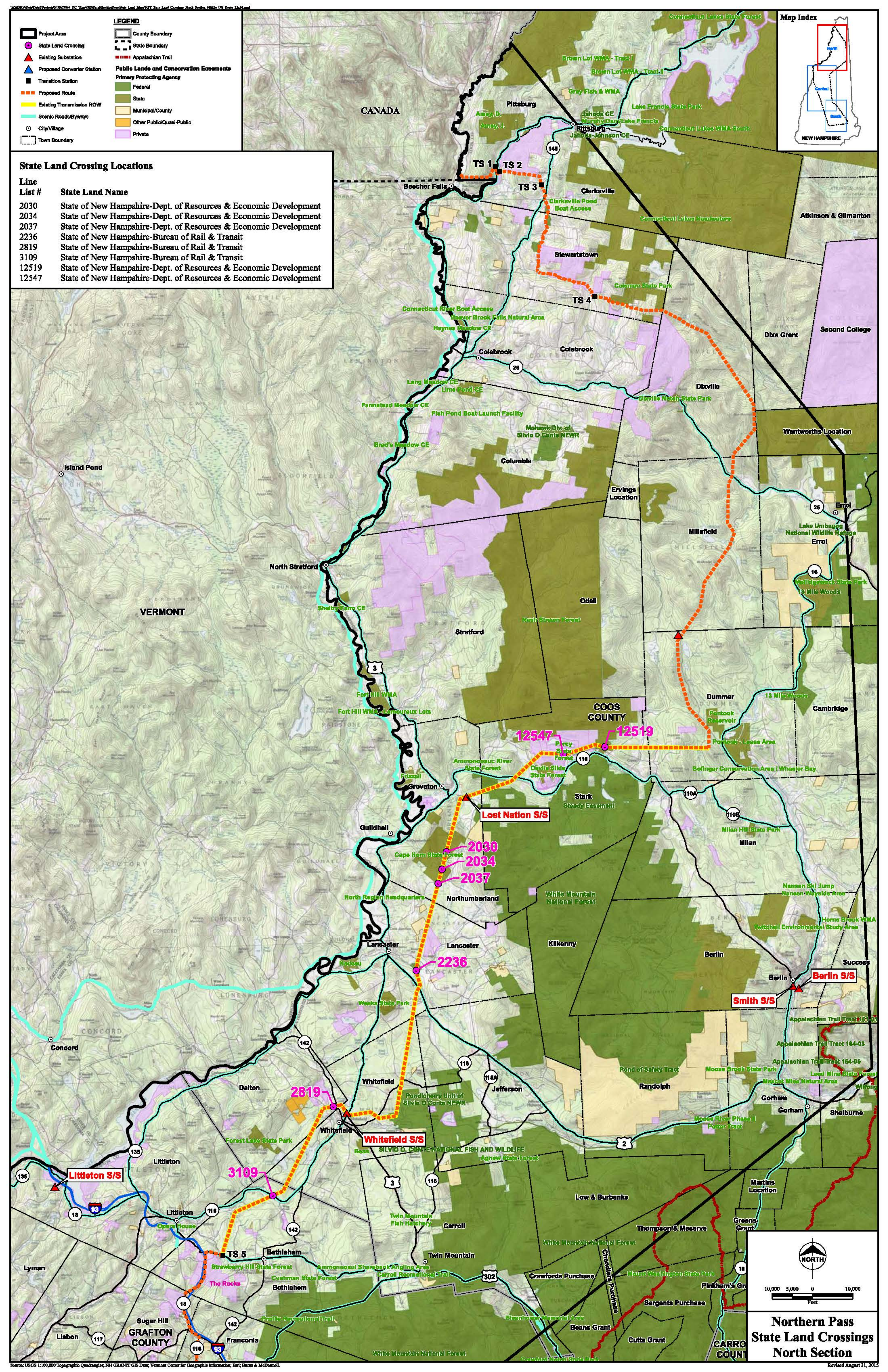
ATTACHMENT A

PROJECT MAPS



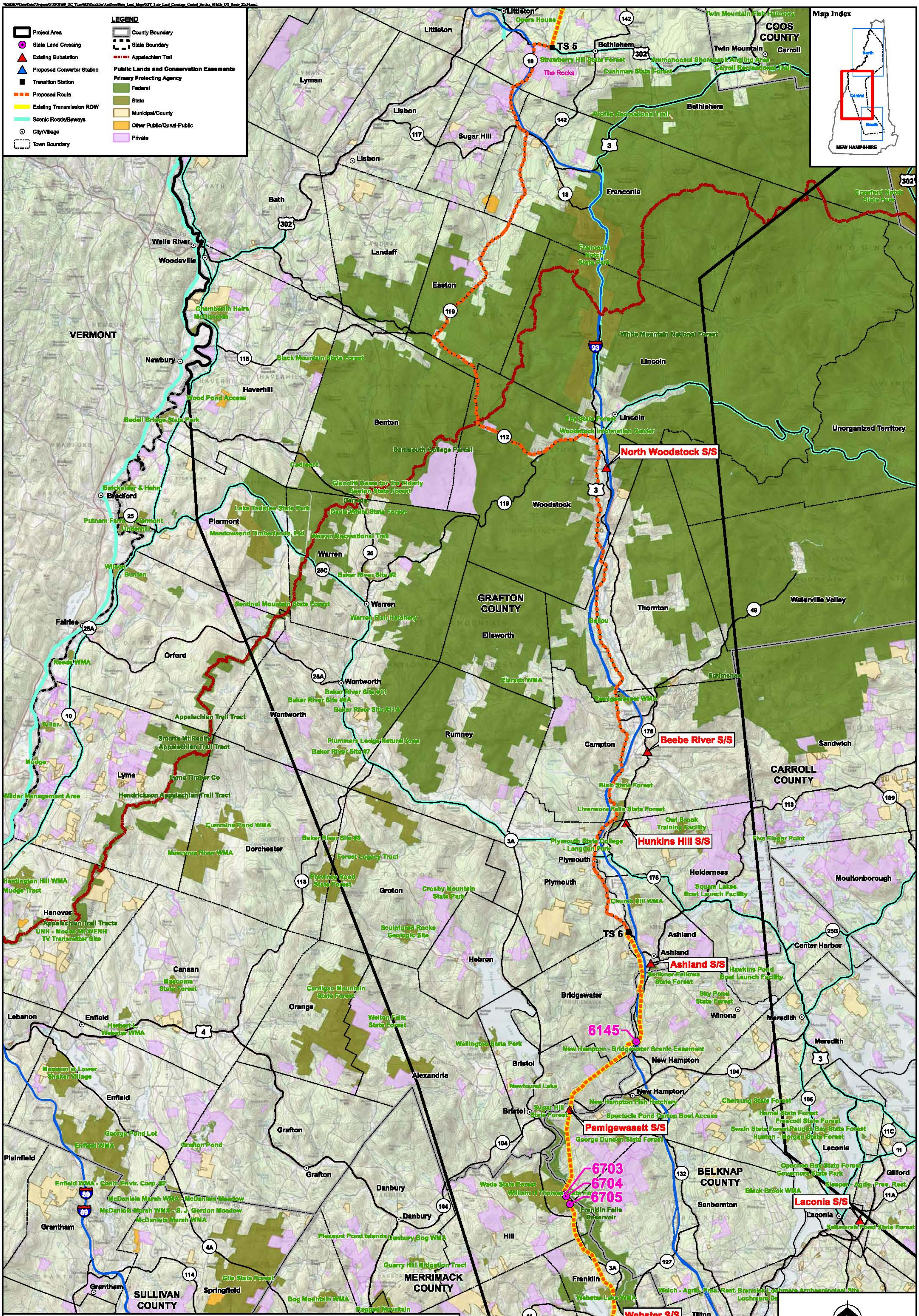
State Land Crossing Locations

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
3109	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

Northern Pass State Land Crossings North Section

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

Revised August 31, 2015



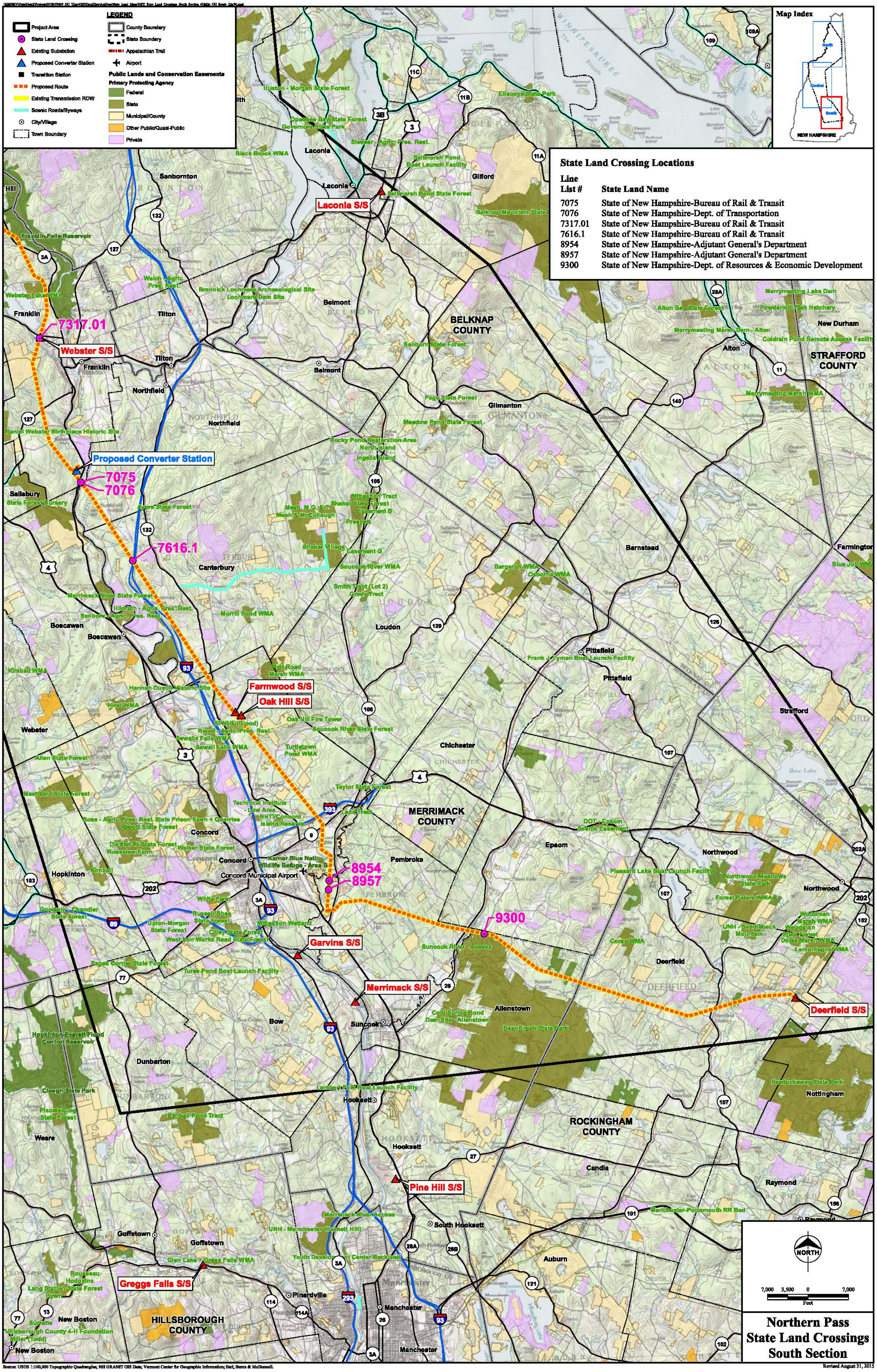
State Land Crossing Locations

Line List #	State Land Name
6145	State of New Hampshire-Dept. of Transportation
6703	State of New Hampshire-Dept. of Resources & Economic Development William H. Thomas State Forest
6704	State of New Hampshire-Dept. of Resources & Economic Development William H. Thomas State Forest
6705	State of New Hampshire-Dept. of Resources & Economic Development William H. Thomas State Forest
7317.01	State of New Hampshire-Bureau of Rail & Transit

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

Northern Pass State Land Crossings Central Section

Revised August 31, 2015



State Land Crossing Locations

Line List #	State Land Name
7075	State of New Hampshire-Bureau of Rail & Transit
7076	State of New Hampshire-Dept. of Transportation
7317.01	State of New Hampshire-Bureau of Rail & Transit
7616.1	State of New Hampshire-Bureau of Rail & Transit
8954	State of New Hampshire-Adjutant General's Department
8957	State of New Hampshire-Adjutant General's Department
9300	State of New Hampshire-Dept. of Resources & Economic Development

Northern Pass State Land Crossings South Section

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

Revised August 31, 2015

ATTACHMENT B

MASTER INDEX

LL NUMBER AND OWNER NAME		NORTHERN PASS						EVERSOURCE					EVERSOURCE				
Line List	**Owner Name (From Title Report or Tax Card)**	**PLS MODEL**	**CIRCUIT NO.**	**FILE NAME**	**APPENDIX NUMBER**	**BACK STRUCT**	**AHEAD STRUCT**	**CIRCUIT NO.**	**FILE NAME**	**APPENDIX NUMBER**	**BACK STRUCT**	**AHEAD STRUCT**	**CIRCUIT NO.**	**FILE NAME**	**APPENDIX NUMBER**	**BACK STRUCT**	**AHEAD STRUCT**
12519	State of New Hampshire - Dept. of Resources and Economic Development	N2	DC	372099005	1	DC-395	DC-402	O154	O15499002	1	O154-42	O154-49					
12547	State of New Hampshire - Dept. of Resources and Economic Development	N2	DC	372099006	2	DC-416	DC-419	O154	O15499001	2	O154-63	O154-66					
2030	State of New Hampshire - Dept. of Resources and Economic Development	N2	DC	372099001	3	DC-486	DC-506	D142	D14299001	3	D142-322	D142-343					
2034	State of New Hampshire - Dept. of Resources and Economic Development	N2	DC	372099001	3	DC-486	DC-506	D142	D14299001	3	D142-322	D142-343					
2037	State of New Hampshire - Dept. of Resources and Economic Development	N2	DC	372099001	3	DC-486	DC-506	D142	D14299001	3	D142-322	D142-343					
2236	State of New Hampshire - Bureau of Rail & Transit	N2	DC	372099601	4	DC-539	DC-540	D142	D14243601	4	D142-376	D142-377					
2819	State of New Hampshire - Bureau of Rail & Transit	C1	DC	372099602	5	DC-620	DC-621	348X	B-7627-601	5	348X-011	348X-012					
3109	State of New Hampshire - Bureau of Rail & Transit	C1	DC	372099603	6	DC-662	DC-663										
6145	State of New Hampshire - Department of Transportation	C2	DC	372099002	7	DC-1142	DC-1142	E115	E11599001	6	E115-170	E115-170					
6703	State of New Hampshire - Dept. of Resources and Economic Development William H. Thomas State Forest	C2	DC	372099003	8	DC-1209	DC-1213										
6704	State of New Hampshire - Dept. of Resources and Economic Development William H. Thomas State Forest	C2	DC	372099003	8	DC-1209	DC-1213										
6705	State of New Hampshire - Dept. of Resources and Economic Development William H. Thomas State Forest	C2	DC	372099003	8	DC-1209	DC-1213										
7317.01	State of New Hampshire - Bureau of Rail & Transit	C2	DC	372099004	9	DC-1270	DC-1270	M127	M12799001	7	M127-1A	M127-1	F139	F13999002	8	F139-343	F139-342
7075	State of New Hampshire - Bureau of Rail & Transit	S1	3132	313243601	10	3132-4	3132-5	F139	F13943601	9	F139-282	F139-281					
7076	State of New Hampshire - Department of Transportation	S1	3132	313299001	11	3132-4	3132-5	F139	F13999001	10	F139-281	F139-281					
7616.1	State of New Hampshire - Bureau of Rail & Transit	S1	3132	313243602	12	3132-32	3132-33	F139	F13943602	11	F139-250	F139-249					
8954	State of New Hampshire - Adjutant General's Department	S1	3132	313299002	13	3132-159	3132-165	P145	P14599001	12	P145-72	P145-67	C189	C18999001	13	C189-32	C189-30
8957	State of New Hampshire - Adjutant General's Department	S1	3132	313299002	13	3132-160	3132-164	P145	P14599001	12	P145-72	P145-67					
9300	State of New Hampshire - Dept. of Resources and Economic Development	S1	3132	313299003	14	3132-219	3132-227										

APPENDIX 1
3720/3731 DC LINE
STRUCTURES DC-395 TO DC-402
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 372099005

    a. This drawing shows a 30' terrain clearance line (offset from ground surface), which is greater than required minimum of 21.7'.

2. The location of the 3720/3731 line is shown on attached maps titled Line List 12519.

3. This portion of the 3720/3731 line will be on steel structures with foundations. The energized conductor (positive pole and negative pole for direct current) is in a horizontal configuration using a 2-bundle of 2933 kcmil AAAC for each pole. 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 3720/3731 line crosses the parcel LL 12519, State of New Hampshire – Department of Resources of Economic Development, Nash Stream State Forest for approximately 4080'.

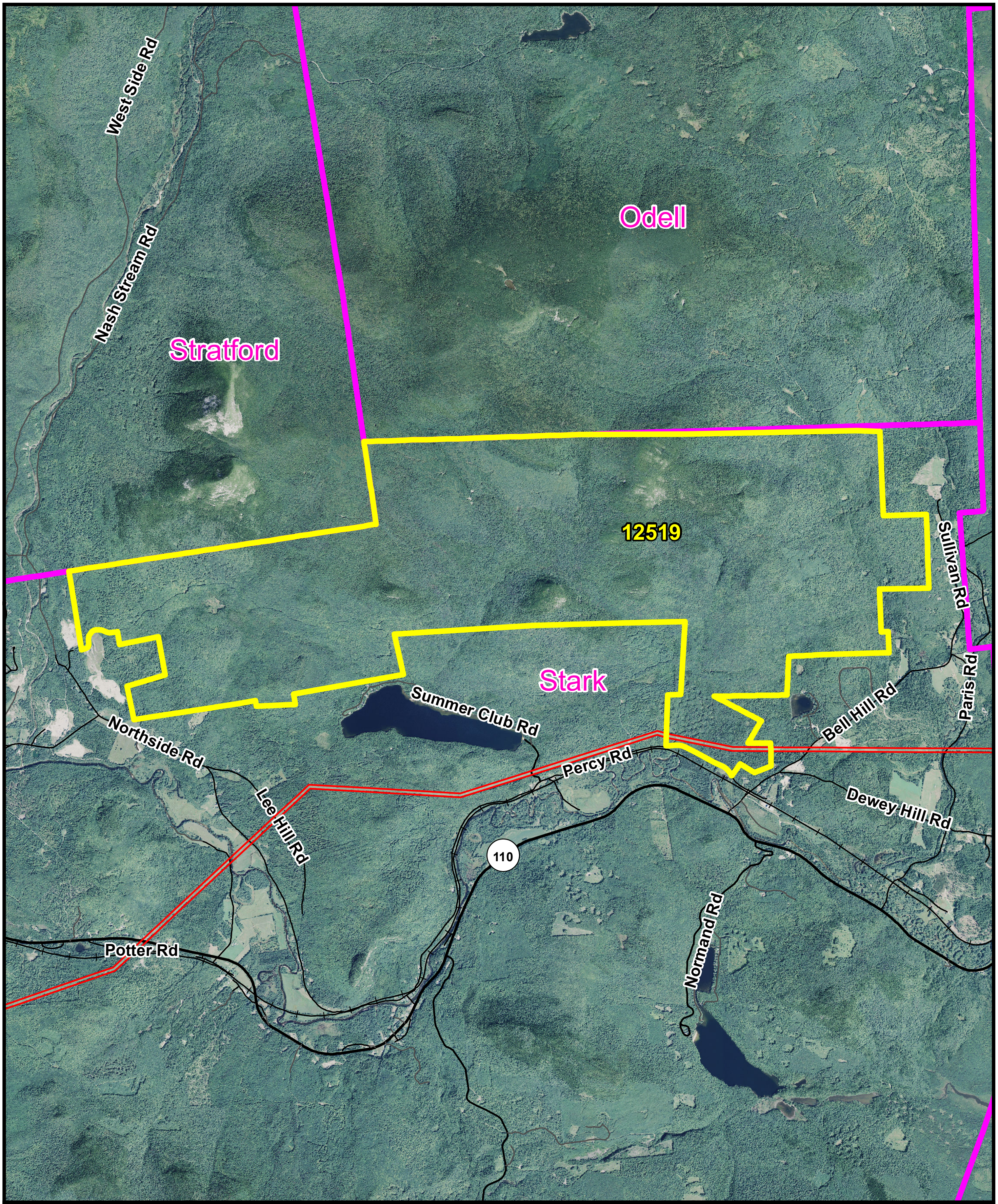
4. Energized conductors will have a maximum tension of 20,000 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice). Ground wires will have a maximum tension of 5,500 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice).

5. The 3720/3731 line is a 320 kV direct current (DC) line. Per NESC 230 the required clearances are applicable for both alternating and direct currents. To convert 320 kV DC to a corresponding alternating current (AC) voltage (for purposes of calculating clearances) take 320 kV x $3^{0.5}$ / $2^{0.5}$ = 392 kV. The equivalent phase to ground is calculated by taking 392 x 105% (voltage adder) divided by $3\text{^}^{0.5}$ =237.6

6. Northern Pass Transmission, LLC (NPT) has investigated a multitude of weather and loading conditions for its design. NPT 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. NPT 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. 130 degrees F – Maximum operating temperature (energized conductor) based on NPT transmission standards the maximum sag for this weather case controls.



NORTH

0 2,500 5,000

Feet

LEGEND

- Parcel Boundary
- Project ROW
- Town Boundary

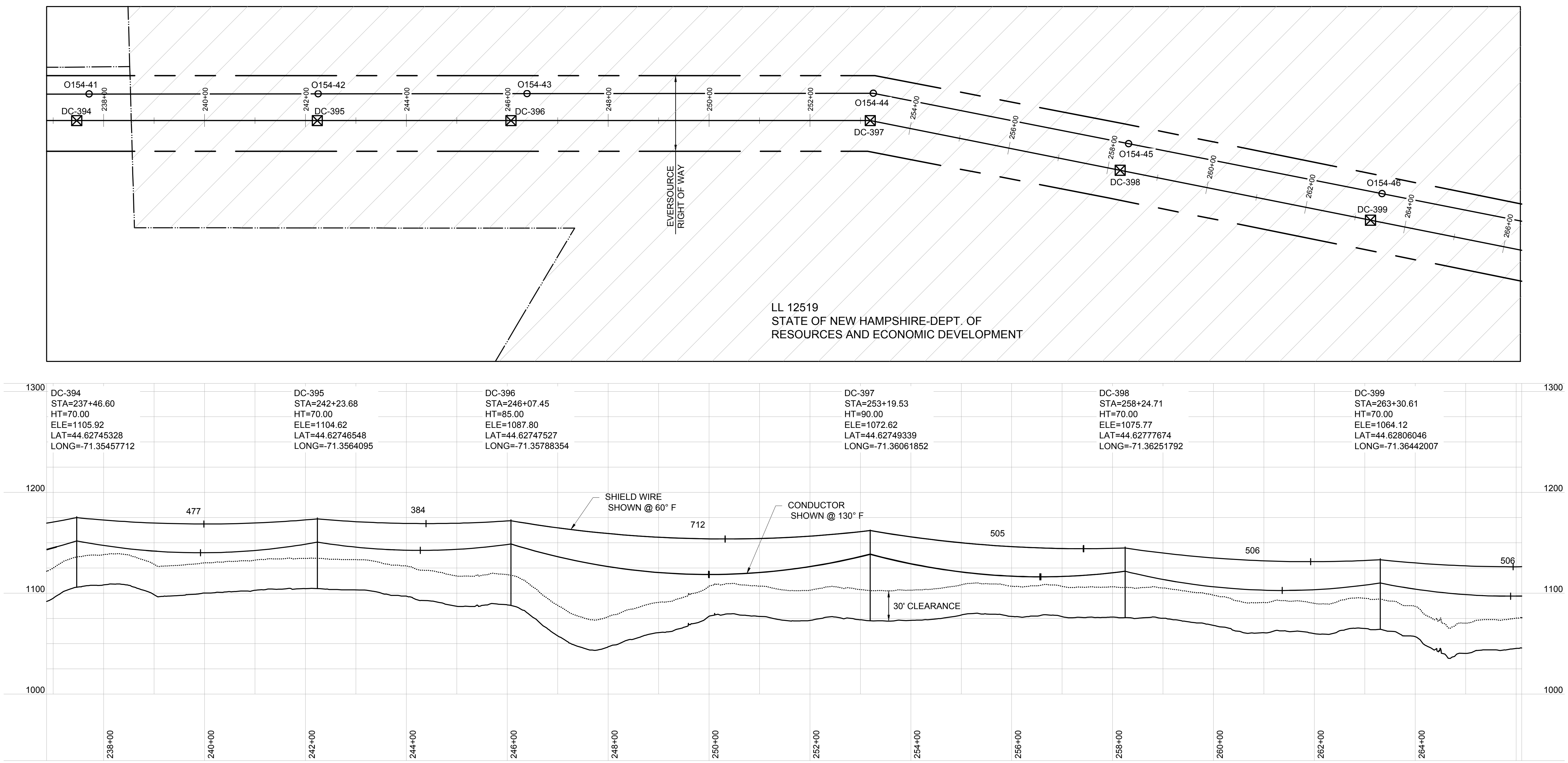
THE NORTHERN PASS

Line List 12519
State Land Crossing Permit
Location Map

Source: USDA NAIP 2014 Aerial Photography; NH GRANIT; Burns & McDonnell.

