DILLON CONSULTING

LOYALIST SOLAR

Design and Operations Report

February 2017 – 16-3674

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1.0 Introduction

Loyalist Solar LP, a limited partnership between Mohawks of the Bay of Quinte and BluEarth Renewables Inc. (together the "Proponent"), proposes to develop a non-rooftop solar facility with a maximum nameplate capacity of 54 megawatts alternating current ("MW_{AC}"), located in the Township of Stone Mills, County of Lennox & Addington, Ontario (**Figure 1**). The renewable energy facility will be known as the Loyalist Solar Project (the "Project"). The Proponent submitted a proposal to the Independent Electricity System Operator ("IESO") under the Large Renewable Procurement I ("LRP") process and was subsequently awarded a LRP contract by the IESO to generate electricity. The Project will now be subject to a number of approvals including, among others, *Ontario Regulation 359/09* (O. Reg. 359/09) – Renewable Energy Approval ("REA") under Part V.0.1 of the Ontario *Environmental Protection Act*.

This *Design and Operations Report* ("DOR") discusses the potential for environmental effects as they relate to permanent solar facility components and their operation, within 300 m of the Project Location. The report provides a detailed site plan, facility design plan, facility operations plan and Environmental Effects Monitoring Plan ("EEMP") (***Appendix A***). It also contains the Emergency Response and Communications Plans ("ERCP"s) (see **Section 9**) that cover the life of the proposed Project from construction through to and including decommissioning as detailed in **Table 1.**

Table 1: Checklist for Requirements under O.Reg. 359/09 – Design and Operations Report

Required Documentation	Location in Report
Site Plan Requirements	
One or more maps or diagrams of: i. all buildings, structures, roads, utility corridors, rights-of-way and easements required in respect of the renewable energy generation facility and situated within 300 metres of the facility,	**Figures 2-4**
ii. any ground water and surface water supplies used at the facility,	**Section 6.3.12**, *Water Supply* **Section 7.1.3**, *Water Taking*
iii. any things from which contaminants are discharged into the air,	N/A – the facility will not require components from which contaminants are discharged to air.
iv. any works for the collection, transmission, treatment and disposal of sewage,	**Section 6.3.14**, *Sewage Disposal* **Section 7.1.2**, *Sewage Management*
v. any areas where waste, biomass, source separated organics and farm material are stored, handled, processed or disposed of,	N/A - the facility will not require components from which waste, biomass, source separated organics and farm material are stored, handled, processed or disposed of.

Required Documentation	Location in Report
vi. the Project Location in relation to any of the following within 125 metres: the portion of the Oak Ridges Moraine Conservation Plan Area that is subject to the Oak Ridges Moraine Conservation Plan, the area of the Niagara Escarpment Plan, the Protected Countryside, the Lake Simcoe watershed, and vii. any noise receptors or odour receptors that may be negatively affected by the use or operation of the facility.	N/A as shown in **Figures 2-4** **Figures 2-3**
A. a description of each item diagrammed under subparagraph i, and	**Section 5**, *Site Plans* **Section 6.1**, *Existing Features*
B. one or more maps or diagrams of land contours, surface water drainage and any of the following, if they have been identified in complying with this Regulation: properties described in Column 1 of the Table to Section 19, heritage resources, archaeological resources, water bodies, significant or provincially significant natural features and any other natural features identified in the Protected Countryside or in the portion of the Oak Ridges Moraine Conservation Plan Area that is subject to the Oak Ridges Moraine Plan.	**Figures 2-4**
Conceptual Plan Requirements Related to Design	
If the facility includes a transformer substation, the works, facilities and equipment for secondary spill containment.	**Section 6.3.5**, *Substation and Other Equipment*
Conceptual Plan Requirements Related to Operations	
If the facility includes a transformer substation, i. a description of the processes in place to prevent spills,	**Section 7.1**, *Daily Operations, Staffing and Training* **Section 9**, *Emergency Response and Communications Plan* ***Appendix A*** *- EEMP*
ii. a description of the processes to prevent, eliminate or ameliorate any adverse effects in the event of a spill, and	**Section 6.3.5**, *Substation and Other Equipment* **Section 8**, *Environmental Effects Monitoring Plan* ***Appendix A*** *- EEMP*
iii. a description of the processes to restore the natural environment in the event of a spill.	**Section 7.1**, *Daily Operations, Staffing and Training* **Section 9**, Emergency Response and Communications Plan ***Appendix A*** – EEMP

Required Documentation	Location in Report
Environmental Effects Monitoring Plan Requirements	
Performance objectives in respect of negative environmental effects.	**Section 8**, *Environmental Effects Monitoring Plan* ***Appendix A*** *- EEMP*
Mitigation measures to assist in achieving the performance objectives mentioned in subparagraph i.	**Section 8**, *Environmental Effects Monitoring Plan* ***Appendix A*** *- EEMP*
A program for monitoring negative environmental effects for the duration of the time that the Project is engaged in, including a contingency plan to be implemented if any mitigation measures fail.	**Section 8**, *Environmental Effects Monitoring Plan* ***Appendix A*** *- EEMP*
Response Plan Requirements	
Measures to provide information regarding the activities occurring at the Project Location, including emergencies.	**Section 9**, *Emergency Response and Communications Plan*
Means by which persons responsible for engaging in the Project may be contacted.	**Section 9.3**, *Non-Emergency Communications Plan*
Means by which correspondence directed to the persons responsible for engaging in the Project will be recorded and addressed.	**Section 9.3**, *Non-Emergency Communications Plan*
General	
If it is determined that a Project Location is not on a property described in Column 1 of the Table to section 19 of O. Reg. 359/09, provide a summary of the matters addressed in making the determination.	**Section 5**, *Site Plans*
If section 20 of O. Reg. 359/09 applies in respect of the Project and it is determined that the Project Location does not meet one of the descriptions set out in subsection 20 (2) or that the Project Location is not in an area described in subsection 20 (3), provide a summary of the matters addressed in making the determination.	**Section 5**, *Site Plans*
If subsection 21 (3) or 23 (2) of O. Reg. 359/09 applies, provide a summary of the matters addressed in making the determination, (a) under subsection 21 (3) or clause 23 (2) (a), as the case may be, including a copy of the document completed under the applicable provision, and	**Section 5**, *Site Plans*
(b) under clause 23 (3) (b), if applicable.	**Section 5**, *Site Plans*

2.0 The Proponent

The Proponent is coordinating and managing the approvals process for the Project. The contact is:

Full Name of Company:	*Loyalist Solar LP, c/o BluEarth Renewables Inc.*
Prime Contact:	*Tom Bird, Director, Regulatory*
Address:	*34 Harvard Road, Guelph, ON, N1G 4V8*
Telephone:	*1-844-214-2578*
Email:	*projects@bluearth.ca*

Dillon Consulting Limited ("Dillon") has been retained by the Proponent to prepare the REA application for the Project. The contact at Dillon is:

Full Name of Company:	*Dillon Consulting Limited*
Prime Contact:	*Megan Bellamy, Project Manager*
Address:	*235 Yorkland Boulevard, Suite 800, Toronto, ON, M2J 4Y8*
Telephone:	*(416) 229-4646 ext. 2423*
Fax:	*(416) 229-4692*
Email:	*MBellamy@dillon.ca*

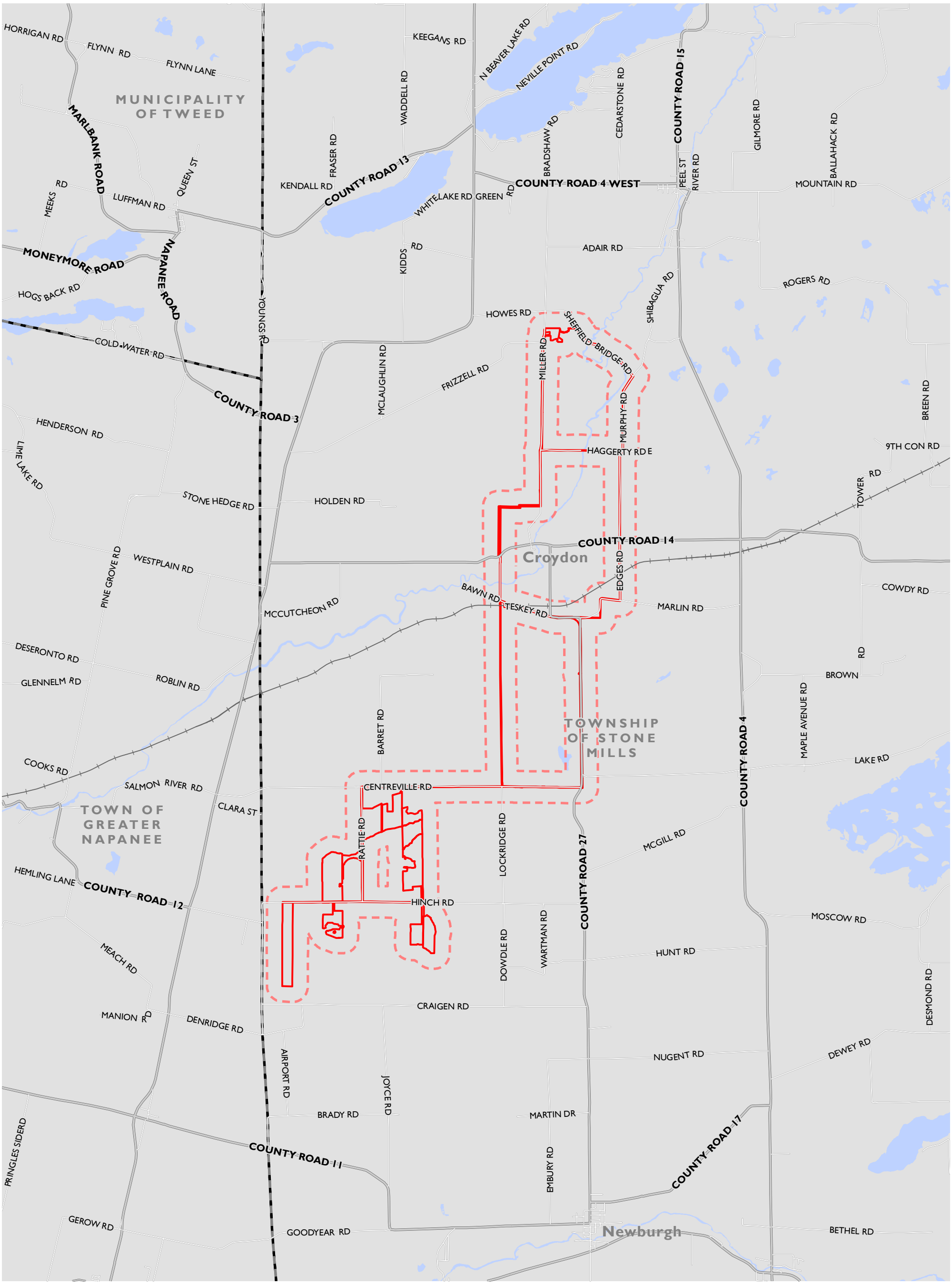
3.0 Project Location

This Class 3 Solar Facility is to be located within the Township of Stone Mills, in the County of Lennox & Addington, approximately nine kilometres north of Napanee, Ontario. The Project Location, situated on multiple privately owned parcels, consists of approximately 200 hectares (494 acres) and is contained within an area generally bounded on the north by Howes Road, Craigen Road to the south, County Road 27 and Murphy Road to the east, and County Road 41 to the west (described as the "Project Location" on **Figure 1** and **2**). It has an approximate centroid at the following geographic coordinates:

- Latitude: 44°22'3.382" N
- Longitude: 76°58'19.543" W

The Project Location is defined in *Ontario Regulation 359/09* to be "a part of land and all or part of any building or structure in, on or over which a person is engaging in or proposes to engage in the project".

Figure 1 shows the general location of the Project. Key solar facility components making up the Project Location are discussed in **Section 6** of this report and their locations have been mapped in the site plans provided in **Section 5.**



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LOYALIST SOLAR LP

General Project Location
FIGURE 1

- Railway
- Project Location Boundary
- Project Location 300 m Area of Investigation
- Municipal Boundary

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MAP CREATED BY: GM
MAP CHECKED BY: JP
MAP PROJECTION: NAD 1983 UTM Zone 18N

1:70,000
0 0.5 1 2 km

N W E S

PROJECT: 163674 STATUS: DRAFT DATE: 2017-01-25

FILE LOCATION: I:\GIS\163674 - Loyalist Solar\mxd\PDR\Figure 1 General Project Location.mxd

4.0 Operational Flexibility

A detailed Project design phase will be undertaken prior to the start of construction which may result in some modifications to the information presented in the REA reports. These modifications include, but are not limited to general adjustments to the site plan that result in a decrease in the Project footprint (within the current boundary), and/or a decrease in the number of Project components or infrastructure (including transformer, inverter stations, photovoltaic ("PV") panels, PV racking etc.). Adjustments to the location of Project components may also occur within the Project Location boundary. Where specific equipment is proposed, alternate equipment may be utilized so long as it is equivalent in nature and does not result in any additional negative effects.

Regarding sound emitting components, provisions for operational flexibility are incorporated by constraining such equipment within an area of placement (polygon) rather than at a fixed point. The *Noise Study Report* demonstrates that the sound emitting equipment can be located anywhere within these polygons and still achieve the required predicted sound level limits at nearby receptors. Please see the *Noise Study Report* for additional details.

In all cases where an operational or technical change is necessary, the Project will remain within the Project Location boundary as shown on **Figure 1**, and commitments made in the various technical reports adhered to. This includes observing the minimum areas to be assessed between Project components and the nearest significant natural feature, water body and/or other feature where described and ensuring any proposed mitigation measures remain effective at avoiding or minimizing impacts. During operations, routine modifications to the solar facility may be implemented (e.g., resurfacing of ingress/egress points and/or access roads, repairs to fencing, electrical maintenance, etc.) provided their effects are environmentally insignificant and do not exceed the boundaries of the constructed Project.

Four Connection Line route options have been assessed and presented in the REA reports. These are shown in Figure 3. All four potential routes have been assessed as per REA requirements. Ultimately, only one route will be constructed and it will be chosen based on input from stakeholders and regulatory agencies as well as from findings from engineering studies. Residents will be notified once the final route has been selected.

The classification (Class 3 Solar Facility) and nameplate capacity (54 MW_{AC}) of the Project are not subject to change.

5.0 Site Plans

The Project site plans detail the location of solar facility components, natural features, noise receptors, land uses, setbacks and other features in accordance with Table 1 of *Ontario Regulation 359/09*. The following (and their associated infrastructure) are *not* shown in the site plans because they will not be collected, transmitted, treated, stored, handled, processed or disposed of in the construction, operation or decommissioning of the solar facility: groundwater, sewage, biomass or source separated organics. The solar facility will not discharge contaminants to air during its operation.

Figure 2 identifies the Project Location boundary and lands within 1,000 m. It provides the larger context for the solar facility components and natural features that will be shown in more detail in **Figures 3** and **4**. **Figure 2** identifies buildings, structures, roads, utility corridors, rights-of-way, municipal land use designations, on-ground land uses, property parcels, lots/concessions, and railways.

Figure 3 provides the location of all proposed solar facility components. As noted in **Section 4** (Operational Flexibility), some of these locations may be subject to adjustment. The components include: PV panels (and associated racking and supports), inverter stations, substation, operations and maintenance building, access roads, and the permanent fences and gated entrances. The conceptual solar facility layout and detailed information regarding components is provided in **Section 6** and ***Appendix B***. The temporary laydown areas will be located within the Project Location boundary. **Figure 3** shows the Project noise-emitting components (i.e., inverter stations and substation). More information is provided in **Section 5.1**.

Figure 4 identifies applicable natural features and water bodies within the Project Location and surrounding 300 m. Distances from each applicable natural feature to the Project Location are provided. Setbacks apply only to those natural features evaluated as 'significant', 'assumed provincially significant' or 'provincially significant' as outlined in the *Natural Heritage Assessment Evaluation of Significance Report*. Details regarding applicable water bodies are provided in the *Water Assessment Report*.

5.1 Transformers and Noise Receptors

The Project is designed to operate 365 days per year. However, the PV panels are designed to generate electricity during daylight hours. The operating characteristics of the inverters and transformers are dependent on the amount of electricity generated by the PV panels, which is at a maximum when the sunlight is most intense. To be conservative, the *Noise Study Report* used the night-time sound level limit of 40 dBA to model the worst-case impacts at receptors.

Noise receptors analyzed included residential properties or vacant lots within 1,000 m of the Project Location. Noise receptors for the Project are shown on **Figures 2** and **3**.

All modelling and predictions for the *Noise Study Report* were done using the software package CadnaA, in accordance with ISO 9613-2. All noise sources were modelled as point sources with no directivity. Inverter stations (also called "inverter-transformer clusters") were modelled as a single point source.

In accordance with the proposed amendments to the *Technical Guide for Renewable Energy Approvals* that came into effect on May 1, 2016 (EBR Proposal Notice 012-4493), a polygon approach was used for this analysis. The location of each sound emitting component was defined in the *Noise Study Report* with a polygon. In this approach, the inverter stations can be located anywhere within the polygon, and compliance would still be achieved at all receptors. Compliance was assessed by grouping project receptors into "zones". Noise sources within a 1.5 km radius of all receptors in a given zone were taken into consideration, and a worst-case conceptual project layout (see **Figure 2**) was determined. The *Noise Study Report* concludes that the Project will be in compliance with the Ministry of the Environment and Climate Change ("MOECC") noise limit of 40 dBA at all receptors without the need for mitigation. Additional details are provided in the *Noise Study Report*.

