REPORT

Natural Environment Assessment - Technical Study Report

DURHAM YORK
RESIDUAL WASTE STUDY

REPORT NO. 1009497

EXECUTIVE SUMMARY

Durham and York Regions (the Regions) have partnered to undertake a joint Residual Waste Planning Study. Both municipalities are in need of a solution to manage the residual solid waste that remains after diversion. The Regions are working together to address the social, economic, and environmental concerns through an Environmental Assessment (EA) Study process to examine potential long-term residual waste management alternatives.

This Report entitled *Natural Environment Assessment – Technical Study Report*, has been prepared to confirm: (a) the potential aquatic and terrestrial impacts associated with the development of a Proposed Thermal Treatment Facility (the Facility) on the Facility Site (the Site), Clarington 01; (b) potential mitigation required; and, (c) potential net effects and impact management measures. This Report will form part of the supporting documentation and materials for the EA Study.

No significant forested areas or permanent watercourses exist on the Site. The flat, open terrain and lack of cover offer few opportunities for specialized habitat or species. No species of conservation concern were documented during the 2007 field surveys. Subsequent supplementary field surveys in 2009 targeted seasonally-sensitive species and features that might not have been present or evident during previous field visits. All plants and animals identified were common and widespread in Ontario.

Overall, the proposed development will not have a significant impact on the natural features and ecological functions of the Site provided the recommendations in this Report are implemented.

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GLOSSARY AND ABBREVIATIONS

** An asterisk (*) beside a defined term indicates that the term is defined in the Environmental Assessment Act.*

Alternative Methods:	Alternative methods of carrying out the proposed undertaking are different ways of doing the same activity. Alternative methods could include consideration of one or more of the following: alternative technologies; alternative methods of applying specific technologies; alternative sites for a proposed undertaking; alternative design methods; and, alternative methods of operating any facilities associated with a proposed undertaking.
Alternatives:	Both alternative methods and alternatives to a proposed undertaking.
Alternatives To:	Alternatives to the proposed undertaking are functionally different ways of approaching and dealing with a problem or opportunity.
Area of Natural and Scientific Interest	Areas of land and water containing natural landscapes or features that have been identified as having life science or earth science values related to protection, scientific study or education.
Durham:	The Regional Municipality of Durham or its geographic area, as the context requires.
Durham/York Residual Waste EA Study:	The Durham/York Residual Waste Study is a joint initiative between the Region of Durham and York Region to work together to find a way to manage solid waste remaining after at-source diversion.
Energy-from-Waste (EFW):	The recovery of energy in the form of heat and/or power from the thermal treatment of waste. Generally applied to incineration, pyrolysis, gasification but can also include the combustion of landfill gas and gas produced from anaerobic digestion of organic materials.

Environment*:	The environment is broadly defined under the Environmental Assessment Act as follows: (a) Air, land or water; (b) Plant and animal life, including human life; (c) The social, economic and cultural conditions that influence the life of humans or a community; (d) Any building, structure, machine or other device or thing made by humans; (e) Any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from human activities; or, (f) Any part or combination of the foregoing and the interrelationships between any two or more of them.
Environmental Assessment:	Environmental assessment is a study, which assesses the potential environmental effects (positive or negative) of a proposal. Key components of an environmental assessment include consultation with government agencies and the public; consideration and evaluation of alternatives; and, the management of potential environmental effects. Conducting an environmental assessment promotes good environmental planning before decisions are made about proceeding with a proposal.
Environmental Assessment Act:	The Environmental Assessment Act (and amendments and regulations thereto) is a provincial statute that sets out a planning and decision-making process to evaluate the potential environmental effects of a proposed undertaking. Proponents wishing to proceed with an undertaking must document their planning and decision-making process and submit the results from their environmental assessment to the Minister for approval.
Fish Habitat	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.
Impact Management Measures:	Measures which can lessen potential negative environmental effects or enhance positive environmental effects. These measures could include mitigation, compensation, or community enhancement.

Impact Studies:	Studies that predict negative consequences (if any) of a proposed undertaking. Air, visual, natural environmental, traffic, hydrogeological, Noise, Health Risk, Land Use and Hydrological Impact Studies are required under the Environmental Protection Act.
Individual Environmental Assessment:	An Individual Environmental Assessment requires the following steps to fully address the requirements of the EAA: Preparation of the Proposed EA Terms of Reference; Submission of the EA Terms of Reference to the Minister of the Environment for Approval; Completion of the EA Study in accordance with approved EA Terms of Reference, and; Submission of the EA Study to the Minister of the Environment for Approval.
Ministry of the Environment (MOE) Ontario:	The MOE monitors pollution and restoration trends in Ontario and uses that information to develop environmental laws, regulations, standards, policies, programs, and guidelines. The MOE works to provide cleaner air, land, and water for Ontarians.
Mitigation:	Measures taken to reduce adverse impacts on the environment.
Municipal Solid Waste (MSW):	Common garbage or trash generated by industries, businesses, institutions, and homes.
Natural Heritage Features and Areas	Features and areas, including significant wetlands, significant coastal wetlands, fish habitat, significant woodlands south and east of the Canadian Shield, significant valleylands south and east of the Canadian Shield, significant habitat of endangered species and threatened species, significant wildlife habitat, and significant areas of natural and scientific interest, which are important for their environmental and social values as a legacy of the natural landscapes of an area.
Project:	Encompasses the design, construction (including construction financing) and operation of the EFW Facility, and includes the EA Study, the supply of municipal waste, and the sale of energy.

Proponent*:	A person, agency, group or organization that carries out or proposes to carry out an undertaking or is the owner or person having charge, management or control of an undertaking.
Regions:	Durham and York collectively.
Species at Risk	Species that are at risk of extinction, extirpation or endangerment globally or within a jurisdiction or region.
Species of Conservation Concern	All species that are in rapid decline, endemic, internationally significant, and /or listed in international legislation.
Terms of Reference:	A document prepared by the proponent and submitted to the Ministry of the Environment for approval. The terms of reference sets out the framework for the planning and decision-making process to be followed by the proponent during the preparation of an environmental assessment. In other words, it is the proponent's work plan for what is going to be studied. If approved, the environmental assessment must be prepared according to the terms of reference.
Thermal Treatment:	Use of elevated temperatures to treat wastes (e.g., combustion or gasification).
Waste-to-Energy (WTE) Facility/Municipal-Waste Combustor:	Facility where recovered municipal solid waste is converted into a usable form of energy, usually via combustion.
York:	The Regional Municipality of York or its geographic area, as context requires.

