Environment

Goshen Wind, Inc.

Revision to the Water Assessment and Water Body Report – Goshen Wind Energy Centre

Prepared by:

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Project Number:

60301207

Date:

November, 2013

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Glossary of Terms

EIS ..... Environmental Impact Study
MNR ..... Ontario Ministry of Natural Resources
mVA ..... mega Volt-Ampere
NextEra ..... NextEra Energy Canada, ULC
O.Reg. 359/09 ..... Ontario Regulation 359/09
The Project ..... Goshen Wind Energy Centre
REA ..... Renewable Energy Approval

1. Introduction

Goshen Wind, Inc. (Goshen), is proposing to construct a wind energy centre in the Municipality of Bluewater and the Municipality of South Huron in Huron County, Ontario. The following sections of this Renewable Energy Approval (REA) Revision Report describe the proposed modifications to this Project and resulting updates to the Water Assessment and Water Body Report.

1.1 The Proponent

The Project will be owned and operated by Goshen, a wholly owned subsidiary of NextEra Energy Canada, ULC (NextEra). NextEra's indirect parent company is NextEra Energy Resources, LLC. The proponent has not changed from the initial REA submission.

The primary contacts for the Project are as follows:

Project Proponent	Project Consultant
Nicole Geneau Project Director NextEra Energy Canada, ULC 390 Bay Street, Suite 1720 Toronto, ON M5H 2Y2 Phone:….1-416-364-9714 Email: .....Goshen.Wind@NextEraEnergy.com Website: ..www.NextEraEnergyCanada.com	Marc Rose Senior Environmental Planner AECOM 105 Commerce Valley Drive West, Floor 7 Markham, ON, Canada L3T 7W3 Phone: .....1-905-747-7793 Email:.....marc.rose@aecom.com

1.2 Project Study Area

The proposed Project is located in the Municipality of Bluewater and the Municipality of South Huron in Huron County, Ontario (refer to **Figure 2-1**). The Project Study Area has not changed from the initial REA submission.

The following co-ordinates define the external boundaries of the Project Study Area:

Longitude	Latitude
-81.6753290	43.4155312
-81.3011931	43.3810955
-81.3303330	43.3036317
-81.7743607	43.2379854

2. Proposed Project Modifications

Goshen is proposing modifications to the Project. These proposed Project modifications are categorized as follows:

- Construction disturbance area modified to reduce or eliminate impacts to archaeological resources or Conservation Authority regulation limits;
- Infrastructure or construction disturbance area added or changed to optimize project design/ constructability; and,
- Turbine and associated infrastructure removed.

Table 2-1 summarizes and documents the following about each of the proposed modifications:

1. A description of the modification and a rationale for why the modification is proposed; and
2. New potential environmental effects and corresponding mitigation measures.

Figure 2-1 illustrates the modified Project Location. **Appendix A** contains a series of figures showing the details for each of the modifications.

Table 2-1 Summary of Project Modifications

Label on Figure 2-1	Proposed Modification	Rationale for Proposed Modification	New Potential Environmental Effects	New Mitigation Measures (related to Water Bodies)[1]
A1	Removal of Turbine 7 and associated access road and collection line	Turbine and associated infrastructure removed	None – no new water body features within 120 m	N/A
A2	Removal of a portion of Turbine 11 construction disturbance area.	Construction disturbance area modified to reduce or eliminate impacts to Conservation Authority regulation limit	None – no new water body features within 120 m	N/A
A3	Relocation of collection line to Turbine 9 17 m to southern property boundary, west of Bronson Line	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources	None – no new water body features within 120 m	N/A
B1	Relocation of collection line from private property to Babylon Line and Huron Street right-of-way	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources	None – no new water body features within 120 m	N/A
B2	Temporary construction laydown area modified and increased in size	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability	None – no new water body features within 120 m	N/A
B3	Relocation of Turbine 71 15 m north within the existing turbine construction disturbance area	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability	None – no new water body features within 120 m	N/A
C1	Relocation of access road to Turbine 66 to the west	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability	None – no new water body features within 120 m	N/A
C2	Removal of a portion of construction disturbance area, east of Shipka Line, for the access road and collection line to Turbine 21	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources	None – removal of infrastructure	N/A
C3	Addition of collection line construction disturbance area in the Black Bush Line right-of-way, east of Turbine 86	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability	None – no new water body features within 120 m	N/A
C4	Relocation of collection line from private property to Black Bush Line right-of-way in two locations, northeast of Turbine 64	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources	None – no new water body features within 120 m	N/A
C5	Relocation of collection line from private property to Crediton Road right-of-way, south of Turbine 39	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources	None – no new water body features within 120 m	N/A
C6	Relocation of collection line from private property to Bronson Line right-of-way, southwest of Turbine 81	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources	None – no new water body features within 120 m	N/A
C7	Relocation of collection line from private property to South Road right-of-way, southeast of Turbine 38	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources	None – no new water body features within 120 m	N/A
C8	Relocation of collection line from private property to South Road right-of-way, southwest of Turbine 41	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources	None – no new water body features within 120 m	N/A
C9	Realignment of collection line from Black Bush Line right-of-way onto private property west of Black Bush Line	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability	None – no new water body features within 120 m	N/A
C10	Removal of a portion of collection line disturbance area on private property, along Black Bush Line	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability	None – removal of infrastructure	N/A
D1	Relocation of Turbine 83 and associated construction disturbance area 1,140 m to the east	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability	Water Bodies: • Effects associated with construction of turbine and associated construction disturbance area within 120 m of water body D05 include: - Increase to surface water temperature from reduced groundwater contribution if dewatering activities are required for excavation of turbine foundations - Increase to stream flows in watercourses that receive temporary groundwater dewatering discharge (if required). Groundwater discharge has potential to cause streambed and/or bank erosion and downstream sedimentation if not managed properly. - Increased erosion, sedimentation and turbidity in watercourse from clearing and grubbing for on adjacent lands for construction of turbines, pads and turnaround areas. - Soil compaction, which may result in hardening of surfaces and increased runoff into watercourses. - Release / discharge of runoff from the construction area, which has the potential to transport sediment and nutrients into the watercourse. - Soil/water contamination by oils, grease and other materials from accidental spills and release of contaminants from construction equipment. • Effects associated with new turbine location within 120 m of water body D05 include: - • Increase in impervious surfaces from presence of turbine foundation and access roads, resulting in increased water temperatures, increased surface runoff and stream peak flows, and reduced infiltration, base flows and upwelling.	• Mitigation measures associated with turbine construction within 120 m of a water body include (refer to **Appendix B** for detailed mitigation measures under the following headings): - Water management - Timing windows - Water quality - Erosion and sediment control - Grading and excavation - Equipment use - Material Stockpiling and handling • Mitigation measures associated with new turbine location within 120 m of a water body include: - N/A

[1] *Refer to **Appendix B** for a detailed list of mitigation measures related to water bodies that were included in the Water Assessment and Water Body Report (AECOM, 2012)*

