



WIRELESS SERVICES

November 24, 2014

HPC Wireless Services  
22 Shelter Rock Lane.  
Building C  
Danbury, CT, 06810  
P.: 203.797.1112

**VIA OVERNIGHT COURIER**

Connecticut Siting Council  
10 Franklin Square  
New Britain, Connecticut 06051  
Attn: Ms. Melanie Bachman, Acting Executive Director

Re: Sprint Spectrum, L.P. – 2.5 Antenna Exempt Modification - Request to Reopen and Modify Application dated June 12, 2014 and Decision Letter dated August 15, 2014  
345 North Main Street, a/k/a 333 North Main Street, West Hartford, Connecticut

Dear Ms. Bachman:

By Decision Letter dated August 15, 2014, the Connecticut Siting Council approved the Exempt Modification Application submitted on behalf of Sprint Spectrum, L.P. (“Sprint”) dated June 12, 2014, as noted above. In summary, the Application stated that Sprint was undertaking modifications to certain existing sites in its Connecticut system in order to implement updated technology. The letter and attachments were notification, pursuant to R.C.S.A. Section 16-50j-73, of construction that constituted an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of that letter and attachments were also sent to the Mayor of the Town of West Hartford.

Sprint plans to modify the existing wireless communications facility owned and managed by Edens & Avart Investments LP, and located at 345 North Main Street, a/k/a/ 333 North Main Street, West Hartford, (coordinates 41°-47’-06.1” N, 72°-44’-54.55” W). We submitted a plan and elevation drawings depicting the planned changes, and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration, subject to modifications detailed in the attached structural documentation. We also included a power density report reflecting the modification to Sprint’s operations at the site. The Structural Analysis Report which included a proposed Modification Design as prepared by SEMAAN Engineering and stamp dated May 14, 2014, was approved by your Agency. The Decision Letter dated August 15, 2014 requires Sprint to follow said Modification Design.

This letter is to notify you that in preparing a Structural Analysis for AT&T, which is also present at the existing wireless communications facility, an error was determined in the calculations in the Modification Design stamp dated May 14, 2014. Attached please find a new Modification Design as prepared by SEMAAN Engineering and stamp dated November 18, 2014. In this submittal, the new calculations take into consideration the antennas and associated equipment for all the wireless telecommunication companies at this location, including two (2) projects for Sprint; the 2.5 Antenna and the Network Vision Projects. This letter pertains to the 2.5 Antenna Project and the Network Vision Project is addressed in a separate letter to you also dated November 24, 2014.

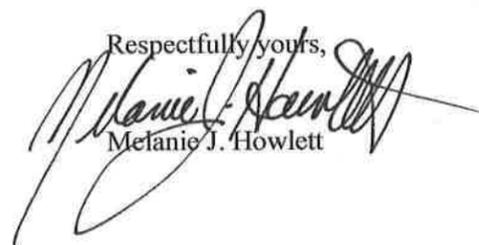
The new Structural Analysis and Modification Design stamp dated November 18, 2014, does not affect Sprint's planned antenna and equipment changes to the facility set forth in the original Application. The Construction Drawings and MPE Report filed with the original Application require no corrections and are not attached. The planned changes to the telecommunications facility do not constitute a modification as defined in Connecticut General Statutes ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. In addition to the change in antennas and equipment under the Network Vision Project, Sprint will add three (3) panel antennas for a total of six (6) antennas, and three (3) RRHs (remote radio heads) for a total of nine (9) RRHs, all on the existing mast and at a centerline height of approximately 100', AGL, or approximately 50' above the roof level. Sprint will also install one new (1) hybridflex cable for a total of four (4) hybridflex cables along the existing coaxial cable run. The proposed modifications will not extend the height of the approximately 100' AGL or approximately 50' rooftop tower.
2. Sprint will place associated equipment and new batteries in the three (3) cabinets on the 12' x 10' reinforced platform on a concrete pad. There will be no increase to the leased area. These changes will have no effect on the site boundaries.
3. The proposed changes will not increase the noise level at the existing facility by six decibels or more. The incremental effect of the proposed changes will be negligible.
4. The changes to the facility will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site. As indicated on the attached report prepared by EBI Consulting, Sprint's operations at the site will result in a power density of approximately 3.19%; the combined site operations will result in a total power density of approximately 48.50%.

Sprint requests that the Letter Decision dated August 25, 2014, be reopened and revised to remove the references to the Structural Analysis prepared by SEMAAN Engineering stamp dated May 14, 2014, and require that we follow the Structural Analysis and Modification Design as prepared by SEMAAN Engineering stamp dated November 18, 2014.

Please contact me by phone at (203) 610-1071 or by e-mail at [mjhowlett@optonline.net](mailto:mjhowlett@optonline.net) with questions concerning this matter. Thank you for your consideration.

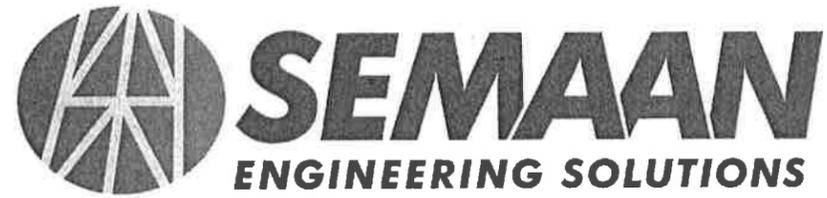
Respectfully yours,



Melanie J. Howlett

Attachment.

cc: Honorable Scott Slifka, Mayor, Town of West Hartford  
Ron F. Van Winkle, Town Manager, Town of West Hartford  
Tod Dumais, Town Planner, Town of West Hartford  
Ena Northeast LP, c/o Edens & Avant Investments LP (underlying property owner)



## Modification Package

Prepared for:

Sprint Sites USA  
1765 Grassland Parkway  
Suite A Alpharetta, GA 30004

ATTN: Ms. Deborah MacMaster

Structure : 50 ft Rohn Guyed Tower  
(rooftop mounted 54 ft above grade)

Proposed Carrier : AT&T

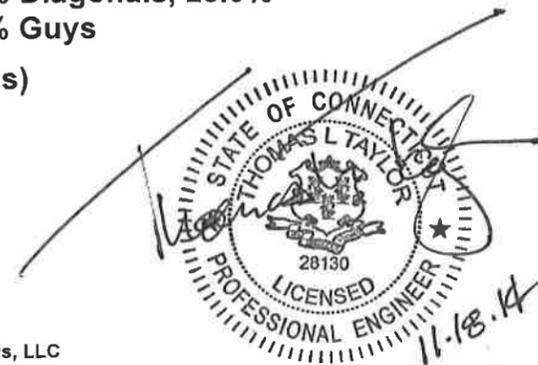
Site ID : CT03XC074

Site Location : West Hartford, CT

County : Hartford

Date : October 20, 2014

Usage : 38.0% Legs, 62.0% Diagonals, 25.0%  
Horizontals, 81.0% Guys  
(with modifications)



**Introduction**

The purpose of this report is to summarize results of the structural analysis performed on the 50 ft Rohn Guyed Tower located at West Hartford, CT, Hartford County (site # CT03XC074). The tower was originally designed and manufactured by Rohn (Drawing # 0970975 dated July 28, 1997). This tower is mounted on top of a building with the base of the tower 54 ft above the grade line.

**Analysis**

The tower was analyzed using Semaan Engineering Solutions, Inc., Software. The analysis assumes that the tower is in good, undamaged, and non-corroded condition. The analysis was performed in conformance with TIA/EIA-222 Rev F and local building codes for a basic wind speed of 80 mph no ice and 69 mph with 1/2" radial ice (fastest mile). This wind speed is equivalent to a 100 mph 3-second gust per the IBC 2003. This is in conformance with the IBC 2003: Section 1609.1.1, Exception (5) and Section 3108.4.

Basic Wind Speed: 80.0 mph  
 Radial Ice: 69 mph w/ 0.50" ice  
 Code: TIA/EIA-222 Rev F

**Antenna Loads**

The following antenna loads were used in the tower analysis.

**Existing Antennas**

| Elev. (ft)     | Qty | Antennas              | Mount             | Coax (in)                | Carrier    |
|----------------|-----|-----------------------|-------------------|--------------------------|------------|
| 46.0/<br>100.0 | 3   | APXVSP18-C-A20        | (3) Sector Frames | (3) 1-1/4                | Sprint     |
|                | 3   | 800 MHz RRH           |                   | (3) 1-1/4                |            |
|                | 3   | 1900 MHz RRU          |                   | (3) 1-1/4                |            |
|                | 3   | APXVTM14-C-I20        |                   | (3) 1-1/4                | Sprint 2.5 |
|                | 3   | TD-RRH-8X20-25        |                   | (3) 1-1/4                |            |
| 39.3/<br>93.3  | 3   | RRUS11                | (3) Sector Frames | (1) Fiber                | AT&T       |
|                | 1   | AM-X-CD-16-65-00T-RET |                   | Optic                    |            |
|                | 2   | P65-17-XLH-RR         |                   | Cable                    |            |
|                | 1   | DC6-48-60-18-8F       |                   | (3) DC                   |            |
|                | 6   | TT19-08BP111-001      |                   | Cables                   |            |
|                | 6   | Powerwave 7770.00     |                   | Inside (1)<br>3" Conduit |            |
| 13.0/<br>67.0  | 1   | GPS antenna           | Leg Mounts        | (1) 1/2                  | Sprint     |

**Proposed Antennas**

| Elev. (ft) | Qty | Antennas | Mount           | Coax (in)                                    | Carrier |
|------------|-----|----------|-----------------|--|---------|
| 39.3       | 3   | RRUS11   | Existing Mounts | (3) DC<br>Cables<br>Inside (1)<br>3" Conduit | AT&T    |

The proposed transmission lines may be placed anywhere on the tower. No line shielding was considered.

**Results**

The existing Guyed Tower is not structurally capable of supporting the existing and proposed antennas. The guy cables at the 32 ft elevation are overstressed. New larger guy cables will be required. Refer to the attached drawings for additional information.

The maximum leg usage is: 37.0% (without mods) and 38.0% (with mods).  
 The maximum diagonal usage is: 66.0% (without mods) and 62.0% (with mods).  
 The maximum horizontal usage is: 26.0% (without mods) and 25.0% (with mods).  
 The maximum guy usage is: 138.0% (without mods) and 81.0% (with mods).

|            | Design<br>Compression<br>(kip) | Analysis<br>Compression<br>(kip) | % Of Design |
|------------|--------------------------------|----------------------------------|-------------|
| Tower Base | 23.00                          | 40.98                            | 178.2       |

| Anchor Radius<br>(Ft) | Design<br>Uplift<br>(kip) | Analysis Uplift<br>(kip) | % Of Design |
|-----------------------|---------------------------|--------------------------|-------------|
| 29.0 ft               | 10.70                     | 16.49                    | 154.1       |

**The analysis reactions exceed the original design reactions. The building support structure and connections must be checked by others for the additional loading.**

**Conclusion**

Based on the analysis results, the existing structure meets the requirements per the TIA/EIA-222 Rev F standards for a basic wind speed of 80 mph no ice and 69 mph with 1/2" radial ice.

If you have any questions or require additional information, please call 402-289-1888.

**Attachments**

1. Drawing T-1, Revision 0, dated 10/20/2014.
2. Drawing N-1, Revision 0, dated 10/20/2014.
3. Drawing N-2, Revision 0, dated 10/20/2014.
4. Drawing S-1, Revision 0, dated 10/20/2014.
5. Drawing S-2, Revision 0, dated 10/20/2014.
6. Drawing S-3, Revision 0, dated 10/20/2014.

**Standard Conditions**

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessary limited, to:

- Information supplied by the client regarding the structure itself, antenna, mounts and feed line loading on the structure and its components, or other relevant information.
- Information from drawings in the possession of Semaan Engineering Solutions, or generated by field inspections or measurements of the structure.

It is the responsibility of the client to ensure that the information provided to Semaan Engineering Solutions Holdings and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and that their capacity has not significantly changed from the "as new" condition.

