

**STATE OF NEW HAMPSHIRE
SITE EVALUATION COMMITTEE**

Docket No. 2015-06

**Joint Application of Northern Pass Transmission, LLC
and Public Service Company of New Hampshire
d/b/a Eversource Energy for a Certificate of Site and Facility**

**PREFILED DIRECT TESTIMONY
OF
BETH FENSTERMACHER, ASSISTANT CITY PLANNER**

December 30, 2016

Background and Qualifications – Beth Fenstermacher

Q. Please state your name, title and business address.

A. My name is Beth Fenstermacher. My work address is 41 Green Street, Concord, New Hampshire 03301. I am the Assistant City Planner for the City of Concord.

Q. Please summarize your responsibilities as the Assistant City Planner.

A. I am currently the Assistant City Planner for Concord, New Hampshire, where my responsibilities include providing technical and managerial assistance to the City of Concord Planning Board, Conservation Commission, and Trails Committee; overseeing the Forestry program; recommending and implementing planning policies for municipal growth; developing and maintaining land use policies and regulations; and working with developers to coordinate successful and responsible development in the City. In that capacity, I report directly to the City Planner. Prior to becoming the Assistant City Planner, I held the position of Senior Planner between March 2015 and November 2016. My job duties have not changed.

Q. Please briefly state your relevant background and employment experience?

A. My background is in land development, planning, ecological design, and environmental consulting. I am licensed Professional Landscape Architect (PLA) and Leadership in Energy & Environmental Design Accredited Professional (LEED-AP). I have worked as a Landscape Architect and planner for over 10 years, and prior to that as an environmental consultant for 8 years. Prior to joining the City of Concord in 2015, I was an Act 250 Coordinator with the State of Vermont Agency of Agriculture, and a landscape architect

1 with private design and land development consulting firms in Massachusetts. I also taught site
2 analysis and ecological design at the Boston Architectural College for 5 years.

3 **Purpose of Testimony**

4 **Q. What is the purpose of this prefiled direct testimony?**

5 A. The purpose of this prefiled testimony is to address the City of Concord's
6 concerns about the proposed Northern Pass project relative to aesthetics, which includes the
7 visual impacts that the proposed project will have on adjacent properties.

8 **Q. What work did you do to prepare your analysis of the impacts that the**
9 **proposed Northern Pass project has on adjacent properties?**

10 A. In the fall of 2016, I analyzed the properties adjacent to the Public Service of New
11 Hampshire corridor to determine the likely visual impacts that the proposed Northern Pass
12 project would have those properties. Paul Gendron, the City Surveyor, assisted with the review.
13 The analysis consisted of reviewing information provided by Northern Pass relative to the
14 current and proposed height of structures along the proposed route, as well as the NH
15 Department of Environmental Services Wetlands & US Army Corps of Engineers Section
16 404/10 Permit Application Plans identifying the removal of vegetative buffers. We also drove
17 and walked along the frontage of properties adjacent to the proposed route.

18 **Q. In performing your work, did you note the current and proposed height of**
19 **structures on the maps provided by Northern Pass?**

20 A. Yes. Based on information that we had about the current and proposed height of
21 structures, I modified the Project Maps February 2016 Supplement to identify the current and

1 proposed heights of structures. I also modified the NH Department of Environmental Services
2 Wetlands & US Army Corps of Engineers Section 404/10 Permit Application Plans to include
3 the street address of properties and other field comments about our review. Those documents are
4 attached as Exhibits A and B.

5 **Q. As a result of the review and analysis that you preformed, did you prepare a**
6 **chart outlining the potential impacts of the project for residential properties?**

7 A. Yes. I prepared a chart that identifies the residential properties that are adjacent
8 to the proposed project. The chart includes information about the property location (such as
9 address and map-block-lot numbers) and comments about the property. We also identified
10 whether the clearing and/or increased pole height in the proposed Northern Pass project would
11 have a high, moderate or low visual impact on the properties. This chart is attached as Exhibit C.
12 There are also a number of photographs of these properties included in the City of Concord's
13 Appendix 1.

14 **Q. How many residential properties did you review that are adjacent to the**
15 **proposed route?**

16 A. We reviewed approximately 150 residential properties located adjacent to, or
17 nearby, the proposed route.

18 **Q. What impact did you find for those residential properties?**

19 A. Out of the approximately 150 residential properties viewed, we found there would
20 likely be a visual impact on 92 residential properties adjacent to, or nearby the proposed route.
21 Of those 92 properties, we found that there would likely be a high impact on 46 of the properties.

1 There would likely be a moderate impact on 34 of the properties, as well as one additional
2 property that is owned by the City of Concord and used for city trails on Portsmouth Street.

3 There would likely be a low or no increase in visual impact on 11 of the properties.

4 **Q. What impacts did you consider in your determination that there would likely**
5 **be a high impact on 46 of the properties?**

6 A. In determining that there would be a high impact, we considered the close
7 proximity of the proposed line to the residence, existing view, increased pole heights, and the
8 extent of proposed vegetation removal. These properties have an existing view of poles and
9 would have an increased clear view of the new poles. There was also consideration for properties
10 that would have impacts during construction.

11 **Q. Were all of the properties that you reviewed single family properties?**

12 A. No. By way of example, there are several properties located on Jennifer Drive
13 that are condexes, which is a duplex style condominium unit. We also reviewed the impacts to
14 Alton Woods, which is a residential apartment complex that has 384 units. We also reviewed the
15 impacts to the McKenna's Purchase property, which is a condominium development that has 148
16 condominium units. Each of the properties at Jennifer Drive, Alton Woods and McKenna's
17 Purchase were counted as a single property, even though multiple dwelling units are located on
18 those properties.

19 **Q. What impacts did you consider in your determination that there would be a**
20 **moderate impact on 35 of the properties?**

1 A. In determining whether there would be a moderate impact, we considered the
2 extent of clearing and increase in pole height. These properties had existing views of the poles
3 and would have an increased view due to proposed tree removal and/or increased pole heights.

4 **Q. What impacts did you consider in your determination that there would be a**
5 **low impact on 11 of the properties?**

6 A. In determining whether there would be a low impact, we considered the existing
7 view, proposed pole heights, and proposed vegetation removal. The 11 properties either have no
8 or a minimal view of the existing poles. The view of the proposed poles will be minimal or
9 viewed only through vegetation.

10 **Q. What are the concerns that you have about some of the specific properties?**

11 A. There are some properties that will be impacted during construction. The common
12 recreation area for the Alton Woods development is located within and adjacent to the powerline
13 easement. Construction pads and the access road will impact the play area and dog walking area,
14 and the common area will be unusable during construction. Construction pads and access road
15 are proposed in the horse pastures of the farm located at 56 Sanborn Road; therefore the farm
16 will need to relocate their horses off-site during construction. Construction pads and access road
17 will also impact driveway access to the single family residences at 37 Snow Pond Road and 87
18 Oak Hill Road.

19 Specific properties with permanent impacts include 41 Hoit Road. The property is located
20 at the busy intersection of Hoit Road and State Route 132 (Mountain Road). There is an existing
21 ±75 foot wide vegetative buffer that screens the house from the intersection. The entire buffer is

1 proposed to be removed for a construction pad and access driveway. Further, the relocated poles
2 will be within feet of the residence.

3 I also have concerns about the residences located at 10, 12, 14 and 16 Brookwood Drive.
4 The powerlines currently pass through the backyards of these residences, and the relocated poles
5 will be approximately 50 feet closer to the houses. Most, if not all of the vegetative buffer is
6 proposed to be removed.

7 There is also concern about the condominiums within McKenna's Purchase, located off
8 Branch Turnpike. There is currently a clear view from most of the condos on the east side of the
9 development. The poles are proposed to be relocated approximately 20 feet closer to the
10 residences and the vegetative buffer is proposed for removal.

11 The residence at 5-7 Old Loudon Road will also be greatly impacted during construction
12 and permanently. There is currently a clear view; however, there is a vegetated buffer and a
13 mature, multi-stemmed tree on the frontage that currently screens some view of the power lines.
14 The buffer and mature tree are proposed for removal, and the relocated poles will be
15 approximately 20 feet closer to the house. Further, a large construction pad is proposed directly
16 across the street from the house.

17 It should be noted that this is not a complete list of properties. The complete list of
18 concerns for the properties that I reviewed is referenced in Exhibit C.

19 **Q. Did your analysis also address potential impacts of the project for**
20 **commercial properties?**

1 A. Yes. In the same chart, we also identified commercial properties. The analysis
2 for commercial properties was whether the construction may impact business operations, as well
3 as whether it would have an increased visual impact due to the clearing and increased pole
4 height.

5 **Q. How many commercial properties did you review?**

6 A. We reviewed 44 commercial properties.

7 **Q. What were the results of your analysis?**

8 A. We determined that eight of the properties would have a high visual impact due to
9 clearing and increased pole height, and that construction might impact business operations. We
10 determined that the remaining commercial properties would have increased visual impact due to
11 the clearing and increased pole height.

12 **Q. Please provide some specific examples of the concerns that you identified?**

13 A. A construction pad is proposed is located adjacent to the parking lot for the
14 buildings at 54 Chenell Drive and 146 Pembroke Road. Parking for the buildings will be
15 impacted during construction. Also construction noise due to proximity to building may disrupt
16 operations during construction.

17 Construction pads, access drives and proposed power lines run through the outdoor
18 storage areas for 75 & 77 Regional Drive and 12 Industrial Park Dr. Stored concrete materials
19 will need to be removed and operations will be disrupted during construction.

1 Construction pads and an access driveway are proposed through the outdoor storage area
2 for 24 Industrial Park Drive. Existing fencing will need to be removed, stored materials will
3 need to be relocated, and operations will likely be impacted during construction.

4 Construction pads and access are proposed within or adjacent to parking lots at 7, 19, and
5 25 Henniker St. Parking spaces may be impacted during construction.

6 New poles are proposed within a parking area at 28 Industrial Park Drive, the spaces may
7 be lost and impacted during construction.

8 **Q. Did your analysis also include potential impacts along public roads?**

9 A. Yes. We drove along all roads that passed under or adjacent to the powerlines.

10 **Q. Please provide some specific examples of the concerns that you identified?**

11 A. The Northern Pass travels along and over scenic roads that lend to the rural
12 character of West Concord. The cycling community uses these roads often because of the scenic
13 character. According to numbers available through Strava (made available to the City of
14 Concord through the Central NH Regional Planning Commission), in 2015, there were 880
15 bicycle rides recorded on Mountain Road, 55 bicycle rides recorded on Snow Pond Road, 611
16 bicycle rides recorded on Shaker Road, and 576 bicycles recorded on Oak Hill Road. Strava is a
17 website that is used to keep track of an athlete's activities. According to The Guardian, it is
18 estimated that 5-10% of cyclists utilize the Strava application to record their rides; therefore,
19 these reported numbers are considered to be only a fraction of the actual amount of bicycle
20 activity on these routes. ([https://www.theguardian.com/lifeandstyle/2016/may/09/city-planners-](https://www.theguardian.com/lifeandstyle/2016/may/09/city-planners-cycling-data-strava-tracking-app)
21 [cycling-data-strava-tracking-app](https://www.theguardian.com/lifeandstyle/2016/may/09/city-planners-cycling-data-strava-tracking-app))

Oak Hill Road is a scenic rural road with open fields, farms, and vistas. The Conservation Commission has expressed interest in conserving the farms along this road to preserve the natural and scenic vistas that can be enjoyed by the public along this road. The Northern Pass structures will be visible while travelling west from Loudon across Turtle Pond interrupting the scenic view. While the structures are currently visible, the increase in height and number of poles will have a greater impact and interrupt the sweeping views.

Viewshed Analysis – Chesapeake Conservancy

Q. Please explain your involvement in obtaining a viewshed analysis prepared by the Chesapeake Conservancy?

A. At the request of the Conservation Commission, I assisted in retaining the Chesapeake Conservancy to prepare a viewshed analysis. The purpose of the viewshed analysis was to compare the results of the viewshed analysis prepared by Terrence J. DeWan & Associates utilizing most current and best available data available, and to take into account the impacts to developed landscapes. I was responsible for providing the City's GIS data to the Chesapeake Conservancy for modeling, including Lidar elevation data, lot data, building locations and elevations. A copy of the viewshed analysis is attached as Exhibit D.

Q. What were the results of the viewshed analysis?

A. The visual analysis showed that there would be an additional 388 acres and 91 buildings that would be impacted by the proposed towers that were not previously affected by the existing towers.

1 Significant heritage landscape properties that will be impacted include Carter Hill
2 Orchard on Carter Hill Road, Dimond Hill Farm on Hopkinton Road, and the Blood Farm on
3 Mountain Road. The Conservation Commission holds conservation easements on Carter Hill
4 Orchard and Dimond Hill Farm, the State holds an easement on the Blood Farm. A copy of the
5 viewshed analysis with Conservation Land overlay is included as Exhibit E.

6 Further, the analysis shows that there will be increased structure visibility from the
7 majority of buildings in downtown Concord, including the State House. The City of Concord
8 recently spent approximately \$2,000,000 to bury the existing utility lines along South Main
9 Street and may bury additional lines in the future along Main Street. The increased visibility of
10 the Northern Pass structures is in conflict with the vision for Concord and the goal to bury
11 infrastructure.

12 **Q. How did the viewshed analysis prepared by Chesapeake Conservancy**
13 **compare to the results of the viewshed analysis prepared by Terrence J. DeWan &**
14 **Associates?**

15 A. Using the Lidar elevation data, Chesapeake Conservancy was able to create
16 datasets that better reflect the actual heights of trees and buildings, as opposed to estimated
17 heights, providing a more representative elevation model than was provided in the DeWan
18 analysis. Further, the Chesapeake Conservancy analysis took into account the fact that an
19 observer in the landscape is not at ground level, but at a given height. By only assessing
20 conditions at the ground level, the DeWan analysis does not take into account the visual impacts

1 of the proposed project on multi-story buildings. By using this methodology, the Chesapeake
2 Conservancy analysis identified a greater number of buildings that will be impacted downtown.

3 Compared to the DeWan analysis, as a result of an increase in accuracy using the Lidar
4 data, it was found that there would be a smaller total amount of the landscape that is visible
5 during both existing and proposed conditions; however, there would be a larger increase in the
6 percentage of the City that would be affected. Further, the Chesapeake Conservancy analysis
7 assessed the intensity of impact, including the number of structures that would be visible, rather
8 than just whether any structures would be visible. Only highlighting new areas of impact
9 significantly downplays the increased impact that would occur to the majority of the affected
10 areas due to construction of the proposed towers. Approximately 4.25% of the landscape and
11 5.89% of buildings with existing impacts will have an increase in visible impacts due to the
12 number of proposed towers.

13 **Q. Do you have any additional comments about the viewshed analysis prepared**
14 **by Terrence J. DeWan & Associates**

15 A. It is my opinion that the increase in structure height is downplayed in the DeWan
16 analysis. By way of example, in their discussion of the impacts to Turtle Pond, it is stated that
17 structures are “the same scale” as the existing structures. The existing structures are 55-75 feet
18 in height, and the proposed structures are 95-105 feet in height. These are larger than some of the
19 tallest buildings downtown. By way of example, according to information from the Zoning
20 Administrator, the building at 2 Pillsbury Street is 84 feet and the Capital Commons building
21 measured from the Main Street side is 78 feet. According to information received from the New


1 Hampshire State House, the eagle on the New Hampshire State House Dome is 150 feet high:
2 The State House Dome is visible throughout areas of Concord. The only structure on a building
3 that is taller than the New Hampshire State House is the First Church of Christian Scientists at 33
4 School Street, which has a steeple at the top of the building that stands at 158 feet tall.

5 **Q. Does this end your testimony?**

6 **A. Yes.**

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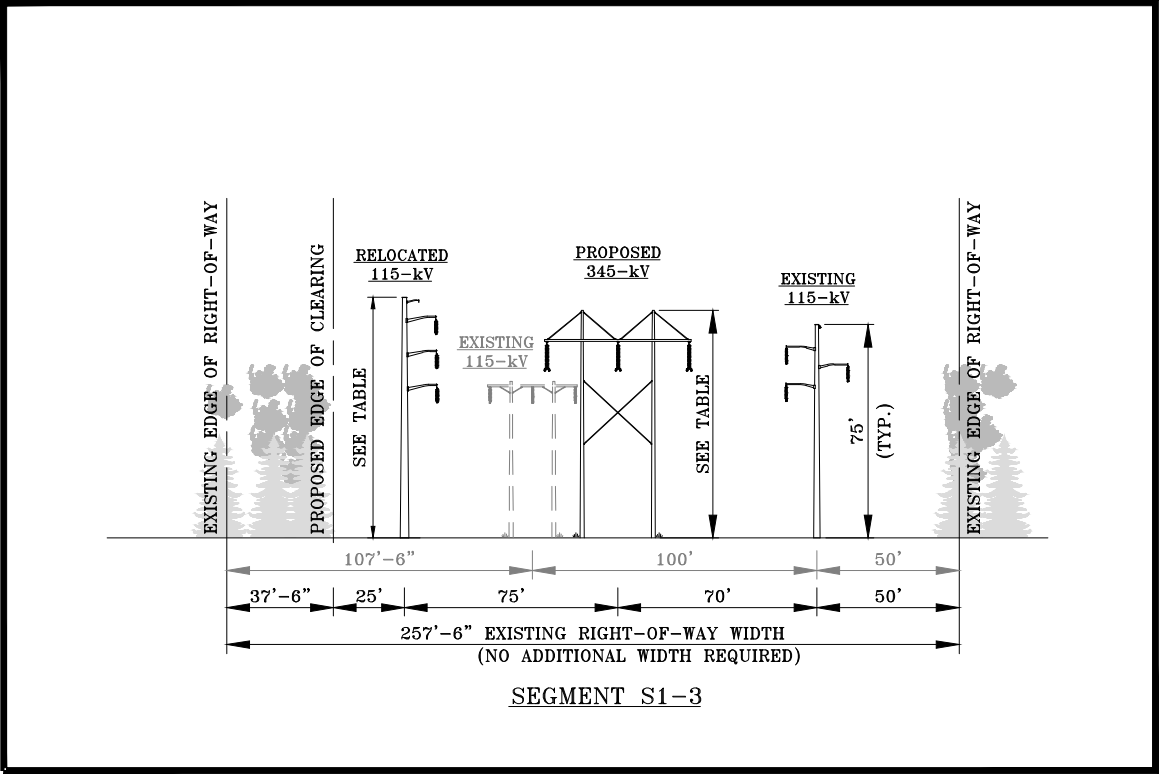
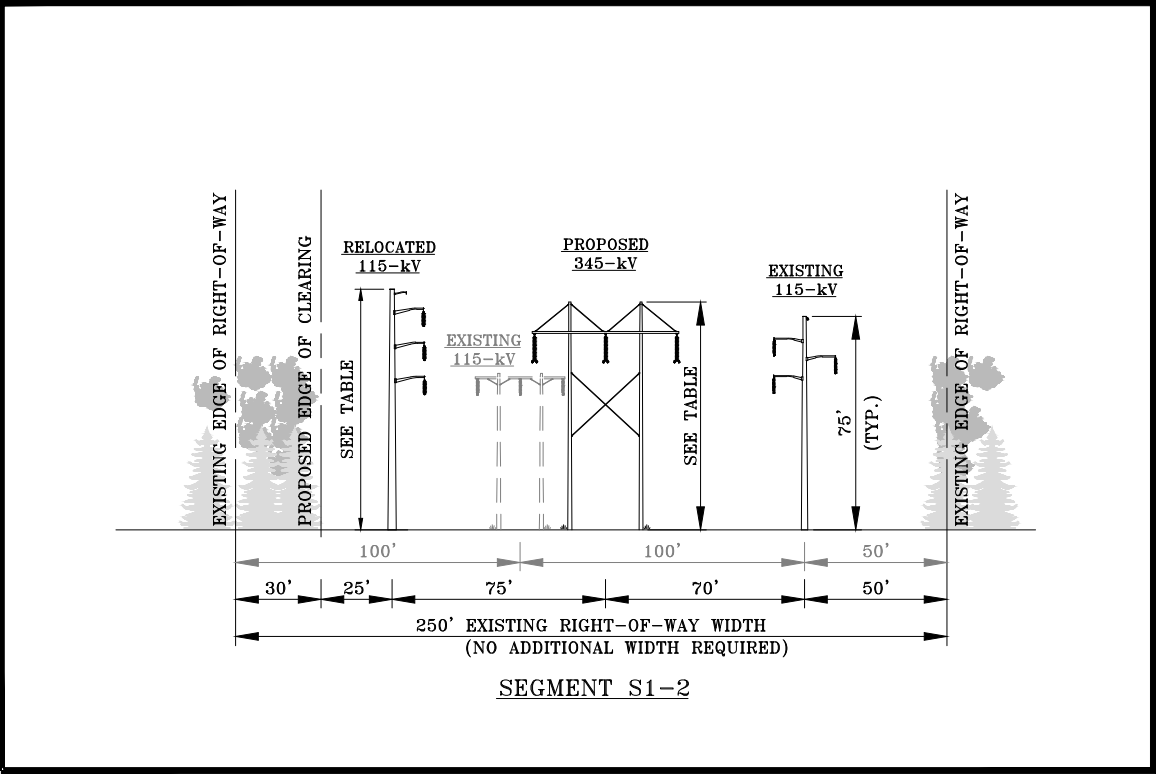
<ul style="list-style-type: none">HVDC LineHVDC UG - TrenchedHVDC UG - Trenchless345-kV LineExisting 345-kV LineExisting 115-kV LineExisting Distribution LineRelocated 115-kV LineRelocated 345-kV Line	<ul style="list-style-type: none">Relocated Distribution LineROW BoundaryEdge of CorridorExisting StructureExisting Structure - RemovedProposed HVDC StructureProposed 345-kV StructureRelocated StructureDistribution Pole	<ul style="list-style-type: none">Replacement StructuresTown BoundaryProperty Owner IdentificationEversource Owned ParcelsResidential BuildingCommercial BuildingOther BuildingField Delineated WetlandsPhoto-Estimated Wetlands	<ul style="list-style-type: none">Approximate WetlandsField Delineated WaterbodyPhoto-Estimated WaterbodyApproximate WaterbodyField Delineated StreamPhoto-Estimated StreamApproximate StreamExtent of Estimated Features	<ul style="list-style-type: none">Conservation Easement, State/Federal Parks and Public Lands
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The Northern Pass
Transmission Line Project
Proposed Route
Canterbury, Concord

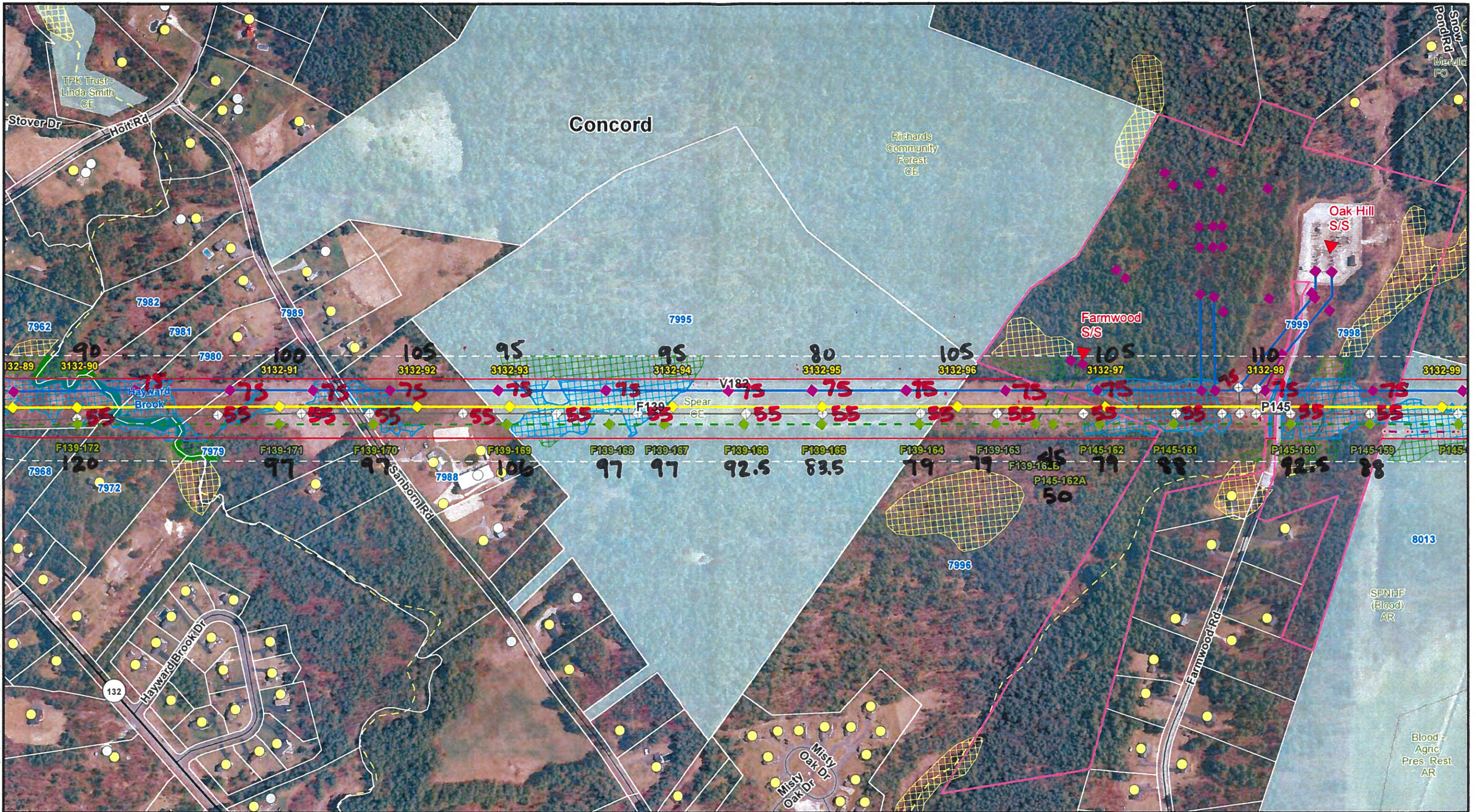
Project Maps
February 2016 Supplement


PRELIMINARY ENGINEERING

Structure Number	Structure Height	Cross Section
F139-172	120	S1-3
F139-173	97	S1-2
F139-174	101.5	S1-2
F139-175	105	S1-2
F139-176	101.5	S1-2
F139-177	92.5	S1-2
F139-178	88	S1-2
F139-179	83.5	S1-2
F139-180	83.5	S1-2
F139-181	83.5	S1-2
F139-182	83.5	S1-2
F139-183	83.5	S1-2
F139-184	79	S1-2
F139-185	83.5	S1-2
F139-186	79	S1-2
3132-76	75	S1-2
3132-77	70	S1-2
3132-78	75	S1-2
3132-79	90	S1-2
3132-80	80	S1-2
3132-81	75	S1-2
3132-82	75	S1-2
3132-83	85	S1-2
3132-85	90	S1-2
3132-86	95	S1-2
3132-87	100	S1-2
3132-88	90	S1-2
3132-89	90	S1-3
3132-90	90	S1-3



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THE NORTHERN PASS

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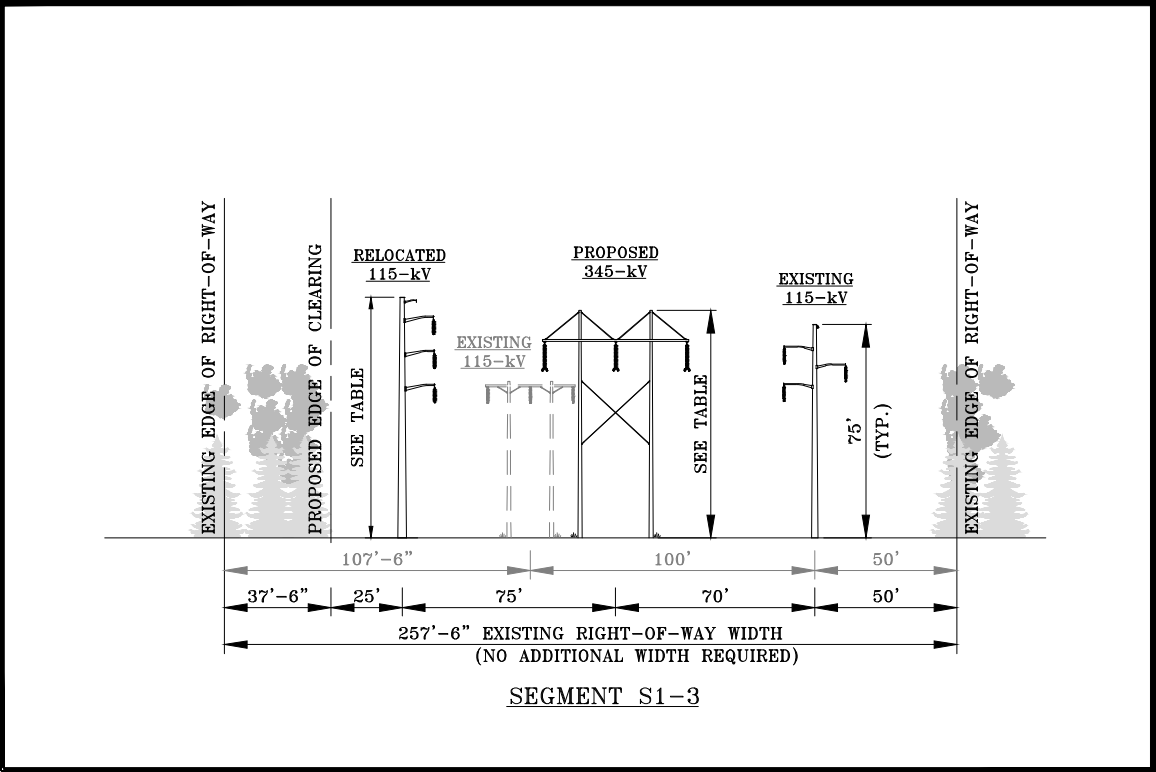
HVDC Line	Relocated Distribution Line	Replacement Structures	Approximate Wetlands	Conservation Easement, State/Federal Parks and Public Lands
HVDC UG - Trenched	ROW Boundary	Town Boundary	Field Delineated Waterbody	
HVDC UG - Trenchless	Edge of Corridor	Property Owner Identification	Photo-Estimated Waterbody	
345-kV Line	Existing Structure	Eversource Owned Parcels	Approximate Waterbody	
Existing 345-kV Line	Existing Structure - Removed	Residential Building	Field Delineated Stream	
Existing 115-kV Line	Proposed HVDC Structure	Commercial Building	Photo-Estimated Stream	
Existing Distribution Line	Proposed 345-kV Structure	Other Building	Approximate Stream	
Relocated 115-kV Line	Relocated Structure	Field Delineated Wetlands	Extent of Estimated Features	
Relocated 345-kV Line	Distribution Pole	Photo-Estimated Wetlands		

