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

January 28, 2014

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

Re: **Notice of Exempt Modification – Antenna Swap**
21-35 East Main Street (a/k/a 1 Central Square), Plainville, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the top of the existing 85-foot tower at the above-referenced address. The tower and underlying property are owