Appendix B
I-135N – Cold River, Walpole, NH

1. As currently constructed, this line crosses over the Cold River in a cross country location approximately 2,400 feet west northwest of the Main Street (Route 12) Crossing of the Cold River. The location of the existing crossing of the Cold River and the proposed construction is shown on attached location map, marked as Exhibit 1-2.

2. In order to accommodate the reconductoring, the existing 4/0 conductors in the current crossing of the I135N Line, a 115 kV circuit, will be replaced with new 795 kcmil ACSR conductors, and the existing 7/16 inch high strength galvanized steel shieldwire will be replaced with a new shieldwire containing fiber optics (OPGW), equivalent to 3/8 inch extra high strength galvanized steel. The existing steel lattice towers will be reused.

3. The design and proposed construction of the crossing is shown on the attached New England Power Company Plan and Profile Drawing entitled "Plan Showing Location of I135N Transmission Line Over and Across Cold River, Walpole , New Hampshire", marked as Exhibit 1-2.

4. The required technical information provided in this petition is based on the 2007 National Electrical Safety Code (NESC) C2-2007.

5. The proposed crossing occurs between two existing lattice towers, located approximately 1,551 feet apart. The tower on the north side of the Cold River, Tower 6, is a 60-foot high deadend tower, Type H-60. The tower on the south side of the river, Tower 7, is a 60-foot high deadend tower, Type H-60. The three phase wires will be 795 kcmil ACSR, 26/7, and the shieldwire will be OPGW, equivalent to 3/8 inch extra high strength galvanized steel.

   The three new phase conductors and the new shieldwire will be located at the same elevation on the towers, but will have different sags and greater clearances over the river than the existing 4/0 conductors. A copy of deadend tower Type H-60 Strain is attached, marked as Exhibit 2-2.

   Both the phase wire and the shieldwire will be sagged using the NESC Heavy Loading condition (0°F, 4 pounds wind, ½" radial ice). The phase wires will be sagged using a maximum tension of 8,000 pounds. The shieldwire will sagged using a maximum tension of 4,500 pounds.

6. The 10 year flood elevation for the Cold River was based on the FEMA 10 year flood profile elevation from the Flood Insurance Study for Cheshire County. The 10-year flood elevation for this location is approximately 250.6 feet based on the National Geodetic Vertical Datum of 1929 (NGVD 29).

7. The nature of the water surface underneath the conductors crossing the Cold River is not suitable for sailboating. See Site Review of the Connecticut River Crossing, the Cold River Crossing, and the Ashuelot River Crossing; Identification of Clearance Issues, Dated September, 2008, Prepared by Vanderweil Engineers.

The applicable vertical clearance is found in NESC Table 232-1, Row 6.

8. Using the above design criteria, and the maximum sags of the phase wire and the shieldwire, the minimum clearance for the crossings have been determined and designed as follows:

Condition	Maximum Sag under this condition	Minimum clearance to Land	Minimum clearance to the 10-year flood
	Feet	Feet	Feet
A. NESC Heavy, Phase Wires	98.0	53.4	183.4
B. Minus 20° F, Phase Wires	94.2	53.8	187.0
C. 105° F, Phase Wires	98.4	53.4	182.3
D. 284° F, Phase Wires	103.4	52.9	177.5
E. NESC Heavy, Shieldwire	89.8	62.4	202.2
F Minus 20° F, Shieldwire	81.3	62.8	207.2
G. 105° F, Shieldwire	86.0	62.5	202.9

H. Minimum Clearance, Phase Wires
Maximum Operating Condition at 284 ° F (Item D above) results in minimum clearance
Minimum Clearance to land under those conditions is 52.9 feet, next to Tower 7
- Required minimum clearance to land based on NESC Table 232-1.2 is 20.1 feet

Minimum Clearance to the 10-year flood water level under those conditions is 177.5 feet
- Required minimum clearance to water surface based on NESC Table 232-1.6 is 18.6 feet

The crossing clearances as proposed exceeds the NESC Requirements

I. Minimum Clearance, Shieldwire
Maximum Temperature Condition at 105° F (Item G above) results in minimum clearance
Minimum Clearance to land under those conditions is 62.5, next to Tower 7
- Required minimum clearance to land based on NESC Table 232-1.2 is 15.5 feet

Minimum Clearance to the 10-year flood water level is 202.9 feet
- Required minimum clearance to water surface based on NESC Table 232-1.6 is 14.0 feet