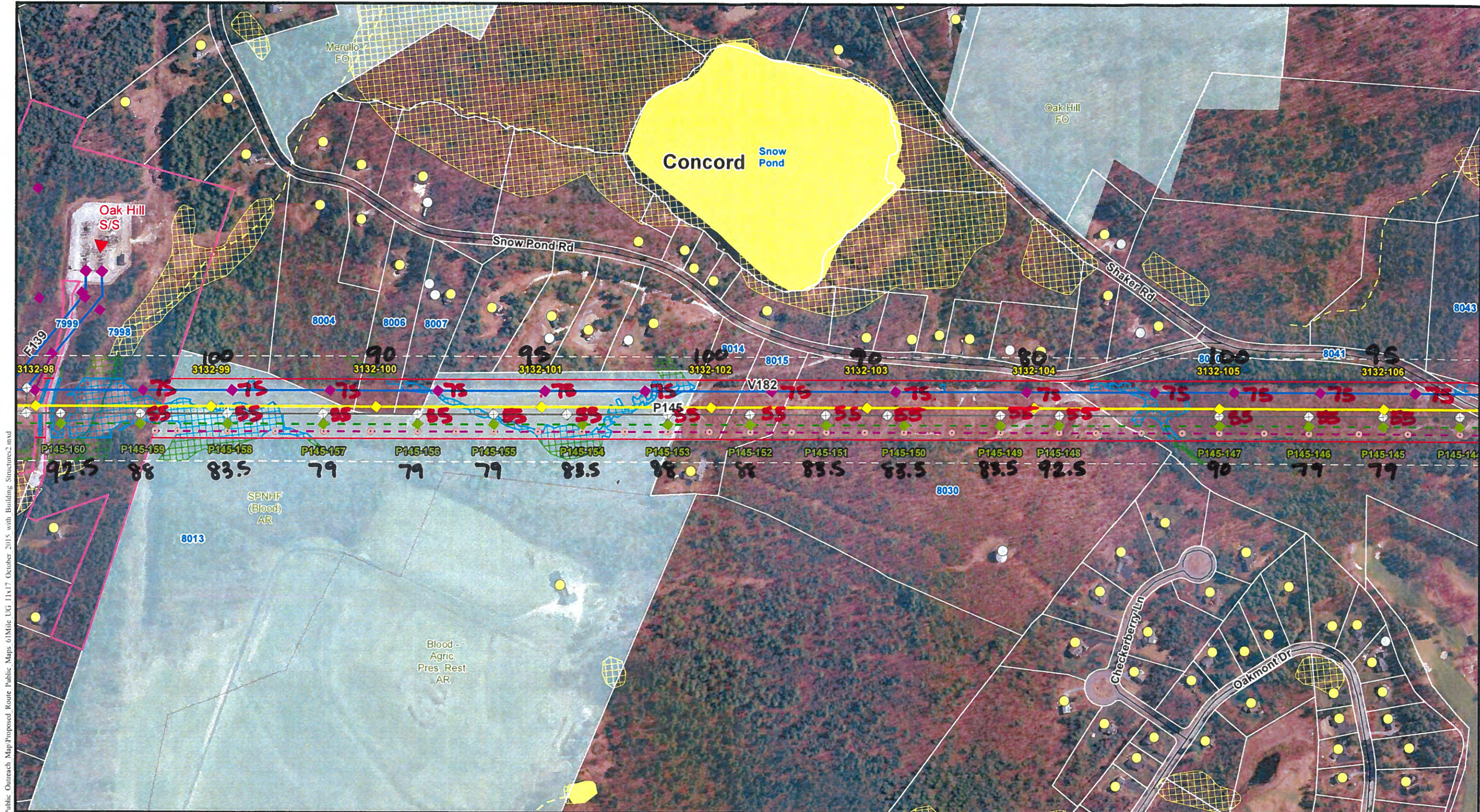
The Northern Pass
Transmission Line Project
Proposed Route
Concord

Project Maps
February 2016 Supplement


PRELIMINARY ENGINEERING

Structure Number	Structure Height	Cross Section
F139-162B	45	NA
F139-163	79	S1-3
F139-164	79	S1-3
F139-165	83.5	S1-3
F139-166	92.5	S1-3
F139-167	97	S1-3
F139-168	97	S1-3
F139-169	106	S1-3
F139-170	97	S1-3
F139-171	97	S1-3
F139-172	120	S1-3
3132-90	90	S1-3
3132-91	100	S1-3
3132-92	105	S1-3
3132-93	95	S1-3
3132-94	95	S1-3
3132-95	80	S1-3
3132-96	105	S1-3
3132-97	105	S1-3
3132-98	110	S1-3
P145-159	88	S1-3
P145-160	92.5	S1-3
P145-161	88	S1-3
P145-162	79	S1-3
P145-162A	50	NA





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THE NORTHERN PASS

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<ul style="list-style-type: none"> — HVDC Line - - - HVDC UG - Trenched - - - HVDC UG - Trenchless — 345-kV Line — Existing 345-kV Line — Existing 115-kV Line — Existing Distribution Line - - - Relocated 115-kV Line - - - Relocated 345-kV Line 	<ul style="list-style-type: none"> - - - Relocated Distribution Line — ROW Boundary - - - Edge of Corridor ■ Existing Structure ☒ Existing Structure - Removed ■ Proposed HVDC Structure ■ Proposed 345-kV Structure ■ Relocated Structure ● Distribution Pole 	<ul style="list-style-type: none"> ▲ Replacement Structures ■ Town Boundary 3582 Property Owner Identification □ Eversource Owned Parcels ● Residential Building ● Commercial Building ○ Other Building ▨ Field Delineated Wetlands ▨ Photo-Estimated Wetlands
		<ul style="list-style-type: none"> ▨ Approximate Wetlands ■ Field Delineated Waterbody ■ Photo-Estimated Waterbody ■ Approximate Waterbody — Field Delineated Stream — Photo-Estimated Stream - - - Approximate Stream - - - Extent of Estimated Features

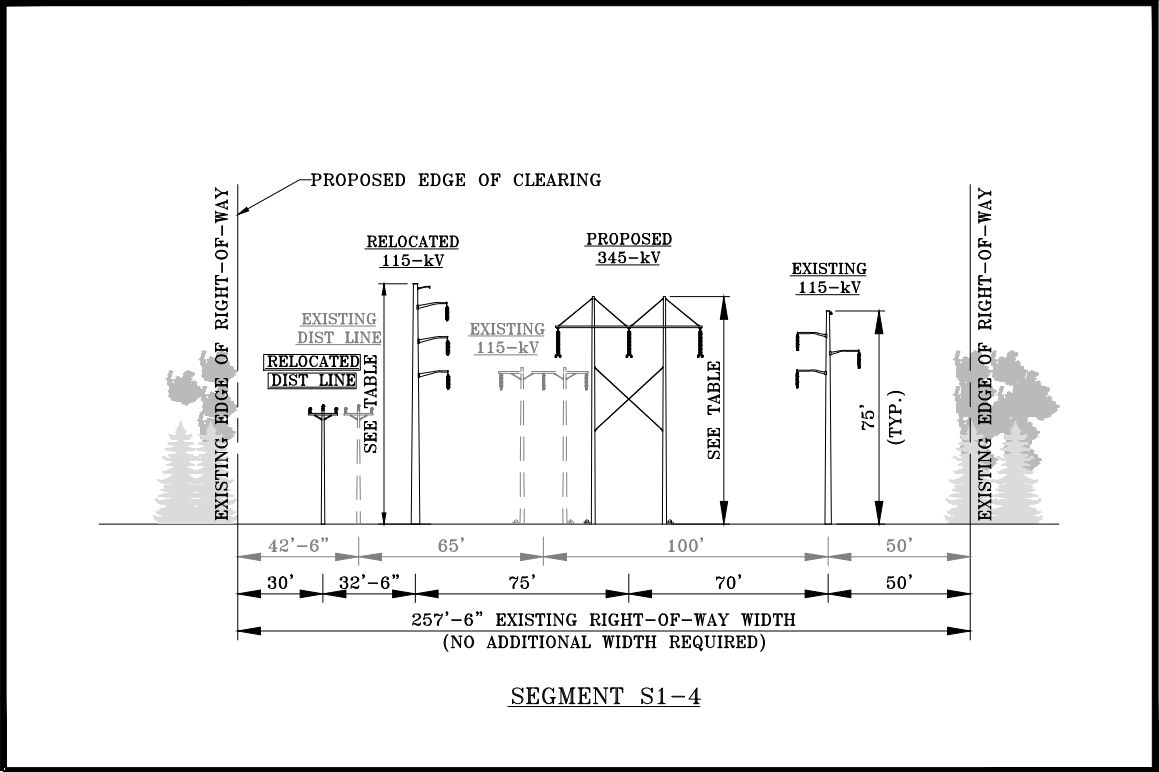
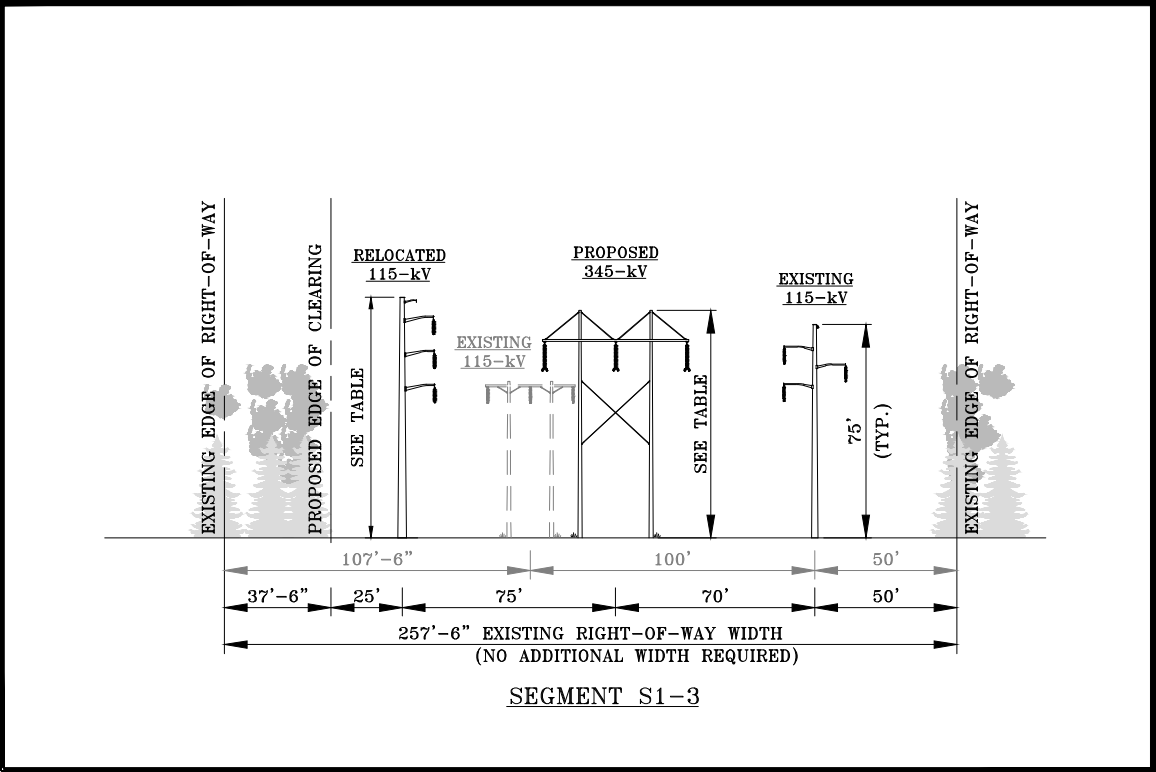
Conservation Easement, State/Federal Parks and Public Lands

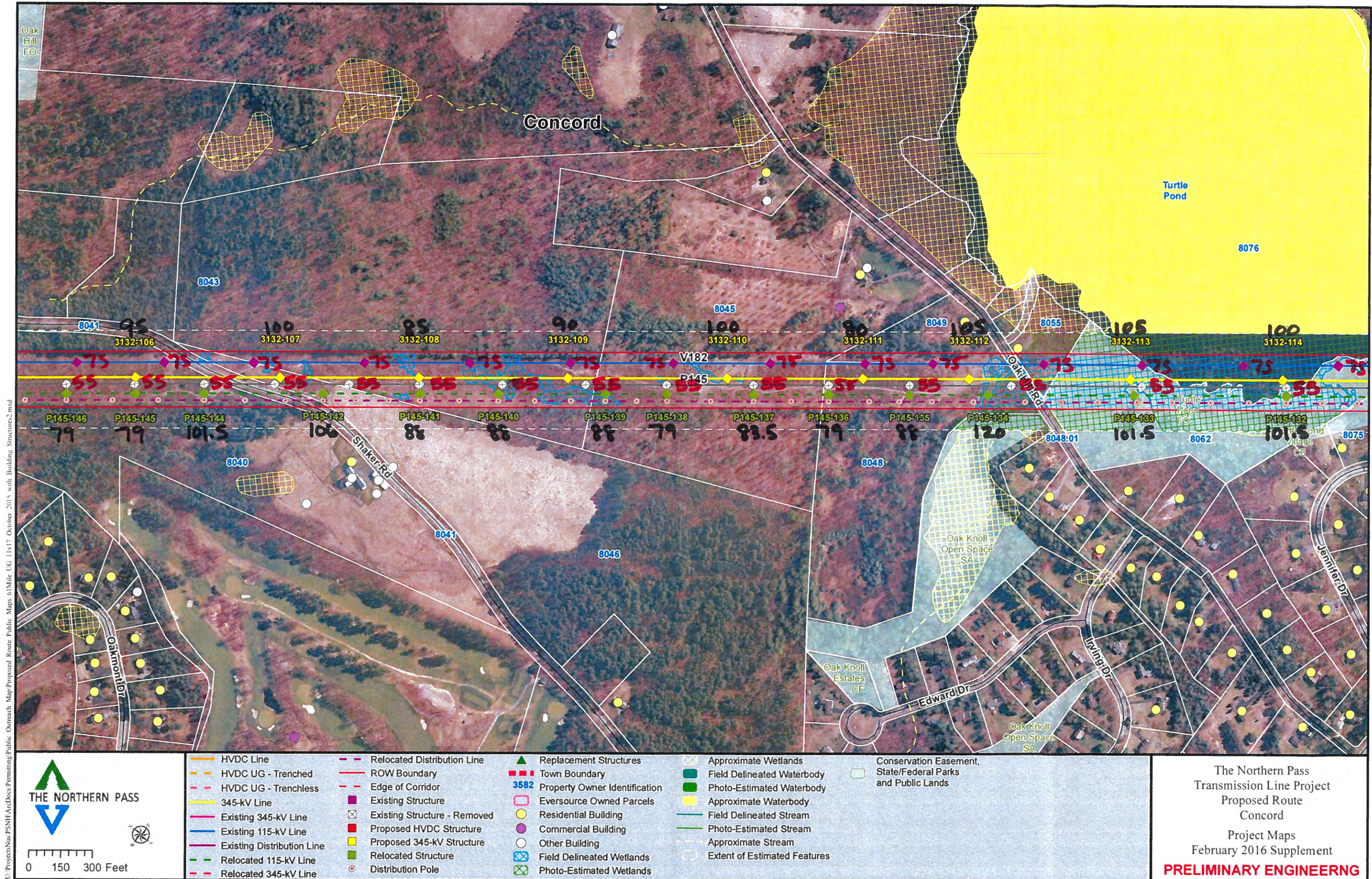
The Northern Pass
Transmission Line Project
Proposed Route
Concord

Project Maps
February 2016 Supplement

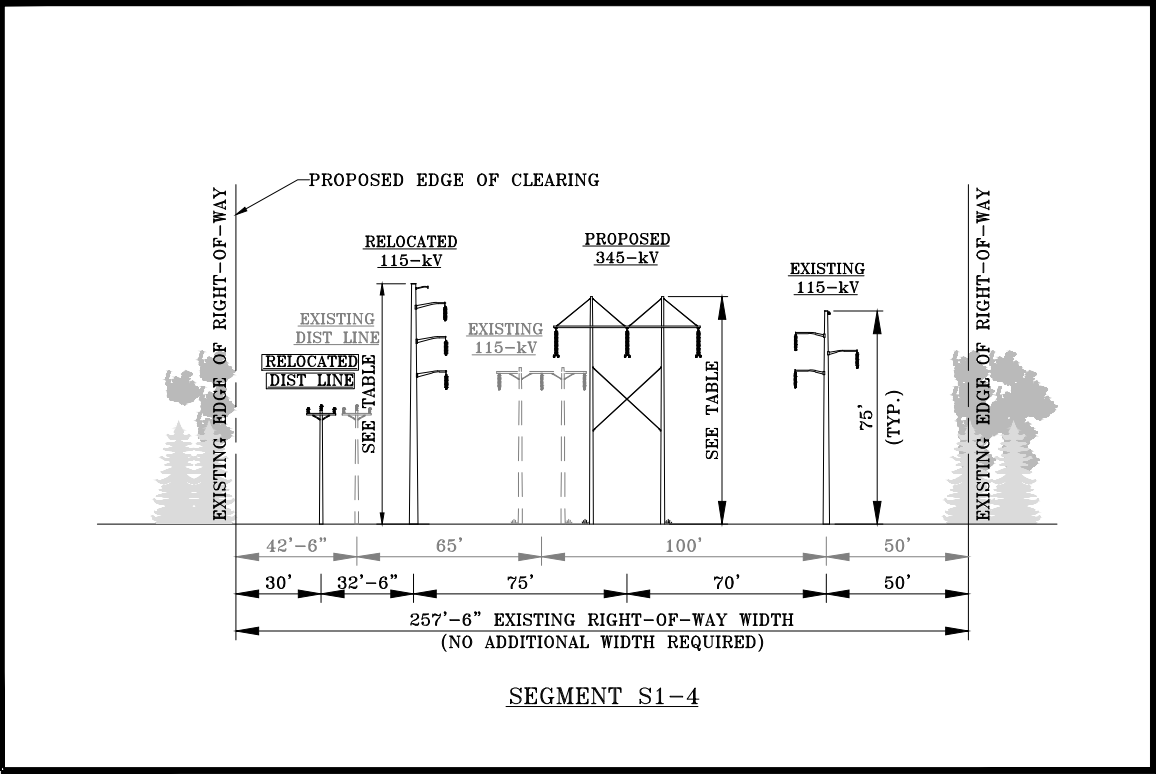
PRELIMINARY ENGINEERING

Structure Number	Structure Height	Cross Section
3132-100	90	51-4
3132-101	95	51-4
3132-102	100	51-4
3132-103	90	51-4
3132-104	80	51-4
3132-105	100	51-4
3132-106	95	51-4
3132-99	100	51-4
P145-145	79	51-4
P145-146	79	51-4
P145-147	90	51-4
P145-148	92.5	51-4
P145-149	83.5	51-4
P145-150	83.5	51-4
P145-151	83.5	51-4
P145-152	88	51-4
P145-153	88	51-4
P145-154	83.5	51-4
P145-155	79	51-4
P145-156	79	51-4
P145-157	79	51-4
P145-158	83.5	51-4
P145-159	88	51-3
P145-160	92.5	51-3

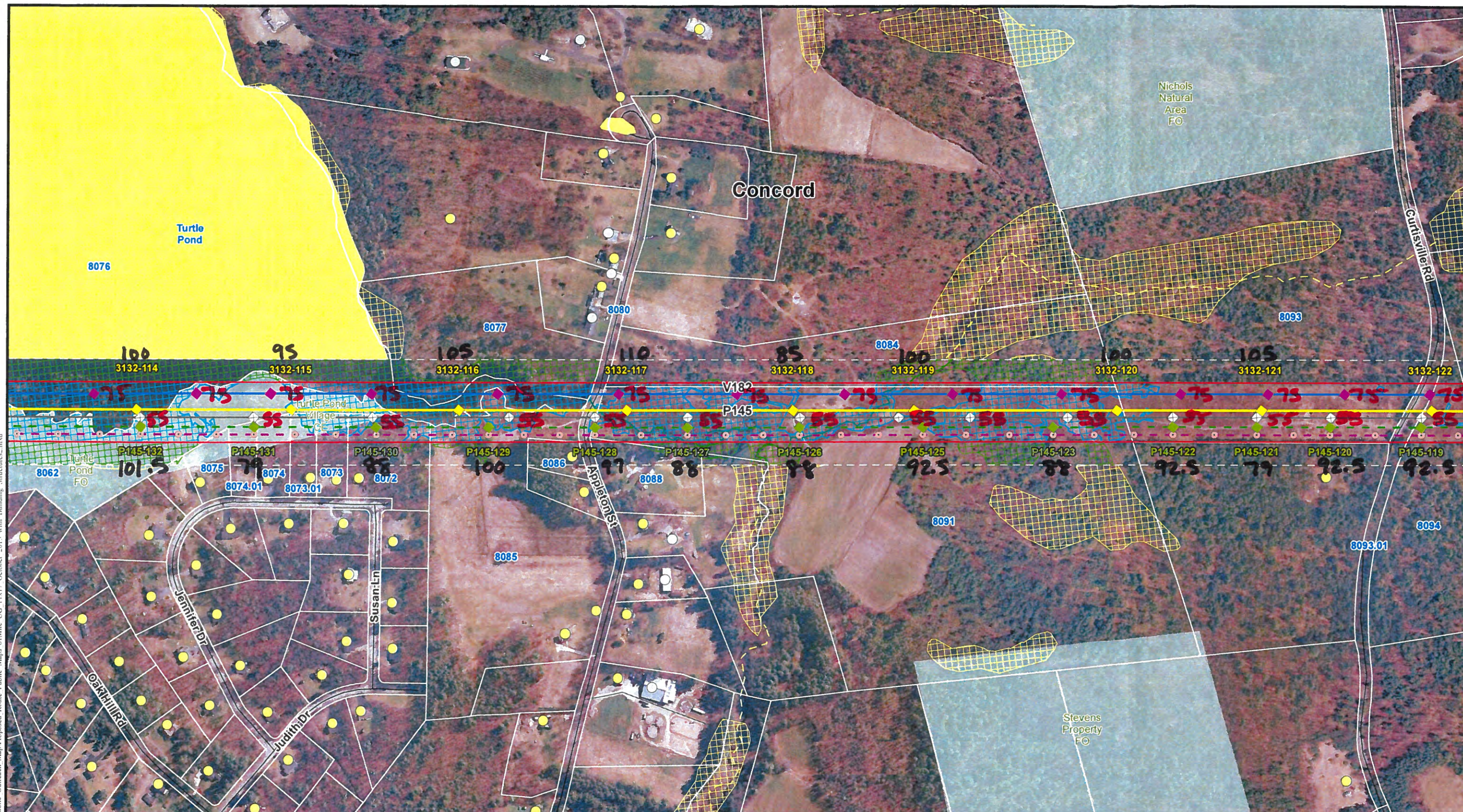





Structure Number	Structure Height	Cross Section
3132-106	95	S1-4
3132-107	100	S1-4
3132-108	85	S1-4
3132-109	90	S1-4
3132-110	100	S1-4
3132-111	80	S1-4
3132-112	105	S1-4
3132-113	105	S1-4
3132-114	100	S1-4
P145-132	101.5	S1-4
P145-133	101.5	S1-4
P145-134	120	S1-4
P145-135	88	S1-4
P145-136	79	S1-4
P145-137	83.5	S1-4
P145-138	79	S1-4
P145-139	88	S1-4
P145-140	88	S1-4
P145-141	88	S1-4
P145-142	106	S1-4
P145-144	101.5	S1-4
P145-145	79	S1-4
P145-146	79	S1-4



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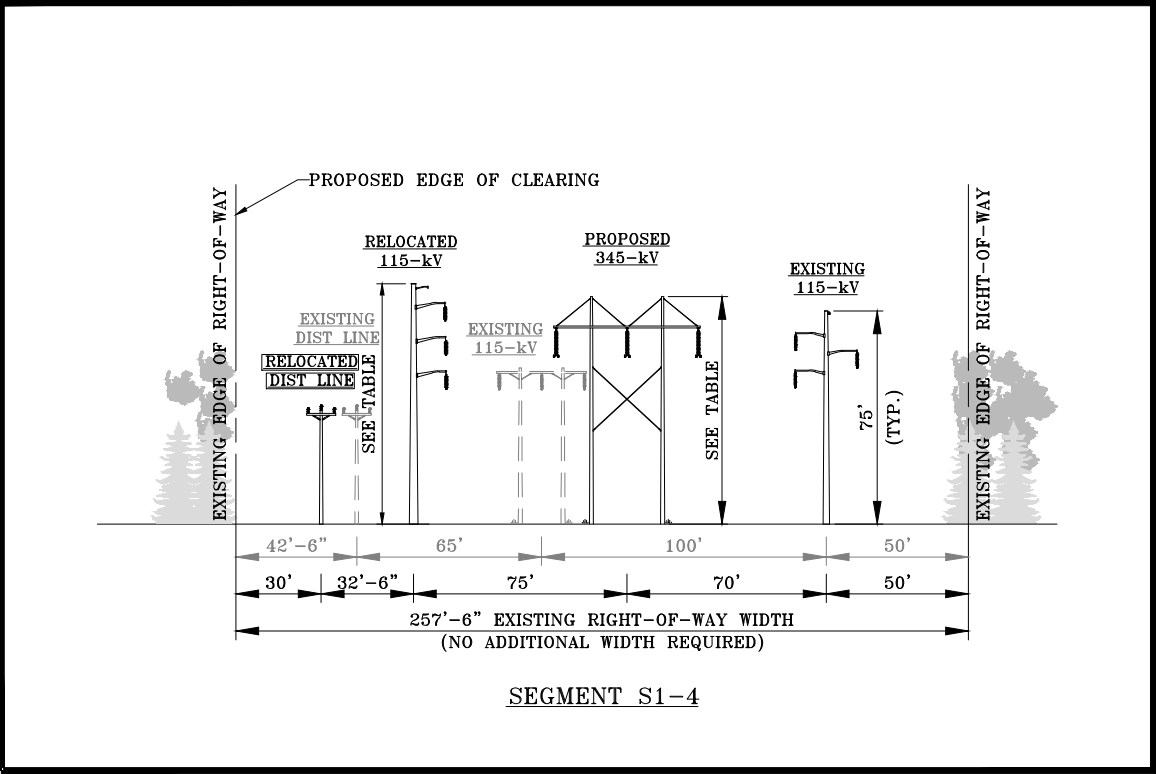
<ul style="list-style-type: none">HVDC LineHVDC UG - TrenchedHVDC UG - Trenchless345-kV LineExisting 345-kV LineExisting 115-kV LineExisting Distribution LineRelocated 115-kV LineRelocated 345-kV Line	<ul style="list-style-type: none">Relocated Distribution LineROW BoundaryEdge of CorridorExisting StructureExisting Structure - RemovedProposed HVDC StructureProposed 345-kV StructureRelocated StructureDistribution Pole	<ul style="list-style-type: none">Replacement StructuresTown BoundaryProperty Owner IdentificationEversource Owned ParcelsResidential BuildingCommercial BuildingOther BuildingField Delineated WetlandsPhoto-Estimated Wetlands	<ul style="list-style-type: none">Approximate WetlandsField Delineated WaterbodyPhoto-Estimated WaterbodyApproximate WaterbodyField Delineated StreamPhoto-Estimated StreamApproximate StreamExtent of Estimated Features	<ul style="list-style-type: none">Conservation Easement, State/Federal Parks and Public Lands
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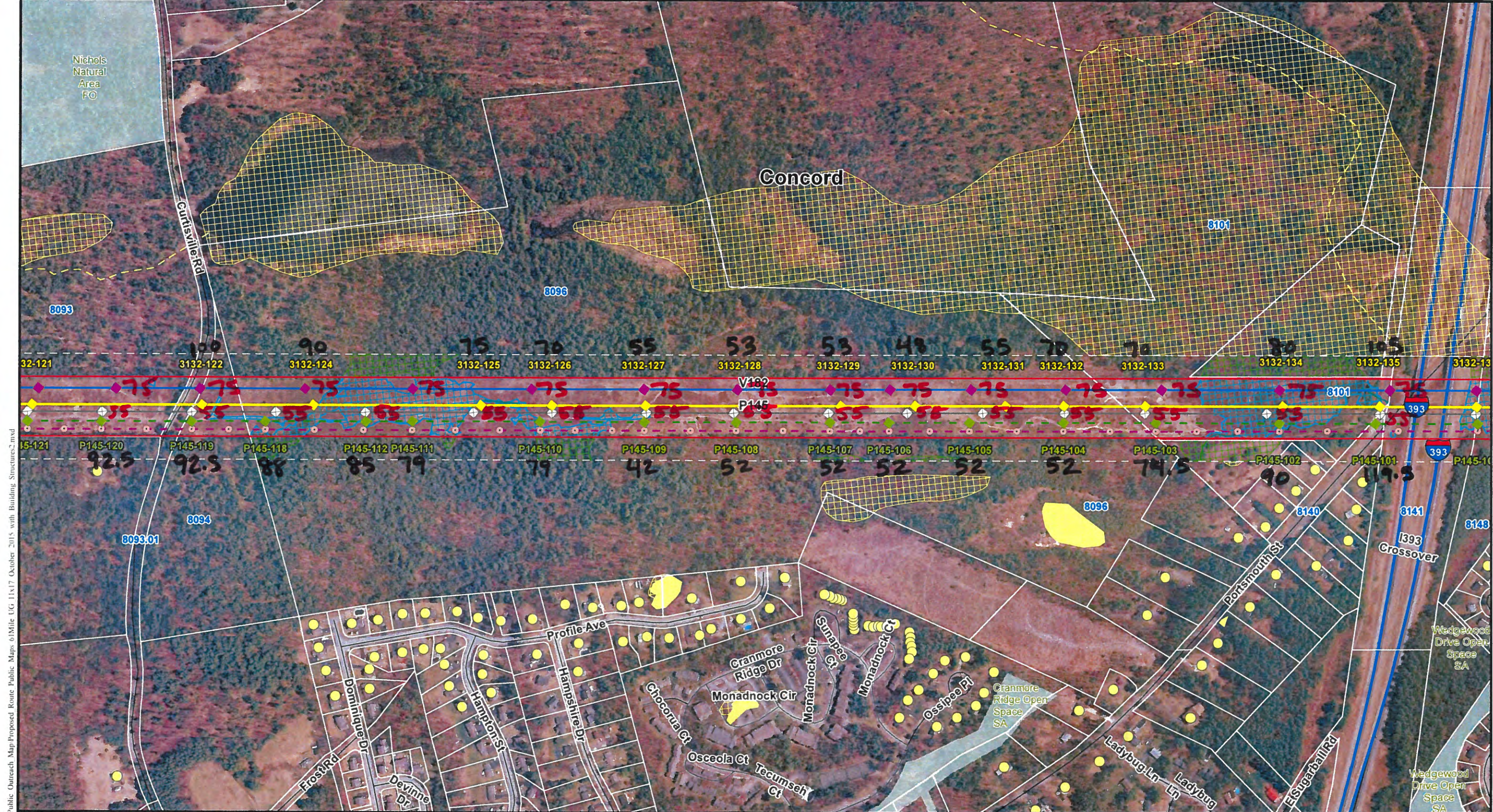
The Northern Pass
Transmission Line Project
Proposed Route
Concord


