



## Preliminary Level 2 Natural Environment Report



**File No. 162603782**  
**September 7, 2004**

Prepared for:  
**Lowndes Holdings**

Prepared by:  
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**Stantec**



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LOWNDES HOLDINGS PROPOSED DOLOSTONE QUARRY  
PRELIMINARY LEVEL 2 NATURAL ENVIRONMENT REPORT



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## 1 BACKGROUND

Stantec was retained by Lowndes Holdings Corp. on October 1, 2003 to complete a Scoped Environmental Impact Statement (SEIS) and Levels 1 and 2 Natural Environment Reports that would accompany applications for Amendments to the Town of Flamborough Official Plan and Zoning By-law No. 90-145-Z and for a Category 2, Class “A” Below Groundwater Quarry License under the Aggregate Resources Act. The Subject Lands included in this Preliminary Level 2 Natural Environment Report are located on Part of Lot 1, Lots 2 and 3, Concession 11, Geographic Township of East Flamborough, City of Hamilton, and are shown on Figure 1.

The location of this site falls within the planning areas of the former Town of Flamborough, the City of Hamilton and the Regional Municipality of Hamilton-Wentworth. The Official Plan designations include: Core Natural Area, [including both Environmentally Significant Area (ESA) and Provincially Significant Wetland (PSW) (Figure 2.0)], Mineral Aggregate Resource area, and some prime agricultural lands (Hamilton–Wentworth Official Plan, April 1998). The Subject Lands include Rural Industrial and Open Space Recreational designations in Schedule B, Mineral Aggregates area in Schedule J and Hazard Land in Schedule E of the Town of Flamborough Official Plan (1997).

Category 2 Class ‘A’ licenses are for aggregate operations with extraction below the established water table. The provincial standards of the ARA require a Level 1 Natural Environment Technical Report to determine whether any of the following exist on and/or within 120 m of the site:

- significant wetlands;
- significant portions of the habitat of endangered or threatened species;
- fish habitat;
- significant woodlands;
- significant valleylands;
- significant wildlife habitat; and
- significant Areas of Natural and Scientific Interest (ANSI).

If any of the above features are present, then a Level 2 Natural Environment Technical Report is required to:

- determine the degree of impact on the natural features or ecological functions; and
- propose any preventative, mitigative or remedial measures that may be necessary.

In addition to the Aggregate Resources Act (ARA), this report addresses the Provincial Policy Statement and issues that are to be addressed in accordance with the Official Plans under municipal planning processes. As part of the Level 1 background review for this site, several of the features listed above were determined to occur either on or within the 120 m surrounding the proposed extraction site. This triggered the initiation of this Preliminary Level 2 Natural Environment Report. A scoped EIS (SEIS) will be prepared, in consultation with the Hamilton ESAIEG, in accordance with the Official Plan. This Preliminary report was prepared to accompany the planning amendment applications, to enable consultation with the City and other agencies having jurisdiction, prior to completion of an SEIS/Level 2 Report.



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## 1.1 SITE RECONNAISSANCE AND SURVEYS

An initial site field visit was made on October 2, 2003. The visit provided Stantec staff with an overview of the site and the surrounding area. Potential issues pertaining to site development, such as environmental opportunities and constraints were discussed with the proponent. Following site reconnaissance, site-specific visits were made (listed below), assisted by detailed topographic mapping and November 2003 digital orthophoto mapping of the site and the adjacent lands:

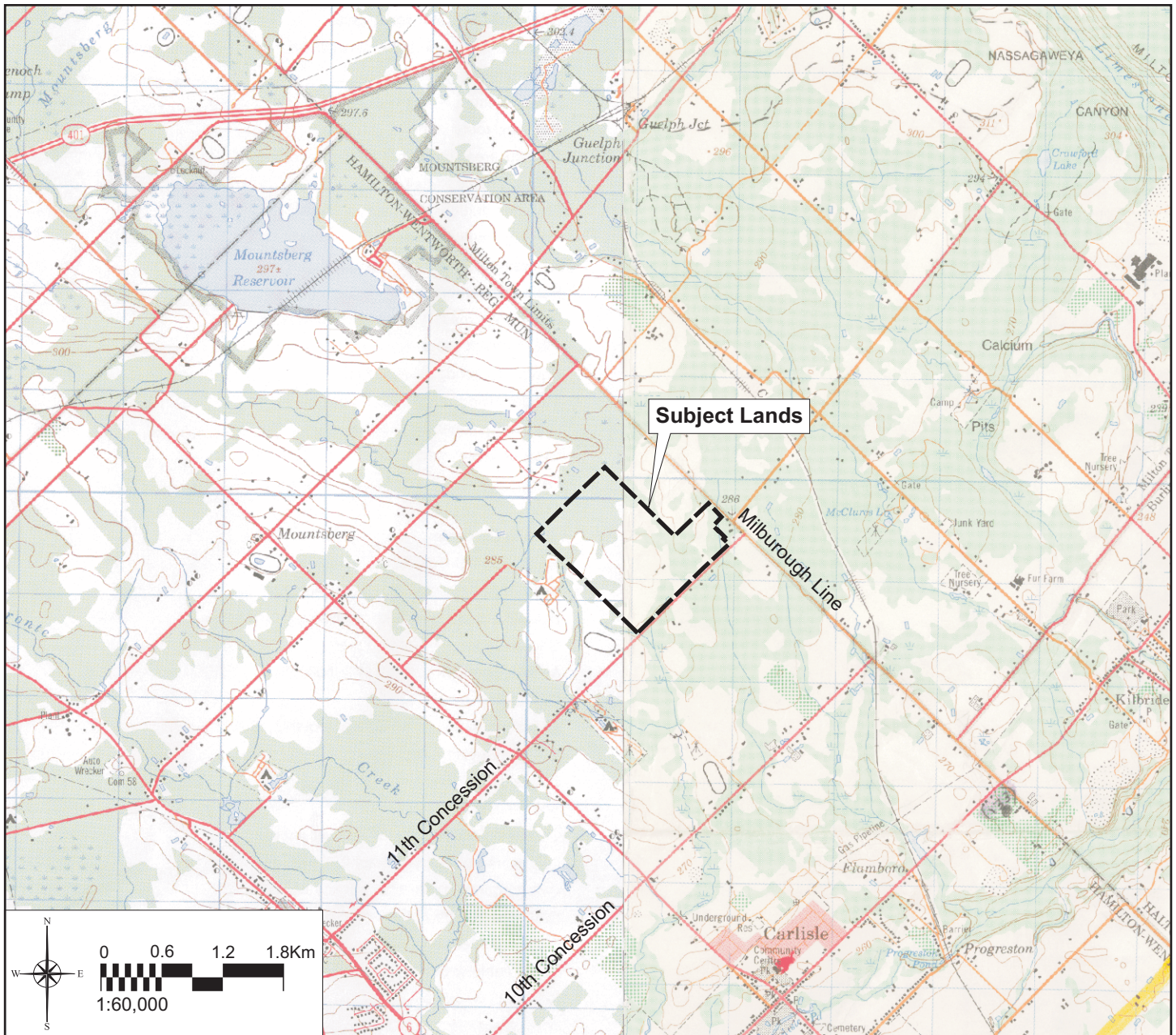
- **October 16 and 23, 2003:** preliminary ELC mapping and fall botanical survey;
- **October 30, 2003:** aquatic habitat assessment;
- **November 25, 2003:** Redd survey, additional habitat assessments and surface water monitoring;
- **January 15, 2004:** aquatic habitat assessment;
- **February 27, March 1 and 4, 2004:** deer yard survey and stream temperature measurements;
- **April 14 and 15, 2004:** salamander egg mass survey;
- **April 14, May 12 and June 16, 2004:** Frog call count survey;
- **April 14, 2004:** Owl survey;
- **May 12, 2004:** Red-shouldered hawk call response and nest survey;
- **May 13 and 14, 2004:** Spring botanical survey;
- **June 9, 10 and 11, 2004:** Benthic sampling;
- **June 15, 16 and 17, 2004:** Fisheries Inventory and Habitat Mapping; and
- **July 1 and 2, 2004:** Breeding Bird Survey.

## 1.2 METHODOLOGY

### 1.2.1 Flora and Vegetation

Field investigations for this project were conducted to confirm and assess the character of existing conditions. The work included Ecological Land Classification (ELC) of vegetation communities and a floristic survey of the Subject Lands and immediate vicinity. Vegetation communities were delineated on aerial photographs (November 2003, 1:20,000) and checked in the field; community characterizations (ecosites and ecotypes) were then based on the Ecological Land Classification for Southern Ontario (ELC) (Lee et al., 1998). Common and Latin nomenclature of plant species generally follows Newmaster et al. (1998). A complete list of the plant species recorded during fall 2003 surveys on the Subject Lands can be found in Appendix A. This appendix and related discussions will be expanded in the final report, based on further ongoing seasonal botanical surveys.

Natural heritage information collected from the Subject Lands was evaluated to determine potential significance at a number of different levels. Provincial significance of vegetation communities was based on the draft rankings assigned by the Natural Heritage Information Centre (Bakowsky, 1996). Identification of potentially sensitive plant species is based on assignment of a coefficient of conservatism (CC) to each native species in southern Ontario (Oldham et al., 1995). The value of CC ranging from 0 (low) to 10 (high), is based on a species' tolerance of disturbance and fidelity to a specific natural habitat.



Source: NRCan Topographic Maps, Cambridge, 40 P/8 and Energy, Mines and Resources Canada, Hamilton-Burlington, 30 M/5 - Original Scale 1:50,000.

**INDEX MAP OF SOUTHERN ONTARIO**



REVISION NO.	REVISION DATE	DESCRIPTION	REVISED BY:
1	July 22, 2004	Update boundary	CEW

PROJECT NAME:  
**PROPOSED DOLOSTONE QUARRY**  
 CLIENT NAME:

**LOWNDES HOLDINGS**  
 15-5400 MILLCREEK DRIVE, MISSISSAUGA, ONTARIO

DATE INITIATED: **NOVEMBER, 2003**  
 FILENAME: **62603782\_02.cdr**

FIGURE NO. **1.0**

**LOCATION OF SUBJECT LANDS**

SCALE:	PROJECT NO.:			
AS SHOWN	162603782			
REV. NO.	SHEET NO.	CHECKED BY:	APPROVED:	DRAWN BY:
1	1 OF 1	NS	NS	CEW





**--- Subject Lands**

**||| Environmentally Sensitive Area**  
(Source: Bronte Creek Watershed Study; Ministry of Natural Resources Region of Halton, City of Hamilton and Conservation Halton)

**Provincially Significant Wetland**  
(Source: Bronte Creek Watershed Study; Ministry of Natural Resources and Conservation Halton)

**Deer Wintering Area**



PROJECT NAME:  
**PROPOSED DOLOSTONE QUARRY**

CLIENT NAME:

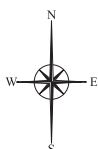
DATE INITIATED: **NOVEMBER, 2003** FILENAME: **62603782\_05.cdr** FIGURE NO. **2.0**

**LOWNDES HOLDINGS**  
 15-5400 MILLCREEK DRIVE, MISSISSAUGA, ONTARIO

# SPECIAL FEATURES

REVISION NO.	REVISION DATE	DESCRIPTION	REVISED BY:
1	January 14, 2004	Add Deer Wintering Area	CEW
2	March 19, 2004	Update 2003 color photobase	JEW
3	July 22, 2004	Update photo and boundary	CEW

REV. NO.	SHEET NO.	DRAWN BY:	CHECKED BY:	APPROVED:	SCALE:	PROJECT NO.:
3	1 OF 1	AM	NS	NS	AS SHOWN	62603782





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## 1.2.2 Terrestrial Wildlife

Background materials were reviewed to identify potentially important habitats. For example, according to the Hamilton-Wentworth Natural Areas Inventory, the Subject Lands contain portions of two locally significant Deer Wintering Ranges. The forested areas at the north end of the Subject Lands were flagged as containing interior forest habitat (Conservation Halton, 2002) and as such, have the potential to provide habitat for area sensitive and forest interior bird species. Studies of site specific conditions were undertaken to validate background data collection results. The studies completed are outlined in the following:

### *1.2.2.1 Deer Wintering Area Survey*

Winter surveys were conducted on February 27, March 1 and March 4, 2004. The primary goal of the survey was to determine the suitability of these areas as deer wintering habitat. The suitability of habitat was determined through an analysis of the coniferous cover in the woodlot, the availability of food sources, and the relative density of the deer population in relation to the habitats carrying capacity. This analysis was completed using the transect method. More details regarding this survey can be found in Appendix C.

### *1.2.2.2 Salamander Survey*

A salamander survey was completed for this site on April 14 and 15, 2004. This survey consisted of a wandering transect method to inspect all vernal pools for the presence of amphibian egg masses, with special attention to potential Jefferson Salamander egg masses. Three Stantec Consulting ecologists completed this study and one egg mass was collected under a Scientific Collectors Permit, issued by the Ontario Ministry of Natural Resources (OMNR).

### *1.2.2.3 Owl Survey*

An owl call survey was completed on the night of April 14, 2004 at two locations on the Subject Lands. The taped callback method is effective for large areas of forest and was therefore completed in the southeast and northern portions of the property.

### *1.2.2.4 Frog Call Survey*

Three frog call surveys were completed for this site on April 14, May 12 and June 16, 2004. Five locations were surveyed on each evening survey.

### *1.2.2.5 Red-Shouldered Hawk Survey*

A Red-shouldered Hawk survey was completed for this site on May 12, 2004. This survey consisted of a wandering transect method throughout the forested portions of this site. A recorded callback tape was played at intervals along this transect and a nest observation survey was completed to determine if any hawks were using the Subject Lands for breeding.

### *1.2.2.6 Breeding Bird Survey*

Breeding bird surveys were conducted on July 1 and 2, 2004. The July 1 survey was conducted between 06:00-10:00, and the initial weather was overcast, with a very light breeze (Beaufort scale 1), and a temperature of approximately 17°C, with a clearing and warming trend through the morning. The weather during the July 2 survey (06:10-07:30) was calm and clear, with a temperature of approximately 16°C. There was good bird song activity on both days.





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This survey consisted of an ecologist surveying the entire site in a systematic manner recording any bird species that were either seen or heard. A conservative approach to determining breeding status was taken; all birds seen or heard in appropriate habitat during the breeding season were assumed to be breeding.

### 1.2.3 Aquatic

Stantec Consulting completed fisheries inventories and habitat assessments (October 30 and November 25, 2003, January 15 and June 15-17, 2004) and benthic invertebrate sampling (June 9-11, 2004) for the surface water features located on and adjacent to the Subject Lands, with particular emphasis on the tributary in the northwest corner of the Subject Lands. Detailed methods are provided in Appendix D.

A few components of the aquatic field program are still underway. Benthic samples were collected in early June 2004 and were sent to a qualified taxonomist (Zaranko Environmental Assessment Services) for analysis. Results are expected from the lab later this summer. Temperature dataloggers were strategically placed at five locations within the vicinity of the Subject Lands to determine the thermal regime of surface water features that have the potential to be cool/cold water. The data obtained from these loggers will be analysed this fall.

Within each reach, observations were noted on numerous attributes. The presence or absence of redds were noted for stream reaches that would provide suitable habitat for spawning salmonid species of fish. Information collected from the Subject Lands and the Bronte Creek Watershed Study (BCWS) (Conservation Halton 2002) were evaluated to confirm potential significance of the aquatic features.

### 1.2.4 Surface Water Monitoring Program

An extensive surface water monitoring program was established for this site in the fall of 2003 in association with Gartner Lee Limited, a firm retained by Lowndes Holding Corp., to prepare a corresponding Interim Hydrogeological Assessment. This program includes measurements for flow, temperature and water levels in the watercourses surrounding the site. Water levels and flows were monitored at all of the locations during the pump test in April, and as part of the fisheries program through to July 2004.



## **2 PRELIMINARY LEVEL 2 REPORT SUMMARY**

This Preliminary Level 2 Report was completed to accompany a complete Official Plan Amendment Application, as set out in the Town of Flamborough Official Plan, Section B.7. This will facilitate discussions with ESAIEG and other agencies, so that the details of a final EIS/Level 2 report can be resolved, while additional field studies and synthesis are being completed.



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### 3 SITE CONDITIONS

The Subject Lands included in this Preliminary Level 2 report are located on Part of Lot 1, Lots 2 and 3, Concession 11, Geographic Township of East Flamborough, City of Hamilton and are shown on Figure 1.0. The site is located west of Milborough Line and north of 11<sup>th</sup> Concession in the former Town of Flamborough, which is now part of the City of Hamilton planning area. The Subject Lands cover an area of approximately 154 ha.

#### 3.1 SURFACE WATER

The Subject Lands are located within the upper Bronte Creek Watershed. The majority of the lands occur in the Mountsberg Creek Subwatershed, except for the southeast corner, which is part of the Flamboro Creek Subwatershed. The headwaters of a tributary of Mountsberg Creek (Tributary A) are located in the wetlands in the northern portion of the Subject Lands, and flow offsite into Mountsberg Creek. This subwatershed flows through the settlement areas of Brookville, Carlisle, Darbyville and Moffat covering an area of 46.7 square kilometers within the Bronte Creek Watershed. The Flamboro Creek watershed encompasses an area of 8.7 square kilometers, originating in the Carlisle North Wetland complex/ESA of the Flamborough Plain and flowing into Bronte Creek downstream of Progreton.

