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

December 10, 2013

Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103

RE: **EM-VER-007-131122** – Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 1657 Wilbur Cross Parkway, Berlin, Connecticut.

Dear Attorney Baldwin:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- Any deviation from the proposed modification as specified in this notice and supporting materials with the Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration.

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated November 21, 2013. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

Melanie A. Bachman
Acting Executive Director

MAB/CDM/jb

c: The Honorable Rachel Rochette, Mayor, Town of Berlin
Denise McNair, Town Manager, Town of Berlin
Arthur Simonian, Town Engineer, Town of Berlin
Berlin Volunteer Fire Department

Robinson+Cole

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

Also admitted in Massachusetts

May 13, 2015

Melanie A. Bachman
Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **EM-VER-007-131122 – 1657 Wilbur Cross Parkway, Berlin, Connecticut**
EM-VER-064-131004 – 219 New Park Avenue, Hartford, Connecticut
TS-VER-115-131009 – 37 Peach Orchard Road, Prospect, Connecticut
EM-VER-118-131213 – 76 East Ridge Road, Ridgefield, Connecticut

Completion of Construction Activity

Dear Ms. Bachman:

The purpose of this letter is to notify the Siting Council that construction activity associated with the above-referenced Cellco Partnership d/b/a Verizon Wireless telecommunications facilities has been completed.

If you have any questions or need any additional information regarding these facilities please do not hesitate to contact me.

Sincerely,

Kenneth C. Baldwin

Copy to:
Tim Parks

ROBINSON & COLE LLP

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

Also admitted in Massachusetts

November 21, 2013

Melanie A. Bachman
Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Antenna Swap**
1657 Wilbur Cross Parkway, Berlin, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 114-foot level on the existing 176-foot tower at the above-referenced address. The tower and underlying property are owned Berlin Volunteer Fire Department. The Council approved Cellco's shared use of this tower in 2006. Cellco now intends to replace six (6) of its existing antennas with three (3) model BXA-70063-6BF cellular antennas and three (3) model BXA-171063-12CF AWS antennas, all at the same level. Cellco also intends to install three (3) remote radio heads ("RRHs") behind its AWS antennas and one (1) HYBRIFLEX™ antenna cable. Included in Attachment 1 are specifications for the replacement antennas, RRHs and HYBRIFLEX™ cable.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that 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 Denise McNair, Town Manager for the Town of Berlin. A copy of this letter is also being sent to the Berlin Volunteer Fire Department.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and RRHs will be located at the 114-foot level on the 176-foot tower.

2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundary.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative General Power Density table for the facility, as modified, is included behind Tab 2.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The tower and its foundation can support Cellco's proposed modifications. (*See* Detailed Structural Analysis and Evaluation included in Attachment 3).

For the foregoing reasons, Cellco respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Denise McNair, Berlin Town Manager
Berlin Volunteer Fire Department
Sandy M. Carter

ATTACHMENT 1

BXA-70063-6BF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

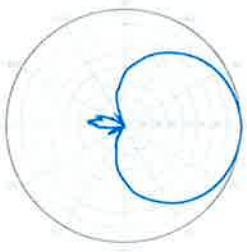
Replace "X" with desired electrical downtilt.

Antenna is also available with N connector(s). Replace "EDIN" with "N" in the model number when ordering

Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	65°	63°
Vertical beamwidth	13°	11°
Gain	14.0 dBd (16.1 dBi)	14.5 dBd (16.6 dBi)
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10	
Impedance	**50Ω**	
VSWR	**≤1.35:1**	
Upper sidelobe suppression (0°)	-18.3 dB	-18.2 dB
Front-to-back ratio (+/-30°)	-33.4 dB	-36.3 dB
Null fill	5% (-26.02 dB)	
Isolation between ports	< -25 dB	
Input power with EDIN connectors	500 W	
Input power with N connectors	300 W	
Lightning protection	Direct Ground	
Connector(s)	2 Ports / EDIN or N / Female / Bottom	
Mechanical Characteristics		
Dimensions Length x Width x Depth	1742 x 285 x 135 mm	68.6 x 11.2 x 5.3 in
Depth with z-brackets	175 mm	6.9 in
Weight without mounting brackets	8.7 kg	19.2 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.50 m² Side: 0.24 m²	Front: 5.3 ft² Side: 2.5 ft²
Wind load @ 161 km/hr (100 mph)	Front: 733 N Side: 386 N	Front: 164 lbf Side: 88 lbf

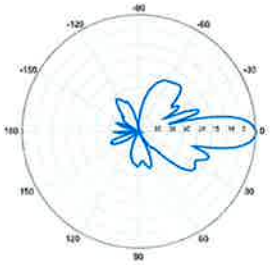
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-6BF-EDIN-X-FP		

BXA-70063-6BF-EDIN-X



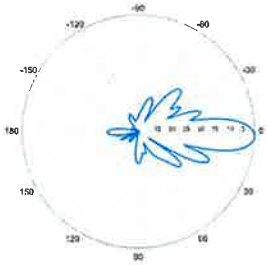
Horizontal | 750 MHz

BXA-70063-6BF-EDIN-0

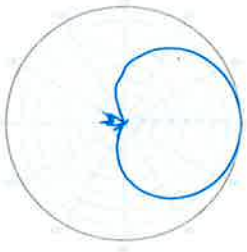


0° | Vertical | 750 MHz

BXA-70063-6BF-EDIN-2

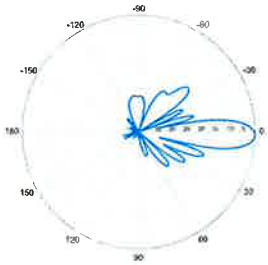


2° | Vertical | 750 MHz



Horizontal | 850 MHz

0° | Vertical | 850 MHz



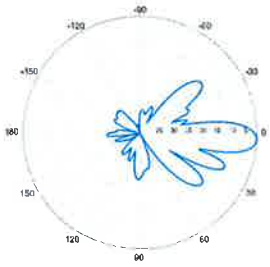
2° | Vertical | 850 MHz

Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

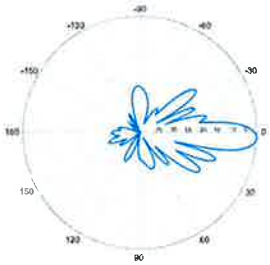
BXA-70063-6BF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6BF-EDIN-3

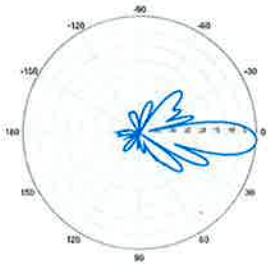


3° | Vertical | 750 MHz

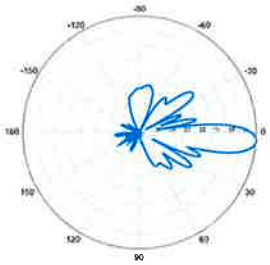


3° | Vertical | 850 MHz

BXA-70063-6BF-EDIN-4

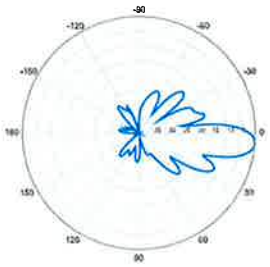


4° | Vertical | 750 MHz

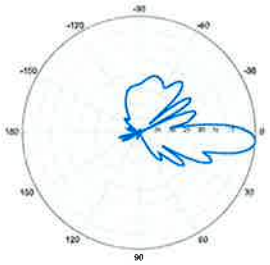


4° | Vertical | 850 MHz

BXA-70063-6BF-EDIN-5

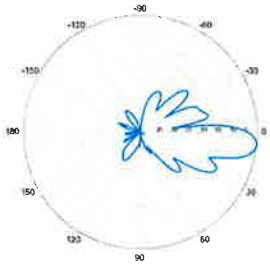


5° | Vertical | 750 MHz

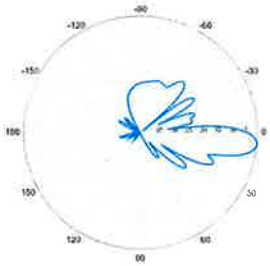


5° | Vertical | 850 MHz

BXA-70063-6BF-EDIN-6

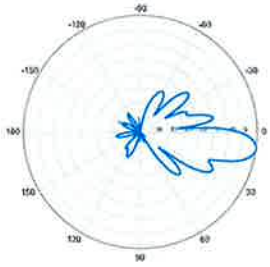


6° | Vertical | 750 MHz

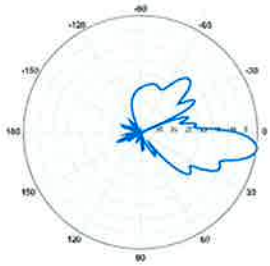


6° | Vertical | 850 MHz

BXA-70063-6BF-EDIN-8

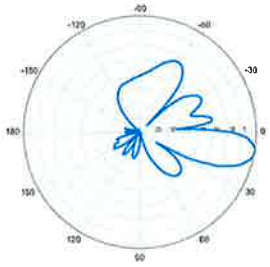


8° | Vertical | 750 MHz

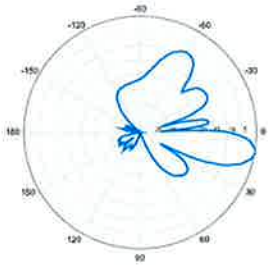


8° | Vertical | 850 MHz

BXA-70063-6BF-EDIN-10



10° | Vertical | 750 MHz



10° | Vertical | 850 MHz

Amphenol ANTENNA SOLUTIONS

BXA-171063-12CF-EDIN-X

X-Pol | FET Panel | 63° | 19.0 dBi

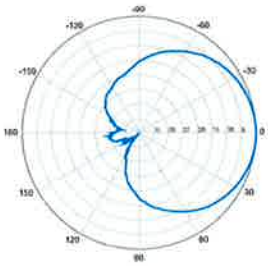
Replace "X" with desired electrical downtilt.

Antenna is also available with NE connector(s). Replace "EDIN" with "NE" in the model number when ordering.

Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	68°	65°	60°
Vertical beamwidth	4.5°	4.5°	4.5°
Gain	16.1 dBd / 18.2 dBi	16.5 dBd / 18.6 dBi	16.9 dBd / 19.0 dBi
Electrical downtilt (X)	0, 2, 5		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back ratio	> 30 dB		
In-band isolation	< -25 dB		
IM3 (20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)		
Operating temperature	-40° to +60° C / -40° to +140° F		
Mechanical Characteristics			
Dimensions Length x Width x Depth	1842 x 154 x 105 mm		72.5 x 6.1 x 4.1 in
Depth with z-brackets	133 mm		5.2 in
Weight without mounting brackets	5.8 kg		12.8 lbs
Survival wind speed	> 201 km/hr		> 125 mph
Wind area	Front: 0.28 m² Side: 0.19 m²		Front: 3.1 ft² Side: 2.1 ft²
Wind load @ 161 km/hr (100 mph)	Front: 460 N Side: 304 N		Front: 103 lbf Side: 68 lbf

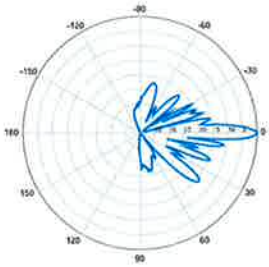
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171063-12CF-EDIN-X-FP		

BXA-171063-12CF-EDIN-X



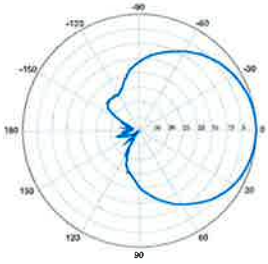
Horizontal | 1710-1880 MHz

BXA-171063-12CF-EDIN-0



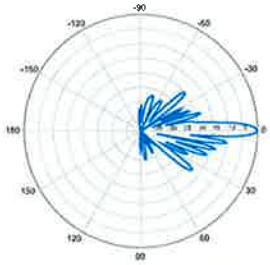
0° | Vertical | 1710-1880 MHz

BXA-171063-12CF-EDIN-X



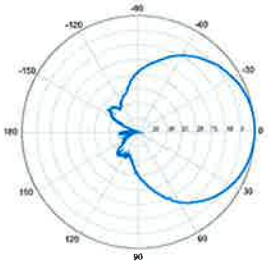
Horizontal | 1850-1990 MHz

BXA-171063-12CF-EDIN-0



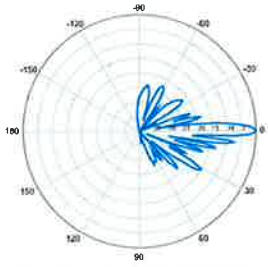
0° | Vertical | 1850-1990 MHz

BXA-171063-12CF-EDIN-X



Horizontal | 1920-2170 MHz

BXA-171063-12CF-EDIN-0

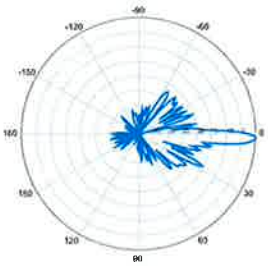


0° | Vertical | 1920-2170 MHz

BXA-171063-12CF-EDIN-X

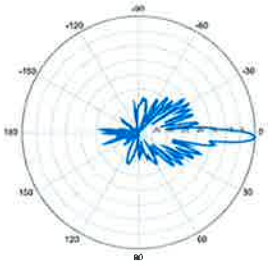
X-Pol | FET Panel | 63° | 19.0 dBi

BXA-171063-12CF-EDIN-2



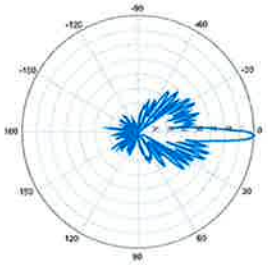
2° | Vertical | 1710-1880 MHz

BXA-171063-12CF-EDIN-2



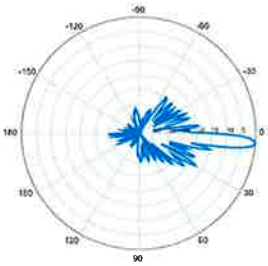
2° | Vertical | 1850-1990 MHz

BXA-171063-12CF-EDIN-2



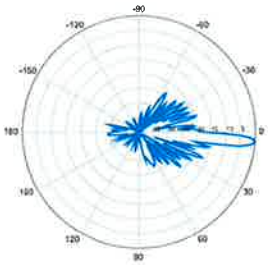
2° | Vertical | 1920-2170 MHz

BXA-171063-12CF-EDIN-5



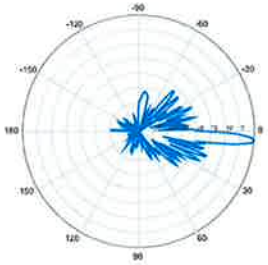
5° | Vertical | 1710-1880 MHz

BXA-171063-12CF-EDIN-5



5° | Vertical | 1850-1990 MHz

BXA-171063-12CF-EDIN-5



5° | Vertical | 1920-2170 MHz

Alcatel-Lucent RRH2x40-07-U

REMOTE RADIO HEAD

The Alcatel-Lucent RRH2x40-07-U is a high-power, small form-factor Remote Radio Head (RRH) operating in the North American Digital Dividend / 700MHz frequency band (3GPP Band 13). The Alcatel-Lucent RRH2x40-07-U is designed with an eco-efficient approach, providing operators with the means to achieve high quality and capacity coverage with minimum site requirements.

A distributed eNodeB expands deployment options by using two components, a Base Band Unit (BBU) containing the digital assets and a separate RRH containing the radio-frequency (RF) elements. This modular design optimizes available space and allows the main components of an eNodeB to be installed separately, within the same site or several kilometres apart.

The Alcatel-Lucent RRH2x40-07-U is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals along with operations, administration and maintenance (OA&M) information. The Alcatel-Lucent RRH2x40-07-U has two transmit RF paths, 40 W RF output power per transmit path, and is designed to manage up to two-way receive diversity. The device is ideally suited to support macro coverage, with multiple-input multiple-output (MIMO) 2x2 operation in up to 10 MHz of bandwidth.

The Alcatel-Lucent RRH2x40-07-U is designed to make available all the benefits of a distributed eNodeB, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX). The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment or require costly cranes to be employed, leaving coverage holes. However, many of these sites can host an Alcatel-Lucent RRH2x40-07-U installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

Fast, low-cost installation and deployment

The Alcatel-Lucent RRH2x40-07-U is a zero-footprint solution and operates noise-free, simplifying negotiations with site property owners and minimizing environmental impacts. Installation can easily be done by a single person because the Alcatel-Lucent RRH2x40-07-U is compact and weights less than 23 kg (50 lb), eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day — a fraction of the time required for a traditional BTS.

Excellent RF performance

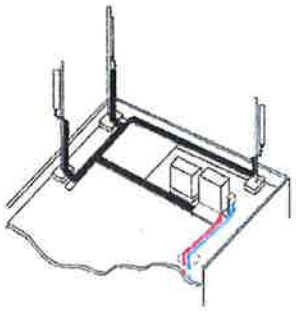
Because of its small size and weight, the Alcatel-Lucent RRH2x40-07-U can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-07-U where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and installation costs are reduced or eliminated, and there is no need for a Tower Mounted Amplifier (TMA) because losses introduced by the RF feeder are greatly reduced. The Alcatel-Lucent RRH2x40-07-U provides more RF power while at the same time consuming less electricity.

Features

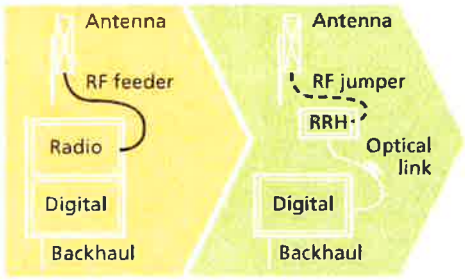
- Zero-footprint deployment
- Easy installation, with a lightweight unit can be carried and set up by one person
- Optimized RF power, with flexible site selection and elimination of a TMA
- Convection-cooled (fanless), noise-free, and heaterless unit
- Best-in-class power efficiency, with significantly reduced energy consumption

Benefits

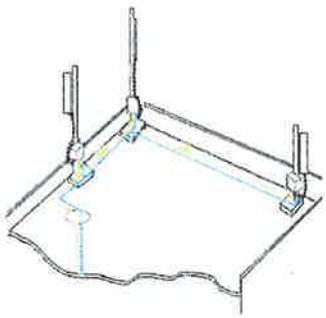
- Leverages existing real estate with lower site costs
- Reduces installation costs, with fewer installation materials and simplified logistics
- Decreases power costs and minimizes environmental impacts, with the potential for eco-sustainable power options
- Improves RF performance and adds flexibility to network planning



Macro



RRH for space-constrained cell sites



Distributed

Technical specifications

Physical dimensions

- Height: 390 mm (15.4 in.)
- Width: 380 mm (15 in.)
- Depth: 210 mm (8.2 in.)
- Weight (without mounting kit): less than 23 kg (50 lb)

Power

- Power supply: -48V

Operating environment

- Outdoor temperature range:
  - ¬ With solar load: -40°C to +50°C (-40°F to +122°F)
  - ¬ Without solar load: -40°C to +55°C (-40°F to +131°F)
- Passive convection cooling (no fans)
- Enclosure protection
  - ¬ IP65 (International Protection rating)

RF characteristics

- Frequency band: 700 MHz; 3GPP Band 13
- Bandwidth: up to 10 MHz
- RF output power at antenna port:
  - ¬ 40 W nominal RF power for each Tx port
- Rx diversity: 2-way or 4-way
- Noise figure: below 2.5 dB typical
- ALD features
  - ¬ TMA
  - ¬ Remote electrical tilt (RET) support (AISG v2.0)

Optical characteristics

Type/number of fibers

- Up to 3.12 Gb/s line bit rate
- Single-mode variant
  - ¬ One SM fiber (9/125 µm) per RRH2x, carrying UL and DL using CWDM (at 1550/1310 nm)
- Multi-mode variant
  - ¬ Two MM fibers (50/125 µm) per RRH2x: one carrying UL, the other carrying DL (at 850 nm)

Optical fiber length

- Up to 500 m (0.31 mi), using MM fiber
- Up to 20 km (12.43 mi), using SM fiber

Alarms and ports

- Six external alarms
- Two optical ports to support daisy-chaining

www.alcatel-lucent.com

CPG2809100913 (09)

Alcatel·Lucent

Product Data Sheet HB158-1-08U8-S8J18

HYBRIFLEX™ RRH Hybrid Feeder Cabling Solution, 1-5/8", Single-Mode Fiber

Product Description

RFS' HYBRIFLEX Remote Radio Head (RRH) hybrid feeder cabling solution combines optical fiber and DC power for RRHs in a single lightweight aluminum corrugated cable, making it the world's most innovative solution for RRH deployments.

It was developed to reduce installation complexity and costs at Cellular sites. HYBRIFLEX allows mobile operators deploying an RRH architecture to standardize the RRH installation process and eliminate the need for and cost of cable grounding. HYBRIFLEX combines optical fiber (multi-mode or single-mode) and power in a single corrugated cable. It eliminates the need for junction boxes and can connect multiple RRHs with a single feeder. Standard RFS CELLFLEX® accessories can be used with HYBRIFLEX cable. Both pre-connectorized and on-site options are available.

Figure 1: HYBRIFLEX Series

Features/Benefits

- Aluminum corrugated armor with outstanding bending characteristics – minimizes installation time and enables mechanical protection and shielding
- Same accessories as 1 5/8" coaxial cable
- Outer conductor grounding – Eliminates typical grounding requirements and saves on installation costs
- Lightweight solution and compact design – Decreases tower loading
- Robust cabling – Eliminates need for expensive cable trays and ducts
- Installation of tight bundled fiber optic cable pairs directly to the RRH – Reduces CAPEX and wind load by eliminating need for interconnection
- Optical fiber and power cables housed in single corrugated cable – Saves CAPEX by standardizing RRH cable installation and reducing installation requirements
- Outdoor polyethylene jacket – Ensures long-lasting cable protection

Technical Specifications

Outer Conductor Armor	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes
Weight, Approximate		[kg/m (lb/ft)]	1.9 (1.30)
Minimum Bending Radius, Single Bending		[mm (in)]	200 (8)
Minimum Bending Radius, Repeated Bending		[mm (in)]	500 (20)
Recommended/Maximum Clamp Spacing		[m (ft)]	1.0 / 1.2 (3.25 / 4.0)
DC-Resistance Outer Conductor Armor		[Ω/km (Ω/1000ft)]	.068 (0.205)
DC-Resistance Power Cable 8.4mm² (8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
Version			Single-mode OM3
Quantity, Fiber Count			16 (8 pairs)
Core/Clad		[µm]	50/125
Primary Coating (Acrylate)		[µm]	245
Buffer Diameter, Nominal		[µm]	900
Secondary Protection, Jacket, Nominal		[mm (in)]	2.0 (0.08)
Minimum Bending Radius		[mm (in)]	104 (4.1)
Insertion Loss @ wavelength 850nm		dB/km	3.0
Insertion Loss @ wavelength 1310nm		dB/km	1.0
Standards (Meets or exceeds)			UL94-V0, UL1666 RoHS Compliant
Size (Power)		[mm² (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm² (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		[mm (in)]	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-95-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

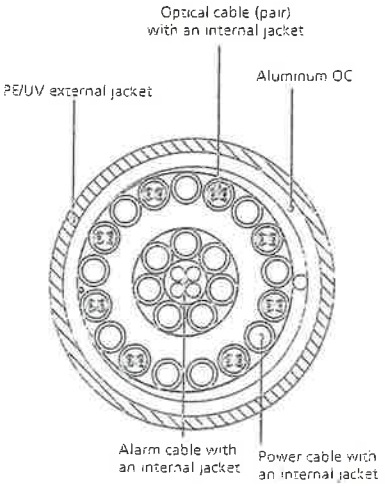


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Berlin 4								
Tower Height: Verizon @ 114ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*Police Channel	1	200	180	0.0022	809	0.5393	0.41%	
*Fire Main	1	100	180	0.0011	154	0.2000	0.55%	
*Fire Intercity	1	30	100	0.0011	154	0.2000	0.54%	
*Highway	1	50	160	0.0007	156	0.2000	0.35%	
*Fire Ground	1	5	130	0.0001	156	0.2000	0.05%	
*SP Hotline	1	80.77	180	0.0009	45	0.2000	0.45%	
*RAFS	1	30	180	0.0003	465	0.3100	0.11%	
*960 Link	1	20.5	100	0.0007	960	0.6400	0.12%	
*Sprint CDMA/LTE	3	778	150	0.0373	1900	1.0000	3.73%	
*Sprint CDMA/LTE	1	438	150	0.0070	850	0.5667	1.24%	
*Clearwire	2	153	150	0.0049	2496	1.0000	0.49%	
*Clearwire	1	211	150	0.0034	11 GHz	1.0000	0.34%	
*MetroPCS CDMA	3	727	124	0.0510	2135	1.0000	5.10%	
*MetroPCS LTE	1	1200	124	0.0281	2130	1.0000	2.81%	
*AT&T UMTS	2	565	170	0.0141	880	0.5867	2.40%	
*AT&T UMTS	2	1077	170	0.0268	1900	1.0000	2.68%	
*AT&T GSM	1	283	170	0.0035	880	0.5867	0.60%	
*AT&T GSM	4	646	170	0.0321	1900	1.0000	3.21%	
*AT&T LTE	1	1313	170	0.0163	734	0.4893	3.34%	
*T-Mobile GSM	8	123	160	0.0138	1945	1.0000	1.38%	
*T-Mobile UMTS	2	490	160	0.0138	2100	1.0000	1.38%	
Verizon PCS	**11**	**622**	**114**	**0.1893**	**1970**	**1.0000**	**18.93%**	
Verizon Cellular	**9**	**405**	**114**	**0.1008**	**869**	**0.5793**	**17.41%**	
Verizon AWS	**1**	**1750**	**114**	**0.0484**	**2145**	**1.0000**	**4.84%**	
Verizon 700	**1**	**696**	**114**	**0.0193**	**698**	**0.4653**	**4.14%**	
								76.59%
* Source: Siting Council								

ATTACHMENT 3

DETAILED STRUCTURAL ANALYSIS AND EVALUATION OF AN EXISTING 176' MONOPOLE FOR PROPOSED ANTENNA ARRANGEMENT

Site: **Berlin Fire Department**
Address: **1657 Wilbur Cross Parkway, Berlin, CT**

prepared for

Verizon Wireless
99 East River Drive
East Hartford, Connecticut 06108

prepared by

URS CORPORATION
500 ENTERPRISE DRIVE, SUITE 3B
ROCKY HILL, CT 06067
TEL. 860-529-8882

36917417.00000
VZ5-168

November 11, 2013

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis of the existing 176' steel tapered monopole structure, located at 1657 Wilbur Cross Parkway in Berlin, CT. The analysis was conducted in accordance with the 2005 Connecticut State Building Code and the TIA/EIA-222-F standard for a wind velocity of 80 mph (fastest mile) and 69 mph (fastest mile) concurrent with 0.5" ice. The antenna loading considered in the analysis consists of all existing and proposed antennas, transmission lines, and ancillary items as outlined in the Introduction Section of this report.

