



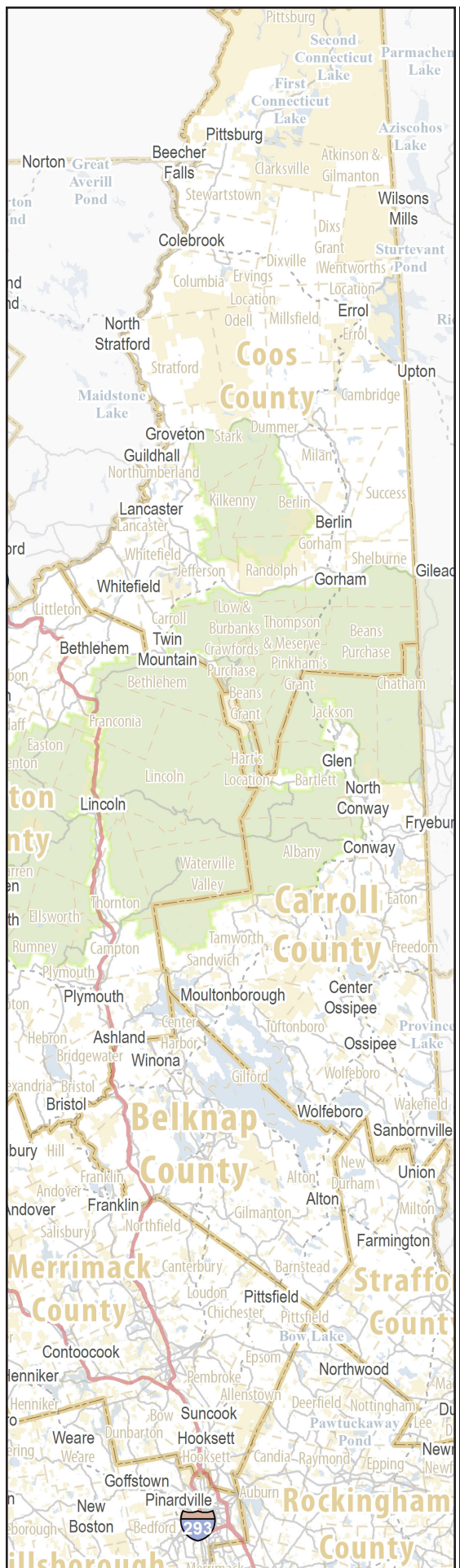
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DRAFT

NORTHERN PASS TRANSMISSION LINE PROJECT ENVIRONMENTAL IMPACT STATEMENT SUPPLEMENT

U.S. DEPARTMENT OF ENERGY
OFFICE OF ELECTRICITY DELIVERY
AND ENERGY RELIABILITY
WASHINGTON, DC

NOVEMBER 2015



DRAFT

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ENVIRONMENTAL IMPACT STATEMENT
DOE/EIS-0463-S1**

Supplement

**U.S. DEPARTMENT OF ENERGY
OFFICE OF ELECTRICITY DELIVERY
AND ENERGY RELIABILITY**



COOPERATING AGENCIES

**United States Forest Service – White Mountain National Forest
United States Environmental Protection Agency– Region 1
United States Army Corps of Engineers – New England District
New Hampshire Office of Energy and Planning**

November 2015

COVER SHEET

RESPONSIBLE FEDERAL AGENCY: U.S. Department of Energy (DOE), Office of Electricity Delivery and Energy Reliability

COOPERATING AGENCIES: United States Forest Service (USFS) – White Mountain National Forest (WMNF); United States Environmental Protection Agency (EPA) – Region 1; United States Army Corps of Engineers (USACE) – New England District; and New Hampshire Office of Energy and Planning (NHOEP)

TITLE: Supplement to the Northern Pass Transmission Line Project Environmental Impact Statement (DOE/EIS-0463-S1)

LOCATION: Coös, Grafton, Belknap, Merrimack, and Rockingham counties in New Hampshire

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ABSTRACT: Northern Pass Transmission, LLC (Northern Pass) has applied to the DOE for a Presidential permit to construct, operate, maintain, and connect a 192-mile (309-km) electric transmission line across the United States (U.S.)/Canada border in northern New Hampshire (NH). The draft EIS analyzes potential environmental impacts from the proposed project (as described in the amended Presidential permit application filed by Northern Pass Transmission, LLC [Northern Pass] on July 1, 2013) and the range of reasonable alternatives (collectively referred to as “the Project”). In August 2015 subsequent to the publication of the draft EIS, Northern Pass submitted a “Further Amendment to Presidential Permit Application” which made changes to Northern Pass’ proposed project. In light of the August 2015 amendment to the application, this supplement identifies the revised proposal (hereafter referred to as “Alternative 7”), rather than Alternative 2, as the Proposed Action. This supplement to the draft EIS addresses the potential environmental impacts of Alternative 7 in comparison to the No Action Alternative and nine additional action alternatives analyzed in the draft EIS (Alternatives 2 through 6, with variations). The NH portion of Alternative 7 would be a single circuit \pm 300 kilovolt (kV) high voltage direct current (HVDC) transmission line running approximately 158 miles (254 km) from the U.S. border crossing with Canada in Pittsburg, NH, to a new direct current-to-alternating current (DC-to-AC) converter station to be constructed in Franklin, NH. From Franklin, NH, to the Project terminus at the Public Service of New Hampshire’s existing Deerfield Substation located in Deerfield, NH, the

Project would consist of 34 miles (55 km) of 345 kV AC electric transmission line. The total length of the Project would be approximately 192 miles (309 km).

PUBLIC COMMENTS: In preparing the draft EIS and this supplement, DOE considered comments received during the scoping period, which extended from February 11, 2011 to June 14, 2011, and was reopened from June 15, 2011 to November 5, 2013 (DOE accepted and considered all comments during the scoping period from February 11, 2011 to November 5, 2013). Additional comments were received during 11 public meetings that took place throughout the same time period in the following communities: Pembroke, Franklin, Lincoln, Whitefield, Plymouth, Colebrook, Haverhill, and Concord, NH. Comments received during this period were considered during preparation of the draft EIS and this supplement.

The draft EIS and this supplement analyze the potential environmental impacts of DOE issuing a Presidential permit for the proposed Northern Pass Project, which is DOE's proposed federal action. DOE will use the draft EIS and this supplement to inform its decision on whether to issue a Presidential permit. Additionally, Northern Pass has applied to the USFS for a special use permit (SUP) authorizing Northern Pass to construct, operate, and maintain an electric power transmission line crossing portions of the WMNF. The WMNF Forest Supervisor will use the draft EIS and this supplement to inform its decision regarding: 1) whether to issue a SUP under the Federal Land Policy and Management Act; 2) the selection of an alternative; 3) any need to amend the Forest Plan; and 4) what specific terms and conditions should apply if a SUP is issued.

Copies of the draft EIS and this supplement are available for public review at 30 local libraries and town halls, or a copy can be requested from Mr. Brian Mills. The draft EIS and this supplement are also available on the Northern Pass EIS website (<http://www.northernpasseis.us/>).

DOE invites comments on the draft EIS and this supplement during the comment period that began with the publication of the EPA's Notice of Availability in the *Federal Register*. As a result of Northern Pass' revision to its proposal, DOE issued a notice of intent to prepare this supplement to the draft EIS (80 Fed. Reg. 58725 [September 30, 2015]). In the same notice, DOE also announced that the public comment period on the draft EIS would be extended to December 31, 2015, to allow for public comment on the draft EIS and this supplement, and DOE announced that public hearings which were to be held in October 2015 would be rescheduled. The comment period on the draft EIS, including this supplement, closes 45 days after publication by the U.S. Environmental Protection Agency (EPA) of the notice of availability of this supplement. In addition to comments on the draft EIS, DOE is seeking public input with respect to the cultural and historic property information presented in the draft EIS in accordance with its cultural and historic property review under Section 106 of the National Historic Preservation Act.

The EIS website (<http://www.northernpasseis.us/>) provides information on the rescheduled public hearings to be held at several locations in New Hampshire during the comment period. Comments on the draft EIS (including this supplement) and Section 106 may be submitted on the EIS website (<http://www.northernpasseis.us/>), sent via email to draftEIScomments@northernpasseis.us or Section106comments@northernpasseis.us, sent to Mr. Brian Mills at the physical address above, or provided verbally or in writing at a public hearing. Written and oral comments will be given equal weight, and any comments received after the comment period ends will be considered to the extent practicable.

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LIST OF ACRONYMS

AC	alternating current
ANST	Appalachian National Scenic Trail
APE	area of potential effects
APM	applicant proposed measure
CO	carbon monoxide
CO ₂	carbon dioxide
dBA	A-weighted decibels
DC	direct current
DOE	(United States) Department of Energy
EIS	environmental impact statement
EMF	electric and magnetic field
EO	Executive Order
EPA	(United States) Environmental Protection Agency
ESA	Endangered Species Act
FE	federally-endangered
FEMA	Federal Emergency Management Agency
FT	federally threatened
ha	hectare
HVAC	high-voltage alternating current
HVDC	high-voltage direct current
I-	Interstate
ISO-NE	New England Independent Systems Operator
km	kilometer
kV	kilovolt
m	meter
MA	Management Area
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NH	New Hampshire
NHB	(New Hampshire) National Heritage Bureau
NHFG	New Hampshire Fish and Game
NO _x	nitrogen oxides
NRHP	National Register of Historic Places
PSNH	Public Service of New Hampshire
RFSS	Regional Forester Sensitive Species
SO ₂	sulfur dioxide
SE	state-endangered
ST	state-threatened
U.S.	United States
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
WMNF	White Mountain National Forest
ZVI	zone of visual influence

SUPPLEMENT TO THE DRAFT NORTHERN PASS TRANSMISSION LINE PROJECT ENVIRONMENTAL IMPACT STATEMENT

1 INTRODUCTION

In July 2015 the Department of Energy (DOE) issued the draft Northern Pass Transmission Line Project Environmental Impact Statement (draft EIS) (80 Fed. Reg. 45652 [July 31, 2015]). The draft EIS analyzes potential environmental impacts from the proposed project (as described in the amended Presidential permit application filed by Northern Pass Transmission, LLC [Northern Pass] on July 1, 2013) and the range of reasonable alternatives (collectively referred to as “the Project”).