Project Maps
February 2016 Supplement

PRELIMINARY ENGINEERING

Structure Number	Structure Height	Cross Section
3132-114	100	51-4
3132-115	95	51-4
3132-116	105	51-4
3132-117	110	51-4
3132-118	85	51-4
3132-119	100	51-4
3132-120	100	51-4
3132-121	105	51-4
P145-119	92.5	S1-4
P145-120	92.5	51-4
P145-121	79	S1-4
P145-122	92.5	51-4
P145-123	88	S1-4
P145-125	92.5	S1-4
P145-126	88	S1-4
P145-127	88	S1-4
P145-128	97	51-4
P145-129	100	S1-4
P145-130	88	51-4
P145-131	79	S1-4
P145-132	101.5	51-4







THE NORTHERN PASS

0 150 300 Feet

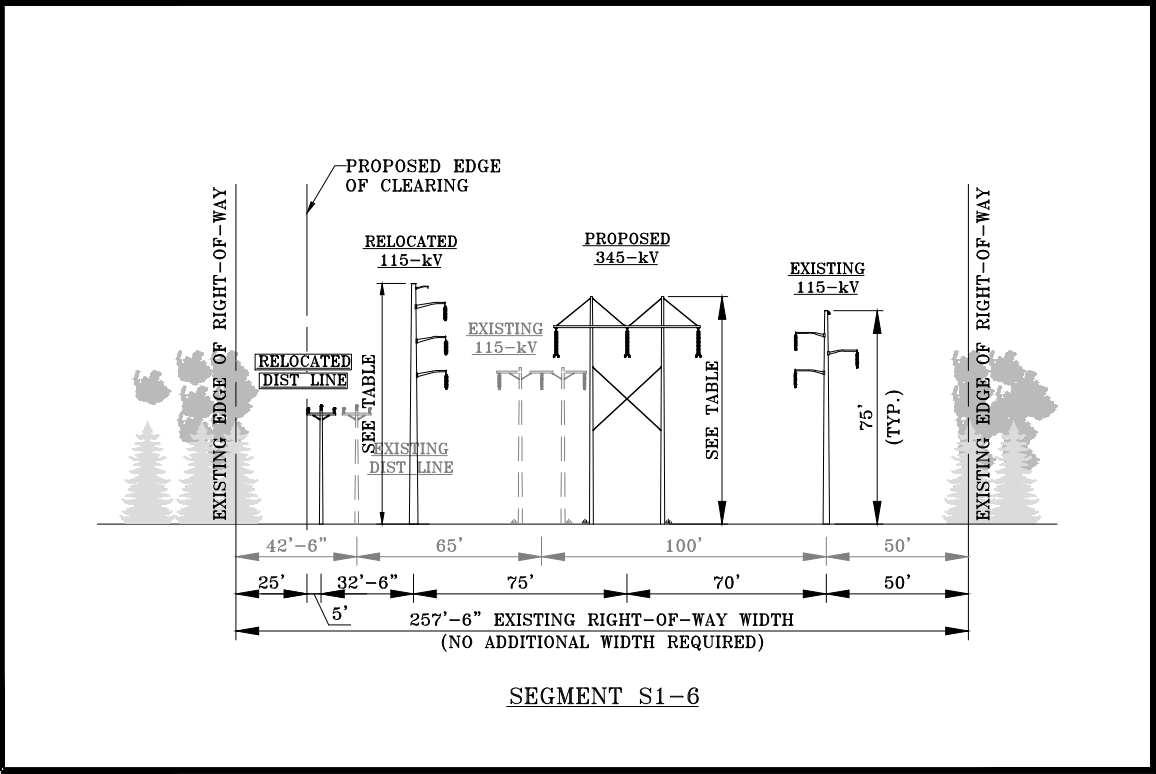
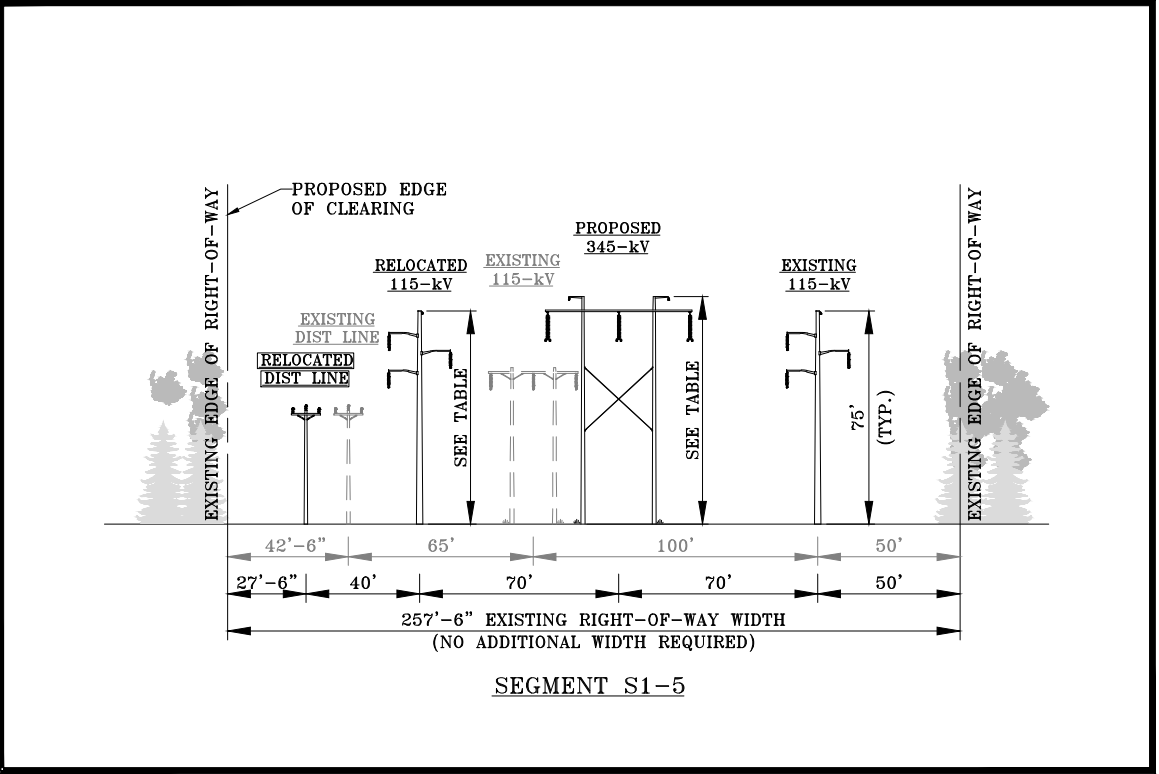
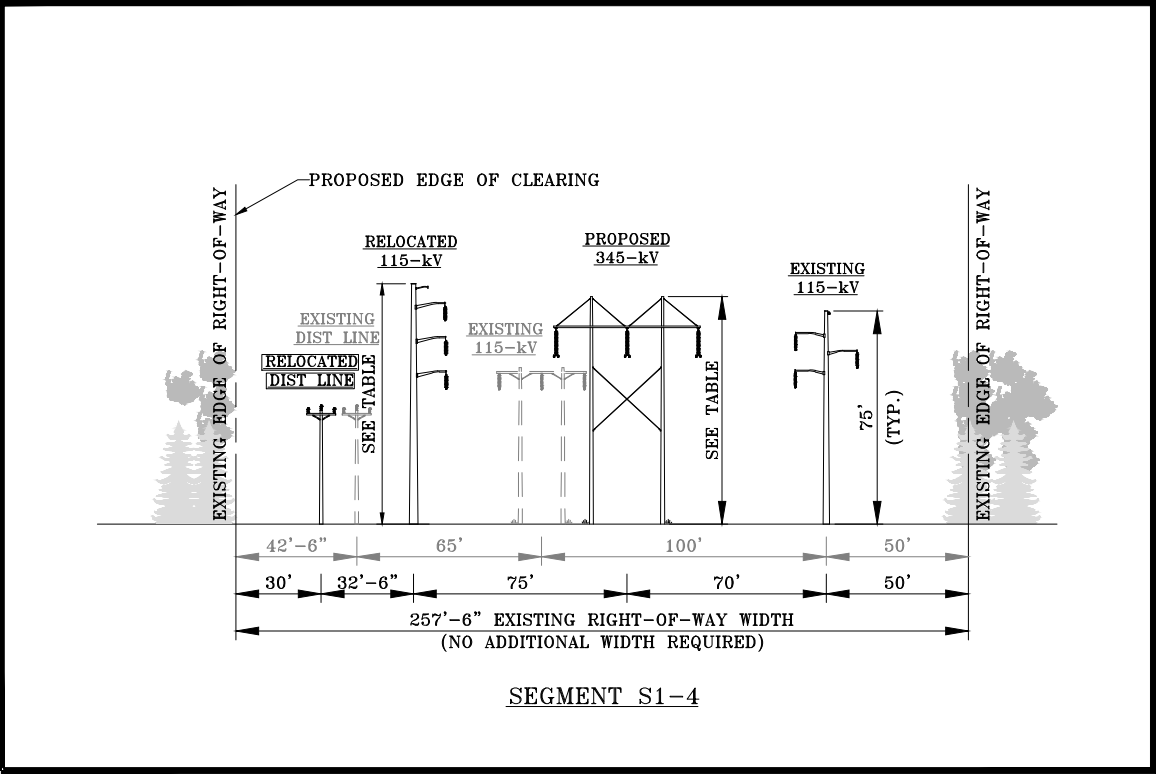
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<ul style="list-style-type: none"> ■ Approximate Wetlands ■ Field Delineated Waterbody ■ Photo-Estimated Waterbody ■ Approximate Waterbody — Field Delineated Stream — Photo-Estimated Stream - - - Approximate Stream - - - Extent of Estimated Features 	<ul style="list-style-type: none"> ■ Conservation Easement, State/Federal Parks and Public Lands 	

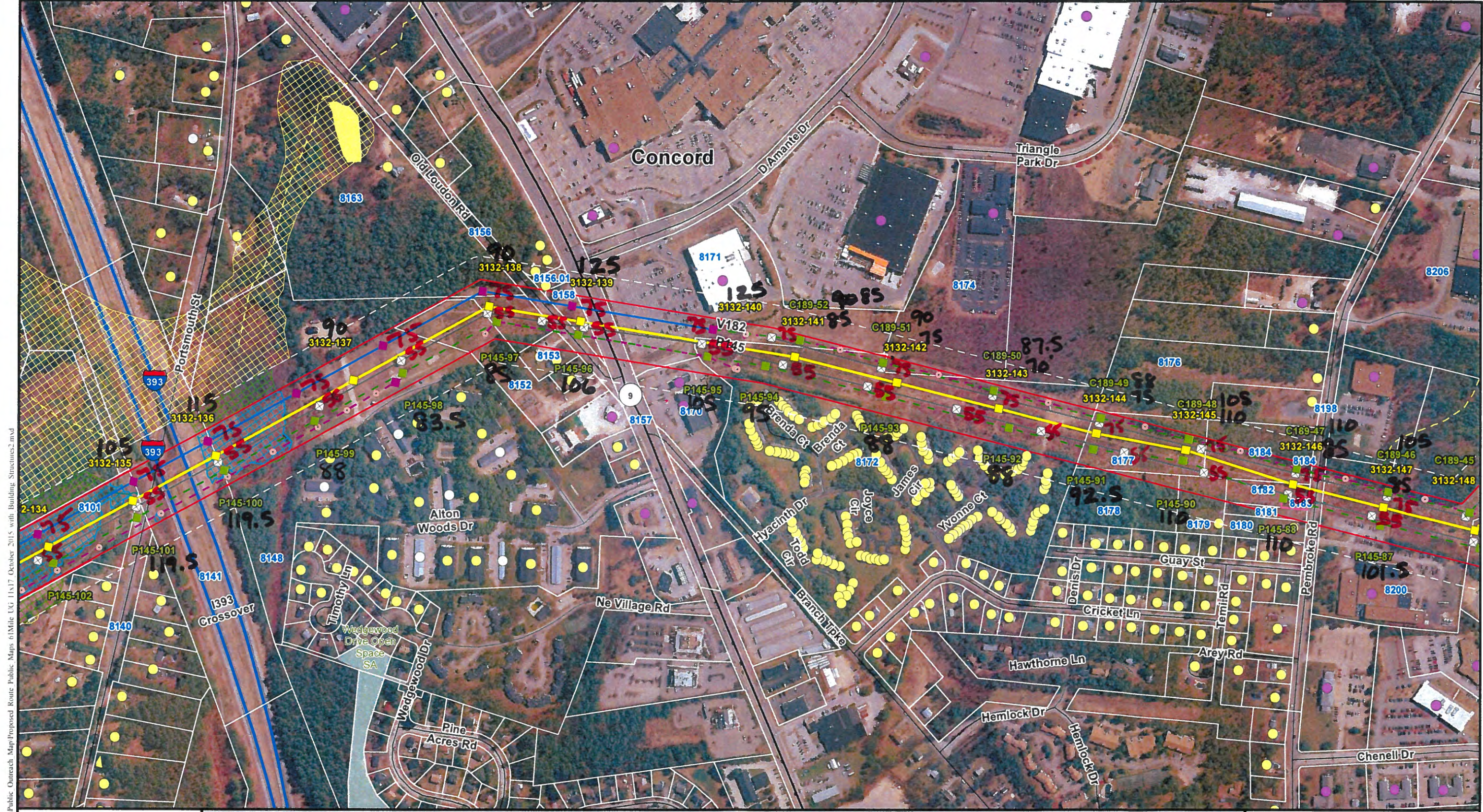
The Northern Pass
Transmission Line Project
Proposed Route
Concord


Project Maps
February 2016 Supplement

PRELIMINARY ENGINEERING

Structure Number	Structure Height	Cross Section
3132-122	100	S1-4
3132-124	90	S1-4
3132-125	75	S1-5
3132-126	70	S1-5
3132-127	55	S1-5
3132-128	53	S1-5
3132-129	53	S1-5
3132-130	48	S1-5
3132-131	55	S1-5
3132-132	70	S1-5
3132-133	70	S1-5
3132-134	80	S1-5
3132-135	105	S1-6
P145-101	119.5	S1-6
P145-102	90	S1-5
P145-103	74.5	S1-5
P145-104	52	S1-5
P145-105	52	S1-5
P145-106	52	S1-5
P145-107	52	S1-5
P145-108	52	S1-5
P145-109	42	S1-5
P145-110	79	S1-5
P145-111	79	S1-5
P145-112	85	S1-4
P145-118	88	S1-4
P145-119	92.5	S1-4
P145-120	92.5	S1-4







THE NORTHERN PASS

0 150 300 Feet

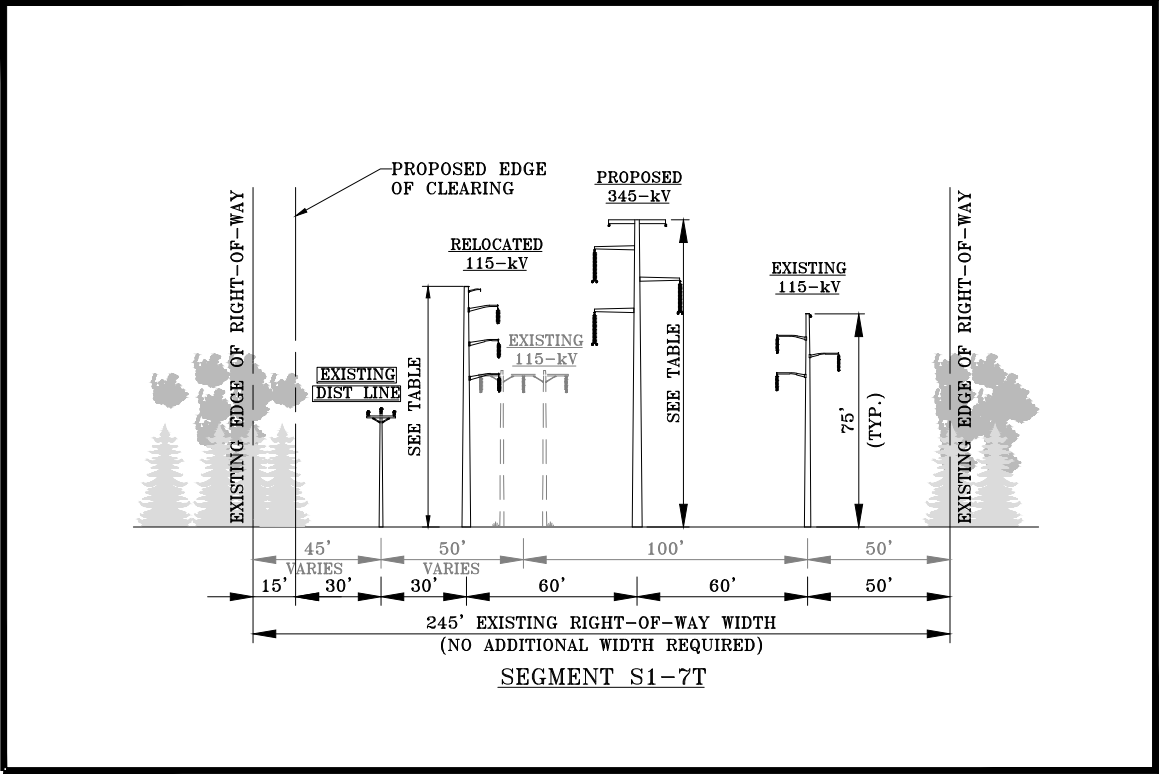
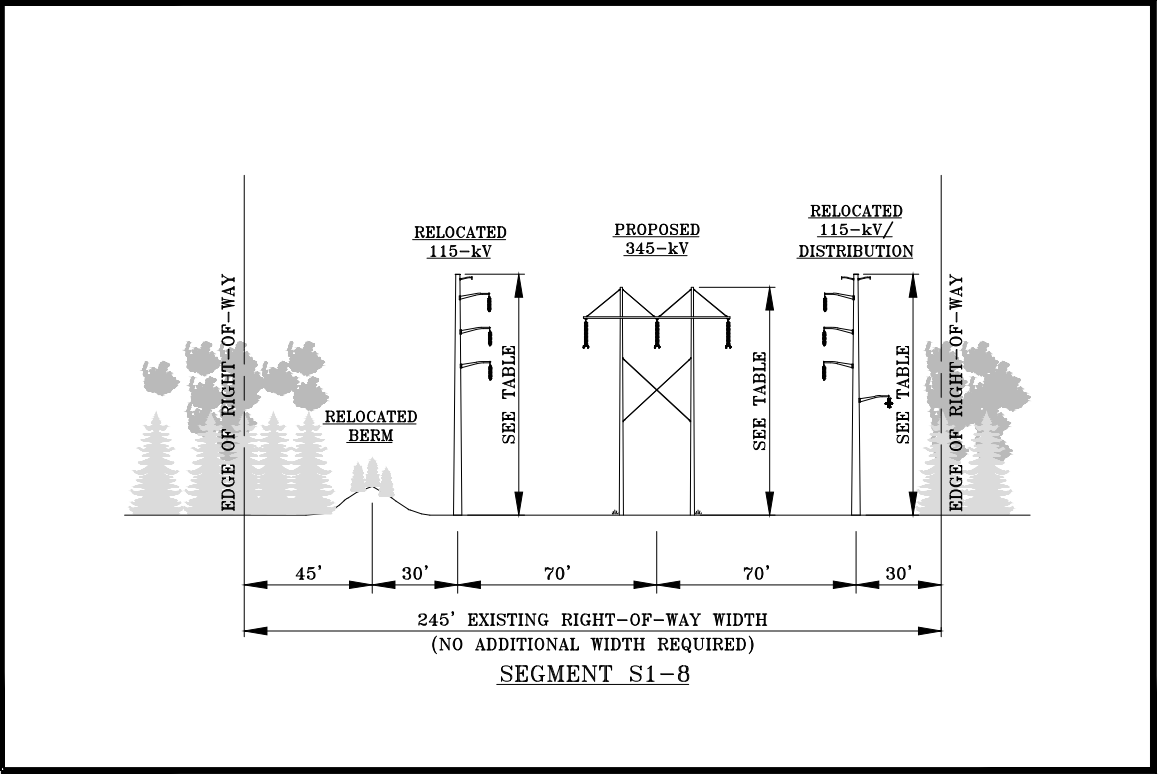
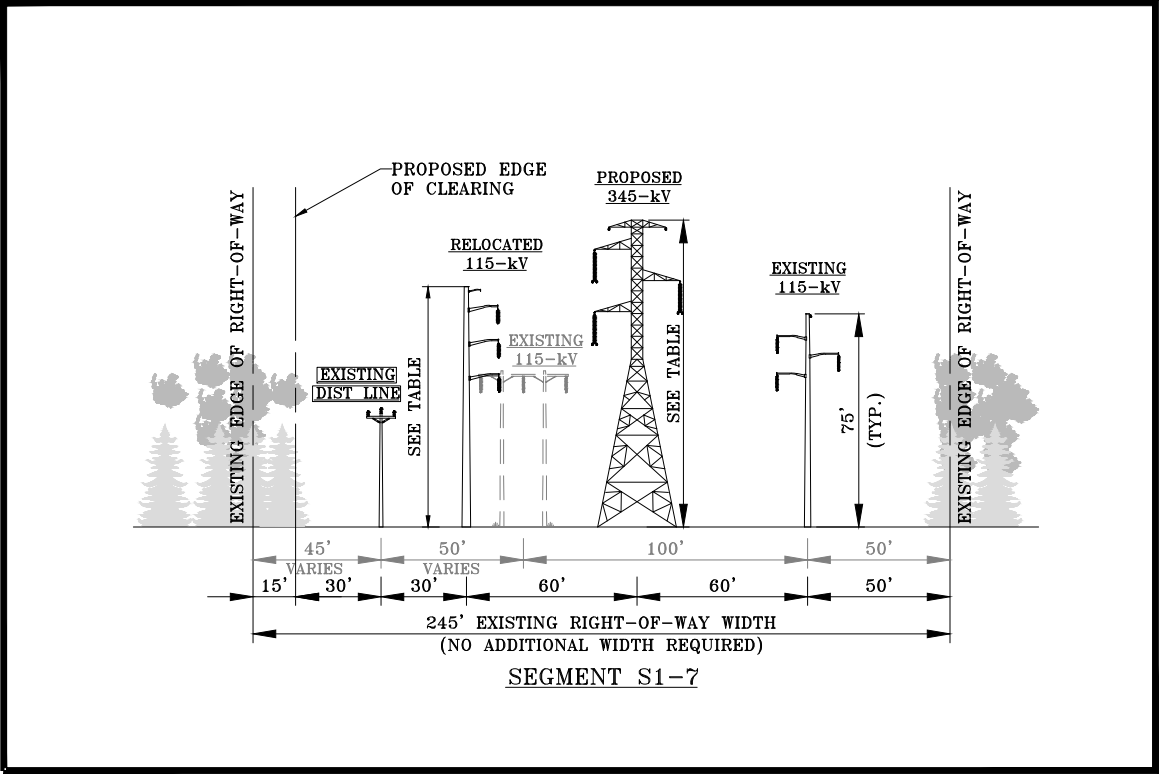
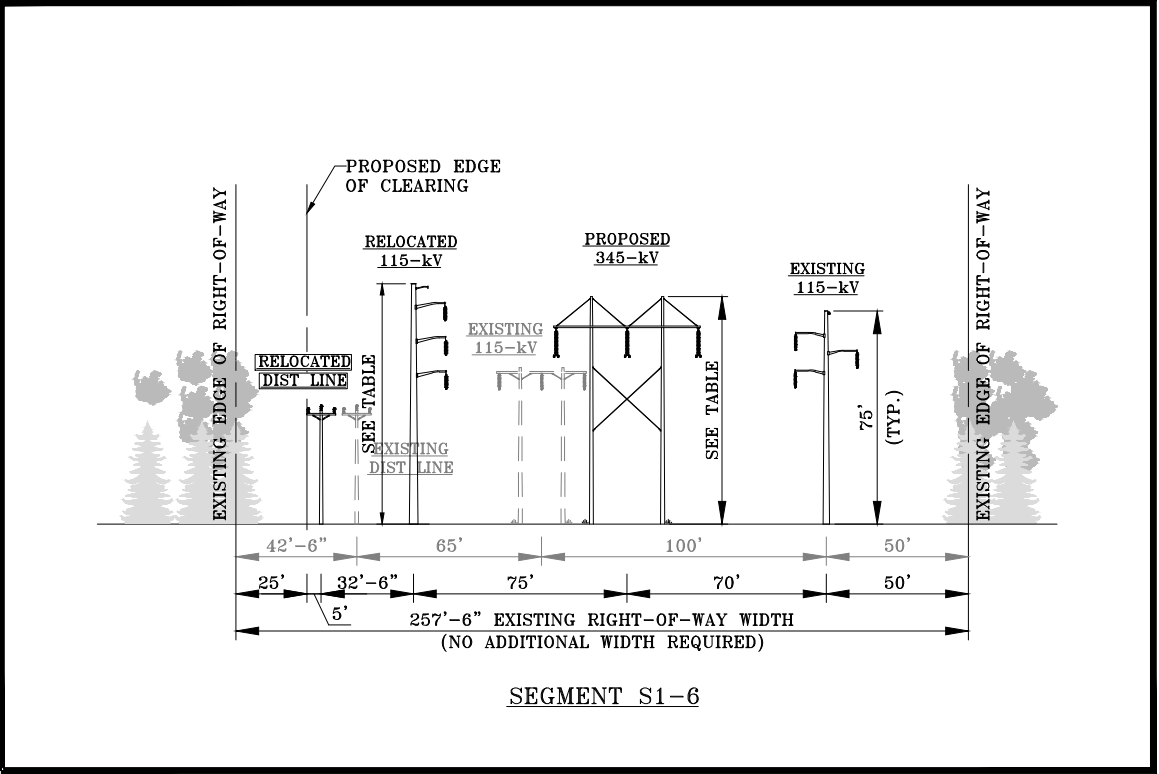
<ul style="list-style-type: none"> — HVDC Line - - - HVDC UG - Trenched - - - HVDC UG - Trenchless — 345-kV Line — Existing 345-kV Line — Existing 115-kV Line — Existing Distribution Line - - - Relocated 115-kV Line - - - Relocated 345-kV Line 	<ul style="list-style-type: none"> — Relocated Distribution Line — ROW Boundary - - - Edge of Corridor ■ Existing Structure □ Existing Structure - Removed ■ Proposed HVDC Structure ■ Proposed 345-kV Structure ■ Relocated Structure ● Distribution Pole 	<ul style="list-style-type: none"> ▲ Replacement Structures ■ Town Boundary ■ 3582 Property Owner Identification □ Eversource Owned Parcels ● Residential Building ● Commercial Building ○ Other Building □ Field Delineated Wetlands □ Photo-Estimated Wetlands 	<ul style="list-style-type: none"> □ Approximate Wetlands ■ Field Delineated Waterbody ■ Photo-Estimated Waterbody ■ Approximate Waterbody — Field Delineated Stream — Photo-Estimated Stream - - - Approximate Stream - - - Extent of Estimated Features 	<ul style="list-style-type: none"> □ Conservation Easement, State/Federal Parks and Public Lands
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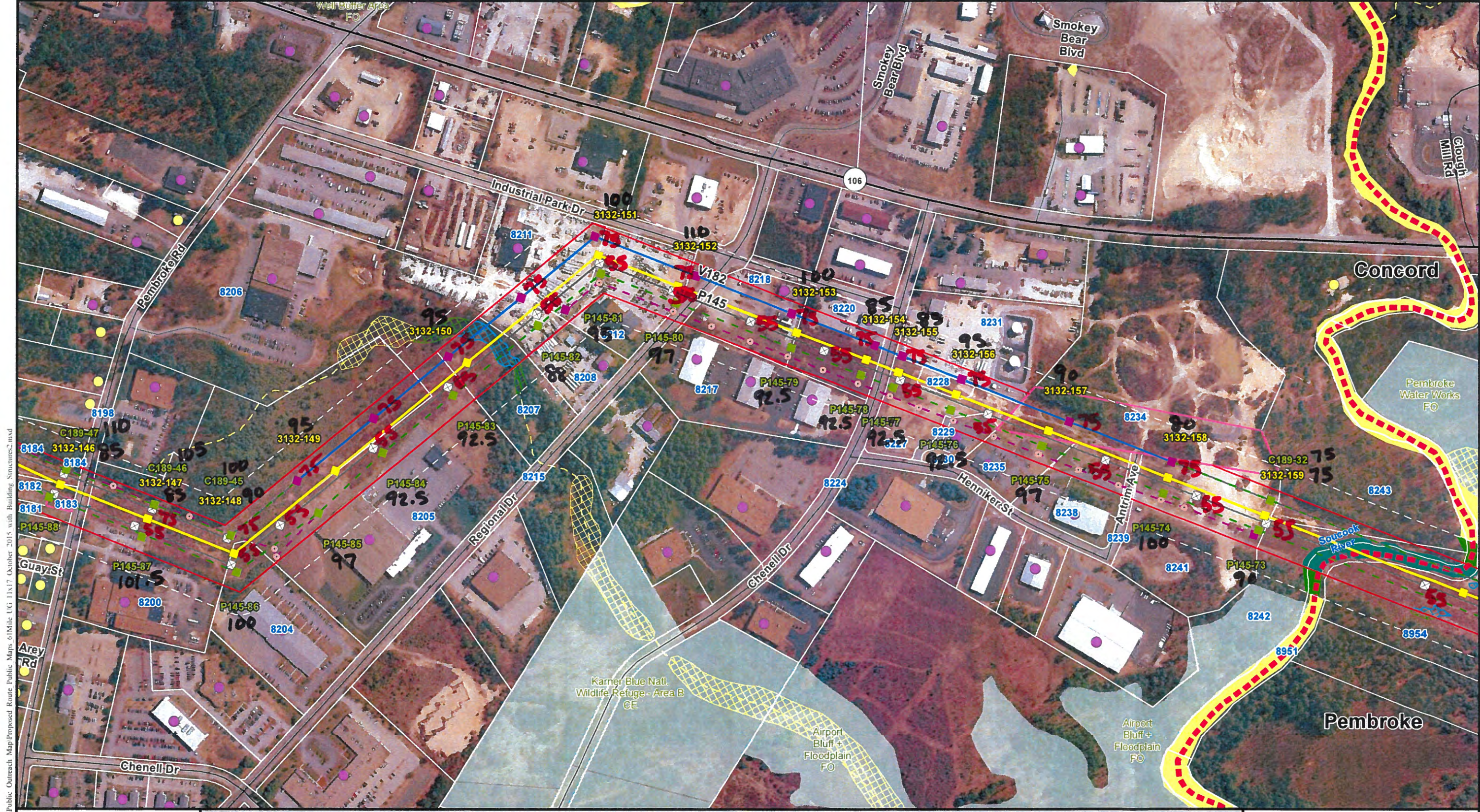
The Northern Pass
Transmission Line Project
Proposed Route
Concord

