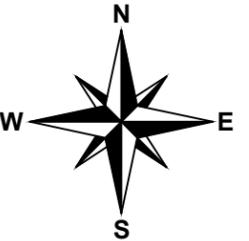


New Hampshire Optical Systems, Inc.  
 99 Pine Hill Rd.  
 Nashua, NH 03063  
 (603-821-6467)

Proposed  
 River Crossing  
 Pembroke, NH



Project # TID-190 - Primary 14  
 Drawing # AC-PEM-RIV-1

Date: 12/13/11  
 Revision #

Proposed  
 River Crossing  
 Pembroke, NH

Location:  
 Sheep Davis Rd., Pembroke, NH  
 Nearest cross street- Clough Mill Rd.



LOCUS MAP  
(Not to Scale)



Spanmaster® Release 3.1 Sag / Tension Computations

Waveguide  
River and Rail Crossings

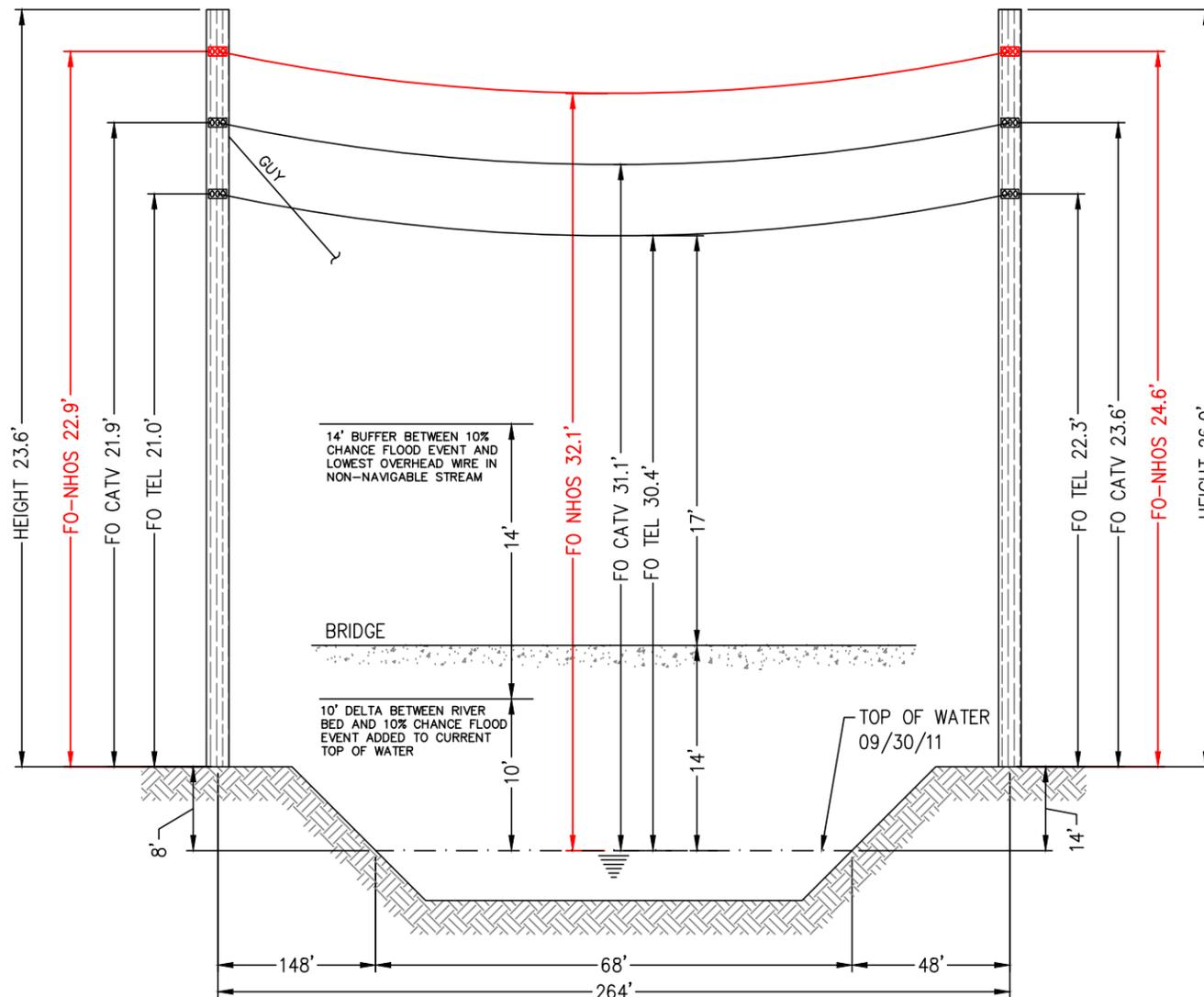
09/01/11 Waveguide

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-286-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 132 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	6.21	2507	0.12	6.23	2.92	5.48	28.1
	120.0	0.000	.00	.0	0.0	0.317	3.12	885	0.01	3.12	0.00	3.12	0.0

Temp (F)	Midspan Sag (ft)	Tension (lb)	% Length Change	Clearance
Span Length = 264.00 ft				
Span Sag = 2.64 ft (31.7 in)				
Span Tension = 1,046 lb				
Max Load = 6,650 lb				
Usable load (60%) = 3,990 lb				
Catenary Length = 264.070 ft				
Stress Free Length @ Installed Temperature = 263.769 ft				
Unloaded Strand Sag = 1.23 ft (14.8 in) Tension = 855 lb				
40.0	2.39	1,153	0.00	N/A
50.0	2.47	1,116	0.00	N/A
60.0	2.55	1,080	0.00	N/A
70.0	2.64	1,044	0.00	N/A
80.0	2.73	1,010	0.00	N/A
90.0	2.82	977	0.00	N/A
100.0	2.92	945	0.01	N/A
110.0	3.02	914	0.01	N/A
120.0	3.12	885	0.01	N/A
130.0	3.22	857	0.01	N/A
140.0	3.33	830	0.02	N/A



E-NT - T-1514/33  
(Existing joint owned utility pole (PSNH/Fairpoint) in existing Right-of-Way)

E-NT - T-2413/14  
(Existing joint owned utility pole (PSNH/Fairpoint) in existing Right-of-Way)



