

Hydro One Proposed Rodney Transformer Station – Environmental Baseline

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ACRONYMS AND MEASUREMENT UNITS

Acronyms

&	and
AAQC	Ambient Air Quality Criteria
ACNBC	Associate Committee on the National Building Code
AES	Atmospheric Environment Service
AMCTO	Association of Municipal Managers, Clerks and Treasurers of Ontario
ANSI	Area of Natural and Scientific Interest
B&B	Bed-and-breakfast
BP	Before present
CCME	Canadian Council of Ministers of the Environment
Chatham-Kent	Chatham-Kent County
CLI	Canada Land Inventory
CN	CN North America
CO	Carbon monoxide
Co.	Company
Corp.	Corporation
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
COSSARO	Committee on the Status of Species at Risk in Ontario
CP	CP Rail System
CSX	CSX Corporation
CWS	Canada-Wide Standard
Dillon	Dillon Consulting Limited
E	East
Ed.	Editor
EMS	Emergency Medical Services
ESA	Environmentally Sensitive Area
<i>et al.</i>	And others (et alii)
Hydro One	Hydro One Networks Inc.
i.e.	That is (id est)
Inc.	Incorporated
INS	Insufficient data to calculate a mean
IR	Indian Reserve
Ltd.	Limited
LTVCA	Lower Thames Valley Conservation Authority
MOE	Ontario Ministry of the Environment
N	North
NHIC	Natural Heritage Information Centre
No.	Number
NO ₂	Nitrogen dioxide
NO _x	Nitrogen oxides
NW	Northwest
O ₃	Ozone
OMMAH	Ontario Ministry of Municipal Affairs and Housing

OMNR	Ontario Ministry of Natural Resources
OPP	Ontario Provincial Police
pers. comm.	Personal communication
PM	Particulate matter
PM ₁₀	Particulate matter of 10 microns diameter and smaller
PM _{2.5}	Particulate matter of 2.5 microns diameter and smaller
PSW	Provincially Significant Wetland
ROW	Right-of-way
S	South
S1	Extremely rare in Ontario
S1S2	Extremely rare to very rare in Ontario
S2	Very rare in Ontario; usually between 5 to 20 occurrences (in a 10-km by 10-km Mercator square grid)
S2?	Possibly very rare in Ontario
S2S3	Very rare to uncommon in Ontario
S3	Rare to uncommon in Ontario; usually between 20 to 100 occurrences (in a 10-km by 10-km Mercator square grid)
S3?	Possibly rare to uncommon in Ontario
S3S4	Rare to common in Ontario
S4	Common in Ontario; apparently secure, usually more than 100 occurrences (in a 10-km by 10-km Mercator square grid)
S4S5	Common to very common in Ontario
S5	Very common in Ontario, demonstrably secure
SE	Exotic, not believed to be a native component of Ontario's flora/fauna
SO ₂	Sulphur dioxide
SPM	Suspended particulate matter
spp.	Two or more species
SU	Unrankable; status uncertain
SW	Southwest
SZB	No clearly definable occurrences of breeding in Ontario
TS	Transformer station
TSP	Total suspended particulates
TVDSB	Thames Valley District School Board
U.S.	United States
UTRCA	Upper Thames River Conservation Authority
VOCs	Volatile organic compounds
W	West
West Elgin	Municipality of West Elgin
WSC	Water Survey of Canada

Measurement Units

cm	centimetre
°	degree
°C	degree Celsius
°F	degree Fahrenheit
\$	dollar
h	hour
ha	hectare
km	kilometre
km ²	square kilometre
km/h	kilometre per hour
kV	kilovolt
L/s	litre per second
m	metre
mm	millimetre
'	minute
m ³ /s	cubic metre per second
ppb	parts per billion
ppm	parts per million
%	percent
"	second
μ	micron (micrometre)
μg/m ³	microgram per cubic metre
y	year

1.0 INTRODUCTION

1.1 Project Description

Hydro One Networks Inc. (Hydro One) is planning to construct a new transformer station (TS) to improve the capacity of its transmission system and to ensure reliable supply for existing and future electricity needs in the Chatham-Kent County (Chatham-Kent) and the Municipality of West Elgin (West Elgin) areas. Currently, Chatham-Kent and West Elgin are supplied by the Kent TS and St. Thomas TS, respectively. The Kent TS is at capacity, whereas the St. Thomas TS is reaching its operating limit. The proposed Rodney TS is required to improve the reliability of electricity supply to customers in this region.

The project involves construction and operation of a new 230/27.6 kilovolt (kV) TS. The proposed Rodney TS will step down electricity from the Hydro One 230-kV transmission system to lower voltages, so that it can be distributed to homes and businesses through the Hydro One electricity distribution system. Ideally, the new station would be sited proximate to the existing transmission corridor to facilitate its connection to the existing transmission line.

1.2 Description of the Study Areas

In this environmental and socio-economic baseline description, reference will be made to regional, local and site-specific study areas. These study areas are defined as follows.

Regional Study Area

The regional setting is generally defined by the municipal boundaries of Chatham-Kent and West Elgin to provide for the baseline description of geology, physiography and socio-economics.

Local Study Area

The local study area is generally centred on the municipal boundary of Chatham-Kent and West Elgin extending approximately 6.5 km west and 3.5 km east, as well as 1 km north and south of the Hydro One transmission line right-of-way (ROW) (see Figure 1.1). The local study area was determined by technical siting constraints associated with existing transmission infrastructure and proximity to electricity need. The local study area provides for the environmental baseline description of soils, vegetation, environmentally significant areas, wildlife, fisheries and land use.

Site-specific Study Area

The site-specific study area encompasses the proposed Rodney TS site and its associated road access, and provides for a site-specific environmental baseline description (see Figure 1.2).

1.3 Study Approach

This environmental and socio-economic baseline was prepared based on literature review, personal contacts and field reconnaissance. Environmental baseline conditions have been documented in a number of publications and reports. This information was augmented and updated by data requested from the Ontario Ministry of the Environment (MOE), Ontario Ministry of Natural Resources (OMNR), Water Survey of Canada (WSC), Upper Thames River Conservation Authority (UTRCA), Lower Thames Valley Conservation Authority (LTVCA), Chatham-Kent and West Elgin. In addition, a Stage 1 Archaeological Assessment and a Phase I Environmental Site Assessment (to assess potential contamination issues associated with the proposed TS site) were completed.

This environmental and socio-economic environmental baseline was prepared as a supporting document to the Hydro One Rodney TS Class Environmental Assessment Draft Environmental Study Report.

2.0 ENVIRONMENTAL SETTING

2.1 Atmospheric Environment

2.1.1 Climate

The climate of southern Ontario is modified continental, moderated by the proximity of the Great Lakes, but differing appreciably from one location to another and from year to year (Brown *et al.*, 1974). The variability in southern Ontario climate is due to local differences in topography, distance from one or another of the Great Lakes, and the direction of the prevailing winds. The proposed Rodney TS study area occurs in the Lake Erie Counties Climatic Region, as defined by Brown *et al.* (1974). This Climatic Region is greatly influenced by the proximity of Lake Erie, which moderates temperatures and provides moisture-laden air to adjacent lands. Air masses affecting this climatic region include flows of cold dry air from the Arctic; moist warm air from the Gulf of Mexico; and dry prevailing winds (westerlies) from the Pacific.

Southern Ontario, including the proposed Rodney TS study area, is located within one of the major storm tracks of the continent. The passage of cyclones and anti-cyclones over the area produces wide variations in day-to-day weather, especially in winter. Changes in air masses can be expected to occur every two to five days throughout the year. Usually, periods of severe cold or excessively warm weather are not prolonged.

Winter severity varies from year to year, depending on the duration and number of episodes of domination of the region by Arctic air masses. During the summer, the Bermuda High often becomes the controlling weather feature, extending its influence over most of southern Ontario. The potential for stagnant air masses is greatest during mid- to late-summer. The intensity of migrating storms usually peaks in the autumn (November) and early spring (March). A summary of pertinent climatic and related plant growth data for the Lake Erie Counties Climatic Region is provided in Table 2.1. Based on data collected from 1931 to 1960 (Brown *et al.*, 1974), the mean length of the growing season for this Climatic Region is 210 days.

Based on the ecoclimatic classification system developed by Environment Canada (Ecoregions Working Group, 1989), the proposed Rodney TS study area occurs in the Humid High Moderate Temperate Ecoclimatic Region of the Moderate Temperate Ecoclimatic Province. Summers tend to be humid and warm to hot. Winters are relatively mild and snowy. Average temperatures above freezing occur for eight to nine months (April through November). Precipitation is also distributed fairly evenly throughout the year.

TABLE 2.1: CLIMATIC DATA FOR THE LAKE ERIE COUNTIES CLIMATIC REGION¹

Climatic Parameter	Lake Erie Counties Climatic Region	
Mean Annual Temperature °C (°F)	7.2 (45)	
Mean Daily Temperature °C (°F)	<u>Minimum</u>	<u>Maximum</u>
January	-8.3 (17)	-0.6 (31)
April	1.7 (35)	11.7 (53)
July	15.0 (59)	27.2 (81)
October	5.0 (41)	16.1 (61)
Mean Date of Last Spring Frost	12 May	
Mean Date of First Fall Frost	10 October	
Mean Annual Frost-Free Days	150	
Mean Start of Growing Season	10 April	
Mean End of Growing Season	08 November	
Annual Length of growing Season (Days)	210	
Mean Annual Growing Degree-Days	3,700	
Mean Annual Precipitation – mm (inch)	863.6 (34)	
Mean Annual Snowfall – cm (inch)	127 (50)	

¹ Source: Brown *et al.* (1974).

Mean daily temperature and precipitation data for the meteorological stations in Port Stanley, New Glasgow and Ridgetown are presented in Table 2.2. The mean annual temperatures at the three stations range from 7.6°C to 8.5°C. For the Port Stanley and New Glasgow meteorological stations, mean monthly precipitation is lowest in February, i.e., 57.2 and 50.5 mm, respectively, whereas at Ridgetown lowest precipitation occurs in January, i.e., 54.2 mm. Mean monthly precipitation is highest at the three meteorological stations in August varying between 97.3 and 109.1 mm. Generally, there is no pronounced wet or dry season. Summer thunderstorm activity is relatively frequent. Total annual precipitation at the Port Stanley station is approximately 1,040 mm with 937 mm falling as rain and 103 cm falling as snow. For the New Glasgow station, total precipitation is approximately 926 mm with 847 mm and 80 cm as rain and snow, respectively. For the Ridgetown station, total precipitation is approximately 969 mm with 851 mm and 117 cm as rain and snow, respectively.