The proposed Verizon Wireless installation is as follows:

Proposed Antenna and Mount	Carrier	Antenna Center Elevation
Remove: **(4) Modcell LPA-80063/6CF Panel Antennas (Alpha & Beta Sectors)** **(2) Modcell RWA-80013 Panel Antennas (Gamma Sector)**	**Verizon Wireless (Existing)**	**@ 114'** (113' above base plate)
Install: **(3) (AWS) Amphenol BXA-171063-12CF-EDIN-2 Panel Antennas** **(3) AWS RRH Units** **(2) Amphenol BXA-70063-6BF-EDIN-0 Panel Antennas (Alpha & Beta Sectors)** **(1) Amphenol BXA-70080-4BF-EDIN-0 Panel Antenna (Gamma Sector)** **(1) Raycap DB-T1=6Z-8AB-0Z Distribution Box** **(1) 1 5/8" Fiber Optic Cable (mounted on outside of monopole)** **Mounted on existing platform**	**Verizon Wireless (Proposed)**	**@ 114'** (113' above base plate)

The results of the analysis indicate that the tower structure has the capacity to support the proposed loading conditions. **The tower and its foundation are considered structurally adequate with the wind load classification specified above and the proposed antenna loading.**

EXECUTIVE SUMMARY - continued

This analysis is based on:

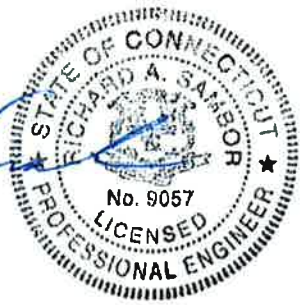
1) The tower structure's theoretical capacity, not including any assessment of the condition of the tower.
2) Geotechnical investigation and report performed by Dr. Clarence Welti, P.E., P.C. dated June 11, 2002.
3) Tower geometry and structural member sizes utilized in the preparation of this report obtained from manufacturers original design documents for a 176' tapered steel monopole, prepared by Engineered Endeavors, Inc., EEI Job #: 11129, signed and sealed September 16, 2002.
4) Foundation geometry utilized in the preparation of this report obtained from manufacturers original design documents for a 176; tapered steel monopole, prepared by Engineered Endeavors, Inc., EEI Job # 11129, signed and sealed September 20, 2002.
5) Previous structural analysis performed by URS Corp, project number VS1-034 / 36922118, signed and sealed September 29, 2005.
6) Previous structural analysis performed by URS Corp, project number VZ1-005 / 36912556, signed and sealed February 21, 2006.
7) Previous structural analysis performed by Natcomm Consulting Engineers, Inc., project number 08007.C05, signed and sealed February 14, 2008.
8) Site documentation and visual verification of existing appurtenances conducted from grade by URS during July 2008.
9) Previous structural analysis performed by URS Corp, project number PWS-002 / 36923532, signed and sealed July 18, 2008.
10) Previous structural analysis performed by URS Corp, project number MXN-003 / 36924391, signed and sealed April 7, 2010.
11) Previous structural analysis performed by URS Corp, project number VZ5-047 / 36931194, signed and sealed June 23, 2010.
12) Previous structural analysis performed by Hudson Design Group, LLC., signed and sealed April 5, 2012.
13) Previous structural analysis performed by Tectonic Engineering & Surveying Consultants, project number 6318.43-846, signed and sealed November 16, 2012.
14) Antenna and mount configuration as specified within Section 2 and 6 of this report.

This report is only valid as per the assumptions and data utilized in this report for antenna inventory, mounts and associated cables. The user of this report shall field verify the assumption of the antenna and mount configuration as well as the physical condition of the tower. Notify the engineer in writing immediately if any of the information in this report is found to be other than specified.

If you should have any questions, please call.

Sincerely,

URS Corporation



Richard A. Sambor, P.E.
Senior Structural Engineer

RAS/mcd
cc: MJE, ICA – URS, CF/Book

2. INTRODUCTION

The subject tower is located at 1657 Wilbur Cross Parkway in Berlin, CT. The structure is an existing 176' steel tapered monopole structure, designed and manufactured by Engineered Endeavors, Inc.

The inventory is summarized in the table below:

Antenna Type	*Carrier*	*Mount*	*Antenna Centerline Elevation*	*Cable*
(1) 8' Dipole Antenna (2) 8' Omni Antennas (2) 4' Omni Antennas (2) 18"x18" Panel Antenna (2) Kathrein Scala MF-900B Grid Dish	Town (existing)	Low-Profile Platform	175'	(9) 1 5/8" (within monopole)
(1) Telewave ANT150D6-9 4-Bay Dipole Antenna	Town (reserved)	See Above Mount	175'	(1) 1 5/8" (within monopole)
(3) Katherin Scala 800-10121Panel Antennas (3) KMW AM-X-CD-16-65 Panel Antennas (6) RRU Units (1) Raycap DC6-48-60-18-8F Surge Arrestor (6) LGP21401 TMA's	AT&T (existing)	(3) 12' T-Arm Mounts	170'	(6) 1 5/8" (1) Fiber Optic (2) DC Power (within monopole)
(6) EMS DR65-19-00DPQ Panel Antennas (6) Decibel PCS 1900 TMA's	T-Mobile (existing)	(3) 12' T-Arm Mounts	160'	(12) 1 5/8" (within monopole)
(3) EMS DR65-19-00DPQ Panel Antennas (6) Decibel PCS 1900 TMA's	T-Mobile (reserved)	See Above Mount	160'	(12) 1 5/8" (within monopole)
(1) Telewave ANT120D3 2-Bay Dipole Antenna (1) Grid Dish (1) 18"x18" Panel Antenna	Town (existing)	See Above Mount	159'	(3) 1 5/8" (within monopole)
(3) Andrew VHLP2.5 Dishes (2) 3' Dishes (3) Kathrein Scala 840-10054 Panel Antennas (6) Dapa 48000 Antennas (3) Samsung RRH Units (3) RFS APXVSPP18-C-A20 Panel Antennas (3) 800 MHz RRH Units (3) 1900 RRH Units	Sprint (existing)	(1) 12' Low-Profile Platform	150'	(4) 1/2" (12) 1 5/8" (6) CAT5 (3) 1 1/4" Hybriflex (within monopole)
(1) 18"x18" Panel Antenna (1) 10' 2-Bay Dipole Antenna	Town (existing)	(1) 6' Extension Arm	129'	(2) 1 5/8" (within monopole)
(3) Katherin 742 213 Panel Antennas	Pocket Wireless (existing)	(3) Pipe Mounts	123'	(6) 1 5/8" (Andrew AVA7-50 exterior of monopole)
(3) LNX-6514DAS-T4M-750_4 Panel Antennas (1) Amphenol BXA-185060/12CF 2 Panel Antennas (2) MG D3-900T0	Verizon (existing)	Low-Profile Platform	114'	(6) 1 5/8" (outside monopole)

Antenna Type	*Carrier*	*Mount*	*Antenna Centerline Elevation*	*Cable*
(2) Amphenol BXA-70063-6BF Panel Antennas (Alpha & Beta Sectors) (1) Amphenol BXA-70080-4BF Panel Antennas (Gamma Sector) (3) Amphenol BXA-171063-12CF-EDIN-2 Panel Antennas (3) AWS RRH Units (1) Raycap DB-T1-6Z-8A-0Z Distribution Box	**Verizon (Proposed)**	(1) Low-Profile Platform	**114'**	**(1) 1 5/8 Fiber Optic Cable (outside monopole) (Proposed)** (12) 1 5/8" (within monopole)
(1) 20' 4-Bay Dipole antenna (1) 18"x18" Panel Antenna (1) Grid Dish	Town (existing)	6' Extension Arm	100'	(2) 1 5/8" (within monopole)
(1) GPS Antenna	Sprint (existing)	3' Standoff Mount	75'	(1) 1/2" (within monopole)
(1) VIC-100 GPS Antenna	T-Mobile (reserved)	3' Standoff Mount	60'	(1) 1/2" (within monopole)
(1) Scanner Antenna	Town (existing)	3' Standoff Mount	60'	(1) 1/2" (within monopole)
(1) GPS	AT&T (existing)	Flush Mounted Assembly	45'	(1) 1/2" (outside monopole)

Note: Base of structure established as 1.0ft above average grade.

This structural analysis of the communications tower was performed by URS Corporation (URS) for Verizon Wireless. The purpose of this analysis was to investigate the structural integrity of the existing tower with its existing and proposed antenna loads. This analysis was conducted to evaluate stress on the tower and the effect of forces to the foundation of the tower resulting from existing and proposed antenna arrangement.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

The structural analysis was conducted in accordance with the 2005 Connecticut State Building Code, TIA/EIA-222-F - Structural Standard for Steel Antenna Towers and Antenna Supporting Structures, and the American Institute of Steel Construction (AISC) Manual of Steel Construction - Allowable Stress Design (ASD).

The analysis was conducted using RISA Tower 5.3. Two load conditions were evaluated as shown below which were compared to allowable stresses according to AISC and TIA/EIA.

Load Condition 1 = 80 mph (fastest mile) Wind Load (without ice) + Tower Dead Load
Load Condition 2 = 69 mph (fastest mile) Wind Load (with ice) + Ice Load + Tower Dead Load

Please note that wind pressure is a function of velocity squared. Under Load Condition 2, a 25 percent reduction in wind pressure is allowed by code to account for the unlikelihood of the full wind pressure and ice load occurring at the same time. The same results may be achieved by utilizing a lower wind pressure without taking the 25 percent reduction, as shown above.

The TIA/EIA standard permits a one-third increase in allowable stresses for towers and monopoles less than 700 feet tall. For the purposes of this analysis, in computing the load capacity the allowable stresses of the tower members were increased by one-third.

4. FINDINGS AND EVALUATION

Combined axial and bending stresses on the monopole structure were evaluated to compare with allowable stresses in accordance with AISC. The calculated stresses under the proposed loading were **BELOW** the allowable stresses (see table below). Detailed analysis and calculations for the proposed load condition are provided in section 6 of this report. Additionally, the anchor bolts, base plate and foundation were all found to be within the allowable limits.

TABLE 1: Proposed Tower Base Reactions

Base Reactions	Reactions
Axial Load (kips)	53
Shear (kips)	36
O.T. Moment (ft-kips)	4398

TABLE 2: Proposed Tower Component Stress vs. Capacity Summary

Component (Section No.)	Controlling Component / Elevation	Stress Ratio (% capacity)	Pass/Fail	Comments:
Pole Shaft (L3)	43'-86.13'	89.0 %	**Pass**	
Anchor Bolts	Compression	87 %	**Pass**	
Base Plate	Bending	86 %	**Pass**	
Caisson Foundation	Flexure	69 %	**Pass**	

5. CONCLUSIONS AND RECOMMENDATIONS

The results of the analysis indicate that the tower structure has the capacity to support the proposed loading conditions. **The tower and its foundation are considered structurally adequate with the wind load classification specified above and the proposed antenna loading.**

Limitations/Assumptions:

This report is based on the following:

1. Tower inventory as listed in this report.
2. Tower is properly installed and maintained.
3. All members are as specified in the original design documents and are in good condition.
4. All required members are in place.
5. All bolts are in place and are properly tightened.
6. Tower is in plumb condition.
7. All member protective coatings are in good condition.
8. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
9. Foundations were properly constructed to support original design loads as specified in the original design documents.
10. All coaxial cable is installed within the monopole unless specified otherwise.

URS is not responsible for any modifications completed prior to or hereafter in which URS is not or was not directly involved. Modifications include but are not limited to:

A. Adding antennas
B. Removing/replacing antennas
C. Adding coaxial cables

URS hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon information contained and set forth herein. If you are aware of any information which conflicts with that which is contained herein, or you are aware of any defects arising from original design, material, fabrication, or erection deficiencies, you should disregard this report and immediately contact URS. URS disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

Ongoing and Periodic Inspection and Maintenance:

After the Contractor has successfully completed the installation and the work has been accepted, the owner will be responsible for the ongoing and periodic inspection and maintenance of the tower.

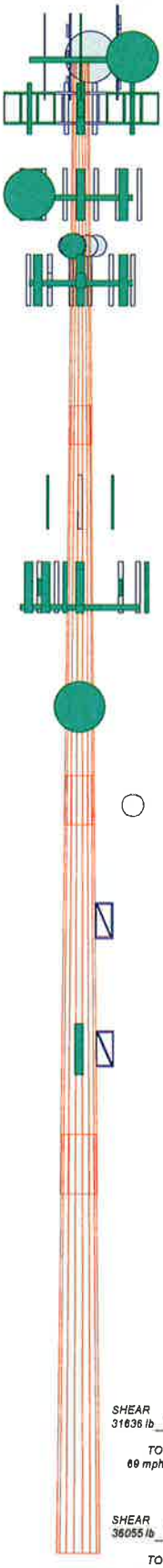
The owner shall refer to TIA/EIA-222-F for recommendations for maintenance and inspection. The frequency of the inspection and maintenance intervals is to be determined by the owner based upon actual site and environmental conditions. It is recommended that a complete and thorough inspection of the entire tower structural system be performed at least yearly and more frequently as conditions warrant. According to TIA/EIA-222-F section 14.1, Note 1: It is recommended that the structure be inspected after severe wind and/or ice storms or other extreme loading conditions.

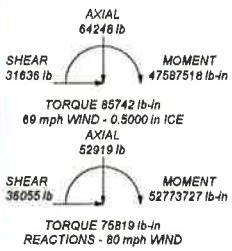
6. DRAWINGS AND DATA

TNX TOWER INPUT/OUTPUT SUMMARY

Section	1	2	3	4
Length (ft)	45.25	49.13	49.88	49.00
Number of Sides	18	18	18	18
Thickness (in)	0.2500	0.3125	0.3750	0.4375
Socket Length (ft)	4.50	5.75	7.00	
Top Dia (in)	21.0000	30.2260	39.8361	49.3600
Bot Dia (in)	31.8000	41.8296	51.3600	60.5000
Grade	A572-65			
Weight (lb)	3196.0	5821.5	8953.1	12570.6

Total Weight: 30540.2





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
12' Low Profile Platform (Town)	176	(2) 48000 (Sprint/Nextel)	150
4 Bay Dipole (Town)	176	(2) 48000 (Sprint/Nextel)	150
(2) 2' Dia 8' Omni (Town)	176	APXVSPP18-C-A20 (Clearwire)	150
Grid Dish (Town)	176	APXVSPP18-C-A20 (Clearwire)	150
Dipole (Town)	176	APXVSPP18-C-A20 (Clearwire)	150
Grid Dish (Town)	176	Andrew 800MHz RRH (Clearwire)	150
(2) 1.5" Dia 4' Omni w/Pipe Mount (Town)	176	Andrew 800MHz RRH (Clearwire)	150
4 Bay Dipole (reserved) (Town)	176	Andrew 800MHz RRH (Clearwire)	150
18"x18"x4" Panel (Town)	176	Panasonic RRH 1900MHZ (Clearwire)	150
Valmont T-Arm (1) (ATI/Cingular)	170	Panasonic RRH 1900MHZ (Clearwire)	150
Valmont T-Arm (1) (ATI/Cingular)	170	Panasonic RRH 1900MHZ (Clearwire)	150
Valmont T-Arm (1) (ATI/Cingular)	170	840 10054 (Clearwire)	150
800-10121 (ATI/Cingular)	170	840 10054 (Clearwire)	150
800-10121 (ATI/Cingular)	170	840 10054 (Clearwire)	150
800-10121 (ATI/Cingular)	170	Remote Radio Heads U-RAS (Clearwire)	150
(2) LPG 21401 TMA (ATI/Cingular)	170	Remote Radio Heads U-RAS (Clearwire)	150
(2) LPG 21401 TMA (ATI/Cingular)	170	2 Bay Dipole (Town)	130
(2) LPG 21401 TMA (ATI/Cingular)	170	18"x18"x4" Panel (Town)	130
AM-X-CD-14-65 (ATI/Cingular)	170	6' Side Mount Standoff (Town)	130
AM-X-CD-14-65 (ATI/Cingular)	170	742-213 (Pocket Wireless)	124
AM-X-CD-14-65 (ATI/Cingular)	170	742-213 (Pocket Wireless)	124
(2) RRUS-11 (ATI/Cingular)	170	742-213 (Pocket Wireless)	124
(2) RRUS-11 (ATI/Cingular)	170	BXA-70063/4BF-EDIN-X (Verizon)	114
(2) RRUS-11 (ATI/Cingular)	170	BXA-70080/4BF-EDIN-X (Verizon)	114
DC6-48-60-18-8F (ATI/Cingular)	170	BXA-171063/12CF-EDIN-X (Verizon)	114
Valmont T-Arm (1) (T-Mobile)	160	BXA-171063/12CF-EDIN-X (Verizon)	114
Valmont T-Arm (1) (T-Mobile)	160	BXA-171063/12CF-EDIN-X (Verizon)	114
Valmont T-Arm (1) (T-Mobile)	160	RH_2X40-AWS (Verizon)	114
(2) DR65-18-00DPQ (T-Mobile)	160	RH_2X40-AWS (Verizon)	114
(2) DR65-18-00DPQ (T-Mobile)	160	RH_2X40-AWS (Verizon)	114
(2) DR65-18-00DPQ (T-Mobile)	160	DB-T1-6Z-8AB-0Z (Verizon)	114
DR65-18-00DPQ (T-Mobile (reserved))	160	Ryrnse MO 03-900Tx (Verizon)	114
DR65-18-00DPQ (T-Mobile (reserved))	160	LNX-6514DS-T4M (Verizon)	114
DR65-18-00DPQ (T-Mobile (reserved))	160	BXA-70063/4BF-EDIN-X (Verizon)	114
(2) TMA 10'x8'x3" (T-Mobile)	160	LNX-6514DS-T4M (Verizon)	114
(2) TMA 10'x8'x3" (T-Mobile)	160	Ryrnse MO 03-900Tx (Verizon)	114
(2) TMA 10'x8'x3" (T-Mobile)	160	LNX-6514DS-T4M (Verizon)	114
(2) TMA 10'x8'x3" (T-Mobile (reserved))	160	BXA-163060/12CF 2 (Verizon)	114
(2) TMA 10'x8'x3" (T-Mobile (reserved))	160	Andrew 12'-6" Low Profile Platform (Verizon)	112
(2) TMA 10'x8'x3" (T-Mobile (reserved))	160	6' Side Mount Standoff (Town)	100
2 Bay Dipole (Town)	160	4 Bay Dipole (Town)	100
Grid Dish (Town)	160	Grid Dish (Town)	100
18"x18"x4" Panel (Town)	160	18"x18"x4" Panel (Town)	100
VHLP2.5-180 (Clearwire)	154	Side Mount Standoff (Sprint/Nextel)	75
VHLP2.5-180 (Clearwire)	154	GPS (Sprint/Nextel)	75
VHLP2.5-180 (Clearwire)	154	Scanner Antenna (Town (reserved))	60
PX3F-52 (Clearwire)	154	Side Mount Standoff (T-Mobile (reserved))	60
PX3F-52 (Clearwire)	154	GPS (Sprint/Nextel)	60
Remote Radio Heads U-RAS (Clearwire)	150	Side Mount Standoff (T-Mobile (reserved))	60
Low Profile Platform (Sprint/Nextel)	150	GPS (ATI)	46
(2) 48000 (Sprint/Nextel)	150		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 69 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 89%

URS Corporation
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
Phone: 860-529-8882
FAX: 860-529-3991

Job	176' EEI Monopole, Berlin, CT
Project	Berlin Fire Department
Client	Verizon Wireless
Drawn by	Michael Dalickas
Appd	
Code	TIA/EIA-222-F
Date	11/11/13
Scale	NTS
Path	
Dwg No.	E-1

TNX TOWER DETAILED OUTPUT

tnxTower	Job	Page
URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: 860-529-8882 FAX: 860-529-3991	176' EEI Monopole, Berlin, CT	1 of 24
	Project Berlin Fire Department	Date 14:42:15 11/11/13
	Client Verizon Wireless	Designed by Michael Dalickas

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 Hartford County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 69 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.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Calculate Redundant Bracing Forces
Use Moment Magnification	Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	Use Clear Spans For KL/r	SR Leg Bolts Resist Compression
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	All Leg Panels Have Same Allowable
Escalate Ice	√ Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	Use Azimuth Dish Coefficients	√ Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Poles
Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	√ Include Shear-Torsion Interaction
Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination		

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	176.01-130.76	45.25	4.50	18	21.0000	31.8000	0.2500	1.0000	A572-65 (65 ksi)
L2	130.76-86.13	49.13	5.75	18	30.2260	41.8200	0.3125	1.2500	A572-65 (65 ksi)
L3	86.13-43.00	48.88	7.00	18	39.8381	51.3600	0.3750	1.5000	A572-65 (65 ksi)
L4	43.00-1.00	49.00		18	48.9600	60.5000	0.4375	1.7500	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	21.3240	16.4651	895.6507	7.3663	10.6680	83.9568	1792.4800	8.2341	3.2560	13.024
	32.2906	25.0349	3148.3461	11.2003	16.1544	194.8909	6300.8349	12.5198	5.1568	20.627
L2	31.7706	29.6704	3354.2440	10.6193	15.3548	218.4493	6712.9015	14.8380	4.7698	15.263
	42.4651	41.1703	8961.3641	14.7352	21.2446	421.8192	17934.5198	20.5890	6.8103	21.793
L3	41.8289	46.9709	9241.6271	14.0094	20.2377	456.6531	18495.4146	23.4899	6.3515	16.937
	52.1523	60.6849	19929.7987	18.0997	26.0909	763.8607	39885.8215	30.3482	8.3794	22.345
L4	51.3893	67.3795	20042.4648	17.2255	24.8717	805.8353	40111.3021	33.6962	7.8470	17.936
	61.4333	83.4043	38013.0437	21.3222	30.7340	1236.8401	76076.1060	41.7101	9.8780	22.578

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 176.01-130.76				1	1	1		
L2 130.76-86.13				1	1	1		
L3 86.13-43.00				1	1	1		
L4 43.00-1.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
1 5/8 (Town)	C	No	Inside Pole	176.00 - 21.00	10	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1 5/8 (AT&T/Cingular)	C	No	Inside Pole	171.00 - 9.00	6	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1 5/8 (T-Mobile)	C	No	Inside Pole	161.00 - 9.00	24	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1 5/8 (Town)	C	No	Inside Pole	161.00 - 21.00	3	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1/2 (Clearwire)	C	No	Inside Pole	151.00 - 9.00	4	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
1 5/8 (Sprint/Nextel)	C	No	Inside Pole	151.00 - 9.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
CATEGORY 5e (1 WIRE) (Clearwire)	C	No	Inside Pole	151.00 - 9.00	6	No Ice	0.00	0.21
						1/2" Ice	0.00	0.21
1 5/8 (Town)	C	No	Inside Pole	131.00 - 21.00	2	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
AVA7-50 (1-5/8 LOW DENSI. FOAM) (Pocket Wireless)	C	No	CaAa (Out Of Face)	124.00 - 4.00	1	No Ice	0.20	0.72
						1/2" Ice	0.30	2.23
AVA7-50 (1-5/8 LOW DENSI. FOAM) (Pocket Wireless)	C	No	CaAa (Out Of Face)	124.00 - 4.00	5	No Ice	0.00	0.72
						1/2" Ice	0.00	2.23
1 5/8 (Verizon)	A	No	CaAa (Out Of Face)	115.00 - 21.00	1	No Ice	0.20	1.04
						1/2" Ice	0.30	2.55
1 5/8 (Verizon)	A	No	CaAa (Out Of Face)	115.00 - 21.00	5	No Ice	0.00	1.04
						1/2" Ice	0.00	2.55

