

JULIE D. KOHLER

PLEASE REPLY TO: Bridgeport
WRITER'S DIRECT DIAL: (203) 337-4157
E-Mail Address: jkohler@cohenandwolf.com

September 4, 2014

Attorney Melanie Bachman
Acting Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

**Re: Notice of Exempt Modification
Bay Communications II, LLC/ T-Mobile
Site ID CTNL803A
232 Shore Road, Old Lyme, Connecticut**

Dear Attorney Bachman:

This office represents T-Mobile Northeast LLC ("T-Mobile") and has been retained to file exempt modification filings with the Connecticut Siting Council on its behalf.

In this case, Bay Communications II, LLC owns the existing monopole telecommunications tower and related facility located at 232 Shore Road, Old Lyme, Connecticut (Latitude: 41.291 Longitude: -72.285861). T-Mobile intends to add nine antennas and related equipment at this existing telecommunications facility in Old Lyme ("Old Lyme Facility"). Please accept this letter as notification, pursuant to R.C.S.A. § 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the First Selectwoman, Bonnie Reemsnyder and the property owner, ATSSLSS.

The existing Old Lyme Facility consists of a 109 foot tall monopole tower, approved by the Council in Docket No. 391.¹ T-Mobile plans to add nine antennas, three TMAs (tower mounted amplifiers) and three remote radio units ("RRU") mounted at a centerline of 99 feet. (See the plans revised to August 14, 2014 attached hereto as Exhibit A). T-Mobile will also install an icebridge, mount an equipment cabinet to the icebridge post, install a PPC and equipment cabinet on the existing concrete pad, install fiber cable and reuse existing coax cable. The existing Old Lyme Facility is structurally capable of supporting T-Mobile's proposed modifications, as indicated in the structural analysis dated August 27, 2014 and attached hereto as Exhibit B.

The planned modifications to the Old Lyme Facility fall squarely within those activities

¹ The height of the antennas is consistent with the Decision and Order in this Docket (dated September 23, 2010).

September 4, 2014
Site ID CTNL803A
Page 2

explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modification will not increase the height of the tower. T-Mobile's new antennas and tower mounted equipment will be installed at a centerline of 99 feet. The enclosed tower drawing confirms that the proposed modification will not increase the height of the tower.

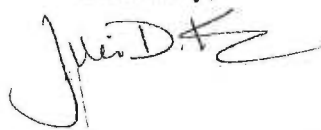
2. The proposed modifications will not require an extension of the site boundaries. T-Mobile's equipment will be located entirely within the existing compound and leased area as shown on Page 2 of Exhibit A.

3. The proposed modification to the Old Lyme Facility will not increase the noise levels at the existing facility by six decibels or more.

4. The operation of the replacement antennas will not increase the total radio frequency (RF) power density, measured at the base of the tower, to a level at or above the applicable standard. According to a Radio Frequency Emissions Analysis Report prepared by EBI dated September 2, 2014 T-Mobile's operations would add 13.95% of the FCC Standard. Therefore, the calculated "worst case" power density for the planned combined operation at the site including all of the proposed antennas would be 79.47% of the FCC Standard as calculated for a mixed frequency site as evidenced by the engineering exhibit attached hereto as Exhibit C.

For the foregoing reasons, T-Mobile respectfully submits that the proposed antennas and equipment at the Old Lyme Facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Upon acknowledgement by the Council of this proposed exempt modification, T-Mobile shall commence construction approximately sixty days from the date of the Council's notice of acknowledgement.

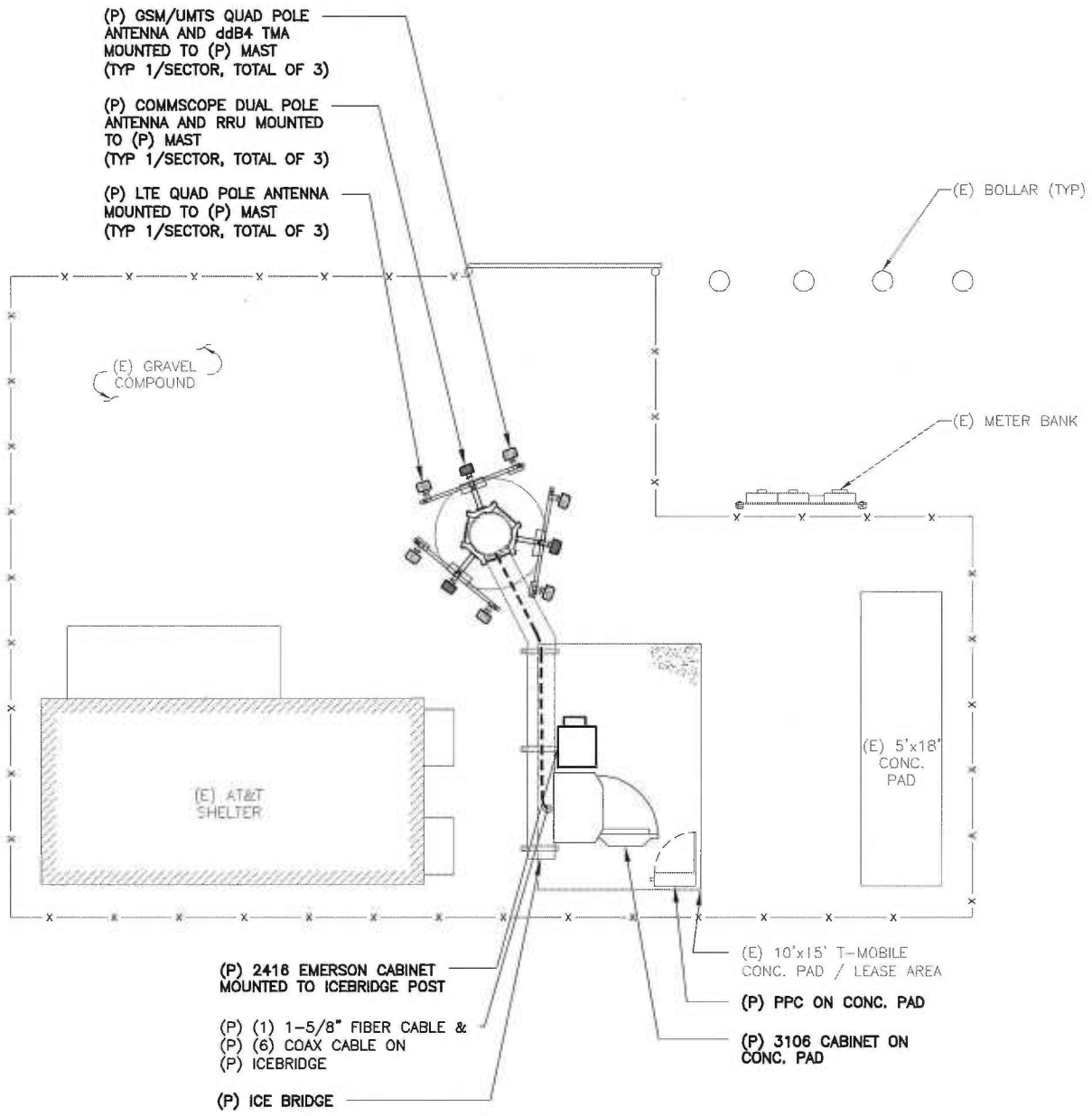
Sincerely,



Julie D. Kohler, Esq.

cc: Town of Old Lyme, First Selectwoman Bonnie Reemsnyder
Bay Communications II, LLC
ATSSLSS
Sheldon Freinckle, NSS

EXHIBIT A



ALL EQUIPMENT LOCATIONS ARE APPROXIMATE AND ARE SUBJECT TO APPROVAL BY LESSEE/LICENSEE'S STRUCTURAL & RF ENGINEERS. LOCATIONS OF POWER & TELEPHONE FACILITIES ARE SUBJECT TO APPROVAL BY UTILITY COMPANIES.

ROOF PLAN 1
SCALE: N.T.S. LE-2

PROJECT : L700

CONFIGURATION

702CU

| SUBMITTALS | |
|------------|----------|
| LE REV A | 08.13.14 |
| LE REV 0 | 08.14.14 |
| | |
| | |
| | |
| | |
| | |

ATLANTIS GROUP
 1340 Centre Street
 Suite 212
 Newton, MA 02459
 Office: 617-965-0789
 Fax: 617-213-5056

LEASE EXHIBIT
 SITE NUMBER:
 CTNL803A
 SITE NAME:
 AMTRAK_OLD LYME4
 SITE ADDRESS:
 232 SHORE ROAD
 OLD LYME, CT 06782

NORTHEAST SITE SOLUTIONS
 54 MAIN STREET, UNIT 3
 STURBRIDGE, MA 01566
 (508) 434-5237
 FOR
T-MOBILE NORTHEAST, LLC
 35 GRIFFIN ROAD SOUTH
 BLOOMFIELD, CT 06002
 OFFICE: (860) 692-7100
 FAX: (860) 692-7159

(P) LTE QUAD POLE ANTENNA
MOUNTED TO (P) MAST
(TYP 1/SECTOR, TOTAL OF 3)

(P) COMMSCOPE DUAL POLE
ANTENNA AND RRU MOUNTED
TO (P) MAST
(TYP 1/SECTOR, TOTAL OF 3)

(P) GSM/UMTS QUAD POLE
ANTENNA AND ddB4 TMA
MOUNTED TO (P) MAST
(TYP 1/SECTOR, TOTAL OF 3)

TOP OF (E) MONOPOLE TOWER
ELEVATION= 110'± AGL

RAD CENTER OF (P) ANTENNAS
ELEV.= 99'± (AGL)

RAD CENTER OF (E) ANTENNAS
ELEV.= 89'± (AGL)

(P) (1) 1-5/8" FIBER CABLE &
(P) (6) COAX CABLE INSIDE
(E) MONOPOLE

(P) 3106 CABINET ON
CONC. PAD

(P) PPC ON CONC. PAD

GROUND LEVEL
ELEV.= 0'-0" (AGL)

ELEVATION 1
N.T.S. LE-3

PROJECT : L700

CONFIGURATION

702CU

| SUBMITTALS | |
|------------|----------|
| LE REV A | 08.13.14 |
| LE REV 0 | 08.14.14 |
| | |
| | |
| | |
| | |
| | |
| | |

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Office: 617-965-0789
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LEASE EXHIBIT
SITE NUMBER:
CTNL803A
SITE NAME:
AMTRAK_OLD LYME4
SITE ADDRESS:
232 SHORE ROAD
OLD LYME, CT 06782

NORTHEAST SITE SOLUTIONS
54 MAIN STREET, UNIT 3
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BLOOMFIELD, CT 06002
OFFICE: (860) 692-7100
FAX: (860) 692-7159

EXHIBIT B

**STRUCTURAL ANALYSIS REPORT
MONOPOLE**



Prepared For:

T-Mobile
35 Griffin Road South
Bloomfield, CT 06002



Monopole Rating

Monopole: Pass (76.2 %)
Foundation: Pass

Sincerely,
Atlantis Group, Inc.
8-27-2014



Ahmet Colakoglu, PE
CT Professional Engineer
License No: 27057

T-Mobile Site ID: CTNL803A
T-Mobile Site Name: AMTRAK_OLD LYME4
232 Shore Road,
Old Lyme, CT 06782

August 27, 2014

Prepared By:
Atlantis Group, Inc.
1340 Centre Street, Suite 212
Newton, Massachusetts 02459
Phone: 617-965-0789, Fax: 617-213-5056

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5.0 - ANALYSIS

6.0 - RESULTS AND CONCLUSION

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1.0 SUBJECT AND REFERENCES

The purpose of this analysis is to evaluate the structural capacity of the existing 109 feet high monopole located at 232 Shore Road, Old Lyme, CT 06782, for the addition and alteration of wireless telecommunication appurtenances proposed by T-Mobile.

The structural analysis is based on the following documentation:

- Lease Exhibit for Site Number CTNL803A prepared by the Atlantis Group, dated August 14, 2014.
- Structural Analysis Report prepared by Centek Engineering, Inc., Centek Project No. 13195.000, dated November 8, 2013.
- Antenna information provided by T-Mobile.

1.1 STRUCTURE

The monopole is formed by the following sections:

| Section Length (ft) | Lap Splice (in) | Shaft Thickness (in) | Top Dia/Bottom Dia (in/in) | Steel Yield Strength(ksi) |
|------------------------|--------------------|-------------------------|-------------------------------|------------------------------|
| 28 | - | 0.188 | 22.2500/30.0900 | 65 |
| 33 | 60 | 0.313 | 30.0900/39.5800 | 65 |
| 53 | - | 0.375 | 37.5161/52.4000 | 65 |

- The pole is 18-sided and connected to the foundation with anchor bolts and a base plate.

2.0 EXISTING AND PROPOSED APPURTENANCES

The analysis is based on the following existing and proposed appurtenances:

Proposed Configuration of T-MOBILE Appurtenances:

| Rad Center (ft) | Antenna & TMA | | Mount | Coax |
|--------------------|--|---|----------------------|--|
| 99 | GSM/UMTS LTE QUAD POLE LTE QUAD POLE LTE DUAL POLE TMA RRU | (3) AIR21 B2A/B4P (3) AIR21 B4A/B2P (3) LNX-6515DS-VTM (3) dd B4 (3) RRUS11_B12 | (3) Sector Mounts | (6) 1 5/8" (1) Fiber Line INSIDE SHAFT |

Existing Appurtenances by Others

| CARRIER | RAD CENTER (FT) | ANTENNA & TMA | COAX | MOUNT |
|---------|-----------------|--|--|----------------------|
| AT&T | 109 | (6) SBNHH-1D65C (12) RRUS-11 (4) DC6-48-18-8F | (2) Fiber Lines (8) DC Cables (3) RET Cables INSIDE SHAFT | (3) Sector Mounts |
| Verizon | 89 | (6) BXA-70063-6CF (6) BXA-171063-12CF (3) RRH2x40-AWS (3) RRH2x40-07-U (1) DB-T1-6Z-8AB-0Z box | (2) Hybrid Lines INSIDE SHAFT | Low Profile Platform |

3.0 CODES AND LOADING

The monopole was analyzed per ANSI/TIA/EIA-222-F-1996 as referenced by 2005 Connecticut Building Code (based on IBC 2003). The following wind loading was used in compliance with the standard for New London County, municipality of Old Lyme.

