Appendix A:

Supporting Information

APPENDIX A-1
Species at Risk in the NPSP Area

The Ontario Species at Risk List includes any native plant or animal that is at risk of extinction or of disappearing from the province. The list contains species that are Extirpated (EXP), Endangered (END), Threatened (THR) and Special Concern (SC). Extirpated species no longer exist in the wild in Ontario but still occur elsewhere. Endangered species face imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's ESA. Threatened species are at risk of becoming endangered in Ontario if limiting factors are not reversed. Special Concern Species have characteristics that make it sensitive to human activities.

The S_RANK column denotes whether a species is S1 (Critically Imperiled), S2 (Imperiled), S3 (Vulnerable), S4 (Apparently Secure), SH (Possibly Extirpated), SX (Presumed Extirpated), SNA (Not Applicable), and SU (Unrankable). When the letter B follows the rank, this is to denote that the species was found breeding.

Plants				
Scientific Name	**Common Name**	**Habitat**	**S_RANK**	**MNR_STATUS**
Arisaema dracontium	Green Dragon	damp deciduous forests and along streams	S3	SC
Betula lenta	Cherry Birch	moist, well-drained soils, but also found on coarse-textured or rocky shallow soils	S1	END
Castanea dentata	American Chestnut	deciduous forest communities	S2	END
Chimaphila maculata	Spotted Wintergreen	sandy habitats in dry-mesic oak-pine woods	S1	END
Cornus florida	Eastern Flowering Dogwood	understory or on the edges of mid-age to mature, deciduous or mixed forests	S2?	END
Cypripedium candidum	Small White Lady's-slipper	prairie openings in wooded grasslands	S1	END
Eurybia divaricata	White Wood Aster	open, dry, deciduous forests	S2	THR
Frasera caroliniensis	American Columbo	open deciduous forested slopes	S2	END
Gymnocladus dioicus	Kentucky Coffee-tree	open areas of floodplains and the edges of wetlands	S2	THR
Hibiscus moscheutos	Swamp Rose-mallow	open, coastal marshes, but it is also sometimes found in open wet woods, thickets and drainage ditches	S3	SC
Juglans cinerea	Butternut	deciduous stands, but large pure populations exist on certain flood plains	S3?	END
Justicia americana	American Water-willow	shorelines and sometimes in nearby wetlands, as well as along streams	S1	THR
Liparis liliifolia	Purple Twayblade	open oak savannah and secondary successional, deciduous or mixed forest	S2	END
Magnolia acuminata	Cucumber Tree	forest with openings, such as wet woods with scattered pools	S2	END
Morus rubra	Red Mulberry	moist forest habitats	S2	END
Phegopteris hexagonoptera	Broad Beech Fern	shady areas of beech and maple forests where the soil is moist or wet	S3	SC
Polygala incarnata	Pink Milkwort	open, mesic to dry mesic sand prairie	S1	END

Ptelea trifoliata	Common Hoptree	sandy soils in areas with a lot of natural disturbance	S3	THR
Quercus shumardii	Shumard Oak	open woodlots with a past history of grazing by dairy cattle, and along fencerows and roadsides	S3	SC
Smilax rotundifolia	Round-leaved Greenbrier	moist to wet shaded woodland habitats	S2	THR
Trillium flexipes	Drooping Trillium	dry, sandy loam, non-acidic soils of mature, deciduous woodlands that are usually associated with watercourses	S1	END
Vaccinium stamineum	Deerberry	dry open woods	S1	THR
Viola pedata	Bird's-foot Violet	Black Oak savannahs within deciduous forests	S1	END

Mosses				
Scientific Name	**Common Name**	**Habitat**	**S_RANK**	**MNR_STATUS**
Bryoandersonia illecebra	Spoon-leaved Moss	soil that is in or near flat, low-lying, seasonally wet areas	S1	END

Birds				
Scientific Name	**Common Name**	**Habitat**	**S_RANK**	**MNR_STATUS**
Ammodramus henslowii	Henslow's Sparrow	open fields	SHB	END
Asio flammeus	Short-eared Owl	extensive stretches of relatively open habitat	S2N,S4B	SC
Charadrius melodus	Piping Plover	sandy or gravelly beaches, gravel shores of shallow, saline lakes and on sandy shores of larger prairie lakes	S1B	END
Chlidonias niger	Black Tern	marshes along the edges of the Great Lakes	S3B	SC
Colinus virginianus	Northern Bobwhite	open habitats that provide a mixture of grasslands, croplands and brush	S1	END
Dendroica cerulea	Cerulean Warbler	mature deciduous forests	S3B	SC
Empidonax virescens	Acadian Flycatcher	large areas of mature undisturbed forest	S2S3B	END
Falco peregrinus	Peregrine Falcon	open habitats such as wetlands, tundra, savanna, sea coasts and mountain meadows	S3B	THR
Haliaeetus leucocephalus	Bald Eagle	n/a	S1S2N,S4B	END
Icteria virens	Yellow-breasted Chat	successional habitats of thick shrubbery	S2B	SC
Ixobrychus exilis	Least Bittern	Ixobrychus exilis	S4B	THR
Lanius ludovicianus	Loggerhead Shrike	open ranges with occasional trees and shrubs	S2B	END
Protonotaria citrea	Prothonotary Warbler	deciduous swamp forests or riparian floodplain forests	S1B	END
Seiurus motacilla	Louisiana Waterthrush	mature forests along steeply sloped ravines adjacent to running water	S3B	SC
Tyto alba	Barn Owl	low-elevation, open country	S1	END
Wilsonia citrina	Hooded Warbler	mature hardwood forests with tall trees and a well-closed canopy	S3B	THR

Mammals				
Scientific Name	**Common Name**	**Habitat**	**S_RANK**	**MNR_STATUS**
Microtus pinetorum	Woodland Vole	deciduous forests in areas of soft, friable, often sandy soil beneath deep humus	S3?	SC
Taxidea taxus	American Badger	Open habitats, whether natural (grasslands) or man-made (agricultural fields, road right-of-ways, golf courses)	S2	END
Urocyon cinereoargenteus	Common Gray Fox	deciduous forests and marshes	SNA	THR

Molluscs				
Scientific Name	**Common Name**	**Habitat**	**S_RANK**	**MNR_STATUS**
Pleurobema sintoxia	Round Pigtoe	small to large rivers	S1	END
Ptychobranchus fasciolaris	Kidneyshell	small to medium-sized rivers and streams	S1	END

Reptiles				
Scientific Name	**Common Name**	**Habitat**	**S_RANK**	**MNR_STATUS**
Apalone spinifera	Spiny Softshell	marshy creeks, swift-flowing rivers, lakes, impoundments, bays, marshy lagoons, ditches and ponds near rivers	S3	THR
Crotalus horridus	Timber Rattlesnake	forested areas with rocky outcrops	SX	END
Elaphe obsoleta pop. 2	Eastern Ratsnake - Carolinian Population	wooded areas, although they may be found in meadows and fields	S1	THR
Emydoidea blandingii	Blanding's Turtle	lakes, permanent or temporary pools, slow-flowing streams, marshes and swamps	S3	THR
Eumeces fasciatus pop. 1	Five-lined Skink - Carolinian Population	rocky outcrops, dunes, fields, and deciduous forests	S2	SC
Graptemys geographica	Northern Map Turtle	lakes and rivers	S3	SC
Lampropeltis triangulum	Milksnake	rural areas, prairies, pastures, and hayfields, to rocky hillsides and a wide variety of forest types	S3	SC
Sistrurus catenatus	Massasauga	different habitats across their range — from tall grass prairie to cedar bogs to shorelines	S3	THR
Sternotherus odoratus	Stinkpot	shallow water	S3	THR
Thamnophis sauritus	Eastern Ribbonsnake	edges of shallow ponds, streams, marshes, swamps, or bogs bordered by dense vegetation that provides cover	S3	SC

Amphibians				
Scientific Name	**Common Name**	**Habitat**	**S_RANK**	**MNR_STATUS**
Ambystoma jeffersonianum	Jefferson Salamander	deciduous forests with suitable breeding areas like limestone sinkhole ponds, kettle ponds and other natural basins	S2	THR
Bufo fowleri	Fowler's Toad	sand dune and lake shore habitats	S2	THR
Desmognathus fuscus	Northern Dusky Salamander	streams in the Niagara Gorge	S1	END

Desmognathus ochrophaeus	Allegheny Mountain Dusky Salamander	forested brooks, mountain cascades, springs, or seeps	S1	END
Gyrinophilus porphyriticus	Spring Salamander	cool, clear streams in forested mountain regions	SX	EXP

Fish				
Scientific Name	**Common Name**	**Habitat**	**S_RANK**	**MNR_STATUS**
Clinostomus elongatus	Redside Dace	pools and slow flowing areas of small headwater streams	S2	THR
Coregonus kiyi	Kiyi	deep waters of large, freshwater lakes	S3?	SC, EXT
Erimyzon sucetta	Lake Chubsucker	heavily vegetated, stagnant bays, channels, ponds and swamps.	S2	THR
Ictiobus cyprinellus	Bigmouth Buffalo	bottom of shallow lakes, ponds, pools of large streams and man-made impoundments	SU	SC
Moxostoma carinatum	River Redhorse	moderate to large rivers	S2	SC
Notropis photogenis	Silver Shiner	moderate to large, deep, relatively clear streams	S2S3	SC

Appendix A-2
Climate Stations
Assessment Report

Station ID	Environment Canada Station Name	Latitude	Longitude	Elevation (mASL)	Monitoring Period (Start/End/Years)			Temperature/ Precipitation	Temperature/ Wind/ Humidity/ Pressure	Snow Depth
Current within NPCA SWP Region										
6132470	FORT ERIE	42.88	-78.97	180	1966	2006	40	X		X
6135657	NIAGARA FALLS NPCSH	43.13	-79.05	175	1980	2006	26	X		X
6136606	PORT COLBORNE	42.88	-79.25	175	1964	2006	42	X		X
613F606	PORT COLBORNE (AUT)	42.87	-79.25	184	1994	2006	12		X	
6136699	PORT WELLER (AUT)	43.25	-79.22	79	2003	2006	3		X	
6137161	RIDGEVILLE	43.05	-79.33	236	1950	2006	56	X		
6137287	ST CATHARINES A (AUT)	43.20	-79.17	97.8	1971	2006	35		X	
6137306	ST CATHARINES POWER GLEN	43.12	-79.25	122	1965	2006	41	X		
6139148	VINELAND STATION RCS (AUT)	43.17	-79.40	79	2002	2006	4		X	
6139445	WELLAND	43.00	-79.27	175	1872	2006	134	X		X
6139449	WELLAND - PELHAM (AUT)	42.97	-79.32	178	2005	2006	1		X	
6153194	HAMILTON A (AUT)	43.17	-79.93	238	1959	2006	47		X	
Current within 10 km of NPCA SWP Region										
6150060	ALBERTON	43.18	-80.05		1994	2006	12	X		X
6153301	HAMILTON RBG CS (AUT)	43.28	-79.90		2002	2006	4		X	
Historic (at least 15 years of data) within NPCA SWP Region										
6139145	VINELAND STATION	43.18	-79.39	79	1924	1988	64	X		X
6139143	VINELAND RITTENHOUSE	43.17	-79.42	95	1965	2001	36	X		
6139142	VINELAND BALLS FALLS	43.13	-79.38	145	1974	1994	20	X		X
6137301	ST CATHARINES CDA	43.18	-79.23	99	1928	1964	36	X		X
6137285	ST CATHARINES	43.20	-79.25	91	1882	1995	113	X		X
6136626	PORT DALHOUSIE	43.18	-79.27	91	1874	1996	122	X		X
6136607	PORT COLBORNE LIGHT	42.87	-79.25	175	1966	1984	18	X		
6135660	NIAGARA FALLS ONT HYDRO	43.08	-79.08	198	1921	1972	51	X		
6135638	NIAGARA FALLS	43.13	-79.08	183	1902	1995	93	X		X
6133057	GRIMSBY ROCK CHAPEL	43.18	-79.58	198	1914	1966	52	X		
6133047	GRIMSBY	43.20	-79.57	91	1910	1985	75	X		X
6132435	FONTHILL	43.03	-79.30	236	1945	1969	24	X		
6131165	CANBORO	42.97	-79.58	183	1946	1971	25	X		