List of Abbreviations

ANSI	Area of Natural and Scientific Interest
CN	Canadian National Railway Company
NHIC	Natural Heritage Information Centre
OBBA	Ontario Breeding bird Atlas
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
MNR	Ministry of Natural Resources
CLOCA	Central Lake Ontario Conservation Authority
SAR	Species at Risk

UNITS OF MEASUREMENT

Area

ha hectare

scf standard cubic feet 35.3 m3

Distance

km kilometre

m metres

REPORT

1.0 INTRODUCTION

Durham and York Regions (the Regions) have partnered to undertake a joint Residual Waste Planning Study. Both municipalities are in need of a solution to manage the residual solid waste that remains after diversion. The Regions are working together to address the social, economic, and environmental concerns through an Environmental Assessment (EA) Study process to examine potential long-term residual waste management alternatives.

1.1 The Environmental Assessment Process

The purpose of the Undertaking (i.e., what the outcome of this EA Study is intended to do) as described in the Approved EA Terms of Reference is:

> *"To process - physically, biologically and/or thermally - the waste that remains after the application of both Regions' at-source waste diversion programs in order to recover resources - both material and energy - and to minimize the amount of material requiring landfill disposal. In proceeding with this undertaking only those approaches that will meet or exceed all regulatory requirements will be considered."*

The EA Study follows a planning approach where environmental constraints or opportunities are considered in the context of the broadly defined environment under the *Environmental Assessment Act* (EAA) (i.e., the natural environment as well as the social, economic and heritage and other "environments" relevant to the undertaking) and potential effects are understood and addressed before development occurs. In accordance with the Approved EA Terms of Reference and EAA, the EA process evaluates: alternatives considering potential effects on the environment; the availability of mitigation measures that address, in whole or in part, the potential effects; and, the comparison of the advantages and disadvantages of the remaining or "net" effects. The result of this process provides the planning rationale and support for a preferred approach and method to implement the undertaking.

It is understood and contemplated that environmental management measures recommended as part of the EA process and this Technical Study Report will in many cases be refined, updated, modified and/or superceded as a result of subsequent approval processes.

The EA Study document has been prepared and conducted in accordance with the EAA, including in accordance with the Terms of Reference approved by Ontario's Minister of the Environment on March 31, 2006. There are currently no federal environmental assessment process triggers identified and, therefore, this project does not require approval under the *Canadian Environmental Assessment Act* (CEAA).

This EA process essentially consists of three staged parts including:

- the Development and Approval of an EA Terms of Reference,

- the evaluation of "Alternatives to" the Undertaking, and;
- the evaluation of "Alternative methods" of implementing the Undertaking.

A detailed description of the process for the EA Study is presented in the EA Study document.

1.2 Purpose of the Report

This Report titled *Natural Environment Assessment – Technical Study Report* has been prepared to confirm: (a) the potential aquatic and terrestrial impacts associated with the development of a Facility on the Site; (b) potential mitigation required; and, (c) potential net effects and impact management measures. This Report will form part of the supporting documentation and materials for the "Description of the Undertaking", completed as part of the EA Study.

1.3 Overview of Report Contents

This Report describes the existing aquatic and terrestrial conditions related to the Site, followed by an effects analysis including net effects of the Project on the subject aspect(s) of the environment and summary of the required monitoring. The key sections of the Report are as follows:

- Section 2.0 Study Methodology;
- Section 3.0 Description of Existing Conditions, including terrestrial and aquatic features of the site, field observations, natural areas and species of special concern;
- Section 4.0 Results of analysis including potential effects and mitigation measures; and,
- Section 5.0 Summary recommending impact management measures.

2.0 STUDY METHODOLOGY

On July 18, 19 and 20, 2007, site assessments for each of the four Short-listed sites including Clarington 01 were conducted. An additional field survey and assessment of the Site were undertaken in May 2009. A potential disturbed area "footprint" equal to the maximum design capacity scenario of 400,000 tpy was assumed to carry out these assessments. Tasks performed during the assessments of the Short-listed sites included:

- Identification of potentially impacted species and environments;
- An inventory of aquatic habitats onsite;
- Evaluation of the amount of woodlands and hedgerows potentially affected at the site; and,
- The degree of impact on any adjacent woodlot or hedgerow edges.

The surveys were conducted on foot and began with an inspection of the Site perimeter, followed by an inspection through the centre of the Site and along any hedgerows or watercourses present. Any natural and biological features present at the Site, including wildlife, vegetation, watercourses and avian

species, were noted and inventoried. All distances and lengths were subsequently measured using geospatial data and GIS applications, as were calculations of the distances from the Site and haul routes to areas designated as Natural Heritage Features and Areas.

Field surveys included:

- Observations of bird species present, bird habitats, and the location of any active or inactive nests;
- Observations of vegetation communities and species present, specifically the presence of woodlands and hedgerows;
- Observations of wildlife and potential wildlife habitat;
- Observations of any watercourses on or adjacent to the Site, and the classification of such as wet or dry; and,
- Assessment of any watercourses to determine the potential for either seasonal or permanent fish habitat.

The intent of this Report is to update and confirm the results of the assessment of the natural environment of the Site undertaken during the evaluation of the Short-listed sites.

This included reviewing the results of the field assessments, documentation reviews, consultation with regulatory authorities, and the application of professional judgment. Documentation of the significance of existing natural features potentially affected included reviews of:

- Mammalian species;
- Avian species;
- Amphibians and reptiles;
- Vegetation;
- Aquatic habitat and natural areas;
- Analysis and identification of potential effects, mitigation measures, and net effects; and,
- Identification of impact management measures.

