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July 16, 2015

Ministry of the Environment
Environmental Approvals Branch
2 St. Clair Avenue West, Floor 12A
Toronto, ON
M4V 1L5

VIA COURIER AND EMAIL

Attention: Mohsen Keyvani, Director

Re: Project Modification Report - Water Taking Assessment

Suncor Energy Products Inc. (SEPI) received a Renewable Energy Approval number 6914-9L5JBB (REA) on August 22, 2014 for the Cedar Point Wind Power Project (Project). On February 25, 2015 notice was provided to the Director in accordance with the REA that the Project title and assets were assigned to Cedar Point II Limited Partnership (CP II LP). On July 14, 2015, SEPI filed REA amendment application materials to amend the name of the permit holder from SEPI to CP II LP. CP II LP submits this letter and included REA amendment application requesting the following amendment to the condition H of the REA:

H1. The Company shall not take more than 50,000 litres of water on any day by any means during the construction, installation, use, operation, maintenance and retiring of the Facility.

H2. Notwithstanding Condition H1, at the construction sites for Turbines 13, 37, 41, 44, and 48 the Company is authorized to take a maximum of 3,202,400 litres of surface water accumulation per day, for the purpose of construction dewatering. In the event that water taking requirements at other turbine locations is required, the company may consult directly with the Southwest Region Technical Support Section to request the ability to add additional locations to this condition without amending the 3,202,400 Litres per day limit.

A series of heavy rainfall events resulted in the accumulation of a significant quantity of rainwater within the turbine foundation excavations at locations 13, 37, 42, 44 and 48. Justification for this request is included in the Modification Report.

If you require any further details please do not hesitate to contact me.

Yours truly,

Christopher Scott
Senior Engineer – Renewable Energy
Suncor Energy Products Inc., on behalf of,
Cedar Point II Limited Partnership

Cc: Nick Colella – Ministry of Environment and Climate Change
Michael Moroney – District Manager, Sarnia/Windsor District

Cedar Point II Limited Partnership

**Project Modification Report –
Cedar Point Wind Power Project**

Report

Cedar Point II Limited Partnership

Project Modification Report – Cedar Point Wind Power Project

Prepared by:

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Date:

July, 2015

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Appendices

Appendix A - Water Taking Assessment

1. Introduction

Suncor Energy Products Inc. (“Suncor”) is constructing the Cedar Point Wind Power Project (“the Project”) on behalf of Cedar Point II Limited Partnership (CP II LP). The Project obtained a Renewable Energy Approval (REA) from the Ontario Ministry of the Environment and Climate Change (MOECC) on August 22, 2014 and construction of the Project commenced in March, 2015.

CP II LP is now requesting an amendment to Condition H1 of the REA (No. 6914-9L5JBB) for construction-related dewatering activities associated with turbine foundation construction at turbine locations WTG 13, 37, 41, 44 and 48. The following sections of this REA Project Modification Report describe the edits to the Construction Plan Report and the Project Description Report resulting from the proposed amendment.

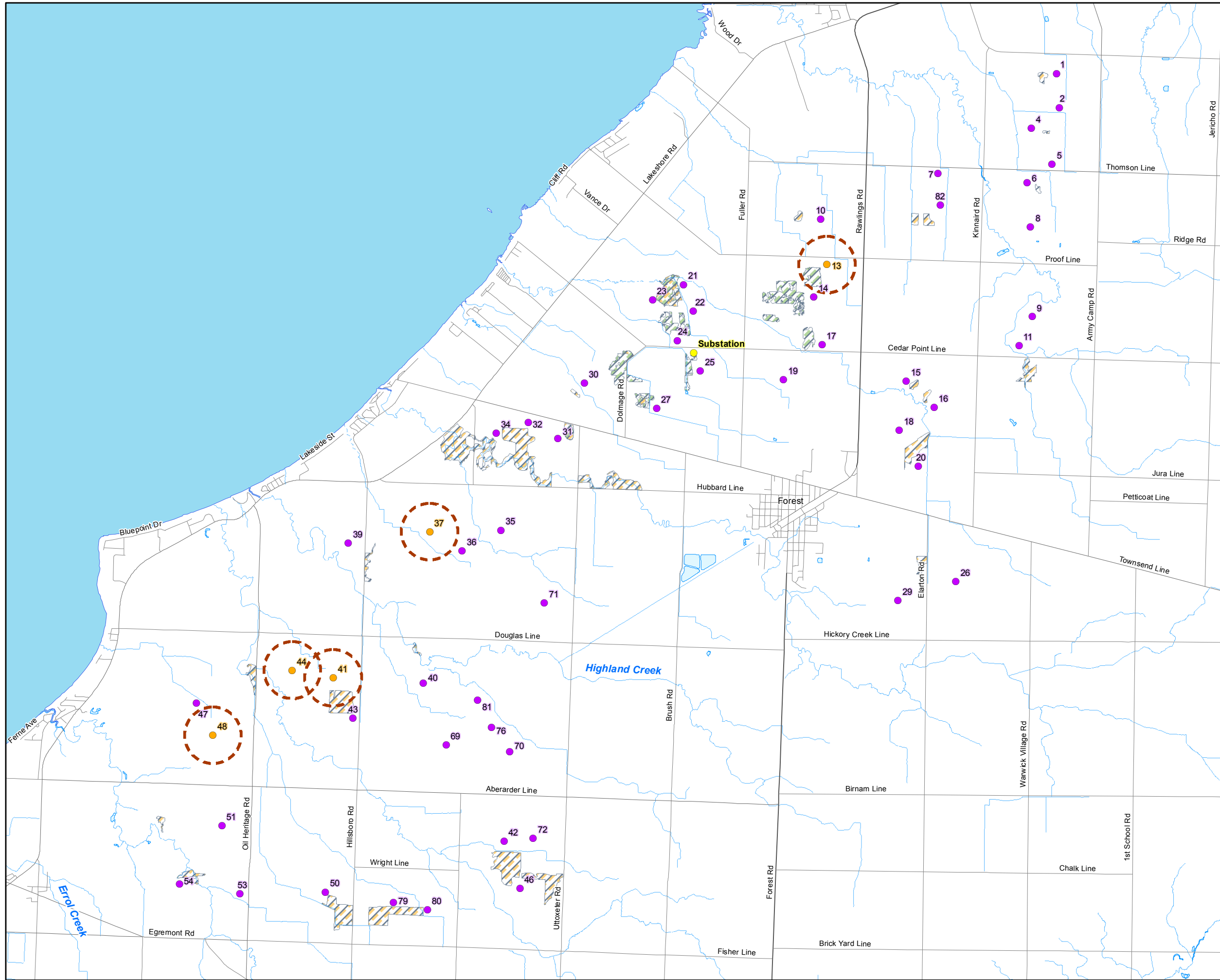
1.1 The Proponent

The primary contacts for the Project are as follows:

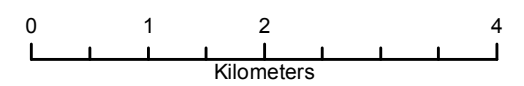
Project Proponent		Project Consultant
Jocelyn Kelln Senior Advisor S&AR Suncor Energy Products Inc. 150 6 th Ave SW Calgary, AB T2P 3E3 Phone: 1-519-888-7187 Email: CedarPoint@Suncor.com	Christopher Scott Project Developer Suncor Energy Products Inc. 150 6 th Avenue SW Calgary, AB T2P 3E3 Phone: 1-866-344-0178 Email: CedarPoint@Suncor.com	Marc Rose Senior Environmental Planner AECOM 105 Commerce Valley Drive West, Floor 7 Markham, ON, L3T 7W3 Phone: 1-905-747-7793 Email: marc.rose@aecom.com

1.2 Study Area

The proposed Project is located in the Town of Plympton-Wyoming, the Municipality of Lambton Shores, and Warwick Township, in Lambton County, Ontario (refer to **Figure 1-1**). For the purposes of this investigation the Study Area is considered to be a 500 m radius encompassing turbine foundations 13, 37, 41, 44 and 48.



