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Stantec

March 4, 2005
File: 162603782

Lowndes Holdings Corp.
c/o Bob Long
Long Environmental Consultants Inc.
43 Forest Park Rd.
Orangeville, ON L9W 1A1

Dear Gentlemen:

Reference: Proposed Dolostone Quarry, City of Hamilton
Environmental Impact Statement Terms of Reference

Stantec completed a Preliminary Level 2 Natural Environment Report, submitted as an appendix to the Planning Report for the Lowndes' Proposed Dolostone Quarry (September, 2004). Additional field data were collected during 2004. We intend now to initiate the additional studies and analyses to enable completion of an Environmental Impact Statement (EIS) for the proposed undertaking that incorporates these data, as well as comments received from the City's Environmentally Significant Areas Impact Evaluation Group (ESAIEG) and Conservation Halton, and that meets the requirements of the City's July 2004 Environmental Impact Statement (EIS) Guidelines, the Provincial Policy Statement (2005) and the Greenbelt Plan (2005). The EIS will also meet the requirements for a Level 2 Natural Environment Report for an application under the Aggregate Resources Act. Specifically, the EIS will:

- Describe the proposal
- Identify the desktop sources, research and field work methods and analyses used
- Describe the existing on-site and surrounding environment
- Identify and assess the impacts of the proposal on natural heritage features and functions
- Identify positive effects of the proposal (enhancement, restoration)
- Evaluate feasible mitigation measures and their effectiveness
- Recommend mitigation measures, site plan changes, adaptive management, progressive rehabilitation and monitoring plans as necessary.

Reference: Proposed Dolostone Quarry, City of Hamilton
Environmental Impact Statement Terms of Reference

The Preliminary Level 2 Natural Environment Report was prepared to address the Proposed Dolostone Quarry Site Plan (Long Environmental, September 2004). This Site Plan included extraction, other quarry-related development and progressive and final rehabilitation partially within the Environmentally Sensitive Areas (ESAs) and Provincially Significant Wetland (PSW) on site. Recommendations will be made for revising the September 2004 Site Plan to exclude quarrying from inside the PSW and to ensure extraction only occurs within the ESAs where adverse effects will not be caused or can be mitigated.

Two documents are attached. One is our recommended annotated Table of Contents of the proposed EIS, which describes the proposed development and lists in detail the information sources referenced, the timing and nature of completed and proposed field work, and the approach to assessing the impacts of the proposed quarry including site planning, adaptive management and progressive rehabilitation recommendations. The second is a summary of all the field work planned or conducted to date, which we believe fully satisfies the requirements of the Guidelines. Together with this letter, these documents represent our Terms of Reference for the EIS.

Sincerely,

STANTEC CONSULTING LTD.

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Attachments: Annotated Table of Contents
Field Work Summary

c. Sherry Yundt, S. E. Yundt Ltd.

Annotated Table of Contents

1 INTRODUCTION

1.1 DESCRIPTION OF THE PROPOSAL

Lowndes Holdings Corp. has acquired 154 ha located in Part Lot 1 and Lots 2 and 3, Concession 11, geographic Township of East Flamborough, in the City of Hamilton. The site contains a significant Amabel dolostone deposit up to 40 m in depth, and has been designated as a mineral aggregate area. Extraction of this resource is planned to produce crushed rock. The proposed quarry will be developed in four phases, which will be progressively rehabilitated. Extraction will be below the water table and will require dewatering.

The initial quarry site plan (Long Environmental, September 2004) involved the excavation of 96 ha (62%) of the site. A revised site plan will be prepared in conjunction with the EIS and associated environmental studies being conducted by the Client's consulting team. A detailed description and map will be included in the EIS.

1.2 ENVIRONMENTAL POLICY CONTEXT

1.2.1 Province of Ontario
- *Provincial Policy Statement, 2005*
- *Aggregate Resources Act*
- *Greenbelt Plan and Greenbelt Act, 2005*

1.2.2 Regional Municipality of Hamilton-Wentworth

1.2.3 Former Township of Flamborough

1.3 STUDY PURPOSE AND CONTENTS

An EIS is a study that assesses the potential impact of a development proposal on the natural environment. Such a study allows the applicant to create a development plan that avoids, minimizes and/or mitigates against negative environmental effects and which assists planners in determining whether the proposal is in compliance with municipal and provincial policy. The EIS also serves as a source of important information to the landowner (City of Hamilton, 2004). This EIS has been prepared to meet the requirements of the City of Hamilton and the Provincial Policy Statement, consistent with the Greenbelt Plan (2005). Additionally this EIS is extended to comprise a Level 2 Natural Environment Report for an application under the Aggregate Resources Act.