The crossing clearances as proposed exceeds the NESC Requirements

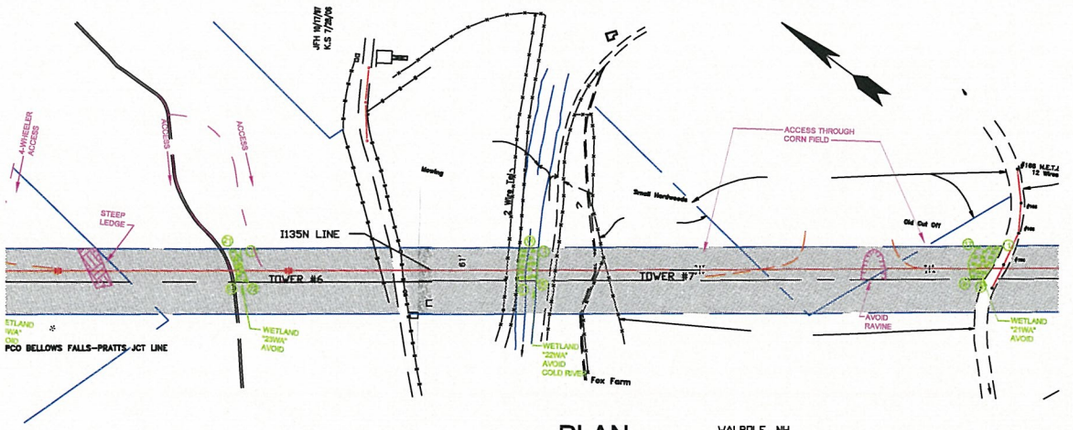
J. Minimum Shieldwire to Phase Wire Clearance

	Shieldwire Sag, feet	Conductor Sag, feet	Minimum separation between shieldwire and conductor
1	30 °F, ½" ice – 88.7	30 °F, Bare – 97.0	9.9 feet, next to Tower 6
2	NESC Heavy – 89.8	NESC Heavy – 98.0	9.8 feet, next to Tower 6
3	30 °F, 3/4" ice, 4 psf wind – 91.2	30 °F, Bare – 97.0	8.9 feet next to Tower 6

The minimum separations are based on the output of PLS-CADD, which searched for the minimum distance between the shieldwire and conductor along the entire span for conditions 1, 2, and 3.
Condition 3 results in the minimum clearance between these wires
Minimum Clearance shieldwire to phase under those conditions is 8.9 feet

- Required minimum clearance shieldwire to phase based on NESC Table 235-6, Section 2 is 4.8 feet

The shieldwire to phase wire clearances as proposed exceeds the NESC Requirements



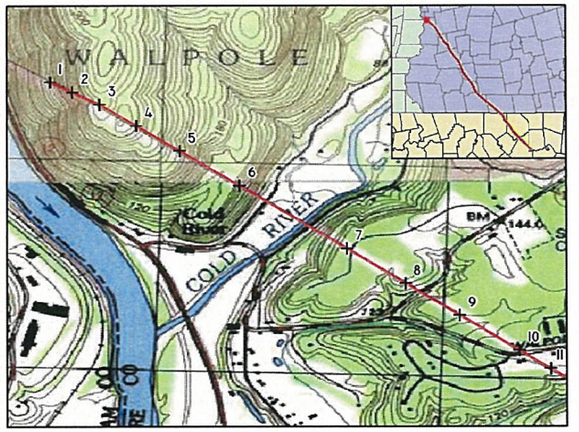
PLAN

WALPOLE, NH

SCALE: 1"=50'