Appendix A-2
Climate Stations
Assessment Report

Station ID /CODE	Regional Niagara Station Name	Easting	Northing	Station Name	Monitoring Period (Start/End/Years)			Precipitation	Temperature/ Wind/ Velocity/ Humidity	-
PRE1/3075	Ontario Road SPS - Welland	644719	4759494	SWEL	1991	2006	15	X		
PRE2/3071	Pelham Municipal Offices	639749	4767184	PELH	1991	2006	15	X		
PRE3/3073	Smithville SPS - West Lincoln	618745	4772310	SMIT	1991	2006	15	X		
PRE4/3076	Victoria SPS - Lincoln	630221	4782700	VICT	1991	2006	15	X		
PRE5/3068	Jordan Yard - Lincoln	632726	4778333	JORD	1991	2002	11	X (INACTIVE)		
PRE6/3064	Port Dalhousie WWTP Station #1	641358	4784695	DALHOUS	1991	2006	15	X (INACTIVE)		
PRE7/3066	Garrison Village SPS - NOTL	654236	4790669	GARR	1994	2006	12	X		
PRE8/3074	Niagara Falls WWTP	655818	4776328	STAN	1991	2006	15	X		
PRE9/3063	Niagara Falls WTP	658512	4769579	CHIP	1991	2006	15	X		
PRE10/3065	DeCew Falls WTP - S.Catharines	641304	4774704	DECE	1991	2006	15	X		
PRE11/3069	Kalar Road SPS - Niagara Falls	651672	4774761	KALA	1991	2006	15	X		
PRE12/3067	Industrial Park - Fort Erie	668102	4754329	INDP	1990	2006	16	X		
PRE14/3080	Seaway - Port Colborne	642722	4751903	PORT/SEAW	1991	2006	15	X		
PRE15/3078	Garner Road - Niagara Falls	650930	4767962	GARN	2001	2006	5	X		
PRE16/3077	Welland WWTP	643649	4763214	WELL	1991	2006	15	X		
PRE17	Humberstone Landfill - Welland	640766	4758039	-	2002	2006	4	X		
PRE18/3070	South Side Highlift - Niagara Falls	653276	4769623	MCLE	1991	2006	15	X		
PRE19	Port Dalhousie WWTP Station #2	641242	4784555	PortD	2006	2006	1	X		
PRE20	Reg. Rd 12 Landfill - West Lincoln	616508	4776894	-	2002	2006	4	X		
PRE21/3061	Baker Road WWTP - Grimsby	618969	4783360	BAKE	1990	2006	16	X		
PRE22/3062	Biggar Lagoon - Grimsby	612540	4785483	BIGG	1994	2001	7	X (INACTIVE)		
CLI1/3067	Industrial Park - Fort Erie	668113	4754335	INDP	1990	2006	16		X	
CLI2/3080	Seaway WWTP - Port Colborne	642702	4751864	SEAW	2002	2006	4		X	
CLI3	Humberstone Landfill - Welland	640766	4758013	-	2002	2006	4		X	
CLI4/3077	Welland WWTP - Welland	643699	4763217	WELL	1991	2006	15		X	
CLI5	Reg. Rd 12 Landfill - West Lincoln	616497	4776895	-	2002	2006	4		X	
CLI6/3061	Baker Road WWTP - Grimsby	618992	4783324	BAKE	1990	2006	16		X	
CLI7/3070	South Side Highlift - Niagara Falls	653308	4769625	MCLE	1991	2006	15		X	
CLI8/3078	Garner Road - Niagara Falls	650930	4767947	GARN	2001	2006	5		X	
CLI9	Port Dalhousie WWTP	641246	4784541	PortD	2006	2006	1		X	

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Climate Stations
Assessment Report

Station ID /CODE	Regional Niagara Station Name	Easting	Northing	Station Name	Monitoring Period (Start/End/Years)			Precipitation	Temperature/ Wind/ Velocity/ Humidity	-
	Crystal Beach WWTP	658689	4747289	-	2006	2006	1	X		
	Lincoln Town Hall	624750	4782821	-	2006	2006	1	X		
	Douglas Town SPS	661300	4759250	DOUG	1996	1997	1	X (INACTIVE)		
	Nigh Rd SPS	658580	4750660	NIGH	1996	1997	1	X (INACTIVE)		
	Lincoln Ontario Street SPS	623670	4783260	ONTA	1996	1997	1	X (INACTIVE)		

Station ID	Ontario Weather Network Station Name	Latitude	Longitude	Elevation (mASL)	Monitoring Period (Start/End/Years)			Wind Speed/ Direction	Precipitation Rate/ Dew Point/ Temperature
NAWN 1	Niagara Parkway	43.23	-79.07	93	1995	2006	11		X
NAWN 2	NOTL Queenston	43.17	-79.06	108	1995	2006	11		X
NAWN 3	NOTL Virgil	43.20	-79.13	93	1995	2006	11	X	X
NAWN 4	Niagara College	43.15	-79.17	120	2000	2006	6		X
NAWN 5	NOTL Virgil - Lakshore	43.25	-79.14	82	1995	2006	11		X
NAWN 6	West St.Catharines	43.12	-79.28	121	1995	2006	11		X
NAWN 7	Jordan Hwy 8	43.14	-79.36	101	1995	2006	11		X
NAWN 8	Jordan Escarpment	43.12	-79.36	163	1995	2006	11		X
NAWN 9	Vineland Cherry Ave.	43.17	-79.42	-	1995	2006	11		X
NAWN 10	Vineland Escarpment	43.15	-79.91	157	1995	2006	11		X
NAWN 11	Beamsville	43.15	-79.47	154	1995	2006	11		X
NAWN 12	Grimsby	-	-	-	1995	2006	11		X
NAWN 13	Winona	43.21	-79.64	90	1995	2006	11	X	X

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Climate Stations
Assessment Report

Station ID	Station Name	Latitude	Longitude	Elevation (mASL)	Monitoring Period (Start/End/Years)			Wind/ Dew Point	Precipitation	Temp
-	Pelham - St. Catharines	-	-	-	-	-	>10		X	
-	Merriton - St. Catharines	-	-	-	-	-	>10		X	
-	City Hall - St. Catharines	-	-	-	-	-	>10	X	X	X
-	Linwell - St. Catharines	-	-	-	-	-	>10		X	
-	Greenhouse - St. Catharines	-	-	-	-	-	>10		X	
27011	Allanburg (Hwy58) - MOE	43.07	-79.18	-	1981	2006	25	X		X
-	Thorold - MTO	-	-	-	-	-	-	X	X	X
-	Homer Patrol Yard (QEW) - MTO	-	-	-	-	-	-	X	X (Rate)	X

Station ID	Station Name	Latitude	Longitude	Elevation (mASL)	Monitoring Period (Start/End/Years)			Wind/ Dew Point	Precipitation	Temp
-	Beamsville - LUFFT RWIS	-	-	-	-	-	-	X	X	X
-	Mount Hope Airport - Hamilton City	-	-	220	-	-	-	X	X (Rate)	X

Notes: AUT - Environment Canada 1 hour interval data, except ST CATHARINESA which runs from 5am to 9pm daily
Latitude and Longitude from Environment Canada Website Climate Data on-line
Regional Niagara datasets are as paper reports prior to 1992 and data extents do not account for hiatuses
Easting and Northings in North American Datum 1983
mASL - metres above sea level PRE - Precipitation Station CLI - Climate Station

Appendix A-3
Surface Water Gauges
Assessment Report

Station Name	ID	Agency	Record Start	Record End [1]	Record Length (years) [2]	Easting (mNAD83)	Northing (mNAD83)	Type	Comments
LAKE ERIE									
Port Colborne	02HA017	EC	1911	Current	95	642700	4748359	Water Level	Nat-RC
BIG FORKS CREEK									
Wainfleet	02HA026	EC	1989	1993	4	632064	4756410	Flow	Reg-RC
			1996	1998	2			Flow	Reg-RC-U
OSWEGO CREEK									
Canboro	02HA024	EC/MNR/NPCA	1988	2001	13	607752	4760695	Flow	Nat-RC
			2002	Current	4			Flow/Level	Nat-RC
WELLAND RIVER									
Mount Hope	02HA015	EC	Feb-80	Jun-87	7	585550	4780293	Flow	Nat-RC
Binbrook Dam/Lake Niapenco	02HANPCA01	NPCA	1972	Current	34	595545	4772920	Flow/Level	Reg-MD
Binbrook - Trimble Road	02HA021	EC	1988	1993	5	597754	4771787	Water Level	Nat-RC
Southbrook Golf Course	02HANPCA02	NPCA	2005	Current	1	596734	4772207	Level	RC
Caistor Corners	02HA007	EC/MNR/NPCA	Jul-57	1968	11	612615	4764158	Flow	Reg-MC/S
			1969	2001	32			Flow	Reg-RC
			2002	Current	4			Flow/Level	Reg-RC
Wellandport	02HA028	EC	1991	1993	2	623680	4762487	Flow	RC
			1996	1998	2			Flow	RC-U
Welland Canal (Siphon)	02HA025	EC/MNR/NPCA	1989	1993	4	642480	4761594	Water Level	RC
THREE MILE CREEK									
Mount Hope	02HA016	EC	Feb-80	Jun-87	7	588650	4779839	Flow	Nat-RC
TWENTY MILE CREEK									
Smithville	02HA020	EC/MNR/NPCA	1986	2001	20	616651	4774654	Flow	Nat-RC
			2002	Current	4			Flow/Level	Nat-RC
Balls Falls	02HA006	EC/MNR/NPCA	1957	1966	9	631494	4776905	Flow	Nat-MC
			1967	2001	34			Flow	Nat-RC
			2002	Current	4			Flow/Level	Nat-RC
TWELVE MILE CREEK									
St.Johns Branch	02HANPCA04	NPCA	2004	Current	2	639802	4771002	Level	Nat-RC
Effingham Branch	02HANPCA03	NPCA	2004	Current	2	638305	4771189	Level	Nat-RC
Power Glen	02HA031	EC	2005	Current	1	640353	4775026	Level	-
WALKERS CREEK									
St. Catharines	02HA027	(EC)/NPCA	Jan-91	Apr-95	4	643901	4786307	Flow	Nat-RC
WELLAND CANAL									
Port Colborne	02HA019	EC	1860	Current	146	645476	4756805	Flow	Reg-MC
FOUR MILE CREEK									
Virgil	02HA030	EC/NPCA	2005	Current	1	653285	4784271	Level	RC
LAKE ONTARIO									
Port Weller	02HA018	EC	1929	Current	77	644555	4788660	Water Level	Nat-RC
BLACK CREEK									
Stevensville	02HA029	EC	1991	1993	2	659720	4756567	Flow	Nat-RC
		NPCA	2006	Current	<1			Level	
NIAGARA RIVER									
Below IBM 35	02HA012	EC	1969	1984	15	670212	4752282	Water Level	Reg-RS-U
Above Peace Bridge	02HA011	EC	1967	1977	10	670659	4752540	Water Level	Reg-RC-U
Below Peace Bridge	02HA008	EC	1967	1973	6	670701	4753130	Water Level	Reg-RS-U
			1974	1985	11				Reg-RC-U
			1999	Current	7				Reg-RC
Fort Erie Pumphouse	02HA009	EC	1967	1973	6	670262	4754814	Water Level	Reg-RC-U
			1974	1975	2				Reg-RS-U
Fort Erie Customs Dock	02HA013	EC	1971	1972	2	670208	4755183	Water Level	Reg-RS-U
			1973	1985	12				Reg-RC-U
Bayer's Creek	02HA010	EC	1967	1971	4	660551	4763685	Water Level	Reg-RS-U
Queenston	02HA003	EC	1860	Current	146	658764	4780094	Flow	Reg-PC

Notes:
EC - Environment Canada, MNR - Ministry of Natural Resources, NPCA - Niagara Peninsula Conservation Authority
Nat - Natural Flow, Reg - Regulated Flow, R - Recording Gauge, M - Manual Gauge, C - Continuous Operation, S - Seasonal Operation, P - Power Plant
D - Daily, U - Unpublished
1 - Current implies data collection to end of 2006
2 - Minor data interruptions may not be captured in this summary
NAD83 - North American Datum 1983

Addition stations exist, preliminary information is listed below:
St. Lawrence Seaway Management Corporation operates two water level stations on the Welland Canal
Ontario Power Generation measures flows coming from the Decew Falls Power Generating Station
The City of St.Catharines also measures water level at the Martindale Pond and flows at the Heywood Power Generating Station