Ecological Land Classification (Second Approximation)

- 2. Cultural Alvar
- 3. CVC_4: Extraction
- 4. CVI_1:Transportation (Rail)
- 5. CVR_4: Rural Residential Property
- 6. FOC: Coniferous Forest
- 7. FOCM2-1: Dry-fresh Red Cedar Coniferous Forest Type
- 8. FOCM2-2: Dry-Fresh White Cedar Coniferous Forest Ecosite
- 9. FOCM4-1: Fresh-Moist White Cedar Coniferous Forest Type
- 10. FOCM4: Fresh-moist White Cedar Coniferous Forest Ecosite
- 11. FOCS3-1: Dry-Fresh White Cedar Calcareous Bedrock Coniferous Forest Type
- 12. FODM3-1: Dry-Fresh Poplar Deciduous Forest Type
- 13. FODM4-2: Dry-Fresh White Ash-Hardwood Deciduous Forest Type
- 14. FODM4-4: Dry-Fresh Ironwood Deciduous Forest Type
- 15. FODM5-2: Dry-Fresh Sugar Maple-Beech Deciduous Forest Type
- 16. FODM5-4: Dry-Fresh Sugar Maple-Ironwood Deciduous Forest Type
- 17. FODM5-7: Dry-fresh Sugar Maple-Black Cherry Deciduous Forest Type
- 19. FODM5: Dry-Fresh Sugar Maple Deciduous Forest Ecosite
- 20. FODM7-2: Fresh-moist Green Ash-Hardwood Lowland Deciduous Forest
- 21. FODM7: Fresh - Moist Lowland Deciduous Forest
- 22. FODM8-1: Fresh-moist Poplar Deciduous Forest
- 23. FODM9: Fresh-moist Oak-Maple-Hickory Deciduous Forest
- 24. FODR2: Dry-Fresh Oak-Hardwood Non-calcareous Shallow Deciduous Forest Ecosite
- 25. FOMM2-3: Dry-Fresh White Pine-Hardwood Mixed Forest Type
- 26. FOMM4-3: Dry-Fresh White Cedar-Hardwood Mixed Forest Type
- 27. FOMM5-2: Dry-Fresh Poplar Mixed Forest Type
- 28. MAM: Meadow Marsh
- 30. MAMM1-2: Cattail Graminoid Mineral Meadow Marsh Type
- 31. MAMM1-3: Reed Canary Grass Mineral Meadow Marsh
- 32. MAMM1-9: Narrow-leaved Sedge Graminoid Mineral Meadow Marsh
- 33. MAMM3: Mixed Mineral Meadow Marsh
- 34. MAMO1-2: Cattail Graminoid Organic Meadow Marsh
- 35. MAMO1-3: Reed Canary Grass Graminoid Organic Meadow Marsh
- 36. MAMR3: Bedrock Meadow Marsh
- 37. MASO1-1: Cattail Organic Shallow Marsh
- 38. MEFM4: Fresh-moist Forb Meadow
- 39. MEGM4: Fresh-moist Graminoid Meadow
- 40. MEMM3: Dry-Fresh Mixed Meadow Ecosite
- 41. MEMM4: Fresh-moist Mixed Meadow Ecosite
- 42. MEMR2: Dry-fresh Non-calcareous Bedrock Mixed Meadow Ecosite
- 43. OAGM1: Annual Cover Crop
- 44. OAGM2: Perennial Cover Crop
- 45. OAGM4: Open Pasture
- 46. OAO: Open Aquatic Area
- 47. RBOA1-1: Dry Lichen-Moss Open Alvar Pavement Type
- 49. RBSA1-1: Common Juniper Shrub Alvar Type
- 50. RBSA1: Alvar Shrub Rock Barren Ecosite
- 51. RBTA1-7: Red Cedar Alvar Woodland Type
- 52. RBTB1-1: Red Cedar Calcareous Treed Rock Barren Type
- 53. SWCO1-1:White Cedar Organic Coniferous Swamp
- 54. SWD: Deciduous Swamp
- 55. SWDM2-1: Black Ash Mineral Deciduous Swamp
- 56. SWDM2-2: Green Ash Mineral Deciduous Swamp
- 57. SWDM3-3: Swamp Maple Mineral Deciduous Swamp
- 58. SWDM4-5: Poplar Mineral Deciduous Swamp
- 59. SWDM4: Mineral Deciduous Swamp Ecosite
- 60. SWDO2-3: Swamp Maple Organic Deciduous Swamp
- 61. SWTM3:Willow Mineral Deciduous Thicket Swamp
- 62. SWTO2:Willow Organic Deciduous Thicket Swamp
- 63. SWTO5: Organic Deciduous Thicket Swamp
- 64. TAGM1: Coniferous Plantation
- 65. TAGM4: Treed Pasture
- 66. TAGM5: Hedgerow
- 67. THCM1-1: Dry - Fresh Red Cedar Coniferous Thicket
- 68. THDM2-7: Prickly Ash Deciduous Shrub Thicket Type
- 69. THDM2: Dry-fresh Deciduous Shrub Thicket Ecosite
- 70. THDM5-1: Gray Dogwood Deciduous Thicket
- 71. WOCM1-1: Dry-Fresh Red Cedar Coniferous Woodland
- 72. FODR1-1: Dry - Fresh Sugar Maple - Hardwood Calcareous Shallow Deciduous Forest
- 73. RBOA1-4:Dry – Fresh Poverty Grass Open Alvar Meadow
- 74. SAGM6: Shrub Pasture

Note: #1, 18, 29, and 48 are intentionally omitted

HOWES RD
SHIBAGUAY RD
COUNTY ROAD 4
COUNTY ROAD 14
MARLIN RD
HOMESTEAD RD
ROBLIN RD
TOWN OF GREATER NAPANEE
TOWNSHIP OF STONE MILLS
BARRET RD
CENTREVILLE RD
SALMON RIVER RD
CLARA ST
Black Creek
Mud Creek
LOCKRIDGE RD
MCGILL RD
SHARPES CORNERS RD
DOWDLE RD
WARTMAN RD
HUNT RD
CRAIGEN RD
DENRIDGE RD

- Existing Noise Receptor
- Vacant Lot Noise Receptor
- Water Well (MOECC WWR)
- Railway
- Mapped Watercourse
- Project Location Boundary
- Project Location 50 m Area of Investigation
- Project Location 1000 m Area of Investigation
- Municipal Boundary
- Parcel
- Parcel Containing a Heritage Resource

Zoning (Township of Stone Mills)*

- Environmental Protection
- Extractive Industrial Pits and Quarries
- Waste Management
- Water Body

*All other lands within the 300 m Setback are zoned Rural.

Land uses designated by the County of Lennox & Addington are Rural for the Project Location and surrounding 300 m.

Built heritage resources and cultural heritage landscapes were identified within and around the Project Location. For more information, please refer to the Cultural Heritage Assessment.

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Site Plan - Land Use
FIGURE 2

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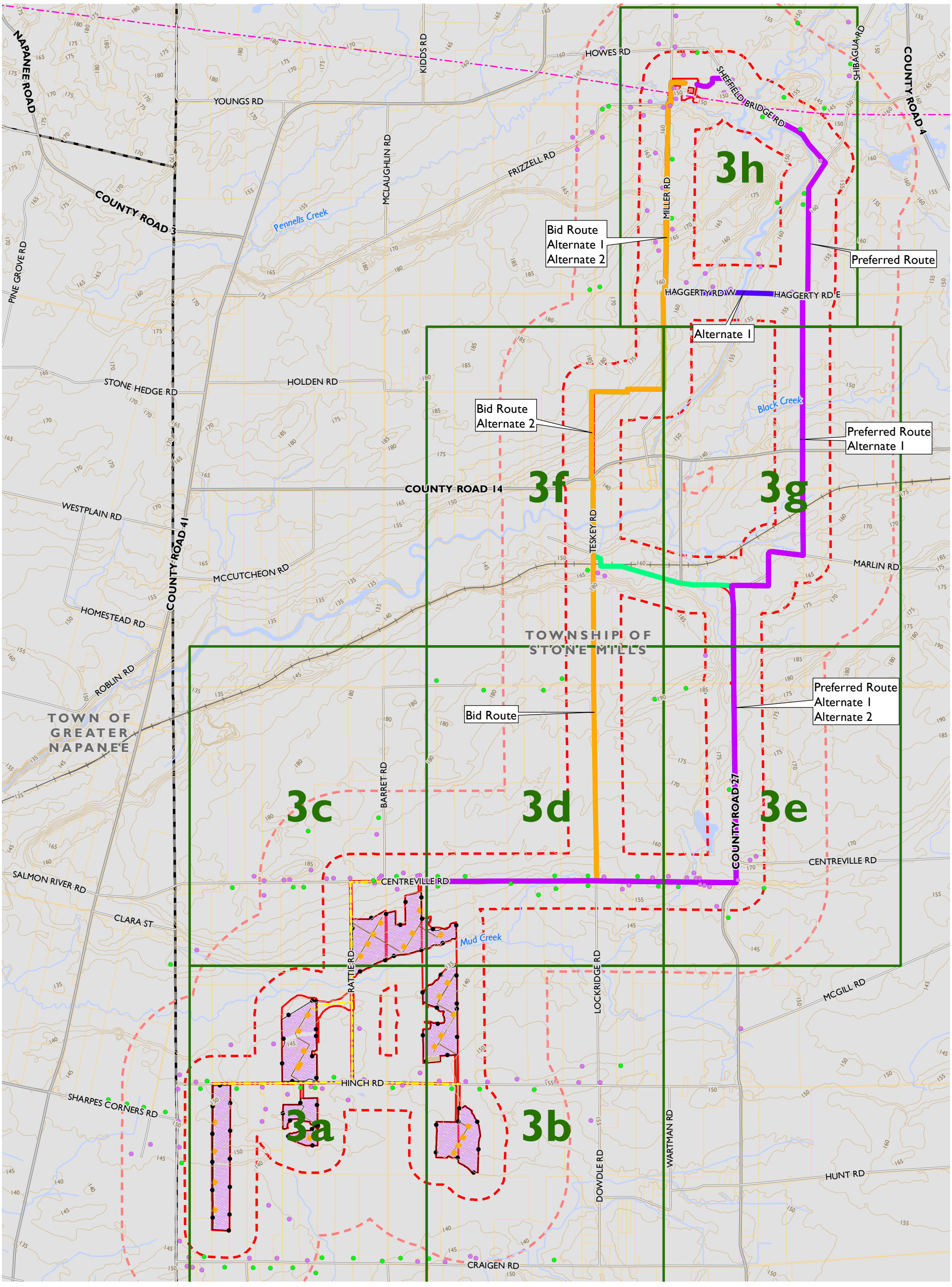
MAP CREATED BY: GM
MAP CHECKED BY: MB
MAP PROJECTION: NAD 1983 UTM Zone 18N

1:40,000
0 250 500 1,000 m

PROJECT: 163674 STATUS: DRAFT DATE: 2017-01-25

FILE LOCATION: I:\GIS\163674 - Loyalist Solar\mxd\DOR\Figure 2 Land Use.mxd



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Site Plan - Conceptual Component Layout
FIGURE 3

- Existing Noise Receptor
- Vacant Lot Noise Receptor
- Connection Line (Preferred Route)
- Connection Line (Bid Route)
- Connection Line (Alternate 1)
- Connection Line (Alternate 2)
- Railway
- Electrical Transmission Line
- 5 m Elevation Contour
- Fence
- Inverter Station
- Solar Panel
- Electrical Collection Line
- Access Road
- Operation and Maintenance Area
- Substation
- Project Location Boundary
- Project Location 300 m Area of Investigation
- Project Location 1000 m Area of Investigation
- Municipal Boundary
- Parcel
- Water Body

See appendices for Figures 3a - 3h.

An Environmental Impact Study has been submitted to the Ministry of Natural Resources and Forestry for natural features deemed significant. A Water Body Report has been prepared.

The proponent will prepare a Stormwater Management Plan based on the final detailed design of the facility prior to construction.

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MAP CREATED BY: GM
MAP CHECKED BY: JP
MAP PROJECTION: NAD 1983 UTM Zone 18N

1:40,000
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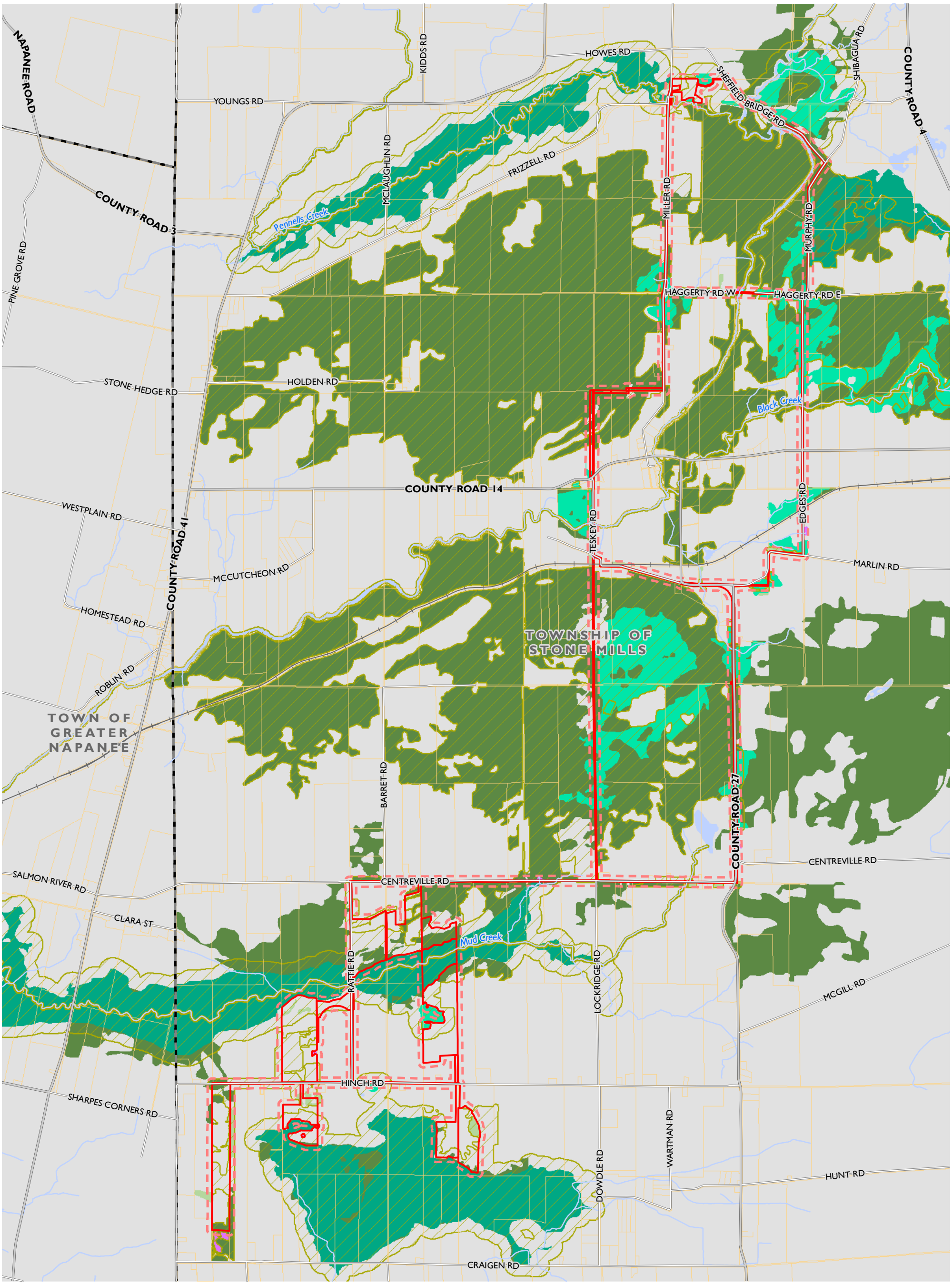
PROJECT: 163674 STATUS: DRAFT DATE: 2017-01-27

FILE LOCATION: I:\GIS\163674 - Loyalist Solar\mxd\DOR\Figure 3 Site Plan Conceptual Component Layout key.mxd



Railway
Watercourse
Project Location Boundary
Project Location 50 m Area of Investigation
Municipal Boundary
Parcel
Significant/Treated as Significant Wildlife Habitat
Water Body
Significant Wetland
Assumed Provincially Significant Wetland
Non Significant Wetland
Significant Woodland
Non Significant Woodland

An Environmental Impact Study has been submitted to the Ministry of Natural Resources and Forestry for natural features deemed significant. A Water Body Report has been prepared.

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LOYALIST SOLAR LP

Site Plan -
Natural Heritage Features
FIGURE 4

DILLON CONSULTING

1:40,000
0 250 500 1,000 m

MAP CREATED BY: GM
MAP CHECKED BY: JP
MAP PROJECTION: NAD 1983 UTM Zone 18N

PROJECT: 163674 STATUS: DRAFT DATE: 2017-01-25

FILE LOCATION: I:\GIS\163674 - Loyalist Solar\mxd\DOR\Figure 4 Natural Heritage Features.mxd

5.2 Cultural Heritage Resources

Archaeological Research Associates Ltd. was retained by the Proponent to complete a Cultural Heritage Assessment as required under Ontario Regulation 359/09.

The assessment included background research, consultation with appropriate agencies, and a windshield survey of potential cultural heritage resources within the study area. The assessment identified 87 Built Heritage Resources ("BHR"), and 5 Cultural Heritage Landscapes ("CHL"), and it was determined that they all have cultural heritage value or interest as per the *Ontario Heritage Act* ("OHA"), *Ontario Regulation 9/06*. The study did not identify any protected properties within the study area. This was determined by engaging provincial and municipal heritage representatives (including the Ontario Heritage Trust, Ministry of Tourism, Culture and Sport ("MTCS"), Township of Stone Mills, County of Lennox & Addington), and investigating several online heritage resources to determine the presence/absence of potential protected properties identified in Section 19 of O. Reg. 359/09. The assessment identified multiple potential impacts from the Project, including direct and indirect. The potential impacts were evaluated against the conditions of the Project Location. Mitigation measures were recommended to address any applicable direct or indirect impacts to the Project. The measures outlined are expected to avoid, eliminate or mitigate impacts on the cultural heritage resources within the study area. The *Cultural Heritage Assessment* received approval from the MTCS in February 2017.

5.3 Archaeological Resources

Archaeological Research Associates Ltd. was retained by the Proponent to complete *Stage 1 and 2 Archaeological Assessment* ("AA") as required under *Ontario Regulation 359/09*.