E-NT - T-1514/33

**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-2413/14



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

**Proposed River Crossing  
Pembroke, NH**

**Notes:**

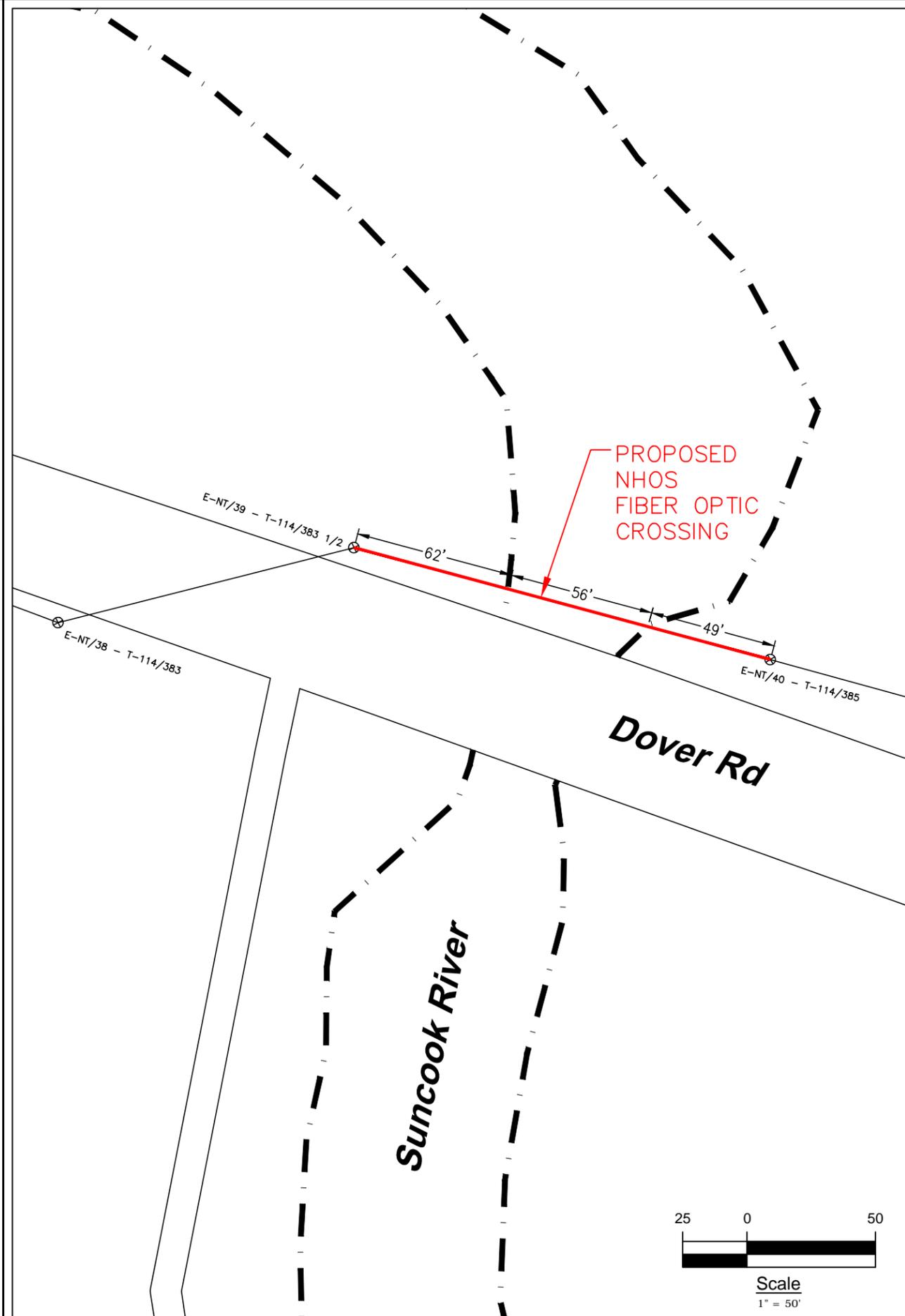
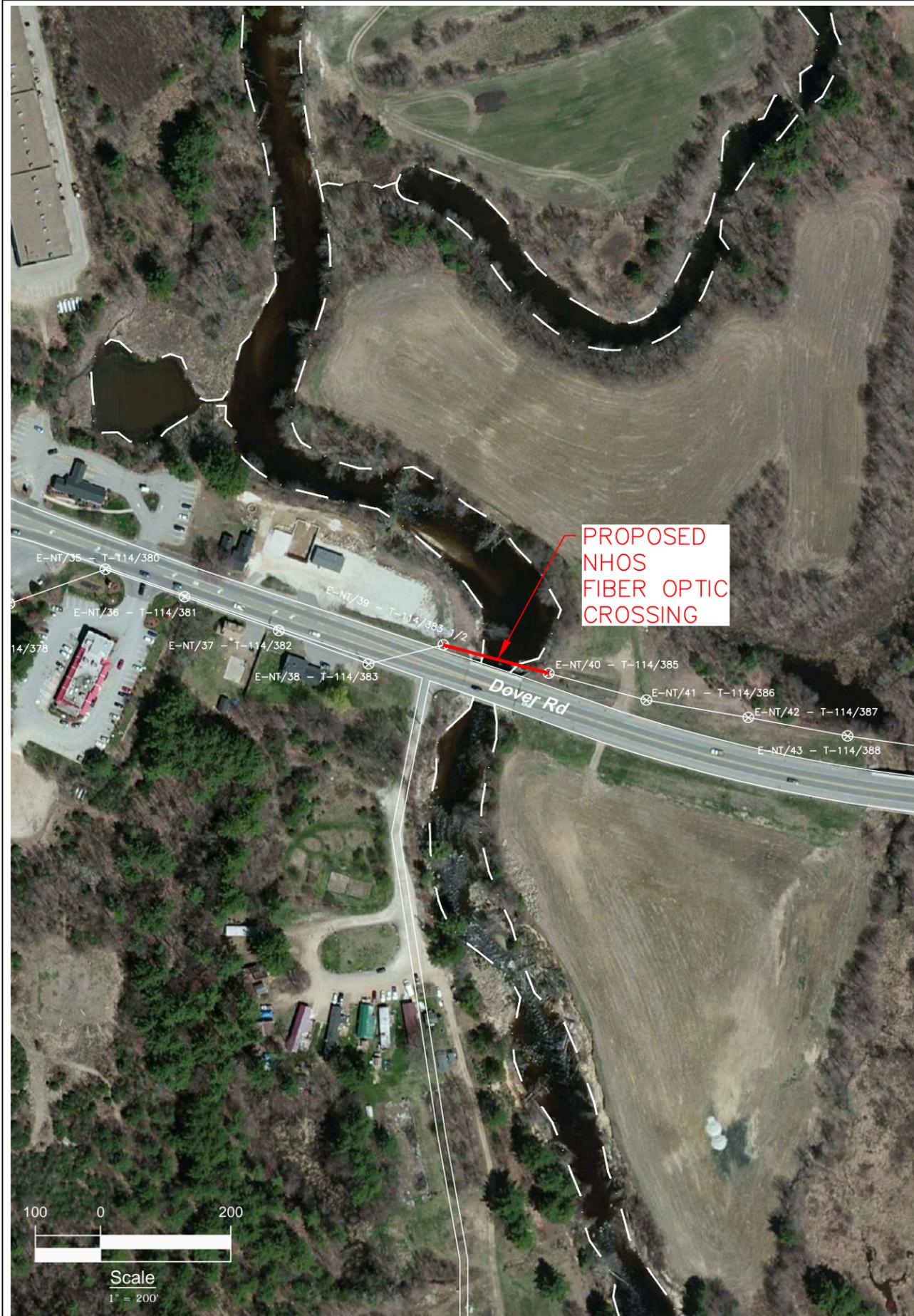
- The heights of structures shown hereon are based on field measurements taken with a Nikon 362 total station during a site survey on 09/30/11.
- The horizontal distance between the nearest bridge edge and the existing overhead wires ranges from 19' to 21'.
- The smallest vertical distance from the top of existing bridge deck to the lowest existing overhead wires is approximately 17'.
- The vertical distance between the top of water and bridge deck is approximately 14'.
- The waterway is classified as not suitable for sail boating and per NESC Table 232-1 a vertical clearance of 14' must be maintained between the lowest conductor and 10 year floodplain.
- Based on the FEMA Flood Profile for the Soucook River (Page 64P) and the Flood Insurance Rate Map for Merrimack County Map Number 33013C0553E) dated April 19, 2010 a conservative 10 year flood elevation was calculated by adding the delta between the river bed elevation and the 10 year flood elevation to the surveyed water level and then a 14' buffer (for non-navigable streams) was added to that. Based on the FEMA Flood Profile the stream bed elevation is 246' and the 10 year flood elevation is 256'.
- Vertical distances are representative of attachment heights after utility make ready moves are completed.

Project # TID-190 - Primary 14  
Drawing # AC-PEM-RIV-1

Date: 12/13/11  
Revision #

**Proposed River Crossing  
Pembroke, NH**

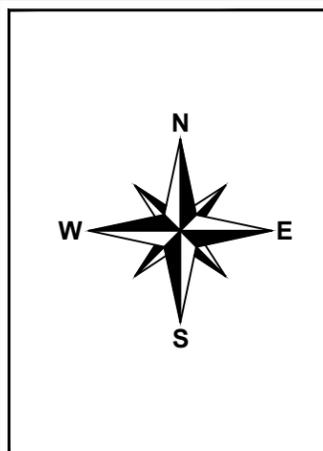
Location:  
Sheep Davis Rd., Pembroke, NH  
Nearest cross street- Clough Mill Rd.



**New Hampshire Optical Systems**

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

**Proposed  
 River Crossing  
 Epsom, NH**



Project # TID-191 - Primary 14  
 Drawing # AC-EPS-RIV-1

Date: 03/26/12  
 Revision #

**Proposed  
 River Crossing  
 Epsom, NH**

Location:  
 Dover Rd., Epsom, NH  
 Nearest cross street- Suncook Valley Hwy.



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	0.5782	2.70E+05	0.858	1.13E-05	0.1960	155982	651
Bundle			1.108		0.3170		

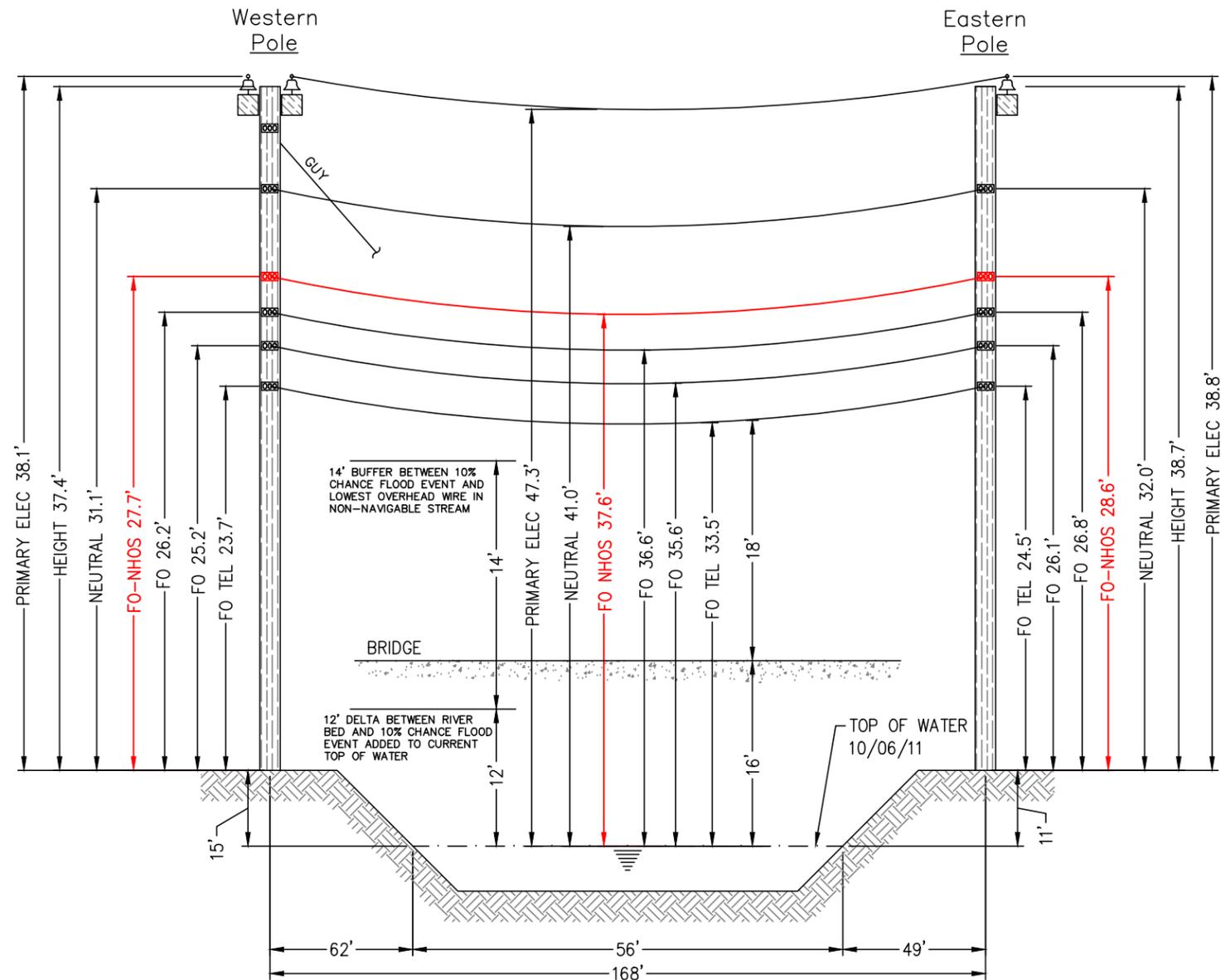
**NESC RESULTS**

Loading Condition	Temp. (F)	Ice Load lb/ft	Ice Thick in	Wind Constant lb/ft	Horz Wind Load lb/sq ft	Result Load Const lb/ft	Sag ft	Tension lb	% Len Chg From Input Conditions	Sag @ Point #4 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	3.47	1819	0.09	3.48	1.63	3.06	28.1
232A1	120.0	0.000	.00	.0	0.0	0.317	2.08	538	0.01	2.08	0.00	2.08	0.0