- Basic wind speed 100 mph (W) without ice, (equivalent to 120mph 3 second gust per Appendix K of 2005 CT Building Code Supplement)
- Basic wind speed 86.6 mph (W_i) with 1/2" radial ice.

The following load combinations were used with wind blowing at 0°, 60° and 90°, measured from a line normal to the face of the monopole.

- D + W
- D + W_i + I

D: Dead Load W: Wind Load, without ice
 W_i : Wind Load with ice I: Ice Gravity Load

4.0 STANDARD CONDITIONS FOR ENGINEERING SERVICES ON EXISTING STRUCTURES

The analysis is based on the information provided to Atlantis Group and is assumed to be current and correct. Unless otherwise noted, the structure is assumed to be in good condition, free of defects and can achieve theoretical strength.

It is assumed that the structure has been maintained and shall be maintained during its service. The superstructure and the foundation system are assumed to be designed with proper engineering practice and fabricated, constructed and erected in accordance with the design documents. Atlantis Group will accept no liability which may arise due to any existing deficiency in design, material, fabrication, erection, construction, etc. or lack of maintenance.

The analysis does not include a qualification of the mounts attached on the structure or their connections. The analysis is performed to verify the capacity of the main structural members, which is the current practice in the tower industry.

The analysis results presented in this report are only applicable for the previously mentioned existing and proposed appurtenances. Any deviation of the appurtenances and appurtenance placement will require Atlantis Group to generate an additional structural analysis. Additionally, the proposed linear appurtenances should be placed per recommendations of this report.

5.0 ANALYSIS and ASSUMPTIONS

It has been assumed that the bolt modifications recommended by Centek Engineering, Inc., on their Structural Analysis Report dated 11/08/2013 have taken place.

The tower was analyzed by utilizing Risa-Tower, a non-linear 3-Dimensional finite element software, a product of Tower Numerics, Inc. Software output for this analysis is provided in Appendix-A of this report.

6.0 RESULTS AND CONCLUSION

The existing monopole is found to have **adequate** structural capacity for the proposed changes by T-Mobile. For the aforementioned load combinations, the first shaft from the ground level is stressed to **80.1%** of capacity as a maximum. Anchor bolts and base plate are stressed to maximum **68.6%** usage of capacity. Monopole foundation (Concrete pad anchored to rock stratum) is also found to have **adequate** structural capacity.

Therefore, the proposed additions and alterations by T-Mobile can be implemented as intended with the conditions outlined in this report.

Reactions Comparison

| Reactions | Analysis Reactions | Centek Eng. Analysis Reactions |
|------------------------|--------------------|--------------------------------|
| Base Compression (kip) | 34.4 | 28.0 |
| Base Shear (kip) | 31.1 | 27.0 |
| Base Moment (kip-ft) | 2598.2 | 2213.0 |

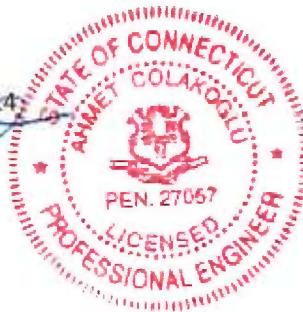
Should you need any clarifications or have any questions about this report, please contact me at (617) 965-0789.

Sincerely,

Atlantis Group

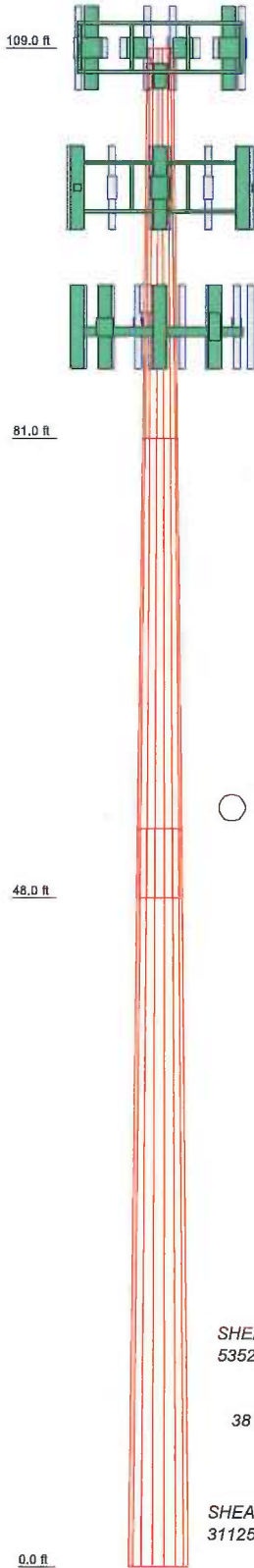
8-27-2014

Ahmet Colakoglu, PE
Connecticut Professional Engineer
License No: 27057



APPENDIX A
SOFTWARE OUTPUT

| | | | |
|--------------------|---------|---------|---------|
| Section | 1 | 2 | 3 |
| Length (ft) | 28.00 | 33.00 | 53.00 |
| Number of Sides | 18 | 18 | 18 |
| Thickness (in) | 0.1980 | 0.3130 | 0.3750 |
| Socket Length (ft) | | 5.00 | |
| Top Dia (in) | 22.2500 | 30.0900 | 37.5161 |
| Bot Dia (in) | 30.0900 | 39.5600 | 52.4000 |
| Grade | | A572-65 | |
| Weight (lb) | 1477.2 | 3851.2 | 9570.2 |



DESIGNED APPURTENANCE LOADING

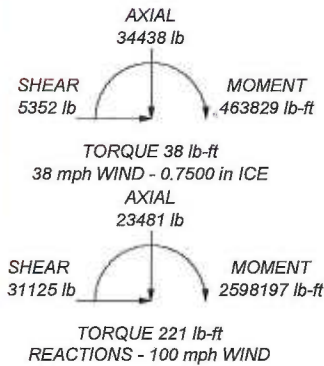
| TYPE | ELEVATION | TYPE | ELEVATION |
|--|-----------|--------------------------------------|-----------|
| (2) SBNHH-1D65C w/ Mount Pipe | 109 | DB-T1-6Z-8AB-0Z | 81 |
| (2) SBNHH-1D65C w/ Mount Pipe | 109 | Valmont Light Duty Tri-Bracket (1) | 91 |
| (2) SBNHH-1D65C w/ Mount Pipe | 109 | RRH2x40-AWS | 89 |
| (4) RRUS 11 incl sunshield | 109 | Valmont 13' Platform w/o Rails | 89 |
| (4) RRUS 11 incl sunshield | 109 | RRH2x40-AWS | 89 |
| (4) RRUS 11 incl sunshield | 109 | RRH2x40-AWS | 89 |
| Valmont T-Arm (3) | 109 | BXA-70063/6CF w/ Mount Pipe | 89 |
| (2) DC6-48-18-8F | 107 | BXA-171063-12CF-EDIN-X w/ Mount Pipe | 89 |
| DC6-48-18-8F | 107 | Pipe | |
| DC6-48-18-8F | 107 | BXA-70063/6CF w/ Mount Pipe | 89 |
| (2) Valmont Light Duty Tri-Bracket (1) | 107 | BXA-171063-12CF-EDIN-X w/ Mount Pipe | 89 |
| Valmont T-Arm (3) | 99 | Pipe | |
| LNX-6515DS-VTM w/ Mount Pipe | 99 | BXA-70063/6CF w/ Mount Pipe | 89 |
| LNX-6515DS-VTM w/ Mount Pipe | 99 | BXA-171063-12CF-EDIN-X w/ Mount Pipe | 89 |
| LNX-6515DS-VTM w/ Mount Pipe | 99 | Pipe | |
| AIR21 B4A/B2P with pipe | 99 | BXA-70063/6CF w/ Mount Pipe | 89 |
| AIR21 B4A/B2P with pipe | 99 | BXA-171063-12CF-EDIN-X w/ Mount Pipe | 89 |
| AIR21 B4A/B2P with pipe | 99 | Pipe | |
| AIR21 B2A/B4P with pipe | 99 | BXA-70063/6CF w/ Mount Pipe | 89 |
| AIR21 B2A/B4P with pipe | 99 | BXA-171063-12CF-EDIN-X w/ Mount Pipe | 89 |
| AIR21 B2A/B4P with pipe | 99 | Pipe | |
| dd B4 TMA | 99 | BXA-70063/6CF w/ Mount Pipe | 89 |
| dd B4 TMA | 99 | BXA-171063-12CF-EDIN-X w/ Mount Pipe | 89 |
| dd B4 TMA | 99 | Pipe | |
| RRUS-11 | 99 | RRH2X40-07-U | 89 |
| RRUS-11 | 99 | RRH2X40-07-U | 89 |
| RRUS-11 | 99 | RRH2X40-07-U | 89 |

MATERIAL STRENGTH

| GRADE | Fy | Fu | GRADE | Fy | Fu |
|---------|--------|--------|-------|----|----|
| A572-65 | 65 ksi | 80 ksi | | | |

TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for a 100 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 76.2%



| | | | |
|-------------------------------|--|--------------------------|--------------------|
| Atlantis Group | | Job: 1417044 | |
| 1340 Centre Street, Suite:212 | | Project: CTNL803A | |
| Newton, MA 02459 | | Client: T-Mobile | Drawn by: |
| Phone: 617-965-0789 | | Code: TIA/EIA-222-F | Date: 08/27/14 |
| FAX: 617-213-5056 | | Path: | Scale: NTS |
| | | | Dwg No. E-1 |

| | | | | |
|---|---------|----------|-------------|-------------------|
| tnxTower Atlantis Group 1340 Centre Street, Suite:212 Newton, MA 02459 Phone: 617-965-0789 FAX: 617-213-5056 | Job | 1417044 | Page | 1 of 14 |
| | Project | CTNL803A | Date | 10:03:21 08/27/14 |
| | Client | T-Mobile | Designed by | |

Tower Input Data

There is a pole section.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

Tower is located in New London County, Connecticut.

Basic wind speed of 100 mph.

Nominal ice thickness of 0.7500 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 38 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 50 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.333.

Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Tapered Pole Section Geometry

| Section | Elevation ft | Section Length ft | Splice Length ft | Number of Sides | Top Diameter in | Bottom Diameter in | Wall Thickness in | Bend Radius in | Pole Grade |
|---------|-----------------|----------------------|---------------------|-----------------|--------------------|-----------------------|----------------------|-------------------|---------------------|
| L1 | 109.00-81.00 | 28.00 | 0.00 | 18 | 22.2500 | 30.0900 | 0.1880 | 0.7520 | A572-65 (65 ksi) |
| L2 | 81.00-48.00 | 33.00 | 5.00 | 18 | 30.0900 | 39.5800 | 0.3130 | 1.2520 | A572-65 (65 ksi) |
| L3 | 48.00-0.00 | 53.00 | | 18 | 37.5161 | 52.4000 | 0.3750 | 1.5000 | A572-65 (65 ksi) |

Tapered Pole Properties

| Section | Tip Dia. in | Area in ² | I in ⁴ | r in | C in | I/C in ³ | J in ⁴ | It/Q in ² | w in | w/t |
|---------|----------------|-------------------------|----------------------|---------|---------|------------------------|----------------------|-------------------------|---------|--------|
| L1 | 22.5932 | 13.1647 | 809.5373 | 7.8320 | 11.3030 | 71.6215 | 1620.1398 | 6.5836 | 3.5851 | 19.07 |
| | 30.5542 | 17.8429 | 2015.5934 | 10.6152 | 15.2857 | 131.8612 | 4033.8390 | 8.9231 | 4.9650 | 26.409 |
| L2 | 30.5542 | 29.5823 | 3313.8400 | 10.5708 | 15.2857 | 216.7932 | 6632.0404 | 14.7940 | 4.7450 | 15.16 |
| | 40.1906 | 39.0103 | 7599.2700 | 13.9398 | 20.1066 | 377.9483 | 15208.5394 | 19.5088 | 6.4152 | 20.496 |
| L3 | 39.5207 | 44.2072 | 7704.4328 | 13.1851 | 19.0582 | 404.2584 | 15419.0033 | 22.1078 | 5.9428 | 15.848 |
| | 53.2084 | 61.9228 | 21174.4387 | 18.4689 | 26.6192 | 795.4574 | 42376.7393 | 30.9673 | 8.5624 | 22.833 |

| Tower Elevation ft | Gusset Area (per face) ft ² | Gusset Thickness in | Gusset Grade | Adjust. Factor A _f | Adjust. Factor A _r | Weight Mult. | Double Angle Stitch Bolt Spacing Diagonals in | Double Angle Stitch Bolt Spacing Horizontals in |
|-----------------------|--|------------------------|--------------|----------------------------------|----------------------------------|--------------|---|---|
| L1 109.00-81.00 | | | | 1 | 1 | 1 | | |
| L2 81.00-48.00 | | | | 1 | 1 | 1 | | |

| | | |
|--|----------------------------|----------------------------------|
| tnxTower Atlantis Group 1340 Centre Street, Suite: 212 Newton, MA 02459 Phone: 617-965-0789 FAX: 617-213-5056 | Job 1417044 | Page 2 of 14 |
| | Project CTNL803A | Date 10:03:21 08/27/14 |
| | Client T-Mobile | Designed by |

| Tower Elevation | Gusset Area (per face) | Gusset Thickness | Gusset Grade | Adjust. Factor A_f | Adjust. Factor A_r | Weight Mult. | Double Angle Stitch Bolt Spacing Diagonals | Double Angle Stitch Bolt Spacing Horizontals |
|-----------------|------------------------|------------------|--------------|----------------------|----------------------|--------------|--|--|
| ft | ft ² | in | | | | | in | in |
| L3 48.00-0.00 | | | | 1 | 1 | 1 | | |

