Section 19. Flooding

SECTION 19. FLOODING

19.1 POTENTIAL FLOODING IMPACT

The Number Nine Wind Farm (Project) includes 8 areas that intersect with areas mapped as either a Federal Emergency Management Agency (FEMA) floodplain or Special Flood Hazard Area (SFHA). The Project includes 6 areas that intersect with Flood Prone Area Protection Subdistricts mapped by the Land Use Planning Commission (LUPC). No improvements to access roads or other permanent features will be located within mapped FEMA floodplains or SFHAs.

As described in detail below, electrical poles are the only permanent structures to be constructed within mapped floodplains. These structures have very small footprints and will not consume flood storage capacity. Therefore, the Project is not expected to cause or increase flooding, or cause a flood hazard to any existing structure. Furthermore, these structures will not have an unreasonable effect on runoff infiltration relationships in accordance with the "No Adverse Effect Standard" of the Site Location of Development Law.

Forest cover in some floodplain areas will be cleared along the Project, resulting in some conversion of forested areas to scrub-shrub or early successional cover, as discussed in Section 10, Buffers, and Exhibit 10-A. Generally, this conversion to dense shrub and grass growth will improve the ability of the land to absorb runoff due to the increased density of the root mass associated with the resultant vegetative cover.

As discussed in Section 12, Stormwater Management, construction of the Project will not change the hydrology in the vicinity of the Project. The surface area to be occupied by the new structures is inconsequential and thus, there will not be an unreasonable effect on runoff infiltration relationships. The Project will be designed, constructed, and maintained such that the flooding extent and frequency of flooding of downstream waterbodies will not be increased and the 100-year flood elevations will not be adversely affected.

19.1.1 Flood Mapping Sources

Two mapping sources were reviewed for the Project, including Q3 Flood Data developed by FEMA and Land Use Planning Commission zoning maps.

Q3 Flood Data are developed by FEMA by scanning the existing hardcopy Federal Insurance Rate Maps (FIRMs), published by FEMA at a scale of 1:24000, and vectorizing a thematic overlay of flood risks. Q3 Flood Data files contain certain key features (e.g., areas inundated by 100-year

Section 19. Flooding

flooding for which base flood elevations have been determined) from the existing hard copy FIRMs.

Within LUPC jurisdiction, zoning maps identify Flood Prone Zones as LUPC Flood Prone Area Protection Subdistricts.

Exhibits 19-1 thru 19-3 provide overlays of the Turbine Area with available Q3 Flood Data and LUPC Flood Prone Zones to illustrate where the Project crosses mapped flood zone areas. There are no Q3 Flood Zones within the Turbine Area.

19.2 TURBINE AREA

The Turbine Area does not intersect any areas mapped by FEMA. The Turbine Area includes 4 areas that intersect an LUPC Flood Prone Area Protection Subdistrict.

In T10 R3, 170 feet of an existing road will be improved within portions of the flood prone area associated with Burnt Land Brook (Figure 19-1A).

In TD R2, the overhead electrical collection line will cross a flood prone area associated with Number Nine Stream. The line is located adjacent to an existing road which will not be improved; two poles will be located within the flood prone area (Figure 19-1B).

In T9 R3, the overhead electrical collection line will cross a flood prone area associated with Hovey Brook. The line is located adjacent to an existing road which will be improved up to to 24 feet. Four poles and 390 feet of the improved road will be located within the flood prone area (Figure 19-1C).

In T8 R3, the overhead electrical collection line will cross a flood prone area associated with the East Branch of Howe Brook. The line is located adjacent to an existing road which will not be improved; four poles will be located within the flood prone area (Figure 19-1D).

19.3 NORTH GENERATOR LEAD

The North Generator Lead intersects 1 LUPC Flood Prone Area Protection Subdistrict.

In T8 R3, an access road to the North Generator Lead will cross 256 feet of a flood prone area associated with the North Branch of the Meduxnekeag River (Figure 19-2A).

The North Generator Lead includes 1 area that intersects with areas mapped by FEMA.

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In Houlton, the Generator Lead crosses 1 area associated with B Stream that is mapped as Zone A¹ and Zone X² by FEMA. This area, located directly north of Ludlow Road includes one pole within this zone (Exhibit 19-2B).

19.4 BRIDAL PATH GENERATOR LEAD

The Bridal Path Generator Lead includes 7 areas that intersect with areas mapped by FEMA.

In Houlton, the Generator Lead crosses 1 area associated with B Stream that is mapped as Zone A and Zone X by FEMA. This area, located directly south of Ludlow Road, includes one pole within this zone (Exhibit 19-3A).

In Houlton, the Generator Lead crosses 1 area associated with the Meduxnekeag River that is mapped as Zone A and Zone X by FEMA. This area, located west of Porter Settlement Road, does not include any poles or other permanent structures within this zone (Exhibit 19-3B).