- Legend**
- Turbines of Concern
 - 500m Turbine Buffer
 - Substation
 - Turbines
 - Intermittent Stream
 - Permanent Stream
 - Provincially Significant Wetlands (Stantec)
 - Significant Wetlands (Stantec)
 - Waterbody
 - Lake Huron



Suncor Energy Cedar Point Wind Power Project - Water Taking Assessment

Study Area

July 2015	1:65,000	Datum: NAD '83 UTM 17N Source: Stantec
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P#:	V#: 001
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Figure 1

This drawing has been prepared for the use of AECOM's client and may not be used, reproduced or relied upon by third parties, except as agreed by AECOM and its client, as required by law or for use by governmental reviewing agencies. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that modifies this drawing without AECOM's express written consent.

Map location: C:\Proposals\Bids & Proposals - 2015\Environment\Cedar Point\Wind Power Project\GIS Design\Study Area.mxd Date saved: 1/16/2015 9:30:41 PM

2. Proposed Project Modification

CP II LP is proposing to increase the construction dewatering allowance, as outlined in Condition H1 of the REA during the excavation and installation of turbine foundations at turbine locations 13, 37, 41, 44 and 48.

At the time of the REA submission, water taking quantities were anticipated to be below the threshold of 50,000 L/day. This was based on water levels obtained in spring during geotechnical investigations at each turbine foundation location. This data shows that ground water levels were all below the bottom of the excavations. Based on this assessment the following condition was included in the REA pertaining to water taking quantities:

H1. The Company shall not take more than 50,000 litres of water on any day by any means during the construction, installation, use, operation, maintenance and retiring of the Facility.

Project construction activities commenced in March, 2015. Currently 19 turbine foundations remain to be completed and are in various stages of construction, including a number of open excavations. A series of heavy rainfall events resulted in the accumulation of a significant quantity of rainwater within the turbine foundation excavations at locations 13, 37, 41, 44 and 48 (**Figure 1**).

CP II LP is requesting that the MOECC revise Condition H of the REA as follows:

H1. The Company shall not take more than 50,000 litres of water on any day by any means during the construction, installation, use, operation, maintenance and retiring of the Facility.

H2. Notwithstanding Condition H1, at the construction sites for Turbines 13, 37, 41, 44, and 48 the Company is authorized to take a maximum of 3,202,400 litres of surface water accumulation per day, for the purpose of construction dewatering. In the event that water taking requirements at other turbine locations is required, the company may consult directly with the Southwest Region Technical Support Section to request the ability to add additional locations to this condition without amending the 3,202,400 Litres per day limit.

A Water Taking Assessment has been prepared and is included as **Appendix A** of this Project Modification Report. The Water Taking Assessment provides additional hydrogeological information and discussion to support the requested revision to Condition H of the REA for construction-related water-taking activities associated with Turbines 13, 37, 41, 44 and 48. Specifically, it provides:

- A description of the proposed undertaking;
- Details regarding the geological and hydrogeological conditions of the project area;
- Predicted water taking requirements;
- Anticipated discharge conditions;
- An assessment of potential impacts related to water taking activities; and
- Monitoring and mitigation measures to reduce potential impacts related to water taking activities.

3. Edits to the REA Reports

Table 3-1 documents pertinent sections of the REA Reports and required revisions resulting from the modifications described in **Section 2**. The table includes the text from the REA submission (April, 2013), and edits to the text (underlined text represents additions and strikethrough text represents deletions).

Table 3-1 Edits to the REA Reports

Section / Page in REA Report	REA Report text	Revised Text (<u>Underlined text</u> represents additions and strikethrough text represents deletions.)
Project Description Report		
Section 4.3.7.1 / page 4.5-4.6	<p>There is a limited potential for groundwater to be encountered during the installation of the turbine foundations, turbine access roads, underground collector lines, and substation. However, rainwater has the potential to collect in the open excavations during construction; therefore, it is possible that some dewatering activities would be required. It is anticipated that groundwater withdrawal amounts will be well below 50,000 L/d. Historical water well records will be reviewed and piezometers will be installed at some turbine locations to assess the ground water level at the site.</p> <p>However, rainwater has the potential to collect in the open excavations during construction. Therefore, it is possible that some dewatering activities would be required. It is possible that some watercourse crossings would require the use of a dam and pump, where the water may be moved by mechanical means.</p> <p>If it is determined that withdrawn water could exceed 50,000 L per day, additional detail will be provided in the REA application in accordance with the guidance for an application for a Permit to Take Water.</p>	<p>There is a limited potential for groundwater to be encountered during the installation of the turbine foundations, turbine access roads, underground collector lines, and substation. However, rainwater has the potential to collect in the open excavations during construction; therefore, it is possible that some dewatering activities would be required. It is anticipated that groundwater withdrawal amounts will be well below 50,000 L/d. Historical water well records will be reviewed and piezometers will be installed at some turbine locations to assess the ground water level at the site.</p> <p>However, rainwater has the potential to collect in the open excavations during construction. Therefore, it is possible that some dewatering activities would be required. It is possible that some watercourse crossings would require the use of a dam and pump, where the water may be moved by mechanical means.</p> <p><u>If it is determined that withdrawn water could exceed 50,000 L per day, additional detail will be provided in the REA application in accordance with the guidance for an application for a Permit to Take Water. It has been determined that withdrawn water at turbine locations 13, 37, 41, 44 and 48 will exceed 50,000 L per day. Additional mitigation measures for dewatering at these locations are provided in the Construction Plan Report, Table 2.1.</u></p>
Construction Plan Report		
Table 2.1 / page 2.4	<p>Activity</p> <ul style="list-style-type: none"> • Water Taking <p>Description of Activities</p> <ul style="list-style-type: none"> • There may be a potential need to temporarily pump surface water seepage from the excavated turbine foundations. This will occur after rain events as drainage tiles drain the farm land into the foundation excavation. Surface water extraction is anticipated to be nominal and controllable with standard sump pumps. Historical groundwater elevation is below the depth of excavations. • Any water pumped from excavated areas will be directed away from natural features, including wetlands. • Withdrawal amounts are anticipated to be below the threshold of 50,000 L/day. <p>Construction Vehicles (QTY)</p> <ul style="list-style-type: none"> • Sump pumps <p>Material Brought on Site</p> <ul style="list-style-type: none"> • Silt fencing • Straw bales to control surface flows 	<p>Activity</p> <ul style="list-style-type: none"> • Water Taking <p>Description of Activities</p> <ul style="list-style-type: none"> • There may be a potential need to temporarily pump surface water seepage from the excavated turbine foundations. This will occur after rain events as drainage tiles drain the farm land into the foundation excavation. Surface water extraction is anticipated to be nominal and controllable with standard sump pumps. Historical groundwater elevation is below the depth of excavations. • Any water pumped from excavated areas will be directed away from natural features, including wetlands. • Withdrawal amounts are <u>typically</u> anticipated to be below the threshold of 50,000 L/day <u>except at turbine locations 13, 37, 41, 44 and 48 where large quantities of surface water runoff caused by heavy rainfall events entered into the excavation.</u> • <u>With regard to dewatering the turbine foundations at turbine locations 13, 37, 41, 44 and 48, the following additional mitigation measures will be implemented:</u> • <u>The Permit Holder shall regulate the discharge at such a rate that there is no flooding in the receiving water body or to the surrounding land surface, and that no soil erosion, or stream channel scouring is caused.</u> • <u>Siltation and erosion control measures shall be installed at the discharge site(s) and shall be sufficient to control the volumes. Continuous care shall be taken to properly maintain the control devices for the full duration of the discharge.</u> • <u>The Permit Holder shall not discharge turbid water to any storm sewer, tile drain or watercourse including a road side ditch. Turbid water is defined as post-treatment discharge water with a total suspended solids (TSS) concentration in excess of 25 mg/L, turbidity in excess of 10 NTU or a TSS/turbidity greater than 10% of background water quality where applicable.</u> • <u>Based on a representative sample, the Permit Holder shall monitor the discharge's TSS and/or turbidity at least twice daily on any day when a discharge occurs. The Permit Holder shall keep a record of the sample test results available at or near the site of the taking and shall produce the records immediately for inspection by a Provincial Officer upon request. Records shall be kept up-to-date and the monitoring records shall be maintained for two years after the monitoring is complete.</u> • <u>If the discharge water is turbid, de-watering operations shall cease immediately and treatment control measures shall be checked and modified to improve settling and filtration of suspended solids.</u> <p>Construction Vehicles (QTY)</p> <ul style="list-style-type: none"> • Sump pumps <p>Material Brought on Site</p> <ul style="list-style-type: none"> • Silt fencing • Straw bales to control surface flows
Natural Heritage Assessment & Environmental Impact Study		
There are no edits to the Natural Heritage Assessment & Environmental Impact Study resulting from the modification described in Section 2.		
Design and Operations Report		
There are no edits to the Design and Operations Report resulting from the modifications described in Section 2.		
Water Assessment and Water Body Report		
There are no edits to the Water Assessment and Water Body Report resulting from the modifications described in Section 2.		
Decommissioning Plan Report		
There are no edits to the Decommissioning Plan Report resulting from the modifications described in Section 2.		
Wind Turbine Specification Report		
There are no edits to the Wind Turbine Specification Report resulting from the modifications described in Section 2.		

