

Weaver Wind Project

MDEP Natural Resource Protection Act Application

ATTACHMENT 2: ALTERNATIVES ANALYSIS

2.0 ALTERNATIVES ANALYSIS

The proposed project is located within an area designated for expedited wind permitting in the State of Maine, 35-A M.S.R.A. Chapter 34-A (State of Maine, 2008). The project is specifically sited to maximize energy generation while minimizing impacts to environmental resources. Selection of a viable wind energy project site is based on a multitude of factors including quality of wind resource, suitable geography, proximity to transmission infrastructure, and compatibility with existing land uses. In determining the location of the project, existing wind data from nearby projects (Bull Hill Wind and Hancock Wind) was advantageous to the siting process. As part of Bull Hill Wind and Hancock Wind, several years of wind data were collected and evaluated. The resulting evaluation concluded that wind resources were well suited for wind energy generation in this area/terrain of Maine. Additional factors favorable for wind development in the area include sparse residential development, proximate access to the electrical grid that avoids the need for new transmission lines, and the relatively large percentage of uplands in the project area.

The overall project design objective was to maximize wind energy generation and minimize environmental impacts. The final project size, design, and layout reflect an iterative process in which multiple hilltops were evaluated for siting the wind generation facilities, and alternative electrical transmission options were considered.

The preliminary project layout (Figure 2-1) was developed using screening level data available in published literature such as: soil survey maps, National Wetland Inventory maps, and Significant Wildlife Habitat maps. Turbines were sited in areas that satisfied the turbine selection criteria and which, based on the available screening level data, had limited potential to impact wetlands and associated regulated resources (e.g., streams, water bodies, and Significant Wildlife Habitats). The preliminary layout consisted of 30 turbines and included consideration for three transmission/substation alternatives. The final project layout (Figure 2-2) was developed in consideration of the previously mentioned studies. Several locations for turbines, collector lines, substations, and roads were reviewed with the goal of identifying a project layout that meets the project purpose with the least environmental impact. The Applicant considered multiple criteria when determining turbine locations for the proposed project. The most important criteria were the presence of a quality wind resource based on existing data from Bull Hill Wind and Hancock Wind. With known wind resources in the area, measures were taken to reduce the impacts of construction and operation of turbines. Proximity of the turbines to existing infrastructure (e.g., roads and electrical substations) was an important factor, as it minimized the number/length of new roads needed for the project and subsequently reduced the amount of disturbance required for cutting and filling. Moderate slopes were preferred and selected to minimize the amount of erosion and runoff potential, as well as to reduce cut and fill impacts. Avoiding wetlands, stream crossings, and other high-value natural resources (i.e., Significant Wildlife Habitat) was also an important consideration in the siting of turbines and locations of electric transmission lines and new roads. Maintaining buffers around natural resources was also factored into the design process.

Further avoidance and minimization efforts included micro-siting or eliminating turbines, using existing roads to the maximum extent practicable, installing most electrical collector lines underground within existing or new roads, adjusting spacing between poles for overhead lines, narrowing access road footprints in some areas, and adjusting turbine grading limits. Turbine pads were sited in upland areas away from wetland boundaries as much as was feasible. Footprints of some turbine pads were reshaped or reduced to avoid impacts to nearby wetlands.

As a result of careful avoidance and minimization during the siting process, there are no impacts to Significant Wildlife Habitat including the Critical Terrestrial Habitat (CTH) of the two Significant Vernal Pools (SVPs) located within proximity to the project area. Soil disturbance will occur in three Inland Waterfowl and Wading Bird Habitats

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(IWWHs) that straddle Spectacle Pond Road. The disturbance will be trenching within the existing road during installation of the underground collector line system, soil disturbance will not occur in any previously undisturbed areas within the IWWHs. The project will not result in permanent or temporary fill of any regulated wetlands and will not require any in-stream work. Clearing of wetland vegetation will occur, but it is limited to clearing adjacent to existing roads as required to accommodate turbine transport and locations along the above ground portion of the collector line. Using existing roads minimizes overall project impacts and clearing vegetation in adjacent wetlands will result in a minimal loss of functions or values of the wetlands. In addition, roadside clearing for turbine delivery is a one-time occurrence with a de minimis impact on the resource, and collector line clearing converts wetland type, but does not fill in wetlands.