In Hodgdon, the Generator Lead crosses 1 area associated with Oliver Brook that is mapped as Zone A by FEMA. This area, located west of Bangor Street, includes 1 pole within this zone (Exhibit 19-3C).

In Linneus, the Generator Lead crosses 1 area, associated with an unnamed stream that flows into Beaver Brook Lake, that is mapped as Zone A by FEMA. This area, located west of Bangor Street, includes 1 pole within this zone (Exhibit 19-3D).

In Haynesville, the Generator Lead crosses 3 areas that are mapped as Zone A by FEMA. The first area, near the northern border of Haynesville, includes 2 poles within this zone (Exhibit 19-3F). The second area, associated with the West Branch of the Mattawamkeag River, includes 1 pole within this zone (Exhibit 19-3G). The third area, associated with Alder Brook, includes 2 poles within this zone (Exhibit 19-3H).

The Bridal Path Generator Lead includes 1 area that interects an LUPC Flood Prone Area Protection Subdistrict.

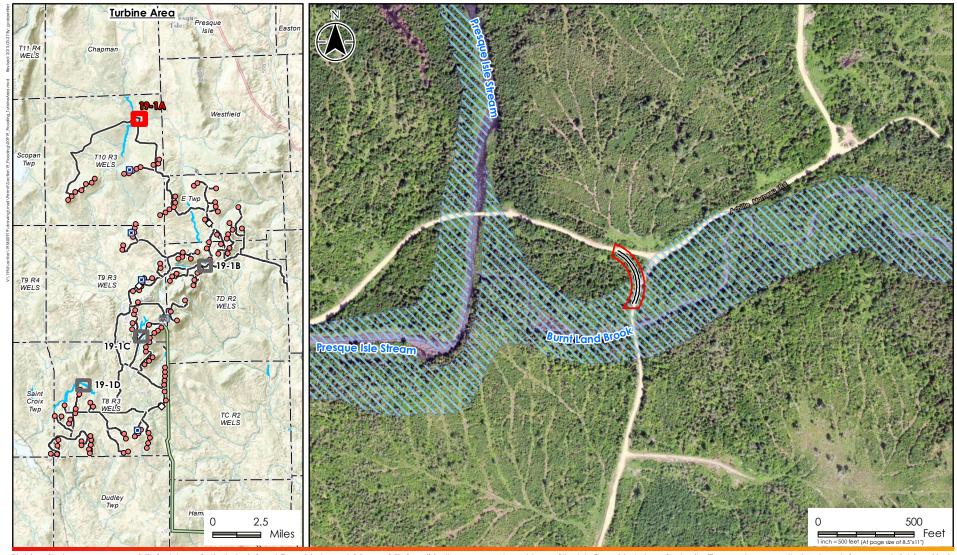
In Forkstown Township, the Line intersects a flood prone area associated with the East Branch of the Mattawamkeag River. No poles will be located within this area (Figure 19-3E).

¹ **FEMA Zone A:** Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones. **FEMA Zone C** is the equivalent of Zone X (unshaded) on new and revised FEMA maps.

² **FEMA Zone X:** Area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods. Area also used to designate base floodplains of lesser hazards, such as areas protected by levees from 100-year flood, or shallow flooding areas with average depths of less than one foot or drainage areas less than 1 square mile.

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EXHIBIT 19-A TURBINE AREA FLOOD MAPS



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Prepared by EMK on 2015-02-26 Reviewed by JYP on 2015-03-26

<u>Legend</u>

— Access Road Edge of Gravel (20150317)

LUPC Flood Prone Area Protection Subdistrict

Limit of Disturbance (20150226)

Aerial Photography: ESRI World Imagery Web Mapping Service (June 2011). Notes:

1. LUPC Flood Prone Area Protection Subdistrict data provided by Maine Office of GIS (MEGIS).

2. FEMA 100 Year Flood Zones digitized from the Maine Flood Insurance Rate Maps obtained from the FEMA Map Service Center and should be considered approximate.

