lepomis cyanellus	Green Sunfish			
Etheostoma exile	Iowa Darter			
Etheostoma nigrum	Johnny Darter	X		
Micropterus salmoides	Large Mouth Bass			
Rhinichthys cataractae	Longnose Dace	X		
Notropis volucellus	Mimic Shiner			
Hypentelium nigricans	Northern Hog Sucker	X		
Esox lucius	Northern Pike			
Phoxinos eos	Northern Redbelly Dace		X	X
Margariscus margarita	Pearl Dace			X
Lepomis gibbosus	Pumpkinseed			X
Etheostoma caeruleum	Rainbow Darter	X		
Oncorhynchus mykiss	Rainbow Trout	X		
Ambloplites rupestris	Rock Bass			
Notropis rubellus	Rosyface Shiner			
Micropterus dolomieu	Small Mouth Bass			
Catostomus commersoni	White Sucker	X	X	X
Perca flavescens	Yellow Perch			

Note: K1 is located downstream of the study area while K4 and K6 are located upstream of the study area

LOWVILLE-BRONTE CREEK ESCARPMENT VALLEY AND EXTENSION

Region	ESA #	Conservation Authority
Halton	9	Halton
Municipality	Lot/Concession (NAI-9)	Watershed
City of Burlington-Town of Milton	6-8/I-II	Bronte Creek
Approximate Area (NAI-9/NAI-9A)	Lot/Concession (NAI-9A)	Ownership
372/111 hectares	9-11/I	Public-Private

GENERAL SUMMARY
The Lowville-Bronte Creek Escarpment Valley encompasses a long east-northeast-trending re-entrant in the Niagara Escarpment. This unusual valley is occupied by the main branch of Bronte Creek[9]. This site is encompassed by the City of Hamilton's ESA 4, which straddles the Halton Region-City of Hamilton boundary.

A large number of vegetation communities exist within this site, some of which are rare within the Niagara Escarpment Biosphere Reserve. The area also supports a rich diversity of native plant, butterfly, herpetofauna, birds, and mammal species, some of which are nationally, provincially, and locally rare. Due to its large size, Lowville-Bronte Creek Escarpment Valley also provides habitat for interior forest species.

The extension NAI-9A also contains interior forest species as well as provincially and locally rare species. Both Lowville-Bronte Creek Escarpment Valley and its extension are linkages to other natural areas.

The Halton NAI surveyed NAI-9 and NAI-9A for birds, butterflies, odonates, and herpetofauna in 2004. ELC surveys were conducted in NAI-9 in 2004.

HISTORICAL EVALUATION
Halton Region Environmentally Sensitive Area - Lowville-Bronte Creek Escarpment Valley (NAI-9)[3, 4]

City of Hamilton Environmentally Significant Area - Bronte Creek Ravine (NAI-9)[9]

Niagara Escarpment Plan Area (NAI-9/NAI-9A)[8]

OMNR
Provincial Life Science ANSI - Lowville Bronte Creek Valley and Bronte Creek Escarpment Valley (NAI-9)

PHYSICAL DESCRIPTION
Relative Size
The City of Hamilton has designated a portion of this area as an Environmentally Significant Area (ESA #4), which straddles the City of Hamilton – Halton Region boundary[9]. Halton Region ESA 9 extends further northeast than the City of Hamilton's ESA # 4, but the area is cut off at the Halton Region boundary[3, 4]. Therefore, the contiguous natural area is actually larger than ESA 4 or ESA 9 would suggest and contains interior forest habitat (100-200 m from the forest edge).

Earth Science Features
A portion of the Niagara Escarpment is located within this area. In addition, the largest expanse of outwash gravel deposits (Pleistocene) of any of the ESAs occurs here and a small glaciofluvial kame deposit is located just inside the City of Hamilton boundary[3, 4].

Hydrogeological Features
The lower valley slopes discharge water into Bronte Creek. The vegetated creeks in this area also help maintain surface water quality in Bronte Creek[3, 4, 9, 23].

ECOLOGICAL LAND CLASSIFICATION
Number of Plant Communities
NAI-9 (Halton NAI ELC Surveys)
22

Riley et. al. (1996) reported 30 plant communities within the western section of NAI-9 and 13 within the eastern section[23].

NAI-9A
Unknown, ELC vegetation type information is needed.

Significant Plant Communities
Riley et. al. (1996) reported the following communities as rare and/or restricted within the Niagara Escarpment Biosphere Reserve:
- Rough Sedge Seepage Slope Meadow Marsh,
- Field Horsetail Seepage Slope Meadow Marsh,
- White Cedar-White Birch Mixed Treed Seepage Slope[23].

Community Descriptions[7]
The Halton NAI ELC crew conducted fieldwork in parts of NAI-9 only. ELC polygons to the community series level were identified for NAI-9A using 2002 air photo stereo pairs. ELC mapping for this area can be found on the included CD.

NAI-9

Polygon 1- Fresh-Moist Sugar Maple - Hardwood Deciduous Forest (FOD6-5)

Polygon Description	Environmental Characteristic
Topographic Features	Valley Slope
Community	Mature Forest
Ranking	S5

Polygon 2- Dry-Fresh Hemlock - Sugar Maple Mixed Forest (FOM3-2)

Polygon Description	Environmental Characteristic
Topographic Features	Valley Slope
Community	Mature Forest
Ranking	S3S5

Polygon 3- Willow Organic Thicket Swamp (SWT3-2)

Polygon Description	Environmental Characteristic
Topographic Features	Bottomland
Community	Mid-Aged Swamp
Ranking	G5, S5

Polygon 4- Dry-Fresh Hemlock - Sugar Maple Mixed Forest (FOM3-2)

Polygon Description	Environmental Characteristic
Topographic Features	Rolling Upland
Community	Mature Forest
Ranking	S3S5

Polygon 5- Dry-Fresh Hemlock - Sugar Maple Mixed Forest (FOM3-2)

Polygon Description	Environmental Characteristic
Topographic Features	Rolling Upland
Community	Mature Forest
Ranking	S3S5

Polygon 6- Dry-Fresh Sugar Maple - Oak Deciduous Forest (FOD5-3)

Polygon Description	Environmental Characteristic
Topographic Features	Rolling Upland
Community	Mature Forest
Ranking	G?, S5

Polygon 7- Birch - Conifer Organic Mixed Swamp (SWM6-1)

Polygon Description	Environmental Characteristic
Topographic Features	Bottomland
Community	Mid-Aged Swamp
Ranking	None

Polygon 8- Coniferous Plantation (CUP3)

Polygon Description	Environmental Characteristic
Topographic Features	Rolling Upland
Community	Mid-Aged Plantation
Ranking	None

Polygon 9- Dry-Moist Old Field Meadow (CUM1-1)

Polygon Description	Environmental Characteristic
Topographic Features	Rolling Upland
Community	Pioneer Meadow
Ranking	None

Polygon 10- Fresh-Moist Sugar Maple - Hemlock Mixed Forest (FOM6-1)

Polygon Description	Environmental Characteristic
Topographic Features	Rolling Upland
Community	Mature Forest
Ranking	G4G5, S4S5

Polygon 11- Dry-Fresh Sugar Maple Deciduous Forest (FOD5-1)

Polygon Description	Environmental Characteristic
Topographic Features	Rolling Upland
Community	Mature Forest
Ranking	G5?, S5

Polygon 12- Sumac Cultural Thicket (CUT1-1)

Polygon Description	Environmental Characteristic
Topographic Features	Rolling Upland
Community	Pioneer Thicket
Ranking	None

Polygon 13- White Pine Coniferous Plantation (CUP3-2)

Polygon Description	Environmental Characteristic
Topographic Features	Tableland
Community	Mid-Aged Plantation
Ranking	None

Polygon 14- Dry-Fresh Sugar Maple-Hickory Deciduous Forest (FOD5-5)

Polygon Description	Environmental Characteristic
Topographic Features	Rolling Upland
Community	Young Forest
Ranking	G?, S4

Polygon 15- Dry-Fresh Sugar Maple - Oak Deciduous Forest (FOD5-3)

Polygon Description	Environmental Characteristic
Topographic Features	Valley Slope
Community	Mid-Aged Forest
Ranking	G?, S5

Polygon 16- Fresh-Moist Sugar Maple - Hardwood Deciduous Forest (FOD6-5)

Polygon Description	Environmental Characteristic
Topographic Features	Riverine
Community	Mid-Aged Forest
Ranking	S5

Polygon 17- Dry-Fresh Hemlock - Sugar Maple Mixed Forest (FOM3-2)

Polygon Description	Environmental Characteristic
Topographic Features	Valley Slope
Community	Mature Forest
Ranking	S3S5

Polygon 18- Fresh-Moist Ash Lowland Deciduous Forest (FOD7-2)

Polygon Description	**Environmental Characteristic**
Topographic Features	Tableland
Community	Mid-Aged Forest
Ranking	S4S5

Polygon 19- Dry-Fresh Sugar Maple Deciduous Forest (FOD5-1)

Polygon Description	**Environmental Characteristic**
Topographic Features	Tableland
Community	Mid-Aged Forest
Ranking	G5?, S5

Polygon 20- Fresh-Moist Sugar Maple - Ash Deciduous Forest (FOD6-1)

Polygon Description	**Environmental Characteristic**
Topographic Features	Tableland
Community	Mid-Aged Forest
Ranking	G?, S5
Inclusion 1	Dry - Moist Old Field Meadow Type (CUM1-1)
Inclusion 1 Ranking	None

Polygon 21- Fresh-Moist Sugar Maple - Yellow Birch Deciduous Forest (FOD6-3)

Polygon Description	**Environmental Characteristic**
Topographic Features	Bottomland
Community	Mature Forest
Ranking	G5?, S5
Complex 1	Birch - Conifer Organic Mixed Swamp Type (SWM6-1)
Complex 1 Ranking	None

Polygon 22- Fresh-Moist Sugar Maple - Hemlock Mixed Forest (FOM6-1)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Mature Forest
Ranking	G4G5, S4S5

Polygon 23- Black Ash Mineral Deciduous Swamp (SWD2-1)

Polygon Description	**Environmental Characteristic**
Topographic Features	Bottomland
Community	Mid-Aged Swamp
Ranking	G4, S5

Polygon 24- Dry-Fresh Sugar Maple - Oak Deciduous Forest (FOD5-3)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Mature Forest
Ranking	G?, S5
Complex 1	Dry - Fresh Sugar Maple - Beech Deciduous Forest Type (FOD5-2)
Complex 1 Ranking	None
Complex 2	Fresh - Moist Sugar Maple - Hemlock Mixed Forest Type (FOM6-1)
Complex 2 Ranking	G4G5, S4S5

Polygon 25- Fresh-Moist Sugar Maple - Hemlock Mixed Forest (FOM6-1)

Polygon Description	**Environmental Characteristic**
Topographic Features	Bottomland
Community	Mature Forest
Ranking	G4G5, S4S5
Inclusion 1	Jewelweed Organic Meadow Marsh Type (MAM3-8)
Inclusion 1 Ranking	G?, S4

Polygon 26- White Cedar - Hardwood Mineral Mixed Swamp (SWM1-1)

Polygon Description	**Environmental Characteristic**
Topographic Features	Bottomland
Community	Mature Swamp
Ranking	G4?, S5
Inclusion 1	Jewelweed Mineral Meadow Marsh Type (MAM2-9)
Inclusion 1 Ranking	G?, S4

Polygon 27- Dry-Fresh Sugar Maple - Black Cherry Deciduous Forest (FOD5-7)

Polygon Description	**Environmental Characteristic**
Topographic Features	Valley Slope
Community	Young Forest
Ranking	S4S5

Polygon 28- Fresh-Moist Sugar Maple - Hemlock Mixed Forest (FOM6-1)

Polygon Description	**Environmental Characteristic**
Topographic Features	Valley Slope
Community	Mature Forest
Ranking	G4G5, S4S5

Polygon 29- Alder Organic Thicket Swamp (SWT3-1)

Polygon Description	**Environmental Characteristic**
Topographic Features	Bottomland
Community	Young Swamp
Ranking	G5?, S5

Polygon 30- Dry-Fresh Sugar Maple - Oak Deciduous Forest (FOD5-3)

Polygon Description	**Environmental Characteristic**
Topographic Features	Valley Slope
Community	Mature Forest
Ranking	G?, S5

SPECIES RICHNESS

Vascular Plants

The Halton NAI field crew conducted plant inventories within NAI-9 in addition to other botanists who have previously surveyed this area. A total of 406 species have been recorded in this area, of which 309 (76%) are native. In addition to the species listed in the Significant Species table, there are 38 locally uncommon species[4, 5, 23, 26, 27].