4. Summary and Conclusion

Generally, with respect to the proposed Project, the significance of anticipated residual effects on water body features and/or natural heritage features is predicted to be low provided that the recommended mitigation measures are properly implemented and proactively managed throughout the duration of construction activities.

Appendix A

Water Taking Assessment

Cedar Point II Limited Partnership

Water Taking Assessment – Cedar Point Wind Power Project

Prepared by:

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905 886 7022 tel

905 886 9494 fax

Date:

July, 2015

Statement of Qualifications and Limitations

The attached Report (the "Report") has been prepared by AECOM Canada Ltd. ("Consultant") for the benefit of the client ("Client") in accordance with the agreement between Consultant and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations and conclusions contained in the Report (collectively, the "Information"):

- is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations");
- represents Consultant's professional judgement in light of the Limitations and industry standards for the preparation of similar reports;
- may be based on information provided to Consultant which has not been independently verified;
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued;
- must be read as a whole and sections thereof should not be read out of such context;
- was prepared for the specific purposes described in the Report and the Agreement; and
- in the case of subsurface, environmental or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time.

Consultant shall be entitled to rely upon the accuracy and completeness of information that was provided to it and has no obligation to update such information. Consultant accepts no responsibility for any events or circumstances that may have occurred since the date on which the Report was prepared and, in the case of subsurface, environmental or geotechnical conditions, is not responsible for any variability in such conditions, geographically or over time.

Consultant agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement, but Consultant makes no other representations, or any guarantees or warranties whatsoever, whether express or implied, with respect to the Report, the Information or any part thereof.

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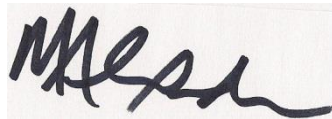
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Report Prepared By:



Erin M. Wilson, P.Geo.
Hydrogeologist

Report Reviewed By:



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Hydrogeologist

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Appendices

Appendix A. Source Water Memo Prepared by GHD

1. Introduction

Cedar Point II Limited Partnership (CP II LP) is currently constructing a wind energy project in the Town of Plympton-Wyoming, Township of Warwick and the Municipality of Lambton Shores, in Lambton County, Ontario. The project is referred to as the Cedar Point Wind Power Project (the "Project") and consists of a total of 46 wind turbines, a transformer substation, and ancillary equipment. The Project obtained a Renewable Energy Approval (REA), as outlined in Ontario regulation 359/09 (O.Reg. 359/09) under the Environmental Protection Act from the Ontario Ministry of the Environment and Climate Change (MOECC) on August 22, 2014 (REA Approval Number 6914-9L5JBB) (MOECC, 2014).

As described in the *Technical Guide to Renewable Energy Approvals* (MOE, 2013), an important environmental effect to consider is the potential for the Project to interfere with existing uses of a water resource. Section 2.0 (Construction and Installation Activities) of the *Suncor Energy Cedar Point Wind Power Project Construction Plan Report* (Stantec, 2013a) indicated a potential requirement to pump surface water seepage from the excavated turbine foundations after rain events. Water taking quantities were anticipated to be below the threshold of 50,000 L/day. Based on this assessment the following condition was made in the REA approval letter pertaining to water taking quantities:

H1. The Company shall not take more than 50,000 litres of water on any day by any means during the construction, installation, use, operation, maintenance and retiring of the Facility.

Project construction activities commenced in March 2015. Currently 19 turbine foundations are in various stages of construction, including a number of open excavations. A series of heavy rainfall events resulted in an accumulation of a significant quantity of rainwater within the turbine foundation excavations at locations 13, 37, 41, 44 and 48 (**Figure 1**).

The Purpose of this report is to provide additional hydrogeological information and discussion in support of a modification to the REA approval from the MOECC for construction related water taking activities associated with the foundation construction at turbine locations 13, 37, 41, 44 and 48. CP II LP is requesting that the MOECC revise Condition H of the REA as follows:

H1. The Company shall not take more than 50,000 litres of water on any day by any means during the construction, installation, use, operation, maintenance and retiring of the Facility.

H2. Notwithstanding Condition H1, at the construction sites for Turbines 13, 37, 41, 44 and 48 the Company is authorized to take a maximum of 3,202,400 litres of surface water accumulation per day, for the purpose of construction dewatering. In the event that water taking requirements at other turbine locations is required, the company may consult directly with the Southwest Region Technical Support Section to request the ability to add additional locations to this condition without amending the 3,202,400 Litres per day limit.

In accordance with the submission requirements associated with securing a Category 2 Surface Water Permit To Take Water (PTTW) prescribed by the MOE, this document presents the following information:

- A description of the proposed undertaking;
- Details regarding the geological and hydrogeological conditions of the project area;
- Predicted water taking requirements;
- Anticipated discharge conditions;

- An assessment of potential impacts related to water taking activities; and
- Monitoring and mitigation measures to reduce potential impacts related to water taking activities.

