19.0 FLOODING

19.1 POTENTIAL FLOODING IMPACT

The Bingham Wind Project (project) is a proposed utility-scale wind energy facility located in Somerset and Piscataquis Counties, Maine. The project includes 62 wind turbines (63 potential turbine locations are being permitted), existing and new access roads and crane paths, up to 5 permanent and up to 5 temporary meteorological towers, an Operations and Maintenance building, 34.5-kilovolt electrical collector lines (the majority of which will be buried alongside project roads), a collector substation, and an approximately 17-mile electrical generator lead. It is anticipated that a dynamic reactive device, such as a synchronous condenser, will be required at the project collector substation to meet the interconnection requirements of ISO-NE and the Central Maine Power Company (CMP).

The Site Location of Development Law standard related to flooding states: "*The activity will not unreasonably cause or increase the flooding of the alteration area or adjacent properties nor create an unreasonable flood hazard to any structure*."

The project includes eight areas that intersect with areas mapped as either a Federal Emergency Management Agency (FEMA) floodplain or Special Flood Hazard Area. As shown in Figures 19-1 through 19-4, a project access road in Moscow crosses the mapped flood zone associated with Gulf Stream. There are no proposed improvements to this section of access road. The generator lead crosses mapped flood zones associated with Carlton Stream, Gales Brook, Kingsbury Stream, and the Piscataquis River.

As described in detail below, poles and gravel fill associated with two access roads are the only permanent structures to be constructed within any mapped floodplains. The pole structures have very small footprints and will not consume any flood storage capacity. One access road located within a mapped floodplain will utilize an existing woods road, and one access road within a mapped floodplain will be located adjacent to an existing woods road. 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 generator lead, resulting in some conversion of forested areas to scrub-shrub or early successional cover. 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 Stormwater Management (Section 12), the construction of the generator lead will not change the hydrology of the project area. The surface area to be occupied by the new pole 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.

19.2 FEDERAL EMERGENCY MANAGEMENT AGENCY MAPPING

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

Figures 19-1 through 19-4 provide overlays of the proposed turbine locations and generator lead with available Q3 Flood Data to illustrate where the project crosses mapped flood zone areas.

Flood zones within the project area in Moscow and Parkman are mapped as Zone A,[1] 100-year floodplain by the FEMA FIRM. Flood zones within the project area in Abbot are mapped as Zone X,[2] between 100- and 500-year floodplain by FEMA. According to FEMA, Mayfield Township and Kingsbury Plantation are mapped as "No Special Flood Hazard Area – All Zone C."[3]

Table 19-1 provides a listing of the areas with mapped flood zones crossed by the proposed generator lead, the approximate crossing widths, and structures that would be located in the mapped flood zone.

[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.

[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.

[3] Federal Emergency Management Agency. Community Status Book Report, Maine. [Online] URL: http://www.fema.gov/cis/ME.pdf (Accessed March 1, 2013).

Table 19-1. Impacted Mapped Flood Zone

Stream/Wetland	Town	Type of Impact	Approximate Crossing Length (feet)	Amount of Clearing (acres)	Amount of Fill (square feet)	Structures within Mapped Flood Zone (structure no.)	Figure Number
Gulf Stream	Moscow	Access Road	4.5' across stream, utilizing existing bridge 168' across flood zone	0	0	0	19-1
Carlton Stream	Parkman	Generator Lead and Access Road	37' across stream 487' across flood zone	1.03	3,518.28	1 utility poles (#103)	19-2
Unnamed tributary of Kingsbury Stream	Abbot	Generator Lead	4'6" across stream 220' across flood zone adjacent to existing road	0.08	0	0 utility poles	19-2
Unnamed tributary of Gales Brook	Abbot	Generator Lead	6' across stream 520' across flood zone adjacent to existing road, 553' across flood zone to the south of existing road	1.48	64	4 utility poles (#59, #60, #61, #61A)	19-3
Gales Brook	Parkman	Generator Lead and Access Road	6' across stream 965' across flood zone for Generator Lead, 1,185' across flood zone for Access Road	3.5	20,430	3 utility poles (#43, #44, #45)	19-3
Unnamed tributary of Gales Brook	Parkman	Generator Lead	11' across stream 595' across flood zone	1.38	16	1 utility pole (#39)	19-3
Unnamed tributary of the Piscataquis River	Parkman	Generator Lead	9' across stream 135' across flood zone	0.08	0	0 utility poles	19-4