August 21, 2015

Path: \\ESPSRV\Data\Data2\Projects\NUS\53899_DC_Tline\GIS\DataFiles\ArcDocs\State_Land_Maps\State_Land_Crossing_Permit_LL12519_Lettersize.mxd rfraser 8/21/2015



200.0 ft. Horiz. Scale

100.0 ft. Vert. Scale

N

PUBLIC LAND

PROPOSED MONOPOLE

PROPOSED TRANS STRUCTURE

PRELIMINARY - NOT FOR CONSTRUCTION

REVISION HISTORY				
–	–	–	–	–
A	4/30/15	ISSUED FOR REVIEW	KRR	DAB

NORTHERN PASS LLC

TITLE N2 LL12519 3720/3731 STATE LAND CROSSING PERMIT SH. 1 OF 2

BY	REV. NO.	DATE	SIZE	DWG. NO.
KRR	A	4/30/15	B	372099005.DWG

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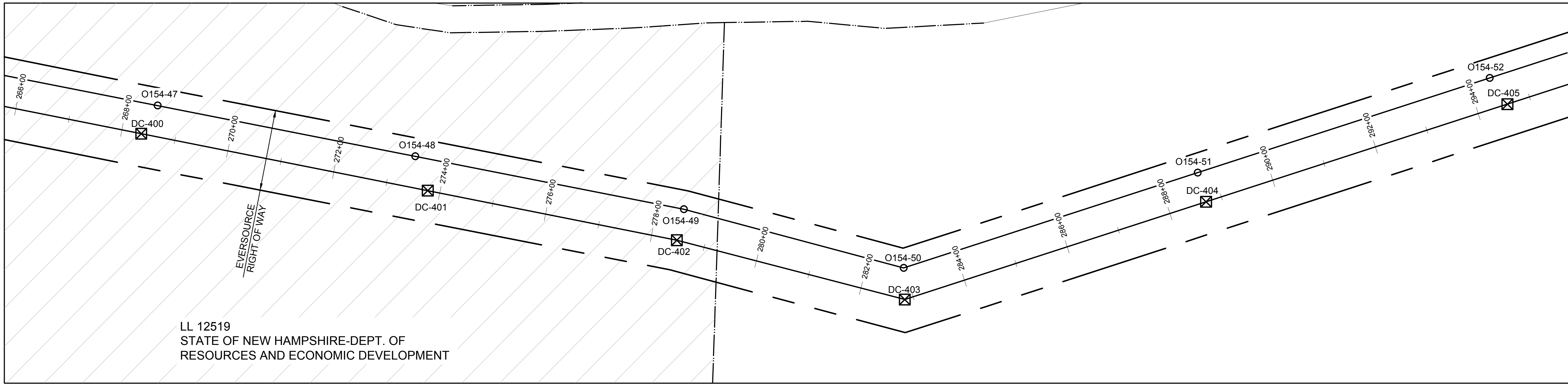

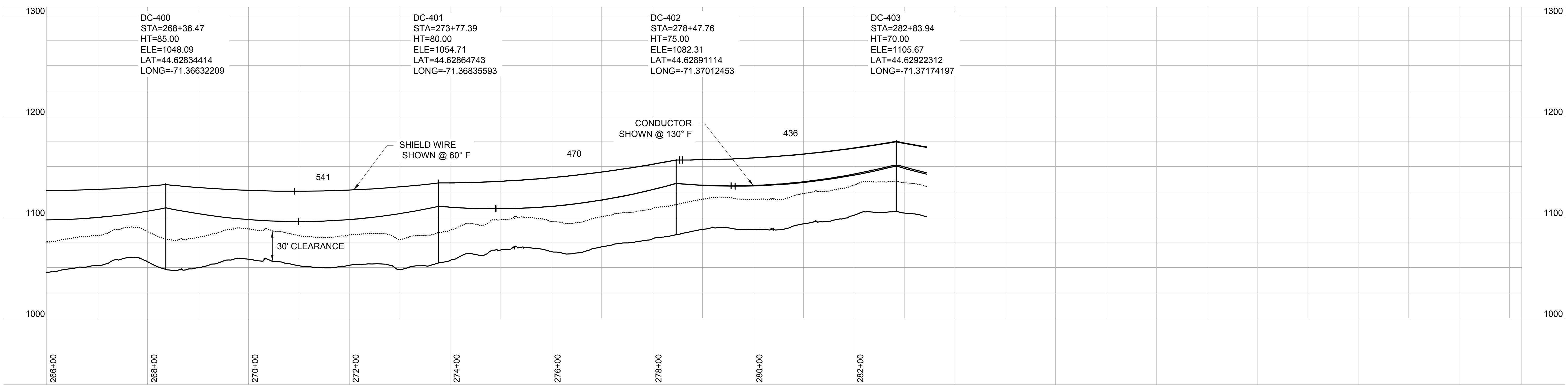

200.0 ft. Horiz. Scale

100.0 ft. Vert. Scale

N

PUBLIC LAND

PROPOSED MONOPOLE

PROPOSED TRANS STRUCTURE

PRELIMINARY - NOT FOR CONSTRUCTION

REVISION HISTORY				
–	–	–	–	–
A	4/30/15	ISSUED FOR REVIEW	KRR	DAB

NORTHERN PASS LLC

TITLE N2 LL12519 3720/3731 STATE LAND CROSSING PERMIT SH. 2 OF 2

BY	REV. NO.	DATE	SIZE	DWG. NO.
KRR	A	4/30/15	B	372099005.DWG

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APPENDIX 2
3720/3731 DC LINE
STRUCTURES DC-416 TO DC-419
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 372099006

    a. This drawing shows a 30' terrain clearance line (offset from ground surface), which is greater than required minimum of 21.7'.

2. The location of the 3720/3731 line is shown on attached maps titled Line List 12547.

3. This portion of the 3720/3731 line will be on steel structures with foundations. For a portion of the crossing, the energized conductor (positive pole and negative pole for direct current) is in a horizontal configuration using a 2-bundle of 2933 kcmil AAAC for each pole. 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. Another portion will be in a vertical configuration using a 2-bundle of 2933 kcmil AAAC for each pole. Structures in a vertical configuration will only have 1 ground wire, an OPGW with sag coefficients similar to 19#10 Alumoweld.

    a. The 3720/3731 line crosses the parcel LL 12547 State of New Hampshire – Department of Resources of Economic Development, Percy State Forest for approximately 2000'.

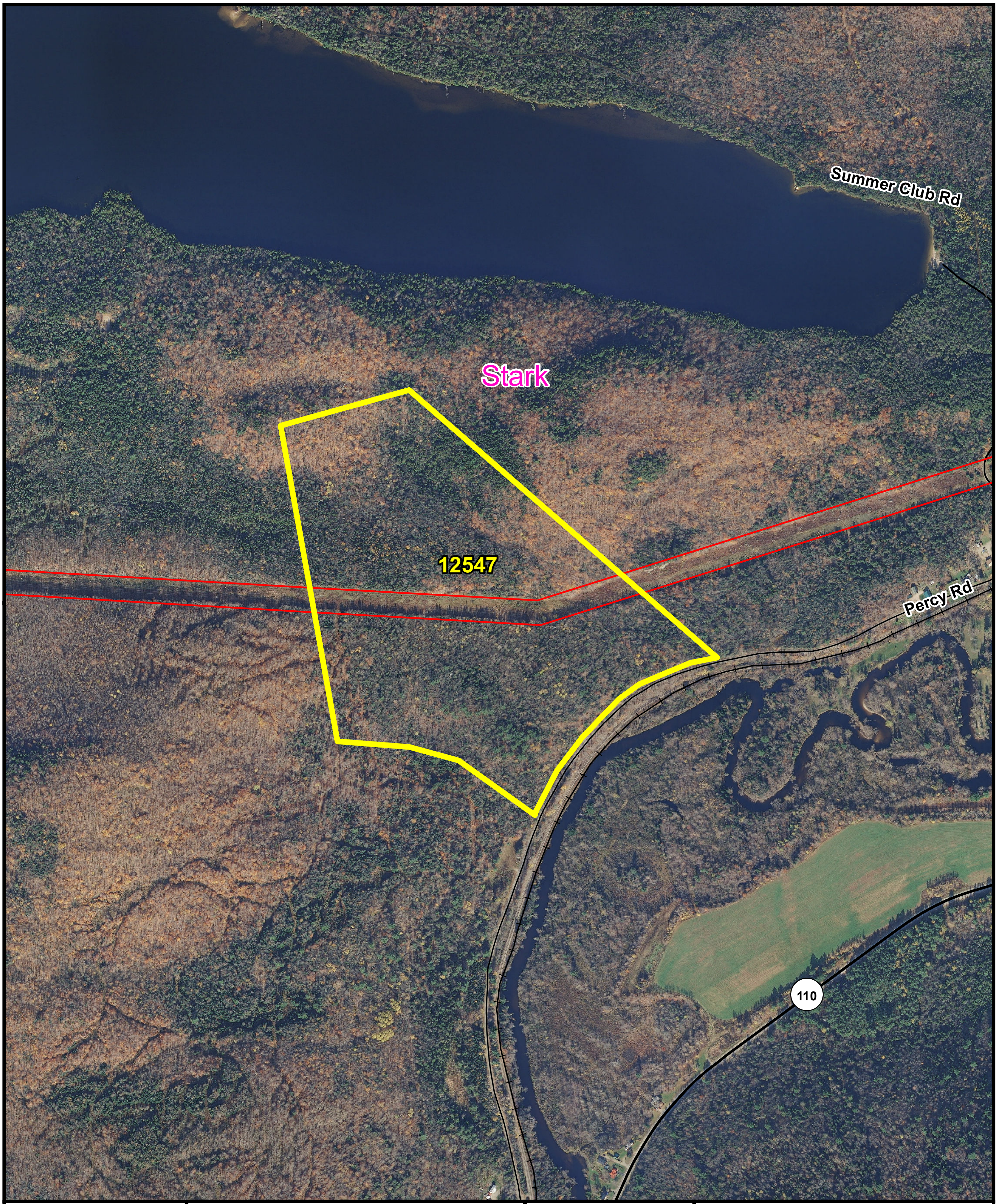
4. Energized conductors will have a maximum tension of 20,000 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice). Ground wires will have a maximum tension of 5,500 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice).

5. The 3720/3731 line is a 320 kV direct current (DC) line. Per NESC 230 the required clearances are applicable for both alternating and direct currents. To convert 320 kV DC to a corresponding alternating current (AC) voltage (for purposes of calculating clearances) take 320 kV x $3^{0.5}$ / $2^{0.5}$ = 392 kV. The equivalent phase to ground is calculated by taking 392 x 105% (voltage adder) divided by $3^{\wedge 0.5}$ =237.6

6. Northern Pass Transmission, LLC (NPT) has investigated a multitude of weather and loading conditions for its design. NPT 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. NPT 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. 130 degrees F – Maximum operating temperature (energized conductor) based on NPT transmission standards the maximum sag for this weather case controls.



NORTH

0 400 800

Feet

LEGEND

Parcel Boundary

Project ROW

Town Boundary

THE NORTHERN PASS

Line List 12547
State Land Crossing Permit
Location Map

Path: \ESPSRV\Data\Data2\Projects\NUS\53899_DC_Tline\GIS\DataFiles\ArcDocs\State_Land_Maps\State_Land_Crossing_Permit_LL12547_Lettersize.mxd rfraser 8/21/2015

Source: NH DOT 2011 Aerial Photography; NH GRANIT; Burns & McDonnell.

August 21, 2015

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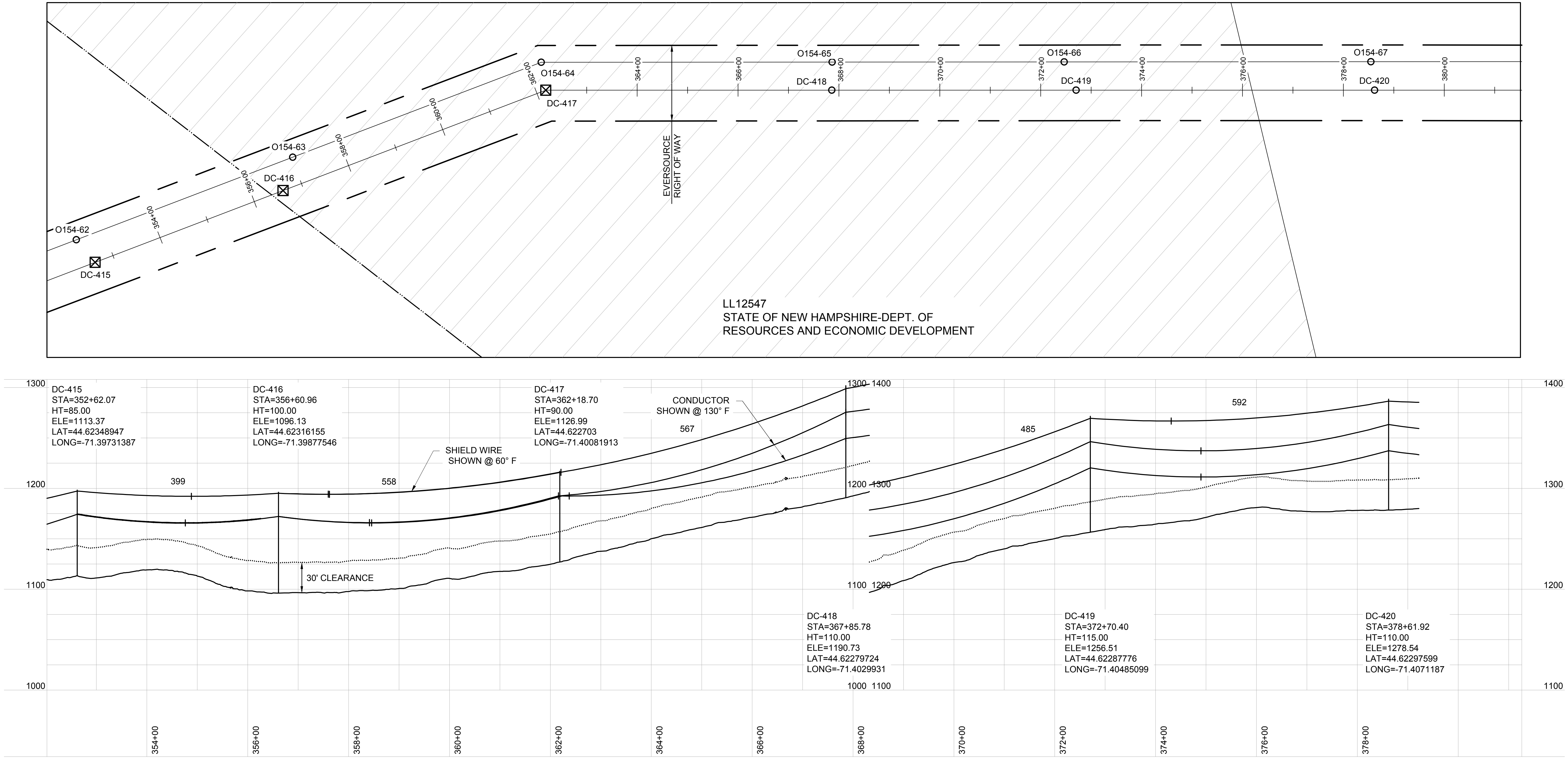


200.0 ft. Horiz. Scale

100.0 ft. Vert. Scale

N

PUBLIC LAND

PROPOSED MONOPOLE

PROPOSED TRANS STRUCTURE

PRELIMINARY - NOT FOR CONSTRUCTION

REVISION HISTORY				
–	–	–	–	–
A	4/30/15	ISSUED FOR REVIEW	KRR	DAB

THE NORTHERN PASS

NORTHERN PASS LLC

TITLE N2 LL12547 3720/3731 STATE LAND CROSSING PERMIT

BY	REV. NO.	DATE	SIZE	DWG. NO.
KRR	A	4/30/15	B	372099006.DWG

APPENDIX 3
3720/3731 DC LINE
STRUCTURES DC-486 TO DC-506
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 372099001

    a. This drawing shows a 30' terrain clearance line (offset from ground surface), which is greater than required minimum of 21.7'.

2. The location of the 3720/3731 line is shown on attached maps titled Line List 2030, Line List 2034, Line List 2037.

3. This portion of the 3720/3731 line will be on steel structures with foundations. The energized conductor (positive pole and negative pole for direct current) is in a horizontal configuration using a 2-bundle of 2933 kcmil AAAC for each pole. 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 3720/3731 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 3720/3731 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 3720/3731 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 20,000 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).

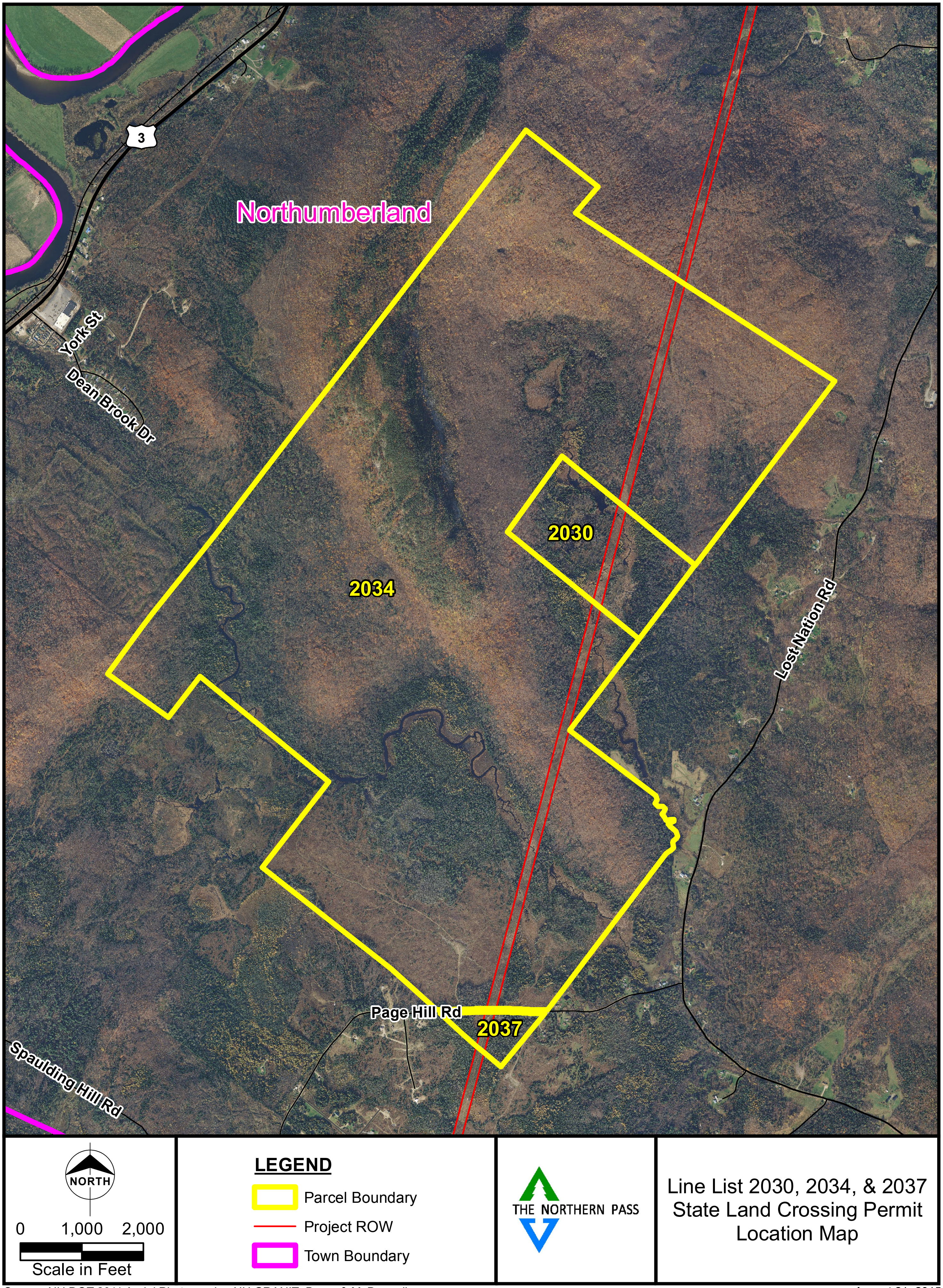
5. The 3720/3731 line is a 320 kV direct current (DC) line. Per NESC 230 the required clearances are applicable for both alternating and direct currents. To convert 320 kV DC to a corresponding alternating current (AC) voltage (for purposes of calculating clearances) take 320 kV x $3^{0.5}$ / $2^{0.5}$ = 392 kV. The equivalent phase to ground is calculated by taking 392 x 105% (voltage adder) divided by 3^$^{0.5}$ =237.6.

6. Northern Pass Transmission, LLC (NPT) has investigated a multitude of weather and loading conditions for its design. NPT 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. NPT 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. 130 degrees F – Maximum operating temperature (energized conductor) based on NPT transmission standards the maximum sag for this weather case controls.

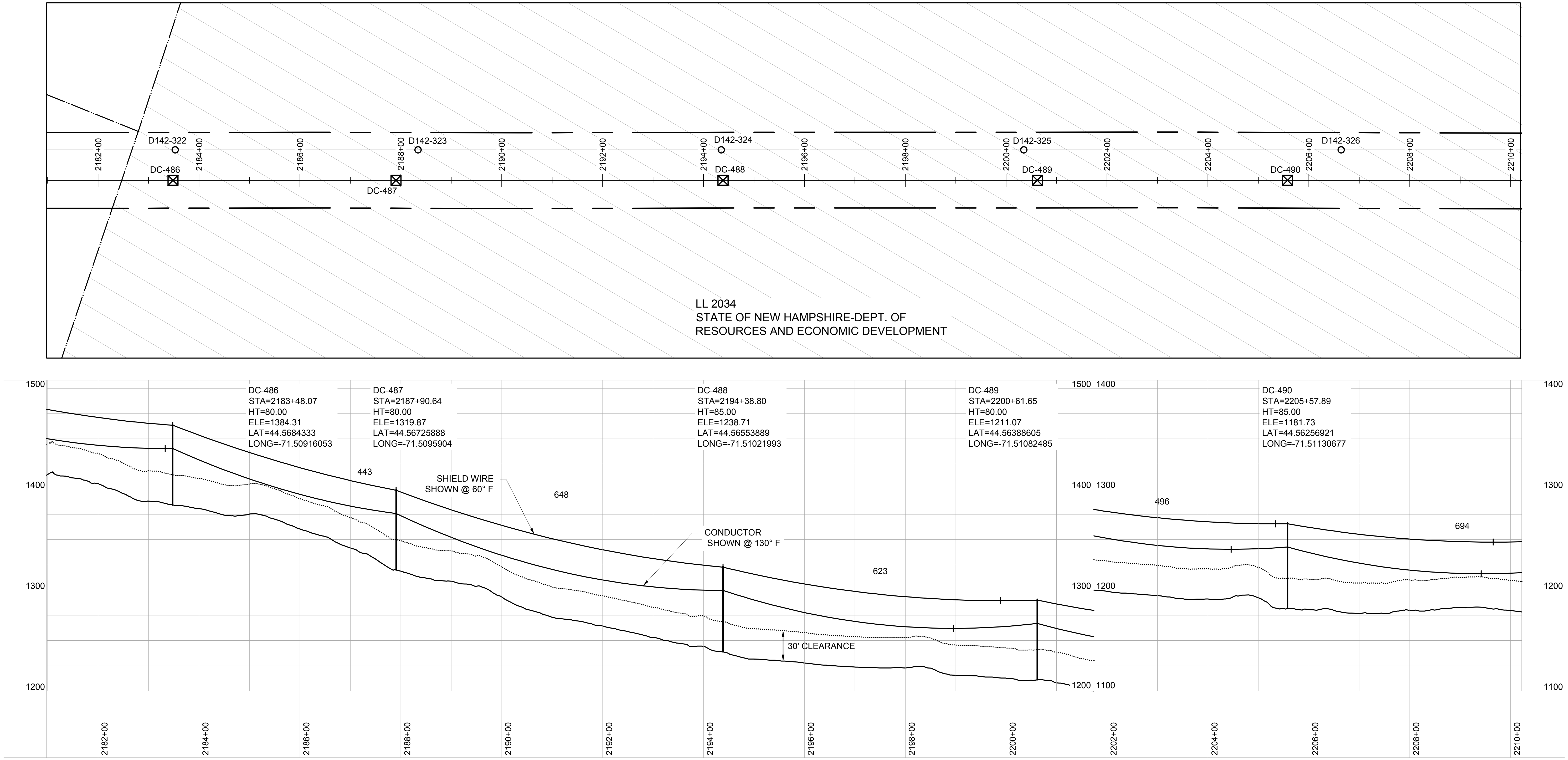


Line List 2030, 2034, & 2037
State Land Crossing Permit
Location Map

Path: \\ESPSRV\Data\Data2\Projects\NUS\53899_DC_Tline\GIS\DataFiles\ArcDocs\State_Land_Maps\State_Land_Crossing_Permit_LL2030_2034_2037_Lettersize.mxd rfraser 8/21/2015

Source: NH DOT 2011 Aerial Photography; NH GRANIT; Burns & McDonnell.