Project Maps
February 2016 Supplement

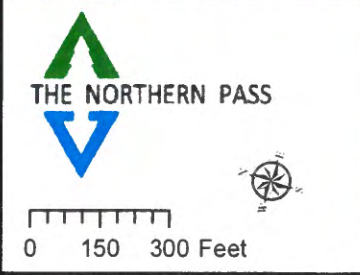
PRELIMINARY ENGINEERING

Structure Number	Structure Height	Cross Section
3132-135	105	S1-6
3132-136	115	S1-6
3132-137	90	S1-6
3132-138	90	S1-7T
3132-139	125	S1-7T
3132-140	125	S1-7T
3132-141	85	S1-7T
3132-142	75	S1-8
3132-143	70	S1-8
3132-144	75	S1-8
3132-145	110	S1-8
3132-146	85	S1-8
3132-147	85	S1-8
C189-46	105	S1-8
C189-47	110	S1-8
C189-48	105	S1-8
C189-49	88	S1-8
C189-50	87.5	S1-8
C189-51	90	S1-8
C189-52	85	S1-7
P145-100	119.5	S1-6
P145-101	119.5	S1-6
P145-87	101.5	S1-8
P145-88	110	S1-8
P145-90	110	S1-8
P145-91	92.5	S1-8
P145-92	88	S1-8
P145-93	88	S1-8
P145-94	95	S1-7
P145-95	105	S1-7
P145-96	106	S1-7
P145-97	85	S1-7
P145-98	83.5	S1-6
P145-99	88	S1-6





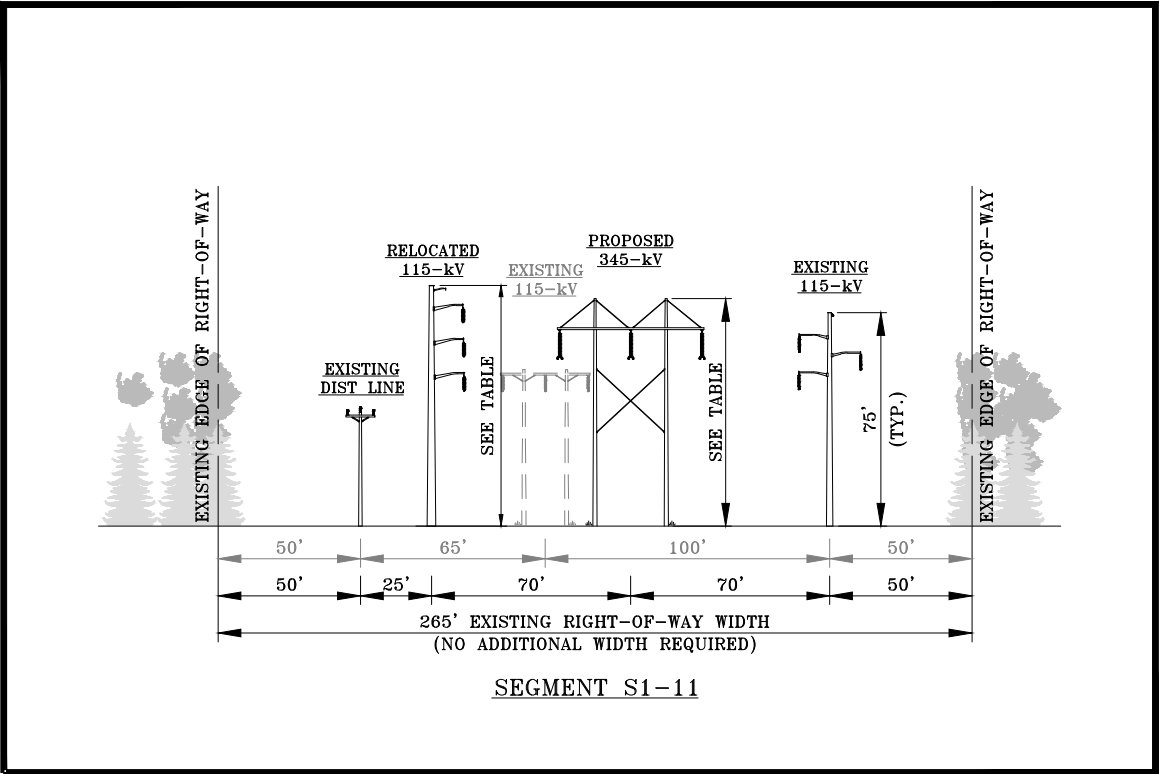
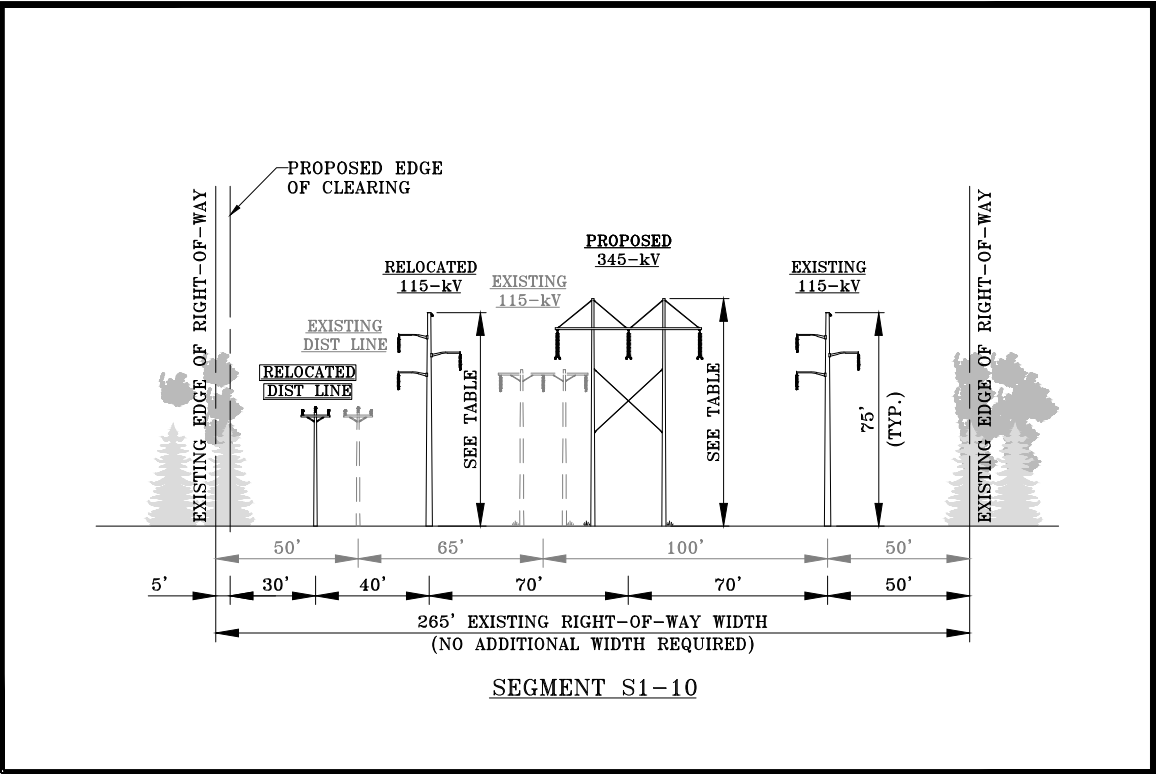
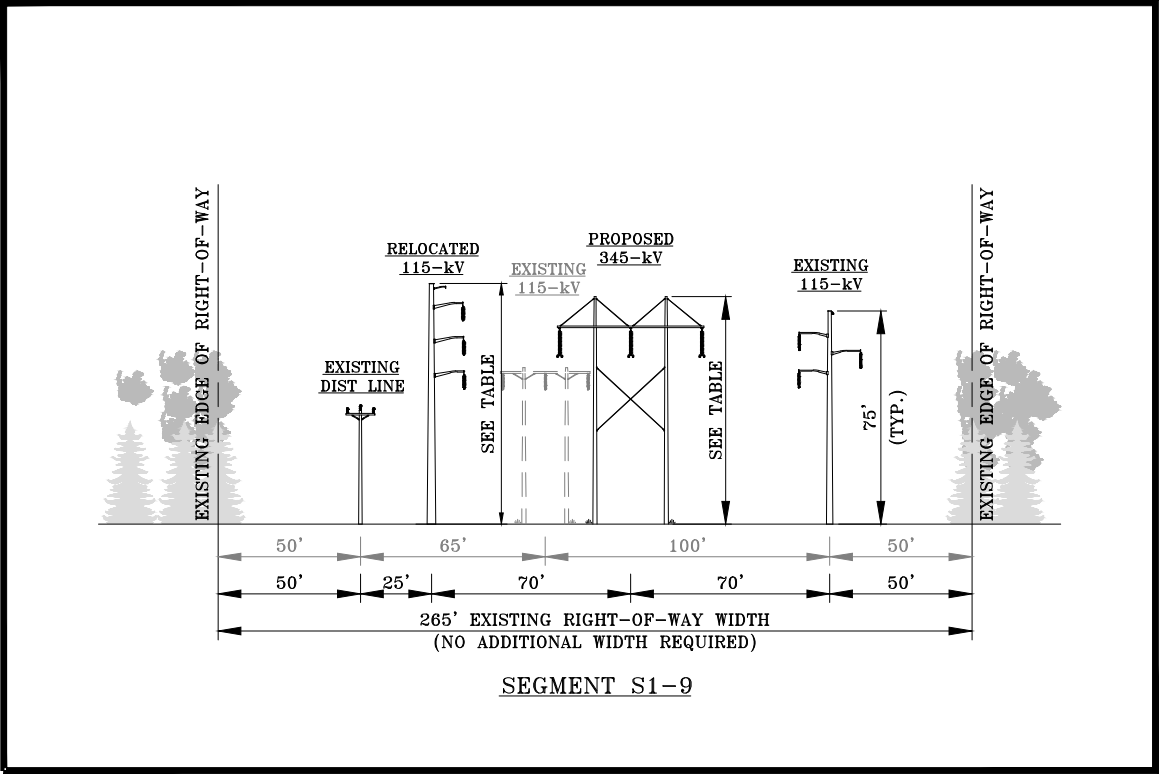
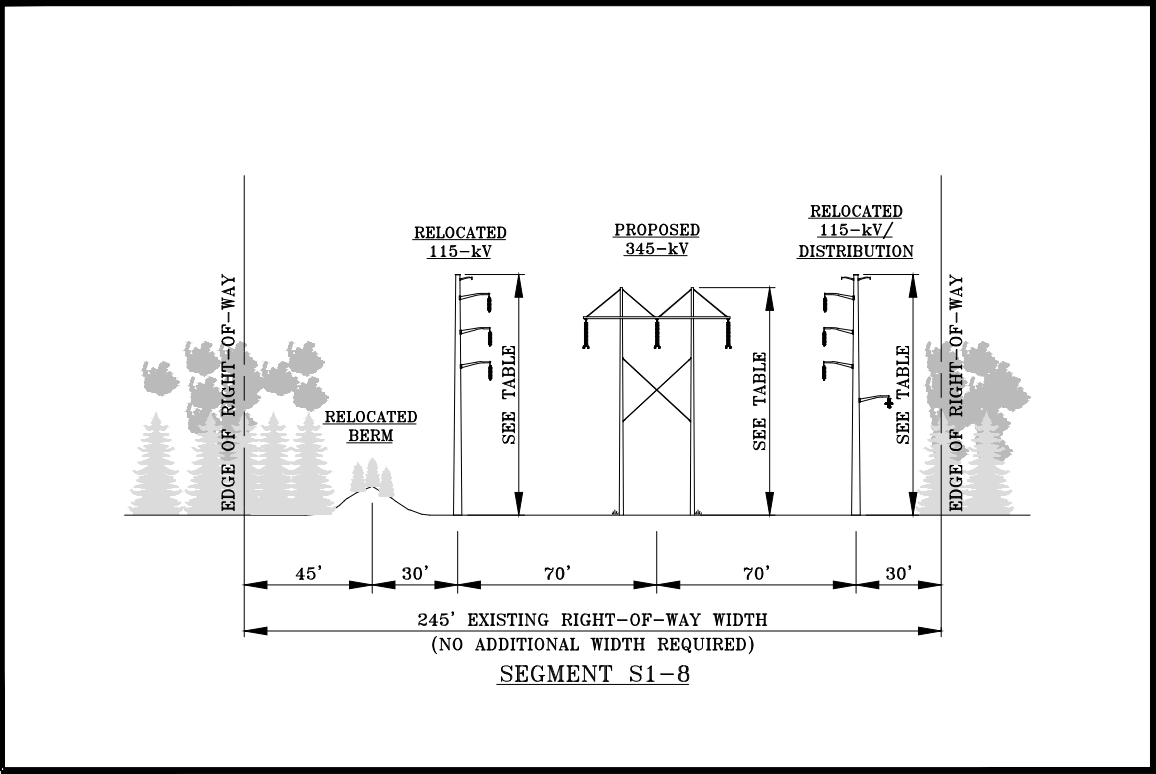
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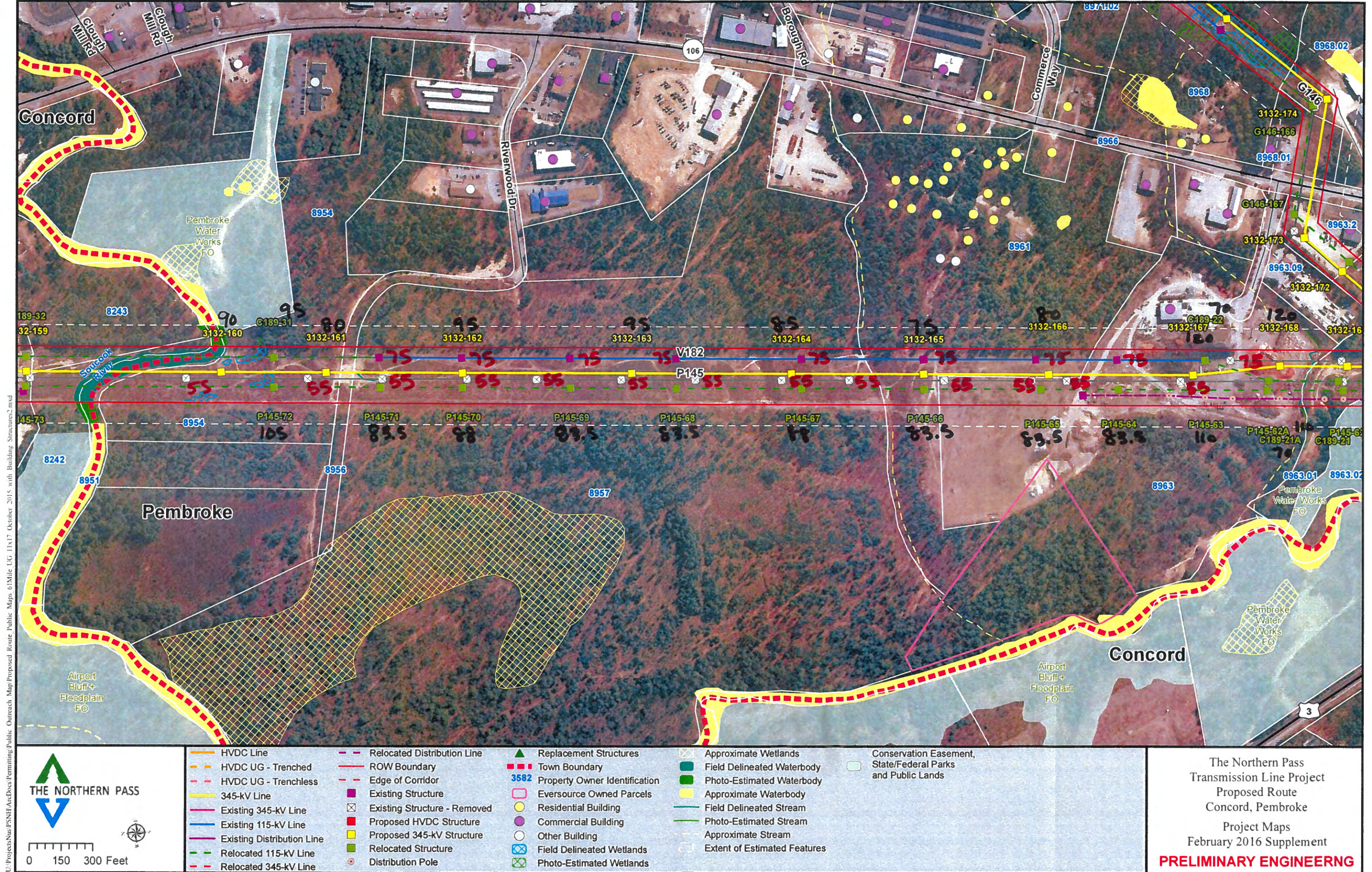


<ul style="list-style-type: none">HVDC LineHVDC UG - TrenchedHVDC UG - Trenchless345-kV LineExisting 345-kV LineExisting 115-kV LineExisting Distribution LineRelocated 115-kV LineRelocated 345-kV Line	<ul style="list-style-type: none">Relocated Distribution LineROW BoundaryEdge of CorridorExisting StructureExisting Structure - RemovedProposed HVDC StructureProposed 345-kV StructureRelocated StructureDistribution Pole	<ul style="list-style-type: none">Replacement StructuresTown BoundaryProperty Owner IdentificationEversource Owned ParcelsResidential BuildingCommercial BuildingOther BuildingField Delineated WetlandsPhoto-Estimated Wetlands	<ul style="list-style-type: none">Approximate WetlandsField Delineated WaterbodyPhoto-Estimated WaterbodyApproximate WaterbodyField Delineated StreamPhoto-Estimated StreamApproximate StreamExtent of Estimated Features	<ul style="list-style-type: none">Conservation Easement, State/Federal Parks and Public Lands
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The Northern Pass
Transmission Line Project
Proposed Route
Concord, Pembroke
Project Maps
February 2016 Supplement
PRELIMINARY ENGINEERING

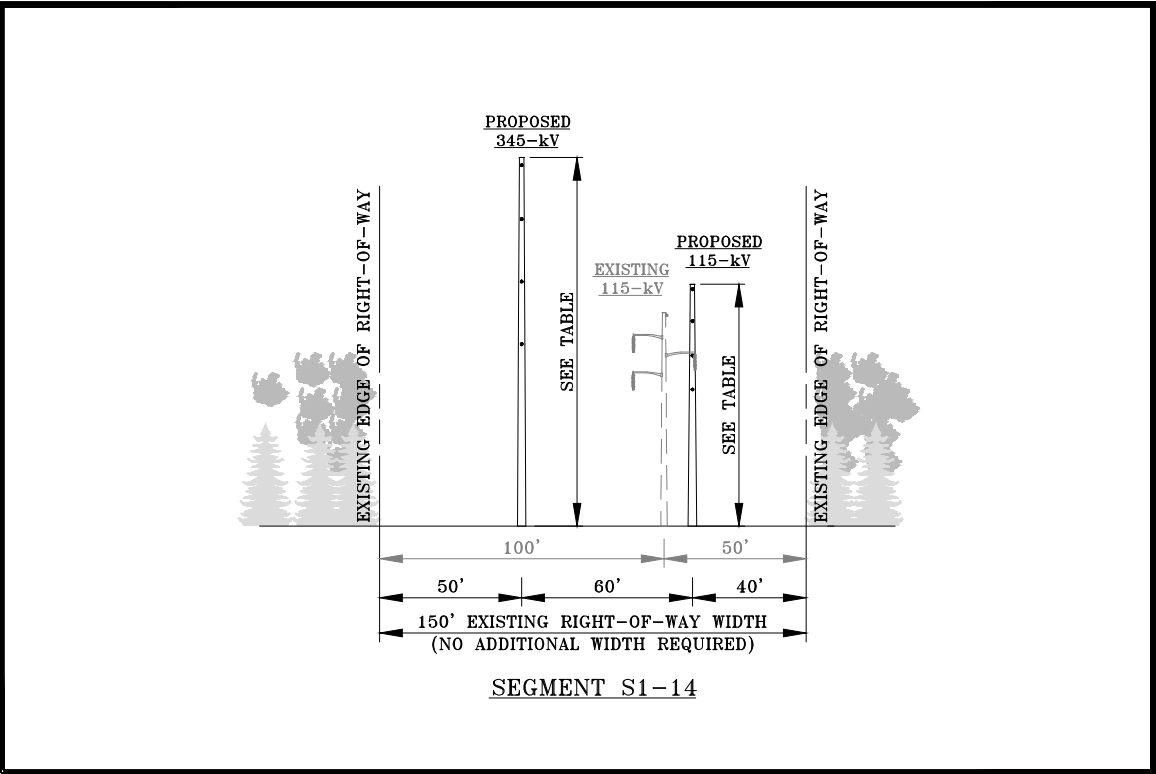
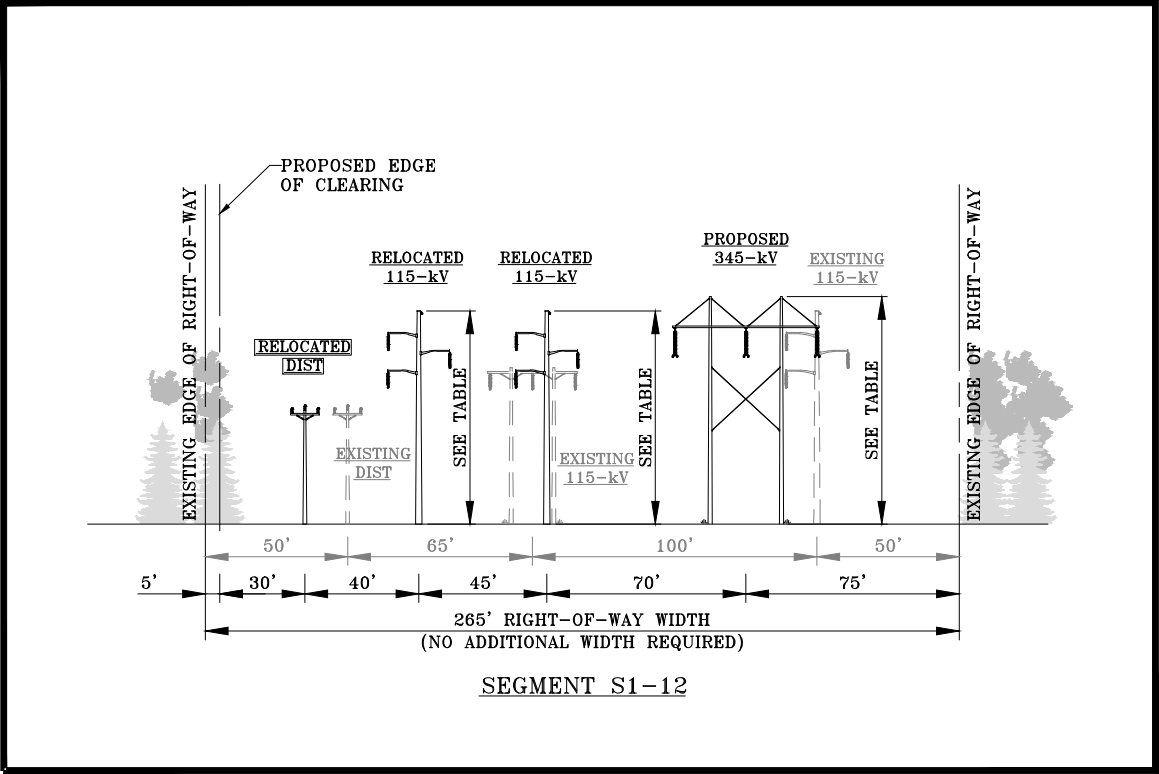
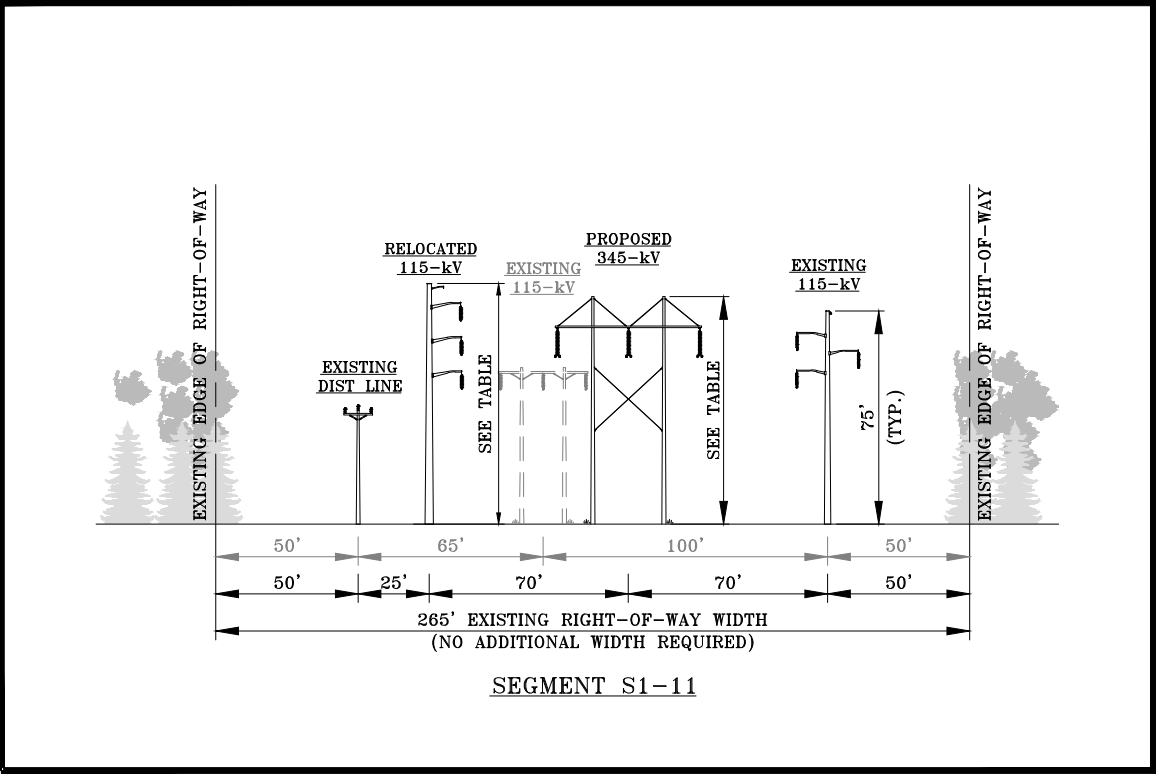
Structure Number	Structure Height	Cross Section
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3132-147	85	S1-8
3132-148	90	S1-9
3132-149	95	S1-9
3132-150	95	S1-9
3132-151	100	S1-9
3132-152	110	S1-10
3132-153	100	S1-10
3132-154	85	S1-10
3132-155	85	S1-10
3132-156	95	S1-10
3132-157	90	S1-10
3132-158	80	S1-10
3132-159	75	S1-11
C189-32	75	S1-11
C189-45	100	S1-8
C189-46	105	S1-8
C189-47	110	S1-8
P145-73	90	S1-11
P145-74	100	S1-10
P145-75	97	S1-10
P145-76	92.5	S1-10
P145-77	92.5	S1-10
P145-78	92.5	S1-10
P145-79	92.5	S1-10
P145-80	97	S1-10
P145-81	95	S1-9
P145-82	88	S1-9
P145-83	92.5	S1-9
P145-84	92.5	S1-9
P145-85	97	S1-9
P145-86	100	S1-8
P145-87	101.5	S1-8