Table 2-1 Summary of Project Modifications

Label on Figure 2-1	Proposed Modification	Rationale for Proposed Modification	New Potential Environmental Effects	New Mitigation Measures (related to Water Bodies)[1]
D2	Removal of the southwest portion of Turbine 17 construction disturbance area	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources	None – removal of infrastructure	N/A
D3	Relocation of collection line from private property to Grand Bend Line right-of-way, south and west of Turbine 53	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability	None – no new water body features within 120 m	N/A
D4	Relocation of collection line from private property to South Road right-of-way, east of Turbine 55	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability	None – no new water body features within 120 m	N/A
E1	Relocation of collection line from private property to Mollard Line right-of-way, west of Turbine 56	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources	None – no new water body features within 120 m	N/A
E2	Removal of a portion of Turbine 56 construction disturbance area	Construction disturbance area modified to reduce or eliminate impacts to Conservation Authority regulation limit	None – removal of infrastructure	N/A
E3	Addition of collection line construction disturbance area on private property, heading west to Turbine 60 from Mollard Line, and removal of collection line heading west to Turbine 58 from Mollard Line	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources	None – no new water body features within 120 m	N/A
E4	Addition of construction disturbance area for access road and collection line to Turbine 56 from Eagleson Line	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability	None – no new water body features within 120 m	N/A
F1	Removal of Turbine 46 and associated access road and collection line, including collection line in the Gordon Line right-of-way and collection line on private property to Turbine 77	Turbine and associated infrastructure removed	None – removal of infrastructure	N/A
F2	Removal of a portion of construction disturbance area for access road and collection line to Turbine 77	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources	None – removal of infrastructure	N/A
F3	Addition of collection line in Babylon Line right-of-way, between the access road to Turbine 77 and the access road to Turbine 49	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability	• New effects associated with collection line crossing water body D15 include: - Soil / water contamination by oils, gasoline, grease and other materials from accidental spills and release of contaminants from equipment. - Release / discharge of runoff from the construction area, which has the potential to transport sediment and nutrients into the watercourse	• Mitigation measures associated with turbine construction within 120 m of a water body include (refer to **Appendix B** for detailed mitigation measures under the following headings): - Directional Drilling - Water Quality - Equipment use - Erosion and sediment control
F4	Addition of transmission line construction disturbance area on private property, west of Parr Line	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability	None – no new water body features within 120 m	N/A
F5	Removal of a portion of transmission line construction disturbance area on private property, west of Ausable Line and relocation of transmission line to an overhead position crossing the Ausable River.	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability	None – removal of infrastructure	N/A
G1	Addition of transmission line construction disturbance area on private property, west of London Road	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability	None – no new water body features within 120 m	N/A
G2	Addition of transmission line construction disturbance area on private property, west of London Road	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability	None – no new water body features within 120 m	N/A
G3	Addition of transmission line construction disturbance area in the Crediton Road right-of-way	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability	None – no new water body features within 120 m	N/A
G4	Removal of a portion of transmission line construction disturbance area on private property, south of Crediton Road and east of McTaggart Line	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability	None – removal of infrastructure	N/A
H1	Addition of transmission line construction disturbance area on private property, east of Hern Line	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability	None – no new water body features within 120 m	N/A
H2	Addition of transmission line construction disturbance area on private property, west of Sunshine Line	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability	None – no new water body features within 120 m	N/A
H3	Addition of transmission line construction disturbance area on private property, east of Sunshine Line	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability	None – no new water body features within 120 m	N/A
H4	Removal of a portion of transmission line construction disturbance area on private property, east of Sunshine Line	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability	None – removal of infrastructure	N/A
H5	Addition of transmission line construction disturbance area on private property, south of Dump Road and west of Sunshine Line,	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability	None – no new water body features within 120 m	N/A

Table 2-1 Summary of Project Modifications

Label on Figure 2-1	Proposed Modification	Rationale for Proposed Modification	New Potential Environmental Effects	New Mitigation Measures (related to Water Bodies)[1]
H6	Addition of transmission line construction disturbance area on private property, south of Dump Road and west of Sunshine Line	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability	None – no new water body features within 120 m	N/A
H7	Addition of transmission line construction disturbance area on private property, on the south side of Dump Road, east of Plugtown Line	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability	None – no new water body features within 120 m	N/A
H8	Addition of transmission line construction disturbance area on private property, on the north side of Dump Road, west of Union Line and addition and removal of portions of the transmission line point of interconnect construction disturbance area	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability	None – no new water body features within 120 m	N/A
H9	Removal of a portion of transmission line construction disturbance area on private property, north of Crediton Road, and west of Hern Line	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources	None – removal of infrastructure	N/A
N/A	Use of a spare 170 mVA transformer to be stored within the existing footprint of the Jericho Wind Energy Centre substation.	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability	N/A	N/A

Lake Huron

Legend
- Transmission Line Study Area
- Wind Energy Centre Study Area
- Properties
- A1 Layout Modification Locations
- Change Map Extent
- August 2013 - 120m Area of Investigation
- January 2013 - 120m Area of Investigation

Turbines and Permanent Meterological Tower
- Added
- Removed
- No Change

Layout Modification (Type, Status)
- Collection Line, Added
- Road, Added
- Collection Line, Removed
- Road, Removed
- Collection Line, No Change
- Access Road , No Change
- Transmission Line, No Change

Modification to Disturbance Areas
Status
- Added
- Removed
- No Change

Antoinette's Lane
Bedard Rd
Moore Crt
Zurich-hensall Rd
Main St
Blind Line
King St
Hensall Rd
Oak Rd
Perth 183 Rd
182 Rd
Sararas Rd
Bronson Line
Lk Shore Dr
Hendrick Rd
Pepper Rd
Parr Line
Ausable Line
Bell's Line
London Rd
Rogerville Rd
Perth 17 Rd
181 Rd
Hurondale Rd
Alexander Rd
Perth 180 Rd
Shadeview Rd
Blackbush Line
Goshen Line
Babylon Line
Airport Line
Morrison Line
Macdonald Rd
Bluewater Hwy
Turnbull's Rd
Centre St
Dashwood Rd
Thames Rd
Perth 20 Line
Gore Rd
Hill St
Main St E
Shoreline Dr
Huron Dr
John St
Ontario St S
B Line
Huron St
Marlborough St
William St
Albert St
Bryde Blvd
Main St N
Mctaggart Line
Elimville Line
Plugtown Line
Union Line
Parkview Cres
Mallard Line
Kirkton Rd
Dump Rd
Hern Line
Sunshine Line
Lakeshore Rd
Goosemarsh Line
Klondyke Rd
Greenway Rd
Grand Bend Line
South Rd
Comet Line
Shipka Line
Crediton Rd
Victoria Ave E
Evergreen Line
Mary St
Perth 8 Line
Woodham Rd
B St
Huron Park Rd
Park Rd
Perth 164 Rd
6 Line
Perth 161 Rd
Squires Sideroad
23 Hwy
Whalen Line
Greenway Dr
Black Bush Line
Bronson Line
Victoria Dr
Tasko Dr
Mount Carmel Dr
Hutchinson Rd
Eagleson Line
Hagmier Rd
Bullock Rd
Cedar Swamp Rd
Salem Rd
Adare Dr
Richmond St
Coursey Line
Saintsbury Line
Roman Line
Mitchell Line
Mark Settlement Dr
Prance Rd
Harmony Rd
Mcinnis Rd
W Corner Dr
Grand Bend Rd
Grieves Rd
Gorkin Rd
Mcgillivray Dr
Mooresville Dr
Creamery Rd
Cassidy Rd
Brinsley Rd
Maguire Rd
Neil Rd
Lieury Rd
Ausable Dr
Breen Dr
Avenue Dr
Parkhill Dr
Sylvan Rd
Pete Sabe Rd
Elliot Dr