Hydrogeological investigation suggests that the PSW and streams on the north and southeastern portions of the property could be directly connected to the water table, because the water levels in the wetland fairly closely match the ground water table elevations (Gartner Lee, 2004). Seasonal monitoring of ground water and surface water is ongoing to confirm this connection.

#### 3.2 VEGETATION COMMUNITIES

The Subject Lands are located in the Niagara Section of the Deciduous Forest Region (Rowe 1972). The vegetation communities recognized on the site, based on the Ecological Land Classification (ELC) system, are shown on Figure 3 (some additional delineations/updates are ongoing at the time of writing of this report). The Subject Lands are generally comprised of the centrally located agricultural lands surrounded by forest, cultural meadow and cultural thicket. Based on their origin, the forests can be divided into two major groups: naturally-occurring and regenerating. The first are either deciduous (e.g. red maple, elm) or mixed (e.g. white cedar, ash, elm) swamps located along the northern boundary, or upland forests (e.g. sugar maple, trembling aspen, elm, ash, white birch) along the eastern boundary. The second group of forests is represented by the variously composed mixed communities (white pine, white cedar, sugar maple, aspen, birch) that have reclaimed the formerly cleared land in the north-central portion of the lands or that are associated with historical plantations through natural succession. The soil is generally thin in the majority of the communities, as the site is strongly bedrock-controlled.

#### 3.3 VASCULAR PLANT SPECIES

One-hundred-and-seventy-four species of vascular plants were recorded from the Subject Lands during the fall 2003 inventories. A high proportion (29%, or 50 species) of the species recorded are non-native, which reflects the anthropogenic nature of the past and present land use and ongoing disturbances, in the form of access, use for agriculture, crop field abandonment and subsequent succession to cultural old field meadows. Most of the native species occur in the deciduous and mixed forests and swamps, as well as meadow marshes.



None of the plant species encountered to date is considered significant at national or provincial levels. All but four of the vascular plant species recorded are ranked “S5”, very common in Ontario and demonstrably secure. Those additional four species are designated “S4”, referring to uncommon to locally common in Ontario:

- Black maple (*Acer saccharum* ssp. *nigrum*) (an “S4?” species - common and apparently secure with some degree of uncertainty, flagged with “?”) – a small sapling was observed close to the southern boundary of the lands, between units FOD and FOM7-2;
- Leatherwood (*Dirca palustris*) (an “S4?” species - common and apparently secure with some degree of uncertainty, flagged with “?”) – a single plant found in the sugar maple forest unit FOD5-1 along the northern boundary of the lands;
- Wood reed grass (*Cinna arundinacea*) – common in the red maple swamp unit SWD3-1 in the north-west sector of the site; and
- Herbaceous carrion flower (*Smilax herbacea*) – a few individuals were found within the hedgerow in the west-central portion, and in the sugar maple stand immediately northeast of the reed-cannary grass meadow MAM2-2.

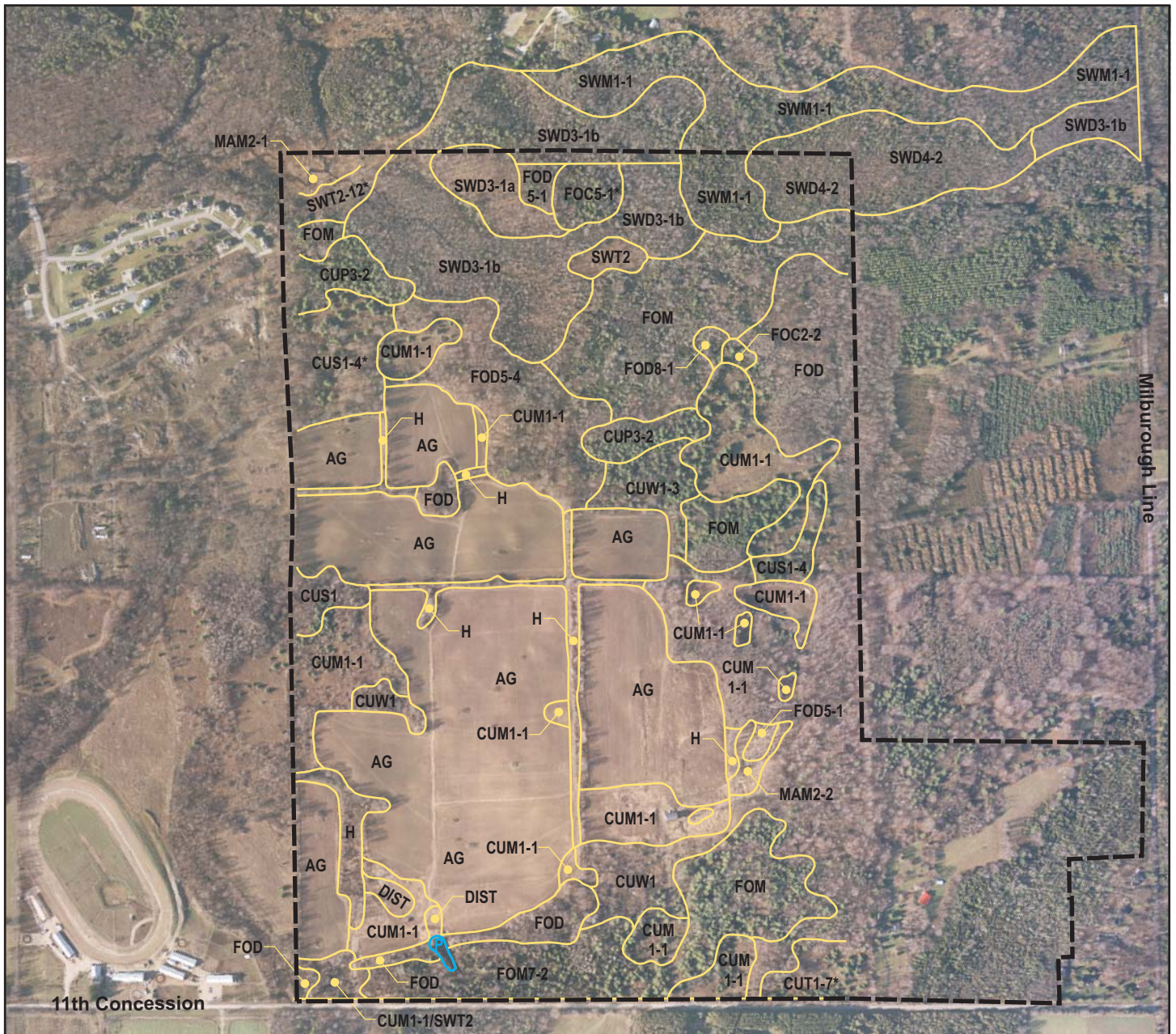
A complete list of plant species recorded from the Subject Lands during the fall 2003 inventory is provided in Appendix A. This list is being revised and expanded to incorporate additional field data collected in 2004.

### 3.4 WILDLIFE

#### 3.4.1 Deer Wintering Area

A Deer Wintering Area Survey was conducted by Stantec Consulting within the MNR designated Guelph Junction and Hilton Falls-Speyside locally significant wintering areas on the Subject Lands (Figure 4.0, Appendix C). The identified areas occur along the northern boundary of the Subject Lands, and along the eastern boundary. In total, these areas comprise approximately 45 ha of the Subject Lands.

Coniferous cover with the main deer wintering area (the northern portion of the site) on the Subject Lands is good. The mixed forest (FOM, Figure 3), centrally located on the site, provides varied coniferous cover and includes such species as eastern hemlock and eastern white cedar. These coniferous species provide between 40% and 50% canopy cover in various areas. This mixed forest also links to an eastern white cedar hardwood mixed swamp (SWM 1-1, Figure 3), which likely provides cover for deer in winters with high snowfall. This mixed swamp community continues off the property as well. Deer beds were noted along transects 2 through 7, inclusive, which traversed this mixed forest community (Figure 4). These were generally located beneath clumps of eastern white cedar or hemlock trees. The other wintering area between Milborough Road and 11 Concession E is composed of dense eastern white cedar and as with the swamp community (SWM 1-1) is likely used in harsh winters for cover and feeding.



Source:

**VEGETATION COMMUNITIES**

**TERRESTRIAL**

- Coniferous Forest (FOC)
- FOC2-2 Dry Fresh White Cedar Coniferous Forest
- FOC5-1\* Fresh Moist White Pine Coniferous Forest
- Mixed Forest (FOM)
- FOM Mixed Forest
- FOM7-2 Fresh Moist White Cedar Hardwood Mixed Forest
- Deciduous Forest (FOD)
- FOD Deciduous Forest
- FOD5-1 Dry Fresh Sugar Maple Deciduous Forest
- FOD5-4 Dry Fresh Sugar Maple Ironwood Deciduous Forest
- FOD8-1 Fresh Moist Poplar Deciduous Forest

**CULTURAL**

- Cultural Plantation (CUP)
- CUP3-2 White Pine Coniferous Plantation
- Cultural Meadow (CUM)

- CUM1-1 Dry Moist Old Field Meadow
- Cultural Thicket (CUT)
- CUT1-7\* White Ash White Elm Cultural Thicket
- Cultural Savanna (CUS)
- CUS1 Mineral Cultural Savanna
- CUS1-4\* White Pine Cultural Savanna
- Cultural Woodland (CUW)
- CUW1 Mineral Cultural Woodland
- CUW1-3\* White Pine Cultural Woodland

**WETLANDS**

- Mixed Swamp(SWM)
- SWM1-1 White Cedar Hardwood Mineral Mixed Swamp
- Deciduous Swamp (SWD)
- SWD3-1a Red Maple Mineral Deciduous Swamp (Graminoid Variant)
- SWD3-1b Red Maple Mineral Deciduous Swamp (Forb Variant)
- SWD4-2 White Elm Mineral Deciduous Swamp
- Thicket Swamp (SWT)

- SWT2 Mineral Thicket Swamp
- SWT2-12\* White Elm Mineral Thicket Swamp
- Meadow Marsh (MAM)
- MAM2-1 Bluejoint Mineral Meadow Marsh
- MAM2-2 Reed-canary Grass Mineral Meadow Marsh

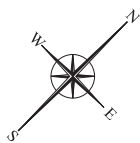
**Other**

- AG Agricultural
- H Hedgerow
- P Pond
- DIST Disturbed

\*not listed in Southern Ontario ELC



--- Subject Lands



PROJECT NAME:  
**PROPOSED DOLOSTONE QUARRY**

CLIENT NAME:



REVISION NO. REVISION DATE DESCRIPTION REVISION BY:

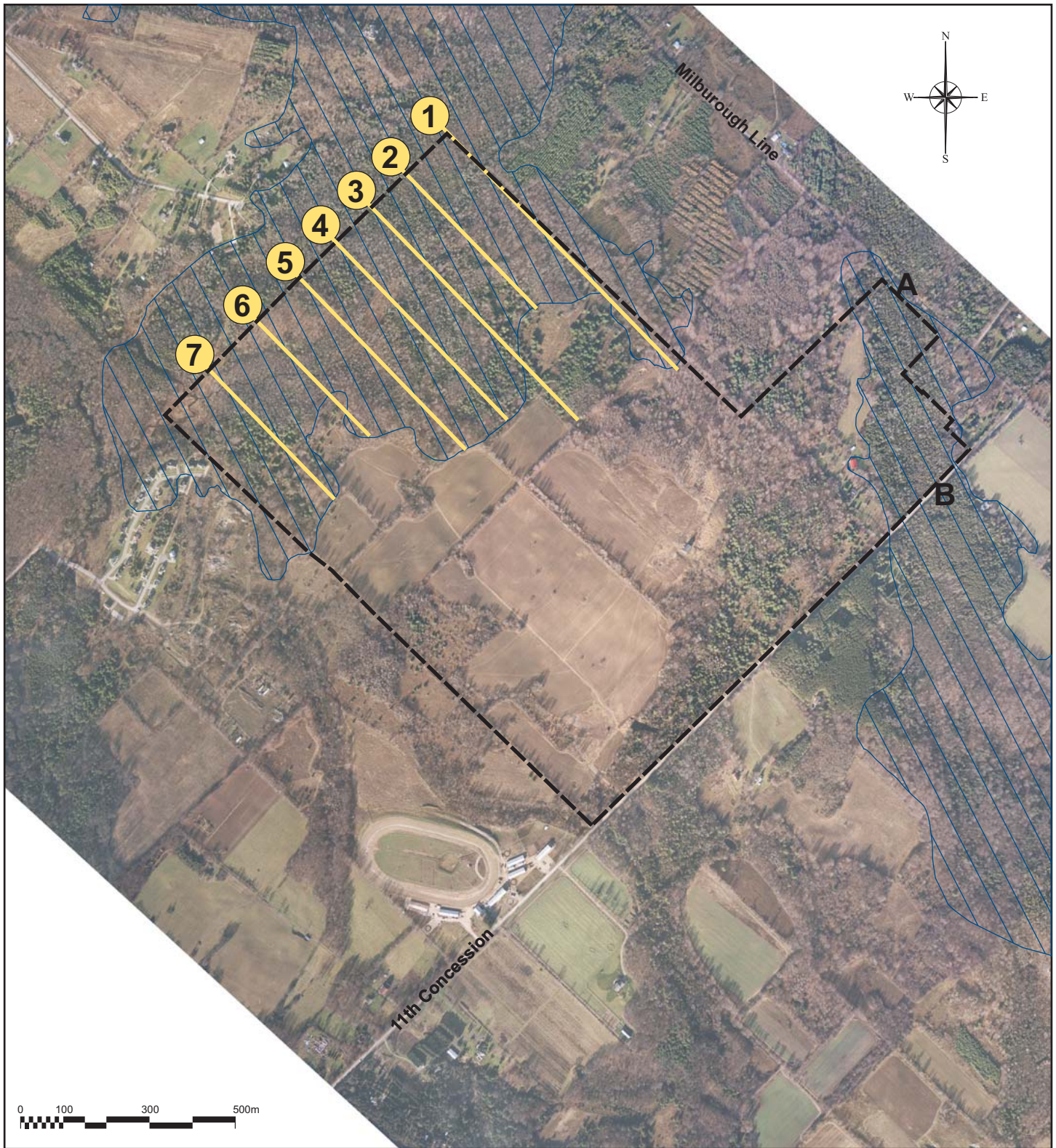
DATE INITIATED:  
**NOVEMBER, 2003**

FILENAME:  
**62603782\_03.cdr**

FIGURE NO. **3.0**

# VEGETATION COMMUNITIES

REV. NO. SHEET NO. DRAWN BY: CHECKED BY: APPROVED: SCALE: PROJECT NO.:  
0 1 OF 1 CEW CZ CZ AS SHOWN 62603782



- Subject Lands
- Deer Wintering Area

- 1 Approximate Transect Location
- A** Observation Locations

PROJECT NAME:  
**PROPOSED DOLOSTONE QUARRY**

DATE INITIATED:  
**MARCH, 2004**

FILENAME:  
**62603782\_08.cdr**

FIGURE NO. **4.0**

CLIENT NAME:  
**LOWNDES HOLDINGS**  
 15-5400 MILLCREEK DRIVE, MISSISSAUGA, ONTARIO



REVISION NO.	REVISION DATE	DESCRIPTION	REVISED BY:
1	March 19, 2004	Updated 2003 Color photobase	JEW
2	July 22, 2004	Update Photo and Boundary	CEW

REV. NO.	SHEET NO.	DRAWN BY:	CHECKED BY:	APPROVED:	SCALE:	PROJECT NO.:
2	1 OF 1	CEW	LC	LC	AS SHOWN	62603782

# DEER YARD SURVEY



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In the winter deer must subsist on low quality food. The major food source at this time of year includes the woody twigs and buds of deciduous trees and shrubs and conifer leaves such as eastern white cedar and hemlock (Voigt et al., 1997). This site presents a good mix of coniferous and deciduous forage. Deer browse of the deciduous cover was noted throughout the deciduous swamps and upland forest areas, and consisted mainly of red osier dogwood and leatherwood.

Through the number of beds noted, scat counted and trails crossed it is likely that the deer wintering area surveyed supports a population of between 10 and 20 deer. This approximate number is for a mild winter, in which other less suitable areas are probably also in use in the surrounding landscape. It is likely that deer off site also use the deer wintering areas in varying seasonal conditions.

### 3.4.2 Breeding Birds

A complete list of the birds observed is found in Appendix B. A conservative approach to determining breeding status was taken; all birds seen or heard in appropriate habitat during the breeding season were assumed to be breeding.

Fifty-nine species of birds were observed, with 54 species likely breeding on site. All the species are ranked S5, very common and demonstrably secure in Ontario, or S4, common and apparently secure, except for the European Starling which is SE, exotic and not a native component of Ontario's fauna.

Eight area-sensitive forest breeding birds (Broad-winged Hawk, Whip-poor-will, Yellow-bellied Sapsucker, Pileated Woodpecker, Ovenbird, Northern Waterthrush, Mourning Warbler and Scarlet Tanager) were observed during the breeding season. These species require a minimum of 20 ha of suitable forest habitat for breeding. All of these species were observed in the northern part of the Subject Lands, in the wooded upland and lowland habitat associated with Tributary A. Additionally, numerous Ovenbirds and one Scarlet Tanager were noted in the upland habitat on the east side of the property. Several Northern Waterthrushes were adjacent to Flamboro Creek. Pileated Woodpeckers were observed crossing cleared parts of the site in several locations, between wooded features.