Botany surveys were not conducted in NAI-9A; however, the Halton NAI recorded 19 incidental sightings during faunal surveys[5]. Of these, 18 (95%) species are native.

Butterflies

Halton NAI field crews recorded 20 species in NAI-9 and 39 species in NAI-9A[5]. Of these, 18 (90%) in NAI-9 and 39 (95%) in NAI-9A are native species. Four additional locally uncommon species not listed in the Significant Species table were found in NAI-9A.

Dragonflies and Damselflies
Halton NAI field crews recorded one species in NAI-9 and 18 species in NAI-9A[5]. Of these, 100% are native species.

Fish
Bronte Creek supports a healthy community of coldwater species including migratory rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*) and brook trout (*Salvelinus fontinalis*)[28]. Much of the Lowville-Bronte Escarpment Valley (NAI-9) has substantial cover and instream habitat features. Areas of cobble and gavel substrate are ideal for spawning salmonids that migrate from Lake Ontario.

Species of significance include American brook lamprey (*Lampetra appendix*), a provincially rare species and redside dace (*Clinostomus elongatus*); however, this record is historic from 1958[28]. Redside dace is nationally a species of special concern and provincially threatened and is likely extirpated from this reach of Bronte Creek. Silver shiner (*Notropis photogenis*), a nationally and provincially rare species, has also been reported within this area[23]. This reach of Bronte Creek is known to support a significant amount of spawning sea lamprey (*Petromyzon marinus)*.

Herpetofauna
A total of 19 species were recorded in NAI-9, including two additional locally uncommon species that are not listed in the Significant Species table[5, 23, 27, 32, 33]. Of these, 100% are native species. Seven native species were recorded within NAI-7A[5, 27, 33].

Breeding Birds
NAI field crews identified 45 species within NAI-9 in 2003 and 2004[5]. A total of 76 species have been identified in NAI-9, including 14 interior forest species[5, 23, 27, 32]. Of these, 72 (95%) species are native. In addition to the species listed in the Significant Species table, 14 locally uncommon species are known to NAI-9.

In 2003 and 2004, NAI field crews identified 32 species within NAI-9A, including six interior forest species[5]. Of these, 31 (97%) species are native. In addition to the species listed in the Significant Species table, two species are locally uncommon.

Mammals
Seventeen species have been recorded in NAI-9 and two in NAI-9A[4, 5, 23, 27]. Of these, 100% are native species. In addition to the species listed in the Significant Species table, one locally uncommon species was recorded in NAI-9.

SIGNIFICANT SPECIES

Species (Year Found)	Area	COSEWIC	MNR	SRank	Halton Region
Vascular Plants					
Black Spruce, *Picea mariana* (2004)[5]	NAI-9			S5	Rare
Broad Beech Fern, *Phegopteris hexagonoptera* (1990)[32]	NAI-9	SC	SC	S3	Rare
Butternut, *Juglans cinerea* (1999)[27] (2004)[5] (pre 1996)[4, 23]	NAI-9	END	END	S3?	Common
Canada Gooseberry, *Ribes hirtellum* (2004)[5]	NAI-9			S5	Rare
Dryopteris x mickelii (1983)[27]	NAI-9			S1?	
Floating Pondweed, *Potamogeton natans* (pre 1996)[23]	NAI-9			S5	Rare
Hay-scented Fern, *Dennstaedtia punctilobula* (1979)[26, 27] (pre 1996)[4, 23]	NAI-9			S5	Rare
Muhlenbergs sedge, *Carex muehlenbergii* var. *muhlenbergii* (1991)[23]	NAI-9			S4S5	Rare
Pokeweed, *Phytolacca americana* (1979)[26] (pre 1993)[4]	NAI-9			S4	Rare
River Bank Wild-rye, *Elymus riparius* (1983)[27] (pre 1993)[4]	NAI-9			S4?	Rare
Smooth Scouring-rush, *Equisetum laevigatum* (pre 1993)[4]	NAI-9			S4	Rare
Spotted Coral-root, *Corallorhiza maculata* (1962)[26] (pre 1993)[4]	NAI-9			S5	Rare
Butterflies					
Monarch, *Danaus plexippus* (2004)[5]	NAI-9A	SC	SC	S4	
West Virginia White, *Pieris virginiensis* (1990)[23]	NAI-9		SC	S3	
Dragonflies and Damselflies					
Delta-spotted Spiketail, *Cordulegaster diastatops* (2003)[5]	NAI-9			S3	Rare
Northern Bluet, *Enallagma cyathigerum* (2004)[5]	NAI-9A			S3	Rare
Spiny Baskettail, *Epitheca spinigera* (2004)[5]	NAI-9A			S5	Rare
Fish					
American Brook Lamprey, *Lampetra appendix* (1998, 1999)[28]	NAI-9			S3	
Redside Dace, *Clinostomus elongatus* (1958)[28]	NAI-9	SC	THR	S3	
Silver Shiner, *Notropis photogenis* (pre 1995)[23]	NAI-9	SC	SC	S2S3	

Species (Year Found)	Area	COSEWIC	MNR	SRank	Halton Region
Herpetofauna					
Eastern Milk Snake, *Lampropeltis triangulum triangulum* (1984, 1990)[27] (1984, 1990)[32]	NAI-9	SC	SC	S3	Common
Eastern Spiny Softshell, *Apalone spinifera spinifera* (1974)[27]	NAI-9	THR	THR	S3	Rare
Jefferson/blue-spotted salamander complex, *Ambystoma jeffersonianum-laterale* (1979, 1980)[33]	NAI-9			S2	Uncommon
Jefferson/blue-spotted salamander complex, *Ambystoma jeffersonianum-laterale* (1979)[33]	NAI-9A			S2	Uncommon
Northern Ring-necked Snake, *Diadophis punctatus edwardsii* (1979, 1984)[27] (pre 1994)[4, 23]	NAI-9			S4	Rare
Breeding Birds					
Blackburnian Warbler, *Dendroica fusca* (2004)[5]	NAI-9A			S5B, SZN	Rare
Broad-winged Hawk, *Buteo platypterus* (2003)[5]	NAI-9			S5B, SZN	Rare
Broad-winged Hawk, *Buteo platypterus* (2004)[5]	NAI-9A			S5B, SZN	Rare
Golden-winged Warbler, *Vermivora chrysoptera* (pre 1996)[4, 23]	NAI-9			S4B, SZN	Rare
Louisiana Waterthrush, *Seiurus motacilla* (1981, 1984, 1991)[32] (1982, 1991)[4, 23]	NAI-9	SC	SC	S3B, SZN	Rare
Nashville Warbler, *Vermivora ruficapilla* (2003)[5]	NAI-9			S5B, SZN	Rare
Red-shouldered Hawk, *Buteo lineatus* (2004)[5]	NAI-9	SC	SC	S4B, SZN	Rare

LAND USE AND LINKAGES

Linkages with Other Natural Areas

Lowville-Bronte Creek Escarpment Valley and its extension provide a linkage between Lake Medad and Medad Valley (NAI-7) and both the Bronte Creek Valley extension (NAI-10B) and the Guelph Junction Woods extension (NAI-20A).

The City of Hamilton's ESA 4 (Bronte Creek Ravine) encompasses NAI-7 and also extends west of the Halton Region boundary. Lowville-Bronte Creek Escarpment Valley, therefore, provides a linkage to the natural areas system within Hamilton.

Present Land Use

The majority of both Lowville-Bronte Creek Escarpment Valley and its extension are privately owned. Development such as residential areas, parkland, and roads are dispersed throughout the forests within these areas. Both areas are also bound by agricultural land, roads, and residential areas.

The natural features within NAI-9 make it suitable for scientific research and conservation education purposes. In the past, the Halton Region School Board has used the area for conservation and outdoor education programs[3, 4].

RECOMMENDATIONS

1. This area should retain its Halton Region ESA status and should be protected from future development within the City of Burlington.
2. Halton Region should consider evaluating the new area NAI-9A as a possible extension of ESA 9, based on the Halton NAI.
3. Linkages to neighbouring natural areas should be created and maintained.
4. Future studies should include the monitoring of significant species in both NAI-9 and NAI-9A and more flora, fauna, and ELC surveys in NAI-9A.

