# STATE OF CONNECTICUT

***CONNECTICUT SITING COUNCIL***

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: siting.council@ct.gov

www.ct.gov/csc


**VIA ELECTRONIC MAIL**

November 12, 2019

Jake Shappy
Transcend Wireless
10 Industrial Avenue, Suite 3
Mahwah, NJ 07430

RE: **EM-CLEARWIRE-044-191030** – Clearwire notice of intent to modify an existing telecommunications facility located at 75 Saltonstall Place, East Haven, Connecticut.

Dear Mr. Shappy:

The Connecticut Siting Council (Council) received a notice of intent to modify the above-referenced facility on October 30, 2019. On November 1, 2019 the Council issued a letter (enclosed) stating that the request for exempt modification was incomplete and recommended that Transcend Wireless provide a passing mount analysis that accounts for the proposed modifications referenced in the request and documentation showing the original facility approval with conditions, if any, or correspondence with the Town stating that there are no records of the original facility approval on or before December 6, 2019.

On November 7, 2019, the Council received an email including a copy of the November 2010 Notice of Clearwire's Tower Share request and a mount analysis dated June 18, 2018. The November 2010 tower share request is for Clearwire's equipment only and therefore does not represent the original facility approval document. Also, the mount analysis provided does not indicate a percentage stress capacity for the proposed modifications and cites the 2016 Connecticut State Building Code (CSBC) and the 2012 International Building Code (IBC); however, the State of Connecticut has adopted the 2015 IBC as amended in the 2018 CSBC effective October 1, 2018.

Therefore, the request for exempt modification remains incomplete at this time. The Council recommends that Transcend Wireless provide a passing mount analysis for the proposed modification that comports with the 2018 CSBC/2015 IBC and indicates a capacity equal to or less than 100 percent, and documentation showing the original facility approval with conditions if any or correspondence with the Town stating that there are no records of the original facility approval on or before December 16, 2019. If additional time is needed to gather the requested information, please submit a written request for an extension of time prior to December 16, 2019. **Please provide an electronic version and one hard copy of the requested information for the incomplete exempt modification to be rendered complete and processed. Please include the Council's exempt modification identification number referenced above with the submittal.**

This notice of incompletion shall have the effect of tolling the Federal Communications Commission (FCC) 60-day timeframe in accordance with Paragraph 217 of the FCC Wireless Infrastructure Report and Order issued on October 21, 2014 (FCC 14-153).

Thank you for your attention to this matter. Should you have any questions, please feel free to contact me at 860-827-2951.

Sincerely,

Melanie Bachman
Executive Director

MAB/IN/emr

Enclosures: Council's incomplete notice dated November 1, 2019

c: The Honorable Joseph Maturo, Jr., Mayor, Town of East Haven
Christopher Soto, Planning & Zoning Enforcement Officer, Town of East Haven

RAMAKER & ASSOCIATES, INC.
100% EMPLOYEE-OWNED

June 18, 2018

Mike Kithcart
Transcend Wireless
10 Industrial Avenue, Suite 3
Mahwah, NJ 07430

Ramaker & Associates, Inc.
855 Community Drive
Sauk City, WI 53583

**SUBJECT:** **MOUNT ASSESSMENT**

**CARRIER:** **SPRINT**

**SITE:** **SALTONSTALL PLACE (CT52XC125)**
**12 SALTONSTALL PLACE**
**EAST HAVEN, NEW HAVEN COUNTY, CONNECTICUT 06512**
**RAMAKER & ASSOCIATES PROJECT NUMBER: 37621**

**RESULTS:** **MOUNT:** **PASS WITH REPLACEMENT**

Dear Mike Kithcart:

Ramaker & Associates, Inc. (RAMAKER) respectfully submits this mount assessment for the above-mentioned site. The purpose of this report is to determine the structural integrity of the mounting structure with the proposed loading configurations. Engineering recommendations regarding the analysis results are provided in the following pages.

RAMAKER developed a finite element model of the mount(s) using RISA analysis software. All information contained herein is valid only for the described structure configuration and loading conditions. RAMAKER reserves the right to modify our recommendations should alterations to the mount loading occur.

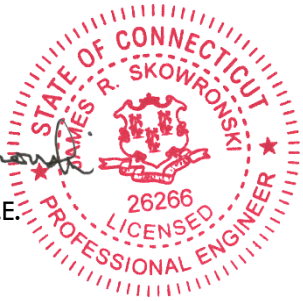
If you have any questions or comments, please do not hesitate to contact our office.

Sincerely,

RAMAKER & ASSOCIATES, INC.

Quin Rogers
Structural Designer

James R. Skowronski, P.E.
Supervising Engineer



## ANALYSIS CRITERIA

| | |
|---|---|
| State Building Code | 2016 CT State Building Code |
| Adopted Building Code | 2012 IBC |
| Referenced Standard | TIA-222-G |
| Risk Category | II |
| Ultimate Design Wind Speed, $V_{ult}$ | 130 mph (3 sec. gust) |
| Nominal Design Wind Speed, $V_{asd}$ | 101 mph (3 sec. gust) |
| Design Wind Speed w/ Ice | 50 mph (3 sec. gust) |
| Ice Thickness | 3/4 inch |
| Exposure Category | C |
| Topographic Feature | None |

## SUPPORTING DOCUMENTATION

- Construction drawings by RAMAKER, project number 37621
- Site visit(s) conducted by RAMAKER
- Other pertinent data procured or assumed by RAMAKER during site due diligence activities

## MOUNT LOADING

RAMAKER understands that the loading to be used for this analysis will consist of the antennas and equipment configurations as shown in the following chart(s):

| Antenna Mount – Alpha Sector | | | | |
|---|---|---|---|---|
| **Elevation** | **Position** | **Appurtenance** | **Mount Type** | **Status** |
| 85 | 1 | **(1) Clearwire WiMax** | **Site Pro 1 VFA8-HD-S** | **Remove** |
| | | **(1) Nokia AAHC** | | **Proposed** |
| | 2 | **(1) Commscope NNVV-65B-R4** | | **Proposed** |
| | 3 | -- | | -- |
| | -- | **(2) ALU 800 MHz 2x50W RRH** | | **Proposed** |
| | -- | **(1) ALU 1900 MHz 4x45W RRH** | | **Proposed** |

| Antenna Mount – Beta Sector | | | | |
|---|---|---|---|---|
| **Elevation** | **Position** | **Appurtenance** | **Mount Type** | **Status** |
| 85 | 1 | **(1) Clearwire WiMax** | **Site Pro 1 VFA8-HD-S** | **Remove** |
| | | **(1) Nokia AAHC** | | **Proposed** |
| | 2 | **(1) Commscope NNVV-65B-R4** | | **Proposed** |
| | 3 | (1) 2' MW Dish | | Existing |
| | -- | **(2) ALU 800 MHz 2x50W RRH** | | **Proposed** |
| | -- | **(1) ALU 1900 MHz 4x45W RRH** | | **Proposed** |

| Antenna Mount – Gamma Sector | | | | |
|---|---|---|---|---|
| **Elevation** | **Position** | **Appurtenance** | **Mount Type** | **Status** |
| 85 | 1 | **(1) Clearwire WiMax** | **Site Pro 1 VFA8-HD-S** | **Remove** |
| | | (1) 2' MW Dish | | Existing |
| | 2 | **(1) Nokia AAHC** | | **Proposed** |
| | 3 | **(1) Commscope NNVV-65B-R4** | | **Proposed** |
| | -- | **(2) ALU 800 MHz 2x50W RRH** | | **Proposed** |
| | -- | **(1) ALU 1900 MHz 4x45W RRH** | | **Proposed** |

**MOUNT RESULTS**

By engineering calculation and inspection, the ***proposed*** antenna and equipment mounting structure(s) are capable of supporting the proposed loading configurations without causing an overstress condition in the antenna and equipment mounting structure(s). ***The existing antenna and equipment mounting structure(s) shall be removed and replaced with the proposed antenna and equipment mounting structure(s) prior to antenna and equipment installation. See the associated construction drawings by RAMAKER for the proposed mounting structures.***

## LIMITATIONS

The recommendations contained within this report were developed using the supporting documentation as previously described. All recommendations pertain only to the proposed antenna installation activities as described in this report. RAMAKER assumes no responsibility for failures caused by factors beyond our control. These include but are not limited to the following:

- Missing, corroding, and/or deteriorating members
- Improper manufacturing and/or construction
- Improper maintenance
- Member grades less than assumed grades show below:

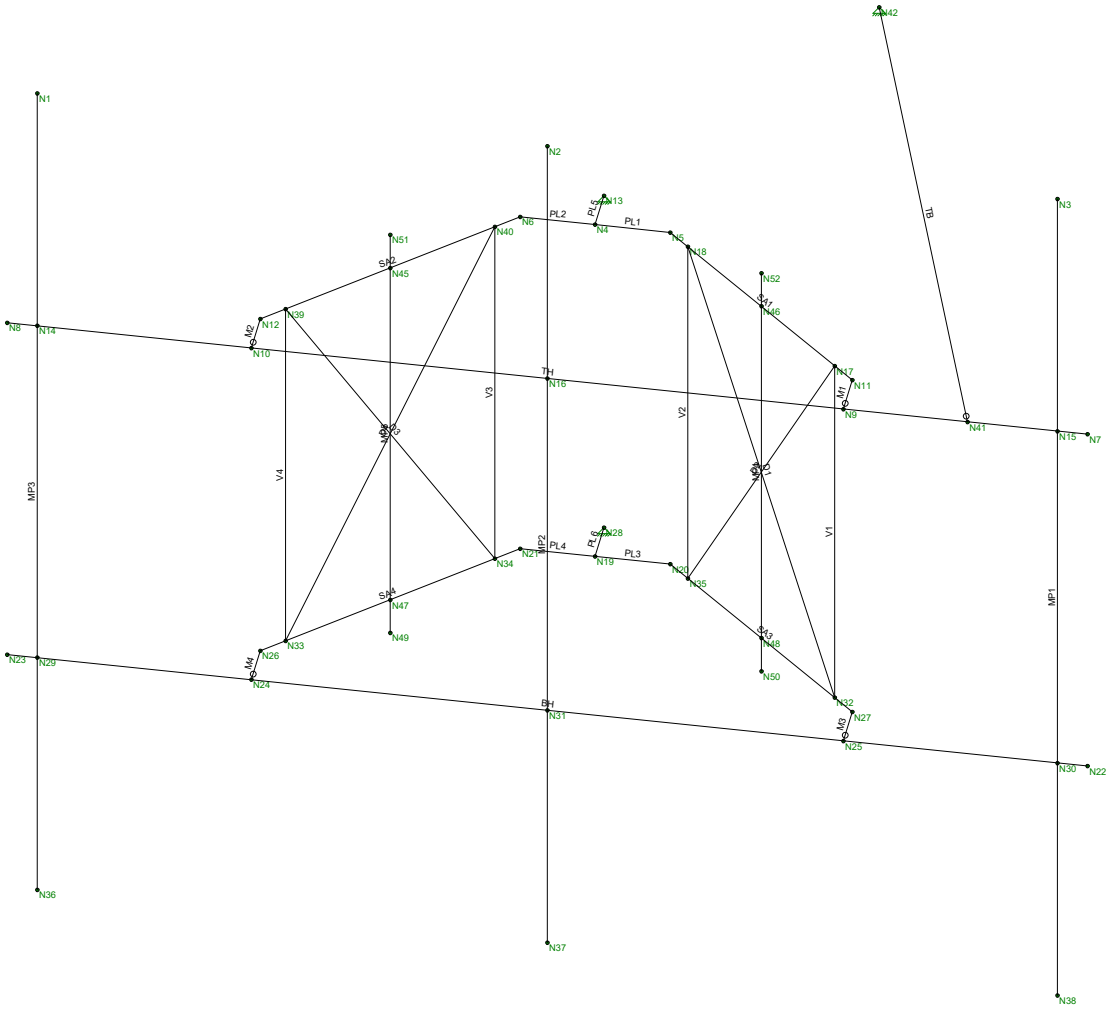
| Assumed Steel Member Grades | |
|---|---|
| Angles/Plates/Channels/Solid Rods | ASTM A36, 36 ksi |
| Pipes | ASTM A53 Gr. B, 35 ksi |

RAMAKER is not responsible for verifying that the loading on the structure is consistent with the loading applied to the structure within this report. If there is any information contrary to that contained herein, or if there are any defects arising from the original design, material, fabrication and erection deficiencies, this report should be disregarded and RAMAKER should be contacted immediately. RAMAKER is not liable for any representation, recommendation, or conclusion not expressly stated herein.

This analysis pertains only to the mounting structure, and no analyses or conclusions were made regarding the supporting structure. Analysis and certification of the supporting structure is performed and submitted separately.

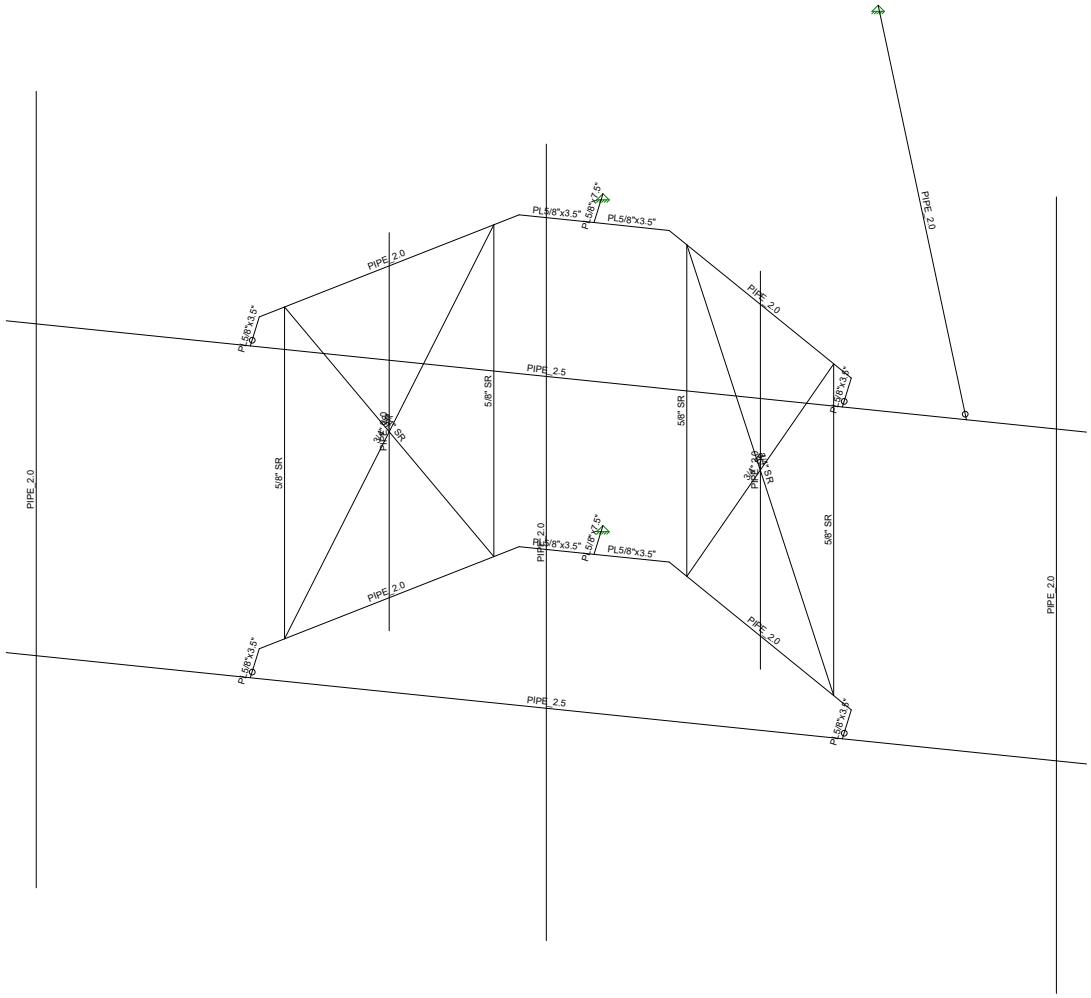
**ATTACHMENTS**

- Analysis Figures
- Analysis Calculations




Envelope Only Solution

| | | |
|---|---|---|
| Ramaker & Associates | CT52XC125 | SK - 1 |
| QAR | | June 15, 2018 at 10:44 AM |
| 37621 | | 37621 Mount.r3d |