Appendix A-4
NPSP Area Dam Inventory

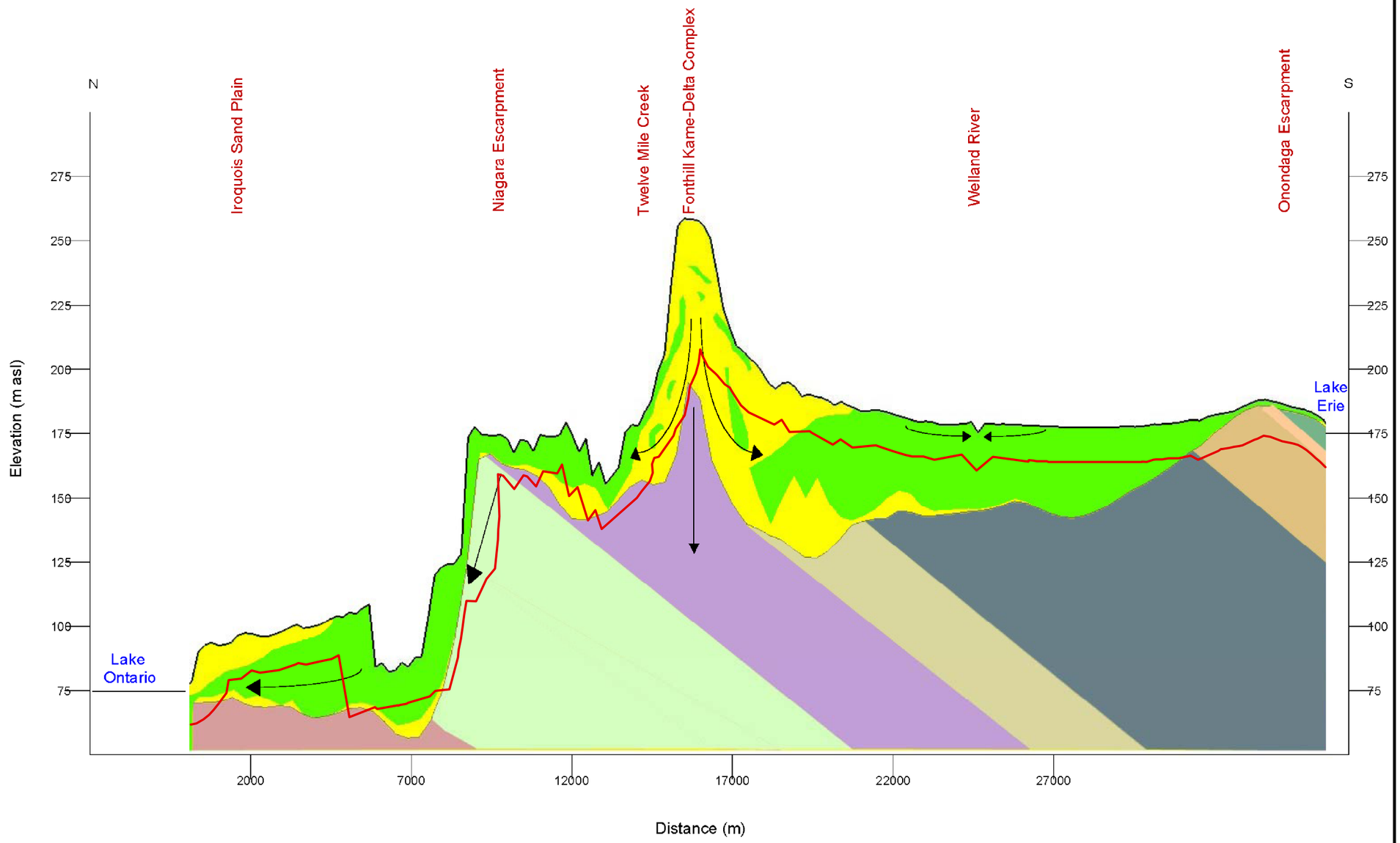
Waterbody	DamType	Purpose	OutletType	Length_m	Height_m	Township
Coyle Creek	Earthfill embankment	Water supply-Agricultural Irrigation	Pipe, Conduit, Culvert	10	1.5	Pelham
Mill Race Creek	Concrete Gravity	Water supply-Agricultural Irrigation	Controlled spillway (steel gates)	7	1.5	Wainfleet
Thompsons Creek	Concrete Arch	Monitoring Station	Controlled spillway (steel gates)	8	2	Niagara Falls
Four Mile Creek	Concrete Butress	Aesthetics	Controlled spillway (stop logs)	7	2.5	NOTL
Richardson Creek	Earthfill embankment	Aesthetics/Agricultural Irrigation	Uncontrolled spillway	40	2	St. Catharines
Richardson Creek	Earthfill embankment (dyke)	Aesthetics/Agricultural Irrigation	N/A	100	3	St. Catharines
Richardson Creek	Concrete Butress	Aesthetics	Uncontrolled spillway	8	3	St. Catharines
Sixteen Mile Creek	Concrete Weir	Aesthetics	Uncontrolled spillway	10	1.5	Lincoln
Sixteen Mile Creek	Earth and Rock filled dam	Aesthetics	Uncontrolled spillway + Pipe	10	4	Lincoln
Eighteen Mile Creek	Earthfill embankment		Pipe, Conduit, Culvert	20	2.6	Lincoln
Gavora Ditch	Earthfill embankment	Aesthetics	Uncontrolled spillway	4	2	Lincoln
Four Mile Creek	Earthfill embankment conc. spillway	Water supply-Agricultural Irrigation	Controlled spillway (steel gates)	95	4	NOTL
Four Mile Creek	Earthfill embankment conc. spillway	Water supply-Agricultural Irrigation	Controlled spillway (steel gates)	125	2.5	NOTL
Beaver Dam Creek	Earthfill embankment (dyke)	Water Management	Pipe, Conduit, Culvert	300	2	Thorold
Lake Gibson	Timber and steel sheet piling	Waterpower (old mill)	Controlled spillway (steel gates)	18	2.5	St. Catharines
Upper Twelve Mile Creek	Earthfill embankment	Aesthetics	Uncontrolled spillway (free running)	30	7	Pelham
Upper Twelve Mile Creek	Earthfill embankment	Use of road (dyke)	Uncontrolled spillway (free running)	200	4.5	Pelham
Upper Twelve Mile Creek	Earthfill embankment	Use of road (dyke)	Uncontrolled spillway (free running)	150	3	Pelham
Upper Twelve Mile Creek	Earthfill embankment	Conservation	Pipe, Conduit, Culvert	64.7	3.7	Pelham
Upper Twelve Mile Creek	Concrete Gravity	Aesthetics	Uncontrolled spillway (free running)	10	1.5	Pelham
Mud Lake	Steel Sheet Piling	Conservation/Wetland Preservation	Pipe, Conduit, Culvert	4	4	Port Colborne
Twenty Mile Creek	Steel Sheet Piling	Water supply-Historical site	Controlled spillway (stop logs)	19.2	1.62	Lincoln
Shriners Creek	Earthfill embankment	Flood Control	Pipe, Conduit, Culvert	61	2.3	Niagara Falls
Shriners Creek	Earthfill embankment	Flood Control	Pipe, Conduit, Culvert	45.7	2.3	Niagara Falls
Shriners Creek	Earthfill embankment	Flood Control	Pipe, Conduit, Culvert	85	3.5	Niagara Falls
Shriners Creek	Earthfill	Flood Control	Pipe, Conduit,	90	2.5	Niagara

	embankment		Culvert			Falls
Fifteen Mile Creek	Concrete Gravity	Recreation-Cottage (campground)	Controlled spillway (stop logs)	3.8	1	Pelham
Welland River	Earthfill embankment	Recreation-Cottage (campground)	Pipe, Conduit, Culvert	100	4	Wainfleet
Unnamed Creek	Concrete Gravity	Water supply-Agricultural Irrigation	Uncontrolled spillway (free running)	10	2	Hamilton
Sixteen Mile Creek	Concrete Butress	Aesthetics	Uncontrolled spillway (free running)	8	1.5	West Lincoln
Fifteen Mile Creek	Earthfill embankment	Water supply-Agricultural Irrigation	Pipe, Conduit, Culvert	20	3	Pelham
Twenty Mile Creek	Earthfill embankment	Stormwater Management	Pipe, Conduit, Culvert	15	1.5	Hamilton
West Wolf Creek	Gabion baskets, steel sheets	Aesthetic/Minor Irrigation	Uncontrolled spillway (free running)	10	1.2	Hamilton
Welland River	Earthfill embankment	Stormwater Management	Hickenbotton	15	1.5	Hamilton
Welland River	Earthfill embankment	Conservation/Wildlife Habitat	16" gate valve	35	3.5	Hamilton
Welland River	Earthfill embankment	Flood control/Flow augmentation	Gate valves, morning glory inlet	1158	11.3	Hamilton

Appendix A-5

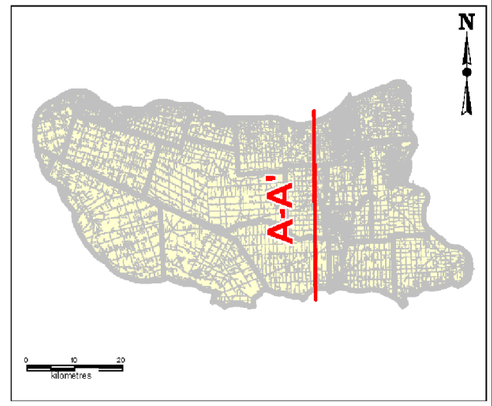
NPCA Groundwater Study

Section A-A'
Vertical Exaggeration: 80



Legend

- Glaciolacustrine (fine)
- Lacustrine (coarse)
- Queenston Formation
- Clinton Group
- Lockport Formation
- Guelph Formation
- Salina Formation
- Bertie Formation
- Bois Blanc Formation
- Onondaga Formation
- Interpreted Groundwater Flow Directions
- 15m Below Ground Level



Disclaimer: This map is intended for illustrative purposes only. This figure is to be read in conjunction with the Niagara Peninsula Conservation Authority Groundwater Study

Digital Mapping Sources: Base Mapping features - Ministry of Natural Resource
Water Well Information: Ministry of the Environment.

Date: February, 2005

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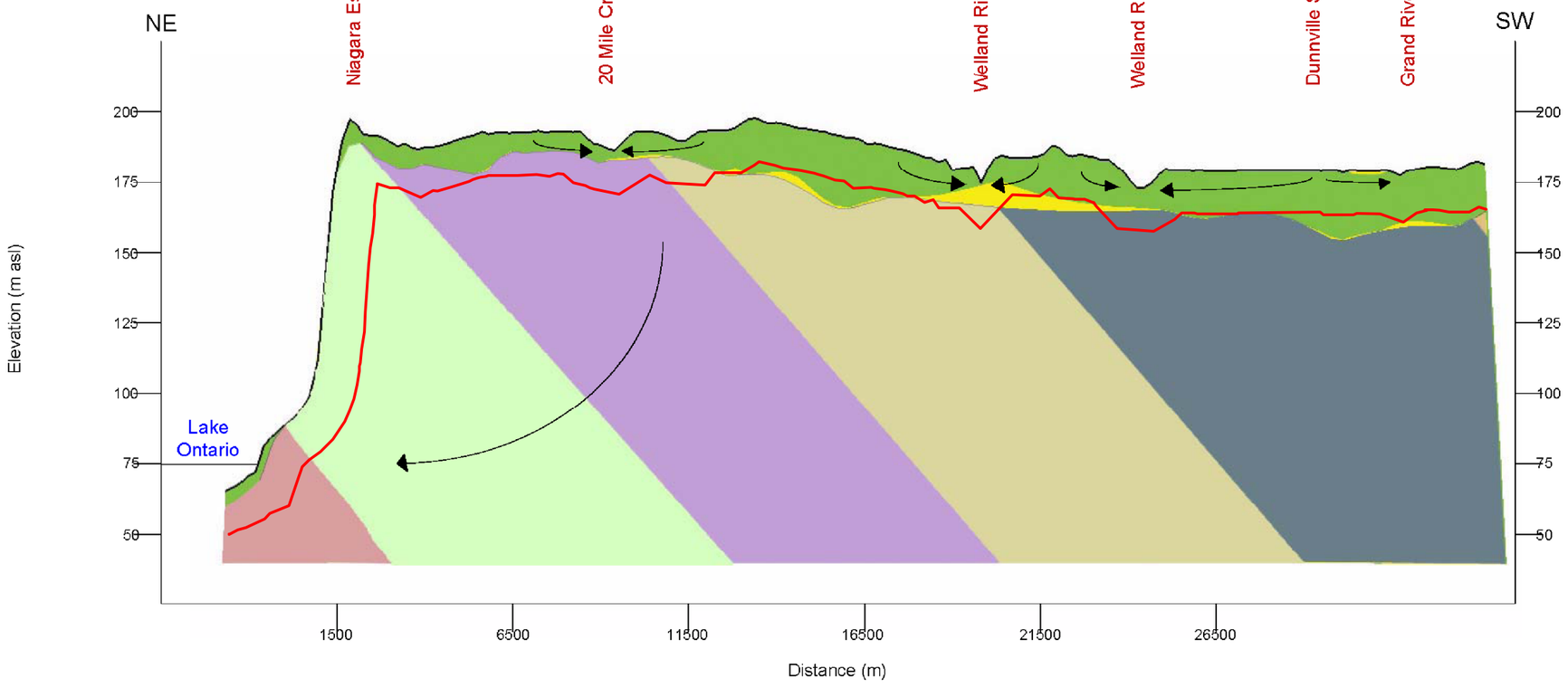
Figure 2-53: Regional Conceptual Model (A-A')

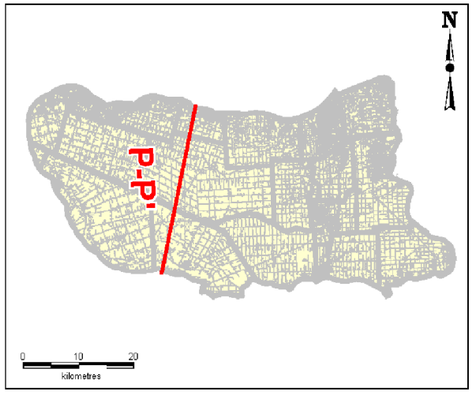
Section P-P'
Vertical Exaggeration: 80



NPCA Groundwater Study

Legend

- Glaciolacustrine (fine)
- Lacustrine (coarse)
- Queenston Formation
- Clinton Group
- Lockport Formation
- Guelph Formation
- Salina Formation
- Bertie Formation
- Bois Blanc Formation
- Onondaga Formation
- Interpreted Groundwater Flow Directions
- 15m Below Ground Level



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Digital Mapping Sources: Base Mapping features - Ministry of Natural Resource
Water Well Information: Ministry of the Environment.