Monopole Base Plate Data

| Base Plate Data | |
|-----------------------|-------------|
| Base plate is square | √ |
| Base plate is grouted | |
| Anchor bolt grade | A615-75 |
| Anchor bolt size | 2.2500 in |
| Number of bolts | 24 |
| Embedment length | 45.0000 in |
| f_c | 3 ksi |
| Grout space | 3.0000 in |
| Base plate grade | A572-50 |
| Base plate thickness | 2.7500 in |
| Bolt circle diameter | 58.7500 in |
| Outer diameter | 62.7500 in |
| Inner diameter | 52.4000 in |
| Base plate type | Plain Plate |

Feed Line/Linear Appurtenances - Entered As Area

| Description | Face or Leg | Allow Shield | Component Type | Placement ft | Total Number | | C_{AA} ft ² /ft | Weight plf |
|--------------------------------------|-------------|--------------|----------------|---------------|--------------|----------|------------------------------|------------|
| Fiber Cable | C | No | Inside Pole | 109.00 - 3.00 | 2 | No Ice | 0.00 | 0.75 |
| | | | | | | 1/2" Ice | 0.00 | 0.75 |
| | | | | | | 1" Ice | 0.00 | 0.75 |
| | | | | | | 2" Ice | 0.00 | 0.75 |
| | | | | | | 4" Ice | 0.00 | 0.75 |
| DC Cable | C | No | Inside Pole | 109.00 - 3.00 | 8 | No Ice | 0.00 | 0.62 |
| | | | | | | 1/2" Ice | 0.00 | 0.62 |
| | | | | | | 1" Ice | 0.00 | 0.62 |
| | | | | | | 2" Ice | 0.00 | 0.62 |
| | | | | | | 4" Ice | 0.00 | 0.62 |
| HB158-1-13U6-S6F18(1-5/8) | B | No | Inside Pole | 89.00 - 3.00 | 2 | No Ice | 0.00 | 1.90 |
| | | | | | | 1/2" Ice | 0.00 | 1.90 |
| | | | | | | 1" Ice | 0.00 | 1.90 |
| | | | | | | 2" Ice | 0.00 | 1.90 |
| | | | | | | 4" Ice | 0.00 | 1.90 |
| AVA7-50 (1-5/8 LOW DENS. FOAM) | B | No | Inside Pole | 99.00 - 3.00 | 6 | No Ice | 0.00 | 0.72 |
| | | | | | | 1/2" Ice | 0.00 | 0.72 |
| | | | | | | 1" Ice | 0.00 | 0.72 |
| | | | | | | 2" Ice | 0.00 | 0.72 |
| | | | | | | 4" Ice | 0.00 | 0.72 |
| CMA-RET/AC5(5/16) | C | No | Inside Pole | 109.00 - 3.00 | 3 | No Ice | 0.00 | 0.07 |
| | | | | | | 1/2" Ice | 0.00 | 0.07 |
| | | | | | | 1" Ice | 0.00 | 0.07 |
| | | | | | | 2" Ice | 0.00 | 0.07 |
| | | | | | | 4" Ice | 0.00 | 0.07 |
| ***Proposed*** 1-5/8" Fiber Cable | C | No | Inside Pole | 99.00 - 3.00 | 1 | No Ice | 0.00 | 1.82 |

| | | |
|---|----------------------------|----------------------------------|
| tnxTower Atlantis Group 1340 Centre Street, Suite:212 Newton, MA 02459 Phone: 617-965-0789 FAX: 617-213-5056 | Job 1417044 | Page 3 of 14 |
| | Project CTNL803A | Date 10:03:21 08/27/14 |
| | Client T-Mobile | Designed by |

| Description | Face or Leg | Allow Shield | Component Type | Placement ft | Total Number | C _A A _A ft ² /ft | Weight plf |
|-------------|-------------|--------------|----------------|-----------------|--------------|--|---------------|
| | | | | | 1/2" Ice | 0.00 | 1.82 |
| | | | | | 1" Ice | 0.00 | 1.82 |
| | | | | | 2" Ice | 0.00 | 1.82 |
| | | | | | 4" Ice | 0.00 | 1.82 |

Feed Line/Linear Appurtenances Section Areas

| Tower Section | Tower Elevation ft | Face | A _R ft ² | A _F ft ² | C _A A _A In Face ft ² | C _A A _A Out Face ft ² | Weight lb |
|---------------|-----------------------|------|-----------------------------------|-----------------------------------|---|--|--------------|
| L1 | 109.00-81.00 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 108.16 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 219.19 |
| L2 | 81.00-48.00 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 267.96 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 279.78 |
| L3 | 48.00-0.00 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 365.40 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 381.52 |

Feed Line/Linear Appurtenances Section Areas - With Ice

| Tower Section | Tower Elevation ft | Face or Leg | Ice Thickness in | A _R ft ² | A _F ft ² | C _A A _A In Face ft ² | C _A A _A Out Face ft ² | Weight lb |
|---------------|-----------------------|-------------|---------------------|-----------------------------------|-----------------------------------|---|--|--------------|
| L1 | 109.00-81.00 | A | 0.851 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 108.16 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 219.19 |
| L2 | 81.00-48.00 | A | 0.812 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 267.96 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 279.78 |
| L3 | 48.00-0.00 | A | 0.750 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 365.40 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 381.52 |

Feed Line Center of Pressure

| Section | Elevation ft | CP _X in | CP _Z in | CP _X Ice in | CP _Z Ice in |
|---------|-----------------|-----------------------|-----------------------|------------------------------|------------------------------|
| L1 | 109.00-81.00 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| L2 | 81.00-48.00 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| L3 | 48.00-0.00 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

Discrete Tower Loads

| | | | | |
|---|---------|----------|-------------|-------------------|
| tnxTower Atlantis Group 1340 Centre Street, Suite:212 Newton, MA 02459 Phone: 617-965-0789 FAX: 617-213-5056 | Job | 1417044 | Page | 4 of 14 |
| | Project | CTNL803A | Date | 10:03:21 08/27/14 |
| | Client | T-Mobile | Designed by | |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustment ° | Placement ft | C _A A ₁ Front ft ² | C _A A ₂ Side ft ² | Weight lb | |
|--|-------------|-------------|--|-------------------------|-----------------|--|---|--------------|---------|
| (2) SBNHH-1D65C w/ Mount Pipe | A | From Face | 3.00 0.00 0.00 | 0.0000 | 109.00 | No Ice | 11.63 | 9.79 | 82.45 |
| | | | | | | 1/2" Ice | 12.35 | 11.31 | 168.14 |
| | | | | | | 1" Ice | 13.07 | 12.85 | 268.91 |
| | | | | | | 2" Ice | 14.54 | 15.19 | 503.51 |
| | | | | | | 4" Ice | 17.81 | 20.05 | 1146.27 |
| (2) SBNHH-1D65C w/ Mount Pipe | B | From Face | 3.00 0.00 0.00 | 0.0000 | 109.00 | No Ice | 11.63 | 9.79 | 82.45 |
| | | | | | | 1/2" Ice | 12.35 | 11.31 | 168.14 |
| | | | | | | 1" Ice | 13.07 | 12.85 | 268.91 |
| | | | | | | 2" Ice | 14.54 | 15.19 | 503.51 |
| | | | | | | 4" Ice | 17.81 | 20.05 | 1146.27 |
| (2) SBNHH-1D65C w/ Mount Pipe | C | From Face | 3.00 0.00 0.00 | 0.0000 | 109.00 | No Ice | 11.63 | 9.79 | 82.45 |
| | | | | | | 1/2" Ice | 12.35 | 11.31 | 168.14 |
| | | | | | | 1" Ice | 13.07 | 12.85 | 268.91 |
| | | | | | | 2" Ice | 14.54 | 15.19 | 503.51 |
| | | | | | | 4" Ice | 17.81 | 20.05 | 1146.27 |
| (4) RRUS 11 incl sunshield | A | From Face | 3.00 0.00 0.00 | 0.0000 | 109.00 | No Ice | 2.99 | 1.25 | 50.00 |
| | | | | | | 1/2" Ice | 3.23 | 1.41 | 69.57 |
| | | | | | | 1" Ice | 3.47 | 1.59 | 92.08 |
| | | | | | | 2" Ice | 3.97 | 1.96 | 146.69 |
| | | | | | | 4" Ice | 5.09 | 2.82 | 299.68 |
| (4) RRUS 11 incl sunshield | B | From Face | 3.00 0.00 0.00 | 0.0000 | 109.00 | No Ice | 2.99 | 1.25 | 50.00 |
| | | | | | | 1/2" Ice | 3.23 | 1.41 | 69.57 |
| | | | | | | 1" Ice | 3.47 | 1.59 | 92.08 |
| | | | | | | 2" Ice | 3.97 | 1.96 | 146.69 |
| | | | | | | 4" Ice | 5.09 | 2.82 | 299.68 |
| (4) RRUS 11 incl sunshield | C | From Face | 3.00 0.00 0.00 | 0.0000 | 109.00 | No Ice | 2.99 | 1.25 | 50.00 |
| | | | | | | 1/2" Ice | 3.23 | 1.41 | 69.57 |
| | | | | | | 1" Ice | 3.47 | 1.59 | 92.08 |
| | | | | | | 2" Ice | 3.97 | 1.96 | 146.69 |
| | | | | | | 4" Ice | 5.09 | 2.82 | 299.68 |
| Valmont T-Arm (3) | B | None | | 0.0000 | 109.00 | No Ice | 21.00 | 21.00 | 1008.00 |
| | | | | | | 1/2" Ice | 29.00 | 29.00 | 1236.00 |
| | | | | | | 1" Ice | 37.00 | 37.00 | 1464.00 |
| | | | | | | 2" Ice | 53.00 | 53.00 | 1920.00 |
| | | | | | | 4" Ice | 85.00 | 85.00 | 2832.00 |
| (2) DC6-48-18-8F | A | From Face | 0.00 0.00 0.00 | 0.0000 | 107.00 | No Ice | 1.19 | 1.19 | 30.00 |
| | | | | | | 1/2" Ice | 1.37 | 1.37 | 44.40 |
| | | | | | | 1" Ice | 1.57 | 1.57 | 61.08 |
| | | | | | | 2" Ice | 1.99 | 1.99 | 101.83 |
| | | | | | | 4" Ice | 2.96 | 2.96 | 217.26 |
| DC6-48-18-8F | B | From Face | 0.00 0.00 0.00 | 0.0000 | 107.00 | No Ice | 1.19 | 1.19 | 30.00 |
| | | | | | | 1/2" Ice | 1.37 | 1.37 | 44.40 |
| | | | | | | 1" Ice | 1.57 | 1.57 | 61.08 |
| | | | | | | 2" Ice | 1.99 | 1.99 | 101.83 |
| | | | | | | 4" Ice | 2.96 | 2.96 | 217.26 |
| DC6-48-18-8F | C | From Face | 0.00 0.00 0.00 | 0.0000 | 107.00 | No Ice | 1.19 | 1.19 | 30.00 |
| | | | | | | 1/2" Ice | 1.37 | 1.37 | 44.40 |
| | | | | | | 1" Ice | 1.57 | 1.57 | 61.08 |
| | | | | | | 2" Ice | 1.99 | 1.99 | 101.83 |
| | | | | | | 4" Ice | 2.96 | 2.96 | 217.26 |
| (2) Valmont Light Duty Tri-Bracket (1) | C | None | | 0.0000 | 107.00 | No Ice | 1.76 | 1.76 | 54.00 |
| | | | | | | 1/2" Ice | 2.08 | 2.08 | 70.00 |
| | | | | | | 1" Ice | 2.40 | 2.40 | 86.00 |
| | | | | | | 2" Ice | 3.04 | 3.04 | 118.00 |
| | | | | | | 4" Ice | 4.32 | 4.32 | 182.00 |
| ***** Valmont T-Arm (3) | C | None | | 0.0000 | 99.00 | No Ice | 21.00 | 21.00 | 1008.00 |