Envelope Only Solution

| | | |
|---|---|---|
| Ramaker & Associates | CT52XC125 | SK - 2 |
| QAR | | June 15, 2018 at 10:45 AM |
| 37621 | | 37621 Mount.r3d |

RAMAKER & ASSOCIATES, INC.
100% EMPLOYEE-OWNED

| | |
|---|---|
| Job | CT52XC125 |
| Project | 37621 |
| By | QAR |
| Date | 6/15/18 |

**Wind Load on Antennas** TIA-222-G

$q_z = 0.00256\ K_z\ K_{zt}\ K_d\ V^2\ I$

$F = q_z\ G_h\ C_a\ A_a$

| | | | |
|---|---|---|---|
| Occupancy : | II | | Classification of Structures (Table 2-1) |
| Exposure : | C | | Exposure Category |
| V : | 101 | mph | Basic Wind Speed (Annex B) |
| z : | 85 | ft | Height above ground level to the center of the antenna |
| I : | 1.00 | | Importance Factor (Table 2-3) |
| $K_z$ : | 1.22 | | Velocity Pressure Coefficient (2.6.5.2) |
| $K_{zt}$ : | 1.00 | | Topographic Factor (2.6.6.4) |
| $K_d$ : | 0.95 | | Wind Direction Probability Factor (Table 2-2) |
| $q_z$ : | 30.3 | psf | Velocity Pressure at Height z |
| $G_h$ : | 1.00 | | Strength Design of Appurtenances and their Connections |

**Mount & Antenna Wind Loads**

| Appurtenance | Height | Width | h/D | Shape | $C_a$ | $A_a$ | Force | Force |
|---|---|---|---|---|---|---|---|---|
| | *in* | *in* | | | | *sq ft* | *lb* | *plf* |
| AAHC | 25.6 | 19.7 | 1.3 | Flat | 1.200 | 3.51 | 127.8 | |
| NNVV-65B-R4 | 72.0 | 19.6 | 3.7 | Flat | 1.252 | 9.80 | 372.3 | |
| VHLP2 | 26.1 | 0.0 | 1.0 | Generic | 1.262 | 3.72 | 142.3 | |
| 1900MHz 4x45W RRH | 25.1 | 11.1 | 2.3 | Flat | 1.200 | 1.93 | 70.4 | |
| 800MHz 2x50W RRH | 19.0 | 13.0 | 1.5 | Flat | 1.200 | 1.72 | 62.5 | |
| | | | | | | | | |
| Pipe2-1/2STD x 9 ft | 108.0 | 2.9 | 37.6 | Round | 1.200 | 2.16 | 78.5 | 8.7 |
| Pipe2STD x 8 ft | 96.0 | 2.4 | 40.4 | Round | 1.200 | 1.58 | 57.7 | 7.2 |
| Pipe2STD x 2.58 ft | 31.0 | 2.4 | 13.0 | Round | 0.934 | 0.51 | 14.5 | 5.6 |
| Pipe2STD x 5.932 ft | 71.2 | 2.4 | 30.0 | Round | 1.200 | 1.17 | 42.7 | 7.2 |
| SR 3/4 x 3.9 ft | 46.8 | 0.8 | 62.4 | Round | 1.200 | 0.24 | 8.9 | 2.3 |
| SR 5/8 x 3.33 ft | 40.0 | 0.6 | 63.9 | Round | 1.200 | 0.17 | 6.3 | 1.9 |
| Pipe2STD x 4 ft | 48.0 | 2.4 | 20.2 | Round | 1.094 | 0.79 | 26.3 | 6.6 |
| Pipe2STD x 4 ft | 48.0 | 2.4 | 20.2 | Round | 1.094 | 0.79 | 26.3 | 6.6 |

RAMAKER & ASSOCIATES, INC.
100% EMPLOYEE-OWNED

| | |
|---|---|
| Job | CT52XC125 |
| Project | 37621 |
| By | QAR |
| Date | 6/15/18 |

**Wind Load on Antennas** TIA-222-G

$q_z = 0.00256\ K_z\ K_{zt}\ K_d\ V^2\ I$

$F = q_z\ G_h\ C_a\ A_a$

| | | | |
|---|---|---|---|
| Occupancy : | II | | Classification of Structures (Table 2-1) |
| Exposure : | C | | Exposure Category |
| V : | 101 | mph | Basic Wind Speed (Annex B) |
| z : | 85 | ft | Height above ground level to the center of the antenna |
| I : | 1.00 | | Importance Factor (Table 2-3) |
| $K_z$ : | 1.22 | | Velocity Pressure Coefficient (2.6.5.2) |
| $K_{zt}$ : | 1.00 | | Topographic Factor (2.6.6.4) |
| $K_d$ : | 0.95 | | Wind Direction Probability Factor (Table 2-2) |
| $q_z$ : | 30.3 | psf | Velocity Pressure at Height z |
| $G_h$ : | 1.00 | | Strength Design of Appurtenances and their Connections |

**Mount & Antenna Wind Loads**

| Appurtenance | Height | Depth | h/D | Shape | $C_a$ | $A_a$ | Force | Force |
|---|---|---|---|---|---|---|---|---|
| | *in* | *in* | | | | *sq ft* | *lb* | *plf* |
| AAHC | 25.6 | 9.7 | 2.7 | Flat | 1.207 | 1.72 | 62.9 | |
| NNVV-65B-R4 | 72.0 | 7.8 | 9.2 | Flat | 1.474 | 3.90 | 174.5 | |
| VHLP2 | 26.1 | 0.0 | 1.0 | Generic | 0.625 | 3.72 | 70.5 | |
| 1900MHz 4x45W RRH | 25.1 | 10.7 | 2.3 | Flat | 1.200 | 1.86 | 67.8 | |
| 800MHz 2x50W RRH | 19.0 | 12.2 | 1.6 | Flat | 1.200 | 1.61 | 58.6 | |
| | | | | | | | | |
| Pipe2-1/2STD x 9 ft | 108.0 | 2.9 | 37.6 | Round | 1.200 | 2.16 | 78.5 | 8.7 |
| Pipe2STD x 8 ft | 96.0 | 2.4 | 40.4 | Round | 1.200 | 1.58 | 57.7 | 7.2 |
| Pipe2STD x 2.58 ft | 31.0 | 2.4 | 13.0 | Round | 0.934 | 0.51 | 14.5 | 5.6 |
| Pipe2STD x 5.932 ft | 71.2 | 2.4 | 30.0 | Round | 1.200 | 1.17 | 42.7 | 7.2 |
| SR 3/4 x 3.9 ft | 46.8 | 0.8 | 62.4 | Round | 1.200 | 0.24 | 8.9 | 2.3 |
| SR 5/8 x 3.33 ft | 40.0 | 0.6 | 63.9 | Round | 1.200 | 0.17 | 6.3 | 1.9 |
| Pipe2STD x 4 ft | 48.0 | 2.4 | 20.2 | Round | 1.094 | 0.79 | 26.3 | 6.6 |
| Pipe2STD x 4 ft | 48.0 | 2.4 | 20.2 | Round | 1.094 | 0.79 | 26.3 | 6.6 |

RAMAKER & ASSOCIATES, INC.
100% EMPLOYEE-OWNED

| | |
|---|---|
| Job | CT52XC125 |
| Project | 37621 |
| By | QAR |
| Date | 6/15/18 |

**Ice Wind Load on Antennas** TIA-222-G

$q_z = 0.00256\ K_z\ K_{zt}\ K_d\ V^2\ I$

$F = q_z\ G_h\ C_a\ A_a$

| | | | |
|---|---|---|---|
| Occupancy : | II | | Classification of Structures (Table 2-1) |
| Exposure : | C | | Exposure Category |
| $V_i$ : | 50 | mph | Basic Wind Speed (Annex B) |
| z : | 85 | ft | Height above ground level to the center of the antenna |
| I : | 1.00 | | Importance Factor (Table 2-3) |
| $K_z$ : | 1.22 | | Velocity Pressure Coefficient (2.6.5.2) |
| $K_{zt}$ : | 1.00 | | Topographic Factor (2.6.6.4) |
| $K_d$ : | 0.95 | | Wind Direction Probability Factor (Table 2-2) |
| $q_z$ : | 7.44 | psf | Velocity Pressure at Height z |
| $G_h$ : | 1.00 | | Strength Design of Appurtenances and their Connections |
| $t_{iz}$ : | 1.65 | in | Design Thickness of Radial Ice at Height z (2.6.8) |

**Mount & Antenna Ice Wind Loads**

| Appurtenance | Height | Width | h/D | Shape | $C_a$ | $A_a$ | Force | Force |
|---|---|---|---|---|---|---|---|---|
| | *in* | *in* | | | | *sq ft* | *lb* | *plf* |
| AAHC | 28.9 | 23.0 | 1.3 | Flat | 1.200 | 4.62 | 41.3 | |
| NNVV-65B-R4 | 75.3 | 22.9 | 3.3 | Flat | 1.235 | 11.97 | 110.0 | |
| VHLP2 | 29.4 | 3.3 | 1.0 | Generic | 1.262 | 4.71 | 44.2 | |
| 1900MHz 4x45W RRH | 28.4 | 14.4 | 2.0 | Flat | 1.200 | 2.84 | 25.3 | |
| 800MHz 2x50W RRH | 22.3 | 16.3 | 1.4 | Flat | 1.200 | 2.52 | 22.5 | |
| | | | | | | | | |
| Pipe2-1/2STD x 9 ft | 111.3 | 6.2 | 18.0 | Round | 1.045 | 4.77 | 37.1 | 4.0 |
| Pipe2STD x 8 ft | 99.3 | 5.7 | 17.5 | Round | 1.033 | 3.91 | 30.1 | 3.6 |
| Pipe2STD x 2.58 ft | 34.3 | 5.7 | 6.0 | Round | 0.779 | 1.35 | 7.8 | 2.7 |
| Pipe2STD x 5.932 ft | 74.5 | 5.7 | 13.1 | Round | 0.936 | 2.93 | 20.4 | 3.3 |
| SR 3/4 x 3.9 ft | 50.1 | 4.0 | 12.4 | Round | 0.919 | 1.41 | 9.6 | 2.3 |
| SR 5/8 x 3.33 ft | 43.3 | 3.9 | 11.0 | Round | 0.890 | 1.18 | 7.8 | 2.2 |
| Pipe2STD x 4 ft | 51.3 | 5.7 | 9.0 | Round | 0.845 | 2.02 | 12.7 | 3.0 |
| Pipe2STD x 4 ft | 51.3 | 5.7 | 9.0 | Round | 0.845 | 2.02 | 12.7 | 3.0 |

RAMAKER & ASSOCIATES, INC.
100% EMPLOYEE-OWNED

| | |
|---|---|
| Job | CT52XC125 |
| Project | 37621 |
| By | QAR |
| Date | 6/15/18 |

**Ice Wind Load on Antennas** TIA-222-G

$q_z = 0.00256\ K_z\ K_{zt}\ K_d\ V^2\ I$

$F = q_z\ G_h\ C_a\ A_a$

| | | | |
|---|---|---|---|
| Occupancy : | II | | Classification of Structures (Table 2-1) |
| Exposure : | C | | Exposure Category |
| $V_i$ : | 50 | mph | Basic Wind Speed (Annex B) |
| z : | 85 | ft | Height above ground level to the center of the antenna |
| I : | 1.00 | | Importance Factor (Table 2-3) |
| $K_z$ : | 1.22 | | Velocity Pressure Coefficient (2.6.5.2) |
| $K_{zt}$ : | 1.00 | | Topographic Factor (2.6.6.4) |
| $K_d$ : | 0.95 | | Wind Direction Probability Factor (Table 2-2) |
| $q_z$ : | 7.44 | psf | Velocity Pressure at Height z |
| $G_h$ : | 1.00 | | Strength Design of Appurtenances and their Connections |
| $t_{iz}$ : | 1.65 | in | Design Thickness of Radial Ice at Height z (2.6.8) |

**Mount & Antenna Ice Wind Loads**

| Appurtenance | Height | Depth | h/D | Shape | $C_a$ | $A_a$ | Force | Force |
|---|---|---|---|---|---|---|---|---|
| | *in* | *in* | | | | *sq ft* | *lb* | *plf* |
| AAHC | 28.9 | 12.9 | 2.2 | Flat | 1.200 | 2.60 | 23.2 | |
| NNVV-65B-R4 | 75.3 | 11.1 | 6.8 | Flat | 1.390 | 5.80 | 60.0 | |
| VHLP2 | 29.4 | 3.3 | 1.0 | Generic | 0.625 | 4.71 | 21.9 | |
| 1900MHz 4x45W RRH | 28.4 | 14.0 | 2.0 | Flat | 1.200 | 2.76 | 24.6 | |
| 800MHz 2x50W RRH | 22.3 | 15.5 | 1.4 | Flat | 1.200 | 2.40 | 21.4 | |
| | | | | | | | | |
| Pipe2-1/2STD x 9 ft | 111.3 | 6.2 | 18.0 | Round | 1.045 | 4.77 | 37.1 | 4.0 |
| Pipe2STD x 8 ft | 99.3 | 5.7 | 17.5 | Round | 1.033 | 3.91 | 30.1 | 3.6 |
| Pipe2STD x 2.58 ft | 34.3 | 5.7 | 6.0 | Round | 0.779 | 1.35 | 7.8 | 2.7 |
| Pipe2STD x 5.932 ft | 74.5 | 5.7 | 13.1 | Round | 0.936 | 2.93 | 20.4 | 3.3 |
| SR 3/4 x 3.9 ft | 50.1 | 4.0 | 12.4 | Round | 0.919 | 1.41 | 9.6 | 2.3 |
| SR 5/8 x 3.33 ft | 43.3 | 3.9 | 11.0 | Round | 0.890 | 1.18 | 7.8 | 2.2 |
| Pipe2STD x 4 ft | 51.3 | 5.7 | 9.0 | Round | 0.845 | 2.02 | 12.7 | 3.0 |
| Pipe2STD x 4 ft | 51.3 | 5.7 | 9.0 | Round | 0.845 | 2.02 | 12.7 | 3.0 |