SCALE OF FEET

200 100 0 200

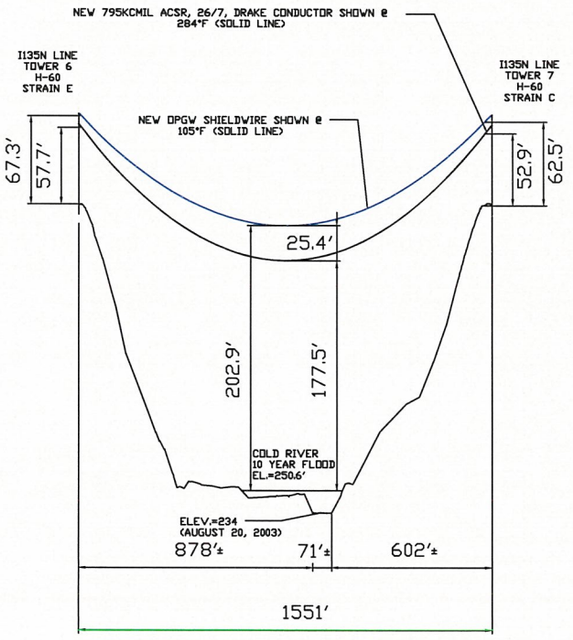


KEY MAP

MAP SOURCE - USGS TOPOGRAPHIC IMAGE

SCALE - 1:24,000

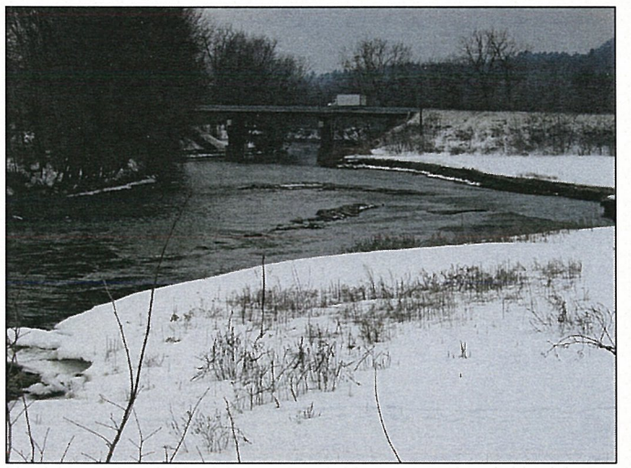
0 0.125 0.25 0.5 0.75 1 1.25 MILES



PROFILE

HORIZONTAL:1"=500'

VERTICAL:1"=100'



PHOTO

BRIDGE CROSSING MARCH 12. 2008
BEFORE CONNECTICUT RIVER

(August 20, 2003) = Date Flown

LEGEND

Tower Location

Existing Conductor to be Replaced

EXHIBIT 1-2

New England Power Company
Plan Showing Location of
I-135N Transmission Line
Over and Across
Cold River
Walpole, New Hampshire

Scale: As Shown Date: September 2008

115KV LINE
LINE CROSSING OF THE COLD RIVER IN WALPOLE, NH
PLAN & PROFILE
SCALE : 1:50

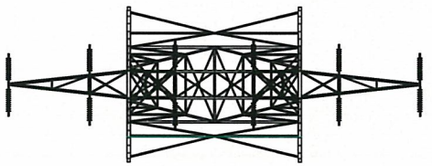
nationalgrid

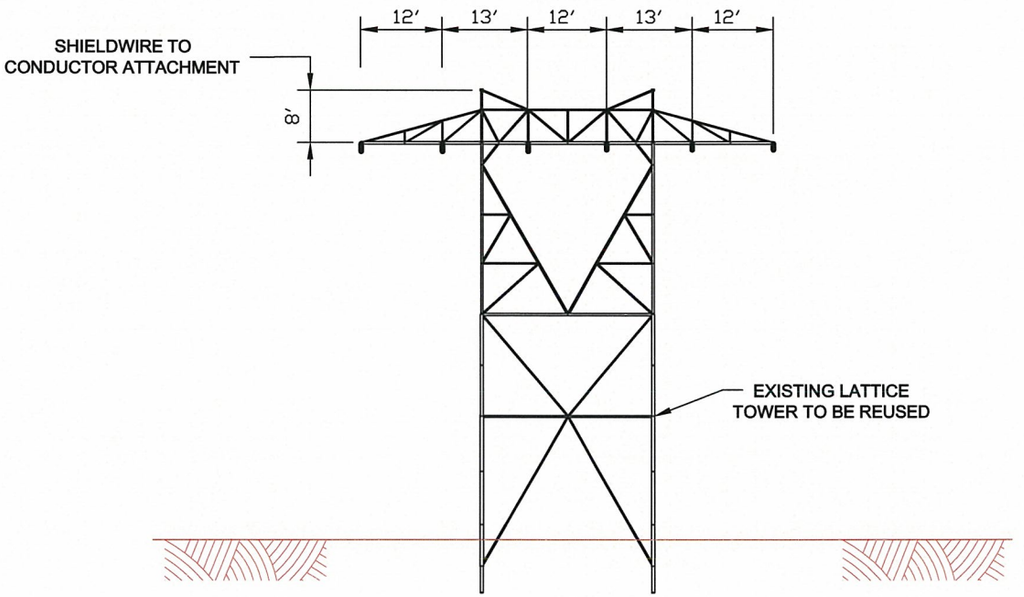
REV	DATE	REVISION DESCRIPTION	DRWN CKED APPVD
1	10/29/08	EDIT FLOOD ELEVATION DESCRIPTION	

ORIGINAL NAME	DATE
DRAWN BY	3/24/08
CHCKD BY	
RSPVD BY	
APPRV BY	

INCHES ON ORIGINAL

INCHES ON ORIGINAL





ELEVATION
SCALE:1"=20'

EXHIBIT 2-2

New England Power Company
Deadend Tower, Type H-60 Strain
I135N Transmission Line
Over and Across the
Cold River
Walpole, New Hampshire

Scale: As Shown Date: October 2008

115KV LINE
LINE CROSSING OF COLD RIVER
IN WALPOLE, NH
DEADEND TOWER
SCALE : As Shown

ORIGINAL NAME
DRAWN BY
CHKD BY
RSPD BY
APPR BY
DATE 1/7/07

nationalgrid

REV	DATE	REVISION DESCRIPTION	DRWN	CHKD	APPVD	REVISION
1						
2						
3						
4						
5						
6						
7						

INCHES ON ORIGINAL

INCHES ON ORIGINAL