This EIS will:

- Describe the proposal
- Identify the desktop sources, research and field work methods and analyses used
- Describe the existing on-site and surrounding environment
- Identify and assess the impacts of the proposal on natural heritage features and functions
- Identify positive effects of the proposal (enhancement, restoration)
- Evaluate feasible mitigation measures and their effectiveness
- Recommend mitigation measures, site plan changes, adaptive management, progressive rehabilitation and monitoring plans as necessary.

2 APPROACH

2.1 BACKGROUND RESOURCES

A variety of background resources were consulted to characterize the site and assess the significance of features, including:

- Natural Heritage Information Centre (NHIC) database (accessed January, May and November 2004)
- Bronte Creek Watershed Study (Conservation Halton, 2002)
- Nature Counts Project: Hamilton Natural Areas Inventory, Vol. I and II (J. Dwyer (ed.), 2003)
- Hamilton-Wentworth Region Environmentally Sensitive Areas Study (Ecologistics, 1976)
- Ecological Survey of the Niagara Escarpment Biosphere Reserve (Riley et al., 1996)
- Ministry of Natural Resources (Provincially Significant Wetlands, deer wintering areas, Areas of Natural and Scientific Interest)

Additionally, detailed site-specific studies of soils, geology, hydrology and hydrogeology were reviewed and incorporated:

- Agricultural Report (Stovel and Associates, 2004)
- Surficial Soils and Microdrainage (Stovel and Associates, in preparation)
- Preliminary Hydrogeological Assessment (Gartner Lee Ltd., 2004)
- Level 2 Hydrogeological Assessment (Gartner Lee Ltd., in preparation)
- Geological Investigation (JEGEL, 2004)

2.2 VEGETATION AND VASCULAR PLANTS

The site was subject to detailed field investigation. Dates and purposes of field visits are summarized in Table 1 (appended).

Vegetation work was conducted on the following dates:

- October 16 and 23, 2003
- May 13 and 14, 2004
- July 19, 2004
- September 10, 2004

Additional coverage is planned for early June 2005. Vegetation communities were delineated and described using the Ecological Land Classification system (Lee et al., 1998). Provincially and regionally (City of Hamilton) significant/rare species will be identified using Oldham (1999) and Goodban (2003), respectively and their locations will be mapped.

Wetlands will be delineated and characterized using the Ontario Wetland Evaluation System: Southern Manual 3rd Edition (OMNR 1993 with updates). Boundaries of the Provincially Significant Wetland on site will be delineated based on soils, microdrainage and vegetation and will be confirmed in the field with agency staff in 2005.

2.3 WILDLIFE

2.3.1 Winter Wildlife Surveys

Winter wildlife surveys were conducted on February 27, March 1 and 4, 2004 and February 11, 2005. 2004 surveys consisted of transects through the northern third of the site, and 2005 surveys studied deer use of the southeastern portion of the site. Surveys were primarily focused on deer use of the areas identified by the MNR as locally significant deer wintering areas. Opportunistic observations of other wildlife signs were also made during these surveys.

2.3.2 Amphibians

A salamander survey was completed for this site on April 14 and 15, 2004. The 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 complex egg masses. This methodology was approved by the MNR and has been used in cooperation with the MNR on numerous other sites in southern Ontario.

Identification of this species is difficult due to hybridization and cannot be accurately completed in a field situation. In order to identify this species, the eggs of suspected Jefferson salamanders are collected and taken to a laboratory. A Scientific Collector's Permit is required for the collection of a Threatened species. The specimens are then grown to maturity and a genetic test is completed on a segment of the tail. Through this test, an accurate identification of the species can be accomplished. The mature specimens are then taken back to their breeding ponds and released.

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

Both salamander and frog call surveys will be repeated in spring, 2005. Additional frog call stations will be added in 2005.

2.3.3 Breeding Birds

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 tape-recorded call, developed by Bird Studies Canada for the purpose of surveying for Red-shouldered Hawks, was played at intervals along this transect. Trees were surveyed for the presence of stick nests that might support breeding woodland raptors.

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 (06:10-10:30) was calm and clear, with a temperature of approximately 16°C. There was good bird song activity on both days.

The Red-shouldered Hawk survey will be repeated between April 17-May 7, 2005. The breeding bird survey will be expanded in 2005 to include two visits covering early (May 24-June 17) and late (June 13-July 10) breeding species.

2.3.4 Other Wildlife

An owl survey was conducted on April 14, 2004. Field checking for snake hibernacula is planned for April 2005 on a day suitable for snake emergence. Opportunistic observations of odonates and butterflies will be recorded during other 2005 surveys.

