

## APPENDIX A

### W-185, W-15 MILL CREEK KEENE, NH

A1. The design, location, and profile of the crossing is shown on the attached PSNH Distribution Business Plan and Profile Drawing entitled “W-15/W-185 DOUBLE CIRCUIT BETWEEN STRUCTURES 185/3 & 185/4 MILL CREEK CROSSING, KEENE, NEW HAMPSHIRE”, marked as Exhibit A-1.

A2. The proposed crossing will occur between two new wood single pole structures to be set and located approximately 123 feet apart. The proposed structure on the east side of Mill Creek, #185/3, will be an angle structure constructed with a class 1, 40 foot tall pole. Pole #185/3 will be western red cedar with a Hendrix brackets and insulators. The proposed structure on the west side of Mill Creek, number 185/4, will be a tangent structure constructed with a class 1, 40 foot tall pole. Pole 185/4 will be western red cedar with Hendrix brackets and insulators. Both lines will be built with covered wire, spacer cable construction as depicted in Exhibits A-2 through A-4. The three conductor wires on the W-185 will be 795 kcmil spacer cable (19 strands). The three conductor wires on the W-15 are 477 kcmil spacer cable (19 strands). The neutral wire will be 052 AWA (5/2 stranding) on each line. The conductors and neutral wires will be sagged using a 60° F condition with a maximum tension of 2,000 lbs under that condition.

A3. The flood water elevation for Mill Creek is based on information from the Flood Insurance Rate Map (FIRM), City of Keene, New Hampshire, Cheshire County, Panel 266 of 610, Community Panel Numbers 330023 0266 E and 330026 0266 E, effective date May 23, 2006. The 100-year flood elevation for this location is approximately 471 feet. These elevations are based on the National Geodetic Vertical Datum of 1929 (NGVD 29). For the purpose of this petition, the more conservative 100 year flood elevation (instead of the 10 year flood elevation per code) was used as the basis for design of the conductor clearance.

A4. The area of Mill Creek as defined by NESC (note 19 to Table 232-1) is less than 1.0± acres. This was calculated by measuring the size of the limit of flood zone A as shown on the FIRM. Since the flood zone for Mill Creek is less than 1 mile long, the entirety of the flood zone for Mill Creek was included in the calculation.

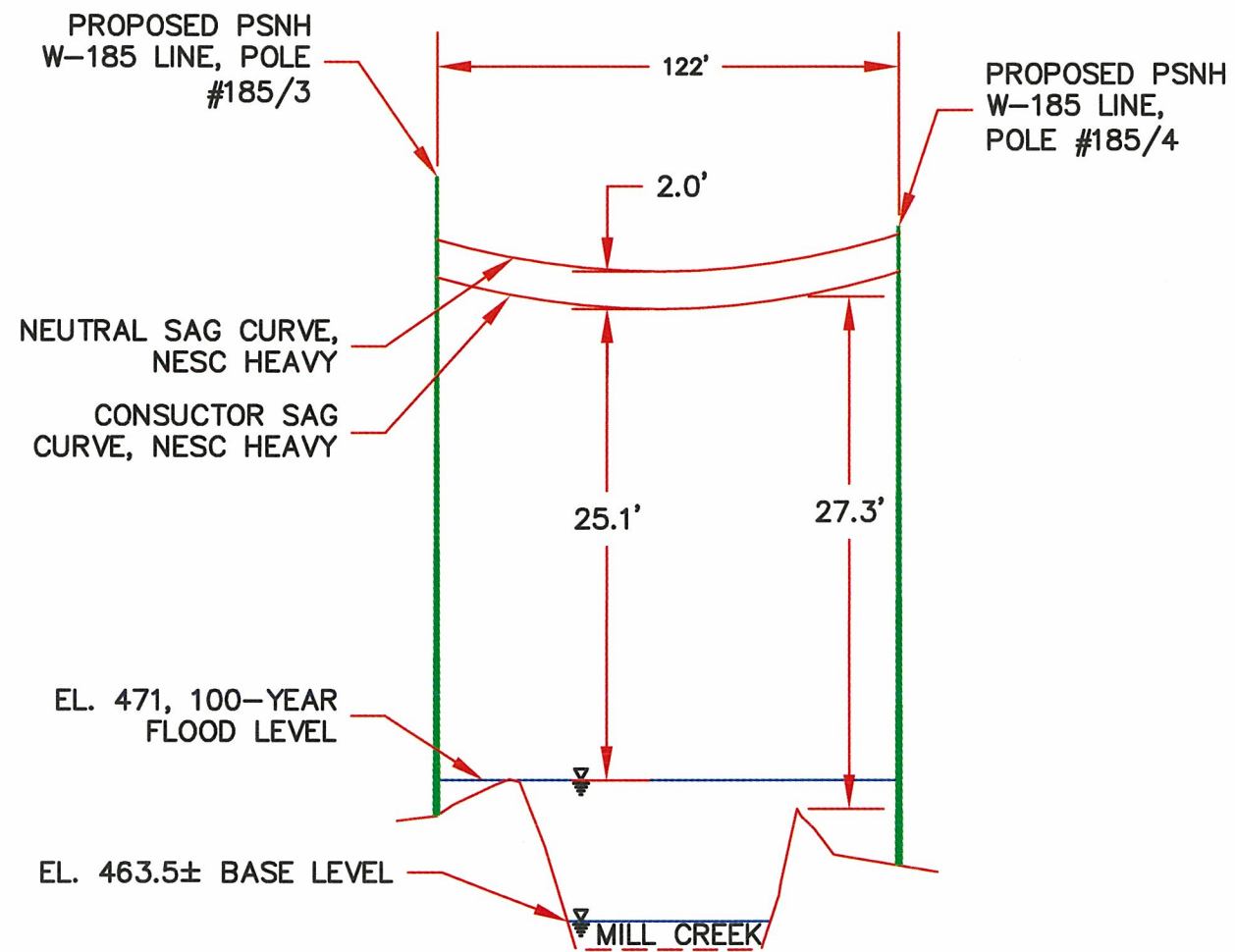
A5. Using the above design criteria, the maximum sags of the phase and neutral wires and minimum clearances for the crossing for the W-185 (the clearances on the W-185 are more restrictive than those on the W-15 due to the larger and heavier wire and higher attachment height of the W-15 on pole 185/3, therefore only clearances for the W-185 are listed) have been determined and designed as follows:

- A. NESC Heavy, Phase Wire – The maximum sag on the phase wires under this condition is 2.49'. The minimum

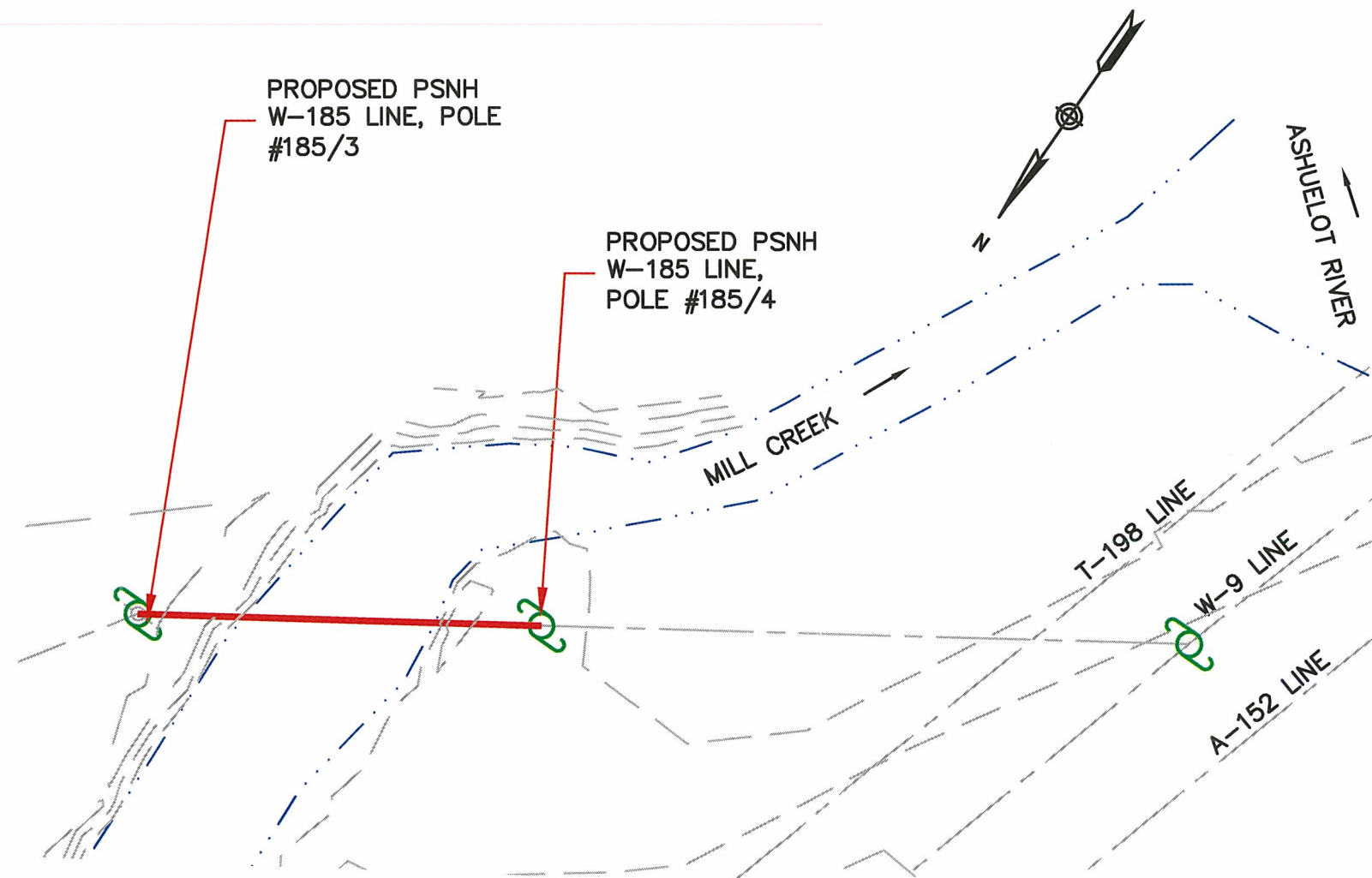
clearance to land is 27.3'. The minimum clearance to the 100 year flood level is 25.1'.