RAMAKER & ASSOCIATES, INC.
100% EMPLOYEE-OWNED

| | |
|---|---|
| Job | CT52XC125 |
| Project | 37621 |
| By | QAR |
| Date | 6/15/18 |

**Ice Load on Antennas** TIA-222-G

| | | | |
|---|---|---|---|
| Ice Weight : | 56 | pcf | Ice Density |
| $t_i$ : | 0.75 | | Design Ice Thickness |
| Occupancy : | II | | Classification of Structures (Table 2-1) |
| Exposure : | C | | Exposure Category |
| $V_i$ : | 50 | mph | Basic Wind Speed (Annex B) |
| z : | 85 | ft | Height above ground level to the center of the antenna |
| I : | 1.00 | | Importance Factor (Table 2-3) |
| $K_{iz}$ : | 1.10 | | Height Escalation Factor for Ice Thickness |
| $K_{zt}$ : | 1.00 | | Topographic Factor (2.6.6.4) |
| $t_{iz}$ : | 1.65 | in | Design Thickness of Radial Ice at Height z (2.6.8) |

| | |
|---|---|
| Platform Grating : | None |
| Ice Load : | psf |

**Mount & Antenna Ice Wind Loads**

| Appurtenance | Height | Width | Depth | Diam. | Area | Perim. | Ice Weight | |
|---|---|---|---|---|---|---|---|---|
| | *in* | *in* | *in* | *in* | *sq in* | *in* | *lb* | *plf* |
| AAHC | 28.9 | 23.0 | 12.9 | 21.95 | 122.27 | 65.34 | 101.6 | |
| NNVV-65B-R4 | 75.3 | 22.9 | 11.1 | 21.10 | 117.81 | 61.40 | 274.9 | |
| VHLP2 | - | - | - | - | - | - | 116.0 | |
| 1900MHz 4x45W RRH | 28.4 | 14.4 | 14.0 | 15.41 | 88.37 | 50.18 | 71.9 | |
| 800MHz 2x50W RRH | 22.3 | 16.3 | 15.5 | 17.83 | 100.89 | 57.00 | 62.1 | |
| | | | | | | | | |
| Pipe2-1/2STD x 9 ft | 111.3 | 6.2 | 6.2 | 2.88 | 23.43 | 14.21 | 82.0 | 9.1 |
| Pipe2STD x 8 ft | 99.3 | 5.7 | 5.7 | 2.38 | 20.84 | 12.64 | 64.8 | 8.1 |
| Pipe2STD x 2.58 ft | 34.3 | 5.7 | 5.7 | 2.38 | 20.84 | 12.64 | 20.9 | 8.1 |
| Pipe2STD x 5.932 ft | 74.5 | 5.7 | 5.7 | 2.38 | 20.84 | 12.64 | 48.1 | 8.1 |
| SR 3/4 x 3.9 ft | 50.1 | 4.0 | 4.0 | 0.75 | 12.43 | 7.54 | 18.8 | 4.8 |
| SR 5/8 x 3.33 ft | 43.3 | 3.9 | 3.9 | 0.63 | 11.78 | 7.14 | 15.3 | 4.6 |
| Pipe2STD x 4 ft | 51.3 | 5.7 | 5.7 | 2.38 | 20.84 | 12.64 | 32.4 | 8.1 |
| Pipe2STD x 4 ft | 51.3 | 5.7 | 5.7 | 2.38 | 20.84 | 12.64 | 32.4 | 8.1 |

## Hot Rolled Steel Properties

| | Label | E [ksi] | G [ksi] | Nu | Therm (\1E..Density[k/ft... | | Yield[ksi] | Ry | Fu[ksi] | Rt |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | A36 Gr.36 | 29000 | 11154 | .3 | .65 | .49 | 36 | 1.5 | 58 | 1.2 |
| 2 | Gr. 33 | 29000 | 11154 | .3 | .65 | .49 | 33 | 1.5 | 58 | 1.2 |
| 3 | A572 Gr.50 | 29000 | 11154 | .3 | .65 | .49 | 50 | 1.1 | 65 | 1.1 |
| 4 | A992 | 29000 | 11154 | .3 | .65 | .49 | 50 | 1.1 | 65 | 1.1 |
| 5 | A500 Gr.B RND | 29000 | 11154 | .3 | .65 | .49 | 42 | 1.4 | 58 | 1.3 |
| 6 | A500 Gr.B Rect | 29000 | 11154 | .3 | .65 | .49 | 46 | 1.4 | 58 | 1.3 |
| 7 | A53 Gr.B | 29000 | 11154 | .3 | .65 | .49 | 35 | 1.6 | 60 | 1.2 |
| 8 | A1085 | 29000 | 11154 | .3 | .65 | .49 | 50 | 1.4 | 65 | 1.3 |

## Hot Rolled Steel Section Sets

| | Label | Shape | Type | Design List | Material | Design Rules | A [in2] | Iyy [in4] | Izz [in4] | J [in4] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Pipe 2.5 | PIPE_2.5 | Beam | Pipe | A53 Gr.B | Typical | 1.61 | 1.45 | 1.45 | 2.89 |
| 2 | PL5/8"x3.5" | PL5/8"x3.5" | Beam | RECT | A36 Gr.36 | Typical | 2.188 | .071 | 2.233 | .253 |
| 3 | PL5/8"x7.5" | PL5/8"x7.5" | Beam | RECT | A36 Gr.36 | Typical | 4.688 | .153 | 21.973 | .578 |
| 4 | Pipe 2.0 | PIPE_2.0 | Beam | Pipe | A53 Gr.B | Typical | 1.02 | .627 | .627 | 1.25 |
| 5 | SR3/4" | 3/4" SR | Beam | BAR | A36 Gr.36 | Typical | .442 | .016 | .016 | .031 |
| 6 | SR5/8" | 5/8" SR | Beam | BAR | A36 Gr.36 | Typical | .307 | .007 | .007 | .015 |

## Member Primary Data

| | Label | I Joint | J Joint | K Joint | Rotate(deg) | Section/Shape | Type | Design List | Material | Design Rules |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | TH | N7 | N8 | | | Pipe 2.5 | Beam | Pipe | A53 Gr.B | Typical |
| 2 | BH | N22 | N23 | | | Pipe 2.5 | Beam | Pipe | A53 Gr.B | Typical |
| 3 | PL5 | N4 | N13 | | 90 | PL5/8"x7.5" | Beam | RECT | A36 Gr.36 | Typical |
| 4 | PL6 | N19 | N28 | | 90 | PL5/8"x7.5" | Beam | RECT | A36 Gr.36 | Typical |
| 5 | PL2 | N6 | N4 | | 90 | PL5/8"x3.5" | Beam | RECT | A36 Gr.36 | Typical |
| 6 | PL1 | N4 | N5 | | 90 | PL5/8"x3.5" | Beam | RECT | A36 Gr.36 | Typical |
| 7 | PL4 | N21 | N19 | | 90 | PL5/8"x3.5" | Beam | RECT | A36 Gr.36 | Typical |
| 8 | PL3 | N19 | N20 | | 90 | PL5/8"x3.5" | Beam | RECT | A36 Gr.36 | Typical |
| 9 | SA4 | N26 | N21 | | | Pipe 2.0 | Beam | Pipe | A53 Gr.B | Typical |
| 10 | SA1 | N11 | N5 | | | Pipe 2.0 | Beam | Pipe | A53 Gr.B | Typical |
| 11 | SA3 | N27 | N20 | | | Pipe 2.0 | Beam | Pipe | A53 Gr.B | Typical |
| 12 | M2 | N10 | N12 | | 90 | PL5/8"x3.5" | Beam | RECT | A36 Gr.36 | Typical |
| 13 | M4 | N24 | N26 | | 90 | PL5/8"x3.5" | Beam | RECT | A36 Gr.36 | Typical |
| 14 | M1 | N9 | N11 | | 90 | PL5/8"x3.5" | Beam | RECT | A36 Gr.36 | Typical |
| 15 | M3 | N25 | N27 | | 90 | PL5/8"x3.5" | Beam | RECT | A36 Gr.36 | Typical |
| 16 | V4 | N39 | N33 | | | SR5/8" | Beam | BAR | A36 Gr.36 | Typical |
| 17 | V3 | N40 | N34 | | | SR5/8" | Beam | BAR | A36 Gr.36 | Typical |
| 18 | V1 | N17 | N32 | | | SR5/8" | Beam | BAR | A36 Gr.36 | Typical |
| 19 | V2 | N18 | N35 | | | SR5/8" | Beam | BAR | A36 Gr.36 | Typical |
| 20 | D3 | N39 | N34 | | | SR3/4" | Beam | BAR | A36 Gr.36 | Typical |
| 21 | D4 | N40 | N33 | | | SR3/4" | Beam | BAR | A36 Gr.36 | Typical |
| 22 | D1 | N18 | N32 | | | SR3/4" | Beam | BAR | A36 Gr.36 | Typical |
| 23 | D2 | N17 | N35 | | | SR3/4" | Beam | BAR | A36 Gr.36 | Typical |
| 24 | MP3 | N36 | N1 | | | Pipe 2.0 | Beam | Pipe | A53 Gr.B | Typical |
| 25 | MP2 | N37 | N2 | | | Pipe 2.0 | Beam | Pipe | A53 Gr.B | Typical |
| 26 | MP1 | N38 | N3 | | | Pipe 2.0 | Beam | Pipe | A53 Gr.B | Typical |
| 27 | SA2 | N12 | N6 | | | Pipe 2.0 | Beam | Pipe | A53 Gr.B | Typical |
| 28 | TB | N41 | N42 | | | Pipe 2.0 | Beam | Pipe | A53 Gr.B | Typical |
| 29 | MP5 | N49 | N51 | | | Pipe 2.0 | Beam | Pipe | A53 Gr.B | Typical |
| 30 | MP4 | N50 | N52 | | | Pipe 2.0 | Beam | Pipe | A53 Gr.B | Typical |

## Basic Load Cases

| | BLC Description | Category | X Gravity | Y Gravity | Z Gravity | Joint | Point | Distributed | Area(Me... | Surface(P... |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Dead Load | None | | -1 | | | 8 | | | |
| 2 | Antenna Wind 0 | None | | | | | 16 | | | |
| 3 | Antenna Wind 30 | None | | | | | 16 | | | |
| 4 | Antenna Wind 45 | None | | | | | 16 | | | |
| 5 | Antenna Wind 60 | None | | | | | 16 | | | |
| 6 | Antenna Wind 90 | None | | | | | 16 | | | |
| 7 | Antenna Wind 120 | None | | | | | 16 | | | |
| 8 | Antenna Wind 135 | None | | | | | 16 | | | |
| 9 | Antenna Wind 150 | None | | | | | 16 | | | |
| 10 | Antenna Wind 180 | None | | | | | 16 | | | |
| 11 | Antenna Wind 210 | None | | | | | 16 | | | |
| 12 | Antenna Wind 225 | None | | | | | 16 | | | |
| 13 | Antenna Wind 240 | None | | | | | 16 | | | |
| 14 | Antenna Wind 270 | None | | | | | 16 | | | |
| 15 | Antenna Wind 300 | None | | | | | 16 | | | |
| 16 | Antenna Wind 315 | None | | | | | 16 | | | |
| 17 | Antenna Wind 330 | None | | | | | 16 | | | |
| 18 | Antenna Ice Dead Load | None | | | | | 8 | | | |
| 19 | Antenna Wind w/Ice 0 | None | | | | | 16 | | | |
| 20 | Antenna Wind w/Ice 30 | None | | | | | 16 | | | |
| 21 | Antenna Wind w/Ice 45 | None | | | | | 16 | | | |
| 22 | Antenna Wind w/Ice 60 | None | | | | | 16 | | | |
| 23 | Antenna Wind w/Ice 90 | None | | | | | 16 | | | |
| 24 | Antenna Wind w/Ice 1... | None | | | | | 16 | | | |
| 25 | Antenna Wind w/Ice 1... | None | | | | | 16 | | | |
| 26 | Antenna Wind w/Ice 1... | None | | | | | 16 | | | |
| 27 | Antenna Wind w/Ice 1... | None | | | | | 16 | | | |
| 28 | Antenna Wind w/Ice 2... | None | | | | | 16 | | | |
| 29 | Antenna Wind w/Ice 2... | None | | | | | 16 | | | |
| 30 | 'Antenna Wind w/Ice ... | None | | | | | 16 | | | |
| 31 | Antenna Wind w/Ice 2... | None | | | | | 16 | | | |
| 32 | Antenna Wind w/Ice 3... | None | | | | | 16 | | | |
| 33 | Antenna Wind w/Ice 3... | None | | | | | 16 | | | |
| 34 | Antenna Wind w/Ice 3... | None | | | | | 16 | | | |
| 35 | Member Wind 0 | None | | | | | | 40 | | |
| 36 | Member Wind 30 | None | | | | | | 40 | | |
| 37 | Member Wind 45 | None | | | | | | 40 | | |
| 38 | Member Wind 60 | None | | | | | | 40 | | |
| 39 | Member Wind 90 | None | | | | | | 40 | | |
| 40 | Member Wind 120 | None | | | | | | 40 | | |
| 41 | Member Wind 135 | None | | | | | | 40 | | |
| 42 | Member Wind 150 | None | | | | | | 40 | | |
| 43 | Member Wind 180 | None | | | | | | 40 | | |
| 44 | Member Wind 210 | None | | | | | | 40 | | |
| 45 | Member Wind 225 | None | | | | | | 40 | | |
| 46 | Member Wind 240 | None | | | | | | 40 | | |
| 47 | Member Wind 270 | None | | | | | | 40 | | |
| 48 | Member Wind 300 | None | | | | | | 40 | | |
| 49 | Member Wind 315 | None | | | | | | 40 | | |
| 50 | Member Wind 330 | None | | | | | | 40 | | |
| 51 | Member Ice Dead Load | None | | | | | | 20 | | |
| 52 | Member Wind w/Ice 0 | None | | | | | | 40 | | |
| 53 | Member Wind w/Ice 30 | None | | | | | | 40 | | |
| 54 | Member Wind w/Ice 45 | None | | | | | | 40 | | |
| 55 | Member Wind w/Ice 60 | None | | | | | | 40 | | |
| 56 | Member Wind w/Ice 90 | None | | | | | | 40 | | |