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
1 5/8 (Verizon)	C	No	Inside Pole	115.00 - 21.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1 5/8 (Town)	C	No	Inside Pole	101.00 - 21.00	2	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1/2 (Clearwire)	C	No	Inside Pole	76.00 - 9.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
FB-L98B-002 (AT&T)	A	No	Inside Pole	171.00 - 10.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
wr-vg122st-brda (AT&T)	A	No	Inside Pole	171.00 - 10.00	2	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
1 5/8" Hybriflex (VZW)	A	No	CaAa (Out Of Face)	116.00 - 10.00	1	No Ice	0.16	0.21
						1/2" Ice	0.26	1.51
1 1/4" Hybriflex Cables (Sprint)	C	No	Inside Pole	151.00 - 10.00	3	No Ice	0.00	0.42
						1/2" Ice	0.00	0.42
1/2 (Sprint)	C	No	Inside Pole	76.00 - 10.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
1/2 (T-Mobile)	C	No	Inside Pole	61.00 - 10.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
1/2 (Town)	C	No	Inside Pole	61.00 - 10.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
1/2 (AT&T)	A	No	CaAa (Out Of Face)	46.00 - 10.00	1	No Ice	0.06	0.25
						1/2" Ice	0.16	0.91

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	176.01-130.76	A	0.000	0.000	0.000	0.000	0.03
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	1.90
L2	130.76-86.13	A	0.000	0.000	0.000	10.570	0.22
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	7.498	3.36
L3	86.13-43.00	A	0.000	0.000	0.000	15.723	0.31
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	8.540	3.55
L4	43.00-1.00	A	0.000	0.000	0.000	11.633	0.18
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	7.722	2.47

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_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	176.01-130.76	A	0.500	0.000	0.000	0.000	0.000	0.03
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	1.90
L2	130.76-86.13	A	0.500	0.000	0.000	0.000	16.444	0.52
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	11.285	3.70
L3	86.13-43.00	A	0.500	0.000	0.000	0.000	24.648	0.76
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	12.853	3.94

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
L4	43.00-1.00	A	0.500	0.000	0.000	0.000	20.433	0.44
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	11.622	2.82

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	176.01-130.76	0.0000	0.0000	0.0000	0.0000
L2	130.76-86.13	-0.1969	-0.2154	-0.2726	-0.3136
L3	86.13-43.00	-0.2245	-0.3481	-0.3104	-0.5095
L4	43.00-1.00	-0.2158	-0.2427	-0.3020	-0.4262

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight K
12' Low Profile Platform (Town)	C	None		0.0000	176.00	No Ice	15.70	15.70	1.30
						1/2" Ice	20.10	20.10	1.76
4 Bay Dipole (Town)	C	From Face	4.00 6.00 0.00	0.0000	176.00	No Ice	5.40	5.40	0.05
						1/2" Ice	9.00	9.00	0.08
(2) 2" Dia 8' Omni (Town)	C	From Face	4.00 0.00 0.00	0.0000	176.00	No Ice	2.00	2.00	0.01
						1/2" Ice	3.03	3.03	0.02
Grid Dish (Town)	C	From Face	4.00 -6.00 0.00	0.0000	176.00	No Ice	5.40	5.40	0.05
						1/2" Ice	9.00	9.00	0.08
Dipole (Town)	B	From Face	4.00 0.00 0.00	0.0000	176.00	No Ice	5.40	5.40	0.05
						1/2" Ice	9.00	9.00	0.08
Grid Dish (Town)	B	From Face	4.00 -6.00 0.00	0.0000	176.00	No Ice	5.40	5.40	0.05
						1/2" Ice	9.00	9.00	0.08
(2) 1.5" Dia 4' Omni w/Pipe Mount (Town)	A	From Face	4.00 0.00 0.00	0.0000	176.00	No Ice	0.94	0.94	0.02
						1/2" Ice	1.39	1.39	0.03
4 Bay Dipole (reserved) (Town)	A	From Face	4.00 6.00 0.00	0.0000	176.00	No Ice	5.40	5.40	0.05
						1/2" Ice	9.00	9.00	0.08
18"x18"x4" Panel (Town)	B	From Face	4.00 0.00 1.00	0.0000	176.00	No Ice	3.15	0.70	0.02
						1/2" Ice	3.39	0.85	0.03
Valmont T-Arm (1) (AT&T/Cingular)	A	None		0.0000	170.00	No Ice	10.54	10.54	0.34
						1/2" Ice	14.45	14.45	0.41
Valmont T-Arm (1)	B	None		0.0000	170.00	No Ice	10.54	10.54	0.34

tnxTower	Job: 176' EEI Monopole, Berlin, CT	Page: 5 of 24
URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: 860-529-8882 FAX: 860-529-3991	Project: Berlin Fire Department	Date: 14:42:15 11/11/13
	Client: Verizon Wireless	Designed by: Michael Dalickas

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(AT&T/Cingular)						1/2" Ice	14.45	14.45	0.41
Valmont T-Arm (1)	C	None		0.0000	170.00	No Ice	10.54	10.54	0.34
(AT&T/Cingular)						1/2" Ice	14.45	14.45	0.41
800-10121	A	From Face	1.00	0.0000	170.00	No Ice	5.62	3.29	0.05
(AT&T/Cingular)			0.00			1/2" Ice	6.04	3.64	0.08
			0.00						
800-10121	B	From Face	1.00	0.0000	170.00	No Ice	5.62	3.29	0.05
(AT&T/Cingular)			0.00			1/2" Ice	6.04	3.64	0.08
			0.00						
800-10121	C	From Face	1.00	0.0000	170.00	No Ice	5.62	3.29	0.05
(AT&T/Cingular)			0.00			1/2" Ice	6.04	3.64	0.08
			0.00						
(2) LPG 21401 TMA	A	From Face	1.00	0.0000	170.00	No Ice	0.95	0.37	0.02
(AT&T/Cingular)			0.00			1/2" Ice	1.09	0.48	0.02
			0.00						
(2) LPG 21401 TMA	B	From Face	1.00	0.0000	170.00	No Ice	0.95	0.37	0.02
(AT&T/Cingular)			0.00			1/2" Ice	1.09	0.48	0.02
			0.00						
(2) LPG 21401 TMA	C	From Face	1.00	0.0000	170.00	No Ice	0.95	0.37	0.02
(AT&T/Cingular)			0.00			1/2" Ice	1.09	0.48	0.02
			0.00						
AM-X-CD-14-65	A	From Face	1.00	0.0000	170.00	No Ice	3.08	1.54	0.04
(AT&T/Cingular)			0.00			1/2" Ice	3.41	1.84	0.05
			0.00						
AM-X-CD-14-65	B	From Face	1.00	0.0000	170.00	No Ice	3.08	1.54	0.04
(AT&T/Cingular)			0.00			1/2" Ice	3.41	1.84	0.05
			0.00						
AM-X-CD-14-65	C	From Face	1.00	0.0000	170.00	No Ice	3.08	1.54	0.04
(AT&T/Cingular)			0.00			1/2" Ice	3.41	1.84	0.05
			0.00						
(2) RRUS-11	A	From Face	1.00	0.0000	170.00	No Ice	2.94	1.25	0.06
(AT&T/Cingular)			0.00			1/2" Ice	3.17	1.41	0.07
			0.00						
(2) RRUS-11	B	From Face	1.00	0.0000	170.00	No Ice	2.94	1.25	0.06
(AT&T/Cingular)			0.00			1/2" Ice	3.17	1.41	0.07
			0.00						
(2) RRUS-11	C	From Face	1.00	0.0000	170.00	No Ice	2.94	1.25	0.06
(AT&T/Cingular)			0.00			1/2" Ice	3.17	1.41	0.07
			0.00						
DC6-48-60-18-8F	C	None		0.0000	170.00	No Ice	1.27	1.27	0.02
(AT&T/Cingular)						1/2" Ice	1.46	1.46	0.04
Valmont T-Arm (1)	A	From Face	2.00	0.0000	160.00	No Ice	10.54	10.54	0.34
(T-Mobile)			0.00			1/2" Ice	14.45	14.45	0.41
			0.00						
Valmont T-Arm (1)	B	From Face	2.00	0.0000	160.00	No Ice	10.54	10.54	0.34
(T-Mobile)			0.00			1/2" Ice	14.45	14.45	0.41
			0.00						
Valmont T-Arm (1)	C	From Face	2.00	0.0000	160.00	No Ice	10.54	10.54	0.34
(T-Mobile)			0.00			1/2" Ice	14.45	14.45	0.41
			0.00						
(2) DR65-19-00DPQ	A	From Face	4.00	0.0000	160.00	No Ice	8.40	3.53	0.03
(T-Mobile)			0.00			1/2" Ice	8.95	3.97	0.07
			0.00						
(2) DR65-19-00DPQ	B	From Face	4.00	0.0000	160.00	No Ice	8.40	3.53	0.03
(T-Mobile)			0.00			1/2" Ice	8.95	3.97	0.07
			0.00						
(2) DR65-19-00DPQ	C	From Face	4.00	0.0000	160.00	No Ice	8.40	3.53	0.03

tnxTower	Job: 176' EEI Monopole, Berlin, CT	Page: 6 of 24
URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: 860-529-8882 FAX: 860-529-3991	Project: Berlin Fire Department	Date: 14:42:15 11/11/13
	Client: Verizon Wireless	Designed by: Michael Dalickas

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(T-Mobile)			0.00 0.00			1/2" Ice	8.95	3.97	0.07
DR65-19-00DPQ (T-Mobile (reserved))	A	From Face	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	8.40 8.95	3.53 3.97	0.03 0.07
DR65-19-00DPQ (T-Mobile (reserved))	B	From Face	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	8.40 8.95	3.53 3.97	0.03 0.07
DR65-19-00DPQ (T-Mobile (reserved))	C	From Face	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	8.40 8.95	3.53 3.97	0.03 0.07
(2) TMA 10"x8"x3" (T-Mobile)	A	From Face	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	0.78 0.90	0.29 0.38	0.01 0.02
(2) TMA 10"x8"x3" (T-Mobile)	B	From Face	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	0.78 0.90	0.29 0.38	0.01 0.02
(2) TMA 10"x8"x3" (T-Mobile)	C	From Face	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	0.78 0.90	0.29 0.38	0.01 0.02
(2) TMA 10"x8"x3" (T-Mobile (reserved))	A	From Face	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	0.78 0.90	0.29 0.38	0.01 0.02
(2) TMA 10"x8"x3" (T-Mobile (reserved))	B	From Face	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	0.78 0.90	0.29 0.38	0.01 0.02
(2) TMA 10"x8"x3" (T-Mobile (reserved))	C	From Face	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	0.78 0.90	0.29 0.38	0.01 0.02
2 Bay Dipole (Town)	C	From Face	4.00 6.00 0.00	0.0000	160.00	No Ice 1/2" Ice	0.00 0.00	0.00 0.00	0.00 0.00
Grid Dish (Town)	C	From Face	4.00 6.00 0.00	0.0000	160.00	No Ice 1/2" Ice	5.40 9.00	5.40 9.00	0.05 0.08
18"x18"x4" Panel (Town)	C	From Face	4.00 6.00 1.00	0.0000	160.00	No Ice 1/2" Ice	3.15 3.39	0.70 0.85	0.02 0.03
840 10054 (Clearwire)	A	From Face	3.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	5.24 5.61	2.15 2.64	0.05 0.08
840 10054 (Clearwire)	B	From Face	3.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	5.24 5.61	2.15 2.64	0.05 0.08
840 10054 (Clearwire)	C	From Face	3.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	5.24 5.61	2.15 2.64	0.05 0.08
Remote Radio Heads U-RAS (Clearwire)	A	From Face	3.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	1.80 1.99	0.78 0.92	0.03 0.04
Remote Radio Heads U-RAS (Clearwire)	B	From Face	3.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	1.80 1.99	0.78 0.92	0.03 0.04
Remote Radio Heads U-RAS (Clearwire)	C	From Face	3.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	1.80 1.99	0.78 0.92	0.03 0.04
Low Profile Platform	C	None		0.0000	150.00	No Ice	17.30	17.30	1.50

tnxTower	Job: 176' EEI Monopole, Berlin, CT	Page: 7 of 24
URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: 860-529-8882 FAX: 860-529-3991	Project: Berlin Fire Department	Date: 14:42:15 11/11/13
	Client: Verizon Wireless	Designed by: Michael Dalickas

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(Sprint/Nextel)								1/2" Ice	22.10	22.10	2.03
(2) 48000	A	From Face	3.00			0.0000	150.00	No Ice	4.51	1.82	0.02
(Sprint/Nextel)			0.00					1/2" Ice	4.91	2.15	0.04
			0.00								
(2) 48000	B	From Face	3.00			0.0000	150.00	No Ice	4.51	1.82	0.02
(Sprint/Nextel)			0.00					1/2" Ice	4.91	2.15	0.04
			0.00								
(2) 48000	C	From Face	3.00			0.0000	150.00	No Ice	4.51	1.82	0.02
(Sprint/Nextel)			0.00					1/2" Ice	4.91	2.15	0.04
			0.00								
APXVSPP18-C-A20	A	From Face	3.00			0.0000	150.00	No Ice	8.40	5.28	0.06
(Clearwire)			0.00					1/2" Ice	8.95	5.74	0.11
			0.00								
APXVSPP18-C-A20	B	From Face	3.00			0.0000	150.00	No Ice	8.40	5.28	0.06
(Clearwire)			0.00					1/2" Ice	8.95	5.74	0.11
			0.00								
APXVSPP18-C-A20	C	From Face	3.00			0.0000	150.00	No Ice	8.40	5.28	0.06
(Clearwire)			0.00					1/2" Ice	8.95	5.74	0.11
			0.00								
Andrew 800MHz RRH	A	From Face	3.00			0.0000	150.00	No Ice	2.36	1.97	0.06
(Clearwire)			0.00					1/2" Ice	2.57	2.17	0.08
			0.00								
Andrew 800MHz RRH	B	From Face	3.00			0.0000	150.00	No Ice	2.36	1.97	0.06
(Clearwire)			0.00					1/2" Ice	2.57	2.17	0.08
			0.00								
Andrew 800MHz RRH	C	From Face	3.00			0.0000	150.00	No Ice	2.36	1.97	0.06
(Clearwire)			0.00					1/2" Ice	2.57	2.17	0.08
			0.00								
Panasonic RRH 1900MHZ	A	From Face	3.00			0.0000	150.00	No Ice	2.49	3.06	0.09
(Clearwire)			0.00					1/2" Ice	2.71	3.30	0.12
			0.00								
Panasonic RRH 1900MHZ	B	From Face	3.00			0.0000	150.00	No Ice	2.49	3.06	0.09
(Clearwire)			0.00					1/2" Ice	2.71	3.30	0.12
			0.00								
Panasonic RRH 1900MHZ	C	From Face	3.00			0.0000	150.00	No Ice	2.49	3.06	0.09
(Clearwire)			0.00					1/2" Ice	2.71	3.30	0.12
			0.00								
2 Bay Dipole	C	From Face	6.00			0.0000	130.00	No Ice	5.40	5.40	0.05
(Town)			0.00					1/2" Ice	9.00	9.00	0.08
			0.00								
18"x18"x4" Panel	C	From Face	6.00			0.0000	130.00	No Ice	3.15	0.70	0.02
(Town)			0.00					1/2" Ice	3.39	0.85	0.03
			1.00								
6' Side Mount Standoff	C	From Face	3.00			0.0000	130.00	No Ice	4.97	4.97	0.07
(Town)			0.00					1/2" Ice	6.12	6.12	0.13
			0.00								
Andrew 12'-6" Low Profile Platform	C	None				0.0000	112.00	No Ice	14.45	14.45	1.30
(Verizon)								1/2" Ice	19.00	19.00	1.69
BXA-185060/12CF 2	A	From Face	4.00			0.0000	114.00	No Ice	3.10	2.10	0.04
(Verizon)			4.00					1/2" Ice	3.60	2.60	0.08
			0.00								
LNX-6514DS-T4M	A	From Face	4.00			0.0000	114.00	No Ice	8.52	9.95	0.06
(Verizon)			0.00					1/2" Ice	9.11	11.12	0.14
			0.00								
Rymsa MG D3-900Tx	B	From Face	4.00			0.0000	114.00	No Ice	5.38	5.02	0.05
(Verizon)			4.00					1/2" Ice	5.86	5.96	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
				0.00						
LNX-6514DS-T4M	B	From Face	4.00	0.00	0.0000	114.00	No Ice	8.52	9.95	0.06
(Verizon)							1/2" Ice	9.11	11.12	0.14
				0.00						
Rymsa MG D3-900Tx	C	From Face	4.00	0.00	0.0000	114.00	No Ice	5.38	5.02	0.05
(Verizon)							1/2" Ice	5.86	5.96	0.09
				0.00						
LNX-6514DS-T4M	C	From Face	4.00	0.00	0.0000	114.00	No Ice	8.52	9.95	0.06
(Verizon)							1/2" Ice	9.11	11.12	0.14
				0.00						
BXA-70063-6BF-EDIN-X	A	From Face	4.00	0.00	0.0000	114.00	No Ice	7.47	4.04	0.03
(Verizon)							1/2" Ice	7.99	4.46	0.08
				0.00						
BXA-70063-6BF-EDIN-X	B	From Face	4.00	0.00	0.0000	114.00	No Ice	7.47	4.04	0.03
(Verizon)							1/2" Ice	7.99	4.46	0.08
				0.00						
BXA-70080-4BF-EDIN-X	C	From Face	4.00	0.00	0.0000	114.00	No Ice	3.45	2.57	0.02
(Verizon)							1/2" Ice	3.79	2.87	0.04
				0.00						
BXA-171063-12CF-EDIN-X	A	From Leg	4.00	0.00	0.0000	114.00	No Ice	4.80	3.63	0.02
(Verizon)				-6.00			1/2" Ice	5.25	4.06	0.05
				0.00						
BXA-171063-12CF-EDIN-X	B	From Leg	4.00	0.00	0.0000	114.00	No Ice	4.80	3.63	0.02
(Verizon)				-6.00			1/2" Ice	5.25	4.06	0.05
				0.00						
BXA-171063-12CF-EDIN-X	C	From Leg	4.00	0.00	0.0000	114.00	No Ice	4.80	3.63	0.02
(Verizon)				-6.00			1/2" Ice	5.25	4.06	0.05
				0.00						
RH_2X40-AWS	A	From Leg	4.00	0.00	0.0000	114.00	No Ice	2.52	1.59	0.04
(Verizon)							1/2" Ice	2.75	1.80	0.06
				0.00						
RH_2X40-AWS	B	From Leg	4.00	0.00	0.0000	114.00	No Ice	2.52	1.59	0.04
(Verizon)							1/2" Ice	2.75	1.80	0.06
				0.00						
RH_2X40-AWS	C	From Leg	4.00	0.00	0.0000	114.00	No Ice	2.52	1.59	0.04
(Verizon)							1/2" Ice	2.75	1.80	0.06
				0.00						
DB-T1-6Z-8AB-0Z	C	None			0.0000	114.00	No Ice	5.35	2.40	0.04
(Verizon)							1/2" Ice	5.75	2.72	0.07
6' Side Mount Standoff	C	From Face	3.00	0.00	0.0000	100.00	No Ice	4.97	4.97	0.07
(Town)							1/2" Ice	6.12	6.12	0.13
				0.00						
4 Bay Dipole	C	From Face	6.00	0.00	0.0000	100.00	No Ice	5.40	5.40	0.05
(Town)							1/2" Ice	9.00	9.00	0.08
				0.00						
Grid Dish	C	From Face	6.00	0.00	0.0000	100.00	No Ice	5.40	5.40	0.05
(Town)							1/2" Ice	9.00	9.00	0.08
				0.00						
18"x18"x4" Panel	C	From Face	6.00	0.00	0.0000	100.00	No Ice	3.15	0.70	0.02
(Town)							1/2" Ice	3.39	0.85	0.03
				1.00						
Side Mount Standoff	B	From Face	1.50	0.00	0.0000	75.00	No Ice	4.97	4.97	0.07
(Sprint/Nextel)							1/2" Ice	6.12	6.12	0.13
				0.00						
GPS	B	From Face	3.00	0.00	0.0000	75.00	No Ice	1.00	1.00	0.01
(Sprint/Nextel)							1/2" Ice	1.50	1.50	0.03
				0.00						

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Side Mount Standoff	B	From Face	1.50	0.0000	60.00	No Ice	4.97	4.97	0.07
(T-Mobile (reserved))			0.00			1/2" Ice	6.12	6.12	0.13
			0.00						
GPS	B	From Face	3.00	0.0000	60.00	No Ice	1.00	1.00	0.01
(Sprint/Nextel)			0.00			1/2" Ice	1.50	1.50	0.03
			0.00						
Scanner Antenna	C	From Face	3.00	0.0000	60.00	No Ice	1.00	1.00	0.01
(Town (reserved))			0.00			1/2" Ice	1.50	1.50	0.03
			0.00						
Side Mount Standoff	C	From Face	1.50	0.0000	60.00	No Ice	4.97	4.97	0.07
(T-Mobile (reserved))			0.00			1/2" Ice	6.12	6.12	0.13
			0.00						
GPS	B	None		0.0000	46.00	No Ice	1.00	1.00	0.01
(AT&T)						1/2" Ice	1.50	1.50	0.03
742-213	A	From Leg	3.00	0.0000	124.00	No Ice	5.14	2.87	0.02
(Pocket Wireless)			0.00			1/2" Ice	5.61	3.48	0.05
			0.00						
742-213	B	From Leg	3.00	0.0000	124.00	No Ice	5.14	2.87	0.02
(Pocket Wireless)			0.00			1/2" Ice	5.61	3.48	0.05
			0.00						
742-213	C	From Leg	3.00	0.0000	124.00	No Ice	5.14	2.87	0.02
(Pocket Wireless)			0.00			1/2" Ice	5.61	3.48	0.05
			0.00						

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2.5-180	A	Paraboloid	From	0.50	Worst		154.00	2.50	No Ice	4.90	0.07
(Clearwire)		w/Radome	Face	0.00					1/2" Ice	5.24	0.10
				0.00							
VHLP2.5-180	B	Paraboloid	From	0.50	Worst		154.00	2.50	No Ice	4.90	0.07
(Clearwire)		w/Radome	Face	-1.00					1/2" Ice	5.24	0.10
				0.00							
VHLP2.5-180	B	Paraboloid	From	0.50	Worst		154.00	2.50	No Ice	4.90	0.07
(Clearwire)		w/Radome	Face	1.00					1/2" Ice	5.24	0.10
				0.00							
PX3F-52	C	Paraboloid	From	0.50	Worst		154.00	3.00	No Ice	7.07	0.04
(Clearwire)		w/Shroud (HP)	Face	1.00					1/2" Ice	7.47	0.08
				0.00							
PX3F-52	A	Paraboloid	From	0.50	Worst		154.00	3.00	No Ice	7.07	0.04
(Clearwire)		w/Shroud (HP)	Face	1.00					1/2" Ice	7.47	0.08
				0.00							

Tower Pressures - No Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 176.01-130.76	152.08	1.547	25	99.550	A	0.000	99.550	99.550	100.00	0.000	0.000
					B	0.000	99.550		100.00	0.000	0.000
					C	0.000	99.550		100.00	0.000	0.000
L2 130.76-86.13	107.70	1.402	23	135.950	A	0.000	135.950	135.950	100.00	0.000	10.570
					B	0.000	135.950		100.00	0.000	0.000
					C	0.000	135.950		100.00	0.000	7.498
L3 86.13-43.00	64.29	1.21	20	166.326	A	0.000	166.326	166.326	100.00	0.000	15.723
					B	0.000	166.326		100.00	0.000	0.000
					C	0.000	166.326		100.00	0.000	8.540
L4 43.00-1.00	21.38	1	16	194.440	A	0.000	194.440	194.440	100.00	0.000	11.633
					B	0.000	194.440		100.00	0.000	0.000
					C	0.000	194.440		100.00	0.000	7.722