In August 2015 subsequent to the publication of the draft EIS, Northern Pass submitted a “Further Amendment to Presidential Permit Application” which made changes to the Applicant’s proposed project. Specifically, the August 2015 amendment proposes to bury an additional 52 miles (84 km) of the transmission line in roadway corridors between Bethlehem and Bridgewater, New Hampshire (NH).¹ Approximately 49 miles (79 km) of this additional burial is the same as was analyzed as part of Alternatives 4c and 5c in the draft EIS. Approximately 3 miles (5 km) of additional burial in Bethlehem, NH is not analyzed in the draft EIS, as it would extend immediately to the north of the alignment analyzed as Alternative 5c. Northern Pass also proposes a minor shift (less than 100 feet [30 m]) in the international border crossing location, two new transition stations (one in Bridgewater, NH, and one in Bethlehem, NH, to transition the line between overhead and underground), a change of the project size from 1,200 megawatts (MW) to 1,000 MW, and other design changes (e.g., change in converter technology and type of cable).

As a result of Northern Pass’ revision to its proposal, DOE issued a notice of intent to prepare this supplement to the draft EIS (80 Fed. Reg. 58725 [September 30, 2015]). DOE regulations provide that DOE may supplement a draft EIS at any time, to further the purposes of NEPA (10 CFR § 1021.314(b)). In the same notice, DOE also announced that the public comment period on the draft EIS would be extended to December 31, 2015, to allow for public comment on the draft EIS and this supplement, and DOE announced that public hearings which were to be held in October 2015 would be rescheduled.

DOE is now updating the schedule for public comment and hearings. The comment period on the draft EIS, including this supplement, closes 45 days after publication by the U.S. Environmental Protection Agency (EPA) of the notice of availability of this supplement. Public hearings have been rescheduled for December 2015. More details, including hearing locations and dates, are available on the Northern Pass EIS website at <http://www.northernpasseis.us>.

Alternative 2 in the draft EIS was identified as the Proposed Action consistent with the application then before DOE. In light of the August 2015 amendment to the application, this supplement identifies the revised proposal (hereafter referred to as “Alternative 7”), rather than Alternative 2, as the Proposed Action. As in the draft EIS, DOE’s Proposed Action remains to issue a Presidential permit for the Project, and the No Action Alternative remains that DOE would not issue a Presidential permit.

This supplement to the draft EIS contains an analysis of the potential environmental impacts of Alternative 7 and supplements the analysis contained in the July 2015 draft EIS. Although Alternative 7 is

¹ The original Proposed Action (Alternative 2 in the draft EIS) included approximately 8 miles (13 km) of underground cable. The revised proposal (Alternative 7) includes an additional 52 miles (84 km) of underground cable, for a total of approximately 60 miles (97 km) of underground cable.

principally evaluated within the draft EIS under a combination of several of the alternatives, DOE determined that providing this supplement would allow the potential environmental impacts of Alternative 7 to be more clearly displayed as an additional singular alternative and facilitate a comparison among the alternatives.

No changes have been made to the analysis of Alternatives 1–6 as presented in the draft EIS, but those findings are presented here alongside the findings for Alternative 7 to allow for comparison. No changes have been made to the draft EIS or the Technical Resource Reports prepared to support the draft EIS. The methods used to analyze Alternative 7 are identical to those used in preparation of the draft EIS and described in the Technical Resource Reports (found online at <http://www.northernpasseis.us/library/draft-eis/technical-reports>). For portions of Alternative 7 that overlap with the alignments of alternatives analyzed in the draft EIS (particularly Alternatives 4c and 5c), data used to describe the existing conditions and potential environmental impacts is already included in the draft EIS and Technical Resource Reports. For portions of Alternative 7 that do not overlap with alternatives previously analyzed (specifically the proposed transition stations in Bethlehem and Bridgewater, NH, and the proposed 3-mile section of burial in Bethlehem, NH, further described in **Section 3** of this supplement), additional data was collected as necessary. Field surveys were conducted in the fall of 2015 for wildlife, vegetation, visual resources, water resources, and historic and cultural resources. For all other resources, a desktop analysis was completed based on data used in the draft EIS. As needed, readers should refer to the glossary and reference list contained in the draft EIS. Analysis of Alternative 7 will be fully integrated into the final EIS (i.e., it will not be prepared as a separate volume such as this supplement).

2 ALTERNATIVES ANALYZED

In addition to the eleven alternatives analyzed in the draft EIS (No Action Alternative and Alternatives 2–6 with variations), this supplement considers Alternative 7 (Proposed Action), as presented in the “Further Amendment to Presidential Permit Application” submitted by Northern Pass on August 31, 2015. **Table 1** briefly describes each alternative analyzed, including the converter stations and substations, and also provides the length of the transmission line (overhead, underground, and total) and the operational capacity. For a visual description of Alternative 7, refer to **Map 1** and **Map 2** in **Appendix A** of this supplement. Maps of all other alternatives can be found in the draft EIS.

Table 1. Alternatives Considered in Detail

Alternative	Description	Length Overhead miles (km)	Length Underground miles (km)	Total Length miles (km)	Operational Capacity (MW)
1	No Action	N/A	N/A	N/A	0
2	Primarily overhead in existing Public Service of New Hampshire (PSNH) transmission route, convert from high-voltage direct current (HVDC) to high-voltage alternating current (HVAC) at Franklin Converter Station, overhead HVAC to Deerfield Substation	179 (288)	8 (13)	187 (301)	1,200
3	Underground in Alternative 2 alignment, convert from HVDC to HVAC at alternate North Road Converter Station, underground HVAC to Deerfield Substation	0	187 (301)	187 (301)	1,000

Table 1. Alternatives Considered in Detail

Alternative	Description	Length Overhead miles (km)	Length Underground miles (km)	Total Length miles (km)	Operational Capacity (MW)
4	Underground in roadway corridors				
4a	Underground in roadway corridors, I-93 through Franconia Notch, convert from HVDC to HVAC at alternate North Road Converter Station, underground HVAC to Deerfield Substation	0	175 (282)	175 (282)	1,000
4b	Underground in roadway corridors, NH Routes 112 and 116 through the White Mountain National Forest (WMNF), convert from HVDC to HVAC at alternate North Road Converter Station, underground HVAC to Deerfield Substation	0	190 (306)	190 (306)	1,000
4c	Underground in roadway corridors, NH Routes 112 and 116 through WMNF, US Route 3 from North Woodstock to Ashland, NH, convert from HVDC to HVAC at alternate North Road Converter Station, underground HVAC to Deerfield Substation	0	182 (293)	182 (293)	1,000
5	Alternative 2 except underground in roadway corridors in the vicinity of the WMNF				
5a	Alternative 2 except underground in I-93 corridor through Franconia Notch	156 (251)	28 (45)	184 (296)	1,000
5b ^a	Alternative 2 except underground in NH Routes 112 and 116 through WMNF	170 (274)	21 (34)	190 (306)	1,200
5c ^a	Alternative 2 except underground in NH Routes 18, 112 and 116 through Sugar Hill, Franconia, Easton, NH, and WMNF	157 (253)	33 (53)	191 (307)	1,000
6	Underground in roadway corridors until Franklin, NH and co-located HVAC between Franklin and Deerfield, NH				
6a	Underground in roadway corridors, I-93 through Franconia Notch, convert from HVDC to HVAC at Franklin Converter Station, co-located overhead HVAC to Deerfield Substation	34 (55)	139 (224)	173 (278)	1,000
6b	Underground in roadway corridors, NH Routes 112 and 116 through WMNF, convert from HVDC to HVAC at Franklin Converter Station, co-located overhead HVAC to Deerfield Substation	34 (55)	154 (248)	188 (303)	1,000
7 (Proposed Action)	Proposed Action – Alternative 2 except underground in NH Routes 18, 112, 116, and US Routes 3 and 302 from Bethlehem to Bridgewater, NH	132 (212)	60 (97)	192 (309)	1,000

This is an updated version of **Table S-1** in the draft EIS. It adds information for Alternative 7; there are no changes to data for the other alternatives.

^aDue to rounding, the total length of the Project may vary slightly from the sum of its parts.

3 ALTERNATIVE 7 – PROPOSED ACTION

Under Alternative 7, the Project would be similar to Alternative 2 (described in detail in **Chapter 2** [Proposed Action and Alternatives] of the draft EIS), but would include an additional 52 miles (84 km) of underground HVDC cable, a minor shift (less than 100 feet [30 m]) in the international border crossing location, two new transition stations (one in Bridgewater, NH, and one in Bethlehem, NH, to transition the line between overhead and underground), a change of the project size from 1,200 MW to 1,000 MW, and other design changes (e.g., change in converter technology and type of cable). Nearly all of the additional burial would be located in the alignments analyzed under Alternatives 4c and 5c in the draft EIS.

As described in the August 2015 “Further Amendment to Presidential Permit Application,” Northern Pass would develop the Project under Alternative 7 as a transmission line to deliver electric power from Québec to southern New Hampshire. Alternative 7 includes a proposed HVDC transmission line that, as currently designed, would be capable of transmitting up to 1,000 MW of power in either direction (Canada to the United States [U.S.] and U.S. to Canada). The northern HVDC converter station is proposed to be constructed at the Des Cantons Substation in Québec, Canada, and would be connected to an HVDC line that would run southward in Québec for approximately 45 miles (72 km) where it would cross the U.S./Canada border into Pittsburg, NH.