Temp (F)	Midspan Sag (ft)	Tension (lb)	% Length Change	Clearance
-40.0	1.04	1,076	-0.02	N/A
-30.0	1.08	1,033	-0.02	N/A
-20.0	1.13	991	-0.01	N/A
-10.0	1.18	950	-0.01	N/A
.0	1.23	909	-0.01	N/A
10.0	1.28	870	-0.01	N/A
20.0	1.34	832	-0.01	N/A
30.0	1.40	796	-0.01	N/A
40.0	1.47	761	-0.01	N/A
50.0	1.54	727	0.00	N/A
60.0	1.61	695	0.00	N/A
70.0	1.68	665	0.00	N/A
80.0	1.76	636	0.00	N/A
90.0	1.83	609	0.01	N/A
100.0	1.91	584	0.01	N/A
110.0	1.99	560	0.01	N/A
120.0	2.08	538	0.01	N/A
130.0	2.16	518	0.02	N/A
140.0	2.24	498	0.02	N/A

Span Length = 168.00 ft  
Span Sag = 1.68 ft (20.2 in)  
Span Tension = 666 lb  
Max Load = 6,650 lb  
Usable load (60%) = 3,990 lb  
Catenary Length = 168.045 ft  
Stress Free Length @  
Installed Temperature = 167.923 ft

Unloaded Strand  
Sag = .88 ft (10.5 in) 0.52 %  
Tension = 488 lb



E-NT/39 - T-114/383 1/2  
(Existing joint owned utility pole (UNITIL/Fairpoint) in existing Right-of-Way)

E-NT/40 - T-114/385  
(Existing joint owned utility pole (UNITIL/Fairpoint) in existing Right-of-Way)



E-NT/39 - T-114/383 1/2

**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 with other Utilities. (see above). Additional pole guys will be added per NESC Rule 264 and as directed by pole owners.



E-NT/40 - T-114/385



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

**Proposed  
River Crossing  
Epsom, NH**

**Notes:**

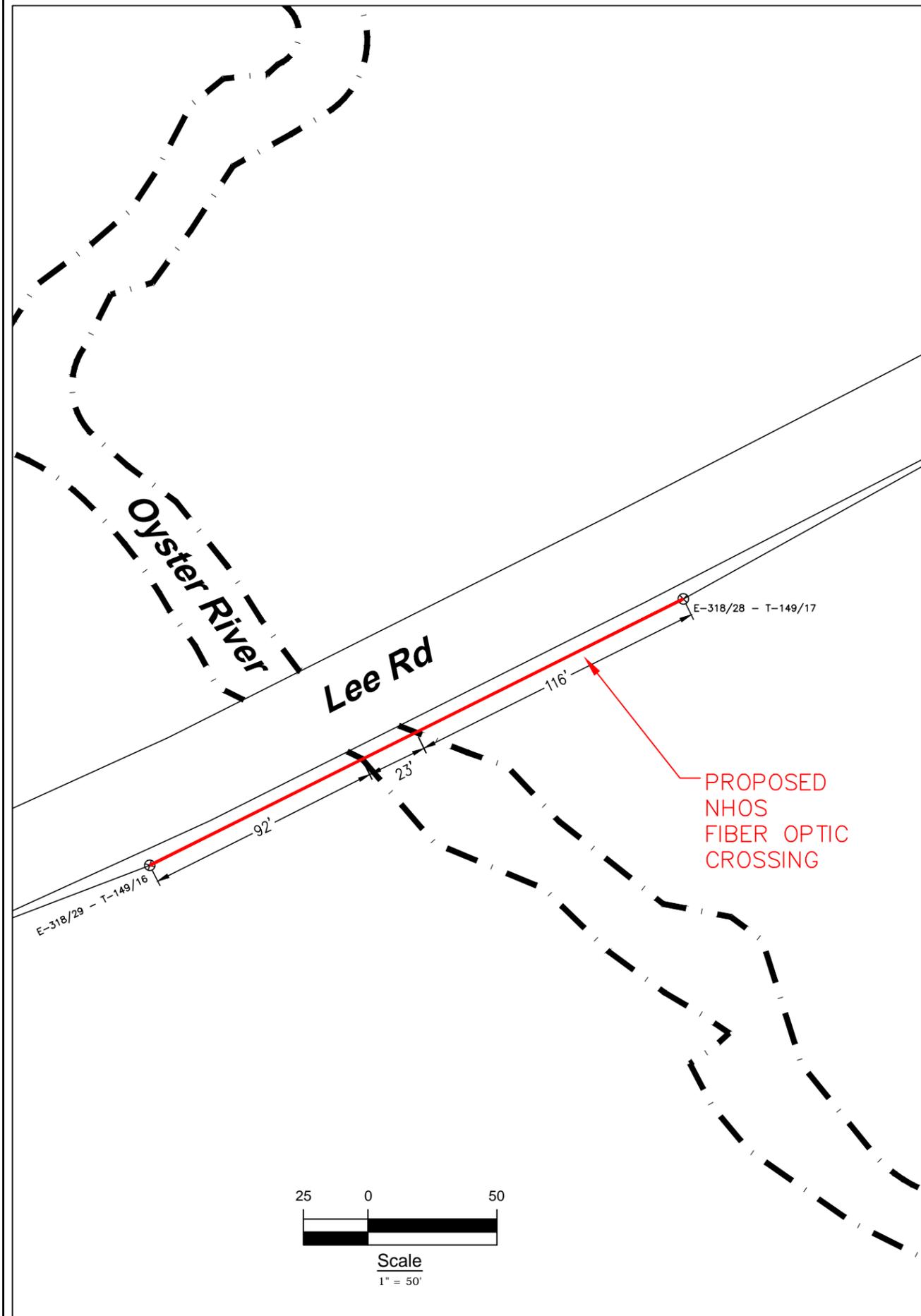
- The heights of structures shown hereon are based on field measurements taken with a Nikon 362 total station during a site survey on 10/06/11.
- The horizontal distance between the nearest bridge edge and the existing overhead wires ranges from 11' to 14'.
- The smallest vertical distance from the top of existing bridge deck to the lowest existing overhead wires is 18'.
- The vertical distance between the top of water and bridge deck is approximately 16'.
- The waterway is classified as not suitable for sail boating and per NESC Table 232-1 a vertical clearance of 14' must be maintained between the lowest conductor and 10 year floodplain.
- Based on the FEMA Flood Profile for the Suncook River (Page 74P) and the Flood Insurance Rate Map for Merrimack County Map Number 33013C0576E dated April 19, 2010 a conservative 10 year flood elevation was calculated by adding the delta between the river bed and the 10 year flood elevation (12') to the surveyed water level and then a 14' buffer (for non-navigable streams) was added to that. Based on the FEMA Flood Profile the stream elevation is 323' and the 10 year flood event elevation is 335'.
- Vertical distances are representative of attachment heights after utility make ready moves are completed.

Project # TID-191 - Primary 14  
Drawing # AC-EPS-RIV-1

Date: 03/26/12  
Revision #

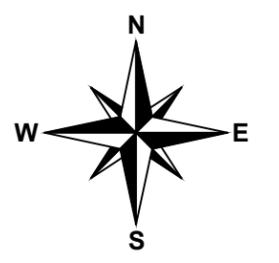
**Proposed  
River Crossing  
Epsom, NH**

Location:  
Dover Rd., Epsom, NH  
Nearest cross street- Suncook Valley Hwy.



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

Proposed  
River Crossing  
Lee, NH

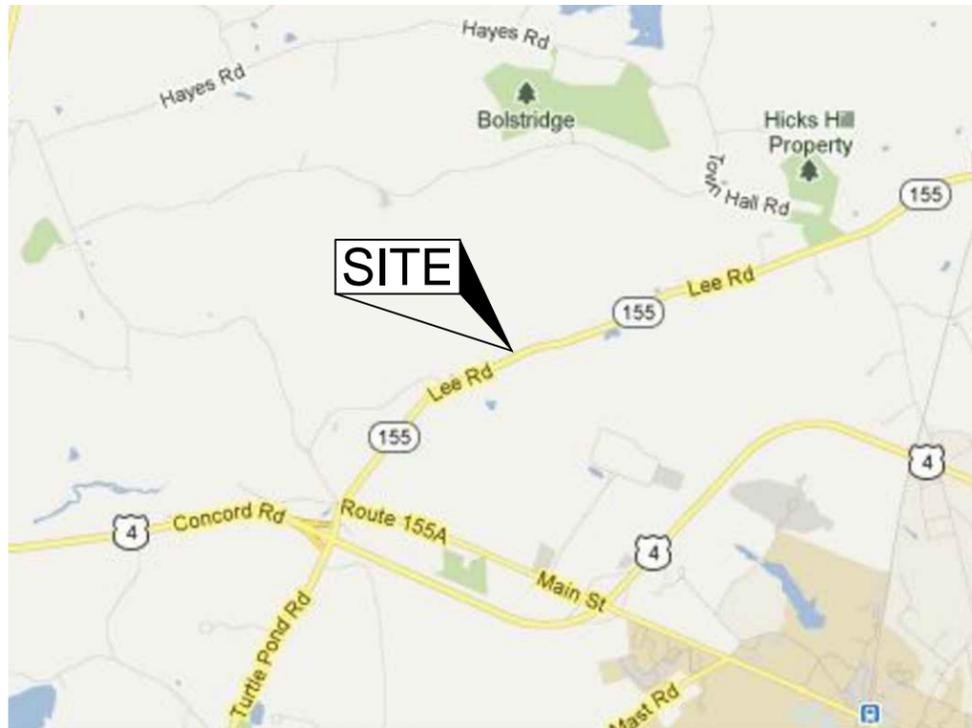


Project # TID-192 - Lateral 15  
Drawing # AC-LEE-RIV-1

Date: 07/24/12  
Revision #

Proposed  
River Crossing  
Lee, NH

Location:  
Lee Rd., Lee, NH  
Nearest cross street- Randall Rd.



LOCUS MAP  
(Not to Scale)



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	1.108	1.13E-05	0.1960	155982	651

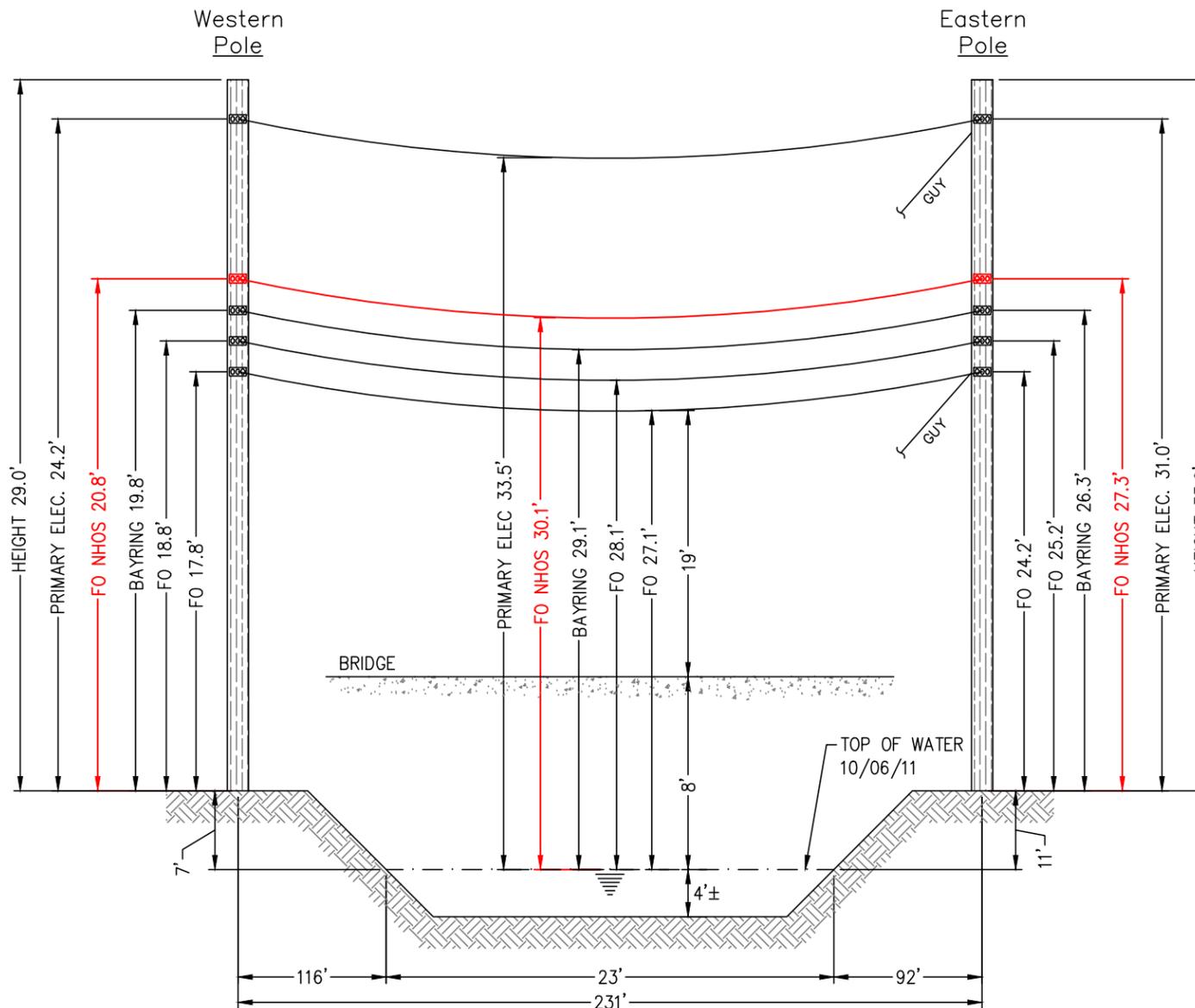
**NESC RESULTS**

Loading Condition	Temp. (F)	Ice Load lb/ft	Ice Thick in	Wind Const lb/ft	Horz Wind Load lb/ft	Result Load + Const lb/ft	Sag ft	Tension lb	% Len Chg From Input Conditions	Sag @ 115.5 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	5.23	2279	0.11	5.25	2.46	4.62	28.1
232A1	120.0	0.000	.00	.0	0.0	0.317	2.77	764	0.01	2.77	0.00	2.77	0.0

Span Length = 231.00 ft  
Span Sag = 2.31 ft (27.7 in)  
Span Tension = 915 lb  
Max Load = 6,650 lb  
Usable load (60%) = 3,990 lb  
Catenary Length = 231.062 ft  
Stress Free Length @ Installed Temperature = 230.831 ft

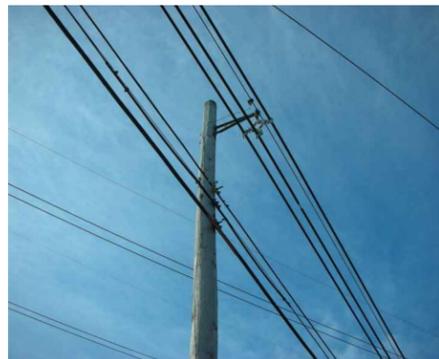
Unloaded Strand  
Sag = 1.11 ft (13.3 in) 0.48 %  
Tension = 727 lb

Temp (F)	Midspan Sag (ft)	Tension (lb)	% Length Change	Clearance
-40.0	1.57	1,345	-0.01	N/A
-30.0	1.62	1,301	-0.01	N/A
-20.0	1.68	1,258	-0.01	N/A
-10.0	1.73	1,216	-0.01	N/A
.0	1.80	1,175	-0.01	N/A
10.0	1.86	1,135	-0.01	N/A
20.0	1.93	1,095	-0.01	N/A
30.0	2.00	1,057	-0.01	N/A
40.0	2.07	1,019	-0.01	N/A
50.0	2.15	983	0.00	N/A
60.0	2.23	948	0.00	N/A
70.0	2.31	914	0.00	N/A
80.0	2.40	881	0.00	N/A
90.0	2.48	850	0.00	N/A
100.0	2.58	820	0.01	N/A
110.0	2.67	791	0.01	N/A
120.0	2.77	764	0.01	N/A
130.0	2.86	738	0.01	N/A
140.0	2.96	713	0.02	N/A



E-318/28 - T-149/17  
(Existing joint owned utility pole (PSNH/Fairpoint) in existing Right-of-Way)

E-318/29 - T-149/16  
(Existing joint owned utility pole (PSNH/Fairpoint) in existing Right-of-Way)