| | | |
|---|----------------------------|----------------------------------|
| tnxTower Atlantis Group 1340 Centre Street, Suite:212 Newton, MA 02459 Phone: 617-965-0789 FAX: 617-213-5056 | Job 1417044 | Page 5 of 14 |
| | Project CTNL803A | Date 10:03:21 08/27/14 |
| | Client T-Mobile | Designed by |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustment ° | Placement ft | C _{AA} Front ft ² | C _{AA} Side ft ² | Weight lb | |
|--------------------------------------|-------------|-------------|--|-------------------------|-----------------|--|---|--------------|---------|
| | | | | | | 1/2" Ice | 29.00 | 29.00 | 1236.00 |
| | | | | | | 1" Ice | 37.00 | 37.00 | 1464.00 |
| | | | | | | 2" Ice | 53.00 | 53.00 | 1920.00 |
| | | | | | | 4" Ice | 85.00 | 85.00 | 2832.00 |
| ***** | | | | | | | | | |
| BXA-70063/6CF w/ Mount Pipe | A | From Face | 3.00 6.00 0.00 | 0.0000 | 89.00 | No Ice | 7.98 | 5.41 | 42.28 |
| | | | | | | 1/2" Ice | 8.62 | 6.56 | 98.43 |
| | | | | | | 1" Ice | 9.23 | 7.42 | 166.25 |
| | | | | | | 2" Ice | 10.47 | 9.20 | 327.70 |
| | | | | | | 4" Ice | 13.08 | 12.95 | 787.97 |
| BXA-171063-12CF-EDIN-X w/ Mount Pipe | A | From Face | 3.00 4.00 0.00 | 0.0000 | 89.00 | No Ice | 5.03 | 5.29 | 40.67 |
| | | | | | | 1/2" Ice | 5.58 | 6.46 | 83.86 |
| | | | | | | 1" Ice | 6.10 | 7.35 | 138.53 |
| | | | | | | 2" Ice | 7.17 | 9.15 | 272.95 |
| | | | | | | 4" Ice | 9.44 | 12.95 | 676.64 |
| BXA-70063/6CF w/ Mount Pipe | A | From Face | 3.00 0.00 0.00 | 0.0000 | 89.00 | No Ice | 7.98 | 5.41 | 42.28 |
| | | | | | | 1/2" Ice | 8.62 | 6.56 | 98.43 |
| | | | | | | 1" Ice | 9.23 | 7.42 | 166.25 |
| | | | | | | 2" Ice | 10.47 | 9.20 | 327.70 |
| | | | | | | 4" Ice | 13.08 | 12.95 | 787.97 |
| BXA-171063-12CF-EDIN-X w/ Mount Pipe | A | From Face | 3.00 -4.00 0.00 | 0.0000 | 89.00 | No Ice | 5.03 | 5.29 | 40.67 |
| | | | | | | 1/2" Ice | 5.58 | 6.46 | 83.86 |
| | | | | | | 1" Ice | 6.10 | 7.35 | 138.53 |
| | | | | | | 2" Ice | 7.17 | 9.15 | 272.95 |
| | | | | | | 4" Ice | 9.44 | 12.95 | 676.64 |
| BXA-70063/6CF w/ Mount Pipe | B | From Face | 3.00 6.00 0.00 | 0.0000 | 89.00 | No Ice | 7.98 | 5.41 | 42.28 |
| | | | | | | 1/2" Ice | 8.62 | 6.56 | 98.43 |
| | | | | | | 1" Ice | 9.23 | 7.42 | 166.25 |
| | | | | | | 2" Ice | 10.47 | 9.20 | 327.70 |
| | | | | | | 4" Ice | 13.08 | 12.95 | 787.97 |
| BXA-171063-12CF-EDIN-X w/ Mount Pipe | B | From Face | 3.00 4.00 0.00 | 0.0000 | 89.00 | No Ice | 5.03 | 5.29 | 40.67 |
| | | | | | | 1/2" Ice | 5.58 | 6.46 | 83.86 |
| | | | | | | 1" Ice | 6.10 | 7.35 | 138.53 |
| | | | | | | 2" Ice | 7.17 | 9.15 | 272.95 |
| | | | | | | 4" Ice | 9.44 | 12.95 | 676.64 |
| BXA-70063/6CF w/ Mount Pipe | B | From Face | 3.00 0.00 0.00 | 0.0000 | 89.00 | No Ice | 7.98 | 5.41 | 42.28 |
| | | | | | | 1/2" Ice | 8.62 | 6.56 | 98.43 |
| | | | | | | 1" Ice | 9.23 | 7.42 | 166.25 |
| | | | | | | 2" Ice | 10.47 | 9.20 | 327.70 |
| | | | | | | 4" Ice | 13.08 | 12.95 | 787.97 |
| BXA-171063-12CF-EDIN-X w/ Mount Pipe | B | From Face | 3.00 -4.00 0.00 | 0.0000 | 89.00 | No Ice | 5.03 | 5.29 | 40.67 |
| | | | | | | 1/2" Ice | 5.58 | 6.46 | 83.86 |
| | | | | | | 1" Ice | 6.10 | 7.35 | 138.53 |
| | | | | | | 2" Ice | 7.17 | 9.15 | 272.95 |
| | | | | | | 4" Ice | 9.44 | 12.95 | 676.64 |
| BXA-70063/6CF w/ Mount Pipe | C | From Face | 3.00 6.00 0.00 | 0.0000 | 89.00 | No Ice | 7.98 | 5.41 | 42.28 |
| | | | | | | 1/2" Ice | 8.62 | 6.56 | 98.43 |
| | | | | | | 1" Ice | 9.23 | 7.42 | 166.25 |
| | | | | | | 2" Ice | 10.47 | 9.20 | 327.70 |
| | | | | | | 4" Ice | 13.08 | 12.95 | 787.97 |
| BXA-171063-12CF-EDIN-X w/ Mount Pipe | C | From Face | 3.00 4.00 0.00 | 0.0000 | 89.00 | No Ice | 5.03 | 5.29 | 40.67 |
| | | | | | | 1/2" Ice | 5.58 | 6.46 | 83.86 |
| | | | | | | 1" Ice | 6.10 | 7.35 | 138.53 |
| | | | | | | 2" Ice | 7.17 | 9.15 | 272.95 |
| | | | | | | 4" Ice | 9.44 | 12.95 | 676.64 |
| BXA-70063/6CF w/ Mount Pipe | C | From Face | 3.00 0.00 | 0.0000 | 89.00 | No Ice | 7.98 | 5.41 | 42.28 |
| | | | | | | 1/2" Ice | 8.62 | 6.56 | 98.43 |

| | | | | |
|---|----------------|----------|--------------------|-------------------|
| tnxTower Atlantis Group 1340 Centre Street, Suite:212 Newton, MA 02459 Phone: 617-965-0789 FAX: 617-213-5056 | Job | 1417044 | Page | 6 of 14 |
| | Project | CTNL803A | Date | 10:03:21 08/27/14 |
| | Client | T-Mobile | Designed by | |

| Description | Face or Leg | Offset Type | Offsets: | | Azimuth Adjustment | Placement | C _A A _A Front | C _A A _A Side | Weight |
|--|-------------|-------------|----------|---------|--------------------|-----------|-------------------------------------|------------------------------------|---------|
| | | | Horz | Lateral | | | | | |
| | | | ft | ft | ° | ft | ft ² | ft ² | lb |
| | | | | 0.00 | | | 1" Ice 9.23 | 7.42 | 166.25 |
| | | | | | | | 2" Ice 10.47 | 9.20 | 327.70 |
| | | | | | | | 4" Ice 13.08 | 12.95 | 787.97 |
| BXA-171063-12CF-EDIN-X w/ Mount Pipe | C | From Face | 3.00 | 0.0000 | 89.00 | No Ice | 5.03 | 5.29 | 40.67 |
| | | | -4.00 | | | 1/2" Ice | 5.58 | 6.46 | 83.86 |
| | | | 0.00 | | | 1" Ice | 6.10 | 7.35 | 138.53 |
| | | | | | | 2" Ice | 7.17 | 9.15 | 272.95 |
| | | | | | | 4" Ice | 9.44 | 12.95 | 676.64 |
| RRH2X40-07-U | A | From Face | 3.00 | 0.0000 | 89.00 | No Ice | 2.25 | 1.23 | 50.00 |
| | | | 4.00 | | | 1/2" Ice | 2.45 | 1.39 | 66.85 |
| | | | 0.00 | | | 1" Ice | 2.66 | 1.55 | 86.39 |
| | | | | | | 2" Ice | 3.10 | 1.91 | 134.35 |
| | | | | | | 4" Ice | 4.10 | 2.73 | 271.17 |
| RRH2X40-07-U | B | From Face | 3.00 | 0.0000 | 89.00 | No Ice | 2.25 | 1.23 | 50.00 |
| | | | 4.00 | | | 1/2" Ice | 2.45 | 1.39 | 66.85 |
| | | | 0.00 | | | 1" Ice | 2.66 | 1.55 | 86.39 |
| | | | | | | 2" Ice | 3.10 | 1.91 | 134.35 |
| | | | | | | 4" Ice | 4.10 | 2.73 | 271.17 |
| RRH2X40-07-U | C | From Face | 3.00 | 0.0000 | 89.00 | No Ice | 2.25 | 1.23 | 50.00 |
| | | | 4.00 | | | 1/2" Ice | 2.45 | 1.39 | 66.85 |
| | | | 0.00 | | | 1" Ice | 2.66 | 1.55 | 86.39 |
| | | | | | | 2" Ice | 3.10 | 1.91 | 134.35 |
| | | | | | | 4" Ice | 4.10 | 2.73 | 271.17 |
| RRH2x40-AWS | A | From Face | 3.00 | 0.0000 | 89.00 | No Ice | 2.52 | 1.59 | 44.00 |
| | | | -4.00 | | | 1/2" Ice | 2.75 | 1.80 | 61.40 |
| | | | 0.00 | | | 1" Ice | 2.99 | 2.01 | 81.69 |
| | | | | | | 2" Ice | 3.50 | 2.46 | 131.76 |
| | | | | | | 4" Ice | 4.61 | 3.48 | 275.24 |
| RRH2x40-AWS | B | From Face | 3.00 | 0.0000 | 89.00 | No Ice | 2.52 | 1.59 | 44.00 |
| | | | -4.00 | | | 1/2" Ice | 2.75 | 1.80 | 61.40 |
| | | | 0.00 | | | 1" Ice | 2.99 | 2.01 | 81.69 |
| | | | | | | 2" Ice | 3.50 | 2.46 | 131.76 |
| | | | | | | 4" Ice | 4.61 | 3.48 | 275.24 |
| RRH2x40-AWS | C | From Face | 3.00 | 0.0000 | 89.00 | No Ice | 2.52 | 1.59 | 44.00 |
| | | | -4.00 | | | 1/2" Ice | 2.75 | 1.80 | 61.40 |
| | | | 0.00 | | | 1" Ice | 2.99 | 2.01 | 81.69 |
| | | | | | | 2" Ice | 3.50 | 2.46 | 131.76 |
| | | | | | | 4" Ice | 4.61 | 3.48 | 275.24 |
| Valmont 13' Platform w/o Rails | C | None | | 0.0000 | 89.00 | No Ice | 35.00 | 35.00 | 1500.00 |
| | | | | | | 1/2" Ice | 42.00 | 42.00 | 2500.00 |
| | | | | | | 1" Ice | 49.00 | 49.00 | 3500.00 |
| | | | | | | 2" Ice | 63.00 | 63.00 | 5500.00 |
| | | | | | | 4" Ice | 91.00 | 91.00 | 9500.00 |
| DB-T1-6Z-8AB-0Z | A | From Face | 0.00 | 0.0000 | 91.00 | No Ice | 5.60 | 2.33 | 44.00 |
| | | | 0.00 | | | 1/2" Ice | 5.92 | 2.56 | 80.13 |
| | | | 0.00 | | | 1" Ice | 6.24 | 2.79 | 120.22 |
| | | | | | | 2" Ice | 6.91 | 3.28 | 213.04 |
| | | | | | | 4" Ice | 8.37 | 4.37 | 454.67 |
| Valmont Light Duty Tri-Bracket (1) | B | None | | 0.0000 | 91.00 | No Ice | 1.76 | 1.76 | 54.00 |
| | | | | | | 1/2" Ice | 2.08 | 2.08 | 70.00 |
| | | | | | | 1" Ice | 2.40 | 2.40 | 86.00 |
| | | | | | | 2" Ice | 3.04 | 3.04 | 118.00 |
| | | | | | | 4" Ice | 4.32 | 4.32 | 182.00 |
| ***Proposed*** LNX-6515DS-VTM w/ Mount Pipe | A | From Face | 3.00 | 0.0000 | 99.00 | No Ice | 11.65 | 9.84 | 83.25 |
| | | | 0.00 | | | 1/2" Ice | 12.37 | 11.37 | 169.12 |
| | | | 0.00 | | | 1" Ice | 13.10 | 12.92 | 270.12 |

| | | | | |
|--|----------------|----------|--------------------|-------------------|
| tnxTower Atlantis Group 1340 Centre Street, Suite: 212 Newton, MA 02459 Phone: 617-965-0789 FAX: 617-213-5056 | Job | 1417044 | Page | 7 of 14 |
| | Project | CTNL803A | Date | 10:03:21 08/27/14 |
| | Client | T-Mobile | Designed by | |

