

TABLE 1

PSNH STATE LAND CROSSINGS

State Land	Town	Line #
Nash Stream State Forest	Stark	O154 - 115 kV
Percy State Forest	Stark	O154 - 115 kV
Cape Horn State Forest	Northumberland	D142 - 115 kV
Groveton Branch RR Crossing	Lancaster	D142 - 115 kV
Groveton Branch RR Crossing	Dalton	348X - 34.5 kV
State Police Firing Range	New Hampton	E115 - 115 kV
Rail Trail	Franklin	M127 - 115 kV
Rail Trail	Franklin	F139 - 115 kV
Concord-Lincoln RR Crossing	Franklin	F139 - 115 kV
Vacant Land	Franklin	F139 - 115 kV
Concord-Lincoln RR Crossing	Canterbury	F139 - 115 kV
State of New Hampshire - Adjutant General's Department	Pembroke	P145 - 115 kV
State of New Hampshire - Adjutant General's Department	Pembroke	C189 (formerly V182) - 115 kV

Project Area

State Land Crossing

Existing Substation

Proposed Converter Station

Transition Station

Proposed Route

Existing Transmission ROW

Scenic Roads/Byways

City/Village

Town Boundary

County Boundary

State Boundary

Appalachian Trail

Public Lands and Conservation Easements

Primary Protecting Agency

Federal

State

Municipal/County

Other Public/Quasi-Public

Private

State of New Hampshire-Dept. of Resources & Economic Development

State of New Hampshire-Dept. of Resources & Economic Development

State of New Hampshire-Dept. of Resources & Economic Development

State of New Hampshire-Bureau of Rail & Transit

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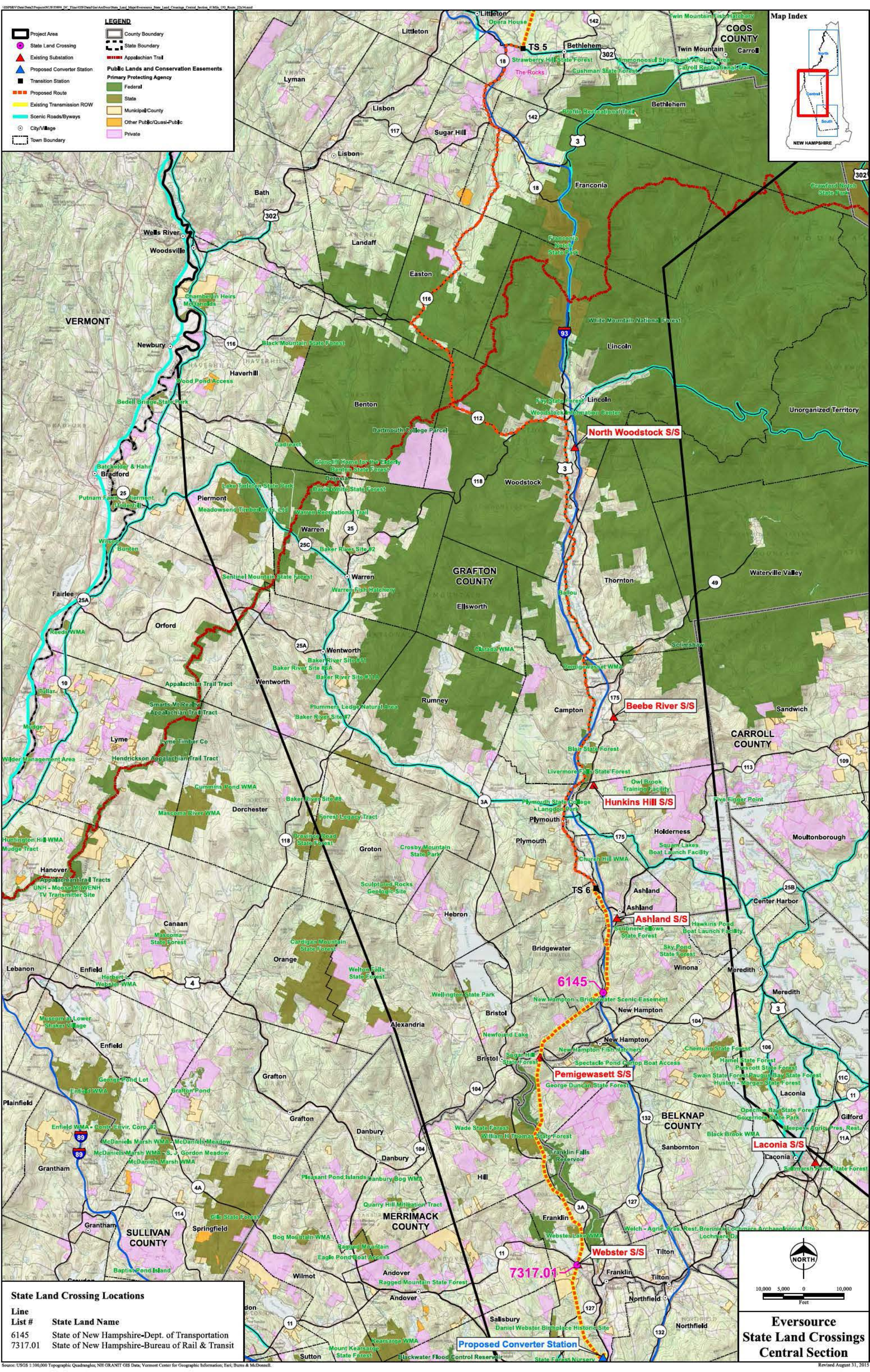
State Land Crossing Locations

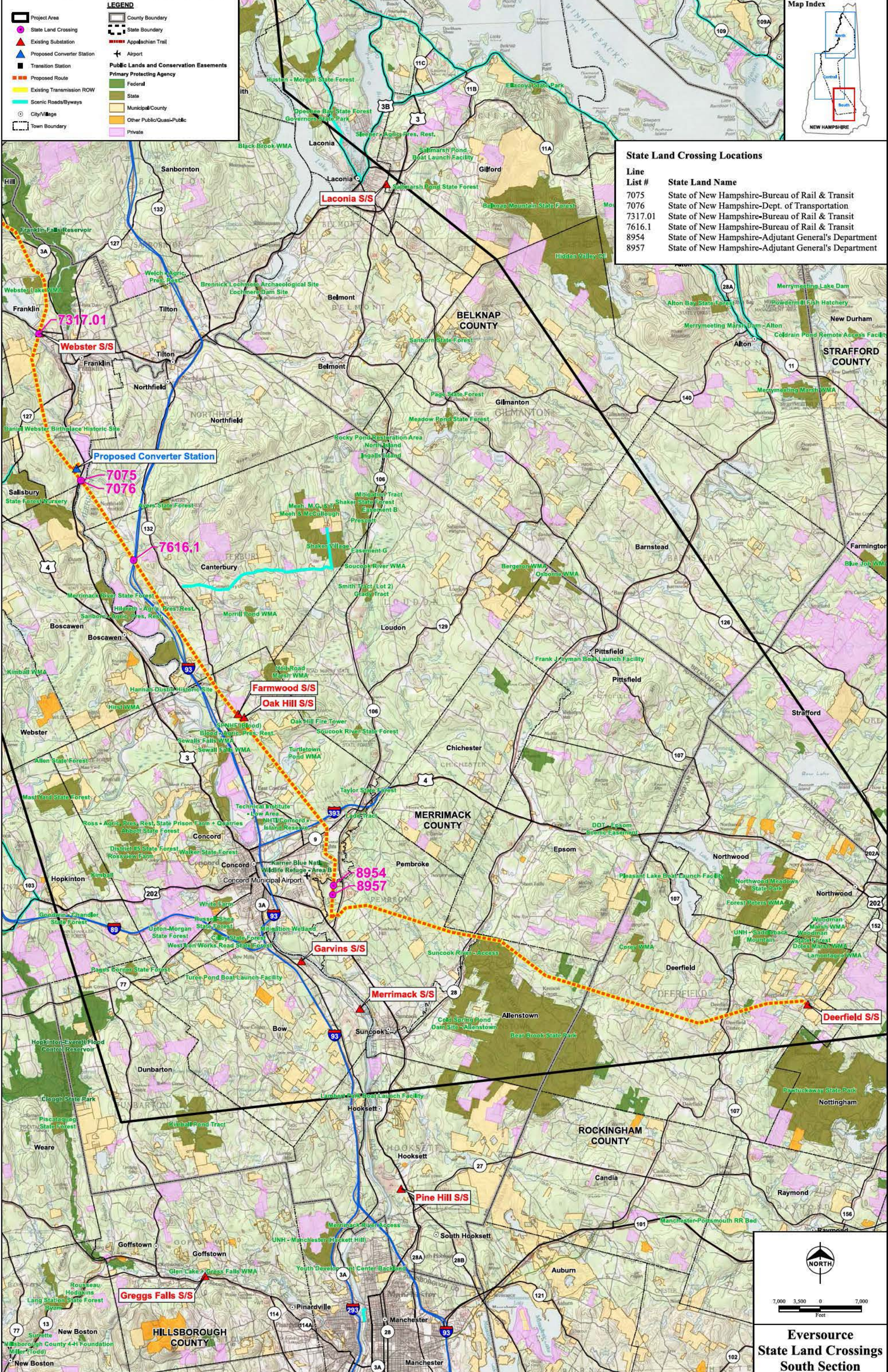
Line List #	State Land Name
2030	State of New Hampshire-Dept. of Resources & Economic Development
2034	State of New Hampshire-Dept. of Resources & Economic Development
2037	State of New Hampshire-Dept. of Resources & Economic Development
2236	State of New Hampshire-Bureau of Rail & Transit
2819	State of New Hampshire-Bureau of Rail & Transit
12519	State of New Hampshire-Dept. of Resources & Economic Development
12547	State of New Hampshire-Dept. of Resources & Economic Development

This map illustrates the proposed Eversource transmission line route through the northern section of New Hampshire, showing its path across various state land crossings and public lands. The route is marked with a dashed orange line, with specific crossing points labeled with line numbers: 2030, 2034, 2037, 2236, 2819, 12519, and 12547. Substations are indicated by red triangles and labeled: Littleton S/S, Whitefield S/S, Berlin S/S, and Smith S/S. Transition stations are marked with black squares and labeled TS 1 through TS 5. The map also shows existing transmission rights-of-way (yellow lines), scenic roads (cyan lines), and various public lands and conservation easements (green and brown areas). Land ownership is categorized by color: Federal (dark green), State (light green), Municipal/County (yellow), Other Public/Quasi-Public (orange), and Private (pink). Major towns and locations such as Littleton, Whitefield, Berlin, and Concord are labeled. The map includes a legend, a map index, a north arrow, and a scale bar. The title 'Eversource State Land Crossings North Section' is prominently displayed at the bottom right.

Source: USGS 1:100,000 Topographic Quadrangles, NH GRANIT GIS Data, Vermont Center for Geographic Information, Esri, Burns & McDonnell.

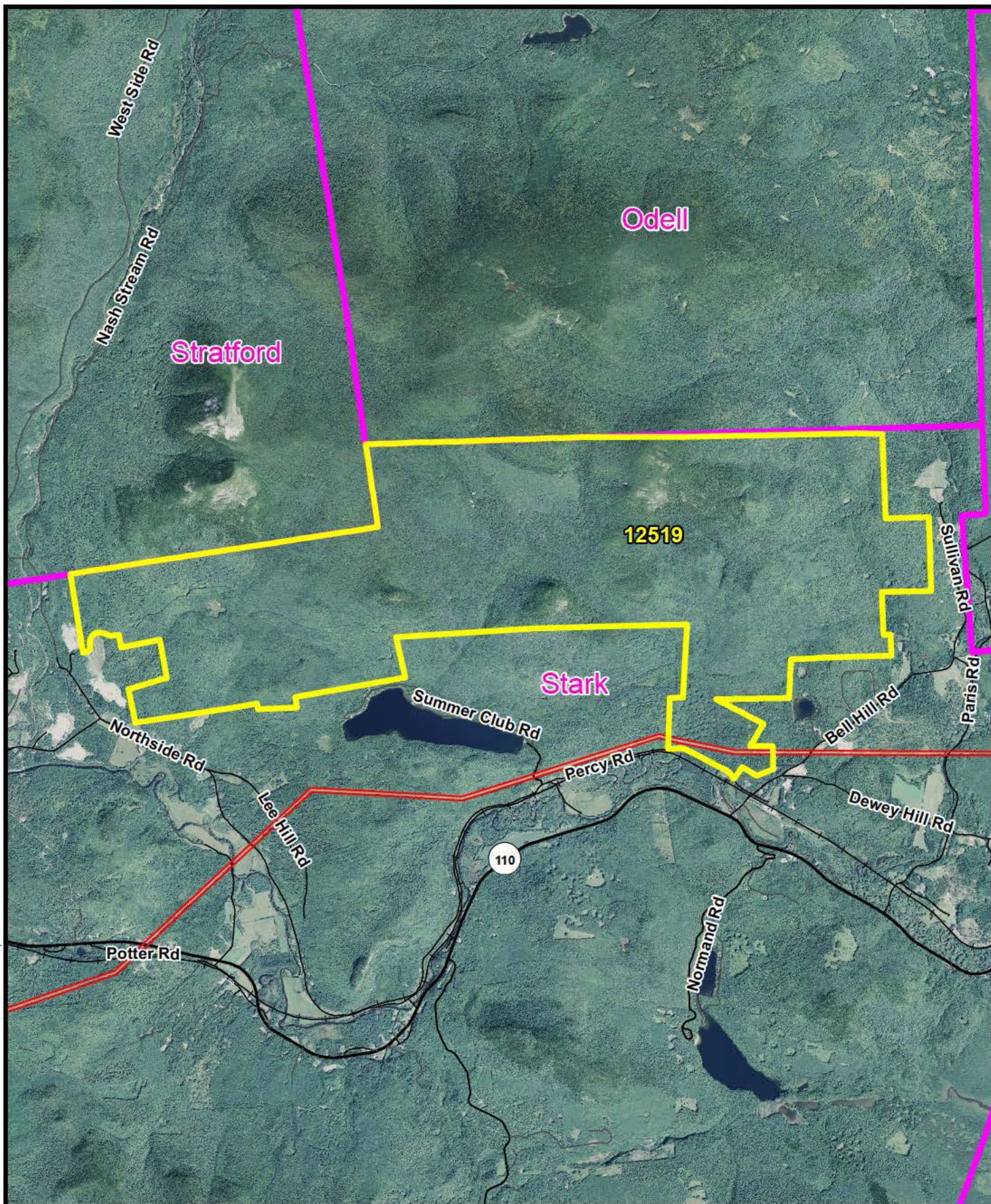
Revised August 31, 2015





APPENDIX 1
O154 AC LINE
STRUCTURES O154-42 TO O154-49
STATE OF NEW HAMPSHIRE- DEPARTMENT OF RESOURCES AND ECONOMIC DEVELOPMENT
NASH STREAM STATE FOREST
LL 12519
STARK, NH

1. This crossing is shown on attached drawing O15499002
 - a. This drawing shows a 24' terrain clearance line (offset from ground surface), which is greater than required minimum of 16.1'.
2. The location of the O154 line is shown on attached maps titled Line List 12519
3. This portion of the O154 line will be on steel structures. The energized conductor is in a vertical configuration using 795 kcmil. The structures will have 1 ground wire, OPGW with sag coefficients similar to 19#10 Alumoweld.
 - a. The O154 line crosses the parcel LL 12519 State of New Hampshire – Department of Resources of Economic Development, Nash Stream State Forest for approximately 4080'.
4. Energized conductors will have a maximum tension of 9,000 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice). Ground wires will have a maximum tension of 5,500 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice).
5. The O154 line is a 115 kV alternating current (AC) line.
6. Eversource has investigated a multitude of weather and loading conditions for its design. Eversource used these design conditions and combinations thereof to determine the minimum clearance of all conductors to both ground and aerial obstacles, between the phase conductors and OPGW cable. Eversource has determined that the weather cases and combinations listed below results in the minimum clearance and control over all other weather conditions and combinations. All NESC clearances have been met by exceeding the horizontal and/or vertical clearances required. Minimum distances to ground per the NESC have been met.
 - a. Ground wires – Due to the fact that the ground wire is located above the energized conductor, its clearance to the ground will always exceed the minimum required NESC distance.
 - b. 285 degrees F – Maximum operating temperature (energized conductor) based on Eversource transmission standards the maximum sag for this weather case controls.



0 2,500 5,000
 Feet

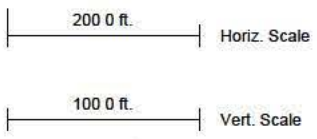
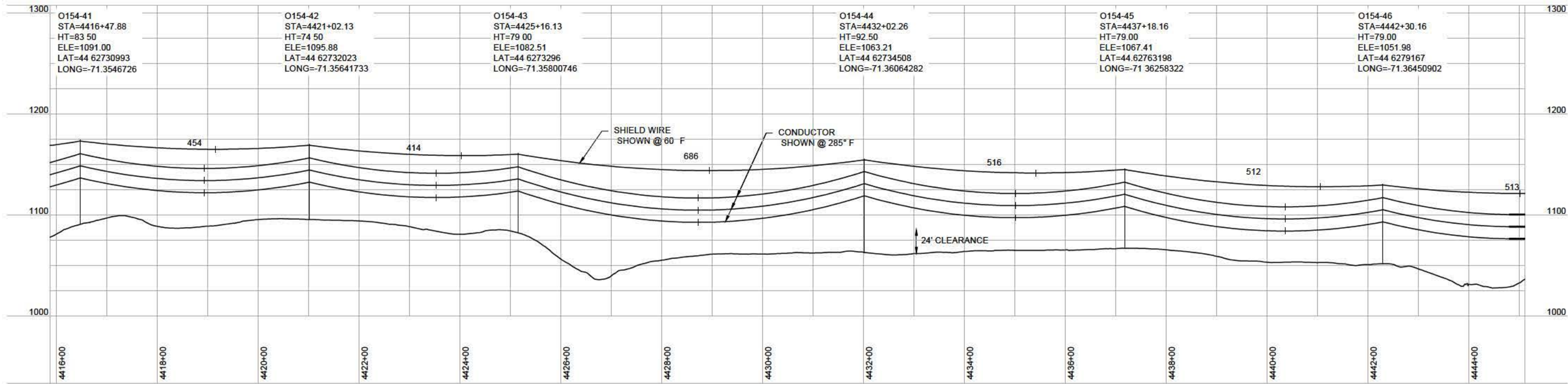
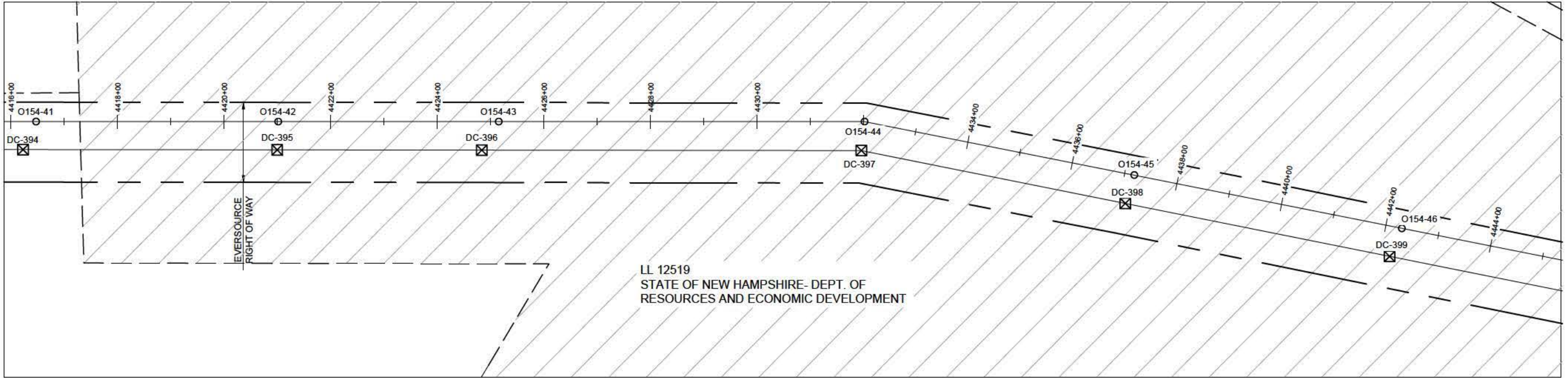
LEGEND