- B. Minus 20° F, Phase Wire – The maximum sag on the phase wires under this condition is 1.42'. The minimum clearance to land is 27.7'. The minimum clearance to the 100 year flood level is 25.7'.
- C. 120° F, Phase Wire - The maximum sag on the phase wires under this condition is 2.22'. The minimum clearance to land is 27.4'. The minimum clearance to the 100 year flood level is 25.3'.
- D. NESC Heavy, Neutral Wire – The maximum sag on the neutral wire under this condition is 2.49'. The minimum clearance to land is 29.3'. The minimum clearance to the 100 year flood level is 27.1'.
- E. Minus 20° F, Neutral Wire – The maximum sag on the neutral wire under this condition is 1.42'. The minimum clearance to land is 29.4'. The minimum clearance to the 100 year flood level is 27.7'.
- F. 120° F, Neutral Wire - The maximum sag on the neutral wire under this condition is 2.22'. The minimum clearance to land is 29.4'. The minimum clearance to the 100 year flood level is 27.3'.
- G. Minimum Clearance, Phase Wire –NESC heavy conditions (item A above), results in the minimum clearance for phase conductors. The minimum clearances expected under those conditions are 27.3' to land and 25.1' to the 100 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 for a 100 year flood based on NESC Table 232-1.7.a, is 20.5'. The crossing design as proposed exceeds the NESC requirements.
- H. Minimum Clearance, Neutral Wire – NESC heavy conditions (item D above), results in the minimum clearance for the neutral wire. The minimum clearances expected under that condition is 29.3' to land and 27.1' to the 100 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 neutral wire to the water surface for a 100 year flood based on NESC Table 232-1.7.a, is 17.5'. The crossing design as proposed exceeds the NESC requirements.

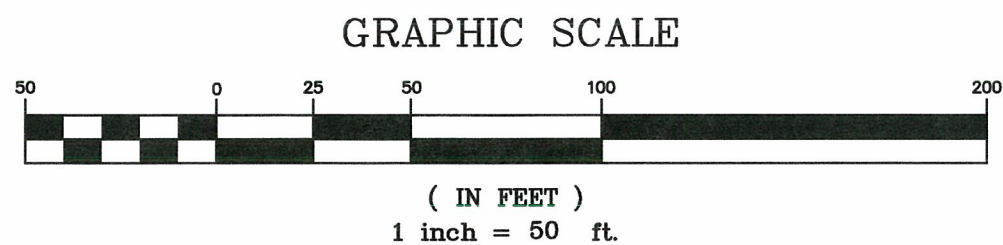
- I. Minimum Phase to Neutral Clearance – Within each individual line there is no minimum clearance requirement for spacer cable construction on a single circuit per NESC section 235.A.2. The required minimum clearance in any direction for line conductors is based on Table 235-6.2.a, which is 13.8” (12” + 0.4”/kV ((12.47 kV \* 1.05) - 8.7 kV). The minimum clearance as proposed is 18” as shown on Exhibit A-2, at pole 185/3, between the conductors on the W-15 line and the messenger on the W-185.