E-318/28 - T-149/17

**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-318/29 - T-149/16



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

**Proposed River Crossing Lee, NH**

**Notes:**

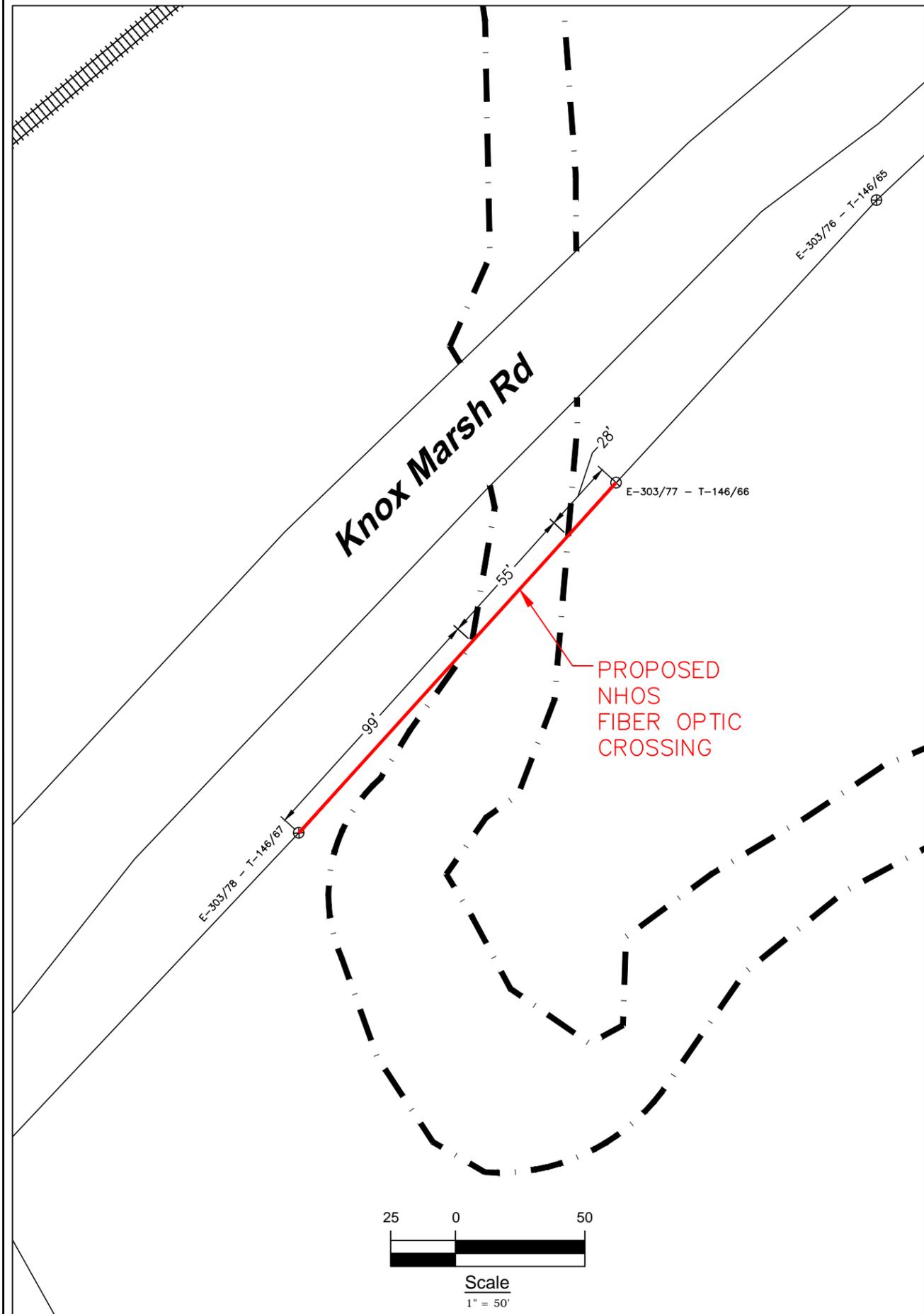
- The heights of structures shown hereon are based on field measurements taken with a Nikon 362 total station during a site survey on 10/06/11.
- The horizontal distance between the nearest bridge edge and the existing overhead wires ranges from 5' to 6'.
- The smallest vertical distance from the top of existing bridge deck to the lowest existing overhead wires is 19'.
- 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 vertical distance between the top of water and bridge deck is approximately 8'.
- Vertical distances are representative of attachment heights after utility make ready moves are completed.

Project # TID-192 - Lateral 15  
Drawing # AC-LEE-RIV-1

Date: 07/24/12  
Revision #

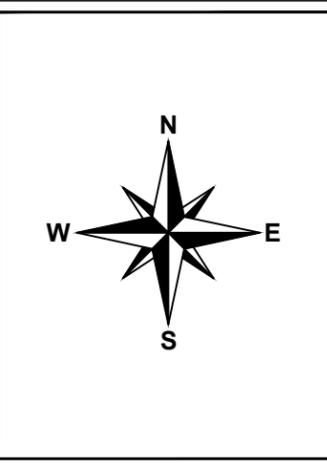
**Proposed River Crossing Lee, NH**

Location:  
Lee Rd., Lee, NH  
Nearest cross street- Randall Rd.



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

**Proposed River Crossing  
Madbury, NH**

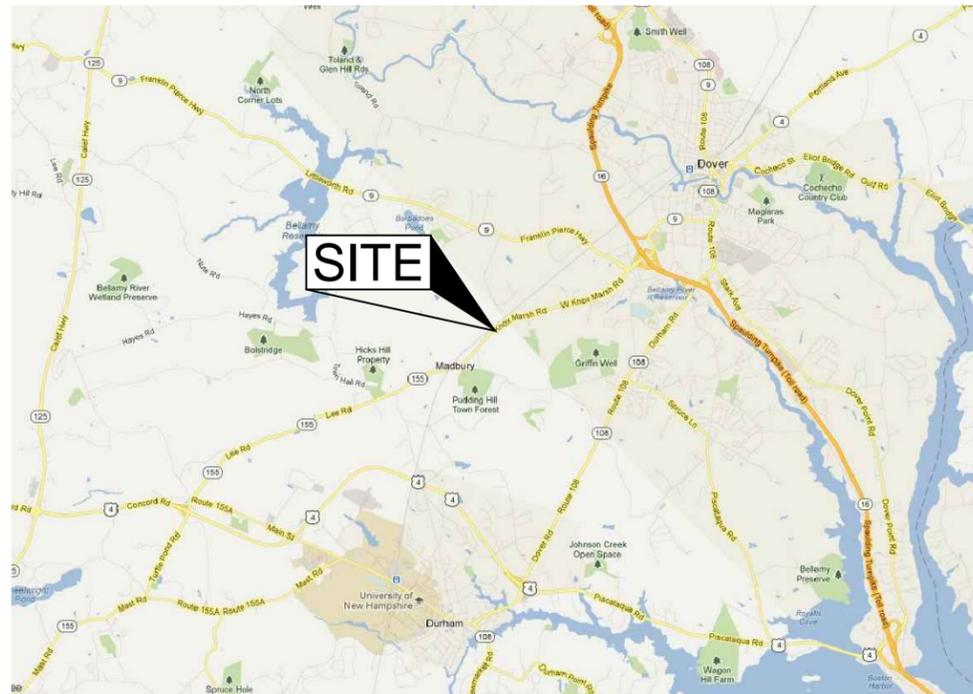


Project # TID-197 - Lateral 15  
Drawing # AC-MADB-RIV-1

Date: 03/26/12  
Revision #

**Proposed River Crossing  
Madbury, NH**

Location:  
Knox Marsh Rd., Madbury, NH  
Nearest cross street- Pudding Hill Rd.



LOCUS MAP  
(Not to Scale)



Spanmaster® Release 3.1 Sag / Tension Computations

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		

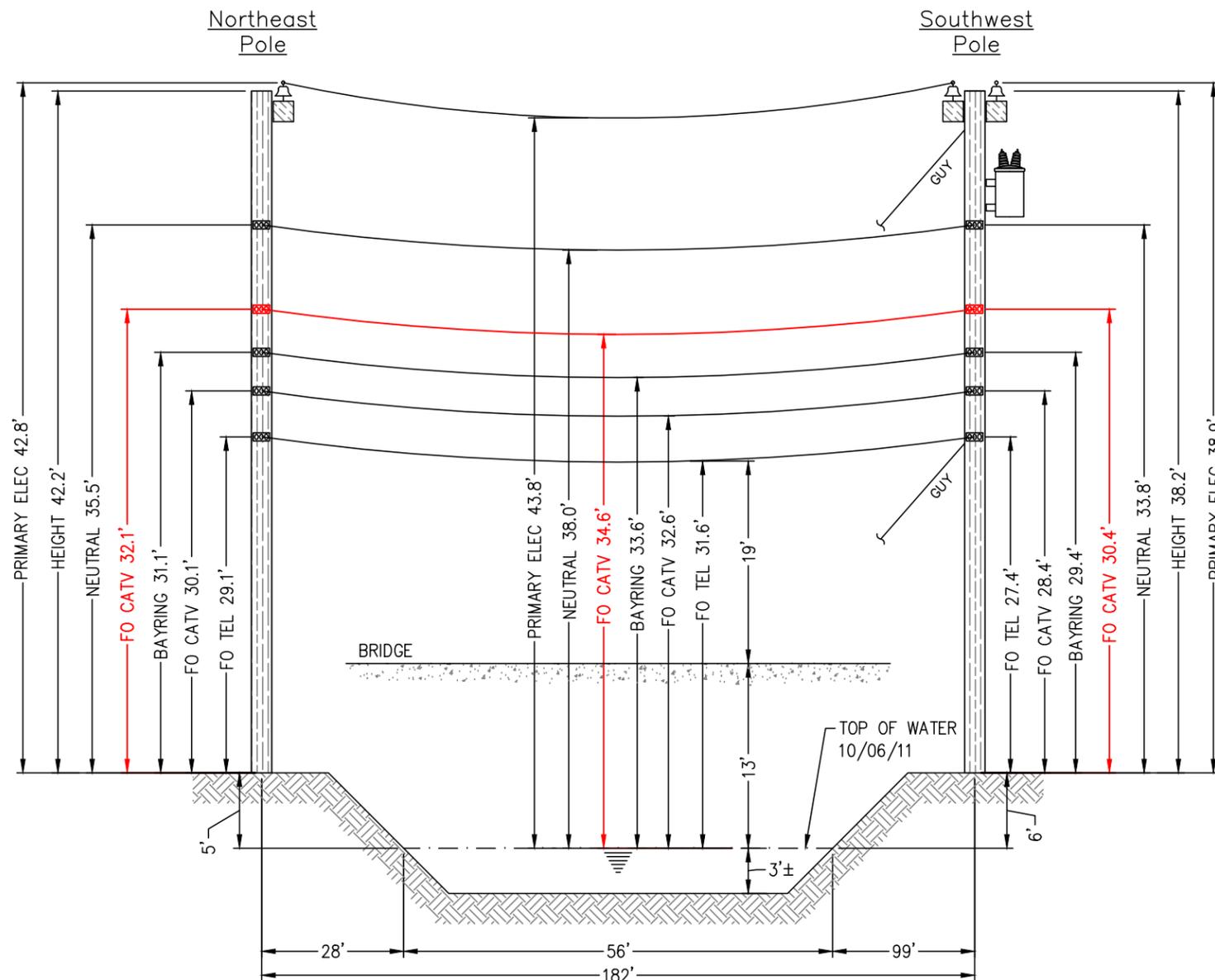
**NESC RESULTS**

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 @ 91 ft	Horz Sag Comp (ft)	Vert Sag (ft)	Vector Angle (Deg)
Rule 251 - Heavy	0.0	1.000	.50	.3	4.0	1.793	3.85	1925	0.09	3.86	1.81	3.40	28.1
232A1	120.0	0.000	.00	.0	0.0	0.317	2.23	588	0.01	2.23	0.00	2.23	0.0