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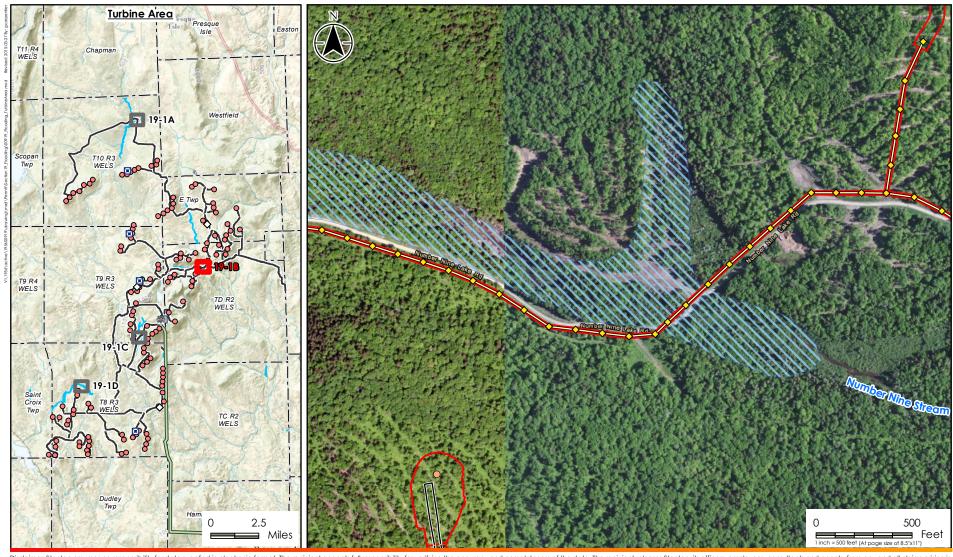
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19-1A

Title

Turbine Area Flood Prone Areas



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Prepared by EMK on 2015-02-26 Reviewed by JYP on 2015-03-26

<u>Legend</u>

- Turbines (20150316)
- ♦ Collector Poles (20150316)
- Overhead Collector (20150316)

Access Road Edge of Gravel (20150317)

LUPC Flood Prone Area Protection Subdistrict

Limit of Disturbance (20150226)

Aerial Photography: ESRI World Imagery Web Mapping Service (June 2011).

1. LUPC Flood Prone Area Protection Subdistrict data provided by Maine Office of GIS (MEGIS).

2. FEMA 100 Year Flood Zones digitized from the Maine Flood Insurance Rate Maps obtained from the FEMA Map Service Center and should be considered approximate.

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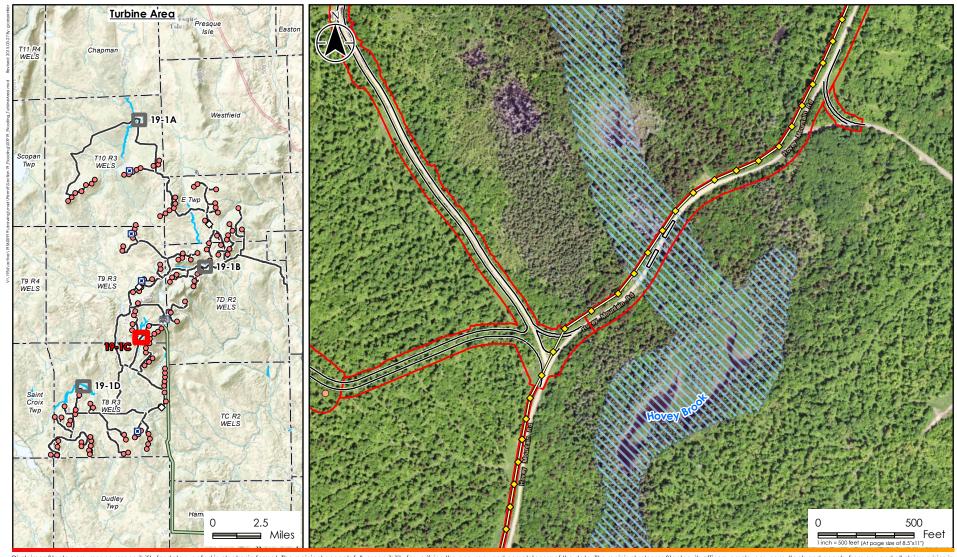
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Title

Turbine Area Flood Prone Areas



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<u>Legend</u>

- Turbines (20150316)
- ♦ Collector Poles (20150316)
- Overhead Collector (20150316)

Access Road Edge of Gravel (20150317)

LUPC Flood Prone Area Protection Subdistrict

Limit of Disturbance (20150226)

Aerial Photography: ESRI World Imagery Web Mapping Service (June 2011). **Notes:**

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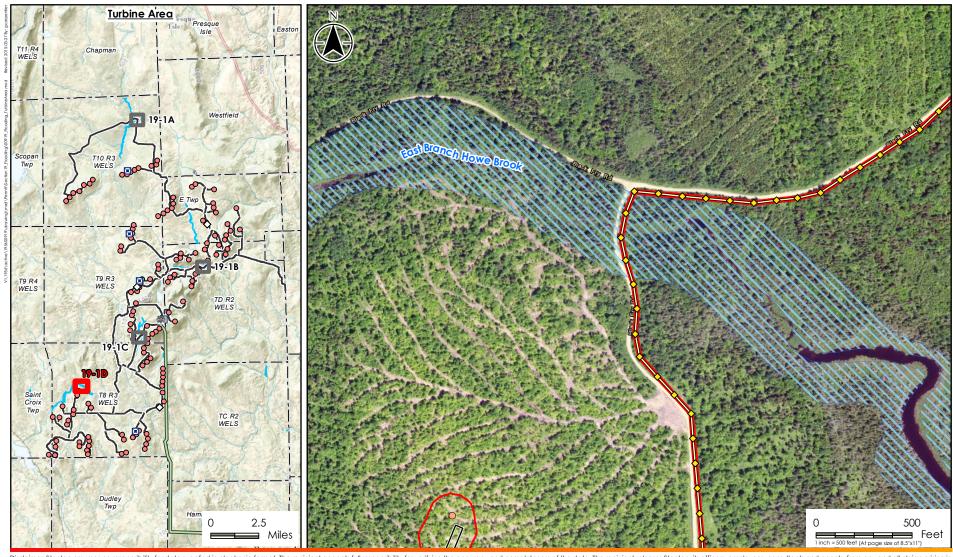
Figure No.