A
B
C
D
E
F
G
H

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N W E S

1:105,000

UTM Zone 17N, NAD 83

Goshen Wind Energy Centre
REA Amendment

Project Location

September 2013
Project 60155032

AECOM

Figure 2-1

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3. Edits to the Water Assessment and Water Body Report

Table 3-1 documents the edits to the Water Assessment and Water Bodies Report resulting from the modifications described in **Section 2**. The table includes the text from the original REA submission and edits to the text (underlined text represents additions and strikethrough text represents deletions). Updated figures are included in **Appendix C** of this Revision Report.

Table 3-1 Edits to the Water Assessment and Water Body Report

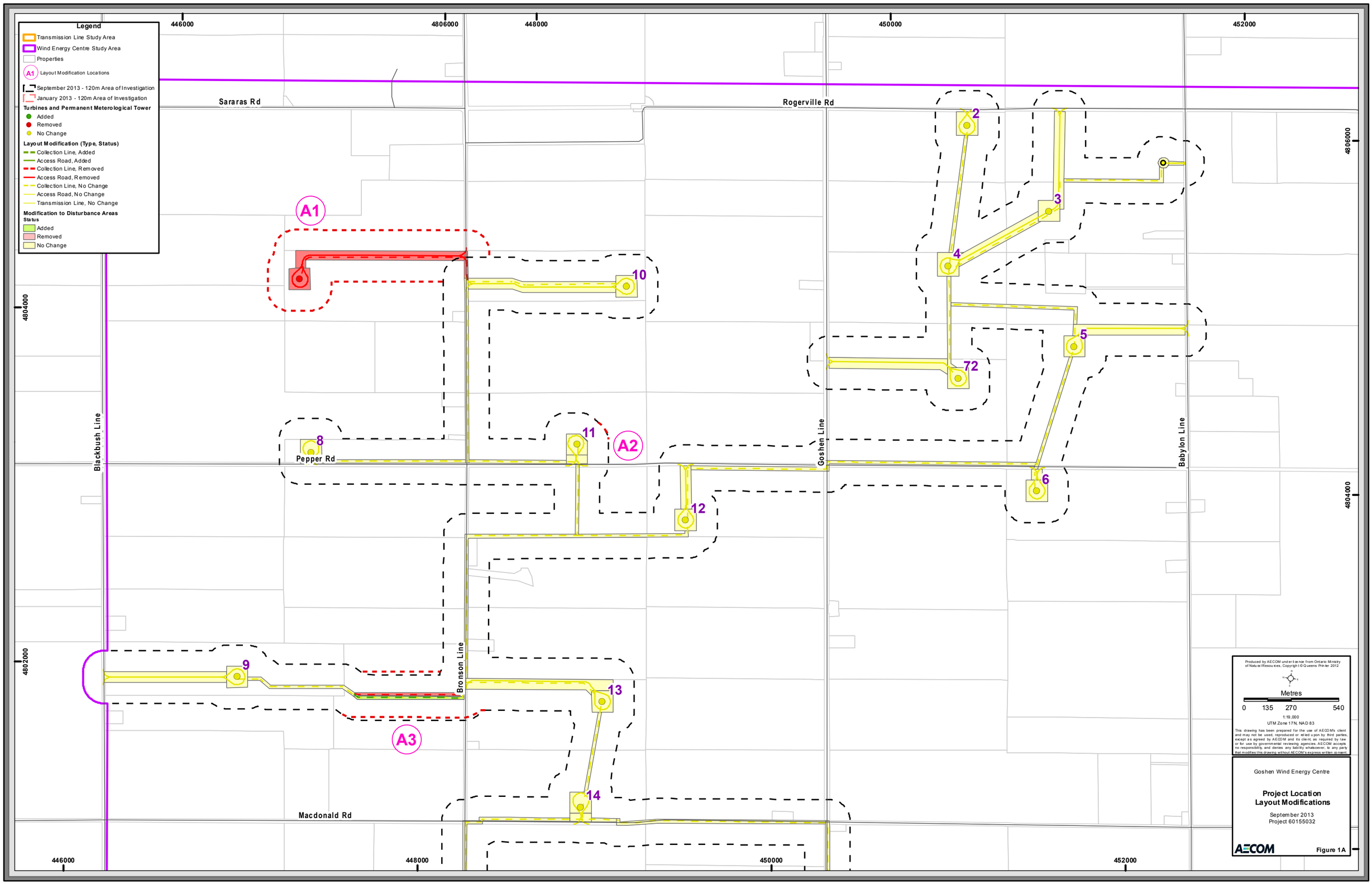
Section / Page	Original Text	Revised Text (Underlined text represents additions and ~~strikethrough text~~ represents deletions)
Section 1 / Page 1	Although NextEra is seeking a Renewable Energy Approval (REA) for 72 wind turbines, only 63 are proposed to be constructed for the Project.	Although NextEra is seeking a Renewable Energy Approval (REA) for ~~72~~ 70 wind turbines, only 63 are proposed to be constructed for the Project.
Table 4-2 / Page 35	N/A	**Date** August 6, 2013 **Duration** 1:10 **Location** D05 **Weather** 15°C, 0 mm precipitation **Field Notes** C. Boros **Name of Investigator(s) / Qualifications** C. Boros, B. Zwiep
Table 4-2 / Page 35	N/A	**Date** August 6, 2013 **Duration** 0:45 **Location** C64 **Weather** 20°C, 0 mm precipitation **Field Notes** C. Boros **Name of Investigator(s) / Qualifications** C. Boros, B. Zwiep
Section 14.3 / Page 163	With regard to the location of the Project Components in relation to the 83 REA water bodies: • 31 are located within 120 m of a wind turbine; • 42 are crossed by a collection line, with an additional 14 located within 120 m of a collection line; • 8 are crossed by an access road, with an additional 15 located within 120 m of an access road; • 9 are crossed by overhead wires for a transmission line, 1 is crossed via horizontal direction drilling for the transmission line and 2 are located within 120 m of the transmission line; • 1 is located within 120 m of the breaker switch station; and, • 3 are located within 120 m of meteorological towers Please note that many of the 83 water bodies intersect more than one Project Component.	With regard to the location of the Project Components in relation to the ~~83~~ 82 REA water bodies: • ~~31~~ 32 are located within 120 m of a wind turbine; • 42 are crossed by a collection line, with an additional 14 located within 120 m of a collection line; • 8 are crossed by an access road, with an additional 15 located within 120 m of an access road; • 9 are crossed by overhead wires for a transmission line, 1 is crossed via horizontal direction drilling for the transmission line and 2 are located within 120 m of the transmission line; • 1 is located within 120 m of the breaker switch station; and, • 3 are located within 120 m of meteorological towers Please note that many of the 83 water bodies intersect more than one Project Component.
Section 15.2.1 / Page 171	With a total nameplate capacity of 102 MW, the Project is categorized as a Class 4 facility under *O. Reg. 359/09*. Although NextEra is seeking an REA for up to 72 wind turbines, only 63 are proposed to be constructed for the Project.	With a total nameplate capacity of 102 MW, the Project is categorized as a Class 4 facility under *O. Reg. 359/09*. Although NextEra is seeking an REA for up to ~~72~~ 70 wind turbines, only 63 are proposed to be constructed for the Project.
Section 15.2.1 / Page 171	There are 31 water bodies located within 120 m of the Project Location for turbines.	There are ~~31~~ 32 water bodies located within 120 m of the Project Location for turbines.
Table 5-2 / Page 177	**Activity – Construction** **Project Component – Turbine** **Waterbody Location and Sensitivity –** • **Moderate Sensitivity** –C5, C7, C15, C43, C46, C52, C67, C74, C80, C89, C124, D44, D57 • **Low Sensitivity**–C14, C36, C37, C48, C56, C62, C68, C73, C75, C76, C78, C86, C110, D07, D09, D51, D52, D55	**Activity – Construction** **Project Component – Turbine** **Waterbody Location and Sensitivity –** • **Moderate Sensitivity** –C5, C7, C15, C43, C46, C52, C67, C74, C80, C89, C124, D44, D57 • **Low Sensitivity**–C14, C36, C37, C48, C56, C62, C68, C73, C75, C76, C78, C86, C110, D05, D07, D09, D51, D52, D55.
Table 5-4 / Page	**Activity – Construction** **Project Component – Collection Line Crossing** **Waterbody Location and Sensitivity –** • **Moderate Sensitivity** – C6, C33, C42, C43, C52, C61, C64, C67, C74, C81, C82, C83, C124, C137, C139, C208, D11, D12, D17, D18, D19, D20, D43 • **Low Sensitivity** – C11, C14, C36, C44, C48, C62, C73, C75, C76, C144, C209, D04, D13, D14, D16, D45, D46, D47, D55 **Activity - Construction** **Project Component - Collection Line Crossing and Associated Buffer** **Collection Line Crossing** • **Moderate Sensitivity** – C6, C33, C42, C43, C52, C61, C64, C67, C74, C81, C82, C83, C124, C137, C139, C208, D11, D12, D17, D18, D19, D20, D43 • **Low Sensitivity** – C11, C14, C36, C44, C48, C62, C73, C75, C76, C144, C209, D04, D13, D14, D16, D45, D46, D47, D55 **Collection Line Buffer** • **Moderate Sensitivity** – C15, C46, C66, C89, C96, D44 • **Low Sensitivity** – C37, C45, C78, D01, D05, D53, P8	**Activity – Construction** **Project Component – Collection Line Crossing** **Waterbody Location and Sensitivity –** • **Moderate Sensitivity** – C6, C33, C42, C43, C52, C61, C64, C67, C74, C81, C82, C83, C124, C137, C139, C208, D11, D12, D17, D18, D19, D20, D43 • **Low Sensitivity** – C11, C14, C36, C44, C48, C62, C73, C75, C76, ~~C144~~, C209, D04, D13, D14, D15, D16, D45, D46, D47, D55 **Activity - Construction** **Project Component - Collection Line Crossing and Associated Buffer** **Collection Line Crossing** • **Moderate Sensitivity** – C6, C33, C42, C43, C52, C61, C64, C67, C74, C81, C82, C83, C124, C137, C139, C208, D11, D12, D17, D18, D19, D20, D43 • **Low Sensitivity** – C11, C14, C36, C44, C48, C62, C73, C75, C76, ~~C144~~, C209, D04, D13, D14, D15, D16, D45, D46, D47, D55 **Collection Line Buffer** • **Moderate Sensitivity** – C15, C46, C66, C89, C96, D44 • **Low Sensitivity** – C37, C45, C78, D01, D05, D53, P8

