

APPENDIX A
317 LINE
STRUCTURES 204-205
WARNER RIVER
WEBSTER, NH

The area of the Warner River at the design flood level as defined by NESC (note 19 to Table 232-1) is 15.76± acres. The required clearances to navigable water for phase conductors and communication wires are 20.5' and 17.5' respectively. The required clearances to ground for phase conductors and communication wires are 18.5' and 15.5' respectively. The phase conductors over the Warner River are configured in Hendrix brackets on both structures. The messenger acts as a neutral, therefore there is no neutral below the phase conductors. Using the above design criteria, the maximum sags of the phase conductors and minimum clearances for the crossing have been determined and designed as follows:

- a. NESC Heavy, Phase Wire – For the sag on the phase wires under this condition, the minimum proposed clearance to land is 39.8'; the minimum proposed clearance to the 10 year flood level is 43.0'.
- b. Minus 20° F, Phase Wire – For the sag on the phase wires under this condition, the minimum proposed clearance to land is 39.9'. The minimum proposed clearance to the 10 year flood level is 44.2'.
- c. 120° F, Phase Wire – For the sag on the phase wires under this condition, the minimum proposed clearance to land is 39.8'. The minimum proposed clearance to the 10 year flood level is 42.3'.

Note: The minimum clearance to ground is constant for all weather cases for this span. This is due to the fact that both structures are set on sloped terrain and the minimum clearance occurs at the point where the conductors are attached to structure 204.

APPENDIX B
317 LINE
STRUCTURES 166-167
BLACKWATER RIVER
HOPKINTON, NH

The area of the Blackwater River at the design flood level as defined by NESC (note 19 to Table 232-1) is 12.12± acres. The required clearance for phase conductors and neutral/communication wires are 20.5' and 17.5' respectively. The required clearances to ground for phase conductors and neutral/communication wires are 18.5' and 15.5' respectively. Using the above design criteria, the maximum sags of the phase and neutral wires and minimum clearances for the crossing have been determined and designed as follows:

- a. NESC Heavy, Phase Wire – For the sag on the phase wires under this condition, the minimum proposed clearance to land is 39.0'; the minimum proposed clearance to the 10 year flood level is 37.74'.
- b. Minus 20° F, Phase Wire – For the sag on the phase wires under this condition, the minimum proposed clearance to land is 40.0'. The minimum proposed clearance to the 10 year flood level is 38.9'.
- c. 212° F, Phase Wire – For the sag on the phase wires under this condition, the minimum proposed clearance to land is 35.8'. The minimum proposed clearance to the 10 year flood level is 34.4'.
- d. NESC Heavy, Neutral Wire – For the sag on the neutral wire under this condition, the minimum proposed clearance to land is 31.6'. The minimum proposed clearance to the 10 year flood level is 30.4'.
- e. Minus 20° F, Neutral Wire – For the sag on the neutral wire under this condition, the minimum proposed clearance to land is 32.9'. The minimum proposed clearance to the 10 year flood level is 31.7'.
- f. 120° F, Neutral Wire - For the sag on the neutral wire under this condition, the minimum proposed clearance to land is 30.3'. The minimum proposed clearance to the 10 year flood level is 29.1'.
- g. Minimum Clearance, Phase Wire – The 212° F conditions (item c above), results in the minimum clearance for phase conductors. The minimum proposed clearances expected under those conditions are 35.8' to land and 34.4' to the 10 year flood level. The required minimum clearance from the

phase wires to land based on NESC Table 232-1.2 is 18.5'. The required minimum clearance from phase wire to the water surface based on NESC Table 232-1.7.b, is 20.5'. The crossing design as proposed exceeds the NESC requirements.

- h. Minimum Clearance, Neutral Wire – The 120° F conditions (item f above), results in the minimum clearance for the neutral wire. The minimum proposed clearances expected under that condition is 30.3' to land and 29.1' to the 10 year flood level. The required minimum clearance from the neutral to land based on NESC Table 232-1.2 is 15.5'. The required minimum clearance from the neutral wire to the water surface based on NESC Table 232-1.7.b, is 25.5'. The crossing design as proposed exceeds the NESC requirements.
- i. Minimum Phase to Neutral Clearance –The conditions which would result in the minimum clearance between these lines is with the phase wires on the 317 line operating at 212°F and the neutral at 60° F. Under those conditions the proposed phase to neutral clearance would be 3.96'. Based on NESC Table 235-6 section 2a, the minimum clearance should be 22.84 inches (1.90 feet)

APPENDIX C
317 LINE
STRUCTURES 82-83
CONTOOCCOOK RIVER
CONCORD, NH

The area of the Contoocook River at the design flood level as defined by NESC (note 19 to Table 232-1) is 48.48± acres. The required clearances to navigable water for phase conductors and neutral/communication wires are 28.5' and 25.5' respectively. The required clearances to ground for phase conductors and neutral/communication wires are 18.5' and 15'5' respectively. Using the above design criteria, the maximum sags of the phase and neutral wires and minimum clearances for the crossing have been determined and designed as follows:

- a. NESC Heavy, Phase Wire – For the sag on the phase wires under this condition, the minimum proposed clearance to land is 53.8'; the minimum proposed clearance to the 10 year flood level is 44.6'.
- b. Minus 20° F, Phase Wire – For the sag on the phase wires under this condition, the minimum proposed clearance to land is 55.0'. The minimum proposed clearance to the 10 year flood level is 45.0'.
- c. 212° F, Phase Wire – For the sag on the phase wires under this condition, the minimum proposed clearance to land is 49.4'. The minimum proposed clearance to the 10 year flood level is 37.9'.
- d. NESC Heavy, Neutral Wire – For the sag on the neutral wire under this condition, the minimum proposed clearance to land is 44.6'. The minimum proposed clearance to the 10 year flood level is 34.8'.
- e. Minus 20° F, Neutral Wire – For the sag on the neutral wire under this condition, the minimum proposed clearance to land is 45.2'. The minimum proposed clearance to the 10 year flood level is 34.2'.
- f. 120° F, Neutral Wire - For the sag on the neutral wire under this condition, the minimum proposed clearance to land is 42.1'. The minimum proposed clearance to the 10 year flood level is 30.1'.
- g. Minimum Clearance, Phase Wire – The 212° F conditions (item c above), results in the minimum clearance for phase conductors. The minimum proposed clearances expected under those conditions are 49.4' to land and 37.9' to the 10 year flood level. The required minimum clearance from the

phase wires to land based on NESC Table 232-1.2 is 18.5'. The required minimum clearance from phase wire to the water surface based on NESC Table 232-1.7.b, is 28.5'. The crossing design as proposed exceeds the NESC requirements.