Tower Pressure - With Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 176.01-130.76	152.08	1.547	19	0.5000	103.321	A	0.000	103.321	103.321	100.00	0.000	0.000
						B	0.000	103.321		100.00	0.000	0.000
						C	0.000	103.321		100.00	0.000	0.000
L2 130.76-86.13	107.70	1.402	17	0.5000	139.669	A	0.000	139.669	139.669	100.00	0.000	16.444
						B	0.000	139.669		100.00	0.000	0.000
						C	0.000	139.669		100.00	0.000	11.285
L3 86.13-43.00	64.29	1.21	15	0.5000	169.920	A	0.000	169.920	169.920	100.00	0.000	24.648
						B	0.000	169.920		100.00	0.000	0.000
						C	0.000	169.920		100.00	0.000	12.853
L4 43.00-1.00	21.38	1	12	0.5000	197.940	A	0.000	197.940	197.940	100.00	0.000	20.433
						B	0.000	197.940		100.00	0.000	0.000
						C	0.000	197.940		100.00	0.000	11.622

Tower Pressure - Service

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 176.01-130.76	152.08	1.547	10	99.550	A	0.000	99.550	99.550	100.00	0.000	0.000
					B	0.000	99.550		100.00	0.000	0.000
					C	0.000	99.550		100.00	0.000	0.000
L2 130.76-86.13	107.70	1.402	9	135.950	A	0.000	135.950	135.950	100.00	0.000	10.570
					B	0.000	135.950		100.00	0.000	0.000
					C	0.000	135.950		100.00	0.000	7.498

tnxTower	Job: 176' EEI Monopole, Berlin, CT	Page: 11 of 24
URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: 860-529-8882 FAX: 860-529-3991	Project: Berlin Fire Department	Date: 14:42:15 11/11/13
	Client: Verizon Wireless	Designed by: Michael Dalickas

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L3 86.13-43.00	64.29	1.21	8	166.326	A	0.000	166.326	166.326	100.00	0.000	15.723
					B	0.000	166.326		100.00	0.000	0.000
					C	0.000	166.326		100.00	0.000	8.540
L4 43.00-1.00	21.38	1	6	194.440	A	0.000	194.440	194.440	100.00	0.000	11.633
					B	0.000	194.440		100.00	0.000	0.000
					C	0.000	194.440		100.00	0.000	7.722

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	1.93	3.20	A	1	0.65	1	1	1	99.550	2.77	61.21	C
176.01-130.76			B	1	0.65	1	1	1	99.550			
			C	1	0.65	1	1	1	99.550			
L2	3.58	5.92	A	1	0.65	1	1	1	135.950	4.12	92.40	C
130.76-86.13			B	1	0.65	1	1	1	135.950			
			C	1	0.65	1	1	1	135.950			
L3	3.86	8.95	A	1	0.65	1	1	1	166.326	4.41	102.29	C
86.13-43.00			B	1	0.65	1	1	1	166.326			
			C	1	0.65	1	1	1	166.326			
L4 43.00-1.00	2.65	12.57	A	1	0.65	1	1	1	194.440	4.04	96.08	C
			B	1	0.65	1	1	1	194.440			
			C	1	0.65	1	1	1	194.440			
Sum Weight:	12.01	30.64						OTM	1219.92 kip-ft	15.34		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	1.93	3.20	A	1	0.65	1	1	1	99.550	2.77	61.21	C
176.01-130.76			B	1	0.65	1	1	1	99.550			
			C	1	0.65	1	1	1	99.550			
L2	3.58	5.92	A	1	0.65	1	1	1	135.950	4.12	92.40	C
130.76-86.13			B	1	0.65	1	1	1	135.950			
			C	1	0.65	1	1	1	135.950			
L3	3.86	8.95	A	1	0.65	1	1	1	166.326	4.41	102.29	C
86.13-43.00			B	1	0.65	1	1	1	166.326			
			C	1	0.65	1	1	1	166.326			
L4 43.00-1.00	2.65	12.57	A	1	0.65	1	1	1	194.440	4.04	96.08	C
			B	1	0.65	1	1	1	194.440			
			C	1	0.65	1	1	1	194.440			
Sum Weight:	12.01	30.64						OTM	1219.92 kip-ft	15.34		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	1.93	3.20	A	1	0.65	1	1	1	99.550	2.77	61.21	C
176.01-130.76			B	1	0.65	1	1	1	99.550			
			C	1	0.65	1	1	1	99.550			
L2	3.58	5.92	A	1	0.65	1	1	1	135.950	4.12	92.40	C
130.76-86.13			B	1	0.65	1	1	1	135.950			
			C	1	0.65	1	1	1	135.950			
L3	3.86	8.95	A	1	0.65	1	1	1	166.326	4.41	102.29	C
86.13-43.00			B	1	0.65	1	1	1	166.326			
			C	1	0.65	1	1	1	166.326			
L4 43.00-1.00	2.65	12.57	A	1	0.65	1	1	1	194.440	4.04	96.08	C
			B	1	0.65	1	1	1	194.440			
			C	1	0.65	1	1	1	194.440			
Sum Weight:	12.01	30.64						OTM	1219.92 kip-ft	15.34		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	1.93	3.20	A	1	0.65	1	1	1	99.550	2.77	61.21	C
176.01-130.76			B	1	0.65	1	1	1	99.550			
			C	1	0.65	1	1	1	99.550			
L2	3.58	5.92	A	1	0.65	1	1	1	135.950	4.12	92.40	C
130.76-86.13			B	1	0.65	1	1	1	135.950			
			C	1	0.65	1	1	1	135.950			
L3	3.86	8.95	A	1	0.65	1	1	1	166.326	4.41	102.29	C
86.13-43.00			B	1	0.65	1	1	1	166.326			
			C	1	0.65	1	1	1	166.326			
L4 43.00-1.00	2.65	12.57	A	1	0.65	1	1	1	194.440	4.04	96.08	C
			B	1	0.65	1	1	1	194.440			
			C	1	0.65	1	1	1	194.440			
Sum Weight:	12.01	30.64						OTM	1219.92 kip-ft	15.34		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	1.93	3.95	A	1	0.65	1	1	1	103.321	2.16	47.64	C
176.01-130.76			B	1	0.65	1	1	1	103.321			
			C	1	0.65	1	1	1	103.321			
L2	4.22	6.94	A	1	0.65	1	1	1	139.669	3.44	77.17	C
130.76-86.13			B	1	0.65	1	1	1	139.669			
			C	1	0.65	1	1	1	139.669			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L3	4.70	10.20	A	1	0.65	1	1	1	169.920	3.70	85.74	C
86.13-43.00			B	1	0.65	1	1	1	169.920			
			C	1	0.65	1	1	1	169.920			
L4 43.00-1.00	3.26	14.02	A	1	0.65	1	1	1	197.940	3.34	79.46	C
			B	1	0.65	1	1	1	197.940			
			C	1	0.65	1	1	1	197.940			
Sum Weight:	14.11	35.11						OTM	995.26 kip-ft	12.64		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	1.93	3.95	A	1	0.65	1	1	1	103.321	2.16	47.64	C
176.01-130.76			B	1	0.65	1	1	1	103.321			
			C	1	0.65	1	1	1	103.321			
L2	4.22	6.94	A	1	0.65	1	1	1	139.669	3.44	77.17	C
130.76-86.13			B	1	0.65	1	1	1	139.669			
			C	1	0.65	1	1	1	139.669			
L3	4.70	10.20	A	1	0.65	1	1	1	169.920	3.70	85.74	C
86.13-43.00			B	1	0.65	1	1	1	169.920			
			C	1	0.65	1	1	1	169.920			
L4 43.00-1.00	3.26	14.02	A	1	0.65	1	1	1	197.940	3.34	79.46	C
			B	1	0.65	1	1	1	197.940			
			C	1	0.65	1	1	1	197.940			
Sum Weight:	14.11	35.11						OTM	995.26 kip-ft	12.64		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	1.93	3.95	A	1	0.65	1	1	1	103.321	2.16	47.64	C
176.01-130.76			B	1	0.65	1	1	1	103.321			
			C	1	0.65	1	1	1	103.321			
L2	4.22	6.94	A	1	0.65	1	1	1	139.669	3.44	77.17	C
130.76-86.13			B	1	0.65	1	1	1	139.669			
			C	1	0.65	1	1	1	139.669			
L3	4.70	10.20	A	1	0.65	1	1	1	169.920	3.70	85.74	C
86.13-43.00			B	1	0.65	1	1	1	169.920			
			C	1	0.65	1	1	1	169.920			
L4 43.00-1.00	3.26	14.02	A	1	0.65	1	1	1	197.940	3.34	79.46	C
			B	1	0.65	1	1	1	197.940			
			C	1	0.65	1	1	1	197.940			
Sum Weight:	14.11	35.11						OTM	995.26 kip-ft	12.64		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	1.93	3.95	A	1	0.65	1	1	1	103.321	2.16	47.64	C
176.01-130.76			B	1	0.65	1	1	1	103.321			
			C	1	0.65	1	1	1	103.321			
L2	4.22	6.94	A	1	0.65	1	1	1	139.669	3.44	77.17	C
130.76-86.13			B	1	0.65	1	1	1	139.669			
			C	1	0.65	1	1	1	139.669			
L3	4.70	10.20	A	1	0.65	1	1	1	169.920	3.70	85.74	C
86.13-43.00			B	1	0.65	1	1	1	169.920			
			C	1	0.65	1	1	1	169.920			
L4 43.00-1.00	3.26	14.02	A	1	0.65	1	1	1	197.940	3.34	79.46	C
			B	1	0.65	1	1	1	197.940			
			C	1	0.65	1	1	1	197.940			
Sum Weight:	14.11	35.11						OTM	995.26 kip-ft	12.64		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	1.93	3.20	A	1	0.65	1	1	1	99.550	1.08	23.91	C
176.01-130.76			B	1	0.65	1	1	1	99.550			
			C	1	0.65	1	1	1	99.550			
L2	3.58	5.92	A	1	0.65	1	1	1	135.950	1.61	36.10	C
130.76-86.13			B	1	0.65	1	1	1	135.950			
			C	1	0.65	1	1	1	135.950			
L3	3.86	8.95	A	1	0.65	1	1	1	166.326	1.72	39.96	C
86.13-43.00			B	1	0.65	1	1	1	166.326			
			C	1	0.65	1	1	1	166.326			
L4 43.00-1.00	2.65	12.57	A	1	0.65	1	1	1	194.440	1.58	37.53	C
			B	1	0.65	1	1	1	194.440			
			C	1	0.65	1	1	1	194.440			
Sum Weight:	12.01	30.64						OTM	476.53 kip-ft	5.99		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	1.93	3.20	A	1	0.65	1	1	1	99.550	1.08	23.91	C
176.01-130.76			B	1	0.65	1	1	1	99.550			
			C	1	0.65	1	1	1	99.550			
L2	3.58	5.92	A	1	0.65	1	1	1	135.950	1.61	36.10	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
130.76-86.13			B	1	0.65	1	1	1	135.950			
			C	1	0.65	1	1	1	135.950			
L3	3.86	8.95	A	1	0.65	1	1	1	166.326	1.72	39.96	C
86.13-43.00			B	1	0.65	1	1	1	166.326			
			C	1	0.65	1	1	1	166.326			
L4 43.00-1.00	2.65	12.57	A	1	0.65	1	1	1	194.440	1.58	37.53	C
			B	1	0.65	1	1	1	194.440			
			C	1	0.65	1	1	1	194.440			
Sum Weight:	12.01	30.64						OTM	476.53 kip-ft	5.99		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	1.93	3.20	A	1	0.65	1	1	1	99.550	1.08	23.91	C
176.01-130.76			B	1	0.65	1	1	1	99.550			
			C	1	0.65	1	1	1	99.550			
L2	3.58	5.92	A	1	0.65	1	1	1	135.950	1.61	36.10	C
130.76-86.13			B	1	0.65	1	1	1	135.950			
			C	1	0.65	1	1	1	135.950			
L3	3.86	8.95	A	1	0.65	1	1	1	166.326	1.72	39.96	C
86.13-43.00			B	1	0.65	1	1	1	166.326			
			C	1	0.65	1	1	1	166.326			
L4 43.00-1.00	2.65	12.57	A	1	0.65	1	1	1	194.440	1.58	37.53	C
			B	1	0.65	1	1	1	194.440			
			C	1	0.65	1	1	1	194.440			
Sum Weight:	12.01	30.64						OTM	476.53 kip-ft	5.99		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	1.93	3.20	A	1	0.65	1	1	1	99.550	1.08	23.91	C
176.01-130.76			B	1	0.65	1	1	1	99.550			
			C	1	0.65	1	1	1	99.550			
L2	3.58	5.92	A	1	0.65	1	1	1	135.950	1.61	36.10	C
130.76-86.13			B	1	0.65	1	1	1	135.950			
			C	1	0.65	1	1	1	135.950			
L3	3.86	8.95	A	1	0.65	1	1	1	166.326	1.72	39.96	C
86.13-43.00			B	1	0.65	1	1	1	166.326			
			C	1	0.65	1	1	1	166.326			
L4 43.00-1.00	2.65	12.57	A	1	0.65	1	1	1	194.440	1.58	37.53	C
			B	1	0.65	1	1	1	194.440			
			C	1	0.65	1	1	1	194.440			
Sum Weight:	12.01	30.64						OTM	476.53	5.99		

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2 kip-ft	F K	w plf	Ctrl. Face

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	30.64					
Bracing Weight	0.00					
Total Member Self-Weight	30.64			1.09	0.50	
Total Weight	52.92			1.09	0.50	
Wind 0 deg - No Ice		0.04	-36.05	-4228.04	-6.61	0.47
Wind 30 deg - No Ice		17.99	-31.24	-3665.00	-2111.73	3.64
Wind 45 deg - No Ice		25.43	-25.52	-2994.38	-2982.96	4.90
Wind 60 deg - No Ice		31.13	-18.06	-2119.63	-3650.88	5.83
Wind 90 deg - No Ice		35.92	-0.04	-6.02	-4211.64	6.46
Wind 120 deg - No Ice		31.09	18.00	2109.50	-3643.76	5.36
Wind 135 deg - No Ice		25.38	25.47	2986.51	-2972.90	4.24
Wind 150 deg - No Ice		17.93	31.21	3660.07	-2099.41	2.83
Wind 180 deg - No Ice		-0.04	36.05	4230.22	7.62	-0.47
Wind 210 deg - No Ice		-17.99	31.24	3667.18	2112.73	-3.64
Wind 225 deg - No Ice		-25.43	25.52	2996.57	2983.97	-4.90
Wind 240 deg - No Ice		-31.13	18.06	2121.82	3651.88	-5.83
Wind 270 deg - No Ice		-35.92	0.04	8.21	4212.65	-6.46
Wind 300 deg - No Ice		-31.09	-18.00	-2107.31	3644.77	-5.36
Wind 315 deg - No Ice		-25.38	-25.47	-2984.32	2973.91	-4.24
Wind 330 deg - No Ice		-17.93	-31.21	-3657.88	2100.42	-2.83
Member Ice	4.47					
Total Weight Ice	64.25			1.45	1.93	
Wind 0 deg - Ice		0.02	-31.64	-3765.02	-2.99	0.27
Wind 30 deg - Ice		15.79	-27.41	-3262.87	-1879.25	3.90
Wind 45 deg - Ice		22.32	-22.39	-2665.32	-2655.91	5.37
Wind 60 deg - Ice		27.32	-15.84	-1886.04	-3251.44	6.48
Wind 90 deg - Ice		31.54	-0.02	-3.47	-3751.90	7.33
Wind 120 deg - Ice		27.30	15.80	1880.43	-3246.53	6.21
Wind 135 deg - Ice		22.28	22.35	2661.27	-2648.96	4.99
Wind 150 deg - Ice		15.75	27.39	3260.85	-1870.73	3.43
Wind 180 deg - Ice		-0.02	31.64	3767.92	6.84	-0.27
Wind 210 deg - Ice		-15.79	27.41	3265.76	1883.10	-3.90
Wind 225 deg - Ice		-22.32	22.39	2668.22	2659.76	-5.37
Wind 240 deg - Ice		-27.32	15.84	1888.94	3255.30	-6.48
Wind 270 deg - Ice		-31.54	0.02	6.36	3755.76	-7.33
Wind 300 deg - Ice		-27.30	-15.80	-1877.53	3250.38	-6.21
Wind 315 deg - Ice		-22.28	-22.35	-2658.37	2652.81	-4.99
Wind 330 deg - Ice		-15.75	-27.39	-3257.95	1874.59	-3.43
Total Weight	52.92			1.09	0.50	
Wind 0 deg - Service		0.01	-14.08	-1650.24	-3.14	0.18
Wind 30 deg - Service		7.03	-12.20	-1430.30	-825.45	1.42
Wind 45 deg - Service		9.93	-9.97	-1168.34	-1165.78	1.92
Wind 60 deg - Service		12.16	-7.05	-826.64	-1426.68	2.28
Wind 90 deg - Service		14.03	-0.01	-1.01	-1645.73	2.52
Wind 120 deg - Service		12.15	7.03	825.36	-1423.91	2.10
Wind 135 deg - Service		9.91	9.95	1167.95	-1161.85	1.66
Wind 150 deg - Service		7.00	12.19	1431.06	-820.64	1.10
Wind 180 deg - Service		-0.01	14.08	1653.77	2.41	-0.18

tnxTower	Job: 176' EEI Monopole, Berlin, CT	Page: 17 of 24
URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: 860-529-8882 FAX: 860-529-3991	Project: Berlin Fire Department	Date: 14:42:15 11/11/13
	Client: Verizon Wireless	Designed by: Michael Dalickas

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 210 deg - Service		-7.03	12.20	1433.83	824.73	-1.42
Wind 225 deg - Service		-9.93	9.97	1171.88	1165.05	-1.92
Wind 240 deg - Service		-12.16	7.05	830.18	1425.96	-2.28
Wind 270 deg - Service		-14.03	0.01	4.55	1645.01	-2.52
Wind 300 deg - Service		-12.15	-7.03	-821.83	1423.18	-2.10
Wind 315 deg - Service		-9.91	-9.95	-1164.41	1161.12	-1.66
Wind 330 deg - Service		-7.00	-12.19	-1427.52	819.92	-1.10

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 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice+Temp
19	Dead+Wind 0 deg+Ice+Temp
20	Dead+Wind 30 deg+Ice+Temp
21	Dead+Wind 45 deg+Ice+Temp
22	Dead+Wind 60 deg+Ice+Temp
23	Dead+Wind 90 deg+Ice+Temp
24	Dead+Wind 120 deg+Ice+Temp
25	Dead+Wind 135 deg+Ice+Temp
26	Dead+Wind 150 deg+Ice+Temp
27	Dead+Wind 180 deg+Ice+Temp
28	Dead+Wind 210 deg+Ice+Temp
29	Dead+Wind 225 deg+Ice+Temp
30	Dead+Wind 240 deg+Ice+Temp
31	Dead+Wind 270 deg+Ice+Temp
32	Dead+Wind 300 deg+Ice+Temp
33	Dead+Wind 315 deg+Ice+Temp
34	Dead+Wind 330 deg+Ice+Temp
35	Dead+Wind 0 deg - Service
36	Dead+Wind 30 deg - Service
37	Dead+Wind 45 deg - Service
38	Dead+Wind 60 deg - Service
39	Dead+Wind 90 deg - Service
40	Dead+Wind 120 deg - Service
41	Dead+Wind 135 deg - Service
42	Dead+Wind 150 deg - Service
43	Dead+Wind 180 deg - Service
44	Dead+Wind 210 deg - Service

Comb. No.	Description
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	176.01 - 130.76	Pole	Max Tension	10	0.00	-0.00	0.00
			Max. Compression	18	-16.05	0.49	0.37
			Max. Mx	14	-10.60	459.86	-1.94
			Max. My	2	-10.59	-1.93	460.43
			Max. Vy	14	-18.15	459.86	-1.94
			Max. Vx	10	18.20	2.19	-459.82
			Max. Torque	24			2.04
L2	130.76 - 86.13	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-30.07	0.85	-2.66
			Max. Mx	14	-21.76	1455.69	-5.51
			Max. My	10	-21.75	4.34	-1462.19
			Max. Vy	14	-27.61	1455.69	-5.51
			Max. Vx	10	27.75	4.34	-1462.19
			Max. Torque	31			7.47
L3	86.13 - 43	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-44.52	0.73	-1.91
			Max. Mx	14	-34.72	2705.08	-6.95
			Max. My	10	-34.71	5.77	-2717.26
			Max. Vy	14	-32.14	2705.08	-6.95
			Max. Vx	10	32.28	5.77	-2717.26
			Max. Torque	31			7.43
L4	43 - 1	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-64.25	1.93	-1.45
			Max. Mx	14	-52.90	4377.44	-8.60
			Max. My	10	-52.90	8.00	-4395.63
			Max. Vy	14	-35.96	4377.44	-8.60
			Max. Vx	10	36.09	8.00	-4395.63
			Max. Torque	31			7.27

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	19	64.25	-0.02	31.64
	Max. H_x	14	52.92	35.92	-0.04
	Max. H_z	2	52.92	-0.04	36.05
	Max. M_x	2	4393.31	-0.04	36.05
	Max. M_z	6	4376.39	-35.92	0.04
	Max. Torsion	31	7.15	31.54	-0.02
	Min. Vert	1	52.92	0.00	0.00
	Min. H_x	6	52.92	-35.92	0.04

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. H_z	10	52.92	0.04	-36.05
	Min. M_x	10	-4395.63	0.04	-36.05
	Min. M_z	14	-4377.44	35.92	-0.04
	Min. Torsion	23	-7.14	-31.54	0.02

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	52.92	0.00	0.00	1.09	0.50	0.00
Dead+Wind 0 deg - No Ice	52.92	0.04	-36.05	-4393.31	-6.96	0.52
Dead+Wind 30 deg - No Ice	52.92	17.99	-31.24	-3808.31	-2194.36	3.61
Dead+Wind 45 deg - No Ice	52.92	25.43	-25.52	-3111.52	-3099.65	4.84
Dead+Wind 60 deg - No Ice	52.92	31.13	-18.06	-2202.59	-3793.68	5.73
Dead+Wind 90 deg - No Ice	52.92	35.92	-0.04	-6.36	-4376.39	6.31
Dead+Wind 120 deg - No Ice	52.92	31.09	18.00	2191.93	-3786.29	5.20
Dead+Wind 135 deg - No Ice	52.92	25.38	25.47	3103.27	-3089.17	4.09
Dead+Wind 150 deg - No Ice	52.92	17.93	31.21	3803.19	-2181.48	2.70
Dead+Wind 180 deg - No Ice	52.92	-0.04	36.05	4395.63	8.00	-0.51
Dead+Wind 210 deg - No Ice	52.92	-17.99	31.24	3810.62	2195.44	-3.59
Dead+Wind 225 deg - No Ice	52.92	-25.43	25.52	3113.80	3100.73	-4.82
Dead+Wind 240 deg - No Ice	52.92	-31.13	18.06	2204.86	3794.76	-5.72
Dead+Wind 270 deg - No Ice	52.92	-35.92	0.04	8.60	4377.44	-6.32
Dead+Wind 300 deg - No Ice	52.92	-31.09	-18.00	-2189.68	3787.30	-5.22
Dead+Wind 315 deg - No Ice	52.92	-25.38	-25.47	-3100.99	3090.17	-4.11
Dead+Wind 330 deg - No Ice	52.92	-17.93	-31.21	-3800.89	2182.48	-2.72
Dead+Ice+Temp	64.25	0.00	0.00	1.45	1.93	-0.00
Dead+Wind 0 deg+Ice+Temp	64.25	0.02	-31.64	-3960.42	-3.25	0.34
Dead+Wind 30 deg+Ice+Temp	64.25	15.79	-27.41	-3432.25	-1976.88	3.87
Dead+Wind 45 deg+Ice+Temp	64.25	22.32	-22.39	-2803.72	-2793.86	5.29
Dead+Wind 60 deg+Ice+Temp	64.25	27.32	-15.84	-1984.02	-3420.31	6.36
Dead+Wind 90 deg+Ice+Temp	64.25	31.54	-0.02	-3.73	-3946.75	7.14
Dead+Wind 120 deg+Ice+Temp	64.25	27.30	15.80	1978.01	-3415.12	6.01
Dead+Wind 135 deg+Ice+Temp	64.25	22.28	22.35	2799.43	-2786.50	4.81
Dead+Wind 150 deg+Ice+Temp	64.25	15.75	27.39	3430.17	-1967.83	3.28
Dead+Wind 180 deg+Ice+Temp	64.25	-0.02	31.64	3963.60	7.28	-0.33
Dead+Wind 210 deg+Ice+Temp	64.25	-15.79	27.41	3435.40	1980.97	-3.85
Dead+Wind 225 deg+Ice+Temp	64.25	-22.32	22.39	2806.85	2797.95	-5.28
Dead+Wind 240 deg+Ice+Temp	64.25	-27.32	15.84	1987.12	3424.39	-6.35
Dead+Wind 270 deg+Ice+Temp	64.25	-31.54	0.02	6.80	3950.79	-7.15
Dead+Wind 300 deg+Ice+Temp	64.25	-27.30	-15.80	-1974.92	3419.11	-6.03
Dead+Wind 315 deg+Ice+Temp	64.25	-22.28	-22.35	-2796.31	2790.48	-4.82
Dead+Wind 330 deg+Ice+Temp	64.25	-15.75	-27.39	-3427.02	1971.82	-3.29
Dead+Wind 0 deg - Service	52.92	0.01	-14.08	-1717.73	-2.40	0.20
Dead+Wind 30 deg - Service	52.92	7.03	-12.20	-1488.91	-858.01	1.42
Dead+Wind 45 deg - Service	52.92	9.93	-9.97	-1216.35	-1212.11	1.90
Dead+Wind 60 deg - Service	52.92	12.16	-7.05	-860.82	-1483.58	2.25
Dead+Wind 90 deg - Service	52.92	14.03	-0.01	-1.76	-1711.48	2.48
Dead+Wind 120 deg - Service	52.92	12.15	7.03	858.09	-1480.66	2.05
Dead+Wind 135 deg - Service	52.92	9.91	9.95	1214.55	-1207.98	1.62
Dead+Wind 150 deg - Service	52.92	7.00	12.19	1488.33	-852.95	1.07
Dead+Wind 180 deg - Service	52.92	-0.01	14.08	1720.07	3.46	-0.20
Dead+Wind 210 deg - Service	52.92	-7.03	12.20	1491.25	859.07	-1.41
Dead+Wind 225 deg - Service	52.92	-9.93	9.97	1218.69	1213.18	-1.90
Dead+Wind 240 deg - Service	52.92	-12.16	7.05	863.16	1484.64	-2.25
Dead+Wind 270 deg - Service	52.92	-14.03	0.01	4.09	1712.54	-2.49