Twelve species are considered to be locally significant in the City of Hamilton (Curry, unpublished, September 2002); Wood Duck, Turkey Vulture, Broad-winged Hawk, Eastern Screech-owl, Whip-poor-will, Belted Kingfisher, Yellow-bellied Sapsucker, Pileated Woodpecker, Chestnut-sided Warbler, Mourning Warbler, Scarlet Tanager and Eastern Towhee.

The Broad-winged Hawk, while common, is a forest-nesting raptor, which is relatively more sensitive to disturbance and requires specialized nesting habitat (Ontario Ministry of Natural Resources. 2000. Significant Wildlife Habitat Technical Guide. 151 p.). This species was observed in the CUP 3-2 unit in the northwest corner of the Subject Lands (Figure 3.0). Based on the presence of this species as well as a diverse community of other area-sensitive forest birds and locally significant species, the forested habitat on site, particularly that in the northern third of the Subject Lands, may be considered to provide significant wildlife habitat.

### 3.4.3 Amphibians, Reptiles and Mammals

The frog surveys recorded seven common amphibian species, including: wood frog, spring peeper, grey tree frog, pickerel frog, leopard frog, American toad and green frog. All of the frog call count locations correspond to areas identified as either wetland or watercourse/pond (Figure 5.0).



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Eight amphibians, one reptile and evidence of eleven mammals were recorded on the Subject Lands. An egg mass collected from the site was raised at the University of Guelph, with the result of no viable larvae, suggesting the presence of Jefferson/Blue-spotted salamander polyploids. As the eggs did not mature, it is not possible to conclusively state that only polyploids might be present. The location of the collection is shown on Figure 5.0.

### 3.5 FISHERIES

There are several components to the aquatic baseline study, benthic invertebrate sampling, fisheries inventories, fisheries habitat assessment and temperature regime estimates. Benthic invertebrate sampling was performed to assess general stream health and quality as well as its ability to support a fish population. Fisheries inventories and habitat assessments were needed to identify the diversity and relative abundance of fishes in the area as well as to identify critical habitats such as spawning, nursery and winter/summer refuge sites. The benthic invertebrate sampling was performed on the 9th, 10th and 11th of June 2004 at several locations on the six tributaries on or near the proposed lands. Fisheries inventories and habitat mapping occurred on the 15th, 16th, and 17th at several locations throughout the same tributaries as the benthic sampling. The general scope and inventory results of the aforementioned work are described below and summarized in Table 1. Station locations are provided in Figure 6.0. Detailed results and a complete list of all fish species recorded as part of the aquatic surveys can be found in Appendix D.

**Tributary A** contained two benthic sampling stations, two fisheries inventory/habitat stations and temperature logger. Three species of fish were captured during the inventory, *Catostomus commersoni* (white sucker), *Margariscus margarita* (pearl dace) and *Umbra limi* (central mudminnow).

**Tributary B** contained one benthic sampling station and one fisheries inventory/habitat station. Most of tributary B contained no water; as a result sampling was restricted to area immediately upstream of the 11<sup>th</sup> Concession. No fish were captured in this tributary.

**Tributary C** contained one benthic sampling station and one fisheries inventory/habitat station. No fish were captured in this tributary.

**Tributary D** contained two benthic sampling locations, three fisheries inventory/habitat locations and a temperature logger. The extra fisheries location is the online pond found within the tributary. One fish species was captured during the inventory; it was *Culaea inconstans* (brook stickleback).

**Mountsberg Creek** contained three benthic sampling locations, three fisheries inventory/habitat locations and two temperature loggers. Several warmwater fish species were caught during the field inventory (Table 1). Additional comments are provided in section 3.5.1.

**Flamboro Creek** contained three benthic sampling locations, four fisheries inventory/habitat locations and a temperature logger. Two fish species were captured in Flamboro Creek during the inventory, *Culaea inconstans* (brook stickleback) and *Rhinichthys atratulus* (blacknose dace). Additional comments are provided in section 3.5.2.





- Subject Lands
- ⊗ Salamander survey locations
- ⊗<sup>1</sup> Salamander sampling location
- ×<sup>1</sup> Frog call count stations
- <sup>1</sup> Owl survey locations
- ..... RSHA route



Source: 2003 Air Photo, Original Scale 1:12,000.

REVISION NO.	REVISION DATE	DESCRIPTION	REVISED BY:
1	March 19, 2003	Update 2003 color photos	JEW
2	July 22, 2004	Revise Boundary	CEW

PROJECT NAME:  
**PROPOSED DOLOSTONE QUARRY**

CLIENT NAME:  
**LOWNDES HOLDINGS**

15-5400 MILLCREEK DRIVE, MISSISSAUGA, ONTARIO

DATE INITIATED: **MAY, 2004** FILENAME: **62603782\_09.cdr**

FIGURE NO. **5.0**

# SALAMANDER STUDY

SCALE:		PROJECT NO.:		
AS SHOWN		62603782		
REV. NO.	SHEET NO.	CHECKED BY:	APPROVED:	DRAWN BY:
2	1 OF 1	CC	CC	JEW



- Subject Lands
- T1 Reaches
- Surface Monitoring Stations
- Redd Survey
- A2 Benthic Station
- M3 Fish Inventory and/or Fisheries Habitat Assessment
- Temperature Data Logger



Source: 2003 Air Photo, Original Scale 1:12,000.

REVISION NO.	REVISION DATE	DESCRIPTION	REVISED BY:
1	March 19, 2003	Update 2003 color photos	JEW
2	July 22, 2004	Update boundary	CEW
3	August 3, 2004	Edits to features as per CC	CEW

PROJECT NAME:  
**PROPOSED DOLOSTONE QUARRY**

CLIENT NAME:  
**LOWNDES HOLDINGS**

15-5400 MILLCREEK DRIVE, MISSISSAUGA, ONTARIO

DATE INITIATED: **NOVEMBER, 2003** FILENAME: **62603782\_04.cdr**

FIGURE NO. **6.0**

# AQUATIC SURVEY STATION LOCATIONS

SCALE:	PROJECT NO.:			
AS SHOWN	62603782			
REV. NO.	SHEET NO.	CHECKED BY:	APPROVED:	DRAWN BY:
3	1 OF 1	CC	CC	CEW

**M1** Located at 10th Concession Road Crossing

**F1** Located at 10th Concession Road Crossing



**Table 1. Fisheries Inventory Results (June 2004). Number of Each Species Caught Within Each Reach**

Species	Reach														Totals
	A1	A2	B1	C1	D1	D2	F1	F2	F3	F4	M1	M2	M3	Pond	
Blacknose dace								3	94	1			11		109
Blacknose shiner											4				4
Bluntnose minnow											4	7	6		17
Brassy minnow												2			2
Brook stickleback					3			5	5					5	18
Central mud minnow	7											1	10		18
Common shiner												39	11		50
Creek chub												47	21		68
Fathead minnow												1			1
Horny head chub													1		1
Johnny darter											6	18	4		28
Longnose dace												22	2		24
Northern hog sucker											1	7	1		9
Northern redbelly dace												1			1
Northern pike												1			1
Pearl dace	19	7										2	10		38
Pumpkinseed													3		3
Rock bass											2		2		4
White sucker	21										2	31	18		72
Unknown (Sand Shiner)												1			1
<b>Total No. of Fish</b>	<b>47</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>8</b>	<b>99</b>	<b>1</b>	<b>19</b>	<b>180</b>	<b>100</b>	<b>5</b>	<b>469</b>
<b>No. of Species</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>6</b>	<b>14</b>	<b>13</b>	<b>1</b>	<b>20</b>

### 3.5.1 Mountsberg Creek

Mountsberg Creek supports a diverse fish community. Within the vicinity of the Subject Lands, which is below the Mountsberg Reservoir, the creek is classified as warmwater sportfish. The presence of the reservoir and other on-line ponds has had a warming effect on the creek and allowed for the introduction of some centrarchid species (sunfish family) more typical of lake environments (Conservation Halton, 2002). A single brown trout was captured by Conservation Halton in 1999, at the 11<sup>th</sup> Concession road crossing and anecdotal reports indicated that small pockets of brook trout and brown trout might persist in this reach (Conservation Halton, 2002).

Mountsberg Creek is associated with the site in a few different locations. A tributary originates in the PSW at the north end of the Subject Lands as a diffuse flow through the wetland and then consolidates into a more defined watercourse (Tributary A on Figure 6) as it leaves the site. At the extreme west corner of the site Mountsberg Creek crosses the property boundary at the confluence with Tributary A. The BCWS reports that





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groundwater is added to the system throughout this section resulting in a marginal cooling of Mountsberg Creek, which is classified as warmwater as it leaves Mountsberg Reservoir. However an on-line pond downstream of Concession 11 contributes to further warming.

All of the remaining watercourses on the Subject Lands are much more diffuse with poorly defined channels and seasonal flows, including the outlet from the pond at the south end of the property.

### 3.5.2 Flamboro Creek

Flamboro Creek emanates as two tributaries from within the Carlisle North Wetland Complex/ESA. Conservation Halton (2002) determined in the BCWS that the headwaters of Flamboro Creek between the CPR tracks and 10<sup>th</sup> Concession, one concession south of the Subject Lands, is supported by significant groundwater discharge and provides suitable coldwater habitat for brook trout. There are no sampling records for brook trout in this reach, however anecdotal reports from local anglers confirm their presence in the headwater area. Just upstream of the next concession south, Carlisle Road, the creek flows into a large on-line pond within a golf course.

The Watershed Study found that with the exception of a warmwater fish community below the Carlisle Golf and Country Club pond, coldwater fish community and temperature regimes throughout most of the subwatershed are consistent with the expectations for first and second order streams on the limestone plain and glacial spillway features. Conservation Halton (2002) has designated the creek at 10<sup>th</sup> Concession as marginal coolwater habitat with high aquatic ecosystem health.

The other branch of Flamboro Creek headwaters, which flows along the eastern corner of the Subject Lands, is designated as warmwater forage fish with high aquatic ecosystem health at the 10<sup>th</sup> Concession (Conservation Halton, 2002). Anecdotal reports from landowners report that brook trout have also been caught in this reach in an on-line pond located between the 10<sup>th</sup> and 11<sup>th</sup> Concessions. Through communication with local residents it was also determined that a potential barrier to fish migration may exist in the form of a falls.

Stantec conducted aquatic surveys with this reach at the 11<sup>th</sup> and 10<sup>th</sup> Concession road crossings.

### 3.5.3 Redd Survey

Redd surveys and three additional fisheries habitat assessments were completed on November 25, 2003 for surface water features located on and adjacent to the Subject Lands, with particular emphasis on Mountsberg Creek. Surface water monitoring stations were also established for ongoing monitoring to aid in characterizing the surface flow leaving the site.

The redd survey locations are identified on Figure 6. Three reaches were investigated, two in Mountsberg Creek and one (at a road crossing) in Flamboro Creek. A redd is an obvious nest or disturbance in the substrate. Brown trout redds are typically elongated scars in the streambed, characterized by a mound of gravel at the downstream end. Multiple redds have several scars and mounds created by more than one spawning pair. Brook trout redds are smaller, rounder and less obvious than brown trout redds.

No redds were observed at any of the surveyed locations during the November 25, field studies.



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## 4 ANALYSIS FOR LEVEL 1 AND LEVEL 2 SCREENING

Documentation of this assessment has been done in a manner consistent with Section 2.3 (Natural Heritage) of the Provincial Policy Statement (PPS) under the Ontario Planning Act, and the Natural Heritage Reference Manual (NHRM) for Policy 2.3 (OMNR, 1999). The natural heritage features assessed are also contained in the Natural Environment Technical Report requirements for Category 2 Class 'A' license under the Aggregate Resources Act (ARA).

### 4.1 PROVINCIAL POLICY STATEMENT

The seven natural heritage features to be considered under the ARA are in accordance with Policy 2.3 of the PPS, and are identified in Section 1.0. With regards to the Subject Lands, these features are discussed in the following.

#### 4.1.1 Significant Wetlands

A portion of the Lower Mountsberg Creek Provincially Significant Wetland Complex (PSW) is located partially within the northern sector of the Subject Lands. It is a Class 2 wetland, with a total size of 285 ha, of which treed swamps cover the majority. Approximately 21 ha of this PSW complex falls within the Subject Lands, with 16.5 ha in the north part of the property and 4.3 in the southeast section (Figure 2.0). The extent of red maple, elm and mixed swamps identified during the vegetation survey generally coincides with the boundaries of the PSW that fall within the study area. This wetland extends along the length of the existing unopened road right-of-way to the Mountsberg Creek subwatershed boundary. Another node of this wetland complex is located within the southeast corner of the site. The southeast branch of the wetland complex contains a tributary of Flamboro Creek, which is also located within the Subject Lands.

The wetland was last evaluated in 1998 (OMNR, 1998), using the third edition of the Wetland Evaluation Manual for Southern Ontario (OMNR, 1986). A review of relevant material suggests that the scoring and complexing have been fairly completed, and updated as new data become available. Redside Dace has been recorded within the wetland complex, according to historical records, but this species has been removed from the final score in the evaluation, pending confirmation of the historical records.

Hydrogeological investigation suggests that the PSW could be directly connected to the water table, because the water levels in the wetland fairly closely match the ground water table elevations (Gartner Lee, 2004). Seasonal monitoring of ground water and surface water is ongoing to confirm this connection.

#### 4.1.2 Significant Portions of the Habitat of Endangered or Threatened Species

The Natural Heritage Information Centre database was searched and no records of threatened or endangered species were documented on or within 120 m of the Subject Lands. No threatened or endangered species have been recorded to date on the Subject Lands as a result of field surveys.



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### 4.1.3 Fish Habitat

Fish habitat is defined as the spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly in order to carry out their life processes (OMNR, 1999). Fish habitat is available on and adjacent to the Subject Lands. Characteristics of this habitat are depicted on Figure 7.

All reaches of **Mountsberg Creek** support good warmwater fish habitat including several sport fish. The Natural Heritage Information Center (NHIC) database was consulted to determine the possible presence of rare species on or within close vicinity to the adjacent lands. This search resulted in the identification of one species record for Redside Dace (fish), which is classified as Threatened. This species may occur within the adjacent lands, however, available data in the BCWS indicates that the species has probably been extirpated from Mountsberg Creek, where it once existed.

**Tributary A**, which originates in the Lower Mountsberg Creek PSW, also provides fish habitat. The fish community is limited to a couple of fish species tolerant of low oxygen, i.e. pearl dace and central mudminnow. The juvenile white suckers found here were caught near the confluence with Mountsberg Creek and it is unlikely that they move very far up Tributary A. This lower reach of Tributary A may also provide spawning habitat for northern pike. The entire tributary also indirectly contributes base flow (which is potentially coldwater) and food/nutrients to Mountsberg Creek. The degree to which groundwater plays a role in the support of these fisheries is subject to hydrogeological investigations and temperature monitoring currently being completed by Gartner Lee Limited and Stantec Consulting.

**Tributary B and C** are not known to support fish habitat. Both of these tributaries are intermittent and likely contribute limited base flow to Mountsberg Creek. The lower reach of Tributary B, located within the wetland, likely provides some groundwater input to Mountsberg Creek.

Fish were identified in **Tributary D** below the 11<sup>th</sup> Concession and in the on-site Pond. However, the fish community here is limited to the extremely tolerant brook stickleback, suggesting that the habitat conditions are less than optimal. Flows within the tributary are likely intermittent with small pools remaining below the culvert and possibly further downstream to sustain the small number of fish found here.

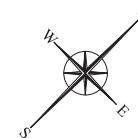
The **Flamboro Creek** headwaters located on the Subject Lands also support fish habitat. Upstream of the 11<sup>th</sup> Concession the diffuse nature of the watercourse and limited flow results in low levels of dissolved oxygen and the low number of fish found in this reach is representative of these conditions. The reach downstream of the 11<sup>th</sup> Concession, F3, was characterized by a more defined channel, however dissolved oxygen was still low. Several blacknose dace were captured in this reach, however the majority were found just below the culvert where a change in elevation has created significant flows.

Excellent habitat conditions are present further downstream from Concession 11 (Reach F2, Figure 6). However, very few fish were found here. The low numbers of fish found throughout this reach may be due to the presence of a falls creating a barrier to fish migration. Anecdotal evidence of this barrier being located between F2 and the on-line pond was obtained from local residents. Local residents also report evidence of brook trout in the pond.

All three of these upper reaches of Flamboro Creek may contribute coldwater base flow to downstream sections of Flamboro Creek. However, the existence of an on-line pond between Concession 10 and 11 appears to restrict the flows downstream. Below the 10<sup>th</sup> Concession the creek displays evidence that flows are intermittent, such as a lack of a defined channel.

The BCWS defines this branch of Flamboro Creek at Concession 10 as warmwater forage fish. During the June survey, no fish were found in this reach and flows appeared to be intermittent. The potential for fish habitat is limited in this reach.