2.1 PROJECT IMPACTS

Based on the information gathered from the surveys identified above, the project layout and footprint were designed to optimize engineering and wind resource conditions while avoiding and/or minimizing environmental impacts. Construction and operation of the project will result in minimal impacts to environmental resources (Table 2-1). As designed, the construction of the project will not result in any soil disturbance or temporary or permanent fill in wetlands. Certain project activities, such as cutting vegetation, filling, disturbing, and installing stormwater controls are proposed adjacent to some regulated natural resources and will require a permit from the MDEP pursuant to the Natural Resources Protection Act (NRPA). To address the proposed impacts, a NRPA Tier 3 application has been completed for the project. The impacts proposed by the project fall into two categories:

- Clearing vegetation in wetlands; and
- Clearing and soil disturbance adjacent to protected natural resources.

A summary of proposed impacts to natural resources is provided in Table 2-2.

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ATTACHMENT 2: ALTERNATIVES ANALYSIS**Table 2-1. Summary of Environmental Impacts from the Weaver Wind Project**

Environmental Resource	Estimated or Potential Impact
Vegetation and Habitat	No RTE species and no unique botanical features identified. Project area is dominated by mixed forest communities.
Wetlands	No permanent or temporary wetland fill. Vegetation clearing within up to 110,038 square feet of wetlands.
Atlantic Salmon	The project is located within designated critical habitat for Atlantic salmon. No direct in-stream work is proposed within the project area. Vegetation clearing and maintenance will only be required within one Atlantic salmon habitat stream buffer.
Significant Vernal Pools	No vegetation clearing within the CTH of SVPs.
Other Significant Wildlife Habitat	Minor disturbance of soil in an existing road that bisects 3 IWWH, no expansion of existing impact footprint. No impacts to other Significant Wildlife Habitat.
Birds	<p>The project area does not contain habitat that supports state or federally listed species. Passage rates and flight heights for diurnally migrating raptors are consistent with other projects in Maine. Nocturnal migrant passage rates are on the higher end, but within range of other studies in Maine and documented mean flight heights are well above the proposed turbine height. The nearest active bald eagle nest was identified 3.2 miles from the nearest proposed turbine.</p> <p>Although correlations between preconstruction survey results and post construction risk have not been found at any project in Maine, or the northeast, post construction bird fatality data in Maine overall is low and collectively has not been found to cause population level effects on any bird species. No take of any threatened or endangered bird species has been observed in Maine and bird fatalities are largely common species in the State. Bird fatality data from nearby operational projects (Bull Hill and Hancock) do not appear to be greater than operational projects in other parts of the state and similar impacts are expected at Weaver.</p>
Bats	Detection rates consistent with other Maine sites. Turbine curtailment will occur during periods of increased risk of collision.

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Table 2-2. Summary of the Proposed Area and Occurrence of Proposed Impacts adjacent to or within Protected Natural Resources

Resource Type	Impact Type	Impact	Number of Occurrence
Direct Wetland Impact			
Non-Wetlands of Special Significance	Vegetation clearing for turbine transport. Additional clearing for one temporary laydown area, one guy wire installation, and the overhead collector line installation ¹	85,188 sq. feet (93,707)	24
Wetlands of Special Significance (WSS)	Vegetation clearing for turbine transport ¹	14,849 sq. feet (16,334)	8
Impacts to Significant Wildlife Habitat			
Significant Wildlife Habitat	Soil disturbances in existing roads within three IWWH areas.	NC ²	3
Activities Adjacent to Protect Natural Resources			
Streams	Soil disturbance associated with installation of underground collector line within existing gravel road, placement of overhead collector line poles, and placement of rip-rap outside of protected natural resources, located within 75 feet of a river, stream, or brook.	NC ²	11
	Vegetation cutting to the edge of the stream.	358 linear feet	7
WSS	Soil disturbance associated with installation of underground collector line within existing gravel road, placement of overhead collector line poles, turbine pad grading, met tower laydown area grading, and placement of timber crane mats located within 75 feet of a WSS (not associated with a stream).	NC ²	0
¹ For direct wetland impacts, the Applicant has applied an additional 10% for vegetation cutting that may occur in tree line to account for vegetation regrowth that may occur between the time survey plans are developed to the time the project is constructed. This total is shown in parentheses. ² NC = Not calculated due to variability in impacts caused by the installation of the underground collector. In most cases, a surficial area disturbance of four to ten square feet per linear foot of collector line is expected.			