Span Length = 182.00 ft  
Span Sag = 1.82 ft (21.8 in)  
Span Tension = 721 lb  
Max Load = 6,650 lb  
Usable load (60%) = 3,990 lb  
Catenary Length = 182.049 ft  
Stress Free Length @ Installed Temperature = 181.905 ft

Unloaded Strand  
Sag = .93 ft (11.1 in) 0.51 %  
Tension = 540 lb

Temp (F)	Midspan Sag (ft)	Tension (lb)	% Length Change	Clearance
-40.0	1.15	1,137	-0.02	N/A
-30.0	1.20	1,093	-0.02	N/A
-20.0	1.25	1,051	-0.01	N/A
-10.0	1.30	1,010	-0.01	N/A
.0	1.35	969	-0.01	N/A
10.0	1.41	930	-0.01	N/A
20.0	1.47	891	-0.01	N/A
30.0	1.53	854	-0.01	N/A
40.0	1.60	819	-0.01	N/A
50.0	1.67	784	0.00	N/A
60.0	1.74	752	0.00	N/A
70.0	1.82	720	0.00	N/A
80.0	1.90	691	0.00	N/A
90.0	1.98	663	0.00	N/A
100.0	2.06	636	0.01	N/A
110.0	2.15	611	0.01	N/A
120.0	2.23	588	0.01	N/A
130.0	2.32	566	0.02	N/A
140.0	2.41	545	0.02	N/A



E-303/77 - T-146/66  
(Existing joint owned utility pole (PSNH/Fairpoint) in existing Right-of-Way)

E-303/78 - T-146/67  
(Existing joint owned utility pole (PSNH/Fairpoint) in existing Right-of-Way)



E-303/77 - T-146/66

**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-303/78 - T-146/67



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

**Proposed River Crossing  
Madbury, 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 10/06/11.
- The horizontal distance between the nearest bridge edge and the existing overhead wires ranges from 34' to 36'.
- 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 13'.
- The waterway is classified as not suitable for sail boating and per NESC Table 232-1 a vertical clearance of 14' must be maintained between the lowest conductor and 10 year floodplain.
- Based on the FEMA Flood Insurance Rate Map for Strafford County (Map Number 33017C03200) dated May 17, 2005 there is currently no 10 year, or 100 year, chance flood event information available for this area.
- Vertical distances are representative of attachment heights after utility make ready moves are completed.

Project # TID-197 - Lateral 15  
Drawing # AC-MADB-RIV-1

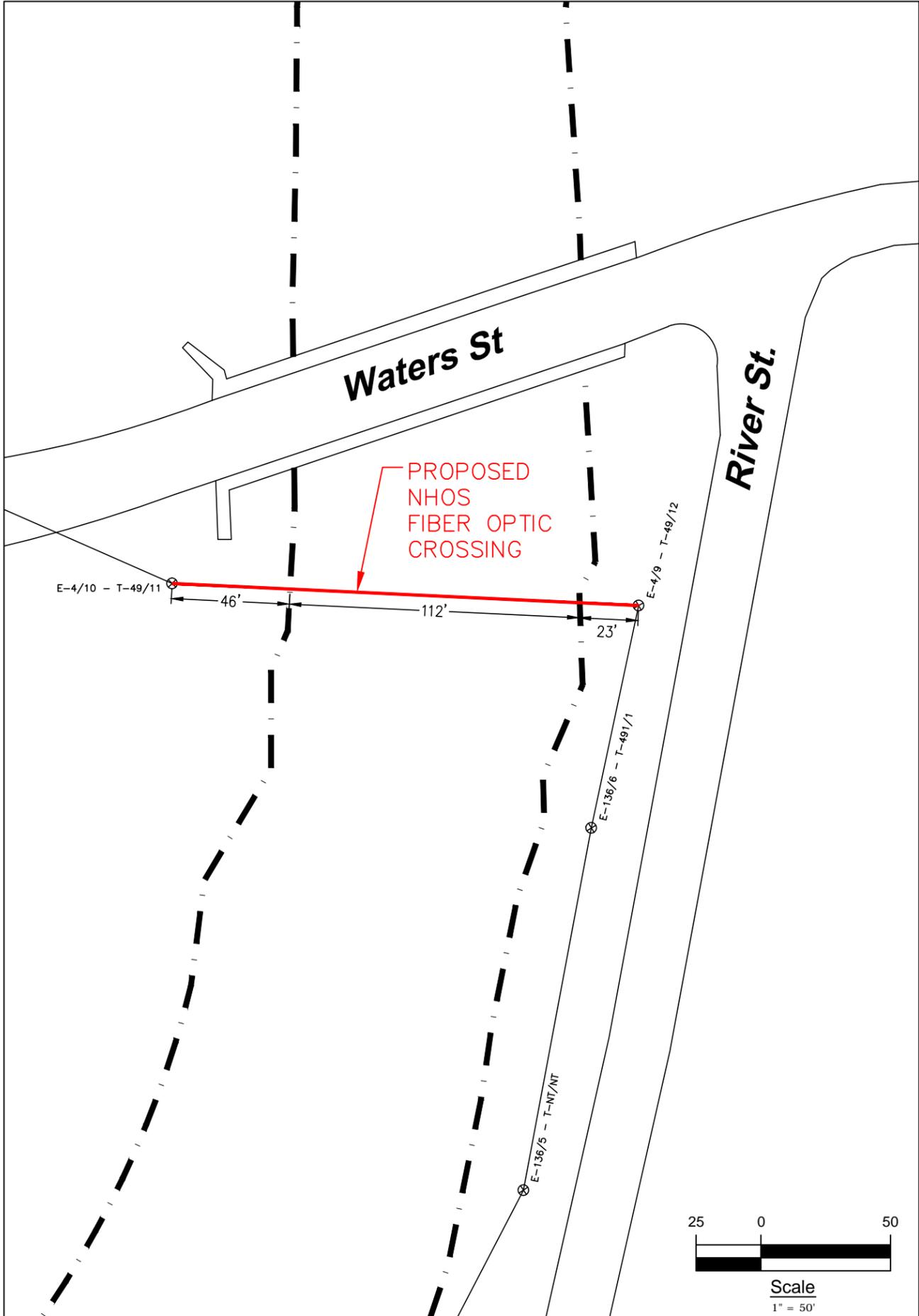
Date: 03/26/12  
Revision #

**Proposed River Crossing  
Madbury, NH**

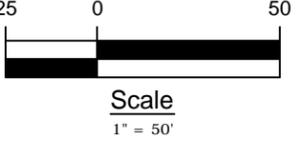
Location:  
Knox Marsh Rd., Madbury, NH  
Nearest cross street- Pudding Hill Rd.



**PROPOSED  
NHOS  
FIBER OPTIC  
CROSSING**

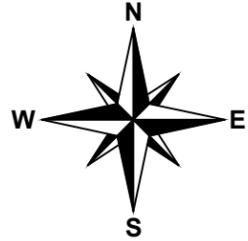


**PROPOSED  
NHOS  
FIBER OPTIC  
CROSSING**



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

**Proposed  
River Crossing  
Dover, NH**



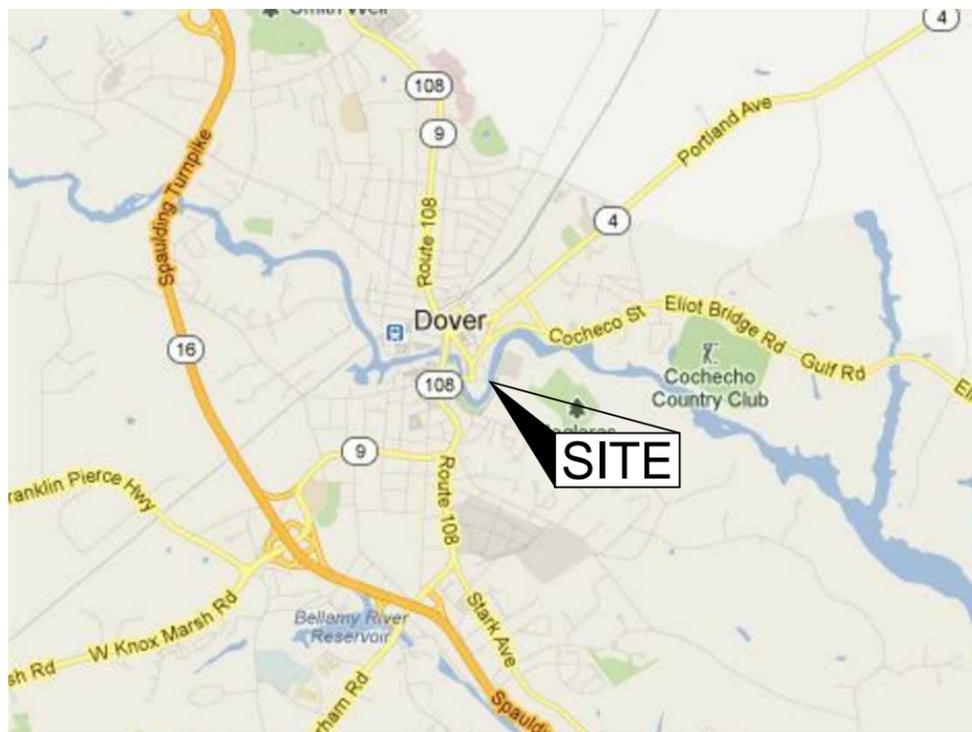
Project # TID-199 - Lateral 15  
Drawing # AC-DOV-RIV-1

Date: 03/26/12  
Revision #

**Proposed  
River Crossing  
Dover, NH**

Location:  
Waters St., Dover, NH  
Nearest cross street- River Rd.