TABLE 2.2: MEAN TEMPERATURE AND PRECIPITATION DATA^{1,2}

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Port Stanley³													
Daily Temperature (°C)	-5.5	-5.2	0.0	6.1	12.4	17.2	20.0	19.4	15.6	9.4	4.1	-2.0	7.6
Rainfall (mm)	32.1	34.8	72.0	81.6	80.3	88.4	87.1	109.1	99.4	78.1	99.6	74.4	936.8
Snowfall (cm)	32.3	22.4	14.9	2.6	0.0	0.0	0.0	0.0	0.0	0.5	6.3	24.5	103.5
Total Precipitation (mm)	64.4	57.2	86.9	84.2	80.3	88.4	87.1	109.1	99.4	78.6	105.9	98.9	1,040.3
Days with Precipitation ⁴	12.4	10.4	13.0	13.5	12.7	11.2	11.0	11.4	11.8	12.6	14.3	13.6	147.6
New Glasgow⁵													
Daily Temperature (°C)	-4.9	-4.1	0.7	6.5	13.1	18.2	20.9	20.1	16.4	10.4	4.4	-1.5	8.4
Rainfall (mm)	30.8	34.9	60.5	77.4	79.2	87.9	81.2	97.3	92.6	67.6	80.1	57.2	846.6
Snowfall (cm)	24.0	15.5	13.4	3.9	0.0	0.0	0.0	0.0	0.0	0.2	5.4	17.4	79.9
Total Precipitation (mm)	54.8	50.5	73.8	81.3	79.2	87.9	81.2	97.3	92.6	67.8	85.5	74.6	926.4
Days with Precipitation ⁴	10.2	8.6	10.8	11.5	11.1	9.9	9.5	9.5	10.2	10.2	11.6	11.3	124.4
Ridgetown⁶													
Daily Temperature (°C)	-6.0	-4.6	0.7	7.1	13.6	18.8	21.5	20.6	16.8	10.6	4.5	-1.9	8.5
Rainfall (mm)	25.6	36.1	66.6	73.0	76.8	82.1	92.8	104.9	92.9	55.4	82.4	61.1	851.4
Snowfall (cm)	28.6	25.4	15.2	4.5	0.0	0.0	0.0	0.0	0.0	0.1	9.0	34.5	117.3
Total Precipitation (mm)	54.2	61.4	81.9	77.5	76.9	82.1	92.8	104.9	92.9	55.4	93.3	95.6	968.8
Days with Precipitation ⁴	11.1	10.3	12.8	12.7	12.2	11.1	9.8	10.8	11.0	11.5	13.5	13.9	140.7

¹ Source: Environment Canada website: www.weatheroffice.ec.gc.ca.

² Years of record: 1971 to 2000.

³ Latitude: 42°40'N; Longitude: 81°13'W; Elevation: 182.9 m.

⁴ Greater than or equal to 0.2 mm.

⁵ Latitude: 42°30'N; Longitude: 81°38'W; Elevation: 198.1 m.

⁶ Latitude: 42°27'N; Longitude: 81°52'W; Elevation: 205.7 m.

Frost data for the three meteorological stations are summarized in Table 2.3. The average length of the frost-free period ranges from 144 to 156 days. Frozen ground conditions usually occur between late December and early March; however, year-to-year variation is considerable, depending on weather and local differences in vegetation, soil types, proximity to waterbodies and topography.

The prevailing winds in the region are usually from a westerly direction (Table 2.4). The annual maximum hourly wind speeds with 1:10, 1:30 and 1:100 probabilities of exceedance in Port Stanley, West Lorne and Dresden are 79, 90 and 101 km/h; 83, 94 and 104 km/h; and 79, 90 and 97 km/h, respectively (ACNBC, 1980).

2.1.2 Air Quality

In southern Ontario, poor air quality is most often the result of high levels of ground-level ozone (O₃) and airborne particulate matter (PM). Ground-level O₃ is the primary component of smog with a contribution by fine PM. O₃ results from chemical reactions between volatile organic compounds (VOCs) and nitrogen oxides (NO_x) in the presence of heat and sunlight.

The air pollutant life cycle is largely influenced by synoptic (i.e., large-scale) weather systems (MOE, 1999). Ground-level O₃, its precursors and fine PM can travel via these large-scale weather systems up to thousands of kilometres from their source.

It is because of the long-range transport of airborne pollutants that transboundary flow from the U.S. plays a significant role in air quality considerations throughout southern Ontario.

The existing air quality is influenced by local and long-range (cross-border) contaminants generated in upwind urban and industrial areas. Air quality in southern Ontario is affected in commensurate part by emissions from the U.S., which contribute approximately 55% of smog (MOE, 2005a). The remaining portion is largely due to fossil fuel combustion in Canada (including vehicle emissions). Typically, these emissions consist of NO_x, nitrogen dioxide (NO₂), sulphur dioxide (SO₂), carbon monoxide (CO) and suspended particulate matter (SPM), which is equivalent to total suspended particulates (TSP). Particles are also reported as PM smaller than 10 µ (PM₁₀) and PM smaller than 2.5 µ (PM_{2.5}).

Table 2.5 presents the 2004 and 2005 ambient air statistics for the Port Stanley and London monitoring stations along with the provincial Ambient Air Quality Criteria (AAQC). In 2004 and 2005, there were no exceedances of their respective AAQCs by NO₂, CO and SO₂ at the London station (MOE, 2006a,b). The 1 h O₃ AAQC was exceeded 172 and 14 times in 2005, but only 46 and seven times in 2004 at the Port Stanley and London stations, respectively.

In 2000, the Canadian Council of Ministers of the Environment (CCME, 2000) developed a Canada-Wide Standard (CWS) for PM_{2.5} as a result of the pollutant's adverse effects on human health and the environment. The CWS for PM_{2.5} of 30 µg/m³ over a 24-h averaging time was exceeded ten and 12 times in 2004, and 12 and 13 times in 2005 at the Port Stanley and London stations, respectively.

TABLE 2.3: FROST DATA¹

Parameter	Port Stanley ²	New Glasgow ²	Ridgetown ³
Mean Frost-Free Period (Days)	144	151	156 ⁴
Average Last Frost (Spring)	15 May	09 May	08 May ⁴
Average First Frost (Fall)	07 October	08 October	12 October ⁴
Earliest Last Frost (Spring)	29 April	19 April	16 April
Latest Last Frost (Spring)	11 June	11 June	11 June
Earliest First Frost (Fall)	17 September	17 September	11 September
Latest First Frost (Fall)	30 October	01 November	13 November
Longest Frost-Free Period (Days)	175	180	191
Shortest Frost-Free Period (Days)	120	120	101

¹ Source: AES (1982).

² Based on 23 years of record.

³ Based on 62 years of record.

⁴ Based on 30 years of record.

Overall, ambient air quality in the proposed Rodney TS study area can be considered to be somewhat worse for O₃ (based on Port Stanley data) and intermediate for the other air quality parameters relative to other locations in southern Ontario (MOE, 2006a,b).

2.1.3 Noise

Environmental noise levels will vary according to a number of factors: intensity, kind and number of noise sources; proximity to the noise sources; topography; presence of barriers and absorbers such as vegetation; and meteorological conditions.

A variety of land and water uses in the local study area contribute to environmental noise levels. The major sources of noise are road traffic and agricultural activities.

TABLE 2.4: WIND DATA FOR THE LONDON AIRPORT METEOROLOGICAL STATION, 1971 TO 2000¹

Parameter	January	February	March	April	May	June	July	August	September	October	November	December	Year
Mean Wind Speed (km/h)	18.5	16.7	17.3	16.6	14.3	12.5	10.9	9.9	11.5	13.8	16.3	17.0	14.6
Most Frequent Direction	SW	W	E	W	W	W	W	W	E	SW	SW	SW	W
Maximum Hourly Speed (km/h)	87	68	93	74	89	80	63	56	58	65	72	74	
Maximum Gust Speed (km/h)	128	106	116	122	100	148	124	121	78	100	100	104	
Direction	S	SW	SW	W	W	W	SW	W	NW	W	W	SW	

¹ Source: Environment Canada website: www.weatheroffice.ec.gc.ca.

TABLE 2.5: AMBIENT AIR QUALITY STATISTICS, 2004 AND 2005¹

Parameter	Percentiles							Maximum		AAQC ²		No. of Times Above AAQC	
	10%	30%	50%	70%	90%	99%	Mean	1h	24h	1h	24h	1h	24h
Port Stanley													
2004													
O ₃ (ppb)	14	24	31	39	50	76	32.2	92	68	80	-	46	-
PM _{2.5} (µg/m ³)	1	3	5	8	17	38	7.5	55	38	-	30 ³	10	-
2005													
O ₃ (ppb)	15	25	33	40	58	88	34.6	111	79	80	-	172	-
PM _{2.5} (µg/m ³)	1	3	6	9	21	42	8.6	63	45	-	30 ³	12	-
London													
2004													
NO (ppb)	1	2	3	4	12	66	6.0	224	60	-	-	-	-
NO ₂ (ppb)	5	8	11	16	26	42	13.7	73	36	200	100	0	0
NO _x (ppb)	6	10	14	20	37	103	19.4	266	86	-	-	-	-
O ₃ (ppb)	5	16	23	30	41	63	23.6	85	53	80	-	7	-
CO(ppm)	0.25	0.36	0.44	0.52	0.67	0.98	0.45	2.3	1.45	30	13	0	0
SO ₂ (ppb)	1	1	1	2	4	12	INS ⁴	33	15	250	100	0	0
PM _{2.5} (µg/m ³)	4	6	8	12	22	42	10.9	66	45	-	30 ³	12	-
2005													
NO (ppb)	0	1	2	4	10	66	5.5	405	99	-	-	-	-
NO ₂ (ppb)	4	8	11	17	28	49	14.1	69	51	200	100	0	0
NO _x (ppb)	5	9	13	20	37	107	19.4	472	134	-	-	-	-
O ₃ (ppb)	6	17	24	32	48	71	26.1	93	64	80	-	14	-
CO(ppm)	0.02	0.09	0.14	0.20	0.32	0.67	0.17	2.40	1.24	30	13	0	0
SO ₂ (ppb)	0	1	1	3	5	11	2.3	31	10	250	100	0	0
PM _{2.5} (µg/m ³)	4	6	9	13	24	43	11.9	71	46	-	30 ³	13	-

¹ Source: MOE (2006a,b).

² AAQC: Ambient Air Quality Criteria (MOE, 2005b).

³ Canada-Wide Standard (CCME, 2000)

⁴ INS = insufficient data to calculate a valid annual mean.

2.2 Geology

Regionally, southern Ontario is underlain by relatively flat-lying, undeformed sedimentary bedrock of Paleozoic age which overlies older crystalline Precambrian bedrock. The Precambrian/Paleozoic unconformity lies to the east (extending from Port Severn on Georgian Bay south to the Lake Ontario outlet to the St. Lawrence River). The bedrock forms part of the Western St. Lawrence Platform, an extension of the stable interior North American Platform. Within this platform, orogenic and tectonic activity during the Cambrian created a series of basins and arches, including the Michigan Basin (centred along the Michigan Peninsula), the Appalachian Basin (extending from the Great Lakes to Alabama) and the Algonquin Arch, a structural high which separates the two basins. From this arch, the bedrock dips gently 6 to 9 m per km towards the Michigan Basin to the west and the Appalachian Basin to the south. Although an overall stable region, the geology is a result of repeated sequences of subsidence, sedimentation and erosion controlled by tectonic forces and eustatic sea level fluctuations operating from the Middle Precambrian to the Early Cretaceous (Williams *et al.*, 1992).

Bedrock underlying the eastern portion of the proposed Rodney TS study area is the Middle Devonian (398 to 385 million y old) Hamilton Group comprised of several impure carbonate formations between 2 to 32 m in unit thickness. These units are composed of shales interbedded with finely grained limestones (Bell, Arkona, Hungry Hollow and Widder Formations) which alternate with limestones (Rockport Quarry and Ipperwash Formations) becoming increasingly fossiliferous upwards (Johnson *et al.*, 1992).

