

Jericho Wind, Inc.

Revision to the Construction Plan Report – Jericho Wind Energy Centre

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Glossary of Terms

EIS	Environmental Impact Study
MNR	Ontario Ministry of Natural Resources
NextEra	NextEra Energy Canada, ULC
NHA	Natural Heritage Assessment
The Project	Jericho Wind Energy Centre
REA	Renewable Energy Approval

1. Introduction

Jericho Wind, Inc. (Jericho) is proposing to construct a wind energy project in the Municipality of Lambton Shores and the Township of Warwick, in Lambton County, Ontario and in the Municipality of North Middlesex, in Middlesex 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 Construction Plan Report.

1.1 The Proponent

The Project will be owned and operated by Jericho, 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
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1.2 Project Study Area

The proposed Project is located in the Municipality of Lambton Shores and the Township of Warwick, in Lambton County, Ontario and in the Municipality of North Middlesex, in Middlesex 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:

UTM Coordinates

Easting	Northing
420938	4761752
419681	4780912
456597	4777307
453312	4766484

2. Proposed Project Modifications

Jericho 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;
- Infrastructure or construction disturbance area added or changed to optimize project design/constructability;
- 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 (please note that most of the mitigation measures were previously identified in the original REA submission, and that new mitigation measures are shown in ***italicized bold*** in the table).

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 (Mitigation measures not included in the original REA are shown in <i>italicized bold</i>)
A1	Addition of Turbine 106 and associated access road and collection line, extending north east from Turbine 4.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	<p><u>Groundwater:</u></p> <ul style="list-style-type: none"> Potential to require construction dewatering of greater than 50,000 L/day during the excavation and installation of turbine foundation. <p><u>Water Bodies:</u></p> <p>Effects associated with water body present within 120 m buffer of turbine and infrastructure (Feature ID R4.16-D) include:</p> <p>Turbine</p> <ul style="list-style-type: none"> Increase to surface water temperature from reduced groundwater contribution if dewatering activities are required for excavation of turbine foundations Increase to streamflows 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 on adjacent lands for construction of turbine, pad and turnaround area. 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. <p>Access Road</p> <ul style="list-style-type: none"> Increased erosion, sedimentation and turbidity from clearing and grubbing for construction of access roads. Soil/water contamination by oils, grease and other materials from construction equipment. Release / discharge of runoff from the construction area, which has the potential to transport sediment and nutrients into the watercourse. Reduction of streamflow due to the withdrawal of surface water for construction activities such as dust suppression, equipment washing and land reclamation (e.g., hydroseeding). <p>Collection Line</p> <ul style="list-style-type: none"> 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. <p><u>Natural Heritage:</u></p> <ul style="list-style-type: none"> Access road is 24 m from a new Rare Vegetation Community Feature RVC-05 not previously described in the NHA. New potential effects associated with the access road during construction include: <ul style="list-style-type: none"> Accidental intrusion into natural features resulting in habitat damage. Increased erosion and sedimentation resulting from clearing and grubbing, backfilling and stockpiling. Access road and collection line are within 120 m of new Generalized Candidate Significant Wildlife Habitat Feature (Insect Species of Conservation Concern Habitat, Plant Species of Conservation Concern Habitat, and Red-headed Woodpecker Habitat) in Natural Area 290, not previously described in the NHA. Potential effects of construction on this feature are the same as described for other Generalized Candidate Significant Wildlife Habitat Features in Section 5.7.3 (Table 5.5) of the NHA. 	<p><u>Groundwater</u></p> <ul style="list-style-type: none"> Direct the discharge from dewatering back into the nearest watercourse (following sediment control practices) to negate the potential that drawdown will decrease baseflow into streams and groundwater discharge into wetlands. Limit duration of dewatering to as short a time frame as possible. Implement groundwater cut-offs as required to limit water taking quantities. Limit dewatering where turbines are constructed within the sand and/or gravel deposits or where shallow water table conditions are expected to less than 400,000 L/day. <p><u>Water Bodies</u> (refer to Appendix B for detailed mitigation measures under the following headings)¹:</p> <p>Turbine</p> <ul style="list-style-type: none"> Timing windows Erosion and sediment control Grading and excavation Material stockpiling and handling <p>Access Road</p> <ul style="list-style-type: none"> Timing Windows Erosion and sediment control Grading and excavation Equipment use Material stockpiling and handling <p>Collection Line</p> <ul style="list-style-type: none"> Equipment use Erosion and sediment control <p><u>Natural Heritage:</u></p> <ul style="list-style-type: none"> For construction of the access road within 24 m of Rare Vegetation Community Feature RVC-05: <ul style="list-style-type: none"> Clearly delineate habitat boundaries where construction will occur within 30 m using protective fencing to ensure that construction activities occur outside the habitat boundaries. Undertake on-site inspections by an Environmental Monitor to ensure that protective fencing is intact and that there is no damage caused during construction on the following basis: <ul style="list-style-type: none"> Weekly during active construction periods; Inspection not required during inactive construction periods, where the site is left alone for 30 days or longer. Contingency Measures: <ul style="list-style-type: none"> Repair protective fencing if damaged. Prune any damaged trees through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester. If accidental damage to habitat occurs, restore habitat within the disturbed area using suitable native species. For construction of the access road within 120 m of Generalized Candidate Significant Wildlife Habitat Feature in Natural Area 290, mitigation measures are the same as described for other Generalized Candidate Significant Wildlife Habitat Features in Section 5.7.3 (Table 5.5) of the NHA.
A2	Relocation of access road to Turbine 4 to travel north east from Jericho Road, and relocation of collection line to Turbine 4 near Kennedy Line.	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
A3	Relocation of access road and collection line to Turbine 6 to travel west from Northville Road and then north to Turbine 6; relocation of Turbine 6 construction disturbance area to the north.	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
A4	Relocation of Turbine 19 construction disturbance area 19 m to the southwest and addition of access road construction disturbance area near Jericho Road.	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	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 (Mitigation measures not included in the original REA are shown in <i>italicized bold</i>)
A5	Removal of access road and collection line to Turbine 24, addition of access road disturbance area between Turbine 22 and Turbine 24 and relocation of collection line to the access road disturbance area for Turbine 22.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	<p><u>Water Bodies:</u> Effects associated with water body present in 120 m buffer and new access road crossing (Feature ID R4.33-B) include:</p> <p>Access Road</p> <ul style="list-style-type: none"> • Temporary disruption of substrates/habitat at locations where in-water work is required (culvert installations). • Degradation of fish habitat from culvert installation. • Increased erosion, sedimentation and turbidity from clearing and grubbing for construction of access roads. • Soil/water contamination by oils, grease and other materials from construction equipment. • Release / discharge of runoff from the construction area, which has the potential to transport sediment and nutrients into the watercourse. • Reduction of streamflow due to the withdrawal of surface water for construction activities such as dust suppression, equipment washing and land reclamation (e.g., hydroseeding). 	<p><u>Water Bodies</u> (refer to Appendix B for detailed mitigation measures under the following headings):</p> <p>Access Road</p> <ul style="list-style-type: none"> • Culvert Design • Isolated crossing • Timing Windows • Erosion and sediment control • Grading and excavation • Equipment use • Material stockpiling and handling • Water quality • Water management • Rehabilitation
A6	Removal of a portion of construction disturbance area for access road and collection line to Turbines 21, 23 and 25.	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources.	N/A	N/A
A7	Removal of Turbine 5 and associated access road and collection line.	Turbine and associated infrastructure removed.	N/A	N/A
B1	Relocation of Turbine 7 and associated construction disturbance area 148 m to the east.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
B2	Addition of collection line in Gordon Road right-of-way, north of the road to Turbine 27.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	<p><u>Water Bodies:</u> Effects associated with water body present in 120 m buffer of collection line and within collection line crossing (Feature ID R3-C-1) include:</p> <ul style="list-style-type: none"> • Release of pressurized drilling fluids into watercourses from fractures in substrate (also known as 'frac-out'). • Change to groundwater flow patterns, which may affect groundwater discharge to watercourses. • Increase in erosion and sedimentation from the entry and exit drill holes required for the directional drilling activities. • Soil/water contamination by oils, grease and other materials from accidental spills and release of contaminants from equipment. • Release / discharge of sediment laden runoff from the construction area. <p><u>Natural Heritage:</u></p> <ul style="list-style-type: none"> • Collection line is within 120 m of new Generalized Candidate Significant Wildlife Habitat Feature (Plant Species of Conservation Concern Habitat and Red-headed Woodpecker Habitat) in Natural Area 233, not previously described in the NHA. Potential effects of construction on this feature are the same as described for other Generalized Candidate Significant Wildlife Habitat Features in Section 5.7.3 (Table 5.5) of the NHA. 	<p><u>Water Bodies</u> (refer to Appendix B for detailed mitigation measures under the following headings):</p> <p>Collection Line</p> <ul style="list-style-type: none"> • Directional drilling • Water quality • Water management • Erosion and sediment control <p><u>Natural Heritage:</u></p> <ul style="list-style-type: none"> • For construction of the collection line within 120 m of Generalized Candidate Significant Wildlife Habitat Feature in Natural Area 233, mitigation measures are the same as described for other Generalized Candidate Significant Wildlife Habitat Features in Section 5.7.3 (Table 5.5) of the NHA.
B3	Removal of Turbine 31 and associated access road and collection line.	Turbine and associated infrastructure removed.	<p><u>Natural Heritage:</u></p> <ul style="list-style-type: none"> • Amphibian Woodland Breeding Habitat Feature AWO-16 in Natural Area 250 was changed to Generalized Candidate Significant Wildlife Habitat because it is more than 120 m away from a proposed access road. Potential effects of construction on this feature are the same as described for other Generalized Candidate Significant Wildlife Habitat Features in Section 5.7.3 (Table 5.5) of the NHA. 	<p><u>Natural Heritage:</u></p> <ul style="list-style-type: none"> • For construction of the collection line within 120 m of Generalized Candidate Significant Wildlife Habitat Feature in Natural Area 250, mitigation measures are the same as described for other Generalized Candidate Significant Wildlife Habitat Features in Section 5.7.3 (Table 5.5) of the NHA.
B4	Addition of Turbine 32 construction disturbance area 34 m to the north and removal of the southeast portion of construction disturbance area.	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	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 (Mitigation measures not included in the original REA are shown in <i>italicized bold</i>)
C1	Relocation of Turbine 26 and associated construction disturbance area 101 m east. Access road relocated to travel north through the substation construction disturbance area and collection line relocated to the southern property boundary; and addition of construction disturbance area in Thomson Line right-of-way.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	<p><u>Water Bodies:</u> Effects from water body present in 120 m buffer of access road, and within 120 m buffer of collection line and collection line crossing (Feature ID R4.16-A) include:</p> <p>Access Road</p> <ul style="list-style-type: none"> • Increased erosion, sedimentation and turbidity from clearing and grubbing for construction of access road. • Soil/water contamination by oils, grease and other materials from construction equipment. • Release / discharge of runoff from the construction area, which has the potential to transport sediment and nutrients into the watercourse. • Reduction of streamflow due to the withdrawal of surface water for construction activities such as dust suppression, equipment washing and land reclamation (e.g., hydroseeding). <p>Collection Line</p> <ul style="list-style-type: none"> • Release of pressurized drilling fluids into watercourses from fractures in substrate (also known as a ‘frac-out’). • Change to groundwater flow patterns which may affect groundwater discharge to watercourses. • Increase in erosion and sedimentation from the entry and exit drill holes required for the directional drilling activities. This will require clearing and grubbing of the land and removal of substrates from the drill hole. • 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. <p><u>Natural Heritage:</u></p> <ul style="list-style-type: none"> • Generalized Candidate Significant Wildlife Habitat in Natural Area 173 was changed to Amphibian Woodland Breeding Habitat Feature AWO-22² because it is >0.1 m from a proposed access road. New potential effects associated with the access road during construction include: <ul style="list-style-type: none"> ▪ Accidental intrusion into natural features resulting in habitat damage. ▪ Disruption or possible mortality of amphibians moving between breeding pools and home range. ▪ Increased erosion and sedimentation resulting from clearing and grubbing, backfilling and stockpiling. ▪ Possible indirect effects on breeding pool condition through changes to surface water drainage patterns. • Amphibian Woodland Breeding Habitat Feature AWO-20 in Natural Area 172 was changed to Generalized Candidate Significant Wildlife Habitat because it is more than 120 m away from a proposed access road. Potential effects of construction on this feature are the same as described for other Generalized Candidate Significant Wildlife Habitat Features in Section 5.7.3 (Table 5.5) of the NHA. • Collection line is within 120 m of new Generalized Candidate Significant Wildlife Habitat Feature (Plant Species of Conservation Concern Habitat) in Natural Area 172, not previously described in the NHA. Potential effects of construction on this feature are the same as described for other Generalized Candidate Significant Wildlife Habitat Features in Section 5.7.3 (Table 5.5) of the NHA. 	<p><u>Water Bodies</u> (refer to Appendix B for detailed mitigation measures under the following headings):</p> <p>Access Road</p> <ul style="list-style-type: none"> • Timing windows • Erosion and sediment control • Grading and excavation • Equipment use • Material stockpiling and handling • Water quality • Water management <p>Collection Line</p> <ul style="list-style-type: none"> • Directional drilling • Water quality • Water management • Erosion and sediment control <p><u>Natural Heritage:</u></p> <ul style="list-style-type: none"> • For construction of the access road within >0.1 m of Amphibian Woodland Breeding Habitat Feature AWO-22: <ul style="list-style-type: none"> ▪ Clearly delineate habitat boundaries where construction will occur within 30 m using protective fencing to ensure that construction activities occur outside the habitat boundaries. ▪ Undertake on-site inspections by an Environmental Monitor to ensure that protective fencing is intact and that there is no damage caused during active construction on the following basis: <ul style="list-style-type: none"> - Weekly during active construction periods; - Inspection not required during inactive construction periods, where the site is left alone for 30 days or longer. ▪ Contingency Measures: <ul style="list-style-type: none"> - Repair protective fencing if damaged. - Any damaged trees will be pruned through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester. - If accidental damage to habitat occurs, habitat restoration will occur within the disturbed area using suitable native species. - Consultation with MNR to determine additional contingency measures if necessary. ▪ Limit construction of roads within 30 m of significant amphibian habitats to daylight hours between April 1 and June 30 (for significant frog breeding habitats) or between March 15 and April 30 (for significant salamander breeding habitat), to avoid excessive noise and vehicle caused mortality, wherever possible. If this is not possible, MNR will be consulted regarding mitigation measures that may be required. ▪ Post speed limits along construction access roads (30 km/hr). ▪ If construction must occur within 30 m during the noted time periods due to a critical phase of construction, work may be permitted if conditions for amphibian breeding are not ideal. Specifically, work may occur if any one of following conditions is met: temperatures are below 6°C, there has been no rain in the previous 24 hours or wind speeds are higher than 3 on the Beaufort Scale. The Environmental Monitor will track weather conditions and determine if suitable amphibian breeding conditions are or are not present. ▪ Install sediment and erosion control fencing along edge of construction area if within 30 m of habitat feature as per Ontario Provincial Standards Specifications (OPSD 219.130). ▪ Monitor on-site conditions (i.e., erosion and sediment control, spills, flooding, etc.) by an Environmental Monitor where construction occurs within 30 m of a feature on the following basis: <ul style="list-style-type: none"> - Weekly during active construction periods; - Prior to, during and post forecasted large rainfall events (>20 millimetres in 24 hours) or significant snowmelt events (i.e., spring freshet); - Daily during extended rain or snowmelt periods; - Monthly during inactive construction periods, where the site is left alone for 30 days or longer. ▪ Contingency Measures: <ul style="list-style-type: none"> - Suspend work if excessive flows of sediment discharges occur until additional mitigation measures are in place (e.g. install the extra erosion and sediment control materials kept on site, such as heavy duty silt fencing, straw bales, etc.). ▪ Inspect locations following completion of access roads by an Environmental Monitor to ensure no changes in drainage patterns. ▪ Examine condition of vernal pools within 30 m of access road following completion of construction. ▪ Contingency Measures: <ul style="list-style-type: none"> - If surface water drainage alterations are detected, undertake corrective measures to restore drainage pattern. • For construction of the collection line within 120 m of Generalized Candidate Significant Wildlife Habitat Features in Natural Area 172, mitigation measures are the same as described for other Generalized Candidate Significant Wildlife Habitat Features in Section 5.7.3 (Table 5.5) of the NHA.

2. Additional field studies are required to evaluate the significance of this feature. For the purposes of this submission, this feature has been treated as significant and potential effects, mitigation measures and monitoring commitments related to this feature are described. However, these will only be implemented if the feature is deemed to be significant based on the results of pre-construction surveys.

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 (Mitigation measures not included in the original REA are shown in <i>italicized bold</i>)
C2	Relocation of access road to Turbine 18 31 m to the north.	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
C3	Addition of construction disturbance area for access road and collection line to Turbine 41.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
C4	Addition of a spare 170 mVA transformer to be stored within the existing footprint of the Jericho substation.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	N/A	N/A
D1	Addition of construction disturbance area in the Northville Road right-of-way in two locations for collection line between Turbines 45 and 46.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
D2	Removal of a portion of construction disturbance area for access road and collection line to Turbine 56.	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
D3	Relocation of Turbine 46 access road to travel north from Cedar Point Line and collection to travel east along the southern property boundary; and addition of construction disturbance area for collection line in the Northville Road right-of-way.	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources.	<p><u>Water Bodies:</u> Effects on water body present in 120 m buffer for access road and collection line (Feature ID R4E and R4D) include:</p> <p>Access Road</p> <ul style="list-style-type: none"> Increased erosion, sedimentation and turbidity from clearing and grubbing for construction of access road. Soil/water contamination by oils, grease and other materials from construction equipment. Release / discharge of runoff from the construction area, which has the potential to transport sediment and nutrients into the watercourse. Reduction of streamflow due to the withdrawal of surface water for construction activities such as dust suppression, equipment washing and land reclamation (e.g., hydroseeding). <p>Collection Line</p> <ul style="list-style-type: none"> Increase in erosion and sedimentation from the entry and exit drill holes required for the directional drilling activities. This will require clearing and grubbing of the land and removal of substrates from the drill hole. 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. 	<p><u>Water Bodies</u> (refer to Appendix B for detailed mitigation measures under the following headings):</p> <p>Access Road</p> <ul style="list-style-type: none"> Erosion and sediment control Grading and excavation Equipment use Material stockpiling and handling Water quality Timing windows Water management <p>Collection Line</p> <ul style="list-style-type: none"> Erosion and sediment control Water management Equipment use Water quality
D4	Addition of Turbine 112 and associated access road and collection line, extending south from Turbine 59.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	<p><u>Groundwater:</u></p> <ul style="list-style-type: none"> Potential to require construction dewatering of greater than 50,000 L/day during the excavation and installation of turbine foundation. <p><u>Natural Heritage:</u></p> <ul style="list-style-type: none"> Turbine construction disturbance area is within 120 m of a new Generalized Candidate Significant Wildlife Habitat Feature (Plant Species of Conservation Concern Habitat and Red-headed Woodpecker Habitat) in Natural Area 145, not previously described in the NHA. Potential effects of construction on this feature are the same as described for other Generalized Candidate Significant Wildlife Habitat Features in Section 5.7.3 (Table 5.5) of the NHA. 	<p><u>Groundwater</u></p> <ul style="list-style-type: none"> Direct the discharge from dewatering back into the nearest watercourse (following sediment control practices) to negate the potential that drawdown will decrease baseflow into streams and groundwater discharge into wetlands. Limit duration of dewatering to as short a time frame as possible Implement groundwater cut-offs as required to limit water taking quantities Limit dewatering where turbines are constructed within the sand and/or gravel deposits or where shallow water table conditions are expected to less than 400,000 L/day <p><u>Natural Heritage:</u></p> <ul style="list-style-type: none"> For construction of the turbine within 120 m of Generalized Candidate Significant Wildlife Habitat Feature in Natural Area 145, mitigation measures are the same as described for other Generalized Candidate Significant Wildlife Habitat Features in Section 5.7.3 (Table 5.5) of the NHA.
D5	Addition of construction disturbance area on private property to the north of Thomson Line to allow for installation of collection line and/or transmission line.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
D6	Addition of transmission line construction disturbance area on private property to allow for transmission line installation either in the Thomson Line right-of-way or on private property, within the disturbance area proposed to host collection line.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	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 (Mitigation measures not included in the original REA are shown in <i>italicized bold</i>)
D7	Addition of collection line disturbance area on private property to allow for collection line installation either in the Thomson Line right-of-way or on private property, within the disturbance area proposed to host the transmission line.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
D8	Addition of collection line disturbance area on private property to allow for collection line installation either in the Thomson Line right-of-way or on private property, within the disturbance area proposed to host the transmission line.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
D9	Addition of collection line disturbance area on private property to allow for collection line installation either in the Thomson Line right-of-way or on private property, within the disturbance area proposed to host the transmission line.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
D10	Relocation of transmission line construction disturbance area within natural areas located in the Thomson Line right-of-way.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	<p><u>Natural Heritage:</u></p> <ul style="list-style-type: none"> • The transmission line is proposed in Significant Woodland Feature WOD-201. New potential effects associated with transmission line construction in this feature include: <ul style="list-style-type: none"> ▪ Clearing of vegetation for the transmission line in significant woodland WOD-201 resulting in loss of up to 0.03 ha of woodland area. ▪ Accidental intrusion into significant woodland resulting in damage to trees. ▪ Increased erosion and sedimentation resulting from clearing and grubbing, excavation, backfilling and stockpiling. ▪ Risk of soil or water contamination resulting from accidental spills of fuel, etc. 	<p><u>Natural Heritage:</u></p> <ul style="list-style-type: none"> • For construction of the transmission line within Significant Woodland Feature WOD-201: <ul style="list-style-type: none"> ▪ Establish an area of forest equal in area to the cleared area (0.03 ha) through tree planting and management (e.g., in partnership with a local Conservation Authority). Details of the afforestation plan will be provided to MNR in a Compensation Plan. ▪ Perform vegetation clearing outside of the breeding bird season (May 1 to July 31). If this is not possible, MNR will be consulted regarding mitigation measures that may be required. Refer to Section 5.7 of the NHA for additional timing constraints related to wildlife. ▪ Clearly stake area to be cleared. ▪ Fell trees with a chainsaw toward the construction area to reduce damage to adjacent vegetation being retained. ▪ Limit size of machines entering significant woodlands to minimize soil compaction. ▪ Carry out removal of tree limbs on adjacent trees being retained under supervision of an Arborist or Forester. ▪ Cut damaged tree roots clean as soon as possible and cover exposed roots in approved topsoil under the supervision of an Arborist or Forester. ▪ Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor. ▪ Monitor establishment of planted area and replant/fill plant if required (may be undertaken by partner organization). ▪ Contingency Measure: Any damaged trees will be pruned through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester. ▪ Where construction occurs within 30 m, install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation. ▪ Undertake monthly site inspections by an Environmental Monitor to ensure that protective fencing is intact and that there is no damage caused during construction. ▪ Contingency Measures: <ul style="list-style-type: none"> - Repair protective fencing if damaged. - Any damaged trees will be pruned through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester. ▪ Install sediment and erosion control fencing along edge of construction area as per Ontario Provincial Standard Specifications (OPSD 219.130). ▪ Monitor on-site conditions (<i>i.e.</i>, erosion and sediment control, flooding, etc.) by an Environmental Monitor where construction occurs within 30 m of a feature on the following basis: <ul style="list-style-type: none"> - Weekly during active construction periods; - Prior to, during and post forecasted large rainfall events (>20 millimetres in 24 hours) or significant snowmelt events (<i>i.e.</i>, spring freshet); - Daily during extended rain or snowmelt periods; - Monthly during inactive construction periods, where the site is left alone for 30 days or longer. ▪ Contingency Measure: Suspend work if excessive flows of sediment discharges occur until additional mitigation measures are in place (e.g., install the extra erosion and sediment control materials kept on site, such as heavy duty silt fencing, straw bales, etc.). ▪ Develop and implement emergency spills plan outlining steps to contain any chemicals or to avoid contamination of adjacent woodland feature. ▪ Contractor to conduct routine inspections of construction equipment for leaks / spills. ▪ Develop an emergency spills plan.