- Parcel Boundary
- Project ROW
- Town Boundary



Line List 12519
 State Land Crossing Permit
 Location Map

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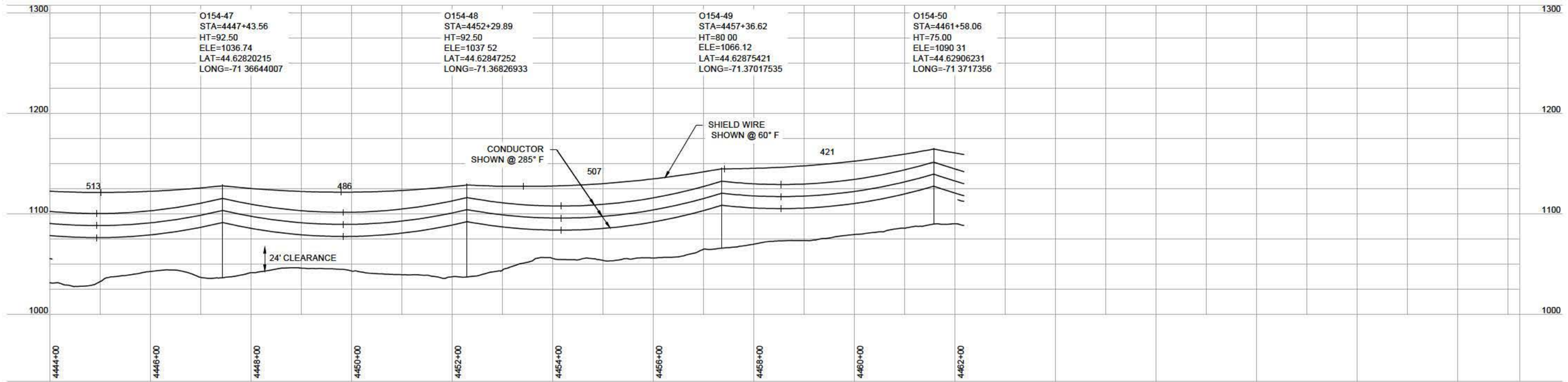
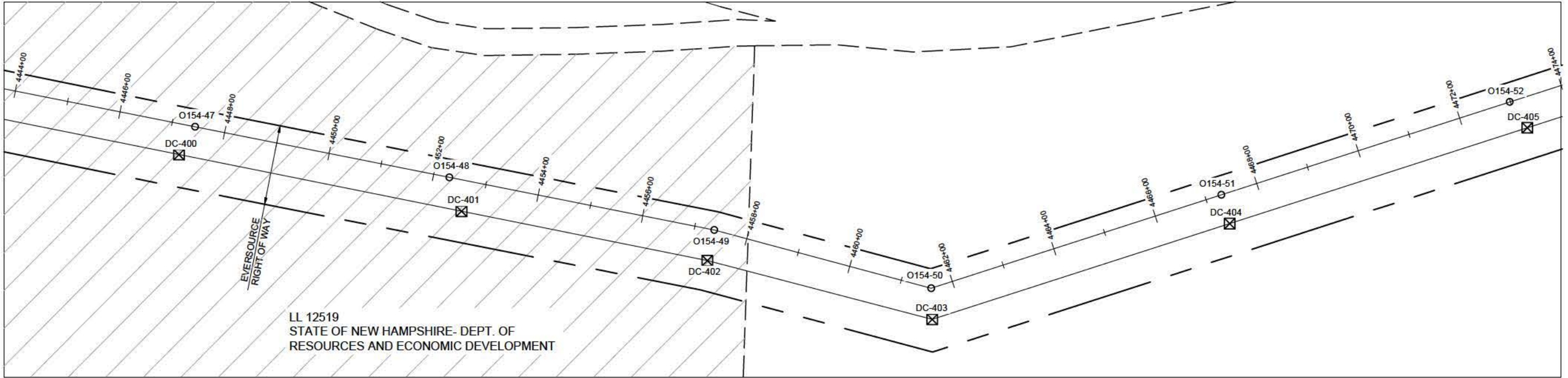
○ PROPOSED MONOPOLE
⊠ PROPOSED TRANS STRUCTURE



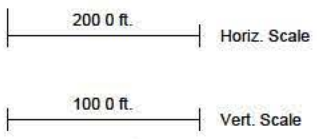
PRELIMINARY - NOT FOR CONSTRUCTION

REVISION HISTORY					
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BY	REV. NO.	DATE	SIZE	DWG. NO.	
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○ PROPOSED MONOPOLE
⊠ PROPOSED TRANS STRUCTURE

**PRELIMINARY - NOT
FOR CONSTRUCTION**

REVISION HISTORY					
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BY KRR	REV. NO. A	DATE 4/30/15	SIZE B	DWG. NO. 015499002.DWG	

APPENDIX 2
O154 AC LINE
STRUCTURES O154-63 TO O154-66
STATE OF NEW HAMPSHIRE- DEPARTMENT OF RESOURCES AND ECONOMIC DEVELOPMENT
PERCY STATE FOREST
LL 12547
STARK, NH

1. This crossing is shown on attached drawing O15499001
 - a. This drawing shows a 24' terrain clearance line (offset from ground surface), which is greater than required minimum of 16.1'.
2. The location of the O154 line is shown on attached maps titled Line List 12547
3. This portion of the O154 line will be on steel structures. The energized conductor is in a vertical configuration using 795 kcmil. The structures will have 1 ground wire, OPGW with sag coefficients similar to 19#10 Alumoweld.
 - a. The O154 line crosses the parcel LL 12547 State of New Hampshire – Department of Resources of Economic Development, Percy State Forest for approximately 2000'.
4. Energized conductors will have a maximum tension of 9,000 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice). Ground wires will have a maximum tension of 5,500 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice).
5. The O154 line is a 115 kV alternating current (AC) line.
6. Eversource has investigated a multitude of weather and loading conditions for its design. Eversource used these design conditions and combinations thereof to determine the minimum clearance of all conductors to both ground and aerial obstacles, between the phase conductors and OPGW cable. Eversource has determined that the weather cases and combinations listed below results in the minimum clearance and control over all other weather conditions and combinations. All NESC clearances have been met by exceeding the horizontal and/or vertical clearances required. Minimum distances to ground per the NESC have been met.
 - a. Ground wires – Due to the fact that the ground wire is located above the energized conductor, its clearance to the ground will always exceed the minimum required NESC distance.
 - b. 285 degrees F – Maximum operating temperature (energized conductor) based on Eversource transmission standards the maximum sag for this weather case controls.



0 400 800
Feet

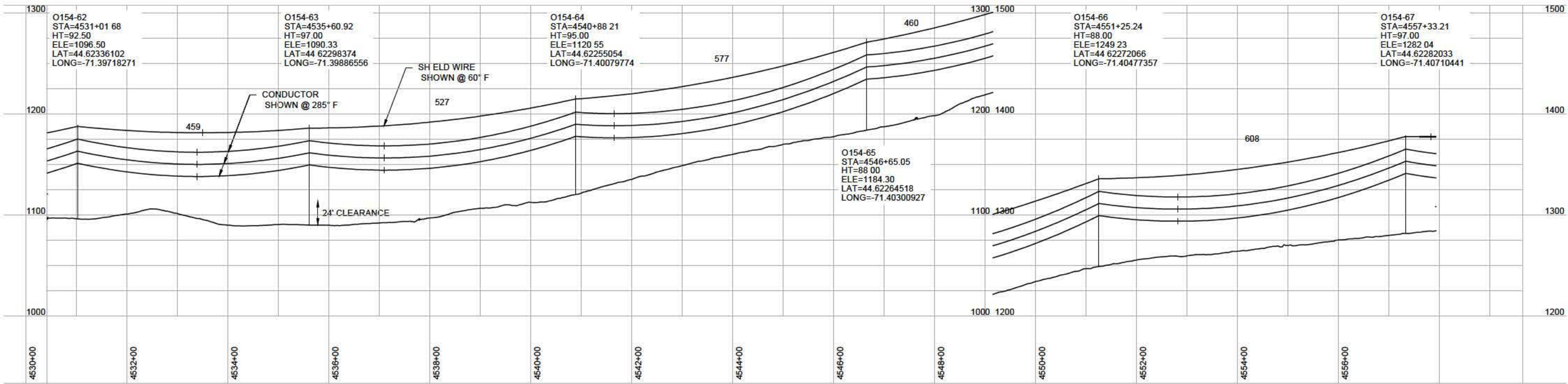
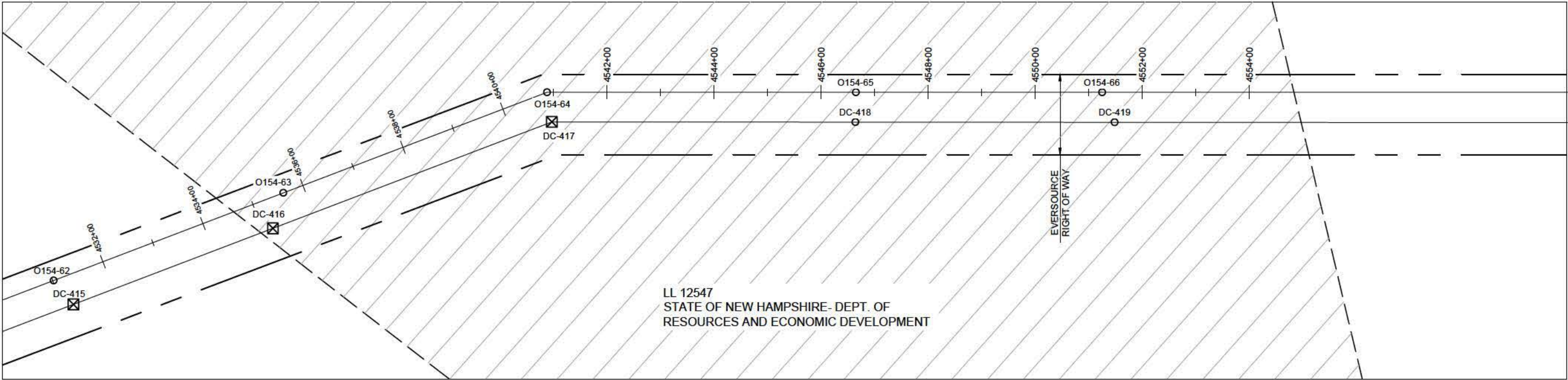
LEGEND

-  Parcel Boundary
-  Project ROW
-  Town Boundary



Line List 12547
State Land Crossing Permit
Location Map

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200.0 ft. Horiz. Scale

100.0 ft. Vert. Scale



PUBLIC LAND



PROPOSED MONOPOLE



PROPOSED TRANS STRUCTURE



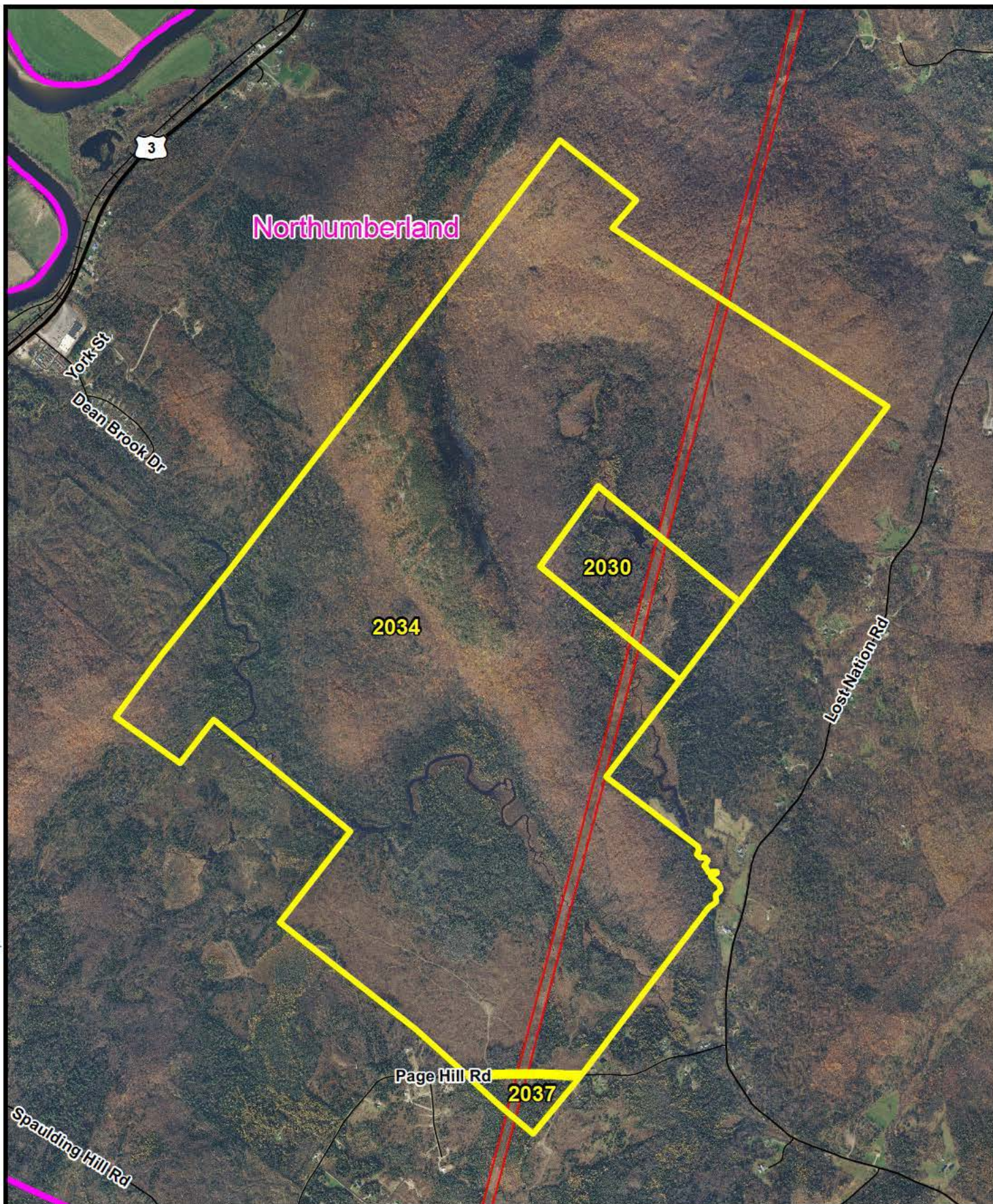
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FOR CONSTRUCTION**

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BY	REV. NO.	DATE	SIZE	DWG. NO.	
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APPENDIX 3
D142 AC LINE
STRUCTURES D142-322 TO D142-343
STATE OF NEW HAMPSHIRE- DEPARTMENT OF RESOURCES AND ECONOMIC DEVELOPMENT
CAPE HORN STATE FOREST
LL 2030, 2034, 2037
NORTHUMBERLAND, NH

1. This crossing is shown on attached drawing D14299001
 - a. This drawing shows a 24' terrain clearance line (offset from ground surface), which is greater than required minimum of 16.1'.
2. The location of the D142 line is shown on attached maps titled Line List 2030, Line List 2034, Line List 2037.
3. This portion of the D142 line will be on steel structures. The energized conductor is in a vertical configuration using 795 kcmil. The structures will have 1 ground wire, OPGW with sag coefficients similar to 19#10 Alumoweld.
 - a. The D142 line crosses the parcel LL 2030, State of New Hampshire – Department of Resources of Economic Development, Cape Horn State Forest for approximately 1,670'
 - b. The D142 line crosses the parcel LL 2034, State of New Hampshire – Department of Resources of Economic Development, Cape Horn State Forest for approximately 10,830'
 - c. The D142 line crosses the parcel LL 2037, State of New Hampshire – Department of Resources of Economic Development, Cape Horn State Forest for approximately 620'
4. Energized conductors will have a maximum tension of 9,000 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice). Ground wires will have a maximum tension of 5,500 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice).
5. The D142 line is a 115 kV alternating current (AC) line.
6. Eversource has investigated a multitude of weather and loading conditions for its design. Eversource used these design conditions and combinations thereof to determine the minimum clearance of all conductors to both ground and aerial obstacles, between the phase conductors and OPGW cable. Eversource has determined that the weather cases and combinations listed below results in the minimum clearance and control over all other weather conditions and combinations. All NESC clearances have been met by exceeding the horizontal and/or vertical clearances required. Minimum distances to ground per the NESC have been met.
 - a. Ground wires – Due to the fact that the ground wire is located above the energized conductor, its clearance to the ground will always exceed the minimum required NESC distance.

- b. 285 degrees F – Maximum operating temperature (energized conductor) based on Eversource transmission standards the maximum sag for this weather case controls.



0 1,000 2,000

Scale in Feet

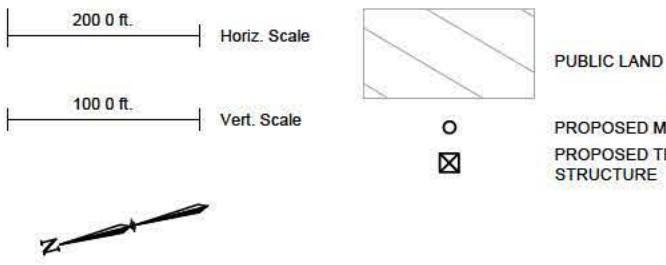
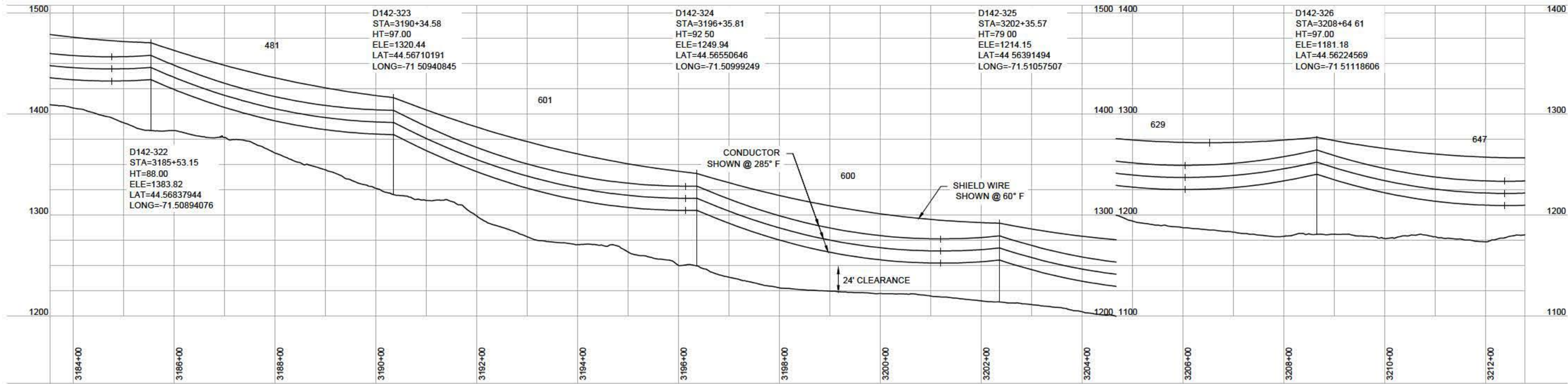
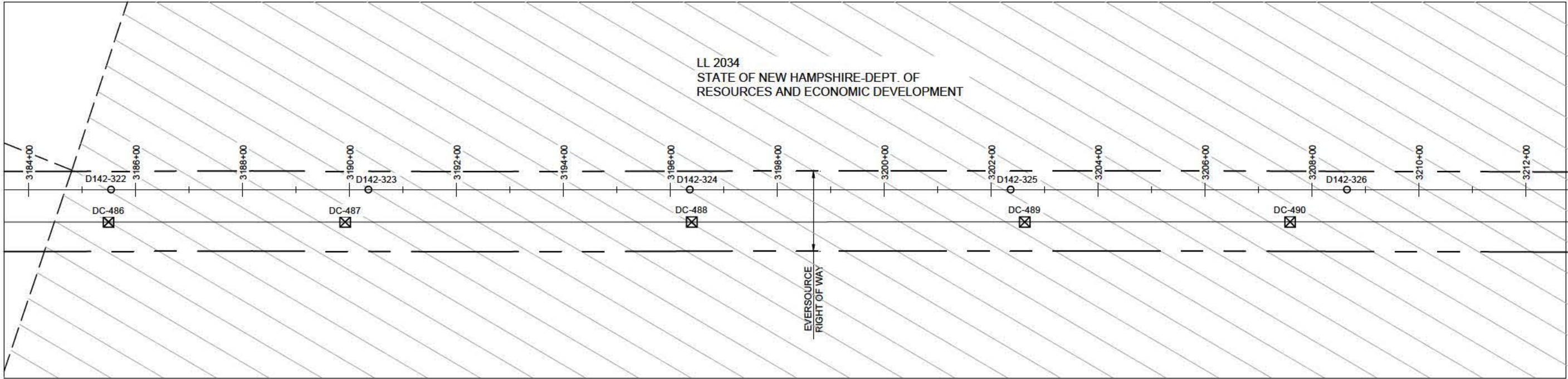
LEGEND

- Parcel Boundary
- Project ROW
- Town Boundary



Line List 2030, 2034, & 2037
 State Land Crossing Permit
 Location Map

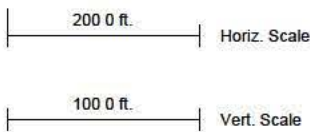
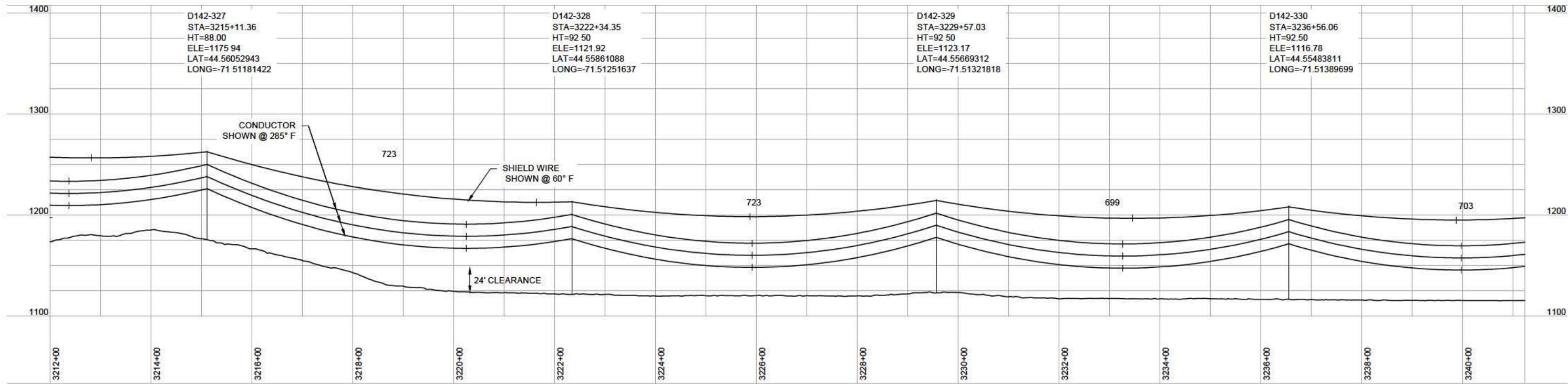
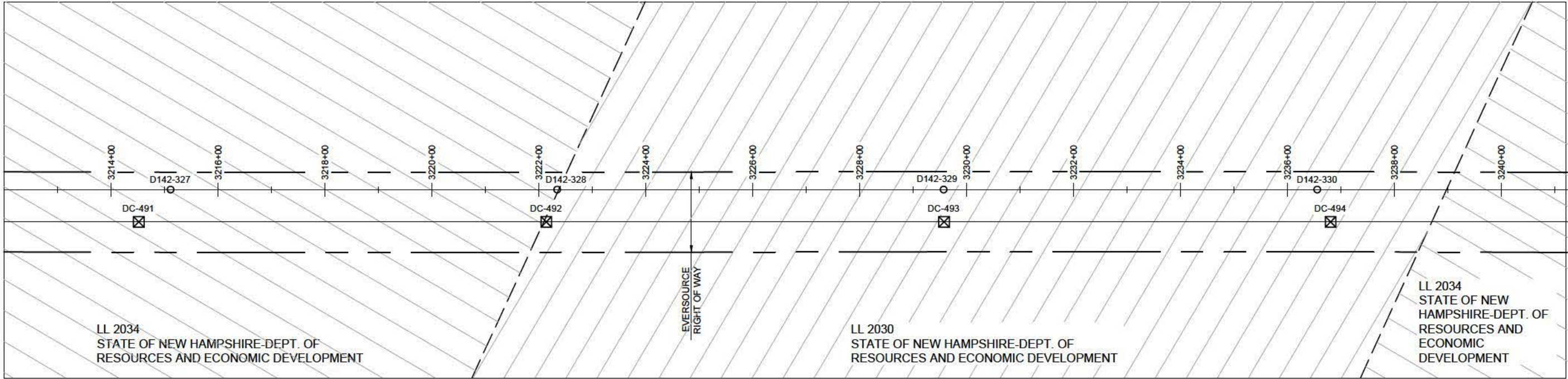
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**PRELIMINARY - NOT
FOR CONSTRUCTION**