Clearing within the flood zones for the generator lead and access roads will result in the conversion of approximately 8.27 acres of floodplain forest cover to scrub-shrub and early-successional types. This should not have any adverse effect on flooding and may have a small net positive hydrologic effect, as discussed above.

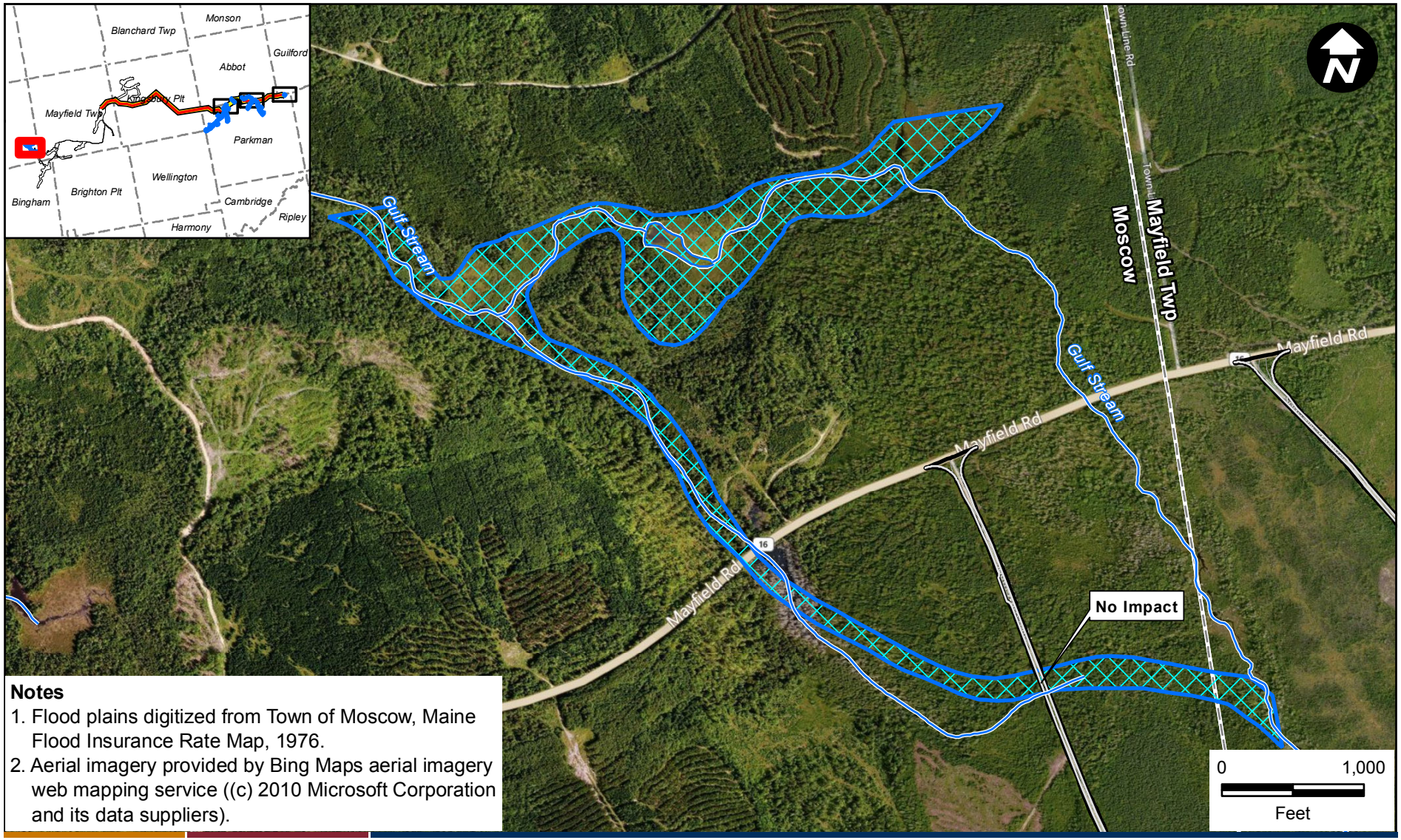
Due to the minimal permanent footprint associated with the poles and access roads, there will be no increase in the incidence of flooding as a result of the construction of this project. Neither the construction activities nor operation of the generator lead will cause the loss of flood water storage. Alteration of the existing topography and natural drainage-ways is not planned along the generator lead. The applicant or its agent will manage ground cover types in the right-of-way to promote growth of shrubs and grasses (see Section 10). Therefore, the project will not increase the potential for flooding.