The Project would consist of a single circuit ± 300 kilovolt (kV) HVDC transmission line running approximately 158 miles (254 km) from the U.S. border crossing with Canada in Pittsburg, NH, to a new direct current (DC)-to-alternating current (AC) converter station to be constructed in Franklin, NH. From Franklin, NH, to the Project terminus at the Public Service of New Hampshire’s (PSNH’s) existing Deerfield Substation located in Deerfield, NH, the Project would consist of 34 miles (55 km) of 345 kV AC electric transmission line.

The Project would include approximately 60 miles (97 km) of underground HVDC cable. Approximately 8 miles (13 km) would be in two areas in Pittsburg and Clarksville, NH, and Stewartstown, NH where the Project would be buried under the Connecticut River and beneath roadways, as analyzed in Alternatives 2, 3, 5a, 5b, and 5c. In addition, the Project would be located underground for approximately 52 miles (84 km) between Bethlehem and Bridgewater, NH. In Bethlehem, NH the Project would transition from overhead to underground HVDC. For a distance of approximately 3 miles (5 km) in Bethlehem, NH the Project would be buried in the NH Route 18 and US Route 302 corridors in an area that was not analyzed in the draft EIS. Between Sugar Hill and Bridgewater, NH, the Project would be buried in the NH Route 18, 112, and 116 and US Route 3 corridors, an alignment which was analyzed under Alternatives 4c and 5c. The Project would transition from underground to overhead HVDC in Bridgewater, NH and would continue in the existing PSNH transmission route to the proposed Franklin Converter Station in Franklin, NH, as analyzed in Alternatives 2, 5a, 5b, and 5c. From the proposed Franklin Converter Station, the Project would continue as an overhead HVAC transmission line through the municipalities of Northfield, Canterbury, Concord, Pembroke, Allenstown, and Deerfield, NH as analyzed in Alternatives 2, 5a, 5b, 5c, 6a, and 6b. The Project would terminate at the existing Deerfield Substation in Deerfield, NH.

The Project under Alternative 7 would be approximately 192 miles (309 km) in length, with approximately 60 miles (97 km) of underground HVDC cable. Refer to **Map 1** in **Appendix A**. **Map 2** in **Appendix A** illustrates the differences between Alternatives 4c, 5c, and 7.

As a part of the Project, system upgrades to existing PSNH AC transmission facilities would be required, including upgrades to the existing Deerfield Substation, the existing Scobie Pond Substation (Londonderry, NH), and existing 345 kV transmission lines between the Deerfield Substation, Scobie Pond Substation, and Lawrence Road Substation (Hudson, NH). These upgrades were analyzed in the draft EIS.

4 SUMMARY OF POTENTIAL IMPACTS ASSOCIATED WITH THE PROJECT

A summary of potential impacts from the construction, operation, maintenance, and emergency repairs associated with the Project under all alternatives is presented in the following resource area discussions. The analysis summarized here describes the potential impacts of the Project as a whole (including the Northern, Central, Southern, and White Mountain National Forest geographic sections). **Chapter 3** (Affected Environment) of the draft EIS summarizes the existing conditions to provide context and explains analysis methods and critical terminology. The detailed impact analysis of Alternatives 1–6, along with Applicant Proposed Measures (APMs) to avoid or minimize potential impacts, is presented in **Chapter 4** (Environmental Impacts), **Chapter 5** (Cumulative Impacts), and **Appendix H** of the draft EIS. All APMs described in **Appendix H** of the draft EIS would be implemented under Alternative 7, as appropriate.

4.1 VISUAL RESOURCES

Potential impacts to visual resources resulting from Alternative 7 would be similar to or less than impacts disclosed in the draft EIS. Impacts resulting from the modified border crossing (less than 100 feet [30 m]), new transition stations in Bethlehem and Bridgewater, NH, and new 3-mile section of underground cable in Bethlehem, NH would result in impacts of the same nature as those discussed in the draft EIS. Refer to **Sections S.9.1, 4.1.1, 4.2.1, 4.3.1, 4.4.1, and 4.5.1** of the draft EIS for a discussion of potential impacts to visual resources. Impacts of the overhead portions of Alternative 7 would be similar to Alternative 2, and underground portions would be similar to Alternative 4a.

Table 2. Visual Resources Summary Impact Table

Alternative	Net Change in Average Scenic Impact	Total Average Scenic Impact	Miles (km) of Road Within Viewshed
1 (No Action)	0	1.62	0
2	0.17	1.79	185 (298)
3	0	1.62	0
4a	0	1.62	0
4b	0	1.62	0
4c	0	1.62	0
5a	0.14	1.76	173 (278)
5b	0.16	1.78	186 (299)
5c	0.15	1.77	185 (298)
6a	0.04	1.66	43 (69)
6b	0.04	1.66	43 (69)
7 (Proposed Action)	0.14	1.76	179 (288)

This is an updated version of **Table S-2** in the draft EIS.

Note: The net change in visual resources is measured in comparison with the existing condition, or Alternative 1, which includes the existing PSNH transmission line. The existing condition has a visual magnitude rating of 1.67 (Very Low to Low), and a scenic impact rating of 1.62 (Very Low to Low). The existing PSNH transmission line crosses 178 roadways as an overhead line.

Refer to the **Glossary** in the draft EIS for a definition of “scenic impact.”

4.2 SOCIOECONOMICS

Potential impacts to socioeconomic resources resulting from Alternative 7 would be within the range of impacts analyzed under Alternatives 1–6 in the draft EIS. Impacts resulting from the modified border crossing (less than 100 feet [30 m]), new transition stations in Bethlehem and Bridgewater, NH, and new 3-mile section of underground cable in Bethlehem, NH would result in impacts of the same nature as those discussed in the draft EIS. Refer to **Sections S.9.2, 4.1.2, 4.2.2, 4.3.2, 4.4.2, and 4.5.2** of the draft EIS for a discussion of potential impacts to socioeconomic resources. Due to the fact that Alternative 7 includes a greater length of underground cable than Alternatives 5a, 5b, and 5c, but less than Alternatives 4a, 4b, 4c, 6a, and 6b, potential impacts would generally fall between these groups of alternatives.

Table 3. Socioeconomic Resources Summary Impacts – Construction

Alternative	Total Construction Costs (\$ billion)	Economic Impacts from Construction (\$ million)		Annual FTE Construction Jobs (over three years)	Reduction of Taxable Assessed Property Values (\$ million)	Reduction in Annual Residential Property Tax Payments (\$)
		Direct	Total			
1 (No Action)	--	--	--	--	--	--
2	\$1.061	\$330.7	\$564.1	5,369	\$9.6	\$260,000
3	\$2.079	\$648.2	\$1,106.1	10,526	--	--
4a	\$1.987	\$620.2	\$1,059.1	10,076	--	--
4b	\$2.113	\$658.3	\$1,122.9	10,687	--	--
4c	\$2.046	\$638.2	\$1,089.6	10,367	--	--
5a	\$1.153	\$358.1	\$609.5	5,806	\$8.8	\$240,000
5b	\$1.223	\$379.5	\$645.2	6,148	\$9.4	\$256,000
5c	\$1.198	\$371.8	\$632.4	6,025	\$8.8	\$240,000
6a	\$1.832	\$571.2	\$974.9	9,277	\$4.4	\$120,000
6b	\$1.955	\$608.6	\$1,037.4	9,876	\$4.4	\$120,000
7 (Proposed Action)	\$1,377	\$427.2	\$726.4	6,921	\$7.1	\$192,000

This is an updated version of **Table S-3** in the draft EIS.

Table 4. Socioeconomic Resources Summary Impacts – Operation, Maintenance, and Emergency Repairs

Alternative	Annual Economic Impacts (\$ million)		Permanent FTE Jobs	Annual Reduction in Wholesale Electricity Costs – ISO-NE (\$ million)	Annual Reduction in Wholesale Electricity Costs – NH (\$ million)	Increase in Statewide Property Tax Annual Collections (\$ million)	Percent Increase in Net Imported Electricity*
	Direct	Total					
1 (No Action)	--	--	--	--	--	--	--
2	\$55.6	\$120.3	887	\$149.4	\$21.6	\$29.0	37.7%
3	\$80.5	\$199.3	1,505	\$133.8	\$18.3	\$57.2	31.1%
4a	\$78.5	\$193.6	1,461	\$133.8	\$18.3	\$55.2	31.1%
4b	\$81.0	\$201.0	1,518	\$133.8	\$18.3	\$57.8	31.1%
4c	\$79.9	\$197.8	1,493	\$133.8	\$18.3	\$56.7	31.1%
5a	\$53.8	\$120.8	901	\$133.8	\$18.3	\$30.6	31.1%
5b	\$58.6	\$129.0	954	\$149.4	\$21.6	\$32.0	37.7%
5c	\$54.7	\$123.3	920	\$133.8	\$18.3	\$31.4	31.1%
6a	\$73.7	\$179.4	1,352	\$133.8	\$18.3	\$50.4	31.1%
6b	\$76.2	\$186.7	1,408	\$133.8	\$18.3	\$52.9	31.1%
7 (Proposed Action)	\$59.2	\$125.2	974	\$133.8	\$18.3	\$36.0	31.1%

This is an updated version of **Table S-4** in the draft EIS.

*Net imported electricity includes electricity delivered by the Project as well as other lines into New England Independent Systems Operator (ISO-NE) from Canada.

4.3 RECREATION

Potential impacts to recreational resources resulting from Alternative 7 would be similar to or less than the impacts disclosed in the draft EIS. Impacts resulting from the modified border crossing (less than 100 feet [30 m]), new transition stations in Bethlehem and Bridgewater, NH, and new 3-mile section of underground cable in Bethlehem, NH would result in impacts of the same nature as those discussed in the draft EIS. Refer to **Sections S.9.3, 4.1.3, 4.2.3, 4.3.3, 4.4.3, and 4.5.3** of the draft EIS for a discussion of potential impacts to recreational resources. Impacts of the overhead portions of Alternative 7 would be similar to Alternative 2, and underground portions would be similar to Alternative 4a.