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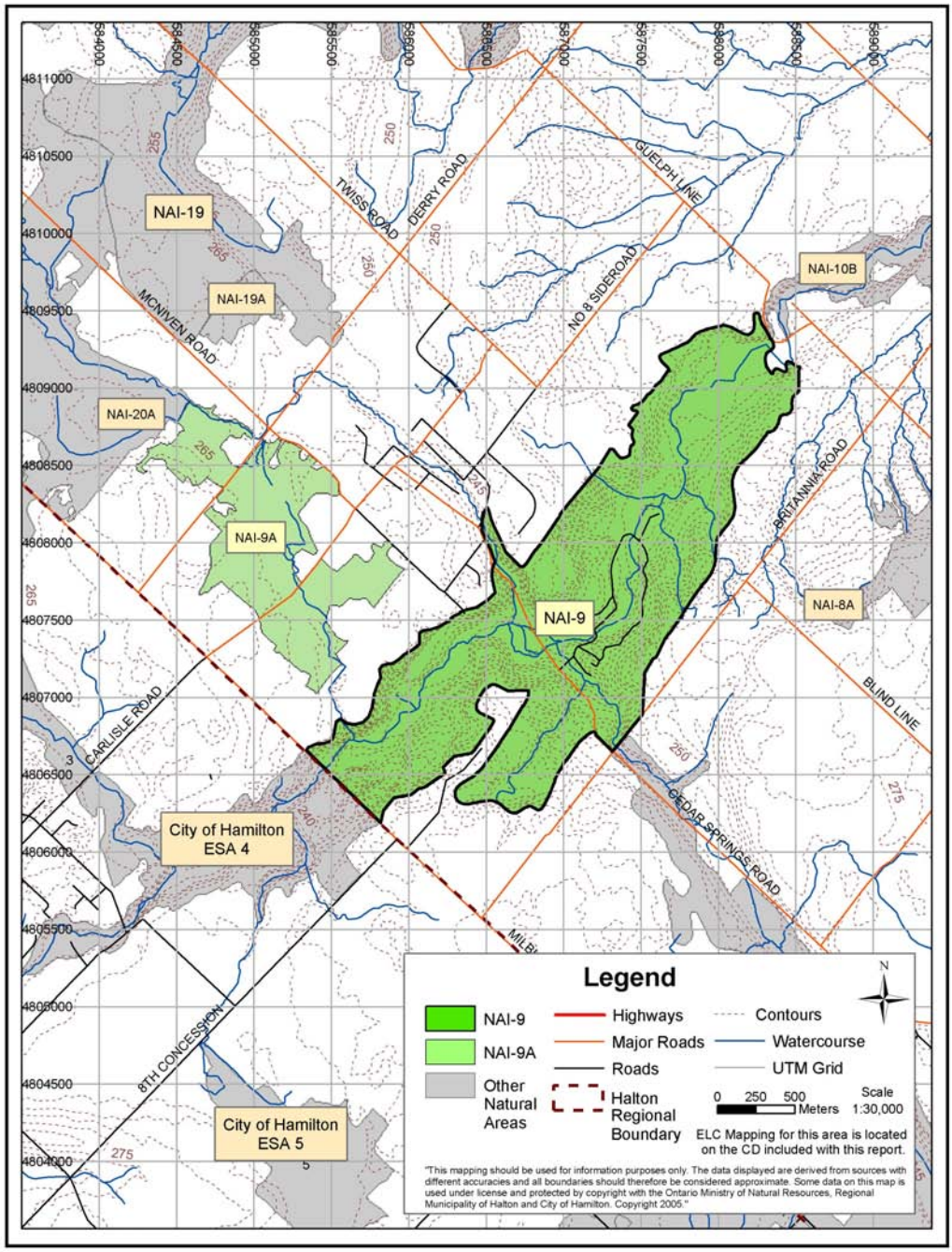
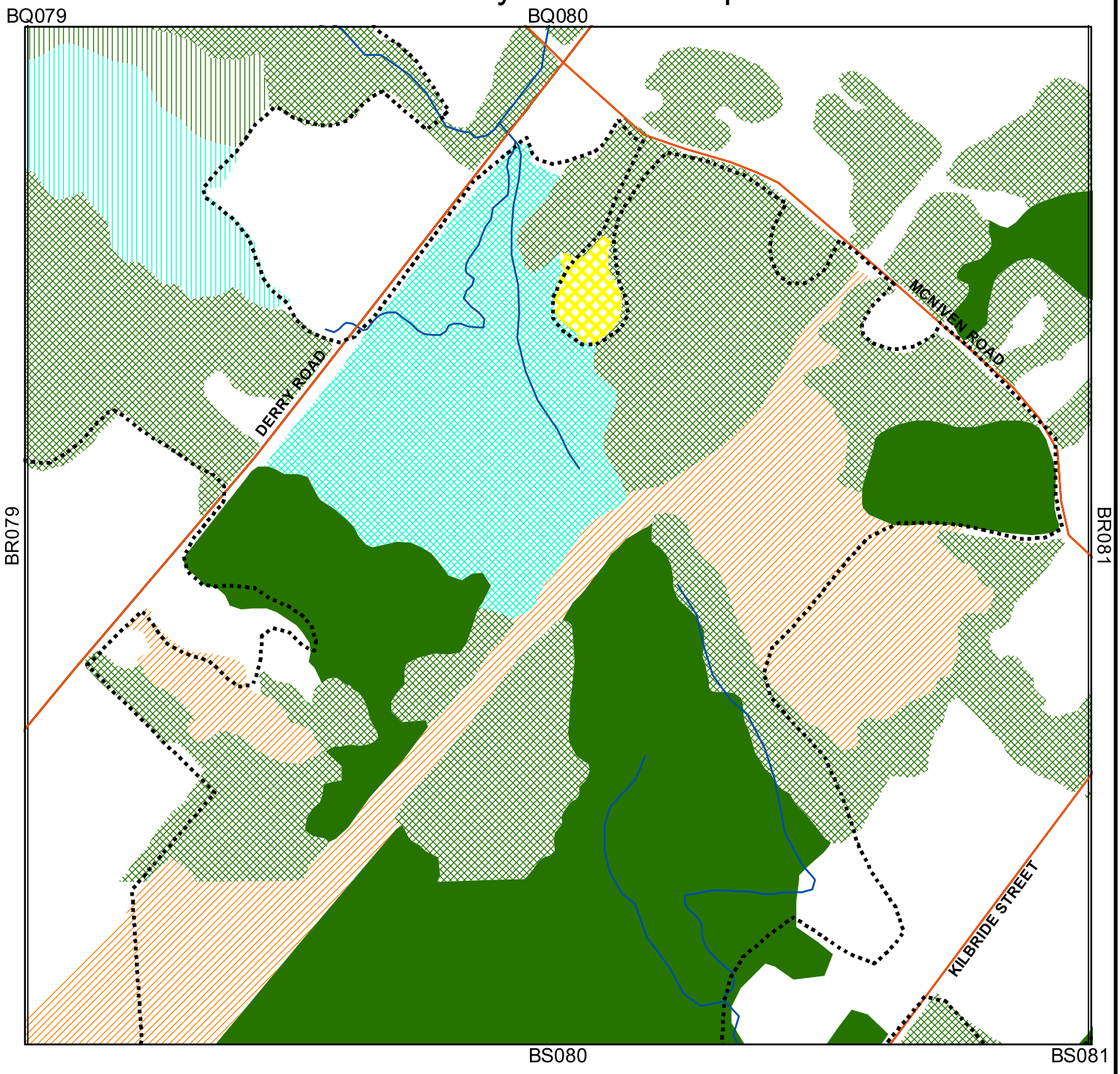
HALTON NAI SITE VISITS

Area	Date	Purpose	Observers
NAI-9	23-Jun-03	Fauna	B. Curry
NAI-9	04-Jun-04	ELC	K. Cain, B. Jameison L. Dick, B.Van Ryswyk
NAI-9	06-Jun-04	ELC	K. Cain, B. Jameison L. Dick, B.Van Ryswyk
NAI-9	07-Jun-04	ELC	K. Cain, B. Jameison L. Dick, B.Van Ryswyk
NAI-9	09-Jun-04	ELC	K. Cain, B. Jameison L. Dick, B.Van Ryswyk
NAI-9	10-Jun-04	ELC	K. Cain, B. Jameison L. Dick, B.Van Ryswyk
NAI-9	11-Jun-04	ELC	K. Cain, B. Jameison L. Dick, B.Van Ryswyk
NAI-9	14-Jun-04	ELC	K. Cain, B. Jameison L. Dick, B.Van Ryswyk
NAI-9	15-Jun-04	ELC	K. Cain, B. Jameison L. Dick, B.Van Ryswyk
NAI-9	21-Jun-04	ELC	K. Cain, B. Jameison L. Dick, B.Van Ryswyk
NAI-9	22-Jun-04	ELC	K. Cain, B. Jameison L. Dick, B.Van Ryswyk
NAI-9A	01-Jun-04	Fauna	B. Curry
NAI-9A	16-Jul-04	Fauna	B. Curry

Map 9. Lowville-Bronte Creek Escarpment Valley (NAI-9) and extension (NAI-9A) mapping.



Halton Natural Area Inventory - Site 9 Map Sheet - BR080



Legend

- HNAI Study Area Boundary
- HNAI Extensions
- 9 Community Description Polygon ID
- Highways
- Major Roads
- Watercourse
- Roads
- Lake Ontario
- Region of Halton Boundary

Map Sheet Index Reference

BQ079	BQ080		BQ082	BQ083	BQ084
BR079	BR080	BR081	BR082	BR083	
	BS080	BS081	BS082	BS083	
	BT080	BT081	BT082	BT083	

Halton Natural Areas Inventory
Detailed ELC Mapping

N

0 100 200 Meters

Scale 1:5,000

APPENDIX 1

RARE SPECIES LIST

Table 1. Rare Species List for ESAs in Bronte Creek. Data derived from Heagy, 1993, Geomatics 1995, Riley *et al.* 1996, Eagles *et al.*, 1976.

				ESA																										
Common Name	**Scientific Name**	**Affinity**	**Status**	**SSD**	**SNW**	**PSW**	**PNS**	**MWA**	**MEW**	**MN**	**MS**	**MH**	**LMM**	**GJW**	**FEW**	**FCS**	**CLR**	**CNF**	**CP**	**BS**	**BDF**	**BCV**	**BCR**	**BS**	**HFC**	**AW**
Vascular Plants																										
Running Clubmoss	*Lycopodium clavatum*		r														X			X			X			
Arrow-grass	*Scheuchzeria palustris*		R																							X
Meadow Horsetail	*Equisetum pratense*		r																				X			
Woodland Horsetail	*Equisetum sylvaticum*		r											X								X	X			
Variegated Scouring-rush	*Equisetum variegatum*		r																X				X			
Daisy-leaved Grape Fern	*Botrychium matricariifolium*		r														X									
Grape Fern	*Botrychium rugulosum*		NPR														X									
Interrupted Fern	*Osmunda claytoniana*		r											X						X						
Hay-scented Fern	*Dennstaedtia punctilobula*		r																				X			
Slender Cliff-brake	*Cryptogramma stelleri*		r														X									
Virginia Chain Fern	*Woodwardia virginica*		r																					X		
Ebony Spleenwort	*Asplenium platyneuron*		R														X	X					X	X		
Maidenhair Spleenwort	*Asplenium trichomanes*		R										X													
Green Spleenwort	*Asplenium viride*		R									X														
Hybrid Shield Fern	*Dryopteris carth X D. crista*		r														X									
Hybrid Shield Fern	*Dryopteris gold X D. marg*		r														X									
Hybrid Shield Fern	*Dryopteris inter X D. marg*		r														X									
Hart's-tongue Fern	*Phylitis scolopendrium*		NRP							X															X	
NorthernBeech Fern	*Phegopteris connectilis*		r											X												
New York Fern	*Thelypteris noveboracensis*		r																	X			X			
Black Spruce	*Picea mariana*		r											X										X		
Red Cedar	*Juniperus virginiana*		r																			X				
Large-leaved Pondweed	*Potamogeton amplifolius*		r											X												
Pondweed	*Potamogeton berchtoldii*		r					X	X																	
Pondweed	*Potamogeton obtusifolius*		R														X									
Pondweed	*Potamogeton perfoliatus*		R																			X				
Small Pondweed	*Potamogeton pusillus*		r											X												
Slender Wheat Grass	*Agropyron trachycaulum*		r														X									
Big Bluestem	*Andropogon gerardii*	S	r																			X				
Little Bluestem	*Andropogon scoparius*	S	r																			X				
Bearded Shorthusk	*Brachyelytrum erectum*		r														X					X				
Tall Brome Grass	*Bromus latiglumis*		r														X					X				
River Bank Wild Rye	*Elymus riparius*		r																			X	X			
Wire-stemmed Muhly Grass	*Muhlenbergia frondosa*		R																			X				
Muhly Grass	*Muhlenbergia glomerata*		r																X							

Table 1 continued. Rare Species List for ESAs in Bronte Creek. Data derived from Heagy, 1993, Geomatics 1995, Riley *et al.* 1996, Eagles *et al.*, 1976.