1.1 Study Area

For the purposes of this investigation the Study Area is considered to be a 500 m radius encompassing turbine foundations 13, 37, 41, 44 and 48.

2. Existing Conditions

2.1 Climate

Climate statistics were obtained from Environment Canada's Sarnia climate station (6127510). Total daily precipitation for the months of May and June 2015, along with long term average values are summarized in **Table 1**. During May 2015 the total accumulation of precipitation of 84.8 mm was higher than the historical average of 69.9 mm for the month. Similarly, the total accumulation of precipitation in June 2015 of 100.4 mm was higher than the historical average of 85.6 mm for the month.

Table 1. Summary of Total Monthly Precipitation and Climate Normals

Month	Maximum Daily Precipitation (2015)	Total Monthly Accumulation (2015)	Precipitation Monthly Normals (1971 – 2000)
May	36.8 mm	84.8 mm	69.9 mm
June	30.0 mm	100.4 mm	85.6 mm

Short duration severe rain events, precipitating large quantities of water in a short period of time, promotes higher levels of surface runoff than would typically occur during lighter rain falls over a longer period of time. This phenomenon has been observed within the last three months and has resulted in higher volumes of surface water accumulating within the excavations than was anticipated.

2.2 Physiography and Topography

The Study Area associated with the five turbines described above lies within the Lambton Clay Plain, a subregion of the St. Clair Clay Plain physiographic region (Chapman and Putnam, 1984). According to Chapman and Putnam (1984) the Lambton Clay Plains often have a shallow veneer of lacustrine clay over underlying till, further described as bevelled till plains.

Topography is generally flat to slightly undulating across the Study Areas and ranges from an elevation of 200 mASL to 210 mASL. Topographic contours for each turbine study area are illustrated on **Figure 2**.

2.3 Overburden Geology

Existing geological and hydrogeological conditions within the Study Areas were established based on a review of surficial geology and Paleozoic bedrock geological mapping from the Ministry of Natural Resources and Forestry (MNR), and MOECC water well records. Site specific geotechnical investigations performed by exp Services Inc. (exp) and field observations collected from construction inspectors were used to characterize the hydrogeological conditions within the Study Areas.

The predominant surficial material throughout the Study Areas is the St. Joseph Till, which is widely characterized as a clayey silt to silty clay till (Fitzgerald, *et al.*, 1979) (**Figure 3**). The St. Joseph Till is not uniform in its lithology across the region. Incorporation and interbedding of coarse grained sediments ranging from laminated silts and clays to sands and gravels are encountered. Predominantly, the St. Joseph Till has a high clay content, which likely restricts infiltration of precipitation and surface water as well as groundwater movement. The St. Joseph Till is considered a local aquitard based on these hydrogeological properties.

Site specific soil stratigraphy for each turbine location was inferred from results of the exp (2014) geotechnical investigation. Fine grained deposits, described as clayey silt till were encountered to the full depth (approximately 23 m below ground surface) in all boreholes. Foundation excavations will extend into and terminate in clayey silt till at all locations.

2.4 Groundwater Conditions

Upon completion of drilling during the geotechnical investigation performed by exp, open boreholes were examined for the presence of groundwater and groundwater seepage. No groundwater was observed in boreholes at turbine locations 13, 37, 41, 44 and 48. In addition, a standpipe monitor was installed within each borehole to monitor water level elevations in April, 2013. Results from this investigation indicated the depth to the groundwater table at turbine locations 13, 37, 41, 44 and 48 ranges between 3.8 m and 5.2 m, which is below the bottom of the turbine foundation excavations.

At the request of Borea Construction (the 'Contractor'), GHD Limited provided a letter statement detailing the observations of the turbine foundation conditions prior to the significant rain fall events (**Appendix A**). The following is an excerpt from this letter pertaining to the conditions of foundation excavations at turbine locations 13, 37, 41, 44 and 48:

"At the time of the original inspection for all these bases, the excavations were dry, and no groundwater seepage was present...." (GHD, 2015).

The information presented herein indicates turbine foundation excavations at the identified locations are above the water table and groundwater seepage is not anticipated to be the cause of the significant volumes of water within the excavation at present.

3. Water Taking Assessment

At five (5) turbine locations currently under construction for the Project (turbines 13, 37, 41, 44 and 48), large quantities of surface water runoff caused by severe precipitation events entered into the excavation. These turbines are primarily surrounded by agricultural fields underlain by silty clay soils. The soils surrounding the turbine excavations do not offer the characteristics to promote rapid surface water infiltration. This results in large overland flows toward the excavations. As minimal groundwater seepage was observed by GHD in the excavation prior to the precipitation event the removal of the water is therefore considered a surface water taking, equivalent to that from a dug out pond.

In addition to turbine sites 13, 37, 41, 44 and 48, there are 14 remaining excavations at various stages of construction that include open excavations (i.e., not backfilled). These sites have benefitted from natural drainage of rainwater and currently do not require significant dewatering. However, should a considerable rain event occur the remaining turbine locations with open excavations could develop similar problems with the accumulation of rain water in the excavation and a delay in construction activities could result.

The necessity to remove large volumes of surface water that enter the turbine excavations after precipitation events is required to maintain dry conditions to pour concrete foundations. The following sections describe the proposed surface water taking calculations. Required mitigation measures for water discharge from the proposed surface water takings are described in **Section 5**.

3.1 Construction Methods

All excavations (existing and planned) are 21.5 m wide by 21.5 m long and extend to a maximum depth of 3.0 mbgs to facilitate the installation of a turbine foundation. Dewatering will be / is required to draw the water level in the turbine foundation excavation from its current water level to dry conditions. Sump pumping dewatering methods will be used to achieve the required drawdown and maintain a dry work area. The sump pump will typically operate 12 hours a day, 7 days a week, until dry conditions are achieved.

3.2 Estimated Dewatering Rates

The remaining turbine foundations are currently at various stages of completion. The quantity of water present within an excavation is estimated based on the volume of the contents currently constructed and the water level within the excavation. **Table 2** summarizes the stage of construction and the estimated volume of water currently present based on site inspections conducted on June 24, 2015 by the Contractor.

Table 2. Turbine Excavation Condition Summary

Turbine Location	Construction Stage	Percentage of Excavation Containing Water (%)	Volume of Contents (m ³)	Water Volume (L)
13	Top Rebar	100%	3.5	1,346,500
37	Bottom Rebar	100%	1	1,349,000
41	Bolt Cage	100%	1.25	1,348,750
44	Bolt Cage	75%	1.25	1,011,563
48	Mud Mat	100%	1	1,349,000

It is expected that the water will be removed from all five (5) turbine excavation listed in **Table 2**, over a period of two (2) days (12 hour work days), resulting in a maximum total dewatering rate of 4,448 L/min. Water taking from turbine locations 13, 37, 41, 44 and 48 may occur simultaneously resulting in a total daily water taking of 3,202,400 L. The average discharge rate per turbine location is estimated to be approximately 890 L/min and will be managed with the mitigation measures detailed in **Section 5**.