- h. Minimum Clearance, Neutral Wire – The 120° F conditions (item f above), results in the minimum clearance for the neutral wire. The minimum proposed clearances expected under that condition is 42.1' to land and 30.1' to the 10 year flood level. The required minimum clearance from the neutral to land based on NESC Table 232-1.2 is 15.5'. The required minimum clearance from the neutral wire to the water surface based on NESC Table 232-1.7.b, is 25.5'. The crossing design as proposed exceeds the NESC requirements.
- i. Minimum Phase to Neutral Clearance –The conditions which would result in the minimum clearance between this line is with the phase wires on the 317 line operating at 212°F and the neutral at 60° F. Under those conditions the proposed phase to neutral clearance would be 6.11'. Based on NESC Table 235-6 section 2a, the minimum clearance should be 22.84 inches (1.90 feet)

APPENDIX D
317 LINE
STRUCTURES 77-78
ROLFE CANAL
CONCORD, NH

The area of the Rolfe Canal at the design flood level as defined by NESC (note 19 to Table 232-1) is 48.48± acres. The required clearance to navigable water for phase conductors and neutral/communication wires are 28.5' and 25.5' respectively. The required clearance to ground for phase conductors and messenger/communication wires is 18.5' and 15.5' respectively. Using the above design criteria, the maximum sags of the phase and neutral wires and minimum clearances for the crossing have been determined and designed as follows:

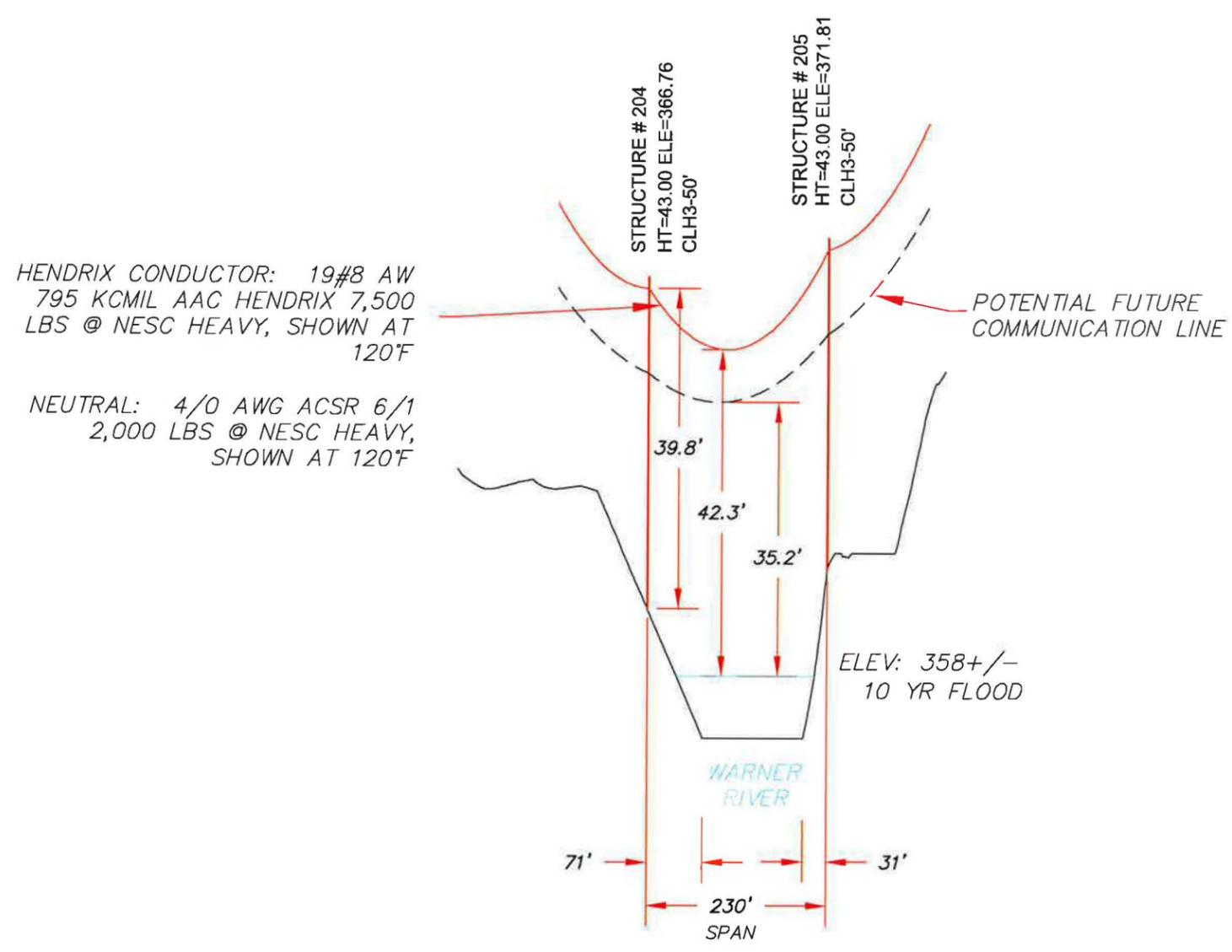
- a. NESC Heavy, Phase Wire – For the sag on the phase wires under this condition, the minimum proposed clearance to land is 39.8'; the minimum proposed clearance to the 10 year flood level is 43.8'.
- b. Minus 20° F, Phase Wire – For the sag on the phase wires under this condition, the minimum proposed clearance to land is 40.3'. The minimum proposed clearance to the 10 year flood level is 46.5'.
- c. 212° F, Phase Wire – For the sag on the phase wires under this condition, the minimum proposed clearance to land is 38.2'. The minimum proposed clearance to the 10 year flood level is 37.5'.
- d. NESC Heavy, Neutral Wire – For the sag on the neutral wire under this condition, the minimum proposed clearance to land is 32.6'. The minimum proposed clearance to the 10 year flood level is 36.1'.
- e. Minus 20° F, Neutral Wire – For the sag on the neutral wire under this condition, the minimum proposed clearance to land is 33.3'. The minimum proposed clearance to the 10 year flood level is 39.3'.
- f. 120° F, Neutral Wire - For the sag on the neutral wire under this condition, the minimum proposed clearance to land is 32.0'. The minimum proposed clearance to the 10 year flood level is 33.3'.
- g. Minimum Clearance, Phase Wire – The NESC Heavy conditions (item A above), results in the minimum clearance for phase conductors. The minimum proposed clearances expected under those conditions are 38.2' to land and 37.5' to the 10 year flood level. The required minimum clearance from the phase

wires to land based on NESC Table 232-1.2 is 18.5'. The required minimum clearance from phase wire to the water surface based on NESC Table 232-1.7.b, is 28.5'. The crossing design as proposed exceeds the NESC requirements.