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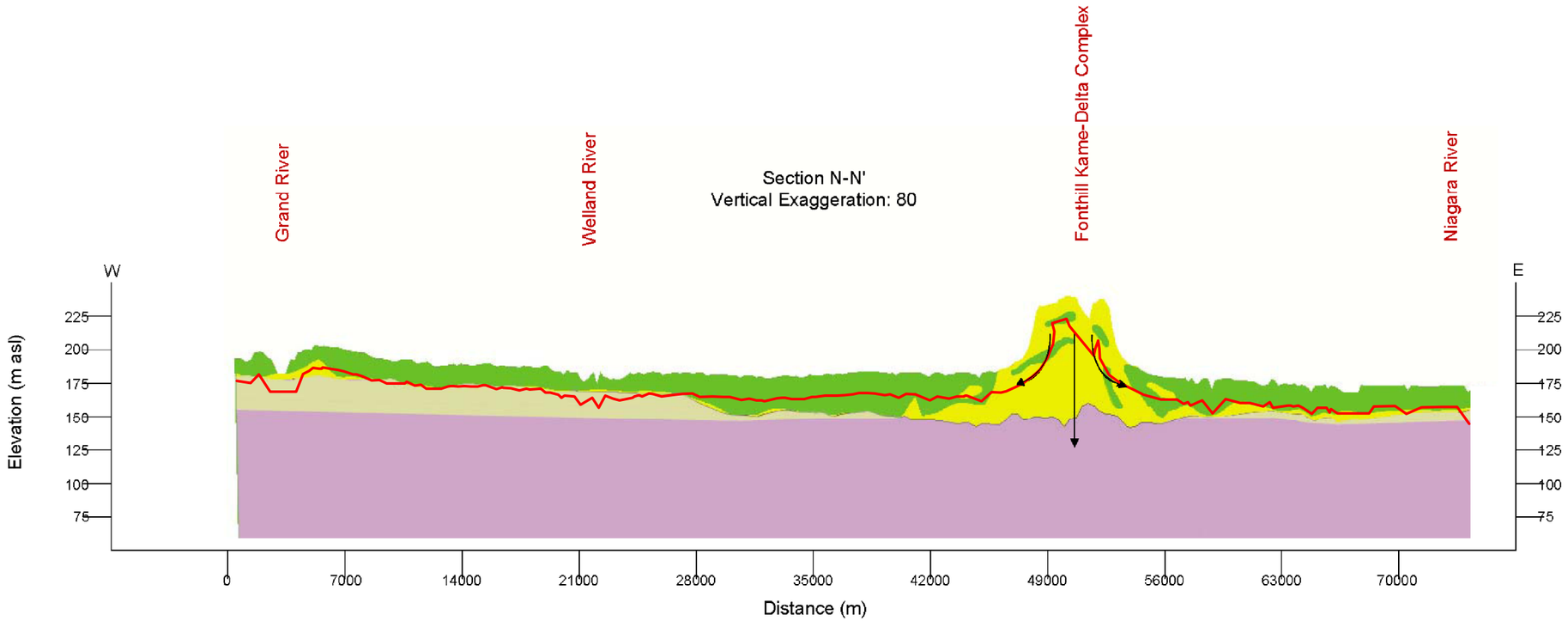
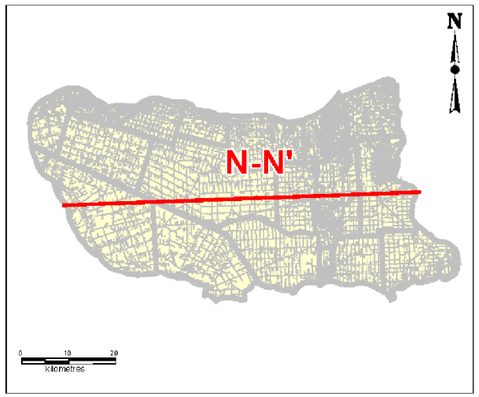
Figure 2-54: Regional Conceptual Model (P-P')



NPCA Groundwater Study

Legend

- Glaciolacustrine (fine)
- Lacustrine (coarse)
- Queenston Formation
- Clinton Group
- Lockport Formation
- Guelph Formation
- Salina Formation
- Bertie Formation
- Bois Blanc Formation
- Onondaga Formation
- Interpreted Groundwater Flow Directions
- 15m Below Ground Level



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Digital Mapping Sources: Base Mapping features - Ministry of Natural Resource
Water Well Information: Ministry of the Environment.

Date: February, 2005

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Figure 2-55: Regional Conceptual Model (N-N')

TABLE A.6
MINISTRY OF THE ENVIRONMENT NPSP AREA PERMIT TO TAKE WATER DATABASE
ASSESSMENT REPORT

Ministry of the Environment Information									NPSP AREA ANALYSIS PARAMETERS					
Permit_Number	MOE Taking_Type	Source_Name	Major_Category	Specific_Purpose	Max (L/Day)	Max (Day/Year)	Max (Hours/Day)	Max (L/min)	WSPA	Source	In_Analysis	GW_Ratio	SW_Ratio	Comments
2073-6GHNKT	Surface and Ground Water	Old Welland Canal	Commercial	Golf Course Irrigation	2600000	183	24	1777	BDSC	SW	Yes	0	-0.5	Positive addition from Welland Canal Great Lakes source, property partially BDSC
2073-6GHNKT	Surface and Ground Water	Pond 1	Commercial	Golf Course Irrigation	2000000	183	6	5455	BDSC	GW	Yes	0.2	0	
2073-6GHNKT	Surface and Ground Water	Pond 2	Commercial	Golf Course Irrigation	2000000	183	6	5455	BDSC	GW	Yes	0.2	0	
2755-6ZVJAL	Ground Water	Four excavated quarry ponds and NWS sumps	Industrial	Aggregate Washing	14400000	365	24	10000	BDSC	GW	Yes	1	0	
3481-74MGRR	Surface Water	Welland Ship Canal	Industrial	Cooling Water	364844000	365	24	253363	BDSC	SW	No	0	0	Not applicable, Great Lakes source and cooling water
3481-74MGRR	Surface Water	Welland Ship Canal	Industrial	Cooling Water	5784000	365	24	4017	BDSC	SW	No	0	0	Not applicable, Great Lakes source and cooling water
3624-6TKJED	Surface Water	Beaverdams Creek	Commercial	Golf Course Irrigation	3930000	183	16	4090	BDSC	SW	Yes	0	1	
5165-77ZGZP	Ground Water	Well 1	Commercial	Golf Course Irrigation	327000	275	24	227	BDSC	GW	Yes	1	0	
5165-77ZGZP	Ground Water	Well 2	Commercial	Golf Course Irrigation	589000	275	24	409	BDSC	GW	Yes	1	0	
5165-77ZGZP	Ground Water	Dug Out Pond	Commercial	Golf Course Irrigation	2520000	275	24	3500	BDSC	SW	Yes	0	0.64	Feb 09 EBR posting indicates pond is filled by groundwater wells but 64% difference in volume
5612-6XJPFG	Surface Water	Welland Canal - Weir 1	Industrial	Power Production	1814400000	365	24	1260000	BDSC	SW	No	0	0	Not applicable Great Lakes source - Welland Canal and for hydro generation
5612-6XJPFG	Surface Water	Welland Canal - Weir 2	Industrial	Power Production	1814400000	365	24	1260000	BDSC	SW	No	0	0	Not applicable Great Lakes source - Welland Canal and for hydro generation
5612-6XJPFG	Surface Water	Welland Canal - Weir 3	Industrial	Power Production	1814400000	365	24	1260000	BDSC	SW	No	0	0	Not applicable Great Lakes source - Welland Canal and for hydro generation
7524-6FSQGA	Surface Water	Welland Canal	Industrial	Cooling Water	9539000	365	24	6624	BDSC	SW	No	0	0	Not applicable, Great Lakes source and cooling water
00-P-2076	Ground Water	Dugout pond	Agricultural	Sod Farm	1909320	20	10	3182	BFC	GW	Yes	1	0	
03-P-2243	Surface and Ground Water	Lake Erie	Commercial	Golf Course Irrigation	943000	153	16	982	BFC	SW	Yes	0	-1	Great Lakes source addition to system
03-P-2243	Surface and Ground Water	Pond	Commercial	Golf Course Irrigation	982000	153	16	2046	BFC	GW	Yes	0.04	0	Pond maximum amount only 4% greater than transfer from Great Lakes addition
03-P-2380	Ground Water	Well #66-3229	Water Supply	Campgrounds	131000	365	24	91	BFC	GW	Yes	1	0	
1627-72URFV	Surface Water	Pumping Station #2, Feeder Canal	Agricultural	Other - Agricultural	2182000	160	24	1515	BFC	SW	No	0	0	Water supplied by addition from Grand River watershed
1627-72URFV	Surface Water	Pumping Station #3, Feeder Canal	Agricultural	Other - Agricultural	2182000	160	24	1515	BFC	SW	No	0	0	Water supplied by addition from Grand River watershed
1627-72URFV	Surface Water	Broad Creek Tributary (Stromness Pumping Station)	Agricultural	Other - Agricultural	6547000	160	24	4546	BFC	SW	Yes	0	-1	Flow from Grand River watershed to NPSP Area
1627-72URFV	Surface Water	Pumping Station #1, Feeder Canal	Agricultural	Other - Agricultural	2182000	160	24	1515	BFC	SW	No	0	0	Water supplied by addition from Grand River watershed
3673-6FKHRR	Surface Water	Old Welland Feeder Canal	Agricultural	Sod Farm	2830000	152	24	1965	BFC	SW	Yes	0	1	
5773-6RWM79	Surface and Ground Water	Pond on an intermittent drain, tributary to the North Hutchinson Drain North Branch	Agricultural	Field and Pasture Crops	1118000	90	12	1552	BFC	SW	Yes	0	1	
5773-6RWM79	Surface and Ground Water	Dugout Pond	Agricultural	Field and Pasture Crops	1118000	90	12	1552	BFC	GW	Yes	1	0	
8786-6KZS5H	Ground Water	Dugout Pond	Agricultural	Nursery	296000	183	10	492	BFC	GW	Yes	1	0	
8786-6KZS5H	Ground Water	Dugout Pond	Agricultural	Nursery	296000	183	10	492	BFC	GW	No	0	0	
87-P-2059	Ground Water	Well 2	Agricultural	Other - Agricultural	392774	0	14	455	BFC	GW	Yes	1	0	
87-P-2059	Ground Water	Well 3	Agricultural	Other - Agricultural	654624	0	24	455	BFC	GW	Yes	1	0	
87-P-2059	Ground Water	Well 1	Agricultural	Other - Agricultural	654624	0	24	455	BFC	GW	Yes	1	0	
0002-6DZRQL	Surface Water	Welland River	Agricultural	Nursery	344000	62	18	318	CWR	SW	Yes	0	1	
00-P-2434	Ground Water	dugout pond	Agricultural	Sod Farm	708200	30	4	2950	CWR	GW	Yes	1	0	
1076-63HNBM	Surface and Ground Water	Welland River	Commercial	Golf Course Irrigation	1964000	150	24	1364	CWR	SW	Yes	0	1	
1076-63HNBM	Surface and Ground Water	Pond	Commercial	Golf Course Irrigation	1964000	150	9	3637	CWR	SW	Yes	0	1	Assigned to surface water because pond appears on-line
1867-7FZTJV	Surface and Ground Water	Irrigation Pond	Commercial	Golf Course Irrigation	682000	200	10	1136	CWR	GW	Yes	1	0	
1867-7FZTJV	Surface and Ground Water	Coyle Creek	Commercial	Golf Course Irrigation	1200000	200	10	2000	CWR	SW	Yes	0	1	
2052-6CKNSN	Ground Water	Pond	Agricultural	Nursery	393000	62	18	363	CWR	GW	Yes	1	0	
2457-6LFNPM	Surface Water	Old Welland Canal	Water Supply	Municipal	110000000	365	24	75800	CWR	SW	No	0	0	Great Lakes source Welland Canal