- Subject Lands
- ..... Proposed Limit of Extraction
- Potential Coldwater
- Potential Coldwater/  
Moderately defined channel  
through swamp - forage fish
- - - Potential Coldwater/  
intermittent no fish
- Warmwater Sportfish
- Warmwater/forage fish
- - - Intermittent/no fish
- Unclassified



Source: 2003 Air Photo, Original Scale 1:12,000.

REVISION NO.	REVISION DATE	DESCRIPTION	REVISED BY:

PROJECT NAME:  
**PROPOSED DOLOSTONE QUARRY**

CLIENT NAME:  
**LOWNDES HOLDINGS**

15-5400 MILLCREEK DRIVE, MISSISSAUGA, ONTARIO

DATE INITIATED: **AUGUST, 2004** FILENAME: **62603782\_10.cdr**

FIGURE NO. **7.0**

# AQUATIC HABITAT CLASSIFICATION

SCALE: AS SHOWN PROJECT NO.: 62603782

REV. NO.	SHEET NO.	CHECKED BY:	APPROVED:	DRAWN BY:
0	1 OF 1	CC	CC	CEW

↓ (Warmwater/sportfish @ Concession 10 crossing)

↓ (Warmwater intermittent @ Concession 10 crossing below online pond)



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#### 4.1.4 Significant Woodlands

Significant woodlands should be defined and designated by the local planning authority. General guidelines for determining significance of these features are presented in the Natural Heritage Reference Manual (NHRM) for Policy 2.3 of the PPS (OMNR, 1999). Criteria suggested by the NHRM include woodland size, shape, proximity to other woodlands or natural features, linkages, species diversity, uncommon characteristics and economic and social values.

The Mountsberg Creek subwatershed is 33% forested (Conservation Halton, 2002), which is much higher than Hamilton-Wentworth Region's total forest cover of 18.3% (Riley and Mohr, 1994). The Subject Lands include some woodlands that are contiguous with larger forests in the vicinity. The size and general connectedness of these wooded areas suggest importance should be attached to them in terms of supporting important wildlife and habitat.

The Bronte Creek Watershed Study (Conservation Halton, 2002) identifies both forest interior/core habitat and linkages on this site. The Subject Lands contain areas of the Carlisle North Forests and Mountsberg East Wetlands ESAs. Portions of these ESAs are included in the Lower Mountsberg Creek PSW complex associated with this site.

Conclusions regarding the potential presence of significant woodlands on these lands will be drawn with the accumulation of additional field data during summer 2004.

#### 4.1.5 Significant Valley Lands

No significant valley lands have been identified on or within 120 m of the Subject Lands. Any watercourses located within or adjacent to the study area are small tributaries without significant valley features associated with them. The more substantial local valley feature, Mountsberg Creek, flows to the west of the site but falls outside of the 120 m area of influence, except for a small portion in the very northwest portion of the Subject Lands.

#### 4.1.6 Significant Wildlife Habitat

The local planning authority is responsible for designating 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).

This site has been identified to contain core natural area and linkages as part of the Bronte Creek Watershed study (Conservation Halton, 2002). The "core natural area" concept is supported by the breeding bird survey completed by Stantec Consulting, which identified concentrations of area sensitive species in the forests along the northern third of the Subject Lands. The potential definition of these areas as significant wildlife habitat is subject to ongoing analysis this summer.

The Lower Mountsberg Creek Provincially Significant Wetland Complex is present on and adjacent to the Subject Lands and contains portions of the locally significant Guelph Junction and Hilton Falls-Speyside deer wintering range.

#### 4.1.7 Significant Areas of Natural and Scientific Interest (ANSI)

There are no ANSIs present within the Subject Lands or adjacent to them (i.e. within 120 metres of the lands). The nearest regionally significant Life Science ANSIs are located at the Mountsberg Reservoir (Mountsberg Wildlife Centre), approximately 3 km to the north-west, and the Kilbride Swamp about 2 km to



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## 5 POTENTIAL IMPACTS AND MITIGATION

### 5.1 POTENTIAL ENVIRONMENTAL IMPACTS

Figure 7.0 shows the proposed extraction limits. Access is planned to Milborough Line via a haul road on the east side of the Subject Lands. The analysis of the seven natural heritage features to be considered under the ARA have identified the following existing or potential significant environmental elements on, or adjacent to, the Subject Lands:

- provincially significant wetlands;
- fish habitat;
- potentially significant woodlands; and
- potentially significant wildlife habitat.

Effect prediction related to hydrogeology (Gartner Lee, 2004) was reviewed. Preliminary results indicate that the PSW and the streams to the north and southeast of the site may be influenced by ground water. Modeling of the water table drawdown resulting from a 72-hour pump test indicated a maximum drawdown of 12.18 m near the pumping well and no significant drawdown at the property boundaries.

The potential impacts on the significant features as a result of the proposed quarry development and recommended mitigation measures are generally discussed in the following sections. Further predictions will be offered with the completion of data gathering and synthesis and with the presentation of more detailed hydrogeological results and operational plans. Table 2 summarizes potential effects, mitigation and net effects predicted at this preliminary stage of assessment.

### 5.2 LOWER MOUNTSBERG CREEK PROVINCIAL SIGNIFICANT WETLAND COMPLEX

No extraction is planned within the PSW. The wetland boundary shown on Figure 2.0 will be refined as a result of field study and will be staked and confirmed in the field with representatives of the Region's ESAIG and Conservation Halton. The effects of the pumping test conducted in April, 2004 did not extend to the perimeter of the site where the wetlands and streams are located (Gartner Lee, 2004). Additional monitoring and testing will more accurately determine the degree of potential impact to the wetland. A variety of mitigation measures, if required, are being examined by Gartner Lee Ltd. including the use of dewatering discharge to maintain or enhance wetland water levels, direct stream flow augmentation, artificial ground water re-infiltration, holding ponds, etc.

The access location was identified as preferred for a haulage route by traffic specialists involved in this project, given considerations for various social and environmental constraints (e.g., increased truck traffic and noise source locations associated with the proposed extraction operation for this site). This route will require development of relatively small areas of wetland habitat (less than 1 ha) and require crossing of Flamboro Creek. With proper mitigation measures and rehabilitation plans involving wetland creation, it will be possible to develop this road without adversely affecting the ecological functions that these features support.

### 5.3 FISH HABITAT

The Subject Lands contain areas of direct and indirect fish habitat. The effects of the pumping test conducted in April, 2004 did not extend to the perimeter of the site where the wetlands and streams are located (Gartner Lee, 2004). Additional monitoring and testing will more accurately determine the degree of impact to the watercourses. The watercourses with confirmed fish habitat on site are well buffered from





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direct effects associated with extraction, thereby not triggering the federal Fisheries Act authorization process. The haul road crossing of Flamboro Creek will be addressed when design parameters are established.

Dewatering of the proposed quarry floor will result in pumping to selected discharge locations [i.e. to the surrounding watercourse(s)]. The proposed discharge point(s) for pumping has/have not been determined at this time and will require further study prior to the submission of the final Level 2 Report.

Potential indirect physical effects to fish and aquatic habitat are expected to be adequately managed by the general mitigation techniques provided in Section 5.6. A variety of mitigation measures to preserve necessary water inputs, if required, are being examined by Gartner Lee Ltd. including direct stream flow augmentation, artificial ground water re-infiltration to enhance baseflow, splitting discharge between two or more discharge points, and holding ponds to balance peak flows, normalize discharge temperatures and/or settle particulates.

#### **5.4 POTENTIALLY SIGNIFICANT WOODLANDS**

This site contains some features and functions that have been identified as potentially significant, including areas that have been designated as Environmentally Significant Areas and interior habitat in the Flamborough OP. This area contains a deer wintering area and PSW. A breeding bird survey completed in this site in late June 2004, identified habitat use by area sensitive or interior bird species in the northern portion of the Subject Lands. Based on the presence of Broad-winged Hawk as well as a diverse community of other area-sensitive forest birds and locally significant species, the forested habitat on site, especially that in the northern third of the site, may be considered significant wildlife habitat.

The proposed extraction footprint shows encroachment into some portions of these woodlands. Intrusions of this nature are unlikely to negatively affect the larger forest and their functions in the vicinity. The remaining forest area (including off-site forest) will be sufficient to support the area-sensitive bird species. General mitigation techniques to address impacts common to any new forest edge (such as sunscald, potential for windthrow, the introduction of invasive species) include pre-stressing of the forest edge as well as the measures discussed in Section 5.6. The potential degree of effect is subject to ongoing analysis based on further seasonal field data collection.

#### **5.5 POTENTIALLY SIGNIFICANT WILDLIFE HABITAT**

This site contains areas that have been identified as deer wintering habitat and habitat for breeding amphibians. No vulnerable, threatened or endangered species have been found on this site to date. Based on the presence of area-sensitive forest birds and locally significant species, the forested habitat on site, especially that in the northern third of the site, may be considered significant wildlife habitat (subject to ongoing analysis).

The majority of wildlife-related impacts from the proposed quarry operation would be caused by (1) direct removal of habitat, (2) increased ambient noise, and (3) increased lighting, as outlined below.

The proposed direct removal of portions of the PSW and ESA, will not affect habitat for any rare floral or faunal species (given field results to date). Removal of these relatively small areas of wetland and woodland should not adversely affect their wildlife habitat functions.

Depending on the level and duration/frequency of the activity, an increase in ambient noise can have detrimental effects on wildlife through agitation and flushing responses. Frequent disturbance can cause increased energy consumption, decreased feeding time, physiological stress and decreased reproduction success due to increased predation on young while adults are flushed. Land uses associated with vehicular



traffic and the daily presence of site machinery pose an impact in this regard. However, given the proximity of the proposed quarry to existing residential uses/traffic and other local uses (e.g. equestrian centre) it is also likely that resident wildlife have either adapted to periodic background daily noise or have already relocated to areas beyond their individual noise impact threshold. Potential increased effects associated with blasting and haulage are currently under consideration as wildlife and habitat data are accumulated.

Lighting is useful to enhance safety and to discourage vandalism. However, the inappropriate and indiscriminate use of light can be a significant intrusion into the natural environment. Many animal species are only active at night (i.e., nocturnal species) and can be adversely affected by, or discouraged from, lit areas. Mitigation of long-term lighting impacts includes appropriate placement, shielding, and orientation of public lighting structures (e.g., on roads) that are in proximity to natural areas.

## 5.6 GENERAL MITIGATION TECHNIQUES

### 5.6.1 Sediment and Erosion Control

Certain construction and/or extraction-related impacts, such as dust generation, sedimentation and erosion, are mitigable through the use of standard site control measures. Mitigation measures for sediment erosion and dust control should be implemented in the immediate vicinity of any aquatic resources and the boundaries of the PSW and ESAs to prohibit sediment and dust from entering watercourse, wetland and woodland areas during construction.

The primary principles associated with sedimentation and erosion protection measures are to: (1) minimize the duration of soil exposure, (2) retain existing vegetation, where feasible, (3) encourage re-vegetation, (4) divert runoff away from exposed soils, (5) keep runoff velocities low, and to (6) trap sediment as close to the source as possible. To address these principles, the following mitigative measures are proposed:

- Extraction areas should be isolated from creek flow;
- In order to isolate the work area from general runoff and to slow runoff velocities and reduce erosive forces, silt fencing will be required along all construction areas adjacent to watercourses and the boundaries of the PSW and ESAs. Additionally, rock checks or silt fence flow checks should be installed in all ditches immediately upstream of their discharge into any aquatic resources;
- All excavated materials requiring stockpiling should be kept away from any sensitive natural features; and
- Refueling of equipment should be carried out well away from any aquatic resources, to avoid potential impacts, in the event that an accidental spill occurs.

### 5.6.2 Minimizing Damage to Peripheral Vegetation

During extraction and/or construction of facilities, roads and ditches adjacent to the wetland and riparian areas, heavy equipment could damage peripheral vegetation from contact, excavation and/or soil compaction. Dust coated vegetation can reduce photosynthesis, increase susceptibility to disease, and lead to death. Prior to heavy machinery working adjacent to these areas, a barrier for tree protection should be employed to protect any PSW or ESA vegetation that is to be retained and is in the vicinity of exposure to damage by machinery. This involves fencing the vegetation at, or beyond, the treed drip-line. A dust control program should be implemented.





### **5.6.3 Controlled Vehicle Access**

Heavy machinery and vehicle access should be limited in areas adjacent to the PSW and ESAs to prevent soil compaction and/or the initiation of soil erosion events. In addition, a total prohibition of vehicle access within the PSW and ESA should be maintained, the exception to this being any approved extraction areas and the proposed Milborough Line access road. Installing a fence along the boundaries of the PSW and ESAs (e.g., silt fencing or snow fencing) would identify the limits of heavy machinery and vehicle access.

### **5.6.4 Environmental Monitoring**

The limits of development adjacent to the wetland and riparian buffers should be flagged and fenced prior to construction, and monitored during construction (along with sediment and erosion control measures) to ensure the limits are respected with respect to vehicular traffic and soil or equipment stockpiling. This fencing should be maintained throughout all construction phases.

## **5.7 ADAPTIVE MANAGEMENT AND REHABILITATION PLANS**

Adaptive Management and Rehabilitation Plans are important parts of quarry operation. These documents will be prepared in consultation with the City's ESAIG, the Ministry of Natural Resources and Conservation Halton. The Adaptive Management and Rehabilitation Plan will ensure that key features and functions are monitored, set thresholds for potential effects, and provide alternatives and mitigation measures to address any impacts that exceed those thresholds. The Progressive and Final Rehabilitation Plans will ensure that the interim and final land uses of the quarry property are reflective of and integrated into the surrounding features and functions.



**Table 2 Potential Impacts and Mitigation**

<b>Feature</b>	<b>Function</b>	<b>Potential Impacts and Effects</b>	<b>Mitigation</b>	<b>Predicted Net Effects</b>
Provincially Significant Wetlands	Amphibian breeding	Removal of minor areas of habitat	Selective creation of vernal pools throughout wooded borders of site	Net gain in vernal pool habitat on-site
	Area sensitive species habitat	limited woodland removal Increased edge effects including: <ul style="list-style-type: none"> <li>• Invasive species</li> <li>• Sunscald</li> <li>• Windthrow</li> </ul>	Prestressing of edges in phases to allow for new edge/ecotone to develop	Limited reduction in forested cover in general landscape
	Groundwater	Drawdown of water table	If necessary, standard measures including the use of dewatering discharge to maintain or enhance wetland water levels, artificial ground water re-infiltration, holding ponds, etc.	Maintenance of water levels  Potential decrease in water temperature
		Decrease in infiltration area and altered water balance	Pumping to wetlands to maintain water levels  Direct streamflow augmentation proportioned between two points with the use of holding ponds to balance peak flows and normalize discharge temperatures/settle suspended particulates	none  Increases stream flows through peak pumping periods
	Deer wintering habitat	Noise	Restrict blasting to occur outside of winter use periods at dusk and dawn when deer movement is at its peak	none
		Traffic	Traffic restricted to low speeds on haul route surrounding site to avoid crepuscular movement of deer	None due to very slow truck speeds in immediate vicinity of the quarry
			Road signage for deer corridor across Milborough Line	Enhanced awareness of deer crossings through signage and improved visibility
	Loss of Habitat	Enhancement and creation of alternate habitat	Low short term impacts as species move to new habitat	

**Table 2 Potential Impacts and Mitigation**

<b>Feature</b>	<b>Function</b>	<b>Potential Impacts and effects</b>	<b>Mitigation</b>	<b>Predicted Net Effects</b>
Potential Significant Woodlands	Forest interior habitat	Increased edge effects including: <ul style="list-style-type: none"> <li>• Invasive species</li> <li>• Sunscald</li> <li>• Windthrow</li> </ul>	Prestressing of edges to allow new edge/ecotone to develop	Some loss of habitat with opportunities for habitat enhancement and creation in other locations on the site
Fish Habitat	Fish habitat	Changes in water temperature	Opportunities to enhance watercourses to cool/coldwater fisheries	Potential for reintroduction of a cool/coldwater habitat
		Changes in water quality	Filtration of pumped water	none
		Increased flow during pumping periods	Design a program to optimize flow increases and fishery	Increase in potential fish habitat
	Groundwater discharge	Decreased flow	Artificial groundwater re-infiltration to enhance baseflow through recharge wells	none
Potential Significant Wildlife Habitat		Noise	Should have limited effects on breeding animals; under review and ongoing analysis	none
		Traffic	Signage at road crossings Decreased speed limits in vicinity of quarry	See above
		Increased edge effects: <ul style="list-style-type: none"> <li>• predation</li> <li>• parasitism</li> <li>• invasive species</li> </ul>	Prestressing of edges to allow new edge/ecotone to develop	See above
	Habitat loss	Stress on carrying capacity of natural areas	Habitat creation and enhancement on lands not scheduled for extraction	See above



## 6 CONCLUSIONS AND SUMMARY REMARKS

This study examines the existing natural heritage conditions on Part of Lot 1, Lots 2 and 3, Concession 11, Geographic Township of East Flamborough, City of Hamilton. This report summarizes the information contained in OMNR wetland evaluation files, the local subwatershed studies and the results of field inventories conducted in 2003 and 2004.

The proposed quarry occurs in an area of landscape that is predominantly agricultural with some successional fields, thickets and forests. The Subject Lands fall within close proximity to, or contain a number of relatively more important natural features and functions, which are summarized below.

