



LOCUS MAP
(Not to Scale)



Spanmaster® Release 3.1 Sag / Tension Computations
09/01/11 Waveguide

Waveguide
River and Rail Crossings

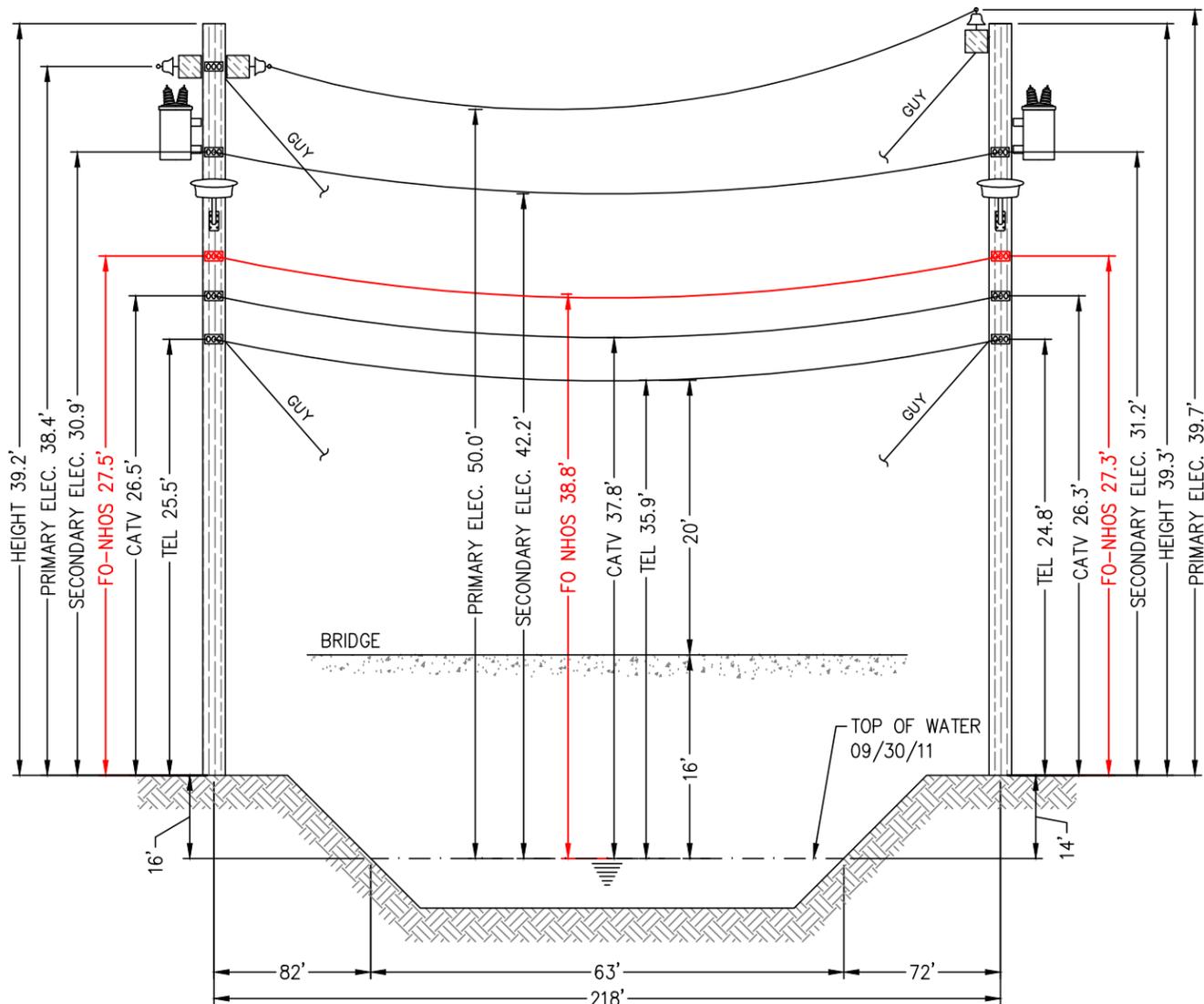
Selected Cables	X-SECT AREA (sq.in)	EFF MODULUS (psi)	NOMINAL DIAM (in)	EFF.EXP. COEFF. (1/F)	CABLE WEIGHT (lb/ft)	E*A LOAD BEARING CAPACITY (lbs)	MAX. RATED LOAD (lbs)
1/4"6.6mEHS	0.0352	2.60E+07	0.250	5.60E-06	0.1210	914940	6650
ORF-O-288-LN Bundle	0.5782	2.70E+05	0.858	1.13E-05	0.1960	155982	651
			1.108		0.3170		