Unless explicitly agreed by both the client and Semaan Engineering Solutions, all services will be performed in accordance with the current revision of ANSI/TIA -222. The design basic wind speed will be determined based on the minimum basic wind speed as prescribed in ANSI/TIA-222. Although every effort is taken to ensure that the loading considered is adequate to meet the requirements of all applicable regulatory entities, we can provide no assurance to meet any other local and state codes or requirements. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. Semaan Engineering Solutions Holdings is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

SEMAN ENGINEERING SOLUTIONS, LLC  
 1079 N.205<sup>th</sup> Street  
 Elkhorn, NE 68022

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Loads: 80 mph no ice  
 69 mph w/ 1/2" radial ice  
 50 mph no ice

**Job Information**

Tower : CT03XC074\_FIX02 Location : West Hartford, CT Base Width : 3.42 ft  
 Code : TIA/EIA-222 Rev F Shape : Triangle  
 Client : Sprint Sites USA - GA 2

**Sections Properties**

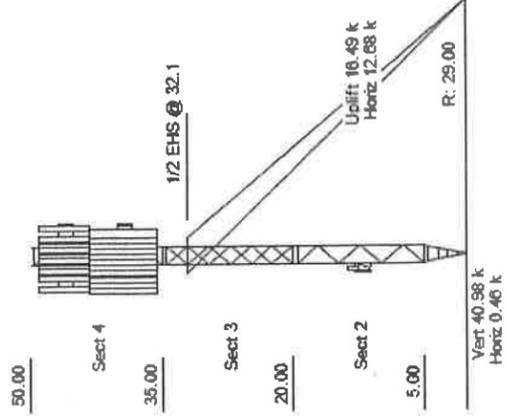
| Section | Leg Members                | Diagonal Members           | Horizontal Members         |
|---------|----------------------------|----------------------------|----------------------------|
| 1       | PXX 50 ksi 2-1/2" DIA PIPE |                            | SAE 36 ksi 4X4X0.25        |
| 2-3     | PX 50 ksi 2-1/2" DIA PIPE  | PSP 42 ksi ROHN 1 1/2X16GA | PSP 42 ksi ROHN 1 1/2X16GA |
| 4       | PX 50 ksi 2-1/2" DIA PIPE  | PSP 42 ksi ROHN 1 1/2X11GA | PSP 42 ksi ROHN 1 1/2X11GA |

**Discrete Appurtenance**

| Elev (ft) | Type           | Qty | Description           |
|-----------|----------------|-----|-----------------------|
| 46.00     | Mounting Frame | 3   | Sector Frames         |
| 46.00     | Panel          | 3   | APXVSP18-C-A20        |
| 46.00     | Panel          | 3   | 800 MHz RRH           |
| 46.00     | Panel          | 3   | 1900 MHz RRU          |
| 46.00     | Panel          | 3   | APX/TM14C120          |
| 46.00     | Panel          | 3   | TD-RRH-8X20-25        |
| 39.33     | Panel          | 3   | RRUS11                |
| 39.33     | Panel          | 3   | RRUS11                |
| 39.33     | Panel          | 1   | AM-X-CD-16-66-00T-RET |
| 39.33     | Panel          | 2   | P65-17-XLH-RR         |
| 39.33     | Panel          | 1   | DC6-48-60-18-8F       |
| 39.33     | Mounting Frame | 3   | Sector Frames         |
| 39.33     | Panel          | 6   | TT19-088P111-001      |
| 39.33     | Panel          | 6   | Powerwave 7770.00     |
| 32.00     | Other          | 1   | Torque Arm            |
| 13.00     | Panel          | 1   | GPS antenna           |

**Linear Appurtenance**

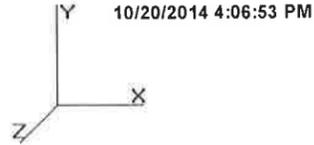
| Elev (ft) | From   | To     | Qty | Description         |
|-----------|--------|--------|-----|---------------------|
| 0.000     | 46.000 | 46.000 | 1   | 5/8" Fiber          |
| 0.000     | 46.000 | 46.000 | 1   | 5/8" Fiber          |
| 0.000     | 46.000 | 46.000 | 3   | 1-1/4" Hybrid Cable |
| 0.000     | 39.330 | 39.330 | 1   | RET cable           |
| 0.000     | 39.330 | 39.330 | 1   | Fiber Optic Cable   |
| 0.000     | 39.330 | 39.330 | 3   | DC Cables           |
| 0.000     | 39.330 | 39.330 | 3   | DC Cables           |
| 0.000     | 39.330 | 39.330 | 1   | 3" conduit          |
| 0.000     | 39.330 | 39.330 | 1   | 3" conduit          |
| 0.000     | 39.330 | 39.330 | 12  | 1.5/8" Coax         |
| 0.000     | 13.000 | 13.000 | 1   | 1/2" Coax           |



SEMAAN ENGINEERING SOLUTIONS, LLC  
 1079 N.205th Street  
 Elkhorn, NE 68022  
 Phone: 402-289-1888  
 Fax: 402-289-1861

Site Number: CT03XC074\_FIX02  
 Location: West Hartford, CT  
 Code: TIA/EIA-222 Rev F

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Gh : 1.22

**Section Forces**

**LoadCase Normal No Ice 80.00 mph Wind Normal To Face with No Ice**

Allow Stress Inc: 1.333  
 Dead LF: 1.000  
 Wind LF: 1.000

| Sect Seq | Height (ft) | Wind qz (psf) | Total Area  |              |              | Sol Ratio | Cf   | Df   | Dr   | Rr   | Eff Area (sqft) | Ice Area      |               | Total Weight (lb) | Ice Weight (lb) | Struct Force (lb) | Linear Force (lb) | Total Force (lb) | Eff Face |
|----------|-------------|---------------|-------------|--------------|--------------|-----------|------|------|------|------|-----------------|---------------|---------------|-------------------|-----------------|-------------------|-------------------|------------------|----------|
|          |             |               | Flat (sqft) | Round (sqft) | Round (sqft) |           |      |      |      |      |                 | Linear (sqft) | Linear (sqft) |                   |                 |                   |                   |                  |          |
| 4        | 42.50       | 22.26         | 0.00        | 11.19        | 0.00         | 0.22      | 2.54 | 1.00 | 1.00 | 0.59 | 6.65            | 15.57         | 0.00          | 630.3             | 0.0             | 456.29            | 505.62            | 961.91           | 1        |
| 3        | 27.50       | 21.21         | 0.00        | 14.33        | 0.00         | 0.28      | 2.35 | 1.00 | 1.00 | 0.61 | 8.74            | 44.13         | 0.00          | 842.7             | 0.0             | 530.01            | 1,365.2           | 1,895.21         | 1        |
| 2        | 12.50       | 20.02         | 0.00        | 11.19        | 0.00         | 0.22      | 2.54 | 1.00 | 1.00 | 0.59 | 6.65            | 44.56         | 0.00          | 768.8             | 0.0             | 410.24            | 1,300.7           | 1,711.01         | 1        |
| 1        | 2.50        | 19.10         | 2.61        | 2.58         | 0.00         | 0.61      | 1.80 | 1.00 | 1.00 | 0.76 | 4.56            | 14.98         | 0.00          | 485.8             | 0.0             | 190.78            | 417.39            | 397.07           | 1 **     |
|          |             |               |             |              |              |           |      |      |      |      |                 |               |               | 2,727.6           | 0.0             |                   |                   | 4,965.20         |          |

\*\* = 2QzGhAg Controls

**LoadCase 60 deg No Ice 80.00 mph Wind at 60 deg From Face with No Ice**

Allow Stress Inc: 1.333  
 Dead LF: 1.000  
 Wind LF: 1.000

| Sect Seq | Height (ft) | Wind qz (psf) | Total Area  |              |              | Sol Ratio | Cf   | Df   | Dr   | Rr   | Eff Area (sqft) | Ice Area      |               | Total Weight (lb) | Ice Weight (lb) | Struct Force (lb) | Linear Force (lb) | Total Force (lb) | Eff Face |
|----------|-------------|---------------|-------------|--------------|--------------|-----------|------|------|------|------|-----------------|---------------|---------------|-------------------|-----------------|-------------------|-------------------|------------------|----------|
|          |             |               | Flat (sqft) | Round (sqft) | Round (sqft) |           |      |      |      |      |                 | Linear (sqft) | Linear (sqft) |                   |                 |                   |                   |                  |          |
| 4        | 42.50       | 22.26         | 0.00        | 11.19        | 0.00         | 0.22      | 2.54 | 0.80 | 1.00 | 0.59 | 6.65            | 15.57         | 0.00          | 630.3             | 0.0             | 456.29            | 505.62            | 961.91           | 1        |
| 3        | 27.50       | 21.21         | 0.00        | 14.33        | 0.00         | 0.28      | 2.35 | 0.80 | 1.00 | 0.61 | 8.74            | 44.13         | 0.00          | 842.7             | 0.0             | 530.01            | 1,365.2           | 1,895.21         | 1        |
| 2        | 12.50       | 20.02         | 0.00        | 11.19        | 0.00         | 0.22      | 2.54 | 0.80 | 1.00 | 0.59 | 6.65            | 44.56         | 0.00          | 768.8             | 0.0             | 410.24            | 1,300.7           | 1,711.01         | 1        |
| 1        | 2.50        | 19.10         | 2.61        | 2.58         | 0.00         | 0.61      | 1.80 | 0.80 | 1.00 | 0.76 | 4.04            | 14.98         | 0.00          | 485.8             | 0.0             | 168.94            | 417.39            | 397.07           | 1 **     |
|          |             |               |             |              |              |           |      |      |      |      |                 |               |               | 2,727.6           | 0.0             |                   |                   | 4,965.20         |          |

\*\* = 2QzGhAg Controls

**LoadCase 90 deg No Ice 80.00 mph Wind at 90 deg From Face with No Ice**

Allow Stress Inc: 1.333  
 Dead LF: 1.000  
 Wind LF: 1.000

| Sect Seq | Height (ft) | Wind qz (psf) | Total Area  |              |              | Sol Ratio | Cf   | Df   | Dr   | Rr   | Eff Area (sqft) | Ice Area      |               | Total Weight (lb) | Ice Weight (lb) | Struct Force (lb) | Linear Force (lb) | Total Force (lb) | Eff Face |
|----------|-------------|---------------|-------------|--------------|--------------|-----------|------|------|------|------|-----------------|---------------|---------------|-------------------|-----------------|-------------------|-------------------|------------------|----------|
|          |             |               | Flat (sqft) | Round (sqft) | Round (sqft) |           |      |      |      |      |                 | Linear (sqft) | Linear (sqft) |                   |                 |                   |                   |                  |          |
| 4        | 42.50       | 22.26         | 0.00        | 11.19        | 0.00         | 0.22      | 2.54 | 0.85 | 1.00 | 0.59 | 6.65            | 15.57         | 0.00          | 630.3             | 0.0             | 456.29            | 505.62            | 961.91           | 1        |
| 3        | 27.50       | 21.21         | 0.00        | 14.33        | 0.00         | 0.28      | 2.35 | 0.85 | 1.00 | 0.61 | 8.74            | 44.13         | 0.00          | 842.7             | 0.0             | 530.01            | 1,365.2           | 1,895.21         | 1        |
| 2        | 12.50       | 20.02         | 0.00        | 11.19        | 0.00         | 0.22      | 2.54 | 0.85 | 1.00 | 0.59 | 6.65            | 44.56         | 0.00          | 768.8             | 0.0             | 410.24            | 1,300.7           | 1,711.01         | 1        |
| 1        | 2.50        | 19.10         | 2.61        | 2.58         | 0.00         | 0.61      | 1.80 | 0.85 | 1.00 | 0.76 | 4.17            | 14.98         | 0.00          | 485.8             | 0.0             | 174.40            | 417.39            | 397.07           | 1 **     |
|          |             |               |             |              |              |           |      |      |      |      |                 |               |               | 2,727.6           | 0.0             |                   |                   | 4,965.20         |          |

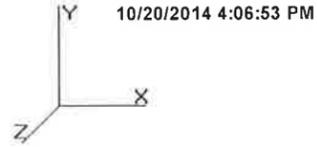
\*\* = 2QzGhAg Controls

SEMAAN ENGINEERING SOLUTIONS, LLC  
 1079 N.205th Street  
 Elkhorn, NE 68022  
 Phone: 402-289-1888  
 Fax: 402-289-1861

Site Number: CT03XC074\_FIX02  
 Location: West Hartford, CT

Code: TIA/EIA-222 Rev F

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Gh : 1.22

**Section Forces**

**LoadCase Normal Ice 69.28 mph Wind Normal To Face with Ice**

Allow Stress Inc: 1.333  
 Dead LF: 1.000  
 Wind LF: 1.000

| Sect Seq | Height (ft) | Wind qz (psf) | Total Flat Area (sqft) | Total Round Area (sqft) | Ice Round Area (sqft) | Sol Ratio | Cf   | Df   | Dr   | Rr   | Eff Area (sqft) | Linear Area (sqft) | Ice Linear Area (sqft) | Total Weight (lb) | Ice Weight (lb) | Struct Force (lb) | Linear Force (lb) | Total Force (lb) | Eff Face |    |
|----------|-------------|---------------|------------------------|-------------------------|-----------------------|-----------|------|------|------|------|-----------------|--------------------|------------------------|-------------------|-----------------|-------------------|-------------------|------------------|----------|----|
|          |             |               |                        |                         |                       |           |      |      |      |      |                 |                    |                        |                   |                 |                   |                   |                  |          | 1  |
| 4        | 42.50       | 16.70         | 0.00                   | 16.35                   | 5.17                  | 0.32      | 2.25 | 1.00 | 1.00 | 0.62 | 10.17           | 15.57              | 12.52                  | 1,000.3           | 370.1           | 463.70            | 684.10            | 1,147.80         | 1        |    |
| 3        | 27.50       | 15.91         | 0.00                   | 21.59                   | 7.26                  | 0.42      | 2.02 | 1.00 | 1.00 | 0.66 | 14.26           | 44.13              | 33.75                  | 1,592.0           | 749.4           | 558.05            | 1,806.9           | 1,983.87         | 1        | ** |
| 2        | 12.50       | 15.01         | 0.00                   | 16.35                   | 5.17                  | 0.32      | 2.25 | 1.00 | 1.00 | 0.62 | 10.17           | 44.56              | 34.42                  | 1,431.6           | 662.8           | 416.90            | 1,729.0           | 1,871.87         | 1        | ** |
| 1        | 2.50        | 14.33         | 2.61                   | 4.13                    | 1.55                  | 0.79      | 1.81 | 1.00 | 1.00 | 0.89 | 6.27            | 14.98              | 11.67                  | 749.4             | 263.5           | 197.38            | 556.82            | 297.78           | 1        | ** |
|          |             |               |                        |                         |                       |           |      |      |      |      |                 |                    |                        | 4,773.3           | 2,045.8         |                   |                   | 5,301.32         |          |    |

