SECTION 7 WETLANDS, WATERCOURSES, WILDLIFE AND FISHERIES

A. Introduction

Tetra Tech conducted natural resource and wildlife field surveys for the Project from 2019 through 2020 with some surveys continued into 2021. Throughout the Project development process, the Applicant has been in correspondence with MDEP and the Maine Department of Inland Fisheries and Wildlife (MDIFW). Members of the Project team met with agency representatives on December 10, 2019 and December 21, 2020 to discuss the scope and methodology for pre-construction wildlife studies and the Wildlife Study Plan (Exhibit 7-1 [Wildlife Study Plan]). The wildlife surveys performed for the Project were approved by MDIFW, and agency recommendations for survey methods were implemented. Correspondence with MDIFW also included email communications with Bob Stratton (Wildlife Biologist, Environmental Program Manager) regarding resource survey recommendations. Notably, MDIFW provided preliminary survey guidance on February 21, 2020, followed by specific survey recommendations on March 10, 2020. All agency communications received from MDIFW and other State agency staff, are provided in Exhibit 7-2 (Agency Correspondence). In addition, information was reviewed and incorporated into field surveys from publicly available information from Maine Beginning with Habitat[7] maps and the U.S. Fish and Wildlife Service (USFWS) Information, Planning, and Consultation (IPaC) System database.[8] Results of the USFWS IPaC database review are provided as Exhibit 7-3 (USFWS IPaC Database Review).

B. Wetlands

Wetlands and watercourses were delineated in accordance with the U.S. Army Corps of Engineers (USACE) *1987 Wetland Delineation Manual* (USACE 1987[9]), and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Regional Supplement Version 2* (USACE 2012[10]) (Regional Supplement); and in accordance with criteria in the NRPA Chapter 310, Wetlands and Waterbodies Protection Rules. Wetlands of Special Significance (WOSS), regulated under the NRPA 38 M.R.S. §§ 480-D, were evaluated in accordance with the criteria described in NRPA, Chapter 310, Section 4(A).

Tetra Tech conducted surveys for vernal pools, wetlands, and watercourses within an approximately 1,499-acre area that covered multiple conceptual Project layouts dating back to when a portion of the property was purchased in 2012. The study area has changed slightly over the course of Project planning to accommodate a changing Project design, turbine layout and interconnection options. The final Project layout includes an approximately 536-acre Study Area (Study Area) surrounding the proposed Project design as illustrated in Figure 7-1 (Final Project Study Area). The Study Area encompasses all areas associated with the proposed development design including roads, crane paths, turbine pads, O&M buildings and other appurtenant facilities.

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[7] Maine Department of Inland Fisheries and Wildlife (MDIFW). 2003. Beginning with Habitat. Available online at: https://www.maine.gov/ifw/fish-wildlife/wildlife/beginning-with-habitat/index.html. Accessed February 2021.

[8] U.S. Fish and Wildlife Service (USFWS). 2020. Information for Planning and Consultation. Available online at: https://ecos.fws.gov/ipac/. Accessed February 2021.

[9] United States Army Corps of Engineers (USACE). 1987. Environmental Laboratory. United States Army Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87 1, U.S. Army Engineers Waterways Experiment Station, Vicksburg, MS. 100 pp.

[10] USACE. 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0), ed. J.S. Wakeley, R.W. Lichvar, C.V. Noble, and J.F. Berkowitz. ERDC/EL TR-12-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

Results of the wetland and waterbody delineations are briefly summarized below. Further details of wetland and waterbody resources identified within the Study Area, as well as relevant data forms, are provided in the Natural Resources Survey Report (Exhibit 7-4 [Natural Resources Survey Report]).

A portion of the Study Area was delineated in the winter 2020/2021 due to the addition of three radar-assisted lighting tower locations to the Project footprint and the relocation of turbines 6 through 8. The Project design includes some roadside and transmission clearing impacts and avoids all direct impacts within wetlands delineated during the winter. All portions of the Study Area delineated during the winter require field verification during the appropriate growing season, and these field efforts are currently in progress. A Natural Resources Report Addendum will be submitted to supplement the permitting record once all the follow-on field surveys and reporting is completed.

The Study Area is located within the Kennebec River Watershed. Chase Stream flows southeast out of the southern end of Chase Pond in the northern limit of the Study Area and flanks the west side of the Study Area. Bassett Brook, a watercourse with a smaller contributing watershed, flows out of a large wetland complex that occurs just north of the proposed turbine array area and bisects the Study Area flowing south and eventually into Chase Stream, just upstream of its intersection with Austin Stream. Austin Stream is located to the east and south of the Study Area and flows generally west, until it's confluence with the Kennebec River, in Bingham, Maine. Aquatic natural resources observed within the Study Area generally contribute to these three streams. North American beaver (*Castor canadensis*) activity is common in the Project area, and several wetlands and watercourses were observed to be affected by impoundments.

Many of the natural resources observed within the Study Area have been affected by disturbances caused by forest management activities and the previous development of the site as a USAF Radar Station. Impacts to natural resources from the more recent forestry practices are observed as tire ruts within wetlands, cleared and regenerating vegetation, as well as compaction and disturbance of topsoil. As is common in many areas throughout Maine, non-wetland areas with shallow water tables that are subject to this level of disturbance, develop hydric conditions over time, and meet the characteristics of regulated wetlands. These naturalized wetlands can be found throughout the Study Area within logging landings and skidder paths. Similar disturbances across the Study Area have developed the conditions required to support vernal pool breeding amphibians.

Areas located within the USAF Radar Station fields are heavily altered. Signs of ditching and soil disturbance are evident throughout the Study Area. Stunted vegetation indicates these soils are heavily compacted. A grounding grid installed within these fields can be observed in the form of metal mesh wires that are occasionally exposed throughout the Study Area. All the resources identified within these fields have been subject to past disturbance.

The existing network of roads represent another human-caused disturbance that disrupt the natural flow of water within and between wetlands and watercourses in the Study Area. Water passes through culverts and flows within ditches created by road construction and maintenance. Due to these past disturbances, there are ditches within the Study Area that convey water but are not subject to regulation as a wetland or watercourse.

Tetra Tech worked with the Applicant's engineer to modify the Project design based on the results of natural resource surveys, to avoid and minimize wetland impacts to the extent practicable. This process is described in more detail below in Section H (Alternatives Analysis). Some Project impacts to wetlands and streams are unavoidable. Proposed wetland impacts include 72,081 square feet of permanent alteration to accommodate the construction of the Project access roads, turbine pads, 34.5 kV overhead collector line, and substation; 6,497 square feet of roadside clearing to accommodate the temporary installation of construction BMPs, and 18,098 square feet of conversion of palustrine forested (PFO) wetland to palustrine emergent/palustrine scrub-shrub (PEM/PSS) wetland associated with the construction of the 50-foot-wide, 2,265-foot-long 34.5 kV overhead collector line adjacent to Stream Road and the reuse of the existing 40-foot-wide, 2,370-foot-long 12.7 kV overhead distribution line between Stream Road

and the O&M building. In addition, temporary construction mats will be used in 21,591 square feet of wetlands to gain construction access to the point of interconnection with the CMP Section 222 transmission line. All proposed wetland impacts are illustrated in Figure 7-2 and summarized in Table 7-1. Construction clearing limits have been minimized to the maximum extent practicable, and all disturbed areas associated with BMP installation will be returned to natural grade and vegetative cover upon completion of construction. USACE paired plot forms (Exhibit 7-5 [USACE Paired Plot Forms]) and a photographic log (Exhibit 7-6 [Aquatic Resources Photographic Log]) of all aquatic resources that are proposed to be impacted by the Project are provided as required in the attached NRPA application.

C. Wetlands Functions and Values Assessment

In accordance with Chapter 310 (Wetland and Waterbodies Protection Rules), Tetra Tech completed a wetlands functions and values assessment to evaluate the loss of wetland functions and values as a result of the proposed wetland impacts associated with the Project. The wetlands were evaluated using the USACE New England District's Highway Methodology Workbook.[11]

The majority of wetlands proposed to be impacted by the Project have been previously disturbed through construction of roads, development of the site as a USAF Radar Station, or from timber harvesting practices. These resources generally score low in the functions and values assessment, with each resource having only one or a few functions and values. Table 7-1 identifies which resources have been previously impacted from these activities.

Several of the wetlands that are not identified as having been previously impacted are under 5,000 square feet and do not contain features that support wetland functions and values of the larger landscape, such as presence of listed species, connection to streams or other resources, or unique qualities. The abundance of larger and more diverse wetlands within the watershed surrounding the Project area limits the functions and values these resources provide at the landscape level. The principal functions and values for these wetlands generally include wildlife habitat, sediment/shoreline stabilization, and sediment/toxicant retention. The location of several wetlands that are proposed to be impacted by the Project also affects the functions of these resources. Several occur within the former USAF Radar Station fields where they are so heavily altered that it is difficult to determine if the origin of the wetland is natural, or if it was created by past activities.

PEM wetland communities within the Study Area are the most common wetland community and represent approximately 50 percent (%) of the wetland cover types. The remaining wetland community is represented as 38% PFO wetlands and 12% PSS wetlands. There are no unconsolidated bottom wetlands present within the Study Area. Function-Value Evaluation Forms for each wetland cover type are provided as Exhibit 7-7 (Functions and Values Assessment Summary Forms). No Function-Value Evaluation Form for the PSS Non-WOSS wetlands type is provided at this time due to the fact that wetland W126EI was delineated in the winter of 2021 and wetland WET-68-02 is a New England Clean Energy Connect wetland. A Function-Value Evaluation Form will be completed once the follow-on wetland delineations for winter delineation field efforts are completed, and will be included in the Natural Resources Report Addendum to be submitted as a supplement to the permitting record. Function-Value Evaluation Forms for each impacted wetland are available upon request.

Proposed construction activities within the Projects 34.5 kV overhead transmission corridor will involve clearing and the conversion of PFO/PSS wetland to PSS/PEM wetlands. Additionally, the reuse of the existing 12.7 kV distribution line will require maintenance clearing and the conversion of PFO/PSS wetland to PSS/PEM wetlands. Potential changes to the functions and values of these wetlands are discussed below.

[11] USACE, New England District. 2015. The Highway Methodology Workbook Supplement. Wetland Functions and Values. April 6, 2015.

Table 7-1 Summary of Wetland Impacts.

Wetland ID	Temporary Construction Clearing (square feet)	Overhead Transmission Line Clearing (square feet)	Permanent Construction Fill (square feet)	Temporary Construction Mats (square feet)	WOSS[1]	Cowardian Classification[2, 3]	Principal Functions & Values	Previously Impacted	Impact Description
W12EI	118	0	0	0	No	PFO	Wildlife habitat	Yes	Construction best management practices (BMP) clearing
W17DS	498	0	13,279	0	Yes	PFO	Sediment / shoreline stabilization, wildlife habitat	Yes	Fill associated with construction of the access road and turbine pad, construction BMP clearing
W18EI	0	0	30	0	No	PFO	Sediment / shoreline stabilization	Yes	Fill associated with access road upgrades for proposed crane path
W30EI	2,790	0	20,057	0	No	PEM	Wildlife habitat	Yes	Fill associated with access road construction, construction BMP clearing
W35EI	0	0	1,556	0	No	PEM	Wildlife habitat	No	Fill associated with access road construction
W37EI	0	0	3,042	0	No	PFO	Wildlife habitat	No	Fill associated with construction of turbine pad
W38EI	0	0	1,692	0	No	PFO	Wildlife habitat	No	Fill associated with construction of turbine pad
W43EI	0	0	271	0	Yes	PFO	Wildlife habitat	No	Fill associated with access road construction
W47EI	55	0	7,656	0	No	PEM	Wildlife habitat	Yes	Fill associated with construction of the access road and turbine pad, construction BMP clearing
W48EI	294	0	16	0	Yes	PFO	Sediment / shoreline stabilization, wildlife habitat	No	Fill associated with access road construction, construction BMP clearing, construction BMP clearing

Wetland ID	Temporary Construction Clearing (square feet)	Overhead Transmission Line Clearing (square feet)	Permanent Construction Fill (square feet)	Temporary Construction Mats (square feet)	WOSS[1]	Cowardian Classification[2, 3]	Principal Functions & Values	Previously Impacted	Impact Description
W51EI	0	0	1,652	0	No	PEM	Wildlife habitat, sediment / toxicant retention	Yes	Fill associated with access road upgrades and construction
W52EI	22	0	0	0	No	PFO	Wildlife habitat, sediment / toxicant retention	Yes	Construction BMP clearing
W61EI	0	0	7	0	No	PEM	Sediment / toxicant retention	Yes	Fill associated with access road upgrades
W63EI	0	0	0	0	No	PEM	Sediment / toxicant retention	Yes	Fill associated with access road upgrades
W67EI	57	0	11	0	No	PEM	Sediment / shoreline stabilization, wildlife habitat	Yes	Fill associated with access road upgrades, construction BMP clearing
W68EI	0	4,088	0	0	Yes	PEM	Sediment / shoreline stabilization, wildlife habitat	Yes	Clearing for overhead transmission line
W71EI	0	6,654	0	0	No	PEM	Sediment / shoreline stabilization, wildlife habitat	Yes	Clearing for overhead transmission line
W81EI	1,700	0	12,947	0	No	PFO	Wildlife habitat	Yes	Fill associated with access road construction, construction BMP clearing
W92EI	0	0	66	0	No	PFO	Wildlife habitat	Yes	Fill associated with construction of turbine pad

Wetland ID	Temporary Construction Clearing (square feet)	Overhead Transmission Line Clearing (square feet)	Permanent Construction Fill (square feet)	Temporary Construction Mats (square feet)	WOSS[1]	Cowardian Classification[2, 3]	Principal Functions & Values	Previously Impacted	Impact Description
W98EI	220	0	6,788	0	No	PEM	Wildlife habitat	Yes	Fill associated with construction of turbine pad, construction BMP clearing
W99EI	0	0	3,000	0	No	PEM	Sediment / toxicant retention	Yes	Fill associated with construction of substation
W123NJ	55	0	7	0	No	PEM	Wildlife habitat, sediment / toxicant retention	Yes	Fill and clearing associated with construction of turbine pad, construction BMP clearing
W126EI	0	7,356	0	0	No	PSS	TBD	Yes	Clearing for overhead transmission line
WET-68-02	688	0	5	21,591	No	PSS	New England Clean Energy Connect Wetland	Yes	Temporary construction mats, utility poles
Total Wetland Impact (square feet)	**6,497**	**18,098**	**72,081**	**21,591**	**118,268**				

1 – Wetlands of Special Significance

2 – PFO = palustrine forested; PEM = palustrine emergent; and PSS = palustrine scrub-shrub.