Sheet 1 of 2



LOCUS MAP  
(Not to Scale)



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

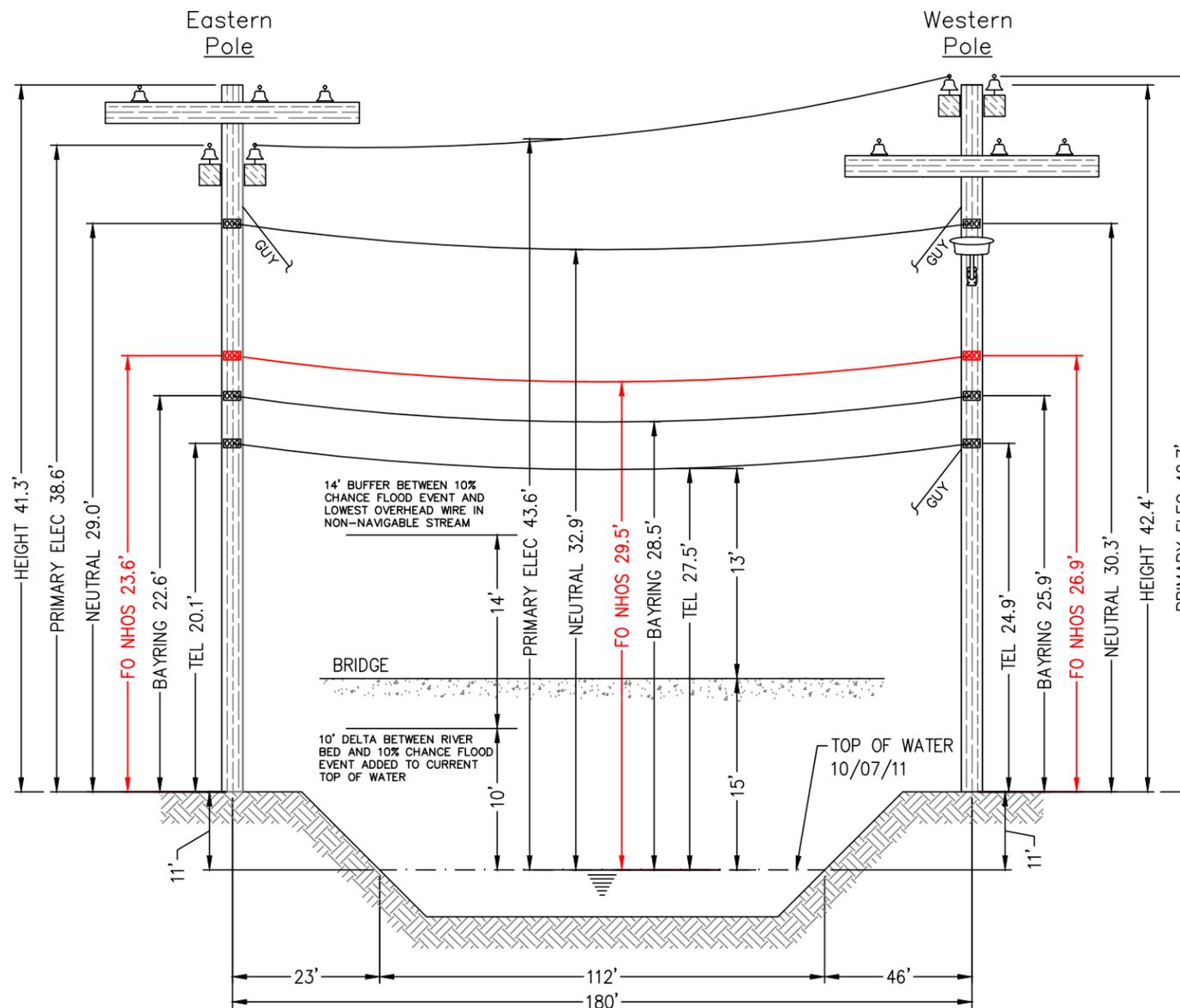
Waveguide  
River and Rail Crossings

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 @ 90° (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	3.79	1910	0.09	3.80	1.79	3.35	28.1
232A1	120.0	0.000	.00	.0	0.0	0.317	2.21	581	0.01	2.21	0.00	2.21	0.0

Span Length = 180.00 ft	Temp (F)	Midspan Sag (ft)	Tension (lb)	% Length Change	Clearance
Span Sag = 1.80 ft (21.6 in)	-40.0	1.14	1,128	-0.02	N/A
Span Tension = 713 lb	-30.0	1.18	1,085	-0.02	N/A
Max Load = 6,650 lb	-20.0	1.23	1,042	-0.01	N/A
Usable load (60%) = 3,990 lb	-10.0	1.28	1,001	-0.01	N/A
Catenary Length = 180.048 ft	.0	1.33	961	-0.01	N/A
Stress Free Length @ Installed Temperature = 179.908 ft	10.0	1.39	921	-0.01	N/A
	20.0	1.45	883	-0.01	N/A
Unloaded Strand	30.0	1.52	846	-0.01	N/A
Sag = .92 ft (11.0 in) 0.51 %	40.0	1.58	810	-0.01	N/A
Tension = 533 lb	50.0	1.65	776	0.00	N/A
	60.0	1.72	744	0.00	N/A
	70.0	1.80	712	0.00	N/A
	80.0	1.88	683	0.00	N/A
	90.0	1.96	655	0.00	N/A
	100.0	2.04	629	0.01	N/A
	110.0	2.12	604	0.01	N/A
	120.0	2.21	581	0.01	N/A
	130.0	2.30	559	0.02	N/A
	140.0	2.38	538	0.02	N/A



E-4/9 - T-49/12  
(Existing joint owned utility pole (PSNH/Fairpoint) in existing Right-of-Way)

E-4/10 - T-49/11  
(Existing joint owned utility pole (PSNH/Fairpoint) in existing Right-of-Way)



E-4/9 - T-49/12

**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-4/10 - T-49/11



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

**Proposed River Crossing  
Dover, NH**

**Notes:**

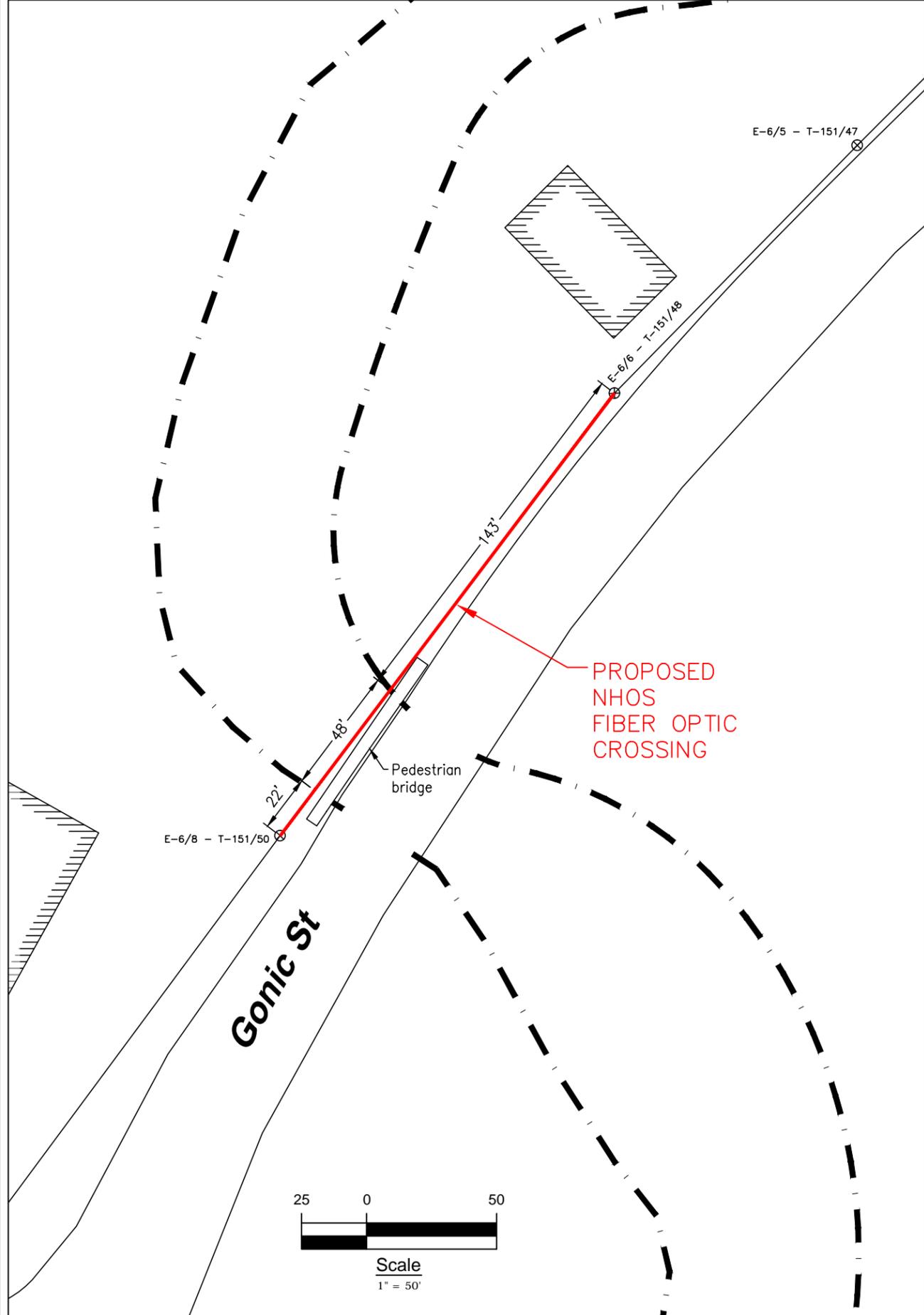
- The heights of structures shown hereon are based on field measurements taken with a Nikon 362 total station during a site survey on 10/07/11.
- The horizontal distance between the nearest bridge edge and the existing overhead wires ranges from 37' to 88'.
- The smallest vertical distance from the top of existing bridge deck to the lowest existing overhead wires is approximately 13'.
- The vertical distance between the top of water and bridge deck is approximately 15'.
- The waterway is classified as not suitable for sail boating and per NESC Table 232-1 a vertical clearance of 14' must be maintained between the lowest conductor and 10 year floodplain.
- Based on the FEMA Flood Profile for the Cochecho River (Page 06P) and the Flood Insurance Rate Map for Strafford County (County Map Number 33017C0330D) dated May 17, 2005 a conservative 10 year flood elevation was calculated by adding the delta between the river bed elevation and the 10 year flood elevation to the surveyed water level and then a 14' buffer (for non-navigable streams) was added to that. Based on the FEMA Flood Profile the stream bed elevation is -2' and the 10 year flood event elevation is 8'.
- Vertical distances are representative of attachment heights after utility make ready moves are completed.