2.1.1 Direct Impacts to Wetlands

Proposed wetland alterations include one-time cutting of vegetation within 32 wetlands to facilitate the transportation of turbine components and construction of overhead electrical lines. In general, vegetation will be cut one to two feet from the ground surface, and low growing herbaceous plants less than one foot tall will remain uncut. The collector has several locations where the existing road narrows through sensitive resource areas; the electrical design goes above ground in some of these areas. Experience during construction of the Bull Hill and Hancock projects demonstrated that the substrate under these log roads through wetlands is stumps and muck, resulting in unstable trenches and installation that destabilizes the roadway. Above ground construction in these areas avoids that disturbance and potential for discharge.

Temporary and permanent wetland alterations are summarized in Table 2-3. The locations of wetland vegetation cutting proposed for the project are shown on the civil and electrical design plans (Application Attachments 5 and 6) It

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should be noted that there is no direct filling, bulldozing, or removing/displacing soil, sands, or other materials proposed within wetlands.

Table 2-3. Summary of Wetlands with Proposed Vegetation Clearing

Wetland Id	WOSS	Wetland Type ¹	Area of Clearing (Square Feet)	Attachment/Sheet Number
W279	No	PFO	606	Attachment 5, Sheet 20
W276	No	PFO	3,672	Attachment 5, Sheets 20 and 21
W277	No	PFO	451	Attachment 5, Sheets 20 and 21
W278	No	PFO	1,171	Attachment 5, Sheets 20 and 21
W110	Yes	PSS	936	Attachment 5, Sheet 35
W164	Yes	PFO	2,185	Attachment 5, Sheet 36
W166	Yes	PFO	494	Attachment 5, Sheet 36
W167	Yes	PFO, PSS, PEM	6,796	Attachment 5, Sheet 36
W172	No	PFO	313	Attachment 6, Sheet W-E 109
W174	No	PFO, PEM	497	Attachment 5, Sheet 37
W175	Yes	PFO, PEM	350	Attachment 5, Sheet 37
W186	No	PFO, PEM	44	Attachment 5, Sheet 40
W189	Yes	PFO, PSS	90	Attachment 5, Sheet 40
W211	No	PSS	16	Attachment 5, Sheet 27
W224	No	PFO, PSS	2,056	Attachment 5, Sheet 28
W232	No	PFO, PSS, PEM	1,853	Attachment 5, Sheet 30
W231	No	PFO, PSS, PEM	5,210	Attachment 5, Sheet 30
W229	No	PFO, PSS, PEM	124	Attachment 5, Sheet 30
W242	Yes	PFO, PSS, PEM	615	Attachment 5, Sheet 31
W244	No	PFO, PSS, PEM	9,070	Attachment 5, Sheet 31
W005	No	PFO	14,105	Attachment 6, Sheet W-E 119

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Wetland Id	WOSS	Wetland Type ¹	Area of Clearing (Square Feet)	Attachment/Sheet Number
W011	No	PFO, PSS	78	Attachment 6, Sheet W-E 120
W021	Yes	PFO	3,383	Attachment 6, Sheet W-E 121
W020	No	PFO	480	Attachment 6, Sheet W-E 121
W024	No	PFO, PEM	257	Attachment 6, Sheet W-E 121
W271	No	PFO	1,119	Attachment 6, Sheet W-E 102
W270	No	PFO	1,366	Attachment 6, Sheet W-E 102
W273	No	PFO	1,955	Attachment 6, Sheet W-E 102
W272	No	PFO	1,334	Attachment 6, Sheet W-E 102
W268	No	PFO	4,049	Attachment 6, Sheet W-E 102
W267	No	PFO	5,232	Attachment 6, Sheet W-E 102
W269	No	PFO	30,130	Attachment 6, Sheet W-E 102
Subtotal			100,037	
Total +10% for potential vegetation regrowth during development			10,001	
Total			110,038	