NESC RESULTS

Loading Condition	Temp. (F)	Ice Load (lb/ft)	Ice Thick (in)	Wind Constant (lb/ft)	Horz Load (lb/ft)	Result Load + Const (lb/ft)	Sag (ft)	Tension (lb)	% Len Chg From Input Conditions	Sag @ Point (ft)	Horz Sag Comp (ft)	Vert Sag Comp (ft)	Vector Angle Deg
Rule 251 - Heavy	0.0	1.000	.50	.3	4.0	1.793	4.86	2187	0.11	4.87	2.29	4.29	28.1
232A1	120.0	0.000	.00	.0	0.0	0.317	2.63	717	0.01	2.63	0.00	2.63	0.0

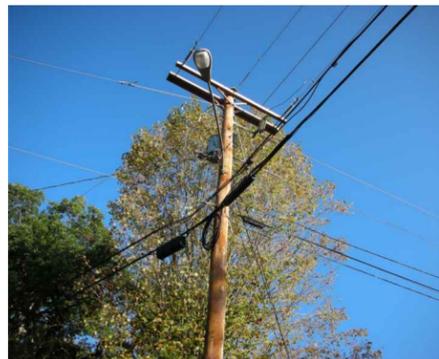
Temp (F)	Midspan Sag (ft)	Tension (lb)	% Length Change	Clearance
-40.0	1.46	1,290	-0.01	N/A
-30.0	1.51	1,246	-0.01	N/A
-20.0	1.56	1,204	-0.01	N/A
-10.0	1.62	1,162	-0.01	N/A
.0	1.68	1,121	-0.01	N/A
10.0	1.74	1,081	-0.01	N/A
20.0	1.80	1,042	-0.01	N/A
30.0	1.87	1,003	-0.01	N/A
40.0	1.95	966	-0.01	N/A
50.0	2.02	931	0.00	N/A
60.0	2.10	896	0.00	N/A
70.0	2.18	863	0.00	N/A
80.0	2.26	831	0.00	N/A
90.0	2.35	800	0.00	N/A
100.0	2.44	771	0.01	N/A
110.0	2.53	743	0.01	N/A
120.0	2.63	717	0.01	N/A
130.0	2.72	692	0.01	N/A
140.0	2.82	668	0.02	N/A

Span Length = 218.00 ft
Span Sag = 2.18 ft (26.2 in)
Span Tension = 864 lb
Max Load = 6,650 lb
Usable load (60%) = 3,990 lb
Catenary Length = 218.058 ft
Stress Free Length @ Installed Temperature = 217.852 ft
Unloaded Strand Sag = 1.06 ft (12.7 in) 0.49 %
Tension = 678 lb



E-6/11X - T-8/68
(Existing joint owned utility pole (PSNH/TDS) in existing Right-of-Way)

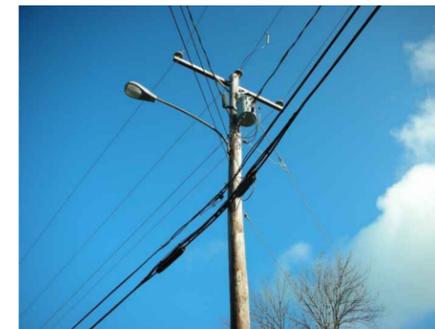
E-NT - T-8/67
(Existing joint owned utility pole (PSNH/TDS) in existing Right-of-Way)