**PROFILE**  
SCALE: 1" = 50' HORIZ. 1" = 5' VERT.

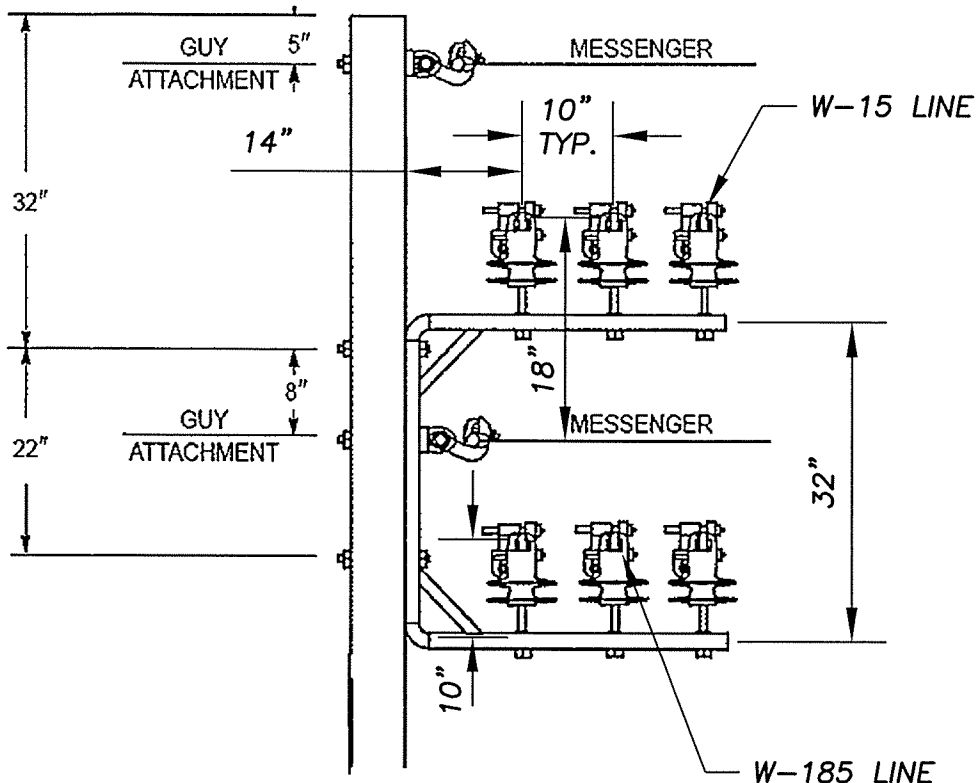


**PLAN**  
SCALE: 1" = 50'

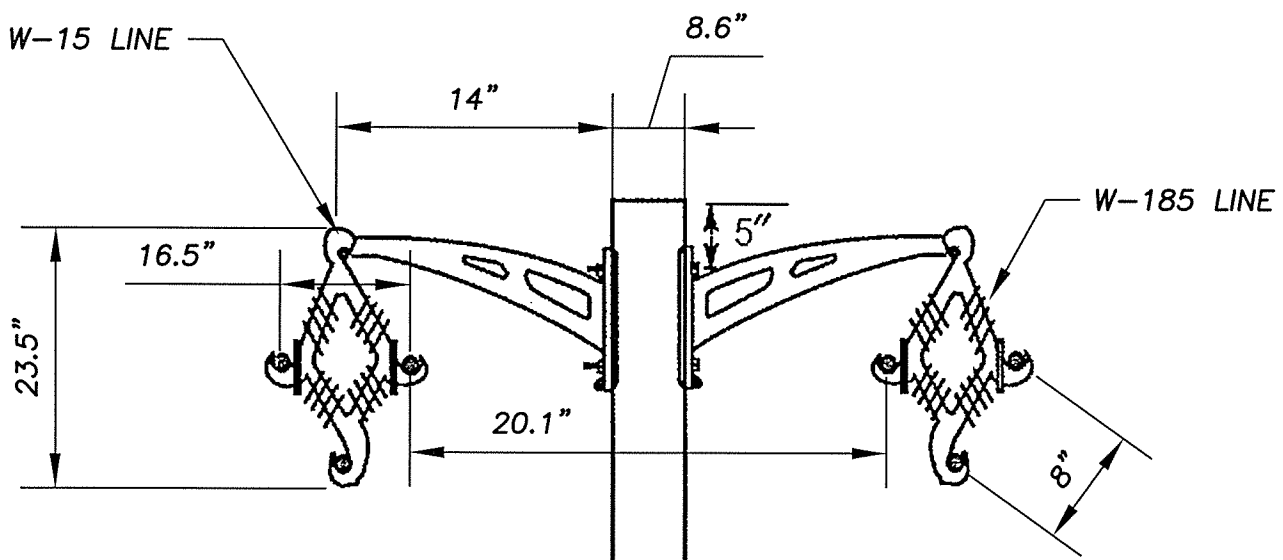


NO.	REVISION	DATE	DRWN	CHK	APPR

	Public Service of New Hampshire		Distribution Business	
	W-15/W-185 DOUBLE CIRCUIT BETWEEN STRUCTURES 185/3 & 185/4 MILL CREEK WATER CROSSING KEENE, NEW HAMPSHIRE			
DRAWN DMS DESIGNED DMS CHECKED DMS APPROVED DMS	SCALE AS SHOWN	DATE 8/25/09	SHEET 1 OF 4	DRAWING NO. EXHIBIT A-1