¹Wetland type based on Cowardin Classification System (Cowardin et al. 1979)

PFO – Palustrine (Freshwater) Forested Wetland

PSS – Palustrine Scrub-Shrub Wetland

PEM – Palustrine Emergent Wetland

2.1.2 Impacts to Significant Wildlife Habitat

There are no impacts to Significant Wildlife Habitat. No clearing or soil disturbance will occur within the CTH of the two SVPs identified adjacent to the project area (SVP_53KN_N and SVP_63KN_N). Soil disturbance associated with the underground collector line will occur in three locations where Spectacle Pond Road goes through IWWHs (UMO-10168, UMO-13356, and UMO-12420). Soil disturbance will be limited to trenching within the existing gravel road, with no expansion in to the IWWHs.

2.1.3 Activities Adjacent to Protect Natural Resources

Activities adjacent to protected natural resources are regulated under the NRPA. The project proposes the following activities adjacent to protected resources:

- Soil disturbance within 75 feet of 8 WSS;

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- Soil disturbance within 75 feet of 11 streams; and
- Vegetation cutting within 25 feet of streams in 7 locations

The soil disturbances listed above will all occur within existing gravel roads and are associated with the installation of the underground collector line system. Vegetation cutting within 25 feet of streams is proposed to allow passage of turbine components on existing roadways. These will be one-time cuts that will be completed as an initial step of project construction. Once turbine components are transported to the site, there will be no need for additional cutting. The locations of vegetation cutting along the edge of streams are shown on the Civil Design Plans (Attachment 5).