3 – Cowardin, L.M., V. Carter, F.C. Golet, and E.T. Roe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. December 1979. 142 pp. Available online at: https://www.fws.gov/wetlands/Documents/Classification-of-Wetlands-and-Deepwater- Habitats-of-the-United-States.pdf. Accessed February 2021.

The removal of capable tree, sapling, and shrub species—coupled with transmission line maintenance—generally creates and maintains permanent early successional communities with different functions and values than forested communities. Habitat functions would be altered with some species benefiting and others not. For example, habitat for arboreal species would be diminished while habitat for early successional species would be enhanced. In Maine and in the northeast where the landscape is dominated by forests,[12] the creation of early successional habitat generally promotes species diversity, stem density, annual growth and decomposition, and increased layering of vegetation. Forage, cover, and habitat values for wildlife species are different in early successional communities with increased herbaceous forage, soft mast, grass and sedge seeds, tubers, flowering plants, and cover (MDIFW 2015). Although the removal of capable species reduces shading and hard mast production and reduces or eliminates winter cover for some species, overall, in a densely forested region, converting forested areas to shrub and emergent communities can increase habitat diversity. In Maine, several Species of Greatest Conservation Need as identified in Maine's Wildlife Action Plan, require early successional habitat. These include, but are not limited to, American woodcock (*Scolopax minor*), brown thrasher (*Toxostoma rufum*), white-throated sparrow (*Zonotrichia albicollis*), and wood thrush (*Hylocichla mustelina*). All of these species have been observed in the Project area (MDIFW 2015).

For wetlands found near streams, the production export and cycling of nutrients to the stream ecosystem via detritus may be enhanced by conversion from a PFO wetland to PSS/PEM wetlands. Dense shrub and herbaceous vegetation can slow the flow of water in streams and increase floodflow alteration functions, slowing and retaining sediments and nutrients (USACE, New England District 2015). Ecological production, diversity, stem density, annual growth, and decomposition will increase. This is a contribution to the local food chain and supports habitat values.

Harvesting timber for sale as lumber, cord wood, and pulp is provided by the initial conversion of PFO wetlands to PSS/PEM wetlands. Hunting value of area lands will remain after clearing, as habitat for game species will still be present.

None of the functions or values provided by the PFO wetlands that will be converted because of the reuse of the distribution line will be completely lost or severely diminished by the conversion to PSS/PEM wetlands. On balance, there is a positive net benefit regarding functions and values.

D. Streams

A total of eight streams are proposed to be impacted by the Project (Table 7-2). Five of the streams, S24EI, S26EI, S28EI, S51EI and S52EI, will require new culverts that are less than 75 feet in length. These culverts will meet the requirements to be permitted through a NRPA, Chapter 305 Permit by Rule Notification Form, which is being submitted concurrently with this application. Three streams, S21EI, S32EI, and S53EI, will have culverts that exceed 75 feet in length, and are included in the NRPA Individual Permit application that also is being submitted concurrently with this application, along with the wetland impacts described above. All new or replacement crossings will follow Maine's Stream Smart Guidelines[13] and will be constructed to be 1.2 times bank full width. As further described below in Section F (Wildlife and Significant Wildlife Habitat), the crossing of Bassett Brook (S51EI) and the unnamed tributary to Bassett Brook (S52EI) will be replaced with an open bottom box culvert to improve the crossing for northern spring salamander (*Gyrinophilus porphyriticus porphyriticus*).

[12] MDIFW. 2015. Maine's Wildlife Action Plan. Maine Department of Inland Fisheries and Wildlife, Augusta, ME. 382 pp. Available online at: https://www.maine.gov/ifw/docs/2015%20ME%20WAP%20All_DRAFT.pdf. Accessed June 16, 2021.

[13] State of Maine Aquatic Resources Management Strategy Forum. Stream Smart Road Crossing Pocket Guide. Available online at: https://www.maine.gov/mdot/publications/docs/brochures/pocket_guide_stream_smart_web.pdf. Accessed February 2021.

Table 7-2 Stream Impacts.

Watercourse ID	Flow Regime	Existing Culvert Distance (feet)	Proposed Culvert Type[1]	Proposed Culvert Length (feet)	Grading Impact (feet)	Clearing Impact (feet)	Permit by Rule
S21EI	Ephemeral	0	1.2 bank width HDPE culvert	80	95.84	5.65	No
S24EI	Intermittent	22	1.2 bank width HDPE culvert	70	65.23	0.36	Yes
S26EI	Intermittent	43	1.2 bank width HDPE culvert	72	42.27	0.30	Yes
S28EI	Ephemeral	0	1.2 bank width HDPE culvert	70	73.67	0.00	Yes
S32EI	Intermittent	0	1.2 bank width HDPE culvert	110	130.64	0.00	No
S51EI	Perennial	31	1.2 bank width concrete box culvert	70	76.63	0.00	Yes
S52EI	Intermittent	23	1.2 bank width concrete box culvert	65	52.41	0.00	Yes
S53EI	Intermittent	76	1.2 bank width HDPE culvert	80	1.38	37.13	No

1 – HDPE = high-density polyethylene

The proposed access road and utility corridor for the ADLS contains 13 existing stream crossings. Construction along this route will require that the utility line be buried in the existing road. Impacts at each of the 13 stream crossings will be either avoided altogether by directionally drilling the utility line under the existing crossing, or if necessary, one or more of the existing crossings may be replaced in-kind in accordance with NRPA, Title 38 M.R.S. § 480-Q. If a culvert replacement is necessary, the new crossing will follow Stream Smart Guidelines and be 1.2 times bank full width.

E. Vernal Pools and Potential Vernal Pools

Vernal pool surveys were completed by Tetra Tech biologists in April and May 2020 in accordance with the criteria outlined in the Maine Association of Wetland Scientists Vernal Pool Technical Committee, Vernal Pool Survey Protocol[14]. Potential vernal pools (PVPs) also were identified during the winter delineation completed in December 2020 and January 2021. Additional vernal pool surveys are being conducted in 2021 to verify PVPs that were identified outside the amphibian breeding season, as well as to determine dry out periods for vernal pools (scheduled for July 2021).

There are eight vernal pools or PVPs identified within the Study Area. The majority of the vernal pools identified within the Study Area are non-natural vernal pools. These vernal pools are generally created by tire ruts and roadside ditches that cause water impoundments and provide conditions conducive to spring amphibian breeding activities. One of the vernal pools is characterized as a significant vernal pool (SVP) (VP19CP). This vernal pool is naturally occurring and meets the egg mass count criteria to be considered significant under MDEP NRPA Chapter 335, Significant Wildlife Habitat Rules.[15] VP19CP is located north of turbine 14 (Figure 7-2, Sheet 1 of 13) and all Project development has been sited to avoid any impacts to the pool's critical terrestrial habitat as defined in Significant Wildlife Habitat Rules. Further details of the vernal pool resources identified within the Study Area, as well as relevant data forms for the Project, are provided in Exhibit 7-4.

F. Wildlife and Significant Wildlife Habitat

As part of Project planning and informal consultation with the USFWS Maine Field Office, and recommendations from MDIFW, a suite of natural resource assessments and field surveys were performed in the Study Area in accordance with the approved Wildlife Study Plan (Exhibit 7-1 [Wildlife Study Plan]). Some field surveys pre-date the final study plan approved by the agencies; however, all efforts conformed to the *MDIFW Maine Wind Power Pre-construction Recommendations and Turbine Curtailment Recommendations to Avoid/Minimize Bat Mortality* (Maine Wind Power Guidance).[16] Results of the wildlife field studies are briefly summarized below. Further details regarding wildlife studies conducted for the Project are provided in the Comprehensive Wildlife Report (Exhibit 7-8 [Comprehensive Wildlife Report]). Wildlife field studies were performed for eagle and great blue heron (*Ardea herodias*) nests, golden eagle (*Aquila chrysaetos*) migration, eagle use, raptor migration, breeding birds, upland sandpipers (*Bartramia longicauda*), northern long-eared bat (*Myotis septentrionalis*), bat winter hibernacula, Roaring Brook mayfly (*Epeorus frisoni*), northern bog lemming (*Synaptomys borealis*), northern spring salamander, and Canada lynx (*Lynx canadensis*). Eagle nest, eagle use, northern long-eared bat, and Canada lynx surveys were completed in coordination with USFWS. All other wildlife surveys were coordinated with MDIFW.

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[14] Maine Association of Wetland Scientists. 2014. Vernal Pool Survey Protocol. Maine Association of Wetland Scientists Vernal Pool Technical Committee. April 2014. 84 pp. Available online at: https://static1.squarespace.com/static/5113deede4b0a785ada17b27/t/537415c4e4b003ad4653fb5a/1400116676556/Complete+MAWS+2014+VP+Survey+Protocol_v3_05.14.2014.pdf. . Accessed June 16, 2021.

[15] MDEP. 2016a. Chapter 335: Significant Wildlife Habitat. Rule Chapters for the Department of Environmental Protection, 06-096. Available online at: https://www.maine.gov/sos/cec/rules/06/096/096c335.doc. Accessed March 2021.

[16] MDIFW. 2018. Maine Department of Inland Fisheries and Wildlife. Maine Wind Power Preconstruction Recommendations and Turbine Curtailment Recommendation to Avoid/Minimize Bat Mortality. Updated March 5, 2018.

(1) Birds

The eagle and great blue heron nest survey was performed via helicopter on May 20, 2020. No eagle or great blue heron nests were observed within a 4-mi radius of the Project area boundaries, and no eagles or great blue herons were observed flying or perched during the survey. The closest documented bald eagle (*Haliaeetus leucocephalus*) nest is located along the Kennebec River approximately 5.4 mi west of the Project. A golden eagle survey, performed in conjunction with eagle use and raptor migration surveys, was conducted twice a week following a protocol prescribed by MDIFW from February 15–June 15, 2020 to capture spring movements; and from August 1–December 15, 2020 to capture fall movements. One golden eagle was observed in the Study Area on April 7, 2020. The eagle use survey commenced on January 23, 2020 and a total of 15 bald eagles were observed. Based on guidance from USFWS, eagle use surveys will continue throughout 2021, with one survey completed per month to assess risk of the Project to eagles. Ten additional raptor species were observed during the eagle and raptor surveys.

Breeding bird surveys, performed in May and June of 2020, did not detect any State- or Federally-listed species. However, 11 State Species of Special Concern and 23 Species of Greatest Conservation Need were documented. Despite past records for the Project site, no upland sandpiper were observed, and it is likely that the available habitat is not suitable for the species. While no great blue heron were observed during the nest survey period, one was observed incidentally on September 3, 2020 during a separate upland sandpiper survey. The Project is unlikely to impact golden eagle, bald eagle, or great blue heron due to low passage rates observed during focused surveys and the absence of nests within a 4-mi radius of the Project. No other State- or Federally-listed bird species were detected.

(2) Bats

A summer bat acoustic survey was coordinated with the USFWS Maine Field Office and conducted in July 2020 in accordance with USFWS' 2020 *Range-wide Indiana Bat Summer Survey Guidelines for Indiana Bat and Northern Long-eared Bat.*[17] Northern long-eared bat was not detected, but the presence of five other bat species was confirmed, including big brown bat (*Eptesicus fuscus*), eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), silver-haired bat (*Lasionycteris noctivagans*), and little brown bat (*Myotis lucifugus*). Little brown bat is a State-listed endangered species and big brown bat, eastern red bat, hoary bat, and silver-haired bat are considered State Species of Special Concern.[18] Although little brown bat was confirmed, calls from this species composed only 1% of total bat activity. Furthermore, 85 of the 99 confirmed little brown bat calls (86%) were recorded in areas that have been removed from the Project area. Based on recommendations from MDIFW, a bat winter habitat analysis was performed via desktop review, drone reconnaissance, and field verification; however, no suitable habitat for overwintering bats was identified. There are no documented bat hibernacula or maternity roost trees within the Project area or within 3 mi of the Project, and tree clearing will occur in the winter to the maximum extent practicable; thus, potential impacts to northern long-eared bat and other tree-roosting bat species will be avoided.

MDIFW recommends curtailment as a protective measure for bats. This recommendation is documented in the Maine Wind Power Guidance (MDIFW 2018[19]), MDIFW's resource survey recommendations for the Project, and MDIFW's written review and comments on other wind development projects in Maine. In addition, MDIFW provided examples of curtailment regimens from other recent projects during the December 10, 2019 agency consultation

[17] USFWS. 2020. Range-wide Indiana Bat Summer Survey Guidelines. March 2020. 65 pp. Available online at: https://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html.

[18] MDIFW. 2020. Solar Energy Project General Resource Guidance and Recommendations. Updated March 5, 2020. Available online at: MDIFW Solar Project Guidance 05March2020 (maine.gov). Accessed June 23, 2021.

[19] MDIFW. 2018. Maine Wind Power Preconstruction Recommendations and Turbine Curtailment Recommendations to Avoid/Minimize Bat Mortality. Update March 5, 2018. Available online at: https://www1.maine.gov/ifw/docs/Wind%20Power%20Preconstruction%20Recommendations%20to%20Avoid%20or%20Minimize%20Bat%20Mortality.pdf. Accessed June 16, 2021.

meeting. As discussed above, no known or potential hibernacula or roost trees have been documented in the Project area or within 3 mi, and the Project is not located within Maine's coastal plain. Migration patterns of bats through the Project area are unknown, however, and MDIFW has expressed concerns about the height of the turbines proposed for the Project at a site that also is located in an artificially elevated area. Thus, to support regional bat conservation, the Applicant proposes that turbines operate only at cut-in wind speeds exceeding 6.0 meters per second (m/s) each night (from at least half an hour before sunset to at least half an hour after sunrise) from April 15–September 30. Turbines will be feathered during curtailment and allowed to turn at no more than one revolution per minute to minimize risks to bats. The Applicant does not believe an increased curtailment wind speed for July 16–September 15 is warranted. This curtailment regimen can be revisited with MDEP as research becomes available related to other weather variables that affect bat activity (e.g., absolute humidity, precipitation, cloud cover) and the efficacy of other conservation measures (e.g., ultrasonic acoustic bat deterrents) on State bat populations.