**Table 3 Summary of Natural Heritage Features on the Lowndes Property**

Degree Of Significance	Jurisdiction/Interpreted Degree Of Importance
Global	N/A
National	<ul style="list-style-type: none"> <li>Fish habitat</li> </ul>
Provincial	<ul style="list-style-type: none"> <li>Significant wetland</li> </ul>
Regional	<ul style="list-style-type: none"> <li>Environmentally Significant Areas</li> <li>Potential significant woodland</li> <li>Potential significant wildlife habitat</li> </ul>
Local	<ul style="list-style-type: none"> <li>Deer wintering areas</li> </ul>

A portion (i.e., approximately 21 ha) of the Mountsberg Creek Provincially Significant Wetland Complex overlaps with the Subject Lands. The final Level 2/EIS report will provide a refined PSW boundary and will further address any direct or indirect impacts that the proposed extraction may have on this feature. At this point only minor and localized intrusions are expected.

Portions of the Carlisle North Forests and Mountsberg East Wetlands ESAs are found within the Subject Lands. The boundaries of these features will be refined as part of the final report for this site. The final report will refine the boundaries of these features and address any direct or indirect impacts that the proposed extraction may have on this feature.

Fish habitat is found in several locations within this site. Both Mountsberg and Flamboro Creeks contain fish within the Subject Lands and within 120 m of the Subject Lands. Alteration of these watercourses may result in a HADD of fish habitat, triggering the federal Fisheries Act authorization process. Alteration could include the addition of water to these features through the pumping process required to remove water from an active aggregate extraction operation.

The deer wintering areas identified within the Subject Lands and within 120 m of the Subject Lands are considered to be locally significant. The limits of the wintering areas fall mostly outside of the proposed extraction limits and should not be subject to any direct impacts.

No significant valleylands, Areas of Natural and Scientific Interest or the habitat of endangered or threatened species were identified in the study area or within the 120 m adjacent lands. Potential significant wildlife habitat is present in the study area.





An examination of the proposed extraction footprint reveals that most of these designated and identified natural heritage features and features and functions will be avoided by direct extraction. Small areas of wetland and some woodland will be removed for clearing for extraction and site access. Additionally, potential indirect effects are predicted associated with potential water balance changes in and around the Subject Lands. The effect prediction and mitigation measure exercise will be expanded upon in the final reporting. Generally, the composite of agricultural and successional communities will be replaced, over time, with a large open aquatic system. The development of rehabilitation plans should focus on the addition of wetland areas and enhanced fish habitat, as means of achieving a reasonable ecological result.

**STANTEC CONSULTING LTD.**

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Senior Project Manager

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Tom Hilditch  
Principal, Environmental Management





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**APPENDIX A**  
**PLANT LIST**

**List of the Vascular Plants Recorded from the Flamborough Quarry Application - November 2003**

LATIN NAME		COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	GLOBAL STATUS	LOCAL STATUS HALT	LOCAL STATUS PEEL	RECORD TYPE
	LOCAL STATUS SOURCE LAST UPDATE/ INITIALS							VARGA 2000  July 2002/KH	VARGA 2000  July 2002/KH	
<b>PTERIDOPHYTES</b>		<b>FERNS &amp; ALLIES</b>								
<b>Dennstaedtiaceae</b>		<b>Bracken Fern Family</b>								SR
<i>Pteridium</i>	<i>aquilinum var. latiusculum</i>	Eastern Bracken-fern	2	3		S5	G5T	X	X	SR
										SR
<b>Dryopteridaceae</b>		<b>Wood Fern Family</b>								SR
<i>Cystopteris</i>	<i>bulbifera</i>	Bulbet Bladder Fern	5	-2		S5	G5	X	X	SR
<i>Dryopteris</i>	<i>carthusiana</i>	Spinulose Wood Fern	5	-2		S5	G5	X	X	SR
<i>Dryopteris</i>	<i>cristata</i>	Crested Wood Fern	7	-5		S5	G5	X	X	SR
<i>Onoclea</i>	<i>sensibilis</i>	Sensitive Fern	4	-3		S5	G5	X	X	
<i>Polystichum</i>	<i>acrostichoides</i>	Christmas Fern	5	5		S5	G5	X	X	
										SR
<b>Equisetaceae</b>		<b>Horsetail Family</b>								
<i>Equisetum</i>	<i>arvense</i>	Field Horsetail	0	0		S5	G5	X	X	
<i>Equisetum</i>	<i>hyemale ssp. affine</i>	Scouring-rush	2	-2		S5	G5T5	X	X	SR
<b>Pteridaceae</b>		<b>Maidenhair Fern Family</b>								
<i>Adiantum</i>	<i>pedatum</i>	Northern Maidenhair Fern	7	1		S5	G5	X	X	SR
										SR
<b>Thelypteridaceae</b>		<b>Marsh Fern Family</b>								
<i>Thelypteris</i>	<i>palustris var. pubescens</i>	Marsh Fern	5	-4		S5	G5T?	X	X	
										SR
<b>GYMNOSPERMS</b>		<b>CONIFERS</b>								SR
<b>Cupressaceae</b>		<b>Cedar Family</b>								SR
<i>Thuja</i>	<i>occidentalis</i>	Eastern White Cedar	4	-3		S5	G5	X	X	SR
										SR
<b>Pinaceae</b>		<b>Pine Family</b>								SR
<i>Abies</i>	<i>balsamea</i>	Balsam Fir	5	-3		S5	G5	U	X	SR
<i>Larix</i>	<i>laricina</i>	Tamarack	7	-3		S5	G5	U	X	SR
<i>Pinus</i>	<i>strobus</i>	Eastern White Pine	4	3		S5	G5	X	X	SR
<i>Pinus</i>	<i>sylvestris</i>	Scotch Pine		5	-3	SE5	G?	X	X	SR
<i>Tsuga</i>	<i>canadensis</i>	Eastern Hemlock	7	3		S5	G5	X	X	SR
										SR
<b>DICOTYLEDONS</b>		<b>DICOTS</b>								SR

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	LOCAL STATUS SOURCE LAST UPDATE/ INITIALS							VARGA 2000  July 2002/KH	VARGA 2000  July 2002/KH	
										SR
<b>Aceraceae</b>		<b>Maple Family</b>								SR
<i>Acer</i>	<i>rubrum</i>	Red Maple	4	0		S5	G5	X	X	SR
<i>Acer</i>	<i>saccharinum</i>	Silver Maple	5	-3		S5	G5	X	X	SR
<i>Acer</i>	<i>saccharum ssp. saccharum</i>	Sugar Maple	4	3		S5	G5T?	X	X	SR
<i>Acer</i>	<i>saccharum ssp. nigrum</i>	Black Maple	7	3		S4?	G5Q	X	X	SR
<i>Acer X</i>	<i>freemanii</i>	Freeman's Maple						X	XSR	SR
										SR
<b>Amaranthaceae</b>		<b>Amaranth Family</b>								SR
<i>Amaranthus</i>	<i>retroflexus</i>	Green Amaranth		2	-1	SE5	G?	X	X	SR
										SR
<b>Anacardiaceae</b>		<b>Sumac or Cashew Family</b>								SR
<i>Rhus</i>	<i>radicans ssp. negundo</i>	Poison-ivy	5	-1		S5	G5T	X	X	SR
<i>Rhus</i>	<i>typhina</i>	Staghorn Sumac	1	5		S5	G5	X	X	SR
										SR
<b>Apiaceae</b>		<b>Carrot or Parsley Family</b>								SR
<i>Cicuta</i>	<i>maculata</i>	Spotted Water-hemlock	6	-5		S5	G5	X	X	SR
<i>Daucus</i>	<i>carota</i>	Wild Carrot		5	-2	SE5	G?	X	X	SR
<i>Sium</i>	<i>suave</i>	Hemlock Water-parsnip	4	-5		S5	G5	X	X	SR
										SR
<b>Aristolochiaceae</b>		<b>Duchman's-pipe Family</b>								SR
<i>Asarum</i>	<i>canadense</i>	Wild Ginger	6	5		S5	G5	X	X	SR
										SR
<b>Asclepiadaceae</b>		<b>Milkweed Family</b>								SR
<i>Asclepias</i>	<i>incarnata ssp. incarnata</i>	Swamp Milkweed	6	-5		S5	G5T5	X	X	SR
<i>Asclepias</i>	<i>syriaca</i>	Common Milkweed	0	5		S5	G5	X	X	SR
										SR
<b>Asteraceae</b>		<b>Composite or Aster Family</b>								SR
<i>Achillea</i>	<i>millefolium ssp. millefolium</i>	Common Yarrow		3	-1	SE?	G5T?	X	X	SR
<i>Arctium</i>	<i>minus ssp. minus</i>	Common Burdock		5	-2	SE5	G?T?	X	X	SR
<i>Aster</i>	<i>ericoides ssp. ericoides</i>	White Heath Aster				S5	G5T?	X	X	SR
<i>Aster</i>	<i>lanceolatus ssp. lanceolatus</i>	Tall White Aster	3	-3		S5	G5T?	X	X	SR
<i>Aster</i>	<i>lateriflorus var. lateriflorus</i>	Calico Aster	3	-2		S5	G5T5	X	X	SR
<i>Aster</i>	<i>novae-angliae</i>	New England Aster	2	-3		S5	G5	X	X	SR

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	LOCAL STATUS SOURCE LAST UPDATE/ INITIALS							VARGA 2000  July 2002/KH	VARGA 2000  July 2002/KH	
<i>Aster</i>	<i>puniceus var. puniceus</i>	Purple-stemmed Aster				S5	G5T?	X	X	SR
<i>Centaurea</i>	<i>nigra</i>	Black Knapweed				SE?	G?	X	X	SR
<i>Chrysanthemum</i>	<i>leucanthemum</i>	Ox-eye Daisy		5	-1	SE5	G?	X	X	SR
<i>Cirsium</i>	<i>arvense</i>	Canada Thistle		3	-1	SE5	G?	X	X	SR
<i>Cirsium</i>	<i>vulgare</i>	Bull Thistle		4	-1	SE5	G5	X	X	
<i>Conyza</i>	<i>canadensis</i>	Horseweed	0	1		S5	G5	X	X	
<i>Erigeron</i>	<i>strigosus</i>	Daisy Fleabane	0	1		S5	G5	X	X	SR
<i>Eupatorium</i>	<i>perfoliatum</i>	Perfoliate Thoroughwort	2	-4		S5	G5	X	X	SR
<i>Eupatorium</i>	<i>rugosum</i>	White Snakeroot	5	3		S5	G5	X	X	SR
<i>Eupatorium</i>	<i>maculatum ssp. maculatum</i>	Spotted Joe-pye-weed	3	-5		S5	G5T5	X	X	SR
<i>Euthamia</i>	<i>graminifolia</i>	Flat-topped Bushy Goldenrod	2	-2		S5	G5	X	X	SR
<i>Hieracium</i>	<i>pilosella</i>	Mouse-ear Hawkweed		5	-1	SE5	G?	X	X	SR
<i>Lactuca</i>	<i>serriola</i>	Prickly Lettuce		0	-1	SE5	G?	X	X	SR
<i>Solidago</i>	<i>altissima var. altissima</i>	Tall Goldenrod	1	3		S5		X	X	SR
<i>Solidago</i>	<i>caesia</i>	Blue-stem Goldenrod	5	3		S5	G5	X	X	SR
<i>Solidago</i>	<i>canadensis</i>	Canada Goldenrod	1	3		S5	G5	X	X	SR
<i>Solidago</i>	<i>flexicaulis</i>	Zig-zag Goldenrod	6	3		S5	G5	X	X	SR
<i>Solidago</i>	<i>nemoralis ssp. nemoralis</i>	Gray Goldenrod	2	5		S5	G5T?	X	X	SR
<i>Solidago</i>	<i>rugosa ssp. rugosa</i>	Rough Goldenrod	4	-1		S5	G5T?	X	U	SR
<i>Sonchus</i>	<i>asper ssp. asper</i>	Spiny-leaved Sow-thistle		0	-1	SE5	G?T?	X	X	
<i>Taraxacum</i>	<i>officinale</i>	Common Dandelion		3	-2	SE5	G5	X	X	
										SR
<b>Berberidaceae</b>		<b>Barberry Family</b>								SR
<i>Berberis</i>	<i>thunbergii</i>	Japanese Barberry		4	-3	SE5	G?	X	X	SR
										SR
<b>Betulaceae</b>		<b>Birch Family</b>								SR
<i>Alnus</i>	<i>incana spp. rugosa</i>	Speckled Alder	6	-5		S5	G5T5	U	X	SR
<i>Betula</i>	<i>alleghaniensis</i>	Yellow Birch	6	0		S5	G5	X	X	SR
<i>Betula</i>	<i>papyrifera</i>	White Birch		2		S5	G5	X	X	SR
<i>Ostrya</i>	<i>virginiana</i>	Hop Hornbeam	4	4		S5	G5	X	X	SR
										SR
<b>Boraginaceae</b>		<b>Borage Family</b>								
<i>Echium</i>	<i>vulgare</i>	Blueweed		5	-2	SE5	G?	X	X	
										SR

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	LOCAL STATUS SOURCE LAST UPDATE/ INITIALS							VARGA 2000  July 2002/KH	VARGA 2000  July 2002/KH	
<b>Brassicaceae</b>		<b>Mustard Family</b>								SR
<i>Alliaria</i>	<i>petiolata</i>	Garlic Mustard		0	-3	SE5	G5	X	X	SR
<i>Capsella</i>	<i>bursa-pastoris</i>	Shepherd's Purse		1	-1	SE5	G?	X	X	SR
<i>Erysimum</i>	<i>cheiranthoides ssp. cheiranthoides</i>	Wormseed Mustard		3	-1	SE5		X	X	SR
										SR
<b>Campanulaceae</b>		<b>Bellflower Family</b>								SR
<i>Lobelia</i>	<i>inflata</i>	Indian Tobacco	3	4		S5	G5	x	X	SR
										SR
<b>Caprifoliaceae</b>		<b>Honeysuckle Family</b>								SR
<i>Linnaea</i>	<i>borealis ssp. longiflora</i>	Twinflower	7	0		S5	G5T?	u	R4	SR
<i>Lonicera</i>	<i>tatarica</i>	Tartarian Honeysuckle		3	-3	SE5	G?	x	X	SR
<i>Sambucus</i>	<i>racemosa ssp. pubens</i>	Red-berried Elderberry	5	2		S5	G5T4T5	x	X	SR
<i>Viburnum</i>	<i>acerifolium</i>	Maple-leaved Viburnum	6	5		S5	G5	x	X	SR
<i>Viburnum</i>	<i>trilobum</i>	High Bush Cranberry	5	-3		S5	G5T5	x	X	SR
										SR
<b>Caryophyllaceae</b>		<b>Pink Family</b>								SR
<i>Dianthus</i>	<i>armeria</i>	Deptford Pink		5	-1	SE5	G?	x	X	SR
<i>Silene</i>	<i>vulgaris</i>	Catchfly		5	-1	SE5	G?	x	X	
<b>Celastraceae</b>		<b>Staff-tree Family</b>								SR
<i>Euonymus</i>	<i>obovata</i>	Running Strawberry-bush	6	5		S5	G5	x	X	
<b>Chenopodiaceae</b>		<b>Goosefoot Family</b>								SR
<i>Chenopodium</i>	<i>album var. album</i>	Lamb's Quarters		1	-1	SE5	G5T5	x	X	SR
										SR
<b>Cornaceae</b>		<b>Dogwood Family</b>								SR
<i>Cornus</i>	<i>alternifolia</i>	Alternate-leaved Dogwood	6	5		S5	G5	x	X	SR
<i>Cornus</i>	<i>amomum ssp. obliqua</i>	Silky Dogwood	5	-4		S5	G5T?	u	R5	SR
<i>Cornus</i>	<i>foemina ssp. racemosa</i>	Red Panicked Dogwood	2	-2		S5	G5?	x	X	SR
<i>Cornus</i>	<i>stolonifera</i>	Red-osier Dogwood	2	-3		S5	G5	x	X	SR
										SR
<b>Dipsacaceae</b>		<b>Teasel Family</b>								SR
<i>Dipsacus</i>	<i>fullonum ssp. sylvestris</i>	Wild Teasel		5	-1	SE5	G?T?	x	X	SR
										SR