4. Summary and Conclusions

The Project modifications described in this REA Revision Report do not change the overall conclusion of the Water Assessment and Water Body Report which states that “all of the potential effects from the construction and operation of the Project can be mitigated so that the effect on the water bodies are reduced to no residual effects, or low in the case of water body crossings”.

Appendix A

Project Modifications



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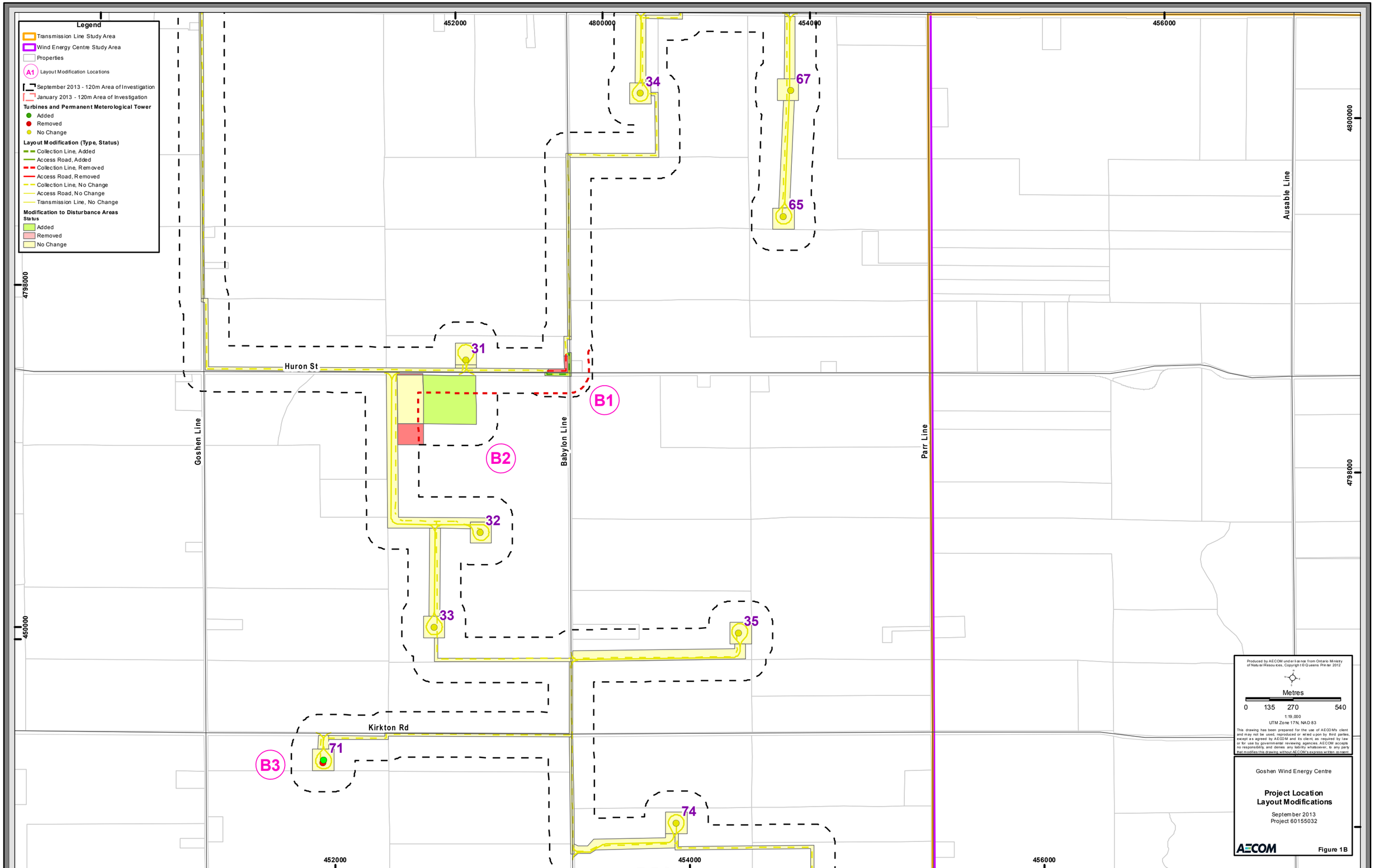