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 (Mitigation measures not included in the original REA are shown in <i>italicized bold</i>)
				<ul style="list-style-type: none"> ▪ Contingency Measures: <ul style="list-style-type: none"> - Immediately stop all work until the spill is cleaned up. - Notify MOE's Spills Action Centre of any leaks or spills. - If a spill enters a wetland, collect and analyze water samples for appropriate parameters. - Monitor daily until cleanup is completed.
E1	Removal of Turbine 77 and associated access road and collection line / Removal and addition of portions of construction disturbance area for access road and collection line to Turbines 78, 79 and 107.	Turbine and associated infrastructure removed / Construction disturbance area modified to reduce or eliminate impacts to archaeological resources.	<u>Cultural Heritage:</u> <ul style="list-style-type: none"> • Location 290 documented. 	<u>Cultural Heritage:</u> <ul style="list-style-type: none"> • Stage 3 assessment of Location 290.
E2	Addition of Turbine 107 and associated access road and collection line, extending south from Turbine 79.	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability.	<u>Cultural Heritage:</u> <ul style="list-style-type: none"> • Location 281 documented. 	<u>Cultural Heritage:</u> <ul style="list-style-type: none"> • Stage 3 assessment of Location 281.
E3	Relocation of Turbine 79 23 m to the east, within existing turbine construction disturbance area.	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
E4	Addition of construction disturbance area on private property to the north of Thomson Line to allow for installation of collection line and/or transmission line.	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
E5	Relocation of transmission line construction disturbance area within natural areas located in the Thomson Line road right-of-way.	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
E6	Relocation of transmission line construction disturbance area within natural areas located in the Thomson Line/Elginfield Road right-of-way.	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability.	<u>Natural Heritage:</u> <ul style="list-style-type: none"> • The transmission line is proposed in Significant Wetland Feature WET-050. New potential effects associated with transmission line construction in this feature include: <ul style="list-style-type: none"> ▪ Trimming of branches or selective tree removal for transmission line in Significant Wetland WET-050 within road right-of-way. ▪ Risk of spread of invasive species into Significant Wetland as a result of construction disturbance. 	<u>Natural Heritage:</u> <ul style="list-style-type: none"> • <i>For construction of the transmission line in Significant Wetland Feature WET-050:</i> <ul style="list-style-type: none"> ▪ <i>Install transmission line poles outside the boundaries of the Significant Wetland. A combination of crew on foot within the Significant Wetland Feature and equipment operated from the road right-of-way reaching over in the Feature will be used to construct the transmission line; no heavy equipment will enter the Significant Wetland Feature.</i> ▪ <i>Minimize vegetation removal in Significant Wetland, to the extent possible.</i> ▪ <i>Perform vegetation clearing outside of the breeding bird season (May 1 to July 31). If this is not possible, MNR will be consulted regarding mitigation measures that may be required. Refer to Section 5.7 of the NHA for additional timing constraints related to wildlife.</i> ▪ <i>Clearly stake area to be cleared.</i> ▪ <i>Remove trees or tree limbs by hand-held equipment within Significant Wetland to minimize soil compaction.</i> ▪ <i>Fell trees with a chainsaw toward the construction area to reduce damage to adjacent vegetation being retained.</i> ▪ <i>Carry out removal of tree limbs on adjacent trees being retained under supervision of an Arborist or Forester.</i> ▪ <i>Cut damaged tree roots clean as soon as possible and cover exposed roots in approved topsoil under the supervision of an Arborist or Forester.</i> ▪ <i>Ensure all equipment, including clothing/boots, is thoroughly washed before entering the Significant Wetland to avoid introducing seeds or fragments of invasive species into the Significant Wetland.</i> ▪ <i>Daily monitoring of areas where construction activities, including active vegetation removal, is occurring within the Significant Wetland by Environmental Monitor.</i> ▪ <i>Restore disturbed areas as soon as possible using suitable native wetland plant species. A Restoration Plan will be provided to MNR.</i> ▪ <i>Monitor establishment of planted area and replant/fill plant if required.</i> ▪ <i>Contingency Measure: Any damaged trees will be pruned through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester.</i>
F1	Removal of a portion of construction disturbance area for access road and collection line to Turbine 43.	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	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 (Mitigation measures not included in the original REA are shown in <i>italicized bold</i>)
F2	Relocation of Turbine 44 access road 32 m to the west.	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources.	<p><u>Cultural Heritage:</u></p> <ul style="list-style-type: none"> • Location 279 documented. <p><u>Natural Heritage:</u></p> <ul style="list-style-type: none"> • Access road is 41 m from a new Significant Woodland Feature WOD-011, not previously described in the NHA. New potential effects associated with the access road during construction include: <ul style="list-style-type: none"> ▪ Risk of soil or water contamination resulting from accidental spills of fuel, etc. • Access road is within 120 m of new Generalized Candidate Significant Wildlife Habitat Feature (Plant Species of Conservation Concern Habitat) in Natural Area 117, not previously described in the NHA. Potential effects of construction on this feature are the same as described for other Generalized Candidate Significant Wildlife Habitat Features in Section 5.7.3 (Table 5.5) of the NHA. • Access road is within 120 m of new Generalized Candidate Significant Wildlife Habitat Feature (Plant Species of Conservation Concern Habitat and Red-headed Woodpecker Habitat) in Natural Area 383, not previously described in the NHA. Potential effects of construction on this feature are the same as described for other Generalized Candidate Significant Wildlife Habitat Features in Section 5.7.3 (Table 5.5) of the NHA. 	<p><u>Cultural Heritage:</u></p> <ul style="list-style-type: none"> • Stage 3 assessment of Location 279. <p><u>Natural Heritage:</u></p> <ul style="list-style-type: none"> • For construction of the access road within 41 m of Significant Woodland Feature WOD-011: <ul style="list-style-type: none"> ▪ Develop and implement emergency spills plan outlining steps to contain any chemicals or to avoid contamination of adjacent woodland features. ▪ Contractor to conduct routine inspections of construction equipment for leaks / spills. ▪ Develop an emergency spills plan. ▪ Contingency Measures: <ul style="list-style-type: none"> - Immediately stop all work until the spill is cleaned up. - Notify MOE's Spills Action Centre of any leaks or spills. - If a spill enters a wetland, collect and analyze water samples for appropriate parameters. - Monitor daily until cleanup is completed. • For construction of the access road within 120 m of Generalized Candidate Significant Wildlife Habitat Feature in Natural Areas 117 and 383, mitigation measures are the same as described for other Generalized Candidate Significant Wildlife Habitat Features in Section 5.7.3 (Table 5.5) of the NHA.
F3	Relocation of Turbine 90 access road and collection line to the north, extending to Townsend Line and addition of collection line in the Townsend Line right-of-way.	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources.	<p><u>Cultural Heritage:</u></p> <ul style="list-style-type: none"> • Location 280 documented. <p><u>Natural Heritage:</u></p> <ul style="list-style-type: none"> • Access road is >0.1 m from a new Significant Woodland Feature WOD-097, not previously described in the NHA. New potential effects associated with the access road during construction include: <ul style="list-style-type: none"> ▪ Accidental intrusion into significant woodlands resulting in damage to trees. ▪ Risk of soil or water contamination resulting from accidental spills of fuel, etc. ▪ Changes in surface water drainage patterns resulting in effects to soil moisture and species composition of vegetation. ▪ Increased erosion and sedimentation resulting from clearing and grubbing, excavation, backfilling and stockpiling. • Access road is 5 m from a new Reptile Hibernaculum Feature RH-05³, not previously described in the NHA. New potential effects associated with the access road during construction include: <ul style="list-style-type: none"> ▪ Accidental intrusion into natural feature (e.g. rock pile) resulting in habitat damage. ▪ Possible mortality from construction equipment. • Access road is within 120 m of new Generalized Candidate Significant Wildlife Habitat Feature (Bat Maternity Colony, Plant Species of Conservation Concern Habitat, and Red-headed Woodpecker Habitat) in Natural Area 118, not previously described in the NHA. Potential effects of construction on this feature are the same as described for other Generalized Candidate Significant Wildlife Habitat Features in Section 5.7.3 (Table 5.5) of the NHA. • Access road is within 120 m of new Generalized Candidate Significant Wildlife Habitat Feature (Bat Maternity Colony, Plant Species of Conservation Concern Habitat, and Red-headed Woodpecker Habitat) in Natural Area 119, not previously described in the NHA. Potential effects of construction on this feature are the same as described for other Generalized Candidate Significant Wildlife Habitat Features in Section 5.7.3 (Table 5.5) of the NHA. 	<p><u>Cultural Heritage:</u></p> <ul style="list-style-type: none"> • Stage 3 assessment of Location 280. <p><u>Natural Heritage:</u></p> <ul style="list-style-type: none"> • For construction of the access road within >0.1 m of Significant Woodland Feature WOD-097: <ul style="list-style-type: none"> ▪ Where construction occurs within 30 m, install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation. ▪ Undertake monthly site inspections by an Environmental Monitor to ensure that protective fencing is intact and that there is no damage caused during construction. ▪ Contingency Measures: <ul style="list-style-type: none"> - Repair protective fencing if damaged. - Any damaged trees will be pruned through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester. - In the event that other woodland vegetation is damaged, habitat restoration will occur utilizing native species suited to the habitat within the disturbed area. ▪ Develop and implement emergency spills plan outlining steps to contain any chemicals or to avoid contamination of adjacent woodland features. ▪ Contractor to conduct routine inspections of construction equipment for leaks / spills. ▪ Develop an emergency spills plan. ▪ Contingency Measures: <ul style="list-style-type: none"> - Immediately stop all work until the spill is cleaned up. - Notify MOE's Spills Action Centre of any leaks or spills. - If a spill enters a wetland, collect and analyze water samples for appropriate parameters. - Monitor daily until cleanup is completed. ▪ Ensure Best Management Practices are used to maintain current drainage patterns, including: <ul style="list-style-type: none"> - Implement infiltration techniques to the maximum extent possible. - Minimize paved surfaces and design roads to promote infiltration. - Limit changes in land contours. ▪ Site inspection by Environmental Monitor following grading activities within 30 m of significant woodlands. ▪ Contingency Measures: <ul style="list-style-type: none"> - If surface water drainage alterations are detected, undertake corrective measures to restore drainage patterns. ▪ Install sediment and erosion control fencing along edge of construction area if within 30 m of a woodland, as per Ontario Provincial Standard Specifications (OPSD 219.130). ▪ Monitor on-site conditions (<i>i.e.</i>, erosion and sediment control, flooding, etc.) by an Environmental Monitor where construction occurs within 30 m of a feature on the following basis: <ul style="list-style-type: none"> - Weekly during active construction periods; - Prior to, during and post forecasted large rainfall events (>20 millimetres in 24 hours) or significant snowmelt events (<i>i.e.</i>, spring freshet); - Daily during extended rain or snowmelt periods; - Monthly during inactive construction periods, where the site is left alone for 30 days or longer.

3. Additional field studies are required to evaluate the significance of this feature. For the purposes of this submission, this feature has been treated as significant and potential effects, mitigation measures and monitoring commitments related to this feature are described. However, these will only be implemented if the feature is deemed to be significant based on the results of pre-construction surveys.

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 (Mitigation measures not included in the original REA are shown in <i>italicized bold</i>)
				<ul style="list-style-type: none"> ▪ Contingency Measures: <ul style="list-style-type: none"> - Suspend work if excessive flows of sediment discharges occur until additional mitigation measures are in place (e.g. install the extra erosion and sediment control materials kept on site, such as heavy duty silt fencing, straw bales, etc.). • For construction of the access road within 5 m of Reptile Hibernaculum Feature RH-05: <ul style="list-style-type: none"> ▪ Clearly delineate habitat boundaries where construction will occur within 30 m using protective fencing to ensure that construction activities occur outside the natural feature (e.g. rock pile). ▪ Undertake on-site inspections by an Environmental Monitor to ensure that protective fencing is intact and that there is no damage caused during construction on the following basis: <ul style="list-style-type: none"> - Weekly during active construction periods. - Inspection not required during inactive construction periods, where the site is left alone for 30 days or longer. ▪ Contingency Measures: <ul style="list-style-type: none"> - Repair protective fencing if damaged. - Consultation with MNR to determine additional contingency measures if necessary. ▪ No construction activities will occur within 30 m of the hibernaculum feature (<i>i.e.</i> within the 30 m habitat buffer) between September 1 and May 15, to avoid overwintering snakes. ▪ If construction must take place within 30 m of hibernacula during this timing window, no sub-surface (excavation) work is to occur. If above-ground activities are to occur: <ul style="list-style-type: none"> - Erect temporary drift fence where within 30 m; and - Conduct area searches for snake species within the construction area daily prior to construction activities. - If this is not possible, MNR will be consulted regarding mitigation measures that may be required. ▪ If construction occurs within 30 m of a reptile hibernaculum (if determined to be significant) between September 1 and May 15, conduct area searches for snakes by a qualified Biologist prior to soil stripping or grubbing, as well as daily prior to construction activities by the Contractor within the construction footprint. ▪ Contingency Measure: Snakes encountered within the construction area will be moved to a safe location under the direction of the Environmental Monitor or a qualified Biologist. • For construction of the access road within 120 m of Generalized Candidate Significant Wildlife Habitat Feature in Natural Areas 118 and 119, mitigation measures are the same as described for other Generalized Candidate Significant Wildlife Habitat Features in Section 5.7.3 (Table 5.5) of the NHA.
F4	Addition of Turbine 91 construction disturbance area 17 m to the west.	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
F5	Removal of a portion of construction disturbance area for access road and collection line to Turbine 92.	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources.	N/A	N/A
F6	Removal of a portion of construction disturbance area for access road and collection line to Turbines 96 and 97.	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources.	N/A	N/A
G1	Addition of Turbine 62 construction disturbance area to the west and addition of collection line disturbance area in two locations in the Northville Road right-of-way.	Infrastructure or construction disturbance area added or changed to optimize project design/ constructability.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
G2	Removal of the road and collection line to Turbine 63 and addition of road and collection line, extending west from Turbine 64 to Turbine 63.	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources.	<p><u>Natural Heritage:</u></p> <ul style="list-style-type: none"> • Access road and collection line are within 20 m of Significant Wetland Feature WET-063. New potential effects associated with access road during construction include: <ul style="list-style-type: none"> ▪ Accidental intrusion into significant wetlands resulting in damage to wetland form or function. ▪ Increased erosion and sedimentation resulting from clearing and grubbing, excavation, backfilling and stockpiling. ▪ Changes in surface water drainage patterns resulting in effects to soil moisture and species composition of vegetation. 	<p><u>Natural Heritage:</u></p> <ul style="list-style-type: none"> • For construction of the access road within 20 m of Significant Wetland Feature WET-063: <ul style="list-style-type: none"> ▪ Where construction occurs within 30 m, install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation. ▪ Undertake monthly site inspection by an Environmental Monitor to ensure that protective fencing is intact and that there is no damage caused during construction. ▪ Contingency Measures: <ul style="list-style-type: none"> - Repair protective fencing if damaged. - Any damaged trees will be pruned through the implementation of proper arboricultural techniques, under supervision or an Arborist or Forester. - If any wetland vegetation is damaged, habitat restoration will occur utilizing suitable native species. ▪ Install sediment and erosion control fencing along edge of construction area if within 30 m of a wetland as per Ontario Provincial Standards Specifications (OPSD 219.130). ▪ Monitor on-site conditions (<i>i.e.</i>, erosion and sediment control, flooding, etc.) by an Environmental Monitor where construction occurs within 5 m to 30 m of a feature on the following basis: <ul style="list-style-type: none"> - Weekly during active construction periods; - Prior to, during and post forecasted large rainfall events (>20 millimetres in 24 hours) or significant snowmelt events (<i>i.e.</i>, spring freshet);