The western portion of the study area is underlain by the Upper Devonian (385 to 359 million y ago) Kettle Point Formation, which consists of black, siliclastic organic-rich shales 30 to 75 m in thickness (Johnson *et al.*, 1992).

The proposed Rodney TS study area lies in a zone of mild potential (Zone 1) for seismic activity (ACNBC, 1980). Unlike the traditional earthquake-prone zones along plate margins, (e.g., those known in the western Rocky Mountains), seismic activity in the study area is related to slippage along ancient fault lines located within the North American continental plate. Earthquake prediction in the study area is difficult, as few ancient faults have been identified.

2.3 Physiography

The proposed Rodney TS study area lies within the West St. Lawrence Lowland Physiographic Unit of the St. Lawrence Lowlands Physiographic Region (Bostock, 1970). The West St. Lawrence Lowland is broken into two parts by the Niagara Escarpment. The surface west of the escarpment slopes gradually southwestward towards Lake Erie. East of the escarpment, the land rises gently northward from Lake Ontario to Georgian Bay.

During the Quaternary, the Laurentide Ice Sheet dominated much of Canada, including southern Ontario. A series of glacial advances and retreats was initiated approximately 190,000 y BP (before present) and lasted to the beginning of the Holocene at 10,000 y BP. The two main stages of glaciation, Illinoian and Wisconsinan, were divided by the Sangamonian Interglacial stage between 115,000 to 135,000 y BP. The Labrador Sector of the Laurentide Ice Sheet, with the main direction of ice flow from the northeast, mainly affected the present-day study area (Barnett, 1992).

Deglaciation of the area was initiated approximately 13,000 y BP (Sly and Lewis, 1972). The Lake Erie basin has its origins as a valley of the Eriean River, a major eastern flowing watercourse which drained the southern part of the present Great Lakes area about two million y ago. This valley was deepened and enlarged by a series of major glacial advances during the Pleistocene. Following the final stages of ice retreat which began 14,000 y ago, a series of six post-glacial lakes occupied the basin depositing a variety of sediments in the area. Modern Lake Erie formed 3,500 to 4,000 y ago when drainage through the Niagara outlet was freed of ice.

Regionally, surficial deposits are divisible into two main categories (Karrow, 1967). The most widespread are fairly deep sediments deposited by Quaternary glaciation, mainly of the Wisconsinan Substage. These are ice-contact sediments (tills) deposited directly from glaciers during ice advance and retreat, and also include landforms such as drumlins, moraines and kames. Additionally, considerable amounts of meltwater from glaciers deposited glaciofluvial and glaciolacustrine sediments.

Other surficial deposits, which are more local in scale, are post-glacial Holocene sediments, mainly alluvium deposited by rivers. Other minor recent sediments include those created by wind deposition, as well as organic and peat deposits in wetlands (Chapman and Putnam, 1984).

The proposed Rodney TS study area is located within the Bothwell Sand Plain physiographic region (Chapman and Putnam, 1984). This sand plain, approximately 1,800 km² in area, was created as a delta of the Thames River during the time of glacial Lake Warren. The sand plain is generally level, particularly in the west, with gently rolling topography in areas away from the major watercourses. With the sands spread thinly (up to 1 m) over the clay floor, the water table is shallow resulting in moist to swampy depressions.

A glacial Lake Warren beach occurs in the centre of the study area north of Highway 401 extending west from the community of Kintyre to its shorecliff just east of the community of Clachan (Chapman and Putnam, 1972). The Blenheim Moraine is present to the south of this beach area. As a result, topography is rolling in most of the northern and western portions of the local study area due to the dune areas and ancient beach ridges, becoming more level to the south and east.

Based on MOE well records for the local study area, subsurface stratigraphy generally consists of an upper shallow (up to 8 m deep) sand and/or gravel layer, underlain by clay to depths of over 60 m, followed by a sand and/or gravel layer with bedrock encountered at depths of 65 m or greater.

2.4 Soils

Predominant soils in the proposed Rodney TS study area are Grey-Brown Podzolics (Gray Brown Luvisols) (Hoffman *et al.*, 1964). The soil types and their characteristics are presented in Table 2.6. Normandale, Kintyre and Wattford soils are the most common in the study area. Organics tend to dominate poorly-drained areas.

TABLE 2.6: CHARACTERISTICS OF SOIL TYPES IN THE LOCAL STUDY AREA¹

Soil Type	Great Group	Soil Materials	Texture	Topography	Drainage
Berrien	Gleyed Brunisolic Gray Brown Luvisol	40 to 100 cm of coarse textured (sandy) material over fine to very fine textured (clayey) lacustrine materials.	Fine sandy loam and loamy sand	Nearly level or very gently undulating	Imperfect
Berrien (till phase)	Gleyed Brunisolic Gray Brown Luvisol	40 to 100 cm of coarse textured material over fine to very fine textured glacial till.	Fine sandy loam and loamy sand	Nearly level or very gently undulating	Imperfect
Beverley	Gleyed Brunisolic Gray Brown Luvisol	Deep fine to very fine textured lacustrine material containing less than 60% clay, often containing layers of medium textured (loamy) material.	Clay loam, silty clay loam and silty clay	Nearly level to very gently undulating	Imperfect
Brady	Gleyed Brunisolic Gray Brown Luvisol	Deep coarse textured lacustrine material, with sand size predominantly medium sand. Surface material frequently modified by wind.	Sandy loam and loamy sand	Nearly level to very gently undulating	Imperfect
Brant	Brunisolic Gray Brown Luvisol	Deep medium textured lacustrine material, often containing thin layers of fine to very fine textured material.	Silt loam and loam	Very gently undulating to hummocky	Well
Churchville	Orthic Humic Gleysol	Deep medium to coarse textured lacustrine material, with sand size predominantly fine to very fine sand.	Very fine sandy loam, fine sandy loam, and loamy fine sand	Nearly level	Very poor
Fox	Brunisolic Gray Brown Luvisol	Deep coarse textured lacustrine material, with sand size predominantly medium sand. Surface material frequently modified by wind.	Sandy loam and loam sand	Nearly level to gently undulating	Rapid
Frome (peaty phase)	Orthic Humic Gleysol	15 to 40 cm of organic material overlying deep coarse textured lacustrine material, with sand size predominantly medium sand.	Sandy loam and loamy sand	Nearly level	Very poor
Gobles (loamy phase)	Gleyed Brunisolic Gray Brown Luvisol	15 to 40 cm of medium textured material over deep fine to very fine textured glacial till material.	Silt clay loam and clay loam	Nearly level to gently undulating	Imperfect

Soil Type	Great Group	Soil Materials	Texture	Topography	Drainage
Granby	Orthic Humic Gleysol	Deep coarse textured lacustrine material, with sand size predominantly medium sand. Surface material frequently modified by wind.	Sandy loam and loamy sand	Nearly level	Poor
Highgate	Gleyed Brunisolic Gray Brown Luvisol	Less than 100 cm of coarse-textured material overlying gravelly coarse textured lacustrine beach material.	Fine sandy loam, sandy loam, and loamy fine sand	Nearly level to very gently sloping	Imperfect
Kelvin	Orthic Humic Gleysol	Deep fine to very fine textured glacial till material	Silty clay loam and clay loam	Nearly level or gently undulating	Poor
Kelvin (till phase)	Orthic Humic Gleysol	15 to 40 cm of coarse textured material over deep fine to very fine textured glacial till material.	Silt clay loam and clay loam	Nearly level or gently undulating	Poor
Kintyre	Brunisolic Gray Brown Luvisol	Less than 100 cm of coarse textured material overlying gravelly coarse textured lacustrine beach material.	Fine sandy loam, sandy loam and loamy fine sand	Very gently to moderately sloping	Rapid
Maplewood	Orthic Humic Gleysol	40 to 100 cm of medium textured material over fine to very fine textured lacustrine material.	Silt loam and loam	Nearly level or very gently sloping	Poor
Muirkirk	Orthic Humic Gleysol	Less than 100 cm of coarse textured material overlying gravelly coarse textured lacustrine beach material.	Fine sandy loam, sandy loam and loamy fine sand	Nearly level or very gently sloping	Poor
Normandale	Gleyed Brunisolic Gray Brown Luvisol	Deep medium to coarse textured lacustrine material, with sand size predominantly fine to very fine sand. Surface material frequently modified by wind.	Very fine sandy loam, fine sandy loam, and loamy fine sand	Nearly level to gently undulating	Imperfect
Plainfield	Brunisolic Grey Brown Luvisol	Deep coarse textured material deposited by wind, with sand size predominantly fine sand.	Fine sand and loamy fine sand	Very gently undulating	Rapid
St. Williams	Orthic Humic Gleysol	Deep medium to coarse textured lacustrine material, with sand size predominantly fine to very fine sand. Surface material frequently modified by wind.	Very fine sandy loam, fine sandy loam, and loamy fine sand	Nearly level to very gently undulating	Poor

Soil Type	Great Group	Soil Materials	Texture	Topography	Drainage
Tavistock	Gleyed Brunisolic Gray Brown Luvisol	40 to 100 cm of medium textured material over fine to very fine textured lacustrine material.	Silt loam and loam	Nearly level to very gently undulating	imperfect
Tuscola	Gleyed Brunisolic Gray Brown Luvisol	Deep medium textured lacustrine material often containing layers of fine to very fine textured material.	Silt loam and loam	Nearly level to very gently undulating	Imperfect
Vittoria	Gleyed Brunisolic Gray Brown Luvisol	40 to 100 cm of coarse textured material over medium textured lacustrine material.	Fine sandy loam and loamy fine sand	Nearly level to very gently undulating	Imperfect
Wattford	Brunisolic Gray Brown Luvisol	Deep medium to coarse textured lacustrine material, with sand size predominantly fine to very fine sand. Surface material frequently modified by wind.	Very fine sandy loam, fine sandy loam, and loamy fine sand	Nearly level to very gently undulating	Well
Wauseon	Orthic Humic Gleysol	40 to 100 cm of coarse textured material over fine to very fine textured lacustrine material.	Fine sandy loam and loamy fine sand	Nearly level to very gently undulating	Poor
Alluvium	Not classified	Undifferentiated material deposited mainly in floodplains of watercourses.	Variable	Nearly level to gently sloping	Imperfect to poor
Organic	Not classified	Depressional wetland areas consisting of 40 cm or more of organic material overlying undifferentiated mineral material.	Organic	Nearly level	Very poor

¹ Source: Schut (1992a, b); Wilson (1994).

The Canada Land Inventory (CLI, 1967) categorizes the soils in the proposed Rodney TS study area as predominantly Class 2 with moderate limitations due to adverse soil characteristics including one or more of the following: undesirable structure, low permeability, a restricted rooting zone due to soil characteristics, low natural fertility and/or low moisture-holding capacity. Some Class 3 soils are also present with moderately severe limitations due to adverse soil characteristics and excess water. Organic soils, which are not classified by the CLI, are common in the study area.

2.5 Surface and Groundwater Hydrology

The proposed Rodney TS study area occurs within the Lake St. Clair drainage basin (Chapman and Putnam, 1984). The study area is drained by Fleming Creek, a tributary of the Thames River, as well as other smaller tributaries of the Thames River. In the eastern portion of the study area, Fleming Creek has cut deeply through the sand plain creating, in some places, broad valley floors and notable elevated terraces. The smaller Thames River tributaries cut less deeply and many have been channelized. The Thames River watershed is shown in Figure 2.1.