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	LOCAL STATUS SOURCE LAST UPDATE/ INITIALS							VARGA 2000 July 2002/KH	VARGA 2000 July 2002/KH	
<b>Fabaceae</b>		<b>Pea Family</b>								SR
<i>Mellilotus</i>	<i>alba</i>	White Sweet-clover		3	-3	SE5	G?	x	X	SR
<i>Trifolium</i>	<i>pratense</i>	Red Clover		2	-2	SE5	G?	x	X	SR
<i>Vicia</i>	<i>cracca</i>	Tufted Vetch		5	-1	SE5	G?	x	X	SR
										SR
<b>Fagaceae</b>		<b>Beech Family</b>								SR
<i>Fagus</i>	<i>grandifolia</i>	American Beech	6	3		S5	G5	x	X	
<i>Quercus</i>	<i>alba</i>	White Oak	6	3		S5	G5	x	X	
<i>Quercus</i>	<i>macrocarpa</i>	Bur Oak	5	1		S5	G5	x	X	SR
										SR
<b>Geraniaceae</b>		<b>Geranium Family</b>								SR
<i>Geranium</i>	<i>robertianum</i>	Herb-robert		5	-2	SE5	G5	x	X	
<b>Grossulariaceae</b>		<b>Currant Family</b>								SR
<i>Ribes</i>	<i>americanum</i>	Wild Black Currant	4	-3		S5	G5	x	X	SR
<i>Ribes</i>	<i>cynosbati</i>	Prickly Gooseberry	4	5		S5	G5	x	X	SR
<i>Ribes</i>	<i>triste</i>	Wild Red Currant	6	-5		S5	G5	x	U	
<b>Guttiferae</b>		<b>St. John's-wort Family</b>								SR
<i>Hypericum</i>	<i>perforatum</i>	Common St. John's-wort		5	-3	SE5	G?	x	X	SR
										SR
<b>Juglandaceae</b>		<b>Walnut Family</b>								SR
<i>Carya</i>	<i>cordiformis</i>	Bitternut hickory	6	0		S5	G5	x	X	SR
<b>Lamiaceae</b>		<b>Mint Family</b>								
<i>Clinopodium</i>	<i>vulgare</i>	Wild Basil	4	5		S5	G?	x	X	SR
<i>Leonurus</i>	<i>cardiaca ssp. cardiaca</i>	Common Motherwort		5	-2	SE5	G?T?	x	X	
<i>Lycopus</i>	<i>uniflorus</i>	Northern Water-horehound	5	-5		S5	G5	x	X	
<i>Mentha</i>	<i>arvensis ssp. borealis</i>	American Wild Mint	3	-3		S5		x	X	SR
<i>Prunella</i>	<i>vulgaris ssp. vulgaris</i>	Common Heal-all		0	-1	SE3	G5T?	x	X	SR
										SR
<b>Lythraceae</b>		<b>Loosestrife Family</b>								SR
<i>Lythrum</i>	<i>salicaria</i>	Purple Loosestrife		-5	-3	SE5	G5	x	X	

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	LOCAL STATUS SOURCE LAST UPDATE/ INITIALS							VARGA 2000 July 2002/KH	VARGA 2000 July 2002/KH	
<b>Malvaceae</b>		<b>Mallow Family</b>								SR
<i>Malva</i>	<i>neglecta</i>	Cheeses		5	-1	SE5	G?	x	X	SR
										SR
<b>Oleaceae</b>		<b>Olive Family</b>								SR
<i>Fraxinus</i>	<i>americana</i>	White Ash	4	3		S5	G5	x	X	SR
<i>Fraxinus</i>	<i>nigra</i>	Black Ash	7	-4		S5	G5	x	X	
<i>Fraxinus</i>	<i>pennsylvanica</i>	Red Ash	3	-3		S5	G5	x	X	
<i>Syringa</i>	<i>vulgaris</i>	Common Lilac		5	-2	SE5	G?	x	X	
										SR
<b>Onagraceae</b>		<b>Evening-primrose Family</b>								SR
<i>Circaea</i>	<i>lutetiana ssp. canadensis</i>	Yellowish Enchanter's Nightshade	3	3		S5	G5T5	x	X	SR
<i>Oenothera</i>	<i>parviflora</i>	Small-flowered Evening-primrose	1	3		S5?	G?	x	X	SR
										SR
<b>Oxalidaceae</b>		<b>Wood Sorrel Family</b>								SR
<i>Oxalis</i>	<i>stricta</i>	Upright Yellow Wood-sorrel	0	3		S5	G5	x	X	SR
<b>Papaveraceae</b>		<b>Poppy Family</b>								
<i>Sanguinaria</i>	<i>canadensis</i>	Bloodroot	5	4		S5	G5	x	X	SR
<b>Plantaginaceae</b>		<b>Plantain Family</b>								
<i>Plantago</i>	<i>lanceolata</i>	Ribgrass		0	-1	SE5	G5	x	X	SR
<i>Plantago</i>	<i>rugelii</i>	Rugel's Plantain	1	0		S5	G5	x	X	SR
										SR
<b>Polygonaceae</b>		<b>Smartweed Family</b>								SR
<i>Polygonum</i>	<i>amphibium</i>	Water Smartweed	5	-5		S5	G5	u	U	SR
<i>Rumex</i>	<i>crispus</i>	Curly-leaf Dock		-1	-2	SE5	G?	x	X	SR
										SR
<b>Primulaceae</b>		<b>Primrose Family</b>								SR
<i>Lysimachia</i>	<i>ciliata</i>	Fringed Loosestrife	4	-3		S5	G5	x	X	SR
										SR
<b>Ranunculaceae</b>		<b>Buttercup Family</b>								SR
<i>Actaea</i>	<i>pachypoda</i>	White Baneberry	6	5		S5	G5	x	X	SR
<i>Anemone</i>	<i>canadensis</i>	Canada Anemone	3	-3		S5	G5	x	X	SR
<i>Anemone</i>	<i>acutiloba</i>	Sharp-lobed Hepatica	6	5		S5	G5	x	X	SR

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	LOCAL STATUS SOURCE LAST UPDATE/ INITIALS							VARGA 2000 July 2002/KH	VARGA 2000 July 2002/KH	
<i>Anemone</i>	<i>virginiana var. virginiana</i>	Thimbleweed	4	5		S5	G5T	x	X	SR
<i>Caltha</i>	<i>palustris</i>	Marsh-marigold	5	-5		S5	G5	u	X	SR
<i>Clematis</i>	<i>virginiana</i>	Virgin's-bower	3	0		S5	G5	x	X	SR
<i>Thalictrum</i>	<i>dioicum</i>	Early Meadow-rue	5	2		S5	G5	x	X	SR
										SR
<b>Rhamnaceae</b>		<b>Buckthorn Family</b>								
<i>Rhamnus</i>	<i>alnifolia</i>	Alder-leaved Buckthorn	7	-5		S5	G5	x	R6	
<i>Rhamnus</i>	<i>cathartica</i>	Common Buckthorn		3	-3	SE5	G?	x	X	SR
<b>Rosaceae</b>		<b>Rose Family</b>								
<i>Agrimonia</i>	<i>gryposepala</i>	Tall Hairy Agrimony	2	2		S5	G5	x	X	
<i>Crataegus</i>	<i>species</i>	Hawthorn species								SR
<i>Fragaria</i>	<i>virginiana ssp. virginiana</i>	Scarlet Strawberry	2	1		SU	G5T?	x	X	
<i>Geum</i>	<i>canadense</i>	White Avens	3	0		S5	G5	x	X	
<i>Potentilla</i>	<i>recta</i>	Rough-fruited Cinquefoil		5	-2	SE5	G?	x	X	SR
<i>Prunus</i>	<i>serotina</i>	Black Cherry	3	3		S5	G5	x	X	SR
<i>Rubus</i>	<i>allegheniensis</i>	Alleghany Blackberry	2	2		S5	G5	x	X	SR
<i>Rubus</i>	<i>idaeus ssp. melanolasius</i>	Wild Red Raspberry	0	-2		S5	G5T	x	X	SR
<i>Rubus</i>	<i>pubescens</i>	Dwarf Raspberry	4	-4		S5	G5	x	X	SR
										SR
<b>Rubiaceae</b>		<b>Madder Family</b>								SR
<i>Galium</i>	<i>triflorum</i>	Sweet-scented Bedstraw	4	2		S5	G5	x	X	SR
										SR
<b>Rutaceae</b>		<b>Rue Family</b>								SR
<i>Zanthoxylum</i>	<i>americanum</i>	American Prickly-ash	3	5		S5	G5	x	R3	SR
										SR
<b>Salicaceae</b>		<b>Willow Family</b>								SR
<i>Populus</i>	<i>alba</i>	Silver Poplar		5	-3	SE5	G5	x	X	SR
<i>Populus</i>	<i>grandidentata</i>	Large-tooth Aspen	5	3		S5	G5	x	X	
<i>Populus</i>	<i>tremuloides</i>	Trembling Aspen		0		S5	G5	x	X	
<i>Salix</i>	<i>eriocephala</i>	Missouri Willow	4	-3		S5	G5	x	X	SR
<i>Salix</i>	<i>purpurea</i>	Basket Willow		-3	-1	SE4	G5	x	X	
<b>Saxifragaceae</b>		<b>Saxifrage Family</b>								SR

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	LOCAL STATUS SOURCE LAST UPDATE/ INITIALS							VARGA 2000  July 2002/KH	VARGA 2000  July 2002/KH	
<i>Penthorum</i>	<i>sedoides</i>	Ditch Stonecrop	4	-5		S5	G5	u	X	SR
<i>Tiarella</i>	<i>cordifolia</i>	False Mitrewort	6	1		S5	G5	x	X	SR
										SR
<b>Scrophulariaceae</b>		<b>Figwort Family</b>								SR
<i>Linaria</i>	<i>vulgaris</i>	Butter-and-eggs		5	-1	SE5	G?	x	X	SR
<i>Verbascum</i>	<i>thapsus</i>	Common Mullein		5	-2	SE5	G?	x	X	SR
<i>Veronica</i>	<i>officinalis</i>	Common Speedwell		5	-2	SE5	G5	x	X	SR
										SR
<b>Solanaceae</b>		<b>Nightshade Family</b>								SR
<i>Solanum</i>	<i>dulcamara</i>	Bitter Nightshade		0	-2	SE5	G?	x	X	SR
<b>Thymelaeaceae</b>		<b>Mezereum Family</b>								
<i>Dirca</i>	<i>palustris</i>	Leatherwood	7	0		S4?	G4	x	R6	SR
										SR
<b>Tiliaceae</b>		<b>Linden Family</b>								SR
<i>Tilia</i>	<i>americana</i>	American Basswood	4	3		S5	G5	x	X	SR
										SR
<b>Ulmaceae</b>		<b>Elm Family</b>								SR
<i>Ulmus</i>	<i>americana</i>	White Elm	3	-2		S5	G5?	x	X	SR
										SR
<b>Urticaceae</b>		<b>Nettle Family</b>								SR
<i>Boehmeria</i>	<i>cylindrica</i>	False Nettle	4	-5		S5	G5	x	X	
<i>Urtica</i>	<i>dioica ssp. gracilis</i>	American Stinging Nettle	2	-1		S5	G5T?	x	X	
										SR
<b>Verbenaceae</b>		<b>Vervain Family</b>								
<i>Verbena</i>	<i>urticifolia</i>	White Vervain	4	-1		S5	G5	x	X	
										SR
<b>Vitaceae</b>		<b>Grape Family</b>								SR
<i>Vitis</i>	<i>riparia</i>	Riverbank Grape	0	-2		S5	G5	x	X	SR
										SR
<b>MONOCOTYLEDONS</b>		<b>MONOCOTS</b>								SR
<b>Alismataceae</b>		<b>Water-plantain Family</b>								SR
<i>Alisma</i>	<i>plantago-aquatica</i>	Common Water-plantain	3	-5		S5	G5	x	X	SR
										SR

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	LOCAL STATUS SOURCE LAST UPDATE/ INITIALS							VARGA 2000  July 2002/KH	VARGA 2000  July 2002/KH	
<b>Cyperaceae</b>		<b>Sedge Family</b>								SR
<i>Carex</i>	<i>species</i>	Sedge species								SR
<i>Carex</i>	<i>intumescens</i>	Bladder Sedge	6	-4		S5	G5	x	X	SR
<i>Carex</i>	<i>lupulina</i>	Hop Sedge	6	-5		S5	G5	x	X	SR
<i>Carex</i>	<i>retrorsa</i>	Retrose Sedge	5	-5		S5	G5	x	X	SR
<i>Scirpus</i>	<i>cyperinus</i>	Wool-grass	4	-5		S5	G5	x	X	SR
										SR
<b>Iridaceae</b>		<b>Iris Family</b>								SR
<i>Iris</i>	<i>versicolor</i>	Multi-coloured Blue-flag	5	-5		S5	G5	u	X	SR
										SR
<b>Juncaceae</b>		<b>Rush Family</b>								SR
<i>Juncus</i>	<i>tenuis</i>	Path Rush	0	0		S5	G5	x	X	SR
										SR
<b>Liliaceae</b>		<b>Lily Family</b>								SR
<i>Asparagus</i>	<i>officinalis</i>	Garden Asparagus		3	-1	SE5	G5?	x	X	SR
										SR
<b>Orchidaceae</b>		<b>Orchid Family</b>								SR
<i>Platanthera</i>	<i>hyperborea</i>	Tall Leafy Green Orchis	5			S5	G5	x	U	SR
										SR
<b>Poaceae</b>		<b>Grass Family</b>								SR
<i>Agrostis</i>	<i>gigantea</i>	Red-top		0	-2	SE5	G4G5	x	X	SR
<i>Bromus</i>	<i>inermis ssp. inermis</i>	Awnless Brome		5	-3	SE5	G4G5T?	x	X	SR
<i>Calamagrostis</i>	<i>canadensis</i>	Blue-joint Grass	4	-5		S5	G5	x	X	SR
<i>Cinna</i>	<i>arundinacea</i>	Wood Reed Grass	7	-3		S4	G5	u	R3	SR
<i>Dactylis</i>	<i>glomerata</i>	Orchard Grass		3	-1	SE5	G?	x	X	SR
<i>Digitaria</i>	<i>ischaemum</i>	Small Crabgrass		3	-1	SE5	G?	x	X	SR
<i>Elymus</i>	<i>hystrix</i>	Bottle-brush Grass	5	5		S5	G5	x	X	SR
<i>Elymus</i>	<i>virginicus var. virginicus</i>	Virginia Wild Rye	5	-2		S5	G5T?	x	X	SR
<i>Panicum</i>	<i>capillare</i>	Witch Grass	0	0		S5	G5	x	X	SR
<i>Phalaris</i>	<i>arundinacea</i>	Reed Canary Grass	0	-4		S5	G5	x	X	SR
<i>Phleum</i>	<i>pratense</i>	Timothy		3	-1	SE5	G?	x	X	SR
<i>Phragmites</i>	<i>australis</i>	Common Reed	0	-4		S5	G5	x	X	SR
<i>Poa</i>	<i>compressa</i>	Canada Blue Grass	0	2		S5	G?	x	X	SR
<i>Setaria</i>	<i>pumila</i>	Yellow Foxtail		0	-1	SE5	G?	x	X	SR

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	LOCAL STATUS SOURCE LAST UPDATE/ INITIALS							VARGA 2000  July 2002/KH	VARGA 2000  July 2002/KH	
										SR
<b>Smilacaceae</b>		<b>Catbrier Family</b>								SR
<i>Smilax</i>	<i>herbacea</i>	Herbaceous Carrion Flower	5	0		S4	G5	x	X	SR
										SR
<b>Typhaceae</b>		<b>Cattail Family</b>								SR
<i>Typha</i>	<i>latifolia</i>	Broad-leaved Cattail	3	-5		S5	G5	x	X	SR
										SR
<b>FLORISTIC SUMMARY &amp; ASSESSMENT</b>										
										SR
										SR
<b>Species Diversity</b>										SR
<i>Total Species:</i>		<b>174</b>								SR
<i>Native Species:</i>		<b>124</b>	71%							SR
<i>Exotic Species</i>		<b>50</b>	29%							SR
<i>S1-S3 Species</i>		0	0%							SR
<i>S4 Species</i>		4	3%							SR
<i>S5 Species</i>		119	97%							SR
										SR
<b>Co-efficient of Conservatism and Floristic Quality Index</b>										
<i>Co-efficient of Conservatism (CC) (average)</i>		<b>3.9</b>								
<i>CC 0 to 3</i>	<i>lowest sensitivity</i>	44	37%							SR
<i>CC 4 to 6</i>	<i>moderate sensitivity</i>	66	55%							SR
<i>CC 7 to 8</i>	<i>high sensitivity</i>	10	8%							SR
<i>CC 9 to 10</i>	<i>highest sensitivity</i>	0	0%							
<b>Floristic Quality Index (FQI)</b>		<b>43</b>								
										SR
<b>Presence of Weedy &amp; Invasive Species</b>										
<i>mean weediness</i>		<b>-1.7</b>								SR
<i>weediness = -1</i>	<i>low potential invasiveness</i>	25	51%							SR
<i>weediness = -2</i>	<i>moderate potential invasiveness</i>	14	29%							SR
<i>weediness = -3</i>	<i>high potential invasiveness</i>	10	20%							SR
										SR
<b>Presence of Wetland Species</b>										
<i>average wetness value</i>		<b>0.6</b>								
<i>upland</i>		36	21%							SR

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	LOCAL STATUS SOURCE LAST UPDATE/ INITIALS							VARGA 2000 July 2002/KH	VARGA 2000 July 2002/KH	
<i>facultative upland</i>		44	26%							SR
<i>facultative</i>		34	20%							SR
<i>facultative wetland</i>		35	21%							
<i>obligate wetland</i>		21	12%							