Formal post-construction fatality monitoring for bats or birds is not proposed. However, Project staff will record all discovered mortalities of bats and birds in an annual log. If possible, carcasses (especially bats) will be collected, stored in plastic bags, and frozen with labels noting the date, time, and nearest turbine number to which it was found. The Applicant will apply to MDIFW for the appropriate permits for the salvage and temporary possession of such specimens. Any bat carcasses or any incident where more than 10 bird carcasses are found during any inspection will be reported to MDIFW and MDEP within 24 hours.

(3) Roaring Brook Mayfly, Northern Bog Lemming, and Northern Spring Salamander

Roaring Brook mayfly and northern bog lemming surveys were conducted in September 2020 but neither species was found in the Study Area. Northern spring salamander surveys were conducted in July 2020 and the species was confirmed as present in Bassett Brook. A tributary to Bassett Brook, located approximately 383 feet northeast of the main stem, was dry in July and could not be searched, but northern spring salamander is assumed to be present. The existing crossing structure at the main stem is an undersized and slightly crushed culvert with a perched outlet, which will be replaced with an open bottom box culvert that will be a minimum of 1.2 times bank full width of the stream channel. The tributary is crossed with two undersized corrugated pipe culverts, one of which has a partially obstructed inlet. The tributary crossing also will be replaced with an open bottom box culvert that will be a minimum of 1.2 times bank full width of the stream channel. The appropriately sized, open bottom box culverts will maintain natural substrates within the crossing, restore stream function, and enhance habitat for northern spring salamander and other aquatic organisms. A minimum amount of clearing will be required to replace the crossing structures and widen the existing road. To the extent practicable, 250-foot riparian management zones will be maintained on both sides of the stream at both crossings, with particular care given to limiting in-stream disturbance and maintaining canopy closure. If construction workspaces are required, they will be located outside of the buffer zones. Current, published BMPs for stream crossings will be followed to prevent erosion, sedimentation, alteration of stream flow, or other impacts to stream habitat.[20]

(4) Canada Lynx

A camera trap and tracking survey conducted from January 10, 2020 to October 8, 2020 confirmed the presence of Canada lynx, a Federally threatened species, within the Project area. Habitat loss or fragmentation are the two primary concerns regarding impacts on Canada lynx which may be influenced by Project design and construction. Habitat loss related to Project development will likely be marginal in the context of the broader landscape and is driven by regional forest management practices and resulting patterns of softwood regeneration. It is likely that as long as habitats adjacent to turbines and access roads continue to support high densities of snowshoe hare (*Lepus*

[20] Maine Forest Service and Maine Department of Agriculture, Conservation & Forestry, "Best Management Practices for Forestry: Protecting Maine's Water Quality - Third Edition". 2017. Forest Service Documents. 53. Available online at: https://digitalmaine.com/for_docs/53. Accessed February 2021.

americanus), the main prey species for Canada lynx, this species will continue to utilize these areas. Canada lynx survey results have been submitted to the USFWS Maine Field Office.

(5) Significant Wildlife Habitat

Figure 7-3 depicts mapped significant wildlife habitat (SWH) in the vicinity of the Project area. SWH areas include deer wintering areas, SVPs, inland waterfowl and wading bird habitat (IWWH), and Atlantic salmon (*Salmo salar*) habitat. The Project area does not intersect with any mapped SWH areas, but one moderate value IWWH is located approximately 200 feet east of the proposed access road for one of the potential ADLS radar tower sites (ADLS-2A). Another moderate value IWWH is located approximately 0.6 mi east of the same proposed radar tower (ADLS-2A) and 0.6 mi west of the proposed turbine pad for turbine 14. Moderate value IWWH meets the SWH definition and are regulated. The closest mapped deer wintering areas are located approximately 2.7 mi to the north and south of the Project area, and the closest SVP (other than VP19CP identified near turbine 14 as described above) is located 1.7 mi south of the Project area, along the CMP transmission corridor. The Project is not expected to negatively impact any SWH areas.

G. Fisheries

The Project area is not located within designated Critical Habitat for the Federally endangered Atlantic salmon, Gulf of Maine Distinct Population Segment. The Penobscot Basin Salmon Habitat Recovery Unit is located approximately 6.2 mi west of the Project area (Figure 7-3).[21] No additional agency consultation for Atlantic salmon is expected to be required. Aquatic surveys were not performed since there were no sensitive aquatic resources documented within or near the Project area, and there are no proposed activities that would directly impact rivers, streams, or brooks. The Project will adhere to MDIFW's guidance and maintain a 100-foot vegetated buffer from the upland edges of all streams and contiguous wetlands.

H. Alternatives Analysis

The purpose and need for the Project is to serve the growing regional demand for electricity in a manner consistent with regional and State energy policies. As described in the Maine Wind Energy Act (WEA), the proposed Project is located within an area designated for expedited wind permitting in the State. 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, based on best available wind data;
- Electric transmission access and capacity, including consideration of alternative interconnection routes;
- Land ownership, including size of contiguous tracts of land, number of landowners, and compatibility with existing land uses;
- Construction-related feasibility and costs (evaluations of soils and geology, topography, accessibility, and existing infrastructure);
- Site viability, including consideration of potential impacts to wildlife and natural resources; and
- Community support, including proximity to population centers and local regulatory structure.

The highest onshore wind resources in the northwest portion of Maine are typically found along ridge lines and at higher elevations, although turbine designs have evolved to maximize production in a variety of wind regimes,

[21] National Oceanic and Atmospheric Administration. 2020. Atlantic Salmon Critical Habitat – Gulf of Maine DPS. NOAA Fisheries Available online at: https://www.fisheries.noaa.gov/resource/map/atlantic-salmon-critical-habitat-gulf-maine-dps.

including those with moderate wind speeds. In siting this Project, wind data collected from a 262-foot met tower in 2013 and 2014 was used to evaluate the productivity of the site using turbines designed to operate in moderate wind regimes. The resulting evaluation concluded that wind resources were well suited for wind energy generation in this area/terrain of the State. Additional factors favorable for wind development in the area include the site's previous development as a defense radar facility for the U.S. military (including several existing buildings that can be used for storage and/or O&M), the constructability of the site due to the presence of existing roads and its non-ridgeline location, sparse residential development, access to the electrical grid, 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 locations were evaluated for siting the wind generation facilities, and alternative electrical transmission options were considered.

The Applicant acquired a significant portion of the Project area from the military in 2012. Initial development activities for a predecessor wind project were suspended in favor of a solar project lease to a different developer. However, when the solar project did not advance, in 2019 the Applicant began redevelopment efforts of the Project area as a wind facility based on fewer, but larger turbines designed for use with this type of wind resource.

The Applicant continually adjusted and redesigned the proposed Project layout as site-specific resource information became available, with the objective of avoiding and minimizing impacts to protected natural resources and land uses. The original Project design consisted of 28 turbines, with a goal of generating approximately 84 MWs of electric power. Turbines were sited in areas that satisfied the turbine selection criteria, which based on the available screening level data, such as soil survey maps, USFWS National Wetland Inventory maps and mapped SWHs, had the potential to be absent of wetlands and associated regulated resources (e.g., waterbodies, SWHs). Additionally, a transmission interconnection study was completed in 2019 to study the alternative transmission capacity constraints within the Project area. During collection of field survey data, a number of alternative locations for turbines, collector lines, substations, transmission interconnection and roads were considered, which required adjustments to the Project design; which ultimately reduced the number of turbines from 28 turbines producing 84.0 MWs of electric power, to 14 turbines producing about 58.8 MWs of power.

Alternative 1, No Action: Under the "no action" alternative the Applicant would not pursue construction of the Project. The Applicant's primary mission and business is the development of renewable energy projects to meet the growing regional demand for electricity in a manner consistent with regional and State energy policies. The "no action" alternative would not meet the Project purpose to generate renewable energy in support of regional and State energy policies, therefore the "no action" alternative was rejected as it was not consistent with the overall Project purpose.

Alternative 2, 28 Turbine Layout: The original Project layout included turbines in the towns of Caratunk and Moscow and was located, in part, within 8 mi of the Appalachian National Scenic Trail (AT). An evaluation of the wind energy ordinance in the Town of Caratunk determined that siting portions of the Project within this municipal jurisdiction would not be economically feasible. This fact, combined with potential visual impacts associated with siting the Project within 8 mi of the AT, had the effect of reducing the area available for siting turbines. This resulted in limiting siting options to the Town in areas located greater than 8 mi from the AT. To find additional buildable area, the Project siting evaluation was moved south and west to commercial timber lands located adjacent to the former defense radar facility. Much of the siting work at this stage involved locating turbines to avoid conflicts with the existing natural resources within the Project area and to avoid conflicts with CMP's existing Section 222 transmission line that runs through the Project area. These constraints made the original 28 turbine layout difficult to design without significant impacts to natural resources, along with the existing land uses identified south and west of the Project.

Alternative 3, 14 Turbine Layout, Proposed Project: The Project layout as proposed minimizes wetland and other habitat impacts, is cost effective, and meets the Project purpose. The Applicant considered multiple criteria when determining turbine locations for the proposed Project, with the most important criteria being the presence of a quality wind resource. Measures were taken to reduce the impacts of construction and operation of turbines on the site. Proximity of turbines to existing infrastructure (e.g., roads, electrical interconnection) was an important factor, as it minimized the number 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., SWH, SVPs) was an important consideration in the siting of turbines and locations of electric transmission lines and new roads. Maintaining buffers around natural resources also was factored into the design process. Further avoidance and minimization efforts included micro-siting of turbines and using existing roads to the maximum extent practicable, installing the majority of electrical collector lines underground within existing or new roads, using existing onsite overhead distribution lines where practicable, narrowing access road footprints in some areas, adjusting turbine grading limits, and minimizing vegetative clearing. Turbine pads were sited in upland areas away from wetland boundaries as much as feasible. Footprints of some turbine pads were reshaped or reduced to avoid impacts to nearby wetlands.

Figure 7-1 illustrates the Study Area for the proposed 14 turbine layout, including alternatives for ADLS Towers, 34.5 kV electrical collector system, interconnection substation, and O&M building which represents the least environmentally damaging practicable alternative for the Project.

I. Compensation

In accordance with the NRPA 38 M.R.S. § 480-Z the Applicant proposes to make a contribution to the Maine Natural Resources Conservation Fund in lieu of a permittee-responsible mitigation project to off-set all affected wetland functions and values for the 72,081 square feet of permanent wetland impact. A contribution in the amount of $340,945, calculated in accordance with the wetland compensation formula provided in the MDEP In-Lieu Fee Compensation Fact Sheet dated September 1, 2020-December 31, 2021, will be made to the Maine Natural Resources Conservation Fund prior to the start of Project construction.

Figures

- Figure 7-1 Project Study Area
- Figure 7-2 Proposed Aquatic Resources Impacts
- Figure 7-3 Mapped Significant Wildlife Habitat

Exhibits

- Exhibit 7-1 Wildlife Study Plan
- Exhibit 7-2 Agency Correspondence
- Exhibit 7-3 USFWS IPaC Database Review
- Exhibit 7-4 Natural Resources Survey Report
- Exhibit 7-5 USACE Paired Plot Forms
- Exhibit 7-6 Aquatic Resources Photographic Log
- Exhibit 7-7 Functions and Values Assessment Summary Forms
- Exhibit 7-8 Comprehensive Wildlife Report

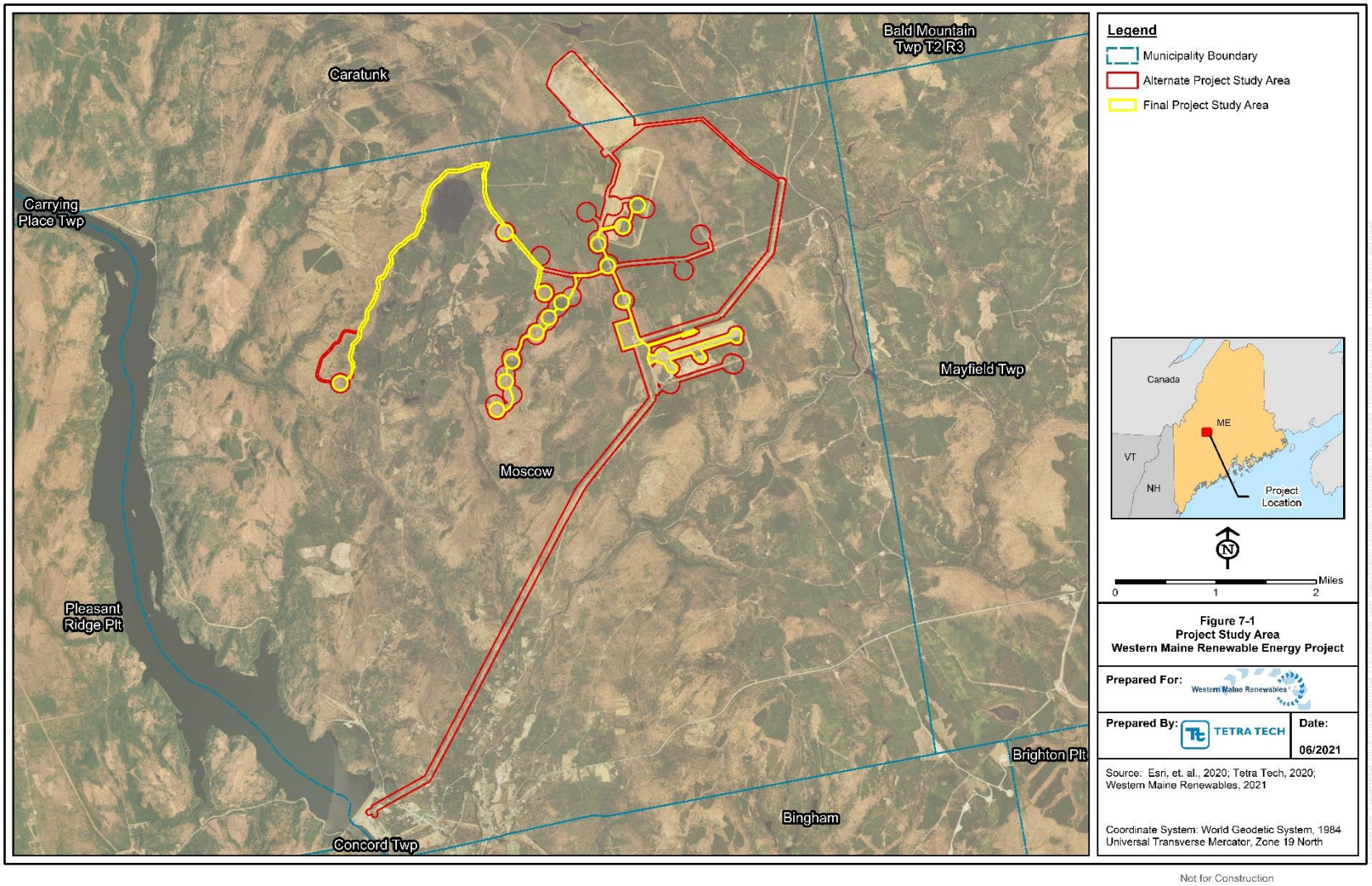

Figure 7-1 Project Study Area.