## Basic Load Cases (Continued)

| | BLC Description | Category | X Gravity | Y Gravity | Z Gravity | Joint | Point | Distributed | Area(Me... | Surface(P... |
|---|---|---|---|---|---|---|---|---|---|---|
| 57 | Member Wind w/Ice 1... | None | | | | | | 40 | | |
| 58 | Member Wind w/Ice 1... | None | | | | | | 40 | | |
| 59 | Member Wind w/Ice 1... | None | | | | | | 40 | | |
| 60 | Member Wind w/Ice 1... | None | | | | | | 40 | | |
| 61 | Member Wind w/Ice 2... | None | | | | | | 40 | | |
| 62 | Member Wind w/Ice 2... | None | | | | | | 40 | | |
| 63 | Member Wind w/Ice 2... | None | | | | | | 40 | | |
| 64 | Member Wind w/Ice 2... | None | | | | | | 40 | | |
| 65 | Member Wind w/Ice 3... | None | | | | | | 40 | | |
| 66 | Member Wind w/Ice 3... | None | | | | | | 40 | | |
| 67 | Member Wind w/Ice 3... | None | | | | | | 40 | | |
| 68 | LV-1 | None | | | | | 1 | | | |
| 69 | LV-2 | None | | | | | 1 | | | |
| 70 | LV-3 | None | | | | | 1 | | | |
| 71 | LV-4 | None | | | | | 1 | | | |
| 72 | LV-5 | None | | | | | 1 | | | |
| 73 | LV-6 | None | | | | | 1 | | | |
| 74 | LV-7 | None | | | | | | | | |
| 75 | LV-8 | None | | | | | | | | |
| 76 | LV-9 | None | | | | | | | | |
| 77 | LV-10 | None | | | | | | | | |
| 78 | LV-11 | None | | | | | | | | |
| 79 | LV-12 | None | | | | | | | | |
| 80 | LV-13 | None | | | | | | | | |
| 81 | LV-14 | None | | | | | | | | |
| 82 | LV-15 | None | | | | | | | | |
| 83 | LM-1 | None | | | | | 1 | | | |
| 84 | LM-2 | None | | | | | 1 | | | |
| 85 | LM-3 | None | | | | | 1 | | | |
| 86 | LM-4 | None | | | | | | | | |
| 87 | LM-5 | None | | | | | | | | |
| 88 | LM-6 | None | | | | | | | | |
| 89 | LM-7 | None | | | | | | | | |
| 90 | LM-8 | None | | | | | | | | |
| 91 | LM-9 | None | | | | | | | | |
| 92 | LM-10 | None | | | | | | | | |
| 93 | LM-11 | None | | | | | | | | |
| 94 | LM-12 | None | | | | | | | | |
| 95 | LM-13 | None | | | | | | | | |
| 96 | LM-14 | None | | | | | | | | |
| 97 | LM-15 | None | | | | | | | | |

## Load Combinations

| | Description | S... | P... | S... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.4D | Yes | Y | | 1 | 1.4 | | | | | | | | | | | | | | | | | | |
| 2 | 0.9D + 1.6 (0-Wind) | Yes | Y | | 1 | .9 | 2 | 1.6 | 35 | 1.6 | | | | | | | | | | | | | | |
| 3 | 0.9D + 1.6 (30-Wind) | Yes | Y | | 1 | .9 | 3 | 1.6 | 36 | 1.6 | | | | | | | | | | | | | | |
| 4 | 0.9D + 1.6 (45-Wind) | Yes | Y | | 1 | .9 | 4 | 1.6 | 37 | 1.6 | | | | | | | | | | | | | | |
| 5 | 0.9D + 1.6 (60-Wind) | Yes | Y | | 1 | .9 | 5 | 1.6 | 38 | 1.6 | | | | | | | | | | | | | | |
| 6 | 0.9D + 1.6 (90-Wind) | Yes | Y | | 1 | .9 | 6 | 1.6 | 39 | 1.6 | | | | | | | | | | | | | | |
| 7 | 0.9D + 1.6 (120-Wind) | Yes | Y | | 1 | .9 | 7 | 1.6 | 40 | 1.6 | | | | | | | | | | | | | | |
| 8 | 0.9D + 1.6 (135-Wind) | Yes | Y | | 1 | .9 | 8 | 1.6 | 41 | 1.6 | | | | | | | | | | | | | | |
| 9 | 0.9D + 1.6 (150-Wind) | Yes | Y | | 1 | .9 | 9 | 1.6 | 42 | 1.6 | | | | | | | | | | | | | | |
| 10 | 0.9D + 1.6 (180-Wind) | Yes | Y | | 1 | .9 | 10 | 1.6 | 43 | 1.6 | | | | | | | | | | | | | | |
| 11 | 0.9D + 1.6 (210-Wind) | Yes | Y | | 1 | .9 | 11 | 1.6 | 44 | 1.6 | | | | | | | | | | | | | | |

## Load Combinations (Continued)

| | Description | S... | P... | S... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 0.9D + 1.6 (225-Wind) | Yes | Y | | 1 | .9 | 12 | 1.6 | 45 | 1.6 | | | | | | | | | | | | | | |
| 13 | 0.9D + 1.6 (240-Wind) | Yes | Y | | 1 | .9 | 13 | 1.6 | 46 | 1.6 | | | | | | | | | | | | | | |
| 14 | 0.9D + 1.6 (270-Wind) | Yes | Y | | 1 | .9 | 14 | 1.6 | 47 | 1.6 | | | | | | | | | | | | | | |
| 15 | 0.9D + 1.6 (300-Wind) | Yes | Y | | 1 | .9 | 15 | 1.6 | 48 | 1.6 | | | | | | | | | | | | | | |
| 16 | 0.9D + 1.6 (315-Wind) | Yes | Y | | 1 | .9 | 16 | 1.6 | 49 | 1.6 | | | | | | | | | | | | | | |
| 17 | 0.9D + 1.6 (330-Wind) | Yes | Y | | 1 | .9 | 17 | 1.6 | 50 | 1.6 | | | | | | | | | | | | | | |
| 18 | 1.2D + 1.6 (0-Wind) | Yes | Y | | 1 | 1.2 | 2 | 1.6 | 35 | 1.6 | | | | | | | | | | | | | | |
| 19 | 1.2D + 1.6 (30-Wind) | Yes | Y | | 1 | 1.2 | 3 | 1.6 | 36 | 1.6 | | | | | | | | | | | | | | |
| 20 | 1.2D + 1.6 (45-Wind) | Yes | Y | | 1 | 1.2 | 4 | 1.6 | 37 | 1.6 | | | | | | | | | | | | | | |
| 21 | 1.2D + 1.6 (60-Wind) | Yes | Y | | 1 | 1.2 | 5 | 1.6 | 38 | 1.6 | | | | | | | | | | | | | | |
| 22 | 1.2D + 1.6 (90-Wind) | Yes | Y | | 1 | 1.2 | 6 | 1.6 | 39 | 1.6 | | | | | | | | | | | | | | |
| 23 | 1.2D + 1.6 (120-Wind) | Yes | Y | | 1 | 1.2 | 7 | 1.6 | 40 | 1.6 | | | | | | | | | | | | | | |
| 24 | 1.2D + 1.6 (135-Wind) | Yes | Y | | 1 | 1.2 | 8 | 1.6 | 41 | 1.6 | | | | | | | | | | | | | | |
| 25 | 1.2D + 1.6 (150-Wind) | Yes | Y | | 1 | 1.2 | 9 | 1.6 | 42 | 1.6 | | | | | | | | | | | | | | |
| 26 | 1.2D + 1.6 (180-Wind) | Yes | Y | | 1 | 1.2 | 10 | 1.6 | 43 | 1.6 | | | | | | | | | | | | | | |
| 27 | 1.2D + 1.6 (210-Wind) | Yes | Y | | 1 | 1.2 | 11 | 1.6 | 44 | 1.6 | | | | | | | | | | | | | | |
| 28 | 1.2D + 1.6 (225-Wind) | Yes | Y | | 1 | 1.2 | 12 | 1.6 | 45 | 1.6 | | | | | | | | | | | | | | |
| 29 | 1.2D + 1.6 (240-Wind) | Yes | Y | | 1 | 1.2 | 13 | 1.6 | 46 | 1.6 | | | | | | | | | | | | | | |
| 30 | 1.2D + 1.6 (270-Wind) | Yes | Y | | 1 | 1.2 | 14 | 1.6 | 47 | 1.6 | | | | | | | | | | | | | | |
| 31 | 1.2D + 1.6 (300-Wind) | Yes | Y | | 1 | 1.2 | 15 | 1.6 | 48 | 1.6 | | | | | | | | | | | | | | |
| 32 | 1.2D + 1.6 (315-Wind) | Yes | Y | | 1 | 1.2 | 16 | 1.6 | 49 | 1.6 | | | | | | | | | | | | | | |
| 33 | 1.2D + 1.6 (330-Wind) | Yes | Y | | 1 | 1.2 | 17 | 1.6 | 50 | 1.6 | | | | | | | | | | | | | | |
| 34 | 1.2D + 1.0Di + 1.0 (0-Wind I... | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 19 | 1 | 52 | 1 | | | | | | | | | | |
| 35 | 1.2D + 1.0Di + 1.0 (30-Wind... | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 20 | 1 | 53 | 1 | | | | | | | | | | |
| 36 | 1.2D + 1.0Di + 1.0 (45-Wind... | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 21 | 1 | 54 | 1 | | | | | | | | | | |
| 37 | 1.2D + 1.0Di + 1.0 (60-Wind... | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 22 | 1 | 55 | 1 | | | | | | | | | | |
| 38 | 1.2D + 1.0Di + 1.0 (90-Wind... | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 23 | 1 | 56 | 1 | | | | | | | | | | |
| 39 | 1.2D + 1.0Di + 1.0 (120-Win... | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 24 | 1 | 57 | 1 | | | | | | | | | | |
| 40 | 1.2D + 1.0Di + 1.0 (135-Win... | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 25 | 1 | 58 | 1 | | | | | | | | | | |
| 41 | 1.2D + 1.0Di + 1.0 (150-Win... | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 26 | 1 | 59 | 1 | | | | | | | | | | |
| 42 | 1.2D + 1.0Di + 1.0 (180-Win... | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 27 | 1 | 60 | 1 | | | | | | | | | | |
| 43 | 1.2D + 1.0Di + 1.0 (210-Win... | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 28 | 1 | 61 | 1 | | | | | | | | | | |
| 44 | 1.2D + 1.0Di + 1.0 (225-Win... | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 29 | 1 | 62 | 1 | | | | | | | | | | |
| 45 | 1.2D + 1.0Di + 1.0 (240-Win... | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 30 | 1 | 63 | 1 | | | | | | | | | | |
| 46 | 1.2D + 1.0Di + 1.0 (270-Win... | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 31 | 1 | 64 | 1 | | | | | | | | | | |
| 47 | 1.2D + 1.0Di + 1.0 (300-Win... | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 32 | 1 | 65 | 1 | | | | | | | | | | |
| 48 | 1.2D + 1.0Di + 1.0 (315-Win... | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 33 | 1 | 66 | 1 | | | | | | | | | | |
| 49 | 1.2D + 1.0Di + 1.0 (330-Win... | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 34 | 1 | 67 | 1 | | | | | | | | | | |
| 50 | 1.2D + 1.5LV-1 | Yes | Y | | 1 | 1.2 | 68 | 1.5 | | | | | | | | | | | | | | | | |
| 51 | 1.2D + 1.5LV-2 | Yes | Y | | 1 | 1.2 | 69 | 1.5 | | | | | | | | | | | | | | | | |
| 52 | 1.2D + 1.5LV-3 | Yes | Y | | 1 | 1.2 | 70 | 1.5 | | | | | | | | | | | | | | | | |
| 53 | 1.2D + 1.5LV-4 | Yes | Y | | 1 | 1.2 | 71 | 1.5 | | | | | | | | | | | | | | | | |
| 54 | 1.2D + 1.5LV-5 | Yes | Y | | 1 | 1.2 | 72 | 1.5 | | | | | | | | | | | | | | | | |
| 55 | 1.2D + 1.5LV-6 | Yes | Y | | 1 | 1.2 | 73 | 1.5 | | | | | | | | | | | | | | | | |
| 56 | 1.2D + 1.5LV-7 | Yes | Y | | 1 | 1.2 | 74 | 1.5 | | | | | | | | | | | | | | | | |
| 57 | 1.2D + 1.5LV-8 | Yes | Y | | 1 | 1.2 | 75 | 1.5 | | | | | | | | | | | | | | | | |
| 58 | 1.2D + 1.5LV-9 | Yes | Y | | 1 | 1.2 | 76 | 1.5 | | | | | | | | | | | | | | | | |
| 59 | 1.2D + 1.5LV-10 | Yes | Y | | 1 | 1.2 | 77 | 1.5 | | | | | | | | | | | | | | | | |
| 60 | 1.2D + 1.5LV-11 | Yes | Y | | 1 | 1.2 | 78 | 1.5 | | | | | | | | | | | | | | | | |
| 61 | 1.2D + 1.5LV-12 | Yes | Y | | 1 | 1.2 | 79 | 1.5 | | | | | | | | | | | | | | | | |
| 62 | 1.2D + 1.5LV-13 | Yes | Y | | 1 | 1.2 | 80 | 1.5 | | | | | | | | | | | | | | | | |
| 63 | 1.2D + 1.5LV-14 | Yes | Y | | 1 | 1.2 | 81 | 1.5 | | | | | | | | | | | | | | | | |
| 64 | 1.2D + 1.5LV-15 | Yes | Y | | 1 | 1.2 | 82 | 1.5 | | | | | | | | | | | | | | | | |
| 65 | 1.2D + 1.5LM-1 + Maintena... | Yes | Y | | 1 | 1.2 | 83 | 1.5 | 2 | .088 | 35 | .088 | | | | | | | | | | | | |
| 66 | 1.2D + 1.5LM-1 + Maintena... | Yes | Y | | 1 | 1.2 | 83 | 1.5 | 3 | .088 | 36 | .088 | | | | | | | | | | | | |
| 67 | 1.2D + 1.5LM-1 + Maintena... | Yes | Y | | 1 | 1.2 | 83 | 1.5 | 4 | .088 | 37 | .088 | | | | | | | | | | | | |
| 68 | 1.2D + 1.5LM-1 + Maintena... | Yes | Y | | 1 | 1.2 | 83 | 1.5 | 5 | .088 | 38 | .088 | | | | | | | | | | | | |