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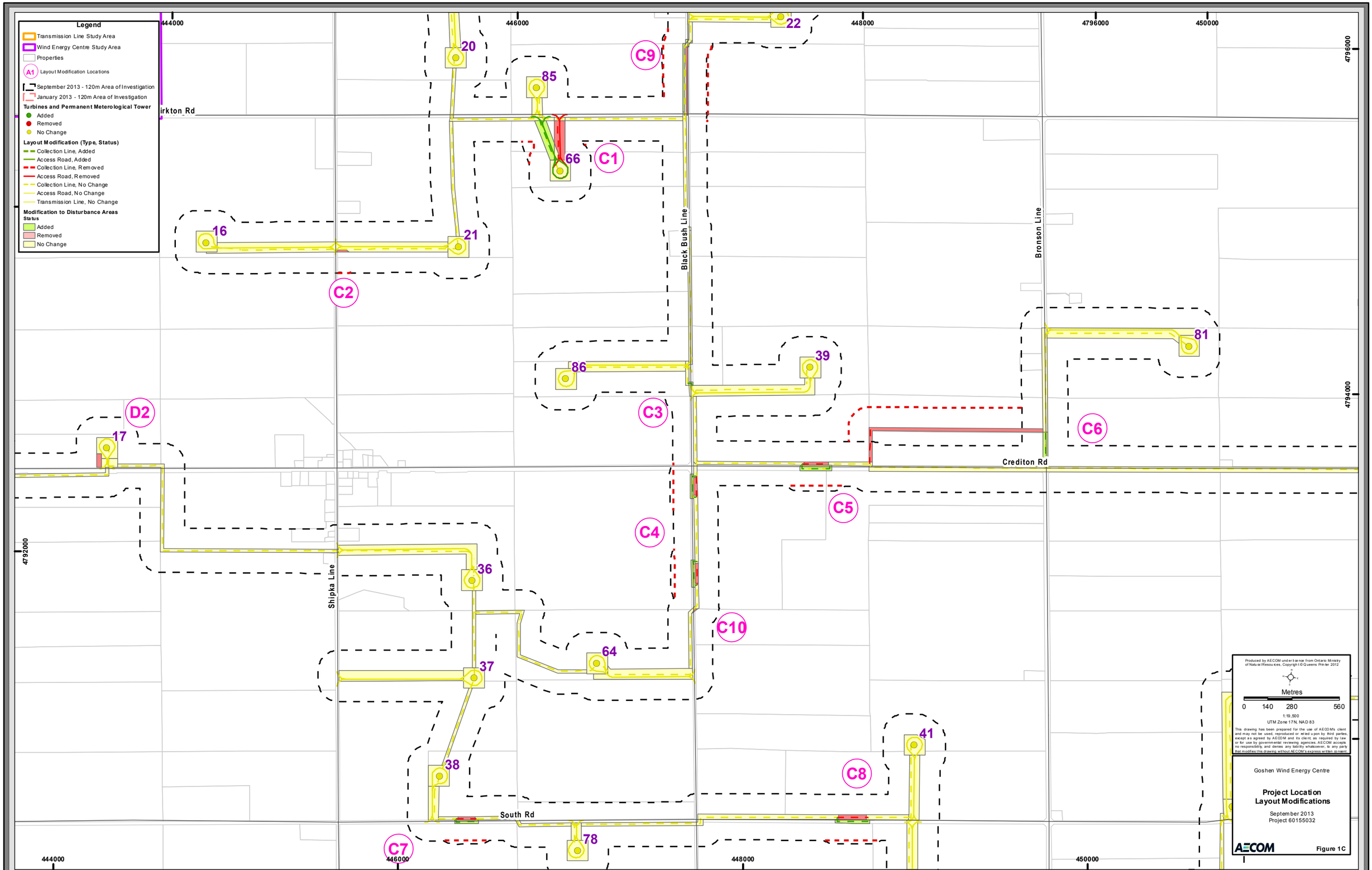

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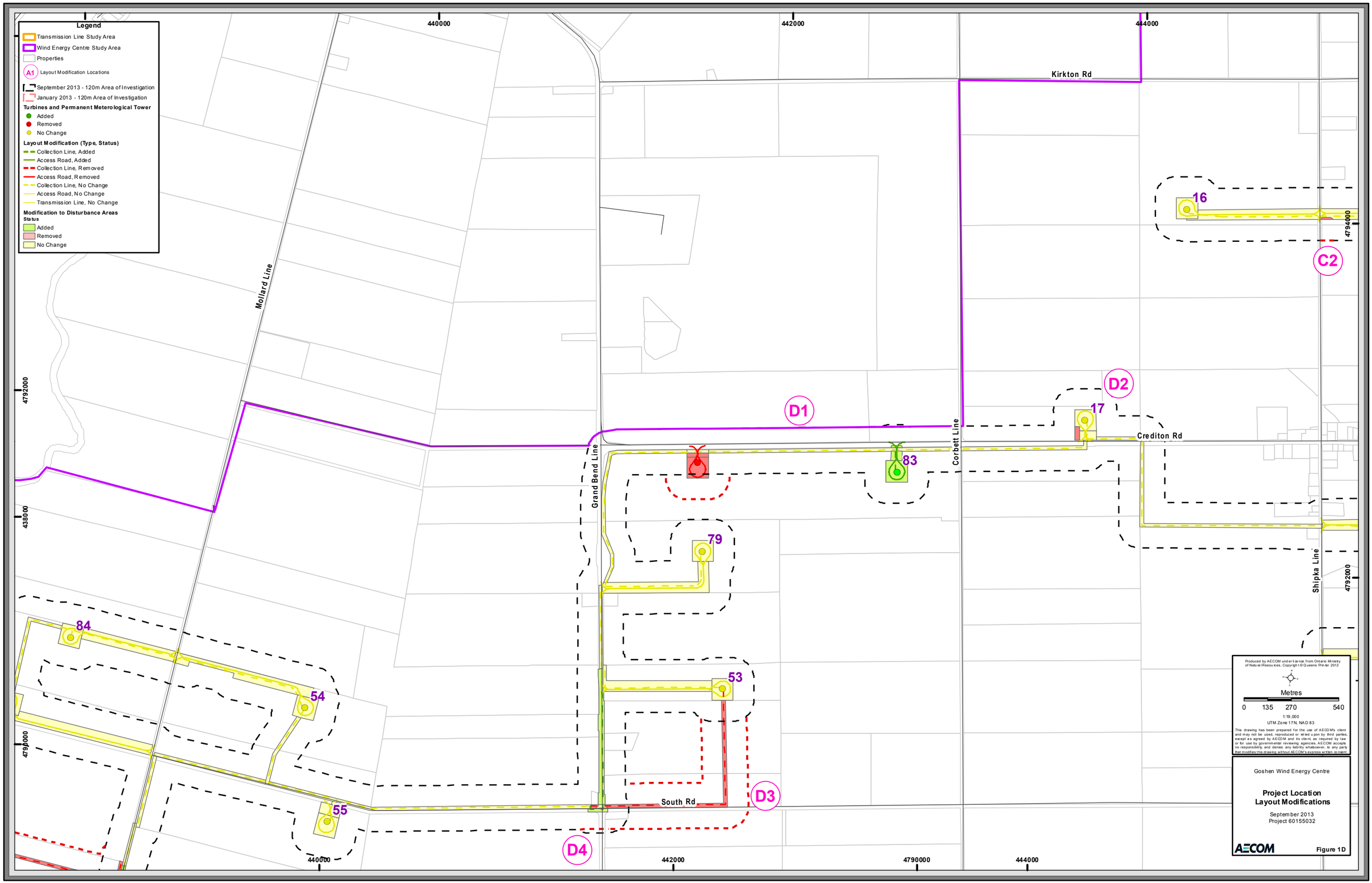