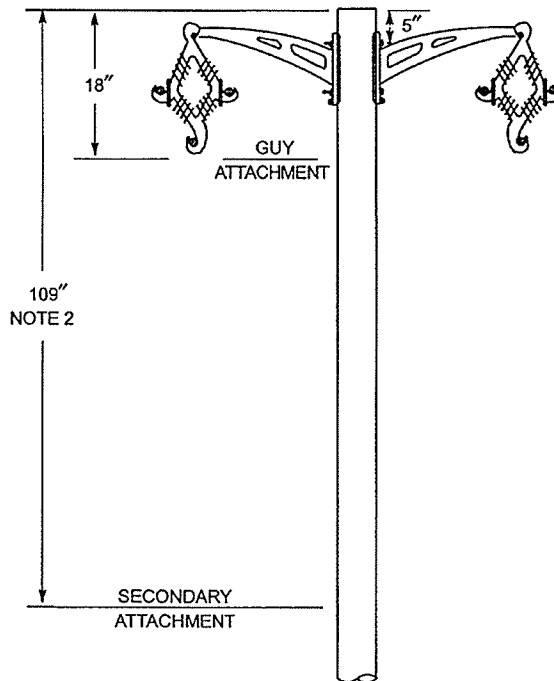
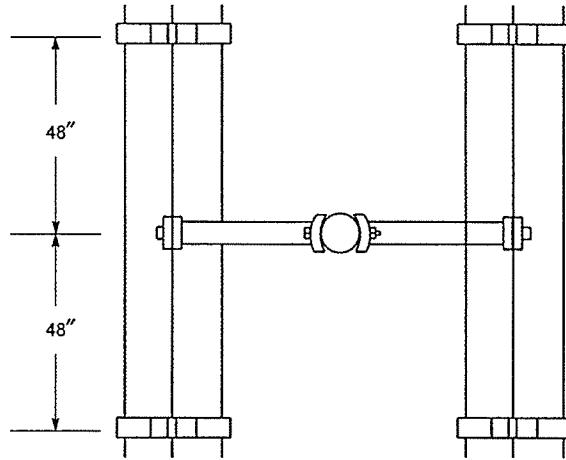
POLE 185/3



POLE 185/4

					DRAWN DMS	Public Service of New Hampshire		Distribution Business	
					DESIGNED _____	<b>CONSTRUCTION STANDARD PLAN</b> <b>W-15/W-185 DOUBLE CIRCUIT</b> <b>MILL CREEK WATER CROSSING</b> <b>KEENE, NEW HAMPSHIRE</b>			
					CHECKED -				
					APPROVED -				
NO.	REVISION	DATE	DRWN	CHK	APPR	SCALE	DATE	SHEET	DRAWING NO.
						NOT TO SCALE	8/24/09	2 of 4	EXHIBIT A-2