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 300 deg - Service	52.92	-12.15	-7.03	-855.75	1481.71	-2.05
Dead+Wind 315 deg - Service	52.92	-9.91	-9.95	-1212.22	1209.04	-1.62
Dead+Wind 330 deg - Service	52.92	-7.00	-12.19	-1485.99	854.00	-1.07

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-52.92	0.00	0.00	52.92	0.00	0.000%
2	0.04	-52.92	-36.05	-0.04	52.92	36.05	0.000%
3	17.99	-52.92	-31.24	-17.99	52.92	31.24	0.000%
4	25.43	-52.92	-25.52	-25.43	52.92	25.52	0.000%
5	31.13	-52.92	-18.06	-31.13	52.92	18.06	0.000%
6	35.92	-52.92	-0.04	-35.92	52.92	0.04	0.000%
7	31.09	-52.92	18.00	-31.09	52.92	-18.00	0.000%
8	25.38	-52.92	25.47	-25.38	52.92	-25.47	0.000%
9	17.93	-52.92	31.21	-17.93	52.92	-31.21	0.000%
10	-0.04	-52.92	36.05	0.04	52.92	-36.05	0.000%
11	-17.99	-52.92	31.24	17.99	52.92	-31.24	0.000%
12	-25.43	-52.92	25.52	25.43	52.92	-25.52	0.000%
13	-31.13	-52.92	18.06	31.13	52.92	-18.06	0.000%
14	-35.92	-52.92	0.04	35.92	52.92	-0.04	0.000%
15	-31.09	-52.92	-18.00	31.09	52.92	18.00	0.000%
16	-25.38	-52.92	-25.47	25.38	52.92	25.47	0.000%
17	-17.93	-52.92	-31.21	17.93	52.92	31.21	0.000%
18	0.00	-64.25	0.00	0.00	64.25	0.00	0.000%
19	0.02	-64.25	-31.64	-0.02	64.25	31.64	0.000%
20	15.79	-64.25	-27.41	-15.79	64.25	27.41	0.000%
21	22.32	-64.25	-22.39	-22.32	64.25	22.39	0.000%
22	27.32	-64.25	-15.84	-27.32	64.25	15.84	0.000%
23	31.54	-64.25	-0.02	-31.54	64.25	0.02	0.000%
24	27.30	-64.25	15.80	-27.30	64.25	-15.80	0.000%
25	22.28	-64.25	22.35	-22.28	64.25	-22.35	0.000%
26	15.75	-64.25	27.39	-15.75	64.25	-27.39	0.000%
27	-0.02	-64.25	31.64	0.02	64.25	-31.64	0.000%
28	-15.79	-64.25	27.41	15.79	64.25	-27.41	0.000%
29	-22.32	-64.25	22.39	22.32	64.25	-22.39	0.000%
30	-27.32	-64.25	15.84	27.32	64.25	-15.84	0.000%
31	-31.54	-64.25	0.02	31.54	64.25	-0.02	0.000%
32	-27.30	-64.25	-15.80	27.30	64.25	15.80	0.000%
33	-22.28	-64.25	-22.35	22.28	64.25	22.35	0.000%
34	-15.75	-64.25	-27.39	15.75	64.25	27.39	0.000%
35	0.01	-52.92	-14.08	-0.01	52.92	14.08	0.000%
36	7.03	-52.92	-12.20	-7.03	52.92	12.20	0.000%
37	9.93	-52.92	-9.97	-9.93	52.92	9.97	0.000%
38	12.16	-52.92	-7.05	-12.16	52.92	7.05	0.000%
39	14.03	-52.92	-0.01	-14.03	52.92	0.01	0.000%
40	12.15	-52.92	7.03	-12.15	52.92	-7.03	0.000%
41	9.91	-52.92	9.95	-9.91	52.92	-9.95	0.000%
42	7.00	-52.92	12.19	-7.00	52.92	-12.19	0.000%
43	-0.01	-52.92	14.08	0.01	52.92	-14.08	0.000%
44	-7.03	-52.92	12.20	7.03	52.92	-12.20	0.000%
45	-9.93	-52.92	9.97	9.93	52.92	-9.97	0.000%
46	-12.16	-52.92	7.05	12.16	52.92	-7.05	0.000%
47	-14.03	-52.92	0.01	14.03	52.92	-0.01	0.000%
48	-12.15	-52.92	-7.03	12.15	52.92	7.03	0.000%
49	-9.91	-52.92	-9.95	9.91	52.92	9.95	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
50	-7.00	-52.92	-12.19	7.00	52.92	12.19	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00049363
3	Yes	5	0.00000001	0.00096327
4	Yes	6	0.00000001	0.00004670
5	Yes	5	0.00000001	0.00090173
6	Yes	5	0.00000001	0.00009777
7	Yes	5	0.00000001	0.00098836
8	Yes	6	0.00000001	0.00004647
9	Yes	5	0.00000001	0.00090109
10	Yes	4	0.00000001	0.00061933
11	Yes	5	0.00000001	0.00092358
12	Yes	6	0.00000001	0.00004671
13	Yes	5	0.00000001	0.00098908
14	Yes	5	0.00000001	0.00010756
15	Yes	5	0.00000001	0.00088563
16	Yes	6	0.00000001	0.00004647
17	Yes	5	0.00000001	0.00096892
18	Yes	4	0.00000001	0.00000001
19	Yes	5	0.00000001	0.00036246
20	Yes	6	0.00000001	0.00011261
21	Yes	6	0.00000001	0.00012340
22	Yes	6	0.00000001	0.00010591
23	Yes	5	0.00000001	0.00041737
24	Yes	6	0.00000001	0.00011589
25	Yes	6	0.00000001	0.00012293
26	Yes	6	0.00000001	0.00010600
27	Yes	5	0.00000001	0.00036391
28	Yes	6	0.00000001	0.00010840
29	Yes	6	0.00000001	0.00012373
30	Yes	6	0.00000001	0.00011585
31	Yes	5	0.00000001	0.00042381
32	Yes	6	0.00000001	0.00010445
33	Yes	6	0.00000001	0.00012291
34	Yes	6	0.00000001	0.00011359
35	Yes	4	0.00000001	0.00014458
36	Yes	5	0.00000001	0.00010147
37	Yes	5	0.00000001	0.00011220
38	Yes	5	0.00000001	0.00008958
39	Yes	4	0.00000001	0.00046205
40	Yes	5	0.00000001	0.00010802
41	Yes	5	0.00000001	0.00011161
42	Yes	5	0.00000001	0.00008966
43	Yes	4	0.00000001	0.00015349
44	Yes	5	0.00000001	0.00009378
45	Yes	5	0.00000001	0.00011287
46	Yes	5	0.00000001	0.00010765
47	Yes	4	0.00000001	0.00047903
48	Yes	5	0.00000001	0.00008708
49	Yes	5	0.00000001	0.00011140
50	Yes	5	0.00000001	0.00010345

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	176.01 - 130.76	47.753	44	2.4414	0.0048
L2	135.26 - 86.13	27.873	44	2.0847	0.0071
L3	91.88 - 43	12.127	44	1.3196	0.0042
L4	50 - 1	3.395	44	0.6373	0.0015

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
176.00	12' Low Profile Platform	44	47.748	2.4414	0.0048	27805
170.00	Valmont T-Arm (1)	44	44.681	2.4027	0.0053	23132
160.00	Valmont T-Arm (1)	44	39.619	2.3331	0.0060	8683
154.00	VHLP2.5-180	44	36.643	2.2854	0.0064	6315
150.00	840 10054	44	34.696	2.2500	0.0066	5343
130.00	2 Bay Dipole	44	25.607	2.0093	0.0071	3401
124.00	742-213	44	23.142	1.9137	0.0069	3389
114.00	BXA-185060/12CF 2	44	19.317	1.7373	0.0062	3369
112.00	Andrew 12'-6" Low Profile Platform	44	18.595	1.7002	0.0061	3364
100.00	6' Side Mount Standoff	44	14.562	1.4725	0.0050	3339
75.00	Side Mount Standoff	44	7.830	1.0235	0.0029	3267
60.00	Side Mount Standoff	44	4.890	0.7849	0.0020	3220
46.00	GPS	44	2.901	0.5805	0.0013	3474

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	176.01 - 130.76	121.642	11	6.2298	0.0123
L2	135.26 - 86.13	71.067	11	5.3173	0.0205
L3	91.88 - 43	30.956	11	3.3682	0.0123
L4	50 - 1	8.672	11	1.6278	0.0043

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
176.00	12' Low Profile Platform	11	121.629	6.2296	0.0123	11153
170.00	Valmont T-Arm (1)	11	113.827	6.1303	0.0136	9278
160.00	Valmont T-Arm (1)	11	100.952	5.9521	0.0162	3481

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
154.00	VHLP2.5-180	11	93.381	5.8299	0.0176	2530
150.00	840 10054	11	88.427	5.7393	0.0185	2140
130.00	2 Bay Dipole	11	65.299	5.1252	0.0204	1357
124.00	742-213	11	59.022	4.8814	0.0198	1350
114.00	BXA-185060/12CF 2	11	49.281	4.4321	0.0180	1338
112.00	Andrew 12'-6" Low Profile Platform	11	47.441	4.3377	0.0175	1336
100.00	6' Side Mount Standoff	11	37.164	3.7576	0.0144	1322
75.00	Side Mount Standoff	11	19.995	2.6135	0.0084	1287
60.00	Side Mount Standoff	11	12.490	2.0047	0.0057	1265
46.00	GPS	11	7.411	1.4829	0.0038	1362

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	176.01 - 130.76 (1)	TP31.8x21x0.25	45.25	0.00	0.0	39.000	24.1827	-10.59	943.13	0.011
L2	130.76 - 86.13 (2)	TP41.82x30.226x0.3125	49.13	0.00	0.0	39.000	39.8244	-21.75	1553.15	0.014
L3	86.13 - 43 (3)	TP51.36x39.8381x0.375	48.88	0.00	0.0	39.000	58.7209	-34.71	2290.12	0.015
L4	43 - 1 (4)	TP60.5x48.96x0.4375	49.00	0.00	0.0	39.000	83.4043	-52.90	3252.77	0.016

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	176.01 - 130.76 (1)	TP31.8x21x0.25	461.92	30.491	39.000	0.782	0.00	0.000	39.000	0.000
L2	130.76 - 86.13 (2)	TP41.82x30.226x0.3125	1464.31	44.531	39.000	1.142	0.00	0.000	39.000	0.000
L3	86.13 - 43 (3)	TP51.36x39.8381x0.375	2719.27	45.635	39.000	1.170	0.00	0.000	39.000	0.000
L4	43 - 1 (4)	TP60.5x48.96x0.4375	4397.81	42.668	39.000	1.094	0.00	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	176.01 - 130.76 (1)	TP31.8x21x0.25	18.22	0.754	26.000	0.058	1.68	0.054	26.000	0.002
L2	130.76 - 86.13 (2)	TP41.82x30.226x0.3125	27.75	0.697	26.000	0.054	2.75	0.041	26.000	0.002

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L3	86.13 - 43 (3)	TP51.36x39.8381x0.375	32.27	0.550	26.000	0.042	3.73	0.031	26.000	0.001
L4	43 - 1 (4)	TP60.5x48.96x0.4375	36.09	0.433	26.000	0.033	3.60	0.017	26.000	0.001

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	176.01 - 130.76 (1)	0.011	0.782	0.000	0.058	0.002	0.794 ✔	1.333	H1-3+VT ✔
L2	130.76 - 86.13 (2)	0.014	1.142	0.000	0.054	0.002	1.157 ✔	1.333	H1-3+VT ✔
L3	86.13 - 43 (3)	0.015	1.170	0.000	0.042	0.001	1.186 ✔	1.333	H1-3+VT ✔
L4	43 - 1 (4)	0.016	1.094	0.000	0.033	0.001	1.111 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	176.01 - 130.76	Pole	TP31.8x21x0.25	1	-10.59	1257.19	59.6	Pass
L2	130.76 - 86.13	Pole	TP41.82x30.226x0.3125	2	-21.75	2070.35	86.8	Pass
L3	86.13 - 43	Pole	TP51.36x39.8381x0.375	3	-34.71	3052.73	89.0	Pass
L4	43 - 1	Pole	TP60.5x48.96x0.4375	4	-52.90	4335.94	83.3	Pass
							Summary	
						Pole (L3)	89.0	Pass
						RATING =	**89.0**	**Pass**

ANCHOR BOLT AND
BASE PLATE ANALYSIS

ANCHOR BOLT AND BASE PLATE ANALYSIS

Input Data

Tower Reactions:

Overturning Moment:	$OM := 4373ft \cdot kips$	*user input*
Shear Force:	$Shear := 36 \cdot kips$	*user input*
Axial Force:	$Axial := 53 \cdot kips$	*user input*

Anchor Bolt Data:

Use ASTM A615 Grade 75		*user input*
Number of Anchor Bolts = N	$N := 18$	*user input*
Diameter of Bolt Circle:	$D_{bc} := 70.00in$	*user input*
Bolt "Column" Distance:	$l := 3.0in$	*user input*
Bolt Ultimate Strength:	$F_u := 100 \cdot ksi$	*user input*
Bolt Yield Strength:	$Fy := 75 \cdot ksi$	*user input*
Bolt Modulus:	$E := 29000 ksi$	*user input*
Anchor Bolt Diameter	$D := 2.25in$	*user input*
Threads per Inch:	$n := 4.5$	*user input*

Base Plate Data:

Use ASTM A572 Grade 60		*user input*
Plate Yield Strength:	$Fy_{bp} := 60 \cdot ksi$	*user input*
Base Plate Thickness:	$PlateThickness := 2.00 \cdot in$	*user input*
Base Plate Diameter:	$D_{bp} := 76.00in$	*user input*
Outer Pole Diameter:	$D_{pole} := 60.50in$	*user input*

Geometric Layout Data:

Distance from the center of gravity of the group to bolt in question = d(i)

Radius of Bolt Circle: $R_{bc} := \frac{D_{bc}}{2}$

Distance to Bolts: $i := 1 .. N$

$$d_i := \left| \begin{array}{l} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N} \right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{array} \right.$$

$d_1 = 11.97 \cdot in$ $d_7 = 22.50 \cdot in$

$d_2 = 22.50 \cdot in$ $d_8 = 11.97 \cdot in$

$d_3 = 30.31 \cdot in$ $d_9 = 0.00 \cdot in$

$d_4 = 34.47 \cdot in$ $d_{10} = -11.97 \cdot in$

$d_5 = 34.47 \cdot in$ $d_{11} = -22.50 \cdot in$

$d_6 = 30.31 \cdot in$ etc.

Critical Distances For Bending in Plate:

Outer Pole Radius: $R_{pole} := \frac{D_{pole}}{2}$ $R_{pole} = 30.25 \cdot in$

Moment Arms of Bolts about Neutral Axis: $MA_i := if\left(d_i \geq R_{pole}, d_i - R_{pole}, 0in\right)$

$MA_1 = 0.00 \cdot in$ $MA_7 = 0.00 \cdot in$

$MA_2 = 0.00 \cdot in$ $MA_8 = 0.00 \cdot in$

$MA_3 = 0.06 \cdot in$ $MA_9 = 0.00 \cdot in$

$MA_4 = 4.22 \cdot in$ $MA_{10} = 0.00 \cdot in$

$MA_5 = 4.22 \cdot in$ $MA_{11} = 0.00 \cdot in$

$MA_6 = 0.06 \cdot in$ etc.

Effective Width of Baseplate for Bending: $EffectiveWidth := .9 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2}$ $EffectiveWidth = 41.40 \cdot in$

Anchor Bolt Analysis:

Polar Moment of Inertia I_p:

$$I_p := \sum_i \left(d_i\right)^2 \qquad I_p = 1.103 \times 10^4 \cdot in^2$$

Gross Area of Bolt:

$$A_g := \frac{\pi}{4} \cdot D^2 \qquad A_g = 3.976 \cdot in^2$$

Net Area of Bolt:

$$A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 \qquad A_n = 3.248 \cdot in^2$$

Net Diameter:

$$D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} \qquad D_n = 2.03 \cdot in$$

Radius of Gyration of Bolt:

$$r := \frac{D_n}{4} \qquad r = 0.51 \cdot in$$

Section Modulus of Bolt:

$$S_x := \frac{\pi \cdot D_n^{\,3}}{32} \qquad S_x = 0.826 \cdot in^3$$

Anchor Bolt Bending Stress:

Maximum Applied Bending:

$$M_x := \left(\frac{Shear}{N}\right) \cdot l \qquad M_x = 0.500 \cdot ft \cdot kips$$

$$f_{bx} := \frac{M_x}{S_x} \qquad f_{bx} = 7.3 \cdot ksi$$

Allowable Bending

$$F_{bx} := 1.333 \cdot 0.60 \cdot Fy \qquad F_{bx} = 60.0 \cdot ksi$$

Note: 1.333 increase allowed per TIA/EIA

Check Tensile Forces:

Maximum Tensile Force (Gross Area):

$AllowableTension := 1.333 \cdot (0.33 \cdot A_g \cdot F_u)$ $AllowableTension = 174.9 \cdot kips$

Note: 1.333 increase allowed per TIA/EIA

Maximum Tensile Force (Net Area):

$F_{net.area} := 1.333 \cdot (0.60 \cdot A_n \cdot Fy)$ $F_{net.area} = 194.8 \cdot kips$

Note: 1.333 increase allowed per TIA/EIA

Applied Tension:

$$MaxTension := \frac{OM \cdot R_{bc}}{I_p} - \frac{Axial}{N} \qquad MaxTension = 163.6 \cdot kips$$

Check Stresses:

Note: Bolts supplied are "upset bolts." Use net area for checking per AISC.

$$\frac{MaxTension}{F_{net.area}} = 0.84$$

$$Condition := if\left(\frac{MaxTension}{F_{net.area}} \le 1.00, "OK", "Overstressed"\right)$$

Condition = "OK"

Check Compression & Combined Stresses (if required):

Check to see if a complete combined stress analysis is required:

Per ASCE Manual 72: "If the clearance between the base plate and concrete does not exceed two times the bolt diameter a bending stress analysis of the bolts is NOT normally required."

Set the clear space between the plate and bolt to zero and remove bending stresses if a combined stress analysis is not required:

$$l := \begin{cases} l & \text{if } l > 2 \cdot D_n \\ 0.00\text{in} & \text{otherwise} \end{cases} \qquad l = 0.00 \cdot \text{in}$$

$$f_{bx} := \begin{cases} f_{bx} & \text{if } l > 2 \cdot D_n \\ 0.0\text{ksi} & \text{otherwise} \end{cases} \qquad f_{bx} = 0.0 \cdot \text{ksi}$$

Allowable Compressive Force:

$$K := 0.65$$

$$C_c := \sqrt{\frac{2 \cdot \pi^2 \cdot E}{Fy}} \qquad C_c = 87.36$$

$$F_a := \begin{cases} \dfrac{\left[1 - \dfrac{\left(\frac{K \cdot l}{r}\right)^2}{2 \cdot C_c^{\,2}}\right] \cdot Fy}{\dfrac{5}{3} + \dfrac{3 \cdot \left(\frac{K \cdot l}{r}\right)}{8 \cdot C_c} - \dfrac{\left(\frac{K \cdot l}{r}\right)^3}{8 \cdot C_c^{\,3}}} & \text{if } \dfrac{K \cdot l}{r} \le C_c \\ \dfrac{12 \cdot \pi^2 \cdot E}{23 \cdot \left(\frac{K \cdot l}{r}\right)^2} & \text{if } \dfrac{K \cdot l}{r} > C_c \end{cases} \qquad F_a = 45.0 \cdot \text{ksi}$$

$$F_{ax} := 1.333 \cdot F_a$$ Note: 1.333 increase allowed per TIA/EIA $\qquad F_a = 60.0 \cdot \text{ksi}$

Applied Compressive Force:

$$\text{MaxCompression} := \frac{OM \cdot R_{bc}}{I_p} + \frac{\text{Axial}}{N} \qquad \text{MaxCompression} = 169.5 \cdot \text{kips}$$

$$f_a := \frac{\text{MaxCompression}}{A_n} \qquad f_a = 52.2 \cdot \text{ksi}$$

Check Combined Stresses:

$$\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} = 0.87$$

$$\text{Condition} := \text{if}\left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right) \qquad \boxed{\text{Condition} = \text{"OK"}}$$

Base Plate Analysis:

Force from Bolt(s):

$$C_i := \frac{OM \cdot d_i}{I_p} + \frac{Axial}{N}$$

$C_1 = 59.9 \cdot kips$ $C_7 = 110.0 \cdot kips$

$C_2 = 110.0 \cdot kips$ $C_8 = 59.9 \cdot kips$

$C_3 = 147.2 \cdot kips$ $C_9 = 2.9 \cdot kips$

$C_4 = 167.0 \cdot kips$ $C_{10} = -54.0 \cdot kips$

$C_5 = 167.0 \cdot kips$ $C_{11} = -104.1 \cdot kips$

$C_6 = 147.2 \cdot kips$ etc.

Bending Stress in Plate:

$$f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{EffectiveWidth \cdot PlateThickness^2} \qquad f_{bp} = 51.7 \cdot ksi$$

Check Stresses:

$$\frac{f_{bp}}{1.333 \cdot 0.75 Fy_{bp}} = 0.86$$

$$Condition := if\left(\frac{f_{bp}}{1.333 \cdot 0.75 Fy_{bp}} < 1.00, "OK", "Overstressed"\right)$$

Condition = "OK"

FOUNDATION ANALYSIS

URS

Job	176' EEI Monopole - Berlin, CT	Project No.	VZ5-168	Page	of
Description	Caisson Foundation Evaluation	Computed by	MCD	Sheet 1	of 2
		Checked by		Date 11/11/13	
				Date	

Check Foundation Depth TIA/EIA-222-F 7.2.5

Shear Force: $S := 36k$ *USER INPUT*

Overturning Moment: $M := 4373ft \cdot k$ *USER INPUT*

Foundation Diameter: $d := 7.5ft$ *USER INPUT*

Overall Length of Caisson: $L_c := 39ft$ *USER INPUT*

Depth From Top of Caisson to Grade: $L_{pag} := 4ft$ *USER INPUT*

Depth of Caisson Below Ground Level: $LD := L_c - L_{pag}$ $LD = 35.0ft$ *USER INPUT*

Depth Required:

$$LD1 := 2.0ft + \left(\frac{S \cdot ft^2}{3k \cdot d}\right) + 2ft \cdot .5\left(\frac{M \cdot ft}{3 \cdot k\, d} + \frac{S \cdot ft}{2k} + \frac{S^2 ft^3}{18k^2 d^2}\right)^{.5} \quad LD1 = 32.8ft$$

$DepthCheck := if(LD1 \le LD, "OK", "NO GOOD")$ $DepthCheck = "OK"$

Note: Result not applicable. Actual soil is better than normal soil as defined in TIA/EIA 222 F. Refer to L-Pile analysis.