TABLE A.6
MINISTRY OF THE ENVIRONMENT NPSP AREA PERMIT TO TAKE WATER DATABASE ASSESSMENT REPORT

Ministry of the Environment Information									NPSP AREA ANALYSIS PARAMETERS					
Permit_Number	MOE Taking_Type	Source_Name	Major_Category	Specific_Purpose	Max (L/Day)	Max (Day/Year)	Max (Hours/Day)	Max (L/min)	WSPA	Source	In_Analysis	GW_Ratio	SW_Ratio	Comments
2801-6T4HVH	Surface Water	EC Brown Conservation Area Wetland	Miscellaneous	Wildlife Conservation	7300000	365	24	1244	CWR	SW	No	0	0	Not applicable wetland creation
4014-6NYK5E	Ground Water	Pond # 1	Agricultural	Nursery	800000	184	12	1137	CWR	GW	Yes	1	0	
4014-6NYK5E	Ground Water	Pond # 2	Agricultural	Nursery	20000	184	4	81.828	CWR	GW	Yes	1	0	
4014-6NYK5E	Ground Water	Pond # 3	Agricultural	Nursery	300000	184	7	175	CWR	GW	Yes	1	0	
4014-6NYK5E	Ground Water	Pond # 4	Agricultural	Nursery	300000	184	5	175	CWR	GW	Yes	1	0	
4315-6FYH6N	Surface and Ground Water	Welland Canal	Recreational	Other - Recreational	1965000	180	24	1364	CWR	SW	No	0	0	Great Lakes source Welland Canal
4315-6FYH6N	Surface and Ground Water	Dugout Pond	Recreational	Other - Recreational	3492000	180	16	3637	CWR	GW	Yes	1	0	
5238-6SPH6V	Surface Water	Brown Wetland 1	Miscellaneous	Wildlife Conservation	6197000	365	24	4303	CWR	SW	No	0	0	Not applicable wetland creation
5238-6SPH6V	Surface Water	Brown Wetland 2	Miscellaneous	Wildlife Conservation	3403000	365	24	20040	CWR	SW	No	0	0	Not applicable wetland creation
5238-6SPH6V	Surface Water	Brown Wetland 3	Miscellaneous	Wildlife Conservation	1800000	365	24	1250	CWR	SW	No	0	0	Not applicable wetland creation
5238-6SPH6V	Surface Water	Brown Wetland 4	Miscellaneous	Wildlife Conservation	1350000	365	24	938	CWR	SW	No	0	0	Not applicable wetland creation
5238-6SPH6V	Surface Water	Brown Wetland 5	Miscellaneous	Wildlife Conservation	810000	365	24	563	CWR	SW	No	0	0	Not applicable wetland creation
5646-6FRNZB	Surface Water	Unnamed tributary to Welland River	Agricultural	Sod Farm	382000	35	8	795	CWR	SW	Yes	0	1	
5813-6APRPT	Surface Water	Welland Ship Canal	Dewatering Construction	Construction	1296000	365	24	900	CWR	SW	No	0	0	Great Lakes source Welland Canal, non-consumptive dewatering
6252-6FKP9X	Surface Water	Welland Ship Canal	Industrial	Other - Industrial	312000000	365	24	216667	CWR	SW	No	0	0	Great Lakes source Welland Canal
7751-6GMGPS	Surface and Ground Water	On-stream pond on Swazye drain, (Tributary of Coyle Creek)	Agricultural	Nursery	229000	250	8.5	448	CWR	SW	Yes	0	1	
8363-6QAGR4	Surface and Ground Water	Irrigation pond	Commercial	Golf Course Irrigation	983000	150	9	1820	CWR	SW	No	0	0	Holding pond
8363-6QAGR4	Surface and Ground Water	Welland River	Commercial	Golf Course Irrigation	983000	150	24	681	CWR	SW	Yes	0	1	
8542-6NTGHE	Surface Water	Old Welland Canal	Industrial	Cooling Water	82000000	365	24	57000	CWR	SW	No	0	0	Great Lakes source Welland Canal
03-P-2103	Surface Water	Lake Erie (Rosehill WTP)	Water Supply	Municipal	78000000	365	24	54167	FEC	SW	No	0	0	Great Lakes source not included
03-P-2241	Ground Water	Well PW3	Commercial	Golf Course Irrigation	980000	213	24	681	FEC	GW	Yes	1	0	
03-P-2241	Ground Water	Well PW2	Commercial	Golf Course Irrigation	980000	0	24	681	FEC	GW	No	0	0	Not included back-up well
03-P-2241	Ground Water	Pond	Commercial	Golf Course Irrigation	2182000	213	8	4646	FEC	GW	Yes	0.55	0	55% amount accounts for total rate amount over primary well rate
03-P-2296	Surface and Ground Water	Well (W1)	Commercial	Golf Course Irrigation	409000	183	24	280	FEC	GW	No	0	0	Well not on newest (October 2008) EBR permit application
03-P-2296	Surface and Ground Water	Well (W2)	Commercial	Golf Course Irrigation	1637000	183	24	1137	FEC	GW	Yes	1	0	
03-P-2296	Surface and Ground Water	Pond on Frenchman's Creek	Commercial	Golf Course Irrigation	2273000	183	10	3787	FEC	SW	Yes	0	1	
0880-74DSYE	Ground Water	EW1	Remediation	Groundwater	432000	365	24	300	FEC	GW	Yes	1	0	
0880-74DSYE	Ground Water	EW2	Remediation	Groundwater	216000	365	24	150	FEC	GW	Yes	1	0	
0880-74DSYE	Ground Water	EW3	Remediation	Groundwater	216000	365	24	150	FEC	GW	Yes	1	0	
0880-74DSYE	Ground Water	EW4	Remediation	Groundwater	216000	365	24	150	FEC	GW	Yes	1	0	
2820-727K8D	Surface Water	Black Creek	Commercial	Golf Course Irrigation	918000	183	9	1700	FEC	SW	Yes	0	1	
2861-62UQVN	Ground Water	TW2/99	Commercial	Golf Course Irrigation	655000	180	24	455	FEC	GW	Yes	1	0	
3420-6ZVPXA	Ground Water	Ridgemount North Quarry Pond # 1	Industrial	Pits and Quarries	7201000	365	24	5000	FEC	GW	Yes	1	0	
7725-6ZVN9T	Ground Water	Ridgemount South Quarry Pond #2	Dewatering	Other - Dewatering	1728000	365	24	1200	FEC	GW	Yes	1	0	

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Permit_Number	MOE Taking_Type	Source_Name	Major_Category	Specific_Purpose	Max (L/Day)	Max (Day/Year)	Max (Hours/Day)	Max (L/min)	WSPA	Source	In_Analysis	GW_Ratio	SW_Ratio	Comments
00-P-2765	Ground Water	Well (W-1)	Water Supply	Other - Water Supply	261850	0	24	182	FSEM	GW	Yes	1	0	
00-P-2765	Ground Water	Well (W-2)	Water Supply	Other - Water Supply	261850	0	0	0	FSEM	GW	No	0	0	Applied entire taking to main well
00-P-2765	Ground Water	Well (W-3)	Water Supply	Other - Water Supply	261850	0	0	0	FSEM	GW	No	0	0	Applied entire taking to main well
03-P-2219	Surface Water	Lake Ontario	Agricultural	Market Gardens / Flowers	2945000	15	24	2045	FSEM	SW	Yes	0	-1	Positive addition to system from Great Lakes source
1266-68DM4N	Ground Water	Well WWR 66 4178	Industrial	Food Processing	206400	61	16	215	FSEM	GW	Yes	1	0	
1266-68DM4N	Ground Water	Well WWR 66 3853	Industrial	Food Processing	117000	61	10	195	FSEM	GW	Yes	1	0	
1545-6CQQLN	Surface and Ground Water	15 mile creek	Agricultural	Other - Agricultural	655000	20	8	1364	FSEM	SW	Yes	0	1	
1545-6CQQLN	Surface and Ground Water	Pond	Agricultural	Other - Agricultural	110000	30	2	909	FSEM	GW	Yes	1	0	
1886-6CZMTW	Ground Water	Dugout Pond	Commercial	Golf Course Irrigation	2101000	183	7	5001	FSEM	GW	Yes	1	0	
1886-6CZMTW	Ground Water	Dugout Pond	Commercial	Golf Course Irrigation	2101000	183	7	5001	FSEM	GW	No	0	0	Total amount applied to pond 1
1886-6CZMTW	Ground Water	Dugout Pond	Commercial	Golf Course Irrigation	2101000	183	7	5001	FSEM	GW	No	0	0	Total amount applied to pond 1
2035-6GMJ6G	Surface Water	Sixteen Mile Creek	Agricultural	Field and Pasture Crops	1296000	15	24	900	FSEM	SW	Yes	0	1	
2035-6GMJ6G	Surface Water	Fifteen Mile Creek	Agricultural	Field and Pasture Crops	1296000	15	24	900	FSEM	SW	Yes	0	1	
3332-73XLHC	Surface and Ground Water	PW1	Agricultural	Other - Agricultural	681000	225	24	533	FSEM	GW	Yes	1	0	
3500-6FQN5E	Surface Water	local drainage within 15 Mile Creek watershed	Miscellaneous	Wildlife Conservation	11493000	365	24	7981	FSEM	SW	No	0	0	Not included wetland creation
3630-63BG6H	Surface and Ground Water	Fifteen Mile Creek	Agricultural	Market Gardens / Flowers	123000	173	18	114	FSEM	SW	Yes	0	1	
3630-63BG6H	Surface and Ground Water	Well	Agricultural	Market Gardens / Flowers	50000	173	7	114	FSEM	GW	Yes	1	0	
3655-6NHNYL	Surface Water	Tributary to 15 Mile Creek	Agricultural	Field and Pasture Crops	110000	10	5	366	FSEM	SW	Yes	0	1	
4833-74ARNZ	Surface Water	One pond connected to 15 Mile Creek	Agricultural	Other - Agricultural	91000	28	2.5	613	FSEM	SW	Yes	0	1	
4833-74ARNZ	Surface Water	One pond on 15 Mile Creek	Agricultural	Other - Agricultural	91000	28	2.5	613	FSEM	SW	Yes	0	1	
5283-6CKR8H	Surface and Ground Water	15 Mile Creek	Agricultural	Other - Agricultural	39000	60	4	159	FSEM	SW	Yes	0	1	
5283-6CKR8H	Surface and Ground Water	Dugout Pond	Agricultural	Other - Agricultural	76000	365	8	159	FSEM	GW	Yes	1	0	
5445-6DUK9K	Surface and Ground Water	15 Mile Creek	Agricultural	Tender Fruit	312000	21	8	650	FSEM	SW	Yes	0	1	
5445-6DUK9K	Surface and Ground Water	Dugout	Agricultural	Tender Fruit	436000	21	8	909	FSEM	GW	Yes	1	0	
5558-6B7MFW	Surface Water	15 Mile Creek	Agricultural	Other - Agricultural	174700	100	8	364	FSEM	SW	Yes	0	1	
5664-6FTJSD	Surface Water	16 Mile Creek	Agricultural	Market Gardens / Flowers	131000	200	12	182	FSEM	SW	Yes	0	1	
5700-6YPHJA	Surface and Ground Water	Fifteen Mile Creek #1	Agricultural	Nursery	745000	25	6	2069	FSEM	SW	Yes	0	1	
5700-6YPHJA	Surface and Ground Water	Fifteen Mile Creek #2	Agricultural	Nursery	98000	365	24	68	FSEM	SW	Yes	0	1	
5700-6YPHJA	Surface and Ground Water	Dugout Pond	Agricultural	Nursery	994000	144	8	2069	FSEM	GW	Yes	1	0	
5736-6R6NCU	Surface Water	Surface water runoff	Miscellaneous	Wildlife Conservation	4056000	365	24	9130	FSEM	SW	No	0	0	Not included wetland creation
5763-6CRPE2	Surface Water	Pond on 16 Mile Creek	Agricultural	Fruit Orchards	909000	10	8	1818.4	FSEM	SW	Yes	0	1	
6334-6FJJZ4	Ground Water	Dugout pond	Agricultural	Tender Fruit	764000	15	7	1818	FSEM	GW	Yes	1	0	
6533-6CKL9S	Surface Water	Jordan Harbour	Agricultural	Tender Fruit	219000	75	8	455	FSEM	SW	Yes	0	-1	Positive addition to system from Lake Ontario
7424-6CKKQD	Surface Water	15 Mile Creek	Agricultural	Fruit Orchards	982000	15	12	1363.8	FSEM	SW	Yes	0	1	
88-P-2067	Surface Water	Lake Ontario	Agricultural	Other - Agricultural	2727600	0	0	0	FSEM	SW	Yes	0	-1	Positive addition to system from Lake Ontario
94-P-2063	Ground Water	Pond	Commerical	Golf Course Irrigation	1091400	0	16	1137	FSEM	GW	No	0	0	Not included pond filled by well
94-P-2063	Ground Water	Well	Commercial	Golf Course Irrigation	2618496	0	24	1818	FSEM	GW	Yes	1	0	
03-P-2195	Ground Water	Well	Industrial	Aggregate Washing	1091000	365	24	1820	FSEM	GW	Yes	1	0	
3221-5VVN7L	Ground Water	Sump	Dewatering	Pits and Quarries	17675000	365	24	12300	GR	GW	Yes	1	0	
93-P-2062	Surface Water	Lake Ontario (Casablanca WTP)	Water Supply	Municipal	44000000	365	24	30555	GR	SW	No	0	0	Not included Great Lakes source