E-6/11X - T-8/68

Construction Notes:

NHOS proposes to install a 1/4 inch metal supporting strand between the existing utility poles shown above that will traverse the river. The strand will be installed at the proposed height (see above). The supporting strand will be secured to each pole using double dead end attachments to prevent any sag in the wire and maintain proper clearances. NHOS will lash a one inch diameter fiber optic cable (PVC jacket) to the strand using a dual lash method to provide security of the fiber over the right of way. The fiber will be tagged with twenty four hour contact information at each pole clamp. NHOS will employ the proper safety personnel during the crossing installation. The proposed install will meet all proper clearances from other Utilities. (see above). Additional pole guys will be added per NESC Rule 264 and as directed by pole owners.



E-NT - T-8/67



New Hampshire Optical Systems, Inc.
99 Pine Hill Rd.
Nashua, NH 03063
(603-821-6467)

Proposed River Crossing Warner, NH

Notes:

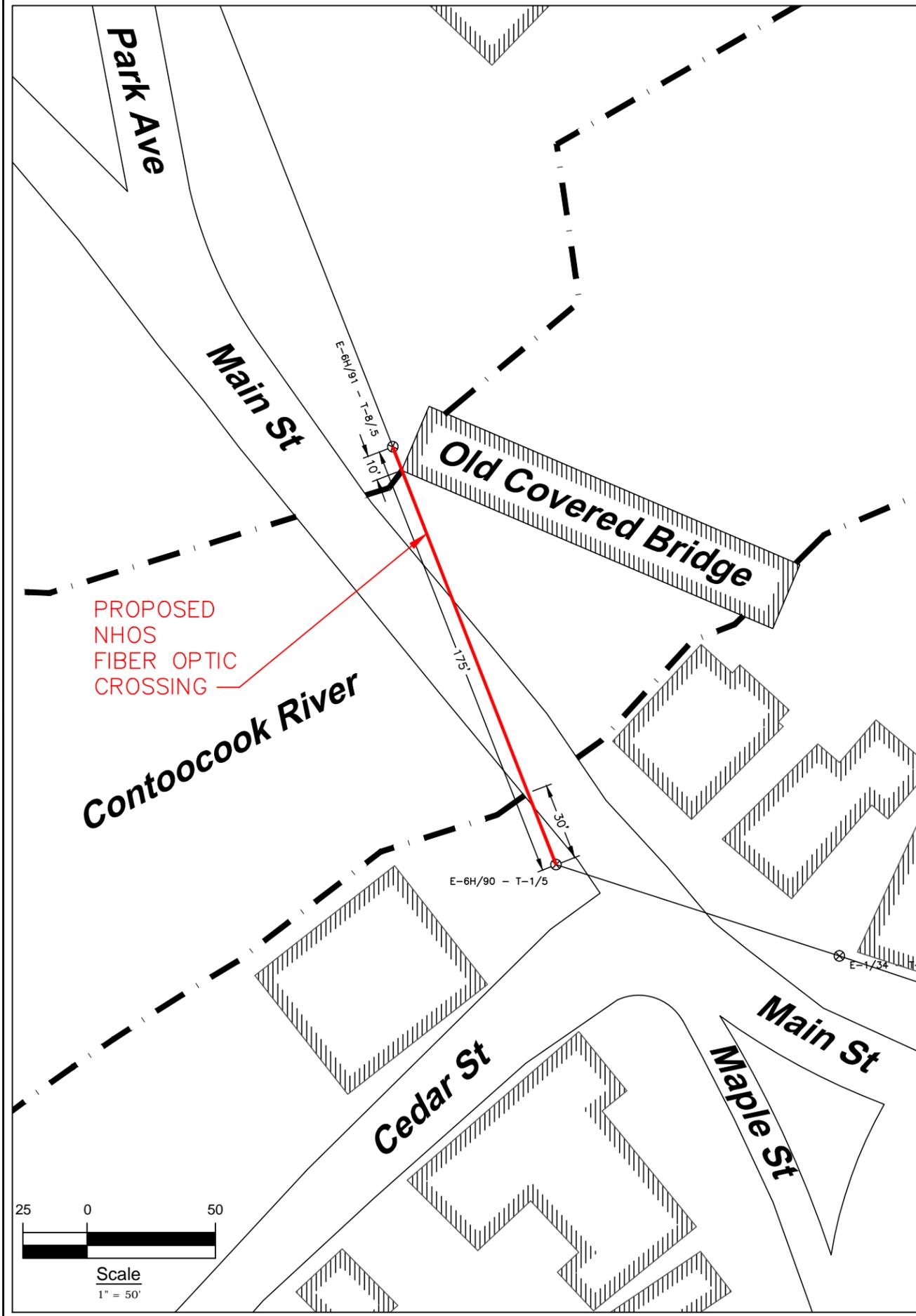
- The heights of structures shown hereon are based on field measurements taken with a Nikon 362 total station during a site survey on 09/11/11.
- The horizontal distance between the nearest bridge edge and the existing overhead wires ranges from 7' to 8'.
- Because of the close horizontal proximity to the existing bridge structure, the simplified drawing is submitted with vertical distances measured to the structure. This process simplifies the preparation and review of the crossing without jeopardizing its intent to protect the safe usage of the waterway.
- The smallest vertical distance from the top of existing bridge deck to the lowest existing overhead wires is 20'.
- The vertical distance between the top of water and bridge deck is approximately 16'.
- Vertical distances are representative of attachment heights after utility make ready moves are completed.