2.4 AQUATIC RESOURCES

2.4.1 Surface Water Monitoring

A surface water monitoring program was established for this site in the fall of 2003 in association with Gartner Lee Limited. This program included measurements of monthly flow and water level (April, 2004-ongoing) and temperature (monthly - March, April, May, 2004; continuous mid-July 2004-ongoing) (Gartner Lee Ltd.) in the watercourses surrounding the site. Water levels and flows were monitored at all of the locations during the pump tests in April and November 2004, and as part of the fisheries program. Samples of surface water collected in November 2004 were analyzed for baseline levels of dissolved oxygen, conductivity, pH, alkalinity, total suspended solids, total dissolved solids, nitrogen, major ions by ICP-MS and anions (chloride, phosphate, bromide, sulphate, nitrate, nitrite) were established. Surface water quality analysis will be continued quarterly in 2005.

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.

2.4.2 Fish Habitat Assessment

A review of available background information on Flamboro and Mountsberg Creeks within the vicinity of the subject lands was completed. Information sources included fish "dot" (survey point inventory) data obtained from the Ministry of Natural Resources, the Bronte Creek Watershed Study (BCWS) (Conservation Halton, 2002) and a search of the Natural Heritage Information Centre (NHIC) database to identify any significant species.

Field investigations included redd surveys, fisheries community inventories, aquatic 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. The redd surveys were performed on November 25, 2003. Habitat assessments were performed on October 30, 2003 and on June 15, 17 and 18 of 2004. Fisheries community inventories were completed on June 15, 17 and 18 of 2004. A site visit to off-site intermittent tributaries was performed in January 2004 to assess year round flow conditions. An additional habitat assessment and community inventory is planned during higher spring flows (April 2005) to address the comments of ESAIEG and Conservation Halton.

Fisheries community inventories were performed at fifteen stations on tributaries of Mountsberg and Flamboro Creeks. The inventories were performed with a Smith-Root Model 12 electro-fisher used to target all habitat types with a single pass to determine the species present 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. Photographic documentation of each station will be continued in 2005.

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)

2.4.3 Benthic Invertebrates

Benthic conditions were surveyed in early June 2004. Samples were collected in triplicate using a Surber sampler where coarse substrates were present, and an Ekman dredge 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 500 µm mesh and placed in 1litre wide mouth plastic jars. The samples were preserved in the field using 10% buffered formalin and delivered to a qualified taxonomist for sorting and identification (Zaranko Environmental Assessment Services).

3 REGIONAL CONTEXT – OVERVIEW OF NATURAL FEATURES

3.1 LANDSCAPE SETTING

3.1.1 Geology, Surficial Geology and Soils

This section will summarize the physiographic region characteristics identified by Chapman and Putnam (1984), and the regional descriptions of soils, surficial geology and bedrock geology in the Natural Areas Inventory (Dwyer, 2003), JEGEL (2004) (who compiled information from numerous Ontario Geological Survey and Ontario Department of Mines documents) and Presant et al. (1965).

3.1.2 Hydrology and Hydrogeology

This section will summarize regional surface and groundwater characteristics based on the work of Gartner Lee Ltd., including watercourse flow and temperature regimes, aquifer descriptions, water table elevations, areas of recharge or discharge, groundwater flow direction and quality, etc. A discussion of watershed and subwatersheds will draw information from the Bronte Creek Watershed Study.

3.1.3 Climate

Gartner Lee Ltd. will include meteorological data and a water budget in their reporting. It will be summarized in the EIS.

3.1.4 Vegetation

The site is located in Site District 6E-1 (Jalava et al., 1997). This section will include a description of the site district's characteristics in terms of their relation to vegetation.

The subject lands are located in the Niagara section of the Deciduous Forest Region (Rowe, 1972). This section is dominated by sugar maple and American beech, mixed with basswood, red maple, red oak, white oak and bur oak. The bulk of Canada's black walnuts, sycamores, swamp white oaks and shagbark hickories are found in this region as well. Other species include the butternut and bitternut hickories, rock elm, silver maple and blue beech. Coniferous species are generally limited

to scattered white pine, eastern hemlock, eastern red cedar and, more rarely, black spruce, tamarack and eastern white cedar.

3.2 DESIGNATED FEATURES

An inventory of regional features will be conducted for a 3 km-radius area surrounding the site, which will permit the identification and mapping of local natural features that create the environmental setting for the site, such as significant woodlots and wetlands supporting wildlife or fish populations. This scale encompasses adjacent subwatersheds and ensures that potentially related features and functions are considered. Designated natural features in this zone include Environmentally Sensitive Areas, Provincially Significant Wetlands, Areas of Natural and Scientific Interest (ANSIs) and deer wintering areas identified by the MNR. The following sections will describe the designated features listed, with particular attention to the features and functions for which the areas were designated.

3.2.1 Provincially Significant Wetlands

A Provincially Significant Wetland, the Mountsberg East Wetland Complex, occupies the headwaters of tributaries to Mountsberg Creek, and Flamboro Creek, at the north and east portions of the property, respectively. Approximately 2 km southwest of the subject lands is the locally significant Freelton Esker Wetland Complex and the locally significant Kilbride Swamp lays to the southeast of the subject lands. The latter is listed as a regionally significant Life Science ANSI.