3.3 Dewatering Discharge and Water Conservation

It is anticipated that water in the excavation will be pumped from a sump located at the lowest point of the excavation. Sediment laden dewatering discharge shall be pumped to a filtration system (sediment bag) more than 30 m from any watercourse, downgradient from the turbine excavation. Typically, the dewatering discharge will be directed to a hickenbottom tile drain intake that is connected to the municipal drainage system. The contractor will ensure that any water discharged to the natural environment will not result in scouring, erosion or physical alteration of stream channels or banks and that there is no flooding of the receiving area or water body.

Long-term water conservation measures are not anticipated for the proposed short-term water taking. The pumped water will remain within the same watershed as it travels from discharge point to the ultimate receiving body.

4. Assessment of Impacts

The objectives of this assessment of impacts are as follows:

- Identify water body features and natural heritage features that are potentially affected by construction dewatering activities;
- Identify mitigation measures to address potential effects of construction dewatering and discharge on these features;
- Develop a monitoring plan to monitor for potential effects of construction dewatering and discharge on identified private water wells, water body features and natural heritage features prior to, during and post-construction, if required.

4.1 Aquatic Resources

Water body features identified within 120 m of the Project are described in the *Water Assessment and Water Body Report – Suncor Energy Cedar Point Wind Power Project* (Stantec, 2013b) and illustrated on **Figure 2**. The following water body features were identified within the Study Areas and are listed below as potential receiving water bodies for dewatering discharge. A summary of key characteristics obtained from the Water Assessment and Water Body Report (Stantec, 2013b) are included.

Turbine Location 13

- Beith Creek Drain - Trapezoidal channel classified as a Class F municipal drain (intermittent flow)
- Wadsworth Drain – Tributary of Beith Creek. Trapezoidal channel classified as a Class F municipal drain (intermittent flow)

Turbine Location 37

- Douglas Drain – Trapezoidal channel classified as a Class F municipal drain (intermittent flow)

Turbine Location 41

- Unknown Drain – unnamed tributary of Aberarder Creek, designated as an Unclassified municipal drain with seasonal warmwater flow.

Turbine Location 44

- Aberarder Creek – Class C drain (warmwater with no top predators present) or Class E drain (warmwater with top predators present)

Turbine Location 48

- 30 Creek Drain – Permanent channel classified as a Class C drain (warmwater with no top predators)

Generally, the water body features within the Study Areas are warmwater or intermittent drains and the significance of anticipated residual effects on water body features is predicted to be low, provided that the recommended

mitigation measures are properly implemented and proactively managed throughout the duration of construction activities.

4.2 Terrestrial Resources

Natural heritage features within 120 m of the Project Location are described in the Natural Heritage Assessment and Environmental Impact Study Report (Stantec, 2013c) and illustrated on **Figure 2**. A desktop analysis was completed using ArcGIS software to identify natural heritage features considered sensitive to dewatering discharge within the PSAs. For the purposes of this investigation all wetland features are treated as significant.

Turbine Location 13

- Provincially Significant Wetland
- Significant Woodlands

Turbine Location 37

- Significant Woodland

Turbine Location 41

- Significant Wetland
- Significant Woodland

Turbine Location 44

- Significant Woodland

Turbine Location 48

- Significant Woodland

According to construction drawings showing the location of hickenbottom and tile drainage directions, discharge water will flow away from the significant wetlands identified above. The potential for adverse impacts on Significant Wetlands is predicted to be low, provided the recommended mitigation measures are properly implemented and proactively managed throughout the duration of the construction activities.

5. Monitoring and Mitigation Measures

Daily records of the timing and volumes of water takings during construction will be maintained by the constructor to ensure compliance with the maximum allowable dewatering rates. Monitoring and mitigation will also include any terms and conditions of the REA approval issued for the Project (MOECC, 2014).

Additional monitoring and mitigation measures to address potential effects to water body features and natural heritage features are described below:

- The Permit Holder shall regulate the discharge at such a rate that there is no flooding in the receiving water body or to the surrounding land surface, and that no soil erosion, or stream channel scouring is caused.

- Siltation and erosion control measures shall be installed at the discharge site(s) and shall be sufficient to control the volumes. Continuous care shall be taken to properly maintain the control devices for the full duration of the discharge.
- The Permit Holder shall not discharge turbid water to any storm sewer, tile drain or watercourse including a road side ditch. Turbid water is defined as post-treatment discharge water with a total suspended solids (TSS) concentration in excess of 25 mg/L, turbidity in excess of 10 NTU or a TSS/turbidity greater than 10% of background water quality where applicable.
- Based on a representative sample, the Permit Holder shall monitor the discharge's TSS and/or turbidity at least twice daily on any day when a discharge occurs. The Permit Holder shall keep a record of the sample test results available at or near the site of the taking and shall produce the records immediately for inspection by a Provincial Officer upon request. Records shall be kept up-to-date and the monitoring records shall be maintained for two years after the monitoring is complete.
- If the discharge water is turbid, discharge operations shall cease immediately and treatment control measures shall be checked and modified to improve settling and filtration of suspended solids.
- Dewatering discharge water shall not be directed to a significant wetland or woodland feature.

6. Closure

This water taking assessment was completed for the purpose of obtaining approval to increase water taking allowances to 3,202,400 litres per day for the Project. Geotechnical investigations and supporting REA application documents were relied upon by AECOM for our assessment. AECOM has assumed that the information provided was factual and accurate. Judgement has been used by AECOM in the interpretation of the field information provided but subsurface physical and chemical characteristics may vary between or beyond borehole locations given the variability in geological conditions.

Generally, with respect to the proposed Project, the significance of anticipated residual effects on water body features and/or natural heritage features is predicted to be low provided that the recommended mitigation measures are properly implemented and proactively managed throughout the duration of construction activities.

With respect to the proposed Project, the potential for adverse impacts on Significant Wetlands is predicted to be low, provided the recommended mitigation measures are properly implemented and proactively managed throughout the duration of the construction activities.

7. References

Chapman, L.J. and D.F. Putnam, 1984:

The Physiography of Southern Ontario. Ontario Geological Survey, Special Volume 2, 270 pp.
Accompanied by Map P.2715 (coloured), scale 1:600 000.

Exp Services Inc. (exp), 2014:

Supplementary Geotechnical Investigation. Prepared for Suncor. February 20, 2014.

Fitzgerald, W.D., Janicki, Edward, and Storrison, D.J., 1979:

Sarnia-Brights Groe Area, Southern Ontario; Ontario Geology Survey Preliminary Map P.2222, Quaternary Geological Series, Scale 1:50,000, Geology 1977.