\*\* = 2QzGhAg Controls

**LoadCase 60 deg Ice 69.28 mph Wind at 60 deg From Face with Ice**

Allow Stress Inc: 1.333  
 Dead LF: 1.000  
 Wind LF: 1.000

| Sect Seq | Height (ft) | Wind qz (psf) | Total Flat Area (sqft) | Total Round Area (sqft) | Ice Round Area (sqft) | Sol Ratio | Cf   | Df   | Dr   | Rr   | Eff Area (sqft) | Linear Area (sqft) | Ice Linear Area (sqft) | Total Weight (lb) | Ice Weight (lb) | Struct Force (lb) | Linear Force (lb) | Total Force (lb) | Eff Face |    |
|----------|-------------|---------------|------------------------|-------------------------|-----------------------|-----------|------|------|------|------|-----------------|--------------------|------------------------|-------------------|-----------------|-------------------|-------------------|------------------|----------|----|
|          |             |               |                        |                         |                       |           |      |      |      |      |                 |                    |                        |                   |                 |                   |                   |                  |          | 1  |
| 4        | 42.50       | 16.70         | 0.00                   | 16.35                   | 5.17                  | 0.32      | 2.25 | 0.80 | 1.00 | 0.62 | 10.17           | 15.57              | 12.52                  | 1,000.3           | 370.1           | 463.70            | 684.10            | 1,147.80         | 1        |    |
| 3        | 27.50       | 15.91         | 0.00                   | 21.59                   | 7.26                  | 0.42      | 2.02 | 0.80 | 1.00 | 0.66 | 14.26           | 44.13              | 33.75                  | 1,592.0           | 749.4           | 558.05            | 1,806.9           | 1,983.87         | 1        | ** |
| 2        | 12.50       | 15.01         | 0.00                   | 16.35                   | 5.17                  | 0.32      | 2.25 | 0.80 | 1.00 | 0.62 | 10.17           | 44.56              | 34.42                  | 1,431.6           | 662.8           | 416.90            | 1,729.0           | 1,871.87         | 1        | ** |
| 1        | 2.50        | 14.33         | 2.61                   | 4.13                    | 1.55                  | 0.79      | 1.81 | 0.80 | 1.00 | 0.89 | 5.75            | 14.98              | 11.67                  | 749.4             | 263.5           | 180.93            | 556.82            | 297.78           | 1        | ** |
|          |             |               |                        |                         |                       |           |      |      |      |      |                 |                    |                        | 4,773.3           | 2,045.8         |                   |                   | 5,301.32         |          |    |

\*\* = 2QzGhAg Controls

**LoadCase 90 deg Ice 69.28 mph Wind at 90 deg From Face with Ice**

Allow Stress Inc: 1.333  
 Dead LF: 1.000  
 Wind LF: 1.000

| Sect Seq | Height (ft) | Wind qz (psf) | Total Flat Area (sqft) | Total Round Area (sqft) | Ice Round Area (sqft) | Sol Ratio | Cf   | Df   | Dr   | Rr   | Eff Area (sqft) | Linear Area (sqft) | Ice Linear Area (sqft) | Total Weight (lb) | Ice Weight (lb) | Struct Force (lb) | Linear Force (lb) | Total Force (lb) | Eff Face |    |
|----------|-------------|---------------|------------------------|-------------------------|-----------------------|-----------|------|------|------|------|-----------------|--------------------|------------------------|-------------------|-----------------|-------------------|-------------------|------------------|----------|----|
|          |             |               |                        |                         |                       |           |      |      |      |      |                 |                    |                        |                   |                 |                   |                   |                  |          | 1  |
| 4        | 42.50       | 16.70         | 0.00                   | 16.35                   | 5.17                  | 0.32      | 2.25 | 0.85 | 1.00 | 0.62 | 10.17           | 15.57              | 12.52                  | 1,000.3           | 370.1           | 463.70            | 684.10            | 1,147.80         | 1        |    |
| 3        | 27.50       | 15.91         | 0.00                   | 21.59                   | 7.26                  | 0.42      | 2.02 | 0.85 | 1.00 | 0.66 | 14.26           | 44.13              | 33.75                  | 1,592.0           | 749.4           | 558.05            | 1,806.9           | 1,983.87         | 1        | ** |
| 2        | 12.50       | 15.01         | 0.00                   | 16.35                   | 5.17                  | 0.32      | 2.25 | 0.85 | 1.00 | 0.62 | 10.17           | 44.56              | 34.42                  | 1,431.6           | 662.8           | 416.90            | 1,729.0           | 1,871.87         | 1        | ** |
| 1        | 2.50        | 14.33         | 2.61                   | 4.13                    | 1.55                  | 0.79      | 1.81 | 0.85 | 1.00 | 0.89 | 5.88            | 14.98              | 11.67                  | 749.4             | 263.5           | 185.05            | 556.82            | 297.78           | 1        | ** |
|          |             |               |                        |                         |                       |           |      |      |      |      |                 |                    |                        | 4,773.3           | 2,045.8         |                   |                   | 5,301.32         |          |    |

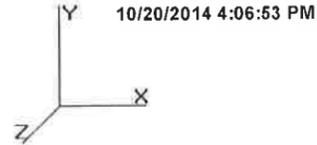
\*\* = 2QzGhAg Controls

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 Location: West Hartford, CT

Code: TIA/EIA-222 Rev F

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Gh : 1.22

**Section Forces**

**LoadCase Normal**

50.00 mph Wind Normal To Face with No Ice

Allow Stress Inc: 1.333  
 Dead LF: 1.000  
 Wind LF: 1.000

| Sect Seq | Height (ft) | Wind qz (psf) | Total Flat Area (sqft) | Total Round Area (sqft) | Ice Round Area (sqft) | Sol Ratio | Cf   | Df   | Dr   | Rr   | Eff Area | Linear Area | Ice Linear Area | Total Weight | Ice Weight | Struct Force | Linear Force | Total Force | Eff Face |
|----------|-------------|---------------|------------------------|-------------------------|-----------------------|-----------|------|------|------|------|----------|-------------|-----------------|--------------|------------|--------------|--------------|-------------|----------|
|          |             |               |                        |                         |                       |           |      |      |      |      | (sqft)   | (sqft)      | (sqft)          | (lb)         | (lb)       | (lb)         | (lb)         | (lb)        | (lb)     |
| 4        | 42.50       | 8.70          | 0.00                   | 11.19                   | 0.00                  | 0.22      | 2.54 | 1.00 | 1.00 | 0.59 | 6.65     | 15.57       | 0.00            | 630.3        | 0.0        | 178.24       | 197.51       | 375.75      | 1        |
| 3        | 27.50       | 8.29          | 0.00                   | 14.33                   | 0.00                  | 0.28      | 2.35 | 1.00 | 1.00 | 0.61 | 8.74     | 44.13       | 0.00            | 842.7        | 0.0        | 207.04       | 533.28       | 740.32      | 1        |
| 2        | 12.50       | 7.82          | 0.00                   | 11.19                   | 0.00                  | 0.22      | 2.54 | 1.00 | 1.00 | 0.59 | 6.65     | 44.56       | 0.00            | 768.8        | 0.0        | 160.25       | 508.11       | 668.36      | 1        |
| 1        | 2.50        | 7.46          | 2.61                   | 2.58                    | 0.00                  | 0.61      | 1.80 | 1.00 | 1.00 | 0.76 | 4.56     | 14.98       | 0.00            | 485.8        | 0.0        | 74.52        | 163.04       | 155.11      | 1 **     |
|          |             |               |                        |                         |                       |           |      |      |      |      |          |             |                 | 2,727.6      | 0.0        |              |              | 1,939.53    |          |

\*\* = 2QzGhAg Controls

**LoadCase 60 deg**

50.00 mph Wind at 60 deg From Face with No Ice

Allow Stress Inc: 1.333  
 Dead LF: 1.000  
 Wind LF: 1.000

| Sect Seq | Height (ft) | Wind qz (psf) | Total Flat Area (sqft) | Total Round Area (sqft) | Ice Round Area (sqft) | Sol Ratio | Cf   | Df   | Dr   | Rr   | Eff Area | Linear Area | Ice Linear Area | Total Weight | Ice Weight | Struct Force | Linear Force | Total Force | Eff Face |
|----------|-------------|---------------|------------------------|-------------------------|-----------------------|-----------|------|------|------|------|----------|-------------|-----------------|--------------|------------|--------------|--------------|-------------|----------|
|          |             |               |                        |                         |                       |           |      |      |      |      | (sqft)   | (sqft)      | (sqft)          | (lb)         | (lb)       | (lb)         | (lb)         | (lb)        | (lb)     |
| 4        | 42.50       | 8.70          | 0.00                   | 11.19                   | 0.00                  | 0.22      | 2.54 | 0.80 | 1.00 | 0.59 | 6.65     | 15.57       | 0.00            | 630.3        | 0.0        | 178.24       | 197.51       | 375.75      | 1        |
| 3        | 27.50       | 8.29          | 0.00                   | 14.33                   | 0.00                  | 0.28      | 2.35 | 0.80 | 1.00 | 0.61 | 8.74     | 44.13       | 0.00            | 842.7        | 0.0        | 207.04       | 533.28       | 740.32      | 1        |
| 2        | 12.50       | 7.82          | 0.00                   | 11.19                   | 0.00                  | 0.22      | 2.54 | 0.80 | 1.00 | 0.59 | 6.65     | 44.56       | 0.00            | 768.8        | 0.0        | 160.25       | 508.11       | 668.36      | 1        |
| 1        | 2.50        | 7.46          | 2.61                   | 2.58                    | 0.00                  | 0.61      | 1.80 | 0.80 | 1.00 | 0.76 | 4.04     | 14.98       | 0.00            | 485.8        | 0.0        | 65.99        | 163.04       | 155.11      | 1 **     |
|          |             |               |                        |                         |                       |           |      |      |      |      |          |             |                 | 2,727.6      | 0.0        |              |              | 1,939.53    |          |

\*\* = 2QzGhAg Controls

**LoadCase 90 deg**

50.00 mph Wind at 90 deg From Face with No Ice

Allow Stress Inc: 1.333  
 Dead LF: 1.000  
 Wind LF: 1.000

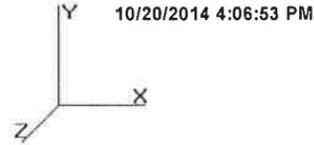
| Sect Seq | Height (ft) | Wind qz (psf) | Total Flat Area (sqft) | Total Round Area (sqft) | Ice Round Area (sqft) | Sol Ratio | Cf   | Df   | Dr   | Rr   | Eff Area | Linear Area | Ice Linear Area | Total Weight | Ice Weight | Struct Force | Linear Force | Total Force | Eff Face |
|----------|-------------|---------------|------------------------|-------------------------|-----------------------|-----------|------|------|------|------|----------|-------------|-----------------|--------------|------------|--------------|--------------|-------------|----------|
|          |             |               |                        |                         |                       |           |      |      |      |      | (sqft)   | (sqft)      | (sqft)          | (lb)         | (lb)       | (lb)         | (lb)         | (lb)        | (lb)     |
| 4        | 42.50       | 8.70          | 0.00                   | 11.19                   | 0.00                  | 0.22      | 2.54 | 0.85 | 1.00 | 0.59 | 6.65     | 15.57       | 0.00            | 630.3        | 0.0        | 178.24       | 197.51       | 375.75      | 1        |
| 3        | 27.50       | 8.29          | 0.00                   | 14.33                   | 0.00                  | 0.28      | 2.35 | 0.85 | 1.00 | 0.61 | 8.74     | 44.13       | 0.00            | 842.7        | 0.0        | 207.04       | 533.28       | 740.32      | 1        |
| 2        | 12.50       | 7.82          | 0.00                   | 11.19                   | 0.00                  | 0.22      | 2.54 | 0.85 | 1.00 | 0.59 | 6.65     | 44.56       | 0.00            | 768.8        | 0.0        | 160.25       | 508.11       | 668.36      | 1        |
| 1        | 2.50        | 7.46          | 2.61                   | 2.58                    | 0.00                  | 0.61      | 1.80 | 0.85 | 1.00 | 0.76 | 4.17     | 14.98       | 0.00            | 485.8        | 0.0        | 68.13        | 163.04       | 155.11      | 1 **     |
|          |             |               |                        |                         |                       |           |      |      |      |      |          |             |                 | 2,727.6      | 0.0        |              |              | 1,939.53    |          |

\*\* = 2QzGhAg Controls

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 Location: West Hartford, CT  
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**Tower Loading**