## Load Combinations (Continued)

| | Description | S... | P... | S... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 69 | 1.2D + 1.5LM-1 + Maintena... | Yes | Y | | 1 | 1.2 | 83 | 1.5 | 6 | .088 | 39 | .088 | | | | | | | | | | | | |
| 70 | 1.2D + 1.5LM-1 + Maintena... | Yes | Y | | 1 | 1.2 | 83 | 1.5 | 7 | .088 | 40 | .088 | | | | | | | | | | | | |
| 71 | 1.2D + 1.5LM-1 + Maintena... | Yes | Y | | 1 | 1.2 | 83 | 1.5 | 8 | .088 | 41 | .088 | | | | | | | | | | | | |
| 72 | 1.2D + 1.5LM-1 + Maintena... | Yes | Y | | 1 | 1.2 | 83 | 1.5 | 9 | .088 | 42 | .088 | | | | | | | | | | | | |
| 73 | 1.2D + 1.5LM-1 + Maintena... | Yes | Y | | 1 | 1.2 | 83 | 1.5 | 10 | .088 | 43 | .088 | | | | | | | | | | | | |
| 74 | 1.2D + 1.5LM-1 + Maintena... | Yes | Y | | 1 | 1.2 | 83 | 1.5 | 11 | .088 | 44 | .088 | | | | | | | | | | | | |
| 75 | 1.2D + 1.5LM-1 + Maintena... | Yes | Y | | 1 | 1.2 | 83 | 1.5 | 12 | .088 | 45 | .088 | | | | | | | | | | | | |
| 76 | 1.2D + 1.5LM-1 + Maintena... | Yes | Y | | 1 | 1.2 | 83 | 1.5 | 13 | .088 | 46 | .088 | | | | | | | | | | | | |
| 77 | 1.2D + 1.5LM-1 + Maintena... | Yes | Y | | 1 | 1.2 | 83 | 1.5 | 14 | .088 | 47 | .088 | | | | | | | | | | | | |
| 78 | 1.2D + 1.5LM-1 + Maintena... | Yes | Y | | 1 | 1.2 | 83 | 1.5 | 15 | .088 | 48 | .088 | | | | | | | | | | | | |
| 79 | 1.2D + 1.5LM-1 + Maintena... | Yes | Y | | 1 | 1.2 | 83 | 1.5 | 16 | .088 | 49 | .088 | | | | | | | | | | | | |
| 80 | 1.2D + 1.5LM-1 + Maintena... | Yes | Y | | 1 | 1.2 | 83 | 1.5 | 17 | .088 | 50 | .088 | | | | | | | | | | | | |
| 81 | 1.2D + 1.5LM-2 + Maintena... | Yes | Y | | 1 | 1.2 | 84 | 1.5 | 2 | .088 | 35 | .088 | | | | | | | | | | | | |
| 82 | 1.2D + 1.5LM-2 + Maintena... | Yes | Y | | 1 | 1.2 | 84 | 1.5 | 3 | .088 | 36 | .088 | | | | | | | | | | | | |
| 83 | 1.2D + 1.5LM-2 + Maintena... | Yes | Y | | 1 | 1.2 | 84 | 1.5 | 4 | .088 | 37 | .088 | | | | | | | | | | | | |
| 84 | 1.2D + 1.5LM-2 + Maintena... | Yes | Y | | 1 | 1.2 | 84 | 1.5 | 5 | .088 | 38 | .088 | | | | | | | | | | | | |
| 85 | 1.2D + 1.5LM-2 + Maintena... | Yes | Y | | 1 | 1.2 | 84 | 1.5 | 6 | .088 | 39 | .088 | | | | | | | | | | | | |
| 86 | 1.2D + 1.5LM-2 + Maintena... | Yes | Y | | 1 | 1.2 | 84 | 1.5 | 7 | .088 | 40 | .088 | | | | | | | | | | | | |
| 87 | 1.2D + 1.5LM-2 + Maintena... | Yes | Y | | 1 | 1.2 | 84 | 1.5 | 8 | .088 | 41 | .088 | | | | | | | | | | | | |
| 88 | 1.2D + 1.5LM-2 + Maintena... | Yes | Y | | 1 | 1.2 | 84 | 1.5 | 9 | .088 | 42 | .088 | | | | | | | | | | | | |
| 89 | 1.2D + 1.5LM-2 + Maintena... | Yes | Y | | 1 | 1.2 | 84 | 1.5 | 10 | .088 | 43 | .088 | | | | | | | | | | | | |
| 90 | 1.2D + 1.5LM-2 + Maintena... | Yes | Y | | 1 | 1.2 | 84 | 1.5 | 11 | .088 | 44 | .088 | | | | | | | | | | | | |
| 91 | 1.2D + 1.5LM-2 + Maintena... | Yes | Y | | 1 | 1.2 | 84 | 1.5 | 12 | .088 | 45 | .088 | | | | | | | | | | | | |
| 92 | 1.2D + 1.5LM-2 + Maintena... | Yes | Y | | 1 | 1.2 | 84 | 1.5 | 13 | .088 | 46 | .088 | | | | | | | | | | | | |
| 93 | 1.2D + 1.5LM-2 + Maintena... | Yes | Y | | 1 | 1.2 | 84 | 1.5 | 14 | .088 | 47 | .088 | | | | | | | | | | | | |
| 94 | 1.2D + 1.5LM-2 + Maintena... | Yes | Y | | 1 | 1.2 | 84 | 1.5 | 15 | .088 | 48 | .088 | | | | | | | | | | | | |
| 95 | 1.2D + 1.5LM-2 + Maintena... | Yes | Y | | 1 | 1.2 | 84 | 1.5 | 16 | .088 | 49 | .088 | | | | | | | | | | | | |
| 96 | 1.2D + 1.5LM-2 + Maintena... | Yes | Y | | 1 | 1.2 | 84 | 1.5 | 17 | .088 | 50 | .088 | | | | | | | | | | | | |
| 97 | 1.2D + 1.5LM-3 + Maintena... | Yes | Y | | 1 | 1.2 | 85 | 1.5 | 2 | .088 | 35 | .088 | | | | | | | | | | | | |
| 98 | 1.2D + 1.5LM-3 + Maintena... | Yes | Y | | 1 | 1.2 | 85 | 1.5 | 3 | .088 | 36 | .088 | | | | | | | | | | | | |
| 99 | 1.2D + 1.5LM-3 + Maintena... | Yes | Y | | 1 | 1.2 | 85 | 1.5 | 4 | .088 | 37 | .088 | | | | | | | | | | | | |
| 100 | 1.2D + 1.5LM-3 + Maintena... | Yes | Y | | 1 | 1.2 | 85 | 1.5 | 5 | .088 | 38 | .088 | | | | | | | | | | | | |
| 101 | 1.2D + 1.5LM-3 + Maintena... | Yes | Y | | 1 | 1.2 | 85 | 1.5 | 6 | .088 | 39 | .088 | | | | | | | | | | | | |
| 102 | 1.2D + 1.5LM-3 + Maintena... | Yes | Y | | 1 | 1.2 | 85 | 1.5 | 7 | .088 | 40 | .088 | | | | | | | | | | | | |
| 103 | 1.2D + 1.5LM-3 + Maintena... | Yes | Y | | 1 | 1.2 | 85 | 1.5 | 8 | .088 | 41 | .088 | | | | | | | | | | | | |
| 104 | 1.2D + 1.5LM-3 + Maintena... | Yes | Y | | 1 | 1.2 | 85 | 1.5 | 9 | .088 | 42 | .088 | | | | | | | | | | | | |
| 105 | 1.2D + 1.5LM-3 + Maintena... | Yes | Y | | 1 | 1.2 | 85 | 1.5 | 10 | .088 | 43 | .088 | | | | | | | | | | | | |
| 106 | 1.2D + 1.5LM-3 + Maintena... | Yes | Y | | 1 | 1.2 | 85 | 1.5 | 11 | .088 | 44 | .088 | | | | | | | | | | | | |
| 107 | 1.2D + 1.5LM-3 + Maintena... | Yes | Y | | 1 | 1.2 | 85 | 1.5 | 12 | .088 | 45 | .088 | | | | | | | | | | | | |
| 108 | 1.2D + 1.5LM-3 + Maintena... | Yes | Y | | 1 | 1.2 | 85 | 1.5 | 13 | .088 | 46 | .088 | | | | | | | | | | | | |
| 109 | 1.2D + 1.5LM-3 + Maintena... | Yes | Y | | 1 | 1.2 | 85 | 1.5 | 14 | .088 | 47 | .088 | | | | | | | | | | | | |
| 110 | 1.2D + 1.5LM-3 + Maintena... | Yes | Y | | 1 | 1.2 | 85 | 1.5 | 15 | .088 | 48 | .088 | | | | | | | | | | | | |
| 111 | 1.2D + 1.5LM-3 + Maintena... | Yes | Y | | 1 | 1.2 | 85 | 1.5 | 16 | .088 | 49 | .088 | | | | | | | | | | | | |
| 112 | 1.2D + 1.5LM-3 + Maintena... | Yes | Y | | 1 | 1.2 | 85 | 1.5 | 17 | .088 | 50 | .088 | | | | | | | | | | | | |
| 113 | 1.2D + 1.5LM-4 + Maintena... | Yes | Y | | 1 | 1.2 | 86 | 1.5 | 2 | .088 | 35 | .088 | | | | | | | | | | | | |
| 114 | 1.2D + 1.5LM-4 + Maintena... | Yes | Y | | 1 | 1.2 | 86 | 1.5 | 3 | .088 | 36 | .088 | | | | | | | | | | | | |
| 115 | 1.2D + 1.5LM-4 + Maintena... | Yes | Y | | 1 | 1.2 | 86 | 1.5 | 4 | .088 | 37 | .088 | | | | | | | | | | | | |
| 116 | 1.2D + 1.5LM-4 + Maintena... | Yes | Y | | 1 | 1.2 | 86 | 1.5 | 5 | .088 | 38 | .088 | | | | | | | | | | | | |
| 117 | 1.2D + 1.5LM-4 + Maintena... | Yes | Y | | 1 | 1.2 | 86 | 1.5 | 6 | .088 | 39 | .088 | | | | | | | | | | | | |
| 118 | 1.2D + 1.5LM-4 + Maintena... | Yes | Y | | 1 | 1.2 | 86 | 1.5 | 7 | .088 | 40 | .088 | | | | | | | | | | | | |
| 119 | 1.2D + 1.5LM-4 + Maintena... | Yes | Y | | 1 | 1.2 | 86 | 1.5 | 8 | .088 | 41 | .088 | | | | | | | | | | | | |
| 120 | 1.2D + 1.5LM-4 + Maintena... | Yes | Y | | 1 | 1.2 | 86 | 1.5 | 9 | .088 | 42 | .088 | | | | | | | | | | | | |
| 121 | 1.2D + 1.5LM-4 + Maintena... | Yes | Y | | 1 | 1.2 | 86 | 1.5 | 10 | .088 | 43 | .088 | | | | | | | | | | | | |
| 122 | 1.2D + 1.5LM-4 + Maintena... | Yes | Y | | 1 | 1.2 | 86 | 1.5 | 11 | .088 | 44 | .088 | | | | | | | | | | | | |
| 123 | 1.2D + 1.5LM-4 + Maintena... | Yes | Y | | 1 | 1.2 | 86 | 1.5 | 12 | .088 | 45 | .088 | | | | | | | | | | | | |
| 124 | 1.2D + 1.5LM-4 + Maintena... | Yes | Y | | 1 | 1.2 | 86 | 1.5 | 13 | .088 | 46 | .088 | | | | | | | | | | | | |
| 125 | 1.2D + 1.5LM-4 + Maintena... | Yes | Y | | 1 | 1.2 | 86 | 1.5 | 14 | .088 | 47 | .088 | | | | | | | | | | | | |