The Stage 1 AA included a desktop study and was conducted in April 2016 in accordance with the MTCS 2011 *Standards and Guidelines for Consultant Archaeologists*. The Stage 1 AA identified potential for archaeological finds to occur. The Stage 2 AA was undertaken from June-September 2016. 16 sites containing archaeological materials were identified, including seven Pre-Contact findspots, eight Euro-Canadian findspots, and one multi-component findspot. Further investigation was recommended for seven of the sites prior to construction. MTCS provided their acceptance of the *Stage 1 and 2 Archaeological Assessment* on December 6, 2016. The letter recommended that some site-specific Stage 3 Assessments be undertaken prior to construction for seven findspots.

5.4 Land Uses and Land Use Plans

The proposed solar facility will be located within lands currently zoned by the Township of Stone Mills as rural. The Official Plan for the Township of Stone Mills designates Project Location as rural, with the surrounding 300 m designated as rural and provincially significant wetlands. The upper-tier municipality (County of Lennox & Addington) Official Plan designates the Project Location lands as rural area, with the surrounding 300 m designated as rural. Temporary loss of agricultural land will occur for the duration of the Project. **Figure 2** depicts the current land uses within the Project Location and surrounding 120 m as identified by the Ecological Land Classification (conducted as part of the *Natural Heritage Assessment*).

Mitigation measures will be undertaken to minimize impacts to surrounding land uses (see ***Appendix A***). Where appropriate, vegetation will be grown beneath and between the PV panel rows to control soil erosion. The Project Location will be returned to its original condition or similar after decommissioning.

A search and analysis of available records identified that the Project is not located in areas subject to Land Use Plans; specifically, the Project does not lie within the Niagara Escarpment, Lake Simcoe Watershed, Oak Ridges Moraine or the Greenbelt.

5.5 Natural Heritage and Water Bodies

The Project has been subject to numerous field investigations and a thorough review of development constraints was undertaken prior to delineating the Project Location.

Based on the field studies conducted, the Project Location was refined to minimize, and, where possible, avoid impacts to significant natural heritage features and water bodies. The layout of the Project has been developed to minimize its footprint and avoid significant natural features.

5.5.1 Natural Heritage Features

Following completion of the NHA records review, site investigation and evaluation of significance, the following natural features were evaluated to be significant[1] and located either within the Project Location or within 50 m of the Project Location:

- In addition to the four Provincially Significant Wetlands in the Project Location or surrounding 50 m, 32 unevaluated southern wetlands within 50 m of the Project Location were assumed to be provincially significant using the Ministry of Natural Resources and Forestry ("MNRF")'s Rapid Assessment to determine wetland characteristics and ecological functions.
- Eighteen woodland units were determined to be significant based on factors like size, interior habitat, and proximity to significant habitats.
- Significant Rare Vegetation Communities (2 units; previously categorized under Alvars)
- Turtle Nesting Area (1 unit)
- Amphibian Breeding Habitats (Woodlands; 4 units)
- Woodland Area- sensitive Bird Breeding Habitat (3 units)
- Common Nighthawk Habitat (3 units)
- Redheaded Woodpecker Habitat (1 unit)
- Eastern Wood-Pewee Habitat (4 units)
- Wood Thrush Habitat (2 units)
- Large Yellow Pond Lily Habitat

[1] Significant refers to provincially significant, significant or assumed provincially significant for the purposes of the REA reporting.

In addition, the following natural features have been treated as significant. With the exception of the waterfowl stopover and staging areas, the following wildlife habitat is not able to be further surveyed due to access limitations (permission and/or health and safety concerns):

- Waterfowl Stopover and Staging Areas (Terrestrial; 10 units)
- Waterfowl Stopover and Staging Areas (Aquatic; 3 units)
- Turtle Wintering Area (1 unit)
- Reptile Hibernaculum (15 units)
- Colonially- Nesting Bird Breeding Habitat (Tree/ Shrub; 10 units)
- Amphibian Breeding Habitats (Woodlands; 2 units)
- Terrestrial Crayfish (1 unit)
- Carolina Whitlow Grass Habitat (1 unit)
- Juniper Hairstreak Habitat(25 units)

For the purposes of the Project, these habitats will be treated as significant and the mitigation measures outlined in the *NHA Environmental Impact Study Report* will be implemented to minimize/avoid negative environmental effects. The remaining candidate wildlife habitat was evaluated as not significant or no longer was located within the Project Location or surrounding 50 m once the Project Location was refined following the site investigation field work.

Of the natural features evaluated to be significant or assumed provincially significant, the layout of the Project will allow for the persistence of these natural features in the local landscape after the Project is constructed and operational. For detailed information on natural heritage features within and surrounding the Project Location, please refer to the *Natural Heritage Assessment*. The MNRF issued a confirmation letter for the *Natural Heritage Assessment* on January 27, 2017.

5.5.2 Water Bodies

A *Water Assessment Report* and *Water Body Report* were completed to identify all water bodies within the Project Location and surrounding 120 m. Specific details related to the identification and mitigation of environmental effects are available in the *Water Body Report*.

Under *Ontario Regulation 359/09,* the definition of a water body includes lakes, permanent and intermittent streams and seepage areas, but does not include grassed waterways, temporary channels for surface drainage, rock chutes and spillways, roadside ditches that do not contain a permanent or intermittent stream, temporary ponded areas that are normally farmed, dugout ponds or artificial bodies of water that are intended for the storage, treatment or recirculation of runoff from farm animal yards, manure storage facilities and outdoor confinement areas.

As outlined in Sections 30 and 31 of *Ontario Regulation 359/09*, a records review and site investigation were undertaken to fulfill the requirements of the *Water Assessment Report*. The records review identified seventeen potential water bodies mapped within the Project Location and the surrounding 120 m, including three potential lakes and 14 potential permanent or intermittent streams.

The purpose of the site investigation was to confirm the presence of these water bodies. This resulted in confirmation of one lake, 13 permanent and/or intermittent streams, and five seepage areas that meet the definition of a water body under as per *Ontario Regulation 359/09*.

Based on the water body information collected during the site investigation, the Project Location was refined to avoid impacts to sensitive water body features, where possible. The layout of the solar facility has been developed to prioritize the protection of sensitive features and minimize environmental effects where possible.

As required by Section 39 of *Ontario Regulation 359/09*, unless a *Water Body Report* is completed, no solar facility components are to be constructed, installed or expanded in the Project Location within 30 m of the average annual high water mark of a water body. By completing a *Water Body Report* in accordance with the procedures established by the MOECC, Subsection (1) of Section 40 (*Ontario Regulation 359/09*) Project components may be constructed and installed within 120 m of the average annual high water mark of a water body, if deemed appropriate by the MOECC. A *Water Body Report* was completed for the project, and identifies mitigation measures for negative environmental effects that may occur. For detailed information on water bodies, refer to the *Water Assessment Report* and the *Water Body Report*.

6.0 Facility Design Plan

The following subsections describe the solar facility components that are planned to be in place for the life of the Project. The currently proposed locations of the Project components are shown in **Figure 3**. Temporary features related to construction and decommissioning activities are described in the *Construction Plan Report* and *Decommissioning Plan Report.* They are also shown in **Figure 3** for context.

As discussed in **Section 4**, the Project has been designed such that it allows for operational flexibility during the detailed design stage. The Project layout may be subject to adjustments during the detailed design phase. Any adjustments made during detailed design phase will remain within the Project Location boundary.

6.1 Existing Features

The Project will likely make use of Operations and Maintenance Building located outside of the Project Location in Napanee or another suitable nearby location. If so, it would not be considered part of the Project for this REA application. As an alternative, the Operations and Maintenance Building will be located within the Project Location (see **Section 6.3.9**). The solar facility will be connected to the existing H23B 230kV transmission circuit. The facility will be accessed from Hinch Road, Centreville Road, Rattie Road, and Miller Road.

6.2 Electricity Generation Process

PV panels will be the technology used to convert solar energy into electricity. With exposure to sunlight, the solar modules convert solar radiation into direct current ("DC") electricity through a PV process. The PV process occurs when the energy from the sunlight is transferred to semiconductors contained in the modules. DC electricity generated from the PV panels will be collected and converted into AC electricity by inverters, which will be contained in multiple inverter stations. An inverter station is comprised of multiple components, including inverters and a medium-voltage ("MV") transformer. The AC energy output from the inverter stations will be transmitted via underground/overhead cables and connected to the substation. At the substation, the voltage will be stepped up to 230 kV and connected to existing H23B transmission circuit.

6.3 Solar Facility Components

The following sub-sections provide detail on the individual components that will be used over the lifetime of the Project.

6.3.1 Solar Modules and Mounting System

Approximately 190,000 to 290,000 solar PV panels of 340 (or higher) watts (DC) each will be installed for the Project. It is anticipated that Hanwha Q Cells Q.PLUS L-G4.2. 340 W PV panels, or equivalent, may be used (see ***Appendix C***). The final number and model of PV panels may be subject to change until a final decision on the module supplier is made and detailed design has been completed. Should a higher output (Watt) panel be chosen, it will likely result in a reduction in the overall number of panels needed and a corresponding reduction in racking system components. It will not result in additional impacts such as an increase Project Location or increased noise output. The PV panels will be installed on either a fixed rack structure or single axis tracking system. Fixed racks structures are static and hold the PV panels at an optimal angle to capture solar irradiance. A single axis tracking system is designed to move throughout the day to capture solar irradiance as the sun moves from east to west.

The PV panels will be aligned in rows approximately 5 to 12 m apart, and will be mounted on racking structures. It is estimated that 2,500 to 5,800 racks will be required for the Project, which will be arranged in long rows with spacing set to optimize the site area. The number of racks required may be subject to change until a final decision on the selection of the racking supplier is made and detailed design has been completed. Each of the racking structures will be assembled on-site. Racking foundation design will vary depending upon the depth of overburden (soil above bedrock). For areas with less than 1.2 m of overburden the foundation will likely consist of a rock socket type anchor; for areas with more than 1.2 m and less than 2.2 m of overburden the proposed PV foundation will likely consist of spread footing type anchor; and for areas with more than 2.2 m of overburden (and with limited cobbles) foundation will likely consist of a helical pile type anchor. The final quantity of solar PV panels and racking structures, and their locations will be subject to the Operational Flexibility parameters described in **Section 4.0**.

6.3.2 Inverter Stations and Equipment

Inverter stations house multiple components, including inverters, an inverter transformer and Supervisory Control and Data Acquisition ("SCADA") monitoring equipment. The AC voltage created by the inverters will be "stepped-up" via the inverter transformer to 34.5 kV in multiple inverter stations. Up to 34 inverter stations will be required for the Project. Inverters, inverter transformers, and all ancillary equipment are expected to be installed on a concrete or steel (skid) platform that will be placed on concrete footings or secured to the ground by other suitable means. Inverters and ancillary equipment may be housed within an enclosure that will provide weather shelter for operational staff as well as sound attenuation. Acoustic louvers may also be used to provide sound attenuation, as necessary. These and other details will be determined during detailed design of the project, after issuance of the REA.

The following inverter type, or equivalent, is anticipated to be used in the final design: SMA Sunny Central SC 2200. Specifications for the proposed inverters can be found in the Noise Impact Assessment Report. The final location of the inverter stations will be subject to the Operational Flexibility parameters described in **Section 4.0**.

6.3.3 Electrical Collector System

The AC electrical energy output from the inverter stations will be collected via collection lines which will be either installed underground or above ground on poles. Poles are anticipated to be between 60 and 70 feet tall and will be equipped with mounting structures and electrical insulators and ancillary equipment such as grounding wire, communications cables, and others as necessary. Above ground poles will be supported by anchored guy wires where necessary. Buried collection lines will require above ground junction boxes for cable splices. It is anticipated that the lines will generally follow the internal access roads, public road networks, or they will be directionally drilled under or span over existing water bodies. The exact locations of lines for the electrical collector system will be determined during detailed design; however, they will all be within the Project Location boundary as shown in **Figure 2**.

6.3.4 Connection Line

The connection line will transmit the generated energy from the PV panels, inverter stations and collection system to the substation. The connection line will likely consist of three 3-phase circuits mounted either on poles or below ground (where necessary). Poles are anticipated to be between 65 and 80 feet tall and be equipped with mounting structures and electrical insulators and ancillary equipment such as grounding wire, communications cables, and others as necessary. Above ground poles will be supported by anchored guy wires where necessary. Below ground connection lines will require junction boxes for where cable splicing is necessary. The preferred connection line route and pole locations have not yet been determined; however, it will be one of the four following options:

- **Preferred Route**: Travels east on Centreville Road, then north on County Road 27, east on Marlin Road, north on Edges Road to Murphy Road to Sheffield Bridge Road where it reaches the substation transformer. (**Purple** on plan).
- **Bid Route:** Travels east on Centreville road to the intersection with Lockridge Road where it then turns north over land through an unopened municipal right-of-way to Teskey Road where it crosses County Road 14 and on to Miller Road through private land easements. It continues north on Miller Road until it reaches the substation transformer. (**Orange** on plan)
- **Alternate 1**: Follows the same route as the Preferred Route until the point of reaching Haggerty Road where it travels west on Haggerty Road, crosses the Salmon River to Miller Road, then travels north on Miller Road until it reaches the substation transformer. (**Dark blue** on plan).
- **Alternate 2**: Follows the same route as the Preferred Route until the point of reaching Teskey Road where it travels west and then north as it crosses County Rd 14 and on to Miller Road through private land easements. It then continues north on Miller Road until it reaches the substation transformer. (**Green** on plan).

The final route will be selected based upon consultation with the public, HONI, the IESO, and other regulatory agencies. All four options are shown on **Figure 3** and in ***Appendix B***.

6.3.5 Substation and Other Equipment

The connection line system voltage will be stepped up to 230 kV transmission grid voltage at the substation. The Project substation will be located within leased lands on private property northeast of the intersection of Miller Road and Frizzell Road. The substation will be located adjacent to the Hydro One Networks Inc. ("HONI") corridor, and connect to the existing 230 kV H23B transmission line. HONI will be responsible for the necessary equipment outside of the Project Location boundary.

The substation will be sized appropriately for a 54 MW_{AC} solar facility. The substation equipment will include an isolation switch, a circuit breaker, a step-up transformer, transmission switch gear, instrument transformers, grounding and metering equipment and other equipment as required. All substation grounding equipment will meet the Ontario Electrical Safety Code. Electrical equipment supplied must be CSA Electrical Safety Authority ("ESA") requirements and be acceptable to HONI/IESO with respect to protection, control and SCADA requirements. Fibre-optic cable runs will be installed into the substation for SCADA and other communications requirements.

The substation will have secondary spill containment, anticipated to be of a size to hold 100% of the oil volume, plus the volume equivalent to the 24-hour, 50-year storm. The substation will contain mineral or a vegetable-derived oil, or similar. There will be an oil detection system to alert the operations and maintenance team when cleanout is required. The substation will undergo effluent monitoring on a quarterly basis, or as required by the MOECC. Spill response kits will be stored on-site in the event of an emergency spill (see **Section 9**).

The substation may require an auxiliary station service connection from a rural feeder in order to maintain basic electrical requirements for protection and control equipment and visibility through SCADA and ancillary systems. However, it is anticipated that station service needs will be withdrawn from the H23B 230 kV transmission line. In the event of complete electrical disruption, the station will draw power from a standby generator.

A standby generator will be located within the substation area to provide power in the case of periodic maintenance and for unexpected loss of local electrical service connection. The generator will be sized appropriately to provide electrical service for the substation transformer. The generator will comply with Section 7 of O.Reg. 359/09 and will operate according to the following conditions:

- The generator will only be operated for the purposes of testing or maintenance or for the start up or shut down of the facility. If being used for this purpose, the generator will not be operational for more than 60 hours in a 12 month period, and will only operate on week days between 7am and 7pm for these purposes.
- In addition to maintenance purposes described above, the generator will only be operated in the event of an emergency (e.g., serious risk to the health and safety of a person, the environment or damage to property).

6.3.6 Access Roads

The main entrances to the solar facility will be located off Hinch Road, Centreville Road, Rattie Road, and Miller Road. Permanent gravel access roads will be constructed to facilitate maintenance requirements during operations. The roads will be granular and approximately 6 m wide and will be constructed as appropriate for the Project and engineering design. Based on the final design for the project, the gravel access roads may also be constructed using a bonding substance. Geotextile fabric may be used to improve structural integrity and preserve the granular. If necessary, culverts will be installed beneath the access roads at locations where conveyance of surface water drainage is required.

6.3.7 Fencing, Lighting and Security

For the safety of the public and wildlife and for security purposes, a perimeter fence will be installed. This will be a chain link fence of standard height (approximately 1.8 m) that will be installed around the entire Project Location. The perimeter fence is a requirement of the Electrical Safety Authority ("ESA") and will be built and posted with signs to required specifications, in accordance with the Canadian Electrical Code. Gates will be installed where the fence intersects access roads.

The perimeter fencing is to have contact with the ground surface to prevent entry of wildlife. Where it is not feasible for the fence to contact the ground, other measures will be installed to prevent wildlife access under the fence. During the construction phase, in areas appropriate to protect hatchling turtles, the spacing in the chain link should be of sufficient size to prevent entry from the ground surface to a height of approximately 0.5 m.

For security and maintenance purposes, lighting may be installed near the entrances of the solar facility and task-specific lights will be provided as necessary. They may also be motion-sensored to address potential lighting concerns. Motion-sensored security cameras (standard and infra-red) will be installed at strategic locations to secure the perimeter of the Project Location. The substation yard will be equipped with a camera and sound recording device.

6.3.8 Control Building and Communication Tower

A control building and communication tower will also be installed to provide transfer of operation data to HONI during operations. The control building will be constructed to house electrical controls, protection, and monitoring systems. In addition, a remote computer based system will be used to control and monitor the generating equipment, including such parameters as: active and reactive power output, terminal voltage, ramp rates, operational and safety alarms, and shutdowns. The building will also contain a battery backup system, fibre-optic communications cabling and external connections. These components will be located within the substation area, as shown on **Figure 3**.

6.3.9 Operations and Maintenance Building

An Operations and Maintenance building will be utilized as part of the Project and would provide equipment to monitor the operation of the facility, staff offices, a washroom, lunch room, warehouse and parking area. The location for the Operations and Maintenance building is planned to be in an existing structure in Napanee or another nearby location outside of the Project Location, as shown in **Figure 3**. If no suitable existing structure is found, the operations and maintenance building will be constructed on-site. If that is the case, foundations for the operations and maintenance building will be based on the results of a geotechnical assessment, but are expected to be cast-in-place concrete pads.