An additional field survey was completed on May 7, 2009 with the specific intent to assess:

- Post-freshet conditions and potential fish habitat in the drainage ditch along the access road;
- Potential nesting cavities for identified birds of conservation concern, namely, Chimney Swift (*Chaetura pelagic)* and Red-headed Woodpecker *(Melanerpes erythrocephalus).*
- Hibernacula that might suggest the potential presence of Milksnake (*Lampropeltis triangulum*); and,
- Additional nesting cavities on adjacent land.

3.0 DESCRIPTION OF EXISTING CONDITIONS

The Site is undeveloped land owned by the Region of Durham, south of Highway 401 in the Municipality of Clarington. The site is located on the west side of Osborne Road north of a CN Rail Corridor. There are commercial properties north and east of the Site. The lands northeast and west of the Site are undeveloped and are currently used for agricultural purposes. The Site is comprised of cultivated and fallow fields with peripheral hedgerows, contains no permanent watercourses and few documented species of conservation concern. The Courtice Water Pollution Control Plant is located south of the Site. The Darlington Nuclear Generating Station is located approximately 1 kilometre (km) to the east. The nearest major intersection is Highway 401 and Courtice Road, which is approximately 1.7 km from the Site. The Site is approximately 12.1 hectares (ha) in area and is located in the Clarington Energy Business Park. The closest natural area to the Site is the locally significant Tooley Creek Coastal Wetland, 0.87 km from the Site. The closest hazard land to the Site is at a distance of 100 m.

The Site is composed of four fields with a central access road originating from Osborne Road. At the time of the July 2007 Site visit, the northeast and northwest hay fields had been baled and contained various weeds typically found in disturbed and agricultural areas. A total of 515 m of hedgerow is present along the boundaries of the Site and between the fields. These consist of a variety of common tree and shrub species representative of agricultural areas. The area surrounding the Site consisted of fallow and cultivated agricultural fields, which contained hedgerows with similar tree and shrub species (see Figure 3-1).

3.1 Terrestrial and Aquatic Inventory

The following sections describe the existing mammalian species, avian species, amphibians and reptiles, vegetation, and aquatic habitat on the Site.

3.1.1 Mammalian Species

The flat, open terrain of the Site and lack of cover offer few habitat opportunities for specialized species. Site specific wildlife surveys confirmed the presence of White-tailed Deer (*Odocoileus virginianus*), Raccoon (*Procyon lotor*), and signs of rabbit browse, likely representing the Eastern Cottontail (*Sylvilagus floridanus*). It is anticipated that the Site also supports common near-urban mammalian species including Striped Skunk (*Mephitis mephitis*), small rodents, Woodchuck (*Marmota monax*), and canid predators including Red Fox (*Vulpes vulpes*) and Coyote (*Canis latrans*). Secondary sources for the area confirm signs of canids travelling the CN Rail right-of-way to the south of the Site and note probable wild canine use of lands east and west of the Site (Department of Fisheries and Oceans 2005). Onsite field surveys and desktop reviews of the Natural Heritage Information Centre (NHIC) website show that no mammalian species of conservation concern occur within a 2 km radius of the approximate Site centroid (NHIC 2009). Based on field surveys performed in 2007 and 2009, no forested areas large enough to provide a winter deer yard exist onsite

The site supports limited hedgerow habitats that act as minor movement corridors for mammalian species. Additionally the agricultural fields provide good cover for small rodents. Despite the hedgerows, wildlife movement through the Site is inhibited by commercial-industrial areas north and east of the Site, by the CN Rail tracks and its associated fencing running south of the Site, and by north-south roadways which bisect the CN Rail right-of-way corridor running west from the Site. While the CN Rail right-of-way does provide an east-west movement corridor for wildlife species, the hedgerows on Site are partially isolated from this corridor by fencing.

Although they provide localized habitat, the hedgerows onsite are limited in size, subject to agricultural and industrial pressures due to surrounding land use, and as such do not constitute significant wildlife habitat. Moreover, no wildlife refuge areas with substantial cover exist near the Site, as the closest refuge areas fall to the west and east at the Darlington Nuclear Generating Station (DNGS) and Darlington Provincial Park (Warme 2004). Enhancing the existing east-west connections via the creation of an additional wildlife movement corridor south of the new Facility's proposed fencing is recommended. This will compensate for both the loss of access due to fencing and the clearing of hedgerows within the Site footprint.

DURHAM/YORK
RESIDUAL WASTE STUDY

Clarington 01 Site and Natural Features

N

CLARINGTON

OSHAWA

Lake Ontario

Nash Rd
Prestonvale Rd
Trulls Rd
Tline Rd S
Grandview St S
Olive Ave
Bloor St
Grandview Dr
Hancock Rd
Solina Rd
Rundle Rd
Maple Grove Rd
Green Rd
Holt Rd
Hwy 401
S Serv Rd
Baseline Rd
Colonel Sam Dr
Courtice Road
Osbourne Road
CN Rail

Collector
Expressway / Highway
Railway
Watercourse
Proposed Clarington 01 Site
Wetland
Waterbody
Wooded Area
Municipal Lower Tier Boundaries

0 250 500 750
Metres - 1:30,000

1009497-011

MB QC ON USA Area of Interest

Jacques Whitford

FIGURE NO.
1

Last Modified: July 22, 2009 By: S.Allen

3.1.2 Avian Species

Lake Ontario lies approximately 400 m south of the Site and provides significant over-wintering and migration staging habitat for a variety of birds along the length of its shoreline. Based on field surveys performed in 2007 and 2009, no significant roosting areas for birds or migratory stopovers exist on the Site. The Site lacks any shoreline and due to its agricultural nature, the Site itself hosts a limited community of birds.