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BY	REV. NO.	DATE	SIZE	DWG. NO.	
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PUBLIC LAND



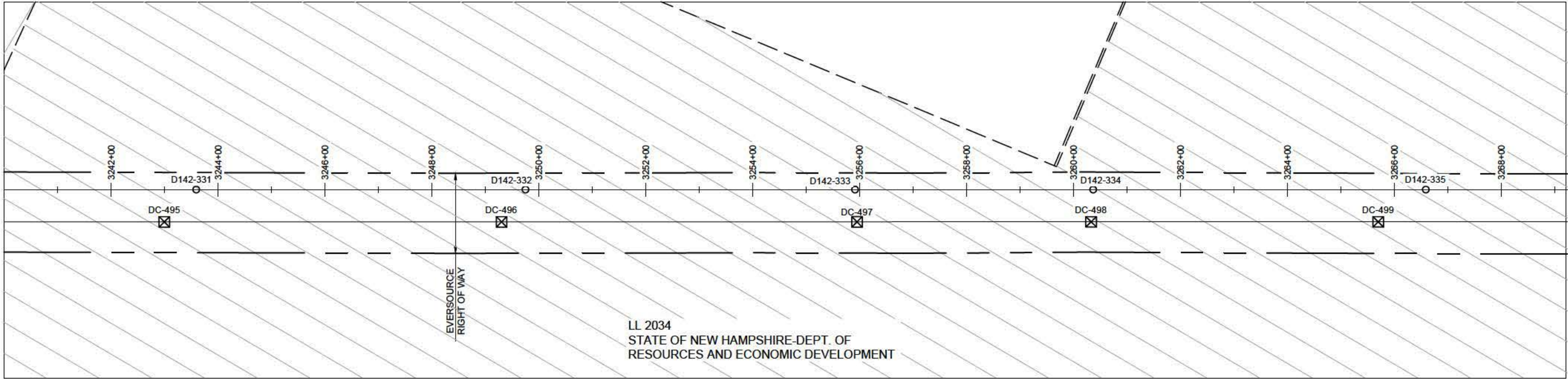
PROPOSED MONOPOLE
PROPOSED TRANS
STRUCTURE



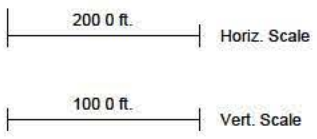
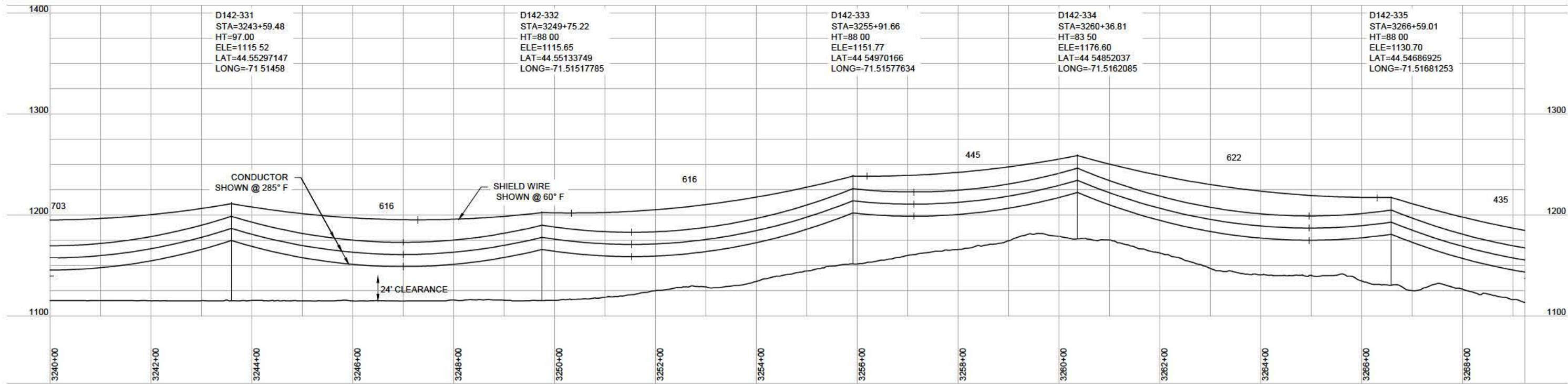
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FOR CONSTRUCTION**

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BY	REV. NO.	DATE	SIZE	DWG. NO.	
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LL 2034
STATE OF NEW HAMPSHIRE-DEPT. OF
RESOURCES AND ECONOMIC DEVELOPMENT



PUBLIC LAND



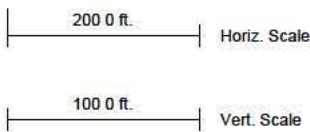
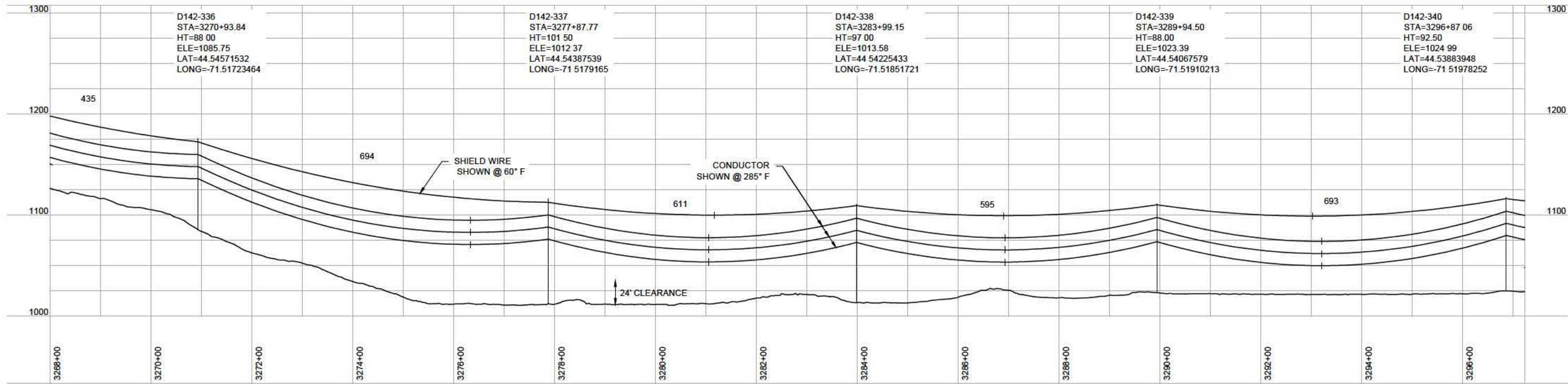
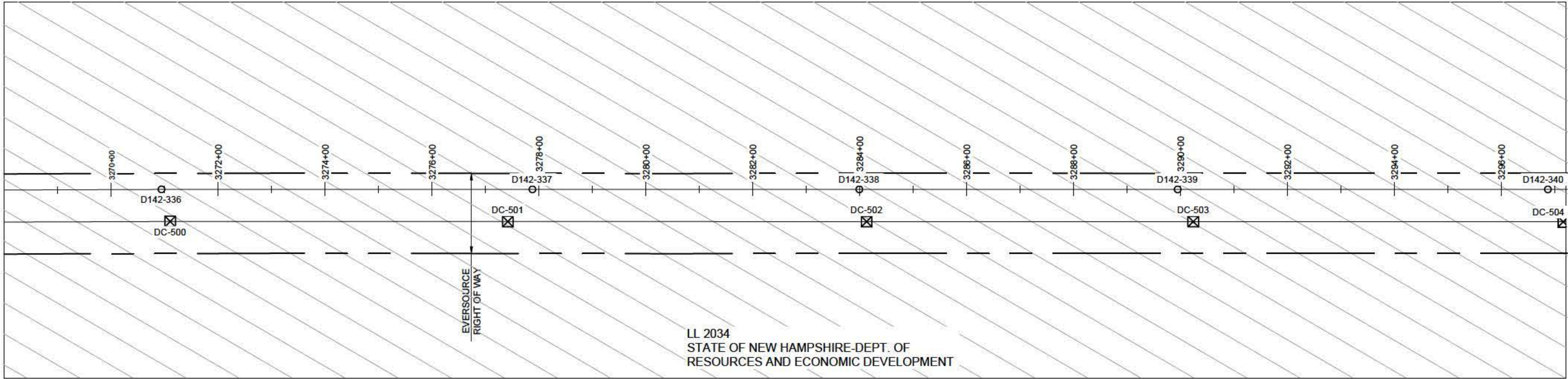
PROPOSED MONOPOLE
PROPOSED TRANS
STRUCTURE



**PRELIMINARY - NOT
FOR CONSTRUCTION**

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PUBLIC LAND



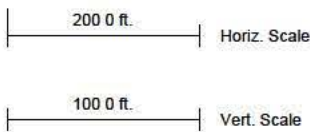
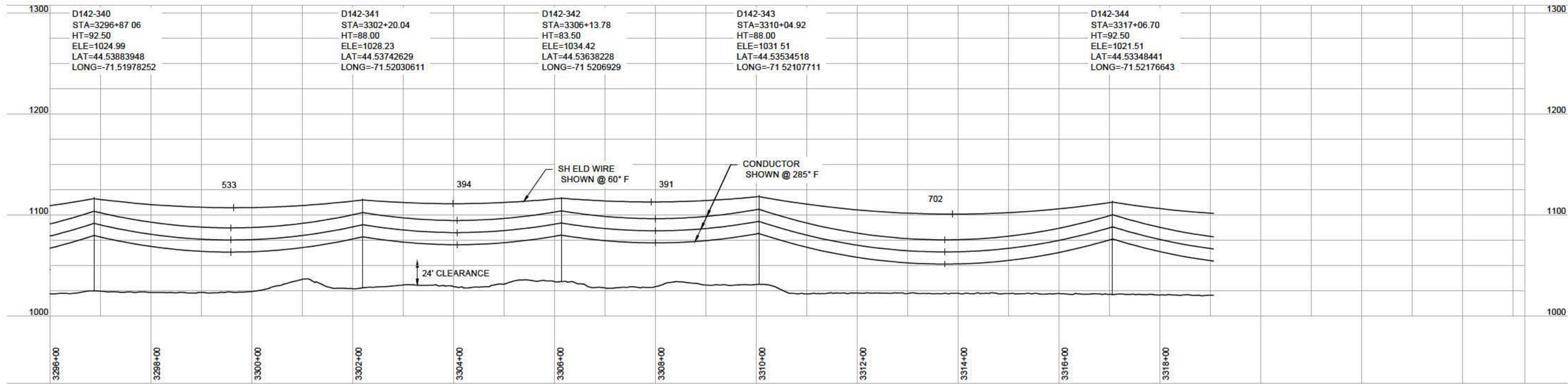
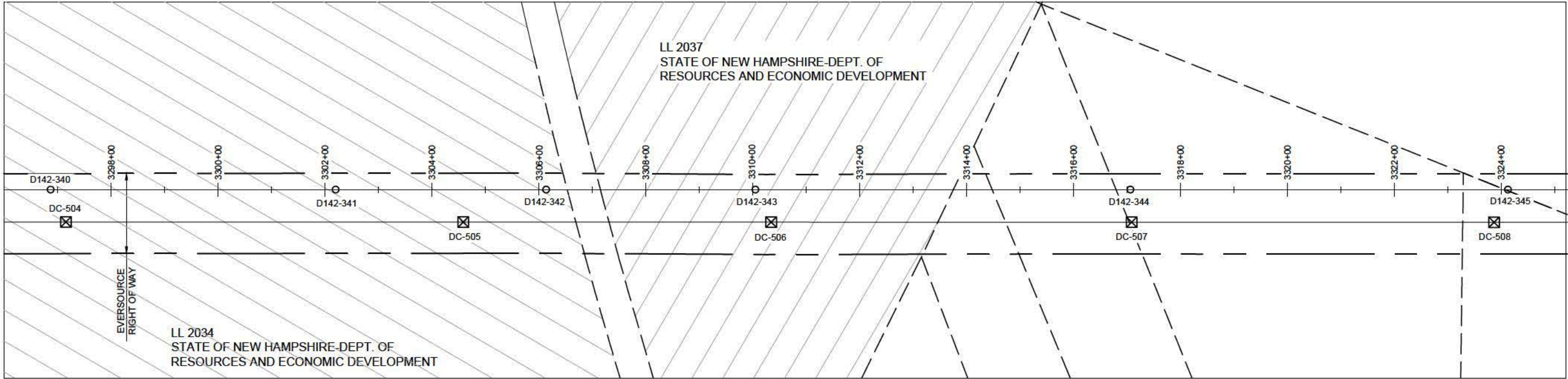
PROPOSED MONOPOLE
PROPOSED TRANS
STRUCTURE



**PRELIMINARY - NOT
FOR CONSTRUCTION**

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PUBLIC LAND



PROPOSED MONOPOLE



PROPOSED TRANS
STRUCTURE



**PRELIMINARY - NOT
FOR CONSTRUCTION**

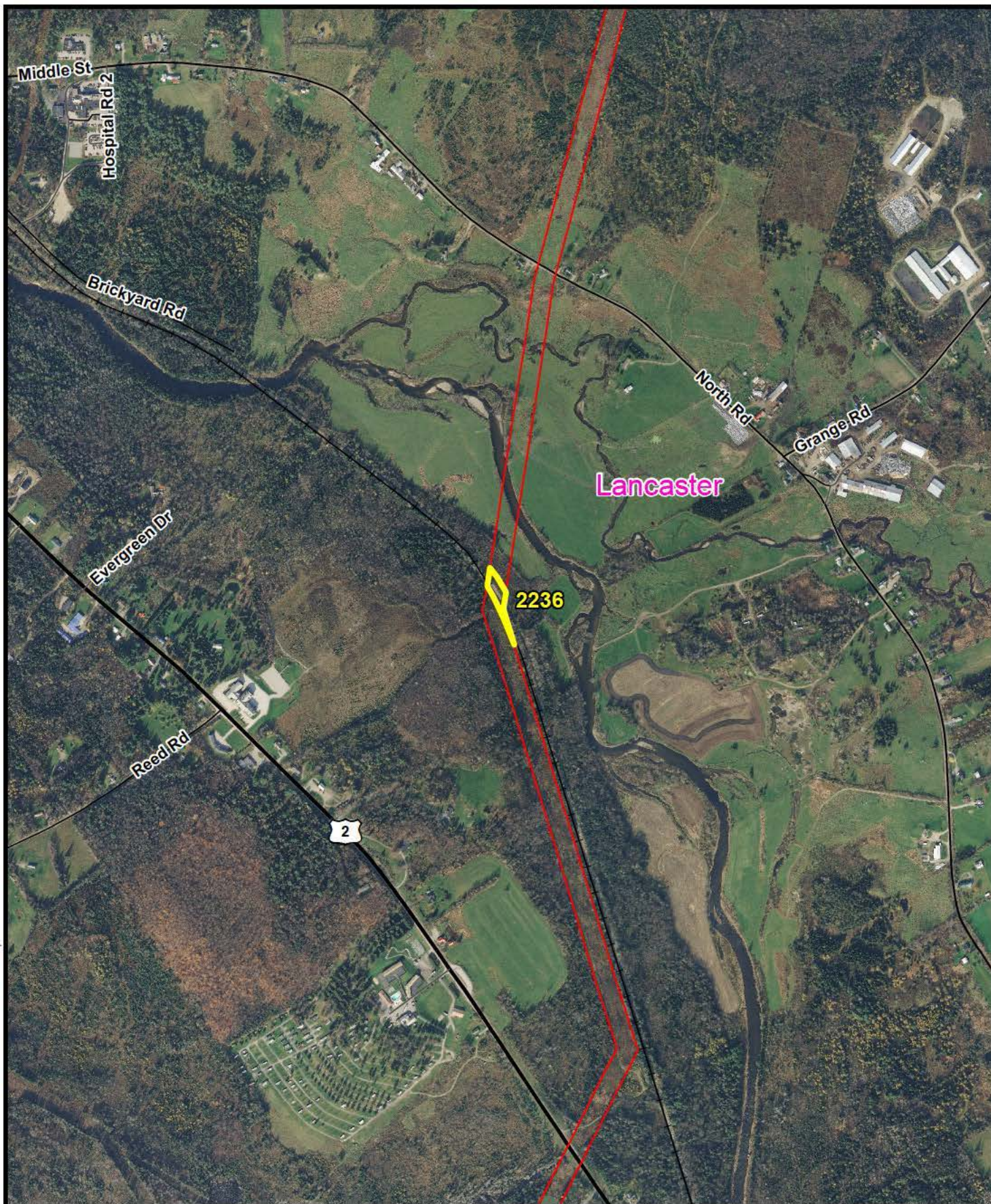
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BY	REV. NO.	DATE	SIZE	DWG. NO.	
KRR	A	4/30/15	B	D14299001.DWG	

APPENDIX 4
D142 AC LINE
STRUCTURES D142-376 TO D142-377
STATE OF NEW HAMPSHIRE – BUREAU OF RAIL & TRANSIT
GROVETON BRANCH
LL 2236
LANCASTER, NH

1. This crossing is shown on attached drawing D14243601
2. The location of the D142 line is shown on attached maps titled Line List 2236
3. The D142 line will be on steel structures at this crossing. The energized conductor is in a vertical configuration using 795 kcmil ACSR. The structures will have ground wire. OPGW with sag coefficients similar to 19#10 Alumoweld will be used.
 - a. D142-376 & D142-377 will be structures with suspension insulators. The energized conductors are separated approximately 0 feet horizontally and 12 feet vertically in a vertical configuration. The ground/OPGW wire is carried on the structure by a support bracket approximately 6 inches below the top of the structure. The ground/OPGW and energized conductor are separated vertically by approximately 13 feet and 5 feet horizontally.
4. Energized conductors will have a maximum tension of 9,000 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice). Ground wires will have a maximum tension of 5,500 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice).
5. All NESC clearances described in subsequent paragraphs have been met by exceeding the horizontal and/or vertical clearances required. Minimum distances to ground per the NESC have been met.
6. The D142 is a 115 kV alternating current (AC) line.
 - a. Based on Table 232-1 of the NESC, for open supply conductors 750 V to 22kV to ground, the minimum clearance to tracks of railroads is 26.5'. NESC Rule 232.C.1.a states that an additional clearance of 1.59 feet or $[(69.7 \text{ kV} - 22 \text{ kV}) \times 0.4]/12$ is needed, which brings the total required minimum clearance to 28.1 feet.
 - b. For overhead ground wires, the minimum required clearance to tracks of railroad is 23.5 feet. As the static wires are located above the energized conductors at all crossings, this NESC minimum clearance requirement will always be met.
 - c. Table 235-1 of the NESC does not specify horizontal values for supply conductors of the same circuit for voltages greater than 50 kV. In the absence of this, the project will use values for different circuits. Based upon Table 235-1:
 - i. 3.07 feet is required between 115 kV AC energized conductor and ground wire

- ii. 4.78 feet is required between 115 kV AC energized conductors
 - d. Based on Table 235-3 of the NESC for horizontal clearance along the span for wires or conductors carried on the same support
 - i. 5.69 feet is required between 115 kV AC energized conductors and ground wire
 - ii. 6.96 feet is required between 115 kV AC energized conductors
 - iii. These horizontal clearances assume conductor or wire sag of 35 feet which exceeds any sag at the location of these crossings.
 - e. Based on Table 235-5 of the NESC the vertical clearance required at the supports for wires or conductors carried on the same supporting structure is:
 - i. 3.37 feet is required between 115 kV AC energized conductors and ground wire
 - ii. 5.07 feet is required between 115 kV AC energized conductors
 - f. Based on Rule 235.C.2.b of the NESC, the vertical clearance required in the span for wires or conductors carried on the same supporting structure:
 - i. 2.69 feet are required between 115 kV AC energized conductors and ground wire
 - ii. 5.01 feet are required between 115 kV AC energized conductors
 - g. Per Figure 235-1 of the NESC conductors or wires cannot encroach the envelope formed by the horizontal and vertical clearances prescribed above.
7. Eversource has investigated a multitude of weather and loading conditions for its design. Eversource used these design conditions and combinations thereof to determine the minimum clearance of all conductors to the water and land surfaces, between the phase conductors and OPGW cable. Eversource has determined that the weather cases and combinations listed below results in the minimum clearance and control over all other weather conditions and combinations.
- a. Ground wires – Due to the fact that the ground wire is located above the energized conductor, its clearance to the railroad track will always exceed the minimum required NESC distance.
 - b. 285 degrees F – Maximum operating temperature (energized conductor) based on Eversource transmission standards, the maximum sag for this weather case results in a clearance to railroad track of 46 feet, this exceeds the minimum required clearance of 28.1 feet.
 - c. Minimum clearance energized conductor to ground wires clearance – The weather case that would produce the minimum clearance between energized conductors and ground wires would be a combination of winter weather factors. First, the energized conductors would be at 30 degrees F immediately following an ice storm and would have recently dropped their ice. The ground wires would be at 32 degrees F and would still be iced with ½" of radial ice. Under these conditions the clearance would be 9 feet

vertically and 6 feet horizontally from the ground wires to the closest energized conductor.