**Discrete Appurtenance Properties**

| Attach Elev (ft) | Description           | Qty | Weight (lb) | No Ice CaAa (sf) | CaAa Factor | Weight (lb) | Ice CaAa (sf) | CaAa Factor | Distance From Face (ft)      | X Angle (deg) | Vert Ecc (ft) |
|------------------|-----------------------|-----|-------------|------------------|-------------|-------------|---------------|-------------|------------------------------|---------------|---------------|
| 46.00            | Sector Frames         | 3   | 500.00      | 15.000           | 0.75        | 650.00      | 20.600        | 0.75        | 0.000                        | 0.00          | 0.000         |
| 46.00            | APXVSPP18-C-A20       | 3   | 50.00       | 8.260            | 0.80        | 99.52       | 9.080         | 0.80        | 0.000                        | 0.00          | 0.000         |
| 46.00            | 800 MHz RRH           | 3   | 50.00       | 2.520            | 0.93        | 64.00       | 2.870         | 0.93        | 0.000                        | 0.00          | 0.000         |
| 46.00            | 1900 MHz RRU          | 3   | 44.09       | 2.690            | 0.80        | 62.21       | 3.030         | 0.80        | 0.000                        | 0.00          | 0.000         |
| 46.00            | APXVTM14-C-I20        | 3   | 54.90       | 6.430            | 0.76        | 92.44       | 7.090         | 0.76        | 0.000                        | 0.00          | 0.000         |
| 46.00            | TD-RRH-8X20-25        | 3   | 70.00       | 4.800            | 0.68        | 70.00       | 5.250         | 0.68        | 0.000                        | 0.00          | 0.000         |
| 39.33            | RRUS11                | 3   | 51.00       | 3.256            | 0.73        | 72.85       | 3.623         | 0.73        | 0.000                        | 0.00          | 0.000         |
| 39.33            | RRUS11                | 3   | 51.00       | 3.256            | 0.73        | 72.85       | 3.623         | 0.73        | 0.000                        | 0.00          | 0.000         |
| 39.33            | AM-X-CD-16-65-00T-RET | 1   | 48.50       | 8.260            | 0.75        | 95.00       | 9.080         | 0.75        | 0.000                        | 0.00          | 0.000         |
| 39.33            | P65-17-XLH-RR         | 2   | 59.00       | 11.470           | 0.88        | 121.06      | 12.394        | 0.88        | 0.000                        | 0.00          | 0.000         |
| 39.33            | DC6-48-60-18-8F       | 1   | 32.80       | 1.467            | 1.00        | 50.52       | 1.667         | 1.00        | 0.000                        | 0.00          | 0.000         |
| 39.33            | Sector Frames         | 3   | 500.00      | 15.000           | 0.75        | 650.00      | 20.600        | 0.75        | 0.000                        | 0.00          | 0.000         |
| 39.33            | TT19-08BP111-001      | 6   | 16.00       | 0.635            | 0.90        | 21.74       | 0.805         | 0.90        | 0.000                        | 0.00          | 0.000         |
| 39.33            | Powerwave 7770.00     | 6   | 35.00       | 5.882            | 0.73        | 67.63       | 6.533         | 0.73        | 0.000                        | 0.00          | 0.000         |
| 32.00            | Torque Arm            | 1   | 500.00      | 15.000           | 1.00        | 1000.00     | 20.000        | 1.00        | 0.000                        | 0.00          | 0.000         |
| 13.00            | GPS antenna           | 1   | 35.00       | 2.120            | 1.00        | 48.31       | 2.430         | 1.00        | 0.000                        | 0.00          | 0.000         |
| Totals           |                       | 45  | 5153.27     |                  |             | 7473.78     |               |             | Number of Appurtenances : 16 |               |               |

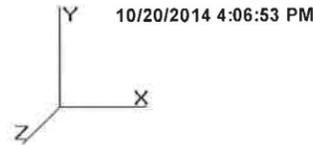
**Linear Appurtenance Properties**

| Elev From (ft) | Elev To (ft) | Description         | Qty | Width (in) | Weight (lb/ft) | Pct In Wind | Spread On Faces | Bundling Arrangement |
|----------------|--------------|---------------------|-----|------------|----------------|-------------|-----------------|----------------------|
| 0.00           | 46.00        | 1-1/4" Hybrid Cable | 3   | 1.25       | 0.95           | 100.00      | Lin App         | Separate             |
| 0.00           | 46.00        | 5/8" Fiber          | 1   | 0.70       | 0.16           | 100.00      | Lin App         | Separate             |
| 0.00           | 46.00        | 5/8" Fiber          | 1   | 0.65       | 0.16           | 100.00      | Lin App         | Separate             |
| 0.00           | 39.33        | 1 5/8" Coax         | 12  | 1.98       | 1.04           | 100.00      | Lin App         | Separate             |
| 0.00           | 39.33        | 3" conduit          | 1   | 3.00       | 1.00           | 100.00      | Lin App         | Separate             |
| 0.00           | 39.33        | 3" conduit          | 1   | 3.00       | 1.00           | 100.00      | Lin App         | Separate             |
| 0.00           | 39.33        | DC Cables           | 3   | 0.00       | 0.52           | 100.00      | Lin App         | Separate             |
| 0.00           | 39.33        | DC Cables           | 3   | 0.00       | 0.52           | 100.00      | Lin App         | Separate             |
| 0.00           | 39.33        | Fiber Optic Cable   | 1   | 0.00       | 0.95           | 100.00      | Lin App         | Separate             |
| 0.00           | 39.33        | RET cable           | 1   | 0.44       | 0.08           | 100.00      | Lin App         | Separate             |
| 0.00           | 13.00        | 1/2" Coax           | 1   | 0.65       | 0.16           | 100.00      | Lin App         | Separate             |

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 Location: West Hartford, CT  
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**Force/Stress Summary**

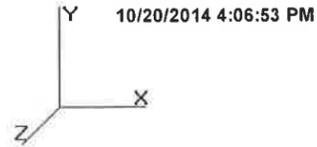
| Section: 1 G80TB - BASE Bot Elev (ft): 0.00 Height (ft): 5.000   |                      |        |               |          |           |           |           |                 |                |           |            |            |           |           |     |            |
|--|----------------------|--------|---------------|----------|-----------|-----------|-----------|-----------------|----------------|-----------|------------|------------|-----------|-----------|-----|------------|
|  |                      | Force  |               | Len      |           | Bracing % |           |                 | Member         |           |            | Shear Bear |           |           | Use |            |
| Max Compression Member   |                      | (kip)  | Load Case     | (ft)     | X         | Y         | Z         | KL/R            | Fa (ksi)       | Cap (kip) | Num Bolts  | Num Holes  | Cap (kip) | Cap (kip) | %   | Controls   |
| LEG  | PXX - 2-1/2" DIA PIP | -14.67 | Normal Ice    | 1.23     | 100       | 100       | 100       | 17.5            | 38.1           | 153.43    | 0          | 0          | 0.00      | 0.00      | 9   | Member X   |
| HORIZ  | SAE - 4X4X0.25       | -0.06  | Normal No Ice | 0.784    | 100       | 100       | 100       | 11.8            | 27.8           | 54.02     | 0          | 0          | 0.00      | 0.00      | 0   | Member Z   |
| DIAG   |                      | 0.00   |               | 0.000    | 0         | 0         | 0         | 0.0             | 0.0            | 0.00      | 0          | 0          | 0.00      | 0.00      |     |            |
| Max Tension Member   |                      | (kip)  | Load Case     | Fy (ksi) | Cap (kip) | Num Bolts | Num Holes | Shear Cap (kip) | Bear Cap (kip) | Use %     | Controls   |            |           |           |     |            |
| LEG  |                      | 0.00   |               | 0        | 0.00      | 0         | 0         | 0.00            | 0.00           | 0         |            |            |           |           |     |            |
| HORIZ  | SAE - 4X4X0.25       | 1.72   | Normal No Ice | 36       | 55.87     | 0         | 0         | 0.00            | 0.00           | 3         | Member     |            |           |           |     |            |
| DIAG   |                      | 0.00   |               | 0        | 0.00      | 0         | 0         | 0.00            | 0.00           | 0         |            |            |           |           |     |            |
| Section: 2 G84HCS-15 FT Bot Elev (ft): 5.00 Height (ft): 15.000  |                      |        |               |          |           |           |           |                 |                |           |            |            |           |           |     |            |
| Max Compression Member   |                      | (kip)  | Load Case     | (ft)     | X         | Y         | Z         | KL/R            | Fa (ksi)       | Cap (kip) | Num Bolts  | Num Holes  | Cap (kip) | Cap (kip) | %   | Controls   |
| LEG  | PX - 2-1/2" DIA PIPE | -16.70 | Normal No Ice | 2.42     | 200       | 200       | 200       | 63.0            | 29.6           | 66.61     | 0          | 0          | 0.00      | 0.00      | 25  | Member X   |
| HORIZ  | PSP - ROHN 1 1/2X16G | -0.47  | 90 deg No Ice | 3.420    | 100       | 100       | 100       | 80.5            | 22.7           | 6.64      | 0          | 0          | 0.00      | 0.00      | 7   | Member X   |
| DIAG   | PSP - ROHN 1 1/2X16G | -1.30  | Normal No Ice | 4.192    | 100       | 100       | 100       | 0.0             | 0.0            | 4.84      | 0          | 0          | 0.00      | 0.00      | 26  | User Input |
| Max Tension Member   |                      | (kip)  | Load Case     | Fy (ksi) | Cap (kip) | Num Bolts | Num Holes | Shear Cap (kip) | Bear Cap (kip) | Use %     | Controls   |            |           |           |     |            |
| LEG  |                      | 0.00   |               | 0        | 0.00      | 0         | 0         | 0.00            | 0.00           | 0         |            |            |           |           |     |            |
| HORIZ  | PSP - ROHN 1 1/2X16G | 1.54   | Normal Ice    | 42       | 9.84      | 0         | 0         | 0.00            | 0.00           | 15        | Member     |            |           |           |     |            |
| DIAG   | PSP - ROHN 1 1/2X16G | 1.37   | 90 deg No Ice | 42       | 4.84      | 0         | 0         | 0.00            | 0.00           | 28        | User Input |            |           |           |     |            |
| Section: 3 G84HCS-15 FT Bot Elev (ft): 20.00 Height (ft): 15.000 |                      |        |               |          |           |           |           |                 |                |           |            |            |           |           |     |            |
| Max Compression Member   |                      | (kip)  | Load Case     | (ft)     | X         | Y         | Z         | KL/R            | Fa (ksi)       | Cap (kip) | Num Bolts  | Num Holes  | Cap (kip) | Cap (kip) | %   | Controls   |
| LEG  | PX - 2-1/2" DIA PIPE | -25.84 | Normal No Ice | 2.42     | 200       | 200       | 200       | 63.0            | 29.6           | 66.61     | 0          | 0          | 0.00      | 0.00      | 38  | Member X   |
| HORIZ  | PSP - ROHN 1 1/2X16G | -0.10  | Normal No Ice | 3.420    | 100       | 100       | 100       | 80.5            | 22.7           | 6.64      | 0          | 0          | 0.00      | 0.00      | 1   | Member X   |
| DIAG   | PSP - ROHN 1 1/2X16G | -3.04  | Normal No Ice | 4.192    | 100       | 100       | 100       | 0.0             | 0.0            | 4.84      | 0          | 0          | 0.00      | 0.00      | 62  | User Input |
| Max Tension Member   |                      | (kip)  | Load Case     | Fy (ksi) | Cap (kip) | Num Bolts | Num Holes | Shear Cap (kip) | Bear Cap (kip) | Use %     | Controls   |            |           |           |     |            |
| LEG  | PX - 2-1/2" DIA PIPE | 18.66  | 60 deg No Ice | 50       | 90.00     | 0         | 0         | 0.00            | 0.00           | 20        | Member     |            |           |           |     |            |
| HORIZ  | PSP - ROHN 1 1/2X16G | 2.19   | Normal No Ice | 42       | 9.84      | 0         | 0         | 0.00            | 0.00           | 22        | Member     |            |           |           |     |            |
| DIAG   | PSP - ROHN 1 1/2X16G | 2.83   | 90 deg No Ice | 42       | 4.84      | 0         | 0         | 0.00            | 0.00           | 58        | User Input |            |           |           |     |            |

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**Force/Stress Summary**

| Section: 4             |                      | G84HCS-15 FT |               | Bot Elev (ft): 35.00 |           | Height (ft): 15.000 |     |          |           | Member    |           | Shear Bear |           | Use  |          |          |
|------------------------|----------------------|--------------|---------------|----------------------|-----------|---------------------|-----|----------|-----------|-----------|-----------|------------|-----------|------|----------|----------|
| Max Compression Member |                      | Force (kip)  | Load Case     | Len (ft)             | Bracing % |                     |     | Fa (ksi) | Cap (kip) | Num Bolts | Num Holes | Cap (kip)  | Cap (kip) | %    | Controls |          |
| LEG                    | PX - 2-1/2" DIA PIPE | -17.36       | Normal No Ice | 2.42                 | 200       | 200                 | 200 | 63.0     | 29.6      | 66.61     | 0         | 0          | 0.00      | 0.00 | 26       | Member X |
| HORIZ                  | PSP - ROHN 1 1/2X11G | -2.94        | 90 deg No Ice | 3.420                | 100       | 100                 | 100 | 83.9     | 22.0      | 11.43     | 0         | 0          | 0.00      | 0.00 | 25       | Member X |
| DIAG                   | PSP - ROHN 1 1/2X11G | -5.21        | Normal No Ice | 4.192                | 100       | 100                 | 100 | 102.9    | 17.9      | 9.32      | 0         | 0          | 0.00      | 0.00 | 55       | Member X |

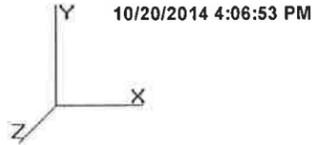
  

| Max Tension Member |                      | Force (kip) | Load Case     | Fy (ksi) | Cap (kip) | Num Bolts | Num Holes | Shear Cap (kip) | Bear Cap (kip) | Use % | Controls |
|--------------------|----------------------|-------------|---------------|----------|-----------|-----------|-----------|-----------------|----------------|-------|----------|
| LEG                | PX - 2-1/2" DIA PIPE | 13.89       | 60 deg No Ice | 50       | 90.00     | 0         | 0         | 0.00            | 0.00           | 15    | Member   |
| HORIZ              | PSP - ROHN 1 1/2X11G | 1.31        | Normal No Ice | 42       | 17.47     | 0         | 0         | 0.00            | 0.00           | 7     | Member   |
| DIAG               | PSP - ROHN 1 1/2X11G | 5.71        | 90 deg No Ice | 42       | 17.47     | 0         | 0         | 0.00            | 0.00           | 32    | Member   |