Table 5. Recreational Resources With Potential to Experience Short-term Construction Impacts

Alternative	Point Sites ^a	Potential Federal Wild and Scenic Rivers	Sites with Spatial Area acres (ha)	Trails	
				miles (km)	ANST ^b miles (km)
1 (No Action)	--	--	--	--	--
2	1	1	493 (200)	5 (8)	0.1 (0.2)
3	1	1	493 (200)	5 (8)	0.1 (0.2)
4a	--	1	61 (25)	0.3 (0.5)	0.1 (0.2)
4b	--	1	82 (33)	0.3 (0.5)	0.1 (0.2)
4c	--	--	48 (19)	0.3 (0.5)	0.1 (0.2)
5a	1	1	287 (116)	0.9 (1.4)	0.1 (0.2)
5b	1	1	385 (156)	0.8 (1.3)	0.1 (0.2)
5c	1	1	339 (137)	0.9 (1.4)	0.1 (0.2)
6a	1	1	80 (33)	0.1 (0.2)	0.1 (0.2)
6b	--	1	101 (41)	0.1 (0.2)	0.1 (0.2)
7 (Proposed Action)	1	1	300 (122)	0.8 (1.3)	0.1 (0.2)

This is an updated version of **Table S-5** in the draft EIS.

^aPoint Sites include recreational resources such as a picnic area or boat launch that have minimal spatial area.

^bAppalachian National Scenic Trail (ANST) impacts are included in the total mileage of trails potentially impacted.

Table 6. Recreational Resources With Potential to Experience Long-term Visual Impacts

Alternative	Point Sites ^a	Potential Federal Wild and Scenic Rivers	Sites with Spatial Area acres (ha)	Trails	
				miles (km)	ANST ^b miles (km)
1 (No Action)	--	--	--	--	--
2	5	1	663 (268)	4 (7)	0.1 (0.2)
3 ^c	--	--	--	--	--
4a ^c	--	--	--	--	--
4b ^c	--	--	--	--	--
4c ^c	--	--	--	--	--
5a	4	1	563 (228)	3 (5)	0.1 (0.2)
5b	4	1	650 (263)	4 (6)	0.1 (0.2)
5c	4	1	618 (250)	3 (5)	0.1 (0.2)
6a	--	--	91 (37)	--	--
6b	--	--	91 (37)	--	--
7 (Proposed Action)	3	1	505 (204)	2 (4)	0.1 (0.2)

This is an updated version of **Table S-6** in the draft EIS.

Notes:

^aPoint Sites include recreational resources such as a picnic area or boat launch that have minimal spatial area.

^bANST impacts are included in the total mileage of trails potentially impacted.

^cAlternatives 3, 4a, 4b, and 4c would be located underground, and the construction and operation would result in long-term impacts resulting from vegetation management. Therefore, long-term impacts to recreation would occur but would be due to limited aboveground structures.

4.4 HEALTH AND SAFETY

Potential impacts to health and safety resulting from Alternative 7 would be similar to or less than the impacts disclosed in the draft EIS. Impacts resulting from the modified border crossing (less than 100 feet [30 m]), new transition stations in Bethlehem and Bridgewater, NH, and new 3-mile section of underground cable in Bethlehem, NH would result in impacts of the same nature as those discussed in the draft EIS. Refer to **Sections S.9.4, 4.1.4, 4.2.4, 4.3.4, 4.4.4, and 4.5.4** of the draft EIS for a discussion of potential impacts to health and safety. Impacts of the overhead portions of Alternative 7 would be similar to Alternative 2, and underground portions would be similar to Alternative 4a.

Table 7. Health and Safety Summary Impact Table

Alternative	Summary of Impacts
1 (No Action)	No impacts.
2	Risks related to spills, hazardous materials, petroleum products, hazardous wastes, worker safety, public safety, and fires would be minimized through the implementation of APMs (see Appendix H). In particular, design measures would reduce risks related to extreme weather events. The Project would generate electric and magnetic fields (EMFs), but there would be no impact of the Project due to EMFs outside of the transmission route, and minimal (not harmful) potential impacts due to AC electric fields within the transmission route.
3	Risks related to spills, hazardous materials, petroleum products, hazardous wastes, worker safety, and fires would be similar to those of Alternative 2. Risks related to weather, public safety, and EMFs would be reduced because the cable would be buried. There could be an increased risk of unearthing hazardous materials and/or contaminated groundwater.
4a	Risks would be similar to those of Alternative 3 because both alternatives would be underground cable, however, there could be more transportation-related risks because the cable would be buried in a roadway corridor.
4b	Same as Alternative 4a
4c	Same as Alternative 4a
5a	Same as Alternative 2 for aboveground portions; same as Alternative 4a for underground portions
5b	Same as Alternative 2 for aboveground portions; same as Alternative 4a for underground portions
5c	Same as Alternative 2 for aboveground portions; same as Alternative 4a for underground portions
6a	Same as Alternative 2 for aboveground portions; same as Alternative 4a for underground portions
6b	Same as Alternative 2 for aboveground portions; same as Alternative 4a for underground portions
7 (Proposed Action)	Same as Alternative 2 for aboveground portions; same as Alternative 4a for underground portions

This is an updated version of **Table S-7** in the draft EIS.

4.5 TRAFFIC AND TRANSPORTATION

Potential impacts to traffic and transportation resulting from Alternative 7 would be similar to or less than the impacts disclosed in the draft EIS. Impacts resulting from the modified border crossing (less than 100 feet [30 m]), new transition stations in Bethlehem and Bridgewater, NH, and new 3-mile section of underground cable in Bethlehem, NH would result in impacts of the same nature as those discussed in the draft EIS. Refer to **Sections S.9.5, 4.1.5, 4.2.5, 4.3.5, 4.4.5, and 4.5.5** of the draft EIS for a discussion of potential impacts to traffic and transportation. Due to the fact that Alternative 7 includes a greater length of underground cable in roadway corridors than Alternatives 5a, 5b, and 5c, but less than Alternatives 4a, 4b, 4c, 6a, and 6b, potential impacts would generally fall between these groups of alternatives.

Table 8. Traffic and Transportation Impacts – Roads within Study Area and Miles (km) Buried in Roadway Corridors

Alternative	Roadways within Study Area					Miles (km) Buried in Roadway Corridor
	Interstates	US Highways	State Highways	Local Roads	Total	
1 (No Action)	--	--	--	--	--	--
2	3	5	22	186	216	6 (10)
3	3	5	22	186	216	6 (10)
4a	3	6	22	440	471	173 (278)
4b	3	6	25	499	533	188 (303)
4c	3	6	22	574	605	179 (288)
5a	3	5	22	208	238	26 (42)
5b	3	5	22	199	229	19 (31)
5c	3	5	22	247	277	31 (50)
6a	3	5	22	413	443	137 (220)
6b	3	5	25	472	505	152 (245)
7 (Proposed Action)	3	5	22	276	306	59 (95)

This is an updated version of **Table S-8** in the draft EIS.

Note: The study area is defined as the Project corridors.

4.6 LAND USE

Potential impacts to land use resulting from Alternative 7 would be similar to or less than the impacts disclosed in the draft EIS. Impacts resulting from the modified border crossing (less than 100 feet [30 m]), new transition stations in Bethlehem and Bridgewater, NH, and new 3-mile section of underground cable in Bethlehem, NH would result in impacts of the same nature as those discussed in the draft EIS. Refer to **Sections S.9.6, 4.1.6, 4.2.6, 4.3.6, 4.4.6, and 4.5.6** of the draft EIS for a discussion of potential impacts to land use. The majority of the Project under Alternative 7 would be located in either the existing PSNH transmission route or existing roadway corridors, but the portion of new transmission route in the Northern Section would result in the conversion of approximately 454 acres (184 ha) of currently non-developed land into Developed, Open Space (see **Table 9**). This conversion could limit future uses of this private land.

Table 9. Land Use Summary Impact Table

Alternative	Land Use Conversion acres (ha)	Forest Plan Standards Inconsistencies
1 (No Action)	--	--
2	454 (184) non-developed to Developed, Open Space	1) Forest-wide, Recreation General Standard S-2, 2) Management Area (MA) 8.3 – Appalachian National Scenic Trail, Recreation Standard S-2, 3) MA 8.3 – Appalachian National Scenic Trail, Scenery Management Standard S-1, and 4) MA 8.3 – Appalachian National Scenic Trail, Scenery Management Standard S-2
3	454 (184) non-developed to Developed, Open Space	--
4a	28 (11) non-developed to Developed, Open Space	--
4b	28 (11) non-developed to Developed, Open Space	--
4c	28 (11) non-developed to Developed, Open Space	--
5a	454 (184) non-developed to Developed, Open Space	--
5b	454 (184) non-developed to Developed, Open Space	1) MA 8.3 – Appalachian National Scenic Trail, Scenery Management Standard S-1
5c	454 (184) non-developed to Developed, Open Space	--
6a	28 (11) non-developed to Developed, Open Space	--
6b	28 (11) non-developed to Developed, Open Space	--
7 (Proposed Action)	454 (184) non-developed to Developed, Open Space	--

This is an updated version of **Table S-9** in the draft EIS.

4.7 NOISE

Noise impacts resulting from Alternative 7 would be similar to or less than the impacts disclosed in the draft EIS. Impacts resulting from the modified border crossing (less than 100 feet [30 m]), new transition stations in Bethlehem and Bridgewater, NH, and new 3-mile section of underground cable in Bethlehem, NH would result in impacts of the same nature as those discussed in the draft EIS. Refer to **Sections S.9.7, 4.1.7, 4.2.7, 4.3.7, 4.4.7, and 4.5.7** of the draft EIS for a discussion of potential noise impacts. Impacts of the overhead portions of Alternative 7 would be identical to Alternative 2, and underground portions would have no corona noise.