19-1C

Title

Turbine Area Flood Prone Areas

 $00919_Flooding_TurbineArea.mxd$



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Prepared by EMK on 2015-02-26 Reviewed by JYP on 2015-03-26

<u>Legend</u>

- Turbines (20150316)
- ♦ Collector Poles (20150316)
- Overhead Collector (20150316)

Access Road Edge of Gravel (20150317)

LUPC Flood Prone Area Protection Subdistrict

Limit of Disturbance (20150226)

Aerial Photography: ESRI World Imagery Web Mapping Service (June 2011). **Notes:**

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Figure No.

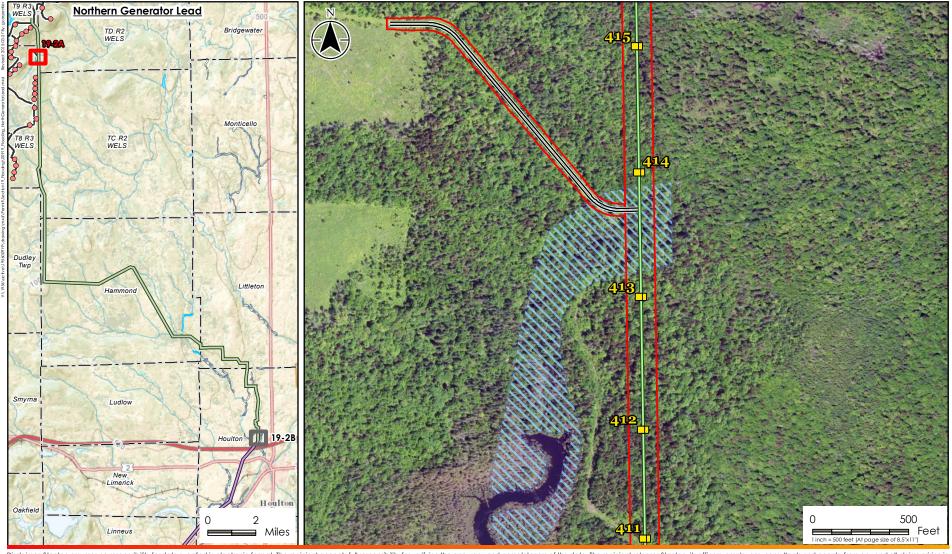
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Turbine Area Flood Prone Areas

Section 19. Flooding

EXHIBIT 19-B NORTH GENERATOR LEAD FLOOD MAPS



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Prepared by EMK on 2015-02-26 Reviewed by JYP on 2015-02-00

<u>Legend</u>

- ☐ Generator Lead Poles (20150320)
- North Generator Lead (20150316)
- Access Road Edge of Gravel (20150317)
- LUPC Flood Prone Area Protection Subdistrict
- Limit of Disturbance (20150226)

Aerial Photography: ESRI World Imagery Web Mapping Service (June 2011). **Notes:**

1. LUPC Flood Prone Area Protection Subdistrict data provided by Maine Office of GIS (MEGIS).

2. FEMA 100 Year Flood Zones digitized from the Maine Flood Insurance Rate Maps obtained from the FEMA Map Service Center and should be considered approximate.

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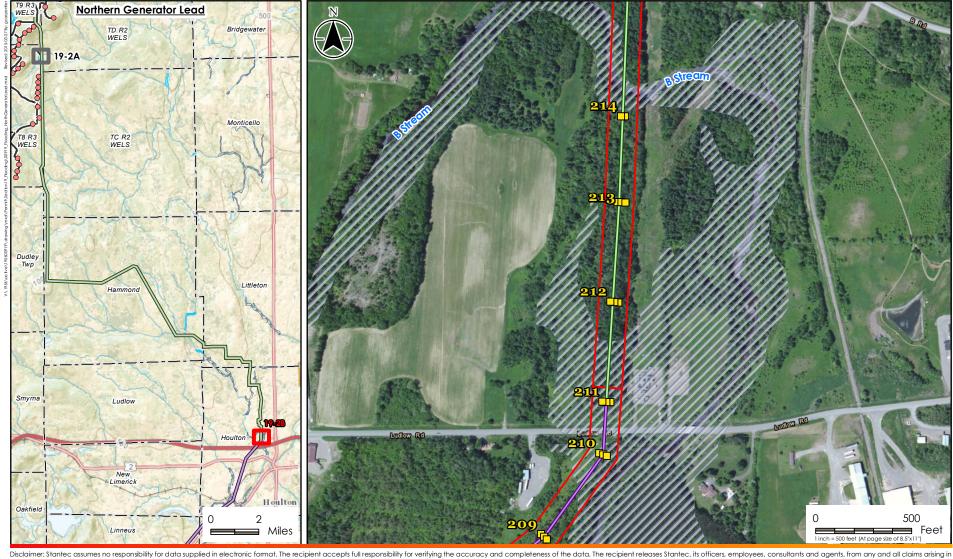
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Figure No.