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Support Forces Summary

| Load Case     | Node | FX (kip) | FY (kip) | FZ (kip) | (-) = Uplift (+) = Down |
|---------------|------|----------|----------|----------|-------------------------|
| 90 deg        | A1b  | -4.31    | -6.47    | -2.44    |                         |
|               | A1a  | 0.06     | -0.09    | -0.05    |                         |
|               | A1   | -0.05    | -3.28    | 2.51     |                         |
|               | 1    | 0.05     | 17.83    | -0.03    |                         |
| 60 deg        | A1b  | -4.17    | -6.28    | -2.41    |                         |
|               | A1a  | 0.52     | -0.80    | -0.35    |                         |
|               | A1   | -0.04    | -0.80    | 0.62     |                         |
|               | 1    | 0.03     | 15.87    | 0.02     |                         |
| Normal        | A1b  | -3.65    | -5.55    | -2.17    |                         |
|               | A1a  | 3.65     | -5.55    | -2.17    |                         |
|               | A1   | 0.00     | -0.02    | 0.02     |                         |
|               | 1    | 0.00     | 19.11    | 0.07     |                         |
| 90 deg Ice    | A1b  | -11.06   | -16.37   | -6.14    |                         |
|               | A1a  | 0.10     | -0.24    | -0.11    |                         |
|               | A1   | -0.24    | -8.37    | 6.42     |                         |
|               | 1    | 0.24     | 37.48    | -0.17    |                         |
| 60 deg Ice    | A1b  | -9.83    | -14.69   | -5.68    |                         |
|               | A1a  | 0.48     | -0.82    | -0.39    |                         |
|               | A1   | -0.10    | -0.82    | 0.61     |                         |
|               | 1    | -0.03    | 28.82    | -0.02    |                         |
| Normal Ice    | A1b  | -9.32    | -14.16   | -5.70    |                         |
|               | A1a  | 9.32     | -14.16   | -5.70    |                         |
|               | A1   | 0.00     | -0.14    | 0.07     |                         |
|               | 1    | 0.00     | 40.98    | 0.39     |                         |
| 90 deg No Ice | A1b  | -11.08   | -16.49   | -6.17    |                         |
|               | A1a  | 0.04     | -0.10    | -0.05    |                         |
|               | A1   | -0.18    | -8.35    | 6.39     |                         |
|               | 1    | 0.31     | 32.93    | -0.16    |                         |
| 60 deg No Ice | A1b  | -9.63    | -14.49   | -5.56    |                         |
|               | A1a  | 0.22     | -0.37    | -0.18    |                         |
|               | A1   | -0.04    | -0.37    | 0.28     |                         |
|               | 1    | 0.02     | 23.21    | 0.01     |                         |
| Normal No Ice | A1b  | -9.39    | -14.29   | -5.69    |                         |
|               | A1a  | 9.39     | -14.29   | -5.70    |                         |
|               | A1   | 0.00     | -0.06    | 0.03     |                         |
|               | 1    | 0.00     | 36.64    | 0.46     |                         |

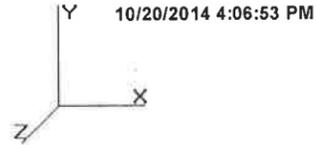
Max Reactions

|                  | <u>Base</u> | <u>Anch1</u> |
|------------------|-------------|--------------|
| Vertical (kip)   | 40.98       | -16.49       |
| Horizontal (kip) | 0.46        | 12.68        |

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**Cable Forces Summary**

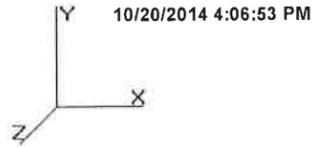
| Load Case     | Elevation (ft) | Cable   | Node 1 | Node 2 | Allow Tension (kip) | Applied Tension (kip) | Use % |
|---------------|----------------|---------|--------|--------|---------------------|-----------------------|-------|
| Normal No Ice | 32.12          | 1/2 EHS | A1     | T1     | 13.35               | 0.05                  | 0     |
|               |                | 1/2 EHS | A1b    | T1b    | 13.35               | 9.50                  | 71    |
|               |                | 1/2 EHS | A1a    | T1a    | 13.35               | 8.57                  | 64    |
|               |                | 1/2 EHS | A1a    | T1     | 13.35               | 9.54                  | 71    |
|               |                | 1/2 EHS | A1b    | T1a    | 13.35               | 8.61                  | 64    |
|               |                | 1/2 EHS | A1     | T1b    | 13.35               | 0.05                  | 0     |
| 60 deg No Ice |                | 1/2 EHS | A1     | T1     | 13.35               | 0.30                  | 2     |
|               |                | 1/2 EHS | A1b    | T1b    | 13.35               | 9.18                  | 68    |
|               |                | 1/2 EHS | A1a    | T1a    | 13.35               | 0.21                  | 1     |
|               |                | 1/2 EHS | A1a    | T1     | 13.35               | 0.30                  | 2     |
|               |                | 1/2 EHS | A1b    | T1a    | 13.35               | 9.18                  | 68    |
|               |                | 1/2 EHS | A1     | T1b    | 13.35               | 0.21                  | 1     |
| 90 deg No Ice |                | 1/2 EHS | A1     | T1     | 13.35               | 5.72                  | 42    |
|               |                | 1/2 EHS | A1b    | T1b    | 13.35               | 10.06                 | 75    |
|               |                | 1/2 EHS | A1a    | T1a    | 13.35               | 0.07                  | 0     |
|               |                | 1/2 EHS | A1a    | T1     | 13.35               | 0.09                  | 0     |
|               |                | 1/2 EHS | A1b    | T1a    | 13.35               | 10.84                 | 81    |
|               |                | 1/2 EHS | A1     | T1b    | 13.35               | 4.85                  | 36    |
| Normal Ice    |                | 1/2 EHS | A1     | T1     | 13.35               | 0.12                  | 0     |
|               |                | 1/2 EHS | A1b    | T1b    | 13.35               | 9.47                  | 70    |
|               |                | 1/2 EHS | A1a    | T1a    | 13.35               | 8.51                  | 63    |
|               |                | 1/2 EHS | A1a    | T1     | 13.35               | 9.50                  | 71    |
|               |                | 1/2 EHS | A1b    | T1a    | 13.35               | 8.54                  | 63    |
|               |                | 1/2 EHS | A1     | T1b    | 13.35               | 0.12                  | 0     |
| 60 deg Ice    |                | 1/2 EHS | A1     | T1     | 13.35               | 0.65                  | 4     |
|               |                | 1/2 EHS | A1b    | T1b    | 13.35               | 9.35                  | 70    |
|               |                | 1/2 EHS | A1a    | T1a    | 13.35               | 0.46                  | 3     |
|               |                | 1/2 EHS | A1a    | T1     | 13.35               | 0.65                  | 4     |
|               |                | 1/2 EHS | A1b    | T1a    | 13.35               | 9.35                  | 70    |
|               |                | 1/2 EHS | A1     | T1b    | 13.35               | 0.46                  | 3     |
| 90 deg Ice    |                | 1/2 EHS | A1     | T1     | 13.35               | 5.78                  | 43    |
|               |                | 1/2 EHS | A1b    | T1b    | 13.35               | 10.02                 | 75    |
|               |                | 1/2 EHS | A1a    | T1a    | 13.35               | 0.16                  | 1     |
|               |                | 1/2 EHS | A1a    | T1     | 13.35               | 0.21                  | 1     |
|               |                | 1/2 EHS | A1b    | T1a    | 13.35               | 10.81                 | 80    |
|               |                | 1/2 EHS | A1     | T1b    | 13.35               | 4.88                  | 36    |
| Normal        |                | 1/2 EHS | A1     | T1     | 13.35               | 0.03                  | 0     |
|               |                | 1/2 EHS | A1b    | T1b    | 13.35               | 3.73                  | 27    |
|               |                | 1/2 EHS | A1a    | T1a    | 13.35               | 3.30                  | 24    |
|               |                | 1/2 EHS | A1a    | T1     | 13.35               | 3.74                  | 28    |
|               |                | 1/2 EHS | A1b    | T1a    | 13.35               | 3.31                  | 24    |
|               |                | 1/2 EHS | A1     | T1b    | 13.35               | 0.03                  | 0     |
| 60 deg        |                | 1/2 EHS | A1     | T1     | 13.35               | 0.70                  | 5     |
|               |                | 1/2 EHS | A1b    | T1b    | 13.35               | 3.99                  | 29    |
|               |                | 1/2 EHS | A1a    | T1a    | 13.35               | 0.35                  | 2     |

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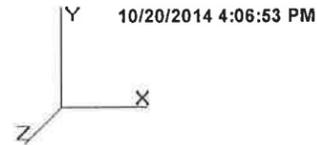


|        |         |     |     |       |      |    |
|--------|---------|-----|-----|-------|------|----|
|        | 1/2 EHS | A1a | T1  | 13.35 | 0.70 | 5  |
|        | 1/2 EHS | A1b | T1a | 13.35 | 3.98 | 29 |
|        | 1/2 EHS | A1  | T1b | 13.35 | 0.35 | 2  |
| 90 deg | 1/2 EHS | A1  | T1  | 13.35 | 2.30 | 17 |
|        | 1/2 EHS | A1b | T1b | 13.35 | 3.93 | 29 |
|        | 1/2 EHS | A1a | T1a | 13.35 | 0.06 | 0  |
|        | 1/2 EHS | A1a | T1  | 13.35 | 0.10 | 0  |
|        | 1/2 EHS | A1b | T1a | 13.35 | 4.28 | 32 |
|        | 1/2 EHS | A1  | T1b | 13.35 | 1.89 | 14 |

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**Deflections and Rotations**

| Load Case                                      | Elevation (ft) | Deflection (ft) | Twist (deg) | Sway (deg) |
|--|----------------|-----------------|-------------|------------|
| 50.00 mph Wind at 60 deg From Face with No Ice | 12.27          | 0.0173          | -0.0054     | 0.0809     |
|  | 32.12          | 0.0467          | 0.0005      | 0.1712     |
|  | 39.85          | 0.0672          | 0.0005      | 0.1397     |
|  | 47.12          | 0.0851          | 0.0004      | 0.1433     |
| 50.00 mph Wind at 90 deg From Face with No Ice | 12.27          | 0.0268          | -0.0302     | 0.1224     |
|  | 32.12          | 0.0708          | -0.0232     | 0.2709     |
|  | 39.85          | 0.0961          | -0.0231     | 0.1859     |
|  | 47.12          | 0.1201          | -0.0230     | 0.1853     |
| 50.00 mph Wind Normal To Face with No Ice      | 12.27          | 0.0332          | -0.0094     | 0.1532     |
|  | 32.12          | 0.0881          | -0.0020     | 0.3272     |
|  | 39.85          | 0.1179          | -0.0023     | 0.2185     |
|  | 47.12          | 0.1465          | -0.0023     | 0.2188     |
| 69.28 mph Wind at 60 deg From Face with Ice    | 12.27          | 0.0622          | -0.0110     | 0.2879     |
|  | 32.12          | 0.1638          | 0.0009      | 0.4195     |
|  | 39.85          | 0.2237          | 0.0003      | 0.4203     |
|  | 47.12          | 0.2778          | 0.0003      | 0.4291     |
| 69.28 mph Wind at 90 deg From Face with Ice    | 12.27          | 0.1177          | -0.0791     | 0.5378     |
|  | 32.12          | 0.3066          | -0.0612     | 0.9105     |
|  | 39.85          | 0.3979          | -0.0640     | 0.6845     |
|  | 47.12          | 0.4871          | -0.0640     | 0.6810     |
| 69.28 mph Wind Normal To Face with Ice         | 12.27          | 0.1364          | -0.0195     | 0.6301     |
|  | 32.12          | 0.3577          | 0.0001      | 1.0629     |
|  | 39.85          | 0.4642          | -0.0033     | 0.7838     |
|  | 47.12          | 0.5656          | -0.0035     | 0.7848     |
| 80.00 mph Wind at 60 deg From Face with No Ice | 12.27          | 0.0617          | -0.0072     | 0.2851     |
|  | 32.12          | 0.1638          | 0.0009      | 0.4039     |
|  | 39.85          | 0.2260          | 0.0004      | 0.4306     |
|  | 47.12          | 0.2814          | 0.0002      | 0.4400     |
| 80.00 mph Wind at 90 deg From Face with No Ice | 12.27          | 0.1214          | -0.0785     | 0.5558     |
|  | 32.12          | 0.3183          | -0.0638     | 0.9336     |
|  | 39.85          | 0.4142          | -0.0668     | 0.7162     |
|  | 47.12          | 0.5072          | -0.0668     | 0.7117     |
| 80.00 mph Wind Normal To Face with No Ice      | 12.27          | 0.1409          | -0.0172     | 0.6524     |
|  | 32.12          | 0.3719          | -0.0010     | 1.0940     |
|  | 39.85          | 0.4835          | -0.0045     | 0.8193     |
|  | 47.12          | 0.5896          | -0.0048     | 0.8213     |
|  |                | 0.0000          | 0.0000      | 0.0000     |