The most abundant bird species observed during field surveys were Common Grackle (*Quiscalus quiscula*), Ring-billed Gull (*Larus delawarensis*), Song Sparrow (*Melospiza melodia*), Savannah Sparrow (*Passerculus sandwichensis*), and European Starling (*Sturnus vulgaris*). Other species observed such as Brown Thrasher (*Toxostoma rufum*), White-crowned Sparrow (*Zonotrichia leucophrys*), Yellow Warbler (*Dendroica petechia*), Northern Mockingbird (*Mimus polyglottos*), Killdeer (*Charadrius vociferus*), Willow Flycatcher (*Empidonax traillii*), and Eastern Meadowlark (*Sturnella magna*) represent species common in shrub/successional and agricultural habitats. No nests were found onsite during the mid-summer field survey in 2007, but five species with fledged young were observed, confirming onsite nesting activity for the following species: Red-winged Blackbird (*Agelaius phoeniceus*), House Sparrow (*Passer domesticus*), Eastern Kingbird (*Tyrannus tyrannus*), Common Grackle, and Savannah Sparrow.

Within the area surrounding the Site, records from the Ontario Breeding Bird Atlas (OBBA) square 17PJ86 from both atlas periods (1981-85 and 2001-05) show the occurrence of several species of conservation concern (**Appendix A**, OBBA 2006). Table 3-1 lists these species as well as two additional species of conservation concern noted within the past 20 years in the immediate vicinity of the study Site (lots 25-28, broken front concession, Clarington) as identified by Warme (2004) and the Central Lake Ontario Conservation Authority (CLOCA) (Memo dated March 11th, 2009, Jackie Scott, Terrestrial & Wildlife Resource Analyst, CLOCA). None of the species were identified as breeding onsite.

Table 3-1 Avian Species of Conservation Concern in the Surrounding Area

Common Name	Scientific Name	Conservation Ranking
Black-crowned Night-Heron	*Nycticorax nycticorax*	NHIC S3B
Least Bittern	*Ixobrychus exilis*	NHIC S3B MNR Threatened COSEWIC Threatened
Black Tern*	*Chlidonias niger*	NHIC S3B MNR Special Concern
Chimney Swift	*Chaetura pelagic*	COSEWIC Threatened
Red-shouldered Hawk	*Buteo lineatus*	MNR Special Concern COSEWIC Special Concern
Red-headed Woodpecker*	*Melanerpes erythrocephalus*	NHIC S3B MNR Special Concern COSEWIC Threatened

Note:
* = Additional species noted via CLOCA. Other species records are directly from OBBA, 2006
Based on MNR (2009). NHIC S Rank = Provincial conservation rank with respect to breeding in Ontario: S1 Critically Imperiled because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation from the province. S2 = Very rare, often susceptible to extirpation; S3 = Rare, may be susceptible to large-scale disturbances and are on watch lists; B=Breeding, N=Non-breeding. The Species

At Risk Act establishes Schedule 1 as the official list of wildlife species at risk. COSEWIC rankings are national recommendations assigned by the Committee on the Status of Endangered Wildlife in Canada, and those noted here are based on www.sararegistry.gc.ca where THR= Threatened, SC=Special Concern. MNR = Ministry of Natural Resources, where THR= Threatened, SC= Special Concern. .

Except for the Chimney Swift and Red-headed Woodpecker, all of the species noted above require specialized wetland or interior forest habitat that the Site does not provide.

The Chimney Swift is a habitat generalist found in urban and rural settings, nesting in both anthropogenic structures (chimneys) as well as hollow trees.

The Red-headed Woodpecker likewise prefers open country with scattered trees, inhabiting forest edges and deciduous woodlands. This species has been noted to be in decline over much of its breeding range, in part due to habitat alteration, but also due to competition from the European Starling for preferred nesting sites in dead trees (Woodliffe 2007).

While the OBBA shows occurrence of the Chimney Swift in the relevant Atlas square, there is no documented evidence of Chimney Swifts nesting on the Site. Red-headed Woodpecker has likewise been known to inhabit environs similar to, and has breeding ranges extending into, the survey area, but has not been documented onsite (Warme 2004).

In order to survey for both the Chimney Swift and the Red-headed Woodpecker, a cavity search was performed in May 2009 to determine if suitable nesting habitat for these two species existed at the Site. Both Chimney Swifts and the Red-headed Woodpecker are known to require large diameter trees: Swifts prefer trees >50 cm diameter at breast height (dbh), and Red-headed Woodpeckers prefer those trees with >31 cm (dbh) (Canadian Wildlife Service 2007a&b). Moreover, Red-headed Woodpeckers require large snags with dead branches higher than 7 m or stumps with cavities 11 m off the ground. Chimney Swifts generally enter dead trees through openings in the top.

Field evidence showed only one tree onsite, a Weeping Willow with an approximate 150 cm dbh and well developed cavities, which could possibly provide nesting opportunities for these two species of conservation concern (Photo 1). However, as mentioned previously, neither of the two species were observed onsite.

Photo 1. Weeping Willow with existing cavity along the east-west access road to Clarington Site 01.

The property immediately west of the Site supports an additional two potential cavity nesting sites which may support the Chimney Swift or Red-headed Woodpecker. Potential mitigation measures for these two birds are outlined in Sections 5.0 and 6.0.

3.1.3 Amphibians and Reptiles

Due to the lack of suitable wetland habitat onsite, very few herpetofauna are expected to use the Site itself. Adaptable species, including the Northern Leopard Frog (*Rana pipiens*), American Toad (*Bufo americanus*), and Eastern Garter Snake (*Thamnophis sirtalis*) may be present in the hedgerow areas onsite, but were not seen during field surveys (Oldham and Weller 2000). The above listed species are all common and widespread in Ontario. They are also highly mobile species, and are able to relocate from potentially disturbed areas to suitable habitat in close proximity.

A desktop review of data from the NHIC shows an element occurrence from 1989 for Milksnake within a 2 km radius of the Site centroid. The Milksnake is designated as a species of Special Concern both provincially and nationally (NHIC 2009).

Because Milksnakes are found in a wide variety of habitats including prairies, pastures and rocky hillsides, they could potentially find suitable habitat on the Site. The 2009 field visit focused on the identification of potential hibernacula (rock piles), but none were found. Although no species were identified, consideration of potential mitigation measures are outlined in Sections 5.0 and 6.0.