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 (Mitigation measures not included in the original REA are shown in <i>italicized bold</i>)
				<ul style="list-style-type: none"> - Daily during extended rain or snowmelt periods; - Monthly during inactive construction periods, where the site is left alone for 30 days or longer. ▪ Contingency Measures: <ul style="list-style-type: none"> - Suspend work if excessive flows of sediment discharges occur until additional mitigation measures are in place (e.g. installation of extra erosion and sediment control materials kept on site such as silt fencing, straw bales, etc.). ▪ Ensure Best Management Practices are used to maintain current drainage patterns, including: <ul style="list-style-type: none"> - Implement infiltration techniques to the maximum extent possible. - Minimize paved surfaces and design roads to promote infiltration. - Limit changes in land contours. ▪ Site inspection by Environmental Monitor following grading activities within 30 m of significant wetlands. ▪ Contingency Measures: <ul style="list-style-type: none"> - If surface water drainage alterations are detected, undertake corrective measures to restore drainage patterns.
G3	Removal of collection line construction disturbance area north of Birnam Line.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	N/A	N/A
G4	Relocation of collection line between Turbines 76 and 75 20 m to the south.	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
G5	Relocation of Turbine 76 access road and collection line 134 m to the west.	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
G6	Addition of Turbine 109 and associated construction disturbance area, access road and collection line; addition of collection line in Hickory Creek Line right-of-way.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	<p>Water Bodies: Effects associated with water body present within 120 m buffer of turbine (Feature ID 9.29-F) include:</p> <p>Turbine</p> <ul style="list-style-type: none"> • Increase to surface water temperature from reduced groundwater contribution if dewatering activities are required for excavation of turbine foundations. • Increase to streamflows 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 on adjacent lands for construction of turbine, pad and turnaround area. • 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. 	<p>Water Bodies (refer to Appendix B for detailed mitigation measures under the following headings):</p> <p>Turbine</p> <ul style="list-style-type: none"> • Timing windows • Erosion and sediment control • Grading and excavation • Material stockpiling and handling
H1	Addition of Turbine 108 and associated construction disturbance area.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
H2	Relocation of collection line from private property to Birnam Line right-of-way.	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
I1	Relocation of Turbine 105 20 m to the south and addition of construction disturbance area.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
J1	Removal of Turbine 2 and associated access road and collection line.	Turbine and associated infrastructure removed	N/A	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 (Mitigation measures not included in the original REA are shown in <i>italicized bold</i>)
J2	Relocation of Turbine 1 and associated construction disturbance area, access road and collection line.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	<p><u>Water Bodies:</u> Effects from water body present within 120 m buffer of turbine (Feature ID R5.8) include:</p> <p>Turbine</p> <ul style="list-style-type: none"> • Increase to surface water temperature from reduced groundwater contribution if dewatering activities are required for excavation of turbine foundations • Increase to streamflows 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 turbine, pad and turnaround area. • 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. <p><u>Natural Heritage:</u></p> <ul style="list-style-type: none"> • Turbine construction disturbance area is within 120 m of new Generalized Candidate Significant Wildlife Habitat Feature (Plant Species of Conservation Concern Habitat) in Natural Area 298, not previously described in the NHA. Potential effects of construction on this feature are the same as described for other Generalized Candidate Significant Wildlife Habitat Features in Section 5.7.3 (Table 5.5) of the NHA. 	<p><u>Water Bodies</u> (refer to Appendix B for detailed mitigation measures under the following headings):</p> <p>Turbine</p> <ul style="list-style-type: none"> • Timing windows • Erosion and sediment control • Grading and excavation • Material stockpiling and handling <p><u>Natural Heritage:</u></p> <ul style="list-style-type: none"> • For construction of the turbine within 120 m of Generalized Candidate Significant Wildlife Habitat Feature in Natural Area 298, mitigation measures are the same as described for other Generalized Candidate Significant Wildlife Habitat Features in Section 5.7.3 (Table 5.5) of the NHA.
J3	Addition of Turbine 2 and associated construction disturbance area, access road and collection line.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	<p><u>Water Bodies:</u> Effects associated with water body present within 120 m buffer of turbine (Feature ID R4-J) include:</p> <p>Turbine</p> <ul style="list-style-type: none"> • Increase to surface water temperature from reduced groundwater contribution if dewatering activities are required for excavation of turbine foundations. • Increase to streamflows 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 turbine, pad and turnaround area. • 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. <p><u>Natural Heritage:</u></p> <ul style="list-style-type: none"> • Turbine construction disturbance area is 30 m from a new Significant Woodland Feature WOD-265, not previously described in the NHA. New potential effects associated with the turbine during construction include: <ul style="list-style-type: none"> ▪ Accidental intrusion into significant woodlands resulting in damage to trees. ▪ Risk of soil or water contamination resulting from accidental spills of fuel, etc. ▪ Changes in surface water drainage patterns resulting in effects to soil moisture and species composition of vegetation. • Turbine construction disturbance area is within 120 m of new Generalized Candidate Significant Wildlife Habitat Feature (Plant Species of Conservation Concern Habitat, and Red-headed Woodpecker Habitat) in Natural Area 293, not previously described in the NHA. Potential effects of construction on this feature are the same as described for other Generalized Candidate Significant Wildlife Habitat Features in Section 5.7.3 (Table 5.5) of the NHA. 	<p><u>Water Bodies</u> (refer to Appendix B for detailed mitigation measures under the following headings):</p> <p>Turbine</p> <ul style="list-style-type: none"> • Timing windows • Erosion and sediment control • Grading and excavation • Material stockpiling and handling <p><u>Natural Heritage:</u></p> <ul style="list-style-type: none"> • For construction of the turbine within 30 m of Significant Woodland Feature WOD-265: <ul style="list-style-type: none"> ▪ Where construction occurs within 30 m, install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation. ▪ Undertake monthly site inspections by an Environmental Monitor to ensure that protective fencing is intact and that there is no damage caused during construction. ▪ Contingency Measures: <ul style="list-style-type: none"> - Repair protective fencing if damaged. - Any damaged trees will be pruned through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester. - In the event that other woodland vegetation is damaged, habitat restoration will occur utilizing native species suited to the habitat within the disturbed area. ▪ Develop and implement emergency spills plan outlining steps to contain any chemicals or to avoid contamination of adjacent woodland features. ▪ Contractor to conduct routine inspections of construction equipment for leaks / spills. ▪ Develop an emergency spills plan. ▪ Contingency Measures: <ul style="list-style-type: none"> - Immediately stop all work until the spill is cleaned up. - Notify MOE's Spills Action Centre of any leaks or spills. - If a spill enters a wetland, collect and analyze water samples for appropriate parameters. - Monitor daily until cleanup is completed. ▪ Ensure Best Management Practices are used to maintain current drainage patterns, including: <ul style="list-style-type: none"> - Implement infiltration techniques to the maximum extent possible. - Minimize paved surfaces and design roads to promote infiltration. - Limit changes in land contours. ▪ Site inspection by Environmental Monitor following grading activities within 30 m of significant woodlands. ▪ Contingency Measures: <ul style="list-style-type: none"> - If surface water drainage alterations are detected, undertake corrective measures to restore drainage patterns. • For construction of the turbine within 120 m of Generalized Candidate Significant Wildlife Habitat Feature in Natural Area 293, mitigation measures are the same as described for other Generalized Candidate Significant Wildlife Habitat Features in Section 5.7.3 (Table 5.5) of the NHA.

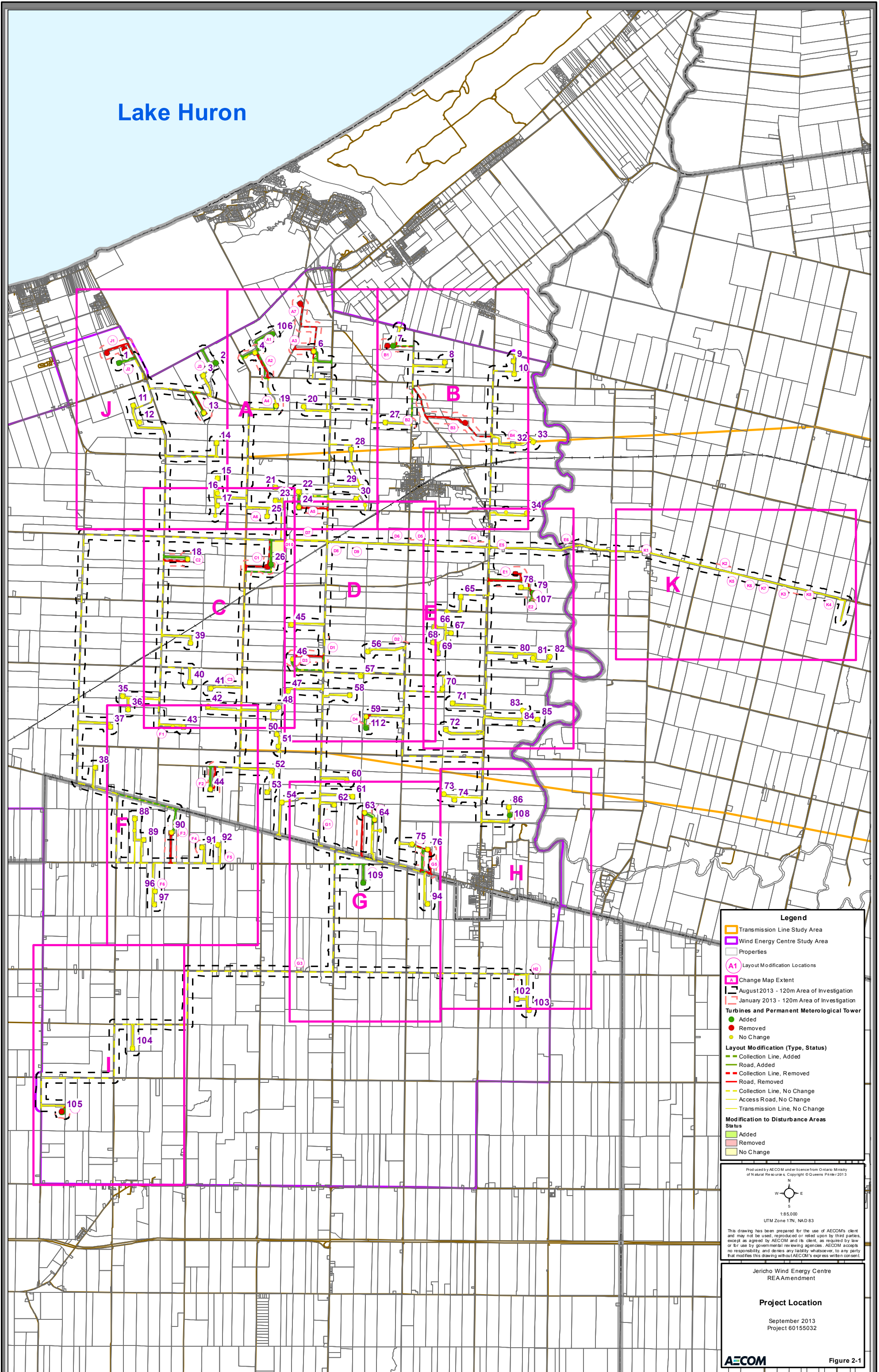
Table 2-1 Summary of Project Modifications

Label on Figure 2-1	Proposed Modification	Rationale for Proposed Modification	New Potential Environmental Effects	New Mitigation Measures (Mitigation measures not included in the original REA are shown in <i>italicized bold</i>)
J4	Relocation of Turbine 13 construction disturbance area 14 m south west.	Construction disturbance area modified to reduce or eliminate impacts to archaeological resources.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
K1	Relocation of transmission line construction disturbance area within natural areas located in the Elginfield Road right-of-way.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
K2	Addition of transmission line of construction disturbance area on private property to the north of Elginfield Road, east of Pete Sebe Road.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
K3	Addition of transmission line construction disturbance area on private property to the south of Elginfield Road, east of Roddick Road.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
K4	Addition of transmission line construction disturbance area on private property to the south of Elginfield Road, west of Kerwood Road.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
K5	Relocation of transmission line construction disturbance area within natural areas located in the Elginfield Road right-of-way.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	<p><u>Natural Heritage:</u></p> <ul style="list-style-type: none"> • The transmission line is proposed in Significant Woodland Feature WOD-181. New potential effects associated with transmission line construction in this feature include: <ul style="list-style-type: none"> ▪ Clearing of vegetation for the transmission line in significant woodland WOD-181 resulting in loss of up to 0.1 ha of woodland area. ▪ Accidental intrusion into significant woodland resulting in damage to trees. ▪ Increased erosion and sedimentation resulting from clearing and grubbing, excavation, backfilling and stockpiling. ▪ Risk of soil or water contamination resulting from accidental spills of fuel, etc. 	<p><u>Natural Heritage:</u></p> <ul style="list-style-type: none"> • For construction of the transmission line within Significant Woodland Feature WOD-181: <ul style="list-style-type: none"> ▪ Establish an area of forest equal in area to the cleared area (0.1 ha) through tree planting and management (e.g., in partnership with a local Conservation Authority). Details of the afforestation plan will be provided to MNR in a Compensation Plan. ▪ Perform vegetation clearing outside of the breeding bird season (May 1 to July 31). If this is not possible, MNR will be consulted regarding mitigation measures that may be required. Refer to Section 5.7 of the NHA for additional timing constraints related to wildlife. ▪ Clearly stake area to be cleared. ▪ Fell trees with a chainsaw toward the construction area to reduce damage to adjacent vegetation being retained. ▪ Limit size of machines entering significant woodlands to minimize soil compaction. ▪ Carry out removal of tree limbs on adjacent trees being retained under supervision of an Arborist or Forester. ▪ Cut damaged tree roots clean as soon as possible and cover exposed roots in approved topsoil under the supervision of an Arborist or Forester. ▪ Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor. ▪ Monitor establishment of planted area and replant/fill plant if required (may be undertaken by partner organization). ▪ Contingency Measure: Any damaged trees will be pruned through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester. ▪ Where construction occurs within 30 m, install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation. ▪ Undertake monthly site inspections by an Environmental Monitor to ensure that protective fencing is intact and that there is no damage caused during construction. ▪ Contingency Measures: <ul style="list-style-type: none"> - Repair protective fencing if damaged. - Any damaged trees will be pruned through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester. ▪ Install sediment and erosion control fencing along edge of construction area as per Ontario Provincial Standard Specifications (OPSD 219.130). ▪ Monitor on-site conditions (<i>i.e.</i>, erosion and sediment control, flooding, etc.) by an Environmental Monitor where construction occurs within 30 m of a feature on the following basis: <ul style="list-style-type: none"> - Weekly during active construction periods; - Prior to, during and post forecasted large rainfall events (>20 millimetres in 24 hours) or significant snowmelt events (<i>i.e.</i>, spring freshet); - Daily during extended rain or snowmelt periods; - Monthly during inactive construction periods, where the site is left alone for 30 days or longer. ▪ Contingency Measure: Suspend work if excessive flows of sediment discharges occur until additional mitigation measures are in place (e.g., install the extra erosion and sediment control materials kept on site, such as heavy duty silt fencing, straw bales, etc.). ▪ Develop and implement emergency spills plan outlining steps to contain any chemicals or to avoid contamination of adjacent woodland feature.

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 (Mitigation measures not included in the original REA are shown in <i>italicized bold</i>)
				<ul style="list-style-type: none"> ▪ Contractor to conduct routine inspections of construction equipment for leaks / spills. ▪ Develop an emergency spills plan. ▪ Contingency Measures: <ul style="list-style-type: none"> - Immediately stop all work until the spill is cleaned up. - Notify MOE's Spills Action Centre of any leaks or spills. - If a spill enters a wetland, collect and analyze water samples for appropriate parameters. - Monitor daily until cleanup is completed.
K6	Relocation of transmission line construction disturbance area within natural areas located in the Elginfield Road right-of-way.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	N/A
K7	Relocation of transmission line construction disturbance area within natural areas located in the Elginfield Road right-of-way.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	<p><u>Natural Heritage:</u></p> <ul style="list-style-type: none"> • The transmission line is proposed in Significant Woodland Feature WOD-175. New potential effects associated with transmission line construction in this feature include: <ul style="list-style-type: none"> ▪ Clearing of vegetation for the transmission line in significant woodland WOD-175 resulting in loss of up to 0.2 ha of woodland area. ▪ Accidental intrusion into significant woodland resulting in damage to trees. ▪ Increased erosion and sedimentation resulting from clearing and grubbing, excavation, backfilling and stockpiling. ▪ Risk of soil or water contamination resulting from accidental spills of fuel, etc. 	<p><u>Natural Heritage:</u></p> <ul style="list-style-type: none"> • For construction of the transmission line within Significant Woodland Feature WOD-175: <ul style="list-style-type: none"> ▪ Establish an area of forest equal in area to the cleared area (0.2 ha) through tree planting and management (e.g., in partnership with a local Conservation Authority). Details of the afforestation plan will be provided to MNR in a Compensation Plan. ▪ Perform vegetation clearing outside of the breeding bird season (May 1 to July 31). If this is not possible, MNR will be consulted regarding mitigation measures that may be required. Refer to Section 5.7 of the NHA for additional timing constraints related to wildlife. ▪ Clearly stake area to be cleared. ▪ Fell trees with a chainsaw toward the construction area to reduce damage to adjacent vegetation being retained. ▪ Limit size of machines entering significant woodlands to minimize soil compaction. ▪ Carry out removal of tree limbs on adjacent trees being retained under supervision of an Arborist or Forester. ▪ Cut damaged tree roots clean as soon as possible and cover exposed roots in approved topsoil under the supervision of an Arborist or Forester. ▪ Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor. ▪ Monitor establishment of planted area and replant/fill plant if required (may be undertaken by partner organization). ▪ Contingency Measure: Any damaged trees will be pruned through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester. ▪ Where construction occurs within 30 m, install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation. ▪ Undertake monthly site inspections by an Environmental Monitor to ensure that protective fencing is intact and that there is no damage caused during construction. ▪ Contingency Measures: <ul style="list-style-type: none"> - Repair protective fencing if damaged. - Any damaged trees will be pruned through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester. ▪ Install sediment and erosion control fencing along edge of construction area as per Ontario Provincial Standard Specifications (OPSD 219.130). ▪ Monitor on-site conditions (<i>i.e.</i>, erosion and sediment control, flooding, etc.) by an Environmental Monitor where construction occurs within 30 m of a feature on the following basis: <ul style="list-style-type: none"> - Weekly during active construction periods; - Prior to, during and post forecasted large rainfall events (>20 millimetres in 24 hours) or significant snowmelt events (<i>i.e.</i>, spring freshet); - Daily during extended rain or snowmelt periods; - Monthly during inactive construction periods, where the site is left alone for 30 days or longer. ▪ Contingency Measure: Suspend work if excessive flows of sediment discharges occur until additional mitigation measures are in place (e.g., install the extra erosion and sediment control materials kept on site, such as heavy duty silt fencing, straw bales, etc.). ▪ Develop and implement emergency spills plan outlining steps to contain any chemicals or to avoid contamination of adjacent woodland feature. ▪ Contractor to conduct routine inspections of construction equipment for leaks / spills. ▪ Develop an emergency spills plan. ▪ Contingency Measures: <ul style="list-style-type: none"> - Immediately stop all work until the spill is cleaned up. - Notify MOE's Spills Action Centre of any leaks or spills. - If a spill enters a wetland, collect and analyze water samples for appropriate parameters. - Monitor daily until cleanup is completed.
K8	Relocation of transmission line construction disturbance area within natural areas located in the Elginfield Road right-of-way.	Infrastructure or construction disturbance area added or changed to optimize project design/constructability.	None – no new natural heritage or water body features within 120 m; area previously studied for cultural heritage.	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 Meteorological 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

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UTM Zone 17N, NAD 83

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Jericho Wind Energy Centre
REAAmendment

Project Location

September 2013
Project 60155032

AECOM

Figure 2-1

3. Edits to the Construction Plan Report

Table 3-1 documents the edits to the Construction Plan Report resulting from the modifications described above. 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. Updated hydrogeological calculations for dewatering activities are included in **Appendix D**.