**APPENDIX B**  
**WILDLIFE LIST**

**Wildlife Recorded from Lowndes Holdings Corp., Proposed Dolostone Quarry - July 2004**

COMMON NAME	SCIENTIFIC NAME	ONTARIO STATUS	GLOBAL STATUS	COSSARO	COSEWIC	SITE REGION	LOCAL	AREA	COMMENTS
<b>AMPHIBIANS</b>									
Tremblay's/Silvery Salamander	<i>Ambystoma hybrid</i>								non-viable eggs collected
American Toad	<i>Bufo americanus</i>	S5	G5						
Tetraploid Gray Treefrog	<i>Hyla versicolor</i>	S5	G5						
Western Chorus Frog	<i>Pseudacris triseriata</i>	S4	G5		NAR				
Northern Green Frog	<i>Rana clamitans</i>	S5	G5						
Pickerel Frog	<i>Rana palustris</i>	S4	G5	NIAC	NAR				
Wood Frog	<i>Rana sylvatica</i>	S5	G5						
Northern Leopard Frog	<i>Rana pipiens</i>	S5	G5	NIAC	NAR				
<b>REPTILES</b>									
Snapping Turtle	<i>Chelydra serpentina</i>	S5	G5						
<b>BIRDS</b>									
Canada Goose	<i>Branta canadensis</i>	S5	G5						
Wood Duck	<i>Aix sponsa</i>	S5	G5				x		
Mallard	<i>Anas platyrhynchos</i>	S5	G5						
Wild Turkey	<i>Meleagris gallopava</i>	S4	G5						
Turkey Vulture	<i>Cathartes aura</i>	S4	G5				x		
Broad-winged Hawk	<i>Buteo platypterus</i>	S5	G5				x	100	
Killdeer	<i>Charadrius vociferus</i>	S5	G5						
American Woodcock	<i>Scolopax minor</i>	S5	G5						
Herring Gull	<i>Larus argentatus</i>	S5	G5						overhead - non-breeding
Mourning Dove	<i>Zenaida macroura</i>	S5	G5						
Eastern Screech-Owl	<i>Megascops asio</i>	S5	G5		NAR		x		
Whip-poor-will	<i>Caprimulgus vociferus</i>	S4	G5				x	100	
Belted Kingfisher	<i>Ceryle alcyon</i>	S5	G5				x		
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	S5	G5				x	30	
Downy Woodpecker	<i>Picoides pubescens</i>	S5	G5						
Hairy Woodpecker	<i>Picoides villosus</i>	S5	G5					10	
Northern Flicker	<i>Colaptes auratus</i>	S5	G5						
Pileated Woodpecker	<i>Dryocopus pileatus</i>	S4S5	G5				x	30-50	
Eastern Wood-Pewee	<i>Contopus virens</i>	S5	G5						
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	S5	G5						

**Wildlife Recorded from Lowndes Holdings Corp., Proposed Dolostone Quarry - July 2004**

<b>COMMON NAME</b>	<b>SCIENTIFIC NAME</b>	<b>ONTARIO STATUS</b>	<b>GLOBAL STATUS</b>	<b>COSSARO</b>	<b>COSEWIC</b>	<b>SITE REGION</b>	<b>LOCAL</b>	<b>AREA</b>	<b>COMMENTS</b>
Eastern Kingbird	<i>Tyrannus tyrannus</i>	S5	G5						
Red-eyed Vireo	<i>Vireo olivaceus</i>	S5	G5						
Blue Jay	<i>Cyanocitta cristata</i>	S5	G5						
American Crow	<i>Corvus brachyrhynchos</i>	S5	G5						
Horned Lark	<i>Eremophila alpestris</i>	S5	G5						
Tree Swallow	<i>Tachycineta bicolor</i>	S5	G5						
Black-capped Chickadee	<i>Poecile atricapilla</i>	S5	G5						
White-breasted Nuthatch	<i>Sitta carolinensis</i>	S5	G5					10	
House Wren	<i>Troglodytes aedon</i>	S5	G5						
Veery	<i>Catharus fuscescens</i>	S4	G5					10	
Wood Thrush	<i>Hylocichla mustelina</i>	S5	G5					4	
American Robin	<i>Turdus migratorius</i>	S5	G5						
Gray Catbird	<i>Dumetella carolinensis</i>	S5	G5						
European Starling	<i>Sturnus vulgaris</i>	SE	G5						
Cedar Waxwing	<i>Bombycilla cedrorum</i>	S5	G5						
Blue-winged Warbler	<i>Vermivora pinus</i>	S4	G5						
Yellow Warbler	<i>Dendroica petechia</i>	S5	G5						
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	S5	G5				x		
Magnolia Warbler	<i>Dendroica magnolia</i>	S5	G5			7		30	migrant - non-breeding
Black-throated Green Warbler	<i>Dendroica virens</i>	S5	G5					30	migrant - non-breeding
Black-and-white Warbler	<i>Mniotilta varia</i>	S5	G5					100	migrant - non-breeding
Ovenbird	<i>Seiurus aurocapilla</i>	S5	G5					20	
Northern Waterthrush	<i>Seiurus noveboracensis</i>	S5	G5					20	
Mourning Warbler	<i>Oporornis philadelphia</i>	S5	G5				x	30	
Common Yellowthroat	<i>Geothlypis trichas</i>	S5	G5						
Scarlet Tanager	<i>Piranga olivacea</i>	S5	G5				x	30	
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	S4	G5				x		
Chipping Sparrow	<i>Spizella passerina</i>	S5	G5						
Field Sparrow	<i>Spizella pusilla</i>	S5	G5						
Song Sparrow	<i>Melospiza melodia</i>	S5	G5						
Swamp Sparrow	<i>Melospiza georgiana</i>	S5	G5						
Northern Cardinal	<i>Cardinalis cardinalis</i>	S5	G5						
Indigo Bunting	<i>Passerina cyanea</i>	S5	G5						
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	S5	G5						
Common Grackle	<i>Quiscalus quiscula</i>	S5	G5						

**Wildlife Recorded from Lowndes Holdings Corp., Proposed Dolostone Quarry - July 2004**

<b>COMMON NAME</b>	<b>SCIENTIFIC NAME</b>	<b>ONTARIO STATUS</b>	<b>GLOBAL STATUS</b>	<b>COSSARO</b>	<b>COSEWIC</b>	<b>SITE REGION</b>	<b>LOCAL</b>	<b>AREA</b>	<b>COMMENTS</b>
Brown-headed Cowbird	<i>Molothrus ater</i>	S5	G5						
Baltimore Oriole	<i>Icterus galbula</i>	S5	G5						
Pine Siskin	<i>Carduelis pinus</i>	S5	G5			7			wintering - non-breeding
American Goldfinch	<i>Carduelis tristis</i>	S5	G5						
<b>MAMMALS</b>									
Little Brown Bat	<i>Myotis lucifugus</i>	S5	G5						
Eastern Cottontail	<i>Sylvilagus floridanus</i>	S5	G5						
Eastern Chipmunk	<i>Tamias striatus</i>	S5	G5						
Grey Squirrel	<i>Sciurus carolinensis</i>	S5	G5						
Porcupine	<i>Erethizon dorsatum</i>	S5	G5			7			
Coyote	<i>Canis latrans</i>	S5	G5						
Red Fox	<i>Vulpes vulpes</i>	S5	G5						
Raccoon	<i>Procyon lotor</i>	S5	G5						
Ermine	<i>Mustela erminea</i>	S5	G5						
Mink	<i>Mustela vison</i>	S5	G5						
White-tailed Deer	<i>Odocoileus virginianus</i>	S5	G5						
<b>SUMMARY</b>									
Total Amphibians:		8							
Total Reptiles:		1							
Total Birds:		59							
Total Breeding Birds:		54							
Total Mammals:		11							
<b>SIGNIFICANT SPECIES</b>									
Global:		0							
National:		0							
Provincial:		0							
Regional:		0							
Local:		12							

**Wildlife Recorded from Lowndes Holdings Corp., Proposed Dolostone Quarry - July 2004**

<b>COMMON NAME</b>	<b>SCIENTIFIC NAME</b>	<b>ONTARIO STATUS</b>	<b>GLOBAL STATUS</b>	<b>COSSARO</b>	<b>COSEWIC</b>	<b>SITE REGION</b>	<b>LOCAL AREA</b>	<b>COMMENTS</b>
<b>Explanation of Status and Acronyms</b>								
COSSARO: Committee on the Status of Species at Risk in Ontario								
COSEWIC: Committee on the Status of Endangered Species in Canada								
REGION: Rare in a Site Region								
S1: Extremely rare in Ontario; usually fewer than 5 occurrences								
S1S2: Extremely rare to very rare in Ontario								
S2: Very rare in Ontario; usually between 5-20 occurrences								
S2S3: Very rare to uncommon in Ontario								
S3: Rare to uncommon in Ontario; usually between 20-100 occurrences								
S3S4: Rare to common in Ontario								
S4: Common in Ontario: apparently secure, usually more than 100 occurrences								
S4S5: Common to very common in Ontario								
S5: Very common in Ontario, demonstrably secure								
SE: Exotic; not believed to be a native component of Ontario's fauna								
SH: Hypothetical; not positively confirmed in Ontario								
SHB: Hypothetical breeder; not positively confirmed breeding in Ontario								
SZ: Not of practical conservation concern as there are no clearly definable occurrences								
SZB: No clearly definable occurrences of breeding								
SZN: no clearly definable occurrences of a non-breeding species								
?: Not yet ranked; or, following a ranking, rank inexact or uncertain								
G1: Extremely rare globally; usually fewer than 5 occurrences in the overall range								
G1G2: Extremely rare to very rare globally								
G2: Very rare globally; usually between 5-10 occurrences in the overall range								
G2G3: Very rare to uncommon globally								
G3: Rare to uncommon globally; usually between 20-100 occurrences								
G3G4: Rare to common globally								
G4: Common globally; usually more than 100 occurrences in the overall range								
G4G5: Common to very common globally								
G5: Very common globally; demonstrably secure								
T: Denotes that the rank applies to a subspecies or variety								
END: Endangered								
THR: Threatened								
VUL: Vulnerable								
SC: Special Concern								

**Wildlife Recorded from Lowndes Holdings Corp., Proposed Dolostone Quarry - July 2004**

<b>COMMON NAME</b>	<b>SCIENTIFIC NAME</b>	<b>ONTARIO STATUS</b>	<b>GLOBAL STATUS</b>	<b>COSSARO</b>	<b>COSEWIC</b>	<b>SITE REGION</b>	<b>LOCAL</b>	<b>AREA</b>	<b>COMMENTS</b>
NAR: Not At Risk									
NIAC: Not In Any Category of risk									
IND: Indeterminant, insufficient information to assign status									
DD: Data Deficient									
6: Rare in Site Region 6									
7: Rare in Site Region 7									
Area: Minimum patch size for area-sensitive species (ha)									
Local: x - significant in the City of Hamilton									

**APPENDIX C**  
**DEER YARD SURVEY**



## 1 METHODOLOGY

In order to assess the function of the deer wintering area and its importance to the local population an intensive survey was completed

The main focus of the deer wintering area survey methodology is the walking of transects through the subject lands at designated intervals. Transects were walked in a northwest and southeast fashion throughout the MNR designated deer wintering area on the main portion of the Subject Lands. Each transect was walked by two observers at 50 – 80 metre intervals. Six transects were walked in total. In addition to these transects, two observation stations were also attended. These stations were located along Milborough Road and 11 Concession East, adjacent to the Eastern white cedar swamp. A transect was not conducted across this feature due to its extremely wet nature and uniformity. Observation stations were considered significant as deer movement in and out of this area was observed from the road side stations. The locations of each transect and observation station is depicted on Figure 4. The following site-specific details were noted during each of the transects.

- severity of deer browse (deciduous);
- evidence of deer tracks and movement trails;
- scat evidence;
- number of deer beds;
- availability of cover (coniferous); and,
- Ecological Land Classification (ELC) vegetation communities.

All of these factors contribute to the quality of a deer wintering area and the degree of importance of this area to the local population.

## 2 RESULTS

Field work was conducted on February 27, March 1 and March 4, 2004. Two main areas were surveyed, the northwestern portion of the subject lands and also a cedar swamp bound between Milborough Road and Concession 11 East. Six transects were completed within the northwest portion of the site and two observation stations were attended in the Eastern white cedar swamp. Transects were not performed within the cedar swamp due to the difficult terrain and the thickness of the vegetation.

Each transect provided a variety of information. The following paragraphs describe the data collected from each transect amount of browse, number of beds, trails, amount scat and habitat type.

### 2.1 TRANSECT 1

This transect passed through both deciduous and mixed forests (FOD & FOM) and a small amount of deciduous swamp (SWD 4-2). Six to ten trails were noted to cross this transect. Very little scat was noted along these trails, less than two piles. The browse was light (some near the southern portion of the transect) and no beds were recorded.

### 2.2 TRANSECT 2

Four vegetation communities were traversed in this transect including cultural meadow (CUM 1-1), Eastern white cedar forest (FOC 2-2), mixed forest (FOM), Eastern white cedar mixed forest (SWM 1-1). There were moderate trails crossing this transect. Six beds were recorded, as was a large amount of scat. The beds were located together in groups of four and two. Browse was recorded along this transect and especially in the deciduous swamp, near the mixed swamp (SWM 1-1).



### 2.3 TRANSECT 3

This transect traversed four vegetation communities: a cultural woodland (CUW 1-3), cultural pine plantation (CUP 3-2), mixed forest (FOM) and red maple deciduous swamp (SWD 3-1b). Use of this area was concentrated at the interface between the mixed forest and deciduous swamp and in the scattered clumps of Eastern White Cedar and Hemlock within the mixed forest. A moderate number of trails were noted along this transect. Four beds were recorded scattered in this area, three were noted together, one alone.

### 2.4 TRANSECT 4

This transect crossed six vegetation communities including white pine cultural woodland (CUW 1-3), white pine plantation (CUP 3-2), mixed forest (FOM), thicket swamp (SWT2), red maple deciduous swamp (SWD 3-1) and white pine coniferous forest (FOC 5-1). The heavy and multiple use of trails were noted throughout the vegetation communities during this transect. More than seventy piles of scat were noted along this transect, mostly fresh. Heavy browse of red osier dogwood was observed within the thicket swamp. Ten beds were observed, five together in each grouping.

### 2.5 TRANSECT 5

Sugar maple deciduous forest (FOD 5-4) and red maple deciduous forest (SWD 3-1) were the two vegetation communities associated with this transect. Scattered trails were noted throughout all of the communities. Heavy browse was observed in the deciduous swamp on elderberry and red osier dogwood. Four beds were noted together and approximately twenty-five piles of scat along the transect (from one to two days old).

### 2.6 TRANSECT 6

Traversing this line three vegetation communities were recorded: cultural meadow (CUM 1-1), sugar maple deciduous forest (FOD 5-4) and red maple deciduous swamp (SWD 3-1). There were few trails observed in this location. Some leatherwood browse was noted in the sugar maple forest and fourteen piles of scat were noted along the line. Four beds were observed, two together in a grouping.

### 2.7 TRANSECT 7

White pine cultural savanna (CUS 1-4\*), white pine plantation (CUP 3-2), mixed forest (FOM) and white elm thicket swamp (SWT 2-12) were the four vegetation communities walked through during this transect. A few trails were noted here, none in the open area near the creek. Twenty-five piles of scat were recorded and six beds. These beds were grouped together in fours and twos.

### 2.8 OBSERVATION POINTS A AND B

As mentioned earlier these observation points were located adjacent to the deer wintering area on Concession 11 East and Milborough Road. Observations were made from these points instead of transects due to the depth of water throughout this vegetation community and the thin layer of ice which covered it. Browse was noted of the red osier dogwoods along observation point B. A heavily used deer trail was noted from station A, with deer travelling south. Scat was noted along this trail but no beds or browse was noted.



## 2.9 SNOW FALL AMOUNTS

The Ministry of Natural Resources does not collect snow fall data in the Cambridge district. This is due to the generally low snowfall amounts for this region and therefore the low deer mortality related to this issue.

**APPENDIX D**

**DETAILED AQUATIC INVESTIGATION METHODOLOGY AND FINDINGS**



## 1 DETAILED METHODS

An initial review of available background information on Flamboro and Mountsberg Creeks within the vicinity of the subject lands was completed. This included fish “dot” (survey point inventory) data obtained from the Ministry of Natural Resources and the Bronte Creek Watershed Study (BCWS) (Conservation Halton, 2002). Field investigations were also conducted to supplement existing data and provided baseline sampling locations for future ecological monitoring.

Stantec Consulting Ltd. completed fisheries inventories, habitat assessments and benthic invertebrate sampling for the surface water features located on and adjacent to the subject lands, with particular emphasis on the tributary in the northwest corner of the subject lands (Tributary A on Figure 6.0).

Fisheries inventories were performed at fifteen stations on tributaries of Mountsberg and Flamboro Creek. The inventories were performed using a single pass habitat method of electro-fishing to determine the species and relative abundance. Gill nets and minnow traps were also used in the pond located on the property. Fish habitat notes were recorded at each of the fifteen stations. **Figure 6** shows the location of the fifteen stations where observations pertaining to fisheries resources were made.

Habitat assessments included observations on the following stream attributes:

- In-stream Cover
- Percent Cover
- Bank Stability
- Substrate Type
- Stream Dimensions and Morphology
- Riparian Vegetation
- Canopy Cover
- Adjacent Land Use
- In-situ Water Quality (dissolved oxygen, pH and conductivity)

In addition to these habitat observations, the following information was also recorded at each station:

- Descriptive Location
- UTM coordinates
- Water and Air Temperature
- Time
- Recent Weather Conditions
- Length of Stream Surveyed.