August 21, 2015



200.0 ft. Horiz. Scale

100.0 ft. Vert. Scale

PUBLIC LAND

PROPOSED MONOPOLE

PROPOSED TRANS STRUCTURE

PRELIMINARY - NOT FOR CONSTRUCTION

REVISION HISTORY				
–	–	–	–	–
A	4/30/15	ISSUED FOR REVIEW	KRR	DAB

THE NORTHERN PASS

NORTHERN PASS LLC

TITLE N2 LL2030, LL2034, LL2037 3720/3731 STATE LAND CROSSING PERMIT SH. 1 OF 5

BY	REV. NO.	DATE	SIZE	DWG. NO.
KRR	A	4/30/15	B	372099001.DWG

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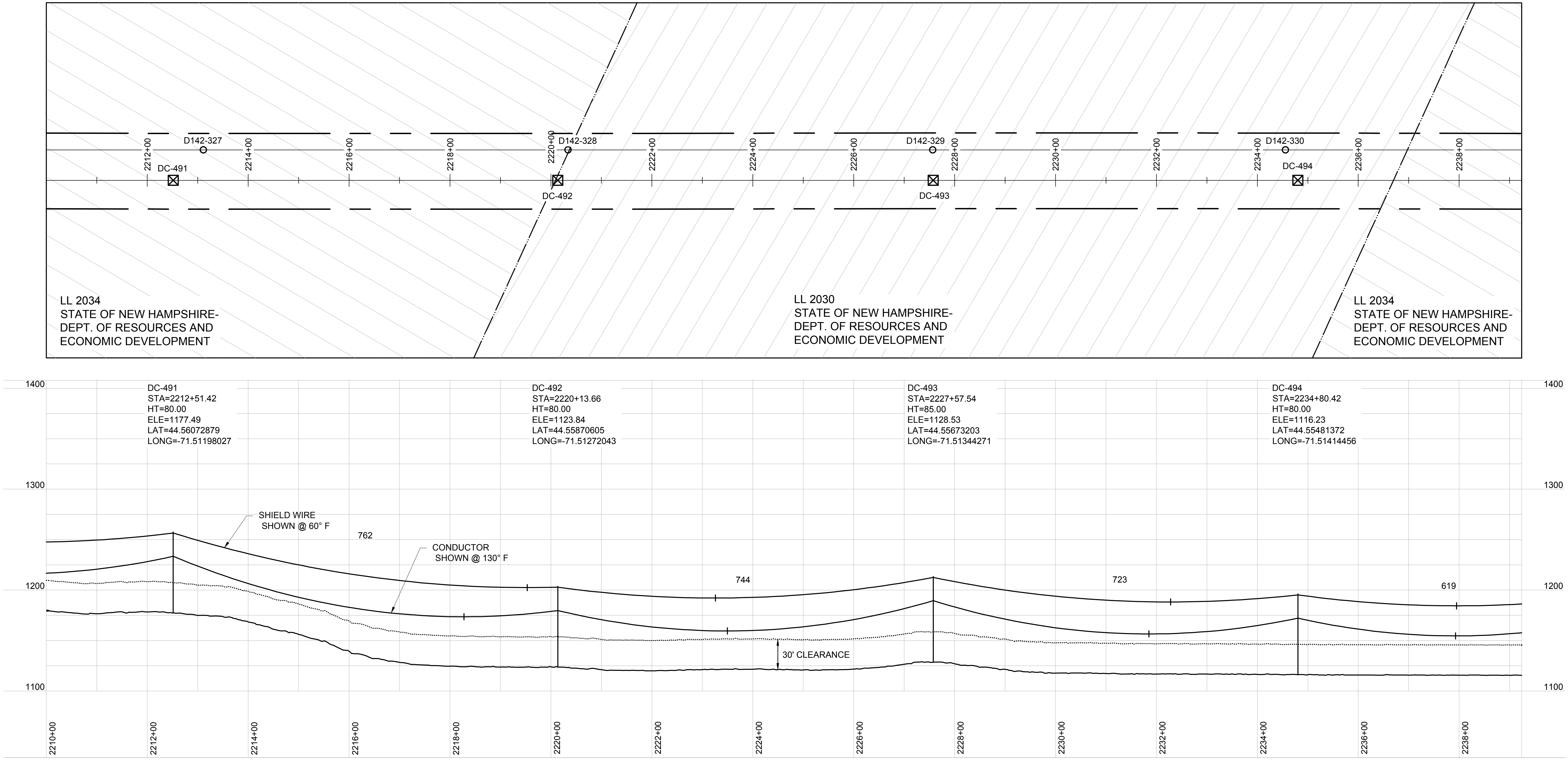

200.0 ft. Horiz. Scale

100.0 ft. Vert. Scale

PUBLIC LAND

○ PROPOSED MONOPOLE

⊠ PROPOSED TRANS STRUCTURE

PRELIMINARY - NOT FOR CONSTRUCTION

REVISION HISTORY				
–	–	–	–	–
A	4/30/15	ISSUED FOR REVIEW	KRR	DAB

THE NORTHERN PASS

NORTHERN PASS LLC

TITLE N2 LL2030, LL2034, LL2037 3720/3731 STATE LAND CROSSING PERMIT SH. 2 OF 5

BY	REV. NO.	DATE	SIZE	DWG. NO.
KRR	A	4/30/15	B	372099001.DWG

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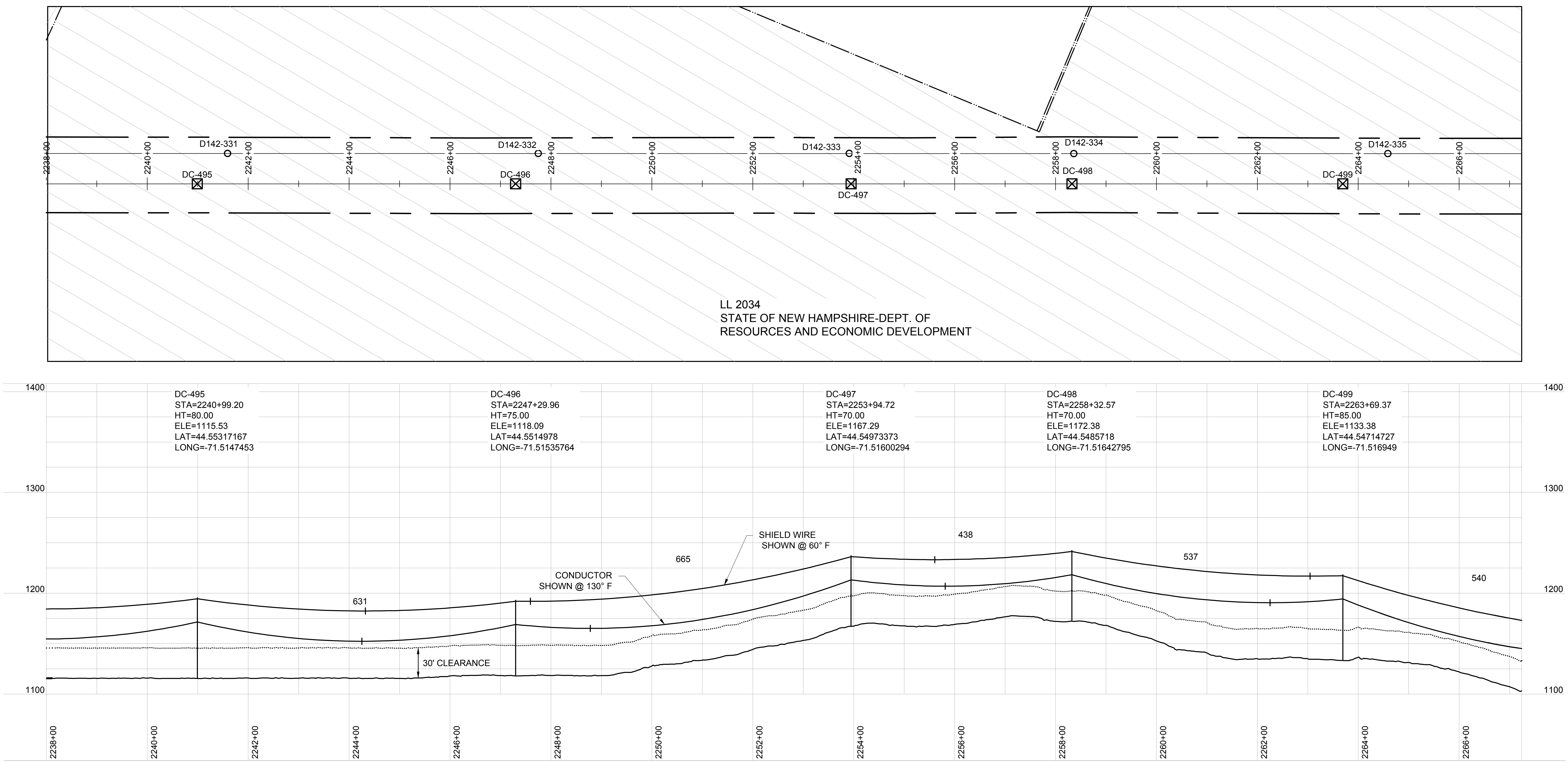

200.0 ft. Horiz. Scale

100.0 ft. Vert. Scale

PUBLIC LAND

PROPOSED MONOPOLE

PROPOSED TRANS STRUCTURE

N

PRELIMINARY - NOT FOR CONSTRUCTION

REVISION HISTORY

–	–	–	–	–
A	4/30/15	ISSUED FOR REVIEW	KRR	DAB

THE NORTHERN PASS

NORTHERN PASS LLC

TITLE N2 LL2030, LL2034, LL2037 3720/3731 STATE LAND CROSSING PERMIT SH. 3 OF 5

BY	REV. NO.	DATE	SIZE	DWG. NO.
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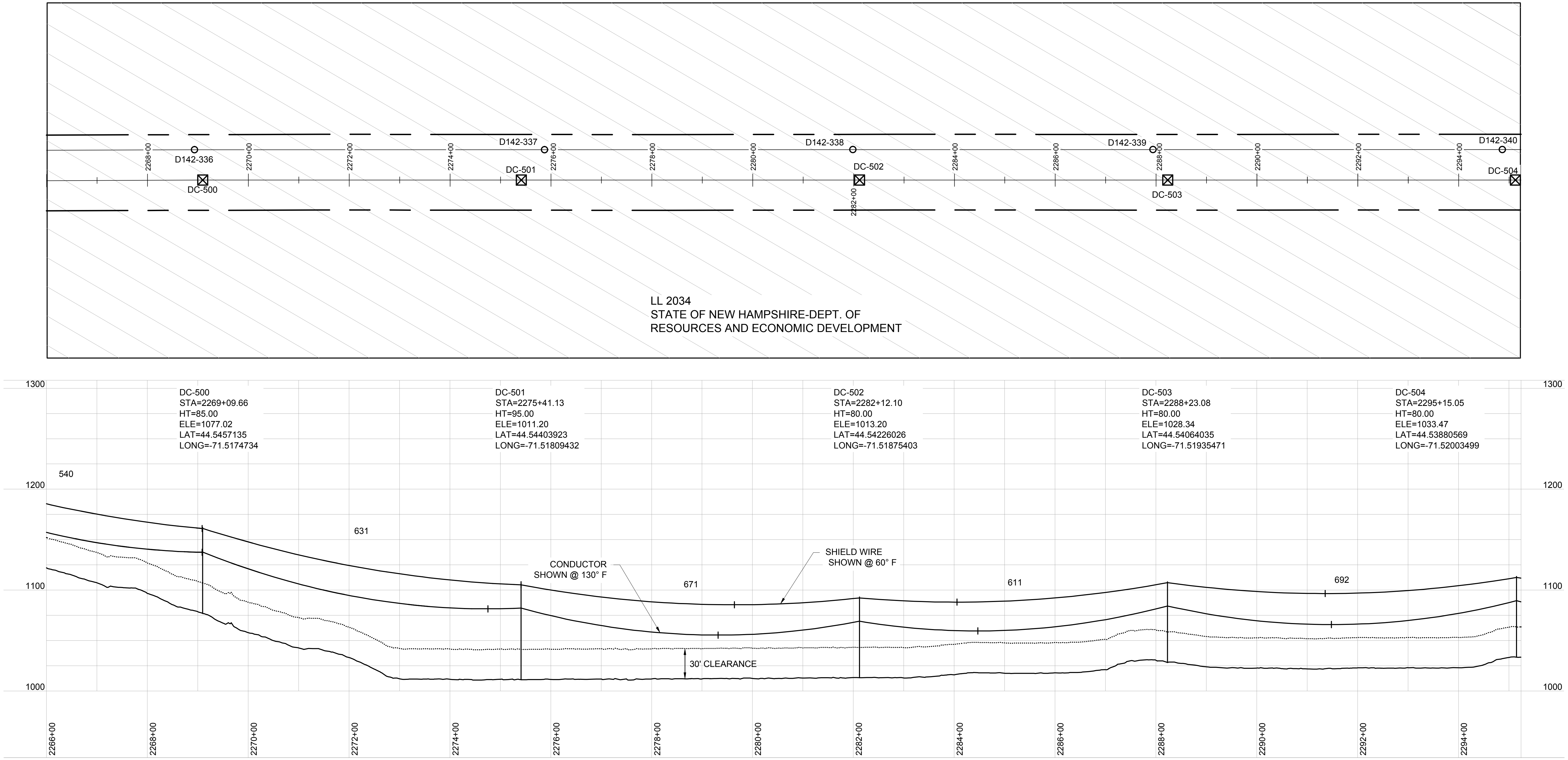

200.0 ft. Horiz. Scale

100.0 ft. Vert. Scale

PUBLIC LAND

○ PROPOSED MONOPOLE

⊠ PROPOSED TRANS STRUCTURE

N

PRELIMINARY - NOT FOR CONSTRUCTION

REVISION HISTORY				
–	–	–	–	–
A	4/30/15	ISSUED FOR REVIEW	KRR	DAB

THE NORTHERN PASS

NORTHERN PASS LLC

TITLE N2 LL2030, LL2034, LL2037 3720/3731 STATE LAND CROSSING PERMIT SH. 4 OF 5

BY	REV. NO.	DATE	SIZE	DWG. NO.
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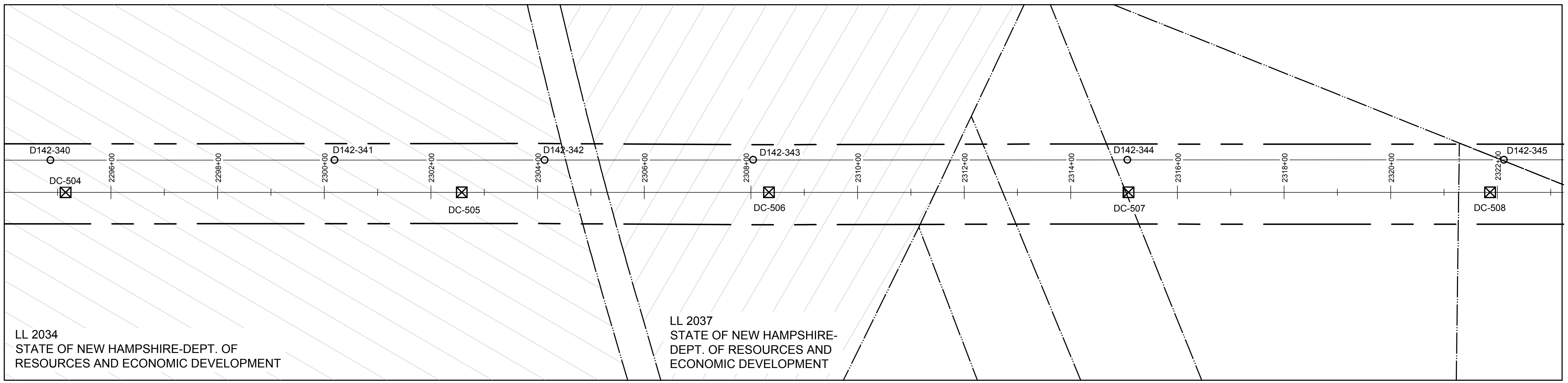

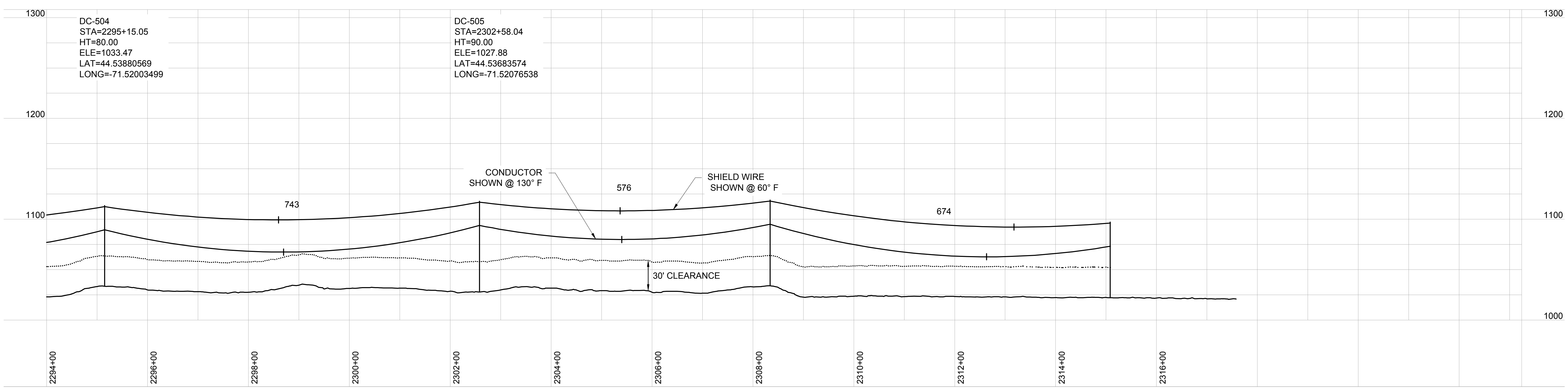

200.0 ft. Horiz. Scale

100.0 ft. Vert. Scale

PUBLIC LAND

PROPOSED MONOPOLE

PROPOSED TRANS STRUCTURE

PRELIMINARY - NOT FOR CONSTRUCTION

REVISION HISTORY				
–	–	–	–	–
A	4/30/15	ISSUED FOR REVIEW	KRR	DAB

THE NORTHERN PASS

NORTHERN PASS LLC

TITLE N2 LL2030, LL2034, LL2037 3720/3731 STATE LAND CROSSING PERMIT SH. 5 OF 5

BY	REV. NO.	DATE	SIZE	DWG. NO.
KRR	A	4/30/15	B	372099001.DWG

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APPENDIX 4
3720/3731 DC LINE
STRUCTURES DC-539 TO DC-540
STATE OF NEW HAMPSHIRE – BUREAU OF RAIL & TRANSIT
GROVETON BRANCH
LL 2236
LANCASTER, NH

1. This crossing is shown on attached drawing 372099601

2. The location of the 3720/3731 line is shown on attached maps titled Line List 2236

3. The 3720/3731 line will be on steel structures with foundations at this crossing. The energized conductor (positive pole and negative pole for direct current) is in a vertical configuration using a 2-bundle of 2933 kcmil AAAC for each pole. The structure will have 1 ground wire. It will be OPGW with sag coefficients similar to 19#10 Alumoweld.

    a. DC-539 & DC-540 will be structures with V-string insulators. The energized conductors are separated approximately 28 feet horizontally and 0 feet vertically in a horizontal configuration. The ground/OPGW wire is carried on the structure by a support bracket approximately 12 inches below the top of the structure. The ground/OPGW wires are separated horizontally approximately 11 feet. The ground/OPGW and energized conductor are separated vertically by approximately 23.5 feet.

4. Energized conductors will have a maximum tension of 20,000 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 3720/3731 line is a 320 kV direct current (DC) line. Per NESC 230 the required clearances are applicable for both alternating and direct currents. To convert 320 kV DC to a corresponding alternating current (AC) voltage (for purposes of calculating clearances) take 320 kV x $3^{0.5}$ / $2^{0.5}$ = 392 kV. The equivalent phase to ground is calculated by taking 392 x 105% (voltage adder) divided by $3^{\wedge 0.5}$ =237.6.

    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 7.19 feet or [(237.6 kV-22 kV)x 0.4]/12 is needed for 392 kV, which brings the total required minimum clearance to 33.7 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. 8.67 feet is required between 320 kV DC energized conductor and ground wire
   ii. 16.59 feet is required between 320 kV DC 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. 9.88 feet is required between 320 kV DC energized conductors and ground wire
   ii. 15.82 feet is required between 320 kV DC 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. 8.96 feet is required between 320 kV DC energized conductors and ground wire
   ii. 16.88 feet is required between 320 kV DC 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. 8.3 feet are required between 320 kV DC energized conductors and ground wire
   ii. 16.21 feet are required between 320 kV DC energized conductors

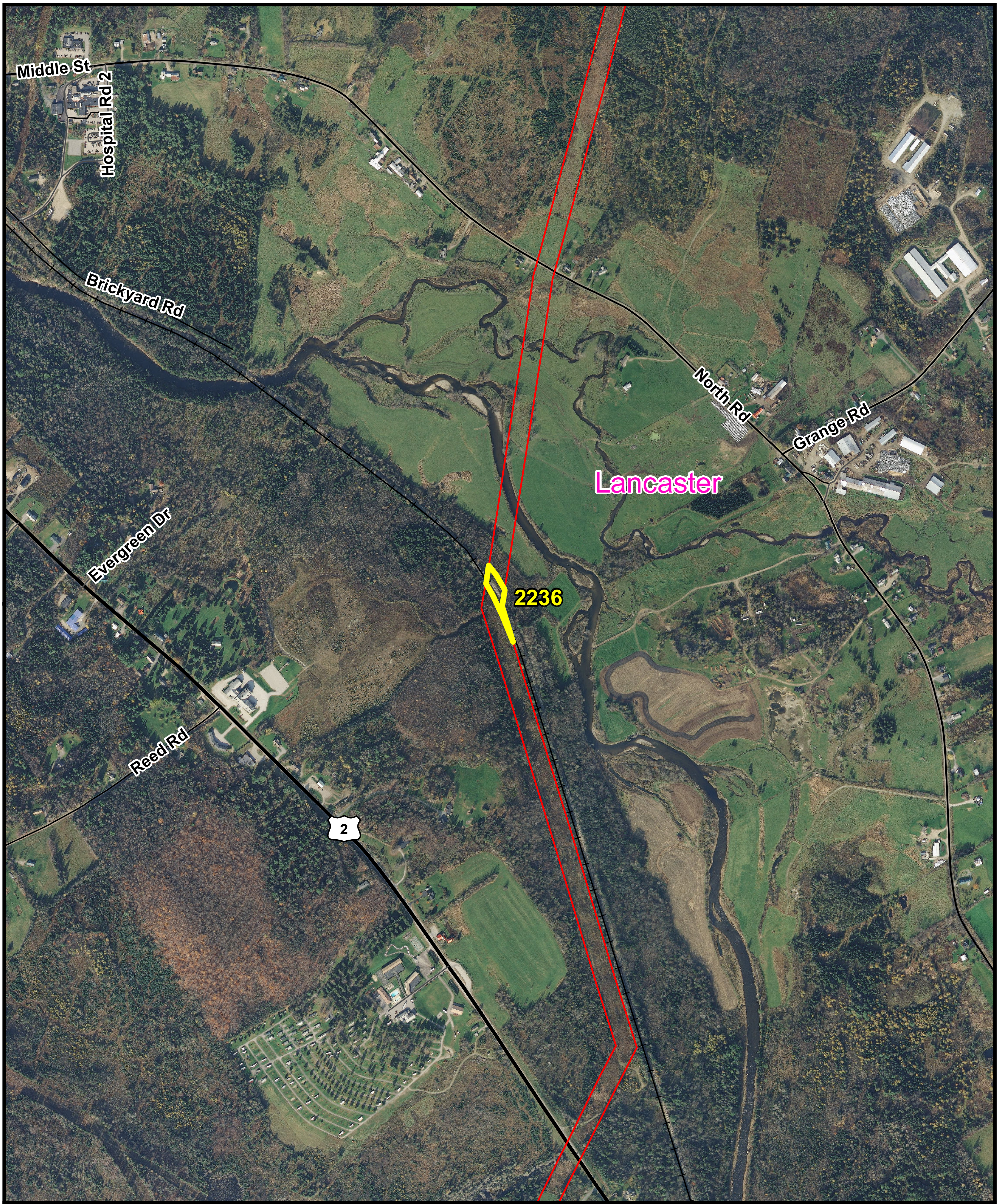
g. Per Figure 235-1 of the NESC conductors or wires cannot encroach the envelope formed by the horizontal and vertical clearances prescribed above.