6.3.10 Water Crossings

As discussed in Section 6.5 of the *Construction Plan Report*, water crossings may be required for the connection line route, depending on which option is preferred. It is not anticipated that maintenance of water crossings will be required. Water bodies have been mapped in relation to the Project Location. It is not anticipated that the design of the Project will require installation of new water crossings for access roads. Appropriate buffers have been applied to water bodies found within 300 m of the Project Location. For more information, please refer to the *Water Assessment Report* and *Water Body Report*.

6.3.11 Stormwater Management Installations

Stormwater management measures such as swales, drainage ditches, retention ponds, rock check dams, etc. will be installed as needed to avoid impact to off-site drainage conditions. A Stormwater Management Plan will be developed prior to construction to identify the location and type of installations required. The Stormwater Management Plan will incorporate commitments from the *Natural Heritage Assessment* and *Water Body Report*, as applicable.

6.3.12 Water Supply

Water is not required for the generation of electricity at the solar facility. Should the operations and maintenance building be constructed within the Project Location, water for use in toilets and sinks will be supplied from the municipal system. If not feasible, water would either be taken from a local well or be trucked in from a municipal supply using a local water hauler and stored in an above ground water tank within the building.

6.3.13 Groundwater

A hydrogeological study was undertaken to determine potential effects to groundwater by the Project. The Project is located in the Napanee Plain physiographic unit characterized by a flat to slightly undulating plain, reflecting the underlying limestone bedrock. The area consists of extensive limestone plain with little to no overburden. Hydrogeological investigations indicate a relatively impermeable underlying bedrock layer. Groundwater movement through the limestone bedrock is slow resulting in a high water table in the study area. More rapid movement of water is interpreted to occur in the network of shallow fractures observed at the bedrock surface. This movement likely occurs in the upper metre of the bedrock.

The Project has potential to impact the groundwater during the operation of the Project without proper mitigations in place. During the operations phase, impacts may occur as a result of accidental fuel spillage/releases from equipment, stormwater run-off, minor waste generation, and foundation supports for PV panels. Through mitigation measures such as monitoring components on a septic tank (if installed), the installation of spill containment at the substation and the implementation of a spill prevention and response plan, impacts to groundwater are not anticipated during operation of the facility.

Overall, no impacts are anticipated to the groundwater as a result construction, operation or decommissioning of the Project.

6.3.14 Sewage Disposal

Sewage disposal is not required for the generation of electricity at the solar facility. Should the operations and maintenance building be constructed within the Project Location a washroom and kitchen facility will be installed. Sewage from the washroom and kitchen facilities will be directed to a septic holding tank, designed in accordance with the Ontario Building Code and Township building standards. The tank would be pumped out as required by a licensed vendor.

6.3.15 Other Equipment

During the operation and maintenance phases, the solar facility will not engage in, nor will any equipment be required for, the following activities:

- the production, handling, storing or processing of any waste, biomass, source separated organics, farm material or biogas; or
- discharges of contaminants to air.

7.0 Facility Operations Plan

7.1 Daily Operations, Staffing and Training

The Project will operate year round and generate electricity during daylight hours only. The solar facility will be continuously monitored and managed utilizing a SCADA system which monitors the status of the facility in real time and stores historical data for the purposes of trending the performance of the facility.

Minimal on-site activity is required for daily operations; however, there will be some employees working out of the operations and maintenance building (if located at the Project Location). Operating reports for the Project, which will track persons on-site and the frequency of maintenance or any incidents, will be produced on a regular basis. Site operators will be trained on policy and procedures in the event of an emergency scenario. Operators will act as first responders in the event of an on-site emergency. Additional resources such as qualified contractors will be utilized in the event of an environmental spill.

During the operations phase, the only minor potential negative environmental effects to natural features would be due to routine maintenance at the Project Location. These are outlined in greater detail in the Environmental Effects Monitoring Plan ("EEMP") (see ***Appendix A***). No hazardous materials will be stored on-site with the possible exception of oil for transformers. It is anticipated that the oil will be FR3 oil (derived from vegetable oils). Transformer oil will be adequately contained and accompanied by a Spills Prevention and Contingency Plan.

7.1.1 Stormwater Management

During the operations phase of the Project, stormwater management is typically focused on the mitigation of potential longer term effects of the proposed development, including any marginal increases in runoff volumes/flow rates, and erosion and sediment issues. Good practices to manage these effects include regular monitoring and maintenance of any stormwater management features that are required for water quality and quantity control (e.g., spillways, ditching, retention ponds, swales, rock check dams, etc.) and that are to remain in place for the duration of facility operation. Specific activities may include monitoring runoff sediment levels after rain events, and performing scheduled clean-out of stormwater facilities, as necessary.

The Proponent will prepare a Stormwater Management Plan after detailed design is completed, and prior to the start of construction. This Stormwater Management Plan will require review by the MOECC and will include recommended mitigation measures and monitoring activities to take place during operation of the facility as outlined in the *Natural Heritage Assessment* and *Water Body Report* as applicable.

7.1.2 Sewage Management

If a septic holding tank is installed for the operations and maintenance building it would have a level monitoring system and include a high level alarm. The system would be sized with a capacity of less than 10,000 L per day and would be placed on a filter bed (per *Ontario Regulation 358, Sewage Systems under the Environmental Protection Act*). It would be designed in accordance with the Ontario Building Code and Township building standards and daily flows would be very minimal. Alternatively, a holding tank or portable toilets may be used. No significant impacts to groundwater or surface water are anticipated.

7.1.3 Water Taking

If the water needed for the washrooms and kitchen facilities in the operation and maintenance building is taken from an on-site well, the estimated water usage would be very minor (i.e., less than 50,000 L/day). Therefore, no negative effects are anticipated.

7.2 Operations and Maintenance Activities

The activities outlined in **Table 2** are associated with the operation and maintenance of the solar facility. It will operate year round and generate electricity during daylight hours only. The amount of daily power generated will depend on the available resource. During normal Project operations, minimal on-site activity is required.

Table 2: Operations and Maintenance Activities

Activity	Description
Monitoring and meter calibrations	The solar facility will be monitored remotely twenty-four hours a day to ensure proper power output and to alert the operations staff to potential issues. Most issues can be remotely diagnosed so that staff can be dispatched to the solar facility to correct any problems.
Routine periodic maintenance and inspection of Project components	Regularly scheduled site visits will occur to inspect the solar facility to ensure all equipment is in proper working order. Activities that will occur during these visits may include data collection, regular maintenance (as described below) and any necessary minor repairs such as replacement of weathered electrical components. Facility security measures (fencing locks) will also be checked. Transformers, inverters, PV panels, racking and above ground cabling will be inspected during scheduled visits.
Access road maintenance	Routine inspections of access roads may indicate the need for the addition of granular material and/or minor levelling and grading activities. The work is normally accomplished by small-scale equipment such as a skid steer.
Lighting	For security and maintenance purposes, lighting may be installed near the entrances of the solar facility and task-specific lights will be provided as necessary. These will be appropriately shielded or directed to avoid impacts to neighbours and will be inspected for burned/broken bulbs. Perimeter lighting is not anticipated.

Activity	Description
Cleaning of PV panels	Rainfall is generally sufficient for cleaning the solar PV panels; however, depending on the quantity and frequency of rain at the Project Location, the modules may require periodic cleaning. If required, water trucks may be utilized to bring water to the site. It is not anticipated that chemical detergents will be used to clean PV panels. During the winter, maintenance and operations crews may be dispatched to the site to remove snow from the PV panels using mechanical means (e.g., blowers affixed to mobile equipment).
Periodic landscape maintenance	Vegetation may be planted once construction activities are complete. It will be necessary to maintain the land in such a way that vegetation does not shade or in other ways impact the PV panels. Regular scheduled maintenance will also occur to manage weed growth as required. Other than in limited targeted applications (i.e., hand spraying of a commercially available herbicide such as RoundUp), it is not anticipated that herbicides will be used to manage vegetation. In most cases, vegetation will be managed by mechanical means. Herbicide applications will be reserved for rare cases where mechanical weed removal is either impractical or unsafe (e.g., presence of giant hogweed).
Major maintenance	Unforeseen, large repairs are not anticipated. Should major maintenance or equipment replacement be required it will be performed using existing roads and site access points.
Third party inspections and testing	Activities will be carried out as required by the local utility and other governing bodies in addition to any regularly scheduled inspections and testing.
Traffic	No major deliveries are anticipated for maintenance. Minimal vehicle traffic is associated with regular maintenance.
Drainage and erosion control	Water drainage from the Project Location will be managed as per a Stormwater Management Plan to be developed at the detailed design stage prior to the start of construction. This will be done with consideration to maintaining pre-construction drainage patterns and fulfilling the recommendations outlined in the *Natural Heritage Assessment* or *Water Reports*. Stormwater management features such as drainage ditches, culverts, rip rap, rock check dams, and retention ponds (if installed) will be regularly inspected. Minor clean-up of accumulated sediment and debris removal may be required and will be accomplished using small-scale equipment e.g. skid-steer.
Waste	The operation of the system does not produce any appreciable waste. All debris as a result of maintenance or cleaning will be removed from the site immediately by the operator. An exception is sewage disposal from the washrooms and kitchen facilities (if an Operations & Maintenance building is located on site), which would be directed to a septic tank, holding tank, or held in portable toilets designed to building code requirements.

8.0 Environmental Effects Monitoring Plan

The EEMP outlines how potential negative environmental effects of the proposed Project will be mitigated and how ongoing monitoring will occur to meet the requirements set out in *Ontario Regulation 359/09*. The EEMP includes information on potential negative effects associated with all phases of the Project from construction through decommissioning. The potential negative environmental effects associated specifically with the construction phase are also described in the *Construction Plan Report*. Given the nature of solar power generation and the mitigation and monitoring commitments set out in the REA application, no significant effects are expected during the operation of the Project.

It should be noted that effects and mitigation related to species at risk ("SAR") will be addressed under separate cover in consultation with the MNRF.

Appendix A presents the EEMP for the Project, which includes identification of the potential negative environmental effects, performance objectives, mitigation strategies and the proposed monitoring plan for each affected feature or environmental component.

9.0 Emergency Response and Communications Plan

Emergency events associated with a solar facility are unlikely. The proponent will develop Emergency Response and Communications Plans ("ERCP"s) that cover the entire life of the Project including construction, operation and decommissioning phases. The plans will be in place prior to construction and will be reviewed and updated on an annual basis or when necessary due to changes in operation. Information dissemination to stakeholders on significant changes will follow the same procedures as described in **Section 9.3**.

9.1 Emergency Response Plan

Prior to construction, the Proponent will establish an Emergency Response Plan ("ERP") for the Project. In preparing this Plan, the Proponent will discuss potential emergency scenarios that could arise during construction, operation, maintenance and decommissioning of the Project with related parties such as the County of Lennox & Addington, Township of Stone Mills, Fire Department, etc. and finalize the plan. A specific ERP for the construction phase of the project will be developed by the contractor(s). Copies of the plan will be kept on-site and in relevant offices. Similarly, the ERP may be updated upon the commissioning of the Project.

9.2 Emergency Communications Plan

An Emergency Communications Plan will be included in the ERP and will provide key contact information for relevant responders, regulators, landowners and other stakeholders. It will contain a description of the chain of communications between the Proponent and relevant responders under emergency scenarios applicable to the Project. A log book including key contacts and their information (names, emergency phone numbers) will be kept in the construction trailers, operations and maintenance building and the Proponent offices for access during an emergency.

In the event of an emergency, relevant responders will be contacted in accordance with the chain of communication included in the ERP. If required during a major emergency, the Proponent will provide information releases to the community. Technical staff will recommend action plans and assist with responses to the public, stakeholders, and first responders such as the local fire department and police services.

9.3 Non-Emergency Communications Plan

This section provides information on the methods of communication and information dissemination in non-emergency situations.

9.3.1 Ongoing Stakeholder Engagement

Stakeholder engagement activities will continue throughout the life of the Project. Information will be mailed and/or emailed to stakeholders as necessary. During construction and operations phases of the Project, a sign will be erected at the entrances to the solar facility, which will include the appropriate contact information, including telephone number should the public have any questions, concerns or complaints.

The following consultation activities are up-coming:

- notice announcing application posting on EBR
- announcement on the Project website when MOECC review is complete and IESO Notice to Proceed has been issued
- other ongoing communications with the public and stakeholder groups

Members of the public can contact the Proponent at any time with questions or comments about this Project via phone or email. Contact information is provided in **Section 2** of this and other REA technical reports and is available on the website and in newspaper notices. After the Operations and Maintenance building is established, local residents will be provided with the site manager contact information.

9.3.2 Communications Methods, Records and Complaints Resolution Process

Correspondence received by the Proponent will be recorded in an electronic file and/or log book. If received prior to the REA submission to MOECC, this correspondence will be included in the *Consultation Report*. If received after the REA submission and during the MOECC Technical Review of the application, it will be recorded and provided to the MOECC if requested. In both cases, if the correspondence requires a response, this will be provided in a timely fashion and the response will be recorded.

Complaints and other communications received during the construction, operations, maintenance and decommissioning phases will be recorded in an electronic file and/or log book and will include the following:

- time and date of communication;
- type of inquiry/comment/complaint;
- name and contact information of the person(s);
- response and date of response; and
- any follow-up issues

A record will be kept for all complaints, including: the history of the complaint resolution process that was followed and all actions taken to address the cause of the complaint. Where appropriate, steps will be taken to prevent reoccurrence of similar complaints in the future and this information will also be recorded.

10.0 Considerations for Projects Subject to Land Use Plans

The Project is not located in areas subject to Land Use Plans. Specifically, the Project does not lie within the Niagara Escarpment, Lake Simcoe Watershed, Oak Ridges Moraine or the Greenbelt.

11.0 Conclusions

This *Design and Operations Report* has been completed to fulfill regulatory requirements as mandated by the provincial government for the development of the Project. This report is consistent with the provisions of *Ontario Regulation 359/09* for a Class 3 Solar Facility and has been prepared in accordance with MOECC guidance documents. Given the nature of solar power generation, few (if any) negative environmental effects are anticipated during the operations phase. Potential negative effects to the environment from operational and maintenance activities are outlined in the EEMP and have been minimized or avoided through careful facility layout planning, the application of appropriate mitigation measures, and adherence to all regulatory requirements. An ERCP will ensure that the facility, stakeholders and first responders are prepared in the unlikely event of an emergency. Based on the results of the *Noise Study Report* the Project is predicted to be compliant with all MOECC noise requirements without the use of mitigation measures during operations.

The generation of power from solar energy will displace 54 MW_{AC} of electricity that otherwise may have been generated by fossil fuel or non-renewable power plants. As a result, the energy generated will not contribute to climate change or emissions-related health impacts. There will also be a direct benefit to the local economy in terms of the number of construction jobs that will be created, and there will also be an economic gain to the local service sector (i.e., hotels, restaurants, etc.). The Project will also contribute to the municipal tax revenues. The Project supports the goals of the Province's *Green Energy and Green Economy Act*, 2009 and *Long-Term Energy Plan* (LTEP), 2013.

The overall conclusion of this *Design and Operations Report* is that this Project can be operated without any significant adverse residual effects to the environment.

Appendix A

Environmental Effects Monitoring Plan (EEMP)

APPENDIX A: ENVIRONMENTAL EFFECTS MONITORING PLAN (EEMP)

Affected Feature(s) or Environmental Component	Potential Effect	Likelihood	Magnitude	Performance Objective	Summary of Mitigation Measures	Monitoring[1]		Contingency Measures
						Monitoring Location	Frequency and Duration	
CONSTRUCTION PHASE								
Cultural Heritage and Archaeological Resources								
Cultural heritage resources. Archaeological resources.	Disruption or destruction of cultural or archaeological materials.	Low Low	Low Low	Minimize impacts to cultural heritage resources Minimize impacts to archaeological resources	Mitigation for archaeological resources will be implemented as outlined by the Stage 2, 3 and Stage 4 Archaeological Assessments and Cultural Heritage Assessment. Avoidance or implementation of buffers where construction is to be located close to cultural heritage resources. Conduct further analysis of vibration-related impacts where buffers are not feasible. No construction activities will take place in the vicinity of known archaeological finds until the assessments have been completed and clearance has been obtained from the MTCS.	N/A	N/A	Should a previously undocumented cultural heritage or archaeological resource be discovered, alteration of the site will immediately cease, and additional fieldwork will be undertaken by a licensed archaeologist in accordance with Section 48(1) of the Ontario Heritage Act. Should human remains be found, the police or regional coroner's office, the Registrar of Cemeteries and any applicable Aboriginal Communities will be contacted in accordance with the Cemeteries Act.
Natural Heritage Features								
(Assumed) Provincially Significant Wetlands Significant Woodlands (Treated as) Significant Waterfowl Stopover and Staging Areas~ (Treated as) Significant Turtle Overwintering Area (Treated as) Significant Reptile Hibernaculum	**<u>Physical Effects</u>** Alteration of wetland vegetation composition Permanent removal or degradation of woodland and/or wildlife habitat area Mortality of wildlife species moving across Project area due to increased traffic volumes during construction. Mortality of avian species due to collision with overhead connection lines.	Low	Moderate	Persistence of significant natural features Significant wildlife habitat will continue to meet the criteria for significance post-construction. General connectivity between woodlands maintained at a local landscape level	Cleared lands to be vegetated as soon as practical following construction activities. <u>Setbacks</u> • Setbacks between significant woodlands and the project perimeter fence, collector and collection line poles to follow ISA Arborist standards. • A minimum 5 m setback to be applied to significant wildlife habitat and wetland areas adjacent to the Project Location where PV panels and/or the Project substation is located.	ESC measures to be monitored where implemented according to the ESC plan. Wildlife monitoring to occur where fencing to exclude wildlife has been installed near significant wildlife habitat.	Monitor ESC measures regularly during construction. ESC monitoring to occur monthly or after rain events 10 mm or greater (within 24 hrs) until vegetation is re-established. Wildlife monitoring to determine if species present in construction disturbance area(s) to occur	Repair deficiencies in ESC structures as soon as possible upon notification of breach in ESC structure and/or insufficient measures based on site conditions. Repair deficiencies in wildlife exclusion fencing within 24 hours of notification of breach.