TABLE A.6
MINISTRY OF THE ENVIRONMENT NPSP AREA PERMIT TO TAKE WATER DATABASE ASSESSMENT REPORT

Ministry of the Environment Information									NPSP AREA ANALYSIS PARAMETERS					
Permit_Number	MOE Taking_Type	Source_Name	Major_Category	Specific_Purpose	Max (L/Day)	Max (Day/Year)	Max (Hours/Day)	Max (L/min)	WSPA	Source	In_Analysis	GW_Ratio	SW_Ratio	Comments
0276-776Q6U	Ground Water	Quarry Lake	Commercial	Golf Course Irrigation	90000	243	8	946	LENS	GW	Yes	1	0	
0276-776Q6U	Ground Water	Stormwater Pond	Commercial	Golf Course Irrigation	90000	243	4	1875	LENS	GW	No	0	0	Not included filled by pumping of Quarry Lakes
03-P-2242	Ground Water	Quarry	Water Supply	Communal	4461000	183	24	5400	LENS	GW	Yes	1	0	
03-P-2269	Surface Water	Lake Erie	Water Supply	Communal	371000	243	16	386	LENS	SW	No	0	0	Not included Great Lakes source
0575-6YNN6Y	Ground Water	A1	Remediation	Other - Remediation	57600	365	24	40	LENS	GW	Yes	1	0	
0575-6YNN6Y	Ground Water	A2	Remediation	Other - Remediation	57600	365	24	40	LENS	GW	Yes	1	0	
0575-6YNN6Y	Ground Water	B1	Remediation	Other - Remediation	57600	365	24	40	LENS	GW	Yes	1	0	
0575-6YNN6Y	Ground Water	B2	Remediation	Other - Remediation	57600	365	24	40	LENS	GW	Yes	1	0	
0575-6YNN6Y	Ground Water	C1	Remediation	Other - Remediation	57600	365	24	40	LENS	GW	Yes	1	0	
0575-6YNN6Y	Ground Water	C2	Remediation	Other - Remediation	57600	365	24	40	LENS	GW	Yes	1	0	
0717-6WFKDR	Ground Water	Long Beach C.A. Shore Well	Water Supply	Campgrounds	737000	214	24	682	LENS	SW	No	0	0	Not included Great Lakes source
2216-6CCNMS	Surface Water	West Quarry	Dewatering	Other - Dewatering	32731000	365	24	22730	LENS	SW	Yes	0	1	
2278-6WHHXA	Surface Water	Welland Canal	Industrial	Cooling Water	1045000	365	24	725	LENS	SW	No	0	0	Not included Great Lakes source of cooling water
2424-78CP3G	Surface Water	Lake Erie	Water Supply	Communal	389000	365	24	270	LENS	SW	No	0	0	Not included Great Lakes source
3827-74BGTY	Ground Water	Quarry sumps 1&2	Dewatering	Pits and Quarries	3,283,000	260	8	7546	LENS	GW	Yes	1	0	
5566-5WRTGZ	Surface Water	Welland Canal	Water Supply	Municipal	45460000	365	24	31600	LENS	SW	No	0	0	Not included Great Lakes source for municipal supply
5118-7HRGKG	Ground Water	Quarry Sump	Industrial	Aggregate Washing	20117000	365	24	14000	LENS	GW	Yes	1	0	
79-P-2038	Ground Water	Sewer Excavation	Dewatering	Other - Dewatering	8182800	365	12	5683	LENS	GW	Yes	1	-1	Positive addition to surface water from groundwater dewatering
93-P-2071	Ground Water	Well #1	Industrial	Other - Industrial	41000	250	8	86	LENS	GW	Yes	1	0	
93-P-2071	Ground Water	Well #2	Industrial	Other - Industrial	55000	250	8	114	LENS	GW	Yes	1	0	
93-P-2071	Ground Water	Well #3	Industrial	Other - Industrial	109000	250	8	227	LENS	GW	Yes	1	0	
93-P-2071	Ground Water	Well #24	Industrial	Other - Industrial	164000	250	8	114	LENS	GW	Yes	1	0	
93-P-2071	Ground Water	Well #25	Industrial	Other - Industrial	98000	250	8	68	LENS	GW	Yes	1	0	
0008-5ZUKRH	Surface Water	Lake Ontario	Agricultural	Tender Fruit	184500	20	5	615	LIN	SW	Yes	0	-1	Positive addition from Great Lakes source
0123-6BGTKR	Surface and Ground Water	Lake Ontario	Agricultural	Tender Fruit	632000	213	2.9	3637	LIN	SW	Yes	0	-1	Positive addition from Great Lakes source
0123-6BGTKR	Surface and Ground Water	Pond	Agricultural	Tender Fruit	632000	213	10	1052	LIN	GW	No	0	0	Holding pond
0177-7BKRRB	Surface Water	Lake Ontario	Agricultural	Market Gardens / Flowers	500000	26	6	1389	LIN	SW	Yes	0	-1	Positive addition from Great Lakes source
01-P-2172	Surface and Ground Water	Lake Ontario	Agricultural	Tender Fruit	1364000	0	0	2273	LIN	SW	Yes	0	-1	Positive addition from Great Lakes source
01-P-2172	Surface and Ground Water	Dugout pond#1	Agricultural	Tender Fruit	1023000	0	0	5455	LIN	GW	No	0	0	Holding pond
01-P-2172	Surface and Ground Water	Dugout pond#2	Agricultural	Tender Fruit	1023000	0	0	5455	LIN	GW	No	0	0	Holding pond
1322-6BDPCF	Surface Water	Lake Ontario	Agricultural	Tender Fruit	164000	180	0.75	3637	LIN	SW	Yes	0	-1	Positive addition from Great Lakes source
1322-6BDPCF	Surface Water	Cistern	Agricultural	Tender Fruit	164000	180	12	227	LIN	SW	No	0	0	Holding cistern
2226-6GEQFJ	Surface Water	Shorewell connected to Lake Ontario	Agricultural	Nursery	198000	84	10	330	LIN	SW	Yes	0	-1	Positive addition from Great Lakes source
2265-6CCNAN	Surface and Ground Water	Lake Ontario	Agricultural	Tender Fruit	819000	121	3.75	3637	LIN	SW	Yes	0	-1	Positive addition from Great Lakes source
2265-6CCNAN	Surface and Ground Water	Pond	Agricultural	Tender Fruit	819000	121	20	682	LIN	GW	No	0	0	Holding pond
2612-6DTJKP	Surface Water	Lake Ontario	Agricultural	Field and Pasture Crops	1137000	20	8	2364	LIN	SW	Yes	0	-1	Positive addition from Great Lakes source
2845-6AXMER	Ground Water	Pond	Agricultural	Tender Fruit	245000	10	6	682	LIN	GW	Yes	1	0	
3782-6BGTQZ	Surface and Ground Water	Lake Ontario	Agricultural	Tender Fruit	655000	184	3	3637	LIN	SW	Yes	0	-1	Positive addition from Great Lakes source
3782-6BGTQZ	Surface and Ground Water	Pond	Agricultural	Tender Fruit	655000	184	24	455	LIN	GW	No	0	0	Holding pond
4328-6ZVPY4	Surface Water	Home Pond	Agricultural	Fruit Orchards	1054000	35	16	1098	LIN	SW	Yes	0	1	
4328-6ZVPY4	Surface Water	Sipos Pond	Agricultural	Fruit Orchards	1054000	35	16	1098	LIN	SW	Yes	0	1	
5540-6G3HXB	Surface Water	Jordan Harbour	Agricultural	Nursery	218000	150	10	362	LIN	SW	Yes	0	-1	Positive addition from Great Lakes source
7566-6E3PBZ	Surface Water	Lake Ontario	Agricultural	Field and Pasture Crops	1087000	20	8	2264	LIN	SW	Yes	0	-1	Positive addition from Great Lakes source
8127-74RJ2H	Surface Water	2 Ponds	Agricultural	Other - Agricultural	211200	40	16	220	LIN	SW	Yes	0	1	
8147-6E3PGP	Surface Water	Lake Ontario	Agricultural	Field and Pasture Crops	245500	365	9	455	LIN	SW	Yes	0	-1	Positive addition from Great Lakes source
8273-6G3KRU	Surface Water	Lake Ontario	Agricultural	Fruit Orchards	651000	20	8	1356	LIN	SW	Yes	0	-1	Positive addition from Great Lakes source

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ASSESSMENT REPORT

Ministry of the Environment Information									NPSP AREA ANALYSIS PARAMETERS					
Permit_Number	MOE Taking_Type	Source_Name	Major_Category	Specific_Purpose	Max (L/Day)	Max (Day/Year)	Max (Hours/Day)	Max (L/min)	WSPA	Source	In_Analysis	GW_Ratio	SW_Ratio	Comments
00-P-2501	Surface Water	Chippawa Creek (Welland River)	Water Supply	Municipal	145475000	365	24	144444	LWR	SW	No	0	0	Not included municipal Great Lakes source
03-P-2314	Surface and Ground Water	Welland River	Commercial	Golf Course Irrigation	2192000	210	12	3105	LWR	SW	Yes	0	1	
03-P-2314	Surface and Ground Water	Dugout pond	Commercial	Golf Course Irrigation	1669500	210	12	3485	LWR	SW	No	0	0	Holding ponds
03-P-2314	Surface and Ground Water	Dugout pond	Commercial	Golf Course Irrigation	1669500	210	12	3485	LWR	SW	No	0	0	Holding ponds
1460-6D4KTD	Surface Water	Welland River	Industrial	Cooling Water	10903000	365	24	7571	LWR	SW	Yes	0	1	
2868-6D4HHE	Surface Water	Welland River	Industrial	Cooling Water	50400000	365	24	35000	LWR	SW	Yes	0	1	
3850-6HQQ76	Surface Water	Welland River	Industrial	Manufacturing	5700000	365	24	3960	LWR	SW	Yes	0	1	
7210-6BVHTK	Surface and Ground Water	Chippawa Power Canal	Commercial	Golf Course Irrigation	1817000	80	20	1514	LWR	SW	No	0	0	Supplied by OPG diversion to Chippawa Power Canal
7210-6BVHTK	Surface and Ground Water	Pond A	Commercial	Golf Course Irrigation	1817000	80	8	3785	LWR	SW	No	0	0	Holding pond
7725-6FJH88	Surface Water	Welland River	Commercial	Golf Course Irrigation	737000	60	9	1364	LWR	SW	Yes	0	1	
92-P-2033	Surface Water	Welland River	Industrial	Cooling Water	13082000	305	24	9085	LWR	SW	Yes	0	1	
0038-63YQDU	Surface Water	One Pond connected to Lake Ontario	Agricultural	Tender Fruit	6547000	60	24	4546	NOTL	SW	Yes	0	-1	Positve addition from Great Lakes into system
00-P-2495	Ground Water	Mountain Road LFS well PW3	Remediation	Groundwater	129600	365	24	90	NOTL	GW	Yes	1	0	
00-P-2495	Ground Water	Mountain Road LFS well PW4	Remediation	Groundwater	319680	365	24	222	NOTL	GW	Yes	1	0	
00-P-2495	Ground Water	Mountain Road LFS well PW5	Remediation	Groundwater	142560	365	24	99	NOTL	GW	Yes	1	0	
00-P-2495	Ground Water	Mountain Road LFS STANDBY WELL PW6	Remediation	Groundwater	0	0	0	0	NOTL	GW	No	0	0	Removed from current permit
00-P-2495	Ground Water	Mountain Road LFS well PW7	Remediation	Groundwater	25920	365	24	18	NOTL	GW	Yes	1	0	
00-P-2495	Ground Water	Mountain Road LFS STANDBY WELL PW8	Remediation	Groundwater	0	0	0	0	NOTL	GW	No	0	0	Removed from current permit
00-P-2495	Ground Water	Mountain Road LFS well PW9	Remediation	Groundwater	17280	365	24	12	NOTL	GW	Yes	1	0	
00-P-2495	Ground Water	Mountain Road LFS STANDBY WELL PW10	Remediation	Groundwater	0	0	0	0	NOTL	GW	No	0	0	Removed from current permit
00-P-2495	Ground Water	Mountain Road LFS STANDBY WELL PW11	Remediation	Groundwater	0	0	0	0	NOTL	GW	No	0	0	Removed from current permit
00-P-2495	Ground Water	Mountain Road LFS well PW12	Remediation	Groundwater	8640	365	24	6	NOTL	GW	Yes	1	0	
00-P-2495	Ground Water	Mountain Road LFS well PW2	Remediation	Groundwater	51840	365	24	36	NOTL	GW	Yes	1	0	
00-P-2495	Ground Water	Mountain Road LFS well PW13	Remediation	Groundwater	43200	365	24	30	NOTL	GW	Yes	1	0	
00-P-2495	Ground Water	Mountain Road LFS well PW14	Remediation	Groundwater	38880	365	24	27	NOTL	GW	Yes	1	0	
00-P-2495	Ground Water	Mountain Road LFS well PW15	Remediation	Groundwater	21600	365	24	15	NOTL	GW	Yes	1	0	
00-P-2584	Ground Water	One dugout pond	Agricultural	Other - Agricultural	360000	25	6	1000	NOTL	GW	Yes	1	0	
0643-6ZVRBM	Surface Water	Virgil Upper Reservoir	Agricultural	Other - Agricultural	16400000	365	24	11400	NOTL	SW	Yes	0	1	
0643-6ZVRBM	Surface Water	Virgil Lower Reservoir	Agricultural	Other - Agricultural	16400000	365	24	11400	NOTL	SW	Yes	0	1	
1348-6DSR3Q	Surface Water	Welland Ship Canal	Agricultural	Tender Fruit	607000	120	8	1263	NOTL	SW	Yes	0	-1	Positve addition from Great Lakes into system
2073-6GHNKT	Surface and Ground Water	Old Welland Canal	Commercial	Golf Course Irrigation	2600000	183	24	1777	NOTL	SW	Yes	0	-0.5	Positive addition from Great Lakes into system, property partially in NOTL
2073-6GHNKT	Surface and Ground Water	Pond 3	Commercial	Golf Course Irrigation	2000000	183	6	5455	NOTL	GW	Yes	0.2	0	
2073-6GHNKT	Surface and Ground Water	Pond 4	Commercial	Golf Course Irrigation	2000000	183	6	5455	NOTL	GW	Yes	0.2	0	
2073-6GHNKT	Surface and Ground Water	Pond 5	Commercial	Golf Course Irrigation	2000000	183	6	5455	NOTL	GW	Yes	0.2	0	
2378-6XQSRP	Surface and Ground Water	Niagara River	Agricultural	Tender Fruit	500000	20	8	1041	NOTL	SW	Yes	0	-1	Positve addition from Great Lakes into system
2378-6XQSRP	Surface and Ground Water	Dugout Pond	Agricultural	Tender Fruit	500000	20	8	1041	NOTL	GW	No	0	0	Holding pond
3036-6ENRD9	Surface and Ground Water	Six Mile Creek	Agricultural	Tender Fruit	1609000	100	24	1117	NOTL	SW	Yes	0	1	
3036-6ENRD9	Surface and Ground Water	Dugout Pond	Agricultural	Tender Fruit	537000	10	8	1117	NOTL	GW	Yes	1	0	
3042-74TR4L	Surface Water	Welland Ship Canal	Water Supply	Other - Water Supply	3543000	275	24	2460	NOTL	SW	Yes	0	-1	Positve addition from Great Lakes into system