7. Northern Pass Transmission, LLC (NPT) has investigated a multitude of weather and loading conditions for its design. NPT 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. NPT 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. 130 degrees F – Maximum operating temperature (energized conductor) based on NPT transmission standards, the maximum sag for this weather case results in a clearance to railroad track of 44 feet, this exceeds the minimum required clearance of 33.7 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 22.5 feet vertically and 8.5 feet horizontally from the ground wires to the closest energized conductor.



NORTH

0 500 1,000

Feet

LEGEND

Parcel Boundary

Project ROW

Town Boundary

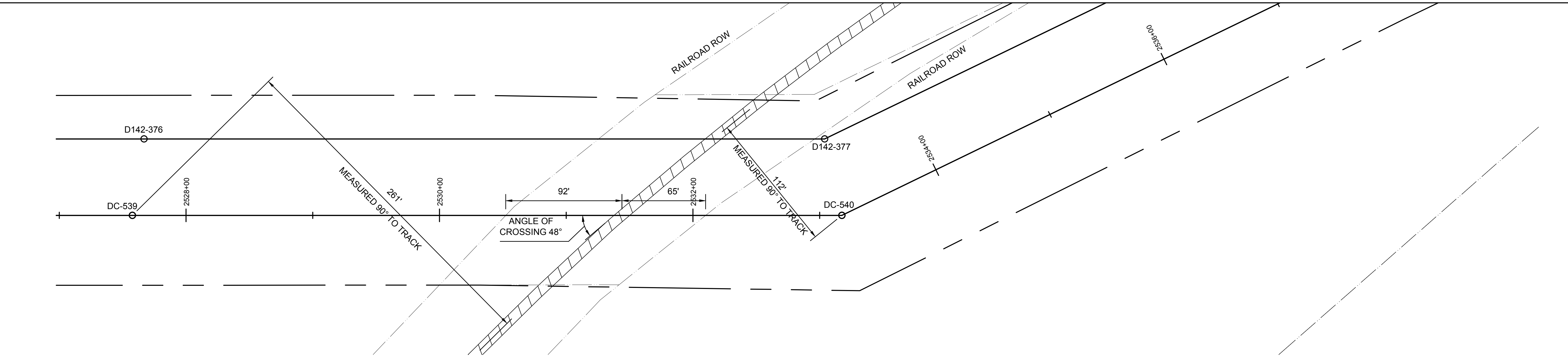
THE NORTHERN PASS

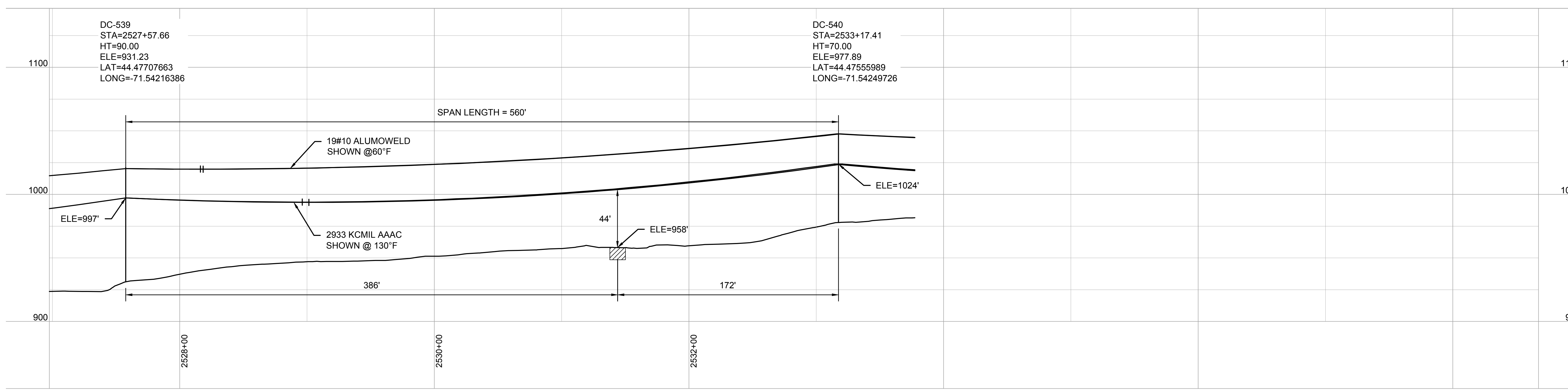
Line List 2236
State Land Crossing Permit
Location Map

Source: NH DOT 2011 Aerial Photography; NH GRANIT; Burns & McDonnell.

August 21, 2015

Path: \\ESPSRV\Data\Data2\Projects\NUS\53899_DC_Tline\GIS\DataFiles\ArcDocs\State_Land_Maps\State_Land_Crossing_Permit_LL2236_Lettersize.mxd rfraser 8/21/2015





NOTES:

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

LEGEND

- TRANSMISSION CENTERLINE
- PARCEL BOUNDARY
- EVERSOURCE ROW
- RAILROAD BED
- PROPOSED MONOPOLE
- PROPOSED TRANS STRUCTURE
- EXISTING H-FRAME

80.0 ft. Horiz. Scale

80.0 ft. Vert. Scale

PRELIMINARY - NOT FOR CONSTRUCTION

REVISION HISTORY				
–	–	–	–	–
A	4/30/15	ISSUED FOR REVIEW	DJL	DAB

THE NORTHERN PASS

NORTHERN PASS LLC

TITLE N2 LL2236 3720/3731 RAILROAD CROSSING PERMIT

BY	REV. NO.	DATE	SIZE	DWG. NO.
MSP	A	4/30/15	B	372099601.DWG

APPENDIX 5
3720/3731 DC LINE
STRUCTURES DC-620 TO DC-621
STATE OF NEW HAMPSHIRE – BUREAU OF RAIL & TRANSIT
GROVETON BRANCH
LL 2819
DALTON, NH

1. This crossing is shown on attached drawing 372099602

2. The location of the 3720/3731 line is shown on attached map titled Line List 2819

3. The 3720/3731 line will be on steel structures with foundations at this crossing. The energized conductor (positive pole and negative pole for direct current) is in a horizontal configuration using a 2-bundle of 2933 kcmil AAAC for each pole. 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. DC-620 will be a structure with V-string insulators. The energized conductors are separated approximately 28 feet horizontally and 0 feet vertically in a horizontal configuration. The ground/OPGW wire is carried on the structure by a support bracket approximately 12 inches below the top of the structure. The ground/OPGW wires are separated horizontally approximately 11 feet. The ground/OPGW and energized conductor are separated vertically by approximately 23.5 feet.

    b. DC-621 will be a structure with strain insulators. The energized conductors are separated approximately 36 feet horizontally and 0 feet vertically in a horizontal configuration. The ground/OPGW wire is carried on the structure by a support bracket approximately 12 inches below the top of the structure. The ground/OPGW wires are separated horizontally approximately 9.5 feet. The ground/OPGW and energized conductor are separated vertically by approximately 23.5 feet.

4. Energized conductors will have a maximum tension of 20,000 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 3720/3731 line is a 320 kV direct current (DC) line. Per NESC 230 the required clearances are applicable for both alternating and direct currents. To convert 320 kV DC to a corresponding alternating current (AC) voltage (for purposes of calculating clearances) take 320 kV x $3^{0.5}$ / $2^{0.5}$ = 392 kV. The equivalent phase to ground is calculated by taking 392 x 105% (voltage adder) divided by 3^$^{0.5}$ =237.6.

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 7.19 feet or [(237.6 kV-22 kV)x 0.4]/12 is needed for 392 kV, which brings the total required minimum clearance to 33.7 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. 8.67 feet is required between 320 kV DC energized conductor and ground wire
    ii. 16.59 feet is required between 320 kV DC 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. 9.88 feet is required between 320 kV DC energized conductors and ground wire
    ii. 15.82 feet is required between 320 kV DC 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. 8.96 feet is required between 320 kV DC energized conductors and ground wire
    ii. 16.88 feet is required between 320 kV DC 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. 8.3 feet are required between 320 kV DC energized conductors and ground wire
    ii. 16.21 feet are required between 320 kV DC energized conductors

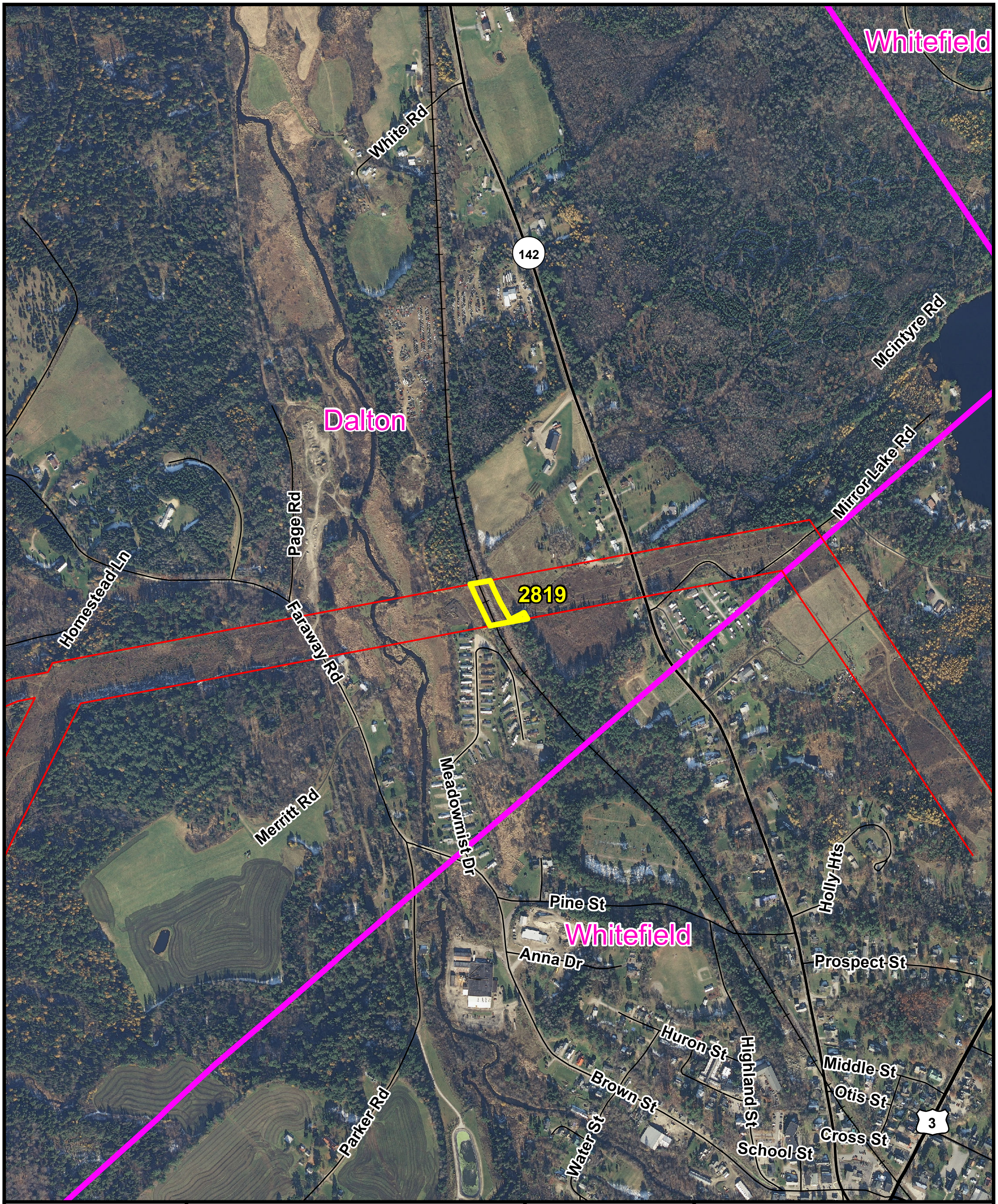
g. Per Figure 235-1 of the NESC conductors or wires cannot encroach the envelope formed by the horizontal and vertical clearances prescribed above.

7. Northern Pass Transmission, LLC (NPT) has investigated a multitude of weather and loading conditions for its design. NPT 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. NPT 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. 130 degrees F – Maximum operating temperature (energized conductor) based on NPT transmission standards, the maximum sag for this weather case results in a clearance to railroad track of 57 feet, this exceeds the minimum required clearance of 33.7 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 22.3 feet vertically and 9.5 feet horizontally from the ground wires to the closest energized conductor.



NORTH

0 400 800

Feet

LEGEND

Parcel Boundary

Project ROW

Town Boundary

THE NORTHERN PASS

Line List 2819
State Land Crossing Permit
Location Map

Source: NH DOT 2011 Aerial Photography; NH GRANIT; Burns & McDonnell.

August 21, 2015

Path: \\ESPSRV\Data\Data2\Projects\NUS\53899_DC_Tline\GIS\DataFiles\ArcDocs\State_Land_Maps\State_Land_Crossing_Permit_LL2819_Lettersize.mxd rfraser 8/21/2015

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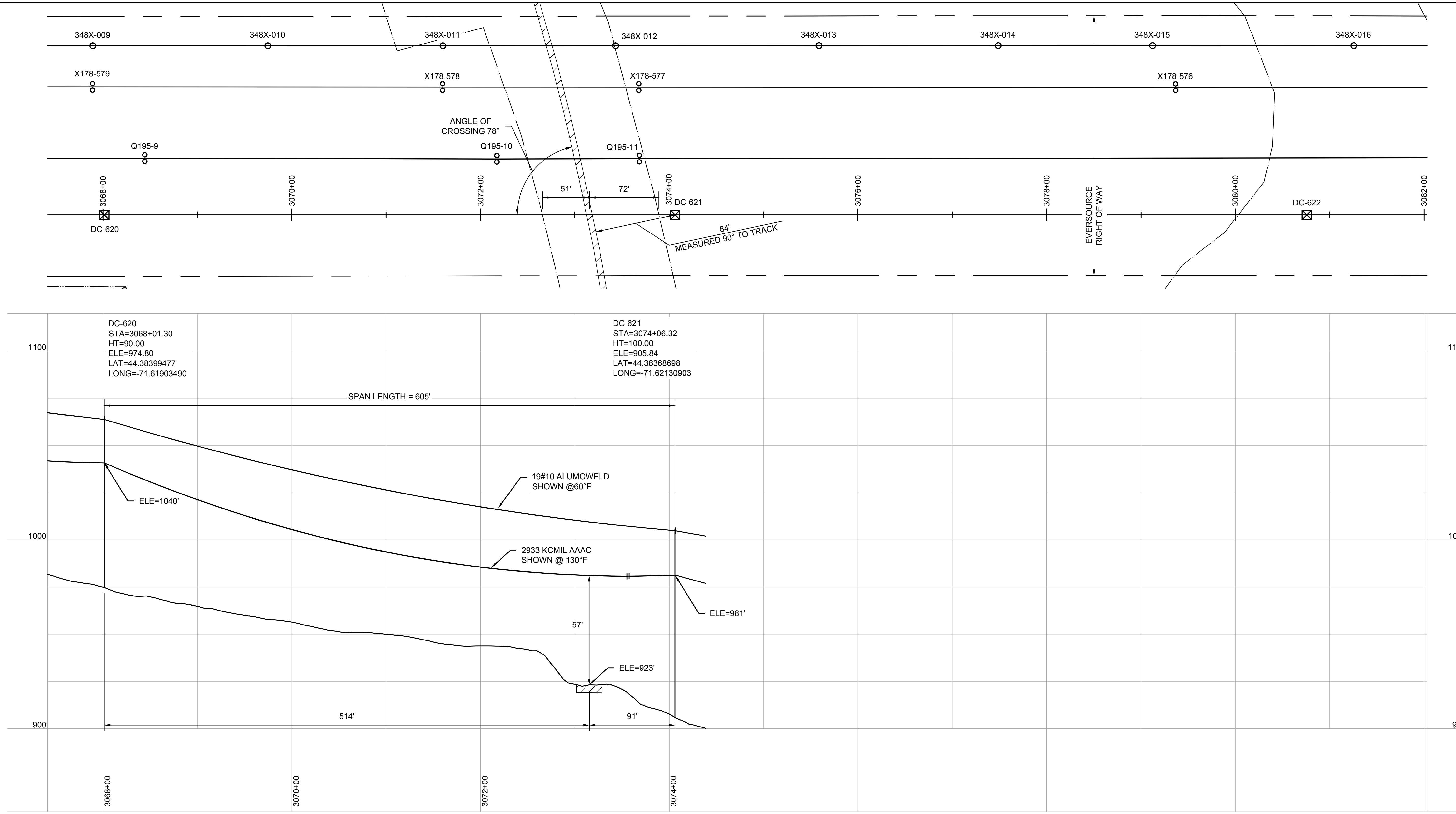


NOTES:

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

LEGEND

- TRANSMISSION CENTERLINE
- PARCEL BOUNDARY
- EVERSOURCE ROW
- RAILROAD BED
- PROPOSED MONOPOLE
- PROPOSED TRANS STRUCTURE
- EXISTING H-FRAME

N

100.0 ft. Horiz. Scale

50.0 ft. Vert. Scale

PRELIMINARY - NOT FOR CONSTRUCTION

REVISION HISTORY

–	–	–	–	–
A	4/30/15	ISSUED FOR REVIEW	DJL	DAB

THE NORTHERN PASS

NORTHERN PASS LLC

TITLE C1 LL2819 3720/3731 RAILROAD CROSSING PERMIT

BY	REV. NO.	DATE	SIZE	DWG. NO.
DJL	A	4/30/15	B	372099602.DWG

APPENDIX 6
3720/3731 LINE
STRUCTURES DC-662 TO DC-663
STATE OF NEW HAMPSHIRE – DEPARTMENT OF TRANSPORTATION
GROVETON BRANCH
LL 3109
BETHLEHEM, NH

1. This crossing is shown on attached drawing 372099603

2. The location of the 3720/3731 line is shown on attached map titled Line List 3109

3. The 3720/3731 line will be on steel structures with foundations at this crossing. The energized conductor (positive pole and negative pole for direct current) is in a horizontal configuration using a 2-bundle of 2933 kcmil AAAC for each pole. 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. DC-662 & DC-663 will be structures with V-string insulators. The energized conductors are separated approximately 28 feet horizontally and 0 feet vertically in a horizontal configuration. The ground/OPGW wire is carried on the structure by a support bracket approximately 12 inches below the top of the structure. The ground/OPGW wires are separated horizontally approximately 11 feet. The ground/OPGW and energized conductor are separated vertically by approximately 23.5 feet.

4. Energized conductors will have a maximum tension of 20,000 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 3720/3731 line is a 320 kV direct current (DC) line. Per NESC 230 the required clearances are applicable for both alternating and direct currents. To convert 320 kV DC to a corresponding alternating current (AC) voltage (for purposes of calculating clearances) take 320 kV x $3^{0.5}$ / $2^{0.5}$ = 392 kV. The equivalent phase to ground is calculated by taking 392 x 105% (voltage adder) divided by $3^{\wedge 0.5}$ =237.6.

    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 7.19 feet or [(237.6 kV-22 kV)x 0.4]/12 is needed for 392 kV, which brings the total required minimum clearance to 33.7 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. 8.67 feet is required between 320 kV DC energized conductor and ground wire
    ii. 16.59 feet is required between 320 kV DC 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. 9.88 feet is required between 320 kV DC energized conductors and ground wire
    ii. 15.82 feet is required between 320 kV DC 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. 8.96 feet is required between 320 kV DC energized conductors and ground wire
    ii. 16.88 feet is required between 320 kV DC 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. 8.3 feet are required between 320 kV DC energized conductors and ground wire
    ii. 16.21 feet are required between 320 kV DC energized conductors

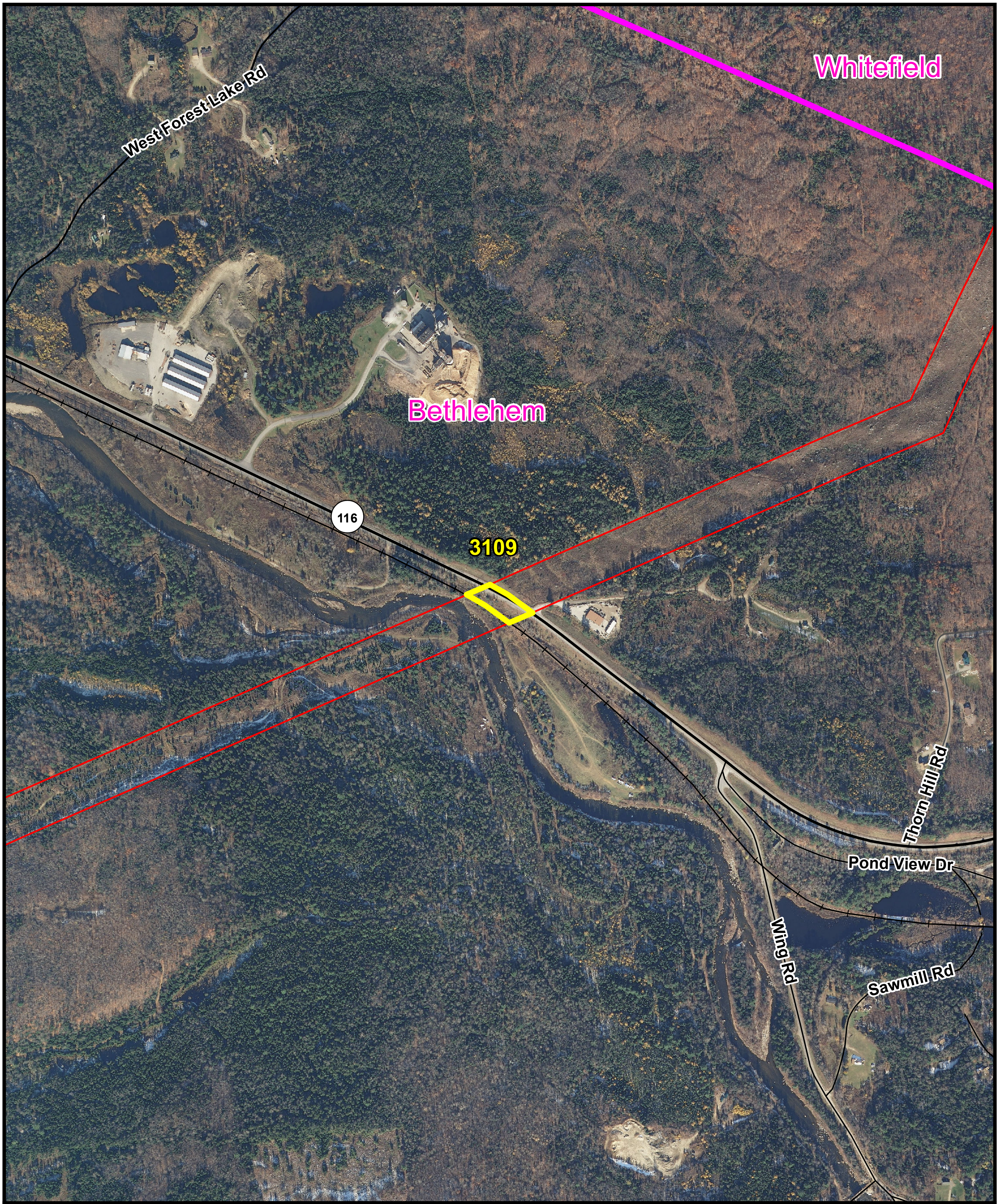
g. Per Figure 235-1 of the NESC conductors or wires cannot encroach the envelope formed by the horizontal and vertical clearances prescribed above.