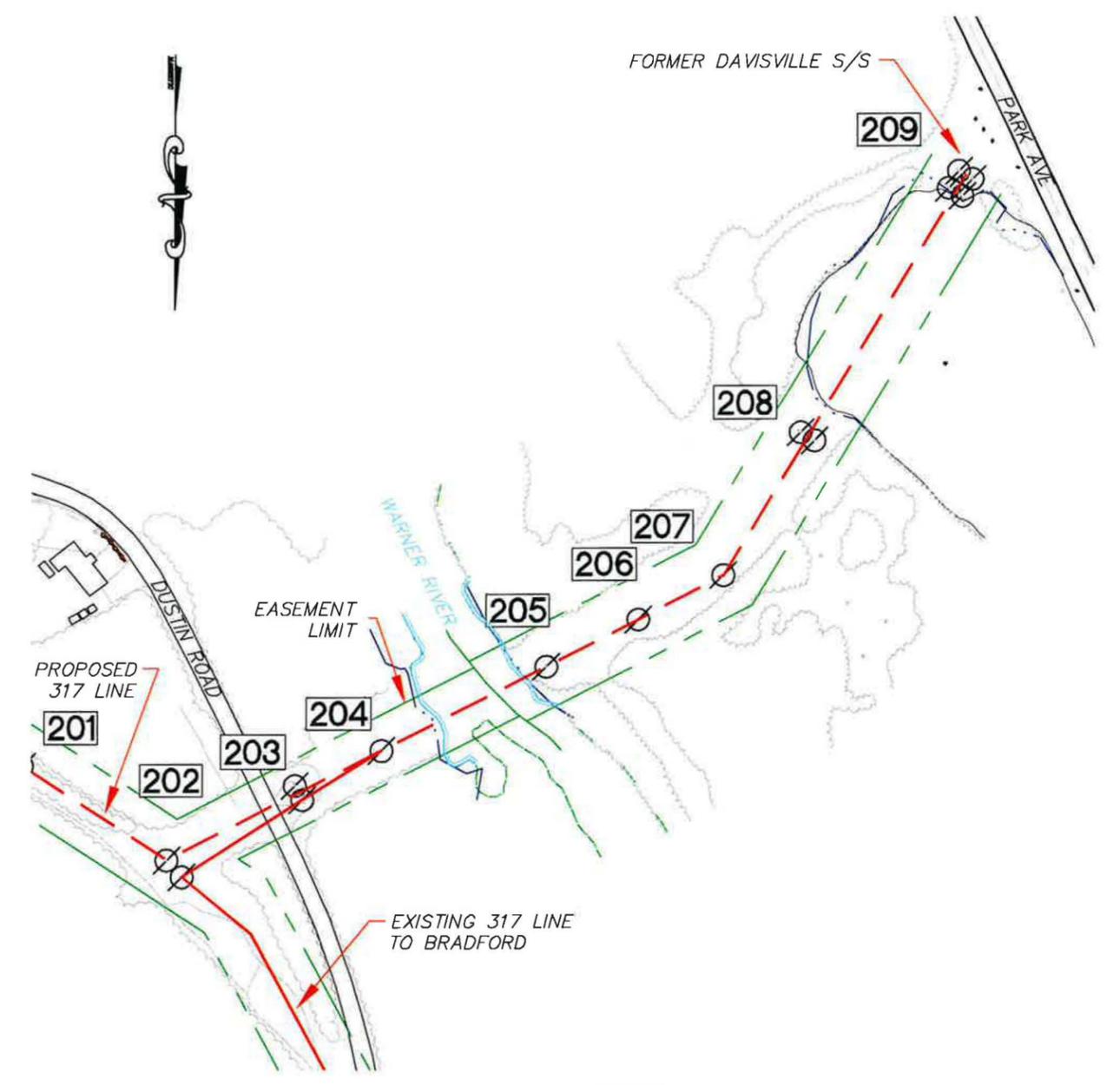
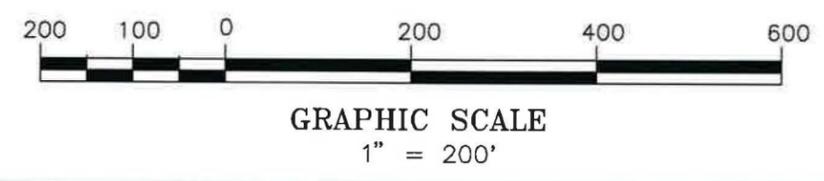
h. Minimum Clearance, Neutral Wire – The NESC Heavy conditions (item D above), results in the minimum clearance for the neutral wire. The minimum proposed clearances expected under that condition is 32.0' to land and 33.3' to the 10 year flood level. The required minimum clearance from the neutral to land based on NESC Table 232-1.2 is 15.5'. The required minimum clearance from the neutral wire to the water surface based on NESC Table 232-1.7.b, is 25.5'. The crossing design as proposed exceeds the NESC requirements.

i. Minimum Phase to Neutral Clearance –The conditions which would result in the minimum clearance between these lines is with the phase wires on the 317 line operating at 212°F and the neutral at 60° F. Under those conditions the phase to neutral clearance would be 3.31'. Based on NESC Table 235-6 section 2a, the minimum clearance should be 22.84 inches (1.90 feet)

NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE



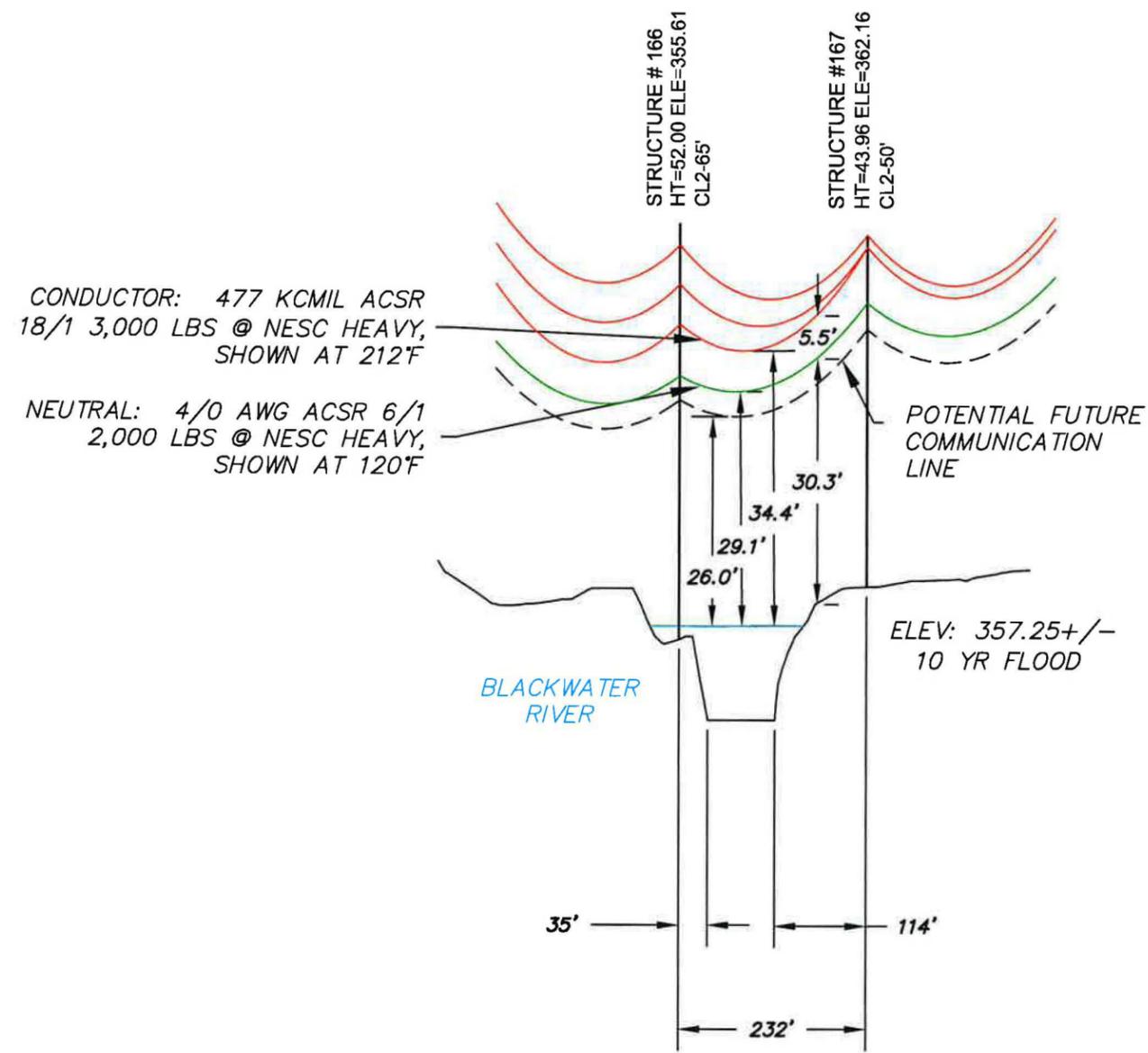
PROFILE
SCALE: 1"=200' HORIZ.
1"=20' VERT.



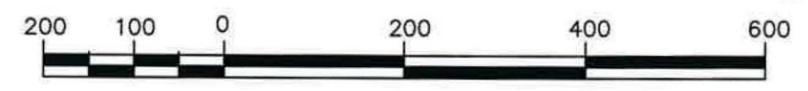
PLAN VIEW
SCALE: 1"=200'

						Energy Delivery			
				DRAWN BAP		DISTRIBUTION LINE WORK 317 LINE WEBSTER, CONCORD & HOPKINTON, NEW HAMPSHIRE			
				DESIGNED LEIDOS					
				CHECKED DMS					
				APPROVED		SCALE 1"=200'	DATE 6/4/2014	SHEET 2 OF 7	DRAWING NO. EXHIBIT 2
1	SHOW EXISTING 317 LINE & DAVISVILLE S/S	07/23/14	JWH	DMS	DMS				
NO.	REVISION	DATE	DRWN	CHK	APPR				