Table 10. Noise Summary Impact Table

Alternative	Audible Corona Noise Level (dBA) During Operation			Exceed EPA Guidance Level of 55 dBA
	HVDC Transmission Line (below conductors)	345 kV AC Transmission Line (below conductors)	345 kV AC Transmission Line (150 feet [46 m] from centerline)	
1 (No Action)	--	--	--	--
2	28	44	36	No
3	No audible corona noise associated with underground lines			
4a	No audible corona noise associated with underground lines			
4b	No audible corona noise associated with underground lines			
4c	No audible corona noise associated with underground lines			
5a	Overhead portions would be identical to Alternative 2; No audible corona noise associated with underground lines			
5b	Overhead portions would be identical to Alternative 2; No audible corona noise associated with underground lines			
5c	Overhead portions would be identical to Alternative 2; No audible corona noise associated with underground lines			
6a	Overhead portions would be identical to Alternative 2; No audible corona noise associated with underground lines			
6b	Overhead portions would be identical to Alternative 2; No audible corona noise associated with underground lines			
7 (Proposed Action)	Overhead portions would be identical to Alternative 2; No audible corona noise associated with underground lines			

This is an updated version of **Table S-10** in the draft EIS.

4.8 HISTORIC AND CULTURAL RESOURCES

Impacts to historic and cultural resources resulting from Alternative 7 would be similar to or less than the impacts disclosed in the draft EIS, with the exception of the number of archaeologically sensitive areas within the direct Area of Potential Effects (APE). See **Section 3.1.8.2** for a definition of the APE. Impacts resulting from the modified border crossing (less than 100 feet [30 m]), new transition stations in Bethlehem and Bridgewater, NH, and new 3-mile section of underground cable in Bethlehem, NH would result in impacts of the same nature as those discussed in the draft EIS. Refer to **Sections S.9.8, 4.1.8, 4.2.8, 4.3.8, 4.4.8, and 4.5.8** of the draft EIS for a discussion of potential impacts to historic and cultural resources. Impacts to historic and cultural resources would result from construction and operations, maintenance, and emergency repairs of both overhead and underground portions of Alternative 7 (as described in **Section 4.1.8** of the draft EIS). While the number of archaeologically sensitive areas within the direct APE of Alternative 7 is the greatest of all alternatives (based on data collected in field surveys for the draft EIS and in the fall of 2015), the total land area potentially impacted (within the potentially disturbed area) is less than the total land area potentially impacted under Alternatives 4a, 4b, 4c, 6a, and 6b as disclosed in the draft EIS.

Table 11. Number of Archaeological Resources Potentially Impacted during Construction

Alternative	Within Direct APE ^a	NRHP-Listed ^b	NRHP-Eligible	Not Yet Evaluated for NRHP Eligibility
1 (No Action)	--	--	--	--
2	49	--	--	49
3	49	--	--	49
4a	30	--	--	30
4b	35	--	--	35
4c	36	--	--	36
5a	44	--	--	44
5b	52	--	--	52
5c	57	--	--	57
6a	36	--	--	36
6b	41	--	--	41
7 (Proposed Action)	52	--	--	52

This is an updated version of **Table S-11** in the draft EIS.

Notes:

^a APE = area of potential effects

^b NRHP = National Register of Historic Places

Table 12. Number of Archaeologically Sensitive Areas Potentially Impacted during Construction

Alternative	Within Direct APE	Total Land Area within Potentially Disturbed Areas acres (ha)
1 (No Action)	--	--
2	255	85 (34)
3	252	88 (36)
4a	174	117 (47)
4b	216	130 (53)
4c	270	146 (59)
5a	233	76 (31)
5b	252	83 (34)
5c	273	78 (32)
6a	198	136 (55)
6b	241	149 (60)
7 (Proposed Action)	309	95 (38)

This is an updated version of **Table S-12** in the draft EIS.

Table 13. Number of Architectural Resources Potentially Impacted during Construction

Alternative	Within Indirect APE	Within Direct APE	NRHP-Listed or -Eligible (within Indirect APE)	Not Yet Evaluated for NRHP Eligibility (within Indirect APE)
1 (No Action)	--	--	--	--
2	163	33	17	146
3	162	32	16	146
4a	231	226	51 ^a	173
4b	263	253	53 ^a	203
4c	351	319	59 ^a	285
5a	164	56	18	146
5b	163	37	18	145
5c	169	52	18	151
6a	219	190	27	192
6b	250	216	29	221
7 (Proposed Action)	264 ^b	75	35 ^c	223

This is an updated version of **Table S-13** in the draft EIS.

Notes:

^a Seven previously evaluated architectural resources were determined to be not eligible for listing on the National Register of Historic Places (NRHP-eligible).

^b A Zone of Visual Influence (ZVI) analysis has not been completed for the new transition stations for Alternative 7. A conservative assumption that the transition stations under Alternative 7 would be visible from all architectural resources within 1 mile was applied; however, given local vegetation, topography, and structures this is unlikely to be the case and the impact is therefore overestimated.

^c In addition to these 35 sites, six architectural resources within the Indirect APE of Alternative 7 were previously evaluated and determined not NRHP-eligible (see **Section 3.1.8.3** of the draft EIS).

4.9 ENVIRONMENTAL JUSTICE

A detailed evaluation of U.S. Census block group data compared the demographic composition of “potentially affected” population (residing within 1,000 feet [305 m] of the Project) against the surrounding “unaffected” population on a county-by county basis. Three specific demographic measures were identified for each block group: the percentage of minority residents, the median household income, and the percentage of families living below the poverty level.

The demographic composition of the “potentially affected” groups compared to the surrounding “unaffected” population shows very little to no differences in the percentage of minority residents, percentage of families living below the poverty level, and median household income levels for Alternative 7. Therefore, in compliance with Executive Order (EO) 12898, no disproportionately high and adverse human health or environmental effects are expected to affect minority or low-income populations under any of the action alternatives.

4.10 AIR QUALITY

Impacts to air quality resulting from Alternative 7 would be similar to or less than the impacts disclosed in the draft EIS. Impacts resulting from the modified border crossing (less than 100 feet [30 m]), new transition stations in Bethlehem and Bridgewater, NH, and new 3-mile section of underground cable in Bethlehem, NH would result in impacts of the same nature as those discussed in the draft EIS. Refer to **Sections S.9.10, 4.1.10, 4.2.10, 4.3.10, 4.4.10, and 4.5.10** of the draft EIS for a discussion of potential impacts to air quality. Due to the fact that Alternative 7 includes a greater length of underground cable in roadway corridors than Alternatives 5a, 5b, and 5c, but less than Alternatives 4a, 4b, 4c, 6a, and 6b, potential impacts would generally fall between these groups of alternatives.

Table 14. Construction Emissions and Loss of Carbon Dioxide (CO₂) Uptake from Vegetation Removal

Alternative	Construction Emissions (metric tons) Entire Construction Period			Loss of Carbon Dioxide Uptake from Vegetation Removal (metric tons per year)	Reduction in CO ₂ Emissions from Implementation (million tons per year)	Percent Reduction in CO ₂ Emissions (compared with existing conditions)
	Nitrous Oxides (NO _x)	Carbon Monoxide (CO)	Carbon Dioxide (CO ₂)			
1 (No Action)	--	--	--	--	--	--
2	374	238	93,954	932	3.5	11%
3	164	150	33,734	266	2.9	9%
4a	134	124	27,663	127	2.9	9%
4b	141	130	28,910	145	2.9	9%
4c	140	129	29,998	162	2.9	9%
5a	370	244	91,917	828	2.9	9%
5b	383	250	95,312	906	3.5	11%
5c	374	247	92,638	847	2.9	9%
6a	183	149	41,440	115	2.9	9%
6b	190	155	42,687	133	2.9	9%
7 (Proposed Action)	342	231	83,552	763	2.9	9%

This is an updated version of **Table S-14** in the draft EIS.

4.11 WILDLIFE

Impacts to wildlife resulting from Alternative 7 would be similar to or less than the impacts disclosed in the draft EIS. Impacts resulting from the modified border crossing (less than 100 feet [30 m]), new transition stations in Bethlehem and Bridgewater, NH, and new 3-mile section of underground cable in Bethlehem, NH would result in impacts of the same nature as those discussed in the draft EIS. Refer to **Sections S.9.11, 4.1.11, 4.2.11, 4.3.11, 4.4.11, and 4.5.11** of the draft EIS for a discussion of potential impacts to wildlife. Due to the fact that Alternative 7 includes a greater length of underground cable in roadway corridors (which would require less vegetation removal) than Alternatives 5a, 5b, and 5c, but less than Alternatives 4a, 4b, 4c, 6a, and 6b, potential impacts would generally fall between these groups of alternatives.

Table 15. Wildlife Habitat Impacts

Alternative	Impacts to Wildlife Habitat acres (ha)
1 (No Action)	--
2	1,217 (493)
3	1,038 (420)
4a	253 (102)
4b	270 (109)
4c	261 (106)
5a	1,119 (453)
5b	1,188 (481)
5c	1,127 (456)
6a	262 (106)
6b	279 (113)
7 (Proposed Action)	1,019 (412)

This is an updated version of **Table S-15** in the draft EIS.

A total of 9 federally- and 29 state-listed wildlife species have the potential to occur in the study area and were therefore considered in this analysis. Based on data collected during field surveys conducted for the draft EIS and in the fall of 2015 for new areas, Alternative 7 would have the same effects determinations for federally-listed species as Alternatives 2, 3, 5a, 5b, and 5c. Alternative 7 would have “No Effect” on the following federally-listed wildlife species: Shortnose Sturgeon, Dwarf Wedgemussel, Puritan Tiger Beetle, Gray Wolf, and New England Cottontail.² Alternative 7 “May Affect, but [is] Not Likely to Adversely Affect” the following federally-listed wildlife species: Canada Lynx, Indiana Bat, and Northern Long-Eared Bat. Alternative 7 “May Affect, and is Likely to Adversely Affect” the Karner Blue Butterfly.