Historical hydrological data are available for a Water Survey of Canada streamflow gauge location on the Thames River at Thamesville (see Table 2.7). These data indicate that the greatest streamflows occur during the spring freshet in March and April, with lowest flows occurring during the summer and fall months of July to September.

Average dates for pond and river freeze-up and break-up in the proposed Rodney TS study area vary from year to year. Freeze-up generally occurs by late-December and break-up usually occurs by mid- or late-March. The freeze-up and break-up dates are approximate and will vary according to ambient temperatures, the size of the waterbody, its orientation and its flow rate (OMNR, 1984).

The bedrock in southern Ontario is a major source of water supply. This is specifically true in areas where overburden is absent or where the thickness of the overburden is small. Groundwater in the Hamilton Group hydrogeological unit is generally found at much greater depth than in the Kettle Point hydrogeological unit. Both hydrogeologic units have a fair water-yielding capability (Dillon/Golder, 2004). Groundwater yields from this bedrock are typically less than 1 L/s generally suitable for most domestic purposes.

A shallow unconfined aquifer is associated with the Bothwell Sand Plain (Dillon/Golder, 2004). As indicated in Section 2.3, overburden thickness in the study area is generally greater than 65 m. Groundwater yields from overburden are typically from less than 1 to 4 L/s (Dillon/Golder, 2004).

Based on MOE well records, the water table in the local study area is extremely variable ranging from as shallow as 2 m to as deep as 70 m.

TABLE 2.7: MONTHLY AND ANNUAL MEAN, MINIMUM AND MAXIMUM DISCHARGES (m³/s), THAMES RIVER¹

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
At Thamesville²													
Mean	55.7	71.4	132	107	46.2	25.6	18.0	15.9	20.9	25.9	45.7	64.6	52.2
Minimum	4.91	6.73	39.7	17.1	8.85	6.11	4.15	2.77	3.24	3.61	4.71	4.07	22.1
Maximum	183	223	292	278	194	89.7	94.7	68.2	115	130	200	173	88.6

¹ Source: www.wsc.ec.gc.ca/staflow/flow-monthly.cfm

² Station O2GE003; Latitude: 42°32'41"N, Longitude: 81°58'02"W; Drainage area: 4,300 km²; Period of record: 1938 – 2005.

2.6 Vegetation

The proposed Rodney TS study area is located in the Niagara Section of the Deciduous Forest Region, commonly referred to as the 'Carolinian Zone' (Rowe, 1972). The Deciduous Forest Region is located in southwestern Ontario and forms a narrow band along the northern shore of Lake Ontario extending to about the Presqu'île Peninsula to the east. Its southern location allows for the presence of some tree species typical of more southerly portions of the United States. The region serves as a transition area, with representatives from many species common to both the southern Carolinian forest and the Great Lakes-St. Lawrence Forest Region to the north.

The forest communities of the Niagara Forest Section are dominated by broad-leaved trees. Characteristic tree species include sugar maple and American beech, with lesser representation by such species as American basswood, red maple, red oak, white oak and bur oak. This forest section also includes the main distribution in Canada for such Carolinian forest species as black walnut (*Juglans nigra*), sycamore (*Platanus occidentalis*), swamp white oak (*Q. bicolor*) and shagbark hickory (*Carya ovata*). Other more widely distributed species include butternut, bitternut hickory (*C. cordiformis*), rock elm (*Ulmus thomasi*), silver maple and blue-beech (*Carpinus caroliniana*).

Intensive agriculture and urbanization across southwestern Ontario have fragmented the Deciduous Forest Region, leaving smaller woodlots representative of the original communities.

Lands within the proposed Rodney TS study area are categorized as Class 1, 2, 3 and 4 with no important, slight, moderate and moderately severe limitations to the growth of commercial forests, respectively (CLI, 1971a). The Class 2, 3 and 4 lands are limited by excessive soil moisture, whereas some of the Class 2 and 3 lands are also limited by low soil fertility. In addition, some of the Class 2 lands can be limited by soil moisture deficiency and physical restriction to rooting by dense or consolidated layers, other than bedrock.

A number of forested areas and woodlots are present in the proposed Rodney TS study area (see Figure 2.2), with the larger tracts designated as significant (see Section 2.7).

Remnants of a rare vegetation community, i.e., Moist-Fresh Tallgrass Prairie Type, are located approximately 5 km southwest of the western limit of the proposed Rodney TS study area (NHIC, 2007a). The prairie remnants occur between the CSX Corporation (CSX) and CP Rail System (CP) railway ROWs. This community type has one of the densest and most extensive tracts of little bluestem (*Shizachyrium scoparium*) in Chatham-Kent. Other species include prairie three-awn (*Aristida oligantha*), purple lovegrass (*Eragrostis spectabilis*), prairie milkweed (*Asclepias sullivantii*), fall boneset (*Eupatorium altissimum*) and dense blazing-star (*Liatris spicata*). The low-lying damp areas support red-osier dogwood (*Cornus stolonifera*) and willow (*Salix* spp.) thickets. Upland poplar (*Populus* spp.) and stag-horn sumac (*Rhus typhina*) are also present.

Undisturbed areas of native vegetation within the proposed Rodney TS study area have the potential to support plant species which are of concern, i.e., species which are designated with special status under federal and/or provincial legislation. Federally, species at risk are recognized by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC, 2007) and are protected under the *Species At Risk Act*, whereas provincially they are recognized by the

Committee on the Status of Species at Risk in Ontario (COSSARO) under the Ontario *Endangered Species Act* and the Species at Risk in Ontario List (OMNR, 2006). Species designated as endangered or threatened and their habitat are protected under the *Endangered Species Act*.

In addition, provincially significant species are defined as those with provincial rankings of S1 (extremely rare in Ontario), S2 (very rare in Ontario), or S3 (rare to uncommon in Ontario) as tracked by the NHIC (2005a).

Based on the National Heritage Information Centre (NHIC, 2005a) database, a number of rare plant species have been documented within or in the immediate vicinity of the study area (Table 2.8).

TABLE 2.8: RARE PLANT SPECIES DOCUMENTED WITHIN OR IN THE VICINITY OF THE LOCAL STUDY AREA¹

Scientific Name	Common Name	Provincial Status ²
<i>Asclepias verticillata</i>	Whorled milkweed	S2
<i>Carex tetanica</i>	Rigid sedge	S3
<i>C. virescens</i>	Ribbed sedge	S3
<i>Castanea dentata</i> ³	American chestnut	S2
<i>Cyperus erythrorhizos</i>	Red-root flatsedge	S3
<i>Echinochloa walteri</i>	Walter's barnyard grass	S3
<i>Eragrostis spectabilis</i>	Purple love grass	S2
<i>Fraxinus profunda</i>	Pumpkin ash	S2
<i>Liatris spicata</i> ³	Dense blazing star	S2
<i>Lythrum alatum</i>	Winged loosestrife	S3
<i>Oenothera villosa</i>	Hairy evening-primrose	S2?
<i>Panicum rigidulum</i>	Redtop panic grass	S2S3
<i>Paspalum setaceum</i>	Slender paspalum	S2
<i>Ratibida pinnata</i>	Grey-headed coneflower	S2S3
<i>Sphenopholis obtusata</i>	Prairie wedgegrass	S1
<i>Sporobolus asper</i>	Longleaf dropseed	S1S2
<i>Symphyotrichum praealtum</i> ³	Willowleaf aster	S2

¹ Source: NHIC (2005a).

² S3 = rare to uncommon in Ontario; S2S3 = very rare to uncommon in Ontario; S2? = possibly very rare in Ontario; S2 = very rare in Ontario; S1S2 = extremely to very rare in Ontario; S1 = extremely rare in Ontario.

³ Designated as an endangered species federally by COSEWIC (2007), as well as provincially by COSSARO (OMNR, 2006).

⁴ Designated as a threatened species federally by COSEWIC (2007), as well as provincially by COSSARO (OMNR, 2006).

2.7 Environmentally Significant Areas

Wetlands and other environmentally significant areas provide important habitat for a variety of wildlife and plant species. Further, wetlands provide water storage and control functions which

reduce erosion and flooding, and improve water quality. Wetlands also increasingly provide areas for a range of recreational pursuits, including nature appreciation.

The Ontario Government (1992) issued a Wetlands Policy Statement intended to ensure that there will be no net loss of wetland functions of Provincially Significant Wetlands (PSWs). Recently, the Wetlands Policy Statement was incorporated into the Provincial Policy Statement (OMMAH, 2005). A PSW is either a Class 1, 2 or 3 wetland situated south and east of the Canadian Shield, or a wetland in another area of the province that the OMNR has classified as Provincially Significant through an evaluation of biological, social, hydrological and special features of the area. Development and site alteration are not permitted in PSWs in Ecoregions 5E, 6E and 7E (OMMAH, 2005). North of Ecoregions 5E, 6E and 7E, development and site alteration are not permitted unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.

Areas of Natural and Scientific Interest (ANSIs) and Environmentally Sensitive Areas (ESAs) have been identified by the OMNR and conservation authorities and/or municipalities, respectively, where it has been determined that the natural landscape and/or its features are in need of protection for heritage appreciation, scientific study or conservation education purposes. Life Science ANSIs are natural areas selected to protect outstanding landscapes, environments and biotic communities. Earth Science ANSIs are geological sites selected to protect outstanding examples of rock types, fossil localities, landform associations and areas containing significant groundwater resources. ESAs are land and water areas with natural features or ecological functions of such significance as to require their protection or preservation. Other natural areas of local and possibly regional significance have also been identified.

One environmentally significant area is partially located within the northwest corner of the proposed Rodney TS study area: the Turin Paw-Paw Special Area, designated as a Life Science ANSI. This ANSI is composed of a woodland strip, approximately 3 km long, intersected by Orford Road (Bowles *et al.*, 1994). The vegetation communities on this site include mixed deciduous forest on ridges alternating with swamps. Sections of naturally regenerating second growth forest recovering from intensive cutting have also been included within the ANSI as they add considerable species and community diversity to the overall composition of the site. Several of the associations contain good mixtures of Carolinian plants. Vegetation communities present on the site are Mesic Sugar Maple Forest, Mesic Sugar Maple Cut Over Forest, Mesic American Beech-Sugar Maple Forest, Mesic Red Oak-American Beech-Red Maple Forest, Mesic Red Maple-Black Cherry Forest, Grazed Shagbark Hickory Parkland, Mesic Sassafras-Bitternut Hickory Secondary Forest, Mesic to Wet-Mesic Red Maple-White Ash-American Beech Woodland, Wet to Wet-Mesic Large-tooth Aspen-Black Cherry Second Growth Thicket, Wet-Mesic Trembling Aspen Second Growth Woodland and Wet Silver Maple Permanent Swamp.

In addition, a designated natural area, Clark's Woodlot-Wetland, is located in the northwest corner of the study area south of the Turin Paw-Paw Special Area. This 4.2-km, non-provincially significant wetland is comprised of 100% swamp (Deary and Gagnon, 1987).

Four publicly-owned woodlands that occur within or extend into the West Elgin portion of the study area are designated as natural heritage features in the West Elgin Official Plan (Community Planners Inc., 2006). In addition to the Turin Paw-Paw Special Area and Clark's

Woodlot-Wetland, there are four woodlands within the Chatham-Kent portion of the study area that are designated as significant woodlands (based on area greater than 2 ha) in the Chatham-Kent (2005) Official Plan. The designation of significant woodlands conforms with the requirements of the Provincial Policy Statement (OMMAH, 2005).