Moment Capacity:

Bending Moment: $Mu := 4684.29ft \cdot k$ *USER INPUT–FROM LPILE*

Moment Capacity: $Mn := 8817.64ft \cdot k$ *USER INPUT–FROM LPILE*

Factor of Safety: $FS := \frac{Mn}{Mu}$ $FS = 1.9$

Factor of Safety Required: $FS_{reqd} := 1.3$ $FOSCheck := if(FS \ge FS_{reqd}, "OK", "NO GOOD")$ $FOSCheck = "OK"$

Factor of Safety Ratio: $FS_{ratio} := \left(\frac{FS_{reqd}}{FS}\right) = 0.69$

URS

Job	176' EEI Monopole - Berlin, CT	Project No.	VZ5-168	Page	of
Description	Caisson Foundation Evaluation	Computed by	MCD	Sheet 2	of 2
		Checked by		Date 11/11/13	
				Date	

Axial Capacity:

Applied Axial Load: $A1 := 53k$ *USER INPUT*

Concrete Weight: $A2 := .150\frac{k}{ft^3}\cdot LD\cdot\pi\frac{d^2}{4}$ $A2 = 231.9\cdot k$

Total Axial Load: $AT := A1 + A2$ $AT = 284.9\cdot k$

Number of Rebar: $n := 30$ *USER INPUT*

Area of Rebar: $Ar := 1.56in^2$ *USER INPUT* #11

Rebar Yield Strength: $fy := 60ksi$ *USER INPUT*

Area of Concrete: $Ag := \pi\cdot\frac{d^2}{4}$ $Ag = 44.2\,ft^{2.0}$

Concrete Comp Strength: $f'c := 4ksi$ *USER INPUT*

Axial Capacity: $Po := n\cdot Ar\cdot fy + (Ag - n\cdot Ar)\cdot 0.85\cdot f'c$ $Po = 24278.7\cdot k$

$AxialCheck := if(AT \le Po, "OK", "NO GOOD")$ AxialCheck = "OK"

Pile Plus for Windows, Version 2012-06.031

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

This copy of LPile is licensed to:

URS Corporation
Rocky Hill, CT

Serial Number of Security Device: 138585063
Company Name Stored in Security Device: URS

Files Used for Analysis

Path to file locations: Y:\Back-up VZ5-168\MathCAD\Foundation\
Name of input data file: Caisson Analysis.lp6d
Name of output report file: Caisson Analysis.lp6o
Name of plot output file: Caisson Analysis.lp6p
Name of runtime messeage file: Caisson Analysis.lp6r

Date and Time of Analysis

Date: November 11, 2013 Time: 14:51:24

Problem Title

176' EEI Monopole - Berlin Fire Department

Job Number:

Client:

Engineer:

Description:

Program Options

Engineering units are US Customary Units: pounds, inches, feet

Basic Program Options:

This analysis computes pile response to lateral loading and will compute nonlinear moment-curvature and nominal moment capacity for section types with nonlinear properties.

Computation Options:
- Analysis does not use p-y multipliers (individual pile or shaft only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- No computation of foundation stiffness matrix values
- Report pile response for full length of pile
- Analysis assumes no loading by soil movements acting on pile
- No p-y curves to be computed and reported for user-specified depths

Solution Control Parameters:

- Number of pile increments	=	100	
- Maximum number of iterations allowed	=	200	
- Deflection tolerance for convergence	=	1.0000E-05	in
- Maximum allowable deflection	=	100.0000	in

Pile Response Output Options:

- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1

Pile Structural Properties and Geometry

Total Number of Sections = 1

Total Pile Length = 39.00 ft

Depth of ground surface below top of pile = 4.00 ft

Pile dimensions used for p-y curve computations defined using 2 points.
p-y curves are computed using values of pile diameter interpolated over the length of the pile.

Point	Depth X ft	Pile Diameter in
1	0.00000	90.0000000
2	39.000000	90.0000000

Input Structural Properties:

Pile Section No. 1:

Section Type = Drilled Shaft with Permanent Casing
Section Length = 39.00000000 ft
Section Diameter = 90.00000000 in

Ground Slope and Pile Batter Angles

Ground Slope Angle = 0.000 degrees
= 0.000 radians

Pile Batter Angle = 0.000 degrees
= 0.000 radians

Soil and Rock Layering Information

The soil profile is modelled using 4 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 4.00000 ft
Distance from top of pile to bottom of layer = 5.00000 ft
Effective unit weight at top of layer = 61.99890 pcf
Effective unit weight at bottom of layer = 61.99890 pcf
Friction angle at top of layer = 30.00000 deg.
Friction angle at bottom of layer = 30.00000 deg.
Subgrade k at top of layer = 1.00000 pci
Subgrade k at bottom of layer = 1.00000 pci

Layer 2 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 5.00000 ft
Distance from top of pile to bottom of layer = 11.00000 ft
Effective unit weight at top of layer = 61.99890 pcf
Effective unit weight at bottom of layer = 61.99890 pcf
Friction angle at top of layer = 32.00000 deg.
Friction angle at bottom of layer = 32.00000 deg.
Subgrade k at top of layer = 25.00000 pci
Subgrade k at bottom of layer = 25.00000 pci

Layer 3 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	11.00000 ft
Distance from top of pile to bottom of layer	=	16.00000 ft
Effective unit weight at top of layer	=	61.99890 pcf
Effective unit weight at bottom of layer	=	61.99890 pcf
Friction angle at top of layer	=	34.00000 deg.
Friction angle at bottom of layer	=	34.00000 deg.
Subgrade k at top of layer	=	35.00000 pci
Subgrade k at bottom of layer	=	35.00000 pci

Layer 4 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	16.00000 ft
Distance from top of pile to bottom of layer	=	39.00000 ft
Effective unit weight at top of layer	=	61.99890 pcf
Effective unit weight at bottom of layer	=	61.99890 pcf
Friction angle at top of layer	=	36.00000 deg.
Friction angle at bottom of layer	=	36.00000 deg.
Subgrade k at top of layer	=	120.00000 pci
Subgrade k at bottom of layer	=	120.00000 pci

(Depth of lowest soil layer extends 0.00 ft below pile tip)

Summary of Soil Properties

Layer Num.	Soil Type (p-y Curve Criteria)	Layer Depth ft	Effective Unit Wt. pcf	Undrained Cohesion psf	Angle of Friction deg.	Uniaxial qu psi	RQD % or GSI	Strain Factor Epsilon 50	J Factor	kpy pci	Rock Mass Rock Emass psi	krm	Test Type	Test Property	Subgrade Mod. pci
1	Sand (Reese, et al.)	4.000	61.999	--	30.000	--	--	--	--	1.000	--	--	--	--	--
		5.000	61.999	--	30.000	--	--	--	--	1.000	--	--	--	--	--
2	Sand (Reese, et al.)	5.000	61.999	--	32.000	--	--	--	--	25.000	--	--	--	--	--
		11.000	61.999	--	32.000	--	--	--	--	25.000	--	--	--	--	--
3	Sand (Reese, et al.)	11.000	61.999	--	34.000	--	--	--	--	35.000	--	--	--	--	--
		16.000	61.999	--	34.000	--	--	--	--	35.000	--	--	--	--	--
4	Sand (Reese, et al.)	16.000	61.999	--	36.000	--	--	--	--	120.000	--	--	--	--	--
		39.000	61.999	--	36.000	--	--	--	--	120.000	--	--	--	--	--

Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1		Condition 2		Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 31636. lbs	M =	47587518. in-lbs		64248.	False
2	1	V = 36055. lbs	M =	52773727. in-lbs		52919.	False

V = perpendicular shear force applied to pile head
M = bending moment applied to pile head
y = lateral deflection relative to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applie to pile head
Axial thrust is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft with Permanent Casing:

Length of Section	=	39.00000000 ft
Outer Diameter of Casing	=	90.00000000 in
Concrete Cover Thickness Inside Casing	=	3.29532744 in
Casing Wall Thickness	=	0.0000000 in
Moment of Inertia of Steel Casing	=	0.0000000 in^4
Yield Stress of Casing	=	60.00000000 ksi
Elastic Modulus of Casing	=	29000. ksi
Number of Reinforcing Bars	=	30 bars
Area of Single Reinforcing Bar	=	1.56000000 sq. in.
Edge-to-Edge Bar Spacing	=	7.16126554 in
Rebar Offset	=	0.0000000 in
Yield Stress of Reinforcing Bars	=	60.00000000 ksi
Elastic Modulus of Reinforcing Bars	=	29000. ksi
Area of Concrete	=	6314.92512352 sq. in.
Cross-sectional Area of Steel Casing	=	0.0000000 sq. in.
Area of All Steel (Casing and Bars)	=	46.80000000 sq. in.
Area Ratio of All Steel	=	0.74 percent

Axial Structural Capacities:

Nom. Axial Structural Capacity = 0.85 Fc Ac + Fy As	=	18911.060 kips
Tensile Load for Cracking of Concrete	=	-2443.521 kips
Nominal Axial Tensile Capacity	=	-2808.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.41000	1.56000	40.99967	0.00000
2	1.41000	1.56000	40.10373	8.52431
3	1.41000	1.56000	37.45506	16.67607
4	1.41000	1.56000	33.16943	24.09900
5	1.41000	1.56000	27.43414	30.46869
6	1.41000	1.56000	20.49984	35.50676
7	1.41000	1.56000	12.66960	38.99301
8	1.41000	1.56000	4.28563	40.77507
9	1.41000	1.56000	-4.28563	40.77507
10	1.41000	1.56000	-12.66960	38.99301
11	1.41000	1.56000	-20.49984	35.50676
12	1.41000	1.56000	-27.43414	30.46869
13	1.41000	1.56000	-33.16943	24.09900
14	1.41000	1.56000	-37.45506	16.67607
15	1.41000	1.56000	-40.10373	8.52431
16	1.41000	1.56000	-40.99967	0.00000
17	1.41000	1.56000	-40.10373	-8.52431
18	1.41000	1.56000	-37.45506	-16.67607
19	1.41000	1.56000	-33.16943	-24.09900
20	1.41000	1.56000	-27.43414	-30.46869
21	1.41000	1.56000	-20.49984	-35.50676

22	1.41000	1.56000	-12.66960	-38.99301
23	1.41000	1.56000	-4.28563	-40.77507
24	1.41000	1.56000	4.28563	-40.77507
25	1.41000	1.56000	12.66960	-38.99301
26	1.41000	1.56000	20.49984	-35.50676
27	1.41000	1.56000	27.43414	-30.46869
28	1.41000	1.56000	33.16943	-24.09900
29	1.41000	1.56000	37.45506	-16.67607
30	1.41000	1.56000	40.10373	-8.52431

Concrete Properties:

Compressive Strength of Concrete	=	3.00000000 ksi
Modulus of Elasticity of Concrete	=	3122.01857778 ksi
Modulus of Rupture of Concrete	=	-0.41079191 ksi
Compression Strain at Peak Stress	=	0.00163356
Tensile Strain at Fracture of Concrete	=	-0.00011596
Maximum Coarse Aggregate Size	=	0.0000000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
1	52.919
2	64.248

Definitions of Run Messages and Notes:

C = concrete in section has cracked in tension.
Y = stress in reinforcing steel has reached yield stress.
T = ACI 318-08 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than than 0.003. See ACI 318-08, Section 10.3.4.
Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
Position of neutral axis is measured from edge of compression side of pile.
Compressive stresses and strains are positive in sign.
Tensile stresses and strains are negative in sign.

Axial Thrust Force = 52.919 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Concrete Stress ksi	Max Steel Stress ksi	Max Casing Stress ksi	Run Msg
0.000000313	3997.0397906	12790527330.	51.9214107	0.0000162	-0.0000119	0.0587881	0.4664597	0.4664597	
0.000000625	7973.3866365	12757418618.	48.4726220	0.0000303	-0.0000260	0.1092281	0.8704100	0.8704100	
0.000000938	11928.	12723650089.	47.3231126	0.0000444	-0.0000400	0.1592321	1.2743628	1.2743628	
0.000001250	15862.	12689715062.	46.7484059	0.0000584	-0.0000541	0.2088001	1.6783172	1.6783172	
0.000001563	19775.	12655713274.	46.4036177	0.0000725	-0.0000681	0.2579320	2.0822733	2.0822733	
0.000001875	23666.	12621678090.	46.1737887	0.0000866	-0.0000822	0.3066278	2.4862310	2.4862310	
0.000002188	27535.	12587623797.	46.0096501	0.0001006	-0.0000962	0.3548876	2.8901903	2.8901903	
0.000002500	31384.	12553557560.	45.8865682	0.0001147	-0.0001103	0.4027112	3.2941512	3.2941512	
0.000002813	31384.	11158717831.	23.8909754	0.0000672	-0.0001859	0.2372638	-5.3553142	-5.3553142	C
0.000003125	31384.	10042846048.	23.5916035	0.0000737	-0.0002075	0.2597401	-5.9774797	-5.9774797	C
0.000003438	31384.	9129860044.	23.3464127	0.0000803	-0.0002291	0.2821215	-6.5996701	-6.5996701	C
0.000003750	31384.	8369038373.	23.1431961	0.0000868	-0.0002507	0.3044257	-7.2217399	-7.2217399	C
0.000004063	31384.	7725266191.	22.9722708	0.0000933	-0.0002723	0.3266525	-7.8436887	-7.8436887	C