Ontario Ministry of the Environment (MOE), 2013:

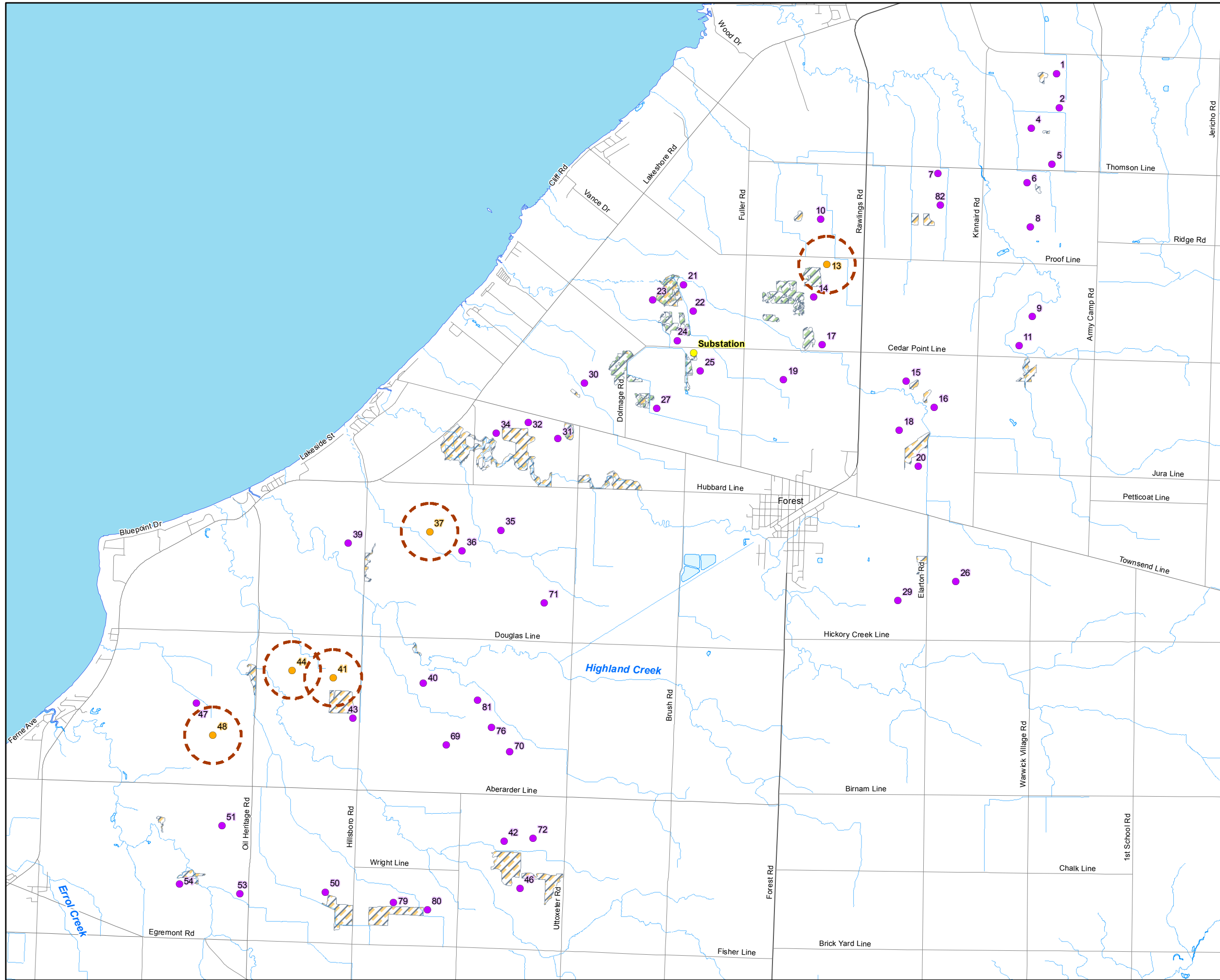
Technical Guide to Renewable Energy Approvals.

Ministry of Environment and Climate Change (MOECC), 2014:
Renewable Energy Approval No. 6914-9L5JBB. Issued August 22, 2014.

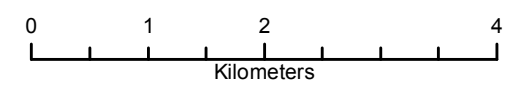
Stantec, 2013a:
Suncor Energy Cedar Point Wind Power Project Construction Plan Report. Prepared for Suncor Energy Products Inc. File No. 160960709. April, 2013.

Stantec, 2013b:
Suncor Energy Cedar Point Wind Power Project Water Assessment and Water Body Report. Prepared for Suncor Energy Products Inc. April, 2013.

Stantec, 2013c:
Suncor Energy Cedar Point Wind Power Project Natural Heritage Assessment and Environmental Impact Study. April, 2013.



- Legend**
- Turbines of Concern
 - 500m Turbine Buffer
 - Substation
 - Turbines
 - Intermittent Stream
 - Permanent Stream
 - Provincially Significant Wetlands (Stantec)
 - Significant Wetlands (Stantec)
 - Waterbody
 - Lake Huron



Suncor Energy Cedar Point Wind Power Project - Water Taking Assessment

Study Area

July 2015	1:65,000	Datum: NAD '83 UTM 17N Source: Stantec
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P#:	V#: 001
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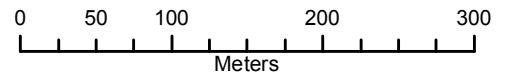
Figure 1

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Map location: C:\Proposals\Bids & Proposals - 2015\Environment\Cedar Point\Wind Power Project\GIS Design\Study Area.mxd Date saved: 1/16/2015 9:30:41 PM



- Legend**
- Turbine of Concern
 - 500m Turbine Buffer
 - Lake Huron
 - Waterbody
 - Intermittent Stream
 - Permanent Stream
 - Contours (5m)
 - Provincially Significant Wetlands (Stantec)
 - Significant Wetlands (Stantec)
 - Significant Woodlands
 - Non-Significant Woodlands



Suncor Energy Cedar Point Wind Power Project - Water Taking Assessment

Turbine Sites - Turbine 210

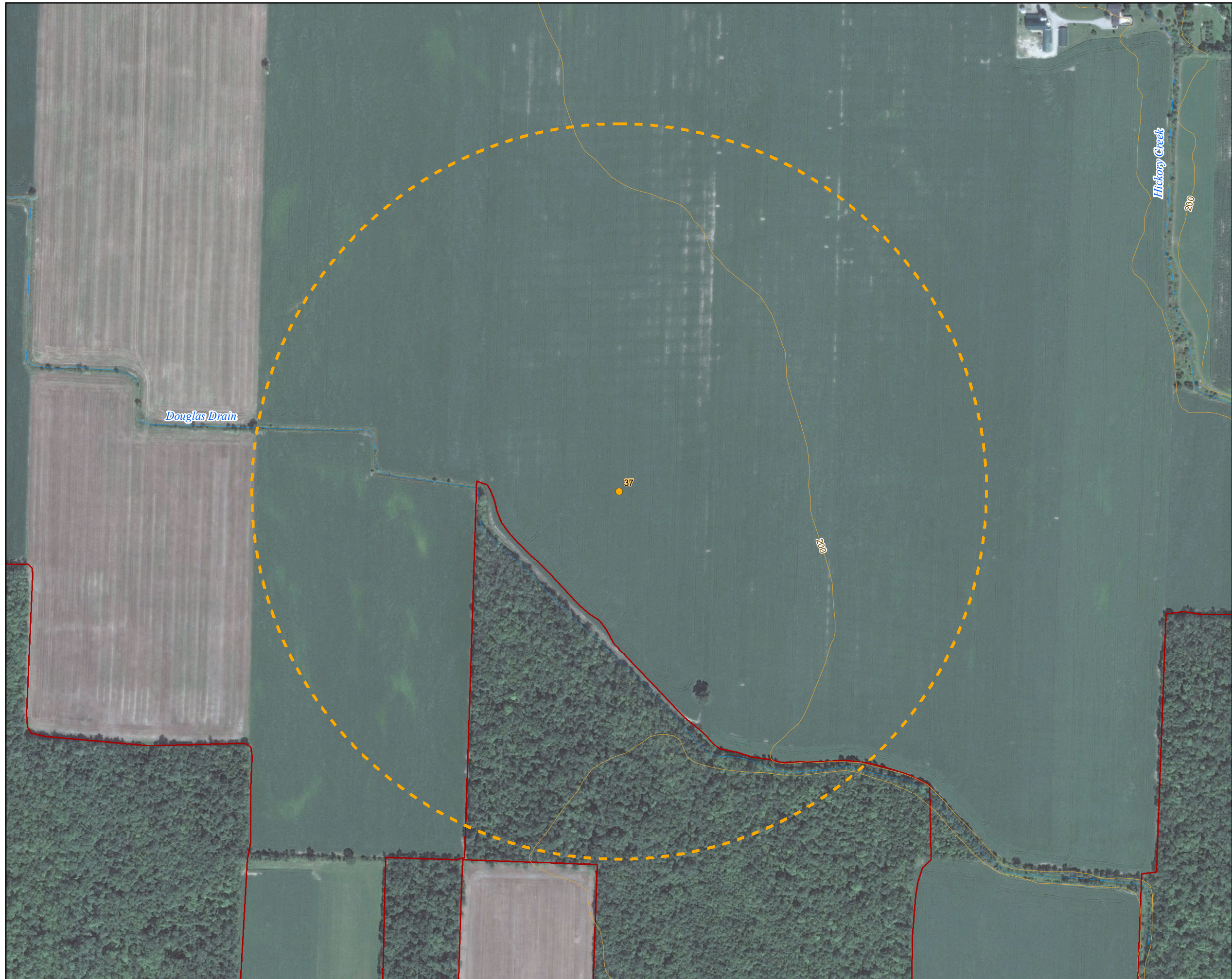
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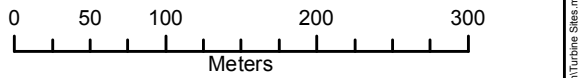
Figure 2a