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Permit_Number	MOE Taking_Type	Source_Name	Major_Category	Specific_Purpose	Max (L/Day)	Max (Day/Year)	Max (Hours/Day)	Max (L/min)	WSPA	Source	In_Analysis	GW_Ratio	SW_Ratio	Comments
3128-6CCQ6K	Surface Water	Lake Ontario	Agricultural	Tender Fruit	1207000	60	18	1117	NOTL	SW	Yes	0	-1	Positve addition from Great Lakes into system
3572-6FTFJF	Surface Water	Lake Ontario	Agricultural	Tender Fruit	2412000	100	18	2233	NOTL	SW	Yes	0	-1	Positve addition from Great Lakes into system
3780-6UVPST	Ground Water	Quarry Sump	Dewatering	Pits and Quarries	562000	365	24	390	NOTL	GW	Yes	1	0	
4550-74TQ4Q	Surface Water	Welland Ship Canal	Water Supply	Other - Water Supply	21810000	275	24	15140	NOTL	SW	Yes	0	-1	Positve addition from Great Lakes into system
5030-6CPR2H	Surface Water	Welland Ship Canal	Agricultural	Tender Fruit	6546000	120	24	4546	NOTL	SW	Yes	0	-1	Positve addition from Great Lakes into system
5231-6ZKHDU	Surface Water	Pond	Agricultural	Fruit Orchards	333000	30	8	693	NOTL	SW	Yes	0	1	
5475-6DCMS2	Surface Water	Drainage Ditch (Four Mile Creek)	Agricultural	Fruit Orchards	2619000	150	16	2728	NOTL	SW	Yes	0	1	
5821-72RNSU	Surface Water	Chippawa Power Canal	Water Supply	Municipal	22730000	275	24	15911	NOTL	SW	Yes	0	-1	Positve addition from Great Lakes into system
6854-6D5PM3	Surface Water	Four Mile Creek Lot 154 (Location #1)	Agricultural	Tender Fruit	1818000	33	16	1893	NOTL	SW	Yes	0	1	
6854-6D5PM3	Surface Water	Four Mile Creek Lot 186 (Location #2)	Agricultural	Tender Fruit	1818000	33	16	1893	NOTL	SW	No	0	0	Three ponds takings assigned to one pond
6854-6D5PM3	Surface Water	Four Mile Creek Lot 187 (Location 3)	Agricultural	Tender Fruit	1818000	33	16	1893	NOTL	SW	No	0	0	Three ponds takings assigned to one pond
7165-6W7R3Y	Surface Water	Pond # 1	Agricultural	Fruit Orchards	100000	30	12	139	NOTL	SW	Yes	0	1	
7165-6W7R3Y	Surface Water	Pond # 2	Agricultural	Fruit Orchards	100000	90	12	139	NOTL	SW	Yes	0	1	
7376-74TL6N	Surface Water	Niagara River	Water Supply	Municipal	27255000	275	24	18925	NOTL	SW	Yes	0	-1	Positve addition from Great Lakes into system
7552-6HWLZD	Ground Water	Dugout Pond	Agricultural	Tender Fruit	1609000	100	24	1117	NOTL	SW	Yes	0	1	Pond assigned to surface water rather than groundwater, is on-line
76-P-2025	Ground Water	Quarry Excavation sump	Industrial	Other - Industrial	7845000	0	24	5450	NOTL	GW	No	0	0	Not in operation
7754-74UN9R	Surface Water	Ontario Power Generation Reservoir	Water Supply	Other - Water Supply	18000000	275	24	12490	NOTL	SW	Yes	0	-1	Positve addition from Great Lakes (OPG Beck Reservoir) into system
8130-5YJKQY	Surface Water	Welland Canal	Agricultural	Market Gardens / Flowers	50000	20	8	1000	NOTL	SW	Yes	0	-1	Positve addition from Great Lakes into system
8518-6GTPVA	Ground Water	Dugout Pond 1	Commercial	Golf Course Irrigation	273000	150	4	1136	NOTL	GW	Yes	1	0	
8518-6GTPVA	Ground Water	Dugout Pond 2	Commercial	Golf Course Irrigation	273000	150	4	1136	NOTL	GW	No	0	0	Three ponds but only one can be used at a time
8518-6GTPVA	Ground Water	Dugout Pond 3	Commercial	Golf Course Irrigation	273000	150	4	1136	NOTL	GW	No	0	0	Three ponds but only one can be used at a time
88-P-2073	Surface Water	Niagara River	Agricultural	Other - Agricultural	3272727	0	0	0	NOTL	SW	Yes	0	-1	Positve addition from Great Lakes into system
99-P-2047	Ground Water	Municipal Well (Notl #6)	Recreational	Aesthetics	2880000	0	0	0	NOTL	GW	No	0	0	Not in operation
03-P-2135	Surface Water	Chippawa Power Canal	Commercial	Golf Course Irrigation	1227000	115	9	2273	NFU	SW	Yes	0	-1	Great Lakes source adding water from non-consumptive portion to golf course
1835-76ZR7P	Surface Water	Niagara River	Recreational	Other - Recreational	4906000	200	16	5110	NFU	SW	Yes	0	-1	Great Lakes source adding water from non-consumptive portion to golf course, gardens and lawns
2770-6LYLZW	Ground Water	Outlet Channel Sump	Construction	Dewatering Construction	8640000	365	24	6000	NFU	SW	No	0	0	Not applicable - Great Lakes Source from Chippawa Power Canal and OPG Reservoir recirculating
7730-75HKQC	Surface and Ground Water	Circular Cofferdam	Construction	Dewatering Construction	108864000	183	24	75600	NFU	SW	No	0	1	Cofferdam construction permit in Niagara River, a Great Lakes source
7730-75HKQC	Surface and Ground Water	Intake Channel Sump(s)	Construction	Dewatering Construction	8640000	365	24	6000	NFU	GW	No	1	0	Location in Niagara River outside NFU
7730-75HKQC	Surface and Ground Water	Pier 2 Cofferdam	Construction	Dewatering Construction	432000	183	24	300	NFU	SW	No	0	1	Cofferdam construction permit in Niagara River, a Great Lakes source
8510-6QHGKA	Ground Water	Tunnel Sump	Construction	Dewatering Construction	24192000	365	24	16800	NFU	GW	No	1	0	Deep groundwater system between Rochester Shale and Queenston Shale - not applicable
00-P-2387	Ground Water	Dugout pond	Commercial	Golf Course Irrigation	1091040	0	8	2273	SNF	GW	Yes	1	0	
00-P-2387	Ground Water	Well	Commercial	Golf Course Irrigation	523700	0	24	363.7	SNF	GW	Yes	1	0	
03-P-2314	Surface and Ground Water	Dugout pond	Commercial	Golf Course Irrigation	1669500	210	12	3485	SNF	SW	No	0	0	Holding pond
03-P-2314	Surface and Ground Water	Dugout pond	Commercial	Golf Course Irrigation	1669500	210	12	3485	SNF	SW	No	0	0	Holding pond
03-P-2314	Surface and Ground Water	Dugout pond	Commercial	Golf Course Irrigation	1669500	210	12	3485	SNF	SW	No	0	0	Holding pond
03-P-2314	Surface and Ground Water	Dugout pond	Commercial	Golf Course Irrigation	1669500	210	12	3485	SNF	SW	No	0	0	Holding pond
1844-6TMGDJ	Surface Water	Susin Wetland 1	Miscellaneous	Wildlife Conservation	810000	365	24	563	SNF	SW	No	0	0	Not applicable wetland creation
1844-6TMGDJ	Surface Water	Susin Wetland 2	Miscellaneous	Wildlife Conservation	2880000	365	24	2000	SNF	SW	No	0	0	Not applicable wetland creation
3725-6SYHMF	Surface Water	Sauer Wetland #1	Miscellaneous	Wildlife Conservation	1125000	365	24	781	SNF	SW	No	0	0	Not applicable wetland creation
3725-6SYHMF	Surface Water	Sauer Wetland #2	Miscellaneous	Wildlife Conservation	1102000	365	24	765	SNF	SW	No	0	0	Not applicable wetland creation
4412-6G8KZY	Surface Water	Niagara River	Commercial	Golf Course Irrigation	5670000	240	24	3937	SNF	SW	Yes	0	-1	Positive addition to system from Great Lakes source
4412-6G8KZY	Surface Water	Storage Pond	Commercial	Golf Course Irrigation	6534000	240	12	9074	SNF	SW	Yes	0	0.13	13% difference between maximum taking from Niagara River and holding pond