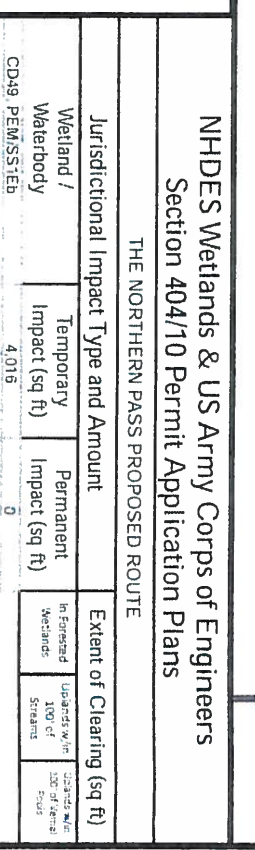




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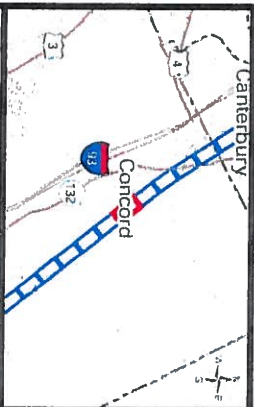
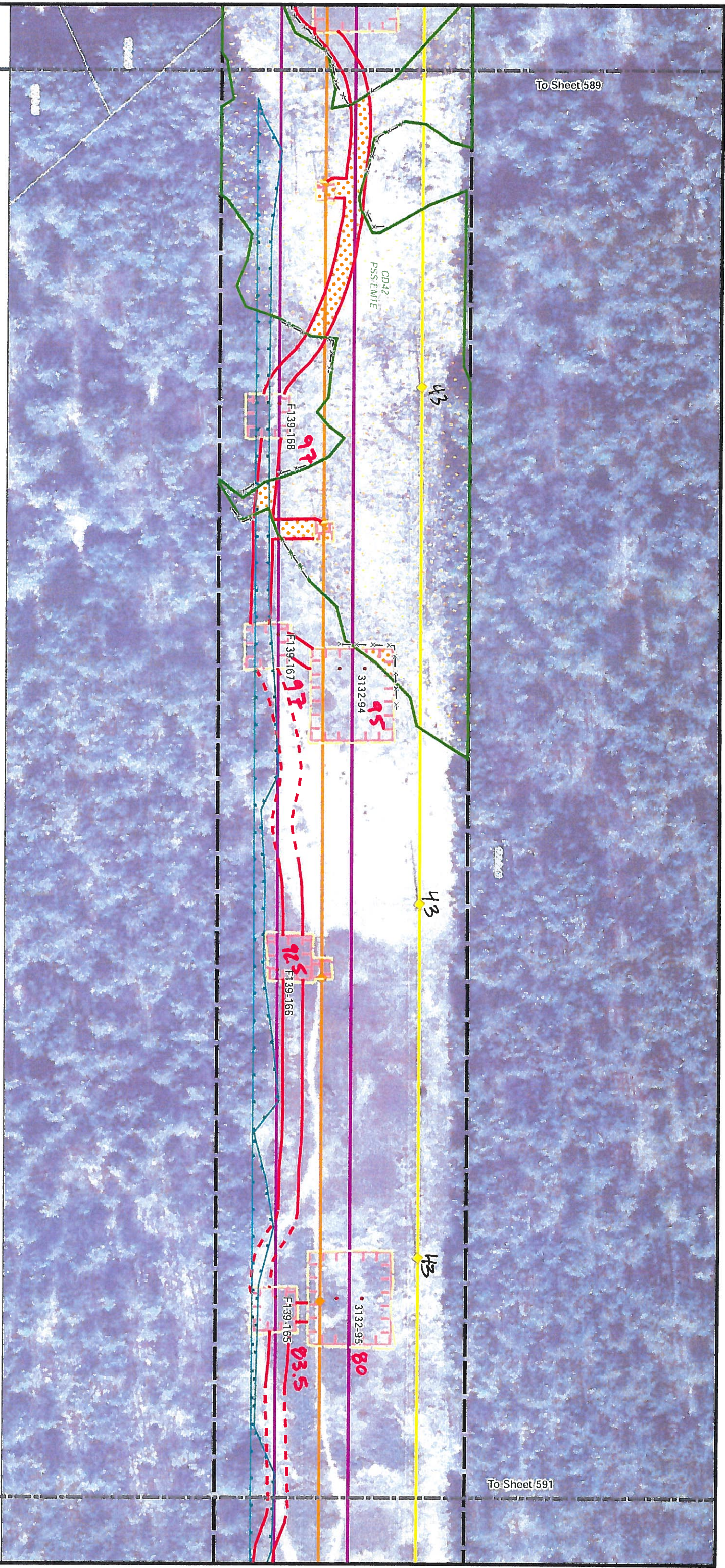
Structure Number	Structure Height	Cross Section
3132-160	90	S1-11
3132-161	80	S1-11
3132-162	95	S1-11
3132-163	95	S1-11
3132-164	85	S1-11
3132-165	75	S1-11
3132-166	80	S1-11
3132-167	120	S1-12
3132-168	120	S1-12
3132-173	145	S1-14
C189-21A	70	S1-12
C189-22	70	S1-12
C189-31	95	S1-11
G146-166	130	S1-14
G146-167	78	S1-14
P145-62A	110	S1-12
P145-63	110	S1-12
P145-64	83.5	S1-11
P145-65	83.5	S1-11
P145-66	83.5	S1-11
P145-67	88	S1-11
P145-68	83.5	S1-11
P145-69	83.5	S1-11
P145-70	88	S1-11
P145-71	83.5	S1-11
P145-72	105	S1-11





3/2015	* High Quality Wetland, * Corps Reviewed
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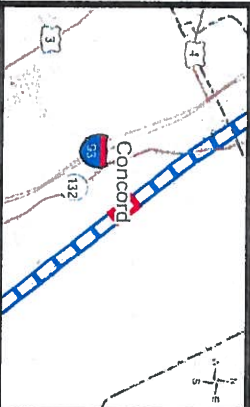
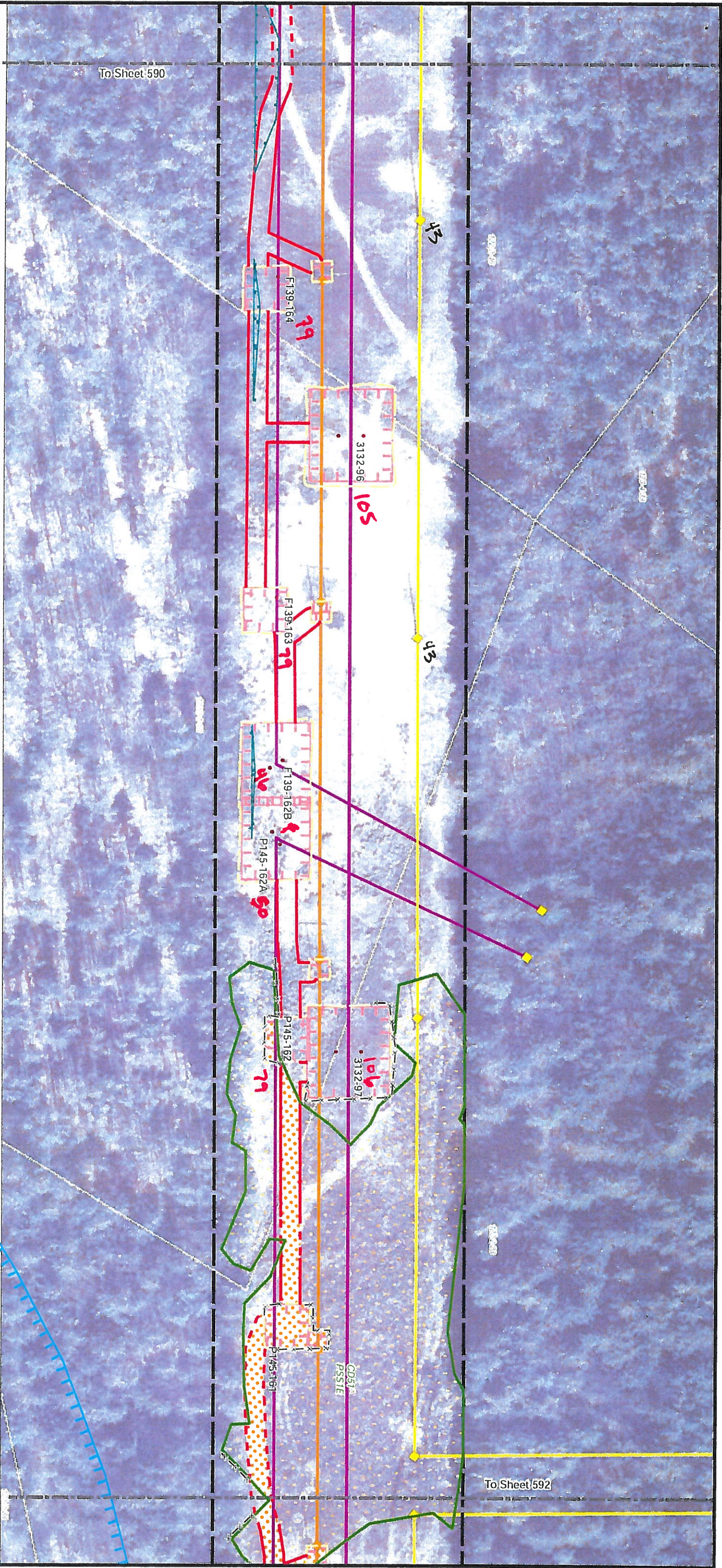
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Sources: NH GRANIT, Normandeau, Cornerstone, Burns & McDonnell.



NHDES Wetlands & US Army Corps of Engineers Section 404/10 Permit Application Plans					
THE NORTHERN PASS PROPOSED ROUTE					
Jurisdictional Impact Type and Amount	Extent of Clearing (sq ft)				
Wetland / Waterbody	Temporary Impact (sq ft)	Permanent Impact (sq ft)	In Forested Wetlands	Islands w/in 100' of Stream	Islands w/in 200' of Wetland Fringe
CD-42 PSS EXEMPT	8,062	0	0	0	0



- Existing Conditions**
- Existing Structure
 - Existing Structure to be Removed
 - Existing Right of Way
 - Existing Transmission Line
 - Existing Transmission Line to be Removed
 - 100-year Floodzone
 - Wetlands
 - USACE Reviewed Wetlands

- Proposed Conditions**
- Vernal Pool
 - 100' Buffer of Vernal Pools
 - Stream Buffer, 100'
 - Delineated Waterbodies
 - Perennial
 - Intermittent
 - Ephemeral
 - Stream Centerlines
 - Perennial
 - Intermittent
 - Ephemeral

- Proposed Conditions**
- LIDAR 10' Contour
 - LIDAR 2' Contour
 - USGS 10' Contour
 - USGS 2' Contour
 - Proposed Structure - No Permanent Impact
 - Proposed Structure - Permanent Impact
 - Proposed New ROW
 - Proposed Transmission/Distribution Line
 - Trenched UG
 - Trenchless UG

- Proposed Conditions**
- New Access Route
 - Existing Access Route
 - Temporary Construction Pad
 - Temporary Area of Disturbance - Construction Pad
 - Erosion and Sedimentation Control BMPs
 - Erosion and Sedimentation Control BMPs (Steep Slope)
 - Temporary Wetlands Matting (16' x 16')
 - Permanent Impacts - Stations

- RTE Bars**
- Vegetation Clearing Areas
 - Span Stream with No Permanent Impacts
 - UG Disturbance Area
 - UG Splice Vaults
 - Lay Down Yard

- RTE Bars**
- Animal
 - Vegetation
 - Both



NHDES Wetlands & US Army Corps of Engineers Section 404/10 Permit Application Plans

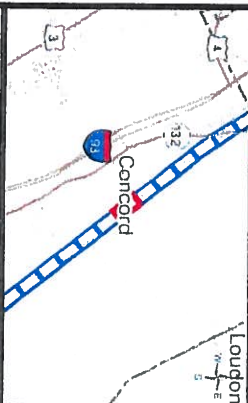
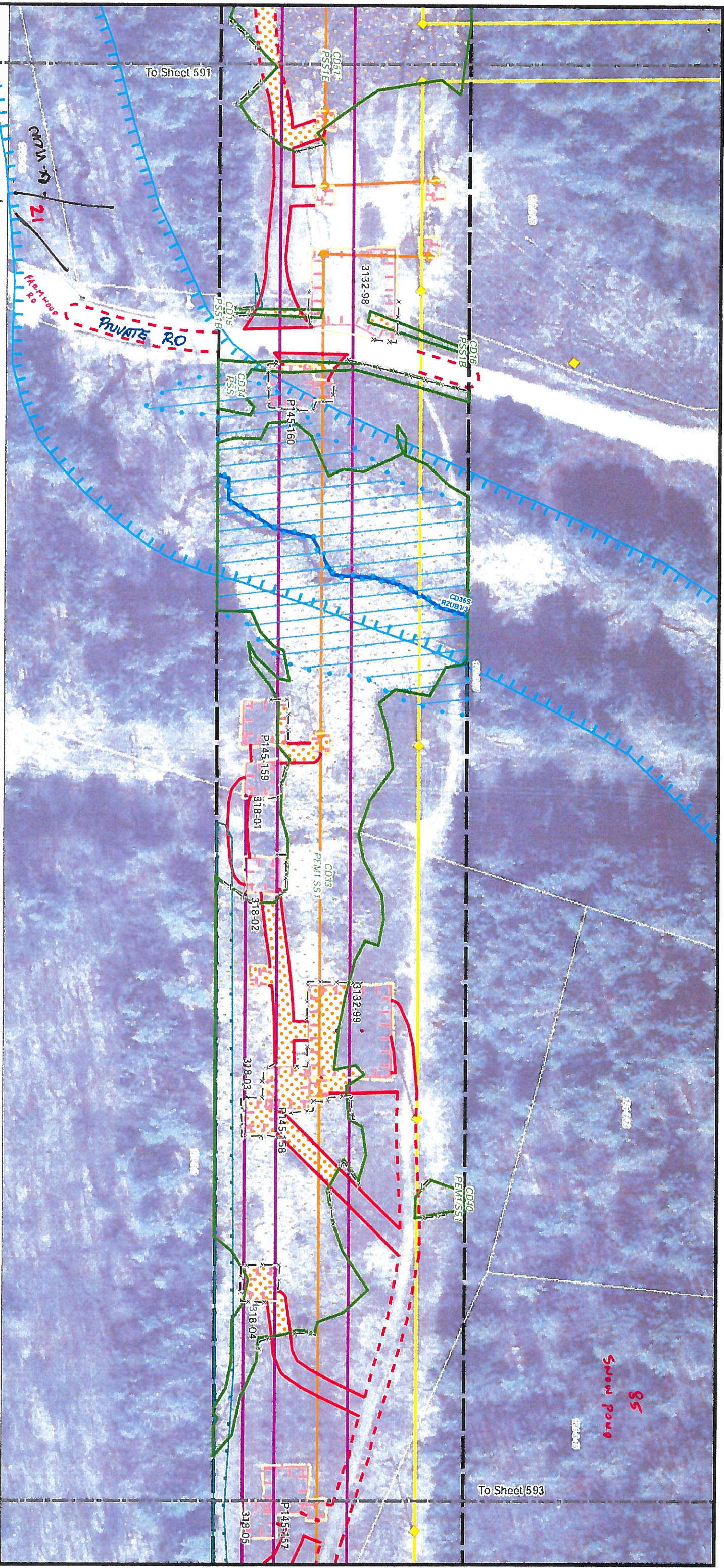
THE NORTHERN PASS PROPOSED ROUTE

Jurisdictional Impact Type and Amount				Extent of Clearing (sq ft)	
Wetland / Waterbody	Temporary Impact (sq ft)	Permanent Impact (sq ft)		In-Engineered Wetlands	Loss of Wetland
CD57, PSS1E	11 097	14			
				0	0
				0	0
				0	0

Date: 10/8/2015

High Quality Wetland * Corps Reviewed

Sheet : 591



- Existing Conditions

Existing Structure

Existing Structure to be Removed

Existing Right of Way

Existing Transmission Line

Existing Transmission Line to be Removed

100-year Floodzone

Wetlands

USACE Reviewed Wetlands

Vernal Pool

100' Buffer of Vernal Pools

Stream Buffer, 100'

Delineated Waterbodies

Perennial

Intermittent

Ephemeral

Stream Centerlines

Perennial

Intermittent

Ephemeral

LIDAR 10' Contour

LIDAR 2' Contour

USGS 10' Contour

USGS 2' Contour

Proposed Structure - No Permanent Impact

Proposed Structure - Permanent Impact

Proposed New ROW

Proposed Transmission/Distribution Line

Trenched UG

Trenchless UG

New Access Route

Existing Access Route

Temporary Construction Pad

Temporary Area of Disturbance - Construction Pad

Erosion and Sedimentation Control BMPs

Erosion and Sedimentation Control BMPs (Steep Slope)

Temporary Wetlands Matting (15' x 15')

Permanent Impacts - Stations

Vegetation Clearing

Areas

Span Stream with No Permanent Impacts

UG Disturbance Area

UG Splice Vaults

Lay Down Yard

RTE Bars

Animal

Vegetation

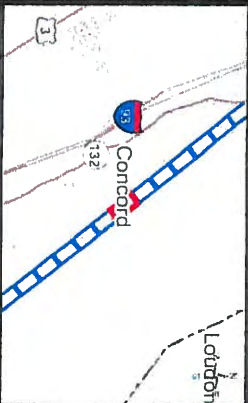
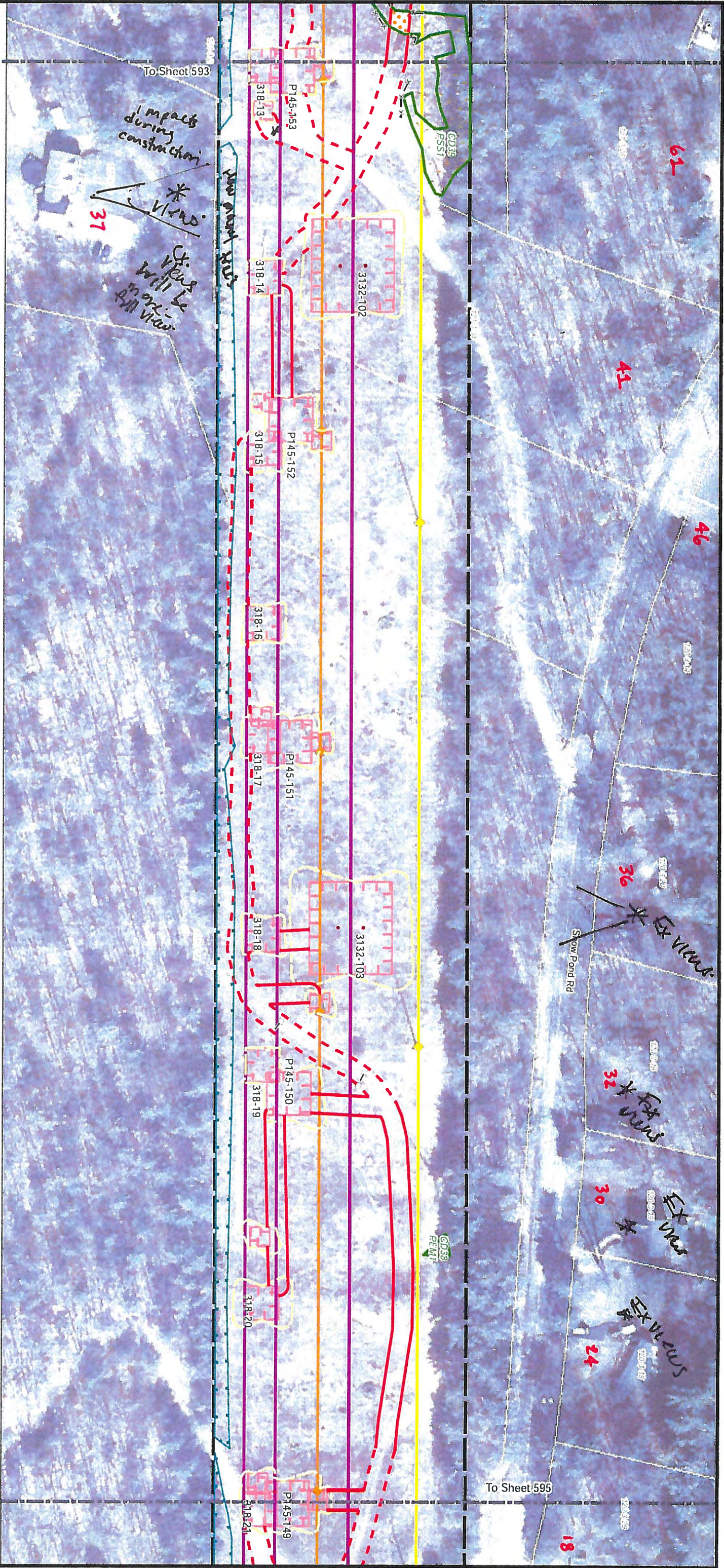
Both

NHDES Wetlands & US Army Corps of Engineers Section 404/10 Permit Application Plans					
THE NORTHERN PASS PROPOSED ROUTE					
Jurisdictional Impact Type and Amount		Extent of Clearing (sq ft)			
Wetland / Waterbody	Temporary Impact (sq ft)	Permanent Impact (sq ft)	In-Processed Wetlands	Islands w/in 100' of Vernal Pools	Islands w/in 200' of Vernal Pools
CD16 PSS1B	739	0			
CD33 PEM1,SS1	17,043	23			
CD34 PSS	889	0			
CD40 PEM1,SS1	87	0			
CD51 PSS1E	2,426	0			
CD35S R2UB1,3	0	0			
			0	0	0

Date: 10/8/2015

High Quality Wetland ^ Corps Reviewed

Sheet - 592



- Existing Conditions**
- Existing Structure
 - Existing Structure to be Removed
 - Existing Right of Way
 - Existing Transmission Line
 - Existing Transmission Line to be Removed
 - 100-year Floodzone
 - Wetlands
 - USACE Reviewed Wetlands

- Proposed Conditions**
- Vernal Pool
 - 100' Buffer of Vernal Pools
 - Stream Buffer, 100'
 - Delimited Waterbodies
 - Perennial
 - Intermittent
 - Ephemeral
 - Stream Centerlines
 - Perennial
 - Intermittent
 - Ephemeral

- Proposed Conditions**
- LIDAR 10' Contour
 - LIDAR 2' Contour
 - USGS 10' Contour
 - USGS 2' Contour
 - Proposed Structure - No Permanent Impact
 - Proposed Structure - Permanent Impact
 - Proposed New ROW
 - Proposed Transmission/Distribution Line
 - Trenched UG
 - Trenchless UG

- Proposed Conditions**
- New Access Route
 - Existing Access Route
 - Temporary Construction Pad
 - Temporary Area of Disturbance - Construction Pad
 - Erosion and Sedimentation Control BMPs
 - Erosion and Sedimentation Control BMPs (Steep Slope)
 - Temporary Wetlands Matting (15' x 16')
 - Permanent Impacts - Stations

- RTE Bars**
- Animal
 - Vegetation
 - Both

- Proposed Conditions**
- Vegetation Clearing Areas
 - Span Stream with No Permanent Impacts
 - UG Disturbance Area
 - UG Splice Vaults
 - Lay Down Yard



NHDES Wetlands & US Army Corps of Engineers
Section 404/10 Permit Application Plans

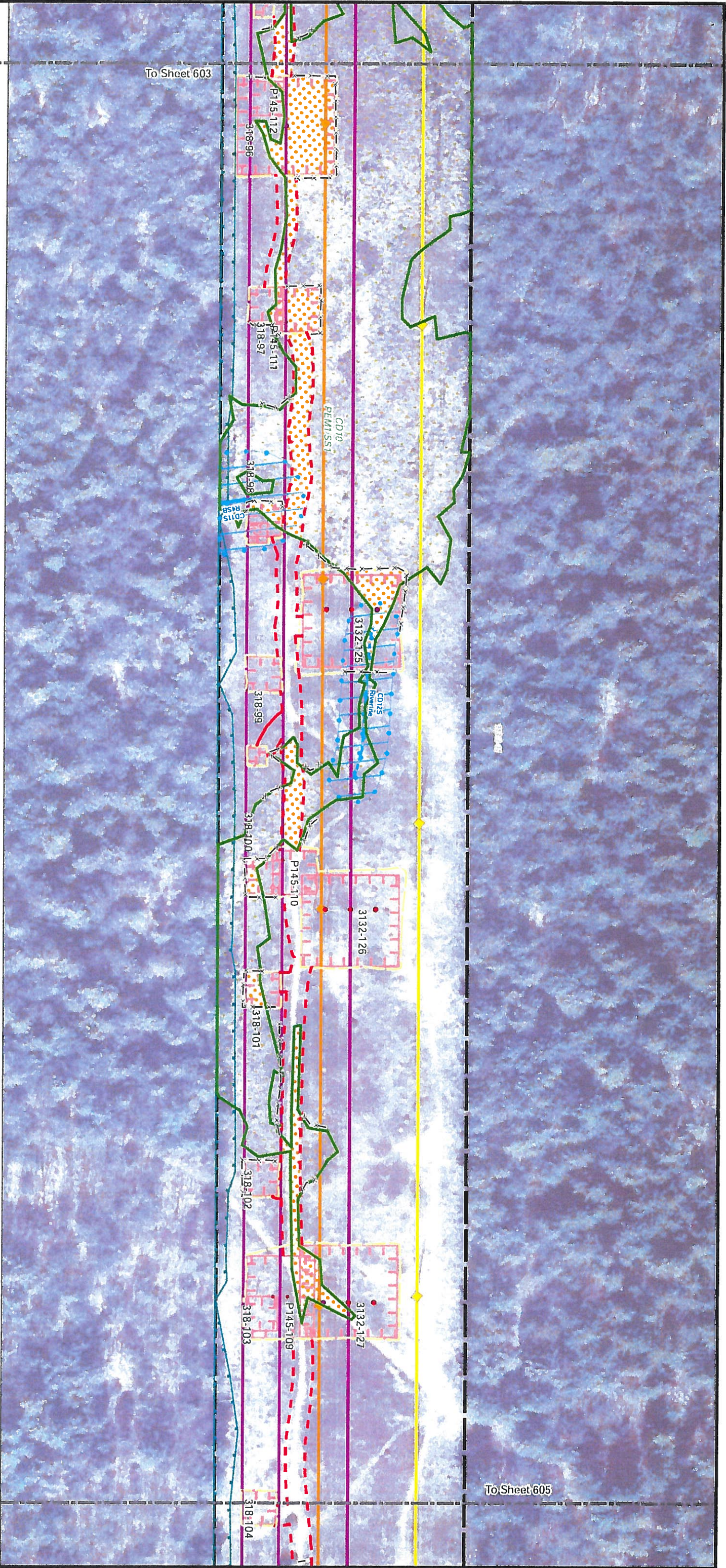
THE NORTHERN PASS PROPOSED ROUTE

Wetland / Waterbody	Jurisdictional Impact Type and Amount		Extent of Clearing (sq ft)	
	Temporary Impact (sq ft)	Permanent Impact (sq ft)	In-Engineered Wetlands 100' of Stream	Out-Engineered Wetlands 100' of Stream
CD38: PEM1	0	0	0	0
CD39: PSS1	0	0	0	0

Date: 10/8/2015

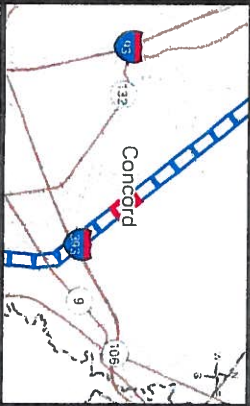
High Quality Wetland * Corps Reviewed

Sheet : 594



To Sheet 603

To Sheet 605



- Existing Conditions**
- Existing Structure
 - Existing Structure to be Removed
 - Existing Right of Way
 - Existing Transmission Line
 - Existing Transmission Line to be Removed
 - 100-year Floodzone
 - Wetlands
 - USACE Reviewed Wetlands

- Delimited Waterbodies**
- Perennial
 - Intermittent
 - Ephemeral
- Stream Centerlines**
- Perennial
 - Intermittent
 - Ephemeral

- Proposed Conditions**
- LIDAR 10' Contour
 - LIDAR 2' Contour
 - USGS 10' Contour
 - USGS 2' Contour
 - Proposed Structure - No Permanent Impact
 - Proposed Structure - Permanent Impact
 - Proposed New ROW
 - Proposed Transmission/Distribution Line
 - Trenched UG
 - Trenchless UG

- New Access Route**
- Existing Access Route
 - Temporary Construction Pad
 - Temporary Area of Disturbance - Construction Pad
 - Erosion and Sedimentation Control BMPs
 - Erosion and Sedimentation Control BMPs (Steep Slope)
 - Temporary Wetlands Matting (16' x 16')
 - Permanent Impacts - Stations

- Vegetation Clearing**
- Vegetation
 - Span Stream with No Permanent Impacts
 - UG Disturbance Area
 - UG Splice Vaults
 - Lay Down Yard