19.3 LAND USE PLANNING COMMISSION FLOOD ZONE MAPPING

A review of the Land Use Planning Commission zoning maps for Kingsbury Plantation and Mayfield Townships identified that none of the project area crosses a FEMA mapped floodplain or is in a Flood Prone Area Protection Subdistrict (P-FP).

Figure 19-1

FEMA Flood Map 1



Notes

1. Flood plains digitized from Town of Moscow, Maine Flood Insurance Rate Map, 1976.
2. Aerial imagery provided by Bing Maps aerial imagery web mapping service ((c) 2010 Microsoft Corporation and its data suppliers).

195600539

Stantec Consulting Services Inc.
30 Park Drive
Topsham, ME USA
04086
Phone (207) 729-1199
Fax: (207) 729-2715
www.stantec.com

00539_19-1_FEMA_Flood.mxd

Legend

- 100 Year Flood Plain (Digitized)
- Edge of Gravel
- Grading
- USGS Stream
- Clearing Limits
- Town Boundary

Client/Project

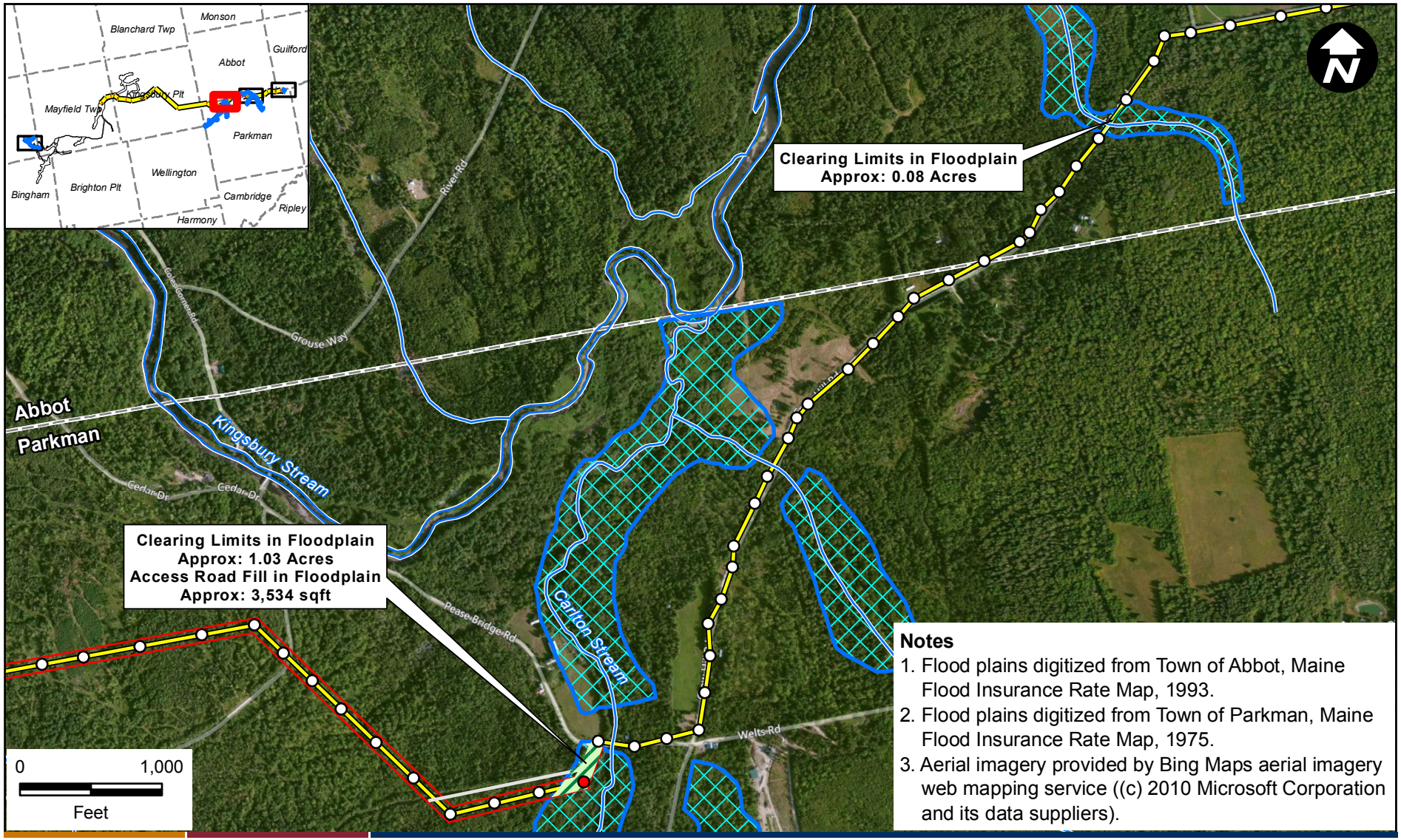
Bingham Wind Project

Figure No.
19-1

Title
FEMA Flood Map 1
4/1/2013

Figure 19-2

FEMA Flood Map 2



195600539

Stantec Consulting Services Inc.
30 Park Drive
Topsham, ME USA
04086
Phone (207) 729-1199
Fax: (207) 729-2715
www.stantec.com

00539_19-2_FEMA_Flood.mxd

Legend

- 100 Year Flood Plain (Digitized)
- Clearing Limit in Floodplain
- Clearing Limits
- Edge of Gravel
- Electrical Generator Lead
- Utility Pole in Floodplain
- Utility Pole
- USGS Stream
- Town Boundary