				ESA																								
Common Name	**Scientific Name**	**Affinity**	**Status**	**SSD**	**SNW**	**PSW**	**PNS**	**MWA**	**MEW**	**MN**	**MS**	**MH**	**LMM**	**GJW**	**FEW**	**FCS**	**CLR**	**CNF**	**CP**	**BS**	**BDF**	**BCV**	**BCR**	**BS**	**HFC**	**AW**
Vascular Plants																										
Muhly Grass	*Muhlenbergia tenuiflora*		NRP																			X				
Panic Grass	*Panicum gattingeri*		NRP							X																
Sedge	*Carex capillaris*		R														X									
Sedge	*Carex careyana*		NRP																						X	
Sedge	*Carex castanea*		r																					X		
Sedge	*Carex formosa*		P											X											X	
Sedge	*Carex gracilescens*	C	NRP																			X			X	
Sedge	*Carex grayi*		R																			X				
Sedge	*Carex grisea*		R*														X					X				
Sedge	*Carex lucorum*		R																			X				
Sedge	*Carex muhlenbergii*	S	r																				X			
Sedge	*Carex prairea*		r																X							
Sedge	*Carex prasina*		NPR							X													X			
Sedge	*Carex scoparia*		r																			X				
Sedge	*Carex sychnocephala*		r					X	X																	
Sedge	*Carex trisperma*		r												X		X									
Sedge	*Carex umbellata*		R																X							
Sedge	*Carex vaginata*		r										X	X												
Nut Grass	*Cyperus erythrorhizos*		NPR																			X				
Nut Grass	*Cyperus rivularis*		N or P																			X				
Nut Grass	*Cyperus strigosus*		r																			X				
Spike-rush	*Eleocharis intermedia*		r																			X				
Bulrush	*Scirpus pendulus*		r			X																				
Star Duckweed	*Lemna trisulca*		r																	X						
wollfia	*Wollfia punctata*		r																	X						
Yellow Mandarin	*Disporum lanuginosum*	C	NRP							X			X													
Wild Yam	*Dioscorea quaternata*		R*										X													
Wild Yam	*Dioscorea villosa*	C	R										X													
Grass-pink	*Calopogon tuberosus*		r																					X		
Spotted Coral-root	*Corallorhiza maculata*		r																			X	X			
Pale Coral-root	*Corallorhiza trifida*		r								X													X		
Stemless Lady-slipper	*Cypripedium acaule*		r																					X		X
Showy Orchis	*Galearis spectabilis*		r						X																	
Dwarf Rattlesnake-plantain	*Goodyera repens*		r																					X		
Club-spur Orchid	*Platanthera clavellata*		r																					X		

Table 1 continued. Rare Species List for ESAs in Bronte Creek. Data derived from Heagy, 1993, Geomatics 1995, Riley *et al.* 1996, Eagles *et al.*, 1976.

				ESA																										
Common Name	Scientific Name	Affinity	Status	SSD	SNW	PSW	PNS	MWA	MEW	MN	MS	MH	LMM	GJW	FEW	FCS	CLR	CNF	CP	BS	BDF	BCV	BCR	BS	HFC	AW
Vascular Plants																										
Small Purple Fringed Orchid	*Platanthera psycodes*		r															X								
Nodding Ladies'-tresses	*Spiranthes cernua*		r																						X	
Shining Ladies'-tresses	*Spiranthes lucida*		R															X								
Hooded Ladies'-tresses	*Spiranthes romanzoffiana*		r																					X	X	
Sage-leaved Willow	*Salix candida*		r																					X		
Black Willow	*Salix nigra*		r											X								X				
Bog Willow	*Salix pedicellaris*		r																X							
Autumn Willow	*Salix serissima*		r														X		X							
Sweet Gale	*Myrica gale*		r										X											X		
Swamp Birch	*Betula pumila*		r																					X		
Wild Chestnut	*Castanea dentata*	C	NPR							X																
Chinquapin Oak	*Quercus muehlenbergii*		R																			X				
Hackberry	*Celtis occidentalis*		r							X							X									
Rock Elm	*Ulmus thomasii*		r														X									
Spring Clearweed	*Pilea fontana*		R							X																
Striate Knotweed	*Polygonum achoreum*		r																X							
Fringed Buckwheat	*Polygonum ciliinode*		r																					X		
Jumpseed	*Polygonum virginianum*	C	r																			X				
Great Water Dock	*Rumex orbiculatus*		r											X												
False Pennyroyal	*Trichostema brachiatum*	A	r														X							X		
Pokeweed	*Phytolacca americana*		r																				X			
Rock Sandwort	*Arenaria stricta*		R							X																
Hybrid Baneberry	*Actaea pachypoda x rubra*		r*														X									
Clematis	*Clematis occidentalis*		R							X							X									
Yellow Water Buttercup	*Ranunculus flabellaris*		R											X			X		X							
Swamp Buttercup	*Ranunculus hispidus*		r																X			X				
Sassafras	*Sassafras albidum*	C	r																			X				
Climbing Fumitory	*Adlumia fungosa*		r																					X		
Golden Corydalis	*Corydalis aurea*		R							X																
Pink Corydalis	*Corydalis sempervirens*		r					X																		
Dutchman's-breeches	*Dicentra cucullaria*		r																			X				
Rock-cress	*Arabis divaricarpa*	S	r									X					X									
Tower-mustard	*Arabis glabra*		r																					X		
Rock-cress	*Arabis hirsuta*		R							X							X									
Cuckoo Flower	*Cardamine pratensis*		R											X												

Table 1 continued. Rare Species List for ESAs in Bronte Creek. Data derived from Heagy, 1993, Geomatics 1995, Riley *et al.* 1996, Eagles *et al.*, 1976.

				ESA																								
Common Name	**Scientific Name**	**Affinity**	**Status**	**SSD**	**SNW**	**PSW**	**PNS**	**MWA**	**MEW**	**MN**	**MS**	**MH**	**LMM**	**GJW**	**FEW**	**FCS**	**CLR**	**CNF**	**CP**	**BS**	**BDF**	**BCV**	**BCR**	**BS**	**HFC**	**AW**
Vascular Plants																										
Skunk Currant	*Ribes glandulosum*		r								X													X		
Sycamore	*Platanus occidentalis*	C	r																			X				
Hairy Agrimony	*Agrimonia pubescens*		R																					X		
Saskatoon-berry	*Amelanchier alnifolia*	S	r																			X				
Hawthorn	*Crataegus aboriginum*		r																X							
Hawthorn	*Crataegus compta*		r										X													
Hawthorn	*Crataegus conspecta*	C	NPR												X											
Hawthorn	*Crataegus dodgei*	C	NPR						X																	
Purple Avens	*Geum rivale*		r										X	X			X		X			X				
Indian Psychic	*Gillenia trifoliata*		NPR										X													
Wild Rose	*Rosa acicularis*		r																			X				
Hardhack	*Spiraea tomentosa*		r										X													
Groundnut	*Apios americana*		r																			X	X			
Canada Milk-vetch	*Astragalus canadensis*		R							X												X				
Round headed Bush Clover	*Lespedeza capitata*	S	R				X						X					X					X			
Bush Clover	*Lespedeza hirta*	C,S	R																			X				
Bush Clover	*Lespedeza intermedia*	S	R																			X				
Virginia Yellow Fever	*Linum virginianum*	C,S	NPR																			X				
Milkwort	*Polygala verticillata*	S	r																			X				
Mountain Holly	*Nemopanthus mucronatus*		R											X										X		
Burning Bush	*Euonymus atropurpurea*	C	NPR														X									
Hybrid Maple	*Acer rubrum X A. saccharinum*		r																	X						
Large Canadian St. John's-wort	*Hypericum majus*		r				X																			
Pinweed	*Lechea intermedia*		r																			X				
Green Violet	*Hybanthus concolor*		NPR														X		X					X	X	
Marsh Violet	*Viola affinis*		r																							
Violet	*Viola fimbriatula*	S	r																			X				
Violet	*Viola macloskeyi*		r										X				X		X							
Violet	*Viola septentrionalis*		r																			X				
Water Willow	*Decodon verticillatus*		r																X							
Fireweed	*Epilobium angustifolium*		r											X												
Downy Willowherb	*Epilobium strictum*		R														X		X					X		
Northern Water-milfoil	*Myriophyllum sibiricum*		r					X																		
Ginseng	*Panax quinquefolius*		NPr														X		X			X			X	
Long-styled Canadian Sanicle	*Sanicula canadensis*	C	NPR																					X		

Table 1 continued. Rare Species List for ESAs in Bronte Creek. Data derived from Heagy, 1993, Geomatics 1995, Riley *et al.* 1996, Eagles *et al.*, 1976.

				ESA																								
Common Name	**Scientific Name**	**Affinity**	**Status**	**SSD**	**SNW**	**PSW**	**PNS**	**MWA**	**MEW**	**MN**	**MS**	**MH**	**LMM**	**GJW**	**FEW**	**FCS**	**CLR**	**CNF**	**CP**	**BS**	**BDF**	**BCV**	**BCR**	**BS**	**HFC**	**AW**
Vascular Plants																										
Pipsissewa	*Chimaphila umbellata*		r														X									
Wintergreen	*Orthilia secunda*		r																	X						
Pink Pyrola	*Pyrola asarifolia*		r																	X						
Shinleaf	*Pyrola virens*		r									X														
Bearberry	*Arctostaphylos uva-ursi*		r														X			X		X		X		
Leather-leaf	*Chamaedaphne calyculata*		r											X			X			X		X	X	X		
Creeping Snowberry	*Gaultheria hispidula*		r																					X		
Labrador-tea	*Ledum groenlandicum*		r																					X		
Bog Laurel	*Kalmia polifolia*		r										X													
Highbush Blueberry	*Vaccinium corymbosum*		r														X									
Velvet-leaved Blueberry	*Vaccinium myrtilloides*		r																					X		
Small Cranberry	*Vaccinium oxycoccos*		r																					X		
Swamp Candles	*Lysimachia terrestris*		r																					X		
Fringed Gentian	*Gentiana crinita*		R																X					X		
Stiff Gentian	*Gentianella quinquefolia*	S	NPR																					X		
Spurred Gentian	*Halenia deflexa deflexa*		r																					X		
Butterfly-weed	*Asclepias tuberosa*	S	r																			X				
Green Milkweed	*Asclepias viridiflora*	S	PR									X														
Low Bindweed	*Calystegia spithameus*		r																			X				
Yellow False Foxglove	*Aureolaria flava*	C	r														X									
False Pimpernel	*Lindernia dubia*		r																			X				
Speedwell	*Veronica catenata*		R											X												
Cancer-root	*Orobanche uniflora*		r																			X				
Flat-leaved Bladderwort	*Utricularia intermedia*		r																					X		
Small Bladderwort	*Utricularia minor*		R					X									X			X						
Bedstraw	*Galium pilosum*		NPR																							
Bedstraw	*Galium tinctorium*		r																			X				
Marsh-bellflower	*Campanula aparinoides*		r																X	X						
Marsh Bellflower	*Campanula uliginosa*		r																X	X						
Pale-spike Lobelia	*Lobelia spicata*		R				X		X					X												
Pearly Everlasting	*Anaphalis margaritacea*		r						X																	
Sky-blue Aster	*Aster azureus*	S	r																			X				
Bog Aster	*Aster borealis*		r																	X				X		
Heath Aster	*Aster ericoides*		r														X					X				
Arrow-leaved Aster	*Aster sagittifolius*	S	r																			X				

Table 1 continued. Rare Species List for ESAs in Bronte Creek. Data derived from Heagy, 1993, Geomatics 1995, Riley *et al.* 1996, Eagles *et al.*, 1976.