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Legend

- Transmission Line Study Area
- Wind Energy Centre Study Area
- Properties
- A1 Layout Modification Locations
- September 2013 - 120m Area of Investigation
- January 2013 - 120m Area of Investigation

Turbines and Permanent Meterological Tower

- Added
- Removed
- No Change

Layout Modification (Type, Status)

- Collection Line, Added
- Access Road, Added
- Collection Line, Removed
- Access Road, Removed
- Collection Line, No Change
- Access Road, No Change
- Transmission Line, No Change

Modification to Disturbance Areas

Status

- Added
- Removed
- No Change

436000 438000 440000

4790000

Lakeshore Rd
Cold Storage Rd
Klondyke Rd
Goosemarsh Line
Museum Rd
Greenway Rd
Mollard Line
South Rd
Greenway Dr
Hagmier Rd
Eagleson Line
Hutchinson Rd

84 57 54 55 58 60 59 61 62 63 56 52

E1 E2 E3 E4

4788000

4786000 436000 438000 440000

434000

Metres

0 135 270 540

1:19,000

UTM Zone 17N, NAD 83

Goshen Wind Energy Centre

Project Location
Layout Modifications

September 2013
Project 60155032

AECOM

Figure 1E

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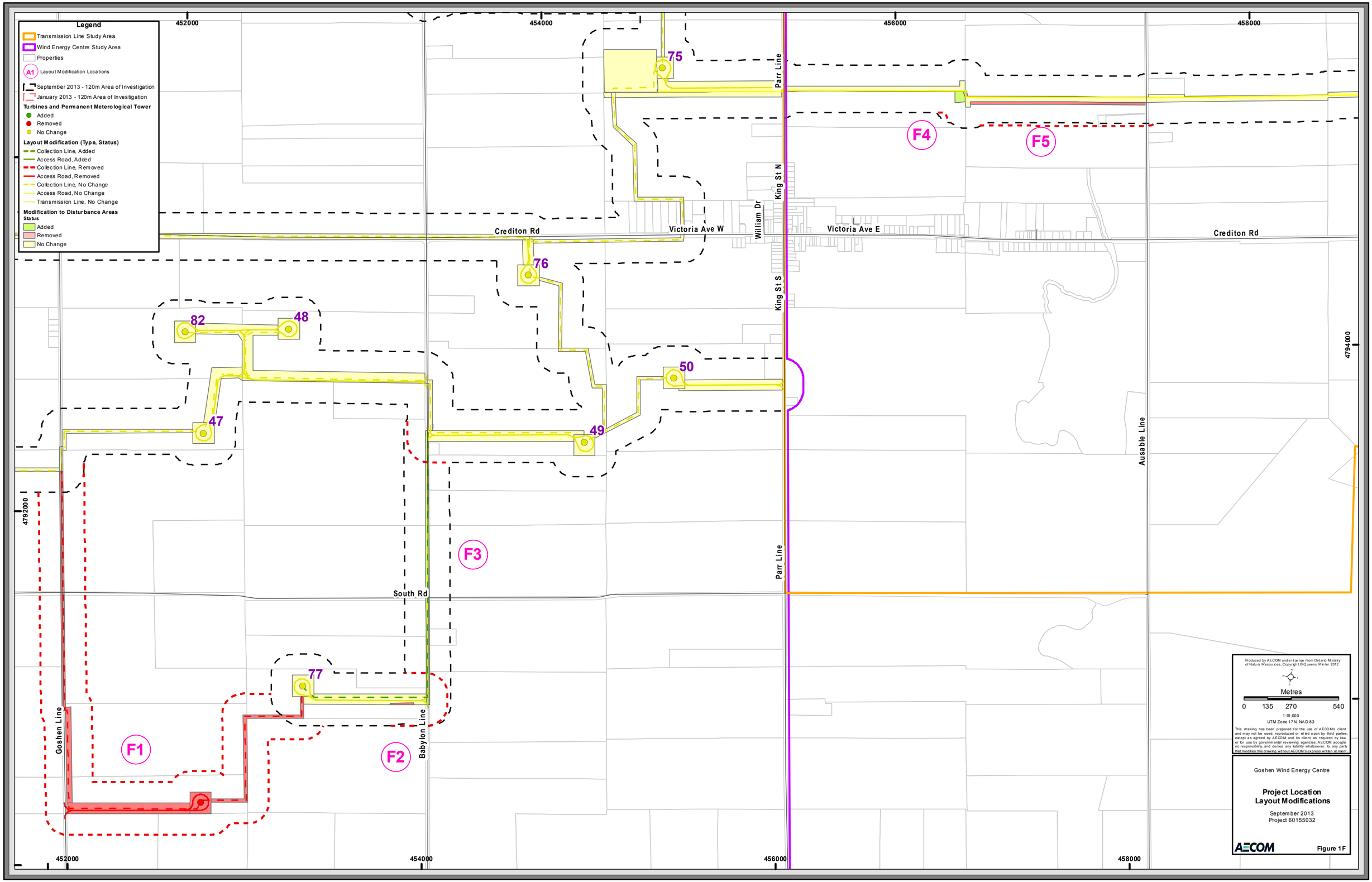