| <i>Description</i> | <i>Face or Leg</i> | <i>Offset Type</i> | <i>Offsets: Horz Lateral Vert</i> <i>ft ft ft</i> | <i>Azimuth Adjustment</i> <i>°</i> | <i>Placement</i> <i>ft</i> | <i>C_AA_A Front</i> <i>ft²</i> | <i>C_AA_A Side</i> <i>ft²</i> | <i>Weight</i> <i>lb</i> | |
|------------------------------|--------------------|--------------------|--|---------------------------------------|-------------------------------|--|---|----------------------------|---------|
| | | | | | | 2" Ice | 14.56 | 15.27 | 505.29 |
| | | | | | | 4" Ice | 17.83 | 20.14 | 1149.70 |
| | | | | | | No Ice | 11.65 | 9.84 | 83.25 |
| | | | | | | 1/2" Ice | 12.37 | 11.37 | 169.12 |
| | | | | | | 1" Ice | 13.10 | 12.92 | 270.12 |
| | | | | | | 2" Ice | 14.56 | 15.27 | 505.29 |
| | | | | | | 4" Ice | 17.83 | 20.14 | 1149.70 |
| LNx-6515DS-VTM w/ Mount Pipe | B | From Face | 3.00 0.00 0.00 | 0.0000 | 99.00 | No Ice | 11.65 | 9.84 | 83.25 |
| | | | | | | 1/2" Ice | 12.37 | 11.37 | 169.12 |
| | | | | | | 1" Ice | 13.10 | 12.92 | 270.12 |
| | | | | | | 2" Ice | 14.56 | 15.27 | 505.29 |
| | | | | | | 4" Ice | 17.83 | 20.14 | 1149.70 |
| LNx-6515DS-VTM w/ Mount Pipe | C | From Face | 3.00 0.00 0.00 | 0.0000 | 99.00 | No Ice | 11.65 | 9.84 | 83.25 |
| | | | | | | 1/2" Ice | 12.37 | 11.37 | 169.12 |
| | | | | | | 1" Ice | 13.10 | 12.92 | 270.12 |
| | | | | | | 2" Ice | 14.56 | 15.27 | 505.29 |
| | | | | | | 4" Ice | 17.83 | 20.14 | 1149.70 |
| AIR21 B4A/B2P with pipe | A | From Face | 3.00 -6.00 0.00 | 0.0000 | 99.00 | No Ice | 6.85 | 5.78 | 126.90 |
| | | | | | | 1/2" Ice | 7.41 | 6.70 | 182.26 |
| | | | | | | 1" Ice | 7.94 | 7.50 | 247.87 |
| | | | | | | 2" Ice | 9.05 | 9.14 | 402.03 |
| | | | | | | 4" Ice | 11.38 | 12.65 | 832.97 |
| AIR21 B4A/B2P with pipe | B | From Face | 3.00 -6.00 0.00 | 0.0000 | 99.00 | No Ice | 6.85 | 5.78 | 126.90 |
| | | | | | | 1/2" Ice | 7.41 | 6.70 | 182.26 |
| | | | | | | 1" Ice | 7.94 | 7.50 | 247.87 |
| | | | | | | 2" Ice | 9.05 | 9.14 | 402.03 |
| | | | | | | 4" Ice | 11.38 | 12.65 | 832.97 |
| AIR21 B4A/B2P with pipe | C | From Face | 3.00 -6.00 0.00 | 0.0000 | 99.00 | No Ice | 6.85 | 5.78 | 126.90 |
| | | | | | | 1/2" Ice | 7.41 | 6.70 | 182.26 |
| | | | | | | 1" Ice | 7.94 | 7.50 | 247.87 |
| | | | | | | 2" Ice | 9.05 | 9.14 | 402.03 |
| | | | | | | 4" Ice | 11.38 | 12.65 | 832.97 |
| AIR21 B2A/B4P with pipe | A | From Face | 3.00 6.00 0.00 | 0.0000 | 99.00 | No Ice | 6.87 | 6.29 | 134.62 |
| | | | | | | 1/2" Ice | 7.38 | 7.05 | 203.81 |
| | | | | | | 1" Ice | 7.90 | 7.84 | 274.48 |
| | | | | | | 2" Ice | 8.96 | 9.46 | 444.94 |
| | | | | | | 4" Ice | 11.23 | 13.02 | 896.58 |
| AIR21 B2A/B4P with pipe | B | From Face | 3.00 6.00 0.00 | 0.0000 | 99.00 | No Ice | 6.87 | 6.29 | 134.62 |
| | | | | | | 1/2" Ice | 7.38 | 7.05 | 203.81 |
| | | | | | | 1" Ice | 7.90 | 7.84 | 274.48 |
| | | | | | | 2" Ice | 8.96 | 9.46 | 444.94 |
| | | | | | | 4" Ice | 11.23 | 13.02 | 896.58 |
| AIR21 B2A/B4P with pipe | C | From Face | 3.00 6.00 0.00 | 0.0000 | 99.00 | No Ice | 6.87 | 6.29 | 134.62 |
| | | | | | | 1/2" Ice | 7.38 | 7.05 | 203.81 |
| | | | | | | 1" Ice | 7.90 | 7.84 | 274.48 |
| | | | | | | 2" Ice | 8.96 | 9.46 | 444.94 |
| | | | | | | 4" Ice | 11.23 | 13.02 | 896.58 |
| dd B4 TMA | A | From Face | 3.00 6.00 0.00 | 0.0000 | 99.00 | No Ice | 0.64 | 0.52 | 22.43 |
| | | | | | | 1/2" Ice | 0.82 | 0.71 | 31.59 |
| | | | | | | 1" Ice | 1.00 | 0.91 | 42.44 |
| | | | | | | 2" Ice | 1.43 | 1.39 | 73.22 |
| | | | | | | 4" Ice | 2.47 | 2.57 | 178.78 |
| dd B4 TMA | B | From Face | 3.00 6.00 0.00 | 0.0000 | 99.00 | No Ice | 0.64 | 0.52 | 22.43 |
| | | | | | | 1/2" Ice | 0.82 | 0.71 | 31.59 |
| | | | | | | 1" Ice | 1.00 | 0.91 | 42.44 |
| | | | | | | 2" Ice | 1.43 | 1.39 | 73.22 |
| | | | | | | 4" Ice | 2.47 | 2.57 | 178.78 |
| dd B4 TMA | C | From Face | 3.00 6.00 0.00 | 0.0000 | 99.00 | No Ice | 0.64 | 0.52 | 22.43 |
| | | | | | | 1/2" Ice | 0.82 | 0.71 | 31.59 |
| | | | | | | 1" Ice | 1.00 | 0.91 | 42.44 |
| | | | | | | 2" Ice | 1.43 | 1.39 | 73.22 |
| | | | | | | 4" Ice | 2.47 | 2.57 | 178.78 |

| | | | | |
|---|---------|----------|-------------|-------------------|
| tnxTower Atlantis Group 1340 Centre Street, Suite:212 Newton, MA 02459 Phone: 617-965-0789 FAX: 617-213-5056 | Job | 1417044 | Page | 8 of 14 |
| | Project | CTNL803A | Date | 10:03:21 08/27/14 |
| | Client | T-Mobile | Designed by | |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustment ° | Placement ft | C _A A _A Front ft ² | C _A A _A Side ft ² | Weight lb | |
|-------------|-------------|-------------|--|-------------------------|-----------------|--|---|--------------|--------|
| RRUS-11 | A | From Face | 3.00 0.00 0.00 | 0.0000 | 99.00 | No Ice | 3.25 | 1.37 | 47.62 |
| | | | | | | 1/2" Ice | 3.49 | 1.55 | 68.42 |
| | | | | | | 1" Ice | 3.74 | 1.74 | 92.25 |
| | | | | | | 2" Ice | 4.27 | 2.14 | 149.81 |
| | | | | | | 4" Ice | 5.43 | 3.04 | 309.89 |
| RRUS-11 | B | From Face | 3.00 0.00 0.00 | 0.0000 | 99.00 | No Ice | 3.25 | 1.37 | 47.62 |
| | | | | | | 1/2" Ice | 3.49 | 1.55 | 68.42 |
| | | | | | | 1" Ice | 3.74 | 1.74 | 92.25 |
| | | | | | | 2" Ice | 4.27 | 2.14 | 149.81 |
| | | | | | | 4" Ice | 5.43 | 3.04 | 309.89 |
| RRUS-11 | C | From Face | 3.00 0.00 0.00 | 0.0000 | 99.00 | No Ice | 3.25 | 1.37 | 47.62 |
| | | | | | | 1/2" Ice | 3.49 | 1.55 | 68.42 |
| | | | | | | 1" Ice | 3.74 | 1.74 | 92.25 |
| | | | | | | 2" Ice | 4.27 | 2.14 | 149.81 |
| | | | | | | 4" Ice | 5.43 | 3.04 | 309.89 |

Load Combinations

| Comb. No. | Description |
|-----------|-----------------------------|
| 1 | Dead Only |
| 2 | Dead+Wind 0 deg - No Ice |
| 3 | Dead+Wind 30 deg - No Ice |
| 4 | Dead+Wind 60 deg - No Ice |
| 5 | Dead+Wind 90 deg - No Ice |
| 6 | Dead+Wind 120 deg - No Ice |
| 7 | Dead+Wind 150 deg - No Ice |
| 8 | Dead+Wind 180 deg - No Ice |
| 9 | Dead+Wind 210 deg - No Ice |
| 10 | Dead+Wind 240 deg - No Ice |
| 11 | Dead+Wind 270 deg - No Ice |
| 12 | Dead+Wind 300 deg - No Ice |
| 13 | Dead+Wind 330 deg - No Ice |
| 14 | Dead+Ice+Temp |
| 15 | Dead+Wind 0 deg+Ice+Temp |
| 16 | Dead+Wind 30 deg+Ice+Temp |
| 17 | Dead+Wind 60 deg+Ice+Temp |
| 18 | Dead+Wind 90 deg+Ice+Temp |
| 19 | Dead+Wind 120 deg+Ice+Temp |
| 20 | Dead+Wind 150 deg+Ice+Temp |
| 21 | Dead+Wind 180 deg+Ice+Temp |
| 22 | Dead+Wind 210 deg+Ice+Temp |
| 23 | Dead+Wind 240 deg+Ice+Temp |
| 24 | Dead+Wind 270 deg+Ice+Temp |
| 25 | Dead+Wind 300 deg+Ice+Temp |
| 26 | Dead+Wind 330 deg+Ice+Temp |
| 27 | Dead+Wind 0 deg - Service |
| 28 | Dead+Wind 30 deg - Service |
| 29 | Dead+Wind 60 deg - Service |
| 30 | Dead+Wind 90 deg - Service |
| 31 | Dead+Wind 120 deg - Service |

| | | | | |
|---|---------|----------|-------------|-------------------|
| tnxTower Atlantis Group 1340 Centre Street, Suite:212 Newton, MA 02459 Phone: 617-965-0789 FAX: 617-213-5056 | Job | 1417044 | Page | 9 of 14 |
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| | Client | T-Mobile | Designed by | |

| Comb. No. | Description |
|-----------|-----------------------------|
| 32 | Dead+Wind 150 deg - Service |
| 33 | Dead+Wind 180 deg - Service |
| 34 | Dead+Wind 210 deg - Service |
| 35 | Dead+Wind 240 deg - Service |
| 36 | Dead+Wind 270 deg - Service |
| 37 | Dead+Wind 300 deg - Service |
| 38 | Dead+Wind 330 deg - Service |

Maximum Member Forces

| Section No. | Elevation ft | Component Type | Condition | Gov. Load Comb. | Force lb | Major Axis Moment lb-ft | Minor Axis Moment lb-ft |
|-------------|--------------|----------------|------------------|-----------------|-----------|-------------------------|-------------------------|
| L1 | 109 - 81 | Pole | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -16265.15 | 152.85 | 88.25 |
| | | | Max. Mx | 11 | -7504.75 | 406061.14 | 876.65 |
| | | | Max. My | 2 | -7514.11 | 903.30 | 405066.25 |
| | | | Max. Vy | 11 | -23090.61 | 406061.14 | 876.65 |
| | | | Max. Vx | 2 | -22994.97 | 903.30 | 405066.25 |
| | | | Max. Torque | 9 | | | -221.43 |
| | | | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -20930.09 | 152.85 | 88.25 |
| L2 | 81 - 48 | Pole | Max. Mx | 11 | -11551.98 | 1089509.62 | 3204.67 |
| | | | Max. My | 2 | -11558.23 | 3233.34 | 1085834.45 |
| | | | Max. Vy | 11 | -25774.14 | 1089509.62 | 3204.67 |
| | | | Max. Vx | 2 | -25678.41 | 3233.34 | 1085834.45 |
| | | | Max. Torque | 9 | | | -221.28 |
| | | | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -34437.51 | 152.85 | 88.25 |
| | | | Max. Mx | 11 | -23457.29 | 2593837.03 | 7582.04 |
| | | | Max. My | 2 | -23457.44 | 7611.41 | 2585110.23 |
| L3 | 48 - 0 | Pole | Max. Vy | 11 | -31096.25 | 2593837.03 | 7582.04 |
| | | | Max. Vx | 2 | -31001.77 | 7611.41 | 2585110.23 |
| | | | Max. Torque | 9 | | | -220.93 |

Maximum Reactions

| Location | Condition | Gov. Load Comb. | Vertical lb | Horizontal, X lb | Horizontal, Z lb |
|----------|---------------------|-----------------|-------------|------------------|------------------|
| Pole | Max. Vert | 25 | 34437.51 | 4634.92 | 2675.97 |
| | Max. H _x | 11 | 23481.42 | 31078.03 | 81.77 |
| | Max. H _z | 2 | 23481.42 | 81.77 | 30983.61 |
| | Max. M _x | 2 | 2585110.23 | 81.77 | 30983.61 |
| | Max. M _z | 5 | 2593697.90 | -31078.03 | -81.77 |
| | Max. Torsion | 3 | 220.70 | -15468.20 | 26791.71 |
| | Min. Vert | 1 | 23481.42 | 0.00 | 0.00 |
| | Min. H _x | 5 | 23481.42 | -31078.03 | -81.77 |
| | Min. H _z | 8 | 23481.42 | -81.77 | -30983.61 |
| | Min. M _x | 8 | -2585029.91 | -81.77 | -30983.61 |
| | Min. M _z | 11 | -2593837.03 | 31078.03 | 81.77 |
| | Min. Torsion | 9 | -220.70 | 15468.20 | -26791.71 |

| | | |
|---|----------------------------|----------------------------------|
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| | Project CTNL803A | Date 10:03:21 08/27/14 |
| | Client T-Mobile | Designed by |