3.1.4 Insects

No effort was made to survey insect species inhabiting the Site. Previous surveys performed for the nearby DNGS report 28 species of butterfly, 208 species of moths and 36 species of dragonflies and damselflies (Henshaw 1997). Henshaw's studies documented the occurrence of two provincially rare dragonfly and damselfly species, but since these species are occasional breeding migrants (NHIC SZB designations) and do not have established Ontario populations, they are not considered as a species of conservation concern.

3.1.5 Vegetation

Owing to the agricultural activities currently practiced on the Site, the Site contains a high representation of exotic species (such as Common Buckthorn, *Rhamnus cathartica*), as well as weeds associated with agricultural fields such as Common Ragweed (*Ambrosia artemsiifolia)* and Green Amaranth (*Amaranthus retroflexus)*. In some instances, portions of the fence rows have been planted with Sugar Maple (*Acer saccharum*), Apple (Malus sp.) and Silver Maple (*Acer saccharinum*) to create a windbreak between the managed field areas. Vegetation observed during 2007 and 2009 field surveys included the following list of native trees, shrubs and herbaceous plants common in hedgerow habitats: Manitoba Maple (*Acer negundo*), Sugar Maple, Red/green Ash (*Fraxinus pennsylvanica*), Mountain Ash (*Sorbus americana*), Chokecherry (*Prunus virginiana*), Pin Cherry (*Prunus pensylvanica*), Red Raspberry (*Rubus idaeus*), Staghorn Sumac (Rhus typhina) and Riverbank Grape (*Vitis riparia*). No vegetation species of conservation concern were observed during the 2007 and 2009 Site visits.

Within a 2 km radius of the approximate Site centroid, the NHIC notes the occurrence of the native S4 designated Bushy Cinquefoil (*Potentilla supina ssp. paradoxa*). Bushy Cinquefoil was observed in 1980 and is an uncommon, but not rare species preferring lakeshore, beach and wet prairie habitats (Newcomb 1977, NHIC 2009). As this type of habitat is not found on the Site, it is unlikely this species occurs onsite. The NHIC record of this species in the general area is likely a record from the nearby Lake Ontario shoreline. Southeast of the Site, two north-south oriented ravines occur, the largest of which bounds the extreme eastern end of the Water Pollution Control Plant lands (Warme 2004). This 25 m deep open canopy ravine has numerous groundwater seeps which support the growth of several specialized botanical species whose presence was confirmed in this offsite area in 2004: Showy Lady's-slipper (*Cypripedium reginae*), Pink Pyrola (*Pyrola asarifolia*), Buffaloberry (*Shepherdia canadensis*) and Carolina Grass-of-Parnassus (*Parnassia glauca*). Of these species, none are provincially rare, and only the Showy Lady's-slipper and Buffaloberry are considered regionally rare by the MNR (Varga et al. 1999 in Warme 2004).

3.1.6 Aquatic Habitat

No permanent watercourses were identified onsite. A dry drainage ditch was identified running south from the central access road towards the railway tracks. Its primary function is to allow runoff to flow from the north to south side of the access road. The drainage ditch is not mapped as part of the Tooley Creek Watershed, nor is it within CLOCA's jurisdiction (Memo dated September 29th, 2008, Jeff McNeice, Natural Heritage Resource Analyst, CLOCA and letter dated October 25, 2007 from Heather Brooks, Director, Watershed Planning and Natural Heritage, CLOCA). A 2009 post-freshet survey of this ditch confirmed that no connectivity exists between the ditch and natural waterbodies downstream nor does the ditch provide fish habitat. No signs of alluvial flow were present, and terrestrial grasses indicate lack of permanent flow and habitat.

A desktop survey of the NHIC natural areas database and properties identified by CLOCA revealed 13 natural areas within a 5 km radius of the approximate Site centroid (see Table 3-2 and Figure 3-1). A larger radius was used for this search to account for the effects to natural areas along the haul route from Hwy. 401.

In addition to the sites identified below, CLOCA has noted that the south side of the CN Rail right-of-way functions as a wildlife corridor (Memo dated April 17, 2007, Heather Brooks, Director of Watershed Planning and Natural Heritage, CLOCA). The hedgerow vegetation along this corridor provides wildlife habitat, but the value of the area as a wildlife corridor is limited due both to the north-south roadways bisecting it, and to the fencing running along the north side of the right-of-way (adjacent the study area). This corridor has been enhanced along the south side of the tracks, and measures are suggested to enhance vegetation species along the north side of the tracks as mitigation for the Facility.

The Site is designated as a 'Low Sensitivity' area through CLOCA's environmentally sensitive areas mapping (Memo dated March 11th, 2009, Jackie Scott, Terrestrial & Wildlife Resource Analyst, CLOCA).