A number of environmentally significant areas are in close proximity to the study area as listed below (NHIC, 2005b):

- Taylor Pond Wetland Complex, a PSW, made up of 19 individual wetlands composed of 76% swamp and 24% marsh, located approximately 2 km south of the proposed Rodney TS study area;
- Taylor Pond, a Life Science ANSI, consisting of wet to mesic forests, a swamp white oak stand, thicket swamps and prairie remnants, located about 3 km south of the study area;
- South Rodney Woods, a Life Science ANSI, consisting of a permanent swamp woodlot with a good, characteristic and representative Carolinian flora, located approximately 5.5 km south of the study area;
- Highgate Rail Road Prairie West, a Life Science ANSI, with one of the densest and most extensive tracts of little bluestem in Chatham-Kent County located approximately 5 km southwest of the study area (see Section 2.6); and
- Highgate Rolling Sandland, an International Biological Program site, consisting of a moist sandplain supporting a diverse hardwood community with Carolinian flora present, located about 6 km southwest of the study area.

2.8 Wildlife

Lands around the proposed Rodney TS provide agricultural, woodland, wetland and riparian habitat for wildlife. In this area, most wildlife species are fully habituated to human activities and are concentrated in specialized habitats.

2.8.1 Mammals

White-tailed deer (*Odocoileus virginianus*) is the principal large wildlife species in the area of the proposed Rodney TS. Deer have seasonal ranges as a result of current land use practices. In the spring, summer and early autumn, deer disperse to forest edges around farmlands, woodlots and the fringes of swamps. They are most abundant where there is an optimal mix of sheltering forest and farmland. During the winter, deer congregate in areas of denser cover, especially dense woodlots, swamps and conifer stands. A major restriction to the deer populations in the region is the availability of woodlots and suitable wintering yards.

The CLI (1971b) has categorized the lands in the proposed Rodney TS study area as Class 2 and Class 3 with very slight and slight limitations to the production of white-tailed deer due to lack of nutrients in the soil for optimum plant growth and poor (excessive or deficient) soil moisture.

Table 2.9 provides a list of mammal species likely present in the proposed Rodney TS study area. Of the 23 native species listed in Table 2.9, 18 species are ranked by the NHIC (2005a) as S5, i.e., very common in Ontario and demonstrably secure; three species are S4, i.e., common in Ontario and apparently secure; one species is S3, i.e., rare to uncommon in Ontario; and one species is S2, i.e., very rare in Ontario.

TABLE 2.9: MAMMAL SPECIES LIKELY PRESENT IN THE LOCAL STUDY AREA¹

Common Name	Scientific Name	Provincial Status ²
New World Opossums	<i>Didelphidae</i>	
Virginia opossum	<i>Didelphis virginiana</i>	S4
Shrews	<i>Soricidae</i>	
Common (Masked) shrew	<i>Sorex cinereus</i>	S5
Short-tailed shrew	<i>Blarina brevicauda</i>	S5
Bats	<i>Vespertilionidae</i>	
Little brown bat	<i>Myotis lucifuga</i>	S5
Big brown bat	<i>Eptesicus fuscus</i>	S5
Eastern red bat	<i>Lasiurus borealis</i>	S4
Squirrels	<i>Sciuridae</i>	
Eastern chipmunk	<i>Tamias striatus</i>	S5
Eastern grey squirrel	<i>Sciurus carolinensis</i>	S5
Southern flying squirrel ³	<i>Glaucomys volans</i>	S3
Mice, Rats and Voles	<i>Muridae</i>	
White-footed mouse	<i>Peromyscus leucopus</i>	S5
Deer mouse	<i>P. maniculatus</i>	S5
Meadow vole	<i>Microtus pennsylvanicus</i>	S5
Muskrat	<i>Ondatra zibethicus</i>	S5
Jumping Mice and Gerboas	<i>Dipodidae</i>	
Meadow jumping mouse	<i>Zapus hudsonius</i>	S5
Dogs	<i>Canidae</i>	
Coyote	<i>Canis latrans</i>	S5
Red fox	<i>Vulpes vulpes</i>	S5
Raccoon	<i>Procyonidae</i>	
Raccoon	<i>Procyon lotor</i>	S5
Weasels	<i>Mustelidae</i>	
Ermine	<i>Mustela erminea</i>	S5
Long-tailed weasel	<i>M. frenata</i>	S4
American mink	<i>M. vison</i>	S5
American badger ⁴	<i>Taxidea taxus</i>	S2
Striped skunk	<i>Mephitis mephitis</i>	S5

Common Name	Scientific Name	Provincial Status ²
Deer White-tailed deer	Cervidae <i>Odocoileus virginianus</i>	S5

¹ Source: Dobbyn (1994).

² NHIC (2005a): S5 = very common in Ontario, demonstrably secure; S4 = common in Ontario, apparently secure; S3 = rare to uncommon in Ontario.

³ Designated as a species of special concern federally by COSEWIC (2007), as well as provincially by COSSARO (OMNR, 2006).

⁴ Designated as an endangered species federally by COSEWIC (2007), as well as provincially by COSSARO (OMNR, 2006).

Of the species listed in Table 2.9, the southern flying squirrel and American badger are designated as a species of special concern and an endangered species, respectively, federally by COSEWIC (2007), as well as provincially by COSSARO (OMNR, 2006). As the record for American badger dates back to 1953 (NHIC, 2005a), this species is likely no longer present in the area.

2.8.2 Avifauna

Habitat in the regional study area is supportive of a variety of bird species given that woodlands, woodlots, watercourse ravines, wetlands, thickets and open fields are all represented.

Waterfowl has a limited occurrence in the area, since there are few lakes or expanses of sluggish backwater on the watercourses of the area. Common waterfowl include mallard (*Anas platyrhynchos*) and Canada goose (*Branta canadensis*). Lands in the proposed Rodney TS study area are categorized by the CLI (1970) as Class 7 with such severe limitations due to adverse topography that almost no waterfowl are produced.

Table 2.10 provides a list of bird species that are documented to be likely or confirmed breeding within a 10-km by 10-km square grid encompassing the proposed Rodney TS study area. Of the 120 species listed in Table 2.10, 76 are considered by the NHIC (2005a) to be S5, i.e., very common in Ontario and demonstrably secure; two are S4S5, i.e., common to very common in Ontario; 28 are S4, i.e., common in Ontario and apparently secure; one species is S3S4, i.e., rare to common in Ontario; four species are S3, i.e., rare to uncommon in Ontario; two species are S2S3, i.e., very rare to uncommon in Ontario; two species are S2; i.e., very rare in Ontario; one species is SZB, i.e., with no clearly definable breeding occurrences; and four species are SE, i.e., exotic, not believed to be a native component of Ontario's fauna.

TABLE 2.10: BIRD SPECIES LIKELY OR CONFIRMED BREEDING WITHIN A 10-KM BY 10-KM SQUARE GRID ENCOMPASSING THE LOCAL STUDY AREA¹

Common Name	Scientific Name	Provincial Status ²
Grebes Pied-billed grebe	Podicepsidae <i>Podilymbus podiceps</i>	S4
Hérons and Bitterns Least bittern ³ Great blue heron	Ardeidae <i>Ixobrychus exilis</i> <i>Ardea herodias</i>	S3 S5

Common Name	Scientific Name	Provincial Status ²
Green heron	<i>Butorides striatus</i>	S4
Swans, Geese and Ducks	Anatidae	
Mute swan	<i>Cygnus olor</i>	SE
Canada goose	<i>Branta canadensis</i>	S5
Wood duck	<i>Aix sponsa</i>	S5
Mallard	<i>Anas platyrhynchos</i>	S5
Blue-winged teal	<i>A. discors</i>	S5
Gadwall	<i>A. strepera</i>	S4
Hooded merganser	<i>Lophodytes culcullatus</i>	S5
Ruddy duck	<i>Oxyura jamaicensis</i>	S2
American Vultures	Cathartidae	
Turkey vulture	<i>Cathartes aura</i>	S4
Ospreys, Eagles and Hawks	Accipitridae	
Bald eagle ⁴	<i>Haliaeetus leucocephalus</i>	S4
Northern harrier	<i>Circus cyaneus</i>	S4
Cooper's hawk	<i>Accipiter cooperi</i>	S4
Sharp-shinned hawk	<i>A. striatus</i>	S5
Broad-winged hawk	<i>Buteo platypterus</i>	S5
Red-tailed hawk	<i>B. jamaicensis</i>	S5
Falcons	Falconidae	
American kestrel	<i>Falco sparverius</i>	S5
Partridges, Pheasants and Grouse	Phasianidae	
Ruffed grouse	<i>Bonasa umbellus</i>	S5
Wild turkey	<i>Meleagris gallopavo</i>	S4
Rails, Gallinules and Coots	Rallidae	
Sora	<i>Porzana carolina</i>	S4
Common moorhen	<i>Gallinula chloropus</i>	S4
American coot	<i>Fulica americana</i>	S4
Plovers	Charadriidae	
Killdeer	<i>Charadrius vociferous</i>	S5
Sandpipers and Phalaropes	Scolopacidae	
Spotted sandpiper	<i>Actitis macularia</i>	S5
Upland sandpiper	<i>Bartramia longicauda</i>	S4
Wilson's (Common) snipe	<i>Gallinago gallinago</i>	S5
American woodcock	<i>Scolopax minor</i>	S5
Pigeons and Doves	Columbidae	
Rock pigeon	<i>Columba livia</i>	SE
Mourning dove	<i>Zenaida macroura</i>	S5
Cuckoos	Cuculidae	
Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	S4
Yellow-billed cuckoo	<i>C. americanus</i>	S4

Common Name	Scientific Name	Provincial Status ²
Typical Owls	Strigidae	
Eastern screech-owl	<i>Otus asio</i>	S5
Great horned owl	<i>Bubo virginianus</i>	S5
Long-eared owl	<i>Asio otus</i>	S4
Goatsuckers	Caprimulgidae	
Common nighthawk	<i>Chordeiles minor</i>	S4
Swifts	Apodidae	
Chimney swift	<i>Chaetura pelagica</i>	S5
Hummingbirds	Trochilidae	
Ruby-throated hummingbird	<i>Archilochus colubris</i>	S5
Kingfishers	Alcedinidae	
Belted kingfisher	<i>Ceryle alcyon</i>	S5
Woodpeckers	Picidae	
Red-headed woodpecker ⁵	<i>Melanerpes erythrocephalus</i>	S3
Red-bellied woodpecker	<i>M. carolinus</i>	S4
Downy woodpecker	<i>Picoides pubescens</i>	S5
Hairy woodpecker	<i>P. villosus</i>	S5
Northern flicker	<i>Colaptes auratus</i>	S5
Pileated woodpecker	<i>Dryocopus pileatus</i>	S4S5
Tyrant Flycatchers	Tyrannidae	
Eastern wood-pewee	<i>Contopus sordidulus</i>	S5
Alder flycatcher	<i>Empidonax alnorum</i>	S5
Willow flycatcher	<i>E. trailli</i>	S5
Least flycatcher	<i>E. minimus</i>	S5
Eastern phoebe	<i>Sayornis phoebe</i>	S5
Great crested flycatcher	<i>Myiarchus crinitus</i>	S5
Eastern kingbird	<i>Tyrannus tyrannus</i>	S5
Larks	Alaudidae	
Horned lark	<i>Eremophila alpestris</i>	S5
Swallows	Hirundinidae	
Purple martin	<i>Progne subis</i>	S4
Tree swallow	<i>Tachycineta bicolor</i>	S5
Northern rough-winged swallow	<i>Steigodopteryx serripennis</i>	S5
Bank swallow	<i>Riparia riparia</i>	S5
Cliff swallow	<i>Hirundo pyrrhonota</i>	S5
Barn swallow	<i>H. rustica</i>	S5
Jays and Crows	Corvidae	
Blue jay	<i>Cyanocitta cristata</i>	S5
American crow	<i>Corvus brachyrhynchos</i>	S5
Titmice	Paridae	
Black-capped chickadee	<i>Parus atricapillus</i>	S5