0 500 1,000
 Feet

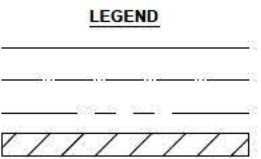
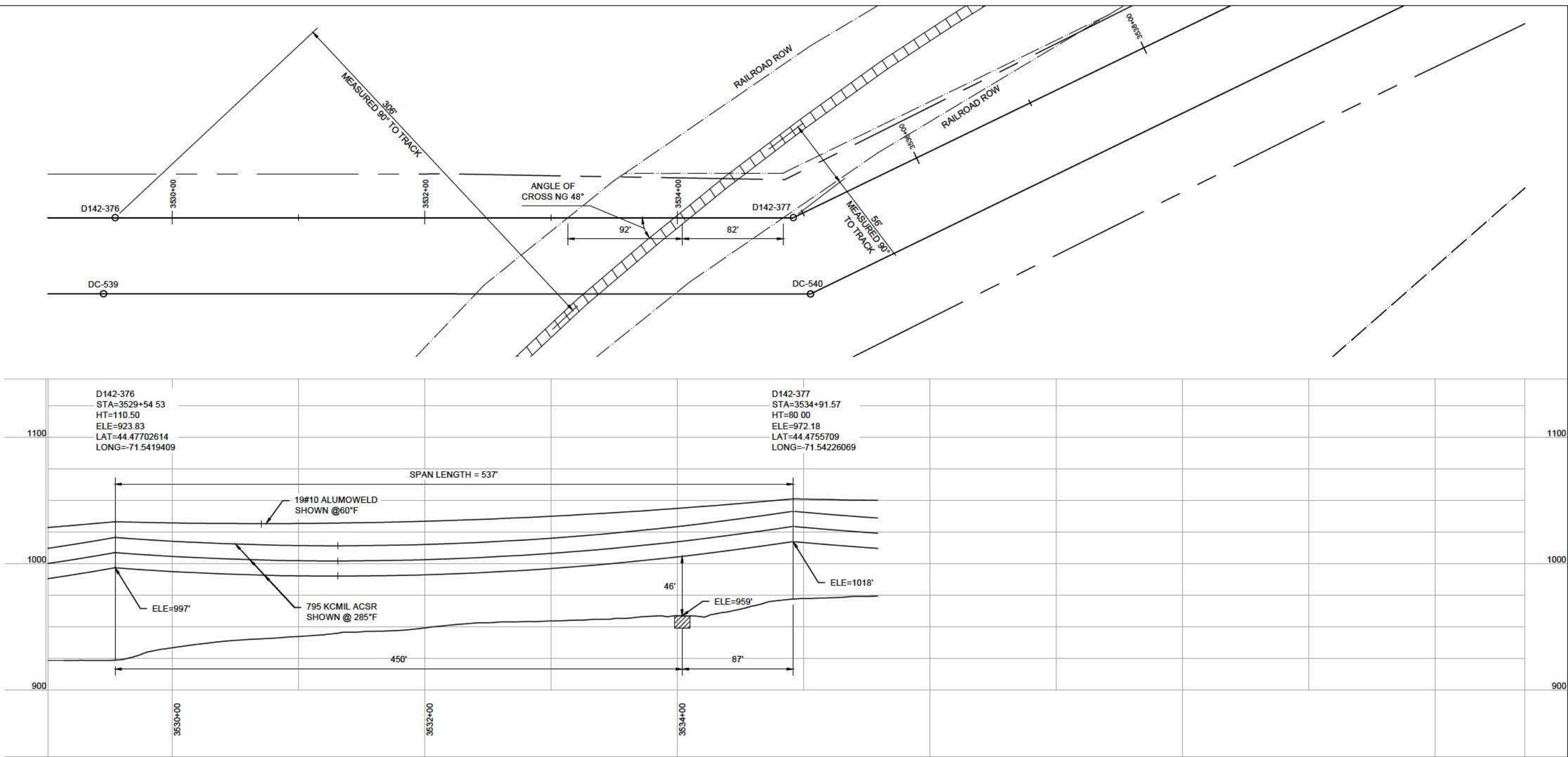
LEGEND

- Parcel Boundary
- Project ROW
- Town Boundary



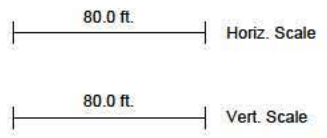
Line List 2236
 State Land Crossing Permit
 Location Map

09/09/2015 7:50am - mspepich - N:\NUSCO\58479 - NP\Overhead\Cadd\01-Record Worksheets\02 Permits\RR Crossing Permits\D14243601.dwg



TRANSMISSION CENTERLINE
PARCEL BOUNDARY
EVERSOURCE ROW
RAILROAD BED

- PROPOSED MONOPOLE
- ⊠ PROPOSED TRANS STRUCTURE
- EXISTING H-FRAME



PRELIMINARY - NOT FOR CONSTRUCTION

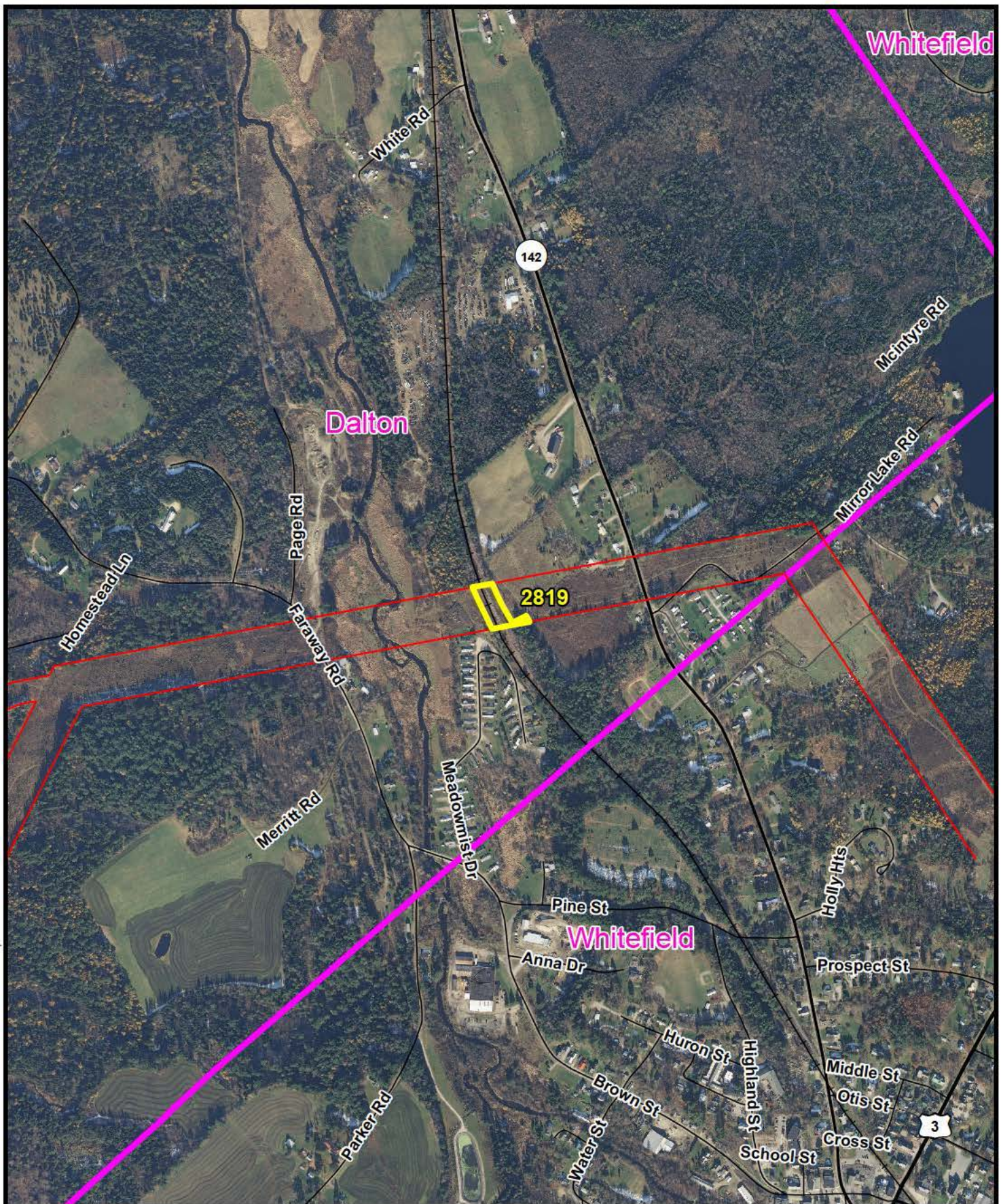
NOTES:
1. DESIGN CONFORMS TO ALL CODE REQUIREMENTS (NATIONAL ELECTRIC SAFETY CODE). SAG CONDITION DISPLAYED IN EXHIBIT IS THE CONTROLLING SAG CONDITION.

REVISION HISTORY					
-	-	-	-	-	-
A	4/30/15	ISSUED FOR REVIEW		MSP	DAB
		EVERSOURCE			
		TITLE N2 LL2236 D142 RAILROAD CROSSING PERMIT			
BY	REV. NO.	DATE	SIZE	DWG. NO.	
MSP	A	4/30/15	B	D14243601.DWG	

APPENDIX 5
348X LINE
STRUCTURES 348X-011 TO 348X-012
STATE OF NEW HAMPSHIRE – BUREAU OF RAIL & TRANSIT
GROVETON BRANCH
LL 2819
DALTON, NH

1. This crossing is shown on attached drawing B-7627-601
2. The location of the 348X line is shown on attached maps titled Line List 2819
3. The 348X line will be on wood structures for this crossing. The energized conductor is in a horizontal configuration using 477 kcmil ACSR. The neutral wire will 4/0 AWG 6/1 ACSR.
 - a. Structures 348X-011 to 348X-012 will be distribution on wood poles. The energized conductors are separated approximately 5 feet horizontally and the middle phase will be approximately 1.5 feet higher than the outer phases. The neutral will be approximately 6 feet below phase conductors and 2 feet offset from center.
4. Energized conductors will have a maximum tension of 3,000 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice). Neutral wires will have a maximum tension of 3,000 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice).
5. All NESC clearances described in subsequent paragraphs have been met by exceeding the horizontal and/or vertical clearances required. Minimum distances to ground per the NESC have been met.
6. The 348X is a 34.5 kV alternating current (AC) line.
 - a. Based on Table 232-1 of the NESC, for open supply conductors 750 V to 22kV to ground, the minimum clearance to tracks of railroads is 26.5' .
 - b. For neutral wires, the minimum required clearance to tracks of railroad is 23.5 feet.
 - c. Based on Table 235-1 of the NESC for horizontal values for supply conductors of the same circuit.
 - i. 1.4 feet is required between 34.5 kV AC energized conductor and neutral wire
 - ii. 1.9 feet is required between 34.5 kV AC energized conductors
 - d. Based on Table 235-3 of the NESC for horizontal clearance along the span for wires or conductors carried on the same support
 - i. 4.2 feet is required between 34.5 kV AC energized conductors and neutral wire
 - ii. 4.6 feet is required between 34.5 kV AC energized conductors

- iii. These horizontal clearances assume conductor or wire sag of 30 feet which exceeds any sag at the location of these crossings.
 - e. Based on Table 235-5 of the NESC the vertical clearance required at the supports for wires or conductors carried on the same supporting structure is:
 - i. 1.7 feet is required between 34.5 kV AC energized conductors and neutral wire
 - ii. 2.3 feet is required between 34.5 kV AC energized conductors
 - f. Based on Rule 235.C.2.b of the NESC, the vertical clearance required in the span for wires or conductors carried on the same supporting structure:
 - i. 1.3 feet are required between 34.5 kV AC energized conductors and neutral wire
 - ii. 1.7 feet are required between 34.5 kV AC energized conductors
 - g. Per Figure 235-1 of the NESC conductors or wires cannot encroach the envelope formed by the horizontal and vertical clearances prescribed above.
7. Eversource has investigated a multitude of weather and loading conditions for its design. Eversource used these design conditions and combinations thereof to determine the minimum clearance of all conductors to the water and land surfaces, between the phase conductors and OPGW cable. Eversource has determined that the weather cases and combinations listed below results in the minimum clearance and control over all other weather conditions and combinations.
- a. Neutral wire- is located below the energized conductor and has a smaller required clearance, however energized conductor clearances have been achieved for the neutral wire.
 - b. 120 degrees F – Maximum operating temperature (energized conductor) based on Eversource distribution standards, the maximum sag for this weather case results in a clearance to railroad track of 42 feet, this exceeds the minimum required clearance of 26.5 feet.
 - c. Minimum clearance between energized conductor to neutral wire clearance – The weather case that would produce the minimum clearance between energized conductors and neutral wire would be a combination of winter weather factors. First, the energized conductors would be at 32 degrees F and would still be iced with ½" of radial ice. The neutral wire would be at 30 degrees F immediately following an ice storm and would have recently dropped their ice. Under these conditions the clearance would be 4.5 feet vertically and 3.02 feet horizontally from the ground wires to the closest energized conductor.



0 400 800
 Feet

LEGEND

- Parcel Boundary
- Project ROW
- Town Boundary



Line List 2819
 State Land Crossing Permit
 Location Map

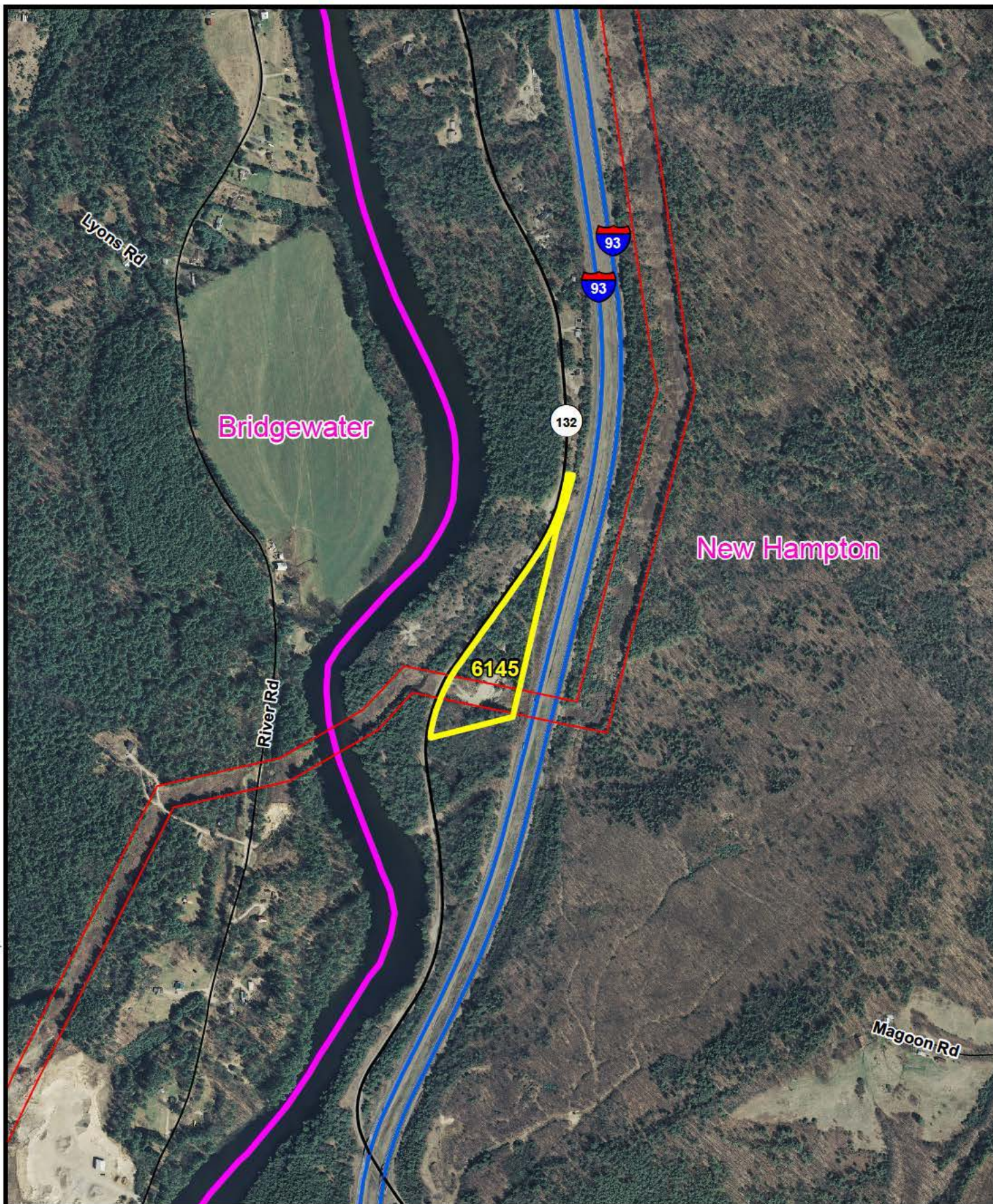


**PRELIMINARY - NOT
FOR CONSTRUCTION**

REVISION HISTORY					
-	-	-			-
A	4/30/15	ISSUED FOR REVIEW			DJL DAB
		EVERSOURCE			
		C1 LL2819 348X			
		RAILROAD CROSSING PERMIT			
BY DJL	REV. NO. A	DATE 4/30/15	SIZE B	DWG. NO. B-7627-601.DWG	

APPENDIX 6
E115 LINE
STRUCTURES E115-170 TO E115-170
STATE OF NEW HAMPSHIRE- DEPARTMENT OF TRANSPORTATION
STATE POLICE FIRING RANGE
LL 6145
NEW HAMPTON, NH

1. This crossing is shown on attached drawing E11599001
 - a. This drawing shows a 24' terrain clearance line (offset from ground surface), which is greater than required minimum of 16.1'.
2. The location of the E115 line is shown on attached maps titled Line List 6145.
3. This portion of the E115 line will be on steel structures. The energized conductor is in a vertical configuration using 795 kcmil. The structures will have 1 ground wire, OPGW with sag coefficients similar to 19#10 Alumoweld.
 - a. The E115 line crosses the parcel LL 6145, State of New Hampshire – Department of Transportation for approximately 450'.
4. Energized conductors will have a maximum tension of 9,000 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice). Ground wires will have a maximum tension of 5,500 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice).
5. The E115 line is a 115 kV alternating current (AC) line.
6. Eversource has investigated a multitude of weather and loading conditions for its design. Eversource used these design conditions and combinations thereof to determine the minimum clearance of all conductors to both ground and aerial obstacles, between the phase conductors and OPGW cable. Eversource has determined that the weather cases and combinations listed below results in the minimum clearance and control over all other weather conditions and combinations. All NESC clearances have been met by exceeding the horizontal and/or vertical clearances required. Minimum distances to ground per the NESC have been met.
 - a. Ground wires – Due to the fact that the ground wire is located above the energized conductor, its clearance to the ground will always exceed the minimum required NESC distance.
 - b. 285 degrees F – Maximum operating temperature (energized conductor) based on Eversource transmission standards the maximum sag for this weather case controls.