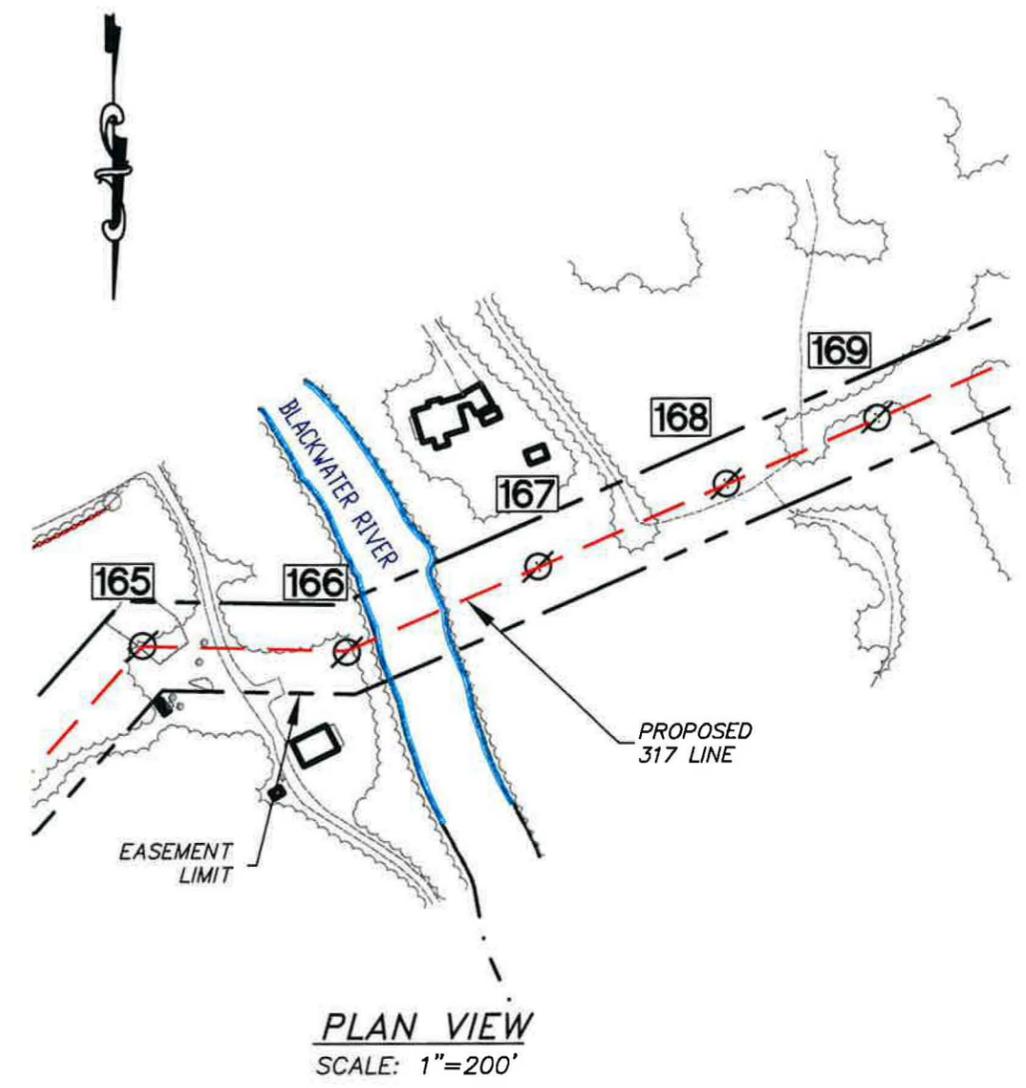
NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE



PROFILE
SCALE: 1"=200' HORIZ.
1"=20' VERT.



GRAPHIC SCALE
1" = 200'



		Public Service of New Hampshire		Energy Delivery	
		DISTRIBUTION LINE WORK			
		317 LINE			
		WEBSTER, CONCORD & HOPKINTON, NEW HAMPSHIRE			
		SCALE 1"=200'	DATE 6/4/2014	SHEET 3 of 7	DRAWING NO. EXHIBIT 3
NO.	REVISION	DATE	DRWN	CHKD	APPR