STRUCTURE LIMIT S2



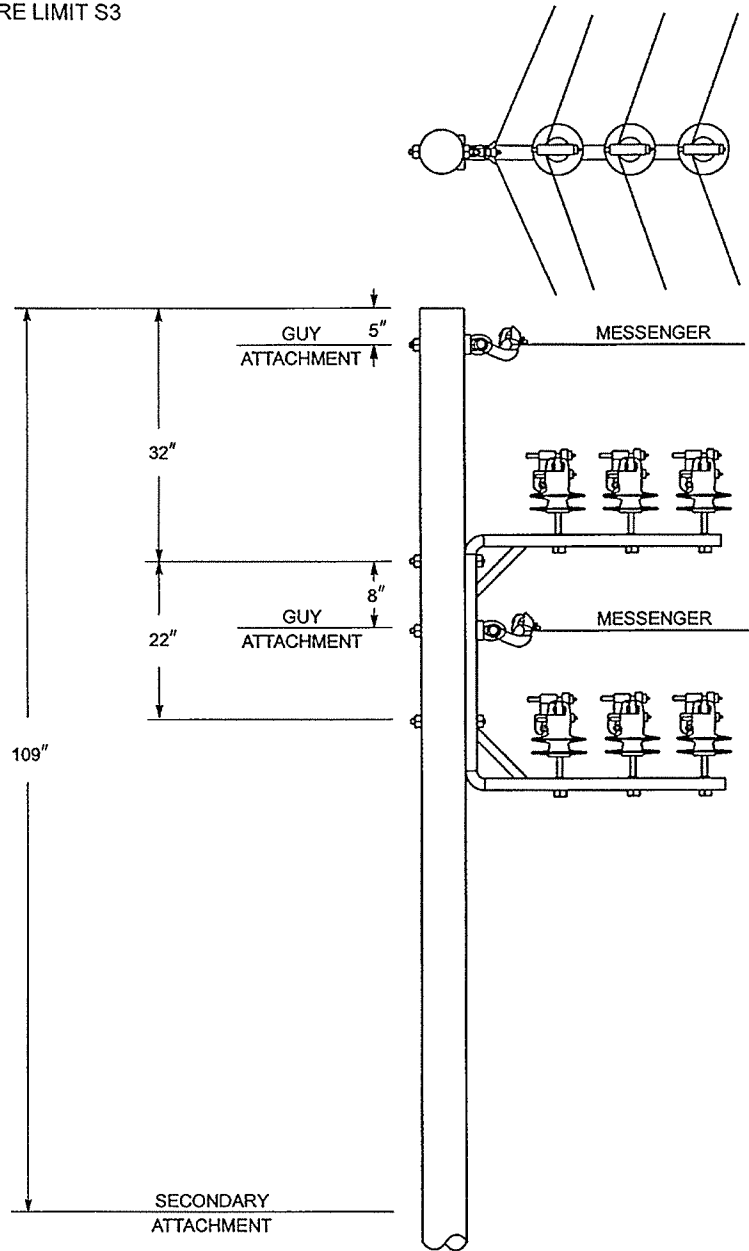
**Notes**

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

						DRAWN <i>DMS</i>	Public Service of New Hampshire	Distribution Business	
						DESIGNED	<b>CONSTRUCTION STANDARD PLAN W-15/W-185 DOUBLE CIRCUIT MILL CREEK WATER CROSSING KEENE, NEW HAMPSHIRE</b>		
						CHECKED -			
						APPROVED -			
NO.	REVISION	DATE	DRWN	CHK	APPR	SCALE <i>NOT TO SCALE</i>	DATE <i>8/24/09</i>	SHEET <i>3 of 4</i>	DRAWING NO. <i>EXHIBIT A-3</i>

STRUCTURE LIMIT S3



Install the first spacer 30 feet from each side of the pole

**Notes**

1. Ground the spacer cable messenger as described in DTR's 32.175 and 32.176.
2. Do not use porcelain insulators. Use polyethylene vise-top insulators only.
3. Do not install a fiberglass guy strain insulator for guying opposite the messenger. However, if additional guys are required to be installed at a location below the messenger, these guys shall be installed with a guy strain insulator.

ORIGINAL	<b>35 KV MGY AND BELOW – SPACER CABLE CONSTRUCTION DOUBLE CIRCUIT – MEDIUM CORNER</b>			
7/23/80				
APPROVED				
7/19/01	NORTHEAST UTILITIES	CONSTRUCTION STANDARD	DTR 10.317	9

					DRAWN	Public Service of New Hampshire		Distribution Business	
					DMS				
					DESIGNED	<b>CONSTRUCTION STANDARD PLAN W-15/W-185 DOUBLE CIRCUIT MILL CREEK WATER CROSSING KEENE, NEW HAMPSHIRE</b>			
					CHECKED				
					APPROVED				
NO.	REVISION	DATE	DRWN	CHCK	APPR	SCALE	DATE	SHEET	DRAWING NO.
						NOT TO SCALE	8/24/09	4 of 4	EXHIBIT A-4