3.2.2 Environmentally Sensitive Areas

Portions of two Environmentally Sensitive Areas (ESAs) fall on the site, the Mountsberg East Wetlands ESA and the Carlisle North Forests ESA. Specific criteria forming the basis for ESA designation have been identified (Heagy, 1993; Dwyer, 2003).

The Mountsberg East Wetlands ESA has been designated because it provides:

Significant Ecological Function

- riparian area serves as a link between other natural areas in Flamborough
- the area provides habitat for significant species
- the area contains interior forest habitat (at least 200 m from forest edge)

Significant Hydrological Function

- the area helps to recharge groundwater supplies, maintain surface water quality and regulate stream flow in the upper Bronte Creek system

The Carlisle North Forests ESA has been designated because it provides:

Significant Ecological Function

- the area contains significant species
- the area contains interior forest habitat (100-200 m from the forest edge
- the riparian area serves as a link between natural areas in Flamborough

Significant Hydrological Function

- the natural vegetation of the area helps to maintain water quality in the coldwater streams

Halton Region's Guelph Junction Woods ESA lies approximately 1.5 km east of the subject lands.

3.2.3 Natural Heritage System and Linkages

This section will highlight regional linkages between the designated features and other features identified in existing documents such as the Bronte Creek Watershed Study (Conservation Halton, 2002), the Greenbelt Plan (2005) and the components of the Official Plan's Natural Heritage System.

4 EXISTING CONDITIONS

This section will summarize the results of the background review and detailed field inventory.

4.1 SOILS AND SURFICIAL GEOLOGY

This section will summarize the detailed characterization of the site's bedrock and surficial geology provided by John Emery Geotechnical Engineering Ltd. (JEGEL) (2004) and the site specific soils information provided by Stovel and Associates (2004 and in prep.). The surficial soil report will be included as an appendix to the EIS.

4.2 HYDROLOGY AND HYDROGEOLOGY

This section will summarize the detailed characterization of the site hydrology and hydrogeology provided by Gartner Lee Ltd. (in prep.). This will include, but not be limited to, a description of groundwater elevations, flow, quality and aquifer characteristics; surface water drainage, flows and seasonal variation; and connections between ground and surface water. Surface microdrainage will be summarized from Stovel and Associates (in prep.). The Level 2 Hydrogeological Assessment (Gartner Lee Ltd., in prep.) will be included as an appendix or companion report to the EIS.

4.3 VEGETATION

4.3.1 Vegetation Communities

Vegetation communities, identified using the Ecological Land Classification system (Lee et al., 1998), will be mapped. Following a general description of the historical land use as it related to vegetation, a table will present a description of each vegetation community. Higher quality (characterized by more mature, less disturbed or particularly diverse vegetation) and sensitive vegetation features will be identified.

Table 2. ELC Vegetation Types

ELC Type	Description

Wetlands, delineated and characterized using the Ontario Wetland Evaluation System: Southern Manual 3rd Edition (OMNR 1993 with updates), will be mapped.

4.3.2 Vascular Plants

The revised species list includes 325 species observed to date on site and will be included as an appendix to the report. The list will be discussed with reference to significance (Oldham, 1993 and Goodban, 2003), conservatism (Floristic Quality Assessment) and sensitivity of species and habitats.

4.4 WILDLIFE

The revised species list will be included as an appendix to the report. The list will be discussed with reference to significance and sensitivity of species, communities and habitats. A map will be included showing the locations of transects, stations and species occurrences, where appropriate.

4.4.1 Mammals

4.4.2 Amphibians and Reptiles

4.4.3 Birds

4.4.4 Other Wildlife

4.5 AQUATIC RESOURCES

This section will include a summary of the habitat assessment and community inventories. The detailed habitat notes will be included as an appendix to the report, and will include a table summarizing the findings within each reach. Fixed-point photographic documentation of each station will be presented.

Fish inventory results, benthic community indices and surface water quality information will be presented in three tables. Examples of the information to be presented are provided below. The results of the water temperature measurements and Bronte Creek Watershed study (Conservation Halton, 2002) will also be reported.