19-2A

Title

North Generator Lead Flood Prone Areas



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Prepared by EMK on 2015-02-26 Reviewed by JYP on 2015-02-00

Legend

- ☐ Generator Lead Poles (20150320)
- North Generator Lead (20150316)
- Bridal Path (20150316)
- FEMA 100 Year Flood Zone (Digitzed)
- Limit of Disturbance (20150226)

Aerial Photography: ESRI World Imagery Web Mapping Service (June 2011). **Notes:**

1. LUPC Flood Prone Area Protection Subdistrict data provided by Maine Office of GIS (MEGIS).

 FEMA 100 Year Flood Zones digitized from the Maine Flood Insurance Rate Maps obtained from the FEMA Map Service Center and should be considered approximate.

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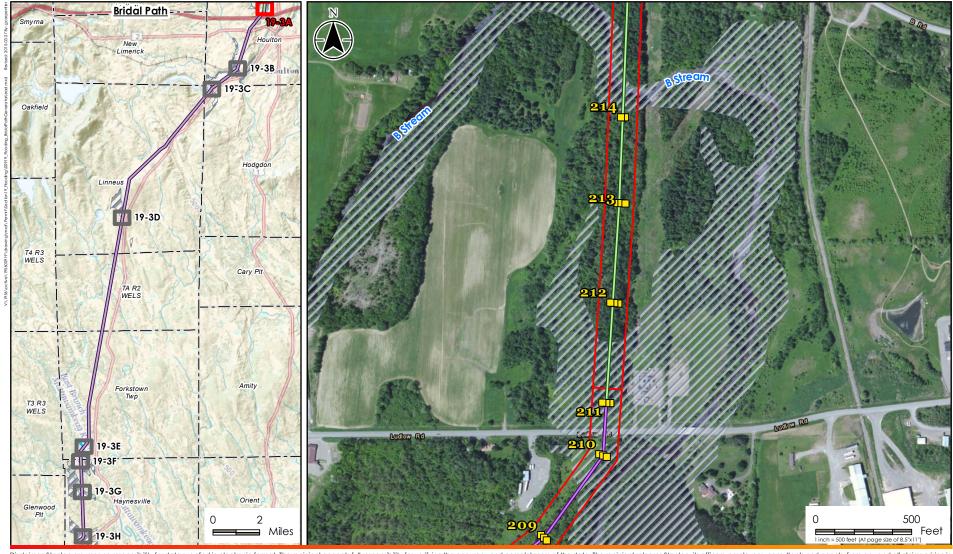
19-2B

Title

North Generator Lead Flood Prone Areas

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EXHIBIT 19-C BRIDAL PATH GENERATOR LEAD FLOOD MAPS



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<u>Legend</u>

☐ Generator Lead Poles (20150320)

— North Generator Lead (20150316)

Bridal Path (20150316)

FEMA 100 Year Flood Zone (Digitzed)

Limit of Disturbance (20150226)

Aerial Photography: ESRI World Imagery Web Mapping Service (June 2011). **Notes:**