**GENERAL NOTES:**

1. REFERENCE THE SEMAAN ENGINEERING SOLUTIONS ANALYSIS DATED 10/20/2014 FOR THE PROPOSED AND EXISTING LOADS CONSIDERED. THIS DRAWING IS NOT VALID IF LOADS OTHER THAN THOSE CONSIDERED IN THE ANALYSIS ARE ADDED TO OR REMOVED FROM THE STRUCTURE UNLESS APPROVED IN WRITING BY SEMAAN ENGINEERING SOLUTIONS HOLDINGS, LLC.
2. THE PROPOSED LOADS SHALL NOT BE ADDED TO THE STRUCTURE UNTIL ALL MODIFICATIONS HAVE BEEN COMPLETED, INSPECTED BY A 3RD PARTY, AND APPROVED BY THE ENGINEER OF RECORD.
3. ALL METHODS, MATERIALS AND WORKMANSHIP SHALL FOLLOW THE DICTATES OF GOOD CONSTRUCTION PRACTICE.
4. ALL WORK INDICATED ON THESE DRAWINGS SHALL BE PERFORMED BY QUALIFIED CONTRACTORS EXPERIENCED IN TOWER AND FOUNDATION CONSTRUCTION.
5. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING DIMENSIONS, ELEVATIONS AND CONDITIONS PRIOR TO FABRICATION. THE CONTRACTOR WILL BE SOLELY RESPONSIBLE FOR THE PROPER FIT AND CLEARANCE IN THE FIELD. CONTACT SEMAAN ENGINEERING IF ANY DISCREPANCIES EXIST.
6. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF RECORD IMMEDIATELY OF ANY INSTALLATION INTERFERENCES. ALL NEW WORK SHALL ACCOMMODATE EXISTING CONDITIONS. DETAILS NOT SPECIFICALLY SHOWN ON THE DRAWINGS SHALL FOLLOW SIMILAR DETAILS FOR THIS JOB.
7. THIS DRAWING DOES NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND INSPECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL THE CONSTRUCTION MEANS, TECHNIQUES, SEQUENCES AND PROCEDURES.
8. ALL WORK SHALL BE DONE IN ACCORDANCE WITH LOCAL CODES AND OSHA SAFETY REGULATIONS. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE ON-SITE SAFETY ASSOCIATED WITH THE WORK TO BE PERFORMED AS WELL AS THE PUBLIC AFFECTED BY THE WORK IN THE VICINITY OF THE JOB SITE.
9. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND EXECUTION OF ALL MISCELLANEOUS SHORING, BRACING, TEMPORARY SUPPORTS, ETC. NECESSARY, PER TIA-1019-A-2001, TO PROVIDE A COMPLETE AND STABLE STRUCTURE AS SHOWN ON THESE DRAWINGS.
10. THE CONTRACTOR'S PROPOSED INSTALLATION SHALL NOT INTERFERE, NOR DENY ACCESS TO, ANY EXISTING OPERATIONAL AND SAFETY EQUIPMENT.
11. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR THE PROTECTION OF THE PROPERTY IN THE VICINITY OF THE JOB SITE. THE CONTRACTOR SHALL USE THE PRECAUTIONARY MEANS NECESSARY FOR ADEQUATE PROTECTION.
12. ALL WORK SHALL BE PERFORMED IN CALM WIND CONDITIONS, WHERE SPEED DOES NOT EXCEED 10 MPH.
13. ALL MATERIALS AND WORKMANSHIP SHALL BE WARRANTED FOR ONE YEAR FROM ACCEPTANCE DATE.
14. ALL TOWER MODIFICATION WORK SHALL BE IN ACCORDANCE WITH TIA-1019-A STANDARDS FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS.

**APPLICABLE CODES AND STANDARDS:**

1. EIA/TIA-222 STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES, REV F.
2. 2006 INTERNATIONAL BUILDING CODE. WITH CONNECTICUT STATE AMENDMENTS.
3. ACI 318: AMERICAN CONCRETE INSTITUTE, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, 318-11 (LATEST EDITION).
4. CRSI: CONCRETE REINFORCEMENT STEEL INSTITUTE, MANUAL OF STANDARD PRACTICE, (LATEST EDITION).
5. AISC: AMERICAN INSTITUTE OF STEEL CONSTRUCTION, MANUAL OF STEEL CONSTRUCTION, 14TH EDITION - 2011 (LATEST EDITION).
6. AWS: AMERICAN WELDING SOCIETY D1.1, STRUCTURAL WELDING CODE - 2011, (LATEST EDITION).

**STEEL CONSTRUCTION:**

1. STRUCTURAL STEEL SHALL CONFORM TO THE AISC MANUAL OF STEEL CONSTRUCTION, 14TH EDITION, FOR THE DESIGN, FABRICATION, AND ERECTION OF STEEL COMPONENTS.
2. UNLESS NOTED OTHERWISE, ALL STRUCTURAL ELEMENTS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS.
  - ANGLE: ASTM A36
  - PIPE/TUBE: ASTM A500 (46 ksi YIELD)
  - PLATE: ASTM A36
  - A. ALL BOLTS, ASTMA325 GALVANIZED HIGH STRENGTH BOLTS.
  - B. ALL U-BOLTS, ASTM A36
  - C. ALL NUTS, A563 CARBON AND STEEL ALLOY NUTS.
  - D. ALL WASHERS, ASTM F436 HARDENED STEEL WASHERS
3. SHOP DRAWINGS SHALL BE SUBMITTED TO SES FOR APPROVAL PRIOR TO FABRICATION. SHOP DRAWINGS SHALL INCLUDE ALL FABRICATED STEEL ASSEMBLIES INCLUDING MONOPOLE/TOWER EXTENSIONS

**STEEL CONSTRUCTION (CONT.):**

4. ALL EXTERIOR STEEL WORK SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123 FOR COMPONENTS AND ASTM A153 FOR HARDWARE, AND AS FOLLOWS, UNLESS OTHERWISE NOTED.
  - A. GALVANIZING SHALL BE PERFORMED AFTER SHOP FABRICATION AND WELDING TO THE GREATEST EXTENT POSSIBLE
  - B. ALL DINGS, SCRAPES, MARS AND WELDS IN THE GALVANIZED AREA SHALL BE COATED WITH (3) BRUSH COATS OF ZRC COLD GALVANIZING COMPOUND OR APPROVED EQUAL. THE COATING SHALL BE APPLIED IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
  - C. IF THE STRUCTURE WAS ORIGINALLY PAINTED, AFTER ZINC-RICH COATING IS DRY, OVERCOAT WITH AN APPROPRIATE PAINT WITH THE SAME COLOR AS THE EXISTING.
5. NO TORCH CUTTING SHALL BE PERMITTED UNLESS APPROVED BY THE ENGINEER.
6. DO NOT PLACE HOLES THROUGH STRUCTURAL STEEL MEMBERS EXCEPT AS SHOWN AND DETAILED ON DRAWINGS.

**WELDING NOTES:**

1. ALL WELDING TO BE PERFORMED BY AWS CERTIFIED WELDERS AND CONDUCTED IN ACCORDANCE WITH THE LATEST EDITION OF THE AWS WELDING CODE D1.1.
2. CONTRACTOR SHALL RETAIN AN AWS CERTIFIED WELD INSPECTOR TO PERFORM VISUAL INSPECTIONS ON ALL FIELD WELDS. A REPORT SHALL BE SUBMITTED TO SEMAAN ENGINEERING FOR FINAL APPROVAL.
3. ALL ELECTRODES SHALL BE LOW HYDROGEN E70XX ELECTRODES, PER AWS D1.1, UNLESS NOTED OTHERWISE.
4. MINIMUM WELD SIZE TO BE 0.1875 INCH FILLET WELDS, UNLESS NOTED OTHERWISE.
5. PRIOR TO FIELD WELDING GALVANIZED MATERIAL, CONTRACTOR SHALL GRIND OFF GALVANIZING AND ANY OTHER CONTAMINANTS 2" BEYOND ALL FIELD WELD SURFACES. AFTER WELDING, REPAIR ALL GROUND AND WELDED SURFACES WITH (3) BRUSH COATS OF ZRC COLD GALVANIZING COMPOUND PER ASTM A780 AND MANUFACTURERS REQUIREMENTS.
6. ALL FULL PENETRATION WELDS ARE REQUIRED TO BE 100% NDE INSPECTED BY ULTRASONIC TESTING (UT) IN ACCORDANCE WITH AWS D1.1.
7. ALL PARTIAL PENETRATION AND FILLET WELDS ARE REQUIRED TO BE 50% NDE INSPECTED BY MAGNETIC PARTICLE (MT) IN ACCORDANCE WITH AWS D1.1.

**BOLTING NOTES:**

1. STRUCTURAL CONNECTIONS TO BE ASSEMBLED AND INSPECTED IN ACCORDANCE WITH RCSC-2009 (SPECIFICATIONS FOR STRUCTURAL JOINTS USING ASTM A325 OR ASTM A490 BOLTS.)
2. ALL CONNECTION BOLTS SHALL BE ASTM A325N (GALVANIZED), UNLESS NOTED OTHERWISE.
3. SPLICE/FLANGE BOLTS SUBJECT TO DIRECT TENSION SHALL BE INSTALLED AND TIGHTENED AS PER SECTION 8.2.1 OF THE AISC "SPECIFICATION FOR STRUCTURAL JOINTS USING A325 OR A490 BOLTS". LOCATED IN THE AISC MANUAL OF STEEL CONSTRUCTION. THE INSTALLATION PROCEDURE IS PARAPHRASED AS FOLLOWS:

FASTENERS SHALL BE INSTALLED IN PROPERLY ALIGNED HOLES AND TIGHTENED BY ONE OF THE METHODS DESCRIBED IN SUBSECTION 8.2.1 THROUGH 8.2.4.

8.2.1 TURN-OF-NUT PRETENSIONING  
 BOLTS SHALL BE INSTALLED IN ALL HOLES OF THE CONNECTION AND BROUGHT TO A SNUG TIGHT CONDITION AS DEFINED IN SECTION 8.1, UNTIL ALL THE BOLTS ARE SIMULTANEOUSLY SNUG TIGHT AND THE CONNECTION IS FULLY COMPACTED. FOLLOWING THIS INITIAL OPERATION ALL BOLTS IN THE CONNECTION SHALL BE TIGHTENED FURTHER BY THE APPLICABLE AMOUNT OF ROTATION SPECIFIED IN THE TABLE PROVIDED. DURING THE TIGHTENING OPERATION THERE SHALL BE NO ROTATION OF THE PART NOT TURNED BY THE WRENCH. TIGHTENING SHALL PROGRESS SYSTEMATICALLY.

TURN-OF-NUT ROTATION FROM SNUG TIGHT CONDITION

| BOLT LENGTH (UNDER SIDE OF HEAD TO END OF BOLT) | BOTH FACES NORMAL TO BOLT AXIS |   |   |
|---|--------------------------------|---|---|
|   | NUT ROTATION                   | INITIAL MARKING POSITION  | FINAL MARKING POSITION  |
| UP TO AND INCLUDING 4 DIAMETERS                 | 1/3 TURN                       |  |  |
| OVER 4 DIAMETERS BUT NOT EXCEEDING 8 DIA.       | 1/2 TURN                       |  |  |
| OVER 8 DIAMETERS BUT NOT EXCEEDING 12 DIA.      | 2/3 TURN                       |  |  |

USE A WATERPROOF BLACK MARKER TO MARK THE BOLT AND NUT AS SHOWN ON THE TABLE.

**BOLTING NOTES (CONT.):**

4. ALL OTHER BOLTED CONNECTIONS SHALL BE BROUGHT TO A SNUG TIGHT CONDITION AS DEFINED IN SECTION 8.1 OF THE SPECIFICATION.
5. ALL BOLT HOLES SHALL BE ALIGNED TO PERMIT INSERTION OF THE BOLTS WITHOUT UNDUE DAMAGE TO THE THREADS. BOLTS SHALL BE PLACED IN ALL HOLES WITH WASHERS POSITIONED AS REQUIRED AND NUTS THREADED TO COMPLETE THE ASSEMBLY. COMPACTING THE JOINT TO THE SNUG-TIGHT CONDITION SHALL PROGRESS SYSTEMATICALLY FROM THE MOST RIGID PART OF THE JOINT. THE SNUG-TIGHTENED CONDITION IS THE TIGHTNESS THAT IS ATTAINED WITH A FEW IMPACTS OF AN IMPACT WRENCH OR THE FULL EFFORT OF AN IRONWORKER USING AN ORDINARY SPUD WRENCH TO BRING THE CONNECTED PLIES INTO FIRM CONTACT.
6. A NUT LOCKING DEVICE SHALL BE INSTALLED ON ALL PROPOSED AND/OR REPLACED BOLTS.
7. ALL NEW BOLTS SHALL BE LONG ENOUGH TO FULLY ENGAGE THE FULL DEPTH OF THE NUT AND LOCKING DEVICE.
8. GALVANIZED ASTM A325 BOLTS SHALL NOT BE REUSED.

**CONCRETE CONSTRUCTION:**

1. ALL CONCRETE SHALL CONFORM TO THE SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS, ACI 301
2. ALL CONCRETE SHALL BE MADE WITH STONE AGGREGATE & SHALL DEVELOP 4000 PSI MIN. COMPRESSIVE STRENGTH IN 28 DAYS. CONCRETE MIX DESIGN: 6 1/2 SACKS OF CEMENT MINIMUM PER CUBIC YARD, 3/4" MAXIMUM AGGREGATE. AIR ENTRAINMENT = 6% ± 1% AND SLUMP = 4" ± 1" (WITHOUT PLASTICIZER)
3. ALL REINFORCING SHALL BE HIGH STRENGTH DEFORMED BARS, GRADE 60, ASTM A615, WITH 60,000 PSI MINIMUM YIELD POINT.
4. REINFORCING PROTECTION: CONCRETE POURED AGAINST EARTH.....3"
5. ALL BAR LENGTHS ARE NOT DRAWN TO SCALE. NO SPLICES OF REINFORCEMENT SHALL BE MADE EXCEPT AS DETAILED OR AS AUTHORIZED BY THE STRUCTURAL ENGINEER. LAP SPLICES, WHERE PERMITTED, SHALL BE A MINIMUM OF 40 BAR DIAMETERS UNLESS NOTED.
6. DETAIL BARS IN ACCORDANCE WITH ACI DETAILING MANUAL & ACI BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.
7. PROVIDE ALL ACCESSORIES NECESSARY TO SUPPORT REINFORCING AT THE POSITIONS SHOWN ON THE PLANS.
8. BACKFILL AND COMPACT SOIL TO A MINIMUM 95% OF STANDARD PROCTOR DENSITY PER ASTM D 698. THE COMPACTED SOIL SHALL PROVIDE A MINIMUM UNIT WEIGHT OF 120 POUNDS PER CUBIC FOOT FOR THE FILL MATERIAL.
9. AS APPLICABLE, ORIENT NEW ANCHORS IN LINE WITH EXISTING ANCHORS.
10. AS APPLICABLE, ANCHOR RODS TO PASS THROUGH CENTROID OF BLOCK.