				ESA																							
Common Name	**Scientific Name**	**Affinity**	**Status**	**SSD**	**SNW**	**PSW**	**PNS**	**MWA**	**MEW**	**MN**	**MS**	**MH**	**LMM**	**GJW**	**FEW**	**FCS**	**CLR**	**CNF**	**CP**	**BS**	**BDF**	**BCV**	**BCR**	**BS**	**HFC**	**AW**
Vascular Plants																										
Rough Hawkweed	*Hieracium scabrum*		r																			X				
Lettuce	*Lactuca biennis*		r														X									
Late Goldenrod	*Solidago gigantea*		r										X									X				
Hairy Goldenrod	*Solidago hispida*		r																			X				
Bog Goldenrod	*Solidago uliginosa*		r											X					X							
Mosses																										
	Platydictya convervoides									X																
	Thamnobryum alleghaniense		R							X																
Fish																										
Silver Lamprey	*Ichthyomyzon unicuspis*		N or P																			X				
Silver Shiner	*Notropis photogenis*		NV																			X	X			
Redside Dace	*Clinostumus elongatus*		V					X																		
Reptiles & Amphibians																										
Wood Turtle	*Clemmys insculpta*		N or P																			X	X			
Jefferson Salamander	*Ambystoma jeffersonianum*		NPrT							X							X		X						X	
Pickerel Frog	*Rana palustris*		NPr			X			X										X					X	X	
Eastern Ribbon Snake	*Thamnophis sauritus*		N or P																X						X	
Stinkpot	*Sternotherus odoratus*		N or P														X									
Blanding's Turtle	*Emydoidea blandingii*		r																					X		
Northern Ringneck Snake	*Diadophis punctatus*		P																				X			
Birds																										
American Bittern	*Botaurus lentiginosus*		r																					X		
American Coot	*Fulica americana*		r					X																		
American Wigeon	*Anas americana*		r																					X		
Broad-winged Hawk	*Buteo platypterus*		r																					X		X
Caspian Tern	*Sterna caspia*		NPrS										X													
Cerulean warbler	*Dendroica cerulea*	C	rS																					X		
Cooper's hawk	*Accipiter cooperi*		NPrS										X						X			X		X		
Eastern Bluebird	*Sialia sialis*		NPr																			X				X
Gadwall	*Anas strepera*		r					X																		
Golden-crowned Kinglet	*Regulus satrapa*		r																					X		
Hooded Merganser	*Lophodytes cucullatus*		r					X																		
Least Bittern	*Ixobrachus exilis*		NPrS					X											X							
Long-eared Owl	*Asio otus*		rS																			X				
Louisiana Waterthrush	*Seiurus motacilla*	C	NPrS																				X	X	X	
Northern Harrier	*Circus cyaneus*		r			X																		X		

Table 1 continued. Rare Species List for ESAs in Bronte Creek. Data derived from Heagy, 1993, Geomatics 1995, Riley *et al.* 1996, Eagles *et al.*, 1976.

Common Name	Scientific Name	Affinity	Status	ESA																								
				SSD	SNW	PSW	PNS	MWA	MEW	MN	MS	MH	LMM	GJW	FEW	FCS	CLR	CNF	CP	BS	BDF	BCV	BCR	BS	HFC	AW
Birds																										
Solitary Vireo	*Vireo solitarius*		r																				X		
Yellow-bellied Sapsucker **	*Sphyrapicus varius*		r					X																	
Yellow-billed Cuckoo	*Coccyzus americanus*		r						X																
Mammals																									
bobcat	*Lynx rufus*		N or P																					X	
Eastern Pipistrelle	*Pipistrellus subflavus*		N or P							X							X								
Small-footed Bat	*Myotis liebii*		HS							X															
Water Shrew	*Sorex palustris*		r					X															X		
Northern Flying Squirrel	*Glaucomys sabrinus*		r					X															X		
Woodland Jumping Mouse	*Napaeozapus insignis*		r																				X		
Porcupine	*Erethizon dorsatum*		r																				X		
Arctic Skipper	*Carterocephalus palaemon*		r			X							X										X		
Leonardus Skipper	*Hesperia leonardus*		r																				X		
Mulberry Wing	*Poanes massasoit*		P																				X		
West Virginia White	*Pieris virginiensis*	C	P															X				X			
Harvester	*Feniseca tarquinius*		r	X																			X		
Hickory Hairstreak	*Satyrium caryaevorum*		P															X					X		
Aphrodite Fritillary	*Speyeria aphrodite*		r				X		X														X		

Status
N-Nationally Rare
P-Provincally Rare
r-Rare in Old Central Region
V-Nationally Vulnerable
R-Regionally Rare
T-Threatened

Affinities
C-Carolinian
S-Prarie/Savannah
A-Alvar

ESA Abbreviations	
AW	Aberfoyle Woods
BS	Beverly Swamp
BCR	Bronte Creek Ravine/Lowville-Bronte Creek Escarpment Valley
BCV	Bronte Creek Valley
BDF	Brookville Drumlin Field
BS	Brookville Swamp
CP	Calcium Pits
CNF	Carlisle North Forests
CLR	Crawford Lake/Rattlesnake Point Escarpment Woods
FCS	Flamboro Centre Swamp
FEW	Freelton Esker-Wetland Complex
GJW	Guelph Junction Woods
HFC	Hilton Falls Complex
LMM	Lake Medad & Medad Valley
MH	Milton Heights
MS	Moffat Swamp/Moffat Marsh/Fish Hatchery Swamp
MN	Mount Nemo Escarpment Woods
MEW	Mountsberg East Wetlands
MWA	Mountsberg Wildlife Area
PNS	Progreston North Swamp
PSW	Puslinch Southeast Wetland
SNW	Strabane North Wetlands
SSD	Strabane Southwest Drumlin Field

APPENDIX B2

Current Field Data and Information

VEGETATION INVENTORY - LCA 2009-2010

SCIENTIFIC NAME	*COMMON NAME*	*ONTARIO STATUS*	*GLOBAL STATUS*	*COS**	*OMNR*	*Tracked +*	*ONTARIO GENERAL STATUS*	*Coefficient of Wetness*	*Coefficient of Conservatism*	*Introduced (Y/N)*	*VEGETATION AREA*	
											McNiven Road Area	*Southeastern shoulder*
TREES												
Acer negundo	Box Elder (Manitoba Maple)	S5	G5			N	SECURE (01-Mar-00)	-2	0	N		x
Acer saccharum var. saccharum	Sugar Maple	S5	G5T5			N	SECURE (01-Mar-00)	3	4	N		x
Betula papyrifera	Paper Birch	S5	G5			N	SECURE (01-Mar-00)	2	2	N		x
Betula pendula	European White Birch	SNA	GNR			N	EXOTIC (01-Mar-00)	-4	N/A	Y		x
Fraxinus americana	White Ash	S5	G5			N	SECURE (01-Mar-00)	3	4	N		x
Fraxinus pennsylvanica	Green Ash	S5	G5			N	SECURE (01-Mar-00)	-3	3	N	x	x
Juglans nigra	Black Walnut	S4	G5			N	SECURE (19-Apr-00)	3	5	N	x	x
Ostrya virginiana	Eastern Hop-hornbeam	S5	G5			N	SECURE (01-Mar-00)	4	4	N		x
Pinus strobus	Eastern White Pine	S5	G5			N	SECURE (01-Mar-00)	3	4	N		x
Populus deltoides	Eastern Cottonwood	S5	G5			N	SECURE (01-Mar-00)	-1	4	N		x
Populus tremuloides	Trembling Aspen	S5	G5			N	SECURE (01-Mar-00)	0	2	N		x
Prunus serotina	Wild Black Cherry	S5	G5			N	SECURE (01-Mar-00)	3	3	N		x
Quercus bicolor	Swamp White Oak	S4	G5			N	SECURE (19-Apr-00)	-4	8	N	x	x
Quercus macrocarpa	Mossy-cup Oak	S5	G5			N	SECURE (01-Mar-00)	1	5	N		x
Quercus rubra	Northern Red Oak	S5	G5			N	SECURE (01-Mar-00)	3	6	N		x
Robinia pseudoacacia	Black Locust	SNA	G5			N	EXOTIC (01-Mar-00)	N/A	N/A	Y		x
Thuja occidentalis	Eastern White Cedar	S5	G5			N	SECURE (01-Mar-00)	-3	4	N	x	
Tilia americana	American Basswood	S5	G5			N	SECURE (01-Mar-00)	3	4	N	x	x
SHRUBS												
Cornus alternifolia	Alternate-leaf Dogwood	S5	G5			N	SECURE (01-Mar-00)	5	6	N	x	
Crataegus sp.	Hawthorn Species	N/A	N/A			N/A	N/A	N/A	N/A	N/A		x
Lonicera tatarica	Tartarian Honeysuckle	SNA	GNR			N	EXOTIC (01-Mar-00)	3	N/A	Y	x	
Rhamnus cathartica	Buckthorn	SNA	GNR			N	EXOTIC (01-Mar-00)	3	N/A	Y		x
Rhus typhina	Staghorn Sumac	S5	G5			N	SECURE (01-Mar-00)	5	1	N		x
Syringa vulgaris	Common Lilac	SNA	GNR			N	EXOTIC (01-Mar-00)	5	N/A	Y		x
Zanthoxylum americanum	Northern Prickley Ash	S5	G5			N	SECURE	5				x
Ribes hirtellum	Smooth Gooseberry											x
HERBS												
Alliaria petiolata (officinalis)	Garlic Mustard	SNA	GNR			N	EXOTIC (01-Mar-00)	0	N/A	Y	x	
Bromus inermis	Awnless Brome	GNR	SNA			N	SECURE (01-Mar-00)	N/A	N/A	N	x	
Chelidonium majus	Greater Celadine	SNA	GNR			N	EXOTIC (01-Mar-00)	5	N/A	Y		x
Dactylis glomerata	Orchard Grass	SNA	GNR			N	EXOTIC (01-Mar-00)	3	N/A	Y	x	x
Danthonia spicata	Poverty Oatgrass	S5	G5			N	SECURE (01-Mar-00)	5	5	N		
Daucus carota	Wild Carrot	SNA	GNR			N	EXOTIC (01-Mar-00)	5	N/A	Y	x	
Equisetum arvense	Field Horsetail	S5	G5			N	SECURE (01-Mar-00)	0	0	N	x	
Geranium robertianum	Herb-robert	SNA	G5			N	EXOTIC (01-Mar-00)	5	N/A	Y		x
Impatiens capensis	Spotted Jewel-weed	S5	G5			N	SECURE (01-Mar-00)	-3	4	N	x	
Iris versicolor	Blueflag	S5	G5			N	SECURE (01-Mar-00)	-5	5	N	x	
Juncus effusus	Soft Rush	S5	G5			N	SECURE (01-Mar-00)	-5	4	N	x	
Onoclea sensibilis	Sensitive Fern	S5	G5			N	SECURE (01-Mar-00)	-3	4	N	x	
Parthenocissus vitacea	Virginia Creeper	S5	G5			N	N/A	N/A	N/A	N		x
Phalaris arundinacea	Reed Canary Grass	S5	G5			N	SECURE (01-Mar-00)	-4	0	N		x
Poa sp.	Bluegrass species	N/A	N/A			N/A	N/A	N/A	N/A	N/A		x
Rumex crispus	Curly Dock	SNA	GNR			N	EXOTIC (01-Mar-00)	-1	N/A	Y	x	