Table 3-1 Edits to the Construction Plan Report

Section / Page	Original Text	Revised Text (Underlined text represents additions and strikethrough text represents deletions. Mitigation measures not included in the original REA are shown in <i>italicized bold</i>)
Section 2 / page 5	The proposed Project Location is shown on Figures 2-1, 2-2 and 2-3 , and includes the components of the Project listed below: <ul style="list-style-type: none"> 97 GE 1.6-100 Wind Turbine generator locations and pad mounted step-up transformers (however, only approximately 92 turbines will ultimately be constructed); 	The proposed Project Location is shown on Figures 2-1, 2-2 and 2-3 , and includes the components of the Project listed below: <ul style="list-style-type: none"> 97 <u>99</u> GE 1.6-100 Wind Turbine generator locations and pad mounted step-up transformers (however, only approximately 92 turbines will ultimately be constructed);
Section 2 / page 5	The above mentioned Project components, with the exception of the common 115 kV transmission line from the Bornish switchyard to the PCC, are depicted in the Project Location figures described below (please refer to Appendix A for the Parkhill Interconnect Renewable Energy Approval Application Construction Plan Report): <ul style="list-style-type: none"> Figure 2-1: shows the locations of Project components and associated disturbance areas including: wind turbines, access roads, the electrical collection system, 115 kV transmission line, the transformer substation, and temporary laydown/storage areas. This figure also shows topographical land contours and surface water drainage for all land within 120 m of the Project Location. 	The above mentioned Project components, with the exception of the common 115 kV transmission line from the Bornish switchyard to the PCC, are depicted in the Project Location figures described below (please refer to Appendix A for the Parkhill Interconnect Renewable Energy Approval Application Construction Plan Report): <p>Figure 2-1: shows the locations of Project components and associated disturbance areas including: wind turbines, access roads, the electrical collection system, 115 kV transmission line, the transformer substation, and temporary laydown/storage areas. This figure also shows topographical land contours and surface water drainage for all land within 120 m of the Project Location.</p> <p><u>The location of access roads, entrances to the site, underground or overhead distribution or transmission facilities, and other project facilities, with the exception of turbines and substations, and/or any construction disturbance areas associated with the Facility, may be altered or moved by up to 20 metres from the locations specified in this Report, provided the appropriate Ministries have been consulted, including, the Ministry of Natural Resources and the Ministry of Tourism, Culture and Sport and the Renewable Energy Approvals Director of the Ministry of the Environment is satisfied with the proposed adjustments.</u></p>
Section 2.1 / page 7	Subject to the receipt of the necessary permits and approvals, site work for the Jericho Wind Energy Centre is expected to begin in 2013 and last for approximately 6 to 12 months.	Subject to the receipt of the necessary permits and approvals, site work for the Jericho Wind Energy Centre is expected to begin in 2013 2014 and last for approximately 6 to 12 months.
Section 2.2 / page 10	The proposed Project will consist of up to 97 GE 1.6-100 Wind Turbines with a nameplate capacity of up to 150 MW (however, only approximately 92 turbines will be constructed).	The proposed Project will consist of up to 97 <u>99</u> GE 1.6-100 Wind Turbines with a nameplate capacity of up to 150 MW (however, only approximately 92 turbines will be constructed).
Section 3 / page 16	This description of effects was completed for all 97 turbines and associated infrastructure shown on the Project Location figures.	This description of effects was completed for all 97 <u>99</u> turbines and associated infrastructure shown on the Project Location figures.
Section 3.1 / page 16	Between 2010 and 2012, pedestrian surveys were conducted within the Project Location in support of the Stage 2 Archaeological Assessment, according to the 2011 Standards and Guidelines for Consultant Archaeologists issued by the Ontario Ministry of Tourism, Culture and Sport (MTCS) (Government of Ontario, 2011). A total of 223 archaeological sites were identified and 74 sites have been recommended for further Stage 3 Archaeological Assessment.	Between 2010 and 2012, pedestrian surveys were conducted within the Project Location in support of the Stage 2 Archaeological Assessment, according to the 2011 Standards and Guidelines for Consultant Archaeologists issued by the Ontario Ministry of Tourism, Culture and Sport (MTCS) (Government of Ontario, 2011). A total of 223 archaeological sites were identified and 74 sites have been <u>were</u> recommended for further Stage 3 Archaeological Assessment. <u>Based on further Stage 2 Archeological Assessment in 2013, 17 additional sites were identified, of which 8 additional sites have been recommended for Stage 3 Archaeological Assessment.</u>
Section 3.1 / page 16	A Heritage Assessment (Golder, 2012a and 2013a) was also completed to identify heritage resources including built heritage and cultural heritage landscapes of cultural heritage value or interest. All work was carried out in accordance with <i>O.Reg.359/09</i> . The report identified 118 structures (66 houses, 51 barns, and one institutional structure) greater than 40 years of age located on parcels which contain project components in the Project Location. When applying the criteria set out in <i>Ontario Regulation 9/06</i> , 89 of these structures (42 houses, 46 barns, and one institutional structure) were determined to have cultural heritage value or interest. <p>Following the evaluation of anticipated impacts, both direct and indirect, according to <i>InfoSheet #5 in Heritage Resources in the Land Use Planning Process, Cultural Heritage and Archaeology Policies of the Ontario Provincial Policy Statement, 2005</i> (Government of Ontario, 2006), no anticipated impacts to these 89 structures were identified. Therefore, no further work is recommended.</p>	A Heritage Assessment (Golder, 2012a and 2013a) was also completed to identify heritage resources including built heritage and cultural heritage landscapes of cultural heritage value or interest. All work was carried out in accordance with <i>O.Reg.359/09</i> . The report identified 118 <u>127</u> structures (66 <u>71</u> houses, 51 <u>55</u> barns, and one institutional structure) greater than 40 years of age located on parcels which contain project components in the Project Location. When applying the criteria set out in <i>Ontario Regulation 9/06</i> , 89 <u>98</u> of these structures (42 <u>47</u> houses, 46 <u>50</u> barns, and one institutional structure) were determined to have cultural heritage value or interest. <p>Following the evaluation of anticipated impacts, both direct and indirect, according to <i>InfoSheet #5 in Heritage Resources in the Land Use Planning Process, Cultural Heritage and Archaeology Policies of the Ontario Provincial Policy Statement, 2005</i> (Government of Ontario, 2006), no anticipated impacts to these 89 <u>98</u> structures were identified. Therefore, no further work is recommended.</p>
Table 3-1 / page 17	Potential Effect Disturbance or displacement of 74 archaeological resources identified through Stage 2 Assessment due to construction of project infrastructure.	Potential Effect Disturbance or displacement of 74 <u>82</u> archaeological resources identified through Stage 2 Assessment due to construction of project infrastructure.
Section 3.2	The potential effects, mitigation measures, residual effects and monitoring commitments regarding the natural heritage features (including significant wetlands, woodlands, and wildlife habitat) were identified and evaluated in the Natural Heritage Assessment Report and Environmental Impact Study (AECOM, 2013c) based on the <i>Natural Heritage Assessment Guide for Renewable Energy Projects</i> (Government of Ontario, 2012) and submitted to the Ontario Ministry of Natural Resources (MNR) for review and sign-off.	The potential effects, mitigation measures, residual effects and monitoring commitments regarding the natural heritage features (including significant wetlands, woodlands, and wildlife habitat) were identified and evaluated in the Natural Heritage Assessment Report and Environmental Impact Study (<u>NHA and EIS Report</u>) (AECOM, 2013c) based on the <i>Natural Heritage Assessment Guide for Renewable Energy Projects</i> (Government of Ontario, 2012) and submitted to the Ontario Ministry of Natural Resources (MNR) for review and sign-off. <u>AECOM also prepared two NHA and EIS Report Addenda in respect to refinements to the Project Location proposed after the original submission of the NHA and EIS to MNR. The MNR issued confirmation and re-confirmation letters on February 7, 2013 for the NHA and EIS Report as well as the two Addenda. AECOM subsequently prepared a third Addendum to the NHA and EIS, to address modifications to the Project Location proposed after MNR confirmation, which was submitted to MNR on August 19, 2013.</u>
Table 3-2 / page 18	Wetlands 29 wetland complexes were treated as significant and carried forward to the EIS. <p>Significant Wildlife Habitat The following Significant Wildlife Habitat features were determined to be significant within the 120 m Area of Investigation and within 120 m of qualifying Project infrastructure, and were therefore carried forward to the EIS:</p> <ul style="list-style-type: none"> Bat Maternity Colonies; Rare Vegetation Communities; Habitat for Plant Species of Conservation Concern (multiple) ; and Habitat for Bird Species of Conservation Concern (Hooded Warbler). 	Wetlands 29 <u>28</u> wetland complexes were treated as significant and carried forward to the EIS. <p>Significant Wildlife Habitat The following Significant Wildlife Habitat features were determined to be significant within the 120 m Area of Investigation and within 120 m of qualifying Project infrastructure, and were therefore carried forward to the EIS:</p> <ul style="list-style-type: none"> Bat Maternity Colonies; Rare Vegetation Communities; <u>Turtle Wintering Areas;</u> Habitat for Plant Species of Conservation Concern (multiple) ; and Habitat for Bird Species of Conservation Concern (Hooded Warbler).

Table 3-1 Edits to the Construction Plan Report

Section / Page	Original Text	Revised Text <i>(Underlined text represents additions and strike through text represents deletions. Mitigation measures not included in the original REA are shown in italicized bold)</i>
	<p>The following features were treated as Significant Wildlife Habitat for the purpose of this submission and carried forward to the EIS (in some cases, a determination as to whether the mitigation measures described in the EIS will be applied will be made based on the outcome of pre-construction surveys):</p> <ul style="list-style-type: none"> • Waterfowl Stopover and Staging Areas (terrestrial); • Waterfowl Stopover and Staging Areas (aquatic); • Raptor Wintering Area; • Bat Maternity Colonies; • Turtle Wintering Areas; • Reptile Hibernacula; • Deer Winter Congregation Areas; • Bald Eagle and Osprey Nesting, Foraging, and Perching Habitat; • Woodland Raptor Nesting Habitat; • Turtle Nesting Habitat; • Seeps and Springs; • Amphibian Woodland Breeding Habitat; • Amphibian Wetland Breeding Habitat; • Woodland Area-sensitive Bird Breeding Habitat; and • Amphibian Movement Corridors. 	<p>The following features were treated as Significant Wildlife Habitat for the purpose of this submission and carried forward to the EIS (in some cases, a determination as to whether the mitigation measures described in the EIS will be applied will be made based on the outcome of pre-construction surveys):</p> <ul style="list-style-type: none"> • Waterfowl Stopover and Staging Areas (terrestrial); • Waterfowl Stopover and Staging Areas (aquatic); • Raptor Wintering Area; • Bat Maternity Colonies; • Turtle Wintering Areas; • Reptile Hibernacula; • Deer Winter Congregation Areas; • Bald Eagle and Osprey Nesting, Foraging, and Perching Habitat; • Woodland Raptor Nesting Habitat; • Turtle Nesting Habitat; • Seeps and Springs; • Amphibian Woodland Breeding Habitat; • Amphibian Wetland Breeding Habitat; • Woodland Area-sensitive Bird Breeding Habitat; and • Amphibian Movement Corridors.
Table 3-4 / page 27	<p>Performance Objectives</p> <ul style="list-style-type: none"> • Avoid accidental intrusion into significant natural features. 	<p>Performance Objectives</p> <ul style="list-style-type: none"> • Avoid accidental intrusion into significant natural features.
Table 3-4 / page 28	<p>Mitigation Strategy</p> <ul style="list-style-type: none"> • Clearly delineate habitat boundaries where construction will occur within 30 m using protective fencing (sediment and erosion control fence) to ensure that construction activities occur outside the habitat boundaries. 	<p>Mitigation Strategy</p> <ul style="list-style-type: none"> • Clearly delineate habitat boundaries where construction will occur within 30 m using protective fencing (sediment and erosion control fence) to ensure that construction activities occur outside the habitat boundaries <u>as per Figure 3.5d in the approved NHA and EIS.</u>
Table 3-4 / page 28	<p>Potential Effect</p> <p>Accidental intrusion resulting in habitat damage in Reptile Hibernacula and Turtle Nesting Habitats.</p>	<p>Potential Effect</p> <p>Accidental intrusion resulting in habitat damage in Reptile Hibernacula and Turtle Nesting Habitats.</p>
Table 3-4 / page 31	<p>Mitigation Strategy</p> <ul style="list-style-type: none"> • Install heavy duty sediment and erosion control fencing along construction disturbance area for access road to Turbines 78, and 79 where within 30 m of natural area 90. 	<p>Mitigation Strategy</p> <ul style="list-style-type: none"> • Install heavy duty sediment and erosion control fencing along construction disturbance area for access road to Turbines 78, and 79 <u>and 107</u> where within 30 m of natural area 90.
Table 3-4 / page 32	<p>Potential Effect</p> <p>Increased erosion and sedimentation resulting from clearing and grubbing, excavation, backfilling and stockpiling near Turtle Wintering Areas, Rare Vegetation Communities, Turtle Nesting Habitats, Amphibian Woodland Breeding Habitat, Amphibian Wetland Breeding Habitats, and Amphibian Movement Corridors.</p>	<p>Potential Effect</p> <p>Increased erosion and sedimentation resulting from clearing and grubbing, excavation, backfilling and stockpiling near Turtle Wintering Areas, Rare Vegetation Communities, Turtle Nesting Habitats, Amphibian Woodland Breeding Habitat, Amphibian Wetland Breeding Habitats, and Amphibian Movement Corridors.</p>
Table 3-4 / page 34		<p>Potential Effect</p> <p><u>Trimming of branches or selective tree removal for transmission line in Significant Wetlands WET-050 and WET-078 within road right-of-way.</u></p> <p>Performance Measure</p> <ul style="list-style-type: none"> • <u>Minimize loss of wetland cover over time.</u> <p>Mitigation Strategy</p> <ul style="list-style-type: none"> • <u>Refer to General Mitigation Measures (Table 3-3) for standard mitigation measures.</u> • <u>Install transmission line poles outside the boundaries of the Significant Wetland. A combination of crew on foot within the Significant Wetland Feature and equipment operated from the road right-of-way reaching over in the Feature will be used to construct the transmission line; no heavy equipment will enter the Significant Wetland Feature.</u> • <u>Minimize vegetation removal in Significant Wetland, to the extent possible.</u> • <u>Vegetation removal for the installation of the transmission line will be kept to a minimum and will be limited to the road right-of-way, where possible.</u> • <u>Perform vegetation clearing outside of the breeding bird season (May 1 to July 31). If this is not possible, MNR will be consulted regarding mitigation measures that may be required. Refer to Section 5.7 of the approved NHA and EIS for additional timing constraints related to wildlife.</u> • <u>Clearly stake area to be cleared.</u> • <u>Remove trees or tree limbs by hand-held equipment within Significant Wetland to minimize soil compaction.</u> • <u>Fell trees with a chainsaw toward the construction area to reduce damage to adjacent vegetation being retained.</u> • <u>Carry out removal of tree limbs on adjacent trees being retained under supervision of an Arborist or Forester.</u> • <u>Cut damaged tree roots clean as soon as possible and cover exposed roots in approved topsoil under the supervision of an Arborist or Forester.</u> • <u>Restore disturbed areas using suitable native wetland plant species. A Restoration Plan will be provided to MNR.</u>

Table 3-1 Edits to the Construction Plan Report

Section / Page	Original Text	Revised Text (Underlined text represents additions and strike through text represents deletions. Mitigation measures not included in the original REA are shown in <i>italicized bold</i>)
		<p>Residual Effects</p> <ul style="list-style-type: none"> Some clearing of vegetation will occur for the transmission line; this would be minimal and limited to the road right-of-way. Minimal residual effects. <p>Monitoring Plan and Contingency Measures</p> <ul style="list-style-type: none"> <u>Daily monitoring of areas where active vegetation removal is occurring by Environmental Monitor.</u> <u>Monitor establishment of planted area and replant/fill plant if required.</u> <p>Contingency Measures:</p> <ul style="list-style-type: none"> <u>Any damaged trees will be pruned through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester.</u>
Table 3-4 / page 35		<p>Potential Effect Risk of spread of invasive species into Significant Wetlands WET-050 and WET-078 as a result of transmission line construction disturbance.</p> <p>Performance Measure</p> <ul style="list-style-type: none"> Avoid spread of invasive species into Significant Wetlands WET-050 and WET-078. <p>Mitigation Strategy</p> <ul style="list-style-type: none"> <u>Ensure all equipment, including clothing/boots, is thoroughly washed before entering the Significant Wetland to avoid introducing seeds or fragments of invasive species into the Significant Wetland.</u> <u>Restore disturbed areas as soon as possible using suitable native wetland plant species. A Restoration Plan will be provided to MNR.</u> <p>Residual Effects</p> <ul style="list-style-type: none"> Spread of invasive species avoided or minimized through the application of mitigation measures. Low likelihood and limited magnitude of effect as a result. <p>Monitoring Plan and Contingency Measures</p> <ul style="list-style-type: none"> <u>Daily monitoring of areas where construction activities are occurring within the Significant Wetland by Environmental Monitor.</u> <u>Monitor establishment of planted area and replant/fill plant if required.</u>
Table 3-4 / page 35	<p>Potential Effect Clearing of vegetation for access roads in Significant Woodlands resulting in loss of up to 0.16 ha of forest cover (representing 0.008% of woodland area).</p> <p>Mitigation Strategy</p> <ul style="list-style-type: none"> Establish an area of forest equal in area to the cleared area (0.16 ha) through tree planting and management (e.g., in partnership with a local Conservation Authority). Details of the afforestation plan will be provided to MNR in a Compensation Plan. 	<p>Potential Effect Clearing of vegetation for access roads <u>and the transmission line</u> in Significant Woodlands resulting in loss of up to 0.4649 ha of forest cover (representing 0.008% of woodland area).</p> <p>Mitigation Strategy</p> <ul style="list-style-type: none"> Establish an area of forest equal in area to the cleared area (0.4649 ha) through tree planting and management (e.g., in partnership with a local Conservation Authority). Details of the afforestation plan will be provided to MNR in a Compensation Plan.
Table 3-4 / page 37	<p>Potential Effect Disruption or possible mortality of turtles moving between wintering ponds and other areas resulting from construction near Turtle Wintering Areas.</p> <p>Performance Measure</p> <ul style="list-style-type: none"> Minimize disruption to turtle movement. <p>Mitigation Strategy</p> <ul style="list-style-type: none"> Post speed limits and turtle crossing signage along relevant construction access roads within 120 m of Significant Turtle Wintering Areas (30 km/hr). <p>Monitoring Plan and Contingency Measures</p> <p>Contingency Measures:</p> <ul style="list-style-type: none"> Turtles encountered within the construction area will be moved to a safe location (nearby pond) under the direction of the Environmental Monitor or a qualified Biologist. 	<p>Potential Effect Disruption or possible mortality of turtles moving between wintering ponds and other areas resulting from construction near Turtle Wintering Areas.</p> <p>Possible injury/mortality from intrusion into construction site.</p> <p>Performance Measure</p> <ul style="list-style-type: none"> Minimize disruption to turtle movement. Prevent <u>injury and/or mortality of turtles during construction.</u> <p>Mitigation Strategy</p> <ul style="list-style-type: none"> Post speed limits and turtle crossing signage along relevant construction access roads <u>within 120 m of Significant Turtle Wintering Areas</u> (30 km/hr). <u>Educate construction site staff about turtle species that may potentially occur in the Study Area and the steps to be taken if an encounter occurs.</u> <u>If roadside nests are encountered during construction, the site should be avoided and the local MNR office should be contacted immediately.</u> <p>Monitoring Plan and Contingency Measures</p> <p>Contingency Measures:</p> <ul style="list-style-type: none"> Turtles encountered within the construction area will be moved to a safe location (nearby pond) under the direction of the Environmental Monitor or a qualified Biologist. <u>A Turtle Relocation Plan will be prepared, to be implemented in the event that turtles need to be handled or moved.</u>