Table 3. Fisheries Inventory Results: Number of Each Species Caught Within Each Reach

Species	Reach														
	A1	A2	B1	C1	D1	D2	F1	F2	F3	F4	M1	M2	M3	Pond	Totals

Table 4. Benthic Community Indices Calculated from Quantitative Data Collected in Flamborough and Mountsberg Creeks (June 2004)

Station	Enumerations			Relative Abundance of Taxonomic Groups					
	Mean # of Organisms	Mean # of Taxa	Mean # of EPT Taxa	Mean % EPT Organisms	Mean % Chironomids	Mean % Other Insects	Mean % Annelids	Mean % Molluscs	Mean % All Other Organisms
A1									

Table 5. Baseline Surface Water Quality Information

	Station			
	A1	M3	M2	F4
Alkalinity (mg CaCO3/L)				
Turbidity (NTU)				
Total Dissolved Solids (mg/L)				
Total Suspended Solids (mg/L)				
Br- (mg/L)				
Cl- (mg/L)				
SO4 (mg/L)				
$PO4^{-3}$ (mg/L)				
NO2-N (mg/L)				
NO3-N (mg/L)				
TKN				
NH3-N (mg/L)				
TOC (mg/L)				
Dissolved Oxygen (mg/L				

4.5.1 Mountsberg Creek

The discussion for each watercourse will summarize the overall water quality (based on both water quality testing and benthic community indices), and fish habitat characteristics, identifying any barriers to fish passage. Fish habitat type or potential will be assessed. Seasonal changes in temperature or flow will be described.

4.5.2 Flamboro Creek

The discussion for each watercourse will summarize the overall water quality (based on both water quality testing and benthic community indices), and fish habitat characteristics, identifying any barriers to fish passage. Fish habitat type or potential will be assessed. Seasonal changes in temperature or flow will be described.

5 ANALYSIS

This section analyzes the existing conditions with respect to the policies of the Province and the City, with reference the Natural Heritage Reference Manual for Policy 2.3 of the Provincial Policy Statement (OMNR, 1999), the Greenbelt Plan (2005) and other materials described in the sections below.

Features that meet the criteria will be mapped. To date, endangered and threatened species, ANSIs and significant valleylands have not been identified on the subject lands.

5.1 SIGNIFICANT WETLANDS

Portions of the Provincially Significant Lower Mountsberg Creek Wetland Complex occur on site. This section of the report will describe and map the revisions to the boundary made through review of the wetland scoring and evaluation record, soils and microdrainage reports (Stovel and Associates, 2004 and Stovel and Associates, in prep.), and field investigation. Any connections between the wetland and watercourses or groundwater, established by Gartner Lee Ltd. (in prep.), will be discussed.

5.2 SIGNIFICANT PORTIONS OF THE HABITAT OF THREATENED AND ENDANGERED SPECIES

A search of the NHIC database indicates that there are several records of one Threatened species, redside dace, in the vicinity of the site through the 1970's. The most recent records from 1995 are in the lower reaches of Mountsberg Creek at or downstream from Concession 10. Available data from the Bronte Creek Watershed Study indicates a decline of the species in Mountsberg Creek. The effects of Mountsberg Reservoir and the introduction of northern pike and other non-indigenous species into the watershed could have contributed to the demise of redside dace in Mountsberg Creek (Conservation Halton, 2002). Field studies will be repeated in spring, 2005.

A genetic analysis of one salamander egg mass collected from the site was not sufficient to determine the species; the non-viable eggs may have been from a Jefferson/blue-spotted salamander polyploid. Jefferson salamanders are known to occur in similar wetland habitat in neighbouring regions. The Jefferson salamander is a Threatened species, and further work is required to determine the presence or absence of this species. Field studies will be repeated in spring, 2005.

5.3 AREAS OF NATURAL AND SCIENTIFIC INTEREST

There are no ANSIs present within the subject lands or adjacent to them (i.e. within 120 metres of the lands).

5.4 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. This section of the report will summarize the results of section 4.5 and provide an aquatic habitat classification map.

5.5 SIGNIFICANT WOODLANDS

Guidelines for determining the significance of woodlands are presented in the Natural Heritage Reference Manual for Policy 2.3 of the Provincial Policy Statement (OMNR, 1999) and the policies of the Greenbelt Plan (2005). Criteria suggested by the manual for designating significant woodlands include woodland size, shape, proximity to other woodlands or natural features, linkages, species diversity, uncommon characteristics, and economic and social values.

Additionally, the City of Hamilton (2005a) has released a technical discussion paper regarding the identification of significant woodlands. It is suggested that woodlands that meet two or more of the following criteria should be considered significant in the City of Hamilton: size (variable criterion according to forest cover in the planning unit); the presence of interior forest located more than 100 m from an edge; location within 50 m of a significant natural area (wetlands 0.5 ha or greater in size,

ESAs, PSWs and Life Science ANSIs); location within 30 m of streams, headwater areas, wetlands or lakes; presence of trees that are 100 years old or more; and the presence of threatened, endangered, special concern, provincially or locally rare plant or wildlife species.

The woodlands on site will be discussed with reference to these criteria.

5.6 SIGNIFICANT VALLEYLANDS

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 associated with Mountsberg Creek is 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.