For the majority of state-listed species considered in this analysis, there is no difference in effects determinations between action alternatives (including Alternative 7). For these species, the potential impact of Alternative 7 would be identical to the “Impact for All Alternatives” presented in **Table 4-62** in the draft EIS. For the species with different effects between alternatives, the results are presented below. Alternative 1 would not result in any impacts to wildlife species.

² Endangered Species Act (ESA) Determinations are used here to define potential impacts to federally-listed species, including “No Effect,” “May Affect, but Not Likely to Adversely Affect,” and “May Affect, and Likely to Adversely Affect.”

Table 16. Summary of Project-wide Effects for State Threatened and Endangered Wildlife Species

Species ^a	Effects by Alternative ^b
Fish	
Bridle Shiner (<i>Notropis bifrenatus</i>) ST	Alternative 2, 5a, 5b, and 5c: No effect for construction and maintenance actions. Buried Alternatives in Central and Southern Sections (including sections of Alternatives 3, 4a, 4b, 4c, 6a, 6b, and 7): localized, short-term, adverse effects resulting from disturbance/displacement during construction and maintenance actions.
Invertebrates	
Brook Floater Mussel (<i>Alasmidonta varicosa</i>) SE	Alternative 2, 5a, 5b, 5c, 6a, 6b, and 7: No effect for construction and maintenance actions. Buried Alternatives in Southern Section (including sections of Alternatives 3, 4a, 4b, 4c): localized, short-term, adverse effects resulting from disturbance/displacement during construction and maintenance actions.

This is an updated version of **Table S-17** in the draft EIS.

Notes:

^a The species identified are only those with differences in effects determinations between action alternatives. All other species have the same effects determinations for all action alternatives.

^b Study area is defined as the extent of disturbance for each of the alternatives.

DOE has made the determinations, based on the most current analysis to-date (including the Wildlife Technical Report prepared for the draft EIS as well as field surveys conducted in the fall of 2015 in new areas). Future coordination/consultation with the USFWS, USFS, and NHFG, may influence the final determinations.

Key: SE = state-endangered; ST = state-threatened

4.12 VEGETATION

Impacts to vegetation resulting from Alternative 7 would be similar to or less than the impacts disclosed in the draft EIS. Impacts resulting from the modified border crossing (less than 100 feet [30 m]), new transition stations in Bethlehem and Bridgewater, NH, and new 3-mile section of underground cable in Bethlehem, NH would result in impacts of the same nature as those discussed in the draft EIS. Refer to **Sections S.9.12, 4.1.12, 4.2.12, 4.3.12, 4.4.12, and 4.5.12** of the draft EIS for a discussion of potential impacts to vegetation. Due to the fact that Alternative 7 includes a greater length of underground cable in roadway corridors (which would require less vegetation removal) than Alternatives 5a, 5b, and 5c, but less than Alternatives 4a, 4b, 4c, 6a, and 6b, potential impacts would generally fall between these groups of alternatives.

Table 17. Vegetation Summary Impact Table

Alternative	Impacts to Vegetated Habitats (including Forestlands) acres (ha)	Impacts to Forestlands acres (ha)
1 (No Action)	--	--
2	1,093 (442)	692 (280)
3	919 (372)	181 (73)
4a	230 (93)	80 (32)
4b	243 (98)	89 (36)
4c	228 (92)	97 (39)
5a	993 (402)	609 (246)
5b	1,062 (430)	668 (270)
5c	998 (404)	618 (250)
6a	239 (97)	84 (34)
6b	253 (102)	93 (38)
7 (Proposed Action)	882 (357)	539 (218)

This is an updated version of **Table S-18** in the draft EIS.

As discussed in **Section 3.1.12** of the draft EIS, the only federally- or state-listed species potentially identified during Project-specific surveys were the beaked sedge and wild lupine (both state-listed). However, even though other federally- and state-listed plant species were not identified during surveys (including the federally-listed small whorled pogonia; the only federally-listed species with potential to occur in the study area), individuals could be present within the study area.

For the majority of these federally- and state-listed species, there is no difference in effects determinations between the action alternatives (including Alternative 7). For these species, the following effects determination applies: “No individuals observed during Project-specific field surveys nor listed in the National Heritage Bureau (NHB) database for the study area (NHB 2014). If populations are present within the study area, impacts to individuals could occur; with the application of APMs (**Appendix H** [of the draft EIS]), no population-level impacts are expected.”

For two species analyzed (alpine brook saxifrage and Robbins’ cinquefoil), it was determined that there is no suitable habitat in the study area and there would therefore be no effect. No federally-listed small whorled pogonia individuals (the only federally-listed species with potential to occur in the study area) were identified during Project-specific surveys or in state databases, but if populations are present in the study area, impacts to individuals could occur but no population-level impacts are expected. The Endangered Species Act (ESA) determination for the small whorled pogonia for all action alternatives (including Alternative 7) is: “May Affect, but Not Likely to Adversely Affect.” Alternative 1 would have “No Effect.” For all species considered, no population-level impacts are expected from any alternative. Effects determinations for all federally- and state-listed species considered in this analysis are presented in **Table 4-64** in the draft EIS. For the species with differences, the results are presented below.

Table 18. Comparison of Project-wide Effects for State-Listed Plant Species

Species	Effects by Alternative
Allegheny-vine/Climbing fumitory (<i>Adlumia fungosa</i>), SE	<p>Impacts for Alternatives 4a, 4b, and 4c: Known populations in the study area in Lancaster, NH based on NHB data (NHB 2014); impacts to individuals are expected; with the application of APMs, no population-level impacts are expected.</p> <p>Impacts for Alternatives 2, 3, 5a, 5b, 5c, 6a, 6b, and 7: if populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p>
Alpine manzanita (<i>Arctostaphylos alpina</i>), RFSS	<p>Impacts for Alternatives 2 and 3: No individuals observed during Project-specific field surveys nor listed in the NHB database for the study area (NHB 2014). If populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p> <p>Impact for Alternatives 4a, 4b, 4c, 5a, 5b, 5c, 6a, 6b, and 7: No effect, study area does not cross suitable habitat.</p>
Red threeawn (<i>Aristida longespica</i> var. <i>geniculata</i>), SE	<p>Impacts for Alternatives 2, 3, 5a, 5b, 5c, 6a, 6b, and 7: Known populations in the study area in the towns of Concord and Pembroke based on NHB data (NHB 2014); impacts to individuals are expected. With the implementation of APMs, no population-level impacts are expected.</p> <p>Impacts for Alternatives 4a, 4b, and 4c: if populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p>

Table 18. Comparison of Project-wide Effects for State-Listed Plant Species

Species	Effects by Alternative
Clasping milkweed (<i>Asclepias amplexicaulis</i>), ST	<p>Impacts for Alternatives 2, 3, 5a, 5c, 6a, 6b, and 7: Known populations in the study area in the Town of Concord based on NHB data (NHB 2014); impacts to individuals are expected. With the implementation of APMs, no population-level impacts are expected.</p> <p>Impacts for Alternatives 4a, 4b, 4c, and 5b: if populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p>
Dwarf white birch (<i>Betula minor</i>), RFSS	<p>Impacts for Alternatives 2 and 3: No individuals observed during Project-specific field surveys nor listed in the NHB database for the study area (NHB 2014). If populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p> <p>Impact for Alternatives 4a, 4b, 4c, 5a, 5b, 5c, 6a, 6b, and 7: No effect, study area does not cross suitable habitat.</p>
Wiegand's sedge (<i>Carex wiegandii</i>), RFSS, SE	<p>Impacts for Alternatives 2 and 3: Known populations in the study area in the Town of Lincoln based on NHB data (NHB 2014); impacts to individuals are expected. With the implementation of APMs, no population-level impacts are expected.</p> <p>Impacts for Alternatives 4a, 4b, 4c, 5a, 5b, 5c, 6a, 6b, and 7: if populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p>
Diapensia (<i>Diapensia lapponica</i>), ST	<p>Impacts for Alternatives 2 and 3: No individuals observed during Project-specific field surveys nor listed in the NHB database for the study area (NHB 2014). If populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p> <p>Impact for Alternatives 4a, 4b, 4c, 5a, 5b, 5c, 6a, 6b, and 7: No effect, study area does not cross suitable habitat.</p>
Mountain avens (<i>Geum peckii</i>), RFSS, ST	<p>Impacts for Alternatives 2 and 3: No individuals observed during Project-specific field surveys nor listed in the NHB database for the study area (NHB 2014). If populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p> <p>Impact for Alternatives 4a, 4b, 4c, 5a, 5b, 5c, 6a, 6b, and 7: No effect, study area does not cross suitable habitat.</p>
Wild lupine (<i>Lupinus perennis</i>) ST	<p>Impacts for Alternatives 2, 3, 5a, 5b, 5c, 6a, 6b, and 7: Project-specific floristic surveys and NHB data (NHB 2014) identified several populations in Concord and Pembroke, NH within the study area; impacts to individuals are expected. With the implementation of APMs, no population-level impacts are expected.</p> <p>Impacts for Alternatives 4a, 4b, and 4c: if populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p>
Alpine arctic cudweed (<i>Omalotheca supine</i>), RFSS, SE	<p>Impacts for Alternatives 2 and 3: No individuals observed during Project-specific field surveys nor listed in the NHB database for the study area (NHB 2014). If populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p> <p>Impact for Alternatives 4a, 4b, 4c, 5a, 5b, 5c, 6a, 6b, and 7: No effect, study area does not cross suitable habitat.</p>