Table 3-1 Edits to the Construction Plan Report

Section / Page	Original Text	Revised Text <i>(Underlined text represents additions and strikethrough text represents deletions. Mitigation measures not included in the original REA are shown in italicized bold)</i>
Table 3-4 / page 38	<p>Potential Effect Increased erosion and sedimentation resulting from clearing and grubbing, excavation, backfilling and stockpiling near Turtle Wintering Areas, Rare Vegetation Communities, Turtle Nesting Habitats, Amphibian Woodland Breeding Habitat, Amphibian Wetland Breeding Habitats, and Amphibian Movement Corridors.</p> <p>Mitigation Strategy</p> <ul style="list-style-type: none"> • Ensure Best Management Practices are used to maintain current drainage patterns, including: <ul style="list-style-type: none"> ▪ Implement infiltration techniques to the maximum extent possible. ▪ Minimize paved surfaces and design roads to promote infiltration. ▪ Limit changes in land contours. 	<p>Potential Effect Increased erosion and sedimentation resulting from clearing and grubbing, excavation, backfilling and stockpiling near Turtle Wintering Areas, Rare Vegetation Communities, Turtle Nesting Habitats, Amphibian Woodland Breeding Habitat, Amphibian Wetland Breeding Habitats, and Amphibian Movement Corridors.</p> <p>Mitigation Strategy</p> <ul style="list-style-type: none"> • Ensure Best Management Practices are used to maintain current drainage patterns, including: <ul style="list-style-type: none"> ▪ Implement infiltration techniques to the maximum extent possible. ▪ Minimize paved surfaces and design roads to promote infiltration. ▪ Limit changes in land contours. • <u>Ensure no grade changes within 30 m of turtle wintering areas.</u>
Table 3-4 / page 40	<p>Potential Effect Possible mortality to turtles from construction equipment during construction near Turtle Nesting Habitats.</p> <p>Performance Measure</p> <ul style="list-style-type: none"> • Avoid mortality from equipment. <p>Mitigation Strategy</p> <ul style="list-style-type: none"> • Post speed limits and turtle crossing signage along relevant construction access road (30 km/hr). • Schedule construction activities within 30 m to avoid nesting period (May 15 to June 30). If this is not possible, MNR will be consulted regarding mitigation measures that may be required. <p>Residual Effects</p> <ul style="list-style-type: none"> • Disruption minimized through speed limits and fencing. • Low likelihood of occurring and limited magnitude (i.e., no or limited mortality expected). <p>Monitoring Plan and Contingency Measures</p> <ul style="list-style-type: none"> • If construction occurs within 30 m of turtle nesting habitat (if determined to be significant) between May 15 and June 30, conduct area searches for turtles by a qualified Biologist prior to soil stripping or grubbing, as well as daily prior to construction activities by the Contractor within the construction footprint. <p>Contingency Measures:</p> <ul style="list-style-type: none"> • Turtles encountered within the construction area will be moved to a safe location under the direction of the Environmental Monitor or qualified Biologist. 	<p>Potential Effect Possible mortality to turtles from construction equipment during construction near Turtle Nesting Habitats.</p> <p>Performance Measure • Avoid mortality from equipment.</p> <p>Mitigation Strategy</p> <ul style="list-style-type: none"> • Post speed limits and turtle crossing signage along relevant construction access road (30 km/hr). • Schedule construction activities within 30 m to avoid nesting period (May 15 to June 30). If this is not possible, MNR will be consulted regarding mitigation measures that may be required. <p>Residual Effects</p> <ul style="list-style-type: none"> • Disruption minimized through speed limits and fencing. • Low likelihood of occurring and limited magnitude (i.e., no or limited mortality expected). <p>Monitoring Plan and Contingency Measures</p> <ul style="list-style-type: none"> • If construction occurs within 30 m of turtle nesting habitat (if determined to be significant) between May 15 and June 30, conduct area searches for turtles by a qualified Biologist prior to soil stripping or grubbing, as well as daily prior to construction activities by the Contractor within the construction footprint. <p>Contingency Measures:</p> <ul style="list-style-type: none"> • Turtles encountered within the construction area will be moved to a safe location under the direction of the Environmental Monitor or qualified Biologist.
Section 3.3.1 / page 41	<p>Following the Records Review and Site Investigation, 116 water bodies were identified.</p> <p>Based on a sensitivity ranking conducted by AECOM, 9 water bodies were classified as high sensitivity (i.e., not very resilient to environmental change); 71 water bodies were classified as moderate sensitivity; and 36 water bodies were classified as low sensitivity.</p>	<p>Following the Records Review and Site Investigation, 116 <u>119</u> water bodies were identified.</p> <p>Based on a sensitivity ranking conducted by AECOM, 9 water bodies were classified as high sensitivity (i.e., not very resilient to environmental change); 71 <u>74</u> water bodies were classified as moderate sensitivity; and 36 water bodies were classified as low sensitivity.</p>
Section 3.3.2 / page 50	<p>The extraction of groundwater for construction dewatering purposes is expected to be of low volume due to the short duration of dewatering activities, and the shallow depth of the turbine bases (up to 4 mbgs). However, there is the potential that water taking could be greater than 50,000 L/day, depending on the surficial material being excavated, the depth to groundwater, the amount of precipitation received during excavation activities, and other geological characteristics that may be determined during the geotechnical analysis. The following turbines have been determined, through the analysis of available geological mapping and MOE water well record borehole logs, to have the potential to require construction dewatering of greater than 50,000 L/day during the excavation and installation of turbine foundations: 1-8, 10, 13, 20, 28, 31-34, 44, 59, 75-76, 83-85, 88-92, 94, 99, 105.</p> <p>As such the water taking may be classified as Groundwater – Category 2 (short-term, non-recurring taking less than 30 consecutive days and less than 400,000 L/day). Appendix B contains detailed calculations on the dewatering estimates and radii of influence for the construction dewatering. Based on the calculations in Appendix B, the conservative water taking per turbine base excavation range from 2,300 L/day to 163,000 L/day with calculated radii of influence for the construction dewatering of 15 m and 213 m for the silty/clayey till unit and the sand and gravel unit respectively. A conservative estimate of 250 m for the zone of influence has been assumed.</p> <p>As these calculations are based on estimations from the available data, at least one geotechnical borehole will be drilled for each turbine base location and these calculations will be revisited using the new soil data and depth to groundwater found from the geotechnical investigations.</p>	<p>The extraction of groundwater for construction dewatering purposes is expected to be of low volume due to the short duration of dewatering activities, and the shallow depth of the turbine bases <u>and collection lines</u> (up to 4 mbgs <u>and 2mbgs respectively</u>). However, there is the potential that water taking could be greater than 50,000 L/day, depending on the surficial material being excavated, the depth to groundwater, the amount of precipitation received during excavation activities, and other geological characteristics that may be determined <u>were observed</u> during the geotechnical <u>analysis investigation</u>. The following turbines have been determined, through the analysis of <u>the geotechnical study prepared by AMEC (2013)</u>, available geological mapping and MOE water well record borehole logs, to have the potential to require construction dewatering of greater than 50,000 L/day during the excavation and installation of turbine foundations: 1-8, 10, 13, 20, 28, 31-34, 44, 59, 75-76, 83-85, 88-92, 94, 99, 105 <u>8, 25, and 32-34</u>. <u>The location and extent of construction dewatering associated with collection line installation varies depending on surficial geological material encountered, the depth to groundwater as indicated in MOE water well records and the presence of groundwater indicators observed during field investigations. All dewatering activities associated with turbine foundations and collection lines are anticipated to be less than 400,000 L/day.</u></p> <p>As such the water taking may be classified as Groundwater – Category 2 (short-term, non-recurring taking less than 30 consecutive days and less than 400,000 L/day). Appendix <u>B-1</u> contains detailed calculations on the dewatering estimates and radii of influence for the construction dewatering <u>associated with turbine foundations</u>. Based on the calculations in Appendix <u>B-1</u>, the conservative water taking per turbine base excavation range from 2,300 <u>95,860</u> L/day to 163,000 <u>214,400</u> L/day with calculated radii of influence for the construction dewatering of <u>ranging between</u> 15 <u>131</u> m and 213 <u>278</u> m <u>for the silty/clayey till unit and the sand and gravel unit respectively</u>. A conservative estimate of 250 m for the zone of influence has been assumed. Appendix <u>B-2</u> contains detailed calculations of the dewatering estimates and radius of influence for the construction dewatering associated with collection line installation. Based on the calculations in Appendix <u>B-2</u>, the conservative water taking for collection lines installed in permeable surficial material is approximately 174,300 L/day with a calculated radius of influence of 77 m.</p> <p>As these calculations are based on estimations from the available data, at least one geotechnical borehole will be drilled for each turbine base location and these calculations will be revisited using the new soil data and depth to groundwater found from the geotechnical investigations.</p>

Table 3-1 Edits to the Construction Plan Report

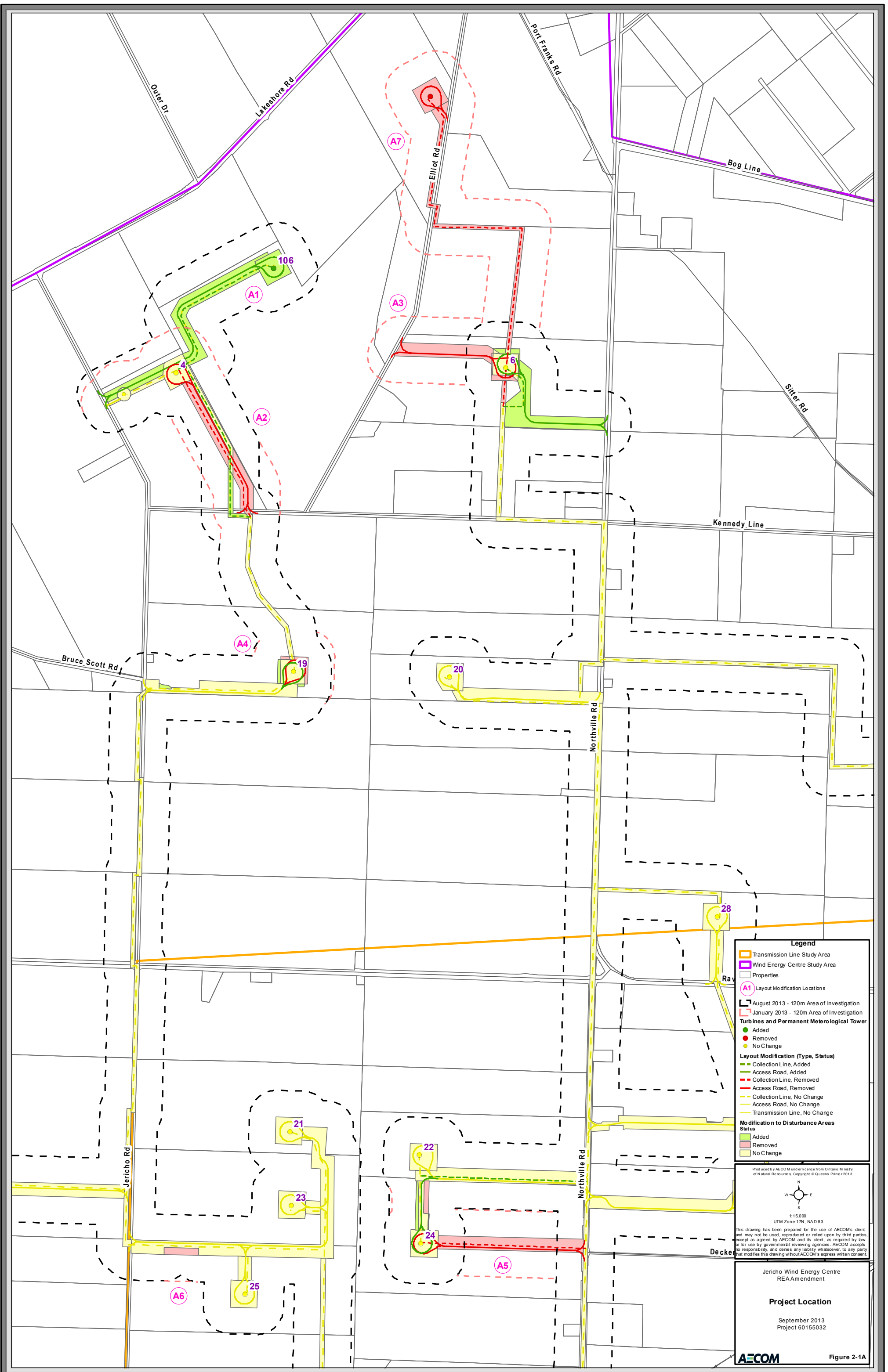
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Table 3-6 / page 50	Mitigation Strategy Limit dewatering where turbines are constructed within the sand and/or gravel deposits or where shallow water table conditions are expected to less than 400,000 L/day (Turbines: 1-8, 10, 13, 20, 28, 31-34, 44, 59, 75-76, 83-85, 88-92, 94, 99, and 105)	Mitigation Strategy Limit dewatering where turbines are constructed within the sand and/or gravel deposits or where shallow water table conditions are expected to be less than 400,000 L/day (Anticipated turbines: <u>1-8, 10, 13, 20, 28, 31-34, 44, 59, 75-76, 83-85, 88-92, 94, 99, and 105</u> , <u>8, 25, and 32-34</u>).																																																
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Section 3.9.4 / page 54	According to CanACRE's Petroleum Facility Location Report (2012), however, seven abandoned wells are located within 75 m of Project infrastructure, as shown in Table 3-11 below.	According to CanACRE's Petroleum Facility Location Report (2012), however, seven <u>five</u> abandoned wells are located within 75 m of Project infrastructure, as shown in Table 3-11 below.																																																
Table 3-11 / page 55	<table border="1" data-bbox="491 673 1597 897"> <thead> <tr> <th>Well ID</th> <th>Project Infrastructure within 75 m</th> <th>Distance to Project Infrastructure</th> </tr> </thead> <tbody> <tr> <td>W1</td> <td>T7 access road</td> <td>58 m</td> </tr> <tr> <td>W2</td> <td>Collection line between T31 and T8</td> <td>52 m</td> </tr> <tr> <td>W7</td> <td>Transmission line</td> <td>47 m</td> </tr> <tr> <td>W10</td> <td>T47 and associated access road and collection line</td> <td>18 m</td> </tr> <tr> <td>W11</td> <td>T71 and associated access road and collection line</td> <td>37 m</td> </tr> <tr> <td>W14</td> <td>T76 access road and collection line to T75 and T76</td> <td>1 m</td> </tr> <tr> <td>W15</td> <td>T94 access road and collection line</td> <td>43 m</td> </tr> </tbody> </table>	Well ID	Project Infrastructure within 75 m	Distance to Project Infrastructure	W1	T7 access road	58 m	W2	Collection line between T31 and T8	52 m	W7	Transmission line	47 m	W10	T47 and associated access road and collection line	18 m	W11	T71 and associated access road and collection line	37 m	W14	T76 access road and collection line to T75 and T76	1 m	W15	T94 access road and collection line	43 m	<table border="1" data-bbox="1793 673 2899 897"> <thead> <tr> <th>Well ID</th> <th>Project Infrastructure within 75 m</th> <th>Distance to Project Infrastructure</th> </tr> </thead> <tbody> <tr> <td>W1</td> <td>T7 access road</td> <td>58 m</td> </tr> <tr> <td>W2</td> <td>Collection line between T31 <u>T27</u> and T8</td> <td>52 m <u>46 m</u></td> </tr> <tr> <td>W7</td> <td>Transmission line</td> <td>47 m <u>40 m</u></td> </tr> <tr> <td>W10</td> <td>T47 and associated access road and collection line</td> <td>18 m</td> </tr> <tr> <td>W11</td> <td>T71 and associated access road and collection line</td> <td>37 m</td> </tr> <tr> <td>W14</td> <td>T76 access road and collection line to T75 and T76</td> <td>1 m</td> </tr> <tr> <td>W15</td> <td>T94 access road and collection line</td> <td>43 m</td> </tr> </tbody> </table>	Well ID	Project Infrastructure within 75 m	Distance to Project Infrastructure	W1	T7 access road	58 m	W2	Collection line between T31 <u>T27</u> and T8	52 m <u>46 m</u>	W7	Transmission line	47 m <u>40 m</u>	W10	T47 and associated access road and collection line	18 m	W11	T71 and associated access road and collection line	37 m	W14	T76 access road and collection line to T75 and T76	1 m	W15	T94 access road and collection line	43 m
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4. Summary and Conclusions

The Project modifications described in this REA Revision Report do not change the overall conclusion of the Construction Plan Report which states that “this Project can be constructed and installed without any significant adverse residual effects”.

Appendix A

Project Modifications



Legend

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

Turbines and Permanent Meteorological 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

No Modification to Disturbance Areas Status

- Added
- Removed
- No Change

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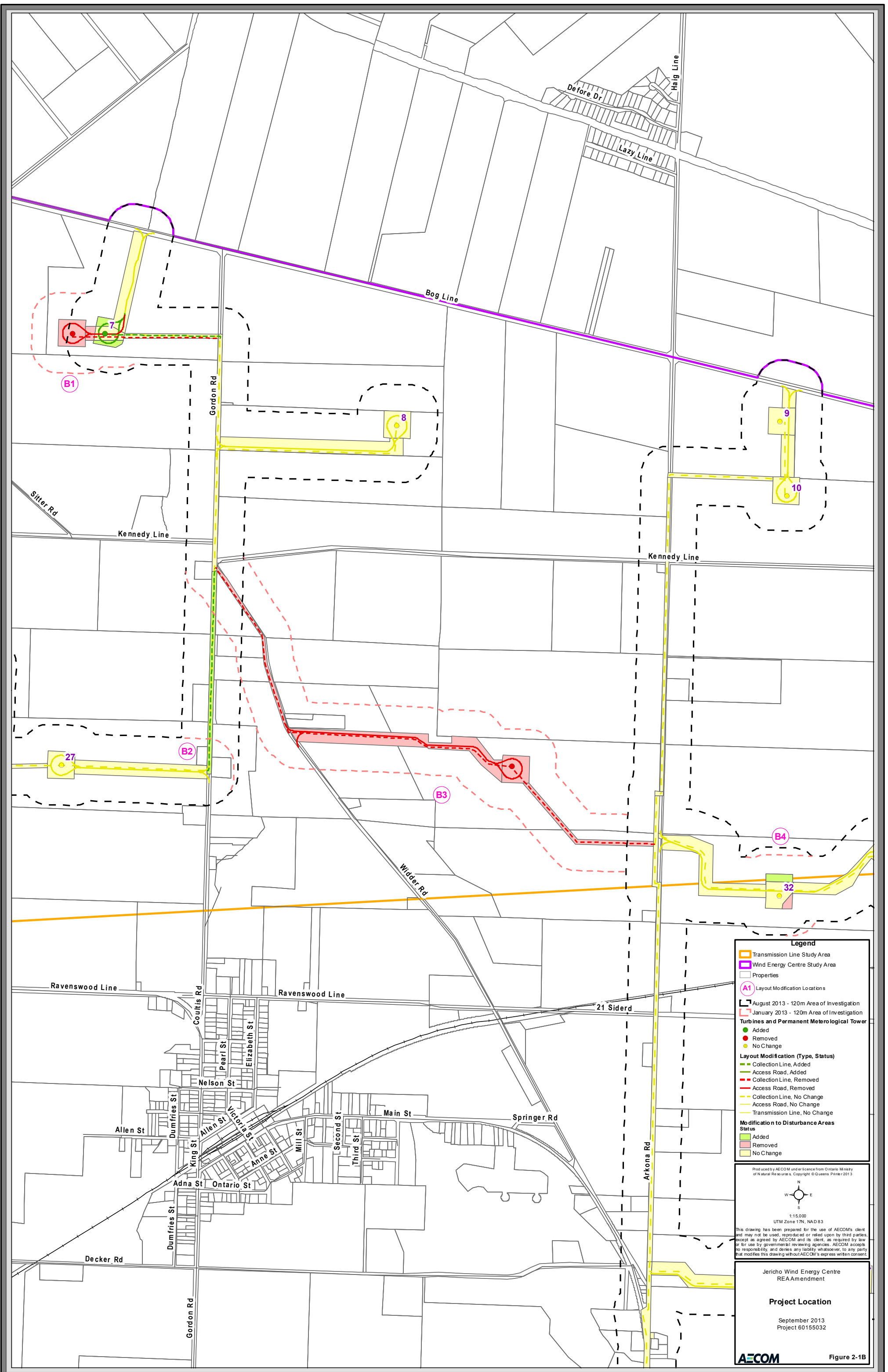
Jericho Wind Energy Centre
REA Amendment

Project Location

September 2013
Project 60155032

AECOM

Figure 2-1A



Legend

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

Turbines and Permanent Meteorological 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