5.7 SIGNIFICANT WILDLIFE HABITAT

Significant wildlife habitat is one of the more complicated natural heritage features to identify and evaluate. In the Provincial Policy Statement (2005), the term wildlife refers to all wild, native, living organisms including insects, amphibians, reptiles, birds, mammals and vegetation. The Natural Heritage Reference Manual (OMNR, 1999) includes criteria and guidelines for designating significant wildlife habitat. There are two other documents, the Significant Wildlife Habitat Technical Guide and the Significant Wildlife Habitat Decision Support System, that can be used to help decide what areas and features should be considered significant wildlife habitat (OMNR, 2000). There are four general types of significant wildlife habitat: seasonal concentration areas, migration corridors, rare or specialized habitat and habitat for species of conservation concern.

Seasonal Concentration Areas

Seasonal concentration areas are those sites where large numbers of a species gather together at one time of the year, or where several species congregate. The following is a partial list of numerous potential examples: deer yards, amphibian breeding ponds, snake and bat hibernacula, waterfowl staging and moulting areas, raptor roosts, bird nesting colonies, shorebird staging areas, and passerine migration concentrations. Only the best examples of these concentration areas are usually designated as significant wildlife habitat. Areas that support a species at risk, or if a large proportion of the population may be lost if the habitat is destroyed, are examples of seasonal concentration areas which should be designated as significant.

A locally significant deer wintering area has been identified by the OMNR in approximately the northern third of the property and along the PSW on Flamborough Creek.

Migration Corridors

Migration corridors are areas that are traditionally used by wildlife to move from one habitat to another. This is usually in response to different seasonal habitat requirements. Some examples are trails used by deer to move to wintering areas, and areas used by amphibians between breeding and summering habitat.

Rare or Specialized Habitat

Rare, or specialized habitats are two separate components. Rare habitats are those with vegetation communities that are considered rare in the province. "S-Ranks" are rarity rankings applied to species at the "state", or in Canada at the provincial level, and are part of a system developed under

the auspices of the Nature Conservancy (Arlington, VA). Generally, community types with S-Ranks of S1 to S3 (extremely rare to rare-uncommon in Ontario), as defined by the Natural Heritage Information Centre (NHIC), could qualify. It is assumed that these habitats are at risk and that they are also likely to support additional wildlife species that are considered significant.

Specialized habitats are microhabitats that are critical to some wildlife species. Potential examples include salt licks for ungulates and groundwater seeps for Wild Turkeys.

Habitat for Species of Conservation Concern

Rare species are considered at five levels: globally rare, nationally rare (with designations by the Committee on the Status of Endangered Wildlife in Canada, or COSEWIC), provincially rare (with designations by the Committee on the Status of Species at Risk in Ontario, or COSSARO), regionally rare (at the Site Region level); and locally rare (in the municipality or Site District). This is also the order of priority that should be attached to the importance of maintaining species. Some species have been identified as being susceptible to certain practices, and their presence may result in an area being designated significant wildlife habitat. Examples include species vulnerable to forest fragmentation and species such as woodland raptors that may be vulnerable to forest management or human disturbance. The final group of species of conservation concern includes species that have a high proportion of their global population in Ontario. Although they may be common in Ontario, they are found in low numbers in other jurisdictions. Under the PPS, vascular plants are considered to be wildlife.

5.8 ENVIRONMENTALLY SIGNIFICANT AREAS

Two ESAs, designated by the City, occur on site. This section will summarize the significant features and functions for which they were designated.

6 POTENTIAL IMPACTS, MITIGATION AND REHABILITATION

6.1 DESCRIPTION OF THE PROPOSED QUARRY

The quarry site plan is currently under review. Revisions are being considered in response to early work on this EIS. The EIS will provide a summary of important environmental features, functions and linkages that will need to be respected within the context of proposed quarrying. The limits for quarry extraction and associated services and facilities, will be assessed through a detailed review of degree of significance and sensitivity. Constraint mapping (layering of various constraints) will assist with these analyses.

This section will include a map of the proposed extraction limit and will describe the accessory features, such as on-site roads and berms, that will be associated with the quarry. The extraction plan will be described in terms of proposed staging and progressive rehabilitation concept.

Extraction is proposed below the water table and a description of the dewatering process, discharge locations and volumes, expected drawdown and surface water balance, as well as measures to mitigate the hydrogeological effects (Gartner Lee Limited) will be provided. This work will provide a detailed assessment of how the quarry might affect the important features, functions and linkages during and post-extraction (with separate analyses addressing individual stages of proposed quarrying, through progressive rehabilitation).

The following sections will identify specific ecological effects of quarry operation, both with hydrological and hydrogeological mitigation measures in place and in the case of these measures failing, with recommendations for an Adaptive Management Plan (AMP). Net effects of the proposed quarry following closure and rehabilitation will be discussed in sections 6.8 and 6.9.