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Legend

- Turbine of Concern
- 500m Turbine Buffer
- Lake Huron
- Waterbody
- Intermittent Stream
- Permanent Stream
- Contours (5m)
- Provincially Significant Wetlands (Stantec)
- Significant Wetlands (Stantec)
- Significant Woodlands
- Non-Significant Woodlands



Suncor Energy Cedar Point Wind Power Project - Water Taking Assessment

Turbine Sites - Turbine 233

July 2015	1:5,000	Datum: NAD '83 UTM 17N Source: Stantec
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P#:	V#: 001
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Figure 2b

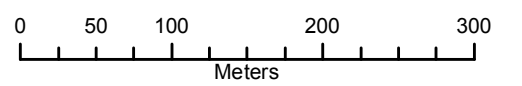
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Map location: C:\Proposals\Bids & Proposals - 2015\Environment\Cedar Point\11 Wind Power Project\GIS Design\Turbine Sites.mxd
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Legend

- Turbine of Concern
- 500m Turbine Buffer
- Lake Huron
- Waterbody
- Intermittent Stream
- Permanent Stream
- Contours (5m)
- Provincially Significant Wetlands (Stantec)
- Significant Wetlands (Stantec)
- Significant Woodlands
- Non-Significant Woodlands



Suncor Energy Cedar Point Wind Power Project - Water Taking Assessment

Turbine Sites - Turbine 242

July 2015	1:5,000	Datum: NAD '83 UTM 17N Source: Stantec
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P#:	V#: 001
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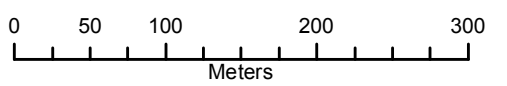
Figure 2c

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Map location: C:\Proposals\Bids & Proposals - 2015\Environment\Cedar Point\11 Wind Power Project\GIS Design\Turbine Sites.mxd
Date saved: 1/16/2015 10:12:34AM



- Legend**
- Turbine of Concern
 - ⬡ 500m Turbine Buffer
 - Lake Huron
 - Waterbody
 - Intermittent Stream
 - Permanent Stream
 - Contours (5m)
 - ▨ Provincially Significant Wetlands (Stantec)
 - ▨ Significant Wetlands (Stantec)
 - ▨ Significant Woodlands
 - ▨ Non-Significant Woodlands



Suncor Energy Cedar Point Wind Power Project - Water Taking Assessment

Turbine Sites - Turbine 244

July 2015	1:5,000	Datum: NAD '83 UTM 17N Source: Stantec
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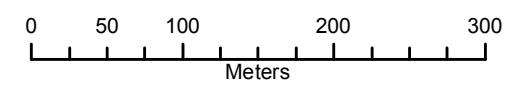
Figure 2d

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Map location: C:\Proposals\Bids & Proposals - 2015\Environment\Cedar Point\11 Wind Power Project\GIS Design\Turbine Sites.mxd
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- Legend**
- Turbine of Concern
 - 500m Turbine Buffer
 - Lake Huron
 - Waterbody
 - Intermittent Stream
 - Permanent Stream
 - Contours (5m)
 - Provincially Significant Wetlands (Stantec)
 - Significant Wetlands (Stantec)
 - Significant Woodlands
 - Non-Significant Woodlands



Suncor Energy Cedar Point Wind Power Project - Water Taking Assessment

Turbine Sites - Turbine 245

July 2015	1:5,000	Datum: NAD '83 UTM 17N Source: Stantec
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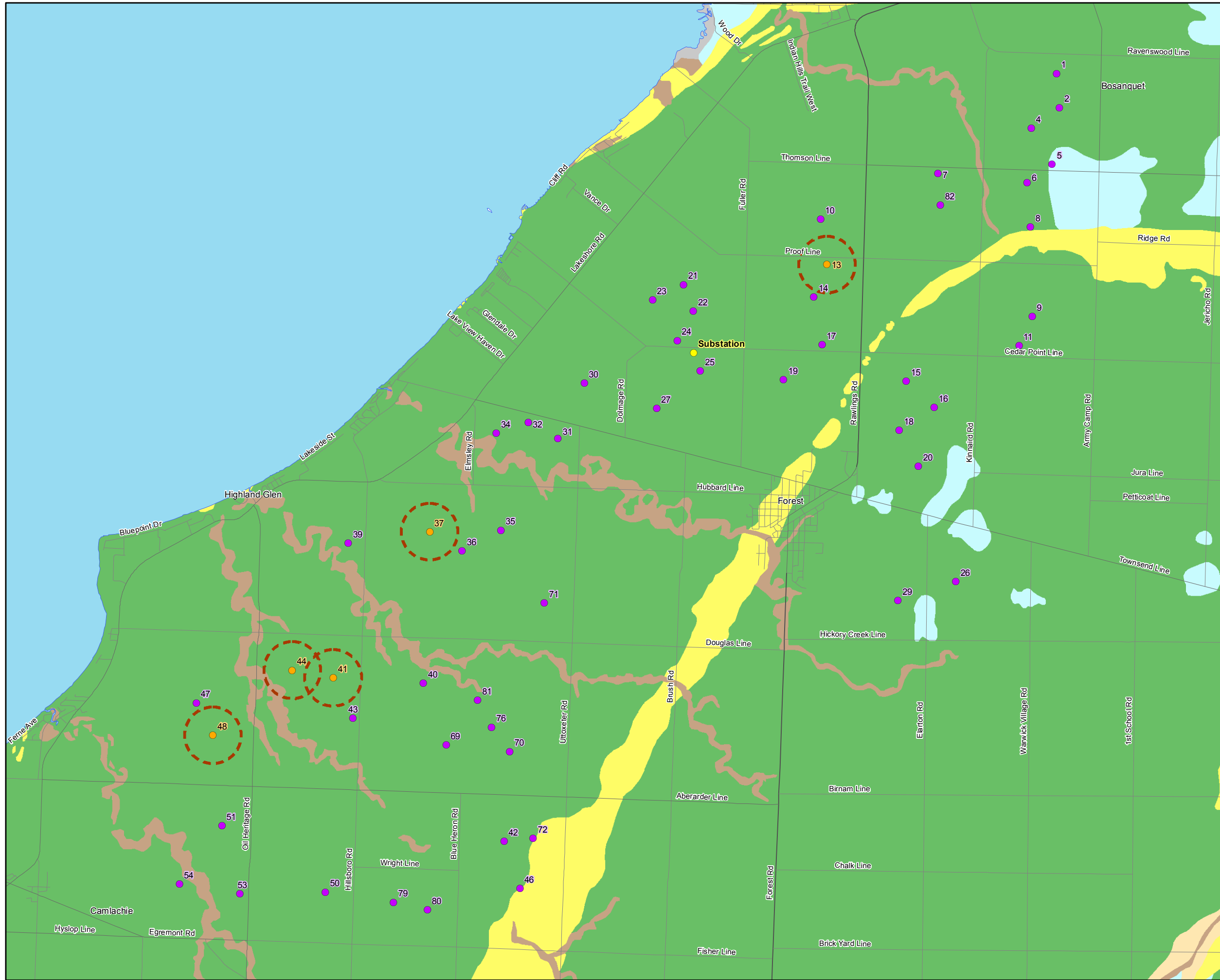
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Figure 2e