7. Northern Pass Transmission, LLC (NPT) has investigated a multitude of weather and loading conditions for its design. NPT 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. NPT 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. 130 degrees F – Maximum operating temperature (energized conductor) based on NPT transmission standards, the maximum sag for this weather case results in a clearance to railroad track of 63 feet, this exceeds the minimum required clearance of 33.7 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 22.0 feet vertically and 8.7 feet horizontally from the ground wires to the closest energized conductor.



NORTH

0 400 800

Feet

LEGEND

Parcel Boundary

Project ROW

Town Boundary

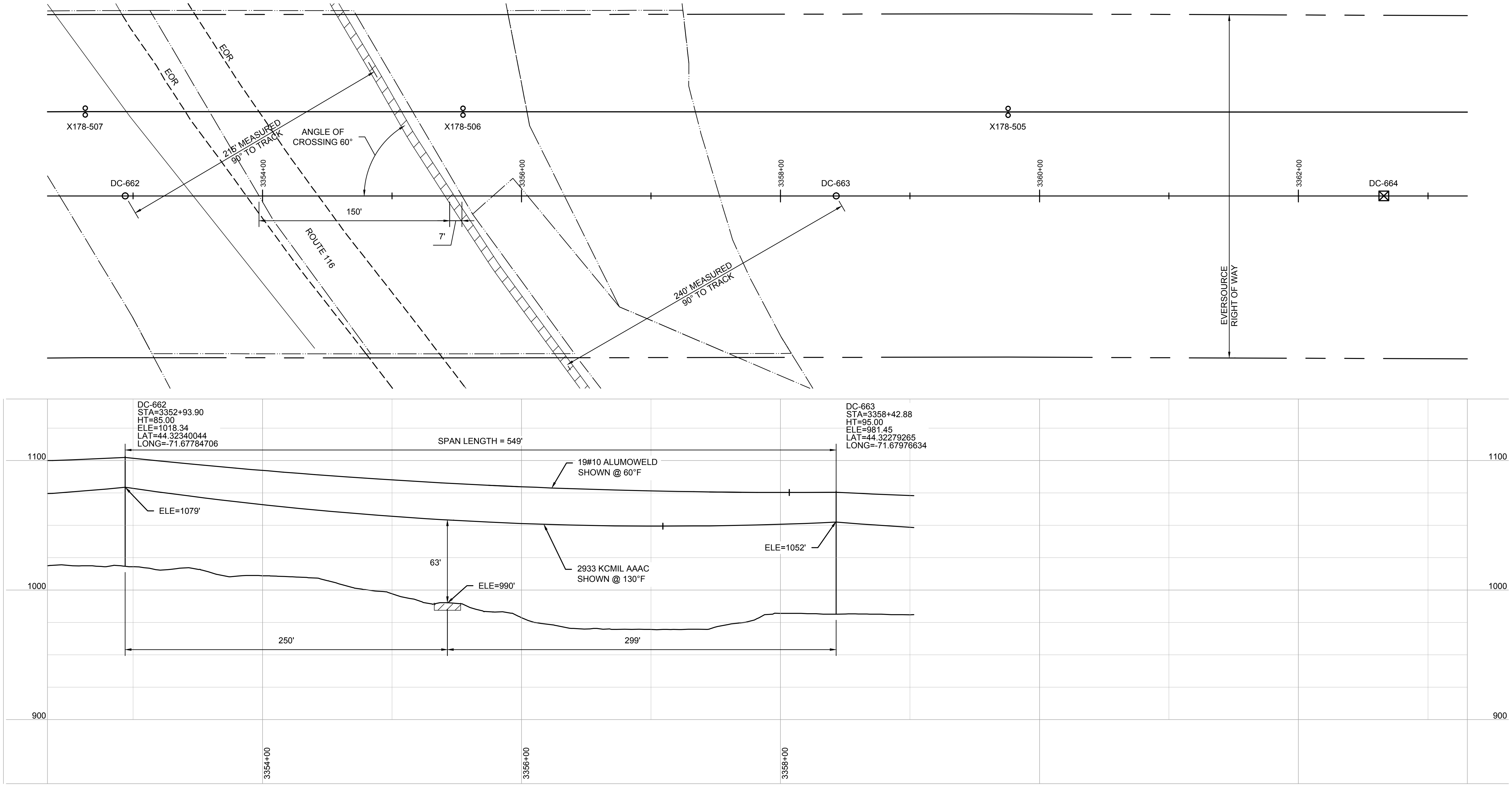
THE NORTHERN PASS

Line List 3109
State Land Crossing Permit
Location Map

Path: \\ESPSRV\Data\Data2\Projects\NUS\53899_DC_Tline\GIS\DataFiles\ArcDocs\State_Land_Maps\State_Land_Crossing_Permit_LL3109_Lettersize.mxd rfraser 8/21/2015

Source: NH DOT 2011 Aerial Photography; NH GRANIT; Burns & McDonnell.

August 21, 2015



NOTES:

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

LEGEND

- TRANSMISSION CENTERLINE
- PARCEL BOUNDARY
- EVERSOURCE ROW
- RAILROAD BED
- PAVED ROADS
- PROPOSED TRANS STRUCTURE
- EXISTING H-FRAME
- PROPOSED MONOPOLE

75.0 ft. Horiz. Scale

75.0 ft. Vert. Scale

PRELIMINARY - NOT FOR CONSTRUCTION

REVISION HISTORY

–	–	–	–	–
A	4/30/15	ISSUED FOR REVIEW	DJL	DAB

THE NORTHERN PASS

NORTHERN PASS LLC

TITLE C1 LL3109 3720/3731 RAILROAD CROSSING PERMIT

BY	REV. NO.	DATE	SIZE	DWG. NO.
DJL	A	4/30/15	B	372099603.DWG

09/25/2015 8:04am – mspepich – N:\NUSCO\58479 – NPT\Overhead\Cadd\01-Record Worksheets\02 Permits\RR Crossing Permits\372099603.dwg

APPENDIX 7
3720/3731 LINE
STRUCTURES DC-1142 TO DC-1142
STATE OF NEW HAMPSHIRE- DEPARTMENT OF TRANSPORTATION
STATE POLICE FIRING RANGE
LL6145
NEW HAMPTON, NH

1. This crossing is shown on attached drawing 372099002

    a. This drawing shows a 30' terrain clearance line (offset from ground surface), which is greater than required minimum of 21.7'.

2. The location of the 3720/3731 line is shown on attached maps titled Line List 6145.

3. This portion of the 3720/3731 line will be on steel structures with foundations. The energized conductor (positive pole and negative pole for direct current) is in a horizontal configuration using a 2-bundle of 2933 kcmil AAAC for each pole. 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 3720/3731 line crosses the parcel LL 6145, State of New Hampshire – Department of Transportation for approximately 450'.

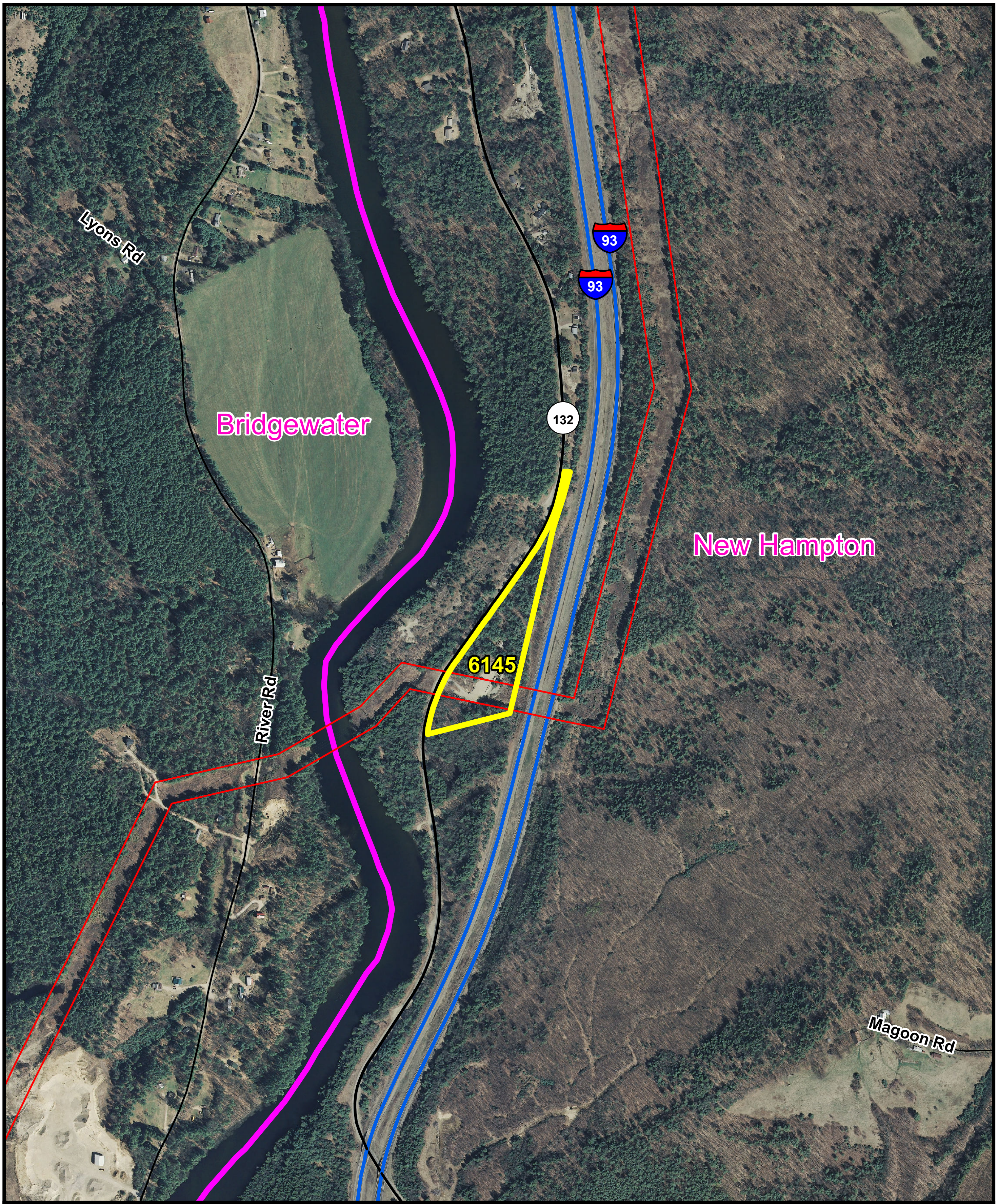
4. Energized conductors will have a maximum tension of 20,000 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice). Ground wires will have a maximum tension of 5,500 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice).

5. The 3720/3731 line is a 320 kV direct current (DC) line. Per NESC 230 the required clearances are applicable for both alternating and direct currents. To convert 320 kV DC to a corresponding alternating current (AC) voltage (for purposes of calculating clearances) take 320 kV x $3^{0.5}$ / $2^{0.5}$ = 392 kV. The equivalent phase to ground is calculated by taking 392 x 105% (voltage adder) divided by 3^$^{0.5}$ =237.6.

6. Northern Pass Transmission, LLC (NPT) has investigated a multitude of weather and loading conditions for its design. NPT 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. NPT 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. 130 degrees F – Maximum operating temperature (energized conductor) based on NPT transmission standards the maximum sag for this weather case controls.



NORTH

0 400 800

Scale in Feet

LEGEND

- Parcel Boundary
- Project ROW
- Town Boundary

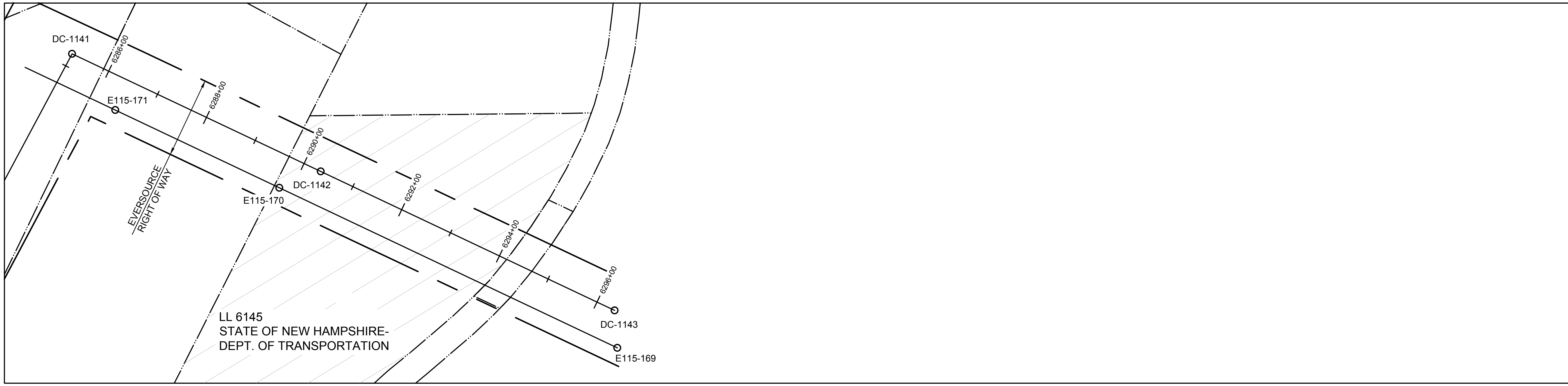
THE NORTHERN PASS

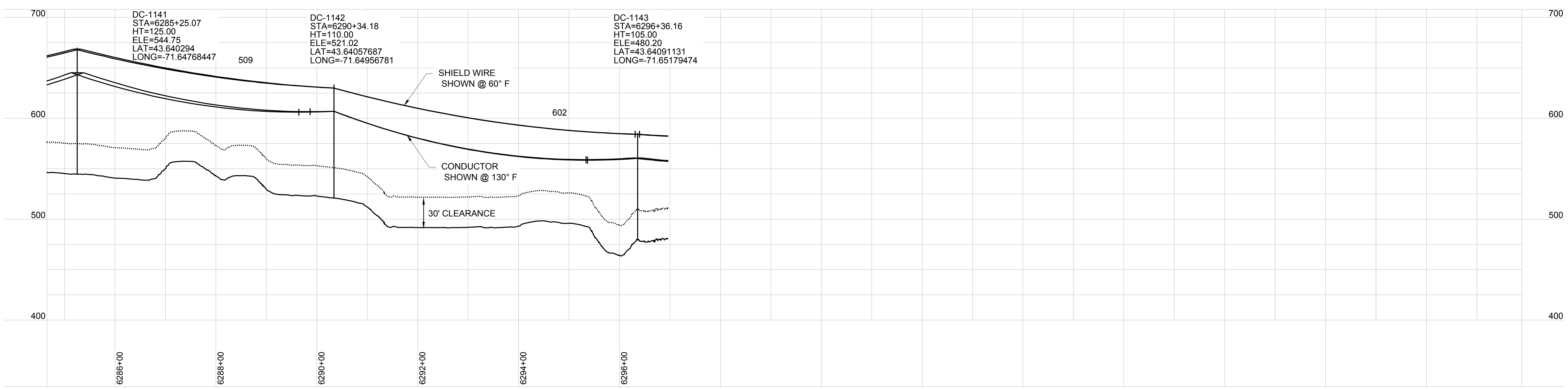
Line List 6145
State Land Crossing Permit
Location Map

Source: NH DOT 2011 Aerial Photography; NH GRANIT; Burns & McDonnell.

August 21, 2015

Path: \\ESPSRV\Data\Data2\Projects\NUS\53899_DC_Tline\GIS\DataFiles\ArcDocs\State_Land_Maps\State_Land_Crossing_Permit_LL6145_Lettersize.mxd rfraser 8/21/2015





200.0 ft. Horiz. Scale

100.0 ft. Vert. Scale

PUBLIC LAND

PROPOSED MONOPOLE

PROPOSED TRANS STRUCTURE

N

PRELIMINARY - NOT FOR CONSTRUCTION

REVISION HISTORY				
–	–	–	–	–
A	4/30/15	ISSUED FOR REVIEW	KRR	DAB

THE NORTHERN PASS

NORTHERN PASS LLC

TITLE C2 LL6145 3720/3731 STATE LAND CROSSING PERMIT

BY	REV. NO.	DATE	SIZE	DWG. NO.
KRR	A	4/30/15	B	372099002.DWG

APPENDIX 8
3720/3731 DC LINE
STRUCTURES DC-1209 TO DC-1213
STATE OF NEW HAMPSHIRE- DEPARTMENT OF RESOURCES AND ECONOMIC DEVELOPMENT
WILLIAM H. THOMAS STATE FOREST
LL6703, 6704, 6705
HILL, NH

1. This crossing is shown on attached drawing 372099003

    a. This drawing shows a 30’ terrain clearance line (offset from ground surface), which is greater than required minimum of 21.7’.

2. The location of the 3720/3731 line is shown on attached maps titled Line List 6703, Line List 6704, Line List 6705.

3. This portion of the 3720/3731 line will be on steel structures with foundations. The energized conductor (positive pole and negative pole for direct current) is in a horizontal configuration using a 2-bundle of 2933 kcmil AAAC for each pole. 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 3720/3731 line crosses the parcel LL 6703, State of New Hampshire – Department of Resources of Economic Development, William H. Thomas State Forest for approximately 420’

    b. The 3720/3731 line crosses the parcel LL 6704, State of New Hampshire – Department of Resources of Economic Development, William H. Thomas State Forest for approximately 720’

    c. The 3720/3731 line crosses the parcel LL 6705, State of New Hampshire – Department of Resources of Economic Development, William H. Thomas State Forest for approximately 880’

4. Energized conductors will have a maximum tension of 20,000 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).

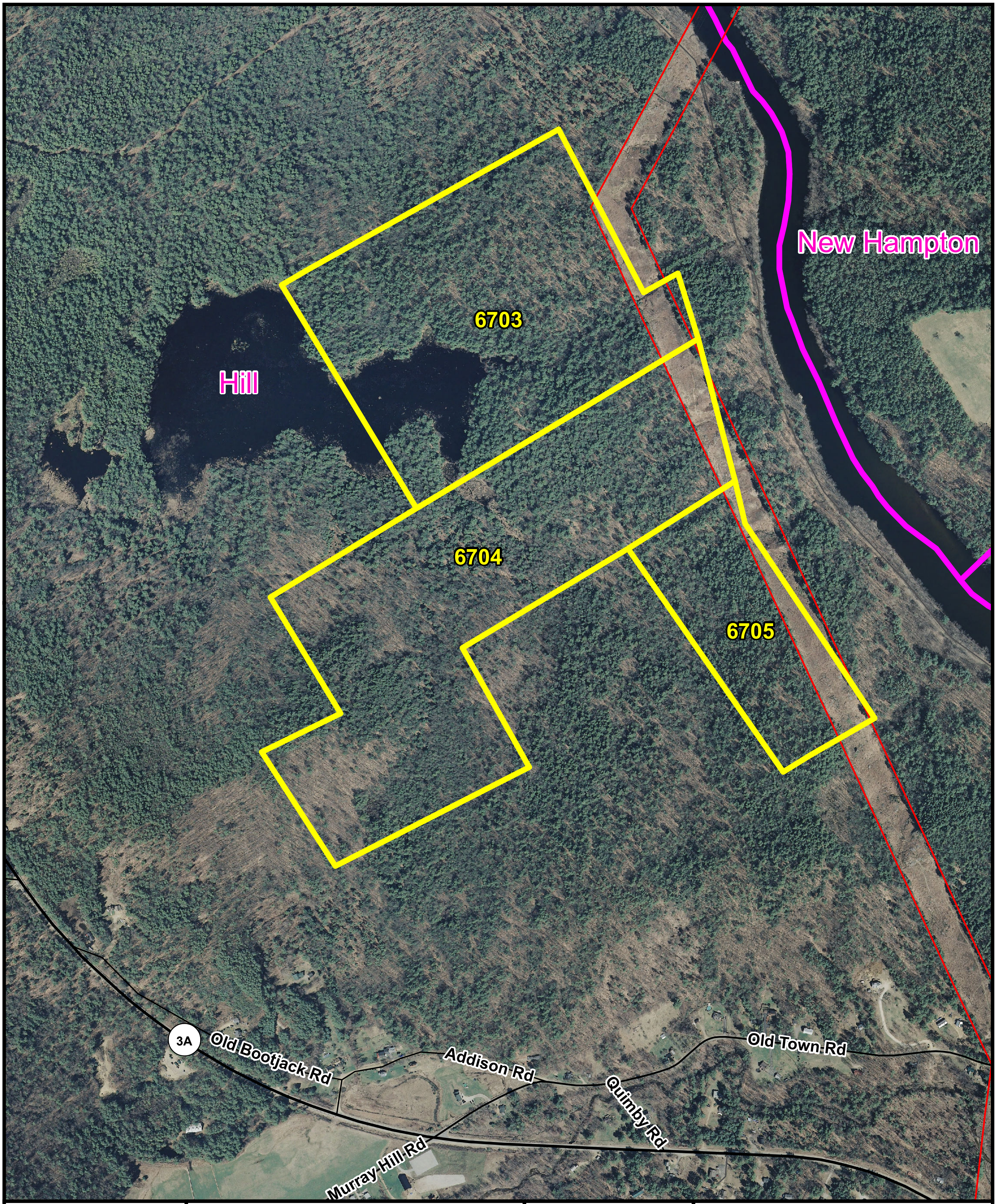
5. The 3720/3731 line is a 320 kV direct current (DC) line. Per NESC 230 the required clearances are applicable for both alternating and direct currents. To convert 320 kV DC to a corresponding alternating current (AC) voltage (for purposes of calculating clearances) take 320 kV x $3^{0.5}$ / $2^{0.5}$ = 392 kV. The equivalent phase to ground is calculated by taking 392 x 105% (voltage adder) divided by 3^$^{0.5}$ =237.6.

6. Northern Pass Transmission, LLC (NPT) has investigated a multitude of weather and loading conditions for its design. NPT 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. NPT 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. 130 degrees F – Maximum operating temperature (energized conductor) based on NPT transmission standards the maximum sag for this weather case controls.



NORTH

0 400 800

Scale in Feet

LEGEND

- Parcel Boundary
- Project ROW
- Town Boundary

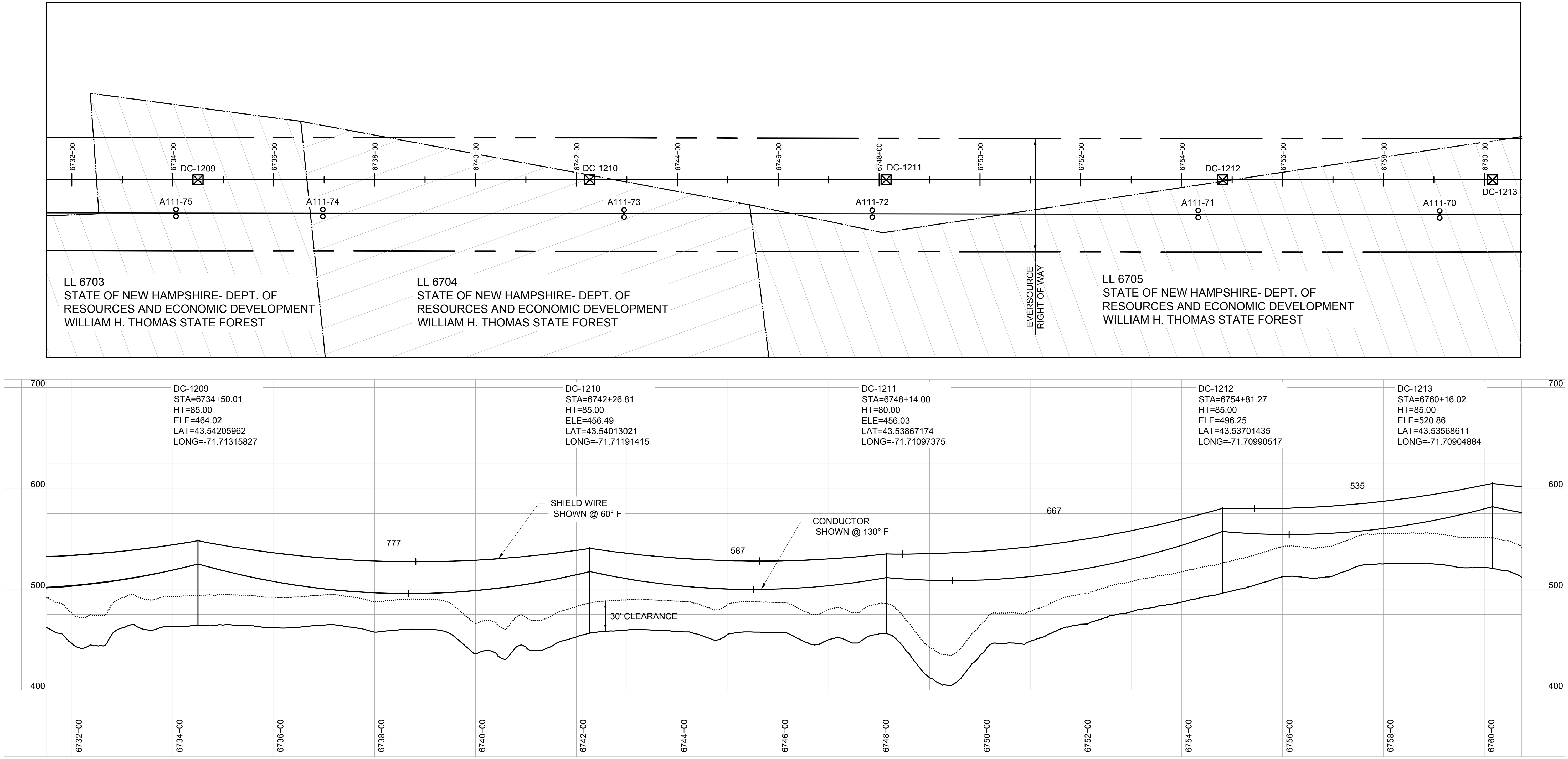
THE NORTHERN PASS

Line List 6703, 6704, & 6705
State Land Crossing Permit
Location Map

Source: NH DOT 2010 Aerial Photography; NH GRANIT; Burns & McDonnell.