- RTE Bars**
- Animal
 - Vegetation
 - Both



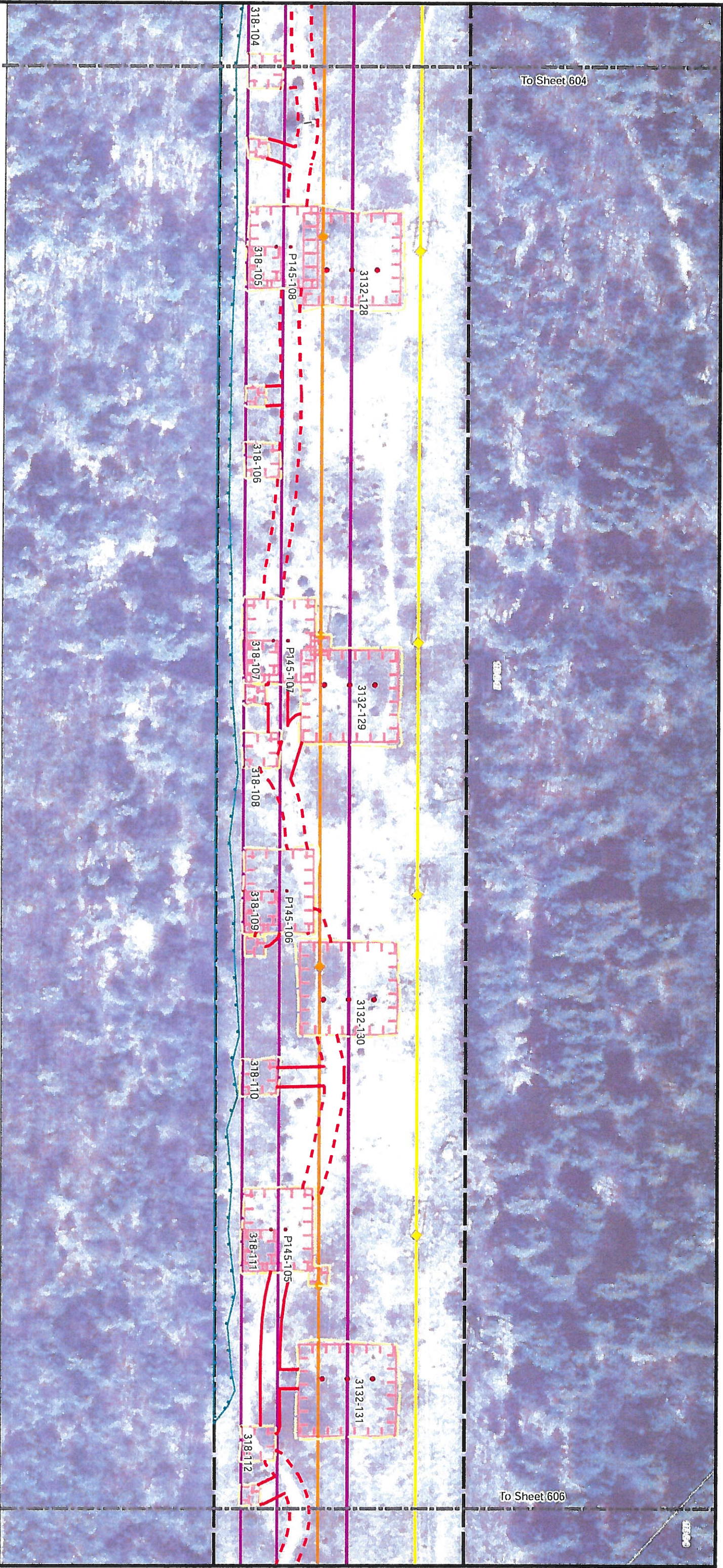
NHDES Wetlands & US Army Corps of Engineers Section 404/10 Permit Application Plans

THE NORTHERN PASS PROPOSED ROUTE

Jurisdictional Impact Type and Amount				Extent of Clearing (sq ft)	
Wetland / Waterbody	Temporary Impact (sq ft)	Permanent Impact (sq ft)		In Forested Methods	100' of Stream

CD10, PEMI, SS1	24,233	75			
CD11S, R4SB	0	1			
CD12S, Riverine	93	0			

0 153 0

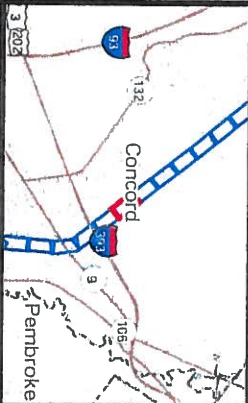


To Sheet 604

318-104

To Sheet 606

318-104



- Existing Conditions**
- Existing Structure
 - Existing Structure to be Removed
 - Existing Right of Way
 - Existing Transmission Line
 - Existing Transmission Line to be Removed
 - 100-year Floodzone
 - Wetlands
 - USACE Reviewed Wetlands

- Delineated Waterbodies**
- Perennial
 - Intermittent
 - Ephemeral
 - Stream Centerlines
 - Perennial
 - Intermittent
 - Ephemeral

- Proposed Conditions**
- Proposed Structure - No Permanent Impact
 - Proposed Structure - Permanent Impact
 - Proposed New ROW
 - Proposed Transmission/Distribution Line
 - LIDAR 10' Contour
 - LIDAR 2' Contour
 - USGS 10' Contour
 - USGS 2' Contour

- New Access Route**
- Existing Access Route
 - Temporary Construction Pad
 - Temporary Area of Disturbance - Construction Pad
 - Erosion and Sedimentation Control BMPs
 - Erosion and Sedimentation Control BMPs (Steep Slope)
 - Temporary Wetlands Matting (15' x 16')
 - Permanent Impacts - Stations

- RTE Bars**
- Animal
 - Vegetation
 - Both
 - Vegetation Clearing Areas
 - Span Stream with No Permanent Impacts

- UG Disturbance**
- Area
 - UG Splice Vaults
 - Lay Down Yard



NHDES Wetlands & US Army Corps of Engineers

Section 404/10 Permit Application Plans

THE NORTHERN PASS PROPOSED ROUTE

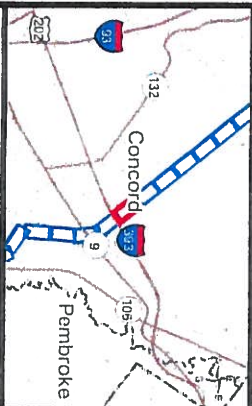
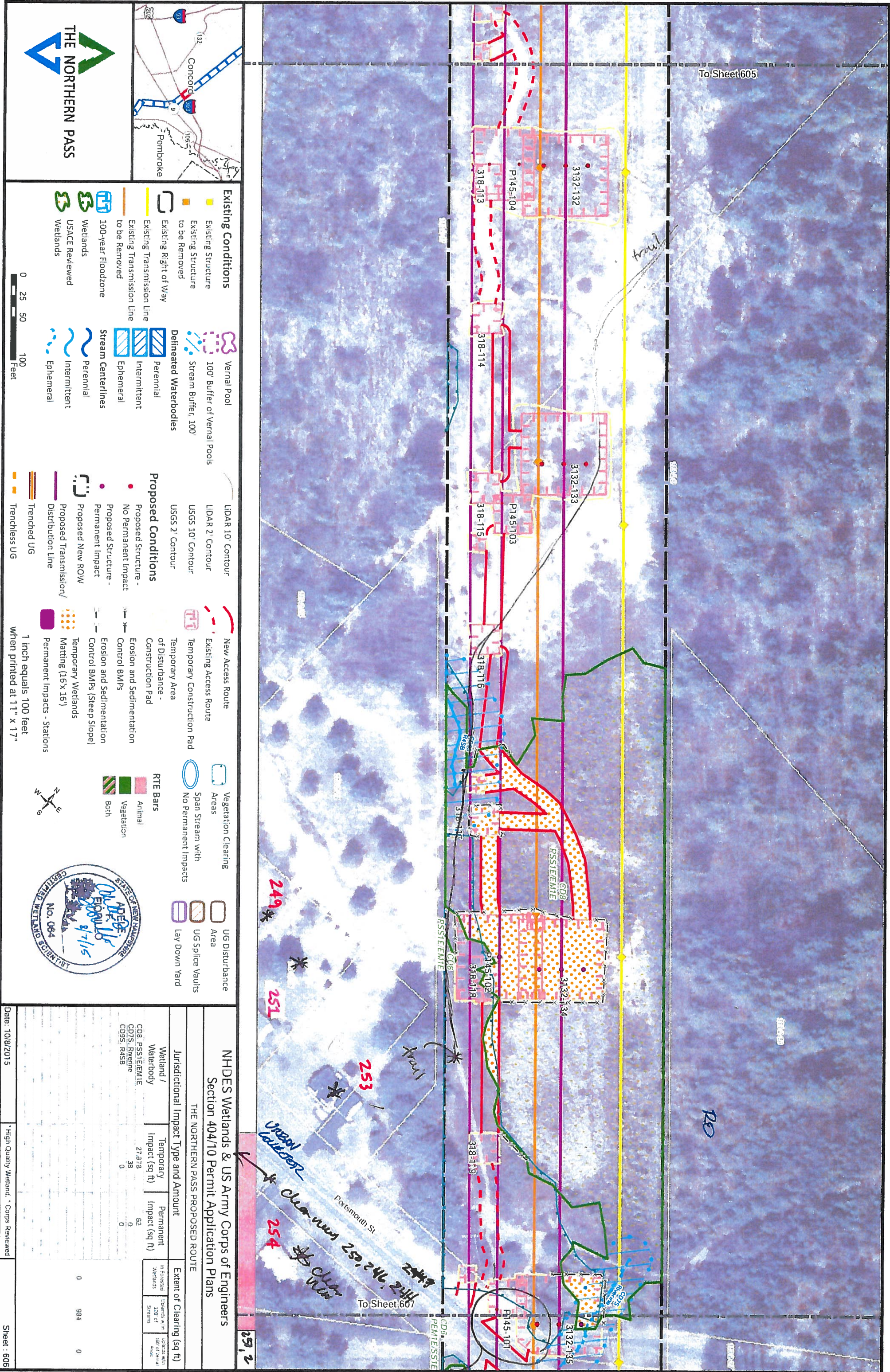
Jurisdictional Impact Type and Amount			Extent of Clearing (sq ft)	
Wetland / Waterbody	Temporary Impact (sq ft)	Permanent Impact (sq ft)	In Forested Wetlands 100' of Stream	USACE Wetlands 100' of Stream

0 0 0

Date: 10/8/2015

High Quality Wetland - Corps Reviewed

Sheet : 605



- Existing Conditions

Existing Structure

Existing Structure to be Removed

Existing Right of Way

Existing Transmission Line

Existing Transmission Line to be Removed

100-year Floodzone

Wetlands

USACE Reviewed Wetlands

Vernal Pool

100' Buffer of Vernal Pools

Stream Buffer, 100'

Delineated Waterbodies

Perennial

Intermittent

Ephemeral

Stream Centerlines

Perennial

Intermittent

Ephemeral

Proposed Conditions

LIDAR 10' Contour

LIDAR 2' Contour

USGS 10' Contour

USGS 2' Contour

Proposed Structure - No Permanent Impact

Proposed Structure - Permanent Impact

Proposed New ROW

Proposed Transmission/Distribution Line

Trenched UG

Trenchless UG

New Access Route

Existing Access Route

Temporary Construction Pad

Temporary Area of Disturbance - Construction Pad

Erosion and Sedimentation Control BMPs

Erosion and Sedimentation Control BMPs (Steep Slope)

Temporary Wetlands Matting (16' x 16')

Permanent Impacts - Stations

Vegetation Clearing Areas

Span Stream with No Permanent Impacts

UG Disturbance Area

UG Splice Vaults

Lay Down Yard

RTE Bars

Animal

Vegetation

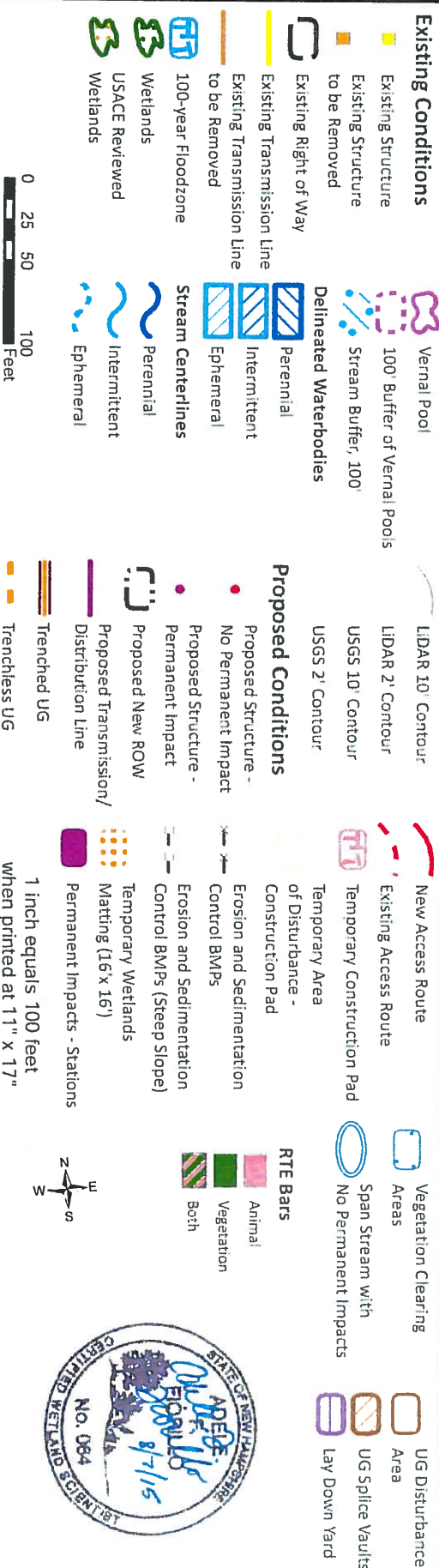
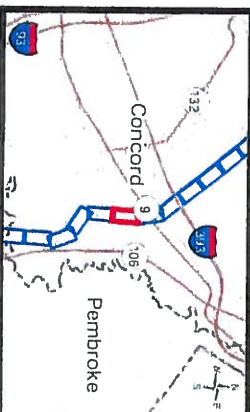
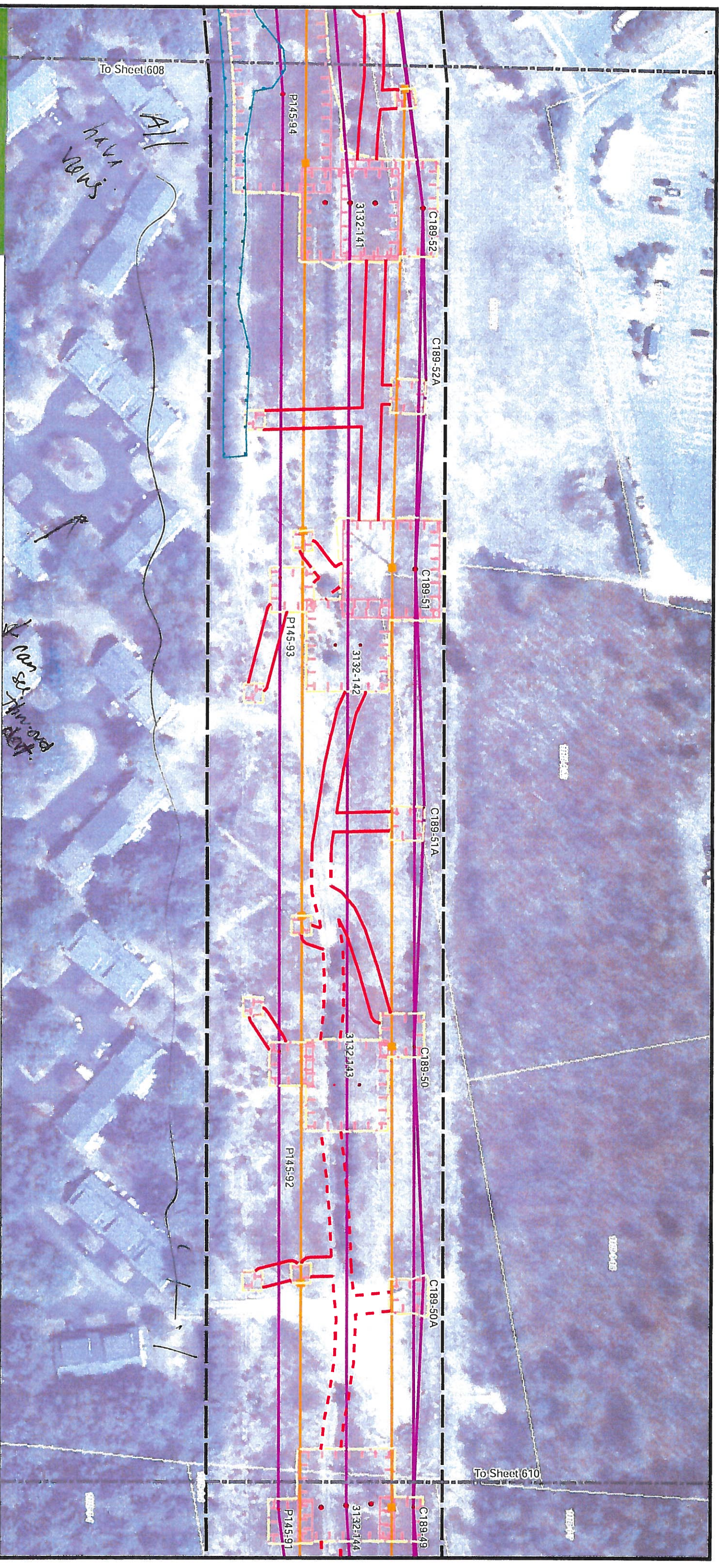
Both

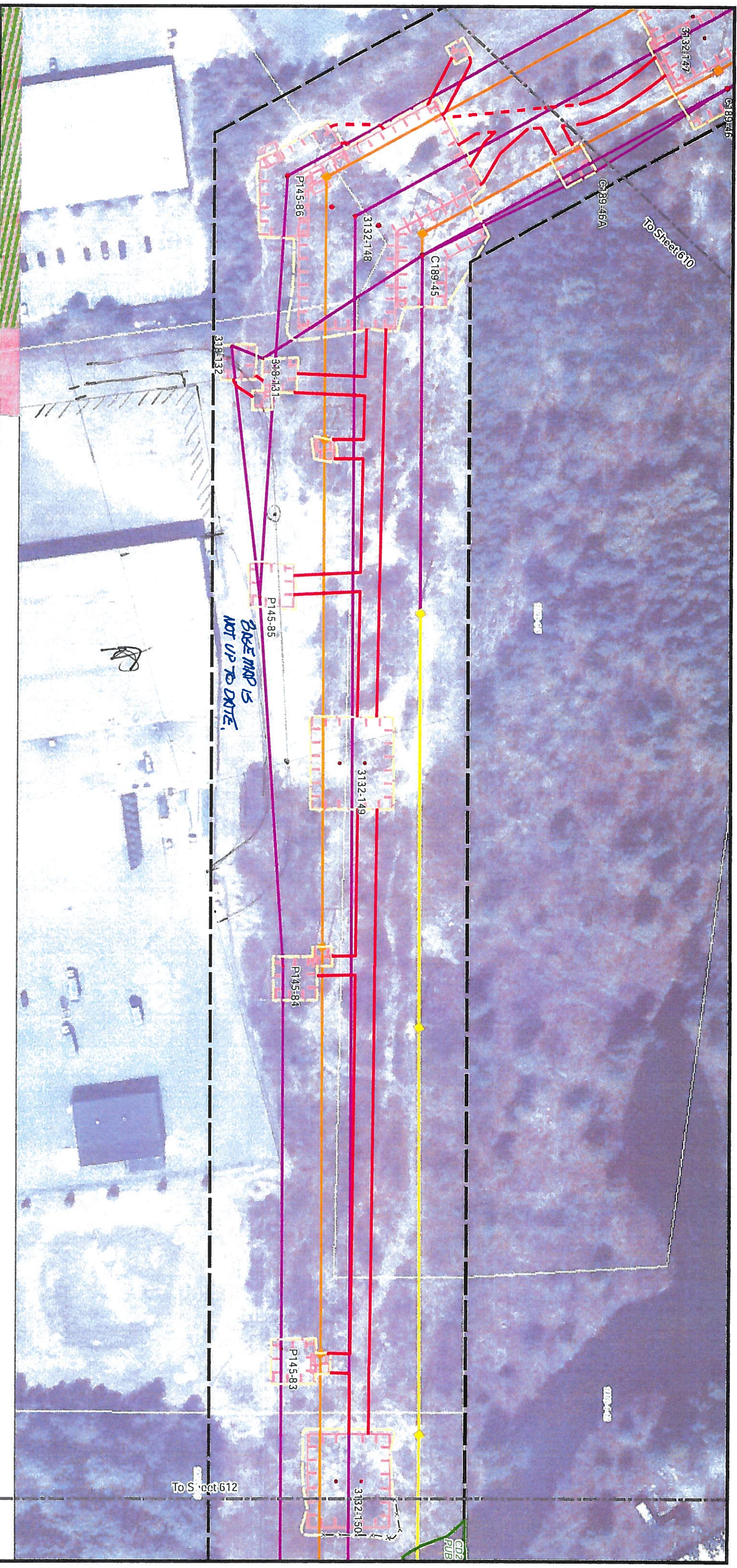
NHDES Wetlands & US Army Corps of Engineers Section 404/10 Permit Application Plans					
THE NORTHERN PASS PROPOSED ROUTE					
Jurisdictional Impact Type and Amount		Extent of Clearing (sq ft)			
Wetland / Waterbody	Temporary Impact (sq ft)	Permanent Impact (sq ft)	In Forested Wetlands	Unforested Wetlands	Streams
CD8, PSS1E/M1E	27,878	62			
CD7S, R4S1B	38	0			
CD9S, R4S1B	0	0			
				984	0

Date: 10/8/2015

High Quality Wetland, Corps Reviewed

Sheet : 606

[illegible]



Existing Conditions

- Existing Structure
- Existing Structure to be Removed
- Existing Right of Way
- Existing Transmission Line
- Existing Transmission Line to be Removed
- 100-year Floodzone
- Wetlands
- USACE Reviewed Wetlands

Proposed Conditions

- LIDAR 10' Contour
- LIDAR 2' Contour
- USGS 10' Contour
- USGS 2' Contour
- Delineated Waterbodies
- Perennial
- Intermittent
- Ephemeral
- Stream Centerlines
- Perennial
- Intermittent
- Ephemeral
- Proposed New ROW
- Proposed Transmission/Distribution Line
- Trenched UG
- Frictionless UG

RTE Bars

- Animal
- Vegetation
- Both

Other Features

- New Access Route
- Existing Access Route
- Temporary Construction Pad
- Temporary Area of Disturbance - Construction Pad
- Erosion and Sedimentation Control BMPs
- Erosion and Sedimentation Control BMPs (Steep Slope)
- Temporary Wetlands Matting (16' x 16')
- Permanent Impacts - Stations
- Vegetation Clearing Areas
- Span Stream with No Permanent Impacts
- UG Disturbance Area
- UG Splice Vaults
- Lay Down Yard

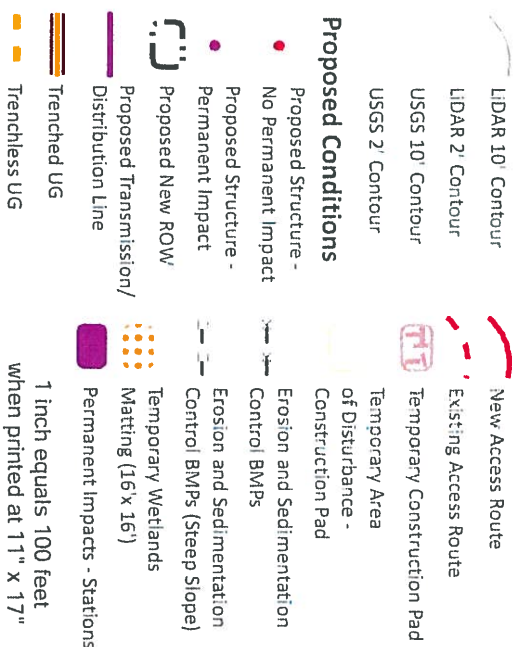
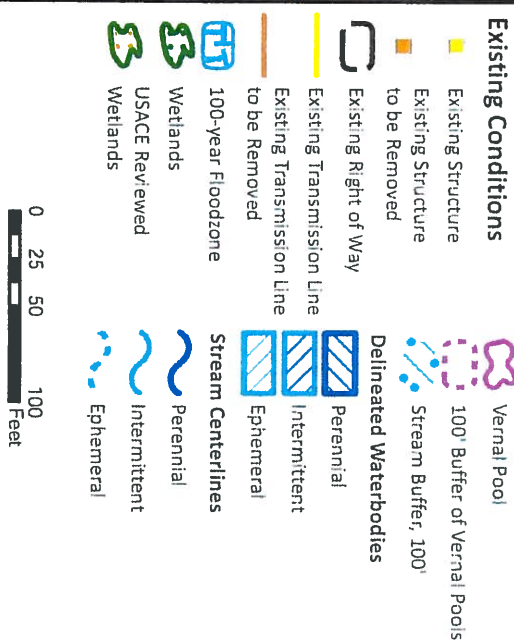
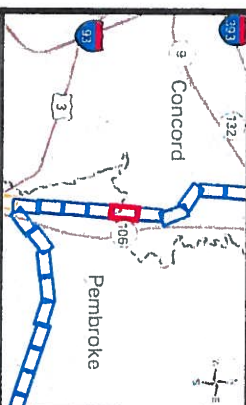
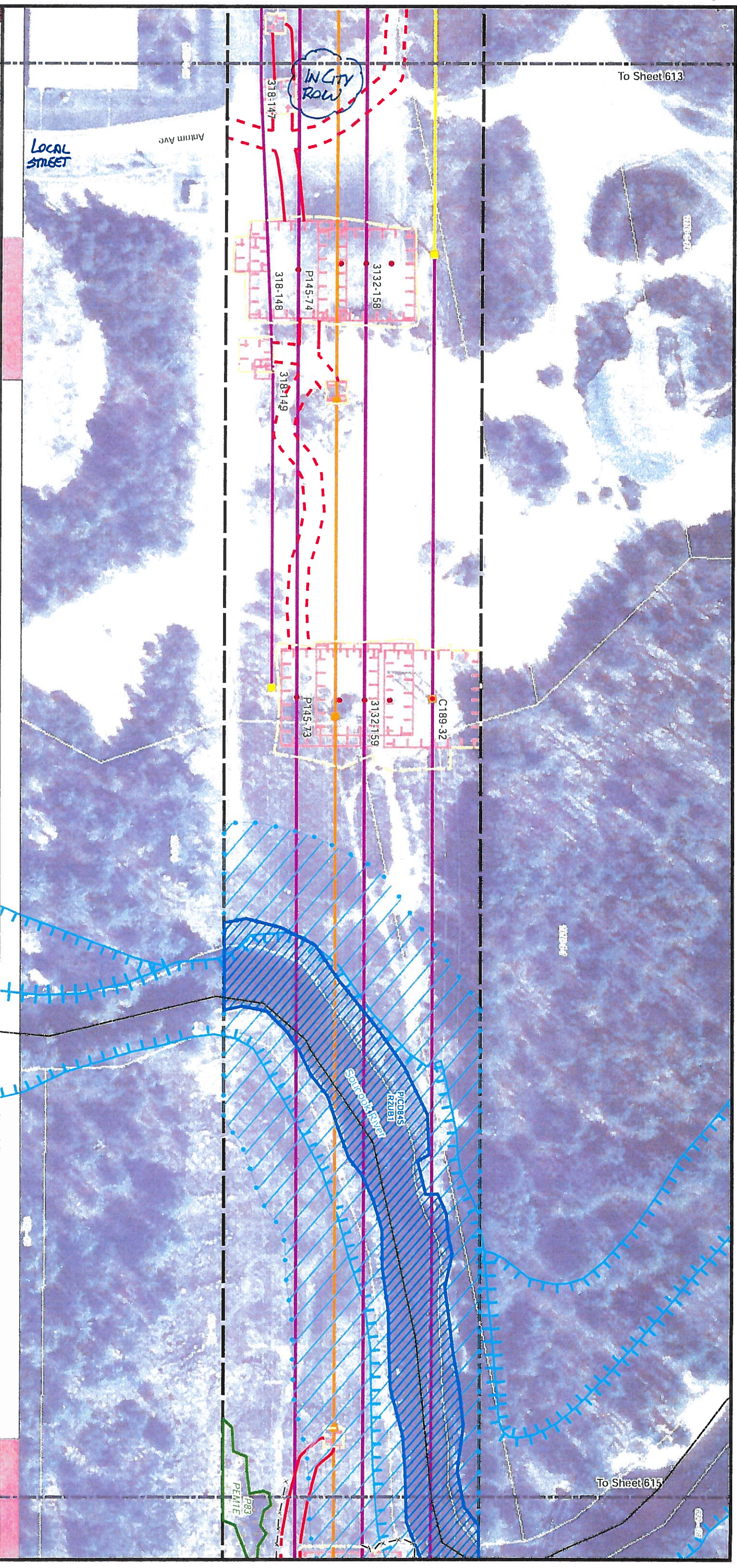
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North Arrow: N, S, E, W

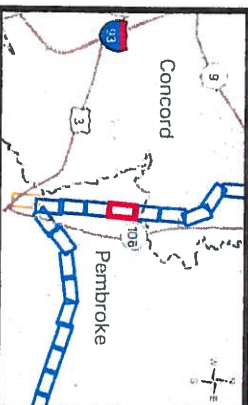
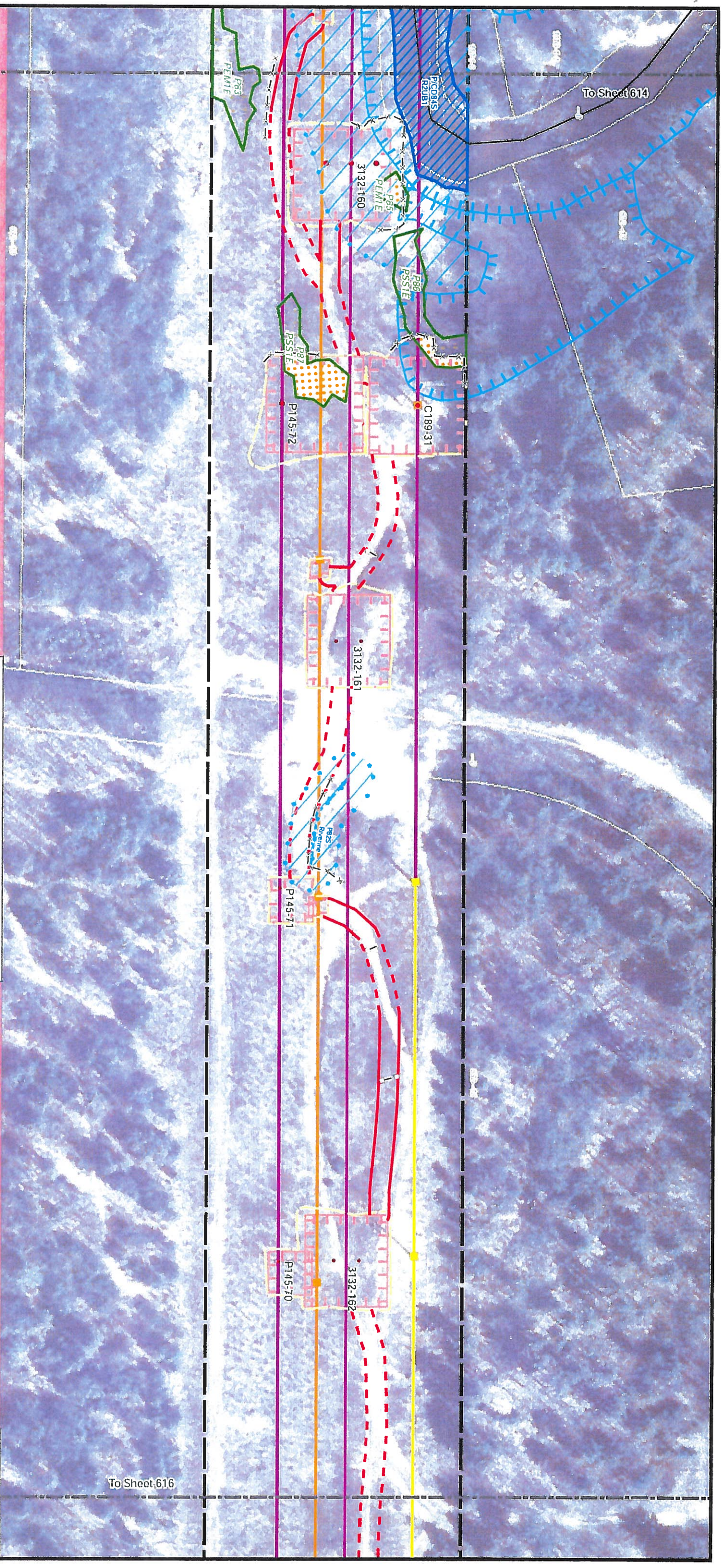
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Stamp: STATE OF NEW HAMPSHIRE, ADEP, ECHOES, NO. 064, CERTIFIED WETLAND SCIENTIST, dated 8-7-15.