6.2 PROVINCIALLY SIGNIFICANT WETLAND

6.2.1 Potential Impacts

This section will discuss potential direct and indirect effects associated with the quarry establishment, operation and rehabilitation. Hydrological and hydrogeological effects will be summarized from Gartner Lee Ltd. (in prep.) and will be used to assess the nature and degree of effects on the wetland vegetation, soils and wildlife. There are a number of impacts that could cause effects:

1) A change in contributing surface waters' volume, quality (e.g. surface catchment area removed by extraction),
2) Altered ground water table associated with drawdown and/or with mounding associated with extraction and progressive rehabilitation scenarios,
3) Erosion and sedimentation, and,
4) Increased dust, noise, vibration and disturbance.

6.2.2 Mitigation Options

Options for mitigating hydrological and hydrogeological effects will be summarized from Gartner Lee Ltd. (in prep.) and will be used to compare the baseline biological conditions, the conditions under extraction scenarios with mitigation, and conditions in the event that the mitigation measures fail. Additional mitigation measures to prevent negative effects from disturbance will be proposed as input to the AMP and progressive rehabilitation plans.

6.3 AQUATIC HABITAT

6.3.1 Potential Impacts

This section will discuss potential direct and indirect effects associated with the quarry establishment, operation and post-extraction. There are several main impacts that could cause effects associated with the aquatic resources:

1) A change in contributing surface waters (e.g. surface catchment area removed by extraction, altered pumping regime from quarry dewatering),
2) A change in surface water quality (e.g. from quarry dewatering),
3) Erosion and sedimentation, and
4) Altered ground water table associated with drawdown and/or with mounding associated with extraction and post-extraction scenarios.

6.3.2 Mitigation Options

Options for mitigating hydrological and hydrogeological effects will be summarized from Gartner Lee Ltd. (in prep.) and will be used to compare the baseline biological conditions, the conditions under

extraction scenarios with mitigation, and conditions in the event that the mitigation measures fail, to be incorporated into the AMP.

Measures to mitigate the effects from altered water chemistry from dewatering, if applicable, will be recommended. The feasibility of improving aquatic habitat, particularly for the redside dace as described in the Draft Recovery Strategy for Redside Dace in Ontario (2005), will be considered.

6.4 SIGNIFICANT WOODLANDS

6.4.1 Potential Impacts

This section will discuss potential direct and indirect effects associated with the quarry establishment, operation and progressive rehabilitation. When the quarry site plan is finalized, in consultation with the Client's study team, it will be possible to determine if any woodland will be removed, and if so, where and what type. Potential effects include:

1) Direct loss of wooded areas (to be quantified by vegetation community), including an evaluation of the types, significance and number of plant and wildlife species affected,
2) Drying, sunscald, windthrow and other exposure effects at new edges created by removal of buffering vegetation, and
3) Indirect disturbance due to dust, noise and vibration
4) Change in surface water quality and quantity and related soil drainage

6.4.2 Mitigation Options

Measures to mitigate any effects will be recommended as input into the AMP.

6.5 (POTENTIALLY) SIGNIFICANT WILDLIFE HABITAT

A locally significant deer wintering area has been identified on site by the OMNR. The presence of other specific types of significant wildlife habitat has not been determined on the site and will take into account substantial additional field work in 2005.

Potential impacts to the deer wintering include the direct loss of habitat, increased disturbance through noise, dust and vibration, increased difficulty in crossing Milburough Line as a result of increased truck traffic.

6.6 ENVIRONMENTALLY SENSITIVE AREAS

This section of the EIS will examine the potential effects on the two designated ESAs, relevant to the proposed quarry. Each criterion for which the two ESAs have been identified will be reviewed. Potential direct, indirect and cumulative effects on each criterion and on the overall designation of the lands as ESA will be addressed.

For example, the Mountsberg East Wetlands ESA has been designated as achieving two criteria; Significant Ecological Function (i.e. linking riparian area, habitat for significant species and interior forest habitat (at least 200 m from forest edge). The ESA also satisfies the Significant Hydrological Function criterion (i.e. groundwater recharge, supplies, maintains surface water in the upper Bronte Creek system). Potential effects on these criteria and sub-criteria will be addressed.

The Carlisle North Forests ESA, has been designated because it also satisfies two criteria, Significant Ecological Function (i.e. significant species, interior forest habitat, and riparian links) and Significant Hydrological Function (i.e. maintains water quality in the coldwater streams). Potential effects on these criteria and characteristics will be thoroughly examined.

6.7 OTHER NATURAL HERITAGE FEATURES

Features that might be included in this category include agricultural fields, hedgerows and cultural communities that have not been identified as part of a significant natural feature, as well as common species of wildlife and plants. This section will describe the extent, degree and nature of impacts and, if appropriate, measures to mitigate impacts where possible.