August 21, 2015

Path: \\ESPSRV\Data\Data2\Projects\NUS\53899_DC_Tline\GIS\DataFiles\ArcDocs\State_Land_Maps\State_Land_Crossing_Permit_LL6703_6704_6705_Lettersize.mxd rfraser 8/21/2015



200.0 ft. Horiz. Scale

100.0 ft. Vert. Scale

N

PUBLIC LAND

PROPOSED MONOPOLE

PROPOSED TRANS STRUCTURE

EXISTING H-FRAME

PRELIMINARY - NOT FOR CONSTRUCTION

REVISION HISTORY				
–	–	–	–	–
A	4/30/15	ISSUED FOR REVIEW	KRR	DAB

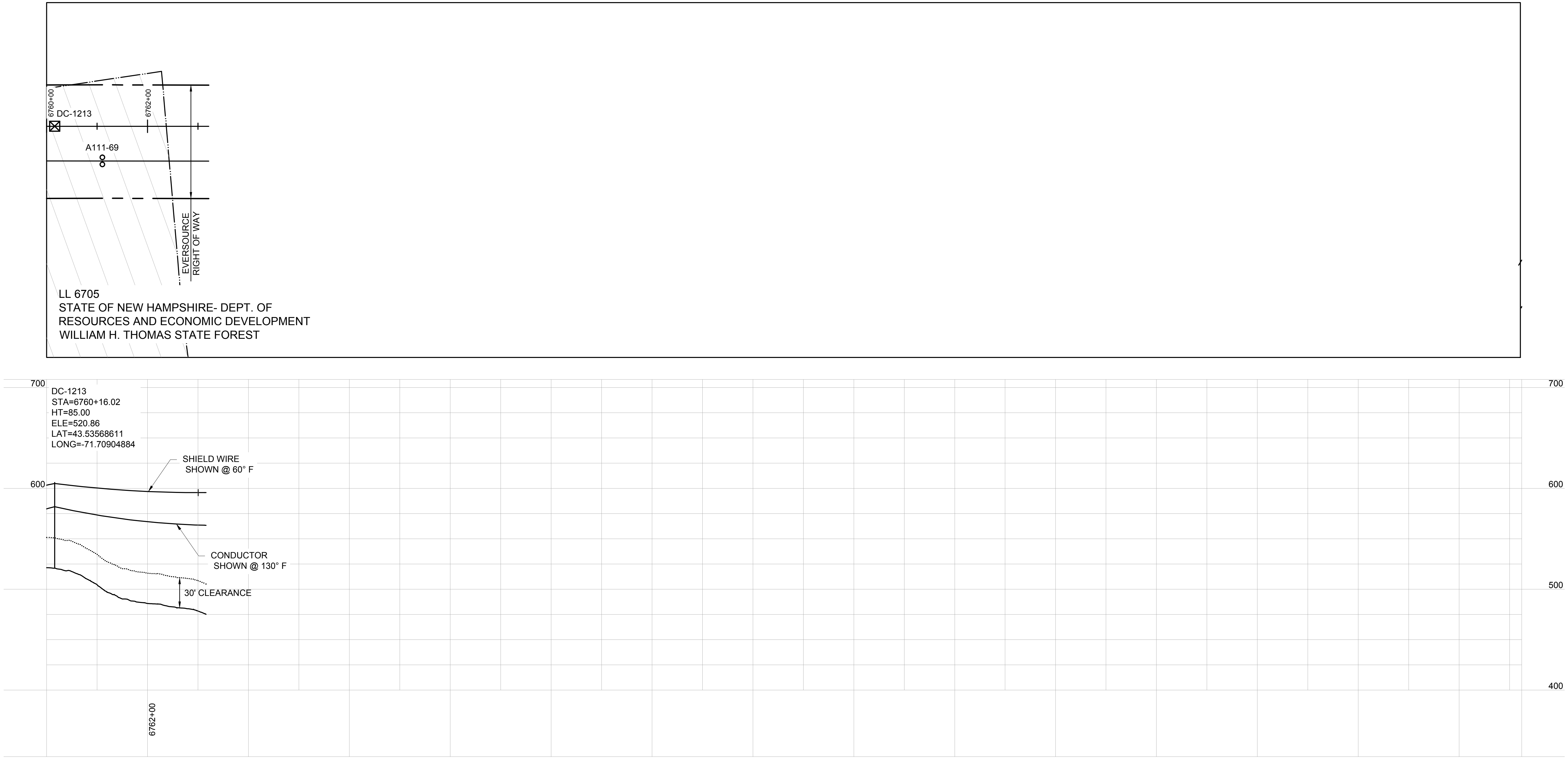
THE NORTHERN PASS

NORTHERN PASS LLC

TITLE C2 LL6703, LL6704, L6705 3720/3731 STATE LAND CROSSING PERMIT SH. 1 OF 2

BY	REV. NO.	DATE	SIZE	DWG. NO.
KRR	A	4/30/15	B	372099003.DWG

08/27/2015 7:29am – mspepich – N:\NUSCO\58479 – NPT\Overhead\Cadd\01–Record Worksheets\02 Permits\Public Lands Crossings\DXF Exports\372099003.dwg



200.0 ft. Horiz. Scale

100.0 ft. Vert. Scale

PUBLIC LAND

PROPOSED MONOPOLE

PROPOSED TRANS STRUCTURE

EXISTING H-FRAME

PRELIMINARY - NOT FOR CONSTRUCTION

REVISION HISTORY

–	–	–	–	–
A	4/30/15	ISSUED FOR REVIEW	KRR	DAB

THE NORTHERN PASS

NORTHERN PASS LLC

TITLE C2 LL6703, LL6704, L6705 3720/3731 STATE LAND CROSSING PERMIT SH. 2 OF 2

BY	REV. NO.	DATE	SIZE	DWG. NO.
KRR	A	4/30/15	B	372099003.DWG

APPENDIX 9
3720/3731 DC LINE
STRUCTURES DC-1270 TO DC-1270
STATE OF NEW HAMPSHIRE- BUREAU OF RAIL AND TRANSIT
RAIL TRAIL
LL7317.01
FRANKLIN, NH

1. This crossing is shown on attached drawing 372099004

    a. This drawing shows a 30' terrain clearance line (offset from ground surface), which is greater than required minimum of 21.7'.

2. The location of the 3720/3731 line is shown on attached maps titled Line List 7317.01

3. This portion of the 3720/3731 line will be on steel structures with foundations. The energized conductor (positive pole and negative pole for direct current) is in a horizontal configuration using a 2-bundle of 2933 kcmil AAAC for each pole. 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 3720/3731 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 20,000 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 3720/3731 line is a 320 kV direct current (DC) line. Per NESC 230 the required clearances are applicable for both alternating and direct currents. To convert 320 kV DC to a corresponding alternating current (AC) voltage (for purposes of calculating clearances) take 320 kV x $3^{0.5}$ / $2^{0.5}$ = 392 kV. The equivalent phase to ground is calculated by taking 392 x 105% (voltage adder) divided by $3^{\wedge 0.5}$ =237.6.

6. Northern Pass Transmission, LLC (NPT) has investigated a multitude of weather and loading conditions for its design. NPT 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. NPT 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. 130 degrees F – Maximum operating temperature (energized conductor) based on NPT transmission standards the maximum sag for this weather case controls.

NORTH

0 200 400

Scale in Feet

LEGEND

- Parcel Boundary
- Project ROW
- Town Boundary

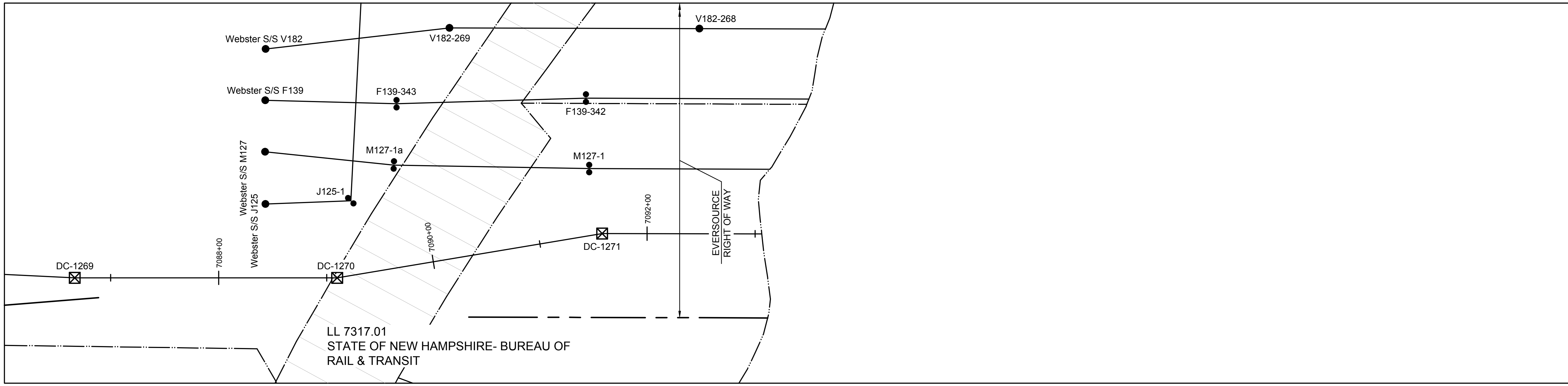
THE NORTHERN PASS

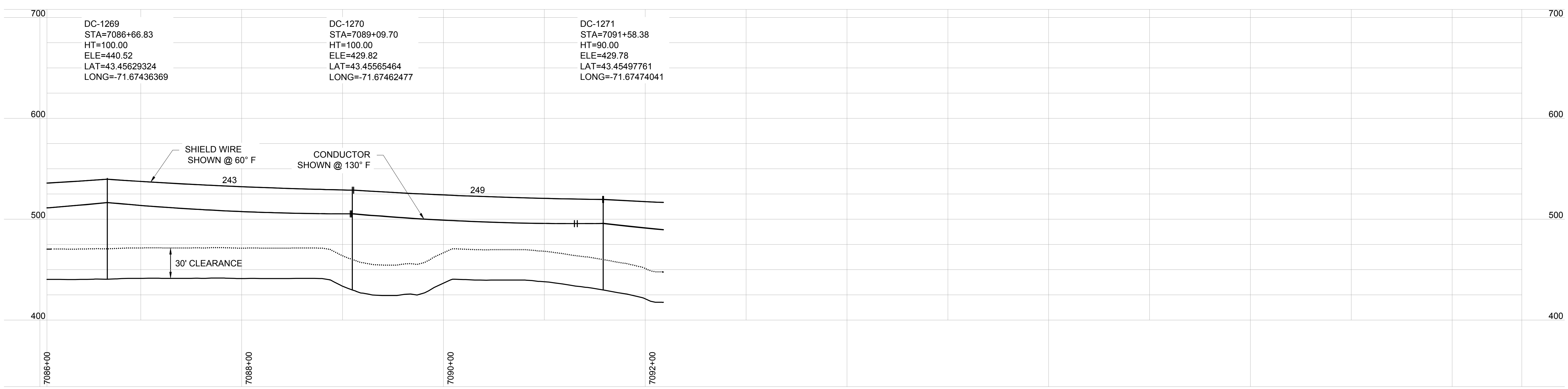
Line List 7317.01
State Land Crossing Permit
Location Map

Source: NH DOT 2010 Aerial Photography; NH GRANIT; Burns & McDonnell.

August 21, 2015

Path: \\ESPSRV\Data\Data2\Projects\NUS\53899_DC_Tline\GIS\DataFiles\ArcDocs\State_Land_Maps\State_Land_Crossing_Permit_LL7317.01_Lettersize.mxd rfraser 8/21/2015





200.0 ft. Horiz. Scale

100.0 ft. Vert. Scale

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

THE NORTHERN PASS

NORTHERN PASS LLC

TITLE C2 7317.01 3720/3731 STATE LAND CROSSING PERMIT

BY	REV. NO.	DATE	SIZE	DWG. NO.
KRR	A	4/30/15	B	372099004.DWG

08/27/2015 7:30am – mspepich – N:\NUSCO\58479 – NPT\Overhead\Cadd\01-Record Worksheets\02 Permits\Public Lands Crossings\DXF Exports\372099004.dwg

APPENDIX 10
3132 AC LINE
STRUCTURES 3132-4 TO 3132-5
STATE OF NEW HAMPSHIRE – DEPARTMENT OF TRANSPORTATION
CONCORD-LINCOLN LINE
LL 7075
FRANKLIN, NH

1. This crossing is shown on attached drawing 313243601

2. The location of the 3132 line is shown on attached map titled Line List 7075

3. The 3132 line will be on steel structures at this crossing. The energized conductor is in a horizontal configuration using a 2-bundle of 1590 kcmil ACSR. 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. 3132-4 & 3132-5 will be structures with suspension insulators. The energized conductors are separated approximately 26 feet horizontally and 0 feet vertically in a horizontal 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 wires are separated horizontally approximately 16 feet. The ground/OPGW and energized conductor are separated vertically by approximately 25 feet.

4. Energized conductors will have a maximum tension of 11,400 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 3132 line is a 345 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 6.24 feet or [(209.1 kV-22 kV) x 0.4]/12 is needed, which brings the total required minimum clearance to 32.7 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. 7.72 feet is required between 345 kV AC energized conductor and ground wire
ii. 12.83 feet is required between 345 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. 9.17 feet is required between 345 kV AC energized conductors and ground wire
ii. 13.00 feet is required between 345 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. 8.01 feet is required between 345 kV AC energized conductors and ground wire
ii. 13.12 feet is required between 345 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. 7.34 feet are required between 345 kV AC energized conductors and ground wire
ii. 14.31 feet are required between 345 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.

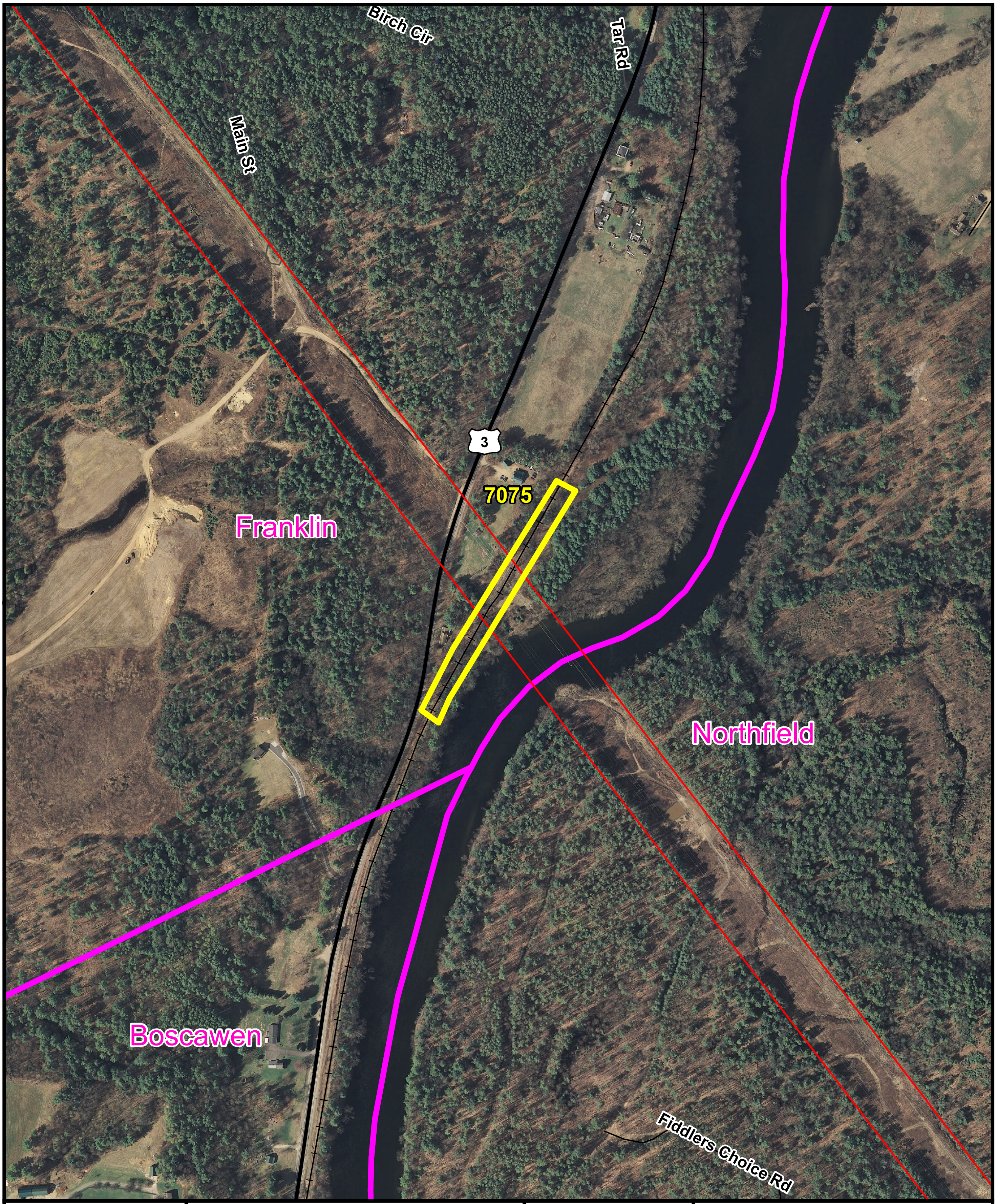
7. Northern Pass Transmission, LLC (NPT) has investigated a multitude of weather and loading conditions for its design. NPT used these design conditions and combinations thereof to determine the minimum clearance of all conductors to the water and land surfaces, between the phase conductors and OPGW cable. NPT 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 NPT transmission standards, the maximum sag for this weather case results in a clearance to railroad track of 57 feet, this exceeds the minimum required clearance of 32.7 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 24.6

feet vertically and 13.3 feet horizontally from the ground wires to the closest energized conductor.



NORTH

0 250 500

Scale in Feet

LEGEND

Parcel Boundary

Project ROW

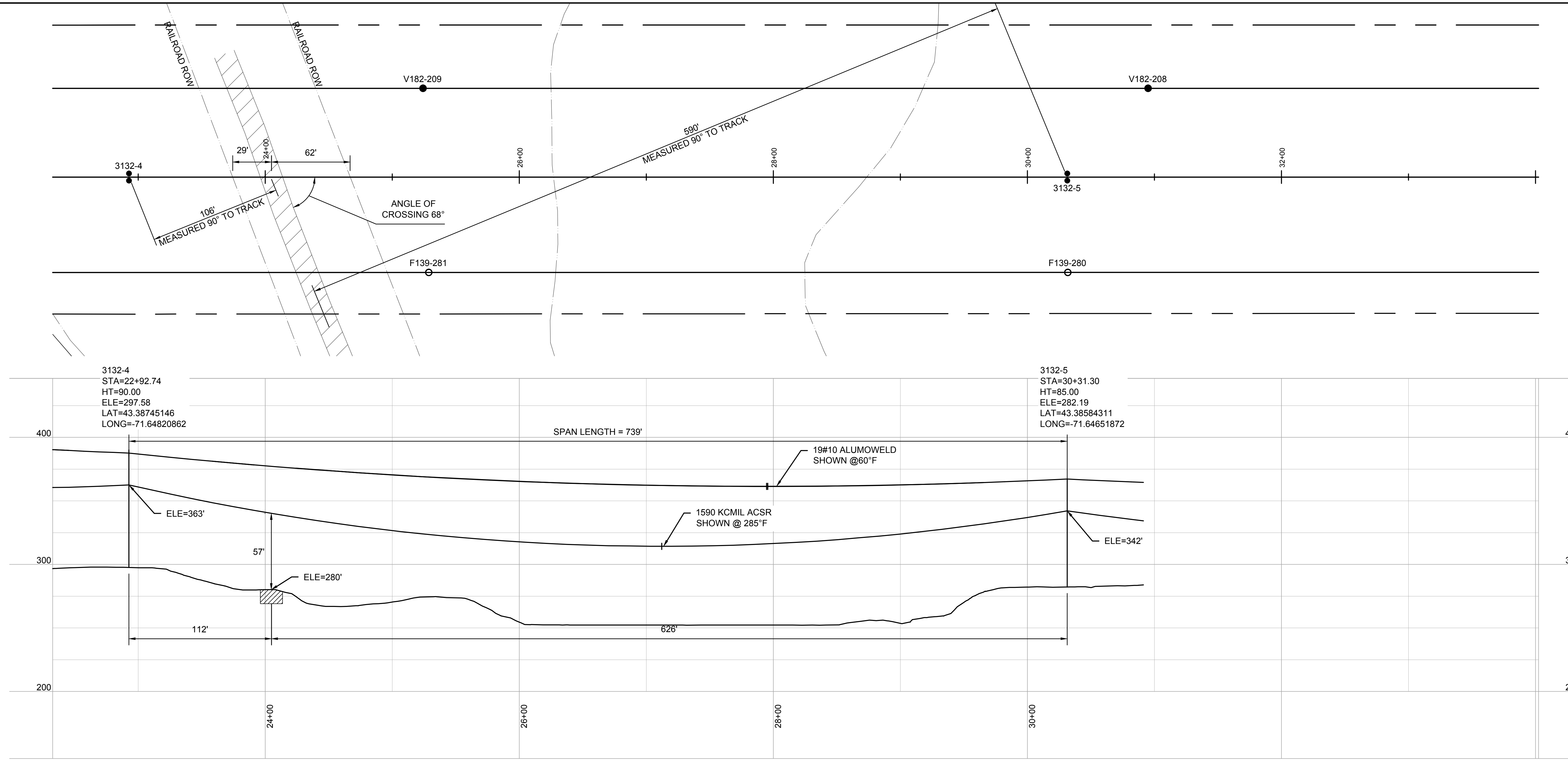
Town Boundary

THE NORTHERN PASS

Line List 7075
State Land Crossing Permit
Location Map

Source: NH DOT 2010 Aerial Photography; NH GRANIT; Burns & McDonnell. August 25, 2015

Path: \\ESPSRV\data\Data2\Projects\NUS\53899_DC_Tline\GIS\DataFiles\ArcDocs\State_Land_Maps\State_Land_Crossing_Permit_LL7075_Lettersize.mxd rfraser 8/25/2015



NOTES:

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

LEGEND

TRANSMISSION CENTERLINE
PARCEL BOUNDARY
EVERSOURCE ROW
RAILROAD BED

PROPOSED MONOPOLE
PROPOSED TRANS STRUCTURE
H-FRAME
EXISTING MONOPOLE

80.0 ft. Horiz. Scale

80.0 ft. Vert. Scale

PRELIMINARY - NOT FOR CONSTRUCTION

REVISION HISTORY				
–	–	–	–	–
A	4/23/15	ISSUED FOR REVIEW	MSP	DAB

THE NORTHERN PASS

NORTHERN PASS LLC

TITLE S1 LL7075 3132 RAILROAD CROSSING PERMIT

BY	REV. NO.	DATE	SIZE	DWG. NO.
MSP	A	4/23/15	B	313243601.DWG

05/07/2015 9:43am – mspepich – N:\NUSCO\58479 – NPT\Overhead\Cadd\01-Record Worksheets\02 Permits\RR Crossing Permits\313243601.dwg

APPENDIX 11
3132 AC LINE
STRUCTURES 3132-4 TO 3132-5
STATE OF NEW HAMPSHIRE- DEPARTMENT OF TRANSPORTATION
VACANT LAND
LL 7076
FRANKLIN, NH

1. This crossing is shown on attached drawing 313299001

    a. This drawing shows a 29' terrain clearance line (offset from ground surface), which is greater than required minimum of 20.8'.