No Modification to Disturbance Areas Status

- Added
- Removed
- No Change

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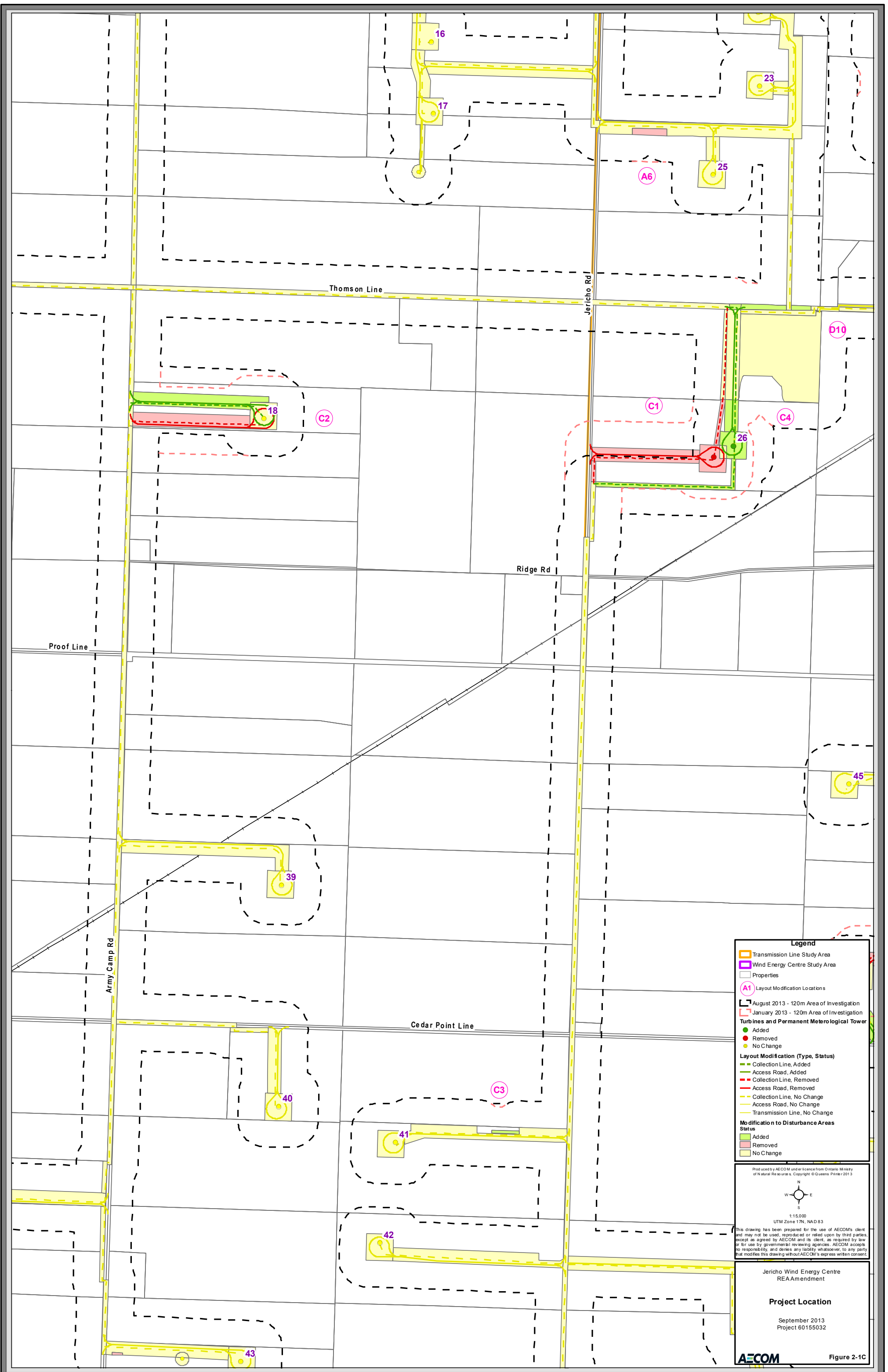
Jericho Wind Energy Centre
REA Amendment

Project Location

September 2013
Project 60155032

AECOM

Figure 2-1B



Legend

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

Turbines and Permanent Meteorological 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

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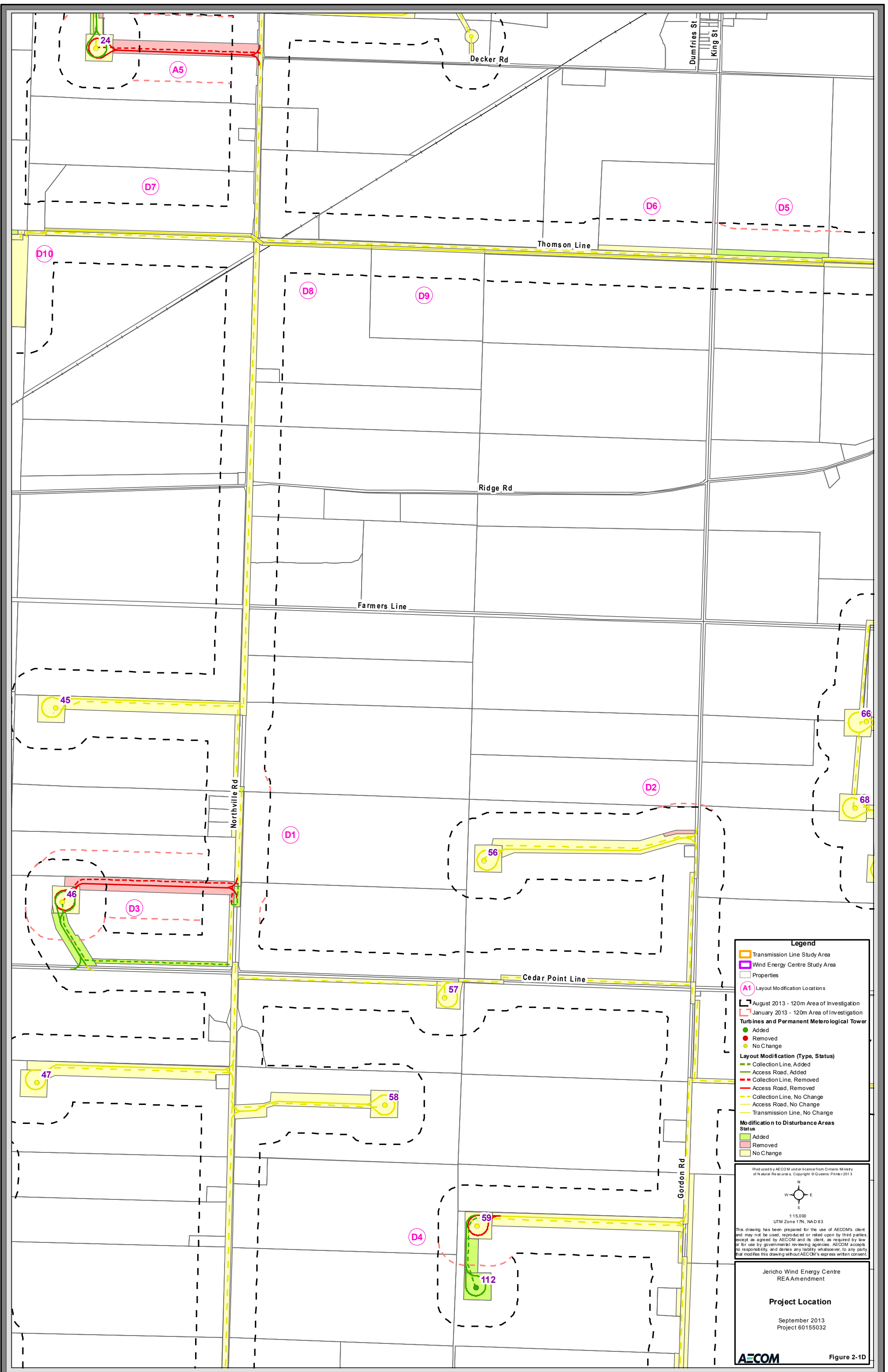
Jericho Wind Energy Centre
REA Amendment

Project Location

September 2013
Project 60155032

AECOM

Figure 2-1C



Legend

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

Turbines and Permanent Meteorological 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

No Modification to Disturbance Areas Status

- Added
- Removed
- No Change

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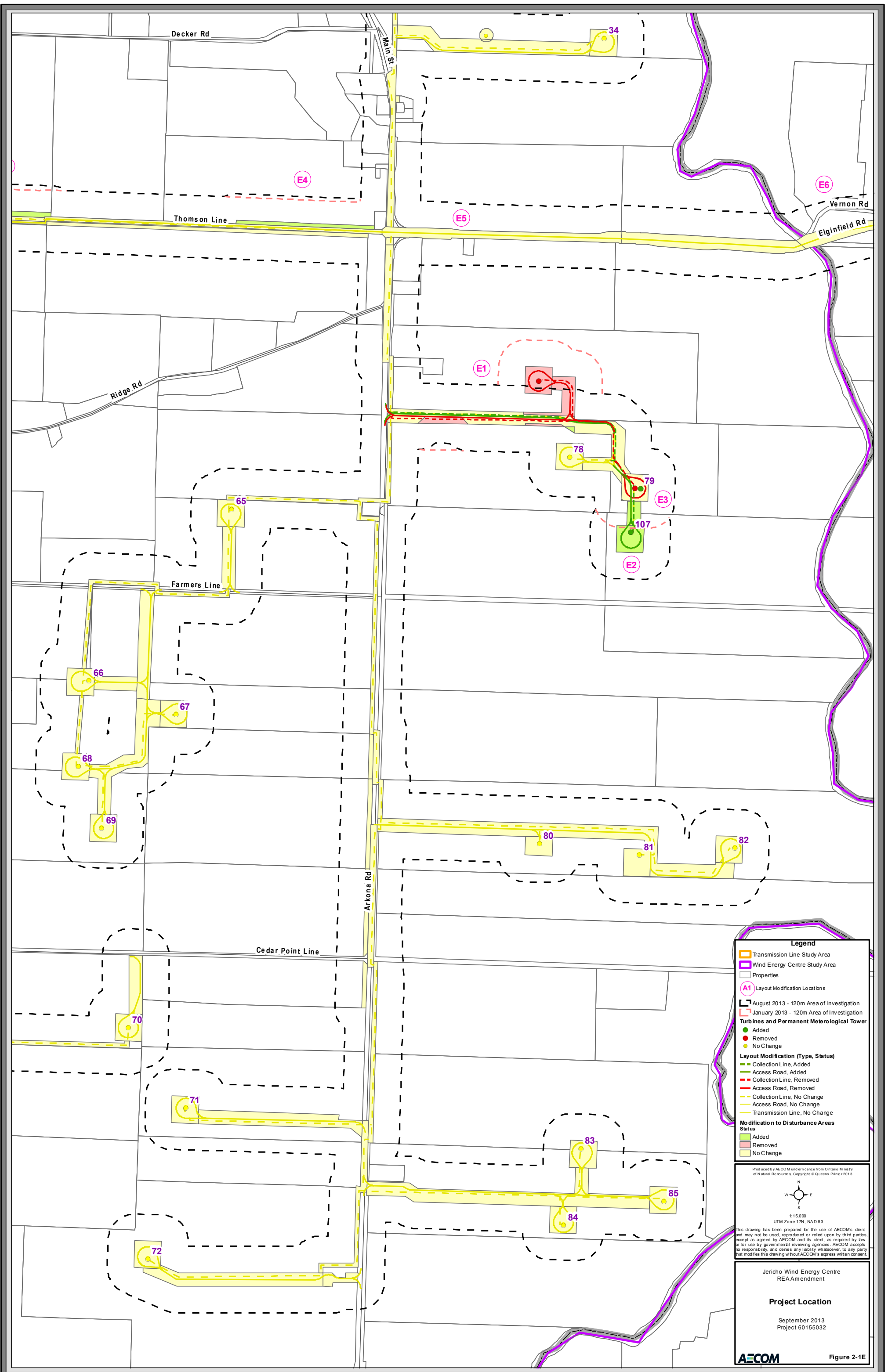
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Jericho Wind Energy Centre
REA Amendment

Project Location

September 2013
Project 60155032

AECOM Figure 2-1D



Legend

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

Turbines and Permanent Meteorological 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

No Modification to Disturbance Areas Status

- Added
- Removed
- No Change

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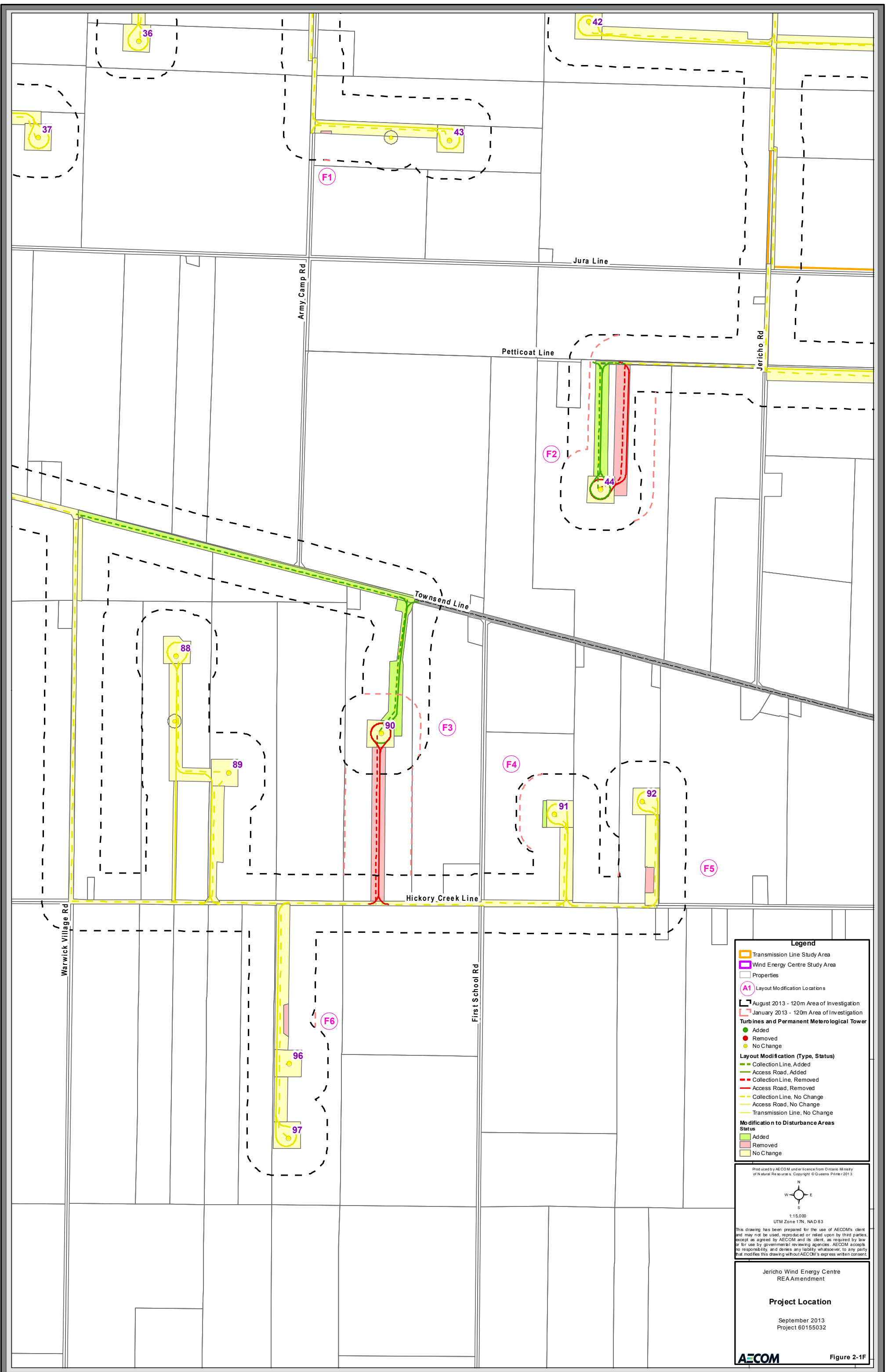
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Jericho Wind Energy Centre
REA Amendment

Project Location

September 2013
Project 60155032

AECOM Figure 2-1E



Legend

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

Turbines and Permanent Meteorological 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

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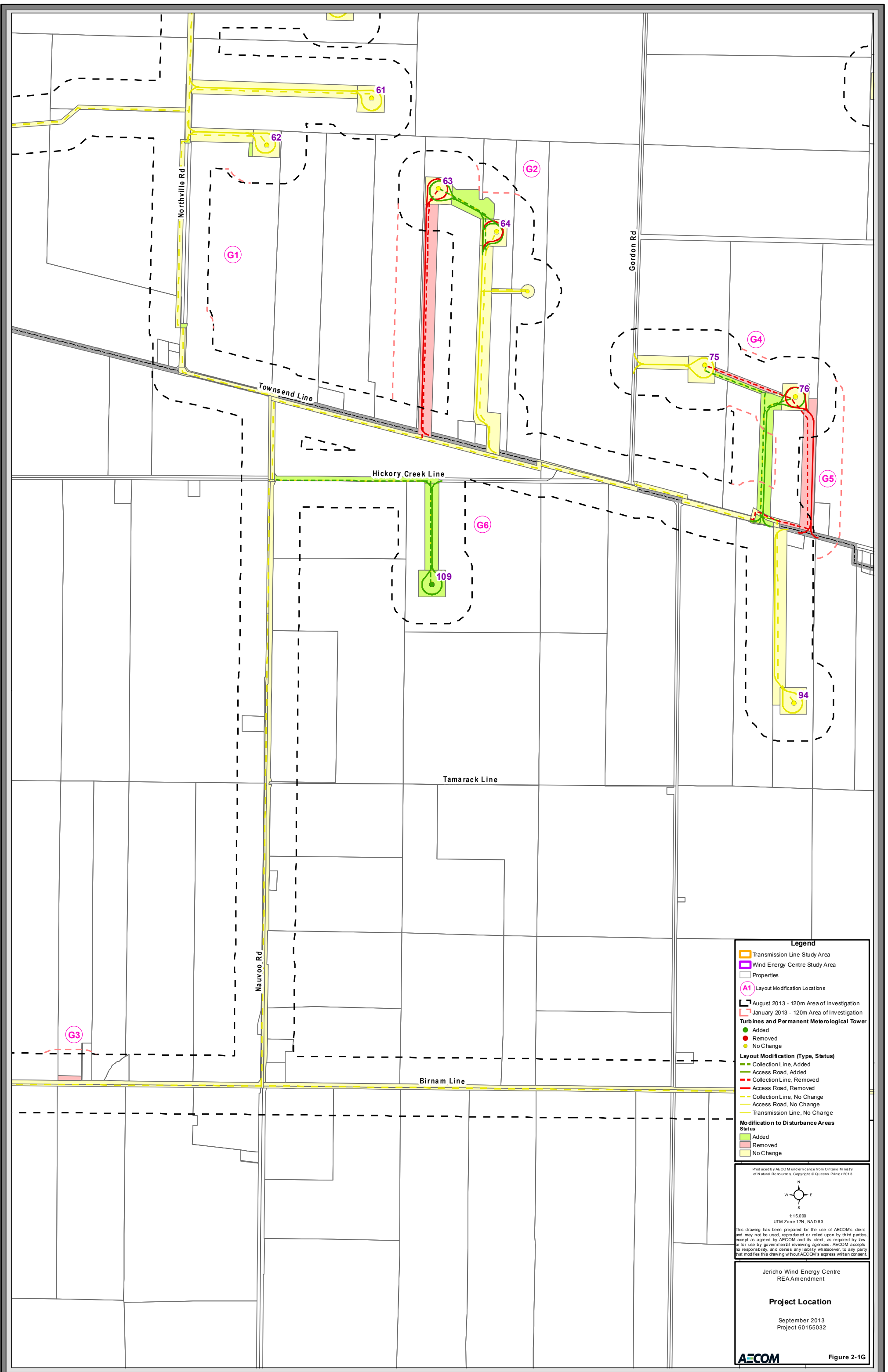
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Jericho Wind Energy Centre
REA Amendment

Project Location

September 2013
Project 60155032

AECOM Figure 2-1F



Legend

- Transmission Line Study Area
- Wind Energy Centre Study Area
- Properties
- Layout Modification Locations
- August 2013 - 120m Area of Investigation
- January 2013 - 120m Area of Investigation
- Turbines and Permanent Meteorological 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
- No Modification to Disturbance Areas Status**
- Added
- Removed
- No Change