Client/Project

Bingham Wind Project

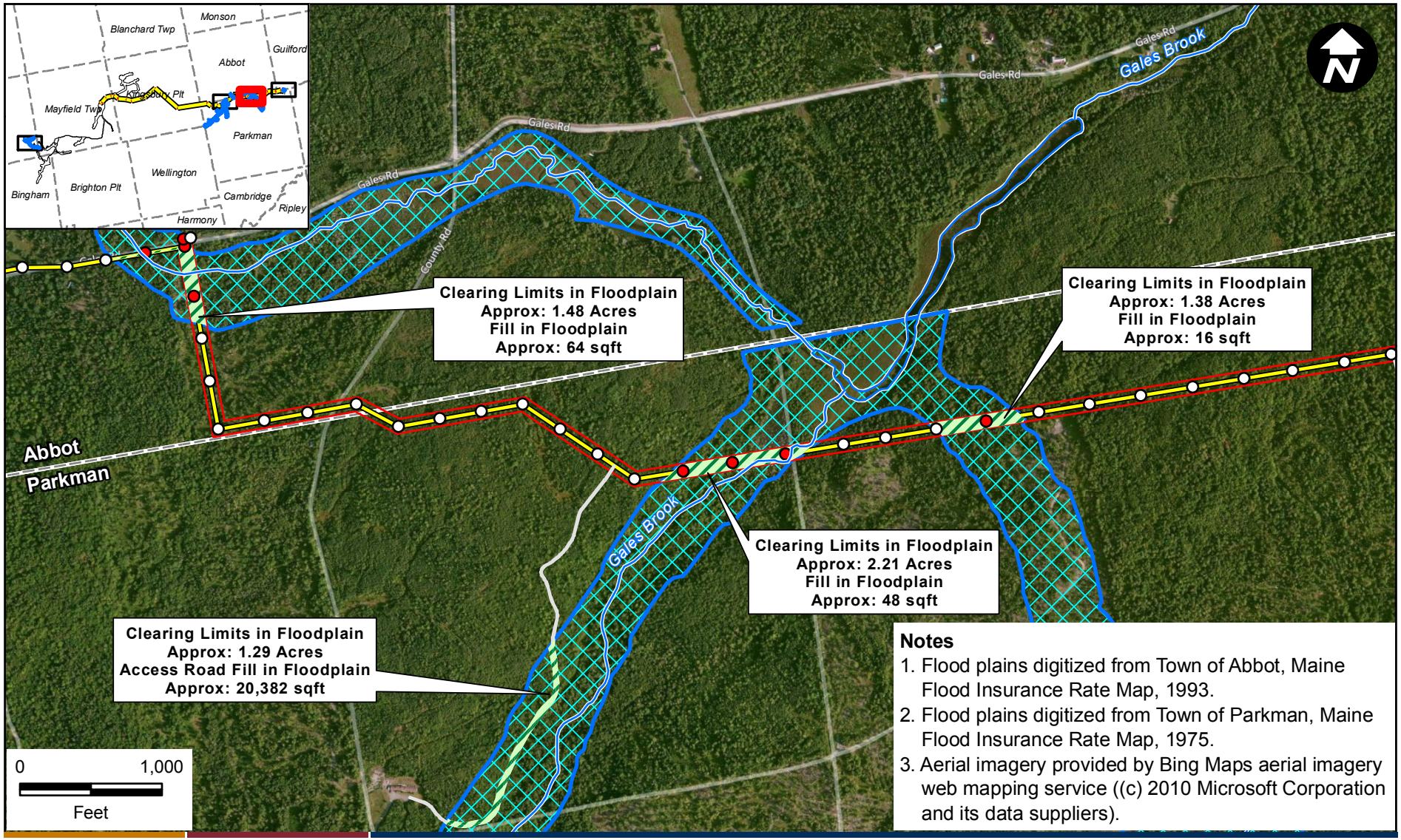
Figure No.
19-2

Title
FEMA Flood Map 2

4/1/2013

Figure 19-3

FEMA Flood Map 3



Notes

1. Flood plains digitized from Town of Abbot, Maine Flood Insurance Rate Map, 1993.
2. Flood plains digitized from Town of Parkman, Maine Flood Insurance Rate Map, 1975.
3. Aerial imagery provided by Bing Maps aerial imagery web mapping service ((c) 2010 Microsoft Corporation and its data suppliers).

195600539

Stantec Consulting Services Inc.
30 Park Drive
Topsham, ME USA
04086
Phone (207) 729-1199
Fax: (207) 729-2715
www.stantec.com

00539_19-3_FEMA_Flood.mxd

Legend

- 100 Year Flood Plain (Digitized)
- Clearing Limit in Floodplain
- Edge of Gravel
- Clearing Limits
- Electrical Generator Lead
- Utility Pole in Floodplain
- Utility Pole
- USGS Stream
- Town Boundary