Common Name	Scientific Name	Provincial Status ²
Nuthatches	Sittidae	
Red-breasted nuthatch	<i>Sitta canadensis</i>	S5
White-breasted nuthatch	<i>S. carolinensis</i>	S5
Wrens	Troglodytidae	
Carolina wren	<i>Thryothorus ludovicianus</i>	S3S4
House wren	<i>Troglodytes aedon</i>	S5
Winter wren	<i>T. troglodytes</i>	S5
Marsh wren	<i>Cistothorus palustris</i>	S5
Kinglets and Thrushes	Muscicapidae	
Blue-gray gnatcatcher	<i>Poliophtila caerulea</i>	S4
Eastern bluebird	<i>Sialia sialis</i>	S4S5
Veery	<i>Catharus fuscescens</i>	S4
Wood thrush	<i>Hylocichla mustelina</i>	S5
American robin	<i>Turdus migratorius</i>	S5
Mockingbirds and Thrashers	Mimidae	
Gray catbird	<i>Dumetella carolinensis</i>	S5
Northern mockingbird	<i>Mimus polyglottos</i>	S4
Brown thrasher	<i>Toxostoma rufum</i>	S5
Waxwings	Bombycillidae	
Cedar waxwing	<i>Bombycilla cedrorum</i>	S5
Starlings	Sturnidae	
European starling	<i>Sturnus vulgaris</i>	SE
Vireos	Vireonidae	
Yellow-throated vireo	<i>Vireo flavifrons</i>	S4
Warbling vireo	<i>V. gilvus</i>	S5
White-eyed vireo	<i>V. griseus</i>	S2
Red-eyed vireo	<i>V. olivaceus</i>	S5
Warblers, Sparrows, Blackbirds and Orioles	Emberizidae	
Golden-winged warbler	<i>Vermivora chrysoptera</i>	S4
Blue-winged warbler	<i>V. pinus</i>	S4
Northern parula	<i>Parula americana</i>	S4
Yellow warbler	<i>Dendroica petechia</i>	S5
Chestnut-sided warbler	<i>D. pensylvanica</i>	S5
Blackburnian warbler	<i>D. fusca</i>	S5
Pine warbler	<i>D. pinus</i>	S5
Cerulean warbler ⁵	<i>D. cerulea</i>	S3
American redstart	<i>Setophaga ruticilla</i>	S5
Ovenbird	<i>Seiurus aurocapillus</i>	S5
Northern waterthrush	<i>S. noveboracensis</i>	S5
Mourning warbler	<i>Oporornis philadelphia</i>	S5
Common yellowthroat	<i>Geothlypis trichas</i>	S5
Hooded warbler ^{3,6}	<i>Wilsonia citrina</i>	S3
Canada warbler	<i>W. canadensis</i>	S5
Yellow-breasted chat	<i>Piranga rubra</i>	S2S3
Scarlet tanager	<i>P. olivacea</i>	S5

Common Name	Scientific Name	Provincial Status ²
Northern cardinal	<i>Cardinalis cardinalis</i>	S5
Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>	S5
Indigo bunting	<i>Passerina cyanea</i>	S5
Eastern (Rufous-sided) towhee	<i>Pipilo erythrophthalmus</i>	S4
Chipping sparrow	<i>Spizella passerina</i>	S5
Field sparrow	<i>S. pusilla</i>	S5
Vesper sparrow	<i>Pooecetes gramineus</i>	S4
Savannah sparrow	<i>Passerculus sandwichensis</i>	S5
Song sparrow	<i>Melospiza melodia</i>	S5
Bobolink	<i>Dolichonyx oryzivorus</i>	S4
Red-winged blackbird	<i>Agelaius phoeniceus</i>	S5
Eastern meadowlark	<i>Stumella magna</i>	S5
Common grackle	<i>Quiscalus quiscula</i>	S5
Brown-headed cowbird	<i>Molothrus ater</i>	S5
Orchard oriole	<i>Icterus spurius</i>	SZB
Baltimore oriole	<i>I. galbula</i>	S5
Finches	<i>Fringillidae</i>	
House finch	<i>Carpodacus mexicanus</i>	SE
American goldfinch	<i>Carduelis tristis</i>	S5
House sparrow	<i>Passer domesticus</i>	SE

¹ Source: Bird Studies Canada (2006).

² NHIC (2005a); S5 = very common in Ontario, demonstrably secure; S4S5 = common to very common in Ontario; S4 = common in Ontario, apparently secure; S3S4 = rare to common in Ontario; S3 = rare to uncommon in Ontario; S2S3 = very rare to uncommon in Ontario; S2 = very rare in Ontario; S1S2 = extremely to very rare in Ontario; SZB = no clearly definable breeding occurrences; SE = exotic, not believed to be a native component of Ontario's fauna.

³ Designated as a threatened species federally by COSEWIC (2007), as well as provincially by COSSARO (OMNR, 2006).

⁴ Designated as an endangered species provincially by COSSARO (OMNR, 2006).

⁵ Designated as a species of special concern federally by COSEWIC (2007), as well as provincially by COSSARO (OMNR, 2006).

⁶ Documented within or in the near vicinity of the proposed Rodney TS study area (NHIC, 2005a).

Of the species listed in Table 2.10, the bald eagle is designated as an endangered species provincially by COSSARO (OMNR, 2006). Bald eagle is not considered to be at risk federally by COSEWIC (2007).

The least bittern and hooded warbler are designated as threatened species federally by COSEWIC (2007), as well as provincially by COSSARO (OMNR, 2006). The hooded warbler has been documented within or in the near vicinity of the proposed Rodney TS study area (NHIC, 2005a).

Red-headed woodpecker and cerulean warbler are designated as species of special concern federally by COSEWIC (2007), as well as provincially by COSSARO (OMNR, 2006).

Acadian flycatcher (*Empidonax vireescens*) designated as an endangered species federally by COSEWIC (2007), as well as provincially by COSSARO (OMNR, 2006), has been documented

as a non-breeder within or in the near vicinity of the proposed Rodney TS study area (NHIC, 2005a).

2.8.3 Herpetofauna

Grouped together, amphibians and reptiles are called herpetofauna. They are generally dependent on wetland habitats associated with mature forests.

Table 2.11 provides a list of amphibian and reptile species with documented ranges overlapping the proposed Rodney TS study area. Of the 28 herpetofauna species listed in Table 2.11, 13 species are considered by the NHIC (2005a) to be S5, i.e., very common in Ontario and demonstrably secure; five species are S4, i.e., common in Ontario and apparently secure; one species is S3?, i.e., possibly rare to uncommon in Ontario; seven species are S3, i.e., rare to uncommon in Ontario; one species is SU, i.e., status uncertain; and one species is SE, i.e., exotic, not believed to be a native component of Ontario's fauna.

TABLE 2.11: AMPHIBIAN AND REPTILE SPECIES WITH DOCUMENTED RANGES OVERLAPPING THE LOCAL STUDY AREA¹

Common Name	Scientific Name	Provincial Status ²
AMPHIBIANS		
Mudpuppy Mudpuppy	Proteidae <i>Necturus maculosus</i>	S4
Newts Red-spotted newt	Salamandridae <i>Notophthalmus viridescens</i>	S5
Mole Salamanders Spotted salamander	Ambystomatidae <i>Ambystoma maculatum</i>	S4
Lungless Salamanders Northern redback salamander	Plethodontidae <i>Plethodon cinereus</i>	S5
Toads American toad	Buфонidae <i>Bufo americanus</i>	S5
Treefrogs Tetraploid gray treefrog Spring peeper Western chorus frog	Hylidae <i>Hyla versicolor</i> <i>Pseudacris crucifer</i> <i>P. triseriata</i>	S5 S5 S4
True Frogs American bullfrog Green frog Northern leopard frog Wood frog	Ranidae <i>Rana catesbeiana</i> <i>R. clamitans</i> <i>R. pipiens</i> <i>R. sylvatica</i>	S4 S5 S5 S5
REPTILES		
Snapping Turtles Common snapping turtle	Chelydridae <i>Chelydra serpentina</i>	S5

Common Name	Scientific Name	Provincial Status ²
Pond and Marsh Turtles	<i>Emydidae</i>	
Midland painted turtle	<i>Chrysemys picta</i>	S5
Northern map turtle ³	<i>Graptemys geographica</i>	S3
Blanding's turtle ⁴	<i>Emydoidea blandingi</i>	S3?
Slider	<i>Trachemys scripta</i>	SE
Skinks	<i>Scincidae</i>	
Five-lined skink ³	<i>Eumeces fasciatus</i>	S3
Typical Snakes	<i>Colubridae</i>	
Northern ribbonsnake ³	<i>Thamnophis sauritus</i>	S3
Eastern gartersnake	<i>T. sirtalis</i>	S5
Eastern hog-nosed snake ⁴	<i>Heterodon platirhinos</i>	S3
Eastern ratsnake ⁴	<i>Elaphe obsoleta</i>	S3
Eastern foxsnake ⁴	<i>E. (vulpina) gloydi</i>	S3
Dekay's brownsnake	<i>Storeria dekayi</i>	SU
Northern red-bellied snake	<i>S. occipitomaculata</i>	S5
Northern watersnake	<i>Nerodia sipedon</i>	S5
Smooth greensnake	<i>Opheodrys vernalis</i>	S4
Milksnake ³	<i>Lampropeltis triangulum</i>	S3

¹ Source: Oldham and Weller (2000).

² NHIC (2005a): S5 = very common in Ontario, demonstrably secure; S4 = common in Ontario, apparently secure; S3? = possibly rare to uncommon in Ontario; S3 = rare to uncommon in Ontario; S2 = very rare in Ontario; SU = status uncertain; SE = exotic, not believed to be a native component of Ontario's fauna.

³ Designated as a species of special concern federally by COSEWIC (2007), as well as provincially by COSSARO (OMNR, 2006).

⁴ Designated as a threatened species federally by COSEWIC (2007), as well as provincially by COSSARO (OMNR, 2006).

Of the 31 species listed in Table 2.11, Blanding's turtle, eastern hog-nosed snake, eastern ratsnake and eastern foxsnake are designated as threatened species federally by COSEWIC (2007), as well as provincially by COSSARO (OMNR, 2006). Northern map turtle, five-lined skink, northern ribbonsnake and milksnake are designated as species of special concern federally by COSEWIC (2007), as well as provincially by COSSARO (OMNR, 2006).

Eastern hog-nosed snake and eastern ratsnake, designated as threatened species, as well as five-lined skink, designated as a species of special concern, federally and provincially by COSEWIC (2007) and COSSARO (OMNR, 2006), respectively, have been documented within or in the near vicinity of the proposed Rodney TS study area (NHIC, 2005a).