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Map location: C:\Proposals\Bids & Proposals - 2015\Environment\Cedar Point\11 Wind Power Project\GIS Design\Turbine Sites.mxd Date saved: 11/16/2015 10:12:37AM



Legend

- Turbine of Concern
- Substation
- Turbines
- 500m Turbine Buffer
- Lake Huron

Surficial Geology

Recent Deposits

- 20: Organic deposits
- 19: Modern alluvial deposits
- 14: Coarse-textured lacustrine deposits
 - 14b: Littoral-foreshore deposits
- 9: Coarse-textured glaciolacustrine deposits
 - 9b: Littoral-foreshore deposits
- 8: Fine-textured glaciolacustrine deposits
 - 8a: Massive-well laminated
- 7: Glaciofluvial deposits
 - 7a: Sandy deposits
- 5: Tills
 - 5d: Glaciolacustrine-derived silty to clayey till

0 1 2 4
Kilometers

Suncor Energy Cedar Point Wind Power Project - Water Taking Assessment

Surficial Geology

July 2015	1:65,000	Datum: NAD '83 UTM 17N Source: Stantec
P#:	V#: 001	

AECOM
AECOM Canada Ltd.

Figure 3

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Map location: C:\Proposals\Bids & Proposals - 2015\Environment\Cedar Point\1 Wind Power Project\GIS Design\Surficial Geology.mxd
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Appendix A

Source Water Memo
prepared by GHD



July 10, 2015

Reference No.T050310-B2

Michael Jaffray
Field Engineer
Borea Construction
3300 Bloor Street West, West Tower
Suite 810
Toronto, ON M8X 2X3

Dear Mr. Jaffray:

**Re: Water Ponding in Foundation Excavations
Wind Turbines CP 210, CP 233, CP 242, CP 244, and CP 245
Cedar Point II Wind Power Project
Lambton Shores, Ontario**

This letter was prepared at the request of Borea Construction to verify the source of water in the bottom of the foundation excavations for Wind Turbines CP 210, CP 233, CP 242, and CP 245. GHD is the new corporate name of Inspec-Sol Inc., as of July 1, 2015.

GHD originally inspected the subgrades for these foundations on the following dates:

- CP 210- May 28, 2015
- CP 233- June 17, 2015
- CP 242- June 16, 2015
- CP 244- June 15, 2015
- CP 245- June 18, 2015

At the time of the original inspection for all these bases, the excavations were dry, and no groundwater seepage was present. Photographs of the subgrades at the time of our inspection are attached. Following our inspection, rains occurred in June (June was a particularly wet month this year). Water has ponded in the open excavations due to the low permeable nature of the site clayey soils. GHD has gone back to each of these excavations, and has noted that the water present is ponded rain water, and not groundwater.

We trust that this letter meets with your present requirements. Please do not hesitate to contact us should any questions arise.

Sincerely,

GHD Limited

A handwritten signature in black ink, appearing to read 'B. Polan', with a horizontal line under the first name.

Bruce Polan, M.A.Sc., P.Eng.
Associate

bp/cr/1

Encl. Photo Logs



Photo 1 – CP210 – Foundation Subgrade



Photo 2 – CP233 – Foundation Subgrade



**Borea Construction
Cedar Point II Wind Power Project
Lambton Shores, Ontario**

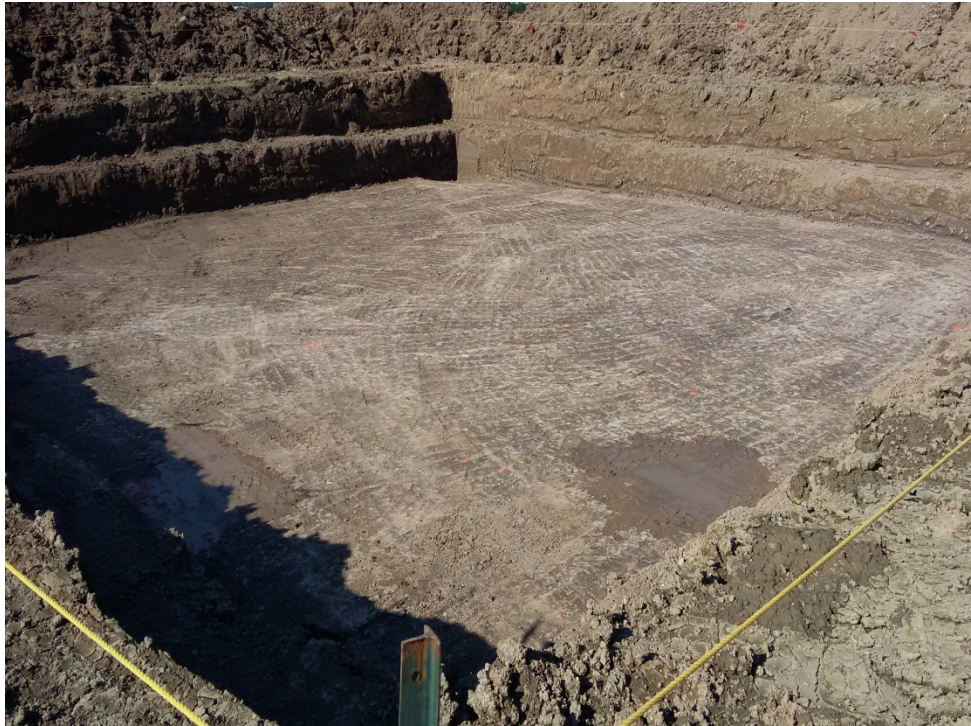


Photo 3 – CP242 – Foundation Subgrade



Photo 4 – CP244– Foundation Subgrade



**Borea Construction
Cedar Point II Wind Power Project
Lambton Shores, Ontario**



Photo 5 – CP245– Foundation Subgrade