[1] Please refer to the *Natural Heritage Assessment Environmental Impact Study* for additional monitoring information for natural features and to the *Water Bodies Report* for additional monitoring information for water bodies

Affected Feature(s) or Environmental Component	Potential Effect	Likelihood	Magnitude	Performance Objective	Summary of Mitigation Measures	Monitoring[1]		Contingency Measures
(Treated as) Significant Colonially Nesting Bird Breeding Habitat (Trees & Shrubs) Significant Other Rare Vegetation Communities Significant Carolina Whitlow-Grass Habitat (Treated as) Significant Waterfowl Nesting Area (Treated as) Significant Turtle Nesting Area (Treated as) Significant Amphibian Breeding Habitat (Woodland) Significant Woodland Area-Sensitive Bird Breeding Habitat (Treated as) Significant Terrestrial Crayfish Habitat Significant Common Nighthawk Habitat Significant Red-headed Woodpecker Habitat Significant Eastern Wood Pewee Habitat Significant Wood Thrush Habitat Significant Yellow Pond Lily Habitat (Treated as) Significant Juniper Hairstreak Habitat Generalized Candidate Significant Wildlife Habitat *Natural Heritage Features (continued)*	**Functional Effects** Change in surface water/drainage run-off volumes and patterns to wetlands and associated wildlife habitat. Compaction of ground near treed vegetation root zone Potential changes to water quality. Reduction in quality of habitat. Potential loss of linear treed connectivity between woodlands.				Erosion and Sediment Control (ESC) Minimize soil exposure. Install erosion and sediment control measures based on final Project ESC Plan prior to vegetation clearing, grubbing and grading to prevent mobilization of sediment and other contaminants from the Project location into the surrounding landscape. Restrict vegetation clearing to lands within Project Location identified for development. Stormwater Management Develop and implement a Stormwater Management Plan to ensure drainage patterns are not significantly altered from existing conditions due to road drainage, reduction in surface permeability, etc. Hydrogeological work to be completed to verify that no significant changes to groundwater characteristics are anticipated as a result of the Project. A plan to address/mitigate soil compaction throughout the Project location to be developed as part of the detailed design to promote infiltration where applicable Vegetation/ Habitat Considerations Woodland removal and/or removal of sensitive natural features to be minimized if possible during detail design. Snags and trees with quality wildlife cavities are to be removed following dusk and before dawn if during the bat active season (generally March to November), or anytime during the winter hibernation period for bat species. Where snags and trees with quality wildlife cavities are removed, an equal number of bat boxes will be installed in similar habitat in the general area of the Project. Installation of connection line overhead poles to avoid areas of sensitive natural features such as potential reptile	Monitor for surface water quality at locations identified in the SWM Plan and/or REA issued by the MOECC. Monitoring for potential turtle nesting along access roads external to perimeter fencing to the intersection with municipal roads if construction of roads occurs during nesting season. Post-Construction Monitoring locations for significant natural features in the same location as pre-construction surveys where significant wildlife habitat is wholly or partially retained following construction. Monitoring of transplanted alvar species to occur in the target recipient sites. Monitoring of invasive species removal in area ALV21 located outside of the Project Location. Monitoring for frac-out to occur in wetland and/or water body	on an ongoing basis throughout the construction phase. Monitor for surface water quality at a frequency and duration identified in the SWM Plan and/or REA issued by the MOECC. During construction, visual surveys for turtle nesting to occur for approximately 3 weeks between late May and early July between 7 pm and 10 pm. Frequency during this time period will be subject to weather conditions One year of post-construction monitoring for significant wildlife habitat that is wholly or partially retained following construction (see Section 13 for which wildlife habitat is subject to post-construction monitoring). Monitoring to document establishment success of transplanted alvar plant species and removal of invasive species in areas of ALV21 for a minimum period of three years following transplantation/ removal activities. Monitoring for frac-out to occur during drilling operations.	If performance objectives are not achieved following the first year of post-construction monitoring and significant wildlife habitat is not re-evaluated as significant, the MNRF will be made aware of the monitoring results and an additional year of post-construction monitoring will occur. The maximum length of time for post-construction monitoring will not exceed three years. If turtles are found to nest in those areas of access road external to the perimeter fence, a qualified biologist will be consulted and efforts to increase nesting success implemented. These efforts will be at the discretion of the qualified biologist and may include barriers placed over known nests to discourage predation or removal of eggs for incubation by a qualified organization. Once the nest is vacated, alternative mitigation options will be explored to discourage further nesting in consultation with the MNRF. If frac-out occurs, re-evaluate drilling pathway and assess feasibility of alternative installation methods (where available.)

Affected Feature(s) or Environmental Component	Potential Effect	Likelihood	Magnitude	Performance Objective	Summary of Mitigation Measures	Monitoring[1]		Contingency Measures
					hibernacula entry/exit points and wetlands or vernal pools with standing water during the amphibian breeding season. To compensate for the loss of 0.65 ha of a Rare Vegetation Community (ALV21), removal of invasive species identified within the portion of the community located to the north of the Project Location or other areas identified will be undertaken. Actions taken may also include periodic thinning of woody vegetation cover to maintain an open alvar environment. Where possible, alvar indicator plants will be collected during an appropriate time of year and transplanted out of the Project Location and into an appropriate recipient site that has been carefully selected and prepared to receive the transplanted species. For installation of collector/collection lines by directional boring/drill, follow proper geotechnical assessment practices, drilling planning and execution. Time drilling activities to occur outside of sensitive timing windows as determined through consultation with the MNRF following approval of the REA. Design the drill path to an appropriate depth below the water body/wetland to minimize the risk of frac-out. Develop an emergency frac-out response plan prior to undertaking direction boring activities. Should frac-out occur, the extent can be limited by careful monitoring during the boring activities and having appropriate response equipment available on-site and ready for use. Monitor the wetland and associated water body to observe signs of surface migration (frac-out) of drilling mud during boring activities. <u>Wildlife Considerations</u> The construction workforce will be educated on local wildlife that may be encountered on the Project Location at the time of site orientation. Included in the orientation will be instructions for how to	locations being drilled under.		
Natural Heritage Features (continued)								

Affected Feature(s) or Environmental Component	Potential Effect	Likelihood	Magnitude	Performance Objective	Summary of Mitigation Measures	Monitoring[1]		Contingency Measures
Natural Heritage Features (continued)					identify and avoid wildlife that may be encountered. A protocol will be provided to contractors to follow in the event wildlife in encountered. This protocol will include specific measures for dealing with turtles, breeding birds and other wildlife. Wildlife located within the Project Location will be relocated to an area outside the Project Location (and into an area of appropriate habitat) as necessary. This will be completed by a professional trained in the safe handling of wildlife. Vehicle speeds restricted to 15 km/hr or less when travelling within the Project Location where PV panels and the substation are proposed. Utilize fencing (e.g., Perimeter fencing and/or silt fencing) to deter wildlife from entering the construction site during construction and decommissioning. In the vicinity of the Project Location (e.g. sections of Rattie Road, Hinch Road and Centreville Road) where traffic volumes exceed normal volumes due to construction activities, exclusion fencing shall be installed adjacent to natural habitats and wetlands areas to minimize road mortality of wildlife. Signage will be installed beyond the extents of the exclusion fencing to warn construction traffic of the potential for wildlife to be crossing the road and to indicate a speed limit of 20 km/hr. An environmental monitor shall regularly inspect the exclusion fencing to ensure it is properly installed (keyed-in) and to observe for wildlife that may be attempting to travel around the ends of the fencing. An environmental monitor or designated personnel will monitor construction traffic speed and have the authority to direct, slow or halt construction traffic accordingly to protect against road mortality. The perimeter fencing is to have contact with the ground surface to prevent entry of wildlife. Where it is not feasible for the			

Affected Feature(s) or Environmental Component	Potential Effect	Likelihood	Magnitude	Performance Objective	Summary of Mitigation Measures	Monitoring[1]		Contingency Measures
Natural Heritage Features (continued)					fence to contact the ground, other measures will be installed to prevent wildlife access under the fence. During the construction phase, in areas appropriate to protect hatchling turtles, the spacing in the chain link should be of sufficient size to prevent entry from the ground surface to a height of approximately 0.5 m. Where feasible, the perimeter fencing is to be constructed outside of the turtle active season (i.e., March- May to avoid turtles emerging from wintering habitats; May-June for nesting; September- October window to avoid turtles moving to wintering habitat). Where it is not feasible to construct perimeter fencing in its entirety during the turtle overwintering period, fencing to be temporarily supplemented with silt fencing to act as a barrier/exclusionary measure. Minimize impacts to breeding birds (from April 1 to September 15; March 15 to September 15 for areas where waterfowl nesting may occur) by clearing naturalized vegetation outside of the breeding bird season. Should clearing be required during the breeding bird season, nest searches conducted by a qualified person must be completed 48 hours prior to clearing activities. If nests are found, works within 10 m will cease until nest has fledged. If no nests are present, clearing can occur. Prohibitions under the federal *Migratory Bird Convention Act* are to be complied with. Construction vehicle speeds to be restricted to 20 km/hr on municipal roads adjacent to where wildlife exclusion fencing has been installed (as described in this table). Minimize construction traffic during nighttime hours. Vehicle speeds to be restricted to 15 km/hr or less on the Project site and speed limit signage posted Access roads located outside of the perimeter fence are to be designed to discourage turtle nesting (e.g. use of			

Affected Feature(s) or Environmental Component	Potential Effect	Likelihood	Magnitude	Performance Objective	Summary of Mitigation Measures	Monitoring[1]		Contingency Measures
					hardeners, at-grade access roads on bedrock, etc.). Overhead connection lines and supporting poles to include mitigation measures for reducing collision mortality such as line marking in areas of known high bird activity and if a connection line is installed in the Lockridge Road unopened road allowance. Cleared lands to be vegetated as soon as practical following construction activities.			
Water Bodies								
• Mud Creek • Pennell's Creek • Seepage Area 5	Vegetation clearing and/or grading may cause changes in natural surface drainage. This may include redirection of surface flow and/or increased or decreased surface runoff, which may cause increased or decreased stream flows.	Low	Low	Maintenance of pre-existing surface drainage.	Appropriate grading techniques will be used to prevent increased run-off potential, and to maintain positive drainage. Changes to land contours will be minimized; physical land alterations (*i.e.*, grading, cut and fill, etc.) required will be designed to remain consistent with the pre-existing drainage patterns.	Throughout construction areas.	Checks to occur monthly and/or after rain events greater than 10 mm until grading is complete.	Grading techniques will be adjusted to meet pre-existing drainage outlined in construction design plans.
• Mud Creek • Tributary 2 to Mud Creek • Tributary 2.1 to Mud Creek • Salmon River • Tributary 1 to Salmon River • Tributary 2 to Salmon River • Tributary 2.1 to Salmon River • Tributary 2.2 to Salmon River • Tributary 3 to Salmon River • Tributary 3.1 to Salmon River • Black Creek • Pennell's Creek • Seepage Areas 1,2,3,5	Vegetation clearing and/or grading may cause soil erosion and mobilization. This may result in increased sedimentation, turbidity and inputs of nutrients and/or contaminants in adjacent water bodies, which may affect fish habitat (*e.g.*, spawning areas, food sources, benthic composition).	Low	Low	Minimize surface runoff and soil mobilization to receiving water bodies.	Mitigation measures from the ESC plan will be implemented, including: • Identifying and protecting trees and plants not shown for removal that are contained within the construction area. • Maintaining existing riparian vegetation buffers around water bodies. • Installing silt fences (placed at the downslope side of proposed grading activities, proposed stockpile areas, and the site limits) and necessary erosion control measures prior to commencing construction activities. • Re-vegetation of disturbed areas after construction has been completed (either through natural re-growth or planting, as necessary).	At areas where ESC measures are constructed.	Checks to occur monthly and/or after rain events greater than 10 mm until vegetative cover is established.	Breaches to ESC measures will be repaired within 24 hours of identification.
• Mud Creek • Seepage Area 5	Construction of access roads and soil compaction from use of equipment in Project Location may cause decreased surface permeability, redirection of runoff,	Low	Low	Maintenance of surface infiltration and minimization of surface runoff and soil mobilization to receiving water bodies.	Access roads will be designed to promote infiltration. Mitigation measures from the ESC plan implemented to include:	At access roads and areas where ESC measures are constructed.	Checks to occur monthly and/or after rain events greater than 10 mm until vegetative cover is established.	Breaches to ESC controls will be repaired within 24 hours of notification.

Affected Feature(s) or Environmental Component	Potential Effect	Likelihood	Magnitude	Performance Objective	Summary of Mitigation Measures	Monitoring[1]		Contingency Measures
	and/or soil erosion and mobilization. This may result in increased sedimentation, turbidity and inputs of nutrients and/or contaminants into adjacent water bodies, potentially impacting water quality and fish habitat (*e.g.*, spawning areas, food sources, benthic composition).				• Maintaining existing riparian vegetation buffers around water bodies where possible. • Installing silt fences (placed at the downslope side of proposed grading activities, proposed stockpile areas, and the site limits) and necessary erosion control measures prior to commencing construction activities. • Reduce soil compaction by scarifying land (or by other appropriate means) following the construction phase. • Re-vegetation of disturbed areas after construction has been completed (either through natural re-growth or planting, as necessary).			
• Mud Creek • Pennell's Creek • Seepage Area 5	Temporary water takings during installation of underground Project components may affect local hydrological regime (groundwater). The overland dispersal of water during temporary water takings may increase surface runoff and increase erosion and sedimentation to adjacent water bodies.	Low	Low	Minimization of impacts to hydrological regime. Maintenance of surface runoff volume.	• The rate and timing of water pumping will be controlled. Water will be pumped onto vegetated surfaces if possible or into a filter bag or temporary retention basin. Pumped water is to re-infiltrate the ground without causing increased run-off or significant changes to local hydrological regime. If possible, water takings will be restricted to less than 50,000 litres per day. Should water takings in excess of 50,000 L/day be required (i.e., 50,000 – 400,000 L/day), the Proponent will file the water taking on the EASR in accordance with EASR requirements. Dewatering will not occur until the EASR application has been filed. ESC measures will be implemented and monitored according to the Project ESC plan	Where installation of Project component(s) requires temporary water takings.	Once during construction/during installation of Project components.	If temporary water takings cause increased soil mobilization or surface run-off in areas of exposed soil, temporary water taking activities will be stopped until additional ESC measures can be implemented. If water taking needs to exceed 50,000 L/day, the MOECC will be consulted for appropriate approvals (i.e., filing the activity on the EASR).
• Water Body 1 • Mud Creek • Tributary 2 to Mud Creek • Tributary 2.1 to Mud Creek • Salmon River • Tributary 1 to Salmon River • Tributary 2 to Salmon River • Tributary 2.1 to Salmon River	The installation of overhead collector/collection line(s) may cause contamination of soil by spills from equipment and machinery, and may cause increased erosion, sedimentation, and/or turbidity in the water body. These effects may be caused from movement of equipment, machinery and personnel on-site leading to vegetation damage and/or loss, soil compaction and	Low	Low	Ensure equipment and materials are stored more than 30 m from the water body Minimize mobilization of sediment in riparian areas. Ensure re-establishment of riparian vegetation to pre-disturbance conditions in disturbed areas following	• Avoid placing poles on meander belts, active floodplains or other unstable areas that may result in erosion or scouring of the stream bed. Locate poles above the high water mark where possible. • Design construction approaches to be perpendicular to water bodies to minimize disturbance. • A Spill Prevention and Contingency Plan	Riparian areas around water bodies that are crossed by overhead collector/ connection lines	Regularly, during installation of overhead line. Once following installation and re-vegetation measures.	If mobilization of sediment is insufficiently controlled, additional ESC measures (e.g. more silt fencing) will be installed. ESC measures will be implemented and maintained until vegetation is observed to be established and thriving.

Affected Feature(s) or Environmental Component	Potential Effect	Likelihood	Magnitude	Performance Objective	Summary of Mitigation Measures	Monitoring[1]		Contingency Measures
• Tributary 2.2 to Salmon River • Tributary 3 to Salmon River • Tributary 3.1 to Salmon River • Black Creek • Pennell's Creek • Seepage Areas 1,2,3	increased surface water run-off into riparian areas. *Note: The environmental effects and mitigation measures have been provided for various options of constructing the collector and connection lines. The method of installation will be determined during detailed design.*			installation.	and spill response kits are to be developed and kept on site during installation. • In accordance with the ESC plan, install effective sediment and erosion control measures to reduce the potential for entry of sediment into the water body. • Operate machinery in locations that maximize distance from the water body, and that minimize disturbance to riparian areas. • Construction equipment and materials will be primarily stored in temporary construction laydown area(s). No equipment or materials are to be stored within 30 m of a water body. • Following the construction phase and prior to vegetation establishment, areas of soil compaction will be rectified by methods such as scarification, etc. • Minimize loss of vegetative cover to the extent possible. Area(s) of vegetation damage and/or loss will be re-vegetated to reduce erosion potential. Although Fisheries and Oceans Operational Statement for Overhead Line Construction (DFO 2007a) is no longer in circulation following changes to the federal *Fisheries Act*, the measures to protect fish and fish habitat when constructing overhead lines outlined in this document should be consulted.			
• Mud Creek • Tributary 2 to Mud Creek • Tributary 2.1 to Mud Creek • Salmon River • Tributary 1 to Salmon River • Tributary 2 to Salmon River • Tributary 2.1 to Salmon River • Tributary 2.2 to Salmon River • Tributary 3 to Salmon River • Tributary 3.1 to Salmon River • Black Creek • Pennell's Creek • Seepage Areas 1,2,3	The installation of underground collector/collection line(s) via isolated or dry open-cut water body crossing may cause barriers to species movement, contamination of soil by spills from equipment and machinery, and may cause increased erosion, sedimentation, and/or turbidity in the water body. These effects may be caused from movement of equipment, machinery and personnel on-site leading to vegetation damage and/or loss, soil compaction and increased surface water run-off into	Low	Low	Ensure equipment and materials are stored more than 30 m from the water body Minimize mobilization of sediment in riparian areas. Ensure re-establishment of water body banks and riparian vegetation to pre-disturbance conditions in disturbed areas following installation.	• Where possible for intermittent streams, conduct activities when the water body is dry. • Minimize duration of in-stream work and time crossings to prevent sensitive life fish stages (fish timing windows). • Use portable dams, pea gravel bags, concrete blocks, steel or wood walls, clean rock, sheet pile or other appropriate designs to separate the dewatered work site from flowing water. • Before dewatering, rescue any fish from	Riparian areas around water bodies that are crossed by underground connection/collector lines	Regularly, during installation of underground line. Once following installation and re-vegetation measures.	If mobilization of sediment is insufficiently controlled, additional ESC measures (e.g. more silt fencing) will be installed. ESC measures will be implemented and maintained until vegetation is observed to be established and thriving. If required, additional bank restoration is to be completed if water body channel not restored to pre-construction condition.