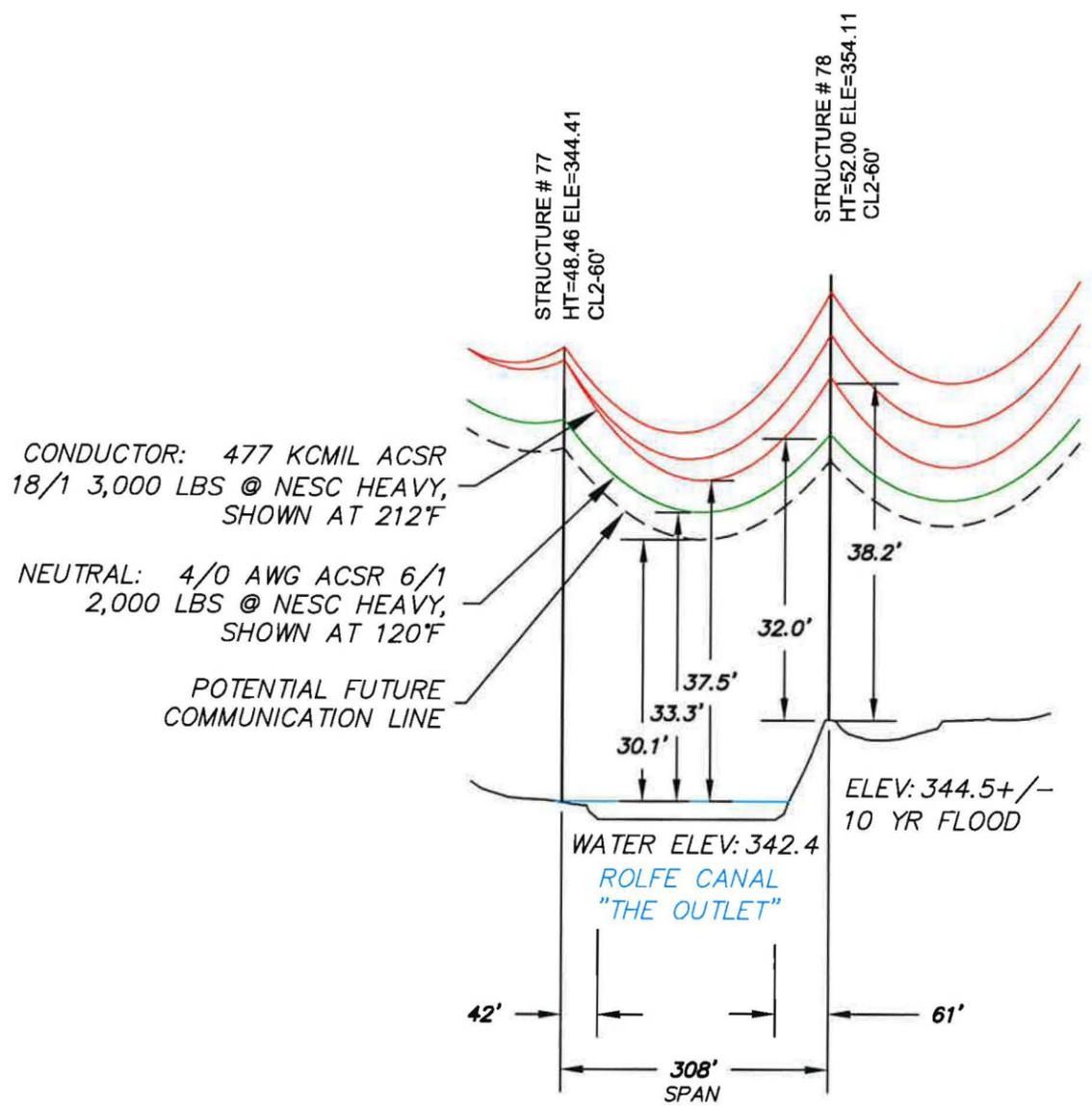
DRAWN
BAP

DESIGNED
LEIDOS

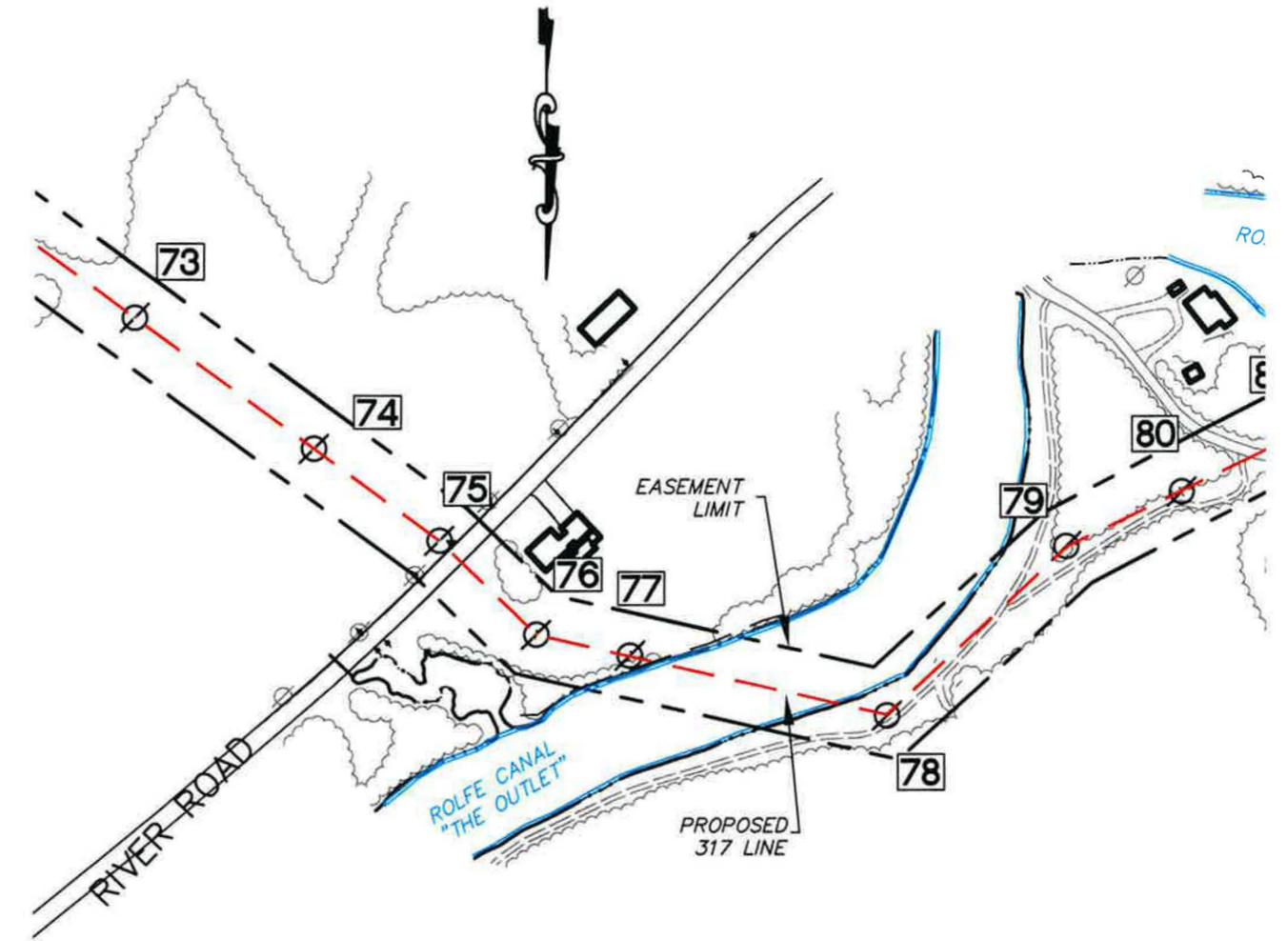
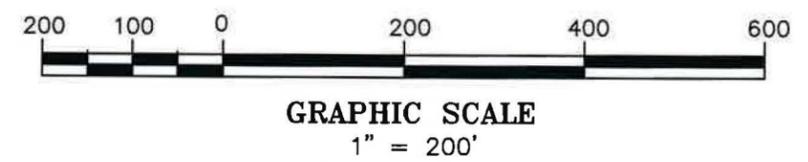
CHECKED
DMS

APPROVED

NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE



PROFILE
SCALE: 1"=200' HORIZ.
1"=20' VERT.



PLAN VIEW
SCALE: 1"=200'