VEGETATION INVENTORY - LCA 2009-2010

SCIENTIFIC NAME	*COMMON NAME*	*ONTARIO STATUS*	*GLOBAL STATUS*	*COS**	*OMNR*	*Tracked +*	*ONTARIO GENERAL STATUS*	*Coefficient of Wetness*	*Coefficient of Conservatism*	*Introduced (Y/N)*	*VEGETATION AREA*	
											McNiven Road Area	*Southeastern shoulder*
Solanum dulcamara	Climbing Nightshade	SNA	GNR			N	EXOTIC (01-Mar-00)	0	N/A	Y	x	
Sonchus oleraceus	Common Sowthistle	SNA	GNR			N	EXOTIC (01-Mar-00)	3	N/A	Y	x	
Thalictrum pubescens	Tall Meadow-rue	S5	G5			N	SECURE (01-Mar-00)	-2	5	N	x	
Trifolium pratense	Red Clover	SNA	GNR			N	EXOTIC (01-Mar-00)	2	N/A	Y	x	
Tussilago farfara	Colt's Foot	SNA	GNR			N	EXOTIC (01-Mar-00)	3	N/A	Y	x	
Typha latifolia	Broad-leaf Cattail	S5	G5			N	SECURE (01-Mar-00)	-5	3	N	x	
Vitis riparia	Riverbank Grape	S5	G5			N	SECURE (01-Mar-00)	-2	0	N	x	

*COSEWIC status current as of April 2010

*SARO status current as of September 2009

*NHIC current database as of June 2010

Tracked + - N/A refers to those species that did not a record within the NHIC database.

BIRD INVENTORY - LCA 2009-2010

SCIENTIFIC NAME	COMMON NAME	ONTARIO STATUS	GLOBAL STATUS	COSEWIC	OMNR			INTRODUCED	NAI	OPIF	BSC	Area-Sensitive		OBBA			CBC	HABITAT NOTES
					Status	Tracked	Ontario General Status		Significa	BCR 13	Halton		June 3, 8	Confirmed	Probable	Possible	Hamilton	
ANATIDAE																		
Branta canadensis	Canada Goose	S5	G5				SECURE (01-Mar-00)							x			x	spring
Anas platyrhynchos	Mallard	S5	G5				SECURE (01-Mar-00)							x			x	urban-tolerant
PHASIANIDAE																		
Meleagris gallopavo	Wild Turkey	S5	G5				SECURE (01-Mar-00)										x	edge
ARDEIDAE																		
Butorides virescens	Green Heron	S4B	G5				SECURE (01-Mar-00)				Marsh IV				x			marshes and ponds
CATHARTIDAE																		
Cathartes aura	Turkey Vulture	S5B	G5				SECURE (01-Mar-00)				Forest III				x			woodland
ACCIPITRIDAE																		
Accipiter striatus	Sharp-shinned Hawk	S5	G5		NAR		SECURE (01-Mar-00)				Forest II	√			x		x	woodland
Accipiter cooperii	Cooper's Hawk	S4	G5	NAR	NAR		SECURE (01-Mar-00)				Forest III	√				x	x	woodland
Buteo Jamaicensis	Red-tailed Hawk	S5	G5	NAR	NAR		SECURE (01-Mar-00)							x			x	nests/roosts along forest edges, hunts fields
FALCONIDAE																		
Falco sparverius	American Kestrel	S5B	G5	MID			SECURE (01-Mar-00)			x	Open Country II			x			x	nester
CHARADRIIDAE																		
Charadrius vociferus	Killdeer	S5B,S5N	G5	LOW			SECURE (01-Mar-00)						x	x				open fields
SCOLOPACIDAE																		
Actitis macularia	Spotted Sandpiper	S5	G5				SECURE (01-Mar-00)				Open Country III			x				open fields
Gallinago delicata	Wilson's Snipe	S5B	G5				SECURE (01-Mar-00)				Marsh II	(√)			x			early spring breeder; damp areas
Scolopax minor	American Woodcock	S4B	G5				SECURE (01-Mar-00)				Forest IV			x				edges
COLUMBIDAE																		
Columba livia	Rock Pigeon	SNA	G5				EXOTIC (01-Mar-00)	√						x			x	urban-tolerant
Zenaida macroura	Mourning Dove	S5	G5				SECURE (01-Mar-00)						x		x		x	urban-tolerant
STRIGIDAE																		
Megascops (Otus) asio	Eastern Screech-Owl	S5	G5	NAR	NAR		SECURE (01-Mar-00)							x			x	cavity nester
Bubo virginianus	Great Horned Owl	S5	G5				SECURE (01-Mar-00)							x			x	often shares habitat with Red-tailed Hawk
ALCEDINIDAE																		
Ceryle alcyon	Belted Kingfisher	S4B	G5	MID			SECURE (01-Mar-00)			x				x			x	sensitive to water quality; erosion, flood
PICIDAE																		
Melanerpes carolinus	Red-bellied Woodpecker	S4	G5				SECURE (01-Mar-00)				Forest III	√			x		x	woodland; cavity nester
Picoides pubescens	Downy Woodpecker	S5	G5				SECURE (01-Mar-00)						x	x			x	urban-tolerant; cavity nester
Picoides villosus	Hairy Woodpecker	S5	G5				SECURE (01-Mar-00)					√		x			x	woodland; cavity nester
Colaptes auratus	Northern Flicker	S4B	G5				SECURE (01-Mar-00)			x			x	x			x	excavator requiring snags >30cm dbh; ant
TYRANNIDAE																		
Contopus virens	Eastern Wood-Pewee	S4B	G5	HIGH			SECURE (01-Mar-00)			x		(√)	x		x			canopy woodlands; does not nest near development
Myiarchus crinitus	Great Crested Flycatcher	S4B	G5				SECURE (01-Mar-00)					(√)	x	x				woodlands; of conservation concern; cavity nester
Sayornis phoebe	Eastern Phoebe	S5B	G5				SECURE (01-Mar-00)				Forest III			x				urban-tolerant
Tyrannus tyrannus	Eastern Kingbird	S4B	G5	LOW			SECURE (01-Mar-00)			x	Open Country III			x				agricultural land
VIREONIDAE																		
Vireo gilvus	Warbling Vireo	S5B	G5				SECURE (01-Mar-00)							x				urban-tolerant
Vireo olivaceus	Red-eyed Vireo	S5B	G5				SECURE (01-Mar-00)						x	x				woodlots; urban tolernt
LANIIDAE																		
Lanius excubitor	Northern Shrike	SNA	G5				SENSITIVE (01-Mar-00)										x	open country
CORVIDAE																		
Cyanocitta cristata	Blue Jay	S5	G5				SECURE (01-Mar-00)						x	x			x	urban-tolerant
Corvus brachyrhynchos	American Crow	S5B	G5				SECURE (01-Mar-00)						x	x			x	urban-tolerant; gather into winter roosts
ALAUDIDAE																		
Eremophila alpestris	Horned Lark	S5B	G5				SECURE (01-Mar-00)				Open Country III				x		x	fields
HIRUNDINIDAE																		
Progne subis	Purple Martin	S4B	G5				SECURE (01-Mar-00)				Marsh II			x				aerial insectivore; colonial nester
Tachycineta bicolor	Tree Swallow	S4B	G5				SECURE (01-Mar-00)							x				water; urban tolerant
Stelgidopteryx serripennis	Northern Rough-winged Swallo	S4B	G5				SECURE (01-Mar-00)				Open Country II			x				aerial insectivore; semi-colonial
Riparia riparia	Bank Swallow	S4B	G5	HIGH			SECURE (01-Mar-00)			x	Open Country II			x				aerial insectivore; colonial nester
Petrochelidon pyrrhonota	Cliff Swallow	S4B	G5				SECURE (01-Mar-00)				Open Country III				x			tolerant
Hirundo rustica	Barn Swallow	S4B	G5	APR 2011			SECURE (01-Mar-00)				Open Country IV		x	x				tolerant