0 400 800

Scale in Feet

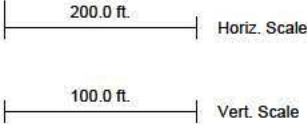
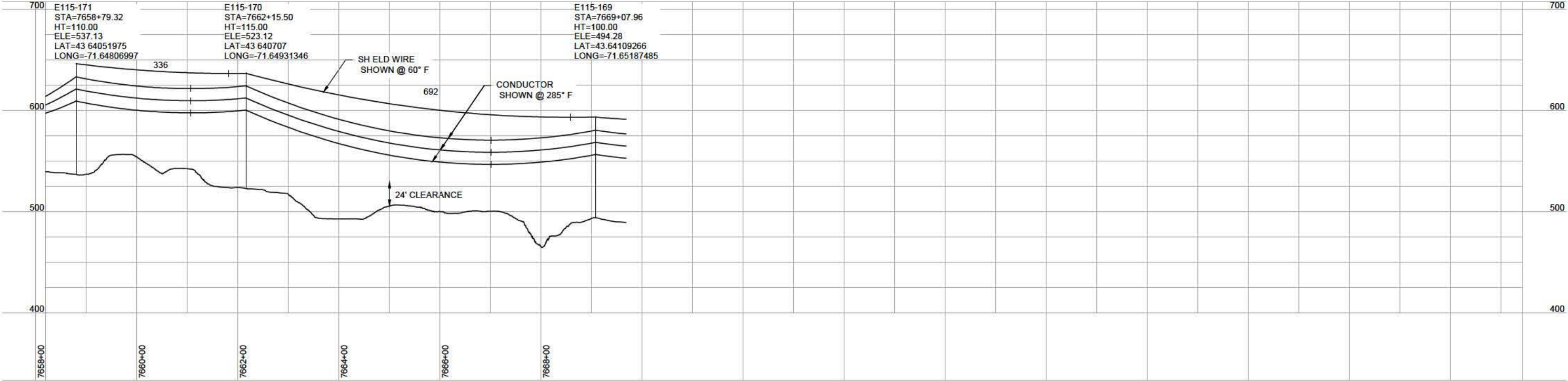
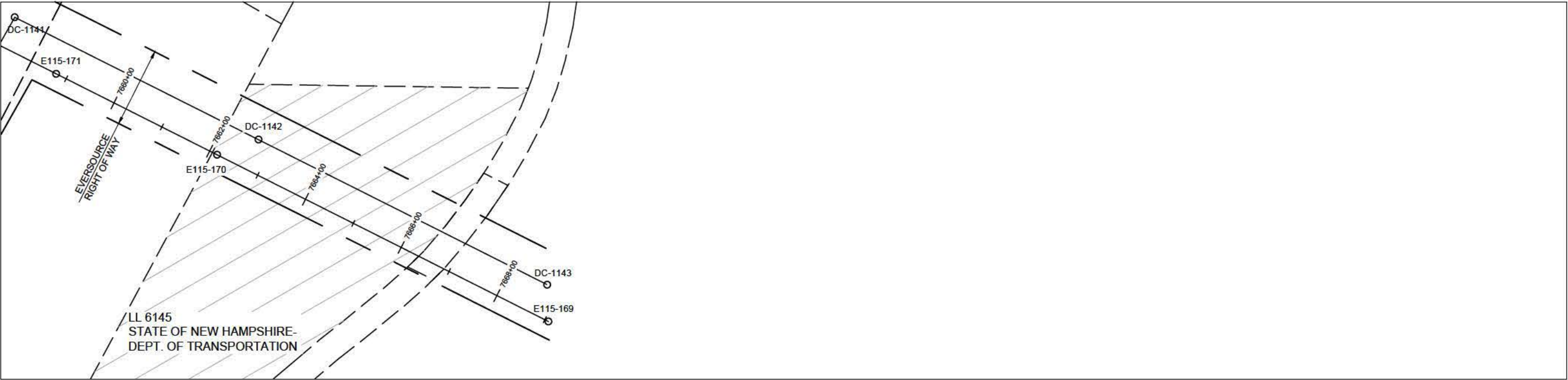
LEGEND

-  Parcel Boundary
-  Project ROW
-  Town Boundary



Line List 6145
State Land Crossing Permit
Location Map

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PUBLIC LAND



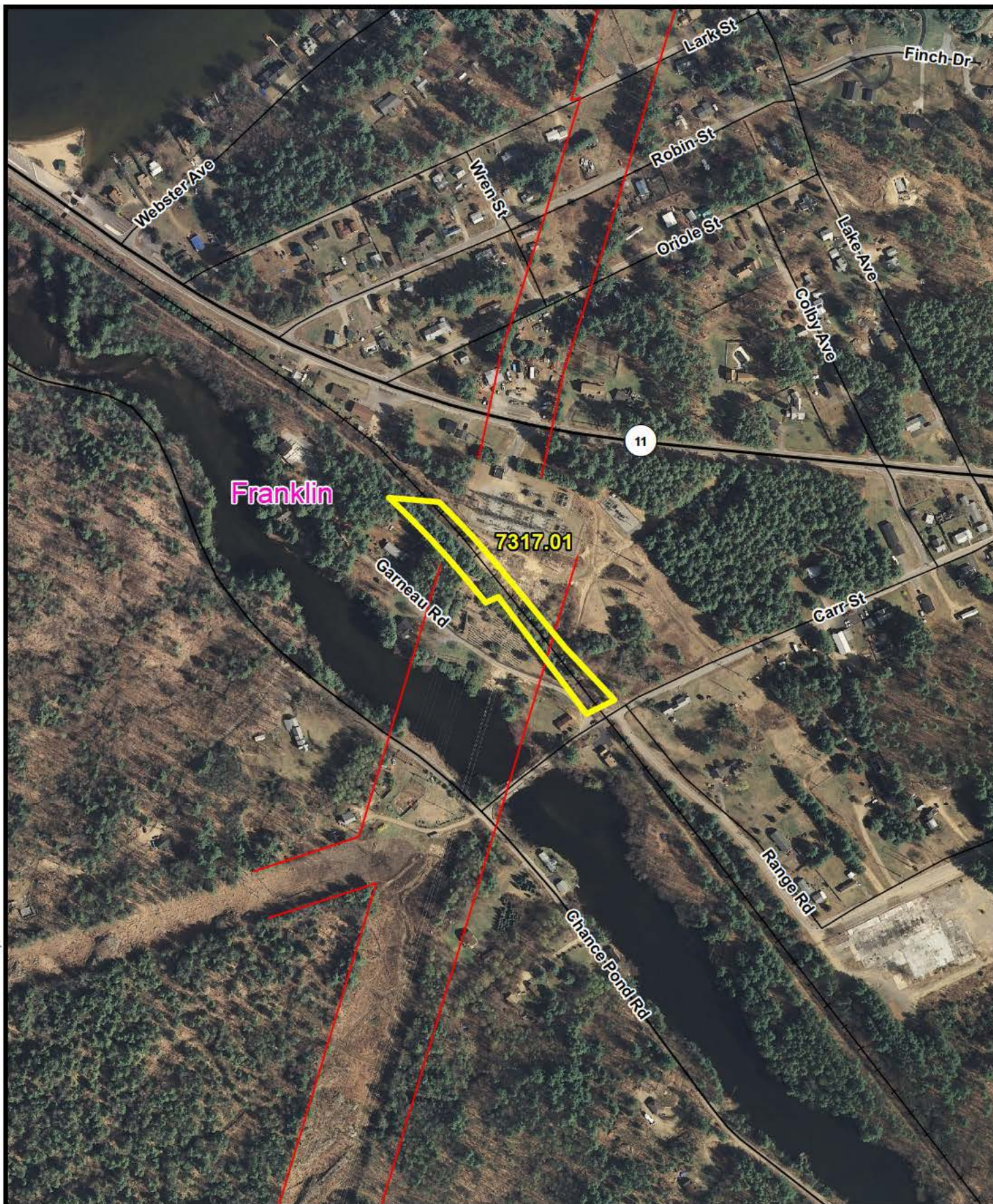
PROPOSED MONOPOLE
PROPOSED TRANS
STRUCTURE

**PRELIMINARY - NOT
FOR CONSTRUCTION**

REVISION HISTORY					
-	-	-	-	-	-
A	4/30/15	ISSUED FOR REVIEW		KRR	DAB
		EVERSOURCE			
		TITLE C2 LL6145 E115 STATE LAND CROSSING PERMIT			
BY	REV. NO.	DATE	SIZE	DWG. NO.	
KRR	A	4/30/15	B	E11599001.DWG	

APPENDIX 7
M127 LINE
STRUCTURES M127-1A TO M127-1
STATE OF NEW HAMPSHIRE- BUREAU OF RAIL AND TRANSIT
RAIL TRAIL
LL 7317.01
FRANKLIN, NH

1. This crossing is shown on attached drawing M12799001
 - a. This drawing shows a 24' terrain clearance line (offset from ground surface), which is greater than required minimum of 16.1'.
2. The location of the M127 line is shown on attached maps titled Line List 7317.01
3. This portion of the M127 line will be on steel structures. The energized conductor is in a horizontal configuration using 795 kcmil. The structures will have 2 ground wires in a horizontal configuration. One will be 19#10 Alumoweld; the other will be an OPGW with sag coefficients similar to 19#10 Alumoweld.
 - a. The M127 line crosses the parcel LL 7317.01, State of New Hampshire – Bureau of Rail and Transit for approximately 130'
4. Energized conductors will have a maximum tension of 9,000 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice). Ground wires will have a maximum tension of 5,500 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice).
5. The M127 line is a 115 kV alternating current (AC) line.
6. Eversource has investigated a multitude of weather and loading conditions for its design. Eversource used these design conditions and combinations thereof to determine the minimum clearance of all conductors to both ground and aerial obstacles, between the phase conductors and OPGW cable. Eversource has determined that the weather cases and combinations listed below results in the minimum clearance and control over all other weather conditions and combinations. All NESC clearances have been met by exceeding the horizontal and/or vertical clearances required. Minimum distances to ground per the NESC have been met.
 - a. Ground wires – Due to the fact that the ground wire is located above the energized conductor, its clearance to the ground will always exceed the minimum required NESC distance.
 - b. 285 degrees F – Maximum operating temperature (energized conductor) based on Eversource transmission standards the maximum sag for this weather case controls.



0 200 400



Scale in Feet

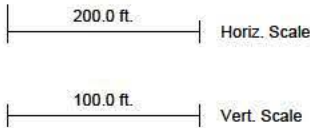
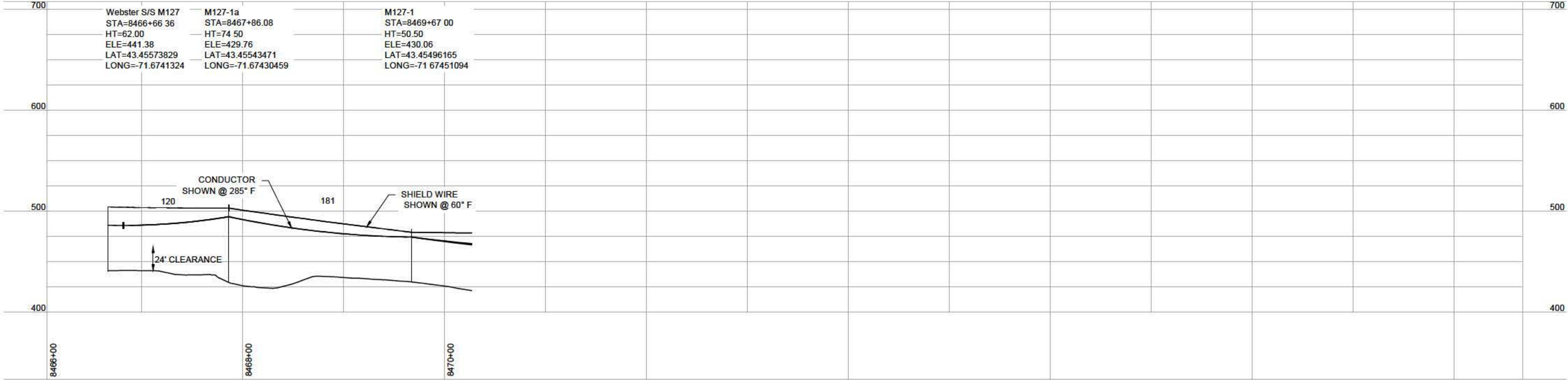
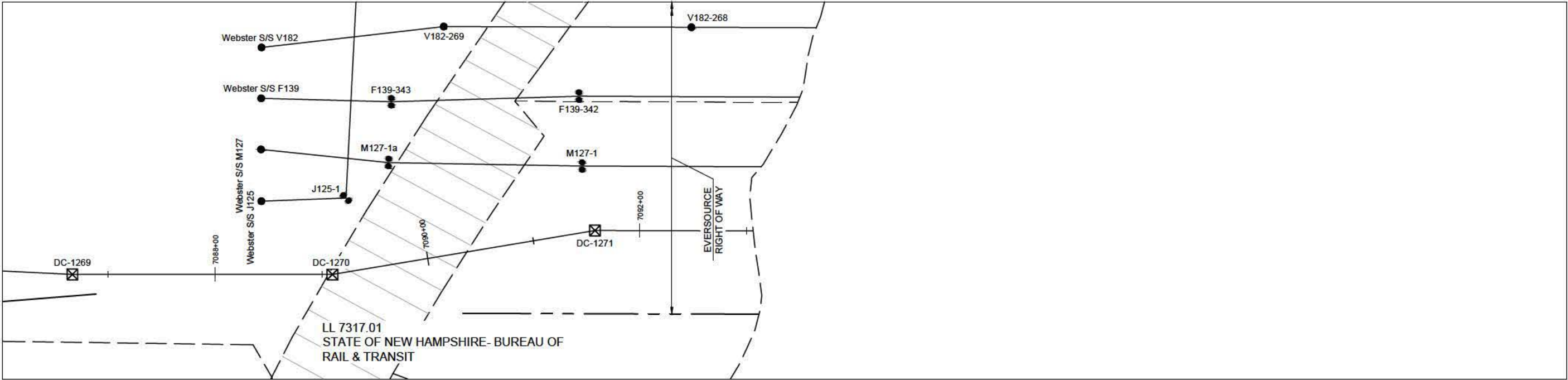
LEGEND

- Parcel Boundary
- Project ROW
- Town Boundary



Line List 7317.01
 State Land Crossing Permit
 Location Map

05/05/2015 10:57am - mspeich - N:\USCO\58479 - NP\Overhead\Cadd\01-Record Worksheets\02 Permits\Public Lands Crossings\DXF Exports\M12799001.dwg



PUBLIC LAND

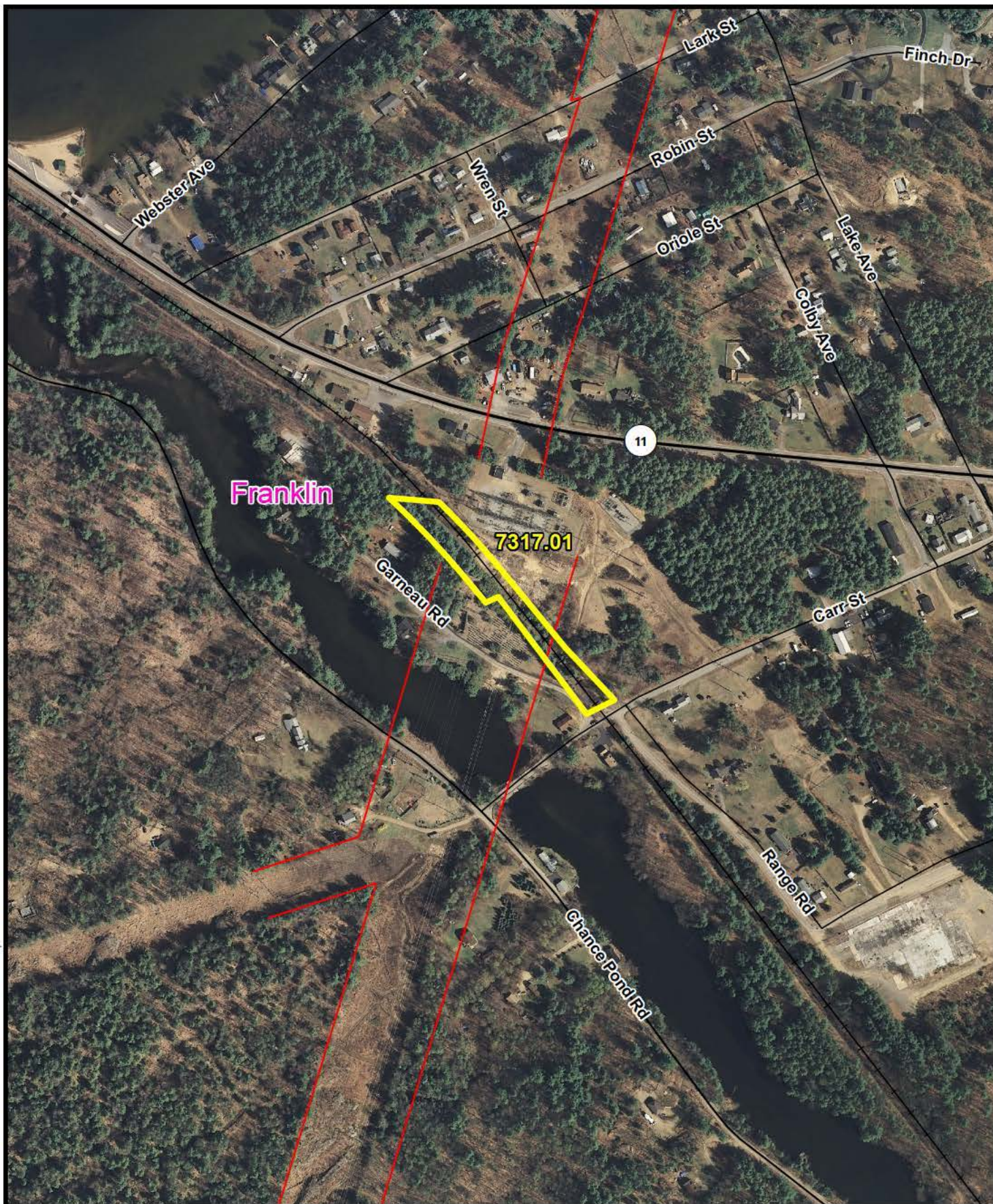
- PROPOSED MONOPOLE
- PROPOSED TRANS STRUCTURE
- PROPOSED H-FRAME
- EXISTING MONOPOLE

**PRELIMINARY - NOT
FOR CONSTRUCTION**

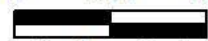
REVISION HISTORY					
-	-	-	-	-	-
A	4/30/15	ISSUED FOR REVIEW		KRR	DAB
		EVERSOURCE			
		C2 7317.01 M127 PUBLIC LAND CROSSING PERMIT			
BY	REV. NO.	DATE	SIZE	DWG. NO.	
KRR	A	4/30/15	B	M12799001.DWG	

APPENDIX 8
F139 LINE
STRUCTURES F139-342 TO F139-343
STATE OF NEW HAMPSHIRE- BUREAU OF RAIL AND TRANSIT
RAIL TRAIL
LL 7317.01
FRANKLIN, NH

1. This crossing is shown on attached drawing F13999002
 - a. This drawing shows a 24' terrain clearance line (offset from ground surface), which is greater than required minimum of 16.1'.
2. The location of the F139 line is shown on attached map titled Line List 7317.01
3. This portion of the F139 line will be on steel structures. The energized conductor is in a delta configuration using 795 kcmil. The structures will have 1 ground wire, an OPGW with sag coefficients similar to 19#10 Alumoweld.
 - a. The F139 line crosses the parcel LL 7317.01, State of New Hampshire – Bureau of Rail and Transit for approximately 130'
4. Energized conductors will have a maximum tension of 9,000 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice). Ground wires will have a maximum tension of 5,500 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice).
5. The F139 line is a 115 kV alternating current (AC) line.
6. Eversource has investigated a multitude of weather and loading conditions for its design. Eversource used these design conditions and combinations thereof to determine the minimum clearance of all conductors to both ground and aerial obstacles, between the phase conductors and OPGW cable. Eversource has determined that the weather cases and combinations listed below results in the minimum clearance and control over all other weather conditions and combinations. All NESC clearances have been met by exceeding the horizontal and/or vertical clearances required. Minimum distances to ground per the NESC have been met.
 - a. Ground wires – Due to the fact that the ground wire is located above the energized conductor, its clearance to the ground will always exceed the minimum required NESC distance.
 - b. 285 degrees F – Maximum operating temperature (energized conductor) based on Eversource transmission standards the maximum sag for this weather case controls.



0 200 400



Scale in Feet

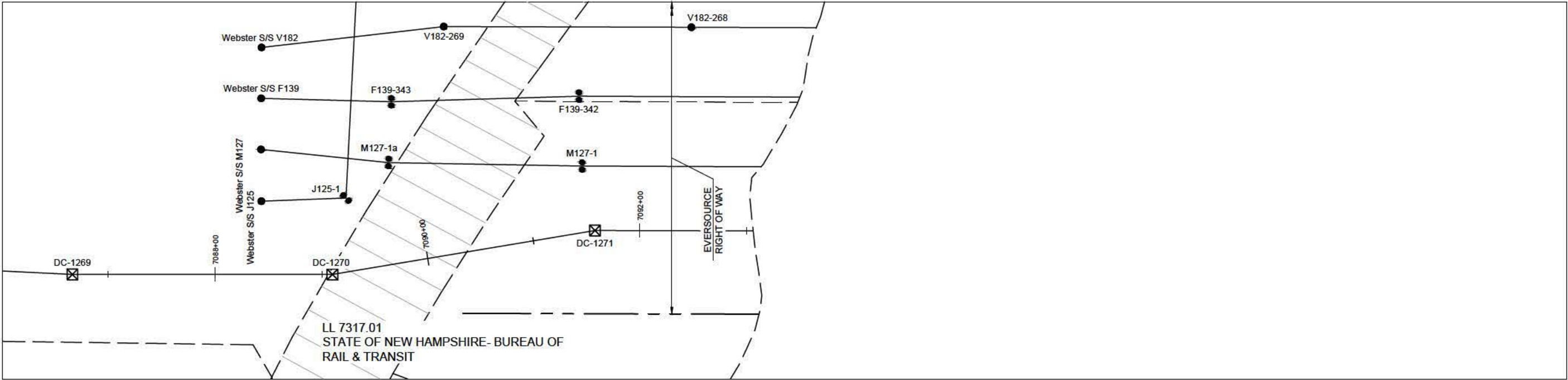
LEGEND

- Parcel Boundary
- Project ROW
- Town Boundary



Line List 7317.01
 State Land Crossing Permit
 Location Map

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PUBLIC LAND



PROPOSED MONOPOLE
PROPOSED TRANS
STRUCTURE
PROPOSED H-FRAME
EXISTING MONOPOLE



**PRELIMINARY - NOT
FOR CONSTRUCTION**

REVISION HISTORY					
-	-	-	-	-	-
A	4/30/15	ISSUED FOR REVIEW		KRR	DAB
		EVERSOURCE			
		TITLE C2 7317.01 F139 PUBLIC LAND CROSSING PERMIT			
BY	REV. NO.	DATE	SIZE	DWG. NO.	
KRR	A	4/30/15	B	F13999002.DWG	