**EPOXY-GROUTED FASTENER INSTALLATION:**

1. CONTRACTOR SHALL VERIFY THAT DRILLING CLEARANCE IS ADEQUATE PRIOR TO CONSTRUCTION. NOTIFY THE ENGINEER IF A CLEARANCE PROBLEM EXISTS.
2. ALL HOLES SHALL BE WIRE-BRUSHED TO PROFILE THE CONCRETE SURFACE, ALL CORED HOLES WITH SMOOTH WALLS SHALL BE ROUGHENED.
3. USE COMPRESSED AIR TO BLOW ANY REMAINING DEBRIS OUT OF THE NEWLY DRILLED HOLES.
4. EPOXY GROUT THE NEW ANCHOR BOLTS OR REBAR IN PLACE PER THE MANUFACTURER'S INSTRUCTIONS.

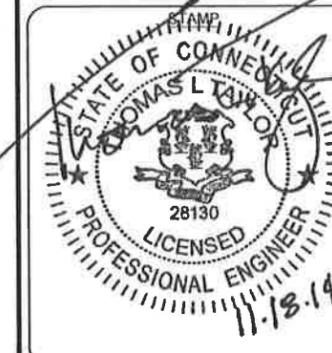
**CONTINUOUS INSPECTION AND MAINTENANCE:**

CONTINUOUS INSPECTION OF THE STRUCTURE AND THE ADDED REINFORCING CONSISTENT WITH THE CURRENT REQUIREMENTS OF THE LATEST TIA 222 STANDARD SHALL BE IMPLEMENTED BY THE OWNER. ANY FUTURE CORROSION OR OTHER DETERIORATION OF THE STRUCTURE OR ITS REINFORCING WILL REDUCE ITS CAPACITY TO WITHSTAND THE REQUIRED LOADS. ANY DEFECTS SHALL BE REPAIRED TO ENSURE THE STRUCTURAL INTEGRITY FOR THE LIFE OF THE STRUCTURE.



SITE NAME/NUMBER  
**CT03XC074**

SITE ADDRESS  
 345 NORTH MAIN STREET  
 WEST HARTFORD, CT 06117  
 N41°47'6.3", W72°44'54.5



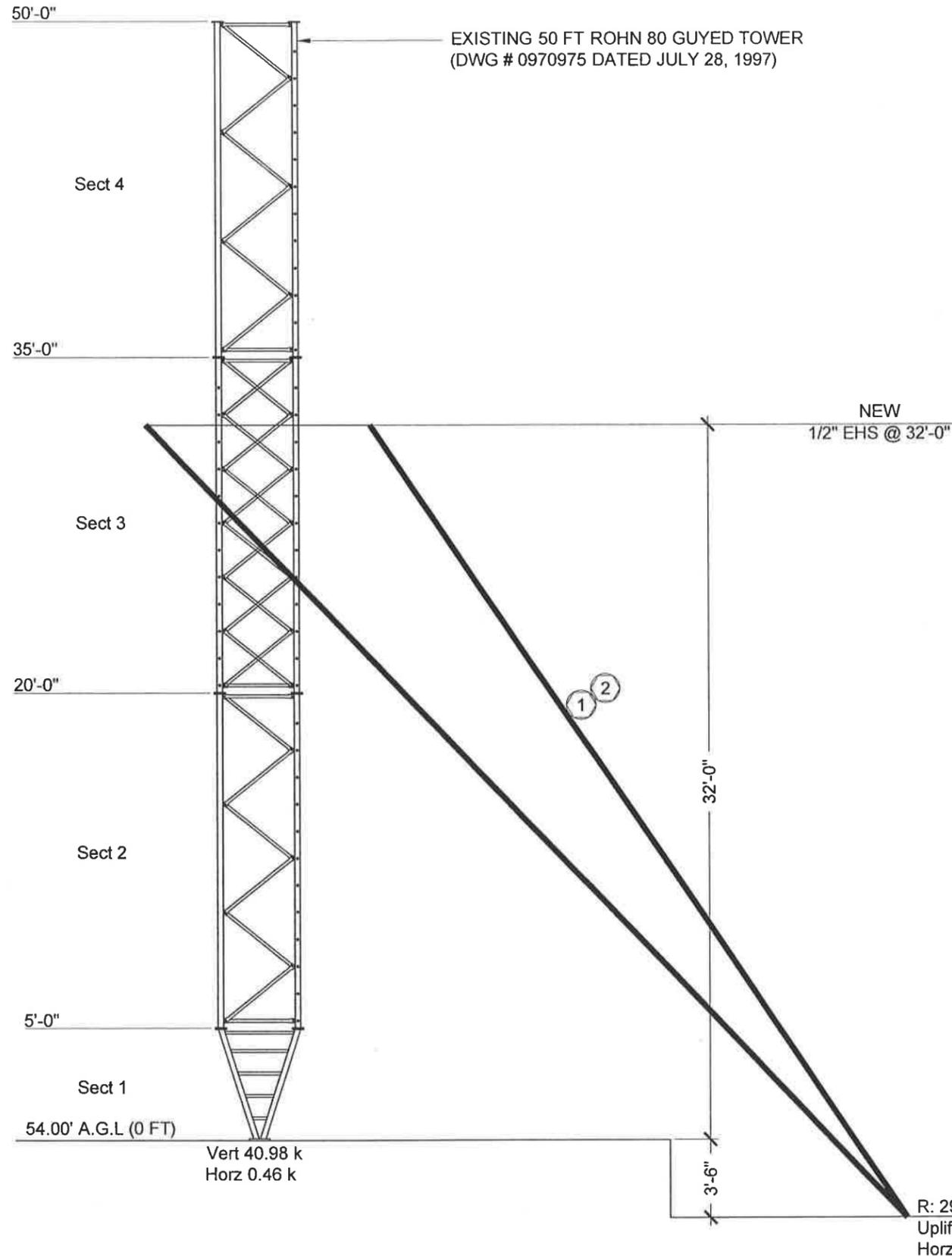
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| 0   | FIRST ISSUE | 10/20/2014 |

DRAWING DESCRIPTION  
**GENERAL NOTES**

SHEET NUMBER: **N-1**  
 REVISION: **0**





### SECTION PROPERTIES

| SECTION | LEG MEMBERS                | DIAGONAL MEMBERS       | HORIZONTAL MEMBERS     |
|---------|----------------------------|------------------------|------------------------|
| 1       | PXX 50 ksi 2 1/2" DIA PIPE |                        | SAE 36 ksi 4x4x0.25    |
| 2 - 3   | PX 50 ksi 2 1/2" DIA PIPE  | PSP 42 ksi 1 1/2"x16GA | PSP 42 ksi 1 1/2"x16GA |
| 4       | PX 50 ksi 2 1/2" DIA PIPE  | PSP 42 ksi 1 1/2"x11GA | PSP 42 ksi 1 1/2"x11GA |

### MODIFICATION SCHEDULE

| NO. | MODIFICATION DESCRIPTION  | ELEVATIONS (FT) | SHEETS |
|-----|---|-----------------|--------|
| ①   | REPLACE (3) 3/8" EHS GUY CABLES W/ (3) NEW 1/2" EHS GUY CABLES AND COMPATIBLE HARDWARE. | 32              | S-3    |
| ②   | RETENSION ALL GUY CABLES  | -               | S-2    |

#### CONTRACTOR NOTES:

1. PROVIDE TEMPORARY GUY CABLES DIRECTLY ABOVE OR BELOW AND CABLES THAT ARE BEING TEMPORARILY REMOVED. AT NO TIME SHOULD ANY OF THE GUY POINTS ON THE OTWER BE LEFT UNSUPPORTED.
2. THE CONNECTIONS TO THE BUILDING AND THE BUILDING STRUCTURE MUST BE CHECKED BY OTHERS. THIS MODIFICATION PACKAGE IS FOR THE EXISTING GUYED TOWER ONLY.

CLIENT



SITE NAME/NUMBER

CT03XC074

SITE ADDRESS

345 NORTH MAIN STREET  
WEST HARTFORD, CT 06117  
N41°47'6.3", W72°44'54.5

DRAWINGS PREPARED BY:



1079 NORTH 205TH STREET  
OMAHA, NEBRASKA 68022  
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DRAWN BY: KRC  
APPROVED BY: LMP

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| 0   | FIRST ISSUE | 10/20/2014 |

DRAWING DESCRIPTION

GUYED TOWER  
ELEVATION VIEW

SHEET NUMBER REVISION

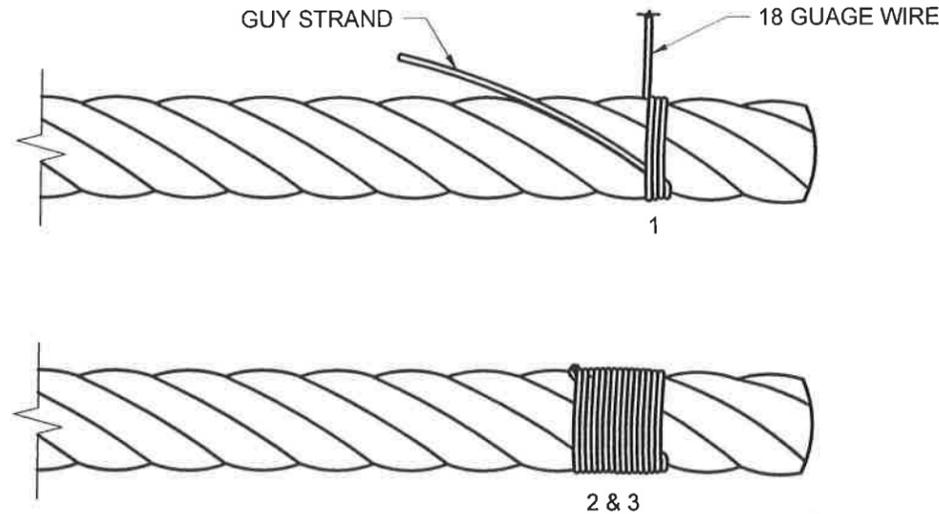
S-1 0

TOWER ELEVATION  
NOT TO SCALE

**INITIAL TENSION NOTES:**

THE MAXIMUM DEVIATION FROM THE DESIGN INITIAL TENSION ARE:

- ±10% FOR GUYS < 1" DIAMETER
- ±5% FOR GUYS > 1" DIAMETER, OF THE INITIAL TENSIONS SPECIFIED ON THIS TEMPERATURE/TENSION CHART.



- LAY ONE END OF THE SEIZING WIRE IN THE GROOVE BETWEEN TWO STRANDS IN THE WIRE ROPE AND WRAP THE OTHER END TIGHTLY OVER THE PORTION IN THE GROOVE.
- CONTINUE TWISTING WITH PLIERS TO TAKE UP SLACK AND TIGHTEN. WIND SEIZING WIRE AROUND ROPE FOR A LENGTH EQUAL TO THE ROPE DIAMETER.
- TWIST WIRE TIGHTLY AGAINST SERVING, WINDING TWISTED WIRE INTO KNOT BEFORE CUTTING OFF ENDS OF THE WIRE. POUND KNOT SNUGLY AGAINST THE ROPE.

**GUY TENSION TABLE**

| Cable Dia. (in) | Anchor Radius (ft) | Guy Elevation (ft) | T (lbs) @ 20 degrees F | T (LBS) @ 40 Degrees F | T (LBS) @ 60 Degrees F | T (LBS) @ 80 Degrees F | T (LBS) @ 100 Degrees F |
|-----------------|--------------------|--------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|
| 1/2             | 29                 | 32+3.5             | 3074                   | 2872                   | 2670                   | 2458                   | 2266                    |

**FIELD VERIFY THE EXISTING HOLE DIAMETERS IN THE GUY LUGS, TORQUE ARM, AND ANCHOR HEAD WILL WORK WITH THE LARGER CONNECTION HARDWARE. CONTACT SEMAAN ENGINEERING AT (402)289-1888 IF ANY PROBLEMS EXIST.**

**GUY CABLE NOTES:**

- ALL EHS AND BRIDGE STRAND HAS A LEFT HAND LAY.
- THE WORKING LOADS ARE BASED ON A SAFETY FACTOR OF 2.0. FOR TOWER TALLER THAN 700', A HIGHER SAFETY FACTOR IS REQUIRED BY EIA.
- USE (1) 3/8" WIRE ROPE CLIP PER ANCHOR WITH 3/8" EHS GUY STRAND X 15' FOR TURNBUCKLE TIE.
- ALL CUT LENGTHS ARE CALCULATED BASED ON TOWER DRAWINGS AND MAPPING, AND ARE THEORETICAL PLUS 5% OR 25 FEET WHICHEVER IS GREATER. CONTRACTOR NEED TO BE AWARE THAT ACTUAL LENGTHS IN FIELD MAY VARY FROM THE CALCULATED LENGTH.
- IF HARDWARE IS NOT PROVIDED (INDICATED AS N/A ON HARDWARE CHART), REUSE EXISTING HARDWARE AND/OR GUY WIRES AS NECESSARY.
- VERIFY SIZES OF GUY WIRES BEFORE RE-TENSIONING. IF ANY DISCREPANCIES ARE NOTED IN THE FIELD, PLEASE CONTACT SEMAAN ENGINEERING (402-289-1888) IMMEDIATELY FOR FURTHER INSTRUCTIONS.

GUY WIRE TENSION TABLE  
NOT TO SCALE

CLIENT



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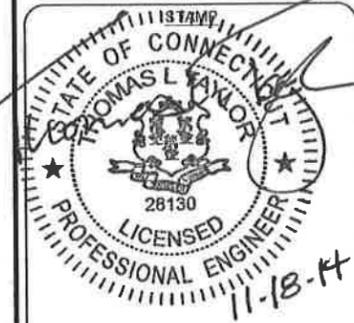
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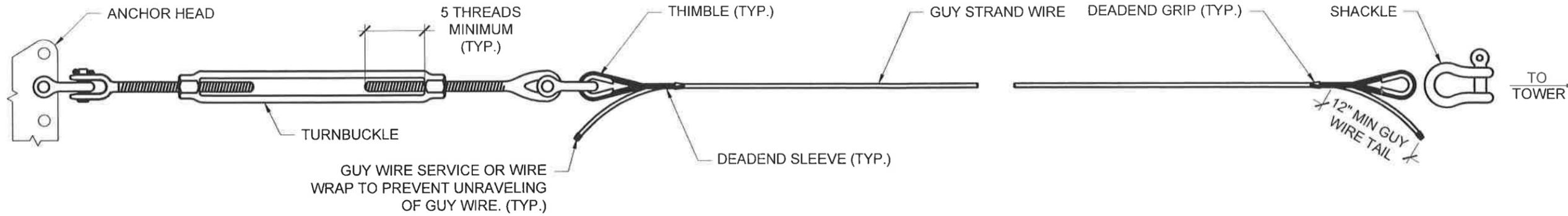
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GUY WIRE TENSION TABLE

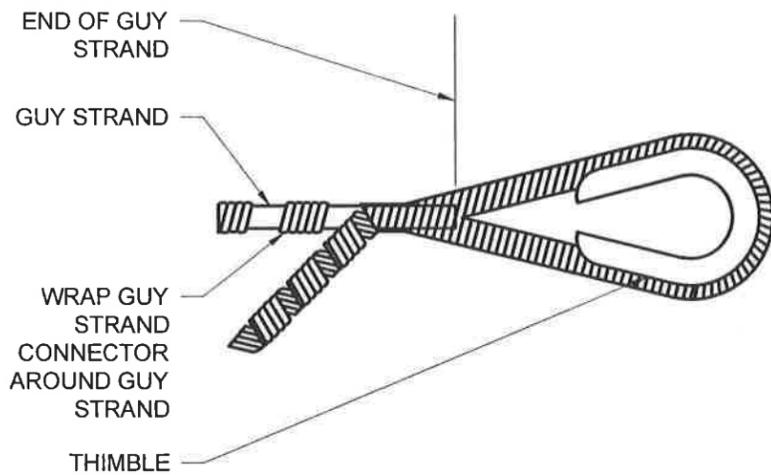
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S-2

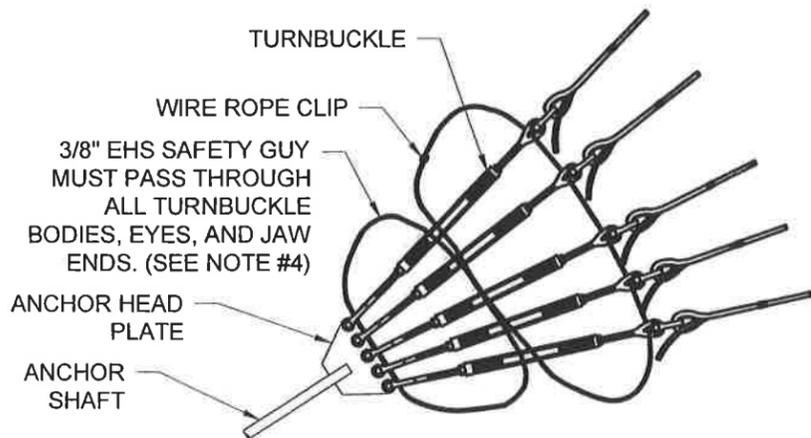
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**TYPICAL GUY ASSEMBLY**  
NOT TO SCALE



**TYPICAL DEADEND GRIP DETAIL**  
NOT TO SCALE



**TYPICAL TIE WIRE ASSEMBLY**  
NOT TO SCALE

**STANDARD GUY STRAND HARDWARE CHART**

| GUY STRAND |        |      | CROSBY TURNBUCKLE<br>HG-228 (JAW & JAW)<br>OR HG-227 (JAW & EYE) |        |      |          | DEADEND<br>GRIP | DEADEND<br>SLEEVE | CROSBY<br>THIMBLE<br>(G-414) | CROSBY SCREW PIN ANCHOR SHACKLE<br>(G-209-A) |        |      |          |
|------------|--------|------|--|--------|------|----------|-----------------|-------------------|------------------------------|--|--------|------|----------|
| SIZE       | U.T.S. | W.L. | SIZE   | U.T.S. | W.L. | PIN DIA. | SIZE            | SIZE              | SIZE                         | SIZE   | U.T.S. | W.L. | PIN DIA. |
| 5/16 EHS   | 11.2   | 5.6  | 5/8 x 12   | 17.5   | 8.8  | 1/2"     | 5/16"           | 5/16"             | 3/8 HVY                      | 1/2"   | 33.3   | 16.6 | 5/8"     |
| 3/8 EHS    | 15.4   | 7.7  | 5/8 x 12   | 17.5   | 8.8  | 1/2"     | 3/8"            | 3/8"              | 1/2 HVY                      | 1/2"   | 33.3   | 16.6 | 5/8"     |
| 7/16 EHS   | 20.8   | 10.4 | 3/4 x 12   | 26.0   | 13.0 | 5/8"     | 7/16"           | 7/16"             | 1/2 HVY                      | 1/2"   | 33.3   | 16.6 | 5/8"     |
| 1/2 EHS    | 26.9   | 13.5 | 3/4 x 12   | 26.0   | 13.0 | 5/8"     | 1/2"            | 1/2"              | 1/2 HVY                      | 1/2"   | 33.3   | 16.6 | 5/8"     |
| 9/16 EHS   | 35.0   | 17.5 | 7/8 x 12   | 36.0   | 18.0 | 3/4"     | 9/16"           | 9/16"             | 3/4 HVY                      | 5/8"   | 50.0   | 25.0 | 3/4"     |
| 5/8 EHS    | 42.4   | 21.2 | 1 x 12   | 50.0   | 25.0 | 7/8"     | 5/8"            | 5/8"              | 3/4 HVY                      | 5/8"   | 50.0   | 25.0 | 3/4"     |
| 11/16 EHS  | 50.0   | 25.0 | 1 x 12   | 50.0   | 25.0 | 7/8"     | 11/16"          | 11/16"            | 3/4 HVY                      | 5/8"   | 50.0   | 25.0 | 3/4"     |
| 3/4 EHS    | 58.3   | 29.2 | 1 1/4 x 18   | 76.0   | 38.0 | 1 1/8"   | 3/4"            | 3/4"              | 1 HVY                        | 3/4"   | 70.0   | 35.0 | 7/8"     |
| 7/8 EHS    | 78.7   | 39.9 | 1 1/2 x 18   | 107.0  | 53.5 | 1 3/8"   | 7/8"            | 7/8"              | 1 1/8 HVY                    | 7/8"   | 95.0   | 47.5 | 1"       |
| 1 EHS      | 104.5  | 52.3 | 1 1/2 x 18   | 107.0  | 53.5 | 1 3/8"   | 1"              | 1"                | 1 1/8 HVY                    | 1"   | 125.0  | 62.5 | 1 1/8"   |
| 5/8 BS     | 48.0   | 24.0 | 1 x 12   | 50.0   | 25.0 | 7/8"     | 5/8"            | 5/8"              | 3/4 HVY                      | 5/8"   | 50.0   | 25.0 | 3/4"     |
| 11/16 BS   | 58.0   | 29.0 | 1 1/4 x 18   | 76.0   | 38.0 | 1 1/8"   | 11/16"          | 11/16"            | 7/8 HVY                      | 3/4"   | 70.0   | 35.0 | 7/8"     |
| 3/4 BS     | 68.0   | 34.0 | 1 1/4 x 18   | 76.0   | 38.0 | 1 1/8"   | 3/4"            | 3/4"              | 1 HVY                        | 3/4"   | 70.0   | 35.0 | 7/8"     |
| 13/16 BS   | 80.0   | 40.0 | 1 1/2 x 18   | 107.0  | 53.5 | 1 3/8"   | 13/16"          | 13/16"            | 1 HVY                        | 7/8"   | 95.0   | 47.5 | 1"       |
| 7/8 BS     | 92.0   | 46.0 | 1 1/2 x 18   | 107.0  | 53.5 | 1 3/8"   | 7/8"            | 7/8"              | 1 1/8 HVY                    | 7/8"   | 95.0   | 47.5 | 1"       |
| 15/16 BS   | 108.0  | 54.0 | 1 3/4 x 24   | 140.0  | 70.0 | 1 5/8"   | 15/16"          | 15/16"            | 1 1/8 HVY                    | 1"   | 125.0  | 62.5 | 1 1/8"   |

- NOTE:
1. THE WORKING LOADS ARE BASED ON A SAFETY FACTOR OF 2.0. FOR TOWERS TALLER THAN 700', A HIGHER SAFETY FACTOR IS REQUIRED BY EIA.
  2. ALL EHS AND BRIDGE STRAND HAS A LEFT HAND WIRE LAY.
  3. USE (1) 3/8" WIRE ROPE CLIP PER ANCHOR WITH 3/8" EHS GUY STRAND x 15' FOR TURNBUCKLE TIE.

THE FOLLOWING CHART IS FOR OTHER TYPES OF SHACKLES AND IS FOR INFORMATION ONLY.

| GUY STRAND |        |      | CROSBY FORGED SHACKLE<br>(G-209) |        |      |          | CROSBY BOLT TYPE SHACKLE<br>(G-2130) |        |      |          |
|------------|--------|------|----------------------------------|--------|------|----------|--------------------------------------|--------|------|----------|
| SIZE       | U.T.S. | W.L. | SIZE                             | U.T.S. | W.L. | PIN DIA. | SIZE                                 | U.T.S. | W.L. | PIN DIA. |
| 5/16 EHS   | 11.2   | 5.6  | 1/2"                             | 24     | 12.0 | 5/8"     | 1/2"                                 | 24     | 12.0 | 5/8"     |
| 3/8 EHS    | 15.4   | 7.7  | 1/2"                             | 24     | 12.0 | 5/8"     | 1/2"                                 | 24     | 12.0 | 5/8"     |
| 7/16 EHS   | 20.8   | 10.4 | 1/2"                             | 24     | 12.0 | 5/8"     | 1/2"                                 | 24     | 12.0 | 5/8"     |
| 1/2 EHS    | 26.9   | 13.5 | 5/8"                             | 39     | 19.5 | 3/4"     | 5/8"                                 | 39     | 19.5 | 3/4"     |
| 9/16 EHS   | 35.0   | 17.5 | 5/8"                             | 39     | 19.5 | 3/4"     | 5/8"                                 | 39     | 19.5 | 3/4"     |
| 5/8 EHS    | 42.4   | 21.2 | 3/4"                             | 57     | 28.5 | 7/8"     | 3/4"                                 | 57     | 28.5 | 7/8"     |
| 3/4 EHS    | 58.3   | 29.2 | 7/8"                             | 78     | 39.0 | 1"       | 7/8"                                 | 78     | 39.0 | 1"       |
| 7/8 EHS    | 79.7   | 39.9 | 1"                               | 102    | 51.0 | 1 1/8"   | 1"                                   | 102    | 51.0 | 1 1/8"   |
| 1 EHS      | 104.5  | 52.3 | 1 1/8"                           | 114    | 57.0 | 1 1/4"   | 1 1/8"                               | 114    | 57.0 | 1 1/4"   |

- NOTES:
1. THE GUY STRAND CONNECTOR MUST FOLLOW THE LAY OF THE GUY STRAND.
  2. THE STRAND AND THE CONNECTOR SHOWN HAVE A LEFT HAND LAY. STRAND WHICH HAS A RIGHT HAND LAY REQUIRES A CONNECTOR WITH A RIGHT HAND LAY.
  3. IF REMOVAL IF EXISTING PERFORMS IS REQUIRED - THEY CANNOT BE RE-USED.
  4. IF THE EXISTING SAFETY CABLES DO NOT HAVE THE LENGTH SUFFICIENT TO MAKE THE CONFIGURATION AS SHOWN, PLEASE REPLACE WITH NEW CABLES AND GUY CLIPS.

**STANDARD GUY STRAND HARWARE CHART**  
NOT TO SCALE

CLIENT

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DRAWINGS PREPARED BY:

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| 0   | FIRST ISSUE | 10/20/2014 |

DRAWING DESCRIPTION  
**STRAND TERMINATION  
AND STANDARD  
SAFETY INSTALLATION  
DETAILS**

SHEET NUMBER: **S-3**      REVISION: **0**