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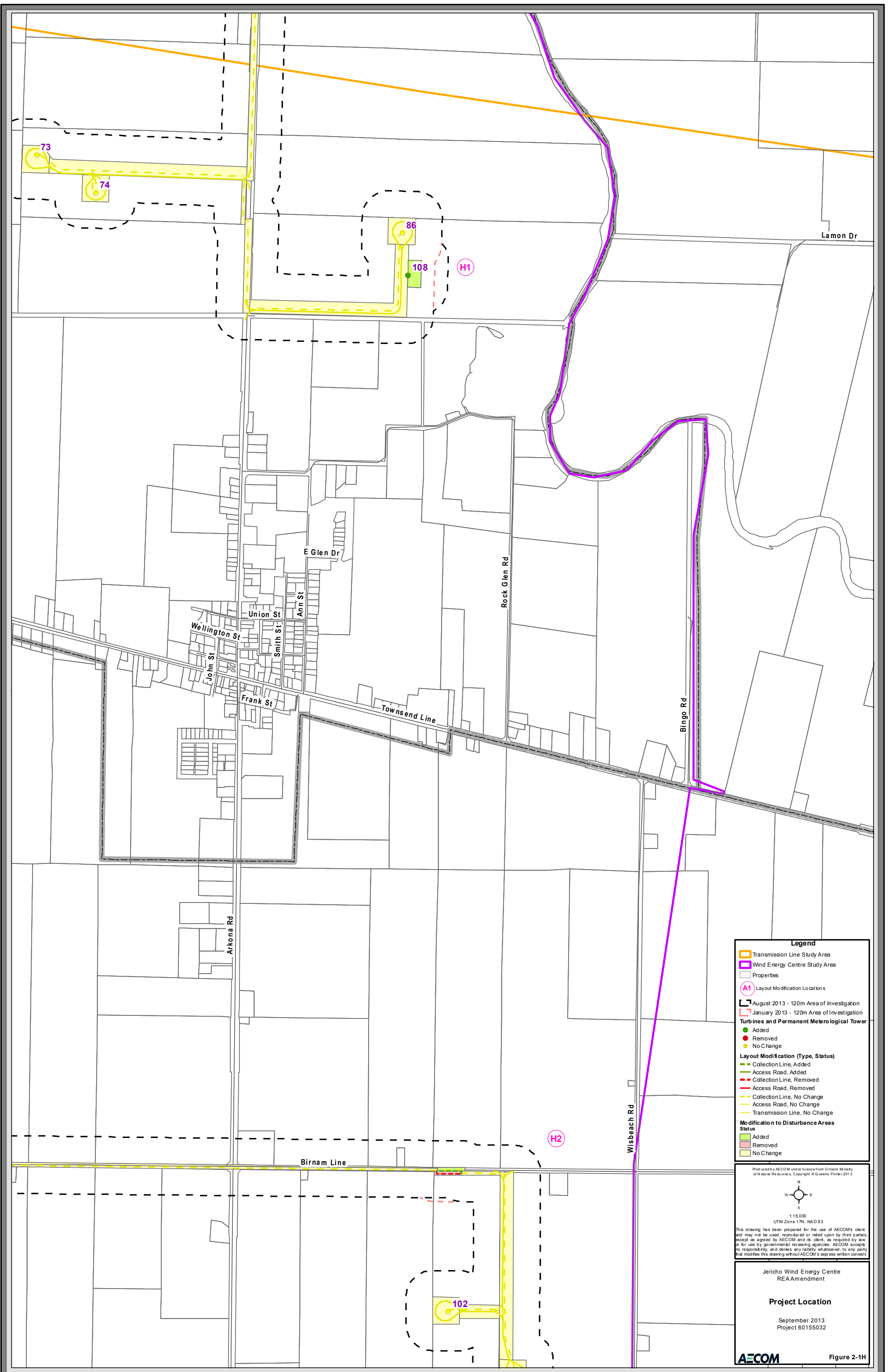
Jericho Wind Energy Centre
REA Amendment

Project Location

September 2013
Project 60155032

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Figure 2-1G



Legend

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

Turbines and Permanent Meteorological 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

No Modification to Disturbance Areas Status

- Added
- Removed
- No Change

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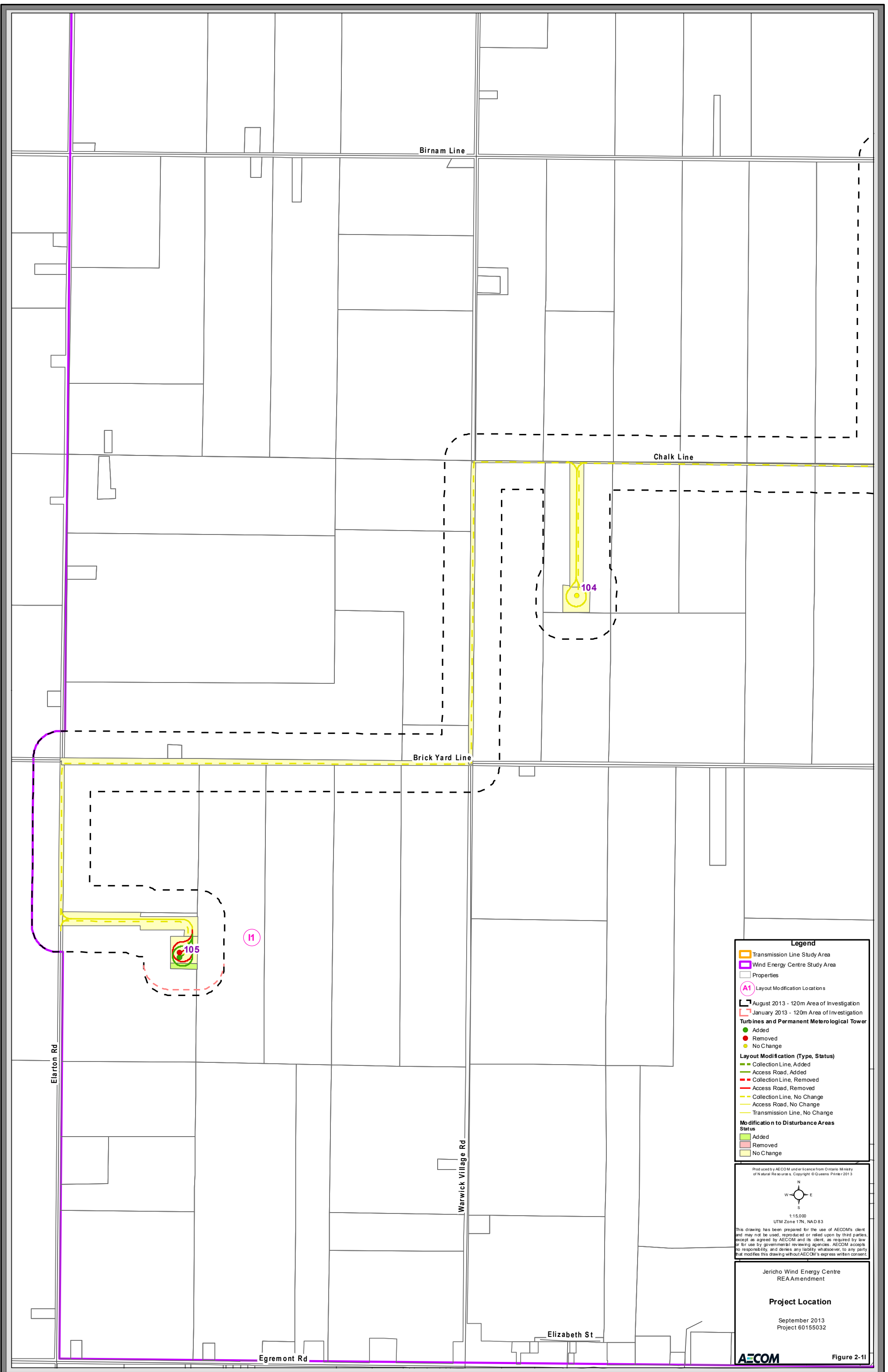
Jericho Wind Energy Centre
REA Amendment

Project Location

September 2013
Project 60155032

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Figure 2-1H



Legend

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

Turbines and Permanent Meteorological 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

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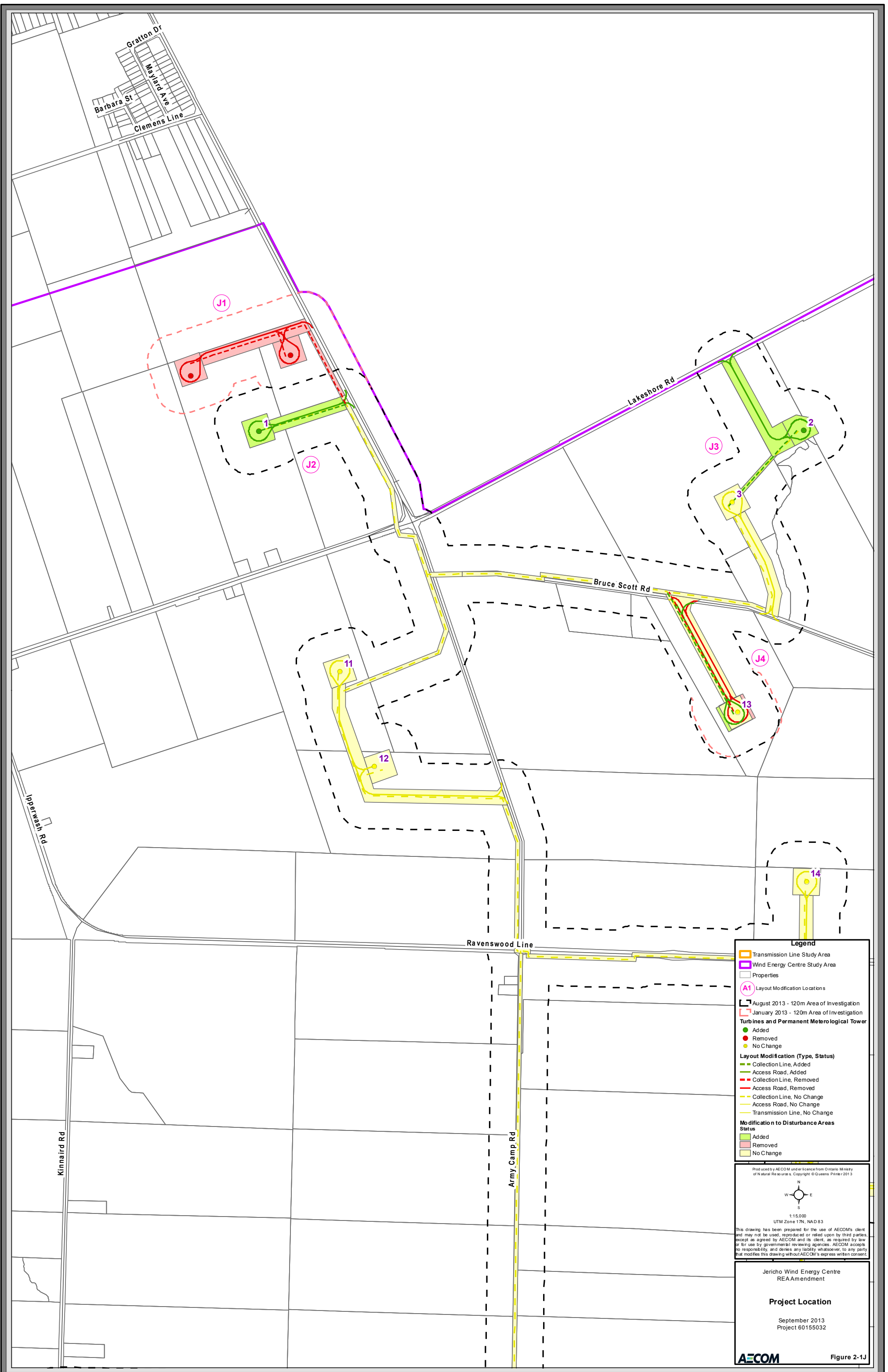
Jericho Wind Energy Centre
REA Amendment

Project Location

September 2013
Project 60155032

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Figure 2-11



Legend

- Transmission Line Study Area
- Wind Energy Centre Study Area
- Properties
- Layout Modification Locations
- August 2013 - 120m Area of Investigation
- January 2013 - 120m Area of Investigation
- Turbines and Permanent Metrological 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
- No Modification to Disturbance Areas Status**
- Added
- Removed
- No Change

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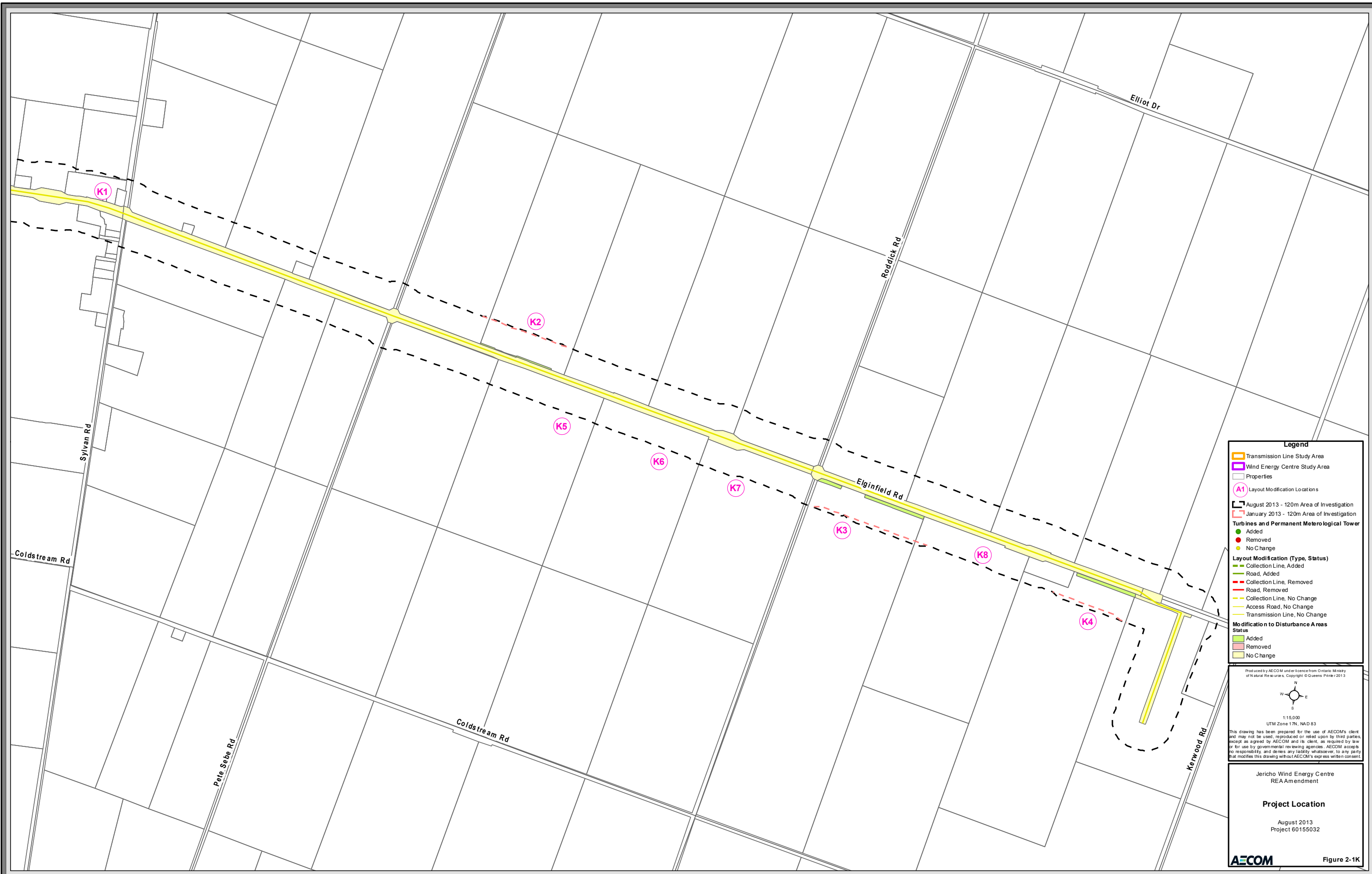
Jericho Wind Energy Centre
REA Amendment

Project Location

September 2013
Project 60155032

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Figure 2-1J



Legend

- Transmission Line Study Area
- Wind Energy Centre Study Area
- Properties
- A1 Layout Modification Locations
- August 2013 - 120m Area of Investigation
- January 2013 - 120m Area of Investigation
- Turbines and Permanent Meteorological 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
- No Modification to Disturbance Areas Status**
 - Added
 - Removed
 - No Change

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Jericho Wind Energy Centre
RE Amendment

Project Location

August 2013
Project 60155032

Appendix B

Mitigation Measures for Water Bodies

Mitigation Measures

Mitigation techniques are proposed to offset possible effects of the construction, decommissioning and operation activities of the Jericho 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 as guidelines to avoid conditions that may harmfully alter aquatic habitat. These DFO operational plans are being used in conjunction with standard mitigation measures that are implemented to protect surface water quality and the aquatic ecosystem.

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 and if possible out of the regulated floodplain to limit risk of impacts to aquatic habitat and surface water quality from accidental spills.
- Keep vegetation removal to a minimum.

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.
- 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. Extra erosion and sediment control materials will be kept on site (e.g., heavy duty silt fencing, strawbales).
- Check that erosion control tools are in good repair and properly functioning prior to conducting daily work and re-install or repair as required prior to commencing daily construction activities.
- Keep sediment and erosion control measures in place until disturbed areas have been stabilized (i.e., re-vegetated).
- To avoid sedimentation in wetlands and watercourses, schedule grading within 30 m of a watercourse or wetland to avoid times of high runoff volumes, wherever possible. Temporarily suspend work if high runoff volume is noted or excessive flows of sediment discharges occur until contingency measures are in place.
- Re-vegetate temporary roads to pre-construction conditions as soon as possible after construction activities are complete using species native to the area in naturally vegetated areas.

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 at least 30 m away from a wetland, woodland or water body. Develop a spill response plan and train staff on associated procedures.
- 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; maintain timing and quantity of flows. Any grading of lands adjacent to water body features should match existing grades at the identified set-back, or buffer from the features.

Construction Timing Windows

- Schedule construction activities that occur within 30 m of watercourses to avoid periods of critical habitat use (i.e., spawning) 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). There are generic restricted in-water work timing windows established by the DFO.
- Specific timing windows for this project may be developed in consultation with ABCA and SCRCA.

Isolated Crossing

- In-water works for permanent water bodies must occur in the dry and via the 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.

Culvert Design

- Design and install culverts to prevent creation of barriers to fish movement and maintain bankfull channel functions.
- Install open bottom crossing structures where possible.
- Design culverts to accommodate high flows of the watercourse by undertaking hydraulic engineering studies.
- 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 construction staff on associated procedures.
- Maintain emergency spill kits on construction 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.

Dewatering Activities (if necessary)

- Confirm the zone of influence of required dewatering activities prior to construction.
- For turbines within the sand and/or gravel deposits, schedule dewatering activities to take place during a seasonally dry time of year where possible.
- Limit duration of dewatering to as short a time frame as possible.
- Implement groundwater cut-offs as required to limit water taking quantities.
- Limit dewatering where turbines are constructed within the sand and/ or gravel deposits to less than 40,000 L/day.

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 stormwater discharge using best management practices (e.g., use of a permeable surface for access roads, complete Stormwater Pollution Prevention Study to address any potential effects associated with stormwater runoff for the Operations and Maintenance Building prior to construction).
- Restrict taking groundwater and surface water during drought conditions.
- Regulate the discharge of water-taking (if required) 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. A discharge diffuser or other energy dissipation device will be used, 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.
- Maintain vegetative buffers around water bodies.

Horizontal 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.