2.8.4 Insects

A search of the NHIC (2007b) database indicated that the eastern amberwing (*Perithemis tenera*), azure bluet (*Enallagma aspersum*) and eastern red damsel (*Amphiagrion saucium*), considered to be rare to uncommon (S3) species, have been documented within or in the near vicinity of the proposed Rodney TS study area (NHIC, 2005a). These species are not designated to be at risk by COSEWIC (2007) or COSSARO (OMNR, 2006).

Moreover, the monarch butterfly (*Danaus plexippus*), considered to be of special concern federally by COSEWIC (2007) and provincially by COSSARO (OMNR, 2006), likely migrates through and breeds in the study area during the summer and fall.

2.9 Fisheries Resources

As indicated in Section 2.5, the proposed Rodney TS study area occurs within the St. Clair River drainage basin (Chapman and Putnam, 1984). The study area is drained by Fleming Creek, a tributary of the Thames River, as well as other smaller tributaries of the Thames River.

Table 2.12 presents the 94 fish species recorded in the Thames River watershed. Of these, 28 species, including rainbow trout, have been documented in Fleming Creek. None of the species recorded in Fleming Creek are considered to be at risk provincially (OMNR, 2006) or federally (COSEWIC, 2007).

TABLE 2.12: FISH SPECIES RECORDED IN THE THAMES RIVER WATERSHED¹

Common Name	Scientific Name	Abundance	Recorded in Fleming Creek ²
Northern brook lamprey ³	<i>Ichthyomyzon fossor</i>	Rare	
Silver lamprey	<i>I. unicuspis</i>	Rare	
American brook lamprey	<i>Lampetra appendix</i>	Uncommon	
Sea lamprey	<i>Petromyzon marinus</i>	Rare	
Longnose gar	<i>Lepisosteus osseus</i>	Uncommon	
Mooneye	<i>Hiodon tergisus</i>	Uncommon	
Alewife	<i>Alosa pseudoharengus</i>	Rare	
Gizzard shad	<i>Dorosoma cepedianum</i>	Common	
Central stoneroller	<i>Campostoma anomalum</i>	Abundant	X
Goldfish	<i>Carassius auratus</i>	Uncommon	
Spotfin shiner	<i>Cyprinella spiloptera</i>	Abundant	X
Common carp	<i>Cyprinus carpio</i>	Abundant	X
Gravel chub	<i>Erimystax x-punctatus</i>	Rare	
Brassy minnow	<i>Hybognathus hankinsoni</i>	Uncommon	
Striped shiner	<i>Luxilus chrysocephalus</i>	Abundant	
Common shiner	<i>L. cornutus</i>	Abundant	X
Redfin shiner	<i>Lythrurus umbratilis</i>	Uncommon	
Pearl dace	<i>Margariscus margarita</i>	Uncommon	
Hornyhead chub	<i>Nocomis biguttatus</i>	Abundant	X
River chub	<i>N. micropogon</i>	Common	
Golden shiner	<i>Notemigonus crysoleucas</i>	Common	
Emerald shiner	<i>Notropis atherinoides</i>	Common	
Ghost shiner	<i>N. buchanani</i>	Common	
Blacknose shiner	<i>N. heterolepis</i>	Uncommon	
Spottail shiner	<i>N. hudsonius</i>	Uncommon	
Silver shiner ³	<i>N. photogenis</i>	Uncommon	
Rosyface shiner	<i>N. rubellus</i>	Abundant	
Mimic shiner	<i>N. volucellus</i>	Abundant	
Pugnose minnow ³	<i>Opsopoeodus emiliae</i>	Rare	
Northern redbelly dace	<i>Phoxinus eos</i>	Abundant	

Common Name	Scientific Name	Abundance	Recorded in Fleming Creek ²
Bluntnose minnow	<i>Pimephales notatus</i>	Abundant	X
Fathead minnow	<i>P. promelas</i>	Abundant	X
Blacknose dace	<i>Rhinichthys atratulus</i>	Abundant	X
Longnose dace	<i>R. cataractae</i>	Common	
Creek chub	<i>Semotilus atromaculatus</i>	Abundant	X
Quillback	<i>Carpionodes cyprinus</i>	Uncommon	
White sucker	<i>Catostomus commersoni</i>	Abundant	X
Lake chubsucker ⁴	<i>Erimyzon sucetta</i>	Rare	
Northern hognose sucker	<i>Hypentelium nigricans</i>	Abundant	X
Bigmouth buffalo ³	<i>Ictiobus cyprinellus</i>	Rare	
Black buffalo ³	<i>I. niger</i>	Rare	
Spotted sucker	<i>Minytrema melanops</i>	Rare	
Silver redhorse	<i>Moxostoma anisurum</i>	Common	X
River redhorse ³	<i>M. carinatum</i>	Rare	
Black redhorse ⁴	<i>M. duquesnei</i>	Uncommon	
Golden redhorse	<i>M. erythrurum</i>	Abundant	X
Shorthead redhorse	<i>M. macrolepidotum</i>	Common	X
Greater redhorse	<i>M. valenciennesi</i>	Common	
Black bullhead	<i>Ameiurus melas</i>	Common	
Yellow bullhead	<i>A. natalis</i>	Common	X
Brown bullhead	<i>A. nebulosus</i>	Uncommon	
Channel catfish	<i>Ictalurus punctatus</i>	Common	
Stonecat	<i>Noturus flavus</i>	Abundant	
Tadpole madtom	<i>N. gyrinus</i>	Uncommon	
Brindled madtom	<i>N. miurus</i>	Rare	
Northern madtom ⁵	<i>N. stigmosus</i>	Rare	
Northern pike	<i>Esox lucius</i>	Common	
Muskellunge	<i>E. masquinongy</i>	Rare	
Central mudminnow	<i>Umbra limi</i>	Abundant	
Coho salmon	<i>Oncorhynchus kisutch</i>	Rare	
Rainbow trout	<i>O. mykiss</i>	Common	X
Chinook salmon	<i>O. tshawytscha</i>	Rare	
Brown trout	<i>Salmo trutta</i>	Uncommon	
Brook trout	<i>Salvelinus fontinalis</i>	Uncommon	
Trout-perch	<i>Percopsis omiscomaycus</i>	Uncommon	
Brook silverside	<i>Labidesthes sicculus</i>	Uncommon	
Brook stickleback	<i>Culaea inconstans</i>	Abundant	X
Mottled sculpin	<i>Cottus bairdii</i>	Uncommon	
White perch	<i>Morone americana</i>	Uncommon	
White bass	<i>M. chrysops</i>	Uncommon	
Rock bass	<i>Ambloplites rupestris</i>	Abundant	X
Green sunfish	<i>Lepomis cyanellus</i>	Abundant	X
Pumpkinseed	<i>L. gibbosus</i>	Abundant	X
Bluegill	<i>L. macrochirus</i>	Common	X
Longear sunfish	<i>L. megalotis</i>	Common	
Smallmouth bass	<i>Micropterus dolomieu</i>	Abundant	
Largemouth bass	<i>M. salmoides</i>	Abundant	X

Common Name	Scientific Name	Abundance	Recorded in Fleming Creek ²
White crappie	<i>Pomoxis annularis</i>	Common	
Black crappie	<i>P. nigromaculatus</i>	Uncommon	
Eastern sand darter ⁴	<i>Ammocrypta pellucida</i>	Uncommon	
Greenside darter	<i>Etheostoma blennioides</i>	Abundant	X
Rainbow darter	<i>E. caeruleum</i>	Uncommon	X
Iowa darter	<i>E. exile</i>	Common	
Fantail darter	<i>E. flabellare</i>	Abundant	X
Least darter	<i>E. microperca</i>	Common	X
Johnny darter	<i>E. nigrum</i>	Abundant	X
Yellow perch	<i>Perca flavescens</i>	Common	
Logperch	<i>Percina caprodes</i>	Common	X
Blackside darter	<i>P. maculata</i>	Abundant	
River darter	<i>P. shumardi</i>	Rare	
Sauger	<i>Sander canadensis</i>	Rare	
Walleye	<i>S. vitreus</i>	Uncommon	
Freshwater drum	<i>Aplodinotus grunniens</i>	Uncommon	
Round goby	<i>Neogobius melanostomus</i>	Rare	

¹ Source: www.thamesfishplan.ca

² Source: J. Schwindt, UTRCA, 2007, pers. comm.

³ Designated as a species of special concern federally by COSEWIC (2007), as well as provincially by COSSARO (OMNR, 2006).

⁴ Designated as a threatened species federally by COSEWIC (2007), as well as provincially by COSSARO (OMNR, 2006).

⁵ Designated as an endangered species federally by COSEWIC (2007), as well as provincially by COSSARO (OMNR, 2006).

2.10 Land Use

As indicated in Section 1.2, the proposed Rodney TS study area spans the municipal border between Chatham-Kent and West Elgin, with approximately 65% of the study area in Chatham-Kent.

Most of the study area lands in Chatham-Kent are zoned as “Agricultural Area” (Chatham-Kent, 2005). A land parcel located west of Duart Road, immediately to the north of the Hydro One ROW and extending to Spence Line, is zoned as “Extractive Industrial Area”.

Approximately 60% of the study area lands in West Elgin are designated as “Aggregate Resources” and the remainder as “Agricultural” (Community Planners Inc., 2006). Lands designated “Aggregate Resources” but not licensed for extraction may be zoned for agricultural purposes until such time as the lands are proposed to be licensed for aggregate and related activities. There are no licensed pits in the West Elgin portion of the study area, although licensed pits occur to the north and south.

Agriculture, primarily cash crop operations and livestock (particularly hog) production, is a significant land use in both municipalities (see Section 2.14). Aggregate resource deposits consist of sand and gravel with medium potential (Dillon, 2005).

Other land uses in the study area include the Hydro One transmission line, Highway 401 and municipal roads.

Proposed utility infrastructure can use any land or erect any building or structure in any land use designations in Chatham-Kent and West Elgin for the purpose of the public service in accordance with environmental requirements (Dillon, 2005; Community Planners Inc., 2006).

A number of woodlands occur within or extend into the proposed Rodney TS study area, including a number designated as significant (see Section 2.7).

The CLI (1969) categorizes the study area as Class 6 with low capability for outdoor recreation exhibiting cultural landscape patterns of agricultural interest; and affording opportunity for viewing of upland wildlife.

The Thames River is designated as a Canadian Heritage River based on its diverse recreational opportunities and rich cultural heritage.

2.11 Heritage Resources

Based on a Stage 1 Archaeological Assessment, Martelle (2007) concluded that the majority of properties within the proposed Rodney TS study area had high potential for the discovery of archaeological resources. As a result, a Stage 2 field assessment will be required for the Rodney TS site prior to construction.

2.12 Socio-Economic Characteristics

2.12.1 Chatham-Kent County

The western two-thirds of the proposed Rodney TS study area is located in Chatham-Kent County (Municipality of Chatham-Kent). With an area of approximately 2,492 km², Chatham-Kent County supports a population of 102,910 with 45,596 households (AMCTO, 2007).