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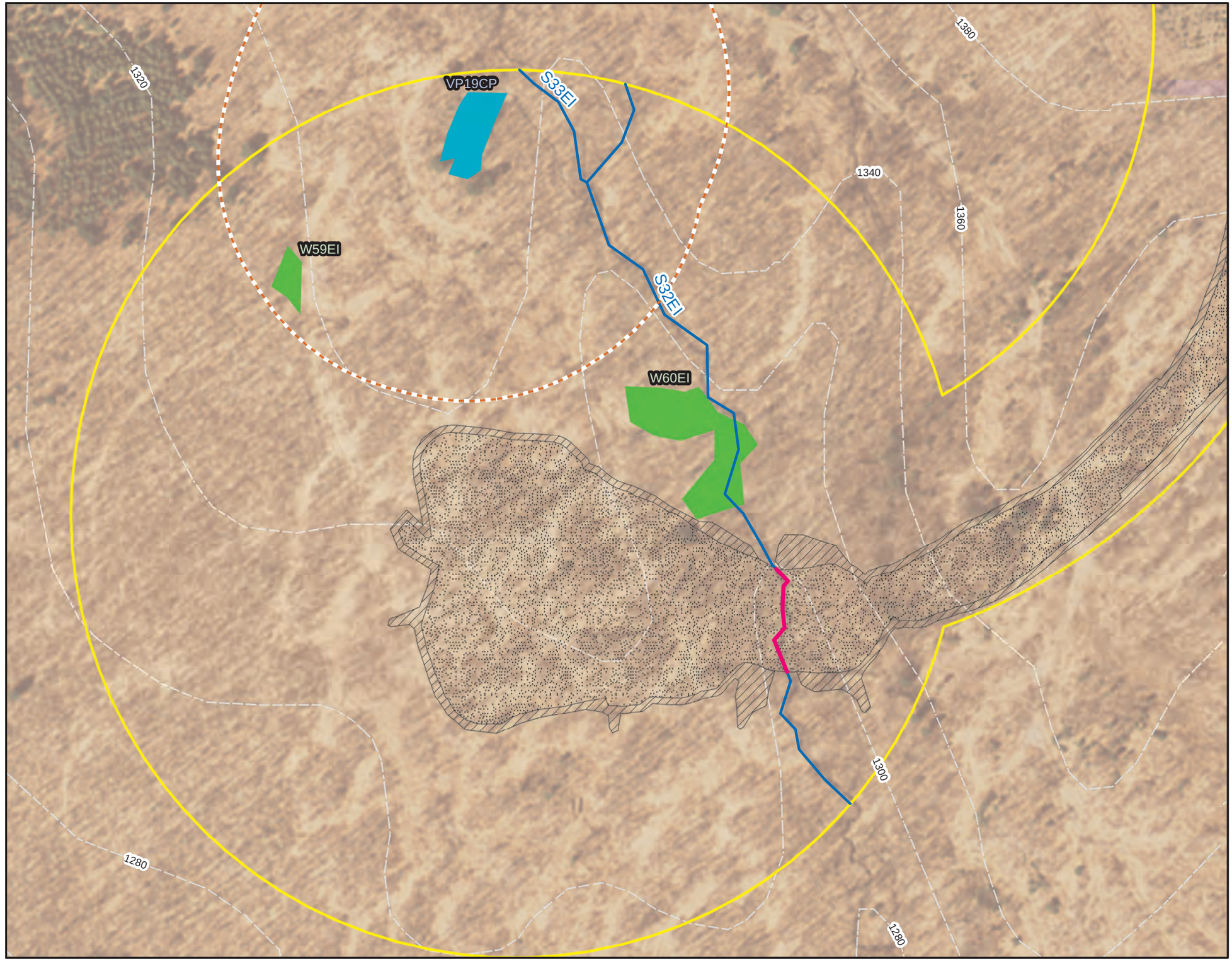
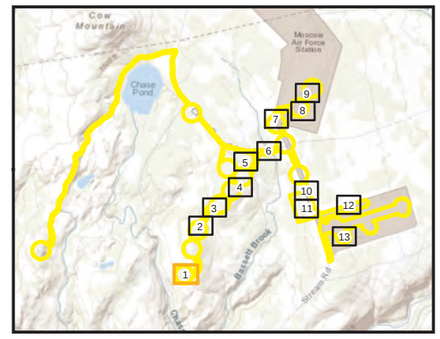


Legend

- Study Area
- 20 Foot Contour
- Clearing Limit
- Grading Limit
- Critical Terrestrial Habitat (250ft)
- Vernal Pool
- Stream Crossing
- Delineated Wetland
- Delineated Stream



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Feet
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Figure 7-2
Sheet 1 of 13
Proposed Aquatic Resources Impacts
Western Maine Renewable Energy Project

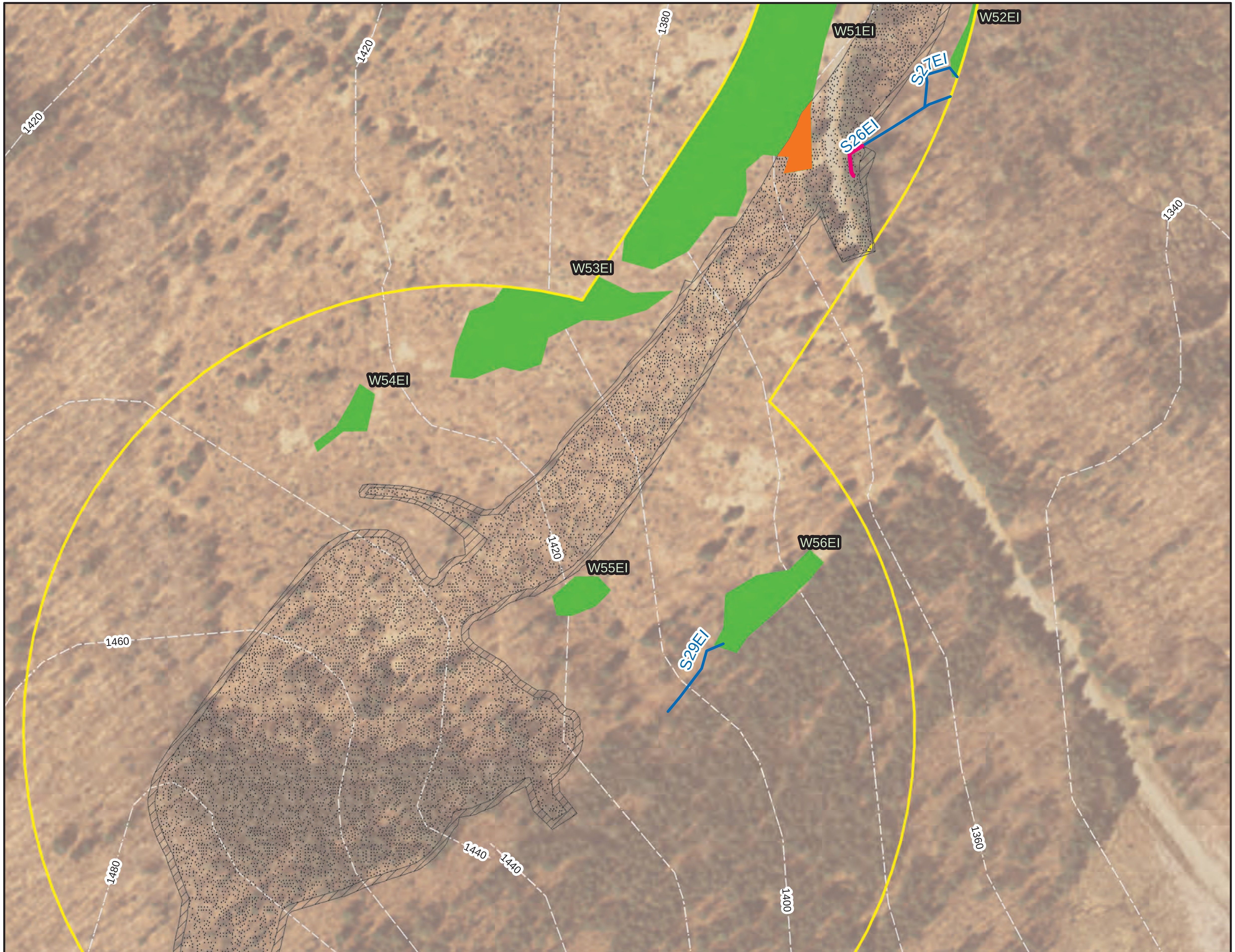
Prepared For: Western Maine Renewables LLC

Prepared By: TETRA TECH

Date: 06/2021

Source: Esri, et. al., 2020; Tetra Tech, 2020-21; Western Maine Renewables, 2021

Coordinate System: World Geodetic System, 1984 Universal Transverse Mercator, Zone 19 North



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- 20 Foot Contour
- Clearing Limit
- Grading Limit
- Wetland Grading Impact
- Stream Crossing
- Delineated Wetland
- Delineated Stream

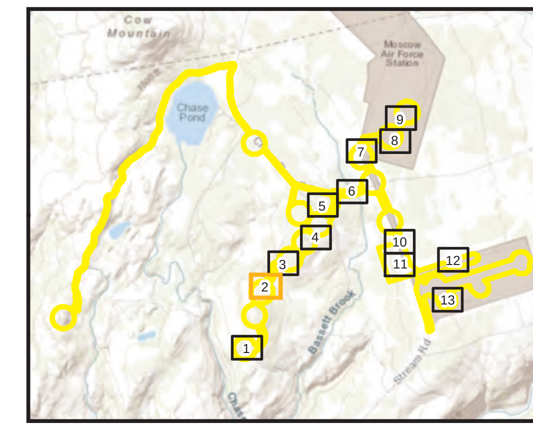

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Figure 7-2
Sheet 2 of 13
Proposed Aquatic Resources Impacts
Western Maine Renewable Energy Project

Prepared For: Western Maine Renewables LLC

Prepared By: TETRA TECH

Date: 06/2021

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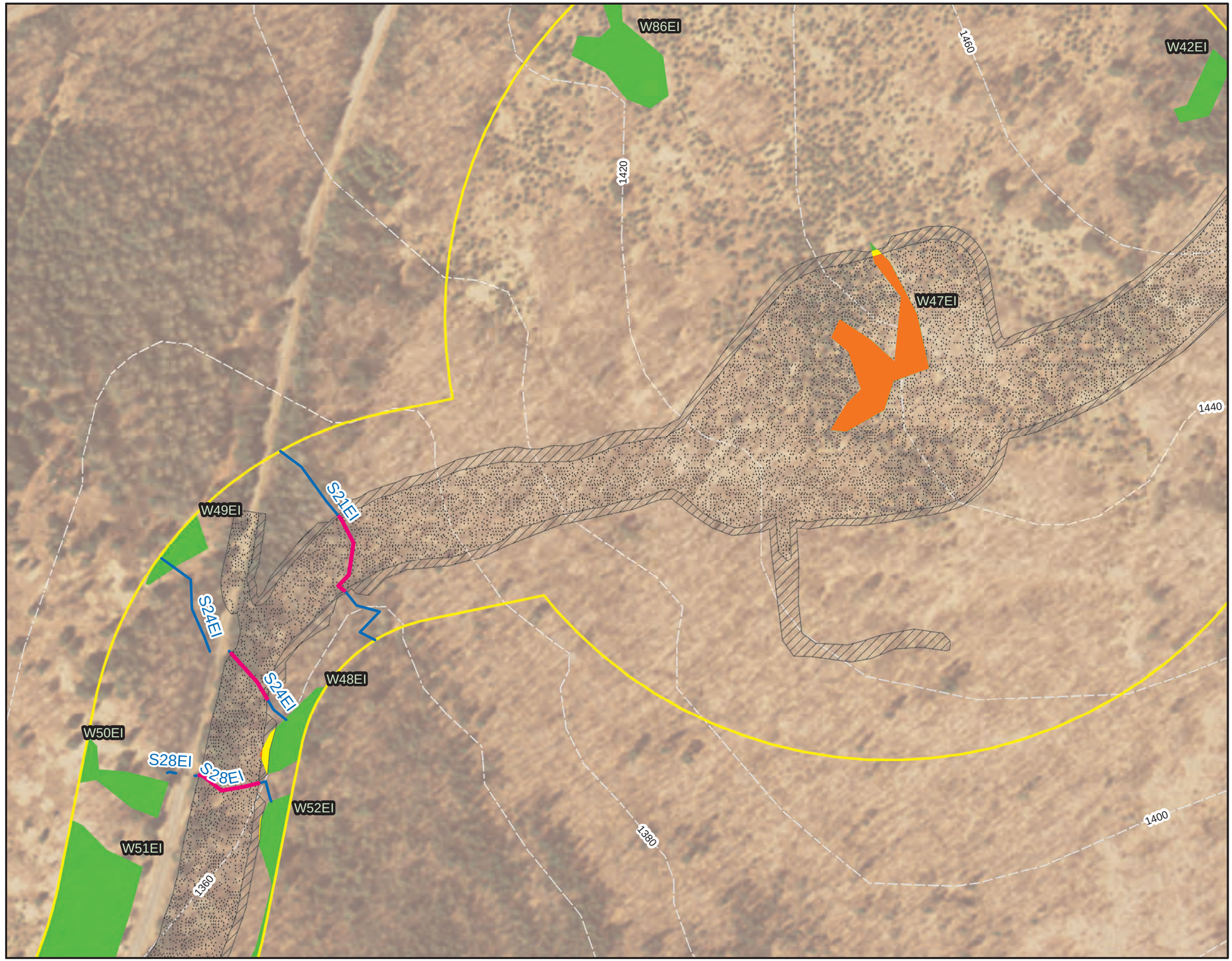
Not for Construction