Client/Project

Bingham Wind Project

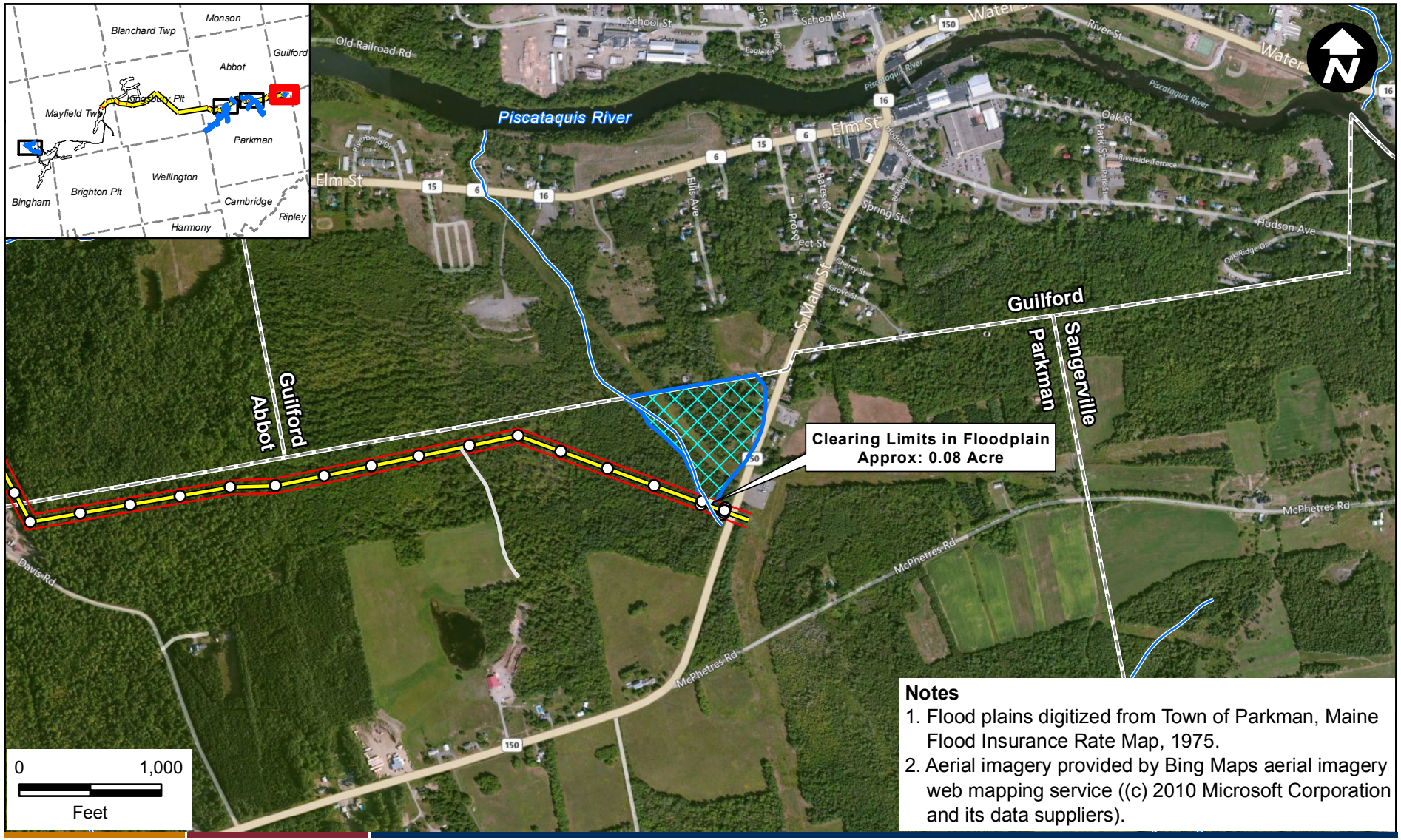
Figure No.
19-3

Title
FEMA Flood Map 3

4/1/2013

Figure 19-4

FEMA Flood Map 4



Notes

1. Flood plains digitized from Town of Parkman, Maine Flood Insurance Rate Map, 1975.
2. Aerial imagery provided by Bing Maps aerial imagery web mapping service ((c) 2010 Microsoft Corporation and its data suppliers).

195600539

Stantec Consulting Services Inc.
30 Park Drive
Topsham, ME USA
04086
Phone (207) 729-1199
Fax: (207) 729-2715
www.stantec.com

00539_19-4_FEMA_Flood.mxd

Legend

- 100 Year Flood Plain (Digitized)
- Clearing Limit in Floodplain
- Edge of Gravel
- Clearing Limits
- Electrical Generator Lead
- Utility Pole in Floodplain
- Utility Pole
- USGS Stream
- Town Boundary

Client/Project

Bingham Wind Project

Figure No.
19-4

Title
FEMA Flood Map 4
4/1/2013