0.000004375	31384.	7173461463.	22.8211620	0.0000998	-0.0002939	
0.3487177	-8.4662213	-8.4662213	C			
0.000004688	31384.	6695230699.	22.6902522	0.0001064	-0.0003155	
0.3706923	-9.0887470	-9.0887470	C			
0.000005000	31384.	6276778780.	22.5765718	0.0001129	-0.0003371	
0.3925903	-9.7111471	-9.7111471	C			
0.000005313	31384.	5907556499.	22.4770831	0.0001194	-0.0003587	
0.4144116	-10.3334212	-10.3334212	C			
0.000005625	31384.	5579358916.	22.3894234	0.0001259	-0.0003803	
0.4361559	-10.9555690	-10.9555690	C			
0.000005938	31384.	5285708446.	22.3117277	0.0001325	-0.0004019	
0.4578232	-11.5775900	-11.5775900	C			
0.000006250	31384.	5021423024.	22.2425036	0.0001390	-0.0004235	
0.4794133	-12.1994837	-12.1994837	C			
0.000006563	31384.	4782307642.	22.1805432	0.0001456	-0.0004451	
0.5009262	-12.8212497	-12.8212497	C			
0.000006875	31384.	4564930022.	22.1248584	0.0001521	-0.0004666	
0.5223615	-13.4428876	-13.4428876	C			
0.000007188	31384.	4366454803.	22.0746326	0.0001587	-0.0004882	
0.5437193	-14.0643969	-14.0643969	C			
0.000007500	31384.	4184519187.	22.0282048	0.0001652	-0.0005098	
0.5649750	-14.6859904	-14.6859904	C			
0.000007813	31384.	4017138419.	21.9850180	0.0001718	-0.0005314	
0.5861262	-15.3076912	-15.3076912	C			
0.000008125	31384.	3862633095.	21.9457257	0.0001783	-0.0005529	
0.6072004	-15.9292571	-15.9292571	C			
0.000008438	31384.	3719572610.	21.9098973	0.0001849	-0.0005745	
0.6281974	-16.5506876	-16.5506876	C			
0.000008750	31384.	3586730731.	21.8771635	0.0001914	-0.0005961	
0.6491171	-17.1719822	-17.1719822	C			
0.000009063	31384.	3463050361.	21.8472062	0.0001980	-0.0006176	
0.6699594	-17.7931405	-17.7931405	C			
0.000009375	31384.	3347615349.	21.8197495	0.0002046	-0.0006392	
0.6907240	-18.4141618	-18.4141618	C			
0.000009688	31384.	3239627757.	21.7945534	0.0002111	-0.0006607	
0.7114110	-19.0350458	-19.0350458	C			
0.0000100	31384.	3138389390.	21.7714076	0.0002177	-0.0006823	
0.7320200	-19.6557918	-19.6557918	C			
0.0000103	31384.	3043286681.	21.7501275	0.0002243	-0.0007038	
0.7525510	-20.2763994	-20.2763994	C			
0.0000106	31384.	2953778249.	21.7305501	0.0002309	-0.0007254	
0.7730038	-20.8968683	-20.8968683	C			
0.0000109	31384.	2869384585.	21.7125313	0.0002375	-0.0007469	
0.7933783	-21.5171974	-21.5171974	C			
0.0000113	31384.	2789679458.	21.6959427	0.0002441	-0.0007684	
0.8136743	-22.1373864	-22.1373864	C			
0.0000116	31384.	2714282716.	21.6806699	0.0002507	-0.0007899	
0.8338917	-22.7574349	-22.7574349	C			
0.0000119	31384.	2642854223.	21.6666107	0.0002573	-0.0008115	
0.8540302	-23.3773423	-23.3773423	C			
0.0000122	31384.	2575088730.	21.6536732	0.0002639	-0.0008330	
0.8740898	-23.9971081	-23.9971081	C			
0.0000128	31384.	2449474646.	21.6308410	0.0002771	-0.0008760	
0.9139716	-25.2362125	-25.2362125	C			
0.0000134	32471.	2416430286.	21.6116034	0.0002904	-0.0009190	
0.9535356	-26.4747439	-26.4747439	C			
0.0000141	33905.	2411002898.	21.5954922	0.0003037	-0.0009619	
0.9927807	-27.7126981	-27.7126981	C			
0.0000147	35337.	2405934289.	21.5821188	0.0003170	-0.0010049	
1.0317055	-28.9500696	-28.9500696	C			
0.0000153	36768.	2401179718.	21.5711584	0.0003303	-0.0010478	
1.0703089	-30.1868545	-30.1868545	C			
0.0000159	38197.	2396701586.	21.5623373	0.0003436	-0.0010907	
1.1085894	-31.4230480	-31.4230480	C			
0.0000166	39625.	2392467961.	21.5554230	0.0003570	-0.0011336	
1.1465457	-32.6586453	-32.6586453	C			
0.0000172	41052.	2388451545.	21.5502172	0.0003704	-0.0011765	
1.1841765	-33.8936418	-33.8936418	C			
0.0000178	42476.	2384628866.	21.5465494	0.0003838	-0.0012193	
1.2214805	-35.1280324	-35.1280324	C			
0.0000184	43899.	2380979624.	21.5442726	0.0003972	-0.0012622	
1.2584562	-36.3618123	-36.3618123	C			
0.0000191	45321.	2377486175.	21.5432589	0.0004107	-0.0013050	
1.2951023	-37.5949765	-37.5949765	C			
0.0000197	46741.	2374133108.	21.5433971	0.0004241	-0.0013477	
1.3314174	-38.8275198	-38.8275198	C			
0.0000203	48159.	2370906899.	21.5445894	0.0004376	-0.0013905	
1.3674000	-40.0594371	-40.0594371	C			
0.0000209	49576.	2367795633.	21.5467503	0.0004511	-0.0014332	
1.4030488	-41.2907232	-41.2907232	C			
0.0000216	50991.	2364788769.	21.5498039	0.0004647	-0.0014760	
1.4383622	-42.5213726	-42.5213726	C			
0.0000222	52404.	2361876943.	21.5536833	0.0004782	-0.0015187	
1.4733388	-43.7513800	-43.7513800	C			

```
     0.0000228        53816.   2359051815.     21.5583288     0.0004918     -0.0015613
1.5079771   -44.9807400   -44.9807400  C
     0.0000234        55226.   2356305922.     21.5636874     0.0005054     -0.0016040
1.5422755   -46.2094469   -46.2094469  C
     0.0000241        56634.   2353632572.     21.5697116     0.0005190     -0.0016466
1.5762326   -47.4374951   -47.4374951  C
     0.0000247        58041.   2351025742.     21.5763590     0.0005327     -0.0016892
1.6098469   -48.6648787   -48.6648787  C
     0.0000253        59446.   2348479999.     21.5835913     0.0005463     -0.0017318
1.6431166   -49.8915921   -49.8915921  C
     0.0000259        60849.   2345990422.     21.5913741     0.0005600     -0.0017743
1.6760403   -51.1176291   -51.1176291  C
     0.0000266        62251.   2343552550.     21.5996764     0.0005737     -0.0018169
1.7086164   -52.3429839   -52.3429839  C
     0.0000272        63650.   2341162322.     21.6084702     0.0005875     -0.0018594
1.7408432   -53.5676503   -53.5676503  C
     0.0000278        65048.   2338816038.     21.6177300     0.0006012     -0.0019019
1.7727190   -54.7916220   -54.7916220  C
     0.0000284        66445.   2336510311.     21.6274328     0.0006150     -0.0019443
1.8042422   -56.0148927   -56.0148927  C
     0.0000291        67839.   2334242043.     21.6375576     0.0006288     -0.0019868
1.8354112   -57.2374559   -57.2374559  C
     0.0000297        69231.   2332008388.     21.6480854     0.0006427     -0.0020292
1.8662241   -58.4593053   -58.4593053  C
     0.0000303        70622.   2329806725.     21.6589988     0.0006565     -0.0020716
1.8966792   -59.6804340   -59.6804340  C
     0.0000309        72011.   2327634759.     21.6702821     0.0006704     -0.0021140
1.9267749   -60.0000000   -60.0000000  CY
     0.0000316        73398.   2325490033.     21.6819206     0.0006843     -0.0021563
1.9565092   -60.0000000   -60.0000000  CY
     0.0000322        74780.   2323256174.     21.6935368     0.0006983     -0.0021986
1.9858554   -60.0000000   -60.0000000  CY
     0.0000328        75977.   2315493455.     21.6874543     0.0007116     -0.0022415
2.0135907   -60.0000000   -60.0000000  CY
     0.0000334        77037.   2303897688.     21.6687136     0.0007245     -0.0022848
2.0400466   -60.0000000   -60.0000000  CY
     0.0000341        77972.   2289090193.     21.6391303     0.0007371     -0.0023285
2.0653379   -60.0000000   -60.0000000  CY
     0.0000347        78889.   2274286113.     21.6094474     0.0007496     -0.0023723
2.0902097   -60.0000000   -60.0000000  CY
     0.0000353        79733.   2257914650.     21.5740018     0.0007618     -0.0024163
2.1142660   -60.0000000   -60.0000000  CY
     0.0000359        80456.   2238771404.     21.5283746     0.0007737     -0.0024607
2.1371922   -60.0000000   -60.0000000  CY
     0.0000366        81163.   2219836663.     21.4832042     0.0007855     -0.0025051
2.1597394   -60.0000000   -60.0000000  CY
     0.0000372        81869.   2201514327.     21.4399752     0.0007973     -0.0025496
2.1820182   -60.0000000   -60.0000000  CY
     0.0000397        84253.   2122915906.     21.2417021     0.0008430     -0.0027288
2.2653315   -60.0000000   -60.0000000  CY
     0.0000422        86316.   2046011261.     21.0370516     0.0008875     -0.0029094
2.3420047   -60.0000000   -60.0000000  CY
     0.0000447        87943.   1967964290.     20.8103251     0.0009300     -0.0030919
2.4111878   -60.0000000   -60.0000000  CY
     0.0000472        89375.   1894029432.     20.5926237     0.0009717     -0.0032752
2.4754425   -60.0000000   -60.0000000  CY
     0.0000497        90782.   1827069035.     20.3990473     0.0010136     -0.0034583
2.5361451   -60.0000000   -60.0000000  CY
     0.0000522        91816.   1759347519.     20.1837717     0.0010533     -0.0036435
2.5902702   -60.0000000   -60.0000000  CY
     0.0000547        92746.   1695933983.     19.9721972     0.0010922     -0.0038296
2.6399273   -60.0000000   -60.0000000  CY
     0.0000572        93671.   1637960138.     19.7821046     0.0011313     -0.0040156
2.6865805   -60.0000000   -60.0000000  CY
     0.0000597        94585.   1584675272.     19.6103686     0.0011705     -0.0042014
2.7301581   -60.0000000   -60.0000000  CY
     0.0000622        95326.   1532881471.     19.4348539     0.0012086     -0.0043883
2.7693629   -60.0000000   -60.0000000  CY
     0.0000647        95897.   1482465435.     19.2493915     0.0012452     -0.0045767
2.8040666   -60.0000000   -60.0000000  CY
     0.0000672        96456.   1435618673.     19.0737049     0.0012815     -0.0047654
2.8357099   -60.0000000   -60.0000000  CY
     0.0000697        97010.   1392070188.     18.9128591     0.0013180     -0.0049539
2.8646898   -60.0000000   -60.0000000  CY
     0.0000722        97560.   1351476112.     18.7653505     0.0013546     -0.0051423
2.8909709   -60.0000000   -60.0000000  CY
     0.0000747        98105.   1313538503.     18.6298785     0.0013914     -0.0053305
2.9145171   -60.0000000   -60.0000000  CY
     0.0000772        98630.   1277800752.     18.5031893     0.0014282     -0.0055187
2.9352028   -60.0000000   -60.0000000  CY
     0.0000797        99028.   1242702068.     18.3635763     0.0014633     -0.0057085
2.9522599   -60.0000000   -60.0000000  CY
     0.0000822        99335.   1208640454.     18.2178357     0.0014973     -0.0058996
2.9662502   -60.0000000   -60.0000000  CY
```

```
     0.0000847        99639.   1176552004.     18.0824171      0.0015314     -0.0060905
2.9778666   -60.0000000   -60.0000000  CY
     0.0000872        99940.   1146266194.     17.9564605      0.0015656     -0.0062813
2.9870772   -60.0000000   -60.0000000  CY
     0.0000897       100238.   1117631493.     17.8392031      0.0016000     -0.0064719
2.9938497   -60.0000000   -60.0000000  CY
     0.0000922       100532.   1090512783.     17.7299661      0.0016345     -0.0066624
2.9981504   -60.0000000   -60.0000000  CY
     0.0000947       100822.   1064789194.     17.6281435      0.0016692     -0.0068527
2.9999449   -60.0000000   -60.0000000  CY
     0.0000972       101107.   1040329749.     17.5317238      0.0017039     -0.0070430
2.9958309   -60.0000000   -60.0000000  CY
     0.0000997       101382.   1016995842.     17.4342973      0.0017380     -0.0072339
2.9989777   -60.0000000   -60.0000000  CY
     0.0001022       101653.    994773958.     17.3431409      0.0017723     -0.0074246
2.9998462   -60.0000000   -60.0000000  CY
     0.0001047       101910.    973472894.     17.2564043      0.0018065     -0.0076153
2.9955979   -60.0000000   -60.0000000  CY
     0.0001072       102158.    953073021.     17.1737208      0.0018408     -0.0078061
2.9987063   -60.0000000   -60.0000000  CY
     0.0001097       102316.    932797289.     17.0807305      0.0018735     -0.0079983
2.9999478   -60.0000000   -60.0000000  CY
     0.0001122       102465.    913333994.     16.9921092      0.0019063     -0.0081906
2.9957789   -60.0000000   -60.0000000  CY
     0.0001147       102602.    894621646.     16.9067727      0.0019390     -0.0083829
2.9964960   -60.0000000   -60.0000000  CY
     0.0001172       102738.    876694720.     16.8260025      0.0019718     -0.0085751
2.9989264   -60.0000000   -60.0000000  CY
     0.0001197       102872.    859503741.     16.7495257      0.0020047     -0.0087672
2.9999613   -60.0000000   -60.0000000  CY
     0.0001222       103003.    842994476.     16.6775044      0.0020378     -0.0089591
2.9959842   -60.0000000   -60.0000000  CY
     0.0001247       103129.    827099027.     16.6042296      0.0020703     -0.0091515
2.9947705   -60.0000000   -60.0000000  CY
     0.0001272       103250.    811797109.     16.5313078      0.0021026     -0.0093443
2.9976116   -60.0000000   -60.0000000  CY
     0.0001297       103371.    797077043.     16.4619086      0.0021349     -0.0095370
2.9993584    60.0000000    60.0000000  CY
     0.0001322       103490.    782905670.     16.3958422      0.0021673     -0.0097295
2.9999971    60.0000000    60.0000000  CY
     0.0001347       103608.    769244266.     16.3334208      0.0021999     -0.0099220
2.9956661    60.0000000    60.0000000  CY
     0.0001372       103724.    756074240.     16.2738836      0.0022326     -0.0101143
2.9927936    60.0000000    60.0000000  CY
     0.0001522       104402.    686011175.     15.9698031      0.0024304     -0.0112665
2.9909608    60.0000000    60.0000000  CY
     0.0001672       104974.    627883540.     15.7172433      0.0026277     -0.0124191
2.9966514    60.0000000    60.0000000  CY
     0.0001822       105266.    577789423.     15.4367926      0.0028124     -0.0135845
2.9970835    60.0000000    60.0000000  CY
     0.0001972       105460.    534821061.     15.2332204      0.0030038     -0.0147431
2.9918521    60.0000000    60.0000000  CY
     0.0002122       105628.    497804656.     15.0745855      0.0031986     -0.0158982
2.9961980    60.0000000    60.0000000  CY
     0.0002272       105778.    465599591.     14.9482587      0.0033961     -0.0170508
2.9949080    60.0000000    60.0000000  CY
     0.0002422       105864.    437113978.     14.8714082      0.0036017     -0.0181952
2.9881673    60.0000000    60.0000000  CY
     0.0002572       105938.    411909117.     14.8000935      0.0038064     -0.0193405
2.9992334    60.0000000    60.0000000  CY


Axial Thrust Force =      64.248 kips

    Bending        Bending        Bending        Depth to       Max Comp       Max Tens     Max
Concrete    Max Steel      Max Casing    Run
   Curvature       Moment        Stiffness       N Axis         Strain         Strain         Stress
     Stress         Stress      Msg
     rad/in.        in-kip         kip-in2          in          in/in          in/in          ksi
       ksi            ksi
 ------------- ------------- ------------- ------------- ------------- -------------
------------- ------------- -------------  ---
   0.000000313  3996.7444896  12789582367.     53.4033265      0.0000167     -0.0000114
0.0604720      0.4798895      0.4798895
   0.000000625  7973.0859893  12756937583.     49.2160926      0.0000308     -0.0000255
0.1109032      0.8838854      0.8838854
   0.000000938    11928.      12723326520.     47.8204713      0.0000448     -0.0000395
0.1608984      1.2878847      1.2878847
   0.000001250    15862.      12689470515.     47.1227224      0.0000589     -0.0000536
0.2104575      1.6918862      1.6918862
   0.000001563    19774.      12655516198.     46.7041175      0.0000730     -0.0000676
0.2595805      2.0958897      2.0958897
   0.000001875    23665.      12621512662.     46.4250838      0.0000870     -0.0000817
0.3082674      2.4998952      2.4998952
```

```
   0.000002188        27535.   12587480993.     46.2258053     0.0001011     -0.0000958
0.3565181     2.9039027     2.9039027
   0.000002500        31384.   12553431717.     46.0763732     0.0001152     -0.0001098
0.4043327     3.3079120     3.3079120
   0.000002813        31384.   11158605970.     24.5298965     0.0000690     -0.0001841
0.2435940    -5.3032022    -5.3032022  C
   0.000003125        31384.   10042745373.     24.1779896     0.0000756     -0.0002057
0.2661689    -5.9243384    -5.9243384  C
   0.000003438        31384.    9129768521.     23.8912528     0.0000821     -0.0002272
0.2886652    -6.5453564    -6.5453564  C
   0.000003750        31384.    8368954478.     23.6448187     0.0000887     -0.0002488
0.3109710    -7.1671885    -7.1671885  C
   0.000004063        31384.    7725188749.     23.4358058     0.0000952     -0.0002704
0.3331777    -7.7890785    -7.7890785  C
   0.000004375        31384.    7173389552.     23.2576106     0.0001018     -0.0002920
0.3553068    -8.4108469    -8.4108469  C
   0.000004688        31384.    6695163582.     23.1040724     0.0001083     -0.0003136
0.3773582    -9.0324933    -9.0324933  C
   0.000005000        31384.    6276715858.     22.9705709     0.0001149     -0.0003351
0.3993317    -9.6540172    -9.6540172  C
   0.000005313        31384.    5907497278.     22.8492062     0.0001214     -0.0003567
0.4211481   -10.2760910   -10.2760910  C
   0.000005625        31384.    5579302985.     22.7412760     0.0001279     -0.0003783
0.4428717   -10.8981731   -10.8981731  C
   0.000005938        31384.    5285655460.     22.6454449     0.0001345     -0.0003999
0.4645183   -11.5201281   -11.5201281  C
   0.000006250        31384.    5021372687.     22.5599006     0.0001410     -0.0004215
0.4860876   -12.1419555   -12.1419555  C
   0.000006563        31384.    4782259702.     22.4831758     0.0001475     -0.0004431
0.5075795   -12.7636550   -12.7636550  C
   0.000006875        31384.    4564884261.     22.4140700     0.0001541     -0.0004647
0.5289940   -13.3852260   -13.3852260  C
   0.000007188        31384.    4366411032.     22.3515917     0.0001607     -0.0004862
0.5503308   -14.0066682   -14.0066682  C
   0.000007500        31384.    4184477239.     22.2949145     0.0001672     -0.0005078
0.5715898   -14.6279811   -14.6279811  C
   0.000007813        31384.    4017098149.     22.2433443     0.0001738     -0.0005293
0.5927709   -15.2491642   -15.2491642  C
   0.000008125        31384.    3862594374.     22.1962936     0.0001803     -0.0005509
0.6138739   -15.8702170   -15.8702170  C
   0.000008438        31384.    3719535323.     22.1532624     0.0001869     -0.0005725
0.6348987   -16.4911392   -16.4911392  C
   0.000008750        31384.    3586694776.     22.1138216     0.0001935     -0.0005940
0.6558451   -17.1119302   -17.1119302  C
   0.000009063        31384.    3463015646.     22.0776016     0.0002001     -0.0006155
0.6767131   -17.7325897   -17.7325897  C
   0.000009375        31384.    3347581791.     22.0440105     0.0002067     -0.0006371
0.6974942   -18.3531909   -18.3531909  C
   0.000009688        31384.    3239595282.     22.0118516     0.0002132     -0.0006586
0.7181592   -18.9739985   -18.9739985  C
     0.0000100        31384.    3138357929.     21.9821794     0.0002198     -0.0006802
0.7387462   -19.5946679   -19.5946679  C
     0.0000103        31384.    3043256174.     21.9547695     0.0002264     -0.0007017
0.7592551   -20.2151986   -20.2151986  C
     0.0000106        31384.    2953748639.     21.9294241     0.0002330     -0.0007232
0.7796857   -20.8355899   -20.8355899  C
     0.0000109        31384.    2869355821.     21.9059678     0.0002396     -0.0007448
0.8000380   -21.4558414   -21.4558414  C
     0.0000113        31384.    2789651493.     21.8842449     0.0002462     -0.0007663
0.8203116   -22.0759526   -22.0759526  C
     0.0000116        31384.    2714255506.     21.8641164     0.0002528     -0.0007878
0.8405066   -22.6959228   -22.6959228  C
     0.0000119        31384.    2642827730.     21.8454581     0.0002594     -0.0008093
0.8606227   -23.3157516   -23.3157516  C
     0.0000122        31384.    2575062916.     21.8281582     0.0002660     -0.0008308
0.8806598   -23.9354387   -23.9354387  C
     0.0000128        31384.    2449450091.     21.7972426     0.0002793     -0.0008738
0.9204964   -25.1743839   -25.1743839  C
     0.0000134        32740.    2436464114.     21.7706772     0.0002925     -0.0009168
0.9600150   -26.4127548   -26.4127548  C
     0.0000141        34174.    2430120642.     21.7478930     0.0003058     -0.0009598
0.9992143   -27.6505467   -27.6505467  C
     0.0000147        35606.    2424213582.     21.7284181     0.0003191     -0.0010027
1.0380932   -28.8877550   -28.8877550  C
     0.0000153        37036.    2418688821.     21.7118576     0.0003325     -0.0010457
1.0766502   -30.1243751   -30.1243751  C
     0.0000159        38465.    2413500630.     21.6978788     0.0003458     -0.0010886
1.1148841   -31.3604026   -31.3604026  C
     0.0000166        39893.    2408610472.     21.6861993     0.0003592     -0.0011314
1.1527936   -32.5958320   -32.5958320  C
     0.0000172        41318.    2403985095.     21.6765780     0.0003726     -0.0011743
1.1903773   -33.8306589   -33.8306589  C
     0.0000178        42743.    2399596014.     21.6688077     0.0003860     -0.0012171
1.2276338   -35.0648785   -35.0648785  C
```

```
     0.0000184        44166.   2395418601.     21.6627094      0.0003994     -0.0012600
1.2645618   -36.2984857   -36.2984857  C
     0.0000191        45587.   2391431449.     21.6581278      0.0004129     -0.0013028
1.3011599   -37.5314756   -37.5314756  C
     0.0000197        47006.   2387615861.     21.6549274      0.0004263     -0.0013455
1.3374267   -38.7638430   -38.7638430  C
     0.0000203        48424.   2383955433.     21.6529896      0.0004398     -0.0013883
1.3733607   -39.9955827   -39.9955827  C
     0.0000209        49840.   2380435712.     21.6522099      0.0004533     -0.0014310
1.4089605   -41.2266894   -41.2266894  C
     0.0000216        51255.   2377043915.     21.6524962      0.0004669     -0.0014737
1.4442246   -42.4571578   -42.4571578  C
     0.0000222        52668.   2373768690.     21.6537669      0.0004804     -0.0015164
1.4791516   -43.6869824   -43.6869824  C
     0.0000228        54079.   2370599921.     21.6559494      0.0004940     -0.0015591
1.5137399   -44.9161578   -44.9161578  C
     0.0000234        55489.   2367528565.     21.6589790      0.0005076     -0.0016017
1.5479881   -46.1446783   -46.1446783  C
     0.0000241        56897.   2364546510.     21.6627979      0.0005213     -0.0016444
1.5818946   -47.3725382   -47.3725382  C
     0.0000247        58303.   2361646459.     21.6673542      0.0005349     -0.0016870
1.6154579   -48.5997318   -48.5997318  C
     0.0000253        59708.   2358821828.     21.6726012      0.0005486     -0.0017295
1.6486764   -49.8262531   -49.8262531  C
     0.0000259        61110.   2356066660.     21.6784970      0.0005623     -0.0017721
1.6815485   -51.0520963   -51.0520963  C
     0.0000266        62512.   2353375551.     21.6850036      0.0005760     -0.0018146
1.7140725   -52.2772552   -52.2772552  C
     0.0000272        63911.   2350743587.     21.6920868      0.0005898     -0.0018571
1.7462469   -53.5017236   -53.5017236  C
     0.0000278        65308.   2348166289.     21.6997154      0.0006035     -0.0018996
1.7780700   -54.7254954   -54.7254954  C
     0.0000284        66704.   2345639563.     21.7078612      0.0006173     -0.0019421
1.8095401   -55.9485641   -55.9485641  C
     0.0000291        68098.   2343159661.     21.7164985      0.0006311     -0.0019845
1.8406555   -57.1709234   -57.1709234  C
     0.0000297        69490.   2340723143.     21.7256039      0.0006450     -0.0020269
1.8714145   -58.3925665   -58.3925665  C
     0.0000303        70881.   2338326845.     21.7351560      0.0006588     -0.0020693
1.9018153   -59.6134868   -59.6134868  C
     0.0000309        72269.   2335967851.     21.7451354      0.0006727     -0.0021116
1.9318562   -60.0000000   -60.0000000  CY
     0.0000316        73656.   2333643470.     21.7555242      0.0006867     -0.0021540
1.9615354   -60.0000000   -60.0000000  CY
     0.0000322        75037.   2331246262.     21.7659712      0.0007006     -0.0021963
1.9908281   -60.0000000   -60.0000000  CY
     0.0000328        76248.   2323737767.     21.7600823      0.0007140     -0.0022391
2.0186035   -60.0000000   -60.0000000  CY
     0.0000334        77317.   2312276489.     21.7411832      0.0007270     -0.0022824
2.0450747   -60.0000000   -60.0000000  CY
     0.0000341        78255.   2297404505.     21.7107899      0.0007395     -0.0023261
2.0703354   -60.0000000   -60.0000000  CY
     0.0000347        79173.   2282477784.     21.6801244      0.0007520     -0.0023698
2.0951618   -60.0000000   -60.0000000  CY
     0.0000353        80027.   2266243314.     21.6446386      0.0007643     -0.0024138
2.1192372   -60.0000000   -60.0000000  CY
     0.0000359        80752.   2247006216.     21.5981522      0.0007762     -0.0024582
2.1421246   -60.0000000   -60.0000000  CY
     0.0000366        81458.   2227922923.     21.5519406      0.0007880     -0.0025026
2.1646175   -60.0000000   -60.0000000  CY
     0.0000372        82164.   2209456979.     21.5077067      0.0007998     -0.0025471
2.1868418   -60.0000000   -60.0000000  CY
     0.0000397        84561.   2130664263.     21.3070039      0.0008456     -0.0027263
2.2700346   -60.0000000   -60.0000000  CY
     0.0000422        86625.   2053328709.     21.1026543      0.0008903     -0.0029066
2.3467569   -60.0000000   -60.0000000  CY
     0.0000447        88264.   1975147158.     20.8741212      0.0009328     -0.0030891
2.4158176   -60.0000000   -60.0000000  CY
     0.0000472        89695.   1900813375.     20.6534574      0.0009746     -0.0032723
2.4798421   -60.0000000   -60.0000000  CY
     0.0000497        91103.   1833528010.     20.4574169      0.0010165     -0.0034554
2.5403244   -60.0000000   -60.0000000  CY
     0.0000522        92150.   1765745884.     20.2447368      0.0010565     -0.0036404
2.5945775   -60.0000000   -60.0000000  CY
     0.0000547        93080.   1702025800.     20.0307370      0.0010954     -0.0038264
2.6439895   -60.0000000   -60.0000000  CY
     0.0000572        94003.   1643771972.     19.8384418      0.0011345     -0.0040124
2.6903937   -60.0000000   -60.0000000  CY
     0.0000597        94918.   1590250447.     19.6648462      0.0011737     -0.0041981
2.7337281   -60.0000000   -60.0000000  CY
     0.0000622        95667.   1538358532.     19.4885029      0.0012119     -0.0043849
2.7727480   -60.0000000   -60.0000000  CY
     0.0000647        96243.   1487806912.     19.3055115      0.0012488     -0.0045730
2.8074594   -60.0000000   -60.0000000  CY
```

0.0000672	96800.	1440750883.	19.1280481	0.0012852	-0.0047617
2.8388333	-60.0000000	-60.0000000	CY		
0.0000697	97354.	1397008043.	18.9655621	0.0013217	-0.0049502
2.8675395	-60.0000000	-60.0000000	CY		
0.0000722	97903.	1356232896.	18.8165363	0.0013583	-0.0051386
2.8935428	-60.0000000	-60.0000000	CY		
0.0000747	98448.	1318126156.	18.6796580	0.0013951	-0.0053267
2.9168067	-60.0000000	-60.0000000	CY		
0.0000772	98977.	1282298237.	18.5523928	0.0014320	-0.0055149
2.9372366	-60.0000000	-60.0000000	CY		
0.0000797	99384.	1247173503.	18.4166035	0.0014676	-0.0057043
2.9541977	-60.0000000	-60.0000000	CY		
0.0000822	99691.	1212967915.	18.2695301	0.0015015	-0.0058953
2.9678851	-60.0000000	-60.0000000	CY		
0.0000847	99994.	1180743851.	18.1328657	0.0015356	-0.0060862
2.9791939	-60.0000000	-60.0000000	CY		
0.0000872	100294.	1150330073.	18.0057435	0.0015699	-0.0062770
2.9880923	-60.0000000	-60.0000000	CY		
0.0000897	100591.	1121574406.	17.8873942	0.0016043	-0.0064676
2.9945475	-60.0000000	-60.0000000	CY		
0.0000922	100885.	1094341156.	17.7771333	0.0016388	-0.0066580
2.9985257	-60.0000000	-60.0000000	CY		
0.0000947	101174.	1068508939.	17.6743499	0.0016735	-0.0068483
2.9999922	-60.0000000	-60.0000000	CY		
0.0000972	101460.	1043960774.	17.5787291	0.0017084	-0.0070384
2.9964329	-60.0000000	-60.0000000	CY		
0.0000997	101737.	1020554791.	17.4832787	0.0017429	-0.0072290
2.9992820	-60.0000000	-60.0000000	CY		
0.0001022	102007.	998236643.	17.3913340	0.0017772	-0.0074197
2.9988232	-60.0000000	-60.0000000	CY		
0.0001047	102265.	976861179.	17.3040100	0.0018115	-0.0076104
2.9962712	-60.0000000	-60.0000000	CY		
0.0001072	102512.	956376399.	17.2205137	0.0018458	-0.0078011
2.9990606	-60.0000000	-60.0000000	CY		
0.0001097	102678.	936093132.	17.1281349	0.0018787	-0.0079931
2.9999971	-60.0000000	-60.0000000	CY		
0.0001122	102826.	916559315.	17.0390009	0.0019116	-0.0081853
2.9946862	-60.0000000	-60.0000000	CY		
0.0001147	102963.	897772392.	16.9528575	0.0019443	-0.0083776
2.9971280	-60.0000000	-60.0000000	CY		
0.0001172	103099.	879774012.	16.8713209	0.0019771	-0.0085698
2.9992637	-60.0000000	-60.0000000	CY		
0.0001197	103232.	862514505.	16.7941157	0.0020100	-0.0087618
2.9999997	-60.0000000	-60.0000000	CY		
0.0001222	103363.	845937360.	16.7215019	0.0020432	-0.0089537
2.9948675	-60.0000000	-60.0000000	CY		
0.0001247	103492.	830015021.	16.6525711	0.0020764	-0.0091455
2.9956540	-60.0000000	-60.0000000	CY		
0.0001272	103614.	814654702.	16.5792420	0.0021087	-0.0093382
2.9982016	-60.0000000	-60.0000000	CY		
0.0001297	103734.	799876291.	16.5091503	0.0021410	-0.0095308
2.9996453	60.0000000	60.0000000	CY		
0.0001322	103853.	785646764.	16.4425433	0.0021735	-0.0097234
2.9990485	60.0000000	60.0000000	CY		
0.0001347	103969.	771931171.	16.3794964	0.0022061	-0.0099158
2.9943771	60.0000000	60.0000000	CY		
0.0001372	104085.	758709582.	16.3193195	0.0022388	-0.0101081
2.9938720	60.0000000	60.0000000	CY		
0.0001522	104761.	688370686.	16.0120295	0.0024368	-0.0112600
2.9914859	60.0000000	60.0000000	CY		
0.0001672	105343.	630087744.	15.7631929	0.0026354	-0.0124115
2.9950557	60.0000000	60.0000000	CY		
0.0001822	105632.	579798484.	15.4842680	0.0028210	-0.0135758
2.9979900	60.0000000	60.0000000	CY		
0.0001972	105824.	536668812.	15.2782554	0.0030127	-0.0147342
2.9900075	60.0000000	60.0000000	CY		
0.0002122	105989.	499507643.	15.1181708	0.0032079	-0.0158890
2.9973111	60.0000000	60.0000000	CY		
0.0002272	106134.	467166126.	14.9920716	0.0034060	-0.0170409
2.9928405	60.0000000	60.0000000	CY		
0.0002422	106217.	438574683.	14.9139964	0.0036120	-0.0181849
2.9904270	60.0000000	60.0000000	CY		
0.0002572	106291.	413282219.	14.8522929	0.0038198	-0.0193271
2.9998190	60.0000000	60.0000000	CY		

Summary of Results for Nominal (Unfactored) Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load	Axial Thrust	Nominal Mom. Cap.	Max. Comp.

No.	kips	in-kip	Strain
1	52.919	105456.176	0.00300000
2	64.248	105811.654	0.00300000

Note note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318-08, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are spirals or tied hoops.