BIRD INVENTORY - LCA 2009-2010

SCIENTIFIC NAME	COMMON NAME	ONTARIO STATUS	GLOBAL STATUS	COSEWIC	OMNR			INTRODUCED	NAI	OPIF	BSC	Area-Sensitive		OBBA			CBC	HABITAT NOTES
					Status	Tracked	Ontario General Status						Observed	Confirmed	Probable	Possible		
PARIDAE																		
Poecile atricapillus	Black-capped Chickadee	S5	G5				SECURE (01-Mar-00)				Forest IV		x	x			x	cavity nester; urban tolerant
SITTIDAE																		
Sitta canadensis	Red-breasted Nuthatch	S5	G5				SECURE (01-Mar-00)				Forest III	√			x		x	woodland; cavity nester
Sitta carolinensis	White-breasted Nuthatch	S5	G5				SECURE (01-Mar-00)					√		x			x	woodland; cavity nester
CERTHIIDAE																		
Certhia americana	Brown Creeper	S5B	G5				SECURE (01-Mar-00)				Forest II	√			x		x	woodland
TROGLODYTIDAE																		
Thryothorus ludovicianus	Carolina Wren	S4	G5				SECURE (01-Mar-00)				Forest III				x		x	undergoing range expansion
Troglodytes aedon	House Wren	S5B	G5				SECURE (01-Mar-00)						x	x				urban-tolerant
Troglodytes troglodytes	Winter Wren	S5B	G5				SECURE (01-Mar-00)				Forest III	√		x			x	woodland
REGULIDAE																		
Regulus satrapa	Golden-crowned Kinglet	S5B	G5				SECURE (01-Mar-00)					√				x	x	woodland
TURDIDAE																		
Sialia sialis	Eastern Bluebird	S5B	G5	NAR	NAR		SECURE (01-Mar-00)				Open Country I	√		x			x	open country, orchards
Catharus fuscescens	Veery	S4B	G5				SECURE (01-Mar-00)				Forest III	√	x	x				
Turdus migratorius	American Robin	S5B	G5				SECURE (01-Mar-00)						x	x			x	urban-tolerant
MIMIDAE																		
Dumetella carolinensis	Gray Catbird	S4B	G5				SECURE (01-Mar-00)				Forest IV			x				urban-tolerant; fields, shrubby thickets
Mimus polyglottos	Northern Mockingbird	S4	G5				SECURE (01-Mar-00)				Open Country I				x		x	fields, shrubby thickets
Toxostoma rufum	Brown Thrasher	S4B	G5				SECURE (01-Mar-00)			x	Open Country I				x			shrub/successional
STURNIDAE																		
Sturnus vulgaris	European Starling	SNA	G5				EXOTIC (01-Mar-00)	√					x	x			x	urban-tolerant; cavity nester
PARULIDAE																		
Dendroica petechia	Yellow Warbler	S5B	G5				SECURE (01-Mar-00)							x				urban-tolerant; damp areas
Geothlypis trichas	Common Yellowthroat	S5B	G5				SECURE (01-Mar-00)						x	x				damp areas
EMBERIZIDAE																		
Spizella arborea	American Tree Sparrow	S4B	G5				SECURE (01-Mar-00)										x	winter only
Spizella passerina	Chipping Sparrow	S5B	G5				SECURE (01-Mar-00)						x	x				urban-tolerant
Spizella pusilla	Field Sparrow	S4B	G5	MID			SECURE (01-Mar-00)			x	Open Country III	√		x				grassland, shrub/successional
Passerculus sandwichensis	Savannah Sparrow	S4B	G5				SECURE (01-Mar-00)			x	Open Country I	√		x				grassland, fields, may be area-sensitive
Melospiza melodia	Song Sparrow	S5B	G5				SECURE (01-Mar-00)						x	x			x	urban-tolerant
Melospiza georgiana	Swamp Sparrow	S5B	G5				SECURE (01-Mar-00)				Marsh II		x		x			wet areas
Zonotrichia albicollis	White-throated Sparrow	S5B	G5				SECURE (01-Mar-00)				Forest II	√			x		x	woodland
Junco hyemalis	Dark-eyed Junco	S5B	G5				SECURE (01-Mar-00)										x	woodland
Plectrophenax nivalis	Snow Bunting	SNA	G5				UNDETERMINED (01-Mar-00)										x	open country
CARDINALIDAE																		
Cardinalis cardinalis	Northern Cardinal	S5	G5				SECURE (01-Mar-00)						x	x			x	urban-tolerant
Pheucticus ludovicianus	Rose-breasted Grosbeak	S4B	G5				SECURE (01-Mar-00)			x			x	x				woodlands; of conservation concern, may be area-sensitive
Passerina cyanea	Indigo Bunting	S4B	G5				SECURE (01-Mar-00)						x	x				fields, hedgerows, woodlot edges
ICTERIDAE																		
Dolichonyx oryzivorus	Bobolink	S4B	G5	THR			SECURE (01-Mar-00)			x	Open Country II	√			x			grassland
Agelaius phoeniceus	Red-winged Blackbird	S5	G5				SECURE (01-Mar-00)						x	x				near water; urban-tolerant
Sturnella magna	Eastern Meadowlark	S4B	G5	APR 2011			SECURE (01-Mar-00)			x	Open Country III	√			x			grassland
Quiscalus quiscula	Common Grackle	S5B	G5				SECURE (01-Mar-00)						x	x				near water; urban-tolerant
Molothrus ater	Brown-headed Cowbird	S4B	G5				SECURE (01-Mar-00)						x	x			x	urban-tolerant
Icterus galbula	Baltimore Oriole	S4B	G5				SECURE (01-Mar-00)			x				x				like areas; susceptible to pesticides,
FRINGILLIDAE																		
Carpodacus mexicanus	House Finch	SNA	G5				EXOTIC (01-Mar-00)	√							x		x	urban-tolerant
Carduelis flammea	Common Redpoll	S4B	G5				SECURE (01-Mar-00)										x	woodland
Carduelis pinus	Pine Siskin	S4B	G5				SECURE (01-Mar-00)										x	woodland; nomadic
Carduelis tristis	American Goldfinch	S5B	G5				SECURE (01-Mar-00)				Open Country III		x	x			x	urban-tolerant
PASSERIDAE																		
Passer domesticus	House Sparrow	SNA	G5				EXOTIC (01-Mar-00)	√					x	x			x	urban-tolerant

2010; LOW, MID, HIGH =

SARO & NHIC status current as of August 2009

OPIF: Ontario Partners in Flight, 2006

BSC: Conservation Priorities, Niagara, 1999

OBBA: Relevant Ontario Breeding Bird Atlas (2001-2005) 10km X 10km Square

CBC: Possible Wintering Birds Adapted from Audubon Christmas Bird Counts (1998-2008)

List in accordance with the American Ornithologists Union (AOU) 7th edition, 42nd-49th supplements

WILDLIFE INVENTORY -LCA 2009/2010

COMMON NAME	*SCIENTIFIC NAME*	*ONTARIO STATUS*	*GLOBAL STATUS*	*COS*	*SARO*	*Tracked*	*ONTARIO GENERAL STATUS*	*Introduced (Y/N)*	*Observed - LCA 2009/2010*	*Expected but Not Observed***
AMPHIBIANS										
Jefferson Salamander	*Ambystoma jeffersoniamnum*	S2	G4	THR	THR	Y	AT RISK	Y		x
Blue-spotted Salamander	*Ambystoma laterale*	S4	G5			N	SECURE (01-Nov-99)	N		x
Spotted Salamander	*Ambystoma maculatum*	S4	G5			N	SECURE (01-Nov-99)	N		x
American Toad	*Bufo americanus*	S5	G5			N	SECURE (01-Nov-99)	N	x	
Gray Treefrog	*Hyla versicolor*	S5	G5			N	SECURE (01-Nov-99)	N		x
Red-spotted Newt	*Notophthalmus viridescens viridescens*	S5	G5T5			N	N/A	N		x
Eastern Red-backed Salamander	*Plethodon cinereus*	S5	G5			N	SECURE (01-Nov-99)	N		x
Spring Peeper	*Pseudacris crucifer*	S5	G5			N	SECURE (01-Nov-99)	N		x
Western Chorus Frog	*Pseudacris triseriata*	S4	G5	THR	NAR	N	SECURE (01-Nov-99)	N	x	
Green Frog	*Rana clamitans*	S5	G5			N	SECURE (01-Nov-99)	N	x	
Northern Leopard Frog	*Rana pipiens*	S5	G5	NAR	NAR	N	SECURE (01-Nov-99)	N		x
MAMMALS										
Coyote	*Canis latrans*	S5	G5			N	SECURE (no date)	N		x
Virginia Opposum	*Didelphis virginiana*	S4	G5			N	SECURE (no date)	N		x
Big Brown Bat	*Eptesicus fuscus*	S5	G5			N	SECURE (no date)	N		x
Striped Skunk	*Mephitis mephitis*	S5	G5			N	SECURE (no date)	N		x
Meadow Vole	*Microtus pennsylvanicus*	S5	G5			N	SECURE (no date)	N		x
Woodland Vole	*Microtus pinetorum*	S3?	G5	SC	SC	Y	SENSITIVE (no date)	N		x
House Mouse	*Mus musculus*	SNA	G5			N	EXOTIC (no date)	Y		x
Little Brown Bat	*Myotis lucifugus*	S5	G5			N	SECURE (no date)	N		x
White-tailed Deer	*Odocoileus virginianus*	S5	G5			N	SECURE (no date)	N	x (tracks)	
Muskrat	*Ondatra zibethicus*	S5	G5			N	SECURE (no date)	N		x
Raccoon	*Procyon lotor*	S5	G5			N	SECURE (no date)	N	x (tracks)	
Norway Rat	*Rattus norvegicus*	SNA	G5			N	EXOTIC (no date)	Y		x
Grey Squirrel	*Sciurus carolinensis*	S5	G5			N	SECURE (no date)	N		x
Eastern Cottontail	*Sylvilagus floridanus*	S5	G5			N	SECURE (no date)	N		x
Eastern Chipmunk	*Tamias striatus*	S5	G5			N	SECURE (no date)	N		x
Red Squirrel	*Tamiasciurus hudsonicus*	S5	G5			N	SECURE (no date)	N		x
Red Fox	*Vulpes vulpes*	S5	G5			N	SECURE (no date)	N		x
REPTILES										
Snapping Turtle	*Chelydra serpentina*	S3	G5	SC	SC	Y	SECURE (01-Nov-99)	N		x
Midland Painted Turtle	*Chrysemys picta marginata*	S5	G5T5			N	N/A	N		x
Spotted Turtle	*Clemmys guttata*	S3	G5	END	END	Y	N/A	N		x
Milksnake	*Lampropeltis triangulum*	S3	G5	SC	SC	Y	SECURE (01-Nov-99)	N		x
Eastern Gartersnake	*Thamnophis sirtalis sirtalis*	S5	G5T5			N	N/A	N		x

WILDLIFE INVENTORY -LCA 2009/2010

COMMON NAME	*SCIENTIFIC NAME*	*ONTARIO STATUS*	*GLOBAL STATUS*	*COS*	*SARO*	*Tracked*	*ONTARIO GENERAL STATUS*	*Introduced (Y/N)*	*Observed - LCA 2009/2010*	*Expected but Not Observed***
BUTTERFLIES										
Common Wood-Nymph	*Cercyonis pegala*	S5	G5			N	SECURE (no date)	N		x
Spring Azure	*Celastrina ladon*	S5	G4			N	SECURE (no date)	N		x
Orange Sulphur	*Colias eurytheme*	S5	G5			N	SECURE (no date)	N		x
Monarch	*Danaus plexippus*	S4B, S2N	G5	SC	SC	P	SECURE (no date)	N		x
Cabbage White	*Pieris rapae*	SNA	G5			N	EXOTIC	Y		x

** Lewis, J. C., 1991. Guide to the Natural History of the Niagara Region & Dobbyn, J.S., 1994. Atlas of Mammals of Ontario - Used to identify species that can be expected in the study area based on their geographical range and habitat preferences.