Project # TID-222 - Primary 3
Drawing # AC-WAR-RIV-1

Date: 11/10/11
Revision #

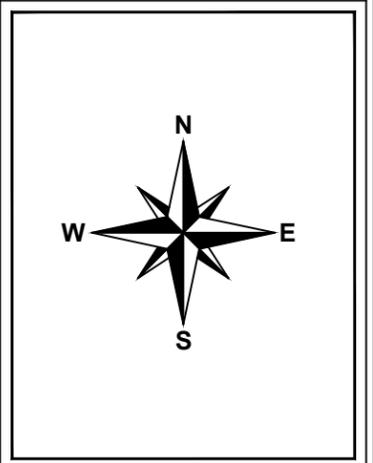
Proposed River Crossing Warner, NH

Location:
Route 127, Warner, NH
Nearest cross street- Dustin Rd.



NHOS
 New Hampshire Optical Systems
 New Hampshire Optical Systems, Inc.
 99 Pine Hill Rd.
 Nashua, NH 03063
 (603-821-6467)

**Proposed Crossing
 Contoocook River,
 Hopkinton, NH**

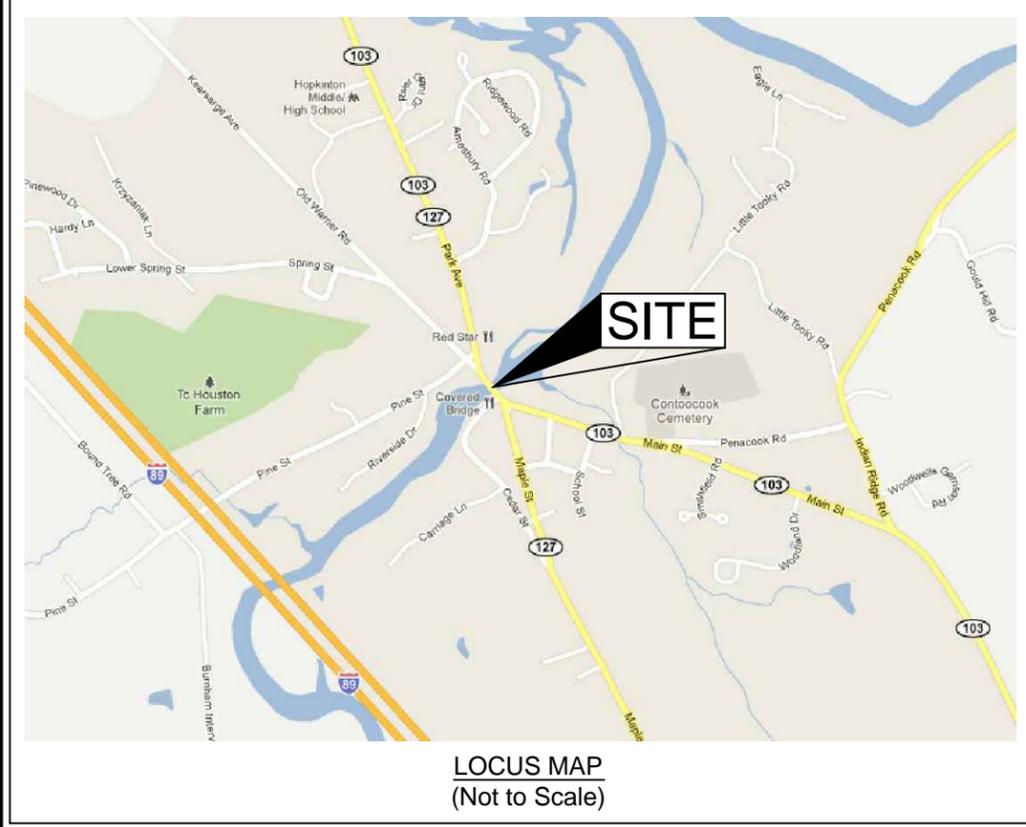


Project # TID-223-PRI-3
 Drawing # AC-HOP-RIV-1

Date: 11/10/2011
 Revision #

**Proposed Crossing
 Contoocook River,
 Hopkinton, NH**

Location:
 Main St, Hopkinton, NH
 Nearest cross street: Maple St



CommScope[®]