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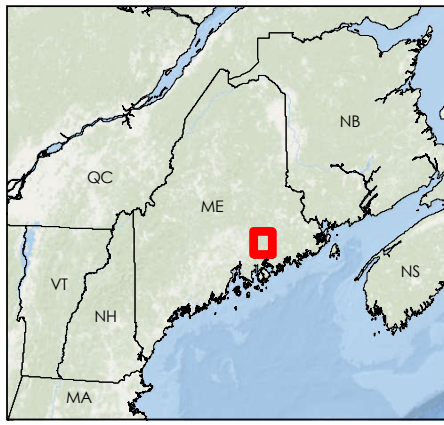
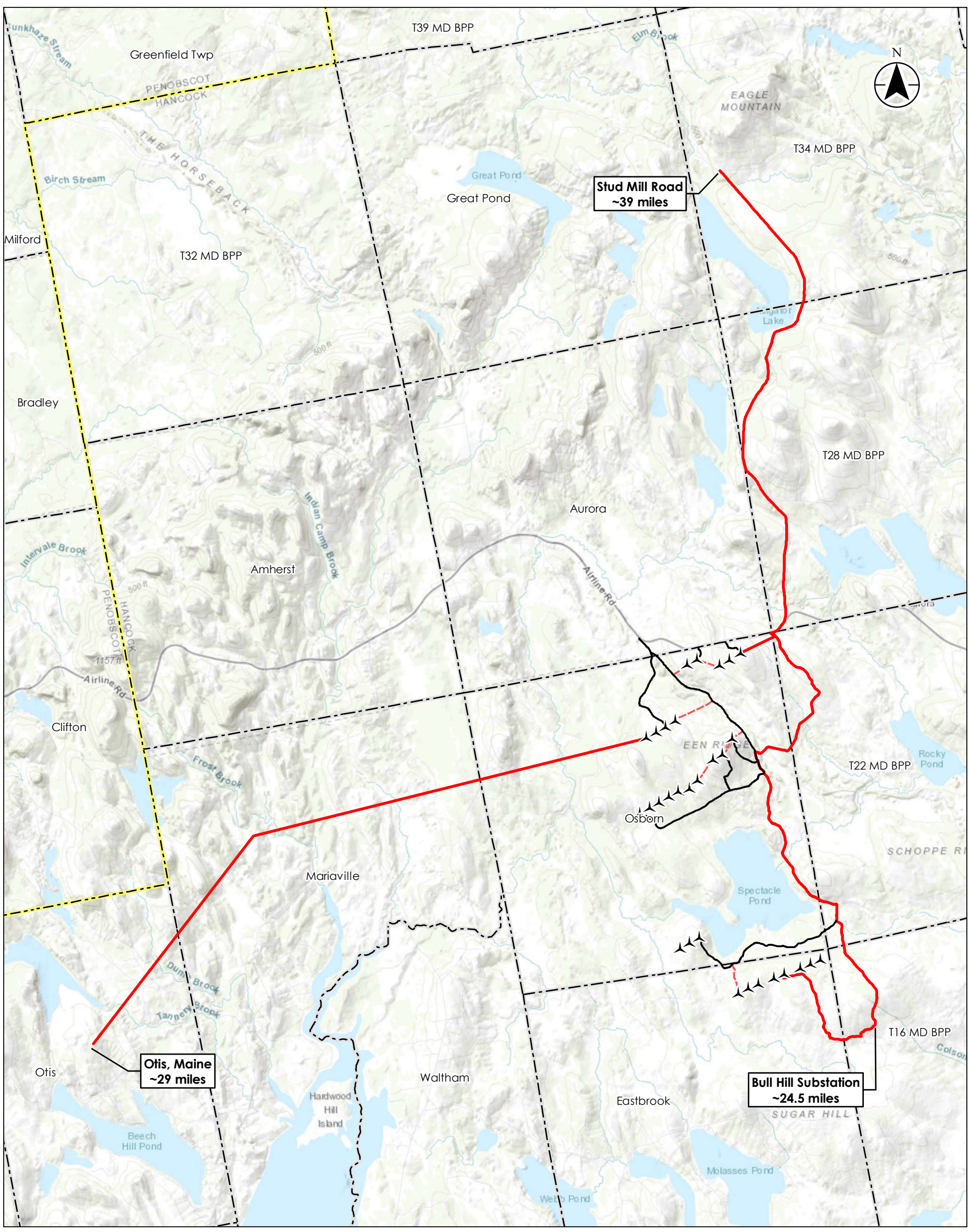
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FIGURE 2-1

Preliminary Layout

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- Legend**
- Proposed Turbines
 - Proposed Collector
 - Proposed Generator Lead
 - Access Roads
 - County Boundary
 - Town Boundary

0 2 Miles
1:126,720 (At Original document size of 11x17)



Project Location: Hancock County, Maine
195601223
Prepared by GAC on 2018-09-13
Reviewed by BRB on 2018-09-19

Client/Project: Weaver Wind Project
Longroad Energy Partners LLC

Figure No. **2-1**

**Weaver Wind Project
Preliminary Layout**

- Notes**
1. Coordinate System: NAD 1983 UTM Zone 19N
 2. Base map: ESRI World Topographic Map