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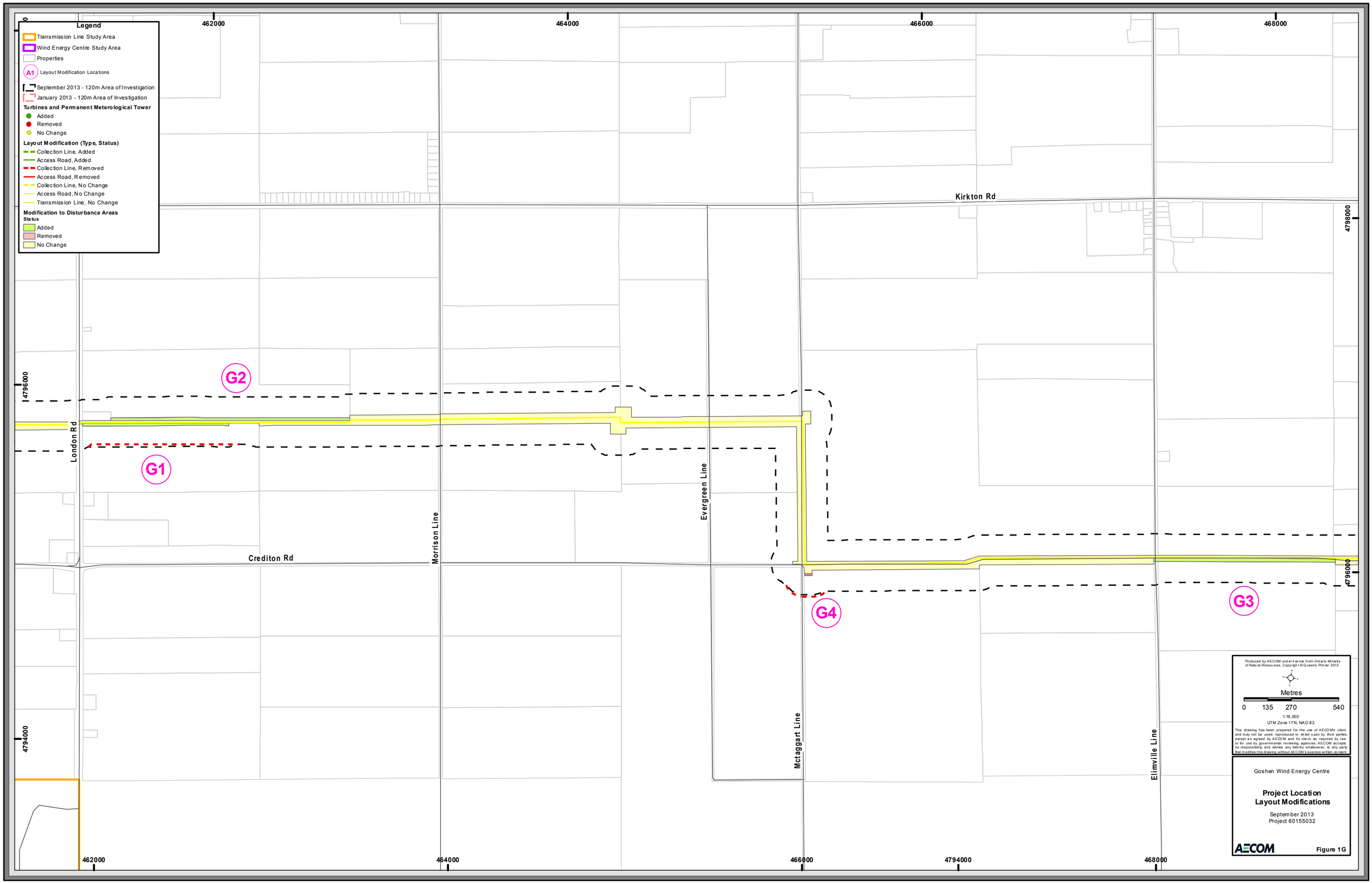

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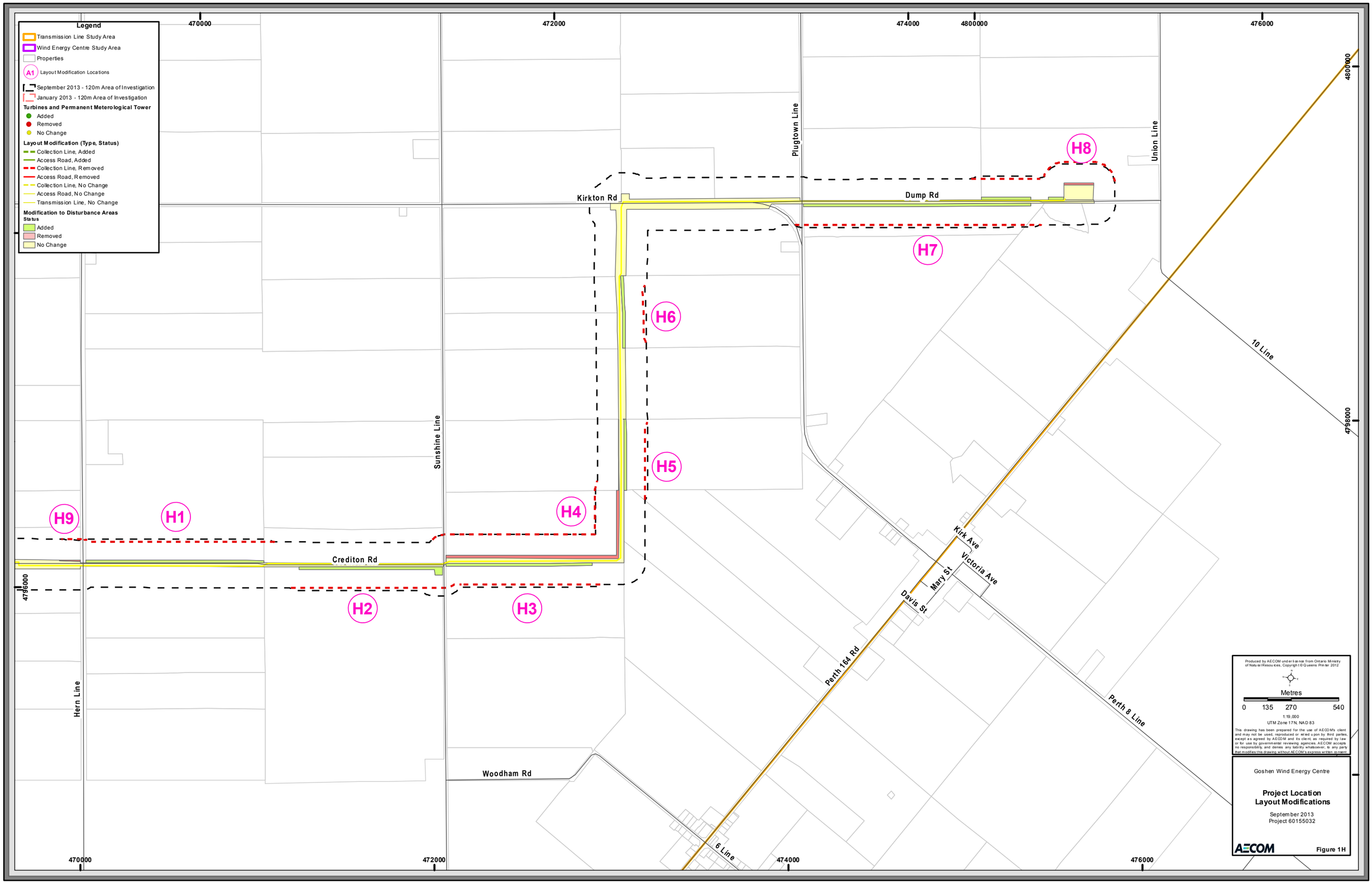

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Appendix B

Water Body Mitigation Measures

Mitigation Measures

Mitigation techniques are proposed to offset possible effects of the construction, decommissioning and operation activities of the Goshen Wind Energy Centre. Mitigation measures recommended to minimize risk associated with potential impacts to the water bodies include the implementation of standard Best Management Practices (BMPs), as described below.