Appendix B2

Derry Road NHIC Inquiry (August 2010)

Scientific Name	English Name	G-rank	S-rank	COSEWIC	SARO	EO Rank	EO Rank Date	First Observed Date	Last Observed Date
Seiurus motacilla	Louisiana Waterthrush	G5	S3B	SC	SC	E	11/10/1997	5/29/1991	5/29/1991
Ambystoma hybrid pop. 1	Jefferson X Blue-spotted Salamander, Jefferson genome dominates	GNA	S2			H	1/16/2002	4/11/1978	4/5/1980
Cordulegaster obliqua	Arrowhead Spiketail	G4	S2			H	9/25/2003	1931	1931
Botrychium rugulosum	Rugulose Grapefern	G3	S2			H	1/1/2009	1975	4/13/1976
Carex careyana	Carey's Sedge	G4G5	S2			H	1/1/2009	5/14/1977	6/9/1978
Euonymus atropurpureus	Burning Bush	G5	S3			H	6/25/2001	6/30/1973	6/30/1973
Hypericum prolificum	Shrubby St. John's-wort	G5	S2			H	3/31/1992	1937	8/15/1937
Monarda didyma	Scarlet Beebalm	G5	S3			H	1/1/2009		7/1/1937
Platanthera macrophylla	Large Round-leaved Orchid	G4	S2			H	1/1/2009		7/8/1978

Derry Road - Tree Inventory Along Road Allowance

Species			
Scientific Name	**Common Name**	**DBH**	**notes**
Quercus rubra	Red Oak	30	
Prunus sp.	Cherry sp.	~40	Dead
Prunus sp.	Cherry sp.	~60	3 stem
Pinus sp.	Austria Pines		horticultural variety
Acer saccharum var. saccharum	Sugar Maple	11.5	
Acer saccharum var. saccharum	Sugar Maple	24.5	
Acer saccharum var. saccharum	Sugar Maple	34.5	
Acer saccharum var. saccharum	Sugar Maple	36	
Prunus sp.	Cherry sp.	36	
Quercus rubra	Red Oak	93	
Acer saccharum var. saccharum	Sugar Maple	25	
Acer saccharum var. saccharum	Sugar Maple	18.5	
Acer saccharum var. saccharum	Sugar Maple	21	
Acer saccharum var. saccharum	Sugar Maple	21	
Acer saccharum var. saccharum	Sugar Maple	27	
Acer saccharum var. saccharum	Sugar Maple	21	
Fraxinus americana	White Ash	30.5	
Fraxinus americana	White Ash	30.5	
Acer saccharum var. saccharum	Sugar Maple	59	
Acer saccharum var. saccharum	Sugar Maple	14	
Quercus rubra	Red Oak	46	
Fraxinus americana	White Ash	31.5	
Tilia americana	Basswood	39	
Tilia americana	Basswood	32	3 stem
Quercus rubra	Red Oak	39	
Quercus rubra	Red Oak	53	
Quercus rubra	Red Oak	107	
Tilia americana	Basswood	27	
Quercus rubra	Red Oak	55.5	
Tilia americana	Basswood	30	
Quercus rubra	Red Oak	60	
Quercus rubra	Red Oak	88.5	
Quercus rubra	Red Oak	50	
Quercus rubra	Red Oak	63	
Quercus rubra	Red Oak	63	
Acer saccharum var. saccharum	Sugar maple	24	
Acer saccharum var. saccharum	Sugar Maple	21.5	
Acer saccharum var. saccharum	Sugar Maple	18.5	
Acer saccharum var. saccharum	Sugar Maple	25	
	snag	29	(1 dead cherry, 1 other dead)
Quercus rubra	Red Oak	24	
Tilia americana	Basswood	29	

Derry Road - Tree Inventory Along Road Allowance

Scientific Name	Common Name	DBH	notes
Quercus rubra	Red Oak	36	
Pinus strobus	White pine	48.5	
Tilia americana	Basswood	35/38	2 stem
Tilia americana	Basswood	27	
Tilia americana	Basswood	25/27	2 stem
Tilia americana	Basswood	37	4 stem
Tilia americana	Basswood	45	5 stem
Tilia americana	Basswood	35	
Quercus rubra	Red Oak	21.5	
Tilia americana	Basswood	26	
Quercus rubra	Red Oak	67	
Tilia americana	Basswood	21.5	
Quercus rubra	Red Oak	14	
Quercus rubra	Red Oak	78	
Quercus rubra	Red Oak	80	
Acer saccharum var. saccharum	Sugar Maple	17	
Acer saccharinum	Silver maple	~5cm	3 trees
Pinus strobus	White pine	80	
Acer saccharum var. saccharum	Sugar Maple	5	
Acer saccharum var. saccharum	Sugar Maple	12	
Prunus sp.	Cherry sp.	80	
Acer saccharum var. saccharum	Sugar Maple	15	
Acer saccharum var. saccharum	Sugar Maple	20	
Acer saccharum var. saccharum	Sugar Maple	20	
Fraxinus americana	White Ash	75	
Fraxinus americana	White Ash	18	
Acer saccharum var. saccharum	Sugar Maple	15	
Prunus sp.	Cherry sp.	>100	
Populus x	Poplar	60	
Acer negundo	Manitoba Maple	stress	
Acer negundo	Manitoba Maple	stress	

APPENDIX C

Field Protocols

1.0 SITE RECONNAISSANCE AND PHOTOGRAPHIC RECORD

Site reconnaissance involves an initial site investigation where site features are referenced with existing aerial photographs and OMNR natural areas mapping. Site features are verified and photos are taken that outline key features of the site including vegetation community transition, signs of degradation or human disturbance, and proximity to significant natural heritage areas (locally or provincially significant wetlands, Environmental Sensitive Areas (ESA'S) and Areas of Natural and Scientific Interest (ANSI's).

2.0 VEGETATION IDENTIFICATION AND COMMUNITY CLASSIFICATION

2.1 Vegetation Surveys

Site boundaries and community overviews are initially identified on aerial images of the study area. Site visits are conducted seasonally and involve walking the site with the purpose of covering all habitat types and listing the species found within them. Vouchers are taken for species whose identity is in doubt. Taxa are identified to the species level where possible with the help of a range of field guides identified in the Literature Reviewed section of this Appendix. The use of technical flora guides, such as Britton and Brown (1993) are also useful. Species of unusual size or distribution are photo-documented. Tree diameters are measured at breast height (DBH) in order to ascertain the most common size class characterizing the study area. Dominant species in each vegetation layer, particular species of interest, and especially large-sized trees are also recorded. The plants are classified for global, provincial and regional significance according to the Natural Heritage Information Centre (NHIC, 2000) and local documentation.

2.2 Ecological Land Classification

The vegetation communities on the subject lands are identified and categorized based on the Ecological Land Classification (ELC) System according to the guidelines in the SCSS Field Guide FG-02 (Lee et al. 1998). The biologist conducting the ELC analysis has undertaken a training course under the direction of Harold Lee, Peter Uhlig, Ken Ursic and Dale Leadbeater at Turkey Point in June 2004. Ecological Land Classification is a protocol established for Southern Ontario that considers distribution and abundance of plants in combination with related topography and soil conditions in order to classify plant communities. It was developed for the purpose of creating a comprehensive and consistent province-wide approach for ecosystem description, inventory and interpretation.

Aerial images are consulted to delineate homogeneous polygons. During site visits to these polygons, vegetation communities are classified according to Community Units, which are identified based on the vegetation species present, the dominant species, soil characteristics and hydrology. Plant lists for each vegetation layer are compiled and vegetation is ranked according to its abundance. The plants are identified to the species level by an experienced botanist and are verified according to the plant identification field guides that are listed in the Literature Reviewed section. Representative soil cores are taken using a soil auger to evaluate texture, moisture regime and drainage values. Prism sweeps are conducted to calculate the basal area cover of trees, which allows for determination of the stand composition with a polygon. Trees are also categorized into size classes and estimates are made for prevalence of standing snags and deadfall. ELC polygons are then identified based on the data collected.

3.0 WILDLIFE AND HABITAT SURVEYS

3.1 Breeding Bird Survey Protocols

Breeding bird surveys are conducted using Point Counts in the early morning and late evening to coincide with the breeding activities of most birds in Ontario. The best time for coverage occurs within the first 5 hours after dawn from June through to the middle of July (traditionally July 20; however, the date changes with locale, weather, etc.). Dusk and night visits are necessary for twilight and nocturnal species. Surveys for some species, such as Great Horned Owls, are best conducted February-March.

Point Counts consider birds both heard and seen from a fixed point for a fixed period of time. The Ontario Breeding Bird Atlas (OBBA) point count is for 5 minutes; while 10 minutes is appropriate for general surveys conducted on the study areas. Area searches are also conducted, which occur in a series of three, twenty-minute point counts. The distance between points and the amount of time spent at each spot are defined by the habitat.

Conservatively, all species of birds found in suitable habitat, or singing, are assumed to be breeding if observed between June and July 10th. The breeding bird inventory includes species identified on the subject property and those identified in the adjacent natural areas. As well, all species identified in transit between the proposed site and adjoining field and forest areas are included in the survey, as their nesting sites can not be determined. The Audubon Christmas Bird Count and the Ontario Breeding Bird Atlas (OBBA) are also consulted to ensure that the species inventoried in the study area is comprehensive. Area searches are conducted according to the OBBA 2001-2005 list in accordance with the American Ornithologists Union (AOU) 7th Edition (42nd-47th supplements).

3.2 Reptile and Amphibian Surveys

Amphibian surveys are conducted according to the Marsh Monitoring Program protocols in the morning and at dusk, between the months of May and August, to coincide with the breeding activity of most amphibians in Ontario. Amphibian species presence is identified based on male breeding calls and visual observations. Incidental sightings during the day are also documented. Salamanders and snakes are surveyed by turning over rocks and logs. Amphibian habitat is also documented during field surveys and expected species that are not observed during surveys are documented based on geographic range and available suitable habitat.

3.3 Mammals

Mammal surveys are conducted in the morning and afternoon, in the spring, summer and fall. Mammal species presence is confirmed by sightings, track marks, scat, and evidence of habitat usage (e.g. holes leading to burrows and stick nests). Expected presence of some species is based on habitat quality and potential. Traps are not used for mammal surveying on any study areas. The Atlas of the Mammals of Ontario is consulted to determine the habitat ranges and habitat requirements for mammals. This information is considered in conjunction with the habitat suitability of the site to determine the potential presence of mammals that were not observed through field surveys.

3.4 Wildlife Habitat Determination

Habitat evaluations are conducted using a Wildlife Habitat Evaluation Field Data Form; the time required to complete an evaluation is dependent on the size and complexity of the study site. The field data form consists of five sections: general information, site description, important habitat features, landscape

context and habitat degradation. Vegetation is characterized by estimating the percent cover for trees, shrubs, woody vines, herbaceous plants, mosses and aquatic plants. Soil is characterized according to the data in recent soil survey reports for the general study area.

Important habitat features are determined through use of a checklist that focuses on references to specific wildlife whose habitats depend on each particular feature. For some habitat features, seasonal hydrology is estimated from indicators present during a site visit. Landscape context is divided into habitat continuity and connectivity with adjoining natural habitats. Aerial photographs are consulted for an assessment of the study area and surrounding lands. Habitat degradation includes any evidence of significant chemical contamination, dumping, erosion or sedimentation problems, invasive exotic plants or animals, road or highway disturbance and other human disturbance.

4.0 LITERATURE REVIEWED

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APPENDIX D

Photographic Records (2009-2010)

DERRY ROAD SITE PHOTOGRAPHS

1. Kilbride Creek at McNiven Road culvert facing downstream

2. Kilbride Creek along Derry Road facing upstream

3. Kilbride Creek floodplain area in proximity to Derry Road

4. Existing culvert under Derry Road

DERRY ROAD SITE PHOTOGRAPHS

5. Wetland pond on northwest side of Derry Rd

6. View of vegetation along Derry Road facing southwest

7. Drainage feature with culverts along northeast side of road.

8. Mature trees along southwest edge of Derry Rd.

DERRY ROAD SITE PHOTOGRAPHS

9. View of Derry Road at Milborough Line facing northeast