Legend

- Study Area
- 20 Foot Contour
- Clearing Limit
- Grading Limit
- Wetland Clearing Impact
- Wetland Grading Impact
- Stream Crossing
- Delineated Wetland
- Delineated Stream

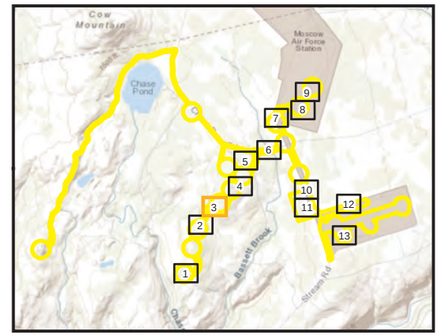


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Figure 7-2
Sheet 3 of 13
Proposed Aquatic Resources Impacts
Western Maine Renewable Energy Project

Prepared For: Western Maine Renewables LLC

Prepared By: TETRA TECH

Date: 06/2021

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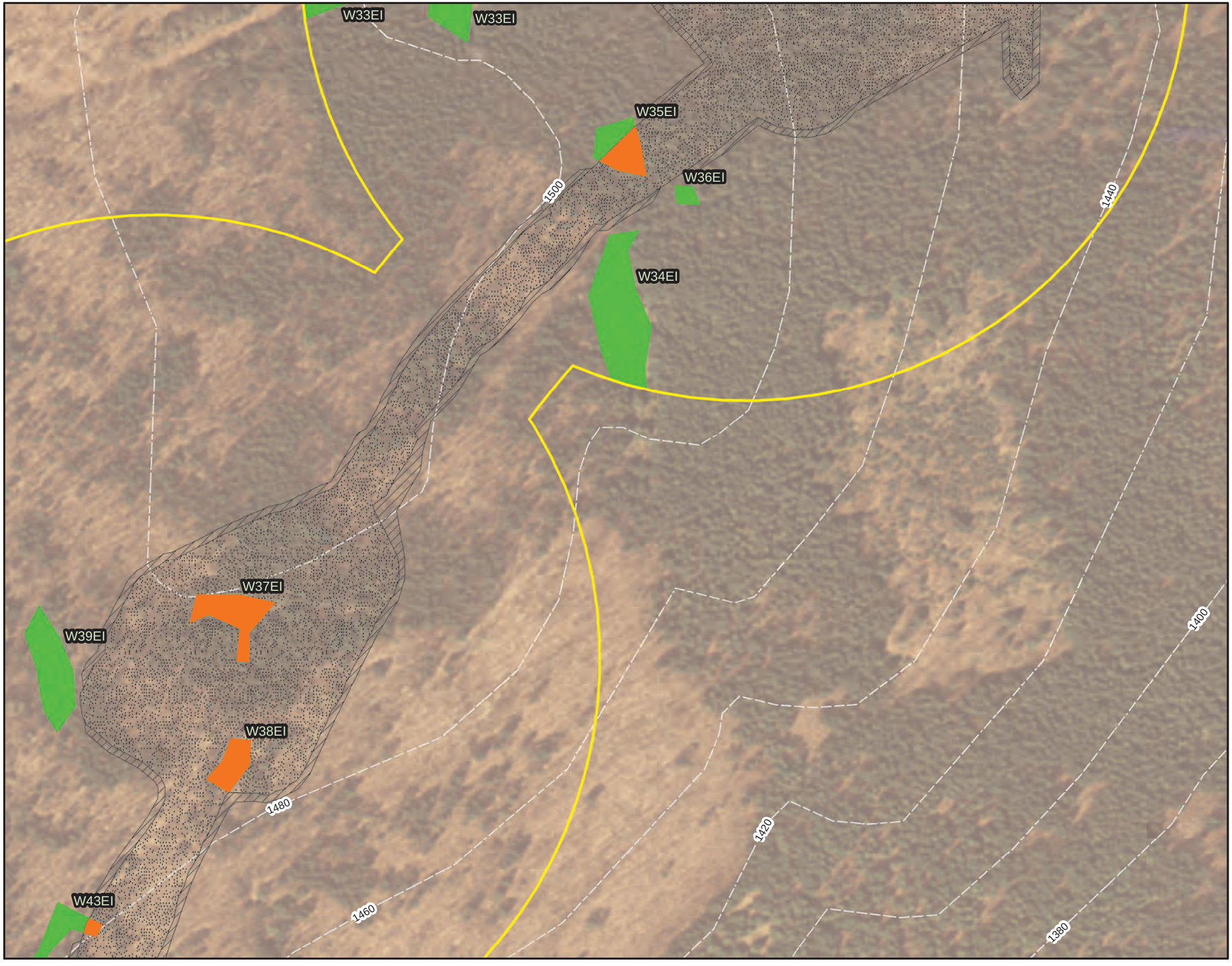

Legend

- Study Area
- 20 Foot Contour
- Clearing Limit
- Grading Limit
- Wetland Clearing Impact
- Wetland Grading Impact
- Delineated Wetland
- Delineated Stream

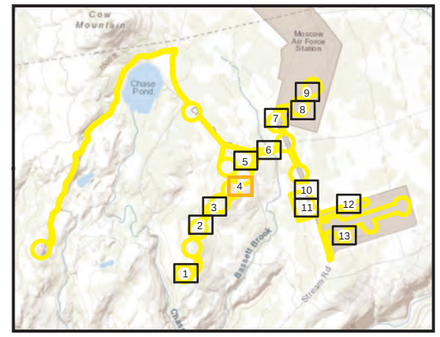

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Figure 7-2
Sheet 4 of 13
Proposed Aquatic Resources Impacts
Western Maine Renewable Energy Project

Prepared For: Western Maine Renewables LLC

Prepared By: TETRA TECH

Date: 06/2021

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Coordinate System: World Geodetic System, 1984 Universal Transverse Mercator, Zone 19 North

Legend

- Study Area
- 20 Foot Contour
- Clearing Limit
- Grading Limit
- Wetland Clearing Impact
- Wetland Grading Impact
- Delineated Wetland
- Delineated Stream

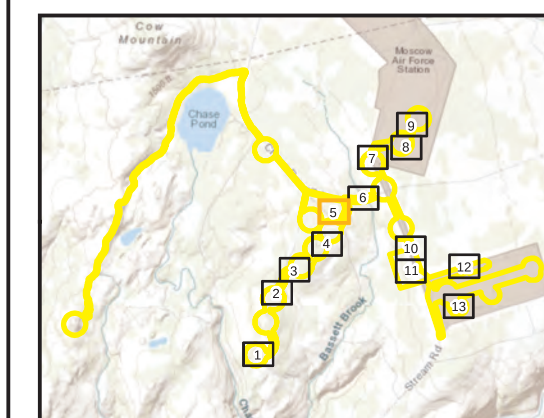

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Figure 7-2
Sheet 5 of 13
Proposed Aquatic Resources Impacts
Western Maine Renewable Energy Project

Prepared For: Western Maine Renewables LLC

Prepared By: TETRA TECH

Date: 06/2021

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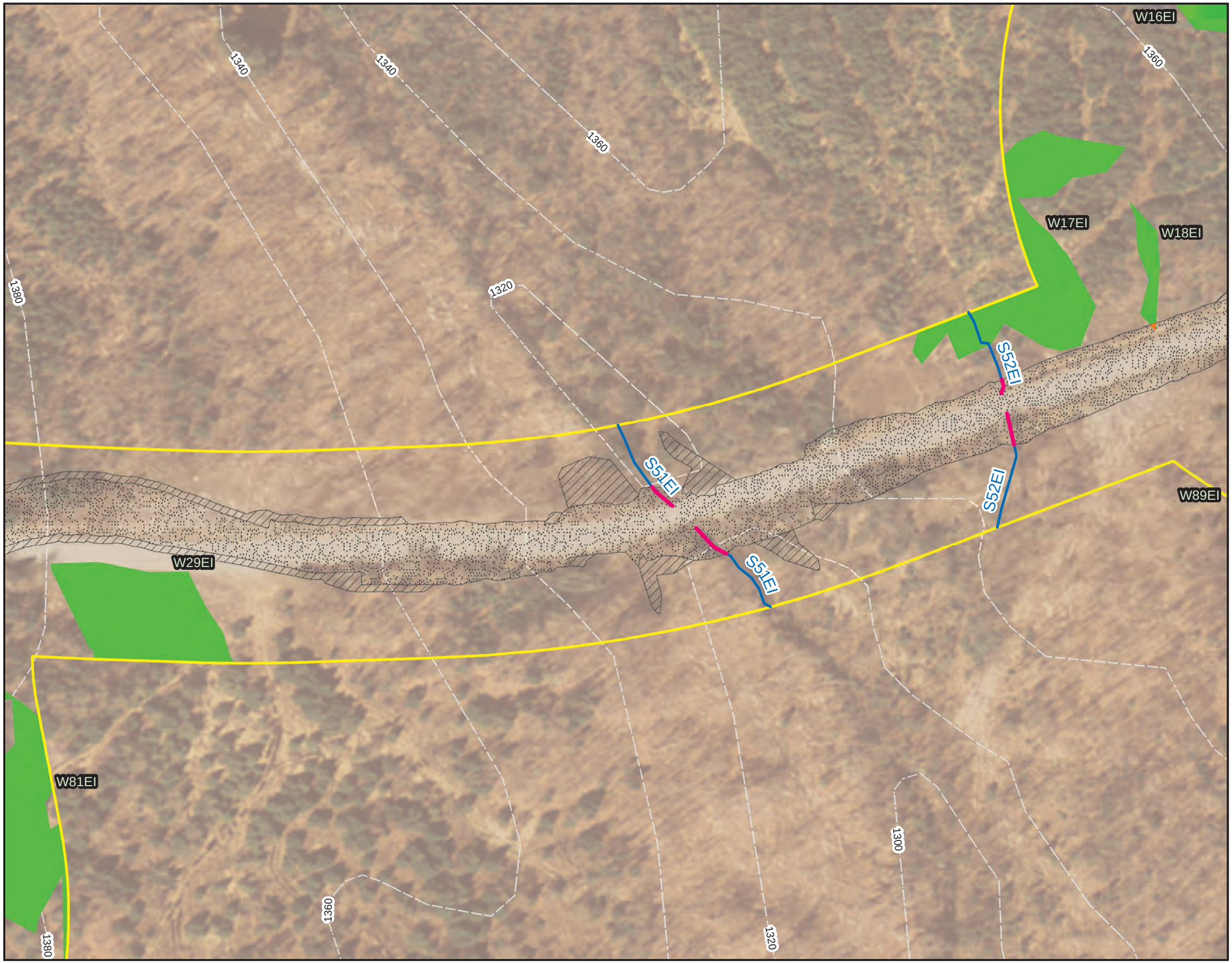

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- Study Area
- 20 Foot Contour
- Clearing Limit
- Grading Limit
- Wetland Grading Impact
- Stream Crossing
- Delineated Wetland
- Delineated Stream

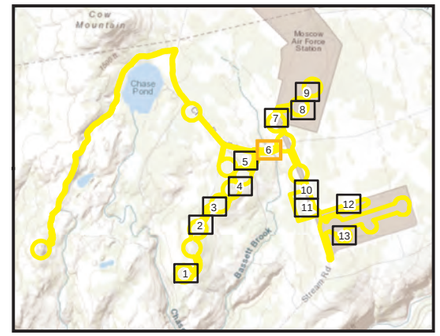

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Figure 7-2
Sheet 6 of 13
Proposed Aquatic Resources Impacts
Western Maine Renewable Energy Project

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Date: 06/2021

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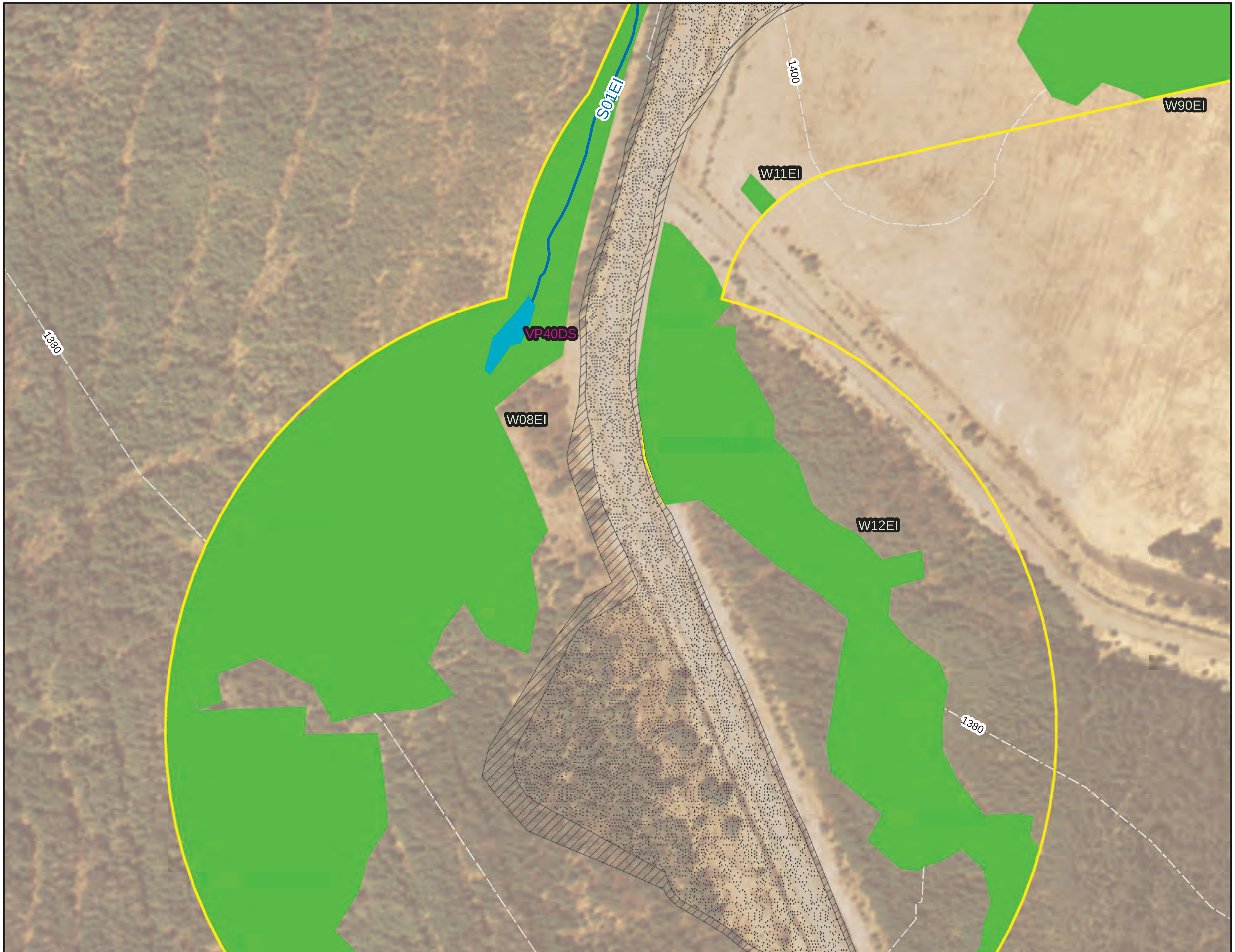