BMPs are work practices that outline acceptable practices to follow when carrying out certain activities. DFO has developed a series of operational statements (BMPs) as guidelines to avoid conditions that may harmfully alter aquatic habitat. The following are applicable to this Project:

Work Area

- Stabilize banks where necessary, minimizing the area and duration of soil exposure.
- Operate machinery on land and in a manner that minimizes disturbance to stream banks.
- Erect sediment fencing around water bodies and areas to be avoided (i.e., near unstable banks, vegetation communities).
- Locate staging areas away from watercourses to limit risk of impacts to aquatic habitat.

Equipment Use

- Ensure machinery arrives on site in a clean, washed condition and is maintained free of fluid leaks.
- Minimize vehicle traffic on exposed soils, avoid compacting or other hardening of natural ground surface, and avoid the movement of heavy machinery on areas with sensitive slopes.
- Locate site maintenance, vehicle washing and refuelling stations where contaminants are handled at least 30 m away from water bodies.
- Implement vehicle and equipment cleaning procedures and practices to minimize or eliminate the discharge of pollutants from vehicle/ equipment cleaning operations to watercourses.
- Limit speed of vehicles near watercourse crossings.

Erosion and Sediment Control

- Develop and implement an erosion and sediment control plan before commencement of construction.
- Utilize erosion blankets, erosion control fencing, straw bales, etc., where necessary to mitigate potential excessive erosion and sedimentation. Ensure any materials placed in floodline are free from silt and other such particles. Keep extra erosion and sediment control materials on site (*e.g.*, heavy duty silt fencing, strawbales).
- Keep sediment and erosion control measures in place until disturbed areas have been stabilized (i.e., re-vegetated).
- Schedule grading to avoid times of high runoff volumes where possible. Temporarily suspend work during storm events to avoid excessive flows of sediment discharges.
- Direct discharged water to an appropriately sized energy dissipating outlet device to prevent erosion at the point of discharge.

Maintenance

- Maintain and repair permanent and temporary erosion and sediment control measures as needed to ensure continued performance of their intended function for the duration of the works.
- Remove temporary erosion and sediment control measures after the final site stabilization is achieved.
- Permanently stabilize disturbed soil resulting from removal of BMPs or vegetation.

Material Stockpiling and Handling

- Store any stockpiled materials away from water bodies to prevent deleterious substances from inadvertently discharging to the environment.
- Dispose of any waste material from construction activities by authorized and approved off-site vendors.

Grading and Excavation

- Minimize changes in land contours and natural drainage to maintain timing and quantity of flows.

Construction Timing Windows

- Time construction within 30 m of watercourses to avoid periods of habitat use to the extent possible. These timing windows are applied to protect fish from any works in and around water during spawning, migration and other critical life history stages. Construction timing windows are based on site specific criteria such as type of fish species present, thermal regime and fish spawning times (spring or fall). The generic restricted in-water work timing windows established by DFO are:
  - Fall Spawning Period – October 1st to May 31st
  - Spring Spawning Period – May 1st to July 15th
- Specific fisheries timing windows will be developed in co-operation with ABCA and UTRCA.

Isolated Crossing

- In-water works for permanent water bodies must occur in the dry via dry conditions and dam and pump method to maintain fish passage during in-water works. For intermittent water bodies, work is preferred to be completed in the dry and carried out during seasonally dry times or when the water body is frozen to the bottom.
- Develop and implement a fish rescue plan for dewatering areas. This will include appropriate sized end-of-pipe fish screen to prevent potential losses of fish due to entrainment or impingement as outlined in the DFO – Freshwater Intake End-of-Pipe Fish Screen Guideline.

Stream Flow

- Design and install culverts to prevent creation of barriers to fish movement and maintain bankfull channel functions.
- Design culverts to accommodate high flows of the watercourse.
- Embed the culvert below the streambed to maintain lateral flow.
- Install adequate gravel base to maintain flow of shallow groundwater.
- Locate crossings within straight sections of the stream, perpendicular to the bank. Avoid crossings on meander bends, braided streams and any other unstable areas.
- Use only clean material (i.e., rock or coarse gravel) for approaches to culverts.
- Regularly maintain culverts to ensure no debris build-up is impeding stream flow.

Water Quality

- Develop a spill response plan and train staff on associated procedures.
- Maintain emergency spill kits on site.
- Pass groundwater from dewatering activities (if required) through a sediment filtration system prior to being discharged to a watercourse.
- Control soil / water contamination through best management practices.
- Install a temporary storage basin to allow water to infiltrate, or use permanent stormwater management facilities as necessary for dewatering discharge.

Water Management

- Control rate and timing of water pumping; pump from deep wells to infiltration galleries adjacent to water bodies or wetlands.
- Control rate and timing of water pumping from surface water features.
- Control quantity and quality of surface water runoff using best management practices, and implement infiltration techniques to the extent possible.
- Restrict taking groundwater and surface water during drought conditions.
- Regulate the discharge of water-taking to ensure that there is no flooding in the downstream area and no soil erosion, or stream channel scouring is caused at the point of discharge. The water taker will use a discharge diffuser or other energy dissipation device, if necessary, to mitigate flows which physically alter the stream channel or banks.
- Install siltation control measures that are sufficient for the volumes pumped at both the taking location upstream of the construction site and (if necessary) the discharge site. All measures will be taken to properly maintain these control devices throughout the construction period.

Directional Drilling

- Conduct all drilling by licensed drillers in accordance with Regulation 903 under *Ontario Water Resources Act*, R.S.O. 1990.
- Locate drill entry and exit pits at least 30 m from water bodies.
- Collect drill cuttings as they are generated, and place in a soil bin or bag for off-site disposal.
- Ensure drill depth is at an appropriate depth below the water body to reduce the risk of a ‘frac-out’.
- Monitor water bodies for signs of surface disturbance.
- Develop a ‘frac-out’ contingency plan prior to the start of construction outlining protocols to monitor, contain and clean up a ‘frac-out’.

Rehabilitation

- Re-vegetate and restore the turbine staging area following turbine installation with tiling (if desired by the owner).
- Restore and maintain vegetative buffers around water bodies including within the foundation footprint where possible.
- Restore & maintain vegetative buffers around water bodies including within the temporary construction areas.
- Keep vegetation removal to a minimum.
- Add suitable stream substrates (e.g., gravel or rip rap) to stabilize sediment and provide cover.

Appendix C

Revised Figures for the Water Assessment and Water Body Report