Affected Feature(s) or Environmental Component	Potential Effect	Likelihood	Magnitude	Performance Objective	Summary of Mitigation Measures	Monitoring[1]		Contingency Measures
	riparian areas. *Note: The environmental effects and mitigation measures have been provided for various options of constructing the collector and connection lines. The method of installation will be determined during detailed design.*				within the isolate and release them downstream. • Divert water around the isolate area to maintain natural downstream flows and prevent upstream ponding. • Avoid construction during wet, rainy or winter thaw conditions where possible. • The construction area adjacent to sensitive features should be clearly delineated by sediment or erosion control fencing, or other similar boundary, to avoid impacting the adjacent feature(s). • Restore and stabilize the streambed, substrate and banks to their original shape and condition. Although Fisheries and Oceans Operational Statement for Isolated or Dry Open-cut Stream Crossings (DFO 2008) is no longer in circulation following changes to the federal *Fisheries Act*, the measures to protect fish and fish habitat when carrying out an isolated or dry open-cut stream crossing outlined in this document should be consulted			
• Mud Creek • Tributary 2 to Mud Creek • Tributary 2.1 to Mud Creek • Salmon River • Tributary 1 to Salmon River • Tributary 2 to Salmon River • Tributary 2.1 to Salmon River • Tributary 2.2 to Salmon River • Tributary 3 to Salmon River • Tributary 3.1 to Salmon River • Black Creek • Pennell's Creek Seepage Areas 1,2,3	The installation of underground collector/collection line(s) via directional boring (also termed HDD) may cause contamination of soil by spills from equipment and machinery, and may cause increased contamination, erosion, sedimentation, and/or turbidity in the water body. These effects may be caused from movement of equipment, machinery and personnel on-site leading to vegetation damage and/or loss, soil compaction and increased surface water run-off into riparian areas. Directional boring also has the potential for frac-outs. *Note: The environmental effects and mitigation measures have been provided for various options of constructing the collector and connection lines. The method of installation will be determined during*	Low	Low	No observable effects from directional boring observed in water body	• Maintaining existing riparian vegetation buffers around water bodies. The boring entry and exit points are to be far enough from the water body/wetland to have minimal impact. • Proper geotechnical assessment practices, drilling planning and execution to be followed. Design the drill path to an appropriate depth below the water body/wetland to minimize the risk of frac-out. Develop an emergency frac-out response plan prior to undertaking direction boring activities. • Equipment should not be operated within the limits of the water body/wetland area. • Extent of a frac-out can be limited by careful monitoring during the boring activities and having appropriate response equipment available on-site	Monitoring to occur in general area of underground crossing and immediately downstream, from a vantage point that allows for safe viewing.	Regularly, during drilling of underground line.	• If a frac-out occurs, implement emergency frac-out response plan. • Notify relevant agencies of frac-out. Implement the contingency crossing plan, which may include measures to either re-drill at a different location or to isolate the water body to complete the crossing at the current location.

Affected Feature(s) or Environmental Component	Potential Effect	Likelihood	Magnitude	Performance Objective	Summary of Mitigation Measures	Monitoring[1]		Contingency Measures
	detailed design.				and ready for use. Monitor the water body/wetland to observe signs of surface migration (frac-out) of drilling mud during boring activities. Although Fisheries and Oceans Operational Statement for High-Pressure Directional Drilling (DFO 2007b) is no longer in circulation following changes to the federal *Fisheries Act*, the measures to protect fish and fish habitat when high-pressure directional drilling outlined in this document should be consulted			
• Water Body 1 • Mud Creek • Tributary 2 to Mud Creek • Tributary 2.1 to Mud Creek • Salmon River • Tributary 1 to Salmon River • Tributary 2 to Salmon River • Tributary 2.1 to Salmon River • Tributary 2.2 to Salmon River • Tributary 2.4 to Salmon River • Tributary 3 to Salmon River • Tributary 3.1 to Salmon River • Black Creek • Pennell's Creek • Seepage Areas 1-5	Storage and use of construction materials and equipment may cause contamination of soils and/or water bodies from accidental spills, from surface runoff, from wind, or from the transport of materials by equipment and machinery onto paved public roads and subsequent surface runoff or wind.	Low	Low	• Ensure equipment and materials are stored more than 30 m from a water body. • Use mud mats or other means to prevent off-site transport of soils and/or other deleterious materials. • Ensure soils transported off-site are washed away from water bodies if road washing is required. Keep public roads clear of construction debris.	• Existing vegetation in the Project Location should be maintained wherever possible to act as a natural buffer. • A Spill Prevention and Contingency Plan and spill response kits are to be developed and kept on site during construction. • Construction equipment and materials will be primarily stored in temporary construction laydown area(s). No equipment or materials are to be stored within 30 m of a water body. • Utilize good management practices to reduce the transport of materials (*e.g.* soil, vegetation, etc.) off site. This may include installing construction entrance features such as mud mats at vehicle access points adjacent to paved roads or as otherwise agreed to with the municipality. • Following the construction phase and prior to vegetation establishment, areas of soil compaction will be rectified by methods such as scarification, etc. Re-vegetate disturbed areas in the Project Location following the construction phase.	Main facility entrance points and in the construction laydown areas.	Regularly, during the construction phase.	If soil is mobilized onto paved public roads by equipment, clearing activities to avoid mobilizing soil into nearby water bodies
Air, Odour and Dust								
Neighbouring land uses	Deposition of dust on adjacent lands.	Low	Low	Minimize dust and odour resulting from construction activities.	Vehicle idling will be limited where possible. Equipment will be maintained in good	N/A	N/A	N/A

Affected Feature(s) or Environmental Component	Potential Effect	Likelihood	Magnitude	Performance Objective	Summary of Mitigation Measures	Monitoring[1]		Contingency Measures
Neighbouring landowners	Air quality and odour nuisance.				working order. Vehicular traffic will be minimized in areas of exposed soils and high traffic areas will be stabilized with fresh gravel. Gravel roads will be watered down (or other measures taken) during construction as needed to reduce dust. Construction activities causing increased odour or dust will be carried out in accordance with applicable regulations and standards.			
Groundwater								
Groundwater table	Accidental fuel spillage/releases from equipment. Stormwater run-off. Minor waste generation.	Low	Low	Minimize impacts to groundwater during construction.	Spill containment around the substation area. A Spill Prevention and Contingency Plan to be in place prior to the start of construction. Erosion and sediment control measures (e.g., silt fencing).	N/A	N/A	N/A
Noise								
Neighbouring landowners	Increased noise disturbance due to construction activities.	Moderate	Low	Minimization of noise resulting from construction.	Vehicle idling will be prohibited, where possible. Noise levels within the Township of Stone Mills are governed by Bylaw 98-56. The bylaw stipulates that noise as a result of operation of any equipment in connection with construction will not be permitted within the hours of 8PM and 7AM, and 24 hours on Sundays. Construction activities resulting in noise emissions will typically take place during normal business hours. Should work need to be conducted on outside permissible hours, a by-law exemption shall be sought. Work will be done in accordance with local regulations and policies to minimize disturbance to the surrounding community. All equipment will be maintained in good working order. Any noise complaints will be investigated and documented as discussed in the Communications Plan (see the Design and Operations Report).	N/A	N/A	N/A

Affected Feature(s) or Environmental Component	Potential Effect	Likelihood	Magnitude	Performance Objective	Summary of Mitigation Measures	Monitoring[1]		Contingency Measures
Land Use and Resources								
Land use at the Project Location	Removal of land from agricultural production.	High	Moderate	N/A	Lands will be restored to their pre-construction condition, or a similar state at the time of decommissioning and adjacent lands have the ability to continue to be used for existing practices. Mitigation measures will include implementation of an ESC plan, avoidance of major excavation works or fill placement, and grading techniques to meet pre-existing drainage conditions.	N/A	N/A	N/A
Neighbouring landowners	Visual impact.	Low	Low	N/A	Visual impacts during construction will be temporary in nature.	N/A	N/A	N/A
Provincial and Local Infrastructure								
General vicinity of the Project Location	Periodic traffic disruption.	Moderate	Low	Limit traffic flow disruption.	A Traffic Management Plan will be prepared during detailed design in consultation with the Township and County.	N/A	N/A	N/A
	Damage to local roads.	Moderate	Low	N/A	Roads will be returned to or maintained at pre-construction condition in accordance with Road Use Agreements established with the Township of Stone Mills and the County of Lennox & Addington.	N/A	N/A	N/A
Public Health and Safety								
• Neighbouring landowners • Other members of the community	Equipment emissions.	Low	Low	N/A	The project will comply with the Occupational Health and Safety Act regulation requirements during the construction phase. All equipment will be operated by qualified contractors.	N/A	N/A	N/A
• Construction workers • Neighbouring landowners • Other members of the community	Injury or death to construction workers or members of the public due to accidents related to construction equipment or traffic.	Low	High	No injuries or deaths	All construction activities will be conducted by qualified contractors in accordance with required standards and codes. All activities will abide by local laws and regulations.	N/A	N/A	N/A
• Construction workers • Neighbouring landowners • Other members of the community • Municipal firefighters	Fires (electrical, wildfire, etc.) at the Project Location during construction.	Low Low	Moderate Low	Minimize fire potential at Project Location.	The contractor will create site-specific health and safety procedures. The contractor will also provide job safety assessment information prior to construction start up.	N/A	N/A	Implementation of ERCPs.
• Construction workers • Neighbouring landowners	Fires (electrical, wildfire, etc.) at the Project Location during construction.	Low	Moderate		All equipment will be maintained in good working order.			

Affected Feature(s) or Environmental Component	Potential Effect	Likelihood	Magnitude	Performance Objective	Summary of Mitigation Measures	Monitoring[1]		Contingency Measures
• Other members of the community • Municipal firefighters					The Project Location will be monitored during construction to discourage unauthorized access. Restricted areas will also be flagged, as appropriate. Smoking will be prohibited excepted in designated areas. Appropriate fire safety equipment (including fire extinguishers) will be available on site and stored in construction vehicles and site trailers as appropriate. An ERCP will be prepared in the event of an emergency on the site and will provide key contact information for relevant responders, regulators, landowners and other stakeholders.			
Areas Protected Under Provincial Plans and Policies								
No potential negative effects are anticipated to the Greenbelt Protected Countryside, Greenbelt Natural Heritage System, Oak Ridges Moraine and/or Lake Simcoe Watershed.								
OPERATIONS PHASE								
Cultural Heritage and Archaeological Resources								
There are no potential negative effects anticipated to cultural heritage and archaeological resources and local infrastructure during the operations phase of the Project.								
Water Bodies								
• Water Body 1 • Mud Creek • Tributary 2 to Mud Creek • Tributary 2.1 to Mud Creek • Salmon River • Tributary 1 to Salmon River • Tributary 2 to Salmon River • Tributary 2.1 to Salmon River • Tributary 2.2 to Salmon River • Tributary 2.4 to Salmon River • Tributary 3 to Salmon River • Tributary 3.1 to Salmon River • Black Creek • Pennell's Creek • Seepage Areas 1-5	Facility operations may cause an overall decrease in permeability of Project Location due to the impervious surfaces of the PV panels and/or soil compaction from construction activities. A decrease in site permeability may lead to an increase in surface water runoff, potentially contributing to increased erosion, sedimentation, and turbidity to receiving waters. Further, maintenance of the Project Location has the potential to introduce materials that are potentially harmful to the environment such as herbicides and/or de-icing substances	Low	Low	Re-establishment of vegetation and management of stormwater will minimize surface water runoff and soil mobilization to receiving water bodies.	• The Project Stormwater Management Plan will be developed to outline the key mitigations required to manage surface water drainage to adjacent water bodies. • The area below the PV panels will be re-vegetated as appropriate, either through seeding or natural re-vegetation. • Following the construction phase and prior to vegetation establishment, areas of soil compaction will be rectified by methods such as scarification, harrowing/tilling, etc. • ESC controls will remain in place until soils are stabilized by vegetative growth. • Maintenance of vegetation will occur in accordance with the mitigation measures outlined in the Environmental Effects Monitoring Plan (see the *Design*	Throughout the Project Location.	For areas to be re-vegetated, weekly during growing season until evidence of growth is observed, then monthly until all areas are vegetated or re-vegetated.	If the performance measures are not met, the Stormwater management plan will be reviewed and revised as required. Areas with no growth will be vegetated using an appropriate seed mix. ESC measures will be implemented and maintained until vegetation is observed to be established and thriving.

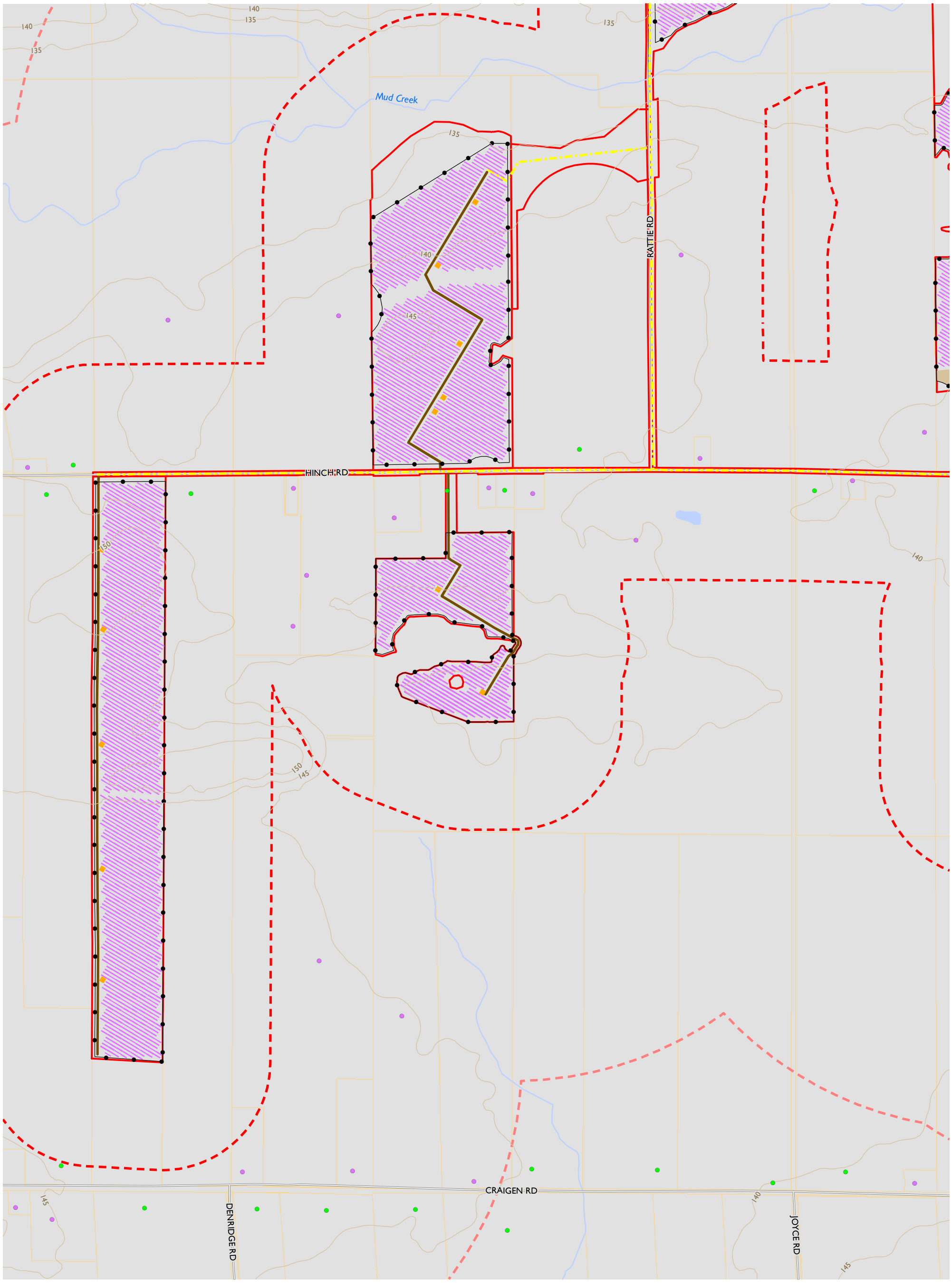
Affected Feature(s) or Environmental Component	Potential Effect	Likelihood	Magnitude	Performance Objective	Summary of Mitigation Measures	Monitoring[1]		Contingency Measures
					and Operations Plan). Use of herbicides and/or de-icing substances within the Project Location will be minimal and only used as required for maintenance of the Project and to provide safe access to site personnel where other means such as mechanical weed control or removal of ice is ineffective.			
Pennell's Creek	Operations may cause contamination of soils with transformer fluids by accidental spills, and/or contamination of water bodies from surface runoff of fluids or of contaminated soils, potentially impacting water quality and fish habitat.	Low	Low	Avoidance of deleterious materials entering a water body.	• Transformers are to be located more than 30 m from water bodies. • Spill containment structures will be constructed in association with the substation. • The Emergency Response and Communication Plan will be followed should a spill occur (as outlined in the *Design and Operations Report*). The MOECC (Spills Action Centre) will be notified in the event of a spill.	Substation location	Throughout Project lifespan.	The Emergency Response and Communication Plan will be followed should a spill occur (as outlined in the Design and Operations Report). Notification of MOECC (Spills Action Centre) in the event of a spill.
Air, Odour and Dust								
Operation of the facility will have no impact on air, odour or dust with the exception of unanticipated major maintenance activities, which have the potential to cause negative environmental effects as described for the construction phase of the Project. The same mitigation and monitoring activities would apply.								
Noise								
In addition to the effect listed below, unanticipated major maintenance activities have the potential to cause negative environmental effects as described for the construction phase of the project and the same mitigation and monitoring activities would apply.								
Neighbouring landowners.	Increased noise disturbance due to operation of the solar facility	Low	Low	Minimize the amount of noise caused by the inverters and substation to comply with the MOECC publication NPC-232.	If required, perform a noise audit in accordance with the requirements of the MOECC publication NPC-233, if necessary. No mitigation measures are required to comply with the MOECC publication NPC-232 requirements.	N/A	N/A	On-site noise testing and re-modelling, if required.
Groundwater								
Groundwater table	Release of fuels, chemicals or sewage disposal.	Low	Low	Minimize potential effects to the groundwater table during operations.	Secondary spill containment will be installed at the substation. Spill response kits will be kept on-site in trailers or vehicles, as necessary. A septic tank (if installed) will be equipped with a level gauge and alarm to notify when emptying is required. Potential effects to groundwater will also be mitigated in accordance with a	Project area	One year of post-construction water well monitoring will occur to assess potential impacts to local wells.	N/A