Legend

- Study Area
- 20 Foot Contour
- Clearing Limit
- Grading Limit
- Vernal Pool
- Wetland Clearing Impact
- Delineated Wetland
- Delineated Stream

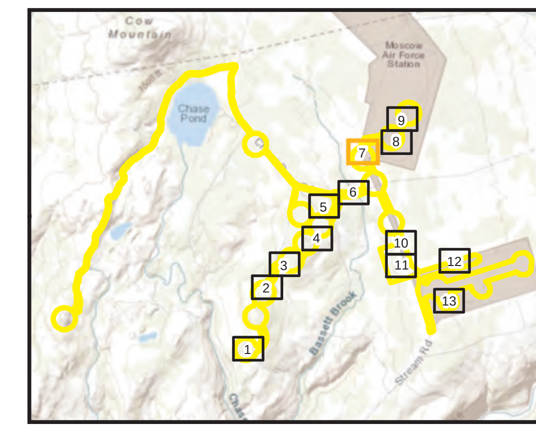

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Figure 7-2
Sheet 7 of 13
Proposed Aquatic Resources Impacts
Western Maine Renewable Energy Project

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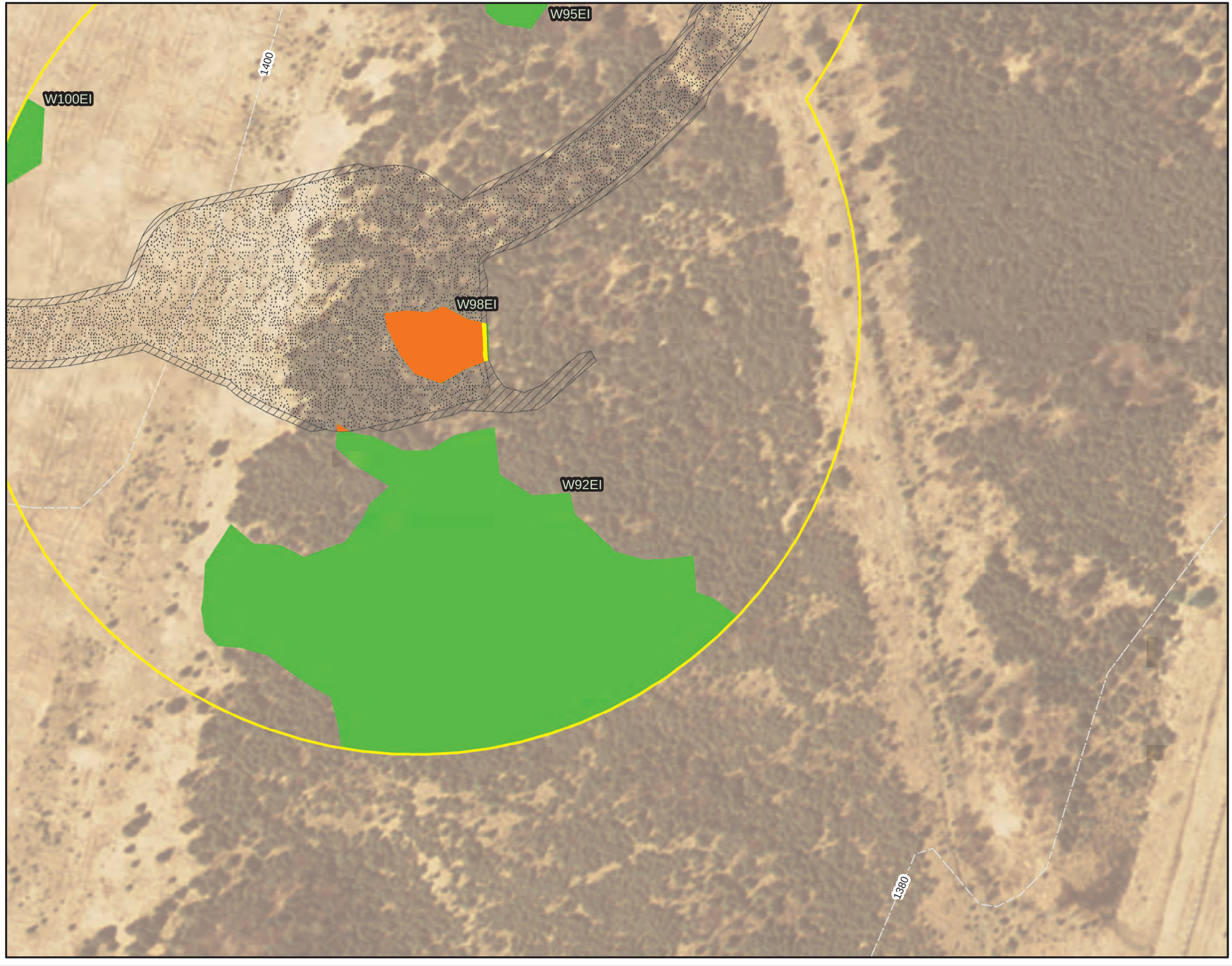

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- 20 Foot Contour
- Clearing Limit
- Grading Limit
- Wetland Clearing Impact
- Wetland Grading Impact
- Delineated Wetland
- Delineated Stream

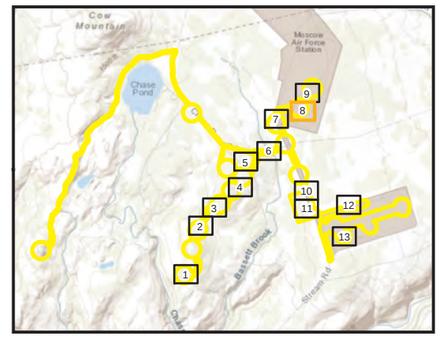

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Figure 7-2
Sheet 8 of 13
Proposed Aquatic Resources Impacts
Western Maine Renewable Energy Project

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Prepared By: TETRA TECH

Date: 06/2021

Source: Esri, et. al., 2020; Tetra Tech, 2020-21; Western Maine Renewables, 2021

Coordinate System: World Geodetic System, 1984 Universal Transverse Mercator, Zone 19 North

W21DS
W20DS
S15DS
S14DS
W17DS
1400
W96EI
W95EI

Legend

- Study Area
- 20 Foot Contour
- Clearing Limit
- Grading Limit
- Wetland Clearing Impact
- Wetland Grading Impact
- Delineated Wetland
- Delineated Stream

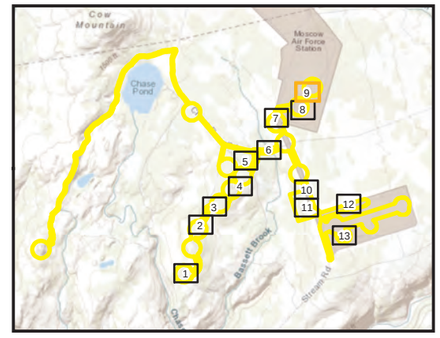

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Figure 7-2
Sheet 9 of 13
Proposed Aquatic Resources Impacts
Western Maine Renewable Energy Project

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Prepared By: TETRA TECH

Date: 06/2021

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Legend

- Study Area
- 20 Foot Contour
- Clearing Limit
- Grading Limit
- Vernal Pool
- Wetland Clearing Impact
- Wetland Grading Impact
- Stream Crossing
- Delineated Wetland
- Delineated Stream

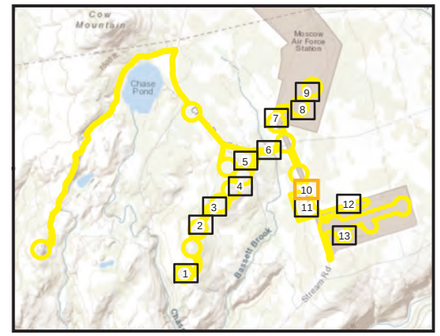

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Figure 7-2
Sheet 10 of 13
Proposed Aquatic Resources Impacts
Western Maine Renewable Energy Project

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Prepared By: TETRA TECH

Date: 06/2021

Source: Esri, et. al., 2020; Tetra Tech, 2020-21; Western Maine Renewables, 2021

Coordinate System: World Geodetic System, 1984 Universal Transverse Mercator, Zone 19 North

Not for Construction

Legend

- Study Area
- 20 Foot Contour
- Clearing Limit
- Grading Limit
- Vernal Pool
- Wetland Clearing Impact
- Wetland Grading Impact
- NECEC Wetland - Temporary Contruction Mat Impact
- Delineated Wetland
- NECEC Wetland
- Delineated Stream

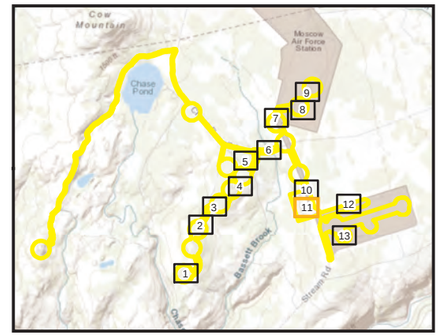

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Figure 7-2
Sheet 11 of 13
Proposed Aquatic Resources Impacts
Western Maine Renewable Energy Project

Prepared For: Western Maine Renewables LLC

Prepared By: TETRA TECH

Date: 06/2021

Source: Esri, et. al., 2020; Tetra Tech, 2020-21; Western Maine Renewables, 2021

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Legend

- Study Area
- 20 Foot Contour
- Clearing Limit
- Grading Limit
- Wetland Clearing Impact
- Delineated Wetland
- NECEC Wetland
- Delineated Stream

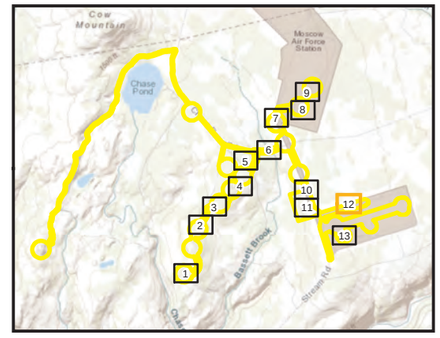

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Figure 7-2
Sheet 12 of 13
Proposed Aquatic Resources Impacts
Western Maine Renewable Energy Project

Prepared For: Western Maine Renewables LLC

Prepared By: TETRA TECH

Date: 06/2021

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Coordinate System: World Geodetic System, 1984 Universal Transverse Mercator, Zone 19 North

Legend

- Study Area
- 20 Foot Contour
- Clearing Limit
- Grading Limit
- Wetland Clearing Impact
- Wetland Grading Impact
- Delineated Wetland
- Delineated Stream

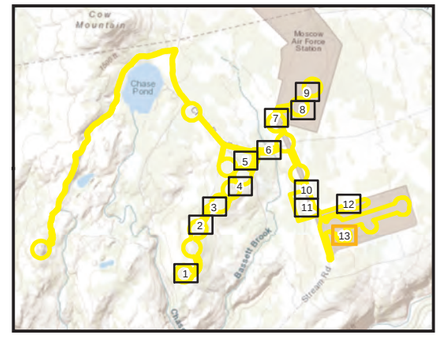

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Figure 7-2
Sheet 13 of 13
Proposed Aquatic Resources Impacts
Western Maine Renewable Energy Project

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Prepared By: TETRA TECH

Date: 06/2021

Source: Esri, et. al., 2020; Tetra Tech, 2020-21; Western Maine Renewables, 2021

Coordinate System: World Geodetic System, 1984 Universal Transverse Mercator, Zone 19 North