Benthic invertebrate samples were collected at 12 stations (**Figure 6**). Samples were collected in triplicate using a surber where coarse substrates were present and an eckman in depositional areas with fine sediments. Where possible surber samples were the preferred method as coarser substrates generally support a more diverse community of benthic organisms. All samples were sieved in the field using a 500um mesh and placed in 1L widemouth plastic jars labelled with the project number, station number, and number of jars. The samples were preserved in the field using 10% buffered formalin and delivered to a qualified taxonomist for sorting and identification (Zaranko Environmental).

### 1.1 LAB ANALYSIS

Benthic invertebrate sorting was facilitated by staining the sample with Rose Bengal, which stains only the organisms. The sample was sieved to remove formalin and all animals washed from the sieve into a plastic sorting tray. Organisms were sorted from the tray using a 10x stereomicroscope. Chironomids and oligochaetes were mounted on glass slides in a clearing medium prior to identification. Taxonomic





keys used for species identification are included in Appendix C. Following detailed identification, organisms were re-preserved in 70-80% ethanol with 5% glycerol and labeled by station and replicate. Data were tabulated in an Excel spreadsheet to facilitate data analysis and interpretation.

Sub-sampling is generally required when samples contain a large quantity of organic matter or high densities of macroinvertebrates. When this was the case, any relatively large, less common organisms were removed by sieving the sample through a large mesh sieve (3.36 mm, No. 6 mesh). The material retained on a 500 µm sieve was then sub-sampled by evenly distributing the sample material on the sieve. One half of the material was removed and set aside while the remaining half was distributed evenly on the sieve and again divided in two. A minimum sub-sample volume of 25% and/or a coefficient of variation less than 20% among sub-sampled fractions were the data quality objectives established for this project. Generally, only taxa with densities greater than 100 individuals were sub-sampled.

Temperature dataloggers were strategically placed at 5 locations (Figure 6) within the vicinity of the subject lands to determine the thermal regime of surface water features that have the potential to be cool/cold water.

## 2 DETAILED RESULTS

The following results section summarizes the fish habitat observation made at each station individually. A full list of fish species identified within the study area during the 2004 field survey and background sources as well as species designations can be found in Table D1

### 2.1 STATION: F1

#### Watershed: Flamboro Creek

This station was located in Flamboro Creek upstream of the 10<sup>th</sup> Concession crossing and extended 30m upstream of the road. Observed stream flow at station F1 was 100% flat, no pools, riffles or runs were found; average stream width was estimated to be 2m. Cover was provided by large / small organic debris and aquatic / wetland vegetation which was found in abundance, throughout the wetted area. Bank stability was approximately 80% depositional and 20% vulnerable. The dominant substrate at this station was detritus with a thin layer of muck overlaying firm sediments. Adjacent land use was vegetated and consisted of cattails, aquatic grasses, dogwoods and mixed cedar forest. Canopy cover was estimated to be 50% closed and 50% partly open.

Downstream of the 10<sup>th</sup> concession no defined channel or flow could be found. Surface water was diffused through a sparsely treed fallow portion of a farm pasture. Aquatic / wetland plant species were observed in this area indicating that the soils remain moist, This area was likely not cleared for farming, like the adjacent pasture due to its wet nature.

No fish were captured at this location. Flows in this reach are likely intermittent and the potential for fish habitat is low, especially south of the 10<sup>th</sup> Concession. Benthic invertebrate sampling will help to determine the potential contribution this reach has to downstream habitats.

As discussed below fish were found further upstream in Flamboro Creek, and upstream reaches appear to be permanent. Perhaps the existence of an on-line pond between the 10<sup>th</sup> and 11<sup>th</sup> Concessions has interrupted the contribution of downstream flows during periods of low flow.



### 2.2 STATION: F2

#### Watershed: Flamboro Creek

Station F2 was located in Flamboro Creek 300m downstream of F3 (11<sup>th</sup> Concession).

The station was 60m in length with an average wetted width of 1.2m. Large organic debris, deep pools, undercut banks, boulders, cobble and aquatic vegetation provided moderate in-stream cover, to a total percent estimated at 50. Stream flow habitats observed at the station were 70% runs, 20% pools, and 10% riffles. Substrate was comprised of cobble and boulder, with abundant detritus and silt along the margins. The meandering nature of the stream has created an even distribution of eroding and depositional banks with a small portion of the stream banks protected from erosion by significant vegetation. The surrounding cedar forest provided excellent canopy cover to the stream with 80% of it being closed and the remaining 20% partly open.

Despite the excellent habitat characteristics present in this reach only a small number of brook stickleback and blacknose dace were captured. This may be due to a potential barrier in the form of a falls that is apparently located between this reach and an on-line pond.

### 2.3 STATION: F3

#### Watershed: Flamboro Creek

Station F3 was located in Flamboro Creek downstream of the 11<sup>th</sup> Concession crossing and extended 20m downstream of the road. The stream at this location meanders through a lowland cedar forest with a riffle, pool, run morphology in the following proportions; 60% runs, 20% flats, 10% pools and 10% riffles. Estimated average stream width was 1.2m and the maximum depth was 0.4m. In-stream cover was abundant and provided by large organic debris, root masses and undercut banks; total in-stream cover was approximately 70%. Bank stability was found to be 40% vulnerable, 40% depositional and 20% eroding. Substrate was predominately detritus, small organic debris and muck with isolated areas of gravel and sand. The cedar swamp surrounding the station provides significant shade to the majority of this reach.

Similar to Station F2, blacknose dace and brook stickleback were captured within this reach. However, much higher numbers of the former were obtained. This is likely due to their preference for high stream flows during spawning. This was provided below the culvert at the 11<sup>th</sup> Concession where the majority of the fish in this reach were captured.

### 2.4 STATION: F4

#### Watershed: Flamboro Creek

Flamboro Creek Station F4 was a stream/cedar swamp that extended 50m upstream of the road crossing at the 11<sup>th</sup> Concession. A small section of the station, approximately 20m, had a slow flowing moderately defined stream with an average width of 5m. The majority of the station was observed to be a broad cedar swamp with abundant pools approximately 100m in width. Undercut banks, deep pools, Large/small organic debris and aquatic vegetation provided significant in-stream cover. The substrate at the station was composed entirely of detritus. The banks of the station were almost entirely depositional with small isolated areas of erosion in the sections with some flow. The trees found throughout the station provided partial shading throughout the day.

Although the station is potentially a coldwater habitat, the low dissolved oxygen value and the low numbers of fish captured compared to the high numbers caught immediately downstream suggest limited fish habitat.



### 2.5 STATION: B1

#### **Watershed: Mountsberg Creek**

Station B1 consisted of two small channels originating from a wooded swamp upstream of the 11<sup>th</sup> Concession adjacent to Lawson Park. This station consisted of two short slow flowing stream channels, approximately 20m, flowing from a cedar/grass wetland. The channels were narrow and were completely covered by surrounding wetland vegetation. Substrate in the stream was estimated to be 60% detritus, 20% muck, 10% gravel and 10% sand. Stream banks throughout the station were observed to be 100% depositional. Dogwood shrubs, cedar trees and the riparian wetland vegetation provided complete abundant stream shading throughout the day. Approximately 80 m north of the station a seep was observed providing groundwater input to the station.

The stream at station B1 provided no direct fish habitat due to the combination of the perched culverts entering Mountsberg creek and the intermittent flow of the streams. During additional site visits the culverts under the 11<sup>th</sup> Concession were found to be dry. Although Station B1 provides no fish habitat it does provide cold water to Mountsberg Creek during periods of flow.

### 2.6 STATION: B2

#### **Watershed: Mountsberg Creek**

Station B2 was a dry streambed running through cattle pastureland. The streambed had terrestrial vegetation growing in it along much of its length indicating it is dry for most of the year. The stream at station B2 contains no fish habitat and would only contribute water to fisheries habitat downstream during storm events.

### 2.7 STATION: B3

#### **Watershed: Mountsberg Creek**

Station B3 is located upstream of station B2 on the northwestern end of the cattle farm. No channels or running water were identified during the June 2004 field program. The station was observed to be a band of wetted soil running through a corridor of mature deciduous forest. Sparse shallow pools of standing water were found at a few locations along the station's length. Station B3 contains no fish habitat and would only provide water to fisheries habitat downstream during storm events. It should be noted that the southern end of the station appeared to be used heavily as pastureland.

The lack of fish and the intermittent nature of the stations contained in tributary B suggest that they do not support fish habitat.

### 2.8 STATION: C1

#### **Watershed: Mountsberg Creek**

Station C1 was a ponded/wetland area upstream of the located 11<sup>th</sup> Concession crossing of tributary C. The length of stream surveyed was 120m long and had an average wetted width of 5m and a maximum depth of 0.5m. In-stream cover at this station was abundantly provided by large/small organic debris and emergent and terrestrial vegetation. Substrate composition at this station was approximately 70% detritus and 30% silt. Stream banks throughout the station were observed to be entirely depositional. Riparian vegetation was found to be grasses, dogwoods, wild grape and scattered willow trees. Land used beyond the riparian zone was natural vegetation and old-field to the north, with natural vegetation and a horse farm to the south. The Willow trees and dogwood shrubs at the station provided a moderate amount of canopy cover. During the field study of this station water levels were high due to a predawn rain event, lower water levels and dry periods were observed at the station on previous and subsequent visits.





The lack of fish and the intermittent nature of the stream suggest that station C1 does not support fish habitat.

### 2.9 STATION: D1

#### Watershed: Mountsberg Creek

Station D1 was a stream located downstream of the 11<sup>th</sup> Concession crossing of tributary D. The section of stream surveyed was 30m long and had a mean wetted width of 0.5m. In-stream cover was estimated to be 20%, the cover was provided by a deep pool, boulders, cobbles, and small organic debris. The observed substrate at the station was an equal mixture of cobble, gravel, sand, muck, silt, and boulder. Stream flow at the station during the survey period was small a riffle pool run complex. The maximum observed pool depth at station D1 was 0.20m. The riparian vegetation of the stream was terrestrial herbaceous plants and deciduous trees. Bank stability at this station was 80% protected by road material, 10% vulnerable and 10% eroding. Canopy cover of the stream was limited. Adjacent land use beyond the riparian zone was deciduous forest, a horse exercise track and the 11<sup>th</sup> Concession road.

Although limited to Brook stickleback, station D1 was found to support fish habitat.

### 2.10 STATION: D2

#### Watershed: Mountsberg Creek

Station D2 was a slow flowing stream located downstream of the pond at the south end of the property. The section of stream surveyed was 50m long and had an average wetted width of 0.75m and a maximum depth of 0.15m. In-stream cover was estimated to be 30% and was provided by large/small organic debris and terrestrial vegetation. The Stream substrate at this station was mostly detritus with a mixture of muck and sand. Stream banks throughout the station were observed to be 100% depositional. The riparian vegetation of the stream was mixed deciduous forest and herbaceous under-story plants. The surrounding deciduous forest provided excellent canopy cover for the stream. Land use beyond the forest was agricultural fields and the 11<sup>th</sup> Concession road.

On previous visits station D2 was found to contain no surface water suggesting that it is of an intermittent nature. The lack of fish and the intermittent nature of the stream suggest that it does not support fish habitat.

### 2.11 STATION: POND

#### Watershed: Mountsberg Creek

The Pond is located in the southwestern portion of the property upstream of station D2. The Pond was approximately 20m long and 10m wide with an estimated average depth of 2m. Heavily vegetated piles of debris surround the pond on three sides, which strongly suggest this is a manmade pond. A small inflow was identified in the southeast end and a small outflow was identified in the southwest end of the pond. Both the inflow and the outflow were densely vegetated with aquatic grasses and lacked defined channels. In-stream cover was submergent and emergent aquatic macrophytes as well as industrial debris such as drums and building material. Substrate at the station was mostly silt and clay with smaller amounts of sand and gravel. The staghorn sumacs surrounding the pond provided little to no shading to its surface. All of the banks were stable due to the vegetative growth surrounding the pond with the exception of the northeast corner that showed signs of moderate erosion. Adjacent land use was observed to be a mixed deciduous forest and an agricultural field. The colour of the pond and the sediment composition suggest that the pond has received significant inputs of silt runoff from the near by field.

The pond was found to contain a population of Brook stickleback.





## 2.12 STATION: A1

### Watershed: Mountsberg Creek

Station A1 was located in tributary A from its confluence with Mountsberg Creek and extended 230m upstream. The slow flowing stream had an average wetted width of approximately 2.5m with an average depth 0.25m. In-stream cover was found in abundance and was provided by undercut banks, large/small organic debris, submergent/emergent vegetation and sparse cobble. Stream substrate was primarily detritus with some silt and sparse cobble. Wetland hummocky sedges, and sparse willow trees formed the riparian community for the first 40m of stream from its confluence with Mountsberg Creek. Sedges, sensitive fens and mixed deciduous lowland forest composed the riparian community for the remainder of the station. Stream banks throughout the station were observed to be 100% eroding with undercut banks and exposed soils under the hummocky sedges. Adjacent land use was wetland and mixed deciduous lowland forest.

## 2.13 STATION: A2

### Watershed: Mountsberg Creek

Station A2 was located upstream of station A1 and extended from the open tall grass marsh and continued to the property line. For the first 50m of the station the stream infiltrated through the grassy marsh with no significant pools or channels. Upstream of the marsh a short slow flowing moderately defined channel approximately 50m long was observed, it had an average wetted width of 2m and an average depth of 0.30m. Undercut banks, large/small organic debris, cobble and aquatic vegetation provided abundant in-stream cover. Stream substrate was primarily detritus with small quantities of silt. The riparian community was composed of wetland grasses, marsh marigold, bracken fern, dogwoods, and white cedar. The stream banks of the station were found to be 80% depositional, 15% vulnerable and 5% eroding. Adjacent land use to the station was cedar/deciduous swamp. Upstream of the short channelled section the stream became very convoluted and dispersed through the dense hummocky cedar swamp that formed the remainder of the station. Numerous iron deposits were observed throughout the station suggesting numerous areas of ground water input in the station.

Both stations located in tributary A were found to support limited fish populations with low species diversities.

## 2.14 STATION: M1

### Watershed: Mountsberg Creek

Station M1 was located in Mountsberg Creek at the 10<sup>th</sup> Concession crossing the station extended 20m upstream and 20m downstream of the bridge. The average wetted width of the stream was 8m with an average depth of 0.6m and a maximum observed depth of 1.2m. Cobbles, boulders, large organic debris and submergent macrophytes provided a moderate amount of in-stream cover. Stream substrate was mainly cobble, gravel, and sand with limited quantities of boulder and silt. The stream flow habitat at this station was a fast flowing run. Typha, willow shrubs, water iris, various wetland grasses and one large maple formed the riparian community of the stream. Bank stability was estimated to be 50% vulnerable and 50% depositional. The rare tree and overhanging tall grasses provided extremely limited canopy cover. Surrounding land use was observed to be agricultural pasture and old-field thicket upstream of the 10<sup>th</sup> Concession with residential lawn and natural field downstream of the crossing.



### 2.15 STATION: M2

#### **Watershed: Mountsberg Creek**

Station M2 was located downstream of the 11<sup>th</sup> Concession crossing adjacent to the Lawson Park campground, approximately 150m of stream was surveyed. The average wetted width of the stream was 7m with an average depth of 0.30m and a maximum pool depth of 1.0m. Abundant in-stream cover was provided by deep pools, large organic debris, cobbles, boulders and submergent macrophytes. Stream substrate was composed of a mixture of cobble, sand, gravel with smaller amounts of silt and boulder. Stream flow at this station was a series of riffle pool run sequences; composed mainly of riffles and runs with fewer pools. Riparian vegetation was observed to be manicured lawn, dogwood, meadow rue, current and large trees with limited undergrowth. Bank stability at this station was 100% vulnerable due to its slope and lack of vegetative cover. Canopy cover was limited for much of the stream with the exception of the Lawson Park bridge and the forested area located in the downstream section of the station. Surrounding land use was mixed deciduous forest, manicured lawn, and recreational parkland.

### 2.16 STATION: M3

#### **Watershed: Mountsberg Creek**

Station M3 was a section of Mountsberg Creek that started at the Stone Brook Estates road crossing and extended 100m upstream. The first 30m were a fast flowing braided section with the remainder of the station consisting of a fast flowing shallow stream. The stream had an estimated wetted width of 20m in the braided regions and 5m in the non-braided regions; average depth of the stream was approximately 0.30m with a maximum pool depth of 0.6m. In-stream cover was abundant and varied; boulders, cobbles, large/small organic debris, and emergent/submergent aquatic macrophytes provided approximately a moderate amount of cover. The observed substrate consisted of primarily gravel and sand with small sections of cobbles and silt isolated boulders were also observed. Stream flow at the station was an elongated sequence of riffles runs and pools with the majority being runs with small amounts of riffles and isolated pools. The riparian vegetation of the stream consisted of sedges, rushes, typha, dogwood and willow trees. The bank stability at the station was estimated as 35% depositional, 35% vulnerable and 30% protected. Canopy cover was 50% partly open, 35% open and 15% closed. The surround land use identified as old-field and deciduous forest.

Every station in Mountsberg Creek (M1, M2, M3) was found to support significant and diverse fish communities.