## Load Combinations (Continued)

| | Description | S... | P... | S... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 126 | 1.2D + 1.5LM-4 + Maintena... | Yes | Y | | 1 | 1.2 | 86 | 1.5 | 15 | .088 | 48 | .088 | | | | | | | | | | | | |
| 127 | 1.2D + 1.5LM-4 + Maintena... | Yes | Y | | 1 | 1.2 | 86 | 1.5 | 16 | .088 | 49 | .088 | | | | | | | | | | | | |
| 128 | 1.2D + 1.5LM-4 + Maintena... | Yes | Y | | 1 | 1.2 | 86 | 1.5 | 17 | .088 | 50 | .088 | | | | | | | | | | | | |
| 129 | 1.2D + 1.5LM-5 + Maintena... | Yes | Y | | 1 | 1.2 | 87 | 1.5 | 2 | .088 | 35 | .088 | | | | | | | | | | | | |
| 130 | 1.2D + 1.5LM-5 + Maintena... | Yes | Y | | 1 | 1.2 | 87 | 1.5 | 3 | .088 | 36 | .088 | | | | | | | | | | | | |
| 131 | 1.2D + 1.5LM-5 + Maintena... | Yes | Y | | 1 | 1.2 | 87 | 1.5 | 4 | .088 | 37 | .088 | | | | | | | | | | | | |
| 132 | 1.2D + 1.5LM-5 + Maintena... | Yes | Y | | 1 | 1.2 | 87 | 1.5 | 5 | .088 | 38 | .088 | | | | | | | | | | | | |
| 133 | 1.2D + 1.5LM-5 + Maintena... | Yes | Y | | 1 | 1.2 | 87 | 1.5 | 6 | .088 | 39 | .088 | | | | | | | | | | | | |
| 134 | 1.2D + 1.5LM-5 + Maintena... | Yes | Y | | 1 | 1.2 | 87 | 1.5 | 7 | .088 | 40 | .088 | | | | | | | | | | | | |
| 135 | 1.2D + 1.5LM-5 + Maintena... | Yes | Y | | 1 | 1.2 | 87 | 1.5 | 8 | .088 | 41 | .088 | | | | | | | | | | | | |
| 136 | 1.2D + 1.5LM-5 + Maintena... | Yes | Y | | 1 | 1.2 | 87 | 1.5 | 9 | .088 | 42 | .088 | | | | | | | | | | | | |
| 137 | 1.2D + 1.5LM-5 + Maintena... | Yes | Y | | 1 | 1.2 | 87 | 1.5 | 10 | .088 | 43 | .088 | | | | | | | | | | | | |
| 138 | 1.2D + 1.5LM-5 + Maintena... | Yes | Y | | 1 | 1.2 | 87 | 1.5 | 11 | .088 | 44 | .088 | | | | | | | | | | | | |
| 139 | 1.2D + 1.5LM-5 + Maintena... | Yes | Y | | 1 | 1.2 | 87 | 1.5 | 12 | .088 | 45 | .088 | | | | | | | | | | | | |
| 140 | 1.2D + 1.5LM-5 + Maintena... | Yes | Y | | 1 | 1.2 | 87 | 1.5 | 13 | .088 | 46 | .088 | | | | | | | | | | | | |
| 141 | 1.2D + 1.5LM-5 + Maintena... | Yes | Y | | 1 | 1.2 | 87 | 1.5 | 14 | .088 | 47 | .088 | | | | | | | | | | | | |
| 142 | 1.2D + 1.5LM-5 + Maintena... | Yes | Y | | 1 | 1.2 | 87 | 1.5 | 15 | .088 | 48 | .088 | | | | | | | | | | | | |
| 143 | 1.2D + 1.5LM-5 + Maintena... | Yes | Y | | 1 | 1.2 | 87 | 1.5 | 16 | .088 | 49 | .088 | | | | | | | | | | | | |
| 144 | 1.2D + 1.5LM-5 + Maintena... | Yes | Y | | 1 | 1.2 | 87 | 1.5 | 17 | .088 | 50 | .088 | | | | | | | | | | | | |
| 145 | 1.2D + 1.5LM-6 + Maintena... | Yes | Y | | 1 | 1.2 | 88 | 1.5 | 2 | .088 | 35 | .088 | | | | | | | | | | | | |
| 146 | 1.2D + 1.5LM-6 + Maintena... | Yes | Y | | 1 | 1.2 | 88 | 1.5 | 3 | .088 | 36 | .088 | | | | | | | | | | | | |
| 147 | 1.2D + 1.5LM-6 + Maintena... | Yes | Y | | 1 | 1.2 | 88 | 1.5 | 4 | .088 | 37 | .088 | | | | | | | | | | | | |
| 148 | 1.2D + 1.5LM-6 + Maintena... | Yes | Y | | 1 | 1.2 | 88 | 1.5 | 5 | .088 | 38 | .088 | | | | | | | | | | | | |
| 149 | 1.2D + 1.5LM-6 + Maintena... | Yes | Y | | 1 | 1.2 | 88 | 1.5 | 6 | .088 | 39 | .088 | | | | | | | | | | | | |
| 150 | 1.2D + 1.5LM-6 + Maintena... | Yes | Y | | 1 | 1.2 | 88 | 1.5 | 7 | .088 | 40 | .088 | | | | | | | | | | | | |
| 151 | 1.2D + 1.5LM-6 + Maintena... | Yes | Y | | 1 | 1.2 | 88 | 1.5 | 8 | .088 | 41 | .088 | | | | | | | | | | | | |
| 152 | 1.2D + 1.5LM-6 + Maintena... | Yes | Y | | 1 | 1.2 | 88 | 1.5 | 9 | .088 | 42 | .088 | | | | | | | | | | | | |
| 153 | 1.2D + 1.5LM-6 + Maintena... | Yes | Y | | 1 | 1.2 | 88 | 1.5 | 10 | .088 | 43 | .088 | | | | | | | | | | | | |
| 154 | 1.2D + 1.5LM-6 + Maintena... | Yes | Y | | 1 | 1.2 | 88 | 1.5 | 11 | .088 | 44 | .088 | | | | | | | | | | | | |
| 155 | 1.2D + 1.5LM-6 + Maintena... | Yes | Y | | 1 | 1.2 | 88 | 1.5 | 12 | .088 | 45 | .088 | | | | | | | | | | | | |
| 156 | 1.2D + 1.5LM-6 + Maintena... | Yes | Y | | 1 | 1.2 | 88 | 1.5 | 13 | .088 | 46 | .088 | | | | | | | | | | | | |
| 157 | 1.2D + 1.5LM-6 + Maintena... | Yes | Y | | 1 | 1.2 | 88 | 1.5 | 14 | .088 | 47 | .088 | | | | | | | | | | | | |
| 158 | 1.2D + 1.5LM-6 + Maintena... | Yes | Y | | 1 | 1.2 | 88 | 1.5 | 15 | .088 | 48 | .088 | | | | | | | | | | | | |
| 159 | 1.2D + 1.5LM-6 + Maintena... | Yes | Y | | 1 | 1.2 | 88 | 1.5 | 16 | .088 | 49 | .088 | | | | | | | | | | | | |
| 160 | 1.2D + 1.5LM-6 + Maintena... | Yes | Y | | 1 | 1.2 | 88 | 1.5 | 17 | .088 | 50 | .088 | | | | | | | | | | | | |
| 161 | 1.2D + 1.5LM-7 + Maintena... | Yes | Y | | 1 | 1.2 | 89 | 1.5 | 2 | .088 | 35 | .088 | | | | | | | | | | | | |
| 162 | 1.2D + 1.5LM-7 + Maintena... | Yes | Y | | 1 | 1.2 | 89 | 1.5 | 3 | .088 | 36 | .088 | | | | | | | | | | | | |
| 163 | 1.2D + 1.5LM-7 + Maintena... | Yes | Y | | 1 | 1.2 | 89 | 1.5 | 4 | .088 | 37 | .088 | | | | | | | | | | | | |
| 164 | 1.2D + 1.5LM-7 + Maintena... | Yes | Y | | 1 | 1.2 | 89 | 1.5 | 5 | .088 | 38 | .088 | | | | | | | | | | | | |
| 165 | 1.2D + 1.5LM-7 + Maintena... | Yes | Y | | 1 | 1.2 | 89 | 1.5 | 6 | .088 | 39 | .088 | | | | | | | | | | | | |
| 166 | 1.2D + 1.5LM-7 + Maintena... | Yes | Y | | 1 | 1.2 | 89 | 1.5 | 7 | .088 | 40 | .088 | | | | | | | | | | | | |
| 167 | 1.2D + 1.5LM-7 + Maintena... | Yes | Y | | 1 | 1.2 | 89 | 1.5 | 8 | .088 | 41 | .088 | | | | | | | | | | | | |
| 168 | 1.2D + 1.5LM-7 + Maintena... | Yes | Y | | 1 | 1.2 | 89 | 1.5 | 9 | .088 | 42 | .088 | | | | | | | | | | | | |
| 169 | 1.2D + 1.5LM-7 + Maintena... | Yes | Y | | 1 | 1.2 | 89 | 1.5 | 10 | .088 | 43 | .088 | | | | | | | | | | | | |
| 170 | 1.2D + 1.5LM-7 + Maintena... | Yes | Y | | 1 | 1.2 | 89 | 1.5 | 11 | .088 | 44 | .088 | | | | | | | | | | | | |
| 171 | 1.2D + 1.5LM-7 + Maintena... | Yes | Y | | 1 | 1.2 | 89 | 1.5 | 12 | .088 | 45 | .088 | | | | | | | | | | | | |
| 172 | 1.2D + 1.5LM-7 + Maintena... | Yes | Y | | 1 | 1.2 | 89 | 1.5 | 13 | .088 | 46 | .088 | | | | | | | | | | | | |
| 173 | 1.2D + 1.5LM-7 + Maintena... | Yes | Y | | 1 | 1.2 | 89 | 1.5 | 14 | .088 | 47 | .088 | | | | | | | | | | | | |
| 174 | 1.2D + 1.5LM-7 + Maintena... | Yes | Y | | 1 | 1.2 | 89 | 1.5 | 15 | .088 | 48 | .088 | | | | | | | | | | | | |
| 175 | 1.2D + 1.5LM-7 + Maintena... | Yes | Y | | 1 | 1.2 | 89 | 1.5 | 16 | .088 | 49 | .088 | | | | | | | | | | | | |
| 176 | 1.2D + 1.5LM-7 + Maintena... | Yes | Y | | 1 | 1.2 | 89 | 1.5 | 17 | .088 | 50 | .088 | | | | | | | | | | | | |
| 177 | 1.2D + 1.5LM-8 + Maintena... | Yes | Y | | 1 | 1.2 | 90 | 1.5 | 2 | .088 | 35 | .088 | | | | | | | | | | | | |
| 178 | 1.2D + 1.5LM-8 + Maintena... | Yes | Y | | 1 | 1.2 | 90 | 1.5 | 3 | .088 | 36 | .088 | | | | | | | | | | | | |
| 179 | 1.2D + 1.5LM-8 + Maintena... | Yes | Y | | 1 | 1.2 | 90 | 1.5 | 4 | .088 | 37 | .088 | | | | | | | | | | | | |
| 180 | 1.2D + 1.5LM-8 + Maintena... | Yes | Y | | 1 | 1.2 | 90 | 1.5 | 5 | .088 | 38 | .088 | | | | | | | | | | | | |
| 181 | 1.2D + 1.5LM-8 + Maintena... | Yes | Y | | 1 | 1.2 | 90 | 1.5 | 6 | .088 | 39 | .088 | | | | | | | | | | | | |
| 182 | 1.2D + 1.5LM-8 + Maintena... | Yes | Y | | 1 | 1.2 | 90 | 1.5 | 7 | .088 | 40 | .088 | | | | | | | | | | | | |

## Load Combinations (Continued)

| | Description | S... | P... | S... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 183 | 1.2D + 1.5LM-8 + Maintena... | Yes | Y | | 1 | 1.2 | 90 | 1.5 | 8 | .088 | 41 | .088 | | | | | | | | | | | | |
| 184 | 1.2D + 1.5LM-8 + Maintena... | Yes | Y | | 1 | 1.2 | 90 | 1.5 | 9 | .088 | 42 | .088 | | | | | | | | | | | | |
| 185 | 1.2D + 1.5LM-8 + Maintena... | Yes | Y | | 1 | 1.2 | 90 | 1.5 | 10 | .088 | 43 | .088 | | | | | | | | | | | | |
| 186 | 1.2D + 1.5LM-8 + Maintena... | Yes | Y | | 1 | 1.2 | 90 | 1.5 | 11 | .088 | 44 | .088 | | | | | | | | | | | | |
| 187 | 1.2D + 1.5LM-8 + Maintena... | Yes | Y | | 1 | 1.2 | 90 | 1.5 | 12 | .088 | 45 | .088 | | | | | | | | | | | | |
| 188 | 1.2D + 1.5LM-8 + Maintena... | Yes | Y | | 1 | 1.2 | 90 | 1.5 | 13 | .088 | 46 | .088 | | | | | | | | | | | | |
| 189 | 1.2D + 1.5LM-8 + Maintena... | Yes | Y | | 1 | 1.2 | 90 | 1.5 | 14 | .088 | 47 | .088 | | | | | | | | | | | | |
| 190 | 1.2D + 1.5LM-8 + Maintena... | Yes | Y | | 1 | 1.2 | 90 | 1.5 | 15 | .088 | 48 | .088 | | | | | | | | | | | | |
| 191 | 1.2D + 1.5LM-8 + Maintena... | Yes | Y | | 1 | 1.2 | 90 | 1.5 | 16 | .088 | 49 | .088 | | | | | | | | | | | | |
| 192 | 1.2D + 1.5LM-8 + Maintena... | Yes | Y | | 1 | 1.2 | 90 | 1.5 | 17 | .088 | 50 | .088 | | | | | | | | | | | | |
| 193 | 1.2D + 1.5LM-9 + Maintena... | Yes | Y | | 1 | 1.2 | 91 | 1.5 | 2 | .088 | 35 | .088 | | | | | | | | | | | | |
| 194 | 1.2D + 1.5LM-9 + Maintena... | Yes | Y | | 1 | 1.2 | 91 | 1.5 | 3 | .088 | 36 | .088 | | | | | | | | | | | | |
| 195 | 1.2D + 1.5LM-9 + Maintena... | Yes | Y | | 1 | 1.2 | 91 | 1.5 | 4 | .088 | 37 | .088 | | | | | | | | | | | | |
| 196 | 1.2D + 1.5LM-9 + Maintena... | Yes | Y | | 1 | 1.2 | 91 | 1.5 | 5 | .088 | 38 | .088 | | | | | | | | | | | | |
| 197 | 1.2D + 1.5LM-9 + Maintena... | Yes | Y | | 1 | 1.2 | 91 | 1.5 | 6 | .088 | 39 | .088 | | | | | | | | | | | | |
| 198 | 1.2D + 1.5LM-9 + Maintena... | Yes | Y | | 1 | 1.2 | 91 | 1.5 | 7 | .088 | 40 | .088 | | | | | | | | | | | | |
| 199 | 1.2D + 1.5LM-9 + Maintena... | Yes | Y | | 1 | 1.2 | 91 | 1.5 | 8 | .088 | 41 | .088 | | | | | | | | | | | | |
| 200 | 1.2D + 1.5LM-9 + Maintena... | Yes | Y | | 1 | 1.2 | 91 | 1.5 | 9 | .088 | 42 | .088 | | | | | | | | | | | | |
| 201 | 1.2D + 1.5LM-9 + Maintena... | Yes | Y | | 1 | 1.2 | 91 | 1.5 | 10 | .088 | 43 | .088 | | | | | | | | | | | | |
| 202 | 1.2D + 1.5LM-9 + Maintena... | Yes | Y | | 1 | 1.2 | 91 | 1.5 | 11 | .088 | 44 | .088 | | | | | | | | | | | | |
| 203 | 1.2D + 1.5LM-9 + Maintena... | Yes | Y | | 1 | 1.2 | 91 | 1.5 | 12 | .088 | 45 | .088 | | | | | | | | | | | | |
| 204 | 1.2D + 1.5LM-9 + Maintena... | Yes | Y | | 1 | 1.2 | 91 | 1.5 | 13 | .088 | 46 | .088 | | | | | | | | | | | | |
| 205 | 1.2D + 1.5LM-9 + Maintena... | Yes | Y | | 1 | 1.2 | 91 | 1.5 | 14 | .088 | 47 | .088 | | | | | | | | | | | | |
| 206 | 1.2D + 1.5LM-9 + Maintena... | Yes | Y | | 1 | 1.2 | 91 | 1.5 | 15 | .088 | 48 | .088 | | | | | | | | | | | | |
| 207 | 1.2D + 1.5LM-9 + Maintena... | Yes | Y | | 1 | 1.2 | 91 | 1.5 | 16 | .088 | 49 | .088 | | | | | | | | | | | | |
| 208 | 1.2D + 1.5LM-9 + Maintena... | Yes | Y | | 1 | 1.2 | 91 | 1.5 | 17 | .088 | 50 | .088 | | | | | | | | | | | | |
| 209 | 1.2D + 1.5LM-10 + Mainten... | Yes | Y | | 1 | 1.2 | 92 | 1.5 | 2 | .088 | 35 | .088 | | | | | | | | | | | | |
| 210 | 1.2D + 1.5LM-10 + Mainten... | Yes | Y | | 1 | 1.2 | 92 | 1.5 | 3 | .088 | 36 | .088 | | | | | | | | | | | | |
| 211 | 1.2D + 1.5LM-10 + Mainten... | Yes | Y | | 1 | 1.2 | 92 | 1.5 | 4 | .088 | 37 | .088 | | | | | | | | | | | | |
| 212 | 1.2D + 1.5LM-10 + Mainten... | Yes | Y | | 1 | 1.2 | 92 | 1.5 | 5 | .088 | 38 | .088 | | | | | | | | | | | | |
| 213 | 1.2D + 1.5LM-10 + Mainten... | Yes | Y | | 1 | 1.2 | 92 | 1.5 | 6 | .088 | 39 | .088 | | | | | | | | | | | | |
| 214 | 1.2D + 1.5LM-10 + Mainten... | Yes | Y | | 1 | 1.2 | 92 | 1.5 | 7 | .088 | 40 | .088 | | | | | | | | | | | | |
| 215 | 1.2D + 1.5LM-10 + Mainten... | Yes | Y | | 1 | 1.2 | 92 | 1.5 | 8 | .088 | 41 | .088 | | | | | | | | | | | | |
| 216 | 1.2D + 1.5LM-10 + Mainten... | Yes | Y | | 1 | 1.2 | 92 | 1.5 | 9 | .088 | 42 | .088 | | | | | | | | | | | | |
| 217 | 1.2D + 1.5LM-10 + Mainten... | Yes | Y | | 1 | 1.2 | 92 | 1.5 | 10 | .088 | 43 | .088 | | | | | | | | | | | | |
| 218 | 1.2D + 1.5LM-10 + Mainten... | Yes | Y | | 1 | 1.2 | 92 | 1.5 | 11 | .088 | 44 | .088 | | | | | | | | | | | | |
| 219 | 1.2D + 1.5LM-10 + Mainten... | Yes | Y | | 1 | 1.2 | 92 | 1.5 | 12 | .088 | 45 | .088 | | | | | | | | | | | | |
| 220 | 1.2D + 1.5LM-10 + Mainten... | Yes | Y | | 1 | 1.2 | 92 | 1.5 | 13 | .088 | 46 | .088 | | | | | | | | | | | | |
| 221 | 1.2D + 1.5LM-10 + Mainten... | Yes | Y | | 1 | 1.2 | 92 | 1.5 | 14 | .088 | 47 | .088 | | | | | | | | | | | | |
| 222 | 1.2D + 1.5LM-10 + Mainten... | Yes | Y | | 1 | 1.2 | 92 | 1.5 | 15 | .088 | 48 | .088 | | | | | | | | | | | | |
| 223 | 1.2D + 1.5LM-10 + Mainten... | Yes | Y | | 1 | 1.2 | 92 | 1.5 | 16 | .088 | 49 | .088 | | | | | | | | | | | | |
| 224 | 1.2D + 1.5LM-10 + Mainten... | Yes | Y | | 1 | 1.2 | 92 | 1.5 | 17 | .088 | 50 | .088 | | | | | | | | | | | | |
| 225 | 1.2D + 1.5LM-11 + Mainten... | Yes | Y | | 1 | 1.2 | 93 | 1.5 | 2 | .088 | 35 | .088 | | | | | | | | | | | | |
| 226 | 1.2D + 1.5LM-11 + Mainten... | Yes | Y | | 1 | 1.2 | 93 | 1.5 | 3 | .088 | 36 | .088 | | | | | | | | | | | | |
| 227 | 1.2D + 1.5LM-11 + Mainten... | Yes | Y | | 1 | 1.2 | 93 | 1.5 | 4 | .088 | 37 | .088 | | | | | | | | | | | | |
| 228 | 1.2D + 1.5LM-11 + Mainten... | Yes | Y | | 1 | 1.2 | 93 | 1.5 | 5 | .088 | 38 | .088 | | | | | | | | | | | | |
| 229 | 1.2D + 1.5LM-11 + Mainten... | Yes | Y | | 1 | 1.2 | 93 | 1.5 | 6 | .088 | 39 | .088 | | | | | | | | | | | | |
| 230 | 1.2D + 1.5LM-11 + Mainten... | Yes | Y | | 1 | 1.2 | 93 | 1.5 | 7 | .088 | 40 | .088 | | | | | | | | | | | | |
| 231 | 1.2D + 1.5LM-11 + Mainten... | Yes | Y | | 1 | 1.2 | 93 | 1.5 | 8 | .088 | 41 | .088 | | | | | | | | | | | | |
| 232 | 1.2D + 1.5LM-11 + Mainten... | Yes | Y | | 1 | 1.2 | 93 | 1.5 | 9 | .088 | 42 | .088 | | | | | | | | | | | | |
| 233 | 1.2D + 1.5LM-11 + Mainten... | Yes | Y | | 1 | 1.2 | 93 | 1.5 | 10 | .088 | 43 | .088 | | | | | | | | | | | | |
| 234 | 1.2D + 1.5LM-11 + Mainten... | Yes | Y | | 1 | 1.2 | 93 | 1.5 | 11 | .088 | 44 | .088 | | | | | | | | | | | | |
| 235 | 1.2D + 1.5LM-11 + Mainten... | Yes | Y | | 1 | 1.2 | 93 | 1.5 | 12 | .088 | 45 | .088 | | | | | | | | | | | | |
| 236 | 1.2D + 1.5LM-11 + Mainten... | Yes | Y | | 1 | 1.2 | 93 | 1.5 | 13 | .088 | 46 | .088 | | | | | | | | | | | | |
| 237 | 1.2D + 1.5LM-11 + Mainten... | Yes | Y | | 1 | 1.2 | 93 | 1.5 | 14 | .088 | 47 | .088 | | | | | | | | | | | | |
| 238 | 1.2D + 1.5LM-11 + Mainten... | Yes | Y | | 1 | 1.2 | 93 | 1.5 | 15 | .088 | 48 | .088 | | | | | | | | | | | | |
| 239 | 1.2D + 1.5LM-11 + Mainten... | Yes | Y | | 1 | 1.2 | 93 | 1.5 | 16 | .088 | 49 | .088 | | | | | | | | | | | | |