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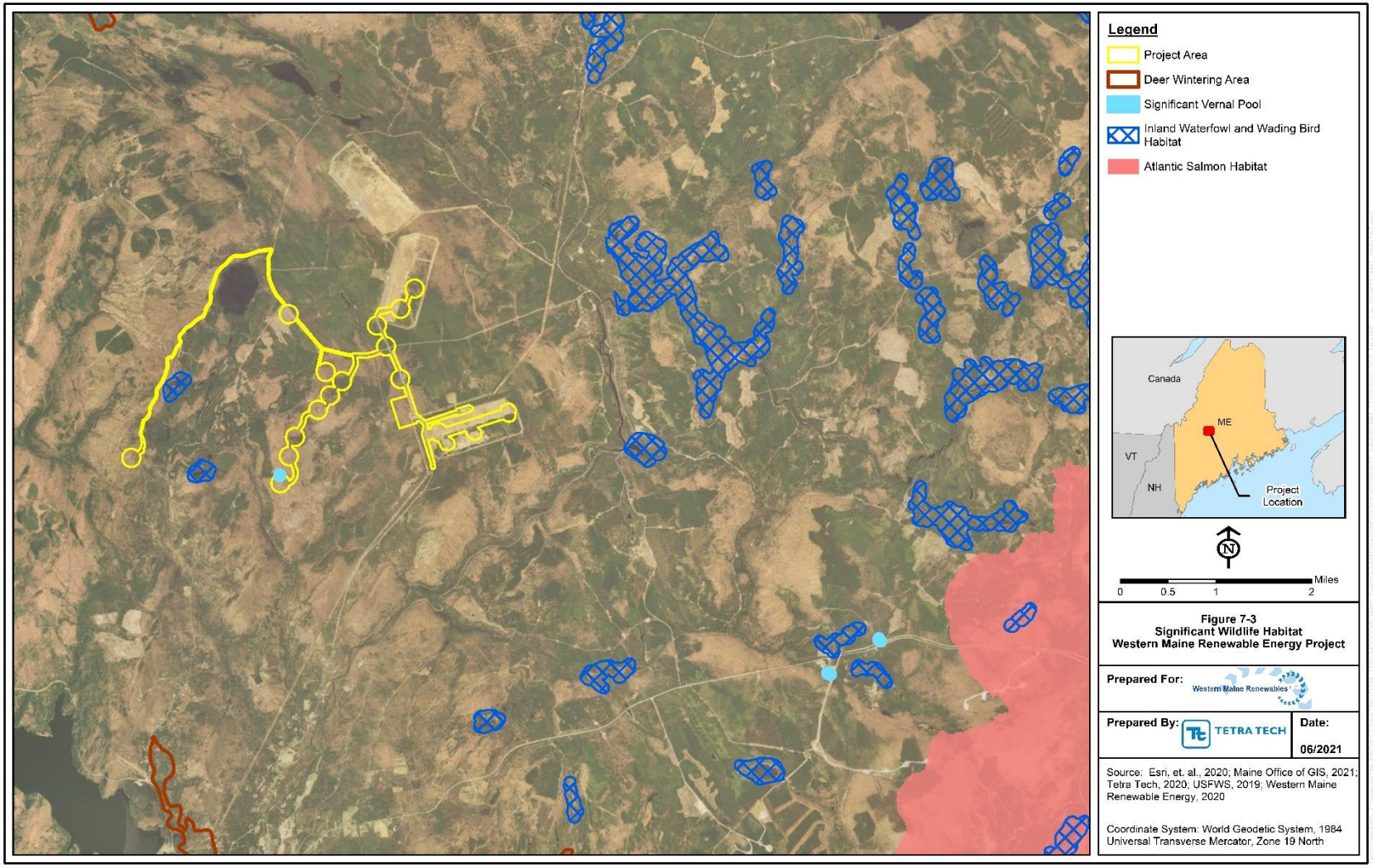

Figure 7-3 Mapped Significant Wildlife Habitat.

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EXHIBIT 7-1 WILDLIFE STUDY PLAN

Patriot Renewables, LLC
Moscow Renewable Energy Project
Study Plan

INTRODUCTION

Patriot Renewables, LLC (Patriot), together with Cianbro Corporation (Cianbro), are working to develop the Moscow Renewable Energy Project (Project), a commercial wind energy project at the decommissioned United States (U.S.) Air Force Radar Installation in the towns of Moscow and Caratunk, Somerset County, Maine (Project Area; Appendix A). As currently envisioned, the Project would consist of approximately 20 GE 3-megawatt (MW) wind turbines on 107-meter towers generating a total of 60.5 MWs, with a potential for an additional 15–20 MWs of solar.

This Study Plan provides relevant background information, includes maps of the Project Area, describes survey methodologies, and clarifies seasonal restrictions and timing of surveys. The Study Plan also establishes strategies and timelines for mobilization, field work, and reporting. Studies included in the Study Plan and specific methodologies may be modified depending on feedback from state and federal wildlife agencies. If necessary, two Tetra Tech staff members may attend at least one on-site agency meeting or site visit and up to two agency conference calls related to developing this Study Plan. Due to seasonal nature of the work some of the studies in the work plan have already begun.

In addition to the feedback received from MDIFW regarding studies to date, Tetra Tech has consulted with the USFWS Maine field office and regional eagle coordinator regarding Canada lynx, eagle use surveys, and northern long-eared bats surveys and summaries of those surveys are also included below. As such, this plan is comprehensive to include feedback from both MDIFW and USFWS.

DESKTOP HIBERNACULA SEARCH AND ACOUSTIC BAT MONITORING

Tetra Tech will perform a desktop review of aerial photography to determine if the Project Area contains ≥½-acre talus fields or rocky outcrops, cliffs, or similar habitat. Tetra Tech will also contact the Maine Department of Inland Fisheries and Wildlife (MDIFW) small mammal biologist to discuss if any potentially valuable features exist in the Project area. If any sites are identified, Tetra Tech will conduct bat acoustic monitoring using full spectrum Wildlife Acoustics bat detectors in accordance with MDIFW survey protocols to determine if any bat hibernacula are present on site and whether they are in use by any Maine listed Threatened, Endangered, and Special Concern bat species. Detectors would be deployed to capture emergence of bats from hibernacula from Mid-November through December 2020. MDIFW guidelines indicate that, at a minimum, one detector should be placed at each feature. Data will be analyzed in accordance with MDIFW protocols. Tetra Tech will prepare a brief technical memorandum of the survey results.

CAMERA TRAP SURVEY

A camera trap survey was recommended at the site to supplement historic tracking data that was collected previously at the project site. Tetra Tech will conduct a camera trap survey plan following an

approved work plan by USFWS Maine Field Office. Seven camera traps (motion-activated camera stations with visual and olfactory lures) will be deployed for a minimum three-month period. Surveys will be conducted using protocols developed by Nielsen and McCollough[1] and Alexej Siren.[2] Camera stations will include long range (a hanging compact disc) and short range (a turkey feather attached to a swivel) visual attractants. A variety of olfactory attractants have been used for Canada Lynx, including beaver castor oil with cat nip and general predator call lure. A snow stake marked at 10 cm increments will be used at the camera station to provide size reference for animals detected and to track snow depth throughout the winter. Cameras will be oriented north on a tree 1–2 m above the ground or snow surface and 3–5 m from the snow depth stake with feather and scent. Browning Strike Force Pro cameras will be used for the surveys and feature 24 mega pixel resolution, red glow infra-red flash, and specific day and night lens. Each camera will be stocked with 6 AA lithium batteries at survey start. Cameras will be checked monthly to download data, refresh attractants, and to ensure cameras are working properly.

EAGLE USE SURVEYS

Tetra Tech in coordination with the USFWS regional eagle coordinator designed an eagle use survey following the recommendations from the U.S. Fish and Wildlife Service *Land-Based Wind Energy Guidelines*[3] and *Eagle Conservation Plan Guidance*[4] as well as the Eagle Rule for wind projects. Tetra Tech implemented eagle use surveys at two survey points in January 2020. The objectives of eagle use surveys would be to (1) estimate the distribution (seasonal, spatial, and temporal use) of the project area by eagles, and (2) assess collision risk posed by the Project and (3) collect information that can be used for any future collision risk models or incidental take permits as requested by the agencies. Surveys are planned for a full year to assess year-round risk to eagles.

Due to an additional string of turbines being added to the project (May 2020) an additional eagle use survey point will be added to future eagle use beginning June 2020.

GOLDEN EAGLE SURVEYS

On February 21, 2020, MDIFW recommended 1 year of golden eagle surveys to be conducted February 15–June 15 and August 1–December 15, 2020 following the raptor migration protocol described in MDIFW's *Maine Wind Power Preconstruction Recommendations*[5]. It is possible that some of the geologic features exhibited by mountains near the Project Area could potentially attract golden eagles. According to MDIFW, there is telemetry documentation of golden activity within the Project Area. A second year of

[1] Nielsen, C.K. and McCollough, M.A., 2009. Considerations on the use of remote cameras to detect Canada lynx in northern Maine. *Northeastern Naturalist*, *16*(1), pp.153-158.

[2] Siren, A.P.K. 2014. A comparison of snow-track and camera surveys for detecting Canada lynx (*Lynx Canadensis*) and sympatric carnivores in north central New England. Unpublished report. New Hampshire Fish and Game.

[3] https://www.fws.gov/ecological-services/es-library/pdfs/WEG_final.pdf

[4] https://www.fws.gov/migratorybirds/pdf/management/eagleconservationplanguidance.pdf

[5] MDIFW (Maine Department of Inland Fisheries and Wildlife). 2018. Maine Wind Power Preconstruction Recommendations and Turbine Curtailment Recommendations to Avoid/Minimize Bat Mortality. Updated March 5, 2018.

golden eagle surveys may be requested pending results from the first year. Prior to receiving MDIFW's recommendations, Tetra Tech had been conducting eagle use surveys at the site (two survey points, 1 hour at each point, every 2 weeks) starting on January 10, 2020 based on recommendations from the USFWS *Land-based Wind Energy Guidelines*[6] and *Eagle Conservation Plan Guidance*[7] for wind projects across the United States. Tetra Tech began the first golden eagle survey following MDIFW's recommendations on March 4, 2020. Due to an additional string of turbines being added to the project (May 2020) an additional survey point will be added to future eagle use and golden eagle surveys.

Golden eagle surveys are conducted two times per week two survey points, one day at each survey point, every week in the spring) in weather conducive to golden eagle movement, from 9am until 2 hours before sunset. An additional third survey point will be added to the fall survey. A survey point in the new additional string and a one of the two surveys points in the original project area will be sampled weekly during the fall surveys.

The number of individuals, behavior (especially foraging or stopover/staging activity), flight height (especially abrupt changes owing to orographic lift) and direction, time of sighting, and location/direction of travel of each bird relative to the Project area are recorded. Incidental observations of raptors are also recorded. Data is collected digitally in the field using electronic data forms loaded on to a ruggedized tablet and related to spatial data collection through an integrated global positioning system (GPS). Data is synced daily to Tetra Tech's centralized, cloud-based database. All data will be summarized and incorporated into a brief technical memorandum.

BREEDING BIRD SURVEY

In their March 10, 2020 Preliminary Resource Survey Recommendations for the Project, MDIFW requested a breeding bird survey for the Project Area. A breeding bird survey will document nesting birds during 10-minute point counts designed to document singing males. Three separate survey events will be completed from late May to early June following MDIFW guidance. Point count surveys will be representative of the habitats within the Project area and be a minimum of 200 meters apart. Survey efforts would be focused on grassland bird species, American pipit (*Anthus rubescens*), upland sandpiper (*Bartramia longicauda*), and rusty blackbird (*Euphagus carolinus*), among others. Tetra Tech would also contact MDIFW to discuss if there is any known information on the presence of these species in the Project Area. Species composition and abundance survey results would be incorporated into a brief field survey report.

This survey will update work conducted by Tetra Tech at the Project Area during late May and early June, 2013 when three rounds of breeding bird point count surveys were completed. During those surveys, 17 point count locations were sampled for 10 minutes each, resulting in 510 minutes of survey effort. A total of 371 birds representing 47 species were observed and recorded. The number of observations at each point count location ranged from 12 to 36. The species richness (i.e., number of different species occurring within a given area) varied from 7 to 18 species per point. Of the 47 species observed during the 2013 breeding bird survey, six species are listed as species of special concern by MDIFW. These species include northern harrier (*Circus hudsonius*), rusty blackbird, black-and-white warbler (*Mniotilta varia*), white-throated sparrow (*Zonotrichia albicollis*), least flycatcher (*Empidonax minimus*), and chestnut-sided warbler *(Setophaga pensylvanica)*.

[6] March 2012. Available at https://www.fws.gov/ecological-services/es-library/index.html.
[7] April 2013. Available at https://www.fws.gov/ecological-services/es-library/index.html.

ROARING BROOK MAYFLY, NORTHERN SPRING SALAMANDER, AND NORTHERN BOG LEMMING PRESENCE/ABSENCE SURVEY

In their March 10, 2020 Preliminary Resource Survey Recommendations for the Project, MDIFW indicated that both the state-listed threatened Roaring Brook mayfly (*Epeorus frisoni*) and the northern spring salamander (*Gyrinophilus porphyriticus porphyriticus*), a state-listed species of special concern, have the potential to exist in the Project Area. MDIFW also noted that Roaring Brook mayflies are known to be present in Caratunk.

Roaring Brook mayflies are restricted to clean, cold, high-elevation headwater streams with coarse substrates above 1,000 feet elevation and bordered by relatively undisturbed mixed or hardwood forest. The Roaring Brook mayfly survey will be conducted by a subcontractor in September 2020 following MDIFW's revised *Recommended Survey Protocol for the Roaring Brook Mayfly* (April 17, 2020). Dipnet samples of gravel/cobble riffle areas and leaf pack surveys will be conducted in two reaches of Chase Stream and Mink Brook which are above 1000' in elevation. These two streams cross the existing powerline corridor to the Wyman Dam substation. Bassett Brook is a tributary of Chase Stream. The upper reach of Bassett Brook, located to the west of Stream Rd., is above 1000' in elevation. Heald Stream is outside of the study area but has an unnamed tributary that flows from the study area at an elevation above 1000' and will be sampled. . Surveys will include all possible habitat upstream and downstream of the power line crossings. Field support will be provided by Tetra Tech staff, as necessary. All late instar specimens of *Epeorus* will be preserved in 70 percent ethanol for identification to species in the lab and delivered to Tetra Tech. The Maine Department of Environmental Protection (MDEP) field sheet for habitat and water quality will be completed for each sample location. Tetra Tech will submit all *Epeorus* samples to MDIFW for verification. Tetra Tech will develop a final field report or technical memorandum summarizing the survey effort.

Northern spring salamanders use clear, cold, mountain streams underlain by coarse substrates at or above 500 feet and bordered by hardwood or mixed wood forests. The species typically occurs in moderate to fast gradient first or second order streams. They can also occur in larger third-order streams and rivers with similar habitat characteristics. Field work will be conducted by a team of two Tetra Tech biologists between mid-May and mid-September, following MDIFWs *Northern Spring Salamander Survey Protocols* (September 25, 2019). A minimum of one field visit and a maximum of three field visits will be conducted. Tetra Tech will develop a brief field report or technical memorandum summarizing the survey effort.

Northern bog lemming habitat consists of alpine sedge meadows, krummholz, spruce-fir forest with dense herbaceous and mossy ground cover, acidic wet meadows, and mossy stream-sides that are at or above 1,000 feet elevation in the western mountain and northern areas of Maine. Most of the Project area and interconnection line is above 1,000 feet. Suitable habitat for northern bog lemming will be documented and evaluated during other field surveys, especially vernal pool surveys and wetland delineation. If potential habitats meet the criteria above, surveys will be conducted to document presence/probable absence, including documenting the presence of green scats, latrines, and runways and the collection of field samples for eDNA testing. Tetra Tech will contact MDIFW's Small Mammal Biologist for the latest guidance and protocols.