NHDES Wetlands & US Army Corps of Engineers Section 404/10 Permit Application Plans				
THE NORTHERN PASS PROPOSED ROUTE				
Jurisdictional Impact Type and Amount			Extent of Clearing (sq ft)	
Wetland / Waterbody	Temporary Impact (sq ft)	Permanent Impact (sq ft)	to Forested Wetlands 100' or Streams	USACE 404 100' or 100' Streams
	0	0	0	0



NHDES Wetlands & US Army Corps of Engineers Section 404/10 Permit Application Plans					
THE NORTHERN PASS PROPOSED ROUTE					
Jurisdictional Impact Type and Amount	Extent of Clearing (sq ft)				
Wetland / Waterbody	Temporary Impact (sq ft)	Permanent Impact (sq ft)	Grassland Wetlands	Shrubland Wetlands	Other Wetlands
P23, P6M1E P/CDBA5, RZUB1	0	0	280.0	200.0	0.0
	0	0	0	0	0



Existing Conditions



















- Existing Structure
- Existing Structure to be Removed
- Existing Right of Way
- Existing Transmission Line
- Existing Transmission Line to be Removed
- 100-year Floodzone
- Wetlands
- USACE Reviewed

Stream Centerlines

- Perennial
- Intermittent
- Epheermal

Delineated Waterbodies

- Vernal Pool
- 100' Buffer of Vernal Pools
- Stream Buffer, 100'
- Intermittent
- Perennial

	LIDAR 10' Contour		New Access Route
	LIDAR 2' Contour		Existing Access Route
	USGS 10' Contour		Temporary Construction Pad
	USGS 2' Contour		Temporary Area of Disturbance - Construction Pad
	Proposed Structure - No Permanent Impact		Erosion and Sedimentation Control BMPs
	Proposed Structure - Permanent Impact		Erosion and Sedimentation Control BMPs (Steep Slope)
	Proposed New ROW		Temporary Wetlands Mating (16' x 16')
	Proposed Transmission/ Distribution Line		Permanent Impacts - Stations
	Trenched UG		
	Trenchless UG		

1 inch equals 100 feet
when printed at 11" x 17"

RTE Bars



Jurisdictional Impact Type and Amount			Extent of Clearing (sq ft)		
Wetland / Waterbody	Temporary Impact (sq ft)	Permanent Impact (sq ft)	In Forested Wetlands	Up to 100' of Stream	Over 100' of Stream
P83, PEMIE	0	0			
P85, PEMIE	575	0			
P86, PSSIE	618	0			
P87, PSSIE	2,424	0			
PICD84S, R2UB1	0	0			
P82S, Riverine	0	0			
			0	0	0

Address	Map-Block-Lot	Sheet # *	Comment	Potential Follow Up	Impact**
18 Brookwood Dr	122-5-19	586	Existing view through trees		
16 Brookwood Dr	122-5-26	586	Existing view, will have full view with planned clearing and pole ht. increase	Clarify how many trees will be removed - clearing limits do not line up with trees in aerial	
14 Brookwood Dr	122-5-27	586	Existing view, will have clearer view with planned clearing (not clear how many trees will be removed) and pole ht. increase	Clarify how many trees will be removed - clearing limits do not line up with trees in aerial	
12 Brookwood Dr	122-5-22	586	Existing full view, more impact from pole ht. increase		
10 (8) Brookwood Dr	122-5-23	586	Existing full view, more impact from pole ht. increase		
11 Brookwood Dr	122-5-20	586	Existing view, will have clearer view with planned clearing and pole ht. increase		
9 Brookwood Dr	122-5-21	586	Existing view, will have clearer view with planned clearing and pole ht. increase		
7 Brookwood Dr	122-5-25	586	Existing view, will have clearer view with planned clearing and pole ht. increase		
6 Fox Run	122-5-16	586	View through trees - unclear how many trees will be removed, potential for increased view	Clarify how many trees will be removed - clearing limits do not line up with trees in aerial	
1 Fox Run	122-5-17	586	Existing view through trees		
549 Mountain Road	122-5-6	587	New house not shown on plan - currently has clear view of poles. Increased impact with increased number and ht. of poles	New house not shown on submitted plans from NP	
550 Mountain Road	122-1-23	587	Existing view, will have clearer view with pole ht. increase		
546 Mountain Road	122-1-22	587	Existing view, will have clearer view with pole ht. increase		
540 Mountain Road	122-1-18	587	Existing view, will have clearer view with pole ht. increase		
Hoit Road	122-3-12	587	Existing view, poles run through western half of parcel. Currently undeveloped.	This lot is under review for a 7 lot subdivision. If approved 7 new houses will have clear view of the poles, and one house will be immediately adjacent to the poles.	
57 Hoit Road	123-1-20	587	View through trees, will have clearer view with pole ht. increase		
61 Hoit Road	123-1-2	587	Currently no view, but will have view with planned clearing for new residences and pole ht. increase	May not be impacted if subdivision across Hoit Road does not go through	
65 Hoit Road	123-1-2	587	Currently no view, but will have view with planned clearing for new residences and pole ht. increase	May not be impacted if subdivision across Hoit Road does not go through	
36/38 Hoit Road	122A-2-11	587	Existing view, will have full view with planned clearing and pole ht. increase		
40/42 Hoit Road	122A-2-25	587	Existing view, will have full view with planned clearing and pole ht. increase		
37 Hoit Road	122-5-11	587	Existing full view, more impact from clearing and pole ht. increase		
41 Hoit Road	122-5-10	587	Clear view, new transmission wires will be within feet of the house. New access driveway too close to the intersection of Hoit Road and Mountain Road. Second access driveway off of Mountain Road. Large area of clearing along Mountain Road for construction pad is not depicted as clearing. This will remove vegetative buffer between the house and Mountain Road.	Address driveway concern and removal of vegetative buffer between house and road.	
511 Mountain Road	122A-1-7	587	Existing view, will have full view with planned clearing and pole ht. increase		

Address	Map-Block-Lot	Sheet # *	Comment	Potential Follow Up	Impact**
516 Mountain Road	122-3-8	587	New access driveway too close to the intersection of Hoit Road and Mountain Road. Large area of clearing along back of property, existing view will have full view with tree clearing	Address driveway concern	
56 Sanborn Road	122-2-26	589	New access driveway off of public road and through fenced horse farm	Horse pasture under power lines, will have major impact on operations during construction	
57 Sanborn Road	122-3-20	589	Existing view, more impact from clearing and pole ht. increase		
61 Sanborn Road	122-3-21	589	New house not shown on plan - currently has clear view of poles. Increased impact with increased number and ht. of poles. New access driveway off of public road.	New house not shown on submitted plans from NP	
67 Sanborn Road	122-3-21-1	589	Existing full view, more impact from clearing and pole ht. increase		
70 Sanborn Road	122-4-8	589	Existing full view, more impact from clearing and pole ht. increase		
73 Sanborn Road	122-3-10	589	Existing full view, more impact from clearing and pole ht. increase		
74 Sanborn Road	122-4-9	589	Existing full view, more impact from clearing and pole ht. increase		
21 Farmwood Road	122-2-38	592	Existing view, more impact from clearing and pole ht. increase		
67 Snow Pond Road	121-3-22	593	Existing view, more impact from clearing and pole ht. increase		
65 Snow Pond Road	121-3-30	593	Existing view, more impact from clearing and pole ht. increase		
63 Snow Pond Road	121-3-29	593	Existing view, more impact from clearing and pole ht. increase		
61 Snow Pond Road	121-3-28	593	Existing view, more impact from clearing and pole ht. increase		
Snow Pond Road	121-2-14	595	New access driveway off of public road.		
37 Snow Pond Road	121-3-33	594	Existing view, will have full view with planned clearing (not clear how many trees will be removed) and pole ht. increase Will have access issues to house during construction	Will be greatly impacted during construction due to location of driveway and construction pads	
36 Snow Pond Road	120-3-20	594	Existing view, more impact from pole ht. increase		
32 Snow Pond Road	120-3-19	594	Existing view, more impact from pole ht. increase		
30 Snow Pond Road	120-3-15	594	Existing view, more impact from pole ht. increase		
24 Snow Pond Road	120-3-18	594	Existing view, more impact from pole ht. increase		
18 Snow Pond Road	120-3-29	594	Existing view, more impact from pole ht. increase and clearing for access road. Access drive is directly across from residential driveway		
183 Shaker Road	121-3-12	596	Three (3) new access driveways off of public road. Full existing view, increased impact from pole hts		
Shaker Road	121-3-17	596	Two (2) new access driveways off of public road.		
86 Oak Hill Road	118F-2-11	598	full existing views, higher visual impact from pole ht. increase		
87 Oak Hill Road	118F-1-1	598	New access driveway off of public road, shared with residential driveway, existing view will be increased with pole ht.	Will be greatly impacted during construction due to location of driveway and construction pads	
91 Oak Hill Road	118F-1-5	598	Existing view, more impact from pole ht. increase		
79 Oak Hill Road	118F-1-23	598	Existing view, more impact from pole ht. increase.		
75 Oak Hill Road	118F-1-17	off map	Existing view, more impact from pole ht. increase		
71 Oak Hill Road	118F-1-16	off map	Existing view, more impact from pole ht. increase		
17/19 Jennifer Drive	118F-2-25 118F-2-62	599	Existing view through trees		

Address	Map-Block-Lot	Sheet # *	Comment	Potential Follow Up	Impact**
21/23 Jennifer Drive	118F-2-9 118F-2-60	599	Existing view, more impact from pole ht. increase and clearing.		
25/27 Jennifer Drive	118F-2-8 118F-2-55	600	Existing view, more impact from pole ht. increase and clearing.		
29/31 Jennifer Drive	118F-2-31 118F-2-59	600	Existing view, more impact from pole ht. increase and clearing.		
33 Jennifer Drive	118F-2-26	600	Existing view, more impact from pole ht. increase and clearing.		
18/20 Jennifer Drive	118F-2-40 118F-2-41	600	Existing view, more impact from pole ht. increase and clearing.		
28/26 Jennifer Drive	118F-2-5 118F-2-39	600	Existing view, more impact from pole ht. increase and clearing.		
Oak Hill Road	118F-2-17	598	New access driveway off of public road.		
53 Appleton St	118-2-5	601	Existing view, more impact from pole ht. increase and clearing. New access driveway off of public road.		
62 Appleton St	118-2-15	off map	Existing view, more impact from pole ht. increase and clearing.		
66 Appleton St	118-2-23	601	Existing view, more impact from pole ht. increase and clearing.		
67 Appleton St	118-2-4	601	Existing view, more impact from pole ht. increase and clearing.		
71 Appleton St	118-2-15	601	Existing view, more impact from pole ht. increase and clearing.		
74 Appleton Street	118-1-43	601	New access driveway off of public road. No existing house, fields only.		
80 Appleton Street	118-1-44	601	New access driveway off of public road. No existing house, fields only.		
83 Appleton Street	118-2-39	601	Existing view, more impact from pole ht. increase and clearing.	Subdivision and new house not shown on submitted plans from NP	
89 Appleton Street	118-2-3	601	Existing view, more impact from pole ht. increase and clearing.		
37 Curtisville Road	118-1-35	603	Existing view, more impact from pole ht. increase and clearing.		
249 Portsmouth St	113-2-26	606	Existing view, more impact from pole ht. increase and clearing.		
251 Portsmouth St	113-2-20	606	Existing view, more impact from pole ht. increase and clearing.		
253 Portsmouth St	113-2-24	606	Existing view, more impact from pole ht. increase and clearing.	Buffer of trees between the transmission line and the house at 253 Portsmouth were required of Unitil by Planning Board action.	
254 Portsmouth St	113-1-3	606	Existing view, more impact from pole ht. increase and clearing.		
250 Portsmouth St	113-1-7	606	Existing view, more impact from pole ht. increase and clearing.		
246 Portsmouth St	113-1-6	606	Existing view, more impact from pole ht. increase and clearing.		
244 Portsmouth St	113-1-14	606	Existing view, more impact from pole ht. increase and clearing.		
259 Portsmouth St (City trails)	113-2-19	606	Location of City of Concord trailhead for the Broken ground trails. Construction pad is located on the trailhead, which was graded/fixed by Unitil for use by the City as part of the Unitil substation construction. Kiosk and parking will be impacted by construction.	Trailhead impacts. Buffer of trees between the transmission line and the house at 253 Portsmouth were required of Until by Planning Board action.	
241 Loudon Rd (Alton Woods)	111C-1-13	607	Existing view from almost all buildings in the complex (several buildings are right along the power line). Additionally, the common area for the complex is located under the power lines. The construction pads are on the play area and dog walking area.	Consider outreach to residents about loss of recreation area during construction	

Address	Map-Block-Lot	Sheet # *	Comment	Potential Follow Up	Impact**
5 & 7 Old Loudon Road	111C-1-11	608	Clear cut. Existing view, will be increased with tree removal and pole ht. increase		
1 Old Loudon Road	111C-1-10	608	Clear cut. Existing view, will be increased with tree removal and pole ht. increase		
20 Loudon Road	111D-2-2	608	Existing line runs through parking lot and adjacent to building		
260 Loudon Road	111D-1-5	608 (off map)	Existing full view, increased with pole ht. increase		
265-273 Loudon Road	111E-1-12	608	Existing full view, increased with pole ht. increase		
240-242 Loudon Road	111B-3-14	608	Existing full view, increased with pole ht. increase		
249 Loudon Road	111C-1-8	608	Existing full view, increased with pole ht. increase		
247 Loudon Road	111C-1-7	608	Existing full view, increased with pole ht. increase		
245 Loudon Road	111C-1-6	off map	Existing full view, increased with pole ht. increase		
42 D'Amante Drive	111D-2-3	609	Existing full view, increased with tree removal and pole ht. increase		
23 Triangle Park Dr (Cobblestone Point)	111B-1-16	609	New development not on map. Multi-unit 65+ residential development will have full view.		
McKenna's Purchase (off Branch Turnpike). Private roads: Brenda Ct., James Cir, Yvonne Ct.	111B-3-194	609	Multi unit condo development, existing views from all units on the listed private streets. Will have increased visual impact from tree clearing and pole increase		
31 Temi Dr	111B-1-15	610	Existing view, more impact increase pole ht		
1 Guay Street	111A-3-3	610	Existing view, more impact increase pole ht		
3 Guay Street	111A-3-2	610	Existing view, more impact increase pole ht		
2 Guay Street	111A-2-2	610	Existing view, more impact increase pole ht		
4 Guay Street	111A-2-3	610	Existing view, more impact increase pole ht		
172 Pembroke Road	111G-1-12	off map	Existing view, more impact increase pole ht		
165 Pembroke Rd	111B-1-7	off map	Existing view, more impact increase pole ht		
163 Pembroke Rd	111B-1-5	610	Existing view, more impact increase pole ht		
162 Pembroke Rd	111G-1-8	610	existing view through trees, more impact from increase pole ht.		
149 Pembroke Rd	111B-1-1	610	Existing view, more impact increase pole ht, large construction pad area and drive 100' from house.		
147 Pembroke Rd	111A-2-1	610	Existing view, more impact increase pole ht		
143 Pembroke Rd	111A-3-2	610	Existing view, more impact increase pole ht		
139 Pembroke Rd	111A-3-1	off map	Existing view, more impact increase pole ht		
146 Pembroke Rd	111G-1-5	610	Existing full view, more impact increase pole ht. large construction pad adjacent to parking lot for building		
130 Pembroke Rd	111G-1-38	off map	Existing view, more impact increase pole ht		
2 Chenell Dr	111G-1-27	off map	Existing view, more impact increase pole ht		
4 Chenell Dr	111G-1-35	off map	Existing view, more impact increase pole ht		
6 Chenell Dr	111G-1-36	off map	Existing view, more impact increase pole ht		
46 Chenell Dr	111G-1-59	off map	Existing view, more impact increase pole ht		
54 Chenell Dr	111G-1-21	613	Existing view, more impact with new poles and hts. Side of lot may be impacted during construction		
59 Chenell Dr	111G-1-28	613	Existing view, more impact with new poles and hts.		
53 Regional Dr	111G-1-34	off map	Existing view, more impact increase pole ht		
54 Regional Dr	111G-1-31	off map	Existing view, more impact increase pole ht		
57 Regional Dr	111G-1-32	611	Existing full view, increased impact with new poles and hts		
65 Regional Dr	111G-1-32	611	Existing full view, increased impact with new poles and hts		

Address	Map-Block-Lot	Sheet # *	Comment	Potential Follow Up	Impact**
75 Regional Dr & 12 Industrial Park Dr.	111G-1-25	612	power lines run through concrete storage lot, will need to coordinate with owner to remove materials, lot will be impacted during construction	Storage of materials will need to be moved, operations will likely be impacted during construction	
78 Regional Drive	111G-1-30	612	Existing full view, increased impact with new poles and hts		
24 Industrial Park Drive	111G-1-23	612	power lines run through lot, will need to coordinate with owner to remove materials, lot will be impacted during construction	Storage of materials will need to be moved, operations will likely be impacted during construction, parking lot area will also be decreased	
28 Industrial Park Drive	111G-1-22	613	Existing full view, increased impact with new poles and hts, few parking spaces may be impacted during construction, large construction pad adjacent to rear parking		
2 Industrial Park Dr	111G-1-16	off map	Existing full view, increased impact with new poles and hts		
8 Industrial Park Dr	111G-1-19	off map	Existing full view, increased impact with new poles and hts		
3 Industrial Park Dr	111G-1-7	off map	Existing full view, increased impact with new poles and hts		
7 & 9 Industrial Park Dr	111G-1-6	off map	Existing full view, increased impact with new poles and hts		
7 Henniker St	111G-1-53	613	Existing full view, increased impact with new poles and hts, few parking spaces may be impacted during construction, large construction pad adjacent to access drive and rear parking		
19 Henniker St	111G-1-65	613	Existing full view, increased impact with new poles and hts, few parking spaces may be impacted during construction, large construction pad adjacent to access drive and rear parking		
25 Henniker St	111G-1-64	613	Existing full view, increased impact with new poles and hts, few parking spaces may be impacted during construction, large construction pad adjacent to access drive and rear parking		
30 Henniker St	111G-1-60	off map	Existing full view, increased impact with new poles and hts		
38 Henniker St	111G-1-61	off map	Existing full view, increased impact with new poles and hts		
46 Henniker St	111G-1-62	off map	Existing full view, increased impact with new poles and hts		
237 Sheep Davis Road	111G-1-13	off map	Existing full view, increased impact with new poles and hts		
243 Sheep Davis Road	111G-1-52	off map	Existing full view, increased impact with new poles and hts		
231 Sheep Davis Road	111G-1-17	off map	Existing view, increased impact with new poles and hts		
227 Sheep Davis Road	111G-1-20	off map	Existing view, increased impact with new poles and hts		
215 Sheep Davis Road	111G-1-24	off map	Existing view, increased impact with new poles and hts		
226 Sheep Davis Road	111-2-5	off map	Existing view, increased impact with new poles and hts		
220-224 Sheep Davis Road	111-2-4	off map	Existing view, increased impact with new poles and hts		

** Sheet # refers to NHDES Wetlands & Army Corps of Engineers Section 404/10 Permit Application Plans, dated 10/8/2015*

*** Impact opinion based on field observations by Beth Fenstermacher (City of Concord Planning Division) and Paul Gendron (Engineering Services) during site visits 9/26/2016 through 10/6/2016*

	Residential property - existing view will have high visual impact with clearing and increased pole height
	Residential property existing view will have moderate increased visual impact with clearing and increased pole height
	Residential property - partial view, may have low increased visual impact with clearing and/or increased pole height.
	Commercial/Retail property - existing view will have high visual impact with clearing and increased pole height. Construction may impact business operations.
	Commercial/Retail property - existing view will have increased visual impact with clearing and increased pole height.

City of Concord
Northern Pass Transmission Line
Viewshed Analysis

November 10, 2016

Chesapeake Conservancy
Annapolis, MD 21401

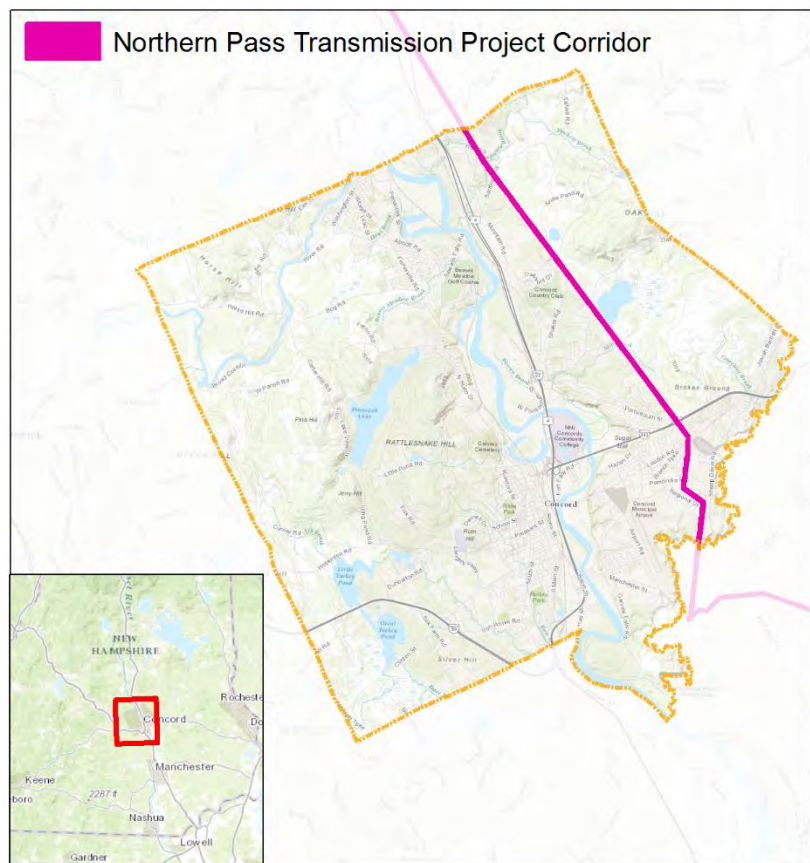
Overview

In October 2015, Terrence J. DeWan & Associates (consultant) submitted a Visual Impact Assessment on behalf of Eversource Energy for the Northern Pass Transmission Project (NPT). This assessment took into account a variety of factors to estimate the cumulative effects the proposed project would have along the entirety of the NPT corridor on the surrounding landscapes and developed areas.

As part of this assessment, the consultant created a Viewshed Mapping model to calculate the areas where structures associated with the existing power lines are currently visible, where proposed structures would be visible, and delineated increased areas of structure visibility. Through this exercise, the consultant was able to determine the visual impacts expected by new structures and how it may differently impact the visual character along the proposed transmission corridor.

Based on an assessment of the consultant's methodology, it was determined that the consultant used common and industry standard methods of assessing viewshed impacts, however due to the limitations of consistent data throughout the project area, the consultant did not take advantage of the best available elevation data within the City of Concord and did not fully take into account the impacts to developed landscapes.

At the request of the City of Concord, Chesapeake Conservancy assessed the potential viewshed impacts from the Northern Pass Transmission Project using Lidar elevation data collected in 2011 and using advanced visibility analysis techniques to better represent the impacts in developed landscapes.



This analysis will recreate, as closely as possible, the methodology and constraints used in the existing viewshed mapping to ensure that the results are compatible with the viewshed mapping used for the rest of the NPT project area.

Methodology

Best Available Data

Lidar point clouds represent the best available elevation data in the City of Concord. These datasets contain millions of points that include a latitude, longitude, and elevation and can be processed into a number of high-resolution, high-accuracy derivative datasets, including a “bare-earth” digital elevation model (DEM), representing the elevation with all natural and anthropogenic features removed, and a “first-return” digital surface model (DSM), representing the tops of trees and buildings as well as open ground.

The City of Concord has two Lidar elevation datasets available within the city boundaries, one collected for the City of Concord¹ and one collected for the Federal Emergency Management Agency in the Merrimack River Watershed². Because Lidar data is not available for the entire NPT project area, the consultant’s methods of using 5m elevation data within the 3-mile buffer of the project area and estimating land cover heights within the 3 to 5-mile buffer are reasonable and provide valid results. In areas where better data exists, however, this method overlooks small changes in topography, as well as natural and man-made features, which can have dramatic impacts on visibility.

Using Lidar elevation data that is available within the City of Concord allows for the creation of 1m resolution datasets that better reflect the actual heights of trees and buildings, as opposed to estimated heights, providing a more representative elevation model.

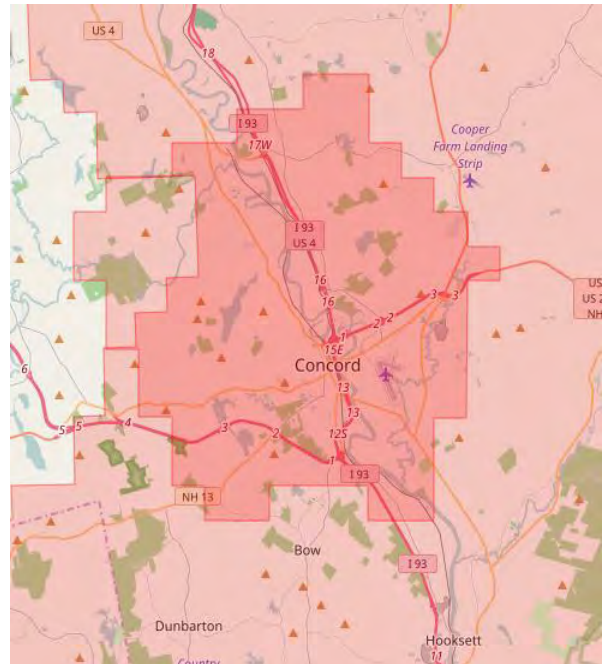


Figure 1: Lidar availability in the City of Concord. Areas in dark red represent where multiple collections have been acquired. Map courtesy of NH GRANIT.



Figure 2: Lidar elevation data can create an extremely detailed, high resolution representation of the landscape, including the exact heights of buildings and trees. 2011 Aerial Imagery courtesy of NH GRANIT

¹ Metadata accessible at http://lidar.unh.edu/assets/metadata/City_of_Concord_LiDAR.xml

² Metadata accessible at http://lidar.unh.edu/assets/metadata/33013C_Terrain_Metadata.xml

Modeling Viewshed Impacts in a Developed Landscape

By design, viewshed modeling assess all of the land that is visible from a given point. Traditionally, this type of modeling has been done to assess the landscape that would be visible from an observer point, such as a fire tower. Recent efforts to assess the comprehensive viewshed impacts from a proposed project, including the consultant's, have used this concept in reverse; to assess all of the areas from which an object would be visible. While this method provides a significant improvement over prior line-of-sight assessments that only judge visibility from a few select locations, certain adjustments must be made to the modeling scenario to account for the fact that an observer in the landscape is not at ground level, but at a given height. The consultant correctly adjusts for areas where the DSM is greater than 5ft above the bare earth elevation, to screen areas that represent tree canopy or buildings, however, the analysis is still only identifying areas where structures would be visible at ground level, not at the height of a person standing on the ground.