1. LUPC Flood Prone Area Protection Subdistrict data provided by Maine Office of GIS (MEGIS).

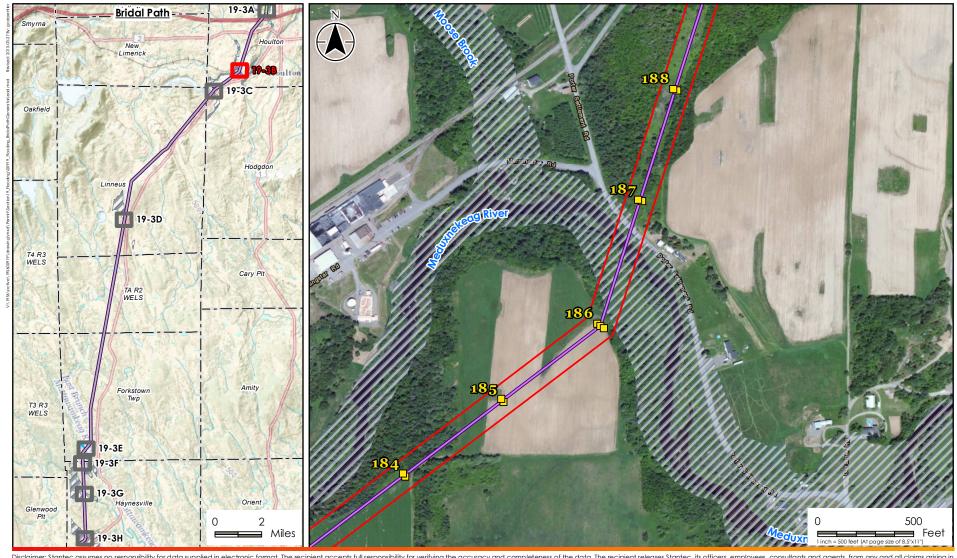
2. FEMA 100 Year Flood Zones digitized from the Maine Flood Insurance Rate Maps obtained from the FEMA Map Service Center and should be considered approximate.

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Figure No.

19-3A



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Legend

Generator Lead Poles (20150320)Bridal Path (20150316)

FEMA 100 Year Flood Zone (Digitzed)

Limit of Disturbance (20150226)

Aerial Photography: ESRI World Imagery Web Mapping Service (June 2011). **Notes:**

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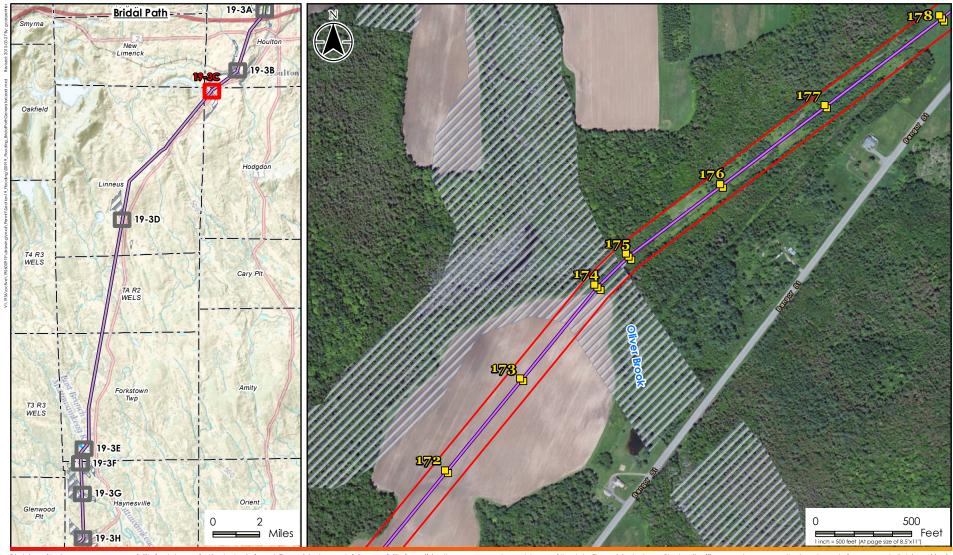
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Figure No.

19-3B

Title Brida



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Legend

Generator Lead Poles (20150320)Bridal Path (20150316)

FEMA 100 Year Flood Zone (Digitzed)

Limit of Disturbance (20150226)

Aerial Photography: ESRI World Imagery Web Mapping Service (June 2011). **Notes:**

1. LUPC Flood Prone Area Protection Subdistrict data provided by Maine Office of GIS (MEGIS).

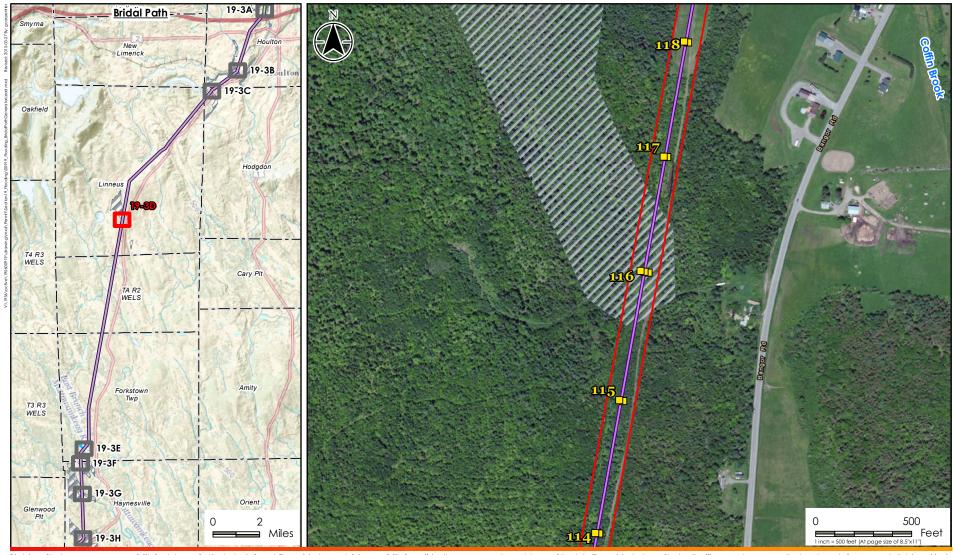
2. FEMA 100 Year Flood Zones digitized from the Maine Flood Insurance Rate Maps obtained from the FEMA Map Service Center and should be considered approximate.