2. The location of the 3132 line is shown on attached maps titled Line List 7076

3. This portion of the 3132 line will be on steel structures. The energized conductor is in a horizontal configuration using a 2-bundle of 1590 kcmil ACSR. 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 3132 line crosses the parcel LL 7076 State of New Hampshire – Department of Transportation for approximately 160'.

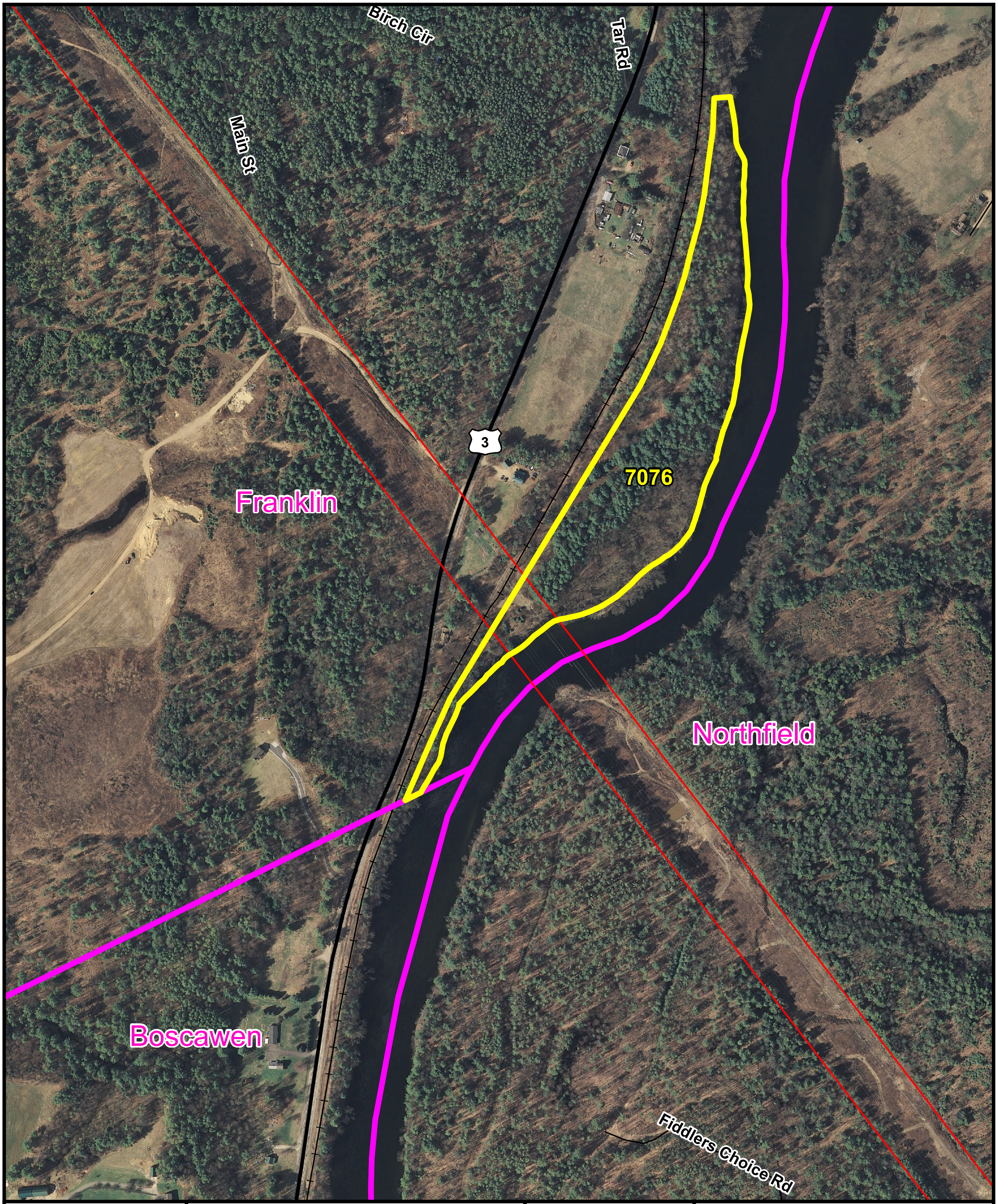
4. Energized conductors will have a maximum tension of 11,400 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice). Ground wires will have a maximum tension of 5,500 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice).

5. The 3132 line is a 345 kV alternating current (AC) line.

6. Northern Pass Transmission, LLC (NPT) has investigated a multitude of weather and loading conditions for its design. NPT 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. NPT 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 NPT transmission standards the maximum sag for this weather case controls.



NORTH

0 250 500

Scale in Feet

LEGEND

Parcel Boundary

Project ROW

Town Boundary

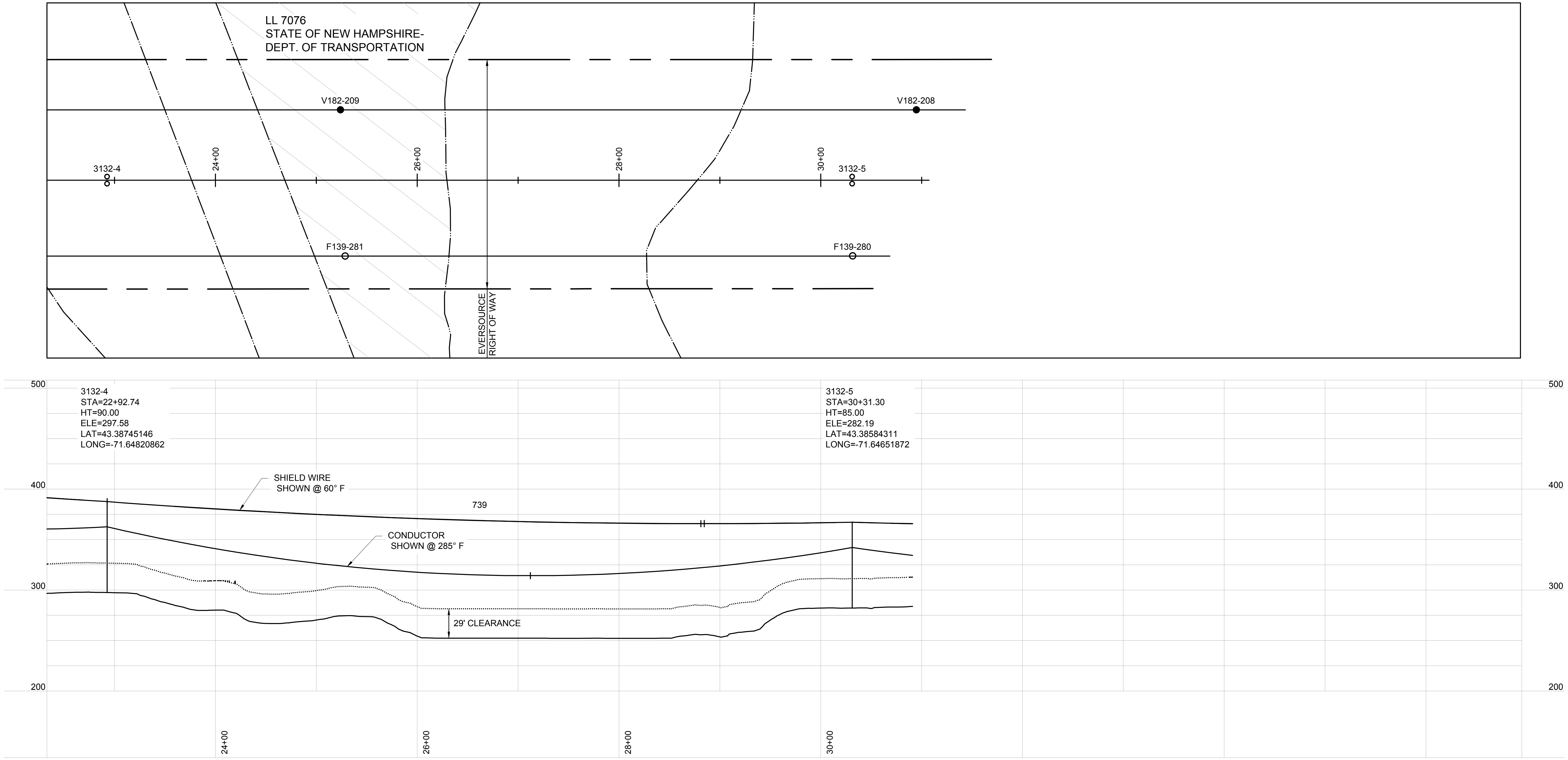
THE NORTHERN PASS

Line List 7076
State Land Crossing Permit
Location Map

Source: NH DOT 2010 Aerial Photography; NH GRANIT; Burns & McDonnell.

August 25, 2015

Path: \\ESPSRV\data\Data2\Projects\NUS\53899_DC_Tline\GIS\DataFiles\ArcDocs\State_Land_Maps\State_Land_Crossing_Permit_LL7076_Lettersize.mxd rfraser 8/25/2015



200.0 ft. Horiz. Scale

100.0 ft. Vert. Scale

PUBLIC LAND

○ PROPOSED MONOPOLE

EXISTING H-FRAME

● EXISITING MONOPOLE

PRELIMINARY - NOT FOR CONSTRUCTION

REVISION HISTORY				
–	–	–	–	–
A	4/30/15	ISSUED FOR REVIEW	KRR	DAB

THE NORTHERN PASS

NORTHERN PASS LLC

TITLE S1 LL7076 3132 STATE LAND CROSSING PERMIT

BY	REV. NO.	DATE	SIZE	DWG. NO.
KRR	A	4/30/15	B	313299001.DWG

APPENDIX 12
3132 AC LINE
STRUCTURES 3132-32 TO 3132-33
STATE OF NEW HAMPSHIRE – DEPARTMENT OF TRANSPORTATION
CONCORD-LINCOLN LINE
LL 7616.1
CANTERBURY, NH

1. This crossing is shown on attached drawing 313243602

2. The location of the 3132 line is shown on attached map titled Line List 7616.1

3. The 3132 line will be on steel structures at this crossing. The energized conductor is in a horizontal configuration using a 2-bundle of 1590 kcmil ACSR. 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. 3132-32 & 3132-33 will be structures with suspension insulators. The energized conductors are separated approximately 26 feet horizontally and 0 feet vertically in a horizontal 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 wires are separated horizontally approximately 13 feet. The ground/OPGW and energized conductor are separated vertically by approximately 25 feet.

4. Energized conductors will have a maximum tension of 11,400 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 3132 line is a 345 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 6.24 feet or [(209.1 kV-22 kV) x 0.4]/12 is needed, which brings the total required minimum clearance to 32.7 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. 7.72 feet is required between 345 kV AC energized conductor and ground wire
ii. 12.83 feet is required between 345 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. 9.17 feet is required between 345 kV AC energized conductors and ground wire
    ii. 13.00 feet is required between 345 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. 8.01 feet is required between 345 kV AC energized conductors and ground wire
    ii. 13.12 feet is required between 345 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. 7.34 feet are required between 345 kV AC energized conductors and ground wire
    ii. 14.31 feet are required between 345 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.

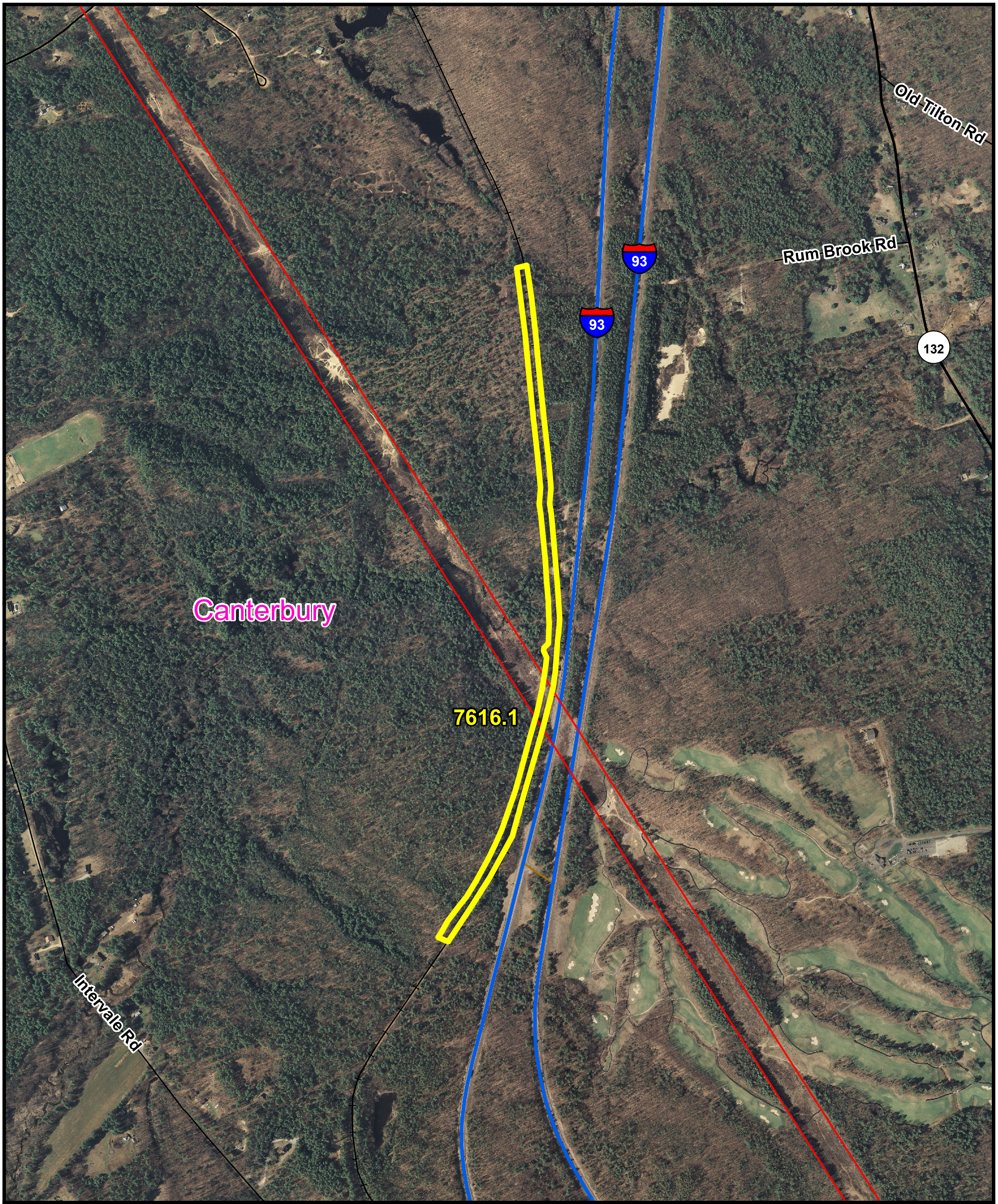
7. Northern Pass Transmission, LLC (NPT) has investigated a multitude of weather and loading conditions for its design. NPT used these design conditions and combinations thereof to determine the minimum clearance of all conductors to the water and land surfaces, between the phase conductors and OPGW cable. NPT 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 NPT transmission standards, the maximum sag for this weather case results in a clearance to railroad track of 77 feet, this exceeds the minimum required clearance of 32.7 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 24.5

feet vertically and 13.5 feet horizontally from the ground wires to the closest energized conductor.



NORTH
0 500 1,000
Feet

LEGEND

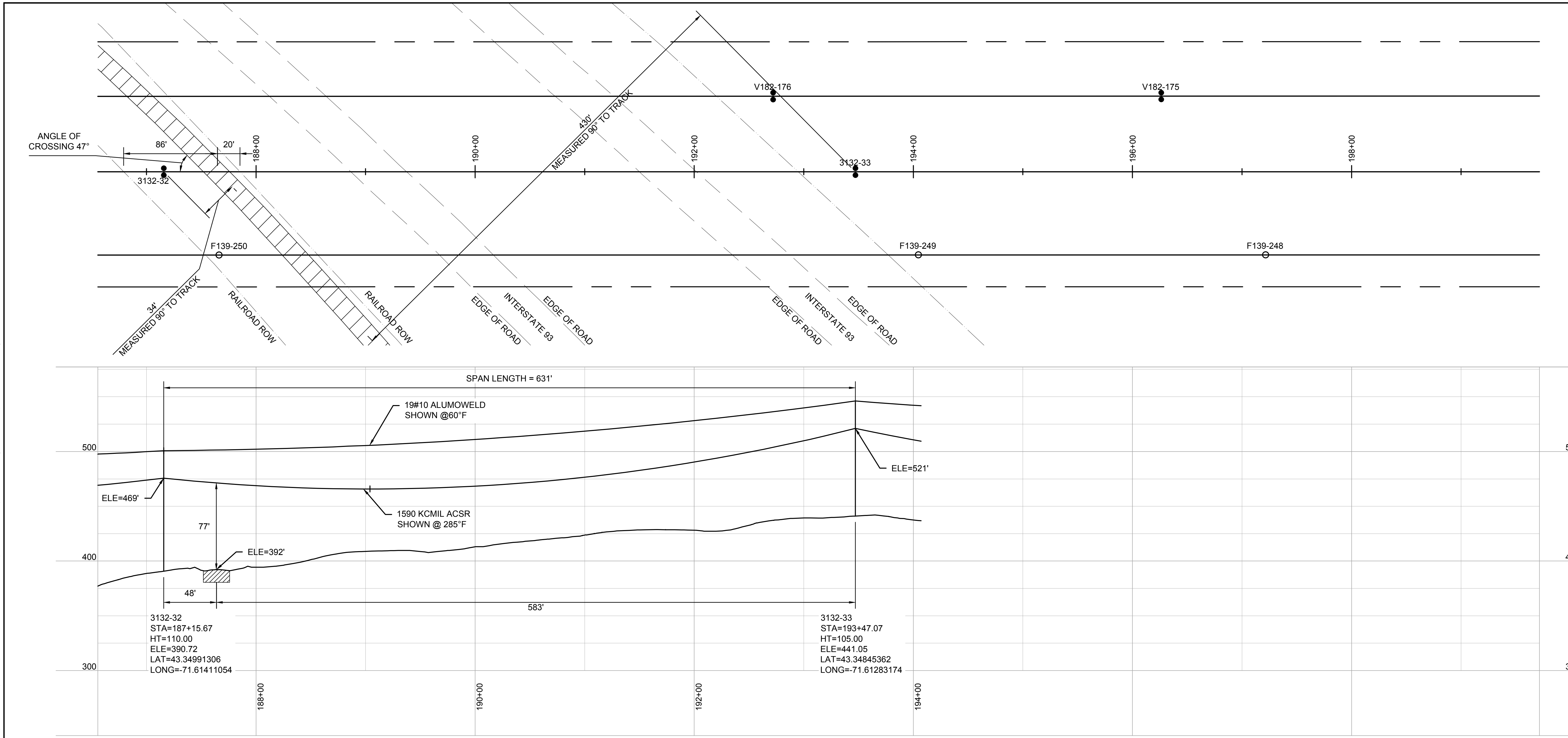
- Parcel Boundary
- Project ROW
- Town Boundary

THE NORTHERN PASS

Line List 7616.1
State Land Crossing Permit
Location Map

Source: NH DOT 2010 Aerial Photography; NH GRANIT; Burns & McDonnell.

August 21, 2015



NOTES:

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

LEGEND

- TRANSMISSION CENTERLINE
- PARCEL BOUNDARY
- EVERSOURCE ROW
- RAILROAD BED
- PAVED ROADS
- ○ PROPOSED MONOPOLE
- ⊠ PROPOSED TRANS STRUCTURE
- H-FRAME

80.0 ft. Horiz. Scale

80.0 ft. Vert. Scale

PRELIMINARY - NOT FOR CONSTRUCTION

REVISION HISTORY

–	–	–	–	–
A	4/23/15	ISSUED FOR REVIEW	MSP	DAB

THE NORTHERN PASS

NORTHERN PASS LLC

TITLE N2 LL7616.1 3132 RAILROAD CROSSING PERMIT

BY	REV. NO.	DATE	SIZE	DWG. NO.
MSP	A	4/23/15	B	313243602.DWG

05/07/2015 9:43am – mspepich – N:\NUSCO\58479 – NPT\Overhead\Cadd\01-Record Worksheets\02 Permits\RR Crossing Permits\313243602.dwg

APPENDIX 13
3132 AC LINE
STRUCTURES 3132-160 TO 3132-164
STATE OF NEW HAMPSHIRE- ADJUTANT GENERAL'S DEPARTMENT
LL 8954 & 8957
PEMBROKE, NH

1. This crossing is shown on attached drawing 313299002

    a. This drawing shows a 29' terrain clearance line (offset from ground surface), which is greater than required minimum of 20.8'.

2. The location of the 3132 line is shown on attached maps titled Line List 8954 & Line List 8957.

3. This portion of the 3132 line will be on steel structures. The energized conductor is in a horizontal configuration using a 2-bundle of 1590 kcmil ACSR. 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 3132 line crosses the parcel LL 8954, State of New Hampshire – Adjutant General Department for approximately 1,000'

    b. The 3132 line crosses the parcel LL 8957, State of New Hampshire – Adjutant General Department for approximately 2,450'

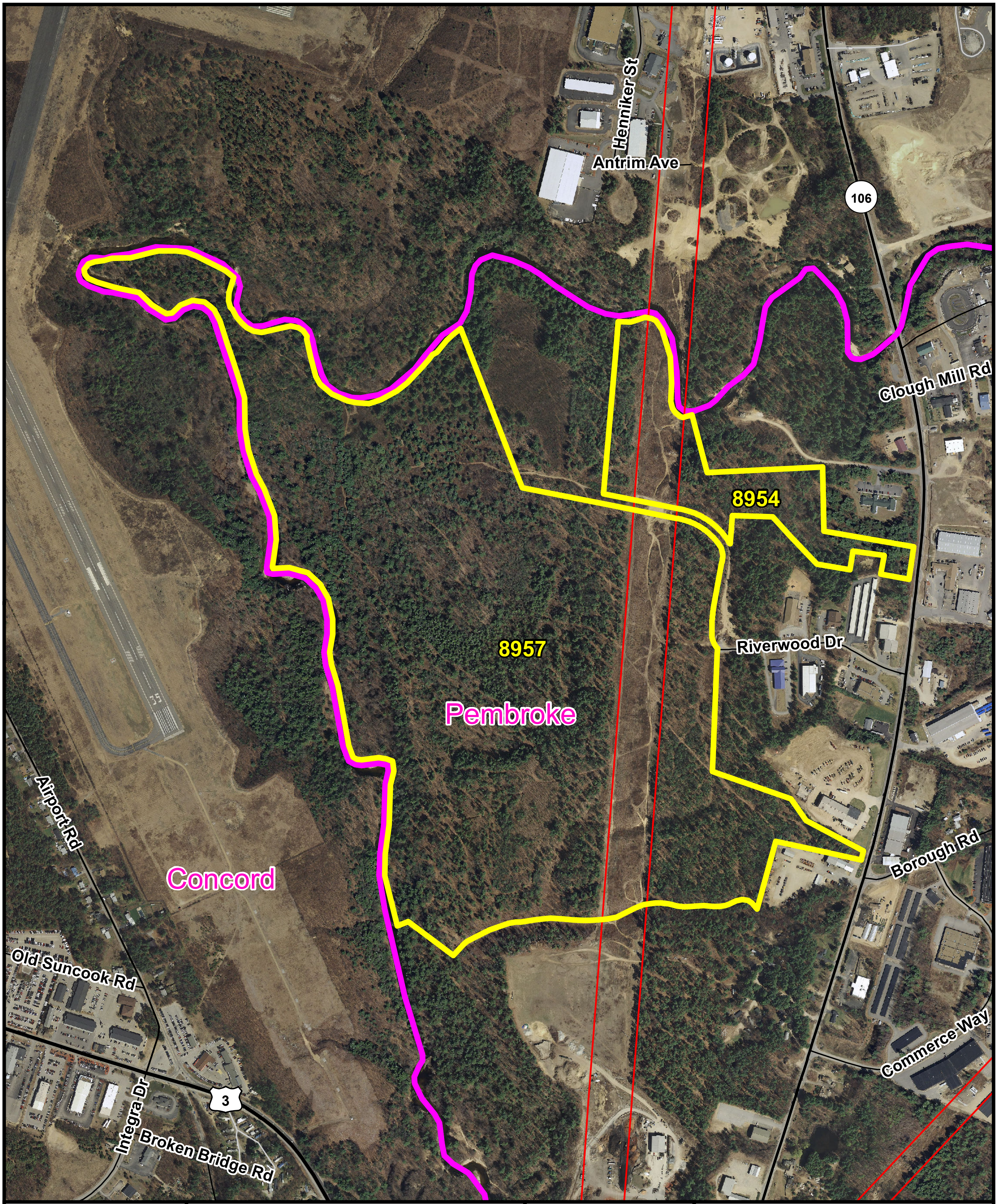
4. Energized conductors will have a maximum tension of 11,400 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice). Ground wires will have a maximum tension of 5,500 pounds at NESC 250B Heavy weather case (0 degrees F, 4 pounds per square foot wind loading, ½-inch radial ice).