6.8 REHABILITATION PLAN

The current concept for rehabilitation of the quarry is to create revegetated perimeter buffers, permanent, naturally landscaped berms, and a water feature with a diversity of aquatic and wetland habitats. There will be areas of exposed cliff (i.e. specialized habitat) and areas of shallow wetland and deep water systems.

These amenities will relate to and enhance the retained and enhanced terrestrial systems that will surround the water feature. Opportunities will be created for both education and interpretation.

Other characteristics of the rehabilitated natural systems will be described in this section along with an indication of timing for development according to the various stages of extraction and progressive rehabilitation. This section will also address the rehabilitation requirements as defined in the Greenbelt Plan (2005), including limitations on the extent of disturbed areas.

6.9 SUMMARY OF NET EFFECTS

This section will present conclusions regarding potential direct, indirect and cumulative effects associated with the proposed quarrying life cycle.

7 SUMMARY AND CONCLUSIONS

7.1 STATEMENT OF NET EFFECTS

A detailed summary of the functions associated with each natural heritage feature on the property, the potential impacts and effects on those features and functions, proposed mitigation and adaptive management measures and the predicted net effects will be provided in a table (an example is provided below) and followed by a summary statement of net effects.

Table 6. Potential Impacts and Mitigation

Feature	Function	Potential Impacts and Effects	Mitigation	Predicted Net Effects

7.2 RECOMMENDED SITE PLAN REFINEMENTS

This section will discuss the September 2004 Site Plan and will review the reasons for revisions to that plan. Changes to the extraction limits, quarry-related development (such as access roads or berms), adaptive management and progressive rehabilitation that are recommended as a result of the impact assessment will be discussed.

7.3 RECOMMENDED MONITORING PLAN

The recommended monitoring plan will be based on the natural heritage elements that required mitigation measures to protect them, or that have the potential to be affected if the mitigation measures fail.

7.4 CONCLUSIONS

This section will provide conclusions regarding:

- Compliance with relevant planning legislation, polices and guidelines
- Modifications to the Site Plan to avoid, minimize, and/or mitigate potential effects on important environmental features, functions and linkages
- A summary of proposed mitigation
- Supplementary Site Plan drawing(s) to prescribe specific environmental management techniques
- Net effects (direct, indirect, cumulative) associated with the undertaking
- A summary of proposed monitoring.

Overall conclusions regarding the proposed quarry will be summarized and presented.

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Appendix A: Stovel and Associates Surficial Soil and Microdrainage report (in prep)

Appendix B: Level 2 Hydrogeological Assessment (Gartner Lee Ltd., in prep.) or summary

Appendix C: List of Vascular Plants

Appendix D: List of Wildlife

Appendix E: Detailed Aquatic Investigation Methodology and Findings

Appendix F: Study Team *Curricula Vitae*

Table 1. Ecological Field Work Program

Date of Field Work	Purpose of Field Work	Personnel
Oct 16, 23, 2003 May 13, 14, July 19, Sept 10, 2004 *June 2005*[1]	Botanical inventory and Ecological Land Classification	C. Zoladeski
Feb 27, March 1, 4, 2004 Feb 11, 2005	Winter wildlife survey	L. Campbell G. Weeks
Apr 14, 2004	Owl survey	N. Smith R. Park
Apr 14, 15, 2004 *Mar 28-Apr 15, 2005*	Salamander egg mass collection/analysis	A. Goodban L. Campbell R. Park
Apr 14, May 12, June 16, 2004 *Apr, May, June 2005*	Amphibian call counts	N. Smith R. Park
Apr 2005 *and all visits*	Reptile surveys - hibernacula emergence - opportunistic observations during other surveys	C. Clarkin
May 12, 2004 *Apr 17-May 7, 2005*	Red-shouldered Hawk survey	V. Wyatt N. Smith
July 1, 2, 2004 *May 24-Jun 17 and Jun 10-Jul 10, 2005* *(two visits)*	Breeding bird inventory	V. Wyatt
Nov 2004 Feb, *May, Aug 2005*	Surface water quality analysis	R. Park
Oct 30, Nov 25, 2003 Jan, Jun 15, 17, 18, 2004 *Apr 2005*	Aquatic habitat assessment and in-situ surface water sampling (dissolved oxygen, pH, conductivity)	S. Geddes R. Park C. Clarkin
Jun 15, 17, 18, 2004 *Apr 2005*	Electrofishing inventory	R. Park C. Clarkin
Jun 2004	Benthic invertebrate sampling	R. Park C. Clarkin
Jun 2005	Wetland boundary refinement	D. Charlton A. Goodban
All visits 2005	Insects (Odonada, Lepidoptera)	A. Sandilands

[1] Dates of future work are italicized