Affected Feature(s) or Environmental Component	Potential Effect	Likelihood	Magnitude	Performance Objective	Summary of Mitigation Measures	Monitoring[1]		Contingency Measures
					Stormwater Management Plan, to be developed during detailed design.			
Land Use and Resources								
There are no potential negative effects anticipated to land use and resources during the operations phase of the Project.								
Provincial and Local Infrastructure								
There are no potential negative effects anticipated to provincial and local infrastructure during the operations phase of the Project.								
Public Health and Safety								
In addition to the effects listed below, unanticipated major maintenance activities have the potential to cause negative environmental effects as described for the construction phase and the same mitigation and monitoring activities would apply.								
• Maintenance employees • Members of the public	Electrocution or other injury from operating components.	Low	Moderate Low	Minimize potential for electrocution or injury to public and employees. N/A	The Project will comply with the Occupational Health and Safety Act regulation requirements during maintenance activities. The Project Location will be fenced as per Electrical Safety Authority (“ESA”) requirements to prevent unauthorized access.	N/A	N/A	Implementation of ERCPs, should an injury occur.
• Neighbouring landowners • Other members of the community • Maintenance workers • Municipal firefighters	Fire (e.g., electrical or wildfires) at the Project Location during operation.	Low	Low Low Moderate	Minimize potential for fires at the Project Location	The Proponent will work with the local fire department to develop an emergency response plan for the Project Location, which will outline the ERCPs. (See the Design and Operations Report). This plan will include measures such as regular maintenance of vegetation and electrical equipment. The ERCPs will outline key contact information for emergency responders, landowners, contractors and stakeholders.	Project Location	Ongoing (remotely)	Implementation of ERCPs.
Provincial Plans and Policies								
No potential negative effects are anticipated to the Greenbelt Protected Countryside, Greenbelt Natural Heritage System, Oak Ridges Moraine and/or Lake Simcoe Watershed.								

Affected Feature(s) or Environmental Component	Potential Effect	Likelihood	Magnitude	Performance Objective	Summary of Mitigation Measures	Monitoring[1]	Contingency Measures
DECOMMISSIONING PHASE							
Cultural Heritage and Archaeological Resources							
There are no potential negative effects anticipated to cultural heritage and archaeological resources and local infrastructure during the decommissioning phase of the Project.							
Natural Heritage Features							
Decommissioning activities have the potential to cause negative environmental effects as described for the construction phase and the same mitigation and monitoring activities would apply with the exception that the final site restoration activities will be returned to a functional state. See Table 9 in the *Natural Heritage Assessment Environmental Impact Study* for a list of all potential environmental effects that may occur during decommissioning and mitigation measures for significant/provincially significant natural features.							
Water Bodies							
Decommissioning activities have the potential to cause negative environmental effects as described for the construction phase and the same mitigation and monitoring activities would apply with the exception that the final site restoration activities will be returned to a functional state.							
Air, Odour and Dust							
Decommissioning activities have the potential to cause negative environmental effects similar to those described for the construction phase and the same mitigation and monitoring activities would apply.							
Noise							
Decommissioning activities have the potential to cause negative environmental effects similar to those described for the construction phase and the same mitigation and monitoring activities would apply.							
Land Use and Resources							
There are no anticipated negative environmental effects to land use and resources during the decommissioning phase of the Project. At the time of decommissioning, the land will be restored to its pre-construction condition or a similar state as determined through consultation with the landowners and in accordance with zoning requirements. All project components will be removed and the Project Location lands will be restored through the spreading of topsoil, re-vegetation and seeding, or appropriate methods dependent on the anticipated land use. Materials will be reused and recycled where available. See Section 5 of the *Decommissioning Plan Report*.							
Public Health and Safety							
In addition to the effect listed below, decommissioning activities have the potential to cause negative environmental effects similar to those described for the construction phase and the same mitigation and monitoring activities would apply.							
• Project Location lands • Neighbouring lands • Persons encountering hazards	Hazards and health impacts from debris left on-site.	Low	Low	N/A	The site will be cleared of debris and hazards and will be returned to a functional state.	N/A	N/A	N/A
Provincial Plans and Policies							
No potential negative effects are anticipated to the Greenbelt Protected Countryside, Greenbelt Natural Heritage System, Oak Ridges Moraine and/or Lake Simcoe Watershed.							

Appendix B

Site Plan – Conceptual Component Layout Figures 3a-3h



BluEarth Renewables Inc.
LOYALIST SOLAR LP

Site Plan - Conceptual Component Layout
FIGURE 3a

- Existing Noise Receptor
- Vacant Lot Noise Receptor
- Connection Line (Preferred Route)
- Connection Line (Bid Route)
- Connection Line (Alternate 1)
- Connection Line (Alternate 2)
- Railway
- Electrical Transmission Line
- 5 m Elevation Contour
- Fence
- Inverter Station
- Solar Panel
- Electrical Collection Line
- Access Road
- Operation and Maintenance Area
- Substation
- Project Location Boundary
- Project Location 300 m Area of Investigation
- Project Location 1000 m Area of Investigation
- Parcel
- Water Body

An Environmental Impact Study has been submitted to the Ministry of Natural Resources and Forestry for natural features deemed significant. A Water Body Report has been prepared.

The proponent will prepare a Stormwater Management Plan based on the final detailed design of the facility prior to construction.

DILLON CONSULTING

MAP CREATED BY: GM
MAP CHECKED BY: JP
MAP PROJECTION: NAD 1983 UTM Zone 18N

1:10,000
0 50 100 200 m

PROJECT: 163674 STATUS: DRAFT DATE: 2017-01-27

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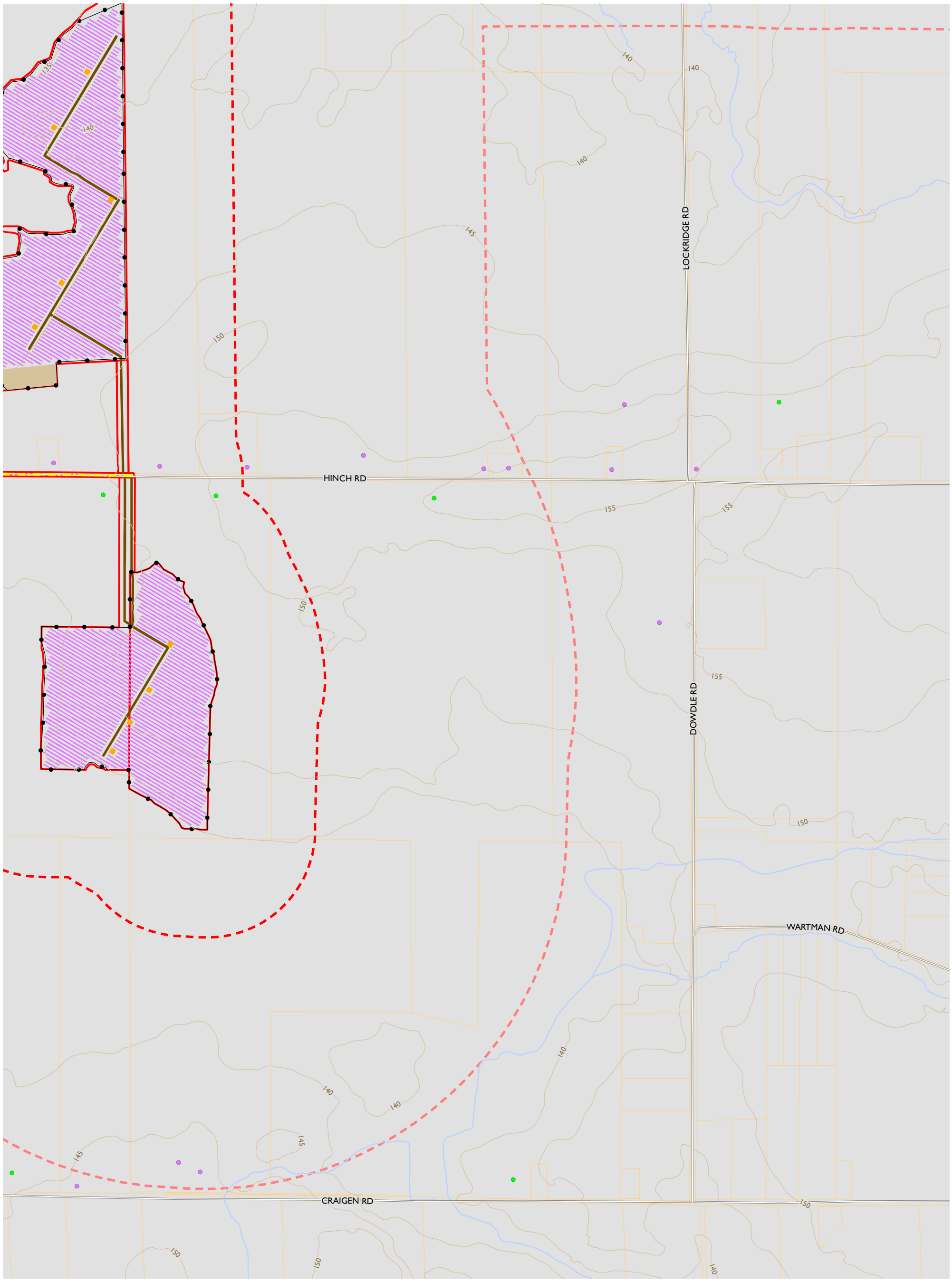

BluEarth Renewables Inc.
LOYALIST SOLAR LP

Site Plan - Conceptual Component Layout
FIGURE 3b

- Existing Noise Receptor
- Vacant Lot Noise Receptor
- Connection Line (Preferred Route)
- Connection Line (Bid Route)
- Connection Line (Alternate 1)
- Connection Line (Alternate 2)
- Railway
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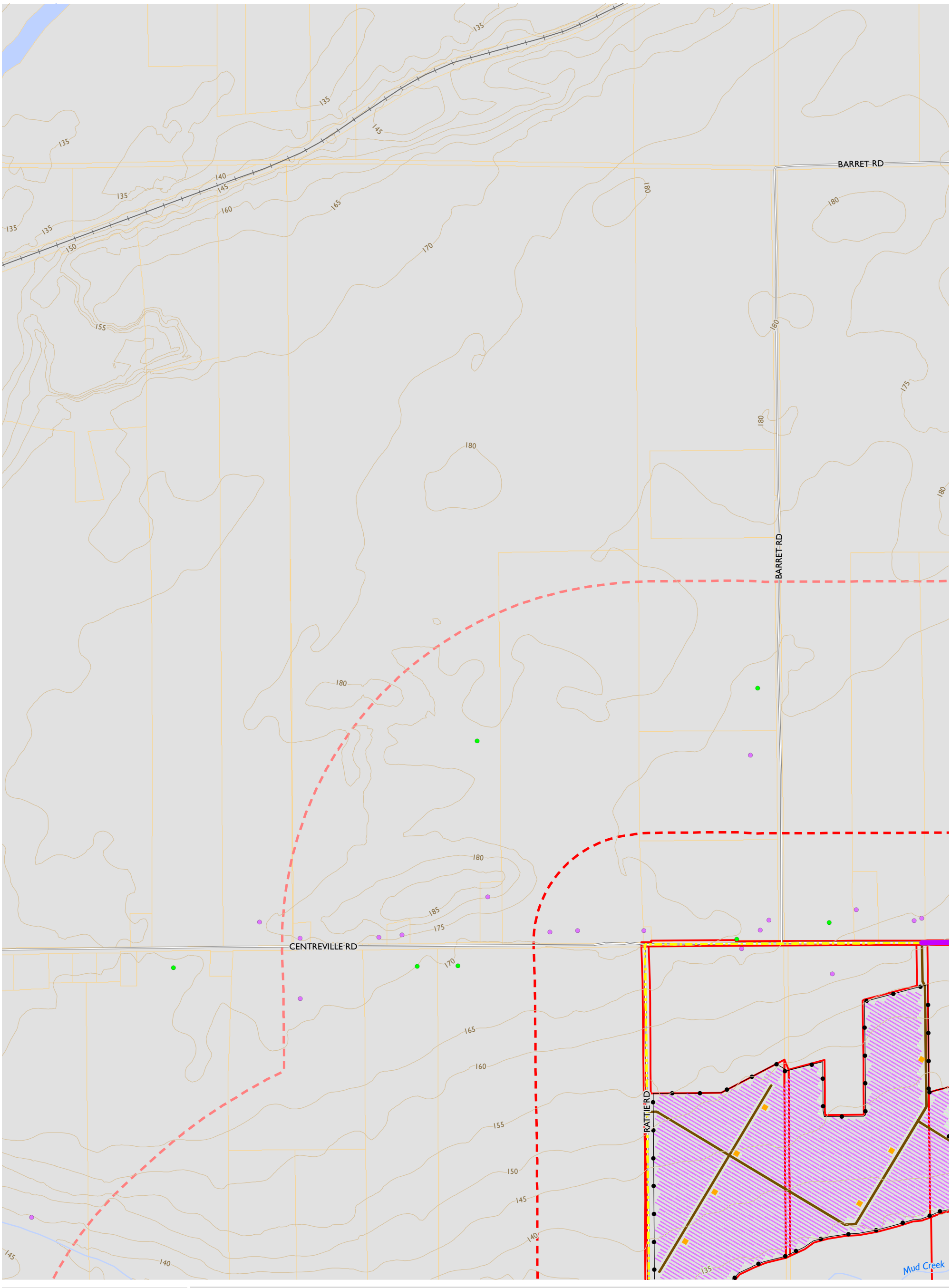

BluEarth Renewables Inc.
LOYALIST SOLAR LP

Site Plan - Conceptual Component Layout
FIGURE 3c

- Existing Noise Receptor
- Vacant Lot Noise Receptor
- Connection Line (Preferred Route)
- Connection Line (Bid Route)
- Connection Line (Alternate 1)
- Connection Line (Alternate 2)
- Railway
- Electrical Transmission Line
- 5 m Elevation Contour
- Fence
- Inverter Station
- Solar Panel
- Electrical Collection Line
- Access Road
- Operation and Maintenance Area
- Substation
- Project Location Boundary
- Project Location 300 m Area of Investigation
- Project Location 1000 m Area of Investigation
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DILLON CONSULTING

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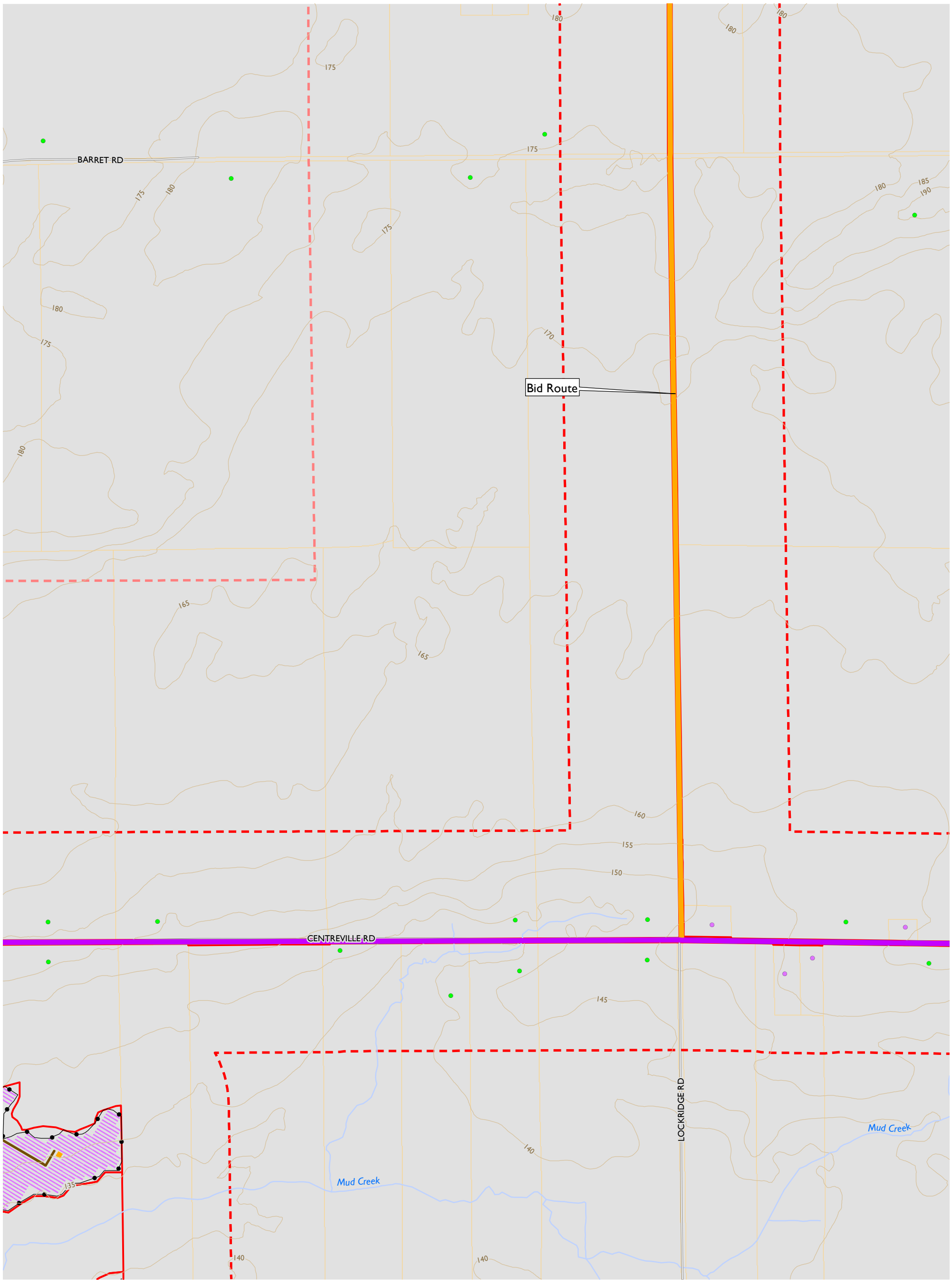