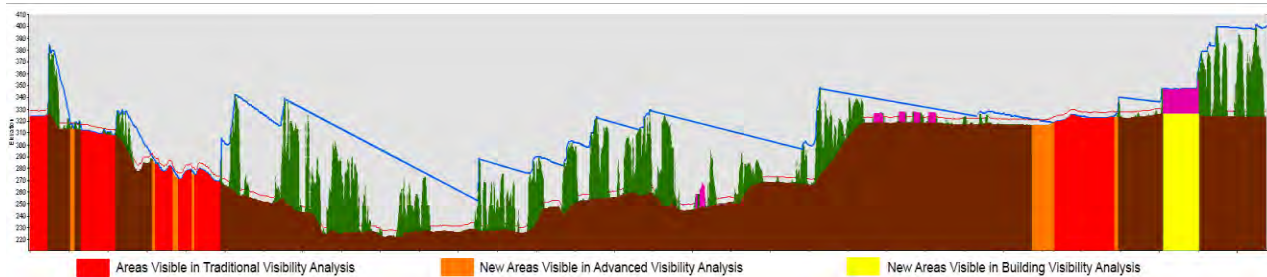


Figure 3: A profile graph comparing the bare earth DEM (brown), DSM (green), buildings (pink), height of visibility (blue line), and height of an observer above ground (red line) can help visualize the differences between analysis techniques.

Furthermore, by only assessing conditions at ground level, the existing analysis does not take into account the visual impact of the proposed project on multi-story buildings. The City of Concord is situated on the western side of a valley with the view from most buildings facing the proposed project corridor. Many of the buildings in the City, including the State Capitol Building, have been designed to overlook the valley and only assessing the viewshed impacts at ground level reduces the potential impacts to the majority of the downtown area. The view from second, third, fourth, or fifth floors is often uninterrupted, and the visual impact of structures on these areas needs to be assessed to fully account for the visual impacts in the City.



Figure 4: The layout of the City of Concord means that some buildings have an uninterrupted view of the proposed project area from higher floors. Image courtesy of Google Earth

Technical Methodology

In an effort to match, as closely as possible, the methodology of the previous viewshed assessment, this analysis created three layers: an existing structure visibility map, a proposed structure visibility map, and an increased areas of structure visibility map.

In preparation for the analysis, two layers were created from the Lidar elevation data, a digital elevation model (DEM), representing bare-earth conditions, and a digital surface model (DSM), representing the maximum elevation of features on the ground, using Esri's ArcGIS software.

- DEM - To create the DEM, a classified Lidar point cloud was filtered to only include ground points, which excludes all points classified as vegetation, buildings, water, bridge decks, or power lines as well as unclassified points. The remaining points were converted into a 1-meter resolution raster elevation surface with the elevation derived from the mean value of all Lidar points within each pixel.
- DSM - To create the DSM, all points in the Lidar point cloud were used to create a 1-meter resolution raster elevation surface. Elevation values were derived from the maximum elevation value in each pixel.

The visibility of each tower was assessed individually using Esri's Visibility tool leveraging the DSM surface with an observer elevation set to the top of the tower. The height of each tower was calculated by adding the proposed tower height to the DEM elevation extracted at the tower's location. Elevations within the proposed right of way layer were set to the DEM to model anticipated vegetation clearing that will occur during construction. All tower locations, as well as the project right of way, were provided as ArcGIS shapefiles by the City of Concord.

Areas where a 5ft tall individual would have an unobstructed view to the top of each structure were selected by identifying areas where the sum of the DSM and above ground layer (AGL), an output of the visibility analysis indicating the additional height that would be required for a surface to be visible, would be less than the elevation five feet above the bare-earth DEM.

The visibility of structures was evaluated by identifying areas within a five-foot buffer of buildings where a person standing in a second, third, fourth, or fifth floor window would be able to see the top of a structure. As the height of each floor is highly variable between buildings, an average height of eleven feet per floor was incorporated to estimate viewer heights.

A similar method to assessing visibility at ground level was used, substituting in 16 feet above ground level for two story buildings, 27 feet for three story buildings, 38 feet for four story buildings, and 49 feet for five story buildings. For the purposes of this assessment, each building's footprint was attributed with the maximum number of towers visible within its buffer, regardless of the number of floors from which a given tower may be visible. A building footprint shapefile, attributed with the number of stories for each building, was provided by the City of Concord.

Once the visibility of each tower was calculated, affected areas were added to a cumulative visibility layer, representing the number of structures that could be seen from each pixel in the

model. The number of structures that would be visible have been grouped into four categories, 1-5, 5-10, 10-20, and over 20.

Existing Structures

Visibility for existing structures was evaluated for all towers that will remain as well as the original position of towers that will be relocated during the project construction. Transmission towers were counted as visible if they could be seen by a five-foot-tall person standing in the landscape or if the tower would be visible from a multi-story building.

Proposed Structures

Visibility for proposed structures was evaluated for all towers that are slated to be constructed or relocated as part of the NPT project as well as the remaining existing structures. Proposed towers were counted as visible if they could be seen by a five-foot-tall person standing in the landscape or if the tower would be visible from a multi-story building.

Increased Areas of Structure Visibility

To better understand the viewshed impacts of the proposed towers, the existing structures map was overlaid on the proposed structures map to identify three focal areas:

1. Landscapes where existing structures were visible but no proposed structures would be visible,
2. Landscapes where existing structures were visible but additional proposed structures were also visible, increasing the total,
3. Landscapes where no existing structures were visible but proposed structures would create a new visual impact.

Considerations and Limitations

One of the largest considerations that must be taken into account is that the Lidar data was collected in 2011 and there is the potential for buildings to have been erected or demolished in that time, trees could have grown or been cut down, and some landscapes may have been cleared and developed. All of these events could have an impact on the visibility of both existing and proposed towers and the visibility analysis conducted should be considered a best representation of anticipated impacts.

Additionally, an estimate of 11 feet per floor represents an average height per floor for commercial and residential buildings found through an online literature search. While each building is different, this estimate was used to assess visibility in multi-story buildings as information for the floor height in each building was not available. This estimate does not take into account foundations and assumes all buildings start at ground level. The number of stories attributed to each building was used with the assumption that it was correct. The visibility of structures for each building was symbolized for the entire building footprint, although structures may only be visible from a portion of the building, to facilitate the visualization of affected buildings.

Findings

It was determined that construction of the proposed towers would increase the total landscape and the number of buildings that would be able to view at least one structure. Compared to the previous assessment, it was found that there would be a smaller total amount of the landscape that is visible during both existing and proposed conditions, as a result of an increase in accuracy using the Lidar elevation data, however, there would be a larger increase in the percentage of the town that was affected.

	Town Area	Town area with possible views of existing structures		Town area with possible views of existing & proposed structures		Delta
Landscape (acres)	43,000	1,197	2.78%	1,585	3.68%	0.9%
Buildings	11,415	674	5.9%	765	6.7%	0.8%

In total, there would be an additional 388 acres and 91 buildings that would be impacted by the proposed towers that were not previously affected by the existing towers. While this increase represents slightly under 1% of the town's total area and building inventory, the vast majority of the impacts are within the 3-mile project boundary, while almost 40% of the town is outside this boundary. Calculating the increase in impacts of the proposed structures just within the 3-mile boundary gives a better representation of the impacts within the town as a percentage and shows that almost 6% of the town and 7% of the buildings in the project area would be impacted.

	Town Area inside 3-mile boundary	Town area with possible views of existing structures		Town area with possible views of existing & proposed structures		Delta
Landscape (acres)	26,199	1,140	4.35%	1,510	5.76%	1.41%
Buildings	9,752	642	6.58%	663	6.8%	0.22%

It should also be noted that while there is an increase of around 1.4% of the town area and 0.22% of the buildings that will have visual impacts that did not before, there is a considerably larger percentage that will have an increase in the number of structures that would be visible. Using the area in the 3-mile boundary, 4.25% of the town will have an increase in the number of structures that would be visible and 5.89% of the buildings would have an increased visual impact. As a result, only highlighting new areas of impact significantly downplays the increased impact that would occur to the majority of the affected areas due to the construction of the proposed towers.

	Town Area	Town Area with existing impacts that will not be increased by proposed towers		Town Area with existing impacts that will be increased by proposed towers		Town area without existing impacts where proposed towers would be visible	
Landscape (acres)	26,199	26	0.1%	1115	4.25%	370	1.41%
Buildings	9,752	68	0.7%	574	5.89%	89	0.91%

Visibility of Existing Structures



Concord City Limit

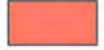


Northern Pass Transmission Project Corridor

Existing Structures



1 - 5



6-10



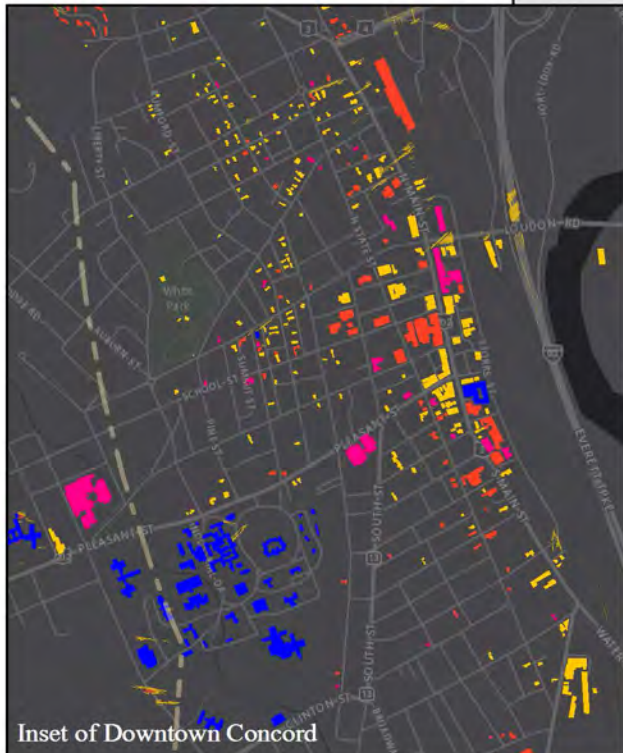
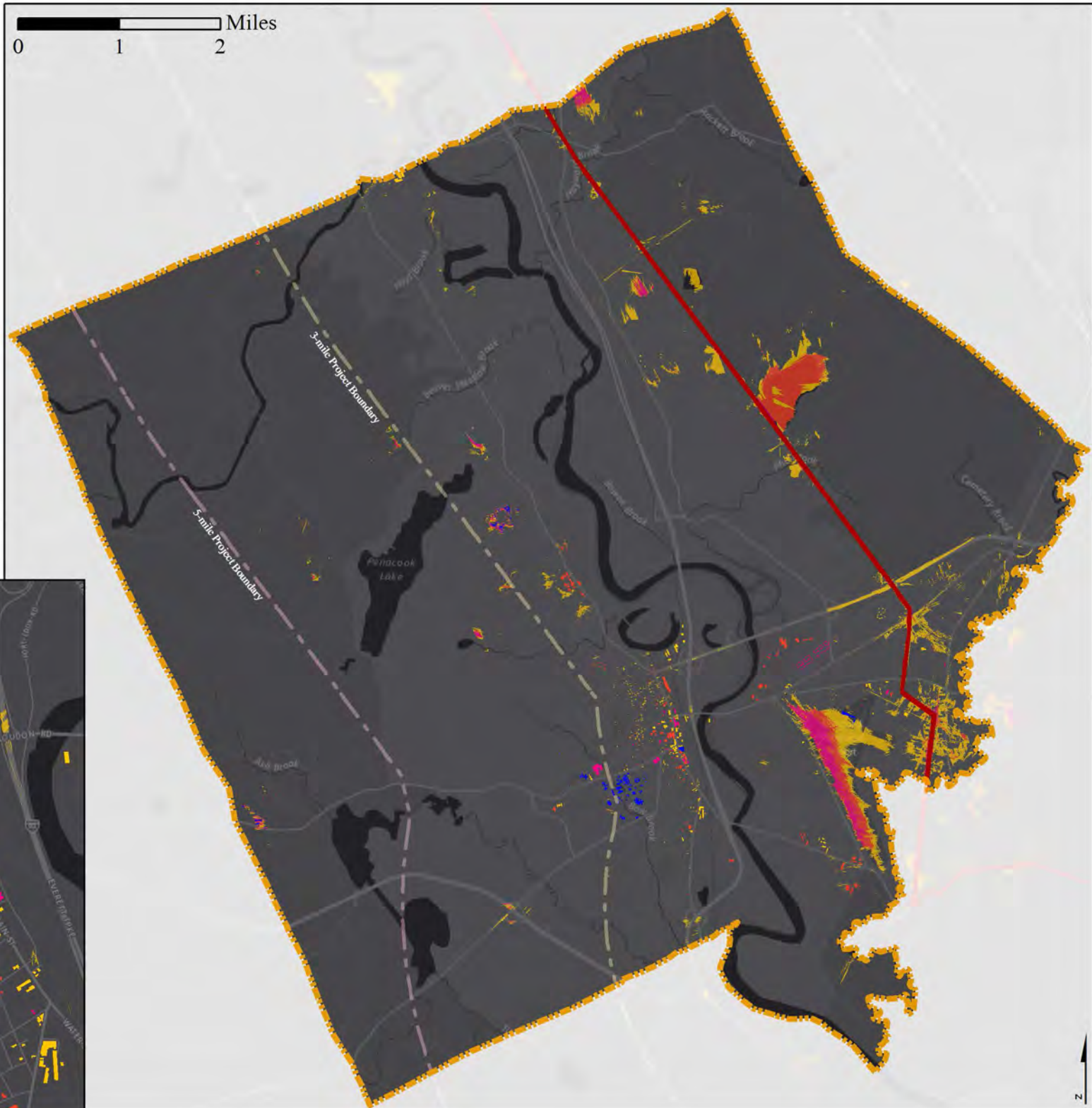
11-20



> 20

This map highlights areas where existing transmission structures would be visible to a 5-ft tall person standing on the ground or in a multi-story building

0 1 2 Miles



Inset of Downtown Concord

Visibility of Proposed Structures



Concord City Limit



Northern Pass Transmission
Project Corridor

Proposed Structures Visible



1 - 5



6-10



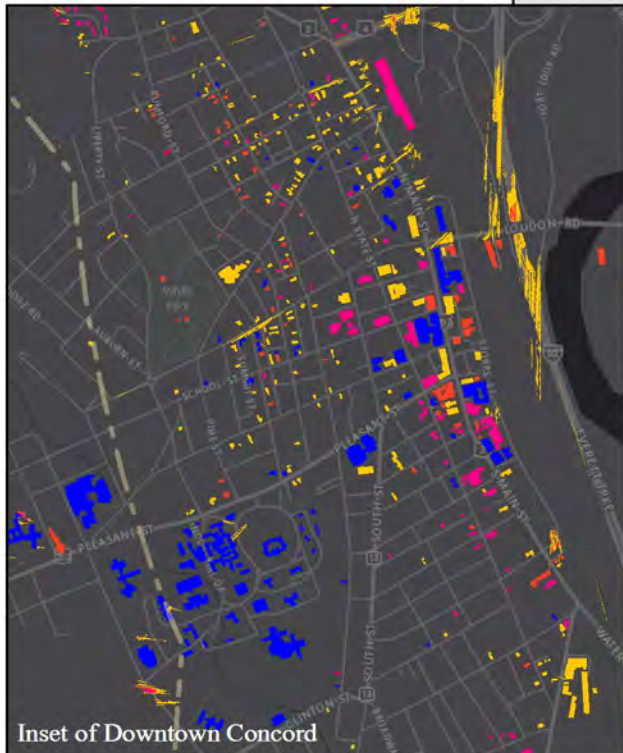
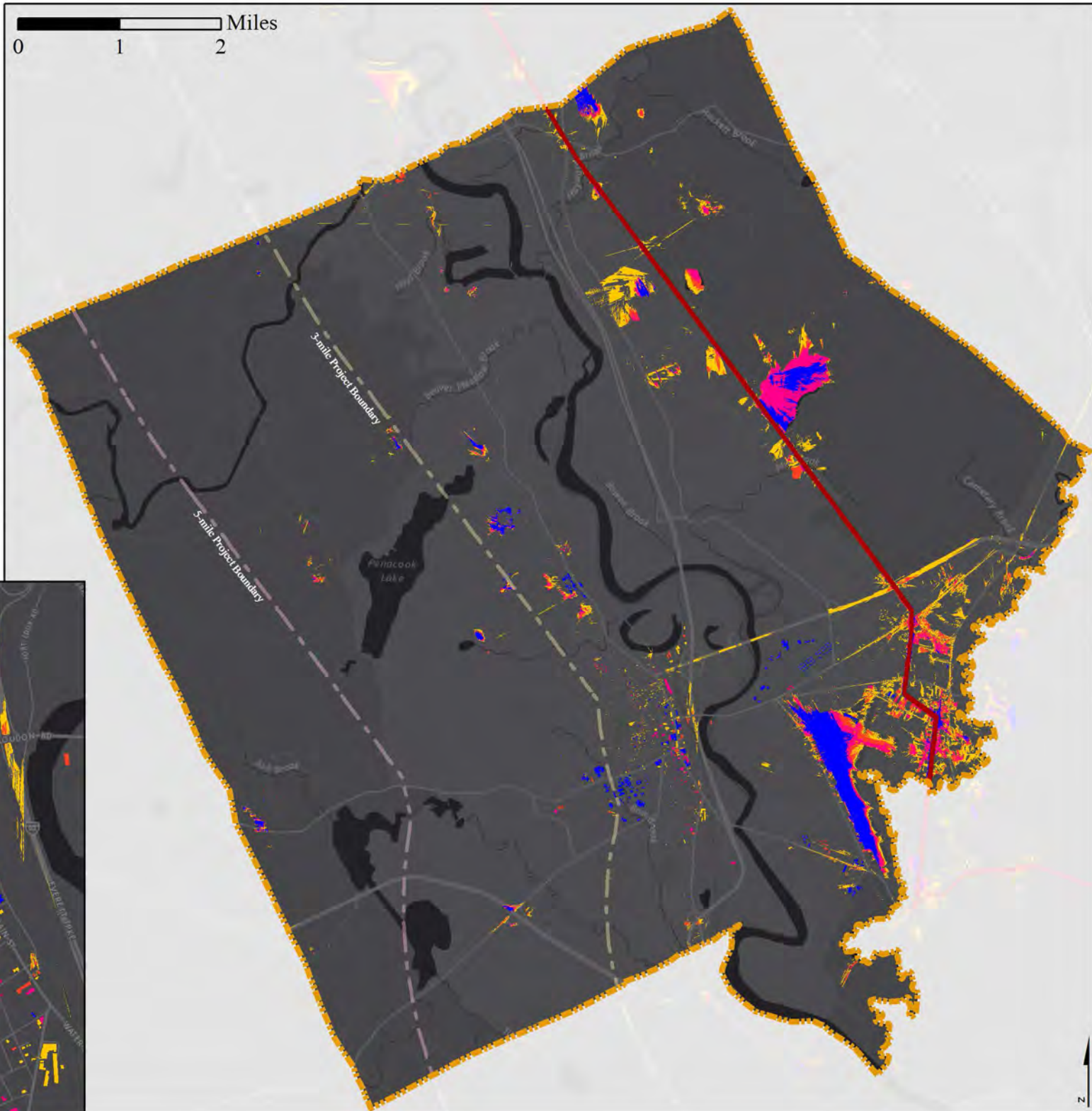
11-20



> 20

This map highlights areas where proposed transmission structures would be visible to a 5-ft tall person standing on the ground or in a multi-story building

0 1 2 Miles



Inset of Downtown Concord

Increased Areas of Structure Visibility



Concord City Limit



Northern Pass Transmission Project Corridor



Existing Structures Visible



Increased Structure Visibility



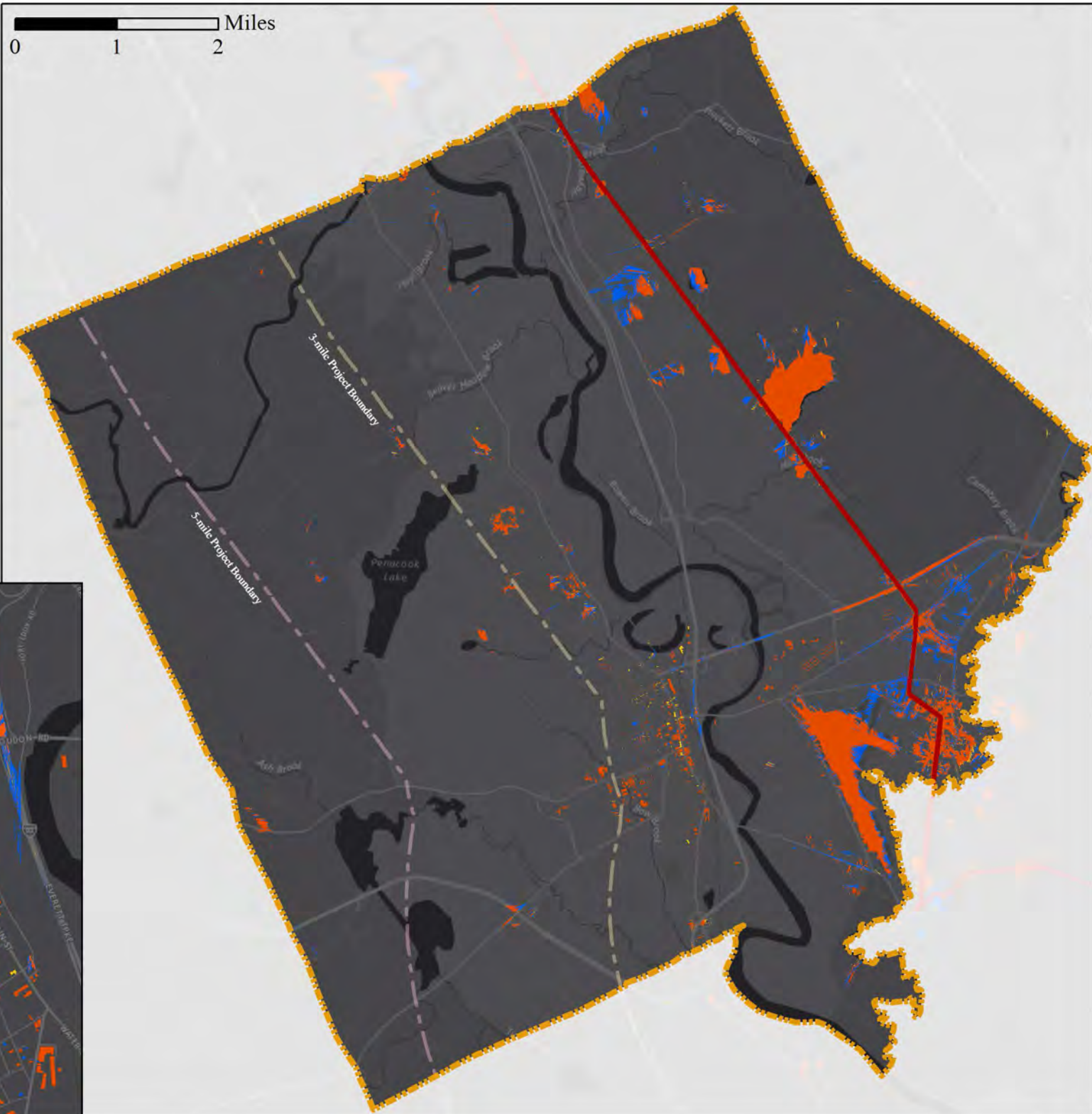
Proposed Structures Visible

Yellow areas define landscapes where existing structures are visible but no proposed structures would be visible

Orange areas indicate where existing structures are visible, but additional proposed structures would also be visible

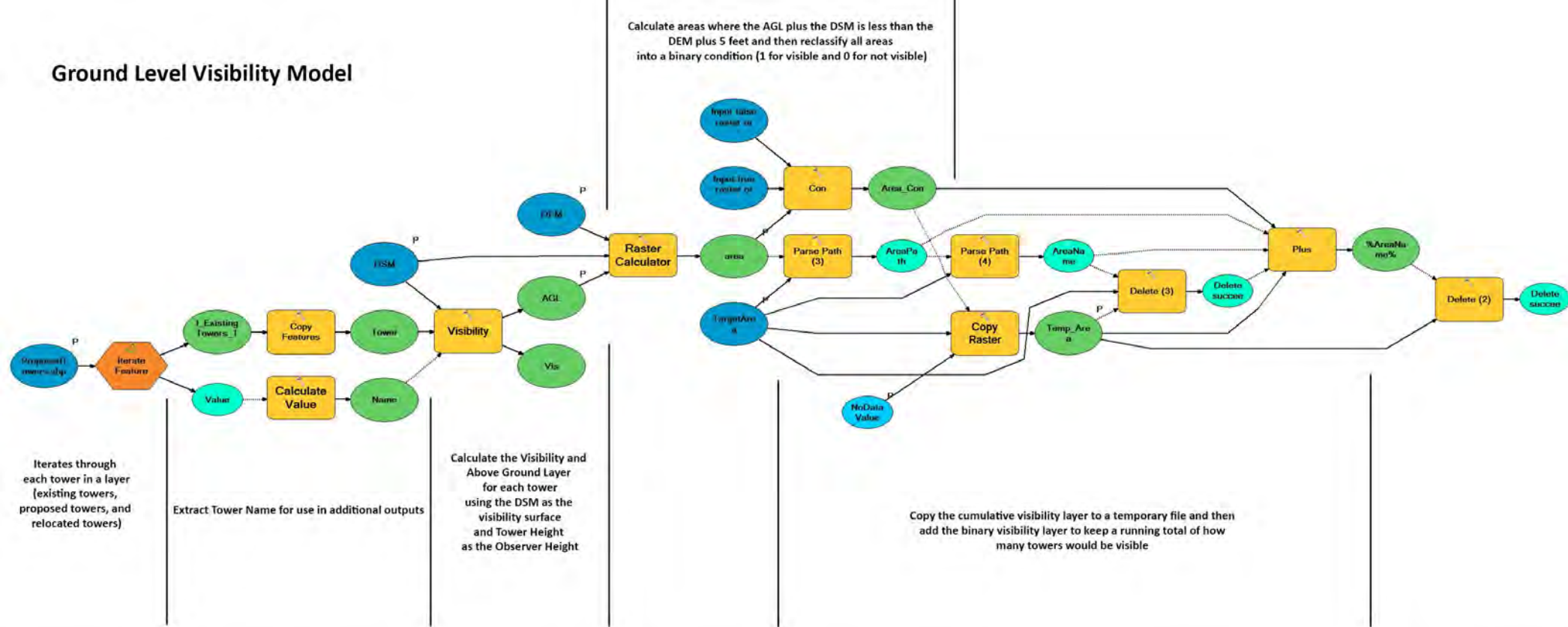
Blue areas highlight landscapes where no structures are currently visible, but proposed structures would create new visual impacts

0 1 2 Miles

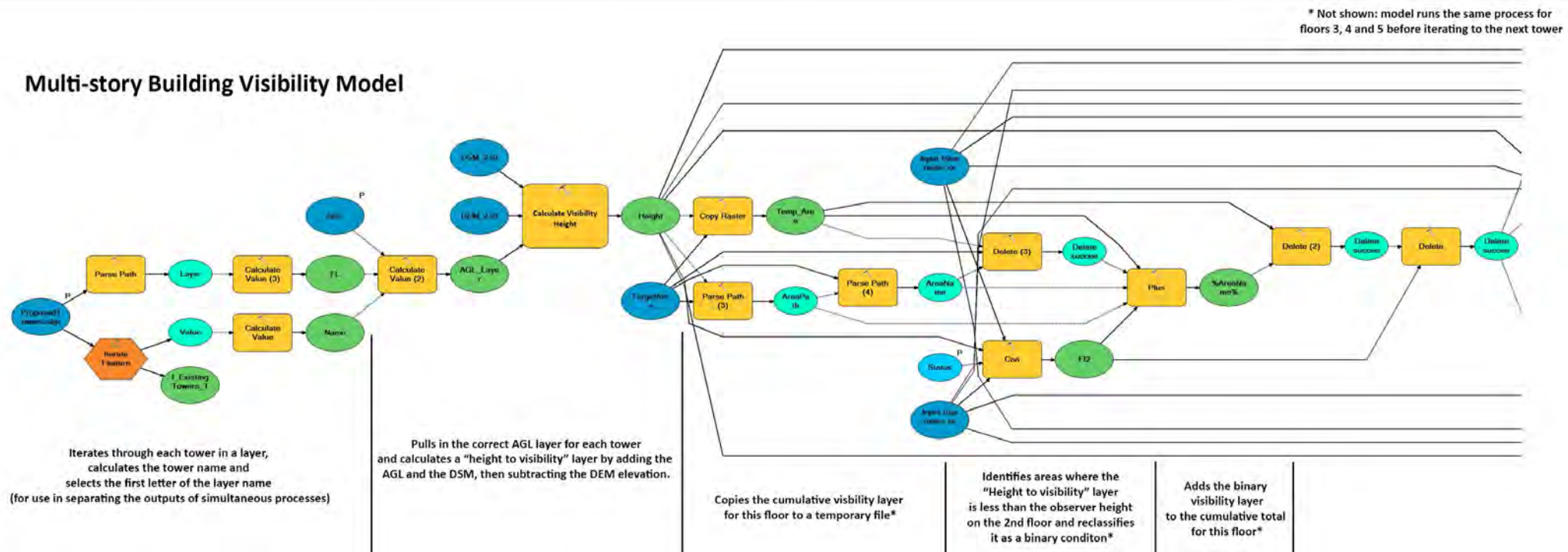


Inset of Downtown Concord

Ground Level Visibility Model



Multi-story Building Visibility Model



Increased Areas of Structure Visibility

- City Hiking Trails
- Conservation**
 - City Park
 - Easement
 - Fee Simple
 - State or Private Institutional
- Concord City Limit
- Northern Pass Transmission Project Corridor
- Existing Structures Visible
- Increased Structure Visibility
- Proposed Structures Visible

Yellow areas define landscapes where existing structures are visible but no proposed structures would be visible

Orange areas indicate where existing structures are visible, but additional proposed structures would also be visible

Blue areas highlight landscapes where no structures are currently visible, but proposed structures would create new visual impacts