5. The 3132 line is a 345 kV alternating current (AC) line.

6. Northern Pass Transmission, LLC (NPT) has investigated a multitude of weather and loading conditions for its design. NPT 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. NPT 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 NPT transmission standards the maximum sag for this weather case controls.



NORTH

0 400 800

Scale in Feet

LEGEND

- Parcel Boundary
- Project ROW
- Town Boundary

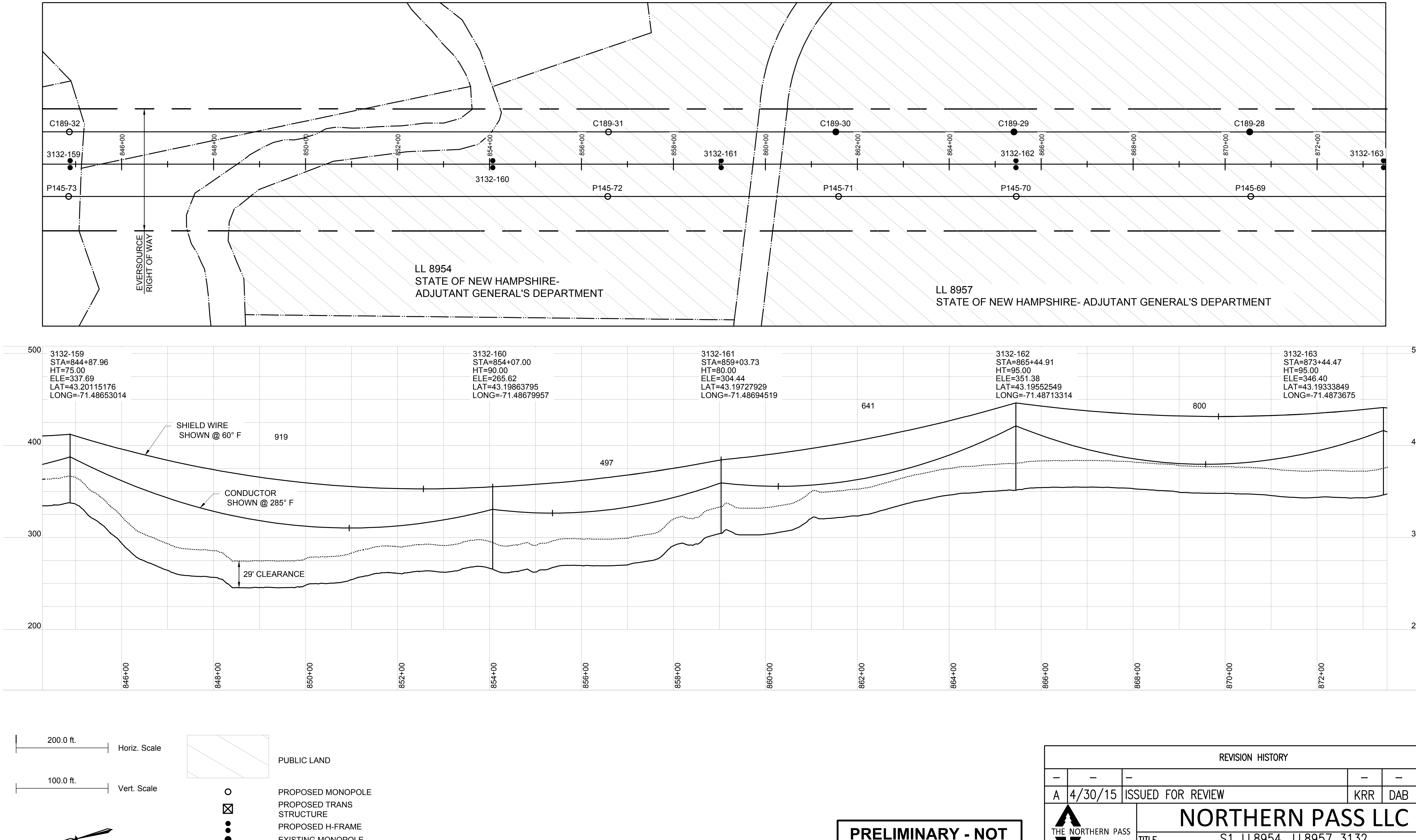
THE NORTHERN PASS

Line List 8954 & 8957
State Land Crossing Permit
Location Map

Source: NH DOT 2010 Aerial Photography; NH GRANIT; Burns & McDonnell.

August 21, 2015

Path: \ESPSRV\Data\Data2\Projects\NUS\53899_DC_Tline\GIS\DataFiles\ArcDocs\State_Land_Maps\State_Land_Crossing_Permit_LL8954_8957_Lettersize.mxd rfraser 8/21/2015



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PRELIMINARY - NOT FOR CONSTRUCTION

REVISION HISTORY				
–	–	–	–	–
A	4/30/15	ISSUED FOR REVIEW	KRR	DAB

THE NORTHERN PASS

NORTHERN PASS LLC

TITLE S1 LL8954, LL8957 3132
STATE LAND CROSSING PERMIT SH. 1 OF 2

BY	REV. NO.	DATE	SIZE	DWG. NO.
KRR	A	4/30/15	B	313299002.DWG

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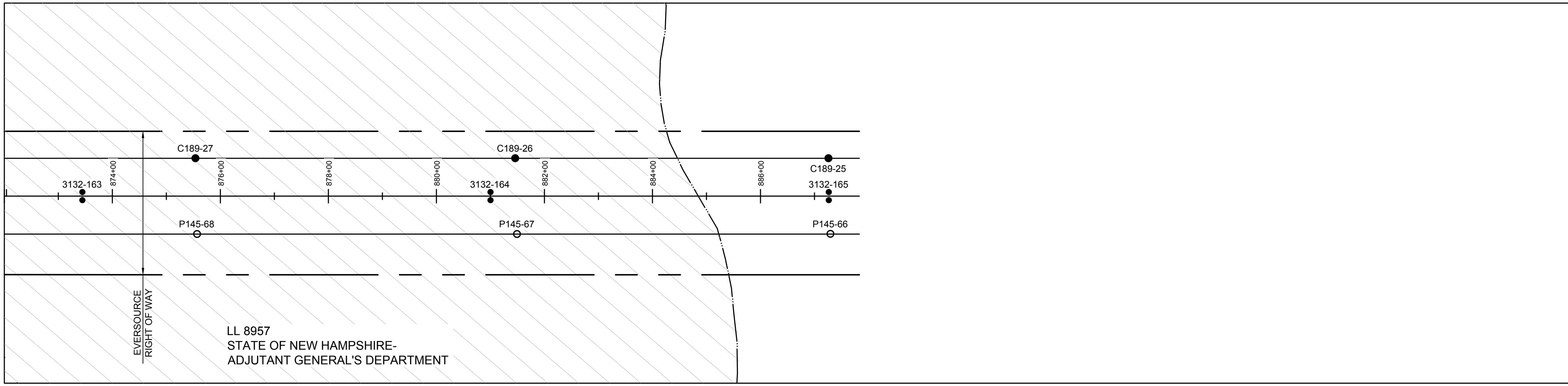

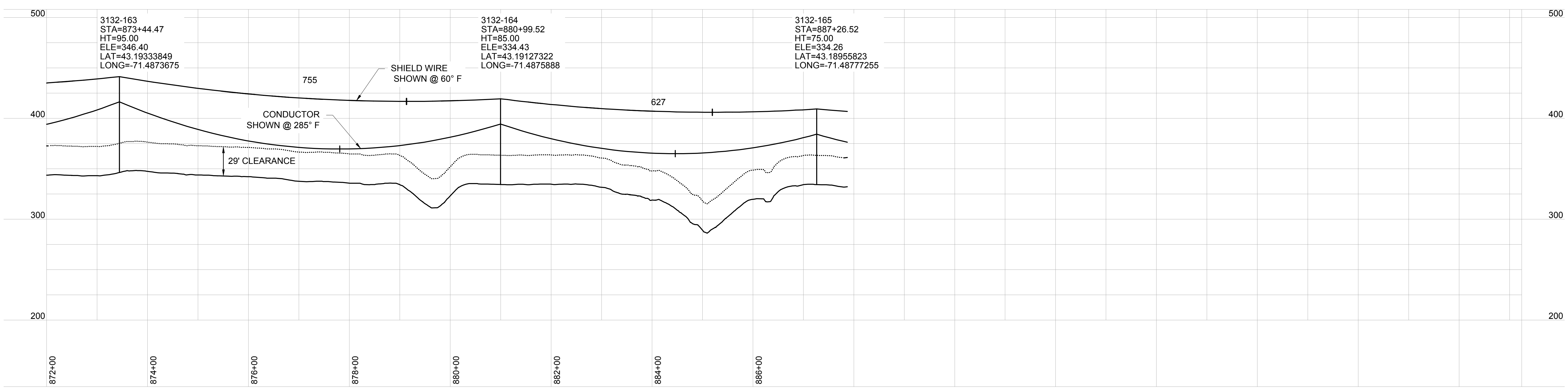

200.0 ft. Horiz. Scale

100.0 ft. Vert. Scale

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

THE NORTHERN PASS

NORTHERN PASS LLC

TITLE S1 LL8954, LL8957 3132
STATE LAND CROSSING PERMIT SH. 2 OF 2

BY	REV. NO.	DATE	SIZE	DWG. NO.
KRR	A	4/30/15	B	313299002.DWG

APPENDIX 14
3132 AC LINE
STRUCTURES 3132-219 TO 3132-227
STATE OF NEW HAMPSHIRE- DEPARTMENT OF RESOURCES AND ECONOMIC DEVELOPMENT
BEAR BROOK STATE PARK
LL 9300
ALLENSTOWN, NH

1. This crossing is shown on attached drawing 313299003

    a. This drawing shows a 29' terrain clearance line (offset from ground surface), which is greater than required minimum of 20.8'.

2. The location of the 3132 line is shown on attached maps titled Line List 9300.

3. This portion of the 3132 line will be on steel structures. The energized conductor is in a vertical configuration using a 2-bundle of 1590 kcmil ACSR. The structures will have 1 ground wire; it will be an OPGW with sag coefficients similar to 19#10 Alumoweld.

    a. The 3132 line line crosses the parcel LL 9300 State of New Hampshire – Department of Resources of Economic Development, Bear Brook State Park for approximately 4500'.

4. Energized conductors will have a maximum tension of 11,400 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).

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    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 NPT transmission standards the maximum sag for this weather case controls.

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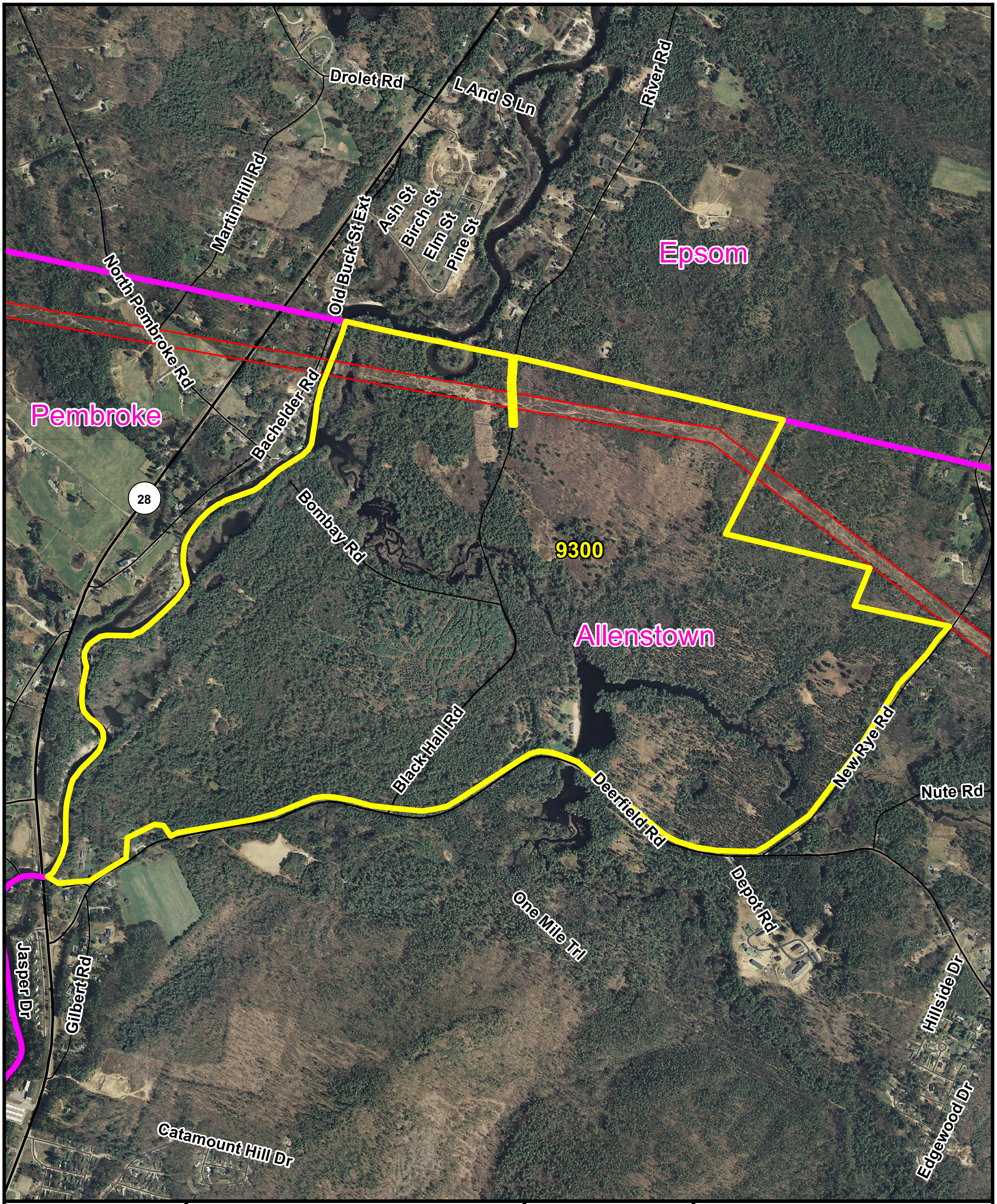


NORTH

0 0.125 0.25

Miles

LEGEND

- Parcel Boundary
- Project ROW
- Town Boundary

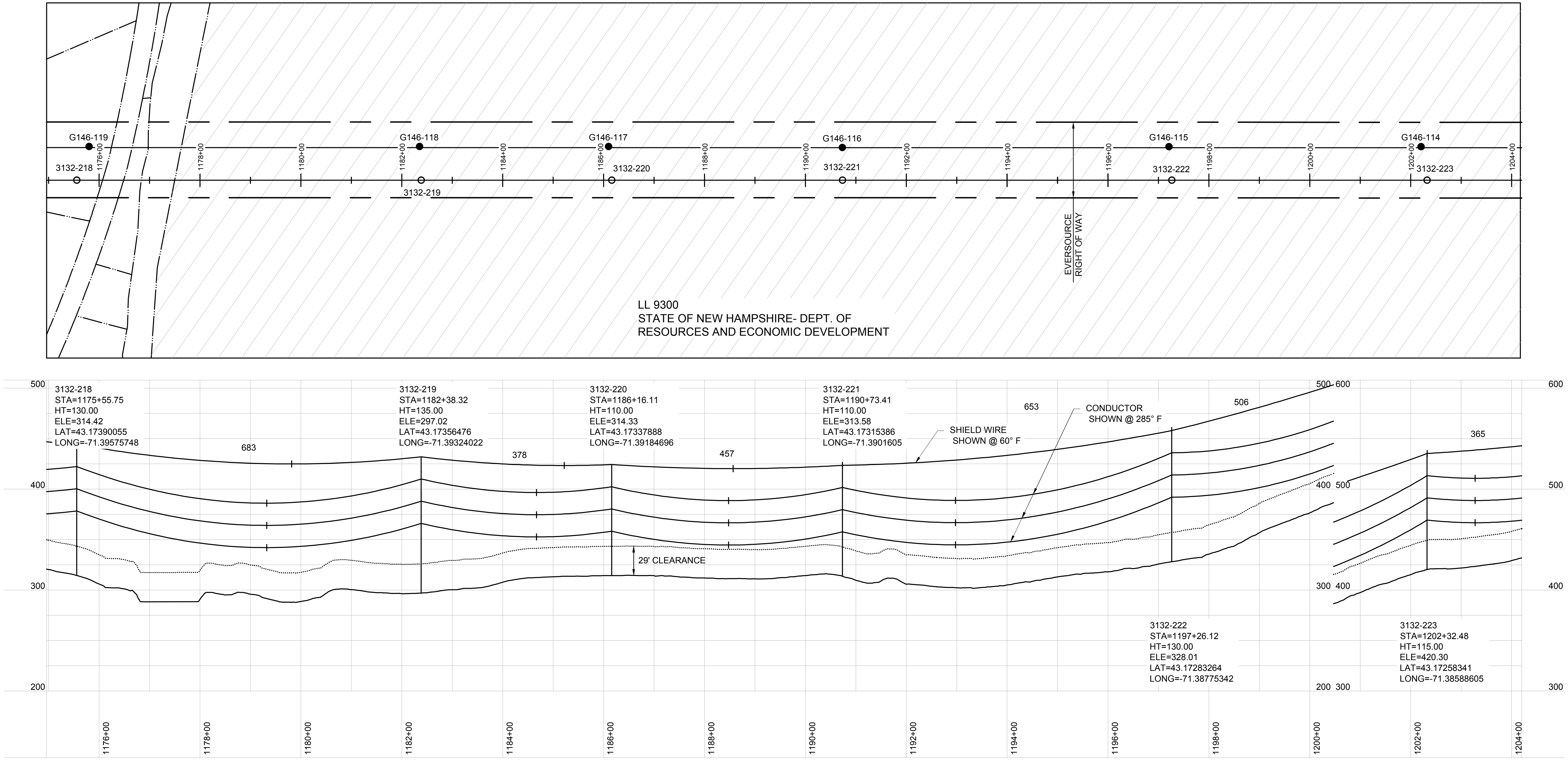
THE NORTHERN PASS

Line List 9300
State Land Crossing Permit
Location Map

Source: NH DOT 2010 Aerial Photography; NH GRANIT; Burns & McDonnell.

August 21, 2015

Path: \\ESPSRV\Data\Data2\Projects\NUS\53899_DC_Tline\GIS\DataFiles\ArcDocs\State_Land_Maps\State_Land_Crossing_Permit_LL9300_Lettersize.mxd rfraser 8/21/2015



200.0 ft. Horiz. Scale

100.0 ft. Vert. Scale

N

PUBLIC LAND

○ PROPOSED MONOPOLE

⊠ PROPOSED TRANS STRUCTURE

● ● PROPOSED H-FRAME

● EXISTING MONOPOLE

PRELIMINARY - NOT FOR CONSTRUCTION

REVISION HISTORY				
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A	4/30/15	ISSUED FOR REVIEW	KRR	DAB

THE NORTHERN PASS

NORTHERN PASS LLC

TITLE S1 LL9300 3132
STATE LAND CROSSING PERMIT SH. 1 OF 2

BY	REV. NO.	DATE	SIZE	DWG. NO.
KRR	A	4/30/15	B	313299003.DWG

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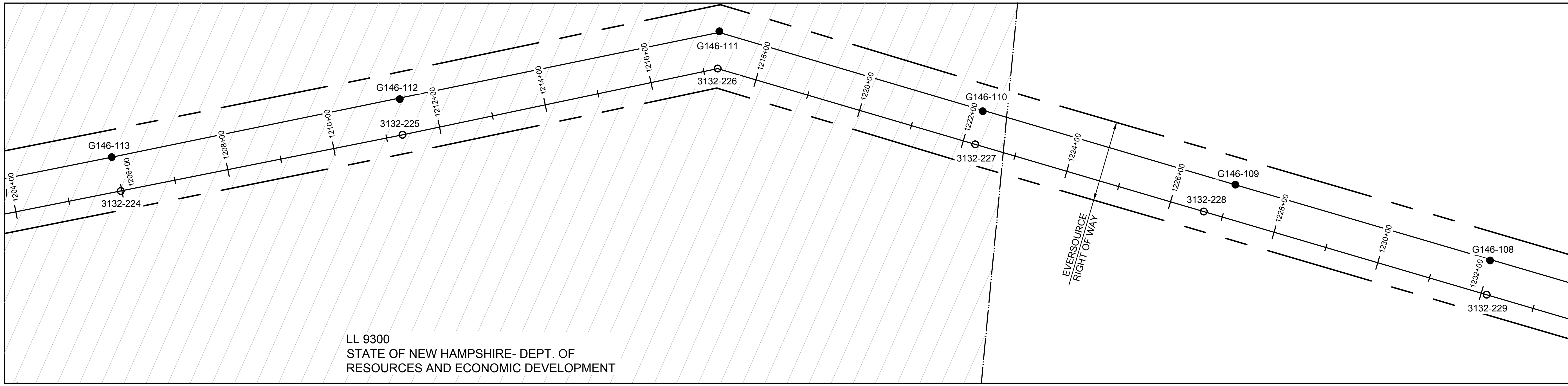

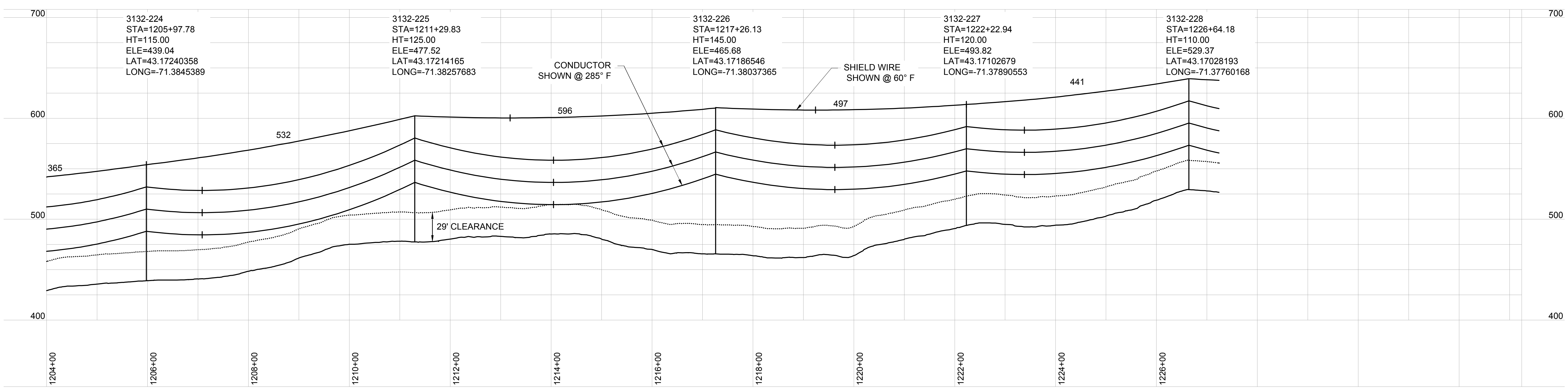

200.0 ft. Horiz. Scale

100.0 ft. Vert. Scale

PUBLIC LAND

PROPOSED MONOPOLE

PROPOSED TRANS STRUCTURE

PROPOSED H-FRAME

EXISTING MONOPOLE

PRELIMINARY - NOT FOR CONSTRUCTION

REVISION HISTORY

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A	4/30/15	ISSUED FOR REVIEW	KRR	DAB

THE NORTHERN PASS

NORTHERN PASS LLC

TITLE S1 LL9300 3132
STATE LAND CROSSING PERMIT SH. 2 OF 2

BY	REV. NO.	DATE	SIZE	DWG. NO.
KRR	A	4/30/15	B	313299003.DWG