Table 3-2 Natural Areas Within 5 km of the Site Centroid

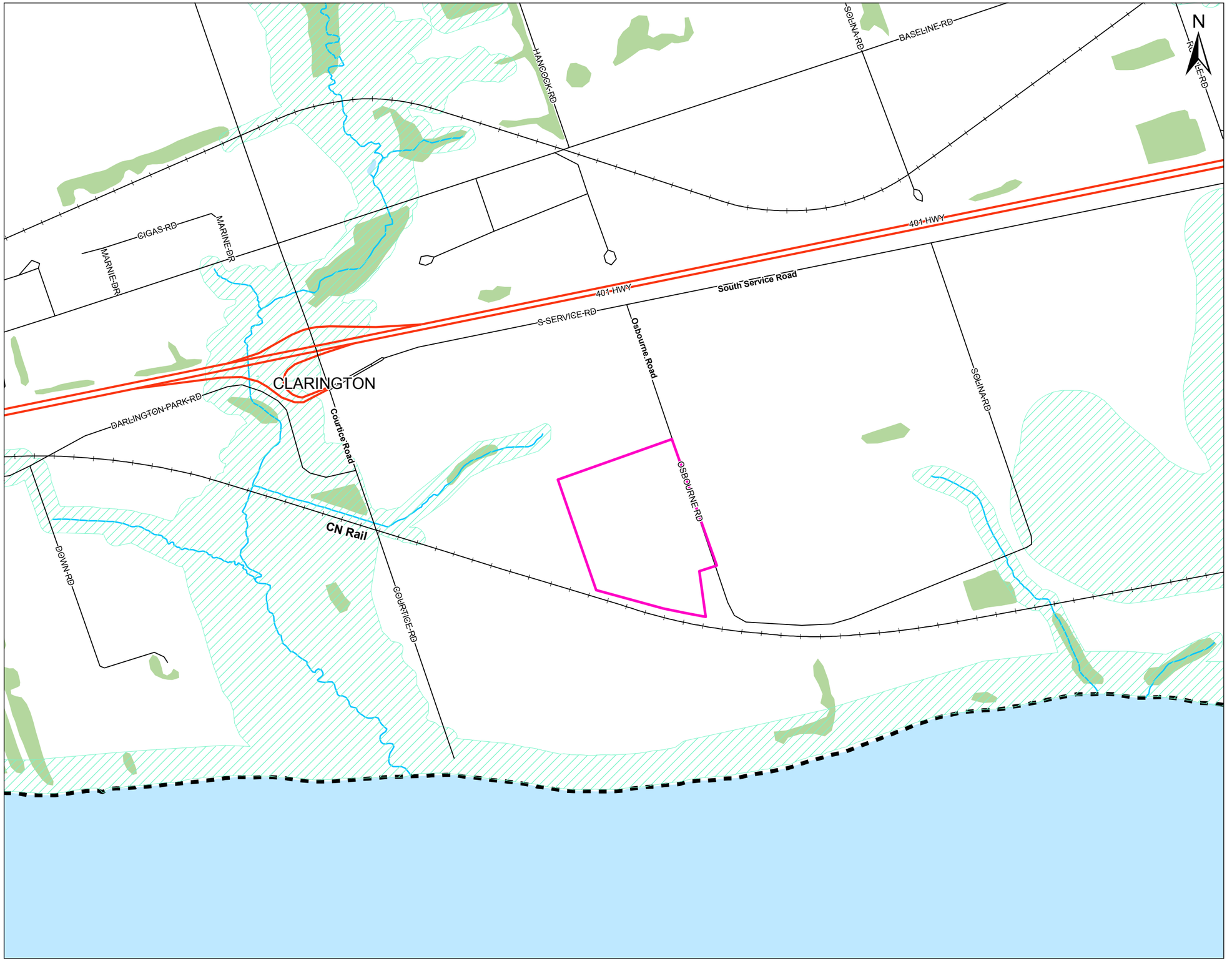
Name	Significance	Area Type	Size (Ha)	Distance (km) from Natural Area to Site	Distance (km) from Natural Area to Haul Route
Tooley Creek Coastal Wetland	Local	Wetland	0.35	0.87	0.9
Darlington Provincial Park	Provincial	Provincial Park - Recreational	209	2.2	1.3
Darlington Provincial Park	Provincial	Earth Science Site	111	2.4	1.4
Darlington Provincial Park - NE Zone	Provincial	Provincial Park Zone - Natural Environment	96	3.0	2.1
McLaughlin Bay Wetland	Provincial	Wetland	31	3.3	2.3
Raby Head Wetland #1	-	Wetland	4	4.2	3.3
Oshawa Second Marsh	Provincial	Life Science ANSI	135	4.3	3.3
Bowmanville Quarry	Provincial	Earth Science ANSI	3	4.6	3.8
Oshawa Second Marsh	Provincial	Wetland	105	4.6	3.5
Raby Head Wetland #2	-	Wetland	3	4.8	3.9
Maple Grove Wetland Complex	-	Wetland	149	5.1	4.8
West Side Beach Marsh	Provincial	Wetland	36	5.9	5.0
Westside Marsh	-	Life Science Site	-	6.0	5.1

3.1.7 Distances from Natural Areas

The Clarington 01 Site is located 0.87 km from the Tooley Creek Coastal Wetland and 2.2 km from Darlington Provincial Park, the closest natural areas to the Site. The proposed haul route for the Site is 0.9 km from the coastal wetland and 1.3 km from Darlington Provincial Park, with the majority of natural areas falling farther than 2 km from the proposed haul route. Given the distances between the Site and nearby natural areas, it is not anticipated that development activities (dust, noise, construction impacts) will have immediate impacts on the natural areas identified in Table 3-2.

3.1.8 Hazard Lands

Hazard lands are areas that typically follow the historical high water level of a watercourse and therefore may be prone to flooding during periods of significant rainfall or during spring runoff. A York-Durham designated hazard land area, namely, the creek valley of an unnamed headwater tributary to Tooley Creek, is located approximately 100 m northwest of the Site boundary (see Figure 3-2).



DURHAM/YORK
RESIDUAL WASTE STUDY

Clarington 01 Site and Hazard Lands

- Railway
- Proposed Clarington 01 Site
- Road
- Highway
- Durham/York Hazard Lands
- Municipal Lower Tier Boundaries
- Watercourse
- Waterbody
- Wetland Area
- Wooded Area

0 100 200 300

Metres - 1:10,000

1009497-012

Jacques Whitford

FIGURE NO.

2

Last Modified: Feb. 17, 2009 By: S.Allen

4.0 RESULTS ANALYSIS

This section provides an analysis of the potential impacts of the Facility on the terrestrial and aquatic environments of the Site and confirms the results of the previous assessment undertaken during the evaluation of the Short-listed sites. Table 4-1 summarizes the key natural features documented in the baseline inventories, their significance, potential impacts (negative, positive or no impact) and mitigation and/or compensation measures. If proposed mitigation strategies are followed, the overall net effects of the Facility on the terrestrial and aquatic environment are expected to be not significant.