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Figure No.

19-3C



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Legend

Generator Lead Poles (20150320)Bridal Path (20150316)

FEMA 100 Year Flood Zone (Digitzed)

Limit of Disturbance (20150226)

Aerial Photography: ESRI World Imagery Web Mapping Service (June 2011). **Notes:**

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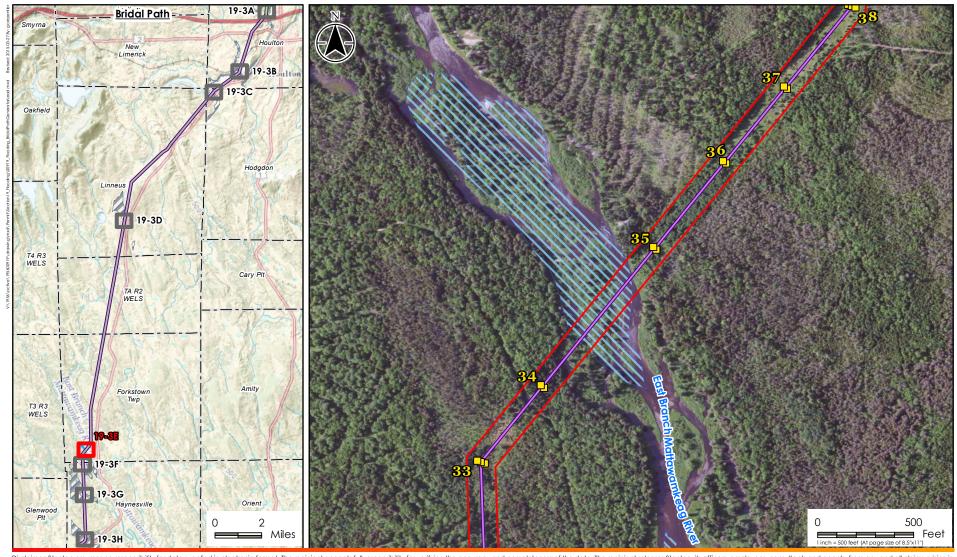
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Figure No.

19-3D

Title



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Prepared by EMK on 2015-02-25 Reviewed by JYP on 2015-03-26

<u>Legend</u>

☐ Generator Lead Poles (20150320) Bridal Path (20150316)

Limit of Disturbance (20150226)

Aerial Photography: ESRI World Imagery Web Mapping Service (June 2011).

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LUPC Flood Prone Area Protection Subdi: 2. FEMA 100 Year Flood Zones digitized from the Maine Flood Insurance Rate Maps obtained from the FEMA Map Service Center and should be considered approximate.

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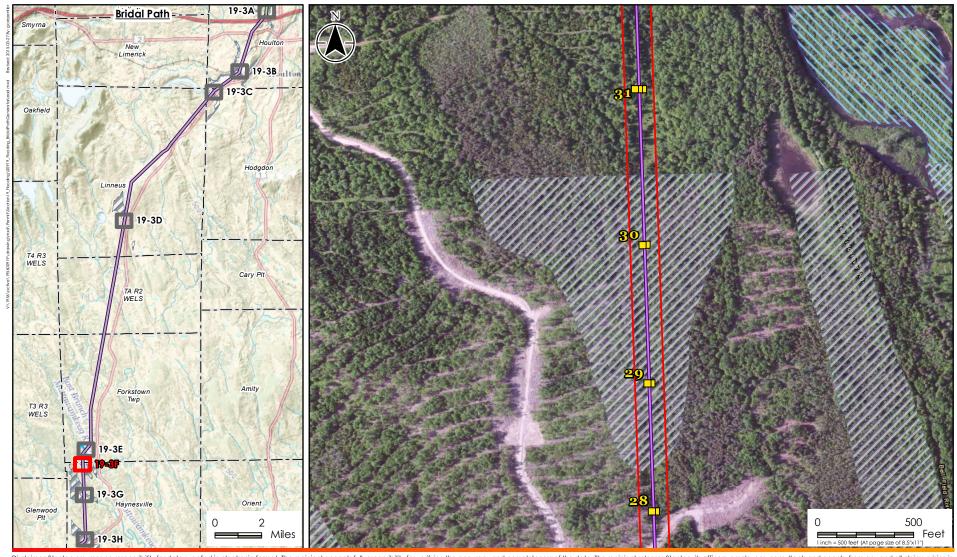
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Figure No.