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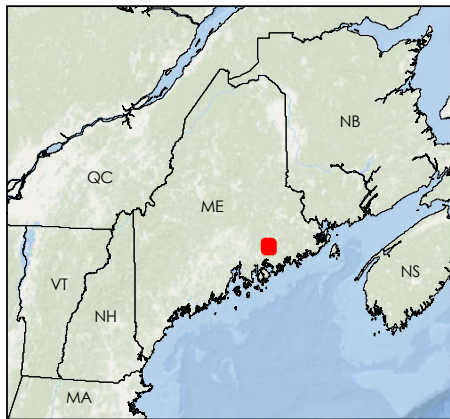
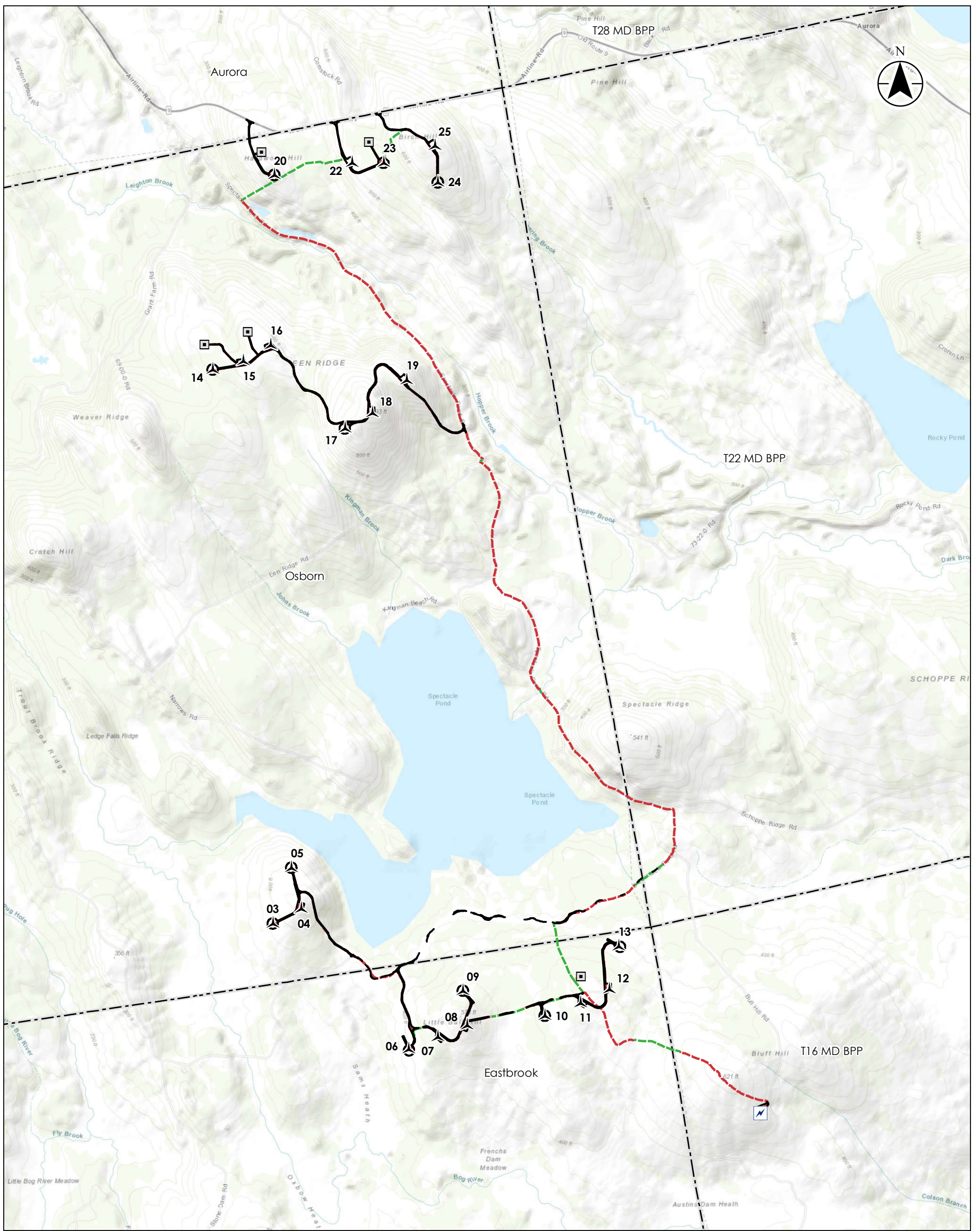
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FIGURE 2-2

Final Layout



- Legend**
- Turbine Layout
 - MET Tower
 - Substation
 - Overhead Collector
 - Underground Collector
 - Access Road

- Notes**
1. Coordinate System: NAD 1983 UTM Zone 19N FT
 2. Base map: ESRI World Topographic Map

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0 4,000 Feet
1:48,000 (At Original document size of 11x17)



Project Location
Hancock County, Maine

195601223
Prepared by GAC on 2018-08-14
Reviewed by BRB on 2018-08-14

Client/Project
Weaver Wind Project
Longroad Energy Partners LLC

Figure No.
2-2

Title
**Weaver Wind Project
Final Project Layout**