## Load Combinations (Continued)

| | Description | S... | P... | S... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 240 | 1.2D + 1.5LM-11 + Mainten... | Yes | Y | | 1 | 1.2 | 93 | 1.5 | 17 | .088 | 50 | .088 | | | | | | | | | | | | |
| 241 | 1.2D + 1.5LM-12 + Mainten... | Yes | Y | | 1 | 1.2 | 94 | 1.5 | 2 | .088 | 35 | .088 | | | | | | | | | | | | |
| 242 | 1.2D + 1.5LM-12 + Mainten... | Yes | Y | | 1 | 1.2 | 94 | 1.5 | 3 | .088 | 36 | .088 | | | | | | | | | | | | |
| 243 | 1.2D + 1.5LM-12 + Mainten... | Yes | Y | | 1 | 1.2 | 94 | 1.5 | 4 | .088 | 37 | .088 | | | | | | | | | | | | |
| 244 | 1.2D + 1.5LM-12 + Mainten... | Yes | Y | | 1 | 1.2 | 94 | 1.5 | 5 | .088 | 38 | .088 | | | | | | | | | | | | |
| 245 | 1.2D + 1.5LM-12 + Mainten... | Yes | Y | | 1 | 1.2 | 94 | 1.5 | 6 | .088 | 39 | .088 | | | | | | | | | | | | |
| 246 | 1.2D + 1.5LM-12 + Mainten... | Yes | Y | | 1 | 1.2 | 94 | 1.5 | 7 | .088 | 40 | .088 | | | | | | | | | | | | |
| 247 | 1.2D + 1.5LM-12 + Mainten... | Yes | Y | | 1 | 1.2 | 94 | 1.5 | 8 | .088 | 41 | .088 | | | | | | | | | | | | |
| 248 | 1.2D + 1.5LM-12 + Mainten... | Yes | Y | | 1 | 1.2 | 94 | 1.5 | 9 | .088 | 42 | .088 | | | | | | | | | | | | |
| 249 | 1.2D + 1.5LM-12 + Mainten... | Yes | Y | | 1 | 1.2 | 94 | 1.5 | 10 | .088 | 43 | .088 | | | | | | | | | | | | |
| 250 | 1.2D + 1.5LM-12 + Mainten... | Yes | Y | | 1 | 1.2 | 94 | 1.5 | 11 | .088 | 44 | .088 | | | | | | | | | | | | |
| 251 | 1.2D + 1.5LM-12 + Mainten... | Yes | Y | | 1 | 1.2 | 94 | 1.5 | 12 | .088 | 45 | .088 | | | | | | | | | | | | |
| 252 | 1.2D + 1.5LM-12 + Mainten... | Yes | Y | | 1 | 1.2 | 94 | 1.5 | 13 | .088 | 46 | .088 | | | | | | | | | | | | |
| 253 | 1.2D + 1.5LM-12 + Mainten... | Yes | Y | | 1 | 1.2 | 94 | 1.5 | 14 | .088 | 47 | .088 | | | | | | | | | | | | |
| 254 | 1.2D + 1.5LM-12 + Mainten... | Yes | Y | | 1 | 1.2 | 94 | 1.5 | 15 | .088 | 48 | .088 | | | | | | | | | | | | |
| 255 | 1.2D + 1.5LM-12 + Mainten... | Yes | Y | | 1 | 1.2 | 94 | 1.5 | 16 | .088 | 49 | .088 | | | | | | | | | | | | |
| 256 | 1.2D + 1.5LM-12 + Mainten... | Yes | Y | | 1 | 1.2 | 94 | 1.5 | 17 | .088 | 50 | .088 | | | | | | | | | | | | |
| 257 | 1.2D + 1.5LM-13 + Mainten... | Yes | Y | | 1 | 1.2 | 95 | 1.5 | 2 | .088 | 35 | .088 | | | | | | | | | | | | |
| 258 | 1.2D + 1.5LM-13 + Mainten... | Yes | Y | | 1 | 1.2 | 95 | 1.5 | 3 | .088 | 36 | .088 | | | | | | | | | | | | |
| 259 | 1.2D + 1.5LM-13 + Mainten... | Yes | Y | | 1 | 1.2 | 95 | 1.5 | 4 | .088 | 37 | .088 | | | | | | | | | | | | |
| 260 | 1.2D + 1.5LM-13 + Mainten... | Yes | Y | | 1 | 1.2 | 95 | 1.5 | 5 | .088 | 38 | .088 | | | | | | | | | | | | |
| 261 | 1.2D + 1.5LM-13 + Mainten... | Yes | Y | | 1 | 1.2 | 95 | 1.5 | 6 | .088 | 39 | .088 | | | | | | | | | | | | |
| 262 | 1.2D + 1.5LM-13 + Mainten... | Yes | Y | | 1 | 1.2 | 95 | 1.5 | 7 | .088 | 40 | .088 | | | | | | | | | | | | |
| 263 | 1.2D + 1.5LM-13 + Mainten... | Yes | Y | | 1 | 1.2 | 95 | 1.5 | 8 | .088 | 41 | .088 | | | | | | | | | | | | |
| 264 | 1.2D + 1.5LM-13 + Mainten... | Yes | Y | | 1 | 1.2 | 95 | 1.5 | 9 | .088 | 42 | .088 | | | | | | | | | | | | |
| 265 | 1.2D + 1.5LM-13 + Mainten... | Yes | Y | | 1 | 1.2 | 95 | 1.5 | 10 | .088 | 43 | .088 | | | | | | | | | | | | |
| 266 | 1.2D + 1.5LM-13 + Mainten... | Yes | Y | | 1 | 1.2 | 95 | 1.5 | 11 | .088 | 44 | .088 | | | | | | | | | | | | |
| 267 | 1.2D + 1.5LM-13 + Mainten... | Yes | Y | | 1 | 1.2 | 95 | 1.5 | 12 | .088 | 45 | .088 | | | | | | | | | | | | |
| 268 | 1.2D + 1.5LM-13 + Mainten... | Yes | Y | | 1 | 1.2 | 95 | 1.5 | 13 | .088 | 46 | .088 | | | | | | | | | | | | |
| 269 | 1.2D + 1.5LM-13 + Mainten... | Yes | Y | | 1 | 1.2 | 95 | 1.5 | 14 | .088 | 47 | .088 | | | | | | | | | | | | |
| 270 | 1.2D + 1.5LM-13 + Mainten... | Yes | Y | | 1 | 1.2 | 95 | 1.5 | 15 | .088 | 48 | .088 | | | | | | | | | | | | |
| 271 | 1.2D + 1.5LM-13 + Mainten... | Yes | Y | | 1 | 1.2 | 95 | 1.5 | 16 | .088 | 49 | .088 | | | | | | | | | | | | |
| 272 | 1.2D + 1.5LM-13 + Mainten... | Yes | Y | | 1 | 1.2 | 95 | 1.5 | 17 | .088 | 50 | .088 | | | | | | | | | | | | |
| 273 | 1.2D + 1.5LM-14 + Mainten... | Yes | Y | | 1 | 1.2 | 96 | 1.5 | 2 | .088 | 35 | .088 | | | | | | | | | | | | |
| 274 | 1.2D + 1.5LM-14 + Mainten... | Yes | Y | | 1 | 1.2 | 96 | 1.5 | 3 | .088 | 36 | .088 | | | | | | | | | | | | |
| 275 | 1.2D + 1.5LM-14 + Mainten... | Yes | Y | | 1 | 1.2 | 96 | 1.5 | 4 | .088 | 37 | .088 | | | | | | | | | | | | |
| 276 | 1.2D + 1.5LM-14 + Mainten... | Yes | Y | | 1 | 1.2 | 96 | 1.5 | 5 | .088 | 38 | .088 | | | | | | | | | | | | |
| 277 | 1.2D + 1.5LM-14 + Mainten... | Yes | Y | | 1 | 1.2 | 96 | 1.5 | 6 | .088 | 39 | .088 | | | | | | | | | | | | |
| 278 | 1.2D + 1.5LM-14 + Mainten... | Yes | Y | | 1 | 1.2 | 96 | 1.5 | 7 | .088 | 40 | .088 | | | | | | | | | | | | |
| 279 | 1.2D + 1.5LM-14 + Mainten... | Yes | Y | | 1 | 1.2 | 96 | 1.5 | 8 | .088 | 41 | .088 | | | | | | | | | | | | |
| 280 | 1.2D + 1.5LM-14 + Mainten... | Yes | Y | | 1 | 1.2 | 96 | 1.5 | 9 | .088 | 42 | .088 | | | | | | | | | | | | |
| 281 | 1.2D + 1.5LM-14 + Mainten... | Yes | Y | | 1 | 1.2 | 96 | 1.5 | 10 | .088 | 43 | .088 | | | | | | | | | | | | |
| 282 | 1.2D + 1.5LM-14 + Mainten... | Yes | Y | | 1 | 1.2 | 96 | 1.5 | 11 | .088 | 44 | .088 | | | | | | | | | | | | |
| 283 | 1.2D + 1.5LM-14 + Mainten... | Yes | Y | | 1 | 1.2 | 96 | 1.5 | 12 | .088 | 45 | .088 | | | | | | | | | | | | |
| 284 | 1.2D + 1.5LM-14 + Mainten... | Yes | Y | | 1 | 1.2 | 96 | 1.5 | 13 | .088 | 46 | .088 | | | | | | | | | | | | |
| 285 | 1.2D + 1.5LM-14 + Mainten... | Yes | Y | | 1 | 1.2 | 96 | 1.5 | 14 | .088 | 47 | .088 | | | | | | | | | | | | |
| 286 | 1.2D + 1.5LM-14 + Mainten... | Yes | Y | | 1 | 1.2 | 96 | 1.5 | 15 | .088 | 48 | .088 | | | | | | | | | | | | |
| 287 | 1.2D + 1.5LM-14 + Mainten... | Yes | Y | | 1 | 1.2 | 96 | 1.5 | 16 | .088 | 49 | .088 | | | | | | | | | | | | |
| 288 | 1.2D + 1.5LM-14 + Mainten... | Yes | Y | | 1 | 1.2 | 96 | 1.5 | 17 | .088 | 50 | .088 | | | | | | | | | | | | |
| 289 | 1.2D + 1.5LM-15 + Mainten... | Yes | Y | | 1 | 1.2 | 97 | 1.5 | 2 | .088 | 35 | .088 | | | | | | | | | | | | |
| 290 | 1.2D + 1.5LM-15 + Mainten... | Yes | Y | | 1 | 1.2 | 97 | 1.5 | 3 | .088 | 36 | .088 | | | | | | | | | | | | |
| 291 | 1.2D + 1.5LM-15 + Mainten... | Yes | Y | | 1 | 1.2 | 97 | 1.5 | 4 | .088 | 37 | .088 | | | | | | | | | | | | |
| 292 | 1.2D + 1.5LM-15 + Mainten... | Yes | Y | | 1 | 1.2 | 97 | 1.5 | 5 | .088 | 38 | .088 | | | | | | | | | | | | |
| 293 | 1.2D + 1.5LM-15 + Mainten... | Yes | Y | | 1 | 1.2 | 97 | 1.5 | 6 | .088 | 39 | .088 | | | | | | | | | | | | |
| 294 | 1.2D + 1.5LM-15 + Mainten... | Yes | Y | | 1 | 1.2 | 97 | 1.5 | 7 | .088 | 40 | .088 | | | | | | | | | | | | |
| 295 | 1.2D + 1.5LM-15 + Mainten... | Yes | Y | | 1 | 1.2 | 97 | 1.5 | 8 | .088 | 41 | .088 | | | | | | | | | | | | |
| 296 | 1.2D + 1.5LM-15 + Mainten... | Yes | Y | | 1 | 1.2 | 97 | 1.5 | 9 | .088 | 42 | .088 | | | | | | | | | | | | |