Tower Mast Reaction Summary

| Load Combination | Vertical | Shear _x | Shear _z | Overturning Moment, M _x | Overturning Moment, M _z | Torque |
|-----------------------------|----------|--------------------|--------------------|------------------------------------|------------------------------------|---------|
| | lb | lb | lb | lb-ft | lb-ft | lb-ft |
| Dead Only | 23481.42 | 0.00 | 0.00 | -39.27 | 68.02 | 0.00 |
| Dead+Wind 0 deg - No Ice | 23481.42 | -81.77 | -30983.61 | -2585110.23 | 7611.36 | -191.99 |
| Dead+Wind 30 deg - No Ice | 23481.42 | 15468.20 | -26791.71 | -2235010.42 | -1290291.40 | -220.70 |
| Dead+Wind 60 deg - No Ice | 23481.42 | 26873.48 | -15420.99 | -1286043.52 | -2242438.03 | -190.27 |
| Dead+Wind 90 deg - No Ice | 23481.42 | 31078.03 | 81.77 | 7501.94 | -2593697.90 | -109.48 |
| Dead+Wind 120 deg - No Ice | 23481.42 | 26955.25 | 15562.62 | 1299017.98 | -2249965.15 | 0.00 |
| Dead+Wind 150 deg - No Ice | 23481.42 | 15609.83 | 26873.48 | 2242457.44 | -1303345.90 | 109.48 |
| Dead+Wind 180 deg - No Ice | 23481.42 | 81.77 | 30983.61 | 2585029.91 | -7472.65 | 190.27 |
| Dead+Wind 210 deg - No Ice | 23481.42 | -15468.20 | 26791.71 | 2234930.34 | 1290430.11 | 220.70 |
| Dead+Wind 240 deg - No Ice | 23481.42 | -26873.48 | 15420.99 | 1285963.56 | 2242576.95 | 191.98 |
| Dead+Wind 270 deg - No Ice | 23481.42 | -31078.03 | -81.77 | -7582.02 | 2593837.03 | 111.20 |
| Dead+Wind 300 deg - No Ice | 23481.42 | -26955.25 | -15562.62 | -1299098.31 | 2250104.27 | 0.00 |
| Dead+Wind 330 deg - No Ice | 23481.42 | -15609.83 | -26873.48 | -2242537.88 | 1303484.81 | -111.20 |
| Dead+Ice+Temp | 34437.51 | 0.00 | 0.00 | -88.25 | 152.85 | 0.00 |
| Dead+Wind 0 deg+Ice+Temp | 34437.51 | -12.36 | -5330.53 | -461739.74 | 1312.92 | -33.33 |
| Dead+Wind 30 deg+Ice+Temp | 34437.51 | 2661.70 | -4610.19 | -399314.50 | -230330.50 | -38.46 |
| Dead+Wind 60 deg+Ice+Temp | 34437.51 | 4622.56 | -2654.56 | -229918.03 | -400214.05 | -33.28 |
| Dead+Wind 90 deg+Ice+Temp | 34437.51 | 5344.81 | 12.36 | 1059.95 | -462817.54 | -19.21 |
| Dead+Wind 120 deg+Ice+Temp | 34437.51 | 4634.92 | 2675.97 | 231729.06 | -401366.51 | 0.00 |
| Dead+Wind 150 deg+Ice+Temp | 34437.51 | 2683.11 | 4622.56 | 400281.77 | -232326.72 | 19.21 |
| Dead+Wind 180 deg+Ice+Temp | 34437.51 | 12.36 | 5330.53 | 461554.54 | -992.17 | 33.28 |
| Dead+Wind 210 deg+Ice+Temp | 34437.51 | -2661.70 | 4610.19 | 399129.31 | 230651.25 | 38.46 |
| Dead+Wind 240 deg+Ice+Temp | 34437.51 | -4622.56 | 2654.56 | 229732.85 | 400534.80 | 33.33 |
| Dead+Wind 270 deg+Ice+Temp | 34437.51 | -5344.81 | -12.36 | -1245.14 | 463138.31 | 19.26 |
| Dead+Wind 300 deg+Ice+Temp | 34437.51 | -4634.92 | -2675.97 | -231914.26 | 401687.27 | 0.00 |
| Dead+Wind 330 deg+Ice+Temp | 34437.51 | -2683.11 | -4622.56 | -400466.97 | 232647.47 | -19.26 |
| Dead+Wind 0 deg - Service | 23481.42 | -20.44 | -7745.90 | -646720.21 | 1956.50 | -48.09 |
| Dead+Wind 30 deg - Service | 23481.42 | 3867.05 | -6697.93 | -559138.31 | -322725.45 | -55.46 |
| Dead+Wind 60 deg - Service | 23481.42 | 6718.37 | -3855.25 | -321746.43 | -560914.56 | -47.97 |
| Dead+Wind 90 deg - Service | 23481.42 | 7769.51 | 20.44 | 1846.24 | -648788.20 | -27.67 |
| Dead+Wind 120 deg - Service | 23481.42 | 6738.81 | 3890.66 | 324933.26 | -562800.92 | 0.00 |
| Dead+Wind 150 deg - Service | 23481.42 | 3902.46 | 6718.37 | 560943.95 | -325992.99 | 27.67 |
| Dead+Wind 180 deg - Service | 23481.42 | 20.44 | 7745.90 | 646639.47 | -1816.70 | 47.97 |
| Dead+Wind 210 deg - Service | 23481.42 | -3867.05 | 6697.93 | 559057.59 | 322865.25 | 55.46 |
| Dead+Wind 240 deg - Service | 23481.42 | -6718.37 | 3855.25 | 321665.72 | 561054.38 | 48.09 |
| Dead+Wind 270 deg - Service | 23481.42 | -7769.51 | -20.44 | -1926.96 | 648928.04 | 27.79 |
| Dead+Wind 300 deg - Service | 23481.42 | -6738.81 | -3890.66 | -325014.00 | 562940.75 | 0.00 |
| Dead+Wind 330 deg - Service | 23481.42 | -3902.46 | -6718.37 | -561024.69 | 326132.81 | -27.79 |

Solution Summary

| Load Comb. | Sum of Applied Forces | | | Sum of Reactions | | | % Error |
|------------|-----------------------|-----------|-----------|------------------|----------|-----------|---------|
| | PX lb | PY lb | PZ lb | PX lb | PY lb | PZ lb | |
| 1 | 0.00 | -23481.42 | 0.00 | 0.00 | 23481.42 | 0.00 | 0.000% |
| 2 | -81.77 | -23481.42 | -30983.61 | 81.77 | 23481.42 | 30983.61 | 0.000% |
| 3 | 15468.20 | -23481.42 | -26791.71 | -15468.20 | 23481.42 | 26791.71 | 0.000% |
| 4 | 26873.48 | -23481.42 | -15420.99 | -26873.48 | 23481.42 | 15420.99 | 0.000% |
| 5 | 31078.03 | -23481.42 | 81.77 | -31078.03 | 23481.42 | -81.77 | 0.000% |
| 6 | 26955.25 | -23481.42 | 15562.62 | -26955.25 | 23481.42 | -15562.62 | 0.000% |
| 7 | 15609.83 | -23481.42 | 26873.48 | -15609.83 | 23481.42 | -26873.48 | 0.000% |
| 8 | 81.77 | -23481.42 | 30983.61 | -81.77 | 23481.42 | -30983.61 | 0.000% |
| 9 | -15468.20 | -23481.42 | 26791.71 | 15468.20 | 23481.42 | -26791.71 | 0.000% |
| 10 | -26873.48 | -23481.42 | 15420.99 | 26873.48 | 23481.42 | -15420.99 | 0.000% |

| | | | | |
|---|---------|----------|-------------|-------------------|
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| Load Comb. | Sum of Applied Forces | | | Sum of Reactions | | | % Error |
|------------|-----------------------|-----------|-----------|------------------|----------|----------|---------|
| | PX lb | PY lb | PZ lb | PX lb | PY lb | PZ lb | |
| 11 | -31078.03 | -23481.42 | -81.77 | 31078.03 | 23481.42 | 81.77 | 0.000% |
| 12 | -26955.25 | -23481.42 | -15562.62 | 26955.25 | 23481.42 | 15562.62 | 0.000% |
| 13 | -15609.83 | -23481.42 | -26873.48 | 15609.83 | 23481.42 | 26873.48 | 0.000% |
| 14 | 0.00 | -34437.51 | 0.00 | 0.00 | 34437.51 | 0.00 | 0.000% |
| 15 | -12.36 | -34437.51 | -5330.52 | 12.36 | 34437.51 | 5330.53 | 0.000% |
| 16 | 2661.69 | -34437.51 | -4610.18 | -2661.70 | 34437.51 | 4610.19 | 0.000% |
| 17 | 4622.55 | -34437.51 | -2654.55 | -4622.56 | 34437.51 | 2654.56 | 0.000% |
| 18 | 5344.80 | -34437.51 | 12.36 | -5344.81 | 34437.51 | -12.36 | 0.000% |
| 19 | 4634.91 | -34437.51 | 2675.97 | -4634.92 | 34437.51 | -2675.97 | 0.000% |
| 20 | 2683.11 | -34437.51 | 4622.55 | -2683.11 | 34437.51 | -4622.56 | 0.000% |
| 21 | 12.36 | -34437.51 | 5330.52 | -12.36 | 34437.51 | -5330.53 | 0.000% |
| 22 | -2661.69 | -34437.51 | 4610.18 | 2661.70 | 34437.51 | -4610.19 | 0.000% |
| 23 | -4622.55 | -34437.51 | 2654.55 | 4622.56 | 34437.51 | -2654.56 | 0.000% |
| 24 | -5344.80 | -34437.51 | -12.36 | 5344.81 | 34437.51 | 12.36 | 0.000% |
| 25 | -4634.91 | -34437.51 | -2675.97 | 4634.92 | 34437.51 | 2675.97 | 0.000% |
| 26 | -2683.11 | -34437.51 | -4622.55 | 2683.11 | 34437.51 | 4622.56 | 0.000% |
| 27 | -20.44 | -23481.42 | -7745.90 | 20.44 | 23481.42 | 7745.90 | 0.000% |
| 28 | 3867.05 | -23481.42 | -6697.93 | -3867.05 | 23481.42 | 6697.93 | 0.000% |
| 29 | 6718.37 | -23481.42 | -3855.25 | -6718.37 | 23481.42 | 3855.25 | 0.000% |
| 30 | 7769.51 | -23481.42 | 20.44 | -7769.51 | 23481.42 | -20.44 | 0.000% |
| 31 | 6738.81 | -23481.42 | 3890.66 | -6738.81 | 23481.42 | -3890.66 | 0.000% |
| 32 | 3902.46 | -23481.42 | 6718.37 | -3902.46 | 23481.42 | -6718.37 | 0.000% |
| 33 | 20.44 | -23481.42 | 7745.90 | -20.44 | 23481.42 | -7745.90 | 0.000% |
| 34 | -3867.05 | -23481.42 | 6697.93 | 3867.05 | 23481.42 | -6697.93 | 0.000% |
| 35 | -6718.37 | -23481.42 | 3855.25 | 6718.37 | 23481.42 | -3855.25 | 0.000% |
| 36 | -7769.51 | -23481.42 | -20.44 | 7769.51 | 23481.42 | 20.44 | 0.000% |
| 37 | -6738.81 | -23481.42 | -3890.66 | 6738.81 | 23481.42 | 3890.66 | 0.000% |
| 38 | -3902.46 | -23481.42 | -6718.37 | 3902.46 | 23481.42 | 6718.37 | 0.000% |

Non-Linear Convergence Results

| Load Combination | Converged? | Number of Cycles | Displacement Tolerance | Force Tolerance |
|------------------|------------|------------------|------------------------|-----------------|
| 1 | Yes | 4 | 0.0000001 | 0.0000001 |
| 2 | Yes | 4 | 0.0000001 | 0.00003410 |
| 3 | Yes | 5 | 0.0000001 | 0.00002535 |
| 4 | Yes | 5 | 0.0000001 | 0.00002571 |
| 5 | Yes | 4 | 0.0000001 | 0.00001569 |
| 6 | Yes | 5 | 0.0000001 | 0.00002576 |
| 7 | Yes | 5 | 0.0000001 | 0.00002567 |
| 8 | Yes | 4 | 0.0000001 | 0.00001685 |
| 9 | Yes | 5 | 0.0000001 | 0.00002575 |
| 10 | Yes | 5 | 0.0000001 | 0.00002537 |
| 11 | Yes | 4 | 0.0000001 | 0.00002747 |
| 12 | Yes | 5 | 0.0000001 | 0.00002577 |
| 13 | Yes | 5 | 0.0000001 | 0.00002588 |
| 14 | Yes | 4 | 0.0000001 | 0.0000001 |
| 15 | Yes | 4 | 0.0000001 | 0.00044559 |
| 16 | Yes | 4 | 0.0000001 | 0.00048105 |
| 17 | Yes | 4 | 0.0000001 | 0.00048171 |
| 18 | Yes | 4 | 0.0000001 | 0.00044620 |
| 19 | Yes | 4 | 0.0000001 | 0.00048368 |
| 20 | Yes | 4 | 0.0000001 | 0.00048311 |
| 21 | Yes | 4 | 0.0000001 | 0.00044519 |
| 22 | Yes | 4 | 0.0000001 | 0.00048145 |
| 23 | Yes | 4 | 0.0000001 | 0.00048186 |

| | | | | |
|--|----------------|----------|--------------------|-------------------|
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| | | | | |
|----|-----|---|------------|------------|
| 24 | Yes | 4 | 0.00000001 | 0.00044689 |
| 25 | Yes | 4 | 0.00000001 | 0.00048467 |
| 26 | Yes | 4 | 0.00000001 | 0.00048417 |
| 27 | Yes | 4 | 0.00000001 | 0.00000872 |
| 28 | Yes | 4 | 0.00000001 | 0.00006512 |
| 29 | Yes | 4 | 0.00000001 | 0.00006756 |
| 30 | Yes | 4 | 0.00000001 | 0.00000831 |
| 31 | Yes | 4 | 0.00000001 | 0.00006742 |
| 32 | Yes | 4 | 0.00000001 | 0.00006674 |
| 33 | Yes | 4 | 0.00000001 | 0.00000849 |
| 34 | Yes | 4 | 0.00000001 | 0.00006771 |
| 35 | Yes | 4 | 0.00000001 | 0.00006535 |
| 36 | Yes | 4 | 0.00000001 | 0.00000846 |
| 37 | Yes | 4 | 0.00000001 | 0.00006753 |
| 38 | Yes | 4 | 0.00000001 | 0.00006813 |