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318-08, Section 9.3.2.2 or the value required by the design standard being followed.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 31636.000 lbs
Applied moment at pile head = 47587518.000 in-lbs
Axial thrust load on pile head = 64248.000 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. p	Soil Spr. Es*h	Distrib. Lat. Load
inches	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/in	lb/inch	lb/inch
0.00	1.0802	47587518.	31636.	-0.006602	0.000	2.386E+12	0.000		
0.000	0.000								
4.680	1.0495	47737546.	31636.	-0.006508	0.000	2.386E+12	0.000		
0.000	0.000								
9.360	1.0193	47887545.	31636.	-0.006415	0.000	2.386E+12	0.000		
0.000	0.000								
14.040	0.9895	48037516.	31636.	-0.006321	0.000	2.385E+12	0.000		
0.000	0.000								
18.720	0.9601	48187459.	31636.	-0.006226	0.000	2.385E+12	0.000		
0.000	0.000								
23.400	0.9312	48337373.	31636.	-0.006131	0.000	2.384E+12	0.000		
0.000	0.000								
28.080	0.9027	48487259.	31636.	-0.006036	0.000	2.384E+12	0.000		
0.000	0.000								
32.760	0.8747	48637116.	31636.	-0.005941	0.000	2.383E+12	0.000		
0.000	0.000								
37.440	0.8471	48786945.	31636.	-0.005845	0.000	2.383E+12	0.000		
0.000	0.000								
42.120	0.8200	48936744.	31636.	-0.005749	0.000	2.383E+12	0.000		
0.000	0.000								
46.800	0.7933	49086515.	31636.	-0.005653	0.000	2.382E+12	0.000		
0.000	0.000								
51.480	0.7671	49236257.	31630.	-0.005557	0.000	2.382E+12	-2.6694		
16.2864	0.000								
56.160	0.7413	49385911.	31609.	-0.005460	0.000	2.382E+12	-6.0490		
38.1888	0.000								
60.840	0.7160	49535404.	31137.	-0.005362	0.000	2.381E+12	-195.9843		
1281.0612	0.000								
65.520	0.6911	49680574.	30041.	-0.005265	0.000	2.381E+12	-272.1646		
1843.0330	0.000								
70.200	0.6667	49819755.	28607.	-0.005167	0.000	2.380E+12	-340.5544		
2390.5930	0.000								
74.880	0.6427	49951447.	26866.	-0.005069	0.000	2.380E+12	-403.5196		
2938.1530	0.000								
79.560	0.6192	50074271.	24843.	-0.004971	0.000	2.380E+12	-461.2223		
3485.7130	0.000								
84.240	0.5962	50186964.	22561.	-0.004872	0.000	2.380E+12	-513.8246		
4033.2730	0.000								
88.920	0.5736	50288373.	20045.	-0.004773	0.000	2.379E+12	-561.4895		
4580.8330	0.000								
93.600	0.5515	50377454.	17317.	-0.004674	0.000	2.379E+12	-604.3802		
5128.3930	0.000								
98.280	0.5299	50453269.	14399.	-0.004575	0.000	2.379E+12	-642.6601		
5675.9530	0.000								
102.960	0.5087	50514977.	11312.	-0.004476	0.000	2.379E+12	-676.4931		
6223.5130	0.000								
107.640	0.4880	50561839.	8076.7275	-0.004376	0.000	2.379E+12	-706.0430		

6771.0730	0.000						
112.320	0.4678	50593207.	4712.9379	-0.004277	0.000	2.379E+12	-731.4739
7318.6330	0.000						
117.000	0.4480	50608524.	1239.3868	-0.004177	0.000	2.379E+12	-752.9496
7866.1930	0.000						
121.680	0.4287	50607320.	-2325.7987	-0.004078	0.000	2.379E+12	-770.6339
8413.7530	0.000						
126.360	0.4098	50589207.	-5965.2578	-0.003978	0.000	2.379E+12	-784.6905
8961.3130	0.000						
131.040	0.3914	50553878.	-9662.3942	-0.003879	0.000	2.379E+12	-795.2824
9508.8730	0.000						
135.720	0.3735	50501100.	-14008.	-0.003779	0.000	2.379E+12	-1061.7359
13304.	0.000						
140.400	0.3560	50425037.	-18997.	-0.003680	0.000	2.379E+12	-1070.4377
14070.	0.000						
145.080	0.3391	50325500.	-24017.	-0.003581	0.000	2.379E+12	-1074.8931
14837.	0.000						
149.760	0.3225	50202390.	-29049.	-0.003482	0.000	2.380E+12	-1075.3272
15604.	0.000						
154.440	0.3065	50055698.	-34073.	-0.003383	0.000	2.380E+12	-1071.9633
16370.	0.000						
159.120	0.2909	49885498.	-39074.	-0.003285	0.000	2.380E+12	-1065.0234
17137.	0.000						
163.800	0.2757	49691942.	-44034.	-0.003187	0.000	2.381E+12	-1054.7275
17903.	0.000						
168.480	0.2610	49475255.	-48939.	-0.003090	0.000	2.381E+12	-1041.2937
18670.	0.000						
173.160	0.2468	49235733.	-53774.	-0.002993	0.000	2.382E+12	-1024.9380
19436.	0.000						
177.840	0.2330	48973732.	-58526.	-0.002896	0.000	2.383E+12	-1005.8739
20203.	0.000						
182.520	0.2197	48689672.	-63183.	-0.002801	0.000	2.383E+12	-984.3127
20970.	0.000						
187.200	0.2068	48384024.	-67734.	-0.002705	0.000	2.384E+12	-960.4628
21736.	0.000						
191.880	0.1944	48057311.	-72168.	-0.002611	0.000	2.385E+12	-934.5298
22503.	0.000						
196.560	0.1824	47710102.	-79951.	-0.002517	0.000	2.386E+12	-2391.5745
61376.	0.000						
201.240	0.1708	47310483.	-91203.	-0.002423	0.000	2.387E+12	-2416.9400
66224.	0.000						
205.920	0.1597	46857899.	-102574.	-0.002331	0.000	2.388E+12	-2442.5471
71589.	0.000						
210.600	0.1490	46351790.	-114050.	-0.002240	0.000	2.389E+12	-2461.4999
77323.	0.000						
215.280	0.1387	45791741.	-125598.	-0.002150	0.000	2.391E+12	-2473.6418
83458.	0.000						
219.960	0.1289	45177487.	-136997.	-0.002061	0.000	2.393E+12	-2397.5830
87075.	0.000						
224.640	0.1194	44510693.	-147963.	-0.001973	0.000	2.394E+12	-2289.0718
89703.	0.000						
229.320	0.1104	43793736.	-158416.	-0.001887	0.000	2.396E+12	-2177.9936
92332.	0.000						
234.000	0.1018	43029051.	-168345.	-0.001802	0.000	2.399E+12	-2064.8946
94960.	0.000						
238.680	0.0935	42219114.	-177740.	-0.001719	0.000	2.401E+12	-1950.2955
97588.	0.000						
243.360	0.0857	41366437.	-186597.	-0.001637	0.000	2.404E+12	-1834.6915
100216.	0.000						
248.040	0.0782	40473551.	-194912.	-0.001558	0.000	2.407E+12	-1718.5515
102845.	0.000						
252.720	0.0711	39543001.	-202682.	-0.001480	0.000	2.410E+12	-1602.3171
105473.	0.000						
257.400	0.0644	38577333.	-209910.	-0.001404	0.000	2.413E+12	-1486.4028
108101.	0.000						
262.080	0.0580	37579087.	-216597.	-0.001330	0.000	2.417E+12	-1371.1949
110730.	0.000						
266.760	0.0519	36550787.	-222747.	-0.001259	0.000	2.421E+12	-1257.0517
113358.	0.000						
271.440	0.0462	35494932.	-228366.	-0.001189	0.000	2.425E+12	-1144.3030
115986.	0.000						
276.120	0.0408	34413995.	-233462.	-0.001122	0.000	2.429E+12	-1033.2499
118614.	0.000						
280.800	0.0357	33310407.	-238042.	-0.001057	0.000	2.434E+12	-924.1651
121243.	0.000						
285.480	0.0309	32186558.	-242117.	-0.000994	0.000	2.442E+12	-817.2923
123871.	0.000						
290.160	0.0264	31044790.	-245697.	-0.000957	0.000	1.222E+13	-712.8364
126499.	0.000						
294.840	0.0219	29887405.	-248781.	-0.000945	0.000	1.257E+13	-604.8544
129128.	0.000						
299.520	0.0175	28716769.	-251351.	-0.000934	0.000	1.258E+13	-493.3404
131756.	0.000						
304.200	0.0132	27535325.	-253390.	-0.000924	0.000	1.259E+13	-378.3223

134384.	0.000						
308.880	0.008875	26345592.	-254884.	-0.000914	0.000	1.260E+13	-259.8229
137012.	0.000						
313.560	0.004620	25150165.	-255814.	-0.000904	0.000	1.261E+13	-137.8601
139641.	0.000						
318.240	0.000409	23951715.	-256166.	-0.000895	0.000	1.262E+13	-12.4468
142269.	0.000						
322.920	-0.003760	22752991.	-255923.	-0.000887	0.000	1.263E+13	116.4090
144897.	0.000						
327.600	-0.007890	21556813.	-255068.	-0.000878	0.000	1.264E+13	248.7038
147526.	0.000						
332.280	-0.0120	20366080.	-253587.	-0.000871	0.000	1.265E+13	384.4387
150154.	0.000						
336.960	-0.0160	19183765.	-251462.	-0.000863	0.000	1.266E+13	523.6190
152782.	0.000						
341.640	-0.0201	18012917.	-248678.	-0.000857	0.000	1.267E+13	666.2543
155410.	0.000						
346.320	-0.0241	16856659.	-245218.	-0.000850	0.000	1.268E+13	812.3578
158039.	0.000						
351.000	-0.0280	15718192.	-241066.	-0.000844	0.000	1.269E+13	961.9464
160667.	0.000						
355.680	-0.0320	14600792.	-236206.	-0.000838	0.000	1.270E+13	1115.0406
163295.	0.000						
360.360	-0.0359	13507812.	-230621.	-0.000833	0.000	1.271E+13	1271.6635
165924.	0.000						
365.040	-0.0398	12442683.	-224294.	-0.000829	0.000	1.272E+13	1431.8413
168552.	0.000						
369.720	-0.0436	11408914.	-217210.	-0.000824	0.000	1.273E+13	1595.6026
171180.	0.000						
374.400	-0.0475	10410091.	-209351.	-0.000820	0.000	1.273E+13	1762.9777
173808.	0.000						
379.080	-0.0513	9449880.	-200700.	-0.000816	0.000	1.274E+13	1933.9988
176437.	0.000						
383.760	-0.0551	8532028.	-191488.	-0.000813	0.000	1.275E+13	2002.8361
170075.	0.000						
388.440	-0.0589	7658041.	-182051.	-0.000810	0.000	1.276E+13	2030.1632
161281.	0.000						
393.120	-0.0627	6828519.	-172496.	-0.000808	0.000	1.276E+13	2052.8822
153239.	0.000						
397.800	-0.0665	6043960.	-162846.	-0.000805	0.000	1.277E+13	2071.1754
145828.	0.000						
402.480	-0.0702	5304763.	-153120.	-0.000803	0.000	1.277E+13	2085.1935
138949.	0.000						
407.160	-0.0740	4611237.	-143338.	-0.000801	0.000	1.278E+13	2095.0640
132523.	0.000						
411.840	-0.0777	3963597.	-133520.	-0.000800	0.000	1.279E+13	2100.8957
126488.	0.000						
416.520	-0.0815	3361971.	-123683.	-0.000798	0.000	1.279E+13	2102.7841
120791.	0.000						
421.200	-0.0852	2806401.	-113847.	-0.000797	0.000	1.279E+13	2100.8139
115390.	0.000						
425.880	-0.0889	2296843.	-103988.	-0.000796	0.000	1.279E+13	2112.6007
111172.	0.000						
430.560	-0.0927	1833556.	-93918.	-0.000796	0.000	1.279E+13	2190.4474
110635.	0.000						
435.240	-0.0964	1418246.	-83484.	-0.000795	0.000	1.279E+13	2268.7937
110167.	0.000						
439.920	-0.1001	1052626.	-72681.	-0.000795	0.000	1.279E+13	2347.6575
109761.	0.000						
444.600	-0.1038	738427.	-61508.	-0.000794	0.000	1.279E+13	2427.0531
109410.	0.000						
449.280	-0.1075	477385.	-49963.	-0.000794	0.000	1.279E+13	2506.9921
109108.	0.000						
453.960	-0.1112	271252.	-38042.	-0.000794	0.000	1.279E+13	2587.4829
108850.	0.000						
458.640	-0.1150	121792.	-25743.	-0.000794	0.000	1.279E+13	2668.5316
108632.	0.000						
463.320	-0.1187	30779.	-13063.	-0.000794	0.000	1.279E+13	2750.1416
108450.	0.000						
468.000	-0.1224	0.000	0.000	-0.000794	0.000	1.279E+13	2832.3139
54150.	0.000						

* This analysis makes computations of pile response using nonlinear moment-curvature relationships.
  The above values of total stress are computed for combined axial and bending stress in elastic sections and do not equal actual stresses in concrete and steel in the range of nonlinear bending.

Output Verification: Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

Pile-head deflection = 1.0801992 inches
Computed slope at pile head = -0.0066020 radians
Maximum bending moment = 50608524. inch-lbs
Maximum shear force = -256166. lbs
Depth of maximum bending moment = 117.0000000 inches below pile head
Depth of maximum shear force = 318.2400000 inches below pile head
Number of iterations = 48
Number of zero deflection points = 1

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 36055.000 lbs
Applied moment at pile head = 52773727.000 in-lbs
Axial thrust load on pile head = 52919.000 lbs

Depth X inches	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	1.2400	52773727.	36055.	-0.007510	0.000	2.361E+12	0.000	0.000	0.000
4.680	1.2051	52944311.	36055.	-0.007405	0.000	2.361E+12	0.000	0.000	0.000
9.360	1.1707	53114870.	36055.	-0.007300	0.000	2.361E+12	0.000	0.000	0.000
14.040	1.1368	53285402.	36055.	-0.007195	0.000	2.360E+12	0.000	0.000	0.000
18.720	1.1034	53455908.	36055.	-0.007089	0.000	2.360E+12	0.000	0.000	0.000
23.400	1.0705	53626388.	36055.	-0.006983	0.000	2.359E+12	0.000	0.000	0.000
28.080	1.0380	53796842.	36055.	-0.006876	0.000	2.359E+12	0.000	0.000	0.000
32.760	1.0061	53967269.	36055.	-0.006769	0.000	2.359E+12	0.000	0.000	0.000
37.440	0.9747	54137669.	36055.	-0.006662	0.000	2.358E+12	0.000	0.000	0.000
42.120	0.9437	54308043.	36055.	-0.006554	0.000	2.358E+12	0.000	0.000	0.000
46.800	0.9133	54478391.	36055.	-0.006446	0.000	2.358E+12	0.000	0.000	0.000
51.480	0.8834	54648711.	36048.	-0.006338	0.000	2.357E+12	-3.0742	16.2864	0.000
56.160	0.8540	54818937.	36024.	-0.006229	0.000	2.357E+12	-6.9686	38.1888	0.000
60.840	0.8251	54988984.	35532.	-0.006120	0.000	2.357E+12	-203.4551	1154.0128	0.000
65.520	0.7967	55154548.	34372.	-0.006011	0.000	2.356E+12	-292.2137	1716.5152	0.000
70.200	0.7688	55313684.	32795.	-0.005901	0.000	2.356E+12	-381.9208	2324.8095	0.000
74.880	0.7415	55464428.	30812.	-0.005791	0.000	2.356E+12	-465.5039	2938.1530	0.000
79.560	0.7146	55604949.	28477.	-0.005681	0.000	2.356E+12	-532.2618	3485.7130	0.000
84.240	0.6883	55733785.	25843.	-0.005570	0.000	2.355E+12	-593.1836	4033.2730	0.000
88.920	0.6625	55849601.	22938.	-0.005459	0.000	2.355E+12	-648.4519	4580.8330	0.000
93.600	0.6372	55951187.	19787.	-0.005348	0.000	2.355E+12	-698.2500	5128.3930	0.000
98.280	0.6124	56037453.	16415.	-0.005237	0.000	2.355E+12	-742.7613	5675.9530	0.000
102.960	0.5882	56107422.	12846.	-0.005126	0.000	2.355E+12	-782.1696	6223.5130	0.000
107.640	0.5645	56160232.	9105.0142	-0.005014	0.000	2.355E+12	-816.6588	6771.0730	0.000
112.320	0.5413	56195128.	5213.4260	-0.004902	0.000	2.354E+12	-846.4130	7318.6330	0.000
117.000	0.5186	56211458.	1193.2380	-0.004791	0.000	2.354E+12	-871.6160	7866.1930	0.000
121.680	0.4964	56208670.	-2934.6805	-0.004679	0.000	2.354E+12	-892.4517	8413.7530	0.000

126.360	0.4748	56186307.	-7150.3198	-0.004567	0.000	2.354E+12	-909.1035
8961.3130	0.000						
131.040	0.4537	56144005.	-11435.	-0.004456	0.000	2.355E+12	-921.7546
9508.8730	0.000						
135.720	0.4331	56081487.	-16472.	-0.004344	0.000	2.355E+12	-1231.0890
13304.	0.000						
140.400	0.4130	55991977.	-22258.	-0.004233	0.000	2.355E+12	-1241.6884
14070.	0.000						
145.080	0.3935	55875244.	-28083.	-0.004121	0.000	2.355E+12	-1247.3642
14837.	0.000						
149.760	0.3744	55731163.	-33923.	-0.004011	0.000	2.355E+12	-1248.3685
15604.	0.000						
154.440	0.3559	55559713.	-39757.	-0.003900	0.000	2.356E+12	-1244.9519
16370.	0.000						
159.120	0.3379	55360967.	-45566.	-0.003790	0.000	2.356E+12	-1237.3628
17137.	0.000						
163.800	0.3204	55135093.	-51330.	-0.003680	0.000	2.356E+12	-1225.8477
17903.	0.000						
168.480	0.3035	54882343.	-57031.	-0.003571	0.000	2.357E+12	-1210.6508
18670.	0.000						
173.160	0.2870	54603050.	-62653.	-0.003462	0.000	2.358E+12	-1192.0137
19436.	0.000						
177.840	0.2711	54297622.	-68181.	-0.003354	0.000	2.358E+12	-1170.1752
20203.	0.000						
182.520	0.2556	53966538.	-73599.	-0.003247	0.000	2.359E+12	-1145.3715
20970.	0.000						
187.200	0.2407	53610341.	-78895.	-0.003140	0.000	2.359E+12	-1117.8354
21736.	0.000						
191.880	0.2262	53229634.	-84056.	-0.003034	0.000	2.360E+12	-1087.7965
22503.	0.000						
196.560	0.2123	52825076.	-92466.	-0.002929	0.000	2.361E+12	-2505.9855
55248.	0.000						
201.240	0.1988	52365604.	-104257.	-0.002825	0.000	2.362E+12	-2533.1437
59628.	0.000						
205.920	0.1858	51850625.	-116177.	-0.002721	0.000	2.363E+12	-2560.5155
64481.	0.000						
210.600	0.1733	51279540.	-128207.	-0.002619	0.000	2.364E+12	-2580.8361
69678.	0.000						
215.280	0.1613	50651902.	-140316.	-0.002518	0.000	2.365E+12	-2593.9121
75249.	0.000						
219.960	0.1498	49967427.	-152469.	-0.002419	0.000	2.367E+12	-2599.5637
81230.	0.000						
224.640	0.1387	49225991.	-164630.	-0.002321	0.000	2.369E+12	-2597.6231
87660.	0.000						
229.320	0.1280	48427636.	-176620.	-0.002225	0.000	2.370E+12	-2526.2612
92332.	0.000						
234.000	0.1179	47573927.	-188128.	-0.002130	0.000	2.372E+12	-2391.4728
94960.	0.000						
238.680	0.1081	46667815.	-198999.	-0.002037	0.000	2.374E+12	-2254.4016
97588.	0.000						
243.360	0.0988	45712304.	-209225.	-0.001946	0.000	2.377E+12	-2115.6002
100216.	0.000						
248.040	0.0899	44710433.	-218798.	-0.001857	0.000	2.379E+12	-1975.5917
102845.	0.000						
252.720	0.0814	43665271.	-227715.	-0.001770	0.000	2.382E+12	-1834.8683
105473.	0.000						
257.400	0.0733	42579899.	-235972.	-0.001685	0.000	2.384E+12	-1693.8910
108101.	0.000						
262.080	0.0656	41457407.	-243570.	-0.001603	0.000	2.387E+12	-1553.0895
110730.	0.000						
266.760	0.0583	40300878.	-250510.	-0.001523	0.000	2.391E+12	-1412.8614
113358.	0.000						
271.440	0.0514	39113384.	-256797.	-0.001445	0.000	2.394E+12	-1273.5723
115986.	0.000						
276.120	0.0448	37897977.	-262434.	-0.001370	0.000	2.398E+12	-1135.5557
118614.	0.000						
280.800	0.0386	36657681.	-267429.	-0.001297	0.000	2.402E+12	-999.1126
121243.	0.000						
285.480	0.0327	35395483.	-271790.	-0.001227	0.000	2.406E+12	-864.5119
123871.	0.000						
290.160	0.0271	34114334.	-275526.	-0.001159	0.000	2.410E+12	-731.9905
126499.	0.000						
294.840	0.0218	32817136.	-278647.	-0.001095	0.000	2.415E+12	-601.7536
129128.	0.000						
299.520	0.0168	31506743.	-281164.	-0.001052	0.000	6.862E+12	-473.9747
131756.	0.000						
304.200	0.0120	30185963.	-283077.	-0.001036	0.000	1.256E+13	-343.4968
134384.	0.000						
308.880	0.007142	28857657.	-284370.	-0.001025	0.000	1.257E+13	-209.0859
137012.	0.000						
313.560	0.002372	27524768.	-285025.	-0.001014	0.000	1.259E+13	-70.7603
139641.	0.000						
318.240	-0.002351	26190327.	-285023.	-0.001004	0.000	1.260E+13	71.4674
142269.	0.000						

322.920	-0.007028	24857450.	-284347.	-0.000995	0.000	1.261E+13	217.5897
144897.	0.000						
327.600	-0.0117	23529335.	-282977.	-0.000986	0.000	1.262E+13	367.6042
147526.	0.000						
332.280	-0.0163	22209270.	-280897.	-0.000977	0.000	1.263E+13	521.5133
150154.	0.000						
336.960	-0.0208	20900625.	-278087.	-0.000969	0.000	1.264E+13	679.3242
152782.	0.000						
341.640	-0.0253	19606858.	-274529.	-0.000962	0.000	1.266E+13	841.0484
155410.	0.000						
346.320	-0.0298	18331509.	-270205.	-0.000955	0.000	1.267E+13	1006.7016
158039.	0.000						
351.000	-0.0343	17078208.	-265097.	-0.000948	0.000	1.268E+13	1176.3035
160667.	0.000						
355.680	-0.0387	15850669.	-259186.	-0.000942	0.000	1.269E+13	1349.8769
163295.	0.000						
360.360	-0.0431	14652694.	-252453.	-0.000937	0.000	1.270E+13	1527.4484
165924.	0.000						
365.040	-0.0475	13488173.	-244880.	-0.000931	0.000	1.271E+13	1709.0470
168552.	0.000						
369.720	-0.0518	12361082.	-236447.	-0.000927	0.000	1.272E+13	1894.7041
171180.	0.000						
374.400	-0.0561	11275490.	-227136.	-0.000922	0.000	1.273E+13	2084.4534
173808.	0.000						
379.080	-0.0604	10235550.	-217283.	-0.000918	0.000	1.273E+13	2126.0599
164645.	0.000						
383.760	-0.0647	9242176.	-207252.	-0.000915	0.000	1.274E+13	2160.5453
156228.	0.000						
388.440	-0.0690	8296122.	-197072.	-0.000912	0.000	1.275E+13	2190.2257
148566.	0.000						
393.120	-0.0733	7398038.	-186763.	-0.000909	0.000	1.276E+13	2215.2963
141530.	0.000						
397.800	-0.0775	6548474.	-176347.	-0.000906	0.000	1.276E+13	2235.9162
135021.	0.000						
402.480	-0.0817	5747881.	-165845.	-0.000904	0.000	1.277E+13	2252.2163
128959.	0.000						
407.160	-0.0860	4996617.	-155276.	-0.000902	0.000	1.278E+13	2264.3062
123278.	0.000						
411.840	-0.0902	4294945.	-144660.	-0.000900	0.000	1.279E+13	2272.2790
117928.	0.000						
416.520	-0.0944	3643042.	-134017.	-0.000899	0.000	1.279E+13	2276.2153
112864.	0.000						
421.200	-0.0986	3040993.	-123364.	-0.000897	0.000	1.279E+13	2276.1862
108051.	0.000						
425.880	-0.1028	2488798.	-112678.	-0.000896	0.000	1.279E+13	2290.6569
104298.	0.000						
430.560	-0.1070	1986774.	-101761.	-0.000896	0.000	1.279E+13	2374.5115
103878.	0.000						
435.240	-0.1112	1536757.	-90451.	-0.000895	0.000	1.279E+13	2458.9742
103518.	0.000						
439.920	-0.1154	1140597.	-78744.	-0.000895	0.000	1.279E+13	2544.0626
103213.	0.000						
444.600	-0.1195	800158.	-66637.	-0.000894	0.000	1.279E+13	2629.7913
102955.	0.000						
449.280	-0.1237	517317.	-54127.	-0.000894	0.000	1.279E+13	2716.1717
102741.	0.000						
453.960	-0.1279	293968.	-41212.	-0.000894	0.000	1.279E+13	2803.2125
102566.	0.000						
458.640	-0.1321	132015.	-27888.	-0.000894	0.000	1.279E+13	2890.9198
102426.	0.000						
463.320	-0.1363	33381.	-14151.	-0.000894	0.000	1.279E+13	2979.2973
102317.	0.000						
468.000	-0.1405	0.000	0.000	-0.000894	0.000	1.279E+13	3068.3462
51119.	0.000						

* This analysis makes computations of pile response using nonlinear moment-curvature relationships.
  The above values of total stress are computed for combined axial and bending stress in elastic sections and do not equal actual stresses in concrete and steel in the range of nonlinear bending.

Output Verification: Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 2:

Pile-head deflection	=	1.2400329 inches
Computed slope at pile head	=	-0.0075100 radians
Maximum bending moment	=	56211458. inch-lbs
Maximum shear force	=	-285025. lbs
Depth of maximum bending moment	=	117.0000000 inches below pile head
Depth of maximum shear force	=	313.5600000 inches below pile head
Number of iterations	=	31

Number of zero deflection points = 1

Summary of Pile Response(s)

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, lbs, and Load 2 = Moment, in-lbs
Load Type 2: Load 1 = Shear, lbs, and Load 2 = Slope, radians
Load Type 3: Load 1 = Shear, lbs, and Load 2 = Rotational Stiffness, in-lbs/radian
Load Type 4: Load 1 = Top Deflection, inches, and Load 2 = Moment, in-lbs
Load Type 5: Load 1 = Top Deflection, inches, and Load 2 = Slope, radians

Load Case No.	Load Type No.	Pile-head Condition 1 V(lbs) or y(inches)	Pile-head Condition 2 in-lb, rad., or in-lb/rad.	Axial Loading lbs	Pile-head Deflection inches	Maximum Moment in-lbs	Maximum Pile-head Shear lbs	Pile-head Rotation radians
1	1	V = 31636.	M = 47587518.	64248.	1.08019920	50608524.	-256166.	-0.00660195
2	1	V = 36055.	M = 52773727.	52919.	1.24003285	56211458.	-285025.	-0.00750996

The analysis ended normally.