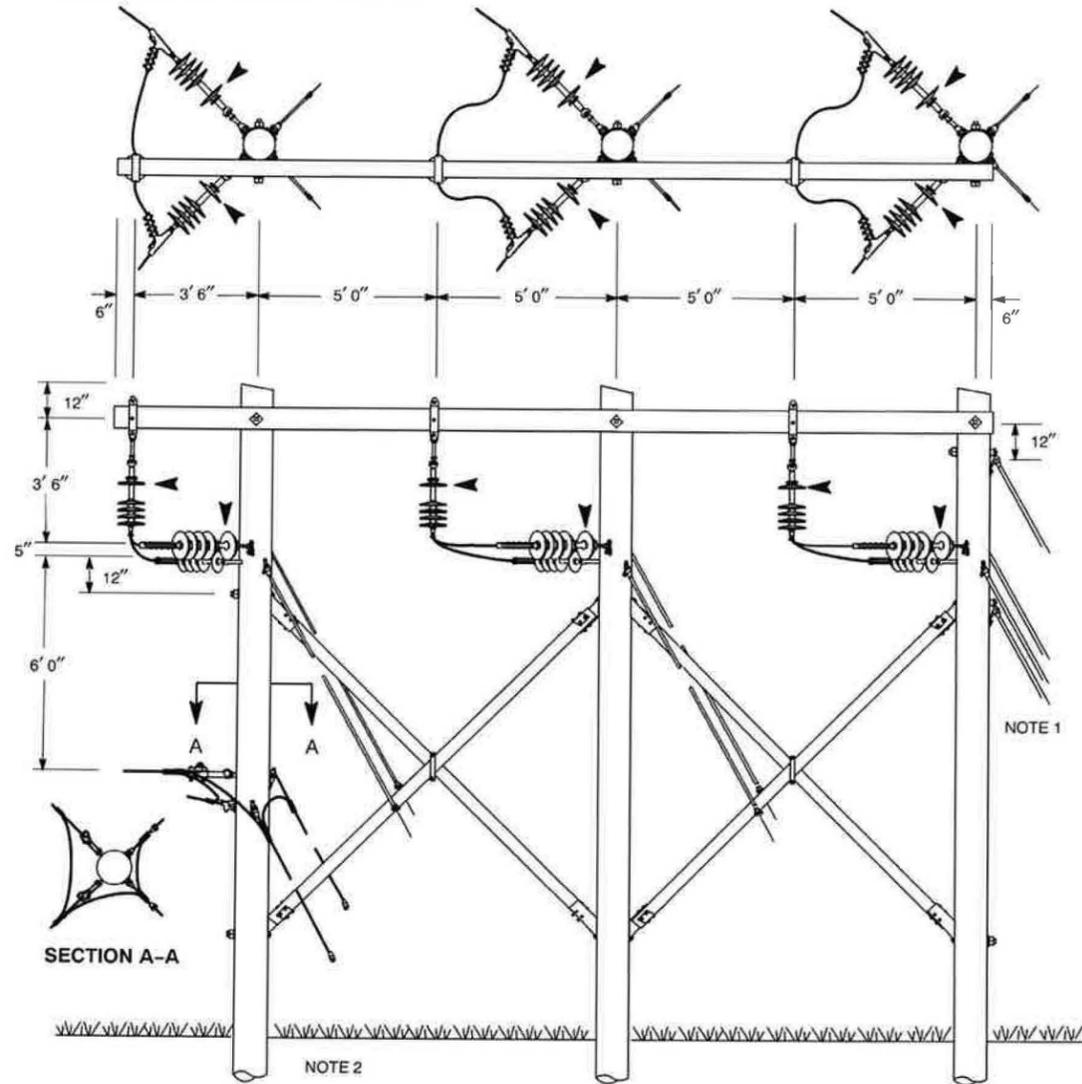
		Public Service of New Hampshire		Energy Delivery						
		DRAWN BAP		DISTRIBUTION LINE WORK 317 LINE WEBSTER, CONCORD & HOPKINTON, NEW HAMPSHIRE						
		DESIGNED LEIDOS								
		CHECKED DMS								
		APPROVED								
NO.		REVISION	DATE	DRWN	CHK	APPR	SCALE 1"=200'	DATE 6/4/2014	SHEET 5 of 7	DRAWING NO. EXHIBIT 5

3/8" : 1'

STRUCTURE ANGLES FROM 12° TO 60°

1/4" : 1'

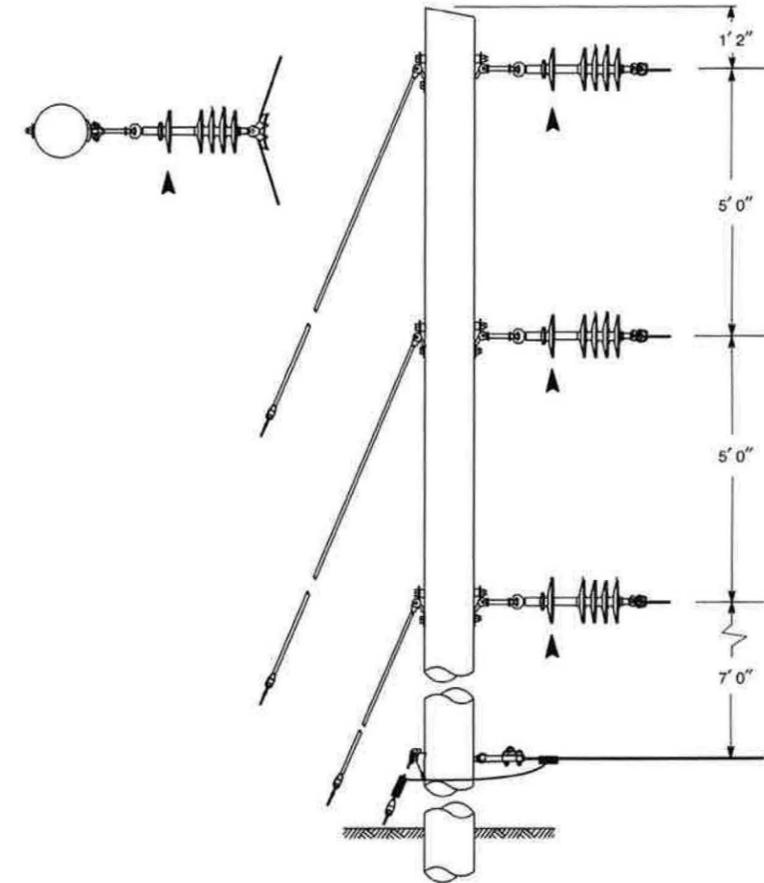
STRUCTURE LIMIT ANGLES ABOVE 50°



Notes

1. Select guys and associated material from **Section 06**. Select variation with 78-inch guy strain insulators for attachments opposite primary conductors and bare guy wire only for guying opposite neutral conductors.
2. Grounding material used on every third pole. See DTR 16.211.

ORIGINAL	DEAD-END STRUCTURE TYPE 34.5 KV AND BELOW		
9/30/04	ANGLES ABOVE 50° - 200 KV BIL		
APPROVED			
8/10/06	NORTHEAST UTILITIES	CONSTRUCTION STANDARD	DTR 10.615 1