Spanmaster[®] Release 3.1 Sag / Tension Computations

Waveguide 09/01/11 Waveguide

River and Rail Crossings

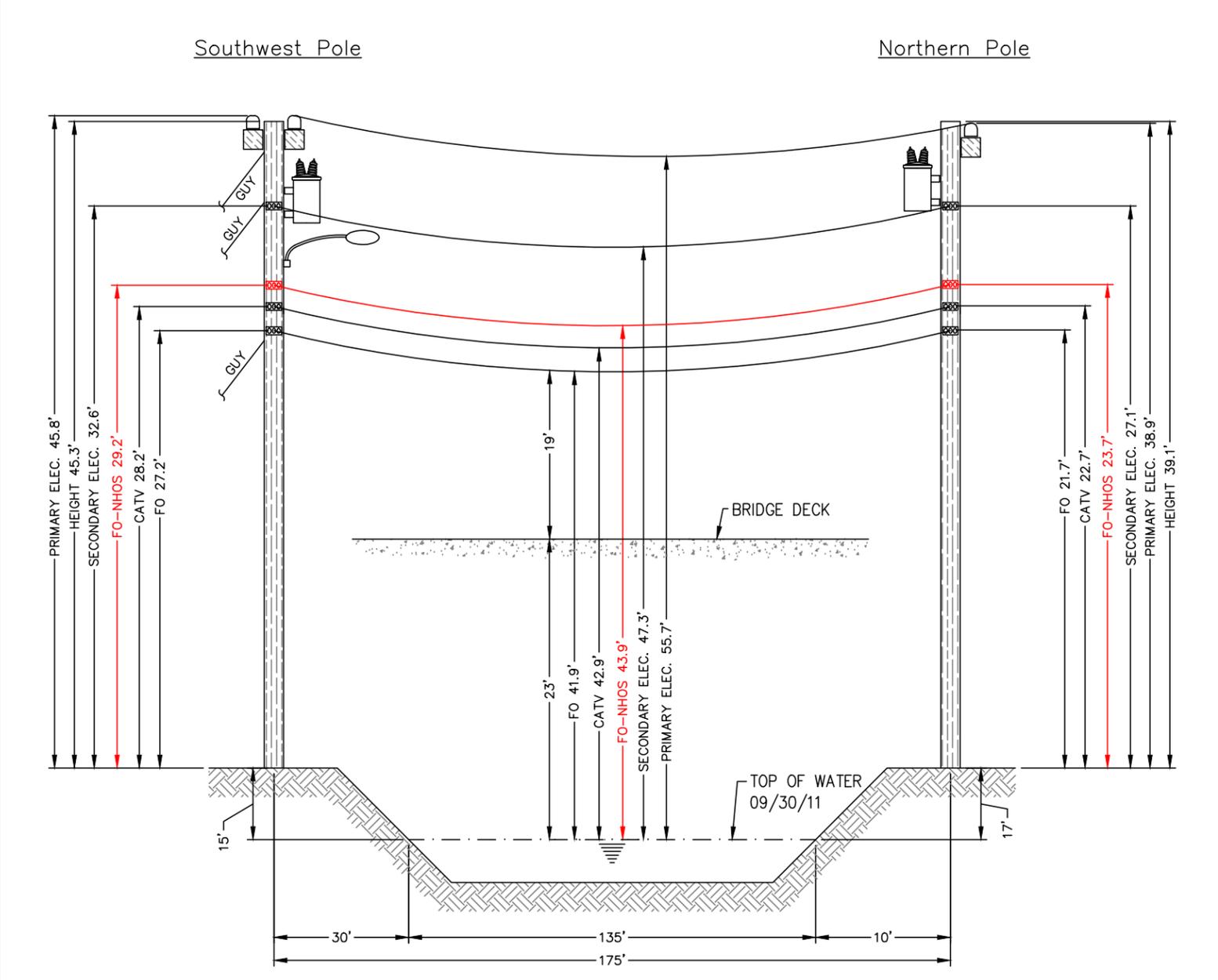
Selected Cables	X-SECT AREA (sq.in)	EFF MODULUS (psi)	NOMINAL DIAM (in)	EFF.EXP. COEFF. (1/F)	CABLE WEIGHT (lb/ft)	E*A LOAD BEARING CAPACITY (lbs)	MAX. RATED LOAD (lbs)
1/4"6.6mEHS	0.0352	2.60E+07	0.250	5.60E-06	0.1210	914940	6650
ORF-O-288-LN Bundle	0.5782	2.70E+05	0.858	1.13E-05	0.1960	155982	651
			1.108		0.3170		

NESC RESULTS													
Loading Condition	Temp. (F)	Ice Load (lb/ft)	Ice Thick (in)	Wind Constant (lb/ft)	Horz Wind Load (lb/ft)	Result Load + Const (lb/ft)	Sag (ft)	Tension (lb)	% Len Chg From Input Conditions	Sag @ Point 87.5 ft	Horz Sag Comp (ft)	Vert Sag Comp (ft)	Vector Angle Deg
Rule 251 - Heavy 232A1	0.0	1.000	.50	.3	4.0	1.793	3.66	1872	0.09	3.66	1.72	3.23	28.1
	120.0	0.000	.00	.0	0.0	0.317	2.15	563	0.01	2.16	0.00	2.15	0.0