Maximum Tower Deflections - Service Wind

| Section No. | Elevation ft | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|-------------|-----------------|------------------------|-----------------|-----------|------------|
| L1 | 109 - 81 | 11.858 | 37 | 0.9834 | 0.0004 |
| L2 | 81 - 48 | 6.485 | 37 | 0.7819 | 0.0002 |
| L3 | 53 - 0 | 2.737 | 37 | 0.4846 | 0.0001 |

Critical Deflections and Radius of Curvature - Service Wind

| Elevation ft | Appurtenance | Gov. Load Comb. | Deflection in | Tilt ° | Twist ° | Radius of Curvature ft |
|-----------------|-------------------------------|-----------------|------------------|-----------|------------|---------------------------|
| 109.00 | (2) SBNHH-1D65C w/ Mount Pipe | 37 | 11.858 | 0.9834 | 0.0004 | 27402 |
| 107.00 | (2) DC6-48-18-8F | 37 | 11.452 | 0.9709 | 0.0004 | 27402 |
| 99.00 | Valmont T-Arm (3) | 37 | 9.840 | 0.9198 | 0.0003 | 13701 |
| 91.00 | DB-T1-6Z-8AB-0Z | 37 | 8.283 | 0.8640 | 0.0003 | 7611 |
| 89.00 | BXA-70063/6CF w/ Mount Pipe | 37 | 7.908 | 0.8489 | 0.0003 | 6850 |

Maximum Tower Deflections - Design Wind

| Section No. | Elevation ft | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|-------------|-----------------|------------------------|-----------------|-----------|------------|
| L1 | 109 - 81 | 47.337 | 12 | 3.9269 | 0.0016 |
| L2 | 81 - 48 | 25.903 | 12 | 3.1232 | 0.0008 |
| L3 | 53 - 0 | 10.937 | 12 | 1.9363 | 0.0003 |

Critical Deflections and Radius of Curvature - Design Wind

| | | | | |
|---|----------------|----------|--------------------|-------------------|
| tnxTower Atlantis Group 1340 Centre Street, Suite:212 Newton, MA 02459 Phone: 617-965-0789 FAX: 617-213-5056 | Job | 1417044 | Page | 13 of 14 |
| | Project | CTNL803A | Date | 10:03:21 08/27/14 |
| | Client | T-Mobile | Designed by | |

| Elevation | Appurtenance | Gov. Load Comb. | Deflection | Tilt | Twist | Radius of Curvature |
|-----------|--------------------------------|-----------------|------------|--------|--------|---------------------|
| ft | | | in | ° | ° | ft |
| 109.00 | (2) SBNEHH-1D65C w/ Mount Pipe | 12 | 47.337 | 3.9269 | 0.0016 | 6930 |
| 107.00 | (2) DC6-48-18-8F | 12 | 45.715 | 3.8771 | 0.0015 | 6930 |
| 99.00 | Valmont T-Arm (3) | 12 | 39.285 | 3.6734 | 0.0013 | 3464 |
| 91.00 | DB-T1-6Z-8AB-0Z | 12 | 33.077 | 3.4508 | 0.0011 | 1923 |
| 89.00 | BXA-70063/6CF w/ Mount Pipe | 12 | 31.581 | 3.3905 | 0.0010 | 1731 |

Base Plate Design Data

| Plate Thickness | Number of Anchor Bolts | Anchor Bolt Size | Actual Allowable Ratio Bolt Tension lb | Actual Allowable Ratio Bolt Compression lb | Actual Allowable Ratio Plate Stress ksi | Actual Allowable Ratio Stiffener Stress ksi | Controlling Condition | Ratio |
|-----------------|------------------------|------------------|--|--|---|---|-----------------------|-------|
| in | | in | | | | | | |
| 2.7500 | 24 | 2.2500 | 86888.72 | 88843.48 | 32.628 | | Plate | 0.87 |
| | | | 131210.58 | 217809.56 | 37.500 | | | ✓ |
| | | | 0.66 | 0.41 | 0.87 | | | |

Compression Checks

Pole Design Data

| Section No. | Elevation | Size | L | L _n | Kl/r | F _a | A | Actual P | Allow. P _a | Ratio P/P _a |
|-------------|--------------|----------------------|-------|----------------|------|----------------|-----------------|-----------|-----------------------|------------------------|
| | ft | | ft | ft | | ksi | in ² | lb | lb | |
| L1 | 109 - 81 (1) | TP30.09x22.25x0.188 | 28.00 | 0.00 | 0.0 | 37.995 | 17.8429 | -7500.06 | 677934.00 | 0.011 |
| L2 | 81 - 48 (2) | TP39.58x30.09x0.313 | 33.00 | 0.00 | 0.0 | 39.000 | 37.5818 | -11548.90 | 1465690.00 | 0.008 |
| L3 | 48 - 0 (3) | TP52.4x37.5161x0.375 | 53.00 | 0.00 | 0.0 | 39.000 | 61.9228 | -23457.20 | 2414990.00 | 0.010 |

Pole Bending Design Data

| Section No. | Elevation | Size | Actual M _x | Actual f _{bx} | Allow. F _{bx} | Ratio f _{bx} /F _{bx} | Actual M _y | Actual f _{by} | Allow. F _{by} | Ratio f _{by} /F _{by} |
|-------------|--------------|----------------------|-----------------------|------------------------|------------------------|--|-----------------------|------------------------|------------------------|--|
| | ft | | lb-ft | ksi | ksi | | lb-ft | ksi | ksi | |
| L1 | 109 - 81 (1) | TP30.09x22.25x0.188 | 406555.00 | 36.998 | 37.995 | 0.974 | 0.00 | 0.000 | 37.995 | 0.000 |
| L2 | 81 - 48 (2) | TP39.58x30.09x0.313 | 1091341.67 | 37.346 | 39.000 | 0.958 | 0.00 | 0.000 | 39.000 | 0.000 |
| L3 | 48 - 0 (3) | TP52.4x37.5161x0.375 | 2598200.00 | 39.196 | 39.000 | 1.005 | 0.00 | 0.000 | 39.000 | 0.000 |

Pole Shear Design Data

| | | |
|---|----------------------------|----------------------------------|
| tnxTower Atlantis Group 1340 Centre Street, Suite:212 Newton, MA 02459 Phone: 617-965-0789 FAX: 617-213-5056 | Job 1417044 | Page 14 of 14 |
| | Project CTNL803A | Date 10:03:21 08/27/14 |
| | Client T-Mobile | Designed by |

| Section No. | Elevation ft | Size | Actual V lb | Actual f _v ksi | Allow. F _v ksi | Ratio f _v /F _v | Actual T lb-ft | Actual f _t ksi | Allow. F _t ksi | Ratio f _t /F _t |
|-------------|--------------|----------------------|-------------|---------------------------|---------------------------|--------------------------------------|----------------|---------------------------|---------------------------|--------------------------------------|
| L1 | 109 - 81 (1) | TP30.09x22.25x0.188 | 23138.4 | 1.297 | 26.000 | 0.100 | 0.00 | 0.000 | 26.000 | 0.000 |
| L2 | 81 - 48 (2) | TP39.58x30.09x0.313 | 25822.0 | 0.687 | 26.000 | 0.053 | 0.00 | 0.000 | 26.000 | 0.000 |
| L3 | 48 - 0 (3) | TP52.4x37.5161x0.375 | 31143.5 | 0.503 | 26.000 | 0.039 | 0.00 | 0.000 | 26.000 | 0.000 |

Pole Interaction Design Data

| Section No. | Elevation ft | Ratio P/P _a | Ratio f _{bx} /F _{bx} | Ratio f _{by} /F _{by} | Ratio f _v /F _v | Ratio f _t /F _t | Comb. Stress Ratio | Allow. Stress Ratio | Criteria |
|-------------|--------------|------------------------|--|--|--------------------------------------|--------------------------------------|--------------------|---------------------|-----------|
| L1 | 109 - 81 (1) | 0.011 | 0.974 | 0.000 | 0.100 | 0.000 | 0.987 | 1.333 | H1-3+VT ✓ |
| L2 | 81 - 48 (2) | 0.008 | 0.958 | 0.000 | 0.053 | 0.000 | 0.966 | 1.333 | H1-3+VT ✓ |
| L3 | 48 - 0 (3) | 0.010 | 1.005 | 0.000 | 0.039 | 0.000 | 1.015 | 1.333 | H1-3+VT ✓ |

Section Capacity Table

| Section No. | Elevation ft | Component Type | Size | Critical Element | P lb | SF*P _{allow} lb | % Capacity | Pass Fail | |
|-------------|--------------|----------------|----------------------|------------------|-----------|--------------------------|-----------------|-------------|-------------|
| L1 | 109 - 81 | Pole | TP30.09x22.25x0.188 | 1 | -7500.06 | 903685.98 | 74.1 | Pass | |
| L2 | 81 - 48 | Pole | TP39.58x30.09x0.313 | 2 | -11548.90 | 1953764.69 | 72.5 | Pass | |
| L3 | 48 - 0 | Pole | TP52.4x37.5161x0.375 | 3 | -23457.20 | 3219181.54 | 76.2 | Pass | |
| | | | | | | | Summary | | |
| | | | | | | | Pole (L3) | 76.2 | Pass |
| | | | | | | | Base Plate | 65.3 | Pass |
| | | | | | | | RATING = | 76.2 | Pass |

FOUNDATION CALCULATIONS

Tower Reactions

$M := 2598.1 \cdot \text{kip} \cdot \text{ft}$ $V := 31.2 \cdot \text{kip}$ $P := 34.4 \cdot \text{kip}$

Foundation Properties

$\text{Width}_{\text{mat}} := 19 \cdot \text{ft}$:Width of Mat
 $\text{Thick}_{\text{mat}} := 3.5 \cdot \text{ft}$:Thickness of concrete
 $\text{Depth}_{\text{soil}} := 0$:Soil Above footing
 $D_{\text{pier}} := 7 \text{ft}$:Pier Diameter or Side, if Pier is Square
 $L_{\text{pier}} := 1 \text{ft}$:Pier Depth
 $L_{\text{pier_above}} := 1 \text{ft}$:Pier above grade
 $D_{\text{btm}} := \text{Thick}_{\text{mat}}$:Depth to bottom of footing
 $D_{\text{soil}} := \text{Thick}_{\text{mat}}$:Depth to supporting soil/rock per Geotech Report
 $L_{\text{anchor}} := 29.5 \text{ft}$:Anchor length in rock

Soil & Rock Properties

$\phi_{\text{rock}} := 45 \text{deg}$:Internal Friction Angle
 $\gamma_{\text{soil}} := 125 \cdot \text{pcf}$:Soil Weight
 $\gamma_{\text{rock}} := 165 \cdot \text{pcf}$:Soil Weight
 $\gamma_{\text{concrete}} := 150 \text{pcf}$:Concrete Weight
 $\sigma_{\text{allowable}} := 8000 \text{psf}$:Allowable Rock Bearing Strength

Rock Anchor Properties

$N_{\text{Total_anchor}} := 4$:Number of Total Anchors
 $N_{\text{anchor}} := 2$:Number of Anchors per side
 $D_{\text{hole}} := 5 \text{in}$:Diameter of Anchor Hole
 $\sigma_{\text{bond}} := 200 \text{psi}$:Ultimate Rock-Grout Bond Stress
 $\sigma_{\text{allowable_bond}} := \sigma_{\text{bond}} \cdot 0.5 = 100 \text{psi}$:Allowable Rock-Grout Bond Stress
 $f_{\text{c_grout}} := 5000 \text{psi}$:Allowable Grout Compressive Strength

| | |
|---|------------------------------------|
| $S_{anchors} := 14\text{ft}$ | :Anchor Spacing |
| $FS := 2.0$ | :Required Factor of Safety |
| $F_{u_anchor} := 150\text{ksi}$ | :Anchor Ultimate Strength |
| $F_{y_anchor} := 127.7\text{ksi}$ | :Anchor Yield Strength |
| $D_{anchor} := 2.5\text{in}$ | :Anchor Diameter |
| $A_g := \frac{\pi}{4} \cdot D_{anchor}^2 = 4.909 \cdot \text{in}^2$ | :Anchor Cross Area |
| $T_u := F_{u_anchor} \cdot A_g = 736.311 \cdot \text{kip}$ | :Anchor Ultimate Tensile Capacity |
| $T_{all} := 0.60 \cdot T_u = 441.786 \cdot \text{kip}$ | :Anchor Allowable Tensile Capacity |
| $P_y := 0.80 \cdot T_u = 589.049 \cdot \text{kip}$ | :Maximum Working Load to Yield |
| $V_y := 0.4 \cdot P_y = 235.619 \cdot \text{kip}$ | :Anchor Shear Capacity |