Table 4-1 Key Natural Features and Functions (Potential Effects, Mitigation Measures, Net Effects)

Feature/function	Existing Conditions	Potential Impact	Impact Management	Net Effects
Diversity of plant species and habitats	No significant habitat present. There are no large forested areas present. Marginal habitat present in 515 m hedgerow	Partial or total removal of the hedgerow.	Compensate for loss of hedgerow by incorporating a diversity of native shrubs and trees into landscaping plans for the Facility. Planting plan for wildlife corridor (see Mammalian section below) will provide hedgerow habitat for birds as well as mammals, and species selection should focus on bird-friendly tree and shrub species.	Considering characteristics of existing features and mitigation measures, no significant net effects would be anticipated.
Mammalian Species	No significant species present. No mammalian species of conservation concern documented. Mammals using the Site are common and widespread in rural and urban Ontario.	Erection of property fencing will obstruct most terrestrial wildlife passage. Mammalian species using the Site are mobile organisms that can relocate to undisturbed areas nearby.	Mitigate by use of protective protocols in an effort to avoid killing or harming wildlife during construction / operation. Establish a wide wildlife corridor (i.e., 30 m) along the entire east-west length of the Site's southern property line to enhance wildlife movement. Work with the Region to coordinate the benefits of this corridor with those of the established corridor south of the railway tracks. A diversity of native tree and shrub species will be incorporated into a planting plan for the area and existing species allowed to grow without disturbance.	Considering characteristics of existing features and mitigation measures, no significant net effects would be anticipated.

Feature/function	Existing Conditions	Potential Impact	Impact Management	Net Effects
Avian Species	No significant species present. No avian species of conservation concern observed during field surveys. Birds using the Site are common and widespread in rural and urban Ontario.	Partial or total removal of the hedgerow.	Timing of clearing should occur outside of migratory breeding bird activity, defined from May 1- July 31 via the *Migratory Birds Convention Act* to limit clearing impacts on nesting bird species. If the Weeping Willow tree requires removal, it would be inspected to ascertain nesting activity. Could include habitat enhancement for Chimney Swifts if present onsite and once construction has been completed, compensation for the loss of hedgerow by incorporating native shrubs and trees into landscaping for the Facility.	Considering characteristics of existing features and mitigation measures, no significant net effects would be anticipated.
Amphibian and Reptile Species	No significant species present. No species of conservation concern observed during field surveys.	If hibernacula are present they would be removed.	An informational package could be supplied to assist with the identification of snakes and habitat as part of the protective protocols to avoid harm to wildlife during construction, in case any are encountered.	Considering characteristics of existing features and mitigation measures, no significant net effects would be anticipated.

Feature/function	Existing Conditions	Potential Impact	Impact Management	Net Effects
Aquatic Habitat	No significant habitat present. No permanent watercourses identified onsite. Possible seasonal bait fish habitat in drainage ditch at high flows. Drainage does not provide fish habitat, nor is it connected to any downstream waterbodies.	Drainage would likely be altered or destroyed.	None required.	Considering characteristics of existing features and mitigation measures, no significant net effects would be anticipated.
Natural Areas	No significant natural areas present. The closest Natural Area, Tooley Creek Coastal Wetland, is located 0.87 km from the Site.	No impact.	None required.	Considering distance of closest natural area to the Site, no significant net effects would be anticipated.
Hazard Lands	No significant hazard lands present. The closest hazard land is located 100 m from the Site.	No impact.	None required.	Considering distance of closest Hazard Land to the Site, no net effect would be anticipated.

5.0 IMPACT MANAGEMENT

As described in Section 4.0, there are no significant impacts or net effects anticipated to the natural environment following the implementation of mitigation measures.

Mitigation measures are focused on mammalian and avian species, with actions recommended to protect and enhance the habitat of targeted species and environmental features:

- One potentially suitable cavity nesting tree (Weeping Willow) was found along the east-west access road off of Osborne Rd. If the Weeping Willow tree requires removal, it would be inspected to ascertain nesting activity.
- Timing of clearing should occur outside of migratory breeding bird activity, defined from May 1- July 31 via the *Migratory Birds Convention Act* to limit clearing impacts on nesting bird species.
- Other mitigation could include habitat enhancement for Chimney Swifts if present onsite and once construction has been completed, compensation for the loss of hedgerow by incorporating native shrubs and trees into landscaping for the Facility.
- By establishing a wide wildlife corridor (i.e., 30 m) along the entire east-west length of the Site's southern property line, wildlife movement will be enhanced. Native tree and shrub species will be planted and existing species allowed to grow without disturbance.

Finally, during the post-construction phase of this Project, a monitoring program is recommended to evaluate the survival of native species enhancement plantings. A general assessment of the viability of the tree and shrub species planted for wildlife corridors and plant species mitigation could be undertaken. Any species that are not thriving or are dead during this time could be replaced. A two year survival rate of 80% or more would be the goal of this monitoring program.

6.0 SUMMARY AND CONCLUSION

It is expected that impacts to the terrestrial and aquatic features of the Site would be minimal to non-existent, which confirms the results of the assessment undertaken during the evaluation of the Short-list sites. No species of conservation concern were observed on the Site. No permanent watercourses were identified. Hazard lands are located approximately 100 m from the Site. The Site and proposed haul route are located at a minimum 0.87 km from any natural area, and should not be directly impacted by the development. It is important to note that this Site lies within an area already designated and zoned for industrial and commercial development.

Overall, the proposed development would not have a significant impact on the natural features and ecological functions of the Site provided the recommendations in this Report are implemented. Mitigation and compensation measures are suggested to offset any slight but permanent effects of the Project.

7.0 CLOSURE

This Report has been prepared by Jacques Whitford Stantec Limited. The assessment represents the conditions at the subject property only at the time of the assessment, and is based on the information referenced and contained in the Report. The conclusions presented herein respecting current conditions, and potential future conditions are at the subject property resulting from the Project, represent the best judgment of the assessor based on current environmental standards. Jacques Whitford Stantec Limited attests that to the best of our knowledge, the information presented in this Report is accurate. The use of this Report for other projects without written permission of Durham Region, York Region and Jacques Whitford Stantec Limited is solely at the user's own risk.

8.0 REFERENCES

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APPENDIX A

Breeding Bird Data for Atlas Square #17PJ86
Ontario Breeding Bird Atlas, 2006

Appendix A Breeding Bird Data for Atlas Square #17PJ86

Ontario Breeding Bird Atlas, 2006.