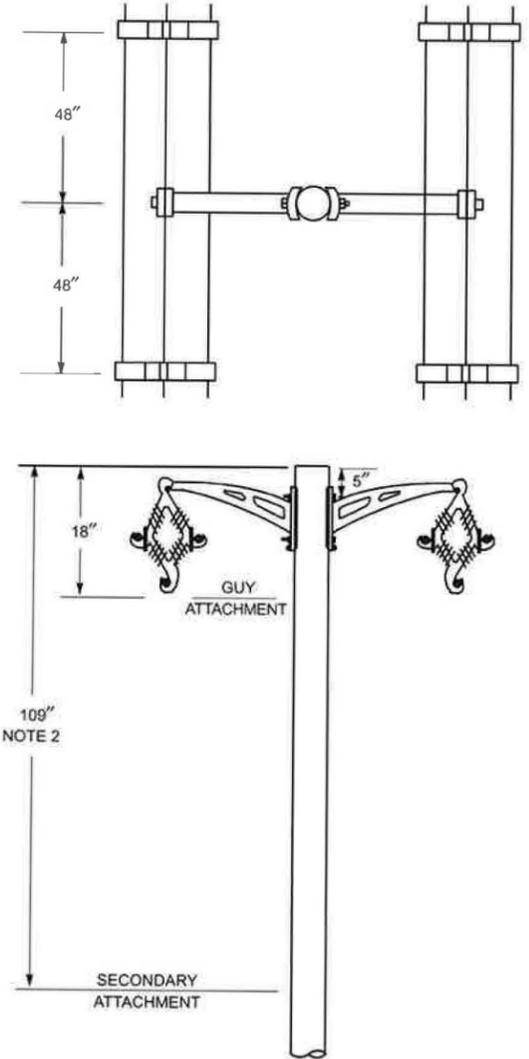
Note

1. Select guys and associated material from **Section 06**. Select variation with 78-inch guy strain insulators for attachment opposite primary conductors and bare guy wire only. Bond all guys together at anchor ends.

ORIGINAL	SINGLE POLE CONSTRUCTION 34.5 KV			NH
9/30/04	VERTICAL ANGLE STRUCTURE - 200 KV BIL TYPE - MEDIUM CORNER			
APPROVED	NORTHEAST UTILITIES	CONSTRUCTION STANDARD	DTR 10.520	1
8/10/06				

		Energy Delivery			
		DISTRIBUTION LINE WORK 317 LINE WEBSTER, CONCORD & HOPKINTON, NEW HAMPSHIRE			
		DRAWN BAP	DESIGNED LEIDOS	CHECKED DMS	APPROVED
		SCALE 1"=200'	DATE 6/4/2014	SHEET 6 of 7	DRAWING NO. EXHIBIT 6
NO.	REVISION	DATE	DRWN	CHKD	APPR

STRUCTURE LIMIT S2

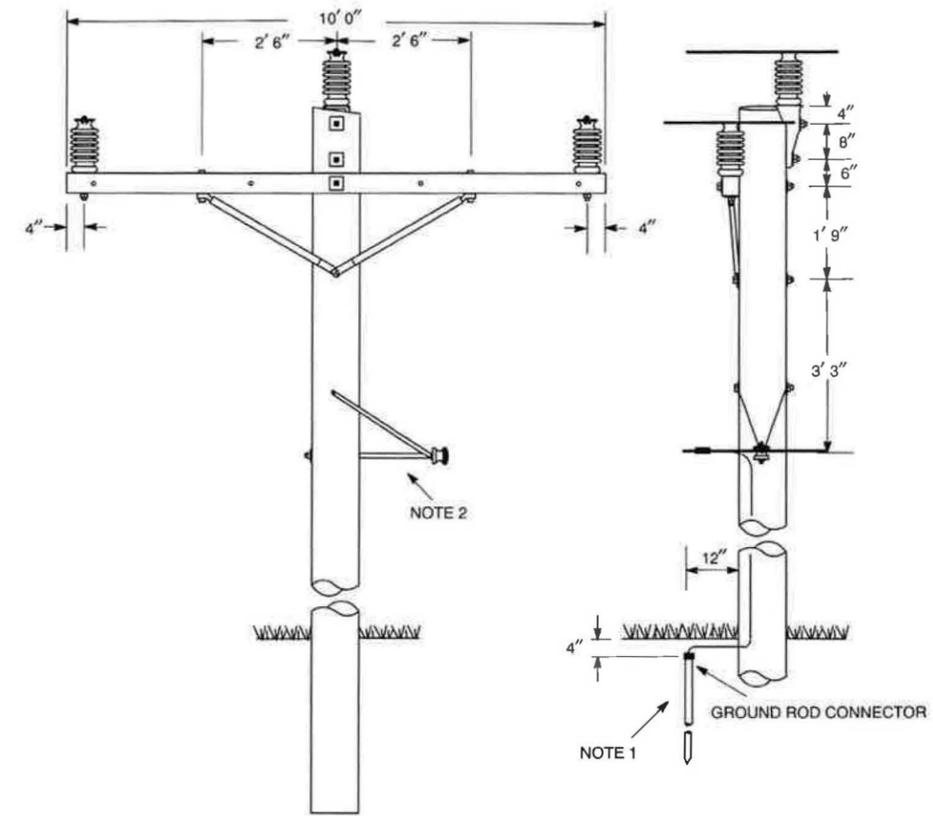


Notes

1. Ground the spacer cable messenger as described in DTR's 32.175 and 32.176.
2. If span lengths are 150 feet or less, this dimension may be reduced to 82 inches if no other electric company equipment (e.g. transformers, capacitors, etc.) is installed on the pole.

ORIGINAL 3/30/94	35 KV MGY AND BELOW – SPACER CABLE CONSTRUCTION DOUBLE CIRCUIT – TANGENT AND SMALL CORNER PREFERRED		
APPROVED 11/9/99	NORTHEAST UTILITIES	CONSTRUCTION STANDARD	DTR 10.306 3

3/8" : 1'
STRUCTURE LIMIT TANGENT



Notes

1. Grounding material used only on every third pole. See DTR 16.211.
2. For most conductor/neutral combinations, neutral is attached at 5 feet below crossarm; on most tangent structures adjacent to vertical angle structures, neutral is attached at 6 feet below crossarm.

ORIGINAL 9/30/04	SINGLE POLE CONSTRUCTION 34.5 KV TANGENT STRUCTURE – 200 KV BIL			NH
APPROVED	NORTHEAST UTILITIES	CONSTRUCTION STANDARD	DTR 10.511	

		Energy Delivery					
				DISTRIBUTION LINE WORK 317 LINE WEBSTER, CONCORD & HOPKINTON, NEW HAMPSHIRE			
				DRAWN BAP	DESIGNED LEIDOS	CHECKED DMS	APPROVED
				SCALE 1"=200'	DATE 6/4/2014	SHEET 7 OF 7	DRAWING NO. EXHIBIT 7
NO.	REVISION	DATE	DRWN	CHK	APPR		