Table 18. Comparison of Project-wide Effects for State-Listed Plant Species

Species	Effects by Alternative
Mountain sorrel (<i>Oxyria digyna</i>), ST	<p>Impacts for Alternatives 2 and 3: No individuals observed during Project-specific field surveys nor listed in the NHB database for the study area (NHB 2014). If populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p> <p>Impact for Alternatives 4a, 4b, 4c, 5a, 5b, 5c, 6a, 6b, and 7: No effect, study area does not cross suitable habitat.</p>
Boott's rattlesnake-root (<i>Prenanthes boottii</i>), RFSS, ST	<p>Impacts for Alternatives 2 and 3: No individuals observed during Project-specific field surveys nor listed in the NHB database for the study area (NHB 2014). If populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p> <p>Impact for Alternatives 4a, 4b, 4c, 5a, 5b, 5c, 6a, 6b, and 7: No effect, study area does not cross suitable habitat.</p>
Satiny willow (<i>Salix pellita</i>), SE	<p>Impacts for Alternatives 4a, 4b, 4c, 6a, and 6b: Known populations in the study area in the towns of Clarksville and Stewartstown, based on NHB data (NHB 2014); impacts to individuals are expected. With the implementation of APMs, no population-level impacts are expected.</p> <p>Impacts for Alternatives 2, 3, 5a, 5b, 5c, and 7: If populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p>
Arizona cinquefoil (<i>Sibbaldia procumbens</i>), RFSS	<p>Impacts for Alternatives 2 and 3: No individuals observed during Project-specific field surveys nor listed in the NHB database for the study area (NHB 2014). If populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p> <p>Impact for Alternatives 4a, 4b, 4c, 5a, 5b, 5c, 6a, 6b, and 7: No effect, study area does not cross suitable habitat.</p>
Moss campion (<i>Silene acaulis</i> var. <i>exscapa</i>), RFSS	<p>Impacts for Alternatives 2 and 3: No individuals observed during Project-specific field surveys nor listed in the NHB database for the study area (NHB 2014). If populations are present within the study area, impacts to individuals could occur; with the application of APMs, no population-level impacts are expected.</p> <p>Impact for Alternatives 4a, 4b, 4c, 5a, 5b, 5c, 6a, 6b, and 7: No effect, study area does not cross suitable habitat.</p>

This is an updated version of **Table S-19** in the draft EIS.

Source: NHB (2014) and USDA Forest Service (2012b)

Notes: Geographic regions were identified using the USDA NRCS (2015a).

Key: RFSS = Regional Forester Sensitive Species; SE = state-endangered; ST = state-threatened

4.13 WATER RESOURCES

Impacts to water resources resulting from Alternative 7 would be similar to or less than the impacts disclosed in the draft EIS. Impacts resulting from the modified border crossing (less than 100 feet [30 m]), new transition stations in Bethlehem and Bridgewater, NH, and new 3-mile section of underground cable in Bethlehem, NH would result in impacts of the same nature as those discussed in the draft EIS. Refer to **Sections S.9.13, 4.1.13, 4.2.13, 4.3.13, 4.4.13, and 4.5.13** of the draft EIS for a discussion of potential impacts to water resources. Impacts of the overhead portions of Alternative 7 would be similar to Alternative 2, and underground portions would be similar to Alternative 4a. Due to the fact that Alternative 7 includes a greater length of underground cable in roadway corridors than Alternatives 5a, 5b, and 5c, but less than Alternatives 4a, 4b, 4c, 6a, and 6b, potential impacts would generally fall between these groups of alternatives.

Table 19. Water Resources Summary Impact Table

Alternative	Wetland Disturbance acres (ha)			Impacts to Vernal Pools acres (ha)	Disturbance in Locations Overlying Aquifers acres (ha)	Disturbance in FEMA Flood Zones ^a acres (ha)	Miles (km) of Impaired Rivers Crossed
	Direct	Temporary	Secondary				
1 (No Action)	--	--	--	--	--	--	--
2	26 (11)	82 (33)	8 (3)	0.2 (0.1)	453 (183)	1,196 (484)	0.3 (0.5)
3	2 (1)	162 (66)	4 (2)	0.2 (0.1)	452 (183)	1,003 (406)	0.4 (0.6)
4a ^b	2 (1)	8 (3)	<0.1 (<0.04)	--	216 (87)	255 (103)	0.3 (0.5)
4b ^b	2 (1)	8 (3)	0.3 (0.12)	--	226 (91)	272 (110)	0.3 (0.5)
4c ^b	2 (1)	8 (3)	<0.1 (<0.04)	--	219 (89)	262 (106)	0.3 (0.5)
5a	25 (10)	69 (28)	8 (3)	0.2 (0.1)	462 (187)	1,097 (444)	0.3 (0.5)
5b	25 (10)	78 (32)	8 (3)	0.2 (0.1)	464 (188)	1,166 (472)	0.3 (0.5)
5c	25 (10)	69 (28)	8 (3)	0.2 (0.1)	471 (191)	1,106 (448)	0.3 (0.5)
6a ^b	3 (1)	9 (4)	<0.1 (<0.04)	--	343 (139)	259 (105)	0.2 (0.3)
6b ^b	3 (1)	9 (4)	<0.1 (<0.04)	--	352 (143)	276 (112)	0.2 (0.3)
7 (Proposed Action)	23 (9)	65 (26)	7 (3)	<0.1 (<0.04)	382 (155)	1,124 (455)	0.2 (0.3)

This is an updated version of **Table S-20** in the draft EIS.

Notes:

^a Including all Federal Emergency Management Agency (FEMA) Flood Zones (Zone A, Zone AE, and Zone X).

^b No vernal pools were identified in the Project corridor. Additional surveys may be conducted, as necessary.

4.14 GEOLOGY AND SOILS

Impacts to geologic and soil resources resulting from Alternative 7 would be similar to or less than the impacts disclosed in the draft EIS. Impacts resulting from the modified border crossing (less than 100 feet [30 m]), new transition stations in Bethlehem and Bridgewater, NH, and new 3-mile section of underground cable in Bethlehem, NH would result in impacts of the same nature as those discussed in the draft EIS. Refer to **Sections S.9.14, 4.1.14, 4.2.14, 4.3.14, 4.4.14, and 4.5.14** of the draft EIS for a discussion of potential impacts to geologic and soil resources. Impacts of the overhead portions of Alternative 7 would be similar to Alternative 2, and underground portions would be similar to Alternative 4a. Due to the fact that Alternative 7 includes a greater length of underground cable than Alternatives 5a, 5b, and 5c, but less than Alternatives 4a, 4b, 4c, 6a, and 6b, potential impacts would generally fall between these groups of alternatives.

Table 20. Geologic and Soil Resources Summary Impact Table

Alternative	Total Ground Disturbance acres (ha)	Disturbance to All Hydric Soils acres (ha)	Disturbance to Prime Farmland, Farmland of Statewide Importance, or Farmland of Local Importance acres (ha)
1 (No Action)	--	--	--
2	1,217 (493)	20 (8)	264 (107)
3	1,038 (420)	40 (16)	285 (115)
4a*	275 (111)	4 (2)	105 (43)
4b*	292 (118)	5 (2)	115 (47)
4c*	291 (118)	5 (2)	119 (48)
5a*	1,119 (453)	19 (8)	234 (95)
5b*	1,188 (481)	20 (8)	262 (106)
5c*	1,127 (456)	19 (8)	244 (99)
6a*	276 (112)	3 (1)	139 (56)
6b*	293 (119)	3 (1)	148 (60)
7 (Proposed Action)	1,019 (412)	18 (7)	227 (92)

This is an updated version of **Table S-21** in the draft EIS.

* For alternatives buried in road corridors, total ground disturbance would depend on whether the cable was buried in the roadway centerline or in one of the shoulders. The total ground disturbance would be less if buried in the roadway centerline. The figures shown in the table are the maximum amount that could occur under each alternative.

4.15 CUMULATIVE IMPACTS

Cumulative impacts for Alternatives 1–6 (including variations) are presented in **Section S.9.15** and **Chapter 5, Section 5.1** of the draft EIS for all resources considered. Past, present, and reasonably foreseeable future actions that could, with implementation of the Project, have cumulative environmental impacts are listed in **Appendix D** of the draft EIS.

Because Alternative 7 would be partially underground and partially aboveground, its contributions to cumulative impacts would be similar to Alternative 5c as presented in the draft EIS. Alternative 7 would result in vegetation clearing, disturbances to wildlife, removal of wildlife habitat types, direct mortality of certain wildlife individuals, soil disturbance and erosion, stormwater runoff, increased noise levels, increased construction traffic and traffic delays along roadways, increased short-term air emissions, decreased long-term air emissions, changes in land use for the new transmission line route, increases in health and safety concerns and roadway workers, changes in socioeconomic indicators, and potential impacts to historic and cultural resources. The portions of Alternative 7 that would be constructed underground along existing roadways would impose the fewest environmental impacts due to the lack of visual impacts and use of previously-disturbed roadway corridors.

Multiple activities occurring at the same time and in the same vicinity would have greater impacts than just one project. Alternative 7 would result in a moderate contribution to cumulative impacts on visual resources and soils and geology; a moderate beneficial contribution to cumulative impacts at a more localized scale on socioeconomics; a minor contribution to cumulative impacts on recreation, health and safety, noise, wildlife, vegetation, and water resources; a negligible contribution to cumulative impacts on land use; no cumulative impact to environmental justice; and a long-term beneficial contribution to cumulative impacts on air quality. Alternative 7 would result in a substantial short-term contribution to cumulative impacts on traffic and transportation. Depending on the resource, the impacts would be short-term and/or long-term in duration. See **Section 5.1** of the draft EIS for a discussion of the types of cumulative impacts expected for each resource.

5 REFERENCES

This supplement incorporates all analysis and sources referenced in the draft EIS and Technical Resource Reports. See **Chapter 7** of the draft EIS and the references section of each Technical Resource Report for a full list of sources. Sources specifically cited in this supplement are presented below.