## Load Combinations (Continued)

| | Description | S... | P... | S... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 297 | 1.2D + 1.5LM-15 + Mainten... | Yes | Y | | 1 | 1.2 | 97 | 1.5 | 10 | .088 | 43 | .088 | | | | | | | | | | | | |
| 298 | 1.2D + 1.5LM-15 + Mainten... | Yes | Y | | 1 | 1.2 | 97 | 1.5 | 11 | .088 | 44 | .088 | | | | | | | | | | | | |
| 299 | 1.2D + 1.5LM-15 + Mainten... | Yes | Y | | 1 | 1.2 | 97 | 1.5 | 12 | .088 | 45 | .088 | | | | | | | | | | | | |
| 300 | 1.2D + 1.5LM-15 + Mainten... | Yes | Y | | 1 | 1.2 | 97 | 1.5 | 13 | .088 | 46 | .088 | | | | | | | | | | | | |
| 301 | 1.2D + 1.5LM-15 + Mainten... | Yes | Y | | 1 | 1.2 | 97 | 1.5 | 14 | .088 | 47 | .088 | | | | | | | | | | | | |
| 302 | 1.2D + 1.5LM-15 + Mainten... | Yes | Y | | 1 | 1.2 | 97 | 1.5 | 15 | .088 | 48 | .088 | | | | | | | | | | | | |
| 303 | 1.2D + 1.5LM-15 + Mainten... | Yes | Y | | 1 | 1.2 | 97 | 1.5 | 16 | .088 | 49 | .088 | | | | | | | | | | | | |
| 304 | 1.2D + 1.5LM-15 + Mainten... | Yes | Y | | 1 | 1.2 | 97 | 1.5 | 17 | .088 | 50 | .088 | | | | | | | | | | | | |

## Envelope Joint Reactions

| | Joint | | X [lb] | LC | Y [lb] | LC | Z [lb] | LC | MX [lb-ft] | LC | MY [lb-ft] | LC | MZ [lb-ft] | LC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | N13 | max | 1285.394 | 30 | 1139.174 | 41 | 1964.461 | 17 | 0 | 1 | 0 | 1 | 0 | 1 |
| 2 | | min | -1224.033 | 6 | 318.302 | 2 | -2891.083 | 25 | 0 | 1 | 0 | 1 | 0 | 1 |
| 3 | N28 | max | 950.664 | 77 | 1108.823 | 49 | 1571.026 | 34 | 0 | 1 | 0 | 1 | 0 | 1 |
| 4 | | min | -1002.603 | 101 | 316.261 | 10 | -111.324 | 10 | 0 | 1 | 0 | 1 | 0 | 1 |
| 5 | N42 | max | 353.97 | 25 | 36.875 | 46 | 1137.24 | 9 | 0 | 1 | 0 | 1 | 0 | 1 |
| 6 | | min | -333.053 | 33 | 8.687 | 5 | -1089.972 | 17 | 0 | 1 | 0 | 1 | 0 | 1 |
| 7 | Totals: | max | 1340.308 | 30 | 2272.751 | 40 | 2089.52 | 18 | | | | | | |
| 8 | | min | -1340.308 | 22 | 669.066 | 2 | -2045.075 | 26 | | | | | | |

## Envelope AISC 14th(360-10): LRFD Steel Code Checks

| | Member | Shape | Code C... | Loc[ft] | LC | Shear ... | Loc[ft] | Dir | LC | phi*Pnc [lb] | phi*Pnt [lb] | phi*Mn y-... | phi*Mn z-... | Cb | Eqn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | TH | PIPE_2.5 | .367 | 2.063 | 33 | .131 | 1.969 | | 32 | 26137.193 | 50715 | 3596.25 | 3596.25 | 1.... | H1-1b |
| 2 | BH | PIPE_2.5 | .149 | 4.5 | 25 | .074 | 1.969 | | 33 | 26137.193 | 50715 | 3596.25 | 3596.25 | 1.... | H1-1b |
| 3 | PL5 | PL5/8"x7.5" | .247 | 0 | 45 | .021 | 0 | y | 30 | 145857.0... | 151875 | 1977.539 | 23730.47 | 1.... | H1-1b |
| 4 | PL6 | PL5/8"x7.5" | .247 | 0 | 35 | .017 | 0 | y | 101 | 145857.0... | 151875 | 1977.539 | 23730.47 | 1.... | H1-1b |
| 5 | PL2 | PL5/8"x3.5" | .352 | .625 | 42 | .403 | 0 | y | 41 | 64718.403 | 70875 | 922.852 | 5167.97 | 1.... | H1-1b |
| 6 | PL1 | PL5/8"x3.5" | .354 | 0 | 41 | .374 | 0 | y | 42 | 64718.403 | 70875 | 922.852 | 5167.97 | 1.... | H1-1b |
| 7 | PL4 | PL5/8"x3.5" | .327 | .625 | 34 | .398 | 0 | y | 36 | 64718.403 | 70875 | 922.852 | 5167.97 | 1.... | H1-1b |
| 8 | PL3 | PL5/8"x3.5" | .313 | 0 | 49 | .384 | 0 | y | 49 | 64718.403 | 70875 | 922.852 | 5167.97 | 1.... | H1-1b |
| 9 | SA4 | PIPE_2.0 | .278 | 2.336 | 103 | .110 | .242 | | 110 | 29670.214 | 32130 | 1871.625 | 1871.625 | 2.... | H1-1b |
| 10 | SA1 | PIPE_2.0 | .324 | 0 | 17 | .102 | .242 | | 77 | 29670.214 | 32130 | 1871.625 | 1871.625 | 1.... | H1-1b |
| 11 | SA3 | PIPE_2.0 | .278 | 2.336 | 80 | .102 | .242 | | 80 | 29670.214 | 32130 | 1871.625 | 1871.625 | 1.... | H1-1b |
| 12 | M2 | PL5/8"x3.5" | .270 | .417 | 105 | .187 | 0 | y | 109 | 68062.221 | 70875 | 922.852 | 5167.97 | 1.... | H1-1b |
| 13 | M4 | PL5/8"x3.5" | .267 | .417 | 112 | .187 | 0 | y | 107 | 68062.221 | 70875 | 922.852 | 5167.97 | 1.... | H1-1b |
| 14 | M1 | PL5/8"x3.5" | .256 | .417 | 72 | .185 | 0 | y | 71 | 68062.221 | 70875 | 922.852 | 5167.97 | 1.... | H1-1b |
| 15 | M3 | PL5/8"x3.5" | .250 | .417 | 80 | .183 | 0 | y | 72 | 68062.221 | 70875 | 922.852 | 5167.97 | 1.... | H1-1b |
| 16 | V4 | 5/8" SR | .057 | 0 | 24 | .015 | 0 | | 105 | 2503.582 | 9940.19 | 103.542 | 103.542 | 2.... | H1-1b |
| 17 | V3 | 5/8" SR | .079 | 3.333 | 35 | .010 | 3.333 | | 32 | 2503.582 | 9940.19 | 103.542 | 103.542 | 2.... | H1-1b |
| 18 | V1 | 5/8" SR | .043 | 3.333 | 37 | .014 | 3.333 | | 68 | 2503.582 | 9940.19 | 103.542 | 103.542 | 2.... | H1-1b |
| 19 | V2 | 5/8" SR | .083 | 0 | 41 | .018 | 0 | | 25 | 2503.582 | 9940.19 | 103.542 | 103.542 | 2.... | H1-1b |
| 20 | D3 | 3/4" SR | .360 | 0 | 104 | .011 | 0 | | 66 | 3739.506 | 14313.866 | 178.929 | 178.929 | 2.... | H1-1a |
| 21 | D4 | 3/4" SR | .094 | 3.927 | 34 | .011 | 3.927 | | 102 | 3739.506 | 14313.866 | 178.929 | 178.929 | 2.... | H1-1b |
| 22 | D1 | 3/4" SR | .082 | 3.927 | 35 | .016 | 0 | | 25 | 3739.506 | 14313.866 | 178.929 | 178.929 | 1.... | H1-1b |
| 23 | D2 | 3/4" SR | .351 | 3.927 | 80 | .012 | 0 | | 112 | 3739.506 | 14313.866 | 178.929 | 178.929 | 1.... | H1-1a |
| 24 | MP3 | PIPE_2.0 | .337 | 5.667 | 26 | .064 | 5.583 | | 18 | 14916.096 | 32130 | 1871.625 | 1871.625 | 3.... | H1-1b |
| 25 | MP2 | PIPE_2.0 | .243 | 5.583 | 18 | .040 | 5.583 | | 25 | 14916.096 | 32130 | 1871.625 | 1871.625 | 4.... | H1-1b |
| 26 | MP1 | PIPE_2.0 | .204 | 2.333 | 80 | .116 | 2.333 | | 17 | 14916.096 | 32130 | 1871.625 | 1871.625 | 4.... | H1-1b |
| 27 | SA2 | PIPE_2.0 | .277 | 2.336 | 105 | .112 | .242 | | 103 | 29670.214 | 32130 | 1871.625 | 1871.625 | 2.... | H1-1b |
| 28 | TB | PIPE_2.0 | .057 | 0 | 24 | .004 | 5.932 | | 37 | 21071.405 | 32130 | 1871.625 | 1871.625 | 1.... | H1-1b* |
| 29 | MP5 | PIPE_2.0 | .075 | 3.666 | 70 | .040 | .333 | | 78 | 26522.441 | 32130 | 1871.625 | 1871.625 | 2.... | H1-1b |
| 30 | MP4 | PIPE_2.0 | .070 | .333 | 112 | .047 | .333 | | 25 | 26522.441 | 32130 | 1871.625 | 1871.625 | 2.... | H1-1b |

# STATE OF CONNECTICUT

***CONNECTICUT SITING COUNCIL***

Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
Internet: ct.gov/csc

*Daniel F. Caruso*
*Chairman*


November 9, 2010

The Honorable April Capone Almon
Mayor
Town of East Haven
250 Main Street
East Haven CT 06512

RE: **TS-CLEARWIRE-044-101109** - Clear Wireless LLC request for an order to approve tower sharing at an existing telecommunications facility located at 45 Saltenstall Road, East Haven, Connecticut.

Dear Mayor Almon:

The Connecticut Siting Council (Council) received this request for tower sharing, pursuant to Connecticut General Statutes § 16-50aa.

The Council will consider this item at the next meeting scheduled for December 2, 2010, at 2:00 p.m. in Hearing Room One, Ten Franklin Square, New Britain, Connecticut.

If you have any questions or comments regarding this proposal, please call me or inform the council by December 1, 2010.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts

Linda Roberts
Executive Director

LR/jbw

Enclosure: Notice of Tower Sharing

c: George Mingione, Zoning Enforcement Officer, Town of East Haven

November 4, 2010

**TS-CLEARWIRE-044-101109**



Linda Roberts, Executive Dire
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Request for Tower Share
Clearwire LLC Request for the Approval of the Shared Use of an Existing Tower at 45 Saltenstall Road, East Haven, Connecticut.
Clearwire Site Number: CT-NHN0095

Dear Ms Roberts,

Clearwire LLC proposes to share an existing monopole telecommunications tower (the Tower) located at 45 Saltenstall Road, East Haven, Connecticut (the Facility). Pursuant to Connecticut Generals Statues Section 16-50aa (the Statute), Clearwire requests a finding from the Connecticut Siting Council that the shared use of this facility is technically legally, environmentally and economically feasible, will meet public safety concerns, will avoid the unnecessary proliferation of the towers and is in the public interest. Clearwire further requests an order approving the shared use of this facility.

The purpose of this request is to use an existing telecommunications tower to develop Clearwire's 4G wireless broadband network to provide high speed wireless data and to develop VoIP service within the State of Connecticut and in this part of East Haven, CT: thus avoiding the need for an additional tower in East Haven, CT.

The facility is a 100' tower located at 45 Saltenstall Road, East Haven, Connecticut. The tower is located at LAT 41.293624 and LONG 72.857369. There are no cellular carriers located on the facility at this time. South Central Connecticut Regional Water Authority, East Haven Fire Department and East Have Police Department all have antennas on this tower for their communications purposes. A site plan is attached.

Clearwire will install three (3) WIMAX antennas, two (2) dishes and three (3) remote radio heads, one each per sector. Clearwire plans to mount the antennas, dishes and remote radio heads at a centerline of 85'. Six (6) cables will run to the new WIMAX antennas (two per antenna), two (2) to the dishes and (3) power cables to the WIMAX antennas and one (1) each to the dishes.

Within the existing compound, Clearwire has leased a 10'by 10' area for its base equipment. Clearwire plans to locate its equipment cabinet on a concrete pad, within the leased area. An ice bridge will connect the cabinet with the tower. A GPS antenna will be located on the ice bridge. The power and telephone cables will be located underground. No upgrades to the road or parking area are proposed.

Consistent with the requirements of the Statute, it is technically feasible for Clearwire to Co-locate at this facility. To confirm that the tower can support Clearwire's proposed antennas and equipment, Clearwire commissioned CHA to perform a structural analysis of the tower. According to the report dated September 17, 2010, the Tower is structurally capable of supporting the loading at a rating of 97.8%. The structural analysis is attached hereto.

The Council has authority, pursuant to Statute, to issue an order approving of the shared use of this tower. By issuing an order approving Clearwire's shared use of this tower, Clearwire will be able to proceed with obtaining a building permit for the proposed installation. Clearwire's proposal is legally feasible.

Pursuant to the Statute, the proposal will be environmentally feasible for the following reasons:

-The overall impact on the Town of East Haven will be decreased with the sharing of a single tower versus the proliferation of the multiple towers.

-The proposal will not increase the height of the tower.

-There will be little increase in the visibility of the tower with the addition of the antennas, remote radio heads and dishes.

-There will be no impact on any wetlands or water resources as a result of the modification.

-There will be no increased impact on air quality because no air pollutants will be generated during the normal operation of the facility.

-There will be no increased impact on air quality because no air pollutants will be generated during the normal operation of the facility.

-There will only be a brief, slight increase in noise pollution while the site is under construction.

-During construction, the proposed project will generate a small amount of traffic as construction takes place. Upon completion, traffic will be limited to an average of one trip per month for maintenance and inspections.

There will be no adverse impact to the health and safety of the surrounding community or workers at the facility due to the addition of Clearwire's antennas to the tower. Clearwire has performed an analysis of the radio frequency fields emanating from the transmitting antennas on the tower to ensure compliance with the National Council on Radiation Protection and measurements (NCRP) standard for maximum permissible exposure (MPE) adopted by the FCC. The analysis, dated November 3, 2010, indicates that Clearwire's antennas will emit 1.79% of the NCRP standard for the Maximum permissible exposure. A cumulative power density analysis indicates that all the antennas on the tower will cumulative emit 3.39% of the NCRP's standard for maximum permissible exposure. The power density report is attached.
The report indicates that maximum level of exposure will be well below the FCC's mandated radio frequency exposure limits.

Clearwire expects to enhance safety in this portion of the East Haven by improving wireless telecommunications for the local residents and travelers. Clearwire is currently developing its 4G wireless broadband network to provide high speed wireless data and its ViOP service with the State of Connecticut. Clearwire's 4G service leverages the WIMAX technology to enable enhanced wireless data communications. In order to provide reliable coverage to residents and travelers in this area of East Haven and fulfill their coverage goals to comply with their FCC license, the site is necessary part of Clearwire's network development.

Specifically, this proposal is designed to provide reliable wireless coverage for this section of East Haven, CT.

For the reasons stated above, the attachment of Clearwire's antennas, radio heads and dishes to the Tower would meet all the requirements set forth in the Statute. The proposal is legally, technically, economically and environmentally feasible and meets all public safety concerns. Therefore, Clearwire respectfully requests that the Council approve this request for the shared use of this tower located at 45 Saltenstall Road, East Haven, Connecticut.

Mark R. Richard
Program Manager
Maxton Technology, Inc.
1296 Blue Hills Avenue
Bloomfield, CT 06002
978-337-4696