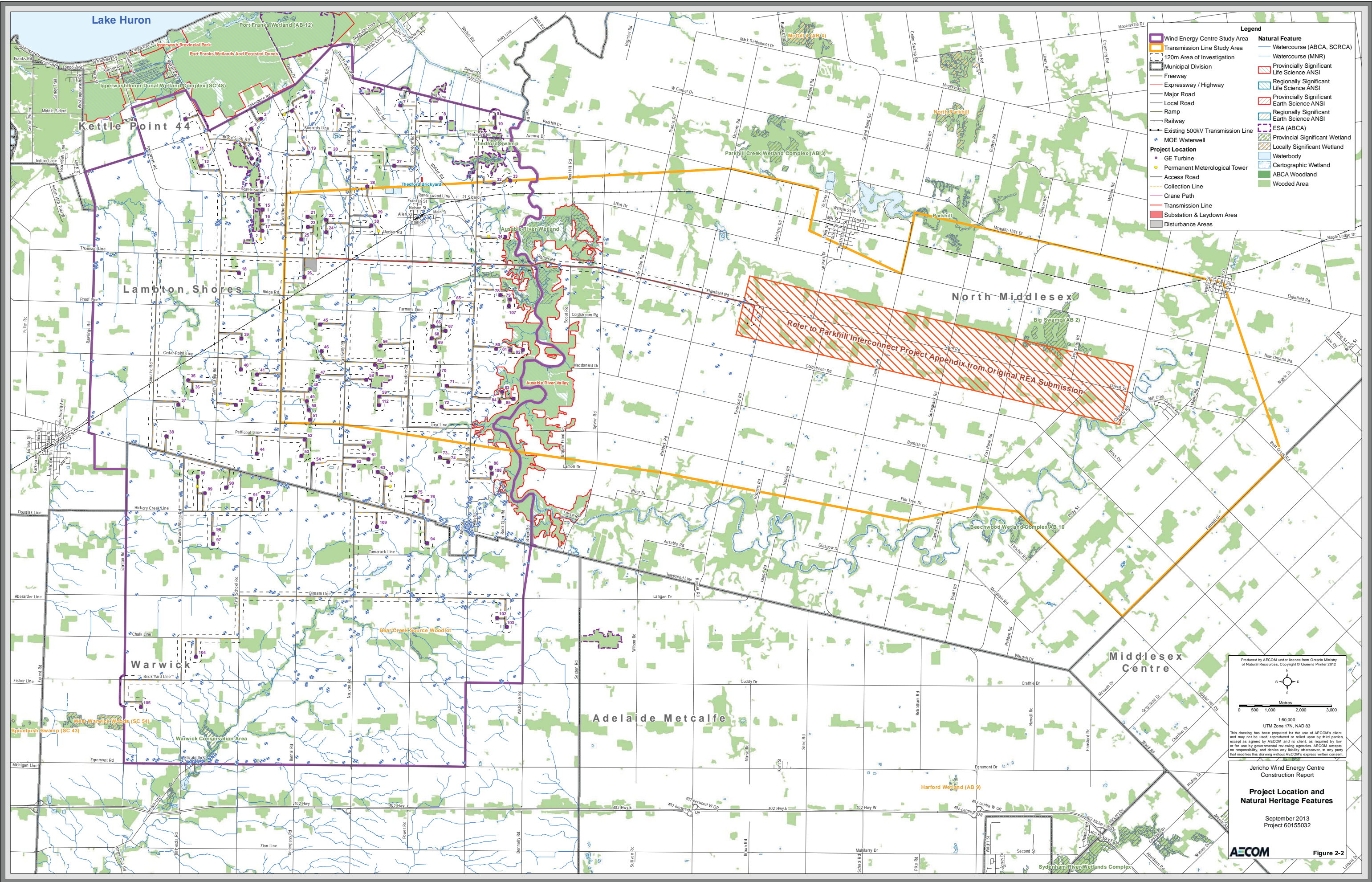
- Collect drill cuttings as they are generated, and place in a soil bin or bag for off-site disposal.
- Ensure drill depth is at an appropriate depth below the water body to reduce the risk of a 'frac-out'.
- Monitor water bodies for signs of surface disturbance.
- Complete geotechnical study to ensure site is suitable for this construction method.
- Implement a "Frac-Out" Contingency Plan in the event of a "frac-out", which will include but is not limited to the following:
 1. Immediately stop all work, including the recycling of drilling mud / lubricant.
 2. Isolate affected watercourse or area using a temporary dam and install by-pass pump system (if required) to maintain continuous flow downstream of the site.
 3. Insert rigid in-water/soil containment unit or underwater boom into the "frac-out" source area in order to contain any sediments and/or deleterious materials originating from the "frac-out".
 4. No captured material will be left on-site. The captured material should be extracted by vacuum truck, if available, or pumped into a containment unit or area for off-site disposal.
 5. Monitor "frac-out" for four hours to determine if the drilling mud congeals. If drilling mud congeals, take no other action that would potentially suspend sediments in the water column. If drilling mud does not congeal, maintain isolation/containment unit in place and continue pumping captured material to a containment unit or area until drilling mud congeals or stops flowing.
 6. Notify the Ministry of the Environment's (MOE) Spills Action Centre (1-800-268- 6060) of the "frac-out" event and the response taken to contain the spill. This step should be completed during the 4 hour "frac-out" monitoring period.
 7. Engage a spill response team to contain and clean up excess drilling mud in the water.
 8. Monitor clean-up procedures to ensure they do not result in greater damage than leaving the mud in-place.
 9. If the spill affects an area that is vegetated, the area will be seeded and/or replanted using the same species to those in the adjacent area, or allowed to re-grow from existing vegetation. Re-vegetated areas will be monitored once per growing season for two years subsequent to "frac-out" to confirm re-vegetation is successful.
 10. Document post-cleanup conditions with photographs and prepare "frac-out" incident report describing time, place, actions taken to remediate "frac-out" and measures implemented to prevent recurrence. Provide incident report to MNR and MOE within 30 days of the incident.

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.
- Add suitable stream substrates (e.g., gravel or rip rap) to stabilize sediment and provide cover.

Appendix C

Revised Figures for the
Construction Plan Report



Legend

Wind Energy Centre Study Area	Natural Feature
Transmission Line Study Area	Watercourse (ABCA, SCRCA)
120m Area of Investigation	Watercourse (MNR)
Municipal Division	Provincially Significant Life Science ANSI
Freeway	Regionally Significant Life Science ANSI
Expressway / Highway	Provincially Significant Earth Science ANSI
Major Road	Regionally Significant Earth Science ANSI
Local Road	ESA (ABCA)
Ramp	Provincially Significant Wetland
Railway	Locally Significant Wetland
Existing 500kV Transmission Line	Waterbody
MOE Waterwell	Cartographic Wetland
Project Location	ABCA Woodland
GE Turbine	Wooded Area
Permanent Meteorological Tower	
Access Road	
Collection Line	
Crane Path	
Transmission Line	
Substation & Laydown Area	
Disturbance Areas	

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Metres

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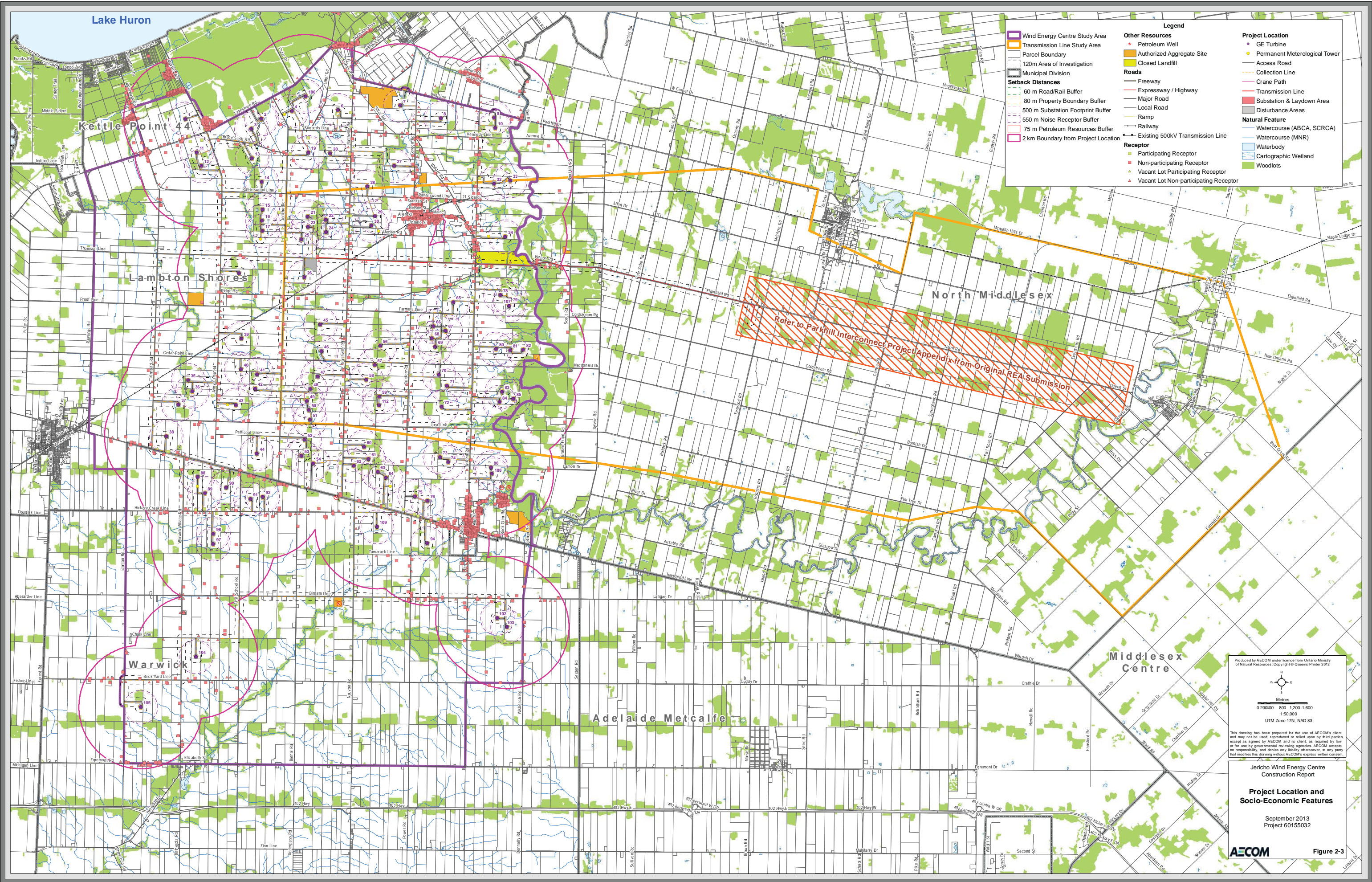
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Jericho Wind Energy Centre
Construction Report

**Project Location and
Natural Heritage Features**

September 2013
Project 60155032

M:\Documents - F:\GIS\New\GIS\Special\Map\Reports\Map\DrD_D_ConstructorReport\Jericho\REA_Sep2013\09172013_Jericho_ProjectLocation_NHFeatures.mxd



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1:50,000
UTM Zone 17N, NAD 83

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Jericho Wind Energy Centre
Construction Report

**Project Location and
Socio-Economic Features**

September 2013
Project 60155032

AECOM

Figure 2-3

Appendix D

Revised Hydrogeological Calculations for Dewatering Activities

(Referenced as Appendix B in the
February, 2013 REA submission)

Appendix B-1* Hydrogeological Calculations for Dewatering Activities for Turbine

1. Introduction

As described in the *Technical Guide to Renewable Energy Approvals (MOE, 2011)*, an important environmental effect to consider in the Construction Plan report is the potential for the Project to interfere with existing uses of a water resource.

Section 3.3.3 (Geology and Groundwater) of the Construction Plan Report determines that the extraction of groundwater for construction dewatering purposes will be less than 50,000 litres per day (L/day) for all turbines with the exception of turbines 8, 25, and 32 – 34, where dewatering has the potential to be greater than 50,000 L/day. At these turbines available geotechnical and geological information indicate permeable sediments (i.e. sand) within 4 mbgs. Daily groundwater inflow rates and resulting radii of influence are attributable to the following:

- A short duration of dewatering activities (3-4 days per turbine base);
- The number of turbine foundations / collection line trenches installed at one time;
- The amount of precipitation that occurs directly before or during construction; and
- The surficial material being excavated.

2. Calculation of Water Takings

Conservative estimates of groundwater inflow rates for a turbine foundation were calculated based on an assumed excavation of 21 x 21 m and a required excavation depth of 4 mbgs. The required water table drawdown varies for each turbine and is dependent on results of the geotechnical investigation and the depth and/or thickness of permeable sediments at the turbine location. The hydraulic conductivity assumed for turbines 8, 25, 32, 33 and 34 ranges between 1.0×10^{-4} to 5.0×10^{-4} m/s and is estimated based on available geotechnical borehole information and geological mapping.

In addition, the calculated radii of influence for the construction dewatering were calculated to range between 131 and 278 m.

The analytical calculations used to determine the predicted groundwater inflow and radii of influence were based upon Powers *et al.* (2007)¹ and Sichart *et al.* (1930)².

Table 1 summarizes the predicted groundwater inflow, radii of influence and applied hydraulic conductivity.

Table 2 shows an example calculation used to determine the radius of influence and groundwater inflow for a sand and gravel unit.

1. Powers, J.P., Corwin, A.B., Schmall, P.C., Kaeck, W.E., and Herridge, C.J., 2007. *Construction Dewatering and Groundwater Control: New Methods and Applications*, 3rd Ed. John Wiley and Sons Inc.

2. Sichart, W. and Kyrieleis, W., 1930. *Grundwasser Absekungen bei Fundierungsarbeiten*. Berlin, Germany.

* Note that the Construction Plan in the original Renewable Energy Approval submission (February, 2013) references *Hydrogeological Calculations for Dewatering Activities* as Appendix B.

Table 1. Summary of Predicted Groundwater Inflow and Radii of Influence

Turbine ID:	8	25	32	33	34
Area:	Excavation for base of single turbine				
Initial Head:	4 m	4 m	4 m	4 m	4 m
Final Head:	0 m				
Excavation Length:	21 m				
Side Slope Wall Ratio:	Varies, but assume 1H : 1V for calculation				
Trench Width:	21 m				
Number of Sides:	4				
Hydraulic Conductivity (m/s):	5.0e ⁻⁴	5.0e ⁻⁴	5.0e ⁻⁴	5.0e ⁻⁴	1.0e ⁻⁴
Q (L/day):	214,350	214,350	214,350	214,350	95,860
ROI (m):	278	278	278	278	131

Notes: Q – Flow rate (L/day)
 ROI – Radius of Influence (m)

Radius of Influence and Groundwater Inflow Rate Calculations - Turbine Foundation

After: Powers et al, 2007 & Sichart and Kryieleis, 1930.
 USE FOR BOX SHAPED EXCAVATIONS, WHERE x/a IS SMALL (I.E. <1.5)

$$x/a = 1$$

Radius of Influence

$$R_o = 3000(H-h)K^{1/2}$$

Sichardt's empirical relationship

Radius of Influence	R _o =	872.07 ft
Saturated Thickness before Dewatering	H =	13 ft
Saturated Thickness after Dewatering	h =	0 ft
Hydraulic Conductivity	K =	5.00E-04 m/s
Number of Sides	n =	4

Equivalent Radius of Influence for Square or rectangular shaped areas

$$r_e = (ax/Pi)^{1/2}$$

Width of Trench	a =	21 m
Length of Trench	x =	21 m
Pi		3.141593
Equiv Radius of Influence	r _e =	11.85 m

Therefore, the Total Radius of Influence equals

$$R_T = R_o + r_e$$

$$R_T = 277.65 \text{ m}$$

References:

Powers, J.P, Corwin, A.B., Schmall, P.C., Kaeck, W.E., and Herridge, C.J., 2007. Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd Ed. John Wiley and Sons Inc
 Sichart, W. and Kryieleis, W., 1930. Grundwasser Absekungen bei Fundierungsarbeiten. Berlin, Germany.

Spreadsheet Instructions

Edit
 Results

TURBINE No: 8

Groundwater Seepage Rate

Jacob's modified non-equilibrium equation**

$$Q = [(xK(H^2-h^2)/2L)]*n$$

Radius of Influence	R _o =	265.81 m
Equiv Radius of Influence	r _e =	11.8 m
Saturated Thickness before Dewatering	H =	3.9624 m
Saturated Thickness after Dewatering	h =	0 m
Hydraulic Conductivity	K =	5.00E-04 m/s
Length of Trench	x =	21 m
Line Source Distance*	L =	132.9029363 m
Pi		3.141593
Groundwater Inflow Rate	Q =	2.48E-03 m3/s
	Q =	214,346 L/day
Sheet Pile % reduction	%	0 %
Revised Total Groundwater Inflow Rate	Q' =	214,346 L/day

Notes:

** Only good for horizontal flow, need to use darcy for vertical flow

**First Term is for Gravity Flow

**Second Term is for artesian flow (confined aquifer)

*Line source distance is the distance where the confined aquifer is drained (i.e., under gravity flow conditions), but the confining unit is still flowing under pressure

References:

Appendix B-2* Hydrogeological Calculations for Dewatering Activities for Collection Line

3. Introduction

As described in the *Technical Guide to Renewable Energy Approvals (MOE, 2011)*, an important environmental effect to consider in the Construction Plan report is the potential for the Project to interfere with existing uses of a water resource.

Section 3.3.3 (Geology and Groundwater) of the Construction Plan Report determines that the extraction of groundwater for construction dewatering purposes will be less than 50,000 litres per day (L/day) for all collection lines installed in surficial material with relatively impermeable aquifer properties (i.e. St. Joseph till). Where collection lines are installed in permeable surficial materials, such as sand and gravel, dewatering has the potential to be greater than 50,000 L/day. Daily groundwater inflow rates and resulting radii of influence are attributable to the following:

- A short duration of dewatering activities (1 day per 50 m length of collection line);
- The number of turbine foundations / collection line trenches installed at one time;
- The amount of precipitation that occurs directly before or during construction; and
- The surficial material being excavated.

4. Calculation of Water Takings

Conservative estimates of groundwater inflow rates for a collection line were calculated based on an assumed excavation of 1 m wide by 50 m long, a required excavation depth of 2 mbgs with a required water table drawdown of 1 m. The hydraulic conductivity assumed for all collection lines encountering permeable surficial sediments is estimated to 5.0×10^{-4} m/s. Based on the same excavation dimensions, conservative estimates for groundwater inflow rate to excavations within sand and gravel deposits were calculated to be 174,300 L/day.

In addition, the calculated radii of influence for the construction dewatering were calculated to be 77 m.

The analytical calculations used to determine the predicted groundwater inflow and radii of influence were based upon Powers *et al.* (2007)³ and Sichart *et al.* (1930)⁴ equation for long thin trenches.

Table 1 summarizes the predicted groundwater inflow, radii of influence and applied hydraulic conductivity.

Table 2 shows an example calculation used to determine the radius of influence and groundwater inflow for a sand and gravel unit.

3. Powers, J.P., Corwin, A.B., Schmall, P.C., Kaeck, W.E., and Herridge, C.J., 2007. *Construction Dewatering and Groundwater Control: New Methods and Applications*, 3rd Ed. John Wiley and Sons Inc.

4. Sichart, W. and Kyrieleis, W., 1930. *Grundwasser Absekungen bei Fundierungsarbeiten*. Berlin, Germany.

* Note that the Construction Plan in the original Renewable Energy Approval submission (February, 2013) references *Hydrogeological Calculations for Dewatering Activities* as Appendix B.

Table 2. Summary of Predicted Groundwater Inflow and Radii of Influence

Area	Excavation for collection line
Initial Head:	1
Final Head:	0
Excavation Length:	50
Side Slope Wall Ratio:	Varies, assume 1H :1V for calculation
Trench Width:	1 m
Number of Sides:	4
Hydraulic Conductivity (m/s):	$5.0e^{-4}$ m/s
Q (L/day):	174,300
ROI (m):	77

Notes: Q – Flow rate (L/day)
 ROI – Radius of Influence (m)

Radius of Influence Calculation - Collection Line Trench

Powers et al. 1992 - Dewatering Design using Analytical Methods

USE FOR LONG THIN TRENCHES WHERE x/a IS LARGE

Radius of Influence

$$R_o = 3000(H-h)K^{1/2} \quad (R_o, H, h \text{ all in feet and } K \text{ in m/s})$$

Sichardt's empirical relationship

Radius of Influence	$R_o =$	199.23 ft
Saturated Thickness before Dewatering	$H =$	3.30 ft
Saturated Thickness after Dewatering	$h =$	0.33 ft
Hydraulic Conductivity	$K =$	5.00E-04 m/s

Equivalent Radius of Influence for Square or rectangular shaped areas

$$r_e = (ax/\pi)^{1/2}$$

Width of Trench	$a =$	1 m
Length of Trench	$x =$	50 m
Pi		3.14159
Equivalent Radius of Influence	$r_e =$	16.23 m

Therefore, the Total Radius of Influence equals $R_T = R_o + r_e$

$R_T =$	76.96 m
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References:

Powers, J.P., Corwin, A.B., Schmall, P.C., Kaeck, W.E., and Herridge, C.J., 2007. Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd Ed. John Wiley and Sons Inc
 Sichart, W. and Kyrieleis, W., 1930. Grundwasser Absekungen bei Fundierungsarbeiten. Berlin, Germany.

Groundwater Seepage Rate

Jacob's modified non-equilibrium equation**

$$Q = [(\pi K(H^2 - h^2))/\ln(R_o/r_e)] + 2[(xK(H^2 - h^2))/2L]$$

Radius of Influence	$R_o =$	60.73 m
Equiv Radius of Influence	$r_e =$	16.2 m
Saturated Thickness before Dewatering	$H =$	1.01 m
Saturated Thickness after Dewatering	$h =$	0.10 m
Hydraulic Conductivity	$K =$	5.00E-04 m/s
Length of Trench	$x =$	50 m
Line Source Distance	$L =$	30.36 m
Pi		3.14159
Groundwater Inflow Rate	$Q =$	2.02E-03 m ³ /s
	Q =	174,288 L/day
Sheet Pile % reduction	%	0 %
Revised Total Groundwater Inflow Rate	Q' =	174,288 L/day

Notes:

** Only good for horizontal flow, need to use darcy for vertical flow

**First Term is for Gravity Flow

**Second Term is for artesian flow (confined aquifer)

*Line source distance is the distance where the confined aquifer is drained (i.e., under gravity flow conditions), but the confining unit is still flowing under pressure