In-text Citation	Reference
NHB 2014	New Hampshire Natural Heritage Bureau. 2014. GIS data.
USDA Forest Service 2012b	USDA Forest Service. 2012. Regional Forester Sensitive Species List. White Mountain National Forest. Campton, NH.
USDA NRCS 2015a	USDA Natural Resources Conservation Service. 2015. PLANTS Database http://plants.usda.gov/java/ . Accessed March 30, 2015.

APPENDIX A

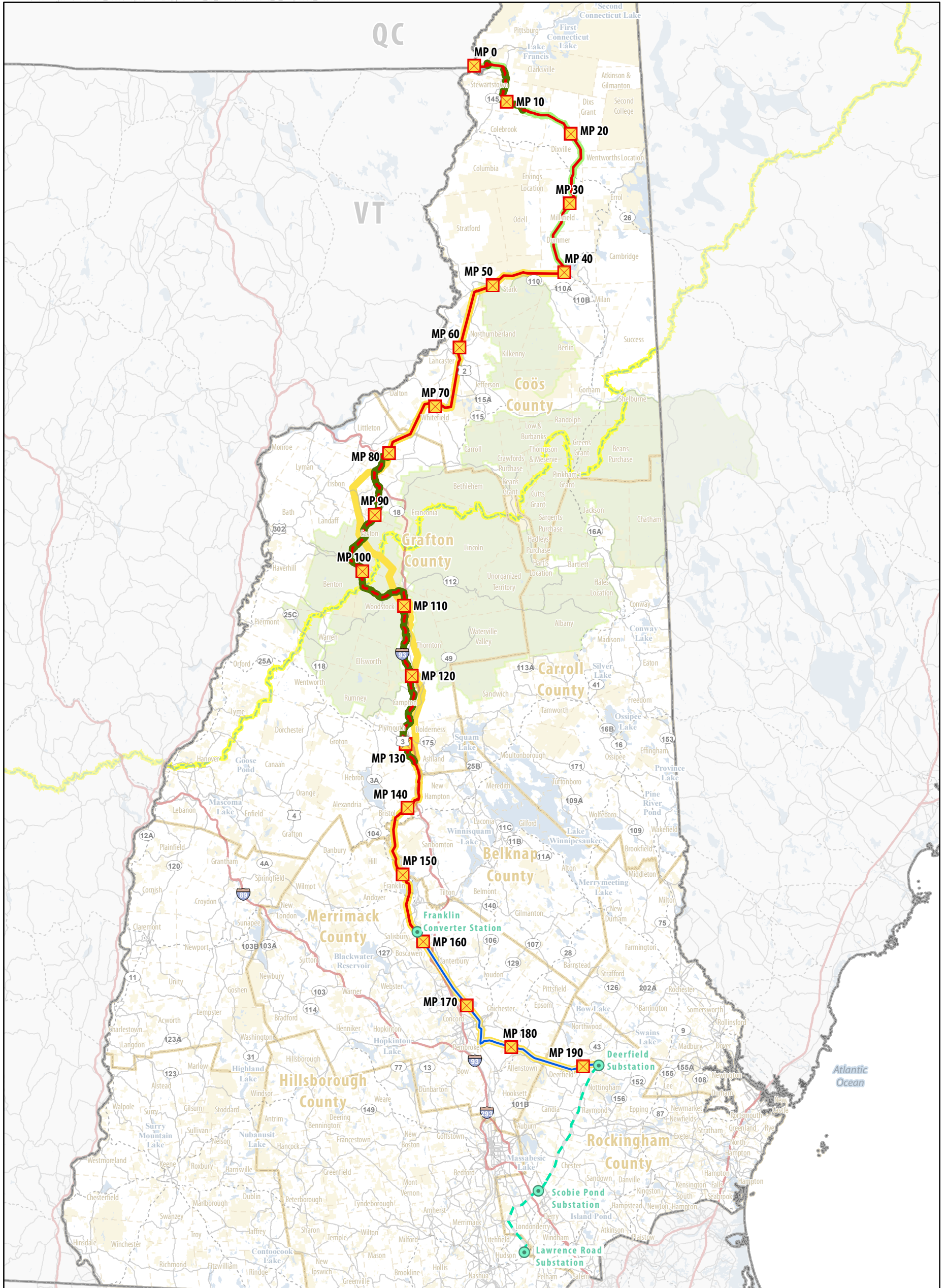
MAPS

APPENDIX A: MAPS

Map 1: Alternative 7 – Proposed Action

Map 2: Alternative 7 Comparison Map

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Legend

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|----------------------------|--|--|-------------------------------|
| Existing Conditions | Appalachian National Scenic Trail | Alternative 7 Projects | Project Milepost |
| State Boundary | Waterbody | New Transmission Route | Converter/Substation Location |
| County Boundary | NH Conservation Land (WMA, State Forest, Conservation Areas, etc.) | Project in Roadway Corridor | |
| Political Boundary | White Mountain National Forest | Overhead High-Voltage Direct Current Centerline | |
| Freeway | Existing PSNH Transmission Route | Overhead High-Voltage Alternating Current Centerline | |
| Major Road | | Underground High-Voltage Direct Current Centerline | |
| Secondary Road | | Existing Transmission Line Upgrades | |

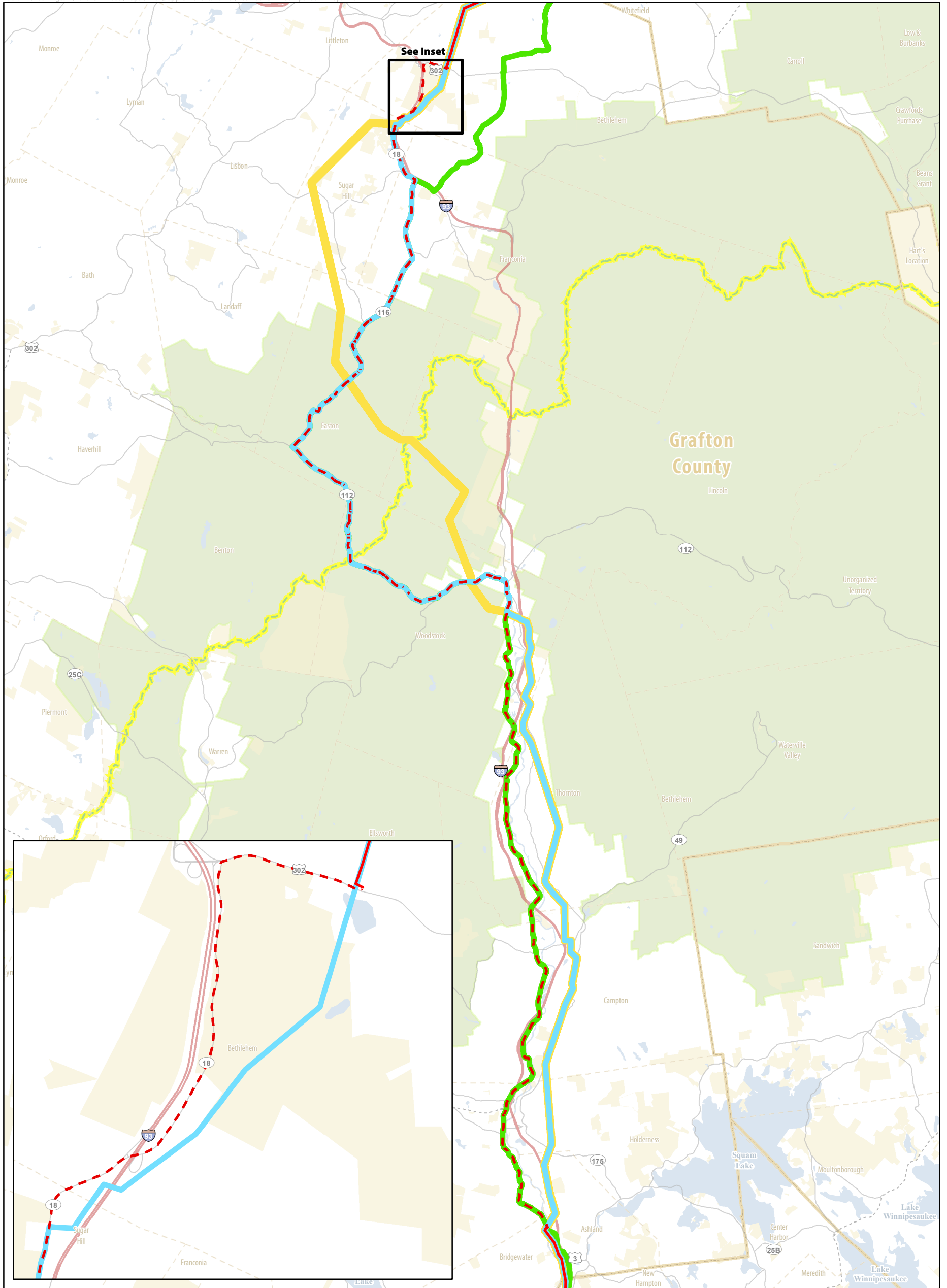
SOURCE: ESRI 2011; GRANIT 2012; Burns and McDonnell 2013; USFS 2012; Ecology and Environment 2013

Map 1:
Alternative 7 - Proposed Action
Northern Pass Transmission Line Project
Environmental Impact Statement



SCALE





Legend

Existing Conditions		Analyzed in the Draft EIS		Alternative 7 Projects	
State Boundary	Appalachian National Scenic Trail	Alternative 4c Alignment	Overhead High-Voltage Direct Current Centerline	Underground High-Voltage Direct Current Centerline	
County Boundary	Waterbody	Alternative 5c Alignment			
Political Boundary	NH Conservation Land (WMA, State Forest, Conservation Areas, etc.)				
Freeway	White Mountain National Forest				
Major Road	Existing PSNH Transmission Route				
Secondary Road					

Map 2:
Alternative 7 Comparison Map
 Northern Pass Transmission Line Project
 Environmental Impact Statement



SCALE