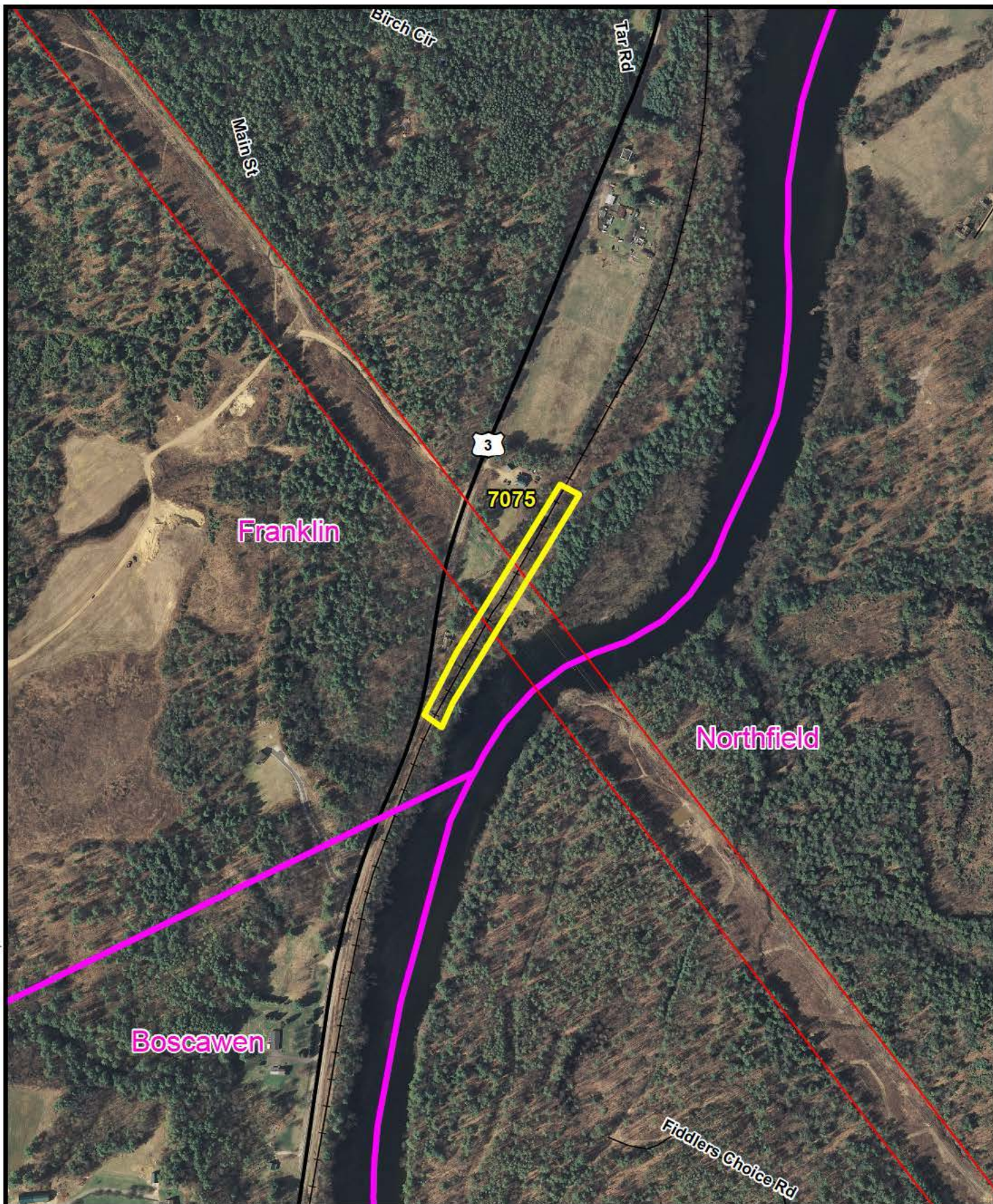
APPENDIX 9
F139 LINE
STRUCTURES F139-281 TO F139-282
STATE OF NEW HAMPSHIRE – DEPARTMENT OF TRANSPORTATION
CONCORD-LINCOLN LINE
LL 7075
FRANKLIN, NH

1. This crossing is shown on attached drawing F13943601
2. The location of the F139 line is shown on attached maps titled Line List 7075
3. The F139 line will be on steel structures at this crossing. The energized conductor is in a vertical configuration using 795 kcmil ACSR. The structures will have ground wire. OPGW with sag coefficients similar to 19#10 Alumoweld will be used.
 - a. F139-282 will be a structure with suspension insulators. The energized conductors are separated approximately 0 feet horizontally and 12 feet vertically in a vertical configuration. The ground/OPGW wire is carried on the structure by a support bracket approximately 6 inches below the top of the structure. The ground/OPGW and energized conductor are separated vertically by approximately 13 feet and 5 feet horizontally.
 - b. F139-281 will be a structure with strain insulators. The energized conductors are separated approximately 0 feet horizontally and 12 feet vertically in a vertical configuration. The ground/OPGW wire is carried on the structure by a support bracket approximately 6 inches below the top of the structure. The ground/OPGW and energized conductor are separated vertically by approximately 13 feet and 0 feet horizontally.
4. Energized conductors will have a maximum tension of 9,000 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice). Ground wires will have a maximum tension of 5,500 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice).
5. All NESC clearances described in subsequent paragraphs have been met by exceeding the horizontal and/or vertical clearances required. Minimum distances to ground per the NESC have been met.
6. The F139 is a 115 kV alternating current (AC) line.
 - a. Based on Table 232-1 of the NESC, for open supply conductors 750 V to 22kV to ground, the minimum clearance to tracks of railroads is 26.5'. NESC Rule 232.C.1.a states that an additional clearance of 1.59 feet or $[(69.7 \text{ kV} - 22 \text{ kV}) \times 0.4]/12$ is needed, which brings the total required minimum clearance to 28.1 feet.

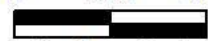
- b. For overhead ground wires, the minimum required clearance to tracks of railroad is 23.5 feet. As the static wires are located above the energized conductors at all crossings, this NESC minimum clearance requirement will always be met.
 - c. Table 235-1 of the NESC does not specify horizontal values for supply conductors of the same circuit for voltages greater than 50 kV. In the absence of this, the project will use values for different circuits. Based upon Table 235-1:
 - i. 3.07 feet is required between 115 kV AC energized conductor and ground wire
 - ii. 4.78 feet is required between 115 kV AC energized conductors
 - d. Based on Table 235-3 of the NESC for horizontal clearance along the span for wires or conductors carried on the same support
 - i. 5.69 feet is required between 115 kV AC energized conductors and ground wire
 - ii. 6.96 feet is required between 115 kV AC energized conductors
 - iii. These horizontal clearances assume conductor or wire sag of 35 feet which exceeds any sag at the location of these crossings.
 - e. Based on Table 235-5 of the NESC the vertical clearance required at the supports for wires or conductors carried on the same supporting structure is:
 - i. 3.37 feet is required between 115 kV AC energized conductors and ground wire
 - ii. 5.07 feet is required between 115 kV AC energized conductors
 - f. Based on Rule 235.C.2.b of the NESC, the vertical clearance required in the span for wires or conductors carried on the same supporting structure:
 - i. 2.69 feet are required between 115 kV AC energized conductors and ground wire
 - ii. 5.01 feet are required between 115 kV AC energized conductors
 - g. Per Figure 235-1 of the NESC conductors or wires cannot encroach the envelope formed by the horizontal and vertical clearances prescribed above.
- 7. Eversource has investigated a multitude of weather and loading conditions for its design. Eversource used these design conditions and combinations thereof to determine the minimum clearance of all conductors to the water and land surfaces, between the phase conductors and OPGW cable. Eversource has determined that the weather cases and combinations listed below results in the minimum clearance and control over all other weather conditions and combinations.
 - a. Ground wires – Due to the fact that the ground wire is located above the energized conductor, its clearance to the railroad track will always exceed the minimum required NESC distance.
 - b. 285 degrees F – Maximum operating temperature (energized conductor) based on Eversource transmission standards, the maximum sag for this weather case results in a

clearance to railroad track of 56 feet, this exceeds the minimum required clearance of 28.1 feet.

- c. Minimum clearance energized conductor to ground wires clearance – The weather case that would produce the minimum clearance between energized conductors and ground wires would be a combination of winter weather factors. First, the energized conductors would be at 30 degrees F immediately following an ice storm and would have recently dropped their ice. The ground wires would be at 32 degrees F and would still be iced with $\frac{1}{2}$ " of radial ice. Under these conditions the clearance would be 12.1 feet vertically and 2.3 feet horizontally from the ground wires to the closest energized conductor.



0 250 500



Scale in Feet

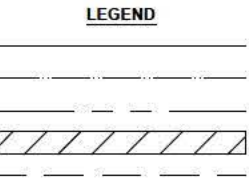
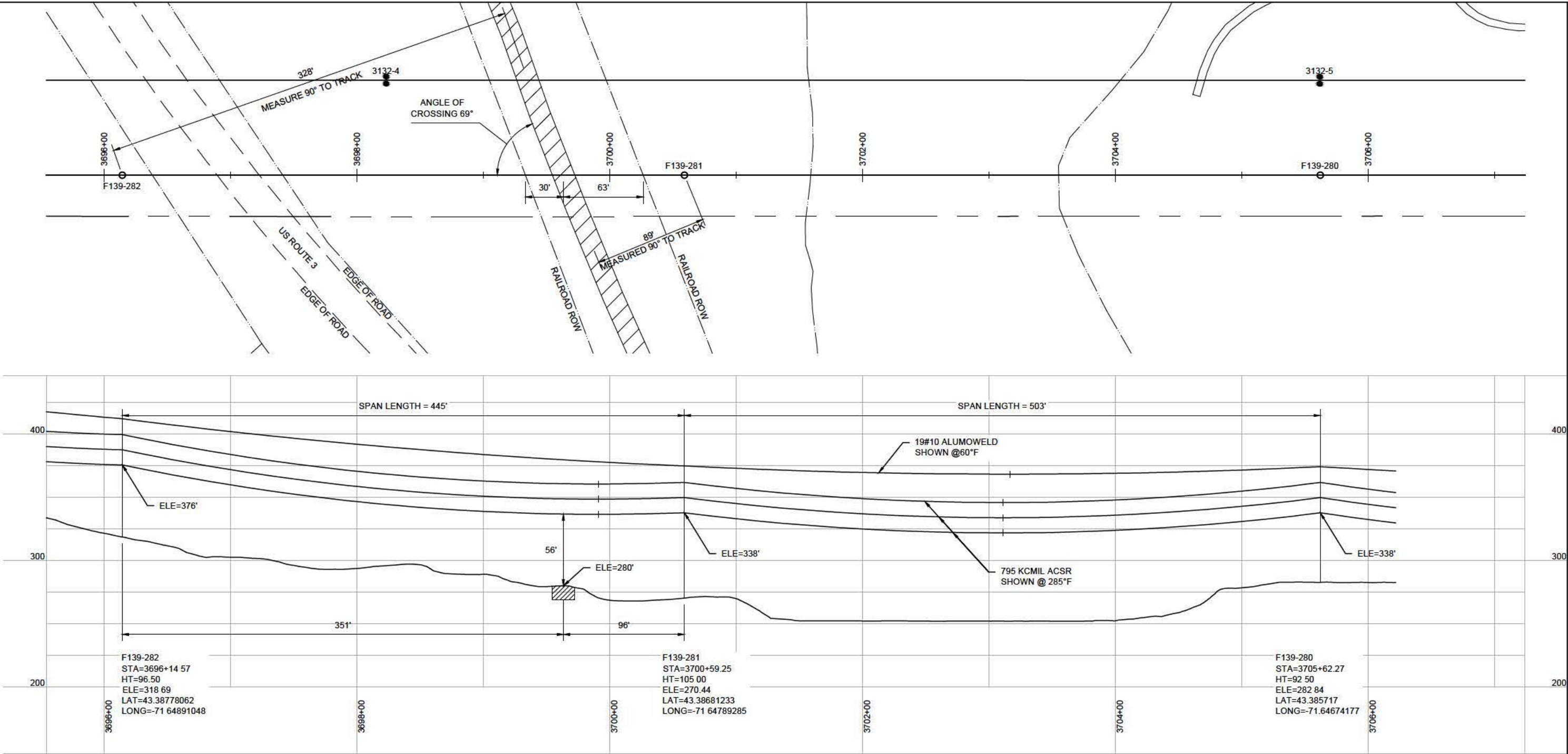
LEGEND

- Parcel Boundary
- Project ROW
- Town Boundary



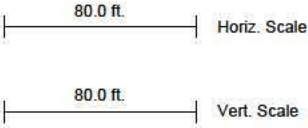
Line List 7075
 State Land Crossing Permit
 Location Map

09/09/2015 7:50am - mspepich - N:\NUSCO\58479 - NP\Overhead\Cadd\01-Record Worksheets\02 Permits\RR Crossing Permits\F13943601.dwg



TRANSMISSION CENTERLINE
PARCEL BOUNDARY
EVERSOURCE ROW
RAILROAD BED
PAVED ROADS

○ PROPOSED MONOPOLE
☒ PROPOSED TRANS STRUCTURE
● PROPOSED H-FRAME



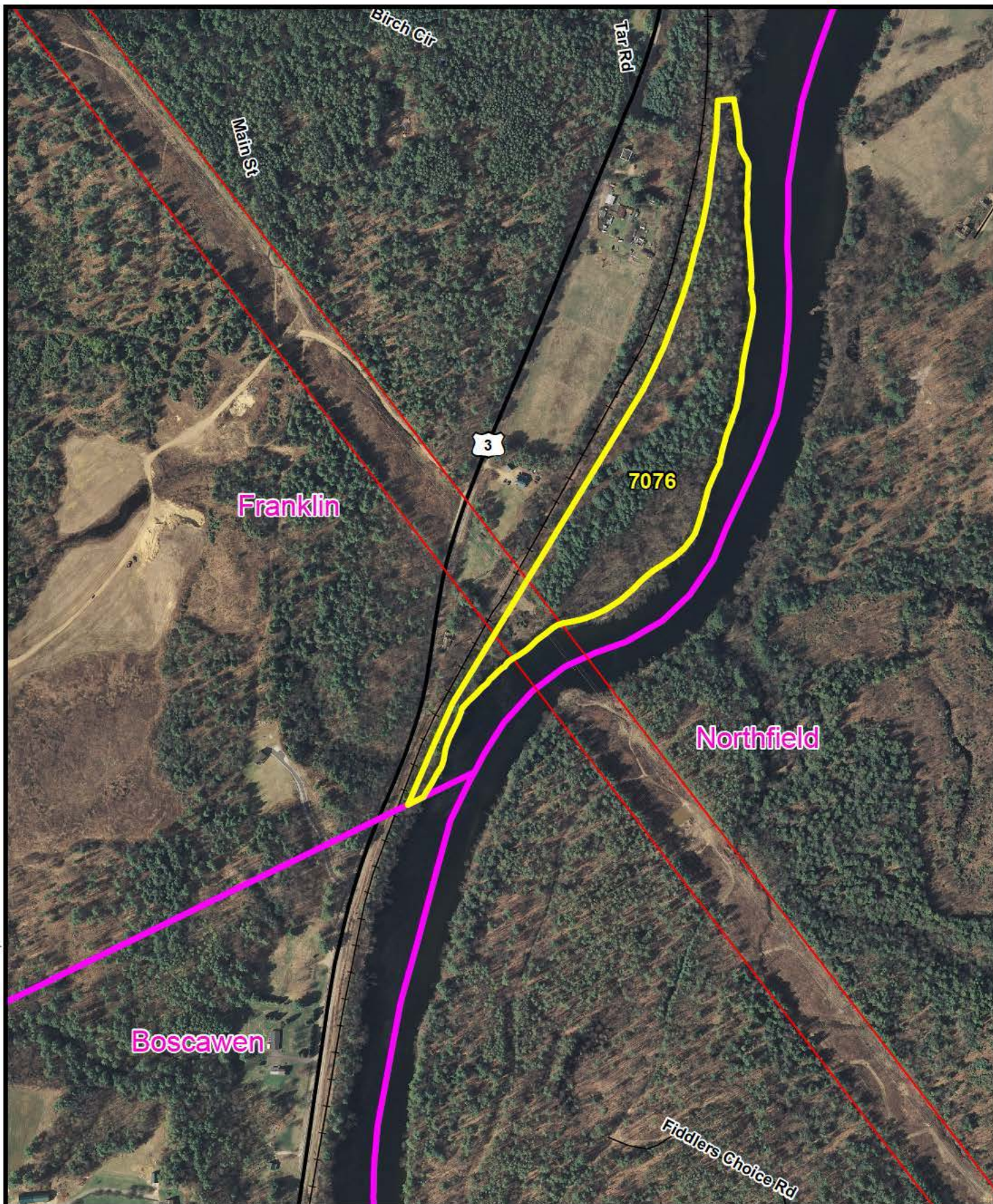
PRELIMINARY - NOT FOR CONSTRUCTION

NOTES:
1. DESIGN CONFORMS TO ALL CODE REQUIREMENTS (NATIONAL ELECTRIC SAFETY CODE). SAG CONDITION DISPLAYED IN EXHIBIT IS THE CONTROLLING SAG CONDITION.

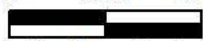
REVISION HISTORY					
-	-	-	-	-	-
A	4/30/15	ISSUED FOR REVIEW		MSP	DAB
		EVERSOURCE			
		TITLE S1 LL7075 F139 RAILROAD CROSSING PERMIT			
BY	REV. NO.	DATE	SIZE	DWG. NO.	
MSP	A	4/30/15	B	F13943601.dwg	

APPENDIX 10
F139 LINE
STRUCTURES F139-281 TO F139-281
STATE OF NEW HAMPSHIRE- DEPARTMENT OF TRANSPORTATION
VACANT LAND
LL 7076
FRANKLIN, NH

1. This crossing is shown on attached drawing F13999001
 - a. This drawing shows a 24' terrain clearance line (offset from ground surface), which is greater than required minimum of 16.1'.
2. The location of the F139 line is shown on attached maps titled Line List 7076
3. This portion of the F139 line will be on steel structures. The energized conductor is in a vertical configuration using 795 kcmil. The structures will have 1 ground wire, OPGW with sag coefficients similar to 19#10 Alumoweld.
 - a. The F139 line crosses the parcel LL 7076 State of New Hampshire – Department of Transportation for approximately 160'.
4. Energized conductors will have a maximum tension of 9,000 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice). Ground wires will have a maximum tension of 5,500 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice).
5. The F139 line is a 115 kV alternating current (AC) line.
6. Eversource has investigated a multitude of weather and loading conditions for its design. Eversource used these design conditions and combinations thereof to determine the minimum clearance of all conductors to both ground and aerial obstacles, between the phase conductors and OPGW cable. Eversource has determined that the weather cases and combinations listed below results in the minimum clearance and control over all other weather conditions and combinations. All NESC clearances have been met by exceeding the horizontal and/or vertical clearances required. Minimum distances to ground per the NESC have been met.
 - a. Ground wires – Due to the fact that the ground wire is located above the energized conductor, its clearance to the ground will always exceed the minimum required NESC distance.
 - b. 285 degrees F – Maximum operating temperature (energized conductor) based on Eversource transmission standards the maximum sag for this weather case controls.



0 250 500



Scale in Feet

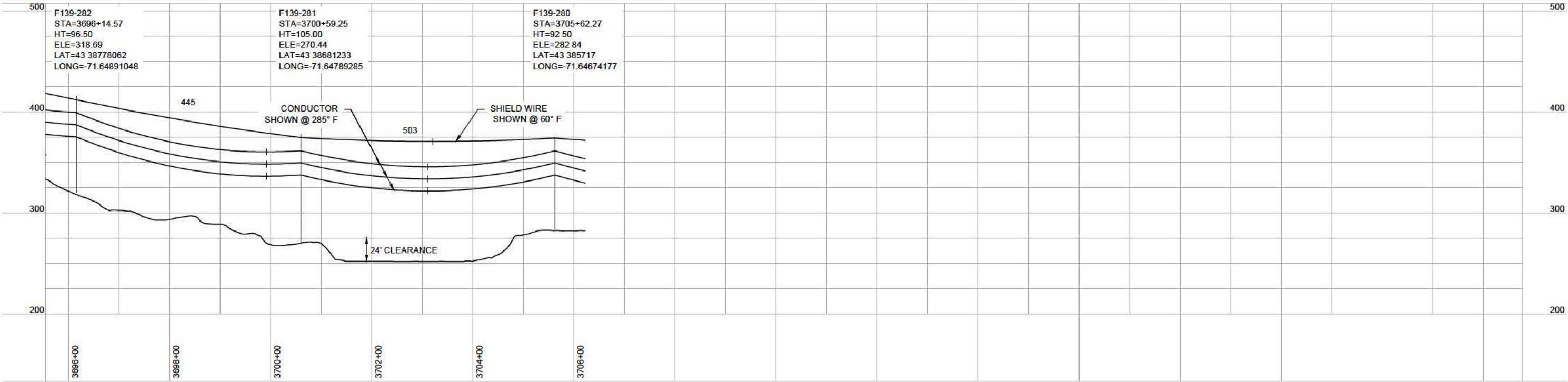
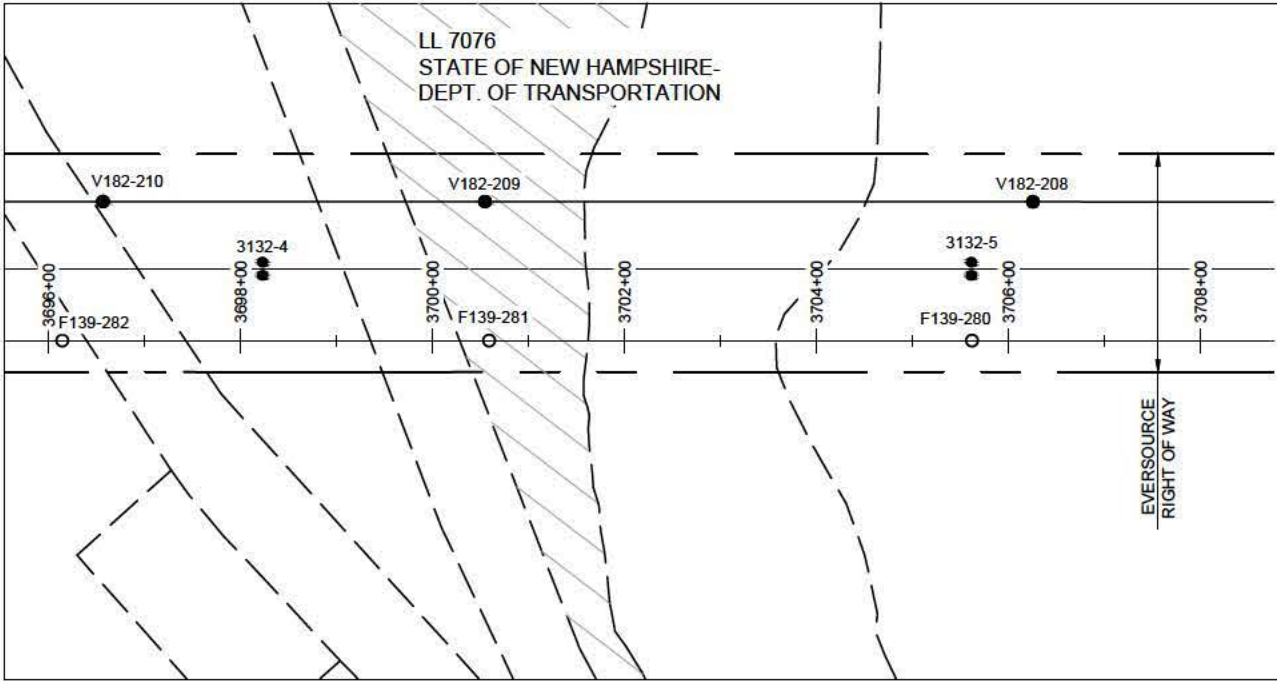
LEGEND