Temp (F)	Midspan Sag (ft)	Tension (lb)	% Length Change	Clearance
-40.0	1.09	1,107	-0.02	N/A
-30.0	1.14	1,063	-0.02	N/A
-20.0	1.19	1,021	-0.01	N/A
-10.0	1.24	980	-0.01	N/A
.0	1.29	939	-0.01	N/A
10.0	1.35	900	-0.01	N/A
20.0	1.41	862	-0.01	N/A
30.0	1.47	825	-0.01	N/A
40.0	1.53	790	-0.01	N/A
50.0	1.60	756	0.00	N/A
60.0	1.68	724	0.00	N/A
70.0	1.75	693	0.00	N/A
80.0	1.83	664	0.00	N/A
90.0	1.91	636	0.00	N/A
100.0	1.99	610	0.01	N/A
110.0	2.07	586	0.01	N/A
120.0	2.15	563	0.01	N/A
130.0	2.24	542	0.02	N/A
140.0	2.33	522	0.02	N/A

Span Length = 175.00 ft
 Span Sag = 1.75 ft (21.0 in)
 Span Tension = 693 lb
 Max Load = 6,650 lb
 Usable load (60%) = 3,990 lb
 Catenary Length = 175.047 ft
 Stress Free Length @ Installed Temperature = 174.914 ft

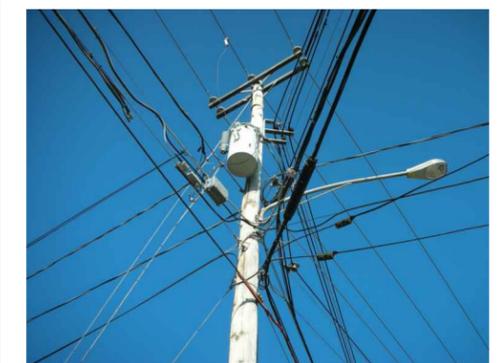
Unloaded Strand
 Sag = .90 ft (10.8 in) 0.51 %
 Tension = 514 lb



E-6H/90 - T-1/5
(Existing joint owned utility pole (PSNH/TDS) in existing Right-of-Way)

Not to Scale

E-6H/91 - T-8/5
(Existing joint owned utility pole (PSNH/TDS) in existing Right-of-Way)



E-6H/90 - T-1/5

Construction Notes:

NHOS proposes to install a 1/4 inch metal supporting strand between the existing utility poles shown above that will traverse the river. The strand will be installed at the proposed height (see above). The supporting strand will be secured to each pole using double dead end attachments to prevent any sag in the wire and maintain proper clearances. NHOS will lash a one inch diameter fiber optic cable (PVC jacket) to the strand using a dual lash method to provide security of the fiber over the right of way. The fiber will be tagged with twenty four hour contact information at each pole clamp. NHOS will employ the proper safety personnel during the crossing installation. The proposed install will meet all proper clearances from other Utilities. (see above). Additional pole guys will be added per NESC Rule 264 and as directed by pole owners.



E-6H/91 - T-8/5

NHOS
New Hampshire Optical Systems

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 99 Pine Hill Rd.
 Nashua, NH 03063
 (603-821-6467)

Proposed Crossing Contoocook River, Hopkinton, NH

- Notes:**
- The heights of structures shown hereon are based on field measurements taken with a Nikon 362 total station during a site survey on 09/30/11.
 - The horizontal distance between the nearest bridge edge and the existing overhead wires ranges from 0' to 8'.
 - Because of the close horizontal proximity to the existing bridge structure, the simplified drawing is submitted with vertical distances measured to the structure. This process simplifies the preparation and review of the crossing without jeopardizing its intent to protect the safe usage of the waterway.
 - The smallest vertical distance from the top of existing bridge deck to the lowest existing overhead wires is 19'.
 - The vertical distance between the top of water and bridge deck is approximately 23'.
 - Vertical distances are representative of attachment heights after utility make ready moves are completed.

Project # TID-223-PRI-3
 Drawing # AC-HOP-RIV-1

Date: 11/10/2011
 Revision #

Proposed Crossing Contoocook River, Hopkinton, NH

Location:
 Main St. Hopkinton, NH
 Nearest cross street: Maple St