GREAT BLUE HERON SURVEY

The great blue heron (*Ardea herodias*) is listed in Maine as a species of special concern. In their *March 10, 2020 Preliminary Resource Survey Recommendations for the Project*, MDIFW recommended a great blue heron survey to update previous surveys and ensure coverage of the Project Area. Tetra Tech will conduct an aerial survey for great blue heron rookeries within a 4-mile radius of the Project Area boundaries to look for new and existing colonies and level of use. The survey will be conducted by helicopter with one Tetra Tech biologist in a 1-day effort May 1–June 15, 2020 in conjunction with the eagle aerial nest survey . Incidental sightings of herons during other surveys will also be documented. Results of this survey and incidental observations will be summarized and included in the Project's permit applications.

Great blue heron were observed incidentally at the Project Area during a raptor use survey conducted during the summer of 2013. An aerial survey for eagle nests and great blue heron rookeries was completed in 2013, but no great blue heron rookeries were observed during the survey (Tetra Tech 2015).

NORTHERN LONG-EARED BAT ACOUSTIC PRESENCE/ABSENCE SURVEY

The Project area falls within the designated white-nose syndrome (WNS) zone of the northern long-eared bat (*Myotis septentrionalis*; NLEB). Since some tree clearing is expected along the access roads and proposed turbine pads, a presence/absence survey for NLEB also will be completed within the Project Area in accordance with the latest USFWS Range-wide Indiana Bat Survey Guidelines (Guidelines). The NLEB is a medium-sized interior forest bat adapted to feeding on insects beneath the forest canopy. Found primarily across much of eastern and north-central U.S., NLEBs roost under tree bark and in small tree cavities of live and standing dead trees (snags) as well as on or in buildings. The species is more solitary than most other *Myotis* species, and individuals are generally found singularly or in small maternity colonies (typically fewer than 60 individuals). The NLEB inhabits intact interior forest habitat with late successional features such as complex vertical structure, tree fall gaps, and standing snags. NLEBs hibernate from October or November until mid-March in caves, mines, and sometimes other man-made structures. Winter hibernacula can be up to 150 miles away from summer roost sites. As a cave-hibernating bat, NLEB has been strongly affected by WNS, with population declines observed in most of its range. The entire state of Maine either includes counties with WNS-infected hibernacula, or is within the 150-mile buffer zone around WNS-positive counties.

This survey will utilize a two-phased approach: Phase 1–desktop and field-based habitat assessments, and Phase 2–field-based habitat ground-truthing and acoustic surveys. Prior to conducting field work, a qualified biologist will use Google Earth (or a similar application) to review aerial photography and identify areas that may be used by NLEB and other bats for foraging and roosting during the breeding and migration seasons (Phase 1 of Guidelines). Potentially suitable roosting habitat will be identified based on forest patch size and proximity to suitable foraging habitats. Closed-canopy forests will be considered potentially suitable roosting or foraging sites and will be further evaluated during the field assessment. In addition to potential roosting habitat, landscape features that may be used by bats commuting between roosting and foraging habitats (e.g., fence rows, wind breaks) will also be identified. Any areas that could potentially support hibernacula, including karst or similar geological formations will also be evaluated. Protected natural resources (e.g., parks, wildlife refuges, wildlife management areas) near the project area will also be noted.

The desktop assessment will inform decision-making regarding (1) whether a project is linear or non-linear, (2) what the appropriate level of effort would be for the field verification, (3) how many acoustic

detectors should be deployed, and (4) the approximate locations of where acoustic detectors will be deployed (Figure 1). Basic field maps and GPS points may be generated during the desktop assessment to support field work. Based on a preliminary desktop assessment, the Project Area was determined to be linear, following a path that includes the transmission line and all access roads associated with the proposed turbine pads. A minimum of 2 detector nights are required per kilometer of suitable habitat for linear projects; therefore, Tetra Tech will deploy acoustic detectors for a minimum of detector nights distributed throughout the Project Area based on the final project layout. The exact number of detectors and detector nights will be determined after a formal desktop habitat assessment has been performed.

Following USFWS approval of this Study Plan, Tetra Tech will conduct a site visit to verify the presence of and describe the NLEB habitat identified during the desktop analysis, and to deploy the acoustic detectors. The acoustic survey will utilize full-spectrum Wildlife Acoustics bat detectors. Acoustic surveys will be performed within the protocol sampling window (May 15–August 15) in 2020 in accordance with the Guidelines.

Upon completion of the survey, recorded acoustic data will be analyzed in accordance with the Guidelines, which recommends a multi-stage approach to call analysis. The data will be run through a coarse filter analysis, followed by a quantitative analysis, and then a final qualitative analysis of the results will be performed by a qualified biologist. In accordance with the Guidelines, one or more of the approved analysis programs will be used for the quantitative analysis step. Tetra Tech will prepare a brief technical memorandum of the survey results.

EAGLE NEST SURVEY

USFWS has recommended an aerial eagle nest survey within a 4-mile radius of the Project Area boundaries to look for new and existing nests. This survey will update a previous survey conducted by Tetra Tech on April 16, 2013. The survey will be conducted by helicopter with one Tetra Tech biologist in a 1-day effort May 1–June 15, 2020 in conjunction with the great blue heron survey. Results of this survey and incidental observations will be summarized and included in the Project's permit applications.

The 2013 survey used a 10-mile radius and identified three active bald eagle nests, and one active nest just outside the 10-mi radius area. All four of these nests were previously mapped by MDIFW, and all four nests were located in large, super-canopy eastern white pines (*Pinus strobus*) along the banks of the Kennebec River. There were no eagle nests found within the Project area. The closest nest to the Project boundary was 5.4 miles (8.7 kilometers), and the mean inter-nest distance between the four nests was 7.08 miles (11.4 kilometers). No great blue heron rookeries or golden eagles (*Aquila chrysaetos*) nests were observed during the aerial survey (Tetra Tech 2015).

UPLAND SANDPIPER SURVEY

In their March 10, 2020 Preliminary Resource Survey Recommendations for the Project, MDIFW requested additional surveys for upland sandpiper since they have been previously recorded on site. In addition to the breeding bird survey areas, searches will be conducted by a wildlife biologist over four one-day site visits during the months of June, July, August, and September looking to determine seasonal use. Site visits will be focused within grassland, barren, or bog habitats that are most likely to support breeding upland sandpiper and will be timed to occur during clear weather conditions to improve detectability. Survey of suitable breeding habitats will consist of meandering transects to record visual observations and audible calls. Audible whistles also may be used during the survey to determine presence. Survey locations

and the number of adults and young observed/heard, approximate locations of active nests and nesting activities, and habitat notes will be documented on field maps, with a GPS, and photographed (if possible). One-day of survey work will consist of two survey periods, with the first occurring at dusk (1800–2030) and the second occurring the following morning at dawn (0415–0615). Species composition and abundance survey results would be incorporated into a brief field survey report.

VERNAL POOL SURVEY

Tetra Tech will perform a vernal pool survey of the Project area, including completion of two site visits to identify vernal pools and assess their significance in accordance with Chapter 335 of the NRPA:

> *"A vernal pool, also referred to as a seasonal forest pool, is a natural, temporary to semi-permanent body of water occurring in a shallow depression that typically fills during the spring or fall and may dry during the summer. Vernal pools have no permanent inlet or outlet and no viable populations of predatory fish. A vernal pool may provide the primary breeding habitat for wood frogs (*Rana *[*Lithobates*]* sylvatica*), spotted salamanders (*Ambystoma maculatum*), blue-spotted salamanders (*Ambystoma laterale*), and fairy shrimp (*Eubranchipus *sp.), as well as valuable habitat for other plants and wildlife including several rare, threatened, and endangered species. A vernal pool intentionally created for the purposes of compensatory mitigation is included in this definition."*

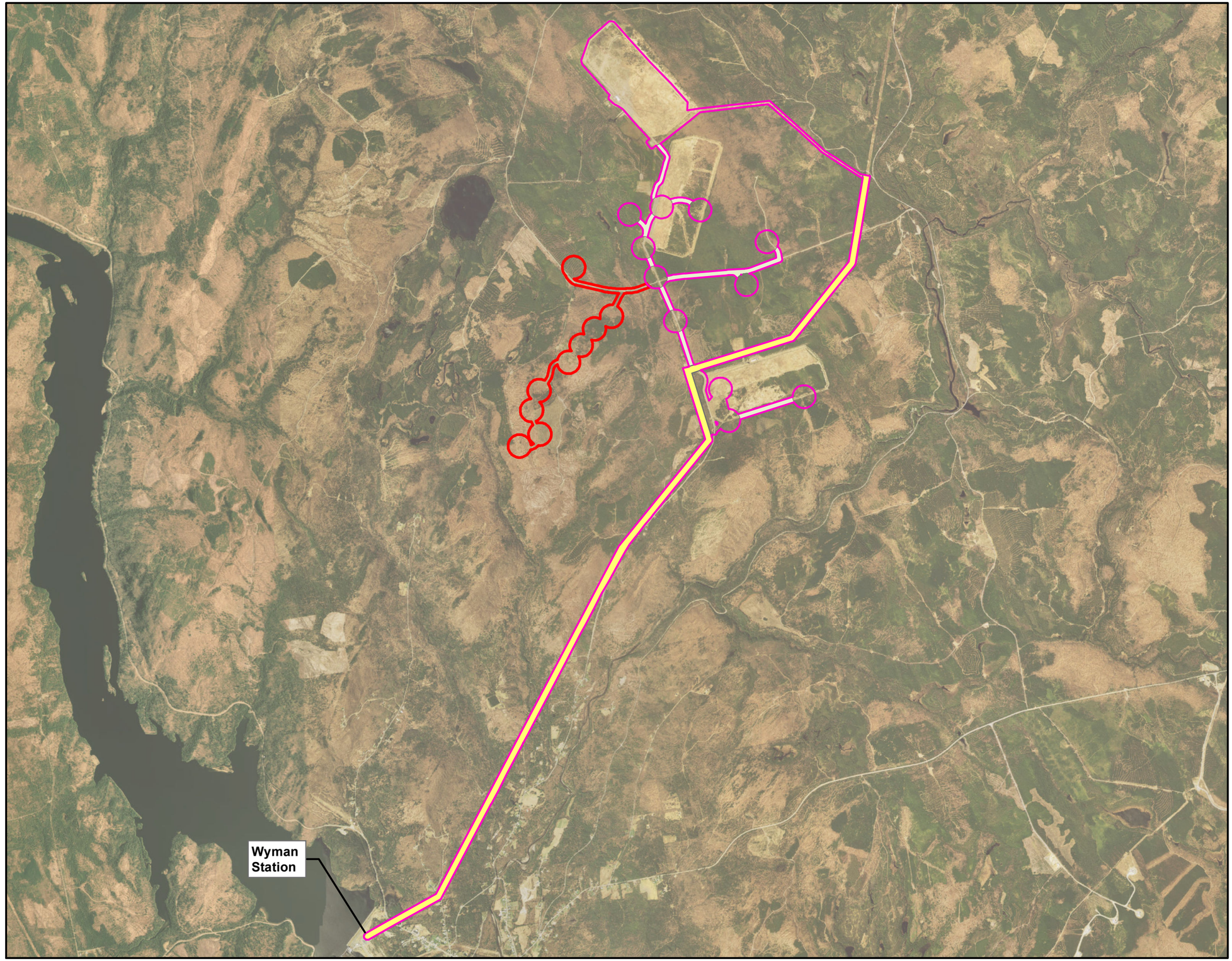
The criteria for identifying a Significant Vernal Pool are described in detail in the April 2014 Maine Association of Wetland Scientists Vernal Pool Technical Committee Vernal Pool Survey Protocol. This survey effort focuses on the requirements to meet Maine regulations relating to vernal pools, as well as recording egg mass counts in Amphibian Breeding Areas.

The first round of vernal pool surveys will be initiated approximately two weeks following reports of full wood frog chorusing (as reported by local area wetland scientists). The Project falls within the MDIFW Central Region, which has target windows for vernal pool surveys conducted for wood frogs between April 25–May 10, and salamander egg masses between May 5–May 25. Two rounds of vernal pool surveys (i.e., secondary visits to surveyed pools to assess later breeding or emergence of vernal pool indicator species) will take place approximately 2–3 weeks after an appropriately timed first visit, depending on weather and reports from proximal field efforts regarding vernal pool activity.

When a resource is encountered that appears to meet the definition of a vernal pool, biologists will GPS the edge of the pool (during spring high water conditions). Scientists will wade through the pool to search for vernal pool indicator species egg masses, presence of fairy shrimp, and/or associated RTE species. The second round of vernal pools surveys will be conducted to assess for later breeding vernal pool indicator species, the presence of fairy shrimp (which often do not emerge until late spring), and/or associated RTE species.

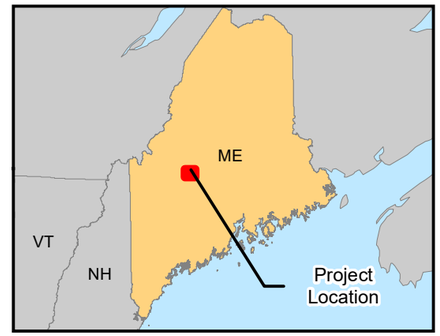
For vernal pools that extend beyond the Project boundary, efforts will be made to visually survey the pool for the presence of egg masses to an approximate distance of no greater than 30 feet from the Project boundary. Photographs and notes regarding the potential full extent of these vernal pools (as much as can be ascertained in this manner) will be collected. All vernal pools will be photographed from various angles. Representative photos of egg masses will be taken. Shapefiles of the delineated vernal pool spring high water boundaries will be provided to Patriot upon completion of the work. All data will be summarized and incorporated into a comprehensive report.

APPENDIX A. STUDY AREA



Legend

- Proposed Survey Area
- Additional Survey Area
- Right-of-Way Verification Area



N

0 2,000 4,000 8,000 Feet

Figure 1
Revised Study Area
Moscow Renewable
Energy Project

Prepared For: PATRIOT RENEWABLES

Prepared By: TETRA TECH

Date: 06/2020

Source: Esri, et. al., 2016; Patriot Renewables, 2019

Coordinate System: North American Datum, 1983 Universal Transverse Mercator, Zone 19 North