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Permit_Number	MOE Taking_Type	Source_Name	Major_Category	Specific_Purpose	Max (L/Day)	Max (Day/Year)	Max (Hours/Day)	Max (L/min)	WSPA	Source	In_Analysis	GW_Ratio	SW_Ratio	Comments
63-P-0056	Surface Water	Lyons Creek	Commercial	Golf Course Irrigation	1473000	213	12	2200	SNF	SW	Yes	0	1	
8550-796M76	Surface Water	Federow Pond 1	Miscellaneous	Wildlife Conservation	91000	365	24	4676	SNF	SW	No	0	0	Not applicable wetland creation
8550-796M76	Surface Water	Federow Pond 2	Miscellaneous	Wildlife Conservation	42000	365	24	2164	SNF	SW	No	0	0	Not applicable wetland creation
00-P-2134	Ground Water	Well	Agricultural	Fruit Orchards	150018	80	22	114	TWEN	GW	Yes	1	0	
00-P-2358	Ground Water	Dugout pond	Commercial	Golf Course Irrigation	545000	40	6	1514	TWEN	GW	Yes	1	0	
00-P-2758	Ground Water	six wells	Industrial	Other - Industrial	653760	0	24	454	TWEN	GW	Yes	1	0	
00-P-2812	Ground Water	well	Agricultural	Other - Agricultural	61371	365	9	114	TWEN	GW	Yes	1	0	
00-P-2812	Ground Water	dugout pond	Agricultural	Other - Agricultural	1091040	40	8	2273	TWEN	SW	Yes	0	1	Pond on-line reclassed to surface water
00-P-2812	Ground Water	dugout pond	Agricultural	Other - Agricultural	1091040	40	8	2273	TWEN	SW	Yes	0	1	Pond on-line reclassed to surface water
01-P-2122	Ground Water	Dugout pond (Lions Club Park)	Recreational	Other - Recreational	225000	124	10	900	TWEN	GW	Yes	1	0	
03-P-2341	Surface Water	Twenty Mile Creek	Commercial	Golf Course Irrigation	655000	231	4	2728	TWEN	SW	Yes	0	1	
03-P-2409	Ground Water	Dugout Pond	Agricultural	Sod Farm	2451600	150	6	6810	TWEN	SW	Yes	0	1	Pond on-line reclassed to surface water
03-P-2409	Ground Water	Dugout Pond	Agricultural	Sod Farm	2451600	150	6	6810	TWEN	SW	Yes	0	1	Pond on-line reclassed to surface water
03-P-2410	Ground Water	Dugout pond	Agricultural	Sod Farm	2451600	160	6	6810	TWEN	SW	Yes	0	1	Pond on-line reclassed to surface water
03-P-2411	Ground Water	Dugout pond	Agricultural	Sod Farm	2451600	150	6	6810	TWEN	SW	Yes	0	1	Pond on-line reclassed to surface water
2422-64PNAT	Surface Water	Tributary to 20 Mile Creek	Agricultural	Tender Fruit	120000	45	10	200	TWEN	SW	Yes	0	1	
4328-6ZVPY4	Surface Water	Lake Ontario	Agricultural	Fruit Orchards	873000	30	8	1818	TWEN	SW	No	0	0	Not included Great Lakes source and distribution unknown in considered addition
5388-6ZYR34	Ground Water	Two sumps	Industrial	Aggregate Washing	21602000	365	24	15000	TWEN	GW	Yes	1	0	
5468-758KX9	Ground Water	Lincoln Quarry Sump	Dewatering	Pits and Quarries	5040000	365	24	3500	TWEN	GW	Yes	1	0	
5876-796KWE	Surface Water	Restored Wetland	Miscellaneous	Wildlife Conservation	3918000	365	24	43100	TWEN	SW	No	0	0	Not included wetland creation
6230-6RFRE9	Ground Water	Pond A	Commercial	Golf Course Irrigation	1000000	100	6	1589	TWEN	GW	Yes	1	0	
7104-6FDPY9	Surface Water	20 Mile Creek impoundment formed by dam	Recreational	Other - Recreational	65578000	365	24	45540	TWEN	SW	No	0	0	Consumption factor by evaporation less than 0.00%
7330-6ERR66	Surface Water	Pond	Commercial	Golf Course Irrigation	3492000	274	14	4160	TWEN	SW	No	0	0	Holding pond
7330-6ERR66	Surface Water	20 Mile Creek which recharges an onstream pond	Commercial	Golf Course Irrigation	3492000	274	22	2637	TWEN	SW	Yes	0	1	
99-P-2029	Ground Water	Smithville Wells RW1-RW8	Remediation	Groundwater	169256	365	0	0	TWEN	GW	Yes	1	0	
99-P-2029	Ground Water	Smithville CWM Lagoon	Remediation	Groundwater	87168	365	8	181	TWEN	GW	Yes	1	0	
99-P-2041	Ground Water	Lions Club Park Well	Institutional	Other - Institutional	50000	0	2	351	TWEN	GW	Yes	1	0	
01-P-2254	Ground Water	Well #2 (WWR #6600672)	Water Supply	Municipal	164000	365	24	1136	UTWEL	GW	No	0	0	Not in operation
01-P-2254	Ground Water	Well #1	Water Supply	Municipal	164000	365	24	1136	UTWEL	GW	No	0	0	Not in operation
02-P-2020	Surface and Ground Water	Well	Water Supply	Campgrounds	190000	156	14	200	UTWEL	GW	Yes	1	0	
02-P-2020	Surface and Ground Water	Spring	Recreational	Other - Recreational	240000	156	10	400	UTWEL	SW	Yes	0	1	
03-P-2175	Surface and Ground Water	Well #12	Commercial	Golf Course Irrigation	109019	244	24	76	UTWEL	GW	Yes	1	0	
03-P-2175	Surface and Ground Water	Pond #12	Commercial	Golf Course Irrigation	75900	244	11	115	UTWEL	GW	Yes	1	0	
03-P-2175	Surface and Ground Water	Pond #17	Commercial	Golf Course Irrigation	273600	244	6	760	UTWEL	GW	Yes	1	0	
2248-6EYFDP	Surface Water	Unnamed tributary to 12 Mile Creek	Miscellaneous	Wildlife Conservation	13578000	365	24	9429	UTWEL	SW	No	0	0	Not included wetland creation
3332-73XLHC	Surface and Ground Water	PW2	Agricultural	Other - Agricultural	1135000	225	24	888	UTWEL	GW	Yes	1	0	
3332-73XLHC	Surface and Ground Water	Irrigation Pond	Agricultural	Other - Agricultural	3048000	225	24	6350	UTWEL	GW	Yes	0.41	0	41% to cover pond total rate over supply well, pond on watershed boundary suggesting groundwater source
0362-68CMX2	Surface Water	Decew Falls Lower Reservoir	Water Supply	Municipal	227000000	365	24	208320	LTWEL	SW	No	0	0	Not included Great Lakes source, addition applied in Water Availability Study results
0362-68CMX2	Surface Water	Lake Gibson- Back-up supply	Water Supply	Municipal	227000000	365	24	208320	LTWEL	SW	No	0	0	Not included Great Lakes source, addition applied in Water Availability Study results
03-P-2175	Surface and Ground Water	Well #2	Commercial	Golf Course Irrigation	109019	244	24	76	LTWEL	GW	Yes	1	0	
03-P-2175	Surface and Ground Water	Pond #2	Commercial	Golf Course Irrigation	244800	244	11	340	LTWEL	SW	Yes	0	1	
03-P-2374	Ground Water	Dugout Pond	Commercial	Golf Course Irrigation	523000	152	8	1090	LTWEL	GW	Yes	1	0	
03-P-2374	Ground Water	Well	Commercial	Golf Course Irrigation	115000	152	8	182	LTWEL	GW	Yes	1	0	
2101-6DTL8D	Surface Water	Richardson's Creek	Agricultural	Market Gardens / Flowers	290000	20	3.5	1364	LTWEL	SW	Yes	0	1	
5738-6CJRE6	Surface Water	12 Mile Creek	Industrial	Other - Industrial	274000	160	8	570	LTWEL	SW	Yes	0	1	
65-P-0004	Surface Water	Martindale Pond	Agricultural	Nursery	1840000	0	15	2050	LTWEL	SW	Yes	0	1	

TABLE A.6
MINISTRY OF THE ENVIRONMENT NPSP AREA PERMIT TO TAKE WATER DATABASE ASSESSMENT REPORT

Ministry of the Environment Information									NPSP AREA ANALYSIS PARAMETERS					
Permit_Number	MOE Taking_Type	Source_Name	Major_Category	Specific_Purpose	Max (L/Day)	Max (Day/Year)	Max (Hours/Day)	Max (L/min)	WSPA	Source	In_Analysis	GW_Ratio	SW_Ratio	Comments
7876-6BULDE	Surface Water	Twelve Mile Creek	Industrial	Power Production	18489600000	365	24	12840000	LTWEL	SW	No	0	0	Not included non-consumptive use
97-P-2040	Surface Water	Dugout Pond	Commercial	Golf Course Irrigation	1309000	213	12	1818	LTWEL	SW	Yes	0	1	
97-P-2040	Surface Water	Twelve Mile Creek	Commercial	Golf Course Irrigation	1047000	213	24	727	LTWEL	SW	Yes	0	1	
01-P-2187	Ground Water	dugout	Agricultural	Nursery	491000	112	0	909	UWR	SW	Yes	0	1	Pond appears on-line
01-P-2187	Ground Water	Well	Agricultural	Nursery	9000	112	0	137	UWR	GW	Yes	1	0	
0368-6JWR7X	Surface and Ground Water	Dils Lake	Water Supply	Other - Water Supply	164160	200	24	114	UWR	SW	Yes	0	1	
0368-6JWR7X	Surface and Ground Water	Well 1	Water Supply	Other - Water Supply	66000	200	24	46	UWR	GW	Yes	1	0	
03-P-2074	Ground Water	Well	Commercial	Golf Course Irrigation	164000	183	24	114	UWR	GW	Yes	1	0	
03-P-2074	Ground Water	Pond	Commercial	Golf Course Irrigation	446400	183	24	310	UWR	SW	Yes	0	1	Pond appears recharged by surface water
03-P-2297	Ground Water	local drainage to a pond	Recreational	Wetlands	6811000	0	0	25000	UWR	SW	No	0	0	Not applicable wetland creation
1228-6AKS3M	Ground Water	Pond	Agricultural	Sod Farm	1137000	30	11	1591	UWR	GW	Yes	1	0	
1443-73UH7U	Surface and Ground Water	Dugout Pond #4	Agricultural	Nursery	700000	365	24	1000	UWR	GW	Yes	1	0	
1647-6VDM9R	Surface Water	London Wetland #1	Miscellaneous	Wildlife Conservation	4365000	365	24	3031	UWR	SW	No	0	0	Not applicable wetland creation
1647-6VDM9R	Surface Water	London Wetland #2	Miscellaneous	Wildlife Conservation	1900000	365	24	1319	UWR	SW	No	0	0	Not applicable wetland creation
1647-6VDM9R	Surface Water	London Wetland #3	Miscellaneous	Wildlife Conservation	2525000	365	24	1753	UWR	SW	No	0	0	Not applicable wetland creation
2363-728KNT	Surface Water	Welland River (Port Davidson Weir)	Miscellaneous	Dams and Reservoirs	7776000	365	24	5400	UWR	SW	No	0	0	Impoundment area sufficiently small <0.5% consumption in August
2478-728LBJ	Surface Water	Pond formed by a weir on Oswego Creek	Miscellaneous	Dams and Reservoirs	38600000	365	24	26800	UWR	SW	No	0	0	Impoundment area sufficiently small <0.00% consumption in August
2640-6G8GLX	Surface Water	Welland River	Recreational	Wetlands	14112000	365	24	9800	UWR	SW	No	0	0	Not applicable wetland creation
3840-6G6NLE	Surface Water	Tributaries to the Lower Grand River (46 Ponds)	Recreational	Wetlands	56000	365	24	39	UWR	SW	No	0	0	Not applicable wetland creation
4716-728LMF	Surface Water	Welland River	Miscellaneous	Dams and Reservoirs	22000000	365	24	15277	UWR	SW	Yes	0	1	Consumption factor of 3% determined for August based upon Environment canada lake evaporation values
5144-796JYA	Surface Water	McDowell Wetland 1	Miscellaneous	Wildlife Conservation	553000	365	24	9000	UWR	SW	No	0	0	Not applicable wetland creation
5144-796JYA	Surface Water	McDowell Wetland 2	Miscellaneous	Wildlife Conservation	1702000	365	24	20460	UWR	SW	No	0	0	Not applicable wetland creation
5350-6SZND7	Surface Water	Matusewski Wetland	Miscellaneous	Wildlife Conservation	447000	365	24	8760	UWR	SW	No	0	0	Not applicable wetland creation
5656-6SZL2C	Surface Water	Urbshas Wetland	Miscellaneous	Wildlife Conservation	1080000	365	24	750	UWR	SW	No	0	0	Not applicable wetland creation
8125-6SYPHF	Surface Water	Schofield Wetland #1	Miscellaneous	Wildlife Conservation	827000	365	24	9060	UWR	SW	No	0	0	Not applicable wetland creation
8125-6SYPHF	Surface Water	Schofield Wetland #2	Miscellaneous	Wildlife Conservation	490000	365	24	5520	UWR	SW	No	0	0	Not applicable wetland creation
8480-6FTKWM	Ground Water	Pond No. 3	Commercial	Golf Course Irrigation	680000	183	5	2270	UWR	GW	Yes	1	0	
8480-6FTKWM	Ground Water	Well TWI	Commercial	Golf Course Irrigation	48000	183	24	33	UWR	GW	Yes	1	0	
8584-6SYNVW	Surface Water	McEwan Wetland	Miscellaneous	Wildlife Conservation	3564000	365	24	2475	UWR	SW	No	0	0	Not applicable wetland creation
87-P-2011	Ground Water	Well	Commercial	Golf Course Irrigation	140000	0	20	114	UWR	GW	Yes	1	0	
87-P-2011	Ground Water	Pond	Commercial	Golf Course Irrigation	705000	0	17	682	UWR	SW	Yes	0	0.8	20% appears supplied by groundwater well
87-P-2011	Ground Water	Well	Commercial	Golf Course Irrigation	41000	0	15	46	UWR	GW	Yes	1	0	