Region	Square	Species	Category: Confirmed, Possible or Probable Breeding
46	17PJ86	Pied-billed Grebe	CONF
46	17PJ86	American Bittern	POSS
46	17PJ86	Least Bittern	POSS
46	17PJ86	Great Blue Heron	POSS
46	17PJ86	Green Heron	POSS
46	17PJ86	Black-crowned Night-Heron	OBS
46	17PJ86	Turkey Vulture	POSS
46	17PJ86	Canada Goose	CONF
46	17PJ86	Mute Swan	CONF
46	17PJ86	Wood Duck	CONF
46	17PJ86	Gadwall	PROB
46	17PJ86	Mallard	CONF
46	17PJ86	Osprey	POSS
46	17PJ86	Northern Harrier	PROB
46	17PJ86	Sharp-shinned Hawk	POSS
46	17PJ86	Cooper's Hawk	PROB
46	17PJ86	Red-shouldered Hawk	CONF
46	17PJ86	Broad-winged Hawk	POSS
46	17PJ86	Red-tailed Hawk	CONF
46	17PJ86	American Kestrel	PROB
46	17PJ86	Peregrine Falcon	CONF
46	17PJ86	Ruffed Grouse	PROB
46	17PJ86	Wild Turkey	POSS
46	17PJ86	Virginia Rail	CONF

Region	Square	Species	Category: Confirmed, Possible or Probable Breeding
46	17PJ86	Sora	POSS
46	17PJ86	Common Moorhen	CONF
46	17PJ86	Killdeer	CONF
46	17PJ86	Spotted Sandpiper	PROB
46	17PJ86	American Woodcock	PROB
46	17PJ86	Bonaparte's Gull	OBS
46	17PJ86	Ring-billed Gull	CONF
46	17PJ86	Herring Gull	CONF
46	17PJ86	Caspian Tern	OBS
46	17PJ86	Common Tern	POSS
46	17PJ86	Forster's Tern	OBS
46	17PJ86	Rock Pigeon	CONF
46	17PJ86	Mourning Dove	CONF
46	17PJ86	Eastern Screech-Owl	POSS
46	17PJ86	Great Horned Owl	CONF
46	17PJ86	Barred Owl	POSS
46	17PJ86	Long-eared Owl	POSS
46	17PJ86	Chimney Swift	POSS
46	17PJ86	Ruby-throated Hummingbird	PROB
46	17PJ86	Belted Kingfisher	POSS
46	17PJ86	Red-bellied Woodpecker	PROB
46	17PJ86	Downy Woodpecker	CONF
46	17PJ86	Hairy Woodpecker	CONF
46	17PJ86	Northern Flicker	CONF
46	17PJ86	Pileated Woodpecker	PROB
46	17PJ86	Eastern Wood-Pewee	PROB
46	17PJ86	Alder Flycatcher	POSS

Region	Square	Species	Category: Confirmed, Possible or Probable Breeding
46	17PJ86	Willow Flycatcher	PROB
46	17PJ86	Least Flycatcher	POSS
46	17PJ86	Eastern Phoebe	CONF
46	17PJ86	Great Crested Flycatcher	PROB
46	17PJ86	Eastern Kingbird	CONF
46	17PJ86	Warbling Vireo	PROB
46	17PJ86	Red-eyed Vireo	PROB
46	17PJ86	Blue Jay	CONF
46	17PJ86	American Crow	CONF
46	17PJ86	Horned Lark	PROB
46	17PJ86	Purple Martin	POSS
46	17PJ86	Tree Swallow	CONF
46	17PJ86	Northern Rough-winged Swallow	CONF
46	17PJ86	Bank Swallow	POSS
46	17PJ86	Cliff Swallow	CONF
46	17PJ86	Barn Swallow	CONF
46	17PJ86	Black-capped Chickadee	CONF
46	17PJ86	White-breasted Nuthatch	PROB
46	17PJ86	Carolina Wren	POSS
46	17PJ86	House Wren	CONF
46	17PJ86	Winter Wren	PROB
46	17PJ86	Marsh Wren	PROB
46	17PJ86	Veery	PROB
46	17PJ86	Wood Thrush	PROB
46	17PJ86	American Robin	CONF
46	17PJ86	Grey Catbird	CONF
46	17PJ86	Northern Mockingbird	CONF

Region	Square	Species	Category: Confirmed, Possible or Probable Breeding
46	17PJ86	Brown Thrasher	CONF
46	17PJ86	European Starling	CONF
46	17PJ86	Cedar Waxwing	CONF
46	17PJ86	Nashville Warbler	PROB
46	17PJ86	Yellow Warbler	CONF
46	17PJ86	Chestnut-sided Warbler	POSS
46	17PJ86	Magnolia Warbler	POSS
46	17PJ86	Black-and-white Warbler	PROB
46	17PJ86	American Redstart	PROB
46	17PJ86	Ovenbird	PROB
46	17PJ86	Northern Waterthrush	PROB
46	17PJ86	Mourning Warbler	PROB
46	17PJ86	Common Yellowthroat	CONF
46	17PJ86	Scarlet Tanager	POSS
46	17PJ86	Chipping Sparrow	CONF
46	17PJ86	Clay-colored Sparrow	POSS
46	17PJ86	Vesper Sparrow	POSS
46	17PJ86	Savannah Sparrow	CONF
46	17PJ86	Song Sparrow	CONF
46	17PJ86	Swamp Sparrow	PROB
46	17PJ86	White-throated Sparrow	POSS
46	17PJ86	Northern Cardinal	CONF
46	17PJ86	Rose-breasted Grosbeak	PROB
46	17PJ86	Indigo Bunting	PROB
46	17PJ86	Bobolink	CONF
46	17PJ86	Red-winged Blackbird	CONF

Region	Square	Species	Category: Confirmed, Possible or Probable Breeding
46	17PJ86	Eastern Meadowlark	PROB
46	17PJ86	Common Grackle	CONF
46	17PJ86	Brown-headed Cowbird	PROB
46	17PJ86	Orchard Oriole	POSS
46	17PJ86	Baltimore Oriole	CONF
46	17PJ86	Purple Finch	CONF
46	17PJ86	House Finch	CONF
46	17PJ86	American Goldfinch	CONF
46	17PJ86	House Sparrow	CONF