BluEarth Renewables Inc.
LOYALIST SOLAR LP

Site Plan - Conceptual Component Layout
FIGURE 3d

- Existing Noise Receptor
- Vacant Lot Noise Receptor
- Connection Line (Preferred Route)
- Connection Line (Bid Route)
- Connection Line (Alternate 1)
- Connection Line (Alternate 2)
- Railway
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DILLON CONSULTING

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MAP CHECKED BY: JP
MAP PROJECTION: NAD 1983 UTM Zone 18N

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0 50 100 200 m

PROJECT: 163674 STATUS: DRAFT DATE: 2017-01-27

FILE LOCATION: I:\GIS\163674 - Loyalist Solar\mxd\DOR\Figure 3 Site Plan Conceptual Component Layout.mxd

Preferred Route
Alternate 1
Alternate 2

COUNTY ROAD 27

CENTREVILLE RD

Mud Creek

BluEarth Renewables Inc.
LOYALIST SOLAR LP

Site Plan - Conceptual Component Layout
FIGURE 3e

- Existing Noise Receptor
- Vacant Lot Noise Receptor
- Connection Line (Preferred Route)
- Connection Line (Bid Route)
- Connection Line (Alternate 1)
- Connection Line (Alternate 2)
- Railway
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- Project Location 1000 m Area of Investigation
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DILLON CONSULTING

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MAP CHECKED BY: JP
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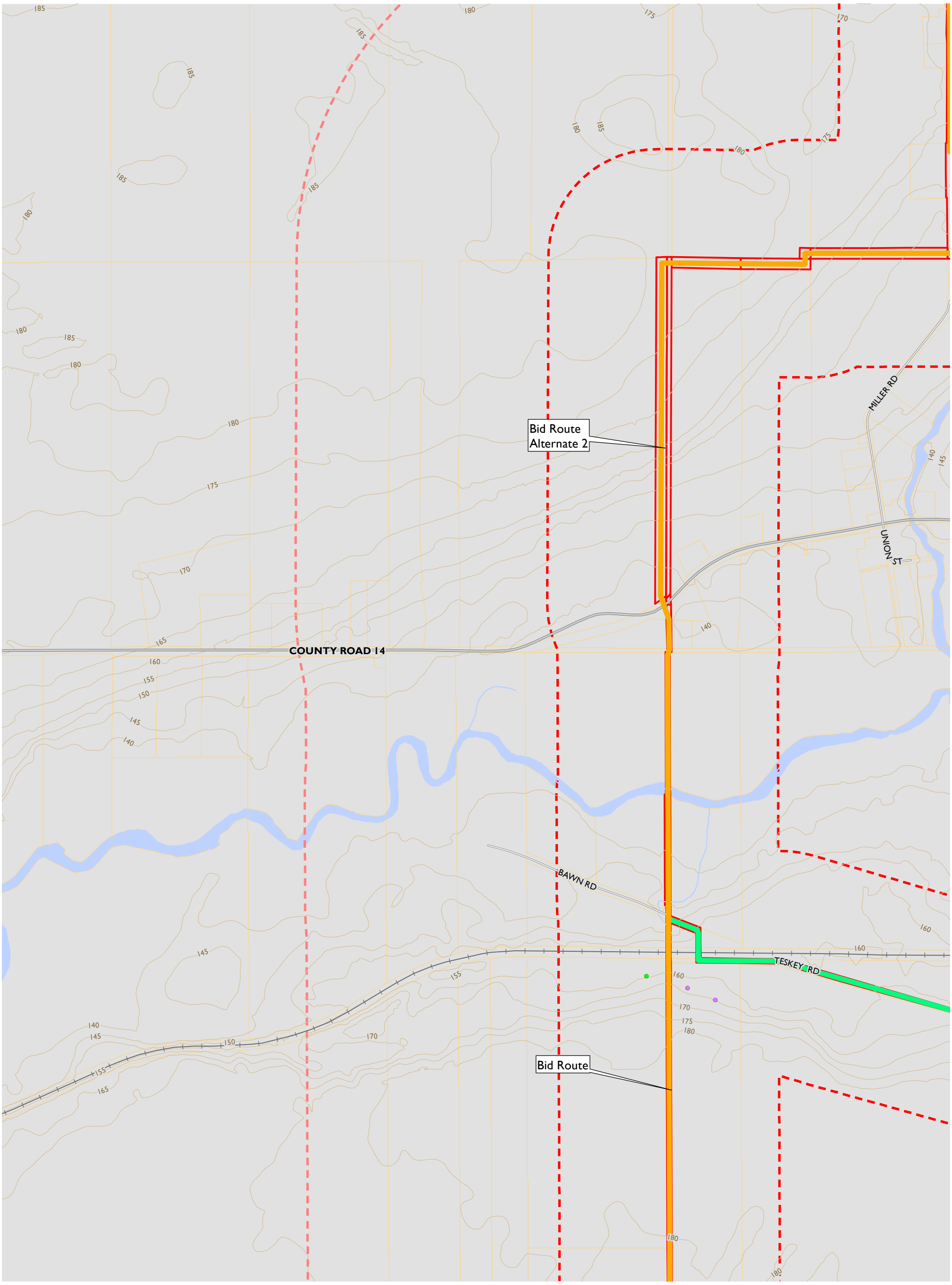

BluEarth Renewables Inc.
LOYALIST SOLAR LP

Site Plan - Conceptual Component Layout
FIGURE 3f

- Existing Noise Receptor
- Vacant Lot Noise Receptor
- Connection Line (Preferred Route)
- Connection Line (Bid Route)
- Connection Line (Alternate 1)
- Connection Line (Alternate 2)
- Railway
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DILLON CONSULTING

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PROJECT: 163674 STATUS: DRAFT DATE: 2017-01-27

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Preferred Route
Alternate 1

MURPHY RD
EDGES RD
MARLIN RD
COUNTY ROAD 14
COUNTY ROAD 27
TESKEY RD
Black Creek

BluEarth Renewables Inc.
LOYALIST SOLAR LP

Site Plan - Conceptual Component Layout
FIGURE 3g

- Existing Noise Receptor
- Vacant Lot Noise Receptor
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- Connection Line (Alternate 2)
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DILLON CONSULTING

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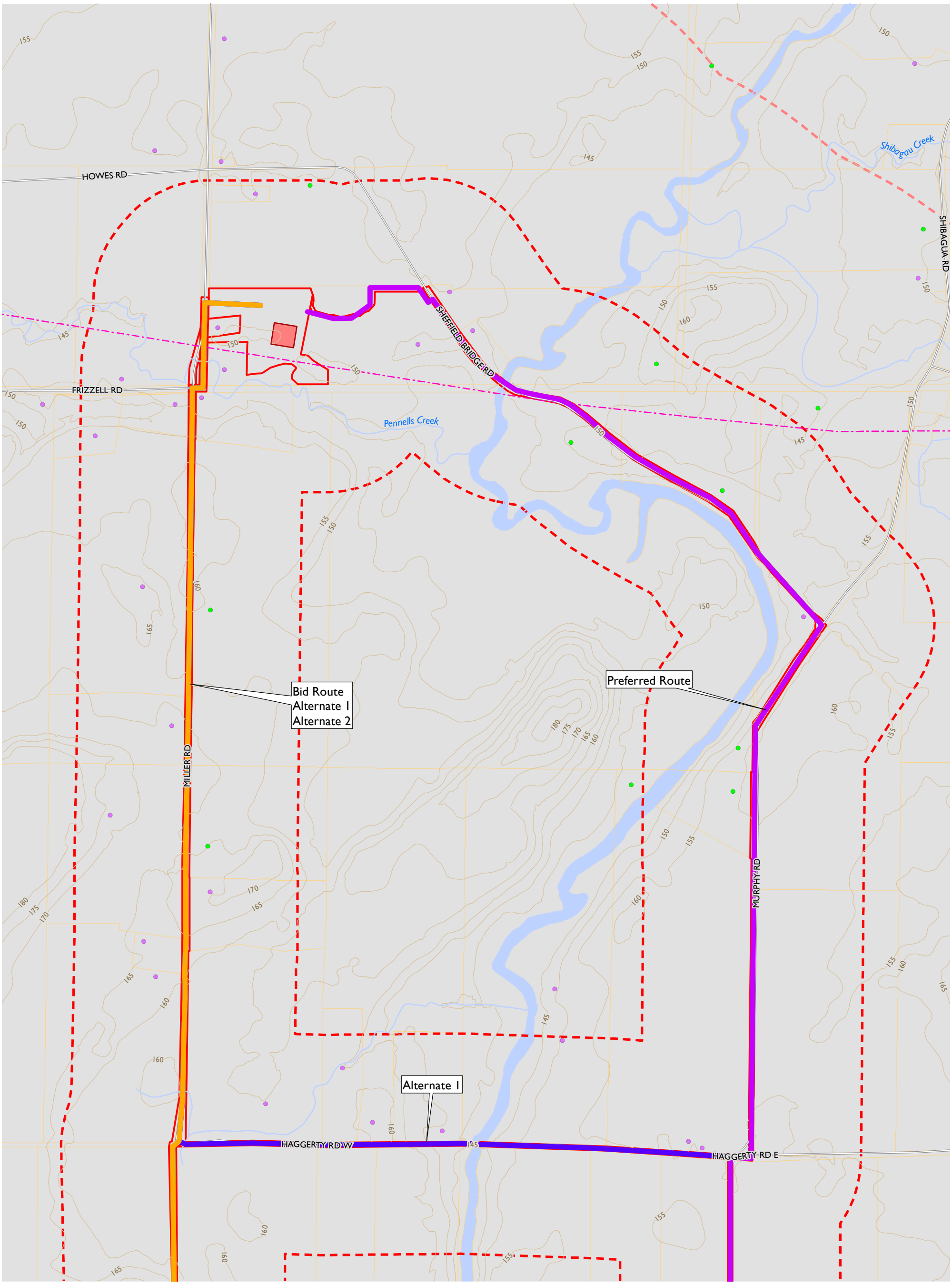

BluEarth Renewables Inc.
LOYALIST SOLAR LP

Site Plan - Conceptual Component Layout
FIGURE 3h

- Existing Noise Receptor
- Vacant Lot Noise Receptor
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Appendix C

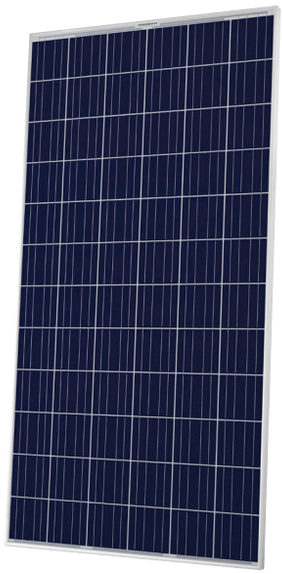
Preliminary Layout, Manufacturer and Technical Specifications

powered by Q.ANTUM

Q.PLUS L-G4.2 340-345

Q.ANTUM SOLAR MODULE

The Q.ANTUM solar module Q.PLUS L-G4.2 with power classes up to 345 Wp is the strongest module of its type on the market globally. Powered by 72 Q CELLS solar cells Q.PLUS L-G4.2 was specially designed for large solar power plants to reduce BOS costs. Only Q CELLS offers German engineering quality with our unique triple Yield Security.



LOW ELECTRICITY GENERATION COSTS
Higher yield per surface area and lower BOS costs thanks to higher power classes and an efficiency rate of up to 17.6 %.

INNOVATIVE ALL-WEATHER TECHNOLOGY
Optimal yields, whatever the weather with excellent low-light and temperature behavior.

ENDURING HIGH PERFORMANCE
Long-term yield security with Anti-PID Technology[1], Hot-Spot-Protect and Traceable Quality Tra.Q™.

EXTREME WEATHER RATING
High-tech aluminum alloy frame, certified for high snow (5400 Pa) and wind loads (2400 Pa).

A RELIABLE INVESTMENT
Inclusive 12-year product warranty and 25-year linear performance guarantee[2].

EUPD RESEARCH TOP BRAND PV MODULES USA 2016

Q CELLS YIELD SECURITY
- ANTI PID TECHNOLOGY (APT)
- HOT-SPOT PROTECT (HSP)
- TRACEABLE QUALITY (TRA.Q™)

Photon Q CELLS Best polycrystalline solar module 2014 Q.PRO-G2 235 174 modules tested

[1] APT test conditions: Cells at -1500 V against grounded, with conductive metal foil covered module surface, 25 °C, 168 h

[2] See data sheet on rear for further information.

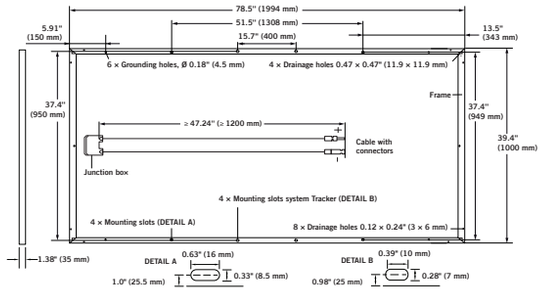
THE IDEAL SOLUTION FOR:
Ground-mounted solar power plants

Engineered in **Germany**

Q CELLS

MECHANICAL SPECIFICATION

Format	78.5 in × 39.4 in × 1.38 in (including frame) (1994 mm × 1000 mm × 35 mm)
Weight	52.9 lbs (24 kg)
Front Cover	0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Anodized aluminum
Cell	6 × 12 Q.ANTUM solar cells
Junction box	3.35-4.37 in × 2.36-3.15 in × 0.59-0.75 in (85-111 × 60-80 × 15-19 mm), Protection class ≥ IP67, with bypass diodes
Cable	4 mm² Solar cable; (+) ≥ 47.24 in (1200 mm), (-) ≥ 47.24 in (1200 mm)
Connector	Amphenol UTX, IP68

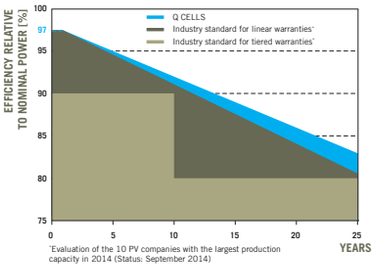


ELECTRICAL CHARACTERISTICS

POWER CLASS				340	345
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC[1] (POWER TOLERANCE +5 W / -0 W)					
Minimum	**Power at MPP[2]**	P_{MPP}	[W]	340	345
	Short Circuit Current*	I_{SC}	[A]	9.59	9.64
	Open Circuit Voltage*	V_{OC}	[V]	47.07	47.32
	Current at MPP*	I_{MPP}	[A]	9.03	9.09
	Voltage at MPP*	V_{MPP}	[V]	37.63	37.93
	Efficiency[2]	η	[%]	≥17.1	≥17.3
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NOC[3]					
Minimum	**Power at MPP[2]**	P_{MPP}	[W]	252.1	255.8
	Short Circuit Current*	I_{SC}	[A]	7.73	7.77
	Open Circuit Voltage*	V_{OC}	[V]	43.92	44.16
	Current at MPP*	I_{MPP}	[A]	7.09	7.14
	Voltage at MPP*	V_{MPP}	[V]	35.56	35.83

[1] 1000 W/m², 25 °C, spectrum AM 1.5 G [2] Measurement tolerances STC ±3%; NOC ±5% [3] 800 W/m², NOCT, spectrum AM 1.5 G * typical values, actual values may differ

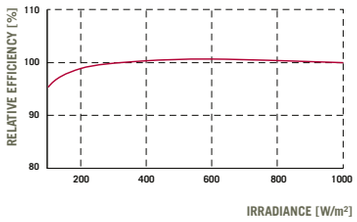
Q CELLS PERFORMANCE WARRANTY



At least 97 % of nominal power during first year. Thereafter max. 0.6 % degradation per year.
At least 92 % of nominal power up to 10 years.
At least 83 % of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organization of your respective country.

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m²).

TEMPERATURE COEFFICIENTS

Temperature Coefficient of I_{SC}	α	[%/K]	+0.04	**Temperature Coefficient of V_{OC}**	β	[%/K]	−0.29
Temperature Coefficient of P_{MPP}	γ	[%/K]	−0.40	**Normal Operating Cell Temperature**	NOCT	[°F]	113 ± 5.4 (45 ± 3 °C)

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage V_{SYS}	[V]	1500 (IEC) / 1500 (UL)	**Safety Class**	II
Maximum Series Fuse Rating	[A DC]	15	**Fire Rating**	C (IEC) / TYPE 1 (UL)
Design load, push (UL)[2]	[lbs/ft²]	75 (3600 Pa)	**Permitted module temperature on continuous duty**	-40 °F up to +185 °F (-40 °C up to +85 °C)
Design load, pull (UL)[2]	[lbs/ft²]	33 (1600 Pa)	[2] safety factor of 1.5 included, see installation manual	

QUALIFICATIONS AND CERTIFICATES

IEC 61215 (Ed. 2); IEC 61730 (Ed. 1), Application class A
This data sheet complies with DIN EN 50380.

PACKAGING INFORMATION

Number of Modules per Pallet	29
Number of Pallets per 53' Container	26
Number of Pallets per 40' Container	22
Pallet Dimensions (L × W × H)	81.3 × 45.3 × 46.9 in (2065 × 1150 × 1190 mm)
Pallet Weight	1671 lbs (758 kg)

NOTE: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

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