Larger communities in Chatham-Kent include Blenheim (with a population of 4,870), Bothwell (1,002), Chatham (43,690), Dresden (2,572), Ridgetown (3,358), Thamesville (928), Tilbury (4,599), Wallaceburg (11,114) and Wheatley (1,606) (Chatham-Kent, 2007). The closest communities to the proposed Rodney TS study area are Highgate (155), Ridgetown, Bothwell and Thamesville, located approximately 2 km south, 9 km southwest, 11 km north and 11.5 km west, respectively.

Major private sector employers are International Truck & Engine Corp. (1,150 employees), Union Gas Limited (679), Autoliv Canada (600), YA Canada FasTrack Mail Processing Facility (500), Siemens VDO Automotive, Tilbury (480), YA Canada (480), Siemens VDO Automotive, Chatham (381) and Waltec Foundry (375) (Chatham-Kent, 2007). Major public sector employers are the Municipality of Chatham-Kent (1,800), Chatham-Kent Health Alliance (1,300), Lambton-Kent School Board (980), Southwestern Regional Centre (650) and St. Clair Catholic School Board (500).

Major employers in Bothwell are Harold Marcus Ltd. (truck transport), GWS Tube Forming Ltd., Comptank Corp. (tank trailers) and Bothwell Manufacturing (furniture). In Ridgetown, major

employers are Thyssen Krupp Fabco (automotive stampings and welding), KSR International (brake and clutch pedal modules) and the University of Guelph, Ridgetown Campus. Metaldyne Powertrain/NVH (transmission dampers) is a major employer in Thamesville.

Agriculture plays a significant role in Chatham-Kent's economy, with approximately 2,228 km² under cultivation and 2,352 farms grossing \$440 million annually. Chatham-Kent is Canada's largest producer of seed corn, tomatoes and sugar beets. Other major crops are soybeans and winter wheat. Swine farms are the most predominant livestock operations.

All essential services are available in Chatham-Kent. Police protection is provided by the Chatham-Kent Police Services deployed in four Patrol Districts based out of Chatham, Wallaceburg, Ridgetown and Tilbury (Chatham-Kent, 2007). The Western Detachment of the Ontario Provincial Police (OPP) in Chatham provides traffic patrol of the provincial highways. The Chatham-Kent Fire Department, with a front-line staff of approximately 400, operates two full-time, one composite and 16 volunteer fire stations, including stations in Bothwell, Ridgetown, Thamesville and Highgate.

Hospital services are provided by the Chatham-Kent Health Alliance, a partnership of Public General Hospital and St. Joseph's Hospital (now part of a shared campus with Public General Hospital) in Chatham, as well as Sydenham District Hospital in Wallaceburg. Emergency medical services (EMS) are provided by an independent contractor: Sun Parlour EMS-Chatham-Kent Division. The EMS fleet consists of 13 ambulances and one first response unit, with headquarters in Chatham and outlying bases in Thamesville, Blenheim, Wallaceburg, Tilbury and Ridgetown.

Lambton-Kent District School Board operates 53 elementary and 13 secondary public schools, whereas the St. Clair Catholic District School Board operates 30 elementary and three secondary separate schools. The Conseil scolaire de district écoles catholiques du Sud-Ouest operates four elementary and one secondary French language schools. Post-secondary education is provided by Ridgetown College in Ridgetown which is a satellite campus of the University of Guelph. The University of Windsor also offers classes at St. Clair College, Thames Campus, in Chatham. There are 12 libraries in Chatham-Kent County, including branches in Highgate, Ridgetown, Bothwell and Thamesville.

Commuter and passenger needs are served by Via Rail and Greyhound Bus. Aboutown Transportation provides regular municipal bus service within Chatham. Regional transportation is provided by Highway 401, with north-south access via Highway 40 to Highway 402. Chatham-Kent is serviced by three major railways: CP, CSX and CN North America (CN). The Chatham-Kent Municipal Airport offers chartered rental and instruction services, and provisions for corporate aircraft.

A full range of recreational, cultural and entertainment facilities and services are available in Chatham-Kent County. Municipal facilities include 92 athletic fields, 90 playgrounds, 27 tennis courts, 18 boat launches, ten arenas, nine outdoor and two indoor swimming pools, eight skateboard parks, five community and neighbourhood centres, and one stadium. Private facilities include ten golf courses and a number of marinas providing seasonal and overnight boating facilities. Eight beaches are located on the shores of Lake Erie and Lake St. Clair.

Cultural opportunities include the publicly owned Chatham Cultural Centre, which incorporates the Kiwanis Theatre, Thames Art Gallery, the Milner Heritage House, the Chatham-Kent Museum and the Ridge House Museum in Ridgetown. Other cultural facilities include Chatham's Historic Capital Theatre (scheduled to be open in 2007); Uncle Tom's Cabin Historic Site & Museum, the Buxton National Historic Site and Museum, and the Heritage Room managed by the Chatham-Kent Black Historical Society; RM Classic Car Exhibit in Blenheim; Fairfield Museum; and Wallaceburg & District Museum.

Shopping opportunities are provided by four and one shopping centres in Chatham and Wallaceburg, respectively, as well as farm markets in Blenheim, Chatham, Kent Bridge and Thamesville. There are a number of higher quality restaurants in Chatham and Wallaceburg, in addition to local and franchise establishments, including five each in Bothwell, Ridgetown and Thamesville. Accommodation is provided by 12 hotels/motels in Chatham (with over 700 rooms); two motels each in Blenheim (30 rooms), Ridgetown (51 rooms) and Wallaceburg (122 rooms); and one motel in Wheatley (13 rooms). In addition, there are 12 bed and breakfast (B&B) establishments, 12 cabin and cottage operations, and 15 campgrounds/ trailer parks.

2.12.2 Elgin County

The eastern one-third of the proposed Rodney TS study area is located in the Municipality of West Elgin in Elgin County. With an area of approximately 1,863 km², Elgin County includes seven other local municipalities: the City of St. Thomas, the Town of Aylmer, the Municipalities of Bayham, Central Elgin, Dutton-Dunwich, and the Townships of Malahide and Southwold. The population of Elgin County is 77,691 with 33,668 households (AMCTO, 2007).

There are over 1,500 businesses within Elgin County, with most located in the City of St. Thomas. Major employers in Elgin County are Ford Motor Company (2,805 employees), Sterling Truck Corporation (1,900), Magna International-Cosma Structural Systems Inc. (1,750), Formet Industries (1,000), St. Thomas/Central Elgin School Boards (1,103), St. Thomas-Elgin General Hospital (890), Presstran Industries (750), Regional Mental Health Care, St. Thomas (540), and City of St. Thomas (490).

Agriculture is a key economic sector in Elgin County supporting approximately 20% of the total workforce. Major staple crops are corn, wheat and beans. Livestock operations are also important in the County.

All essential services are available in Elgin County. Police protection in St. Thomas is provided by the St. Thomas Police Service, whereas the OPP, Elgin Department based in St. Thomas serves the remainder of Elgin County, with a satellite office in Dutton and a community policing office in Port Stanley. The St. Thomas Fire Department provides a comprehensive full-time professional fire protection service. Composite (professional/volunteer) Fire Services provide services to the remainder of Elgin County. The dispatching of calls for the Elgin County fire departments, previously the responsibility of the St. Thomas Fire Department was assumed by the Town of Tillsonburg in July 2007.

Hospital services are provided by the full-service St. Thomas-Elgin General Hospital in St. Thomas. Paramedical services in Elgin County are provided by Elgin-St. Thomas EMS which is operated under contract by Thames EMS Inc. The EMS fleet consists of six

ambulances and one first response unit operating out of two stations in St. Thomas, as well as stations in Aylmer, Rodney and Dutton.

The Thames Valley District School Board (TVDSB), which administers the City of London, Oxford County, Middlesex County and Elgin County, operates 93 elementary and 17 secondary public schools, of which 32 elementary and six secondary schools are located in Elgin County. The London District Catholic School Board, administering the same jurisdictions as the TVDSB, operates 48 elementary and eight secondary separate schools. Of these, eight elementary and one secondary separate schools are located in Elgin County. Post-secondary education is provided by the Fanshawe College St. Thomas/Elgin Campus in St. Thomas. The Elgin County Public Library located in St. Thomas has 11 community branches in Elgin County.

Commuter and passenger needs are serviced by Via Rail in London and Greyhound Bus between St. Thomas and London. St. Thomas Transit Services provides regular municipal bus services within St. Thomas. Regional transportation is provided by Highway 401 and major railways (CN, CP, CSX). St. Thomas Municipal Airport has the capacity to handle most corporate jets.

A full range of recreational, cultural and entertainment facilities and services are available in Elgin County, particularly in St. Thomas and Aylmer. Recreational facilities include arenas, a baseball complex, swimming pool, marinas, beaches, golf courses, community/neighbourhood centres, as well as numerous athletic fields and playgrounds.

Cultural opportunities include theatres (Elgin Theatre Guild, Port Stanley Festival Theatre), art galleries (St. Thomas-Elgin Public Art Centre) and museums (Elgin County Pioneer Museum, Elgin Military Museum, Port Burwell Marine Museum, Aylmer District Museum, among others), as well as a variety of festival events (Iron Horse Festival, Holiday Fantasy of Lights) and attractions (Port Stanley Terminal Rail, Pinafore Park, W.A. Allan Waterworks Park).

Shopping opportunities are provided by a variety of specialty gift and craft shops in the larger communities, as well as a farmers market and flea market in Aylmer. Higher quality restaurants occur in St. Thomas and Port Stanley, in addition to local and franchise establishments. Accommodation is provided by eight motels with over 200 rooms, as well as a number of B&B establishments, cabin/cottage operations and campgrounds/trailer parks.

2.12.3 Municipality of West Elgin

With an area of approximately 324 km², West Elgin supports a population of 5,223 with 2,451 households (AMCTO, 2007). It is estimated that 1,225 and 1,800 persons reside in, or adjacent to, the former villages of Rodney and West Lorne (Community Planners Inc., 2006). The remainder of the population resides in the smaller communities of Clachan, Eagle, Port Glasgow and New Glasgow, as well as throughout the rural area of the municipality.

With over 240 farms covering 62% of the municipality area, agriculture is the key economic mainstay in West Elgin, characterized primarily by cash crop and livestock operations. There are three commercial/industrial areas. Major employers are Dresden Industrial (brake pedal and door latches) in Rodney, as well as Erie Flooring and Wood Products and Milner-Rigsby Co. Ltd. (woodwork for trucks and semi-trailers) in West Lorne.

Police protection is provided by the OPP, Elgin Department at its satellite base in Dutton located to the east of Elgin County. The West Lorne Fire Department and Rodney Fire Department provide fire protection services based on volunteer firefighters.

Hospital services are provided by the full-service St. Thomas-Elgin General Hospital in St. Thomas, as well as a community health centre in West Lorne. Paramedical services are provided by Elgin-St. Thomas EMS with a station in Rodney.

There are two elementary and one secondary public schools, and one elementary separate school in West Elgin. A public library branch and community/recreation centre are located in both West Lorne and Rodney.

Recreational, cultural and entertainment facilities and services include a marina (Port Glasgow), two arenas, two swimming pools, several athletic fields, historic Rodney Jail, and West Lorne Portuguese Festivals. Accommodation is provided by one B&B establishment in West Lorne.

Various small-scale retail and service establishments in West Lorne and Rodney provide the basic needs of the communities and surrounding areas.

2.12.4 First Nations

The nearest First Nation reserve is the Moravian of the Thames (IR 47), located approximately 3 km northwest of the proposed Rodney TS study area.

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