- Parcel Boundary
- Project ROW
- Town Boundary



Line List 7076
 State Land Crossing Permit
 Location Map

09/01/2015 9:02am - mspepich - N:\USCO\58479 - NP\Overhead\Codd\01-Record Worksheets\02 Permits\Public Lands Crossings\DXF Exports\F13999001.dwg



PUBLIC LAND



PROPOSED MONOPOLE
PROPOSED H-FRAME
EXISTING MONOPOLE



**PRELIMINARY - NOT
FOR CONSTRUCTION**

REVISION HISTORY					
-	-	-	-	-	-
A	4/30/15	ISSUED FOR REVIEW		KRR	DAB
		EVERSOURCE			
		TITLE S1 LL7076 F139 STATE LAND CROSSING PERMIT			
BY	REV. NO.	DATE	SIZE	DWG. NO.	
KRR	A	4/30/15	B	F13999001.DWG	

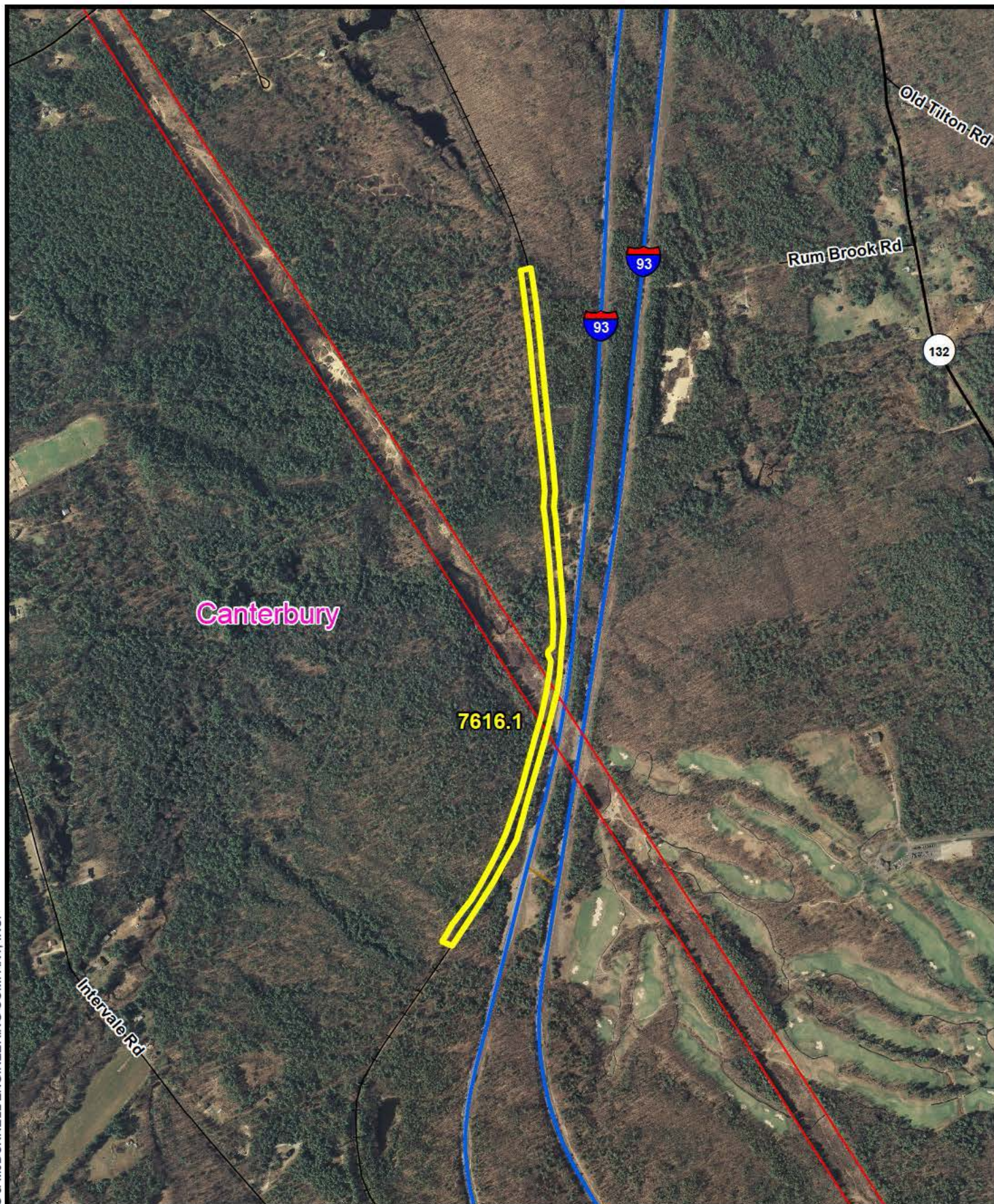
APPENDIX 11
F139 LINE
STRUCTURES F139-249 TO F139-250
STATE OF NEW HAMPSHIRE – DEPARTMENT OF TRANSPORTATION
CONCORD-LINCOLN LINE
LL 7616.1
CANTERBURY, NH

1. This crossing is shown on attached drawing F13943602
2. The location of the F139 line is shown on attached maps titled Line List 7616.1
3. The F139 line will be on steel structures at this crossing. The energized conductor is in a vertical configuration using 795 kcmil ACSR. The structures will have ground wire. OPGW with sag coefficients similar to 19#10 Alumoweld will be used.
 - a. F139-250 will be a structure with suspension insulators. The energized conductors are separated approximately 0 feet horizontally and 12 feet vertically in a vertical configuration. The ground/OPGW wire is carried on the structure by a support bracket approximately 6 inches below the top of the structure. The ground/OPGW and energized conductor are separated vertically by approximately 13 feet and 5 feet horizontally.
 - b. F139-251 will be a structure with strain insulators. The energized conductors are separated approximately 0 feet horizontally and 12 feet vertically in a vertical configuration. The ground/OPGW wire is carried on the structure by a support bracket approximately 6 inches below the top of the structure. The ground/OPGW and energized conductor are separated vertically by approximately 13 feet and 0 feet horizontally.
4. Energized conductors will have a maximum tension of 9,000 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice). Ground wires will have a maximum tension of 5,500 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice).
5. All NESC clearances described in subsequent paragraphs have been met by exceeding the horizontal and/or vertical clearances required. Minimum distances to ground per the NESC have been met.
6. The F139 is a 115 kV alternating current (AC) line.
 - a. Based on Table 232-1 of the NESC, for open supply conductors 750 V to 22kV to ground, the minimum clearance to tracks of railroads is 26.5'. NESC Rule 232.C.1.a states that an additional clearance of 1.59 feet or $[(69.7 \text{ kV} - 22 \text{ kV}) \times 0.4]/12$ is needed, which brings the total required minimum clearance to 28.1 feet.

- b. For overhead ground wires, the minimum required clearance to tracks of railroad is 23.5 feet. As the static wires are located above the energized conductors at all crossings, this NESC minimum clearance requirement will always be met.
 - c. Table 235-1 of the NESC does not specify horizontal values for supply conductors of the same circuit for voltages greater than 50 kV. In the absence of this, the project will use values for different circuits. Based upon Table 235-1:
 - i. 3.07 feet is required between 115 kV AC energized conductor and ground wire
 - ii. 4.78 feet is required between 115 kV AC energized conductors
 - d. Based on Table 235-3 of the NESC for horizontal clearance along the span for wires or conductors carried on the same support
 - i. 5.69 feet is required between 115 kV AC energized conductors and ground wire
 - ii. 6.96 feet is required between 115 kV AC energized conductors
 - iii. These horizontal clearances assume conductor or wire sag of 35 feet which exceeds any sag at the location of these crossings.
 - e. Based on Table 235-5 of the NESC the vertical clearance required at the supports for wires or conductors carried on the same supporting structure is:
 - i. 3.37 feet is required between 115 kV AC energized conductors and ground wire
 - ii. 5.07 feet is required between 115 kV AC energized conductors
 - f. Based on Rule 235.C.2.b of the NESC, the vertical clearance required in the span for wires or conductors carried on the same supporting structure:
 - i. 2.69 feet are required between 115 kV AC energized conductors and ground wire
 - ii. 5.01 feet are required between 115 kV AC energized conductors
 - g. Per Figure 235-1 of the NESC conductors or wires cannot encroach the envelope formed by the horizontal and vertical clearances prescribed above.
- 7. Eversource has investigated a multitude of weather and loading conditions for its design. Eversource used these design conditions and combinations thereof to determine the minimum clearance of all conductors to the water and land surfaces, between the phase conductors and OPGW cable. Eversource has determined that the weather cases and combinations listed below results in the minimum clearance and control over all other weather conditions and combinations.
 - a. Ground wires – Due to the fact that the ground wire is located above the energized conductor, its clearance to the railroad track will always exceed the minimum required NESC distance.
 - b. 285 degrees F – Maximum operating temperature (energized conductor) based on Eversource transmission standards, the maximum sag for this weather case results in a

clearance to railroad track of 80 feet, this exceeds the minimum required clearance of 28.1 feet.

- c. Minimum clearance energized conductor to ground wires clearance – The weather case that would produce the minimum clearance between energized conductors and ground wires would be a combination of winter weather factors. First, the energized conductors would be at 30 degrees F immediately following an ice storm and would have recently dropped their ice. The ground wires would be at 32 degrees F and would still be iced with ½" of radial ice. Under these conditions the clearance would be 12.3 feet vertically and 5.2 feet horizontally from the ground wires to the closest energized conductor.



0 500 1,000
 Feet

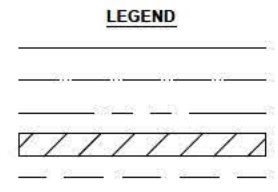
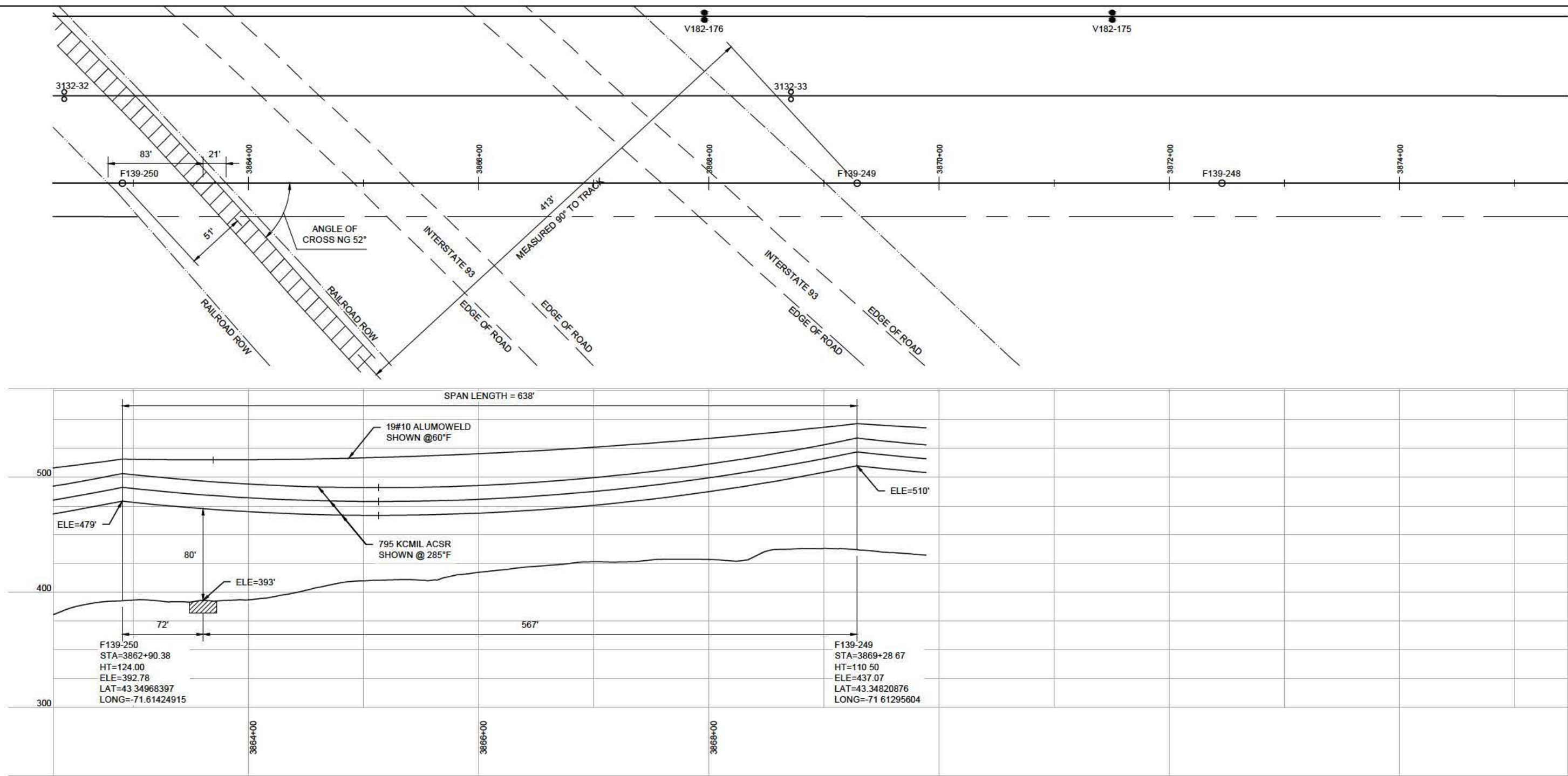
LEGEND

- Parcel Boundary
- Project ROW
- Town Boundary



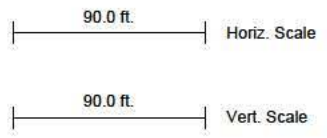
Line List 7616.1
 State Land Crossing Permit
 Location Map

09/10/2015 10:20am - mspepich - N:\NUSCO\58479 - NP\Overhead\Cadd\01-Record Worksheets\02 Permits\RR Crossing Permits\F13943602.dwg



TRANSMISSION CENTERLINE
PARCEL BOUNDARY
EVERSOURCE ROW
RAILROAD BED
PAVED ROADS

- PROPOSED MONOPOLE
- ⊠ PROPOSED TRANS STRUCTURE
- EXSTING H-FRAME
- PROPOSED H-FRAME



PRELIMINARY - NOT FOR CONSTRUCTION

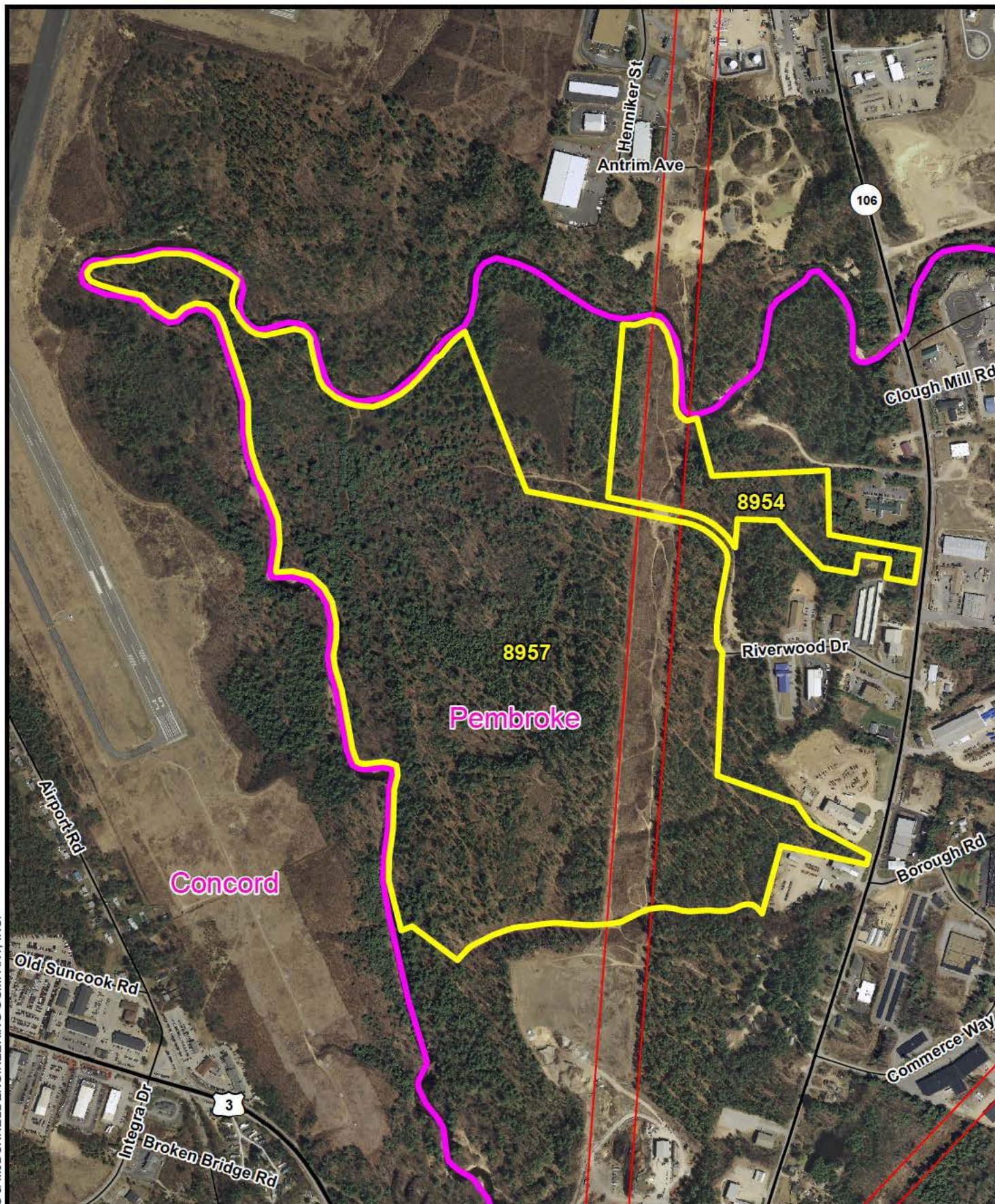
NOTES:

- DESIGN CONFORMS TO ALL CODE REQUIREMENTS (NATIONAL ELECTRIC SAFETY CODE). SAG CONDITION DISPLAYED IN EXHIBIT IS THE CONTROLLING SAG CONDITION.

REVISION HISTORY					
-	-	-	-	-	-
A	4/30/15	ISSUED FOR REVIEW		MSP	DAB
		EVERSOURCE			
		TITLE N2 LL7616.1 F139 RAILROAD CROSSING PERMIT			
BY	REV. NO.	DATE	SIZE	DWG. NO.	
MSP	A	4/30/15	B	F13943602.DWG	

APPENDIX 12
P145 LINE
STRUCTURES P145-67 TO P145-72
STATE OF NEW HAMPSHIRE- ADJUTANT GENERAL'S DEPARTMENT
PEMBROKE, NH

1. This crossing is shown on attached drawing P14599001
 - a. This drawing shows a 24' terrain clearance line (offset from ground surface), which is greater than required minimum of 16.1'.
2. The location of the P145 line is shown on attached maps titled Line List 8954 & Line List 8957
3. This portion of the P145 line will be on steel structures. The energized conductor is in a delta configuration using 795 kcmil. The structures will have 1 ground wire, an OPGW with sag coefficients similar to 19#10 Alumoweld.
 - a. The P145 line crosses the parcel LL 8954, State of New Hampshire – Adjutant General Department for approximately 1,000'
 - b. The P145 line crosses the parcel LL 8957, State of New Hampshire – Adjutant General Department for approximately 2,450'
4. Energized conductors will have a maximum tension of 9,000 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice). Ground wires will have a maximum tension of 5,500 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice).
5. The P145 line is a 115 kV alternating current (AC) line.
6. Eversource has investigated a multitude of weather and loading conditions for its design. Eversource used these design conditions and combinations thereof to determine the minimum clearance of all conductors to both ground and aerial obstacles, between the phase conductors and OPGW cable. Eversource has determined that the weather cases and combinations listed below results in the minimum clearance and control over all other weather conditions and combinations. All NESC clearances have been met by exceeding the horizontal and/or vertical clearances required. Minimum distances to ground per the NESC have been met.
 - a. Ground wires – Due to the fact that the ground wire is located above the energized conductor, its clearance to the ground will always exceed the minimum required NESC distance.
 - b. 285 degrees F – Maximum operating temperature (energized conductor) based on Eversource transmission standards the maximum sag for this weather case controls.