19-3E

Title



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Prepared by EMK on 2015-02-25 Reviewed by JYP on 2015-03-26

<u>Legend</u>

☐ Generator Lead Poles (20150320) Bridal Path (20150316)

FEMA 100 Year Flood Zone (Digitzed)

Limit of Disturbance (20150226)

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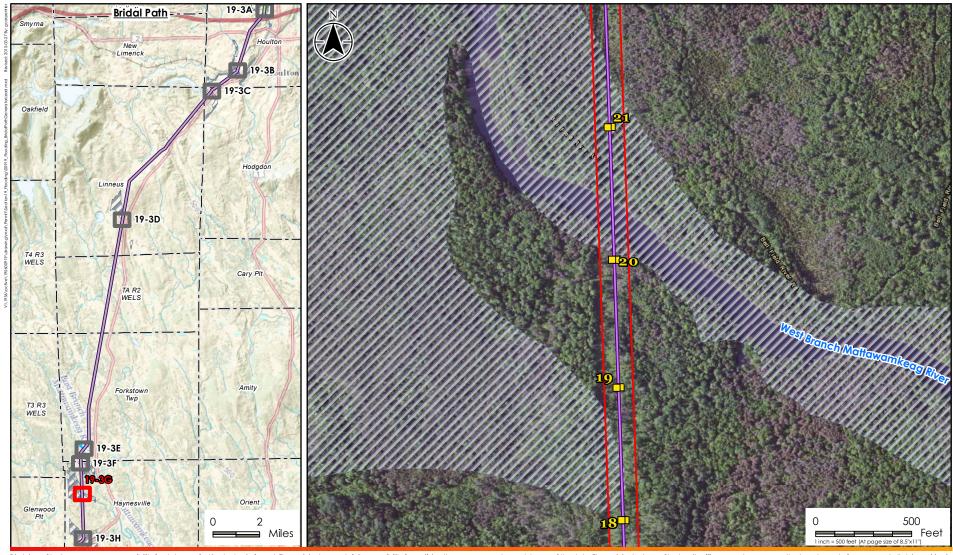
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Figure No.

19-3F

Title



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Legend

Generator Lead Poles (20150320)Bridal Path (20150316)

FEMA 100 Year Flood Zone (Digitzed)

Limit of Disturbance (20150226)

Aerial Photography: ESRI World Imagery Web Mapping Service (June 2011). **Notes:**

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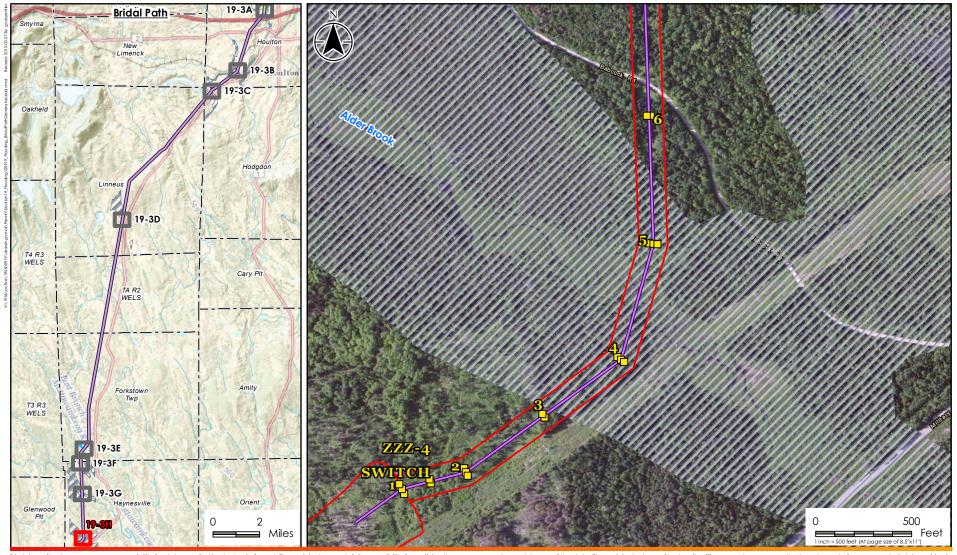
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Figure No.

19-3G

Title



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Prepared by EMK on 2015-02-25 Reviewed by JYP on 2015-03-26

<u>Legend</u>

☐ Generator Lead Poles (20150320) Bridal Path (20150316)

FEMA 100 Year Flood Zone (Digitzed)

Limit of Disturbance (20150226)

Aerial Photography: ESRI World Imagery Web Mapping Service (June 2011).

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EDP Renewables North America LLC Number Nine Wind Farm Aroostook County, Maine

Figure No. 19-3H