Project # TID-199 - Lateral 15  
Drawing # AC-DOV-RIV-1

Date: 03/26/12  
Revision #

**Proposed River Crossing  
Dover, NH**

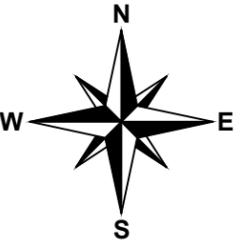
Location:  
Waters St., Dover, NH  
Nearest cross street- River Rd.



**New Hampshire Optical Systems**

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

**Proposed  
 River Crossing  
 Rochester, NH**



Project # TID-203 - Lateral 15  
 Drawing # AC-ROC-RIV-1

Date: 07/09/12  
 Revision #

**Proposed  
 River Crossing  
 Rochester, NH**

Location:  
 Gonic Rd., Rochester, NH  
 Nearest cross street- Brock Rd.



LOCUS MAP  
(Not to Scale)



Spanmaster® Release 3.1 Sag / Tension Computations

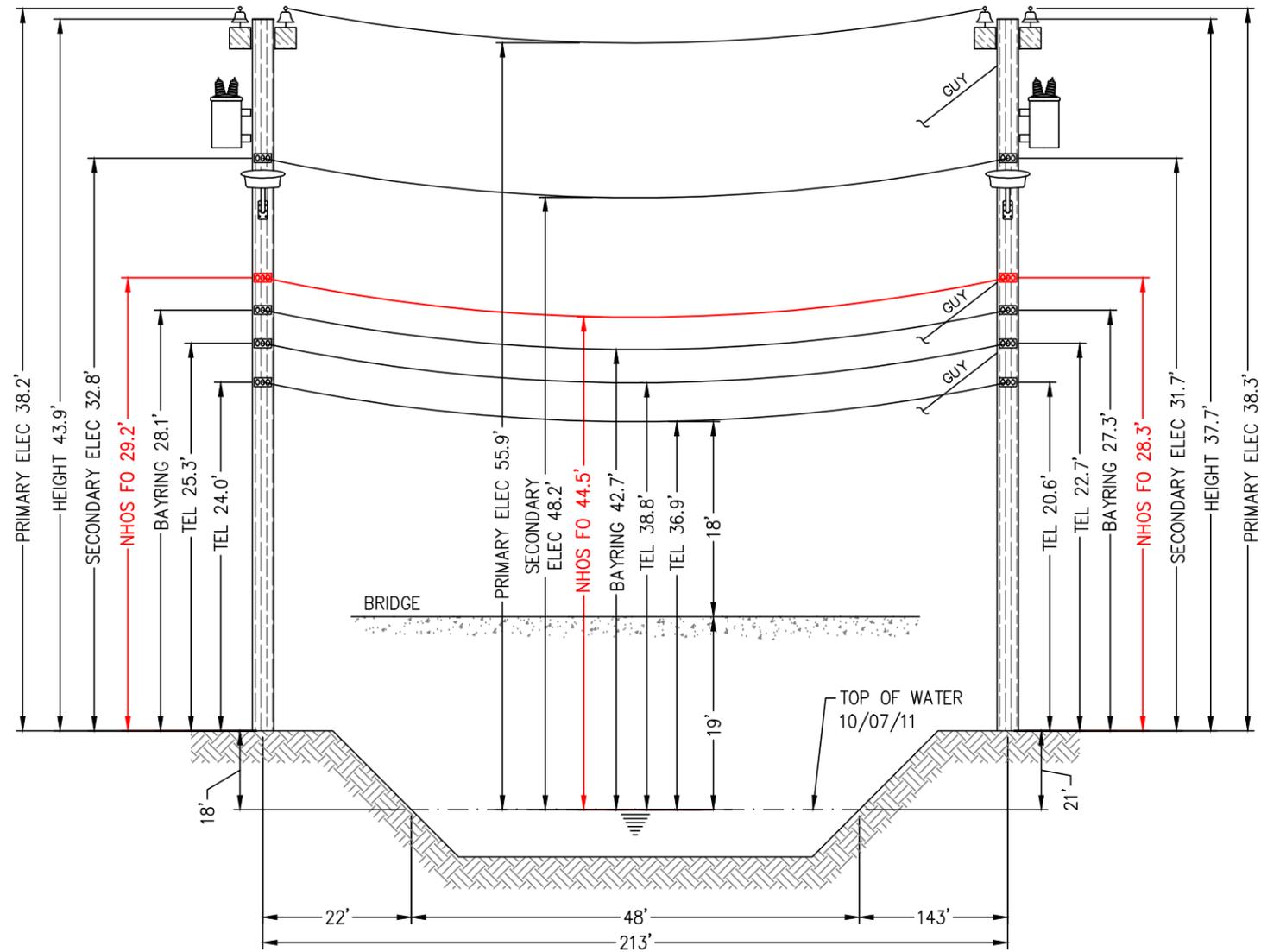
Waveguide  
River and Rail Crossings

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"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	1.108	1.13E-05	0.1960	155982	651

**NESC RESULTS**

Loading Condition	Temp (F)	Ice Load lb/ft	Ice Thick in	Wind Const lb/ft	Horz Wind Load lb/ft	Result Load + Const lb/ft	Sag ft	Tension lb	% Len Chg From Input Conditions	Sag @ Point 100.5 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	4.72	2151	0.10	4.73	2.22	4.16	28.1
232A1	120.0	0.000	.00	.0	0.0	0.317	2.57	699	0.01	2.57	0.00	2.57	0.0

Span Length = 213.00 ft	Temp (F)	Midspan Sag (ft)	Tension (lb)	% Length Change	Clearance
Span Sag = 2.13 ft (25.6 in)	-40.0	1.41	1,269	-0.01	N/A
Span Tension = 844 lb	-30.0	1.46	1,225	-0.01	N/A
Max Load = 6,650 lb	-20.0	1.52	1,183	-0.01	N/A
Usable load (60%) = 3,990 lb	-10.0	1.57	1,141	-0.01	N/A
Catenary Length = 213.057 ft	.0	1.63	1,100	-0.01	N/A
Stress Free Length @ Installed Temperature = 212.860 ft	10.0	1.69	1,060	-0.01	N/A
	20.0	1.76	1,021	-0.01	N/A
Unloaded Strand	30.0	1.83	983	-0.01	N/A
Sag = 1.04 ft (12.5 in) 0.49 %	40.0	1.90	946	-0.01	N/A
Tension = 658 lb	50.0	1.97	910	0.00	N/A
	60.0	2.05	876	0.00	N/A
	70.0	2.13	843	0.00	N/A
	80.0	2.21	811	0.00	N/A
	90.0	2.30	781	0.00	N/A
	100.0	2.39	752	0.01	N/A
	110.0	2.48	725	0.01	N/A
	120.0	2.57	699	0.01	N/A
	130.0	2.67	674	0.02	N/A
	140.0	2.76	651	0.02	N/A



E-6/8 - T-151/50  
(Existing joint owned utility pole (Fairpoint/PSNH) in existing Right-of-Way)

E-6/6 - T-151/48  
(Existing joint owned utility pole (Fairpoint/PSNH) in existing Right-of-Way)



E-6/8 - T-151/50

**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 with other Utilities. (see above). Additional pole guys will be added per NESC Rule 264 and as directed by pole owners.



E-6/6 - T-151/48



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

**Proposed River Crossing Rochester, 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 10/07/11.
- The horizontal distance between the nearest bridge edge and the existing overhead wires ranges from 7' to 9'. The horizontal distance between the pedestrian bridge edge and the existing overhead wires ranges from 1' to 4'.
- 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 wire is 18'.
- The vertical distance between the top of water and bridge deck is approximately 19'.
- Vertical distances are representative of attachment heights after utility make ready moves are completed.

Project # TID-203 - Lateral 15  
Drawing # AC-ROC-RIV-1

Date: 07/09/12  
Revision #

**Proposed River Crossing Rochester, NH**

Location:  
Gonic Rd., Rochester, NH  
Nearest cross street- Brock Rd.