0 400 800

Scale in Feet

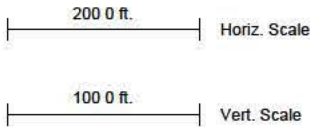
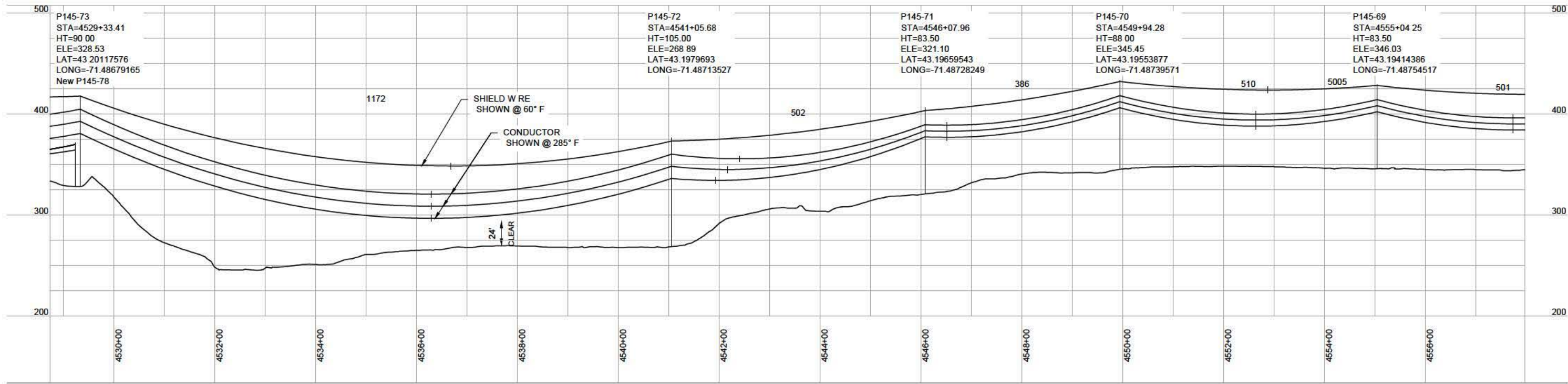
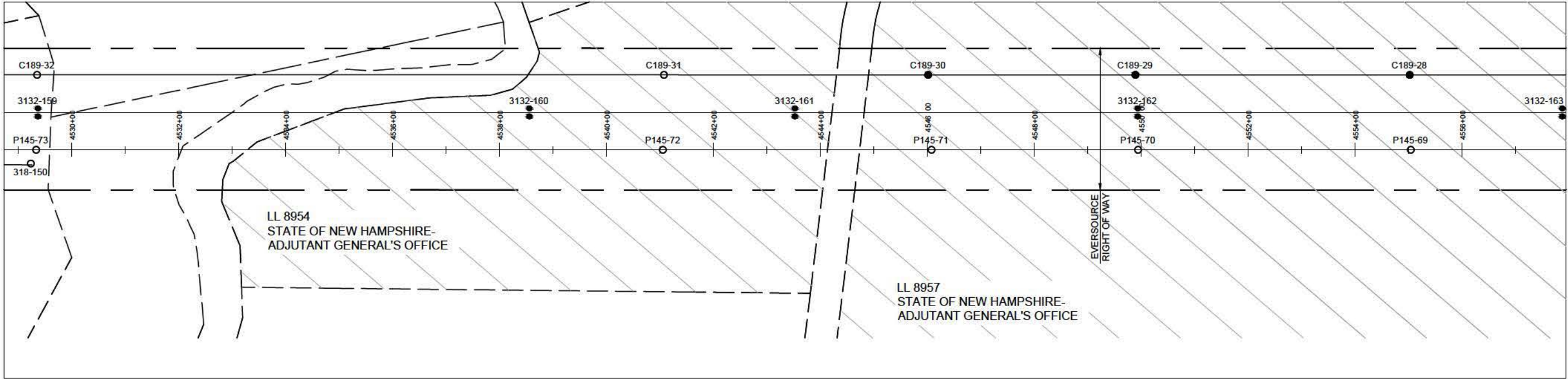
LEGEND

-  Parcel Boundary
-  Project ROW
-  Town Boundary



Line List 8954 & 8957
State Land Crossing Permit
Location Map

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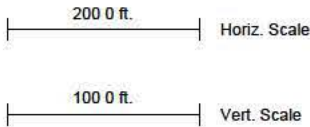
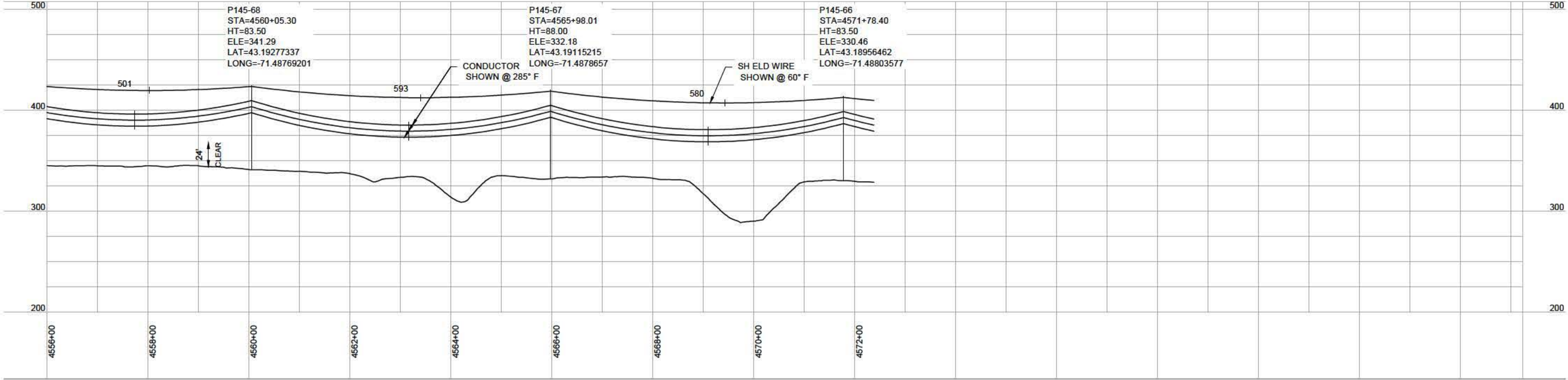
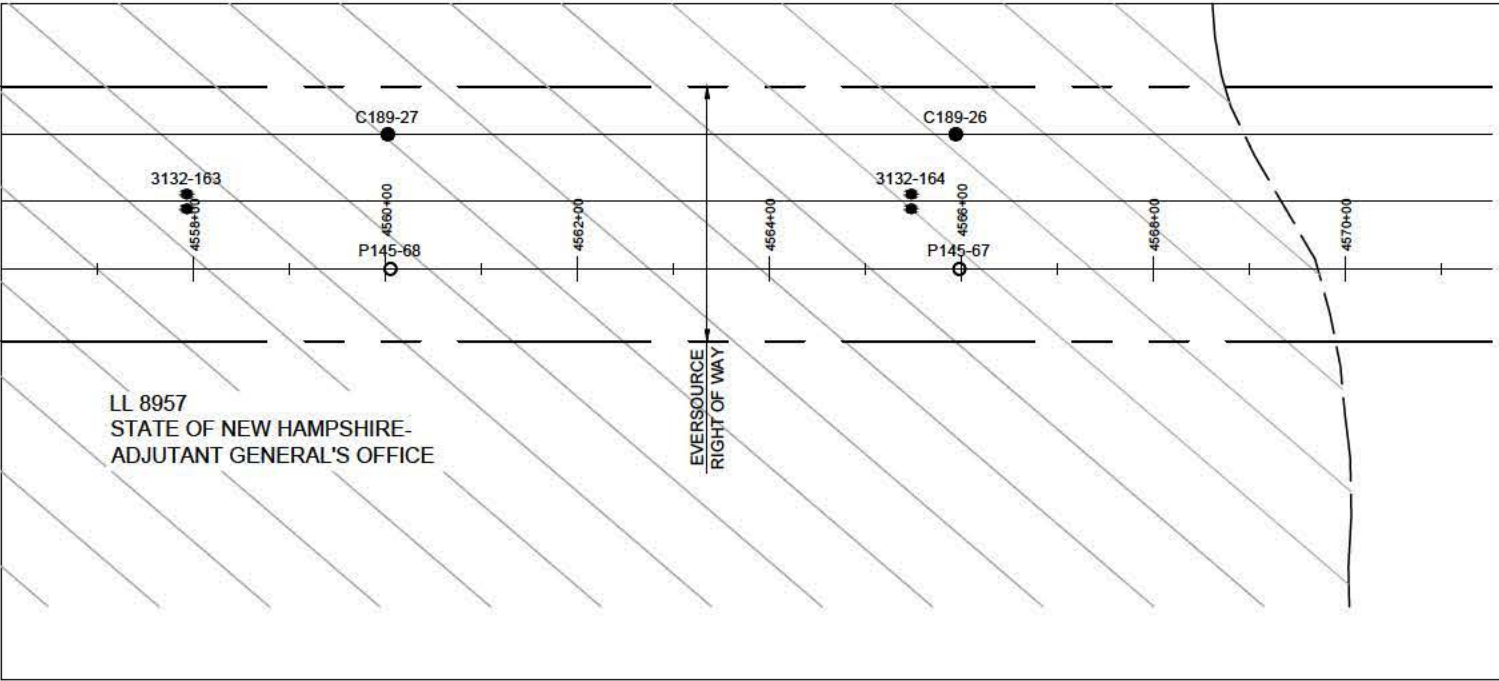


- PROPOSED MONOPOLE
- EXISTING MONOPOLE
- ⊠ PROPOSED TRANS STRUCTURE
- EXISTING H-FRAME
- PROPOSED H-FRAME

**PRELIMINARY - NOT
FOR CONSTRUCTION**

REVISION HISTORY					
-	-	-	-	-	-
A	3/19/15	ISSUED FOR REVIEW		MSP	DAB
		EVERSOURCE			
		TITLE S1 LL8954, LL8957 P145 STATE LAND CROSSING PERMIT sh 1 OF 2			
BY	REV. NO.	DATE	SIZE	DWG. NO.	
MSP	A	4/30/15	B	P14599001.DWG	

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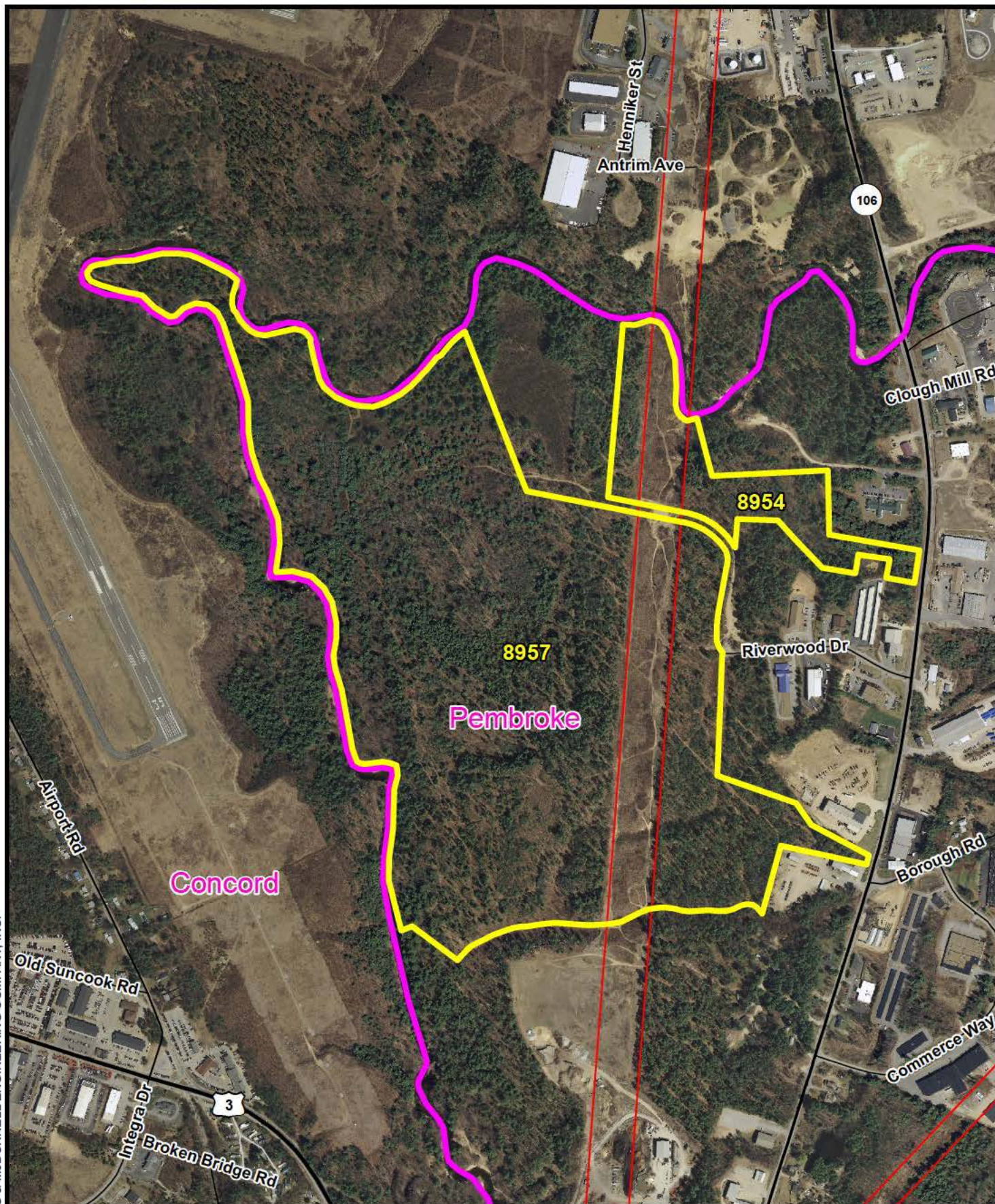
- PROPOSED MONOPOLE
- EXISTING MONOPOLE
- ⊠ PROPOSED TRANS STRUCTURE
- EXISTING H-FRAME
- PROPOSED H-FRAME

**PRELIMINARY - NOT
FOR CONSTRUCTION**

REVISION HISTORY					
-	-	-	-	-	-
A	3/19/15	ISSUED FOR REVIEW		MSP	DAB
		EVERSOURCE			
		TITLE S1 LL8954, LL8957 P145 STATE LAND CROSSING PERMIT sh 2 OF 2			
BY	REV. NO.	DATE	SIZE	DWG. NO.	
BAC	A	4/30/15	B	P14599001.DWG	

APPENDIX 13
C189 LINE
STRUCTURES C189-32 TO C189-30
STATE OF NEW HAMPSHIRE- ADJUTANT GENERAL'S DEPARTMENT
PEMBROKE, NH

1. This crossing is shown on attached drawing C18999001
 - a. This drawing shows a 24' terrain clearance line (offset from ground surface), which is greater than required minimum of 16.1'.
2. The location of the C189 line is shown on attached maps titled Line List 8954 & 8957. The proposed reconstruction of structures will only occur on Line List 8954.
3. This portion of the C189 line will be on steel structures. The energized conductor is in a vertical configuration using 795 kcmil. The structures will have 1 ground wire, an OPGW with sag coefficients similar to 19#10 Alumoweld.
 - a. The C189 line crosses the parcel LL 8954, State of New Hampshire – Adjutant General Department for approximately 1,000'
4. Energized conductors will have a maximum tension of 9,000 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice). Ground wires will have a maximum tension of 5,500 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice).
5. The C189 line is a 115 kV alternating current (AC) line.
6. Eversource has investigated a multitude of weather and loading conditions for its design. Eversource used these design conditions and combinations thereof to determine the minimum clearance of all conductors to both ground and aerial obstacles, between the phase conductors and OPGW cable. Eversource has determined that the weather cases and combinations listed below results in the minimum clearance and control over all other weather conditions and combinations. All NESC clearances have been met by exceeding the horizontal and/or vertical clearances required. Minimum distances to ground per the NESC have been met.
 - a. Ground wires – Due to the fact that the ground wire is located above the energized conductor, its clearance to the ground will always exceed the minimum required NESC distance.
 - b. 285 degrees F – Maximum operating temperature (energized conductor) based on Eversource transmission standards the maximum sag for this weather case controls.



0 400 800

Scale in Feet

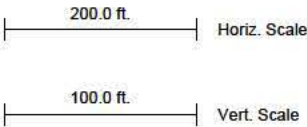
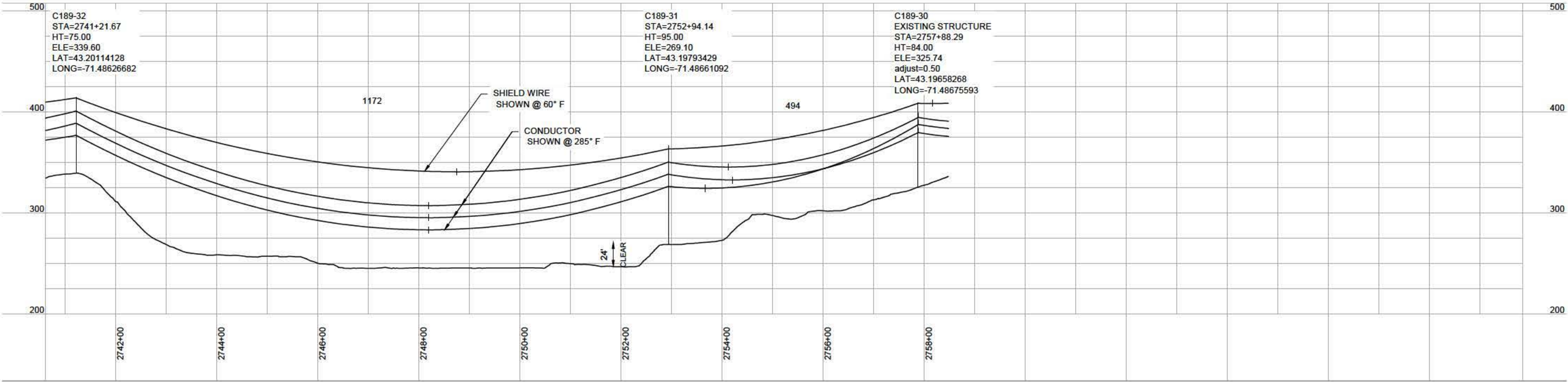
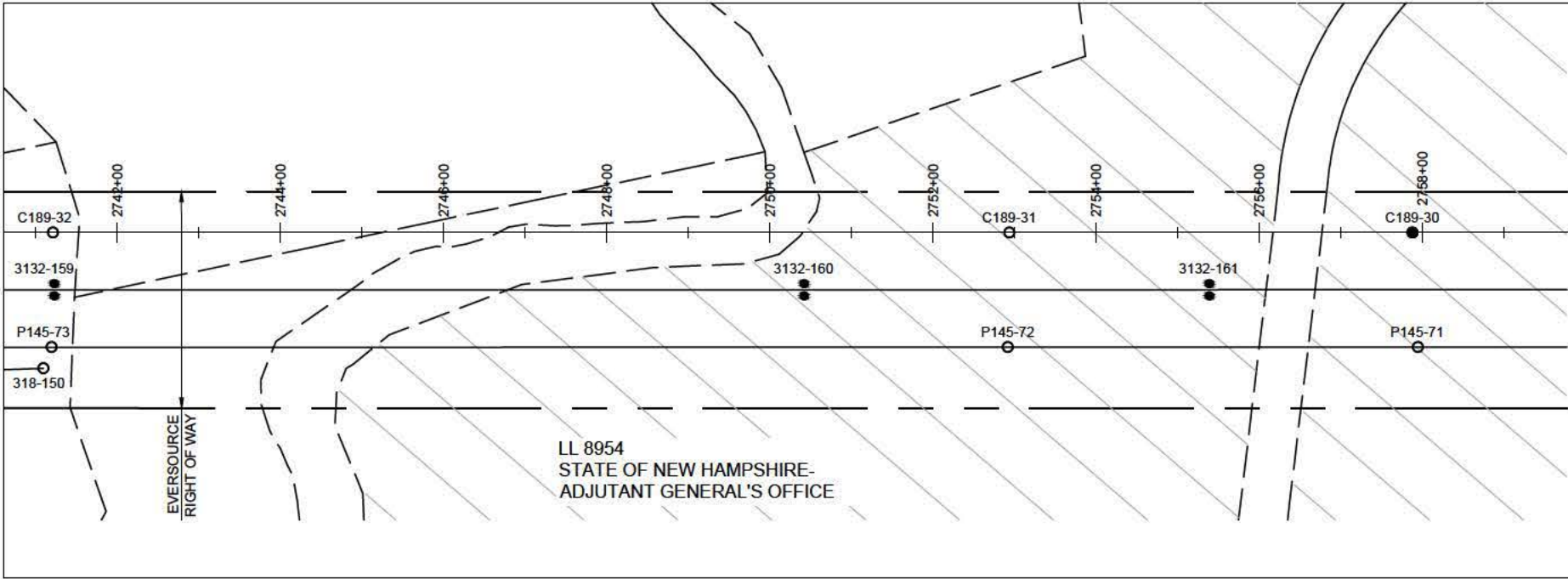
LEGEND

-  Parcel Boundary
-  Project ROW
-  Town Boundary



Line List 8954 & 8957
State Land Crossing Permit
Location Map

09/08/2015 8:52am - mspepich - N:\NUSCO\58479 - NP\Overhead\Cadd\01-Record Worksheets\02 Permits\Public Lands Crossings\DXF Exports\C18999001.dwg



PUBLIC LAND

- PROPOSED MONOPOLE
- EXISTING MONOPOLE
- ⊠ PROPOSED TRANS STRUCTURE
- EXISTING H-FRAME
- PROPOSED H-FRAME



**PRELIMINARY - NOT
FOR CONSTRUCTION**

REVISION HISTORY					
-	-	-	-	-	-
A	3/19/15	ISSUED FOR REVIEW		MSP	DAB
		EVERSOURCE			
		TITLE S1 8954 C189 STATE LAND CROSSING PERMIT			
BY	REV. NO.	DATE	SIZE	DWG. NO.	
MSP	A	4/30/15	B	C18999001.DWG	