Compute Required Moment

| | |
|--|---------------------------|
| $M_{total} := M + V \cdot (Thick_{mat} + L_{pier}) = 2738.5 \cdot \text{kip} \cdot \text{ft}$ | :Total Overturning Moment |
| $W_{mat} := Width_{mat}^2 \cdot Thick_{mat} \cdot \gamma_{concrete} = 189.525 \cdot \text{kip}$ | :Mat Weight |
| $W_{pier} := D_{pier}^2 \cdot L_{pier} \cdot \gamma_{concrete} = 7.35 \cdot \text{kip}$ | :Pier Weight |
| $W_{soil} := (Width_{mat}^2 - D_{pier}^2) \cdot Depth_{soil} \cdot \gamma_{soil} = 0 \cdot \text{kip}$ | :Soil Weight |
| $W_{concrete} := W_{mat} + W_{pier} = 196.875 \cdot \text{kip}$ | :Total Concrete Weight |
| $P_{total} := W_{concrete} + W_{soil} + P = 231.275 \cdot \text{kip}$ | :Total Concrete Weight |
| $M_{resist} := P_{total} \cdot \left(\frac{Width_{mat}}{2} \right) = 2197.112 \cdot \text{kip} \cdot \text{ft}$ | :Resisting Moment |
| $M_{act} := M_{total} \cdot FS = 5477 \cdot \text{kip} \cdot \text{ft}$ | :Acting Moment |
| $M_{net} := M_{act} - M_{resist} = 3279.888 \cdot \text{kip} \cdot \text{ft}$ | :Net Required Moment |

Compute Maximum Tension in Anchors

Perpendicular to Foundation Toe:

$$\begin{aligned} \text{dist}_1 &:= 7\text{ft} && \text{:Distance to Anchor 1} \\ n_{\text{anchors1}} &:= 4 && \text{:Number of Anchors 1} \\ I_1 &:= \text{dist}_1^2 \cdot n_{\text{anchors1}} = 196\text{ft}^2 && \text{:Polar Moment of Inertia 1} \\ T_1 &:= \frac{\text{dist}_1}{I_1} \cdot M_{\text{net}} = 117.139 \cdot \text{kip} && \text{:Tension Force per Anchor} \end{aligned}$$

45 Degree to Foundation Toe:

$$\begin{aligned} \text{dist}_2 &:= 9.9\text{ft} && \text{:Distance to Anchor 2} \\ n_{\text{anchors2}} &:= 2 && \text{:Number of Anchors 2} \\ I_2 &:= \text{dist}_2^2 \cdot n_{\text{anchors2}} = 196.02\text{ft}^2 && \text{:Polar Moment of Inertia 2} \\ T_2 &:= \frac{\text{dist}_2}{I_2} \cdot M_{\text{net}} = 165.651 \cdot \text{kip} && \text{:Tension Force per Anchor} \end{aligned}$$

Maximum Tension per Anchor:

$$T_{\text{max}} := \max(T_1, T_2) = 165.651 \cdot \text{kip}$$

Check Tension and Shear in Anchors

$$T_{L_Req} := 300\text{kip} > T_{\text{max}} = 165.651 \cdot \text{kip} \quad \text{:Design Tension Force per previous SA}$$

$$V_{L_Req} := 50\text{kip} \quad \text{:Design Shear Force per previous SA}$$

$$T_{L_max} := T_u \cdot 0.80 = 589.049 \cdot \text{kip}$$

$$V_{L_max} := T_u \cdot 0.60 = 441.786 \cdot \text{kip}$$

$$T_{L_Req} = 300 \cdot \text{kip} < T_{L_max} = 589.049 \cdot \text{kip} \quad \Rightarrow \text{OK}$$

$$V_{L_Req} = 50 \cdot \text{kip} < V_{L_max} = 441.786 \cdot \text{kip} \quad \Rightarrow \text{OK}$$

$$\frac{T_u}{T_{L_Req}} = 2.454 > FS = 2 \quad \Rightarrow \text{OK}$$

$$\frac{T_u}{T_{\text{max}}} = 4.445 > FS = 2 \quad \Rightarrow \text{OK}$$

Check Anchor Development Length in Rock

$L_{\text{stress_Req}} := 10 \text{ ft}$:Min. Free Stress Length
 $L_{\text{stress_Provided}} := 13 \text{ ft}$:Provided Length
 $L_{\text{f}} := \max(L_{\text{stress_Req}}, L_{\text{stress_Provided}}) = 13 \text{ ft}$:Controlling Length
 $L_{\text{d}} := \frac{\left(\frac{.04}{\text{in}} \cdot T_{\text{L_Req}}\right)}{\sqrt{f_{\text{c_grout}} \cdot \text{psi}}} = 14.142 \text{ ft}$:Anchor-Grout Bond Length
 $L_{\text{b}} := \frac{T_{\text{L_Req}}}{\pi \cdot D_{\text{hole}} \cdot \sigma_{\text{bond}}} = 7.958 \text{ ft}$:Rock-Grout Bond Length
 $L_{\text{a}} := \max(L_{\text{d}}, L_{\text{b}}) = 14.142 \text{ ft}$:Controlling Length
 $L_{\text{provided}} := 16 \text{ ft}$:Provided Length per previous SA
 $L_{\text{a}} = 14.142 \text{ ft} < L_{\text{provided}} = 16 \text{ ft} \Rightarrow \text{OK}$

Check Foundation Capacity

$r := \tan(\phi_{\text{rock}}) \cdot (L_{\text{anchor}} - \text{Thick}_{\text{mat}} - L_{\text{provided}}) = 10 \text{ ft}$:Radius of core
 $V_{\text{rock}} := \frac{\pi \cdot r^2 \cdot (L_{\text{anchor}} - \text{Thick}_{\text{mat}} - L_{\text{provided}})}{3} = 1047 \cdot \text{ft}^3$:Volume of Rock
 $W_{\text{rock}} := V_{\text{rock}} \cdot \gamma_{\text{rock}} = 172.788 \cdot \text{kip}$:Weight of Rock
 $W_{\text{concrete}} = 196.875 \cdot \text{kip}$:Weight of Concrete
 $W_{\text{total}} := W_{\text{rock}} \cdot N_{\text{Total_anchor}} + W_{\text{concrete}} = 888.025 \cdot \text{kip}$:Total Weight

Foundation Uplift Check - Perpendicular to Foundation:

$U_{\text{perp}} := \frac{M_{\text{total}}}{(0.5 \cdot \text{Width}_{\text{mat}})} = 288.263 \cdot \text{kip}$:Uplift Force
 $\frac{W_{\text{total}}}{U_{\text{perp}}} = 3.081 > \text{FS} = 2 \Rightarrow \text{OK}$

Foundation Uplift Check - 45 Degrees to Foundation:

$$U_{\text{diag}} := \frac{M_{\text{total}}}{(0.5\sqrt{2} \cdot \text{Width}_{\text{mat}})} = 203.833 \cdot \text{kip} \quad \text{:Uplift Force}$$

$$\frac{W_{\text{total}}}{U_{\text{diag}}} = 4.357 > \text{FS} = 2 \quad \Rightarrow \text{OK}$$

Foundation Bearing Capacity Check:

$$\sigma_{\text{max}} := \left[\frac{(P + W_{\text{concrete}}) + (N_{\text{Total_anchor}} \cdot V_{\text{L_Req}})}{\text{Width}_{\text{mat}}^2} \right] + \left(\frac{M_{\text{total}}}{\text{Width}_{\text{mat}}^3} \right) = 3.59 \cdot \text{ksf}$$

$$\sigma_{\text{max}} = 3.59 \cdot \text{ksf} < \sigma_{\text{allowable}} = 8 \cdot \text{ksf} \quad \Rightarrow \text{OK}$$

EXHIBIT C

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL
TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CTNL803A

Amtrak_Old Lyme 4
232 Shore Road
Old Lyme, CT 06782

September 2, 2014

| Site Compliance Summary | |
|--|------------------|
| Compliance Status: | COMPLIANT |
| Site total MPE% of FCC general public allowable limit: | 79.47 % |

September 2, 2014

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Emissions Analysis for Site: **CTNL803A – Amtrak_Old Lyme 4**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **232 Shore Road, Old Lyme, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The number of $\mu\text{W}/\text{cm}^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The general population exposure limit for the 700 MHz Band is $467 \mu\text{W}/\text{cm}^2$, and the general population exposure limit for the PCS and AWS bands is $1000 \mu\text{W}/\text{cm}^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **232 Shore Road, Old Lyme, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

- 1) 2 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel
- 2) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 3) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 4) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.
- 5) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

- 6) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 7) The antennas used in this modeling are the **Ericsson AIR21 B4A/B2P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR21 B4A/B2P** has a maximum gain of **15.9 dBd** at its main lobe. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 8) The antenna mounting height centerline of the proposed antennas is **99 feet** above ground level (AGL).
- 9) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculations were done with respect to uncontrolled / general public threshold limits.

T-Mobile Site Inventory and Power Data

| Sector: | A | Sector: | B | Sector: | C |
|-----------------|--------------------------------|-----------------|--------------------------------|-----------------|--------------------------------|
| Antenna #: | 1 | Antenna #: | 1 | Antenna #: | 1 |
| Make / Model: | Ericsson AIR21 B4A/B2P | Make / Model: | Ericsson AIR21 B4A/B2P | Make / Model: | Ericsson AIR21 B4A/B2P |
| Gain: | 15.9 dBd | Gain: | 15.9 dBd | Gain: | 15.9 dBd |
| Height (AGL): | 99 | Height (AGL): | 99 | Height (AGL): | 99 |
| Frequency Bands | 1900 MHz(PCS) / 2100 MHz (AWS) | Frequency Bands | 1900 MHz(PCS) / 2100 MHz (AWS) | Frequency Bands | 1900 MHz(PCS) / 2100 MHz (AWS) |
| Channel Count | 2 | Channel Count | 2 | # PCS Channels: | 2 |
| Total TX Power: | 120 | Total TX Power: | 120 | # AWS Channels: | 120 |
| ERP (W): | 1,906.06 | ERP (W): | 1,906.06 | ERP (W): | 1,906.06 |
| Antenna A1 MPE% | 1.94 | Antenna B1 MPE% | 1.94 | Antenna C1 MPE% | 1.94 |
| Antenna #: | 2 | Antenna #: | 2 | Antenna #: | 2 |
| Make / Model: | Ericsson AIR21 B4A/B2P | Make / Model: | Ericsson AIR21 B4A/B2P | Make / Model: | Ericsson AIR21 B4A/B2P |
| Gain: | 15.9 dBd | Gain: | 15.9 dBd | Gain: | 15.9 dBd |
| Height (AGL): | 99 | Height (AGL): | 99 | Height (AGL): | 99 |
| Frequency Bands | 1900 MHz(PCS) / 2100 MHz (AWS) | Frequency Bands | 1900 MHz(PCS) / 2100 MHz (AWS) | Frequency Bands | 1900 MHz(PCS) / 2100 MHz (AWS) |
| Channel Count | 4 | Channel Count | 4 | Channel Count | 4 |
| Total TX Power: | 120 | Total TX Power: | 120 | Total TX Power: | 120 |
| ERP (W): | 1,906.06 | ERP (W): | 1,906.06 | ERP (W): | 1,906.06 |
| Antenna A2 MPE% | 1.94 | Antenna B2 MPE% | 1.94 | Antenna C2 MPE% | 1.94 |
| Antenna #: | 3 | Antenna #: | 3 | Antenna #: | 3 |
| Make / Model: | Commscope LNX-6515DS-VTM | Make / Model: | Commscope LNX-6515DS-VTM | Make / Model: | Commscope LNX-6515DS-VTM |
| Gain: | 14.6 dBd | Gain: | 14.6 dBd | Gain: | 14.6 dBd |
| Height (AGL): | 99 | Height (AGL): | 99 | Height (AGL): | 99 |
| Frequency Bands | 700 Mhz | Frequency Bands | 700 Mhz | Frequency Bands | 700 Mhz |
| Channel Count | 1 | Channel Count | 1 | Channel Count | 1 |
| Total TX Power: | 30 | Total TX Power: | 30 | Total TX Power: | 30 |
| ERP (W): | 445.37 | ERP (W): | 445.37 | ERP (W): | 445.37 |
| Antenna A3 MPE% | 0.77 | Antenna B3 MPE% | 0.77 | Antenna C3 MPE% | 0.77 |

| Site Composite MPE% | |
|--------------------------|----------------|
| Carrier | MPE% |
| T-Mobile | 13.95 |
| Verizon Wireless | 53.82 % |
| AT&T | 11.70 % |
| Site Total MPE %: | 79.47 % |

| | |
|--------------------------|----------------|
| T-Mobile Sector 1 Total: | 4.65 % |
| T-Mobile Sector 2 Total: | 4.65 % |
| T-Mobile Sector 3 Total: | 4.65 % |
| Site Total: | 79.47 % |

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general public exposure to RF Emissions.

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general public exposure to RF Emissions are shown here:

| T-Mobile Sector | Power Density Value (%) |
|-------------------------|-------------------------|
| Sector 1: | 4.65 % |
| Sector 2: | 4.65 % |
| Sector 3 : | 4.65 % |
| T-Mobile Total: | 13.95 % |
| | |
| Site Total: | 79.47 % |
| | |
| Site Compliance Status: | COMPLIANT |

The anticipated composite MPE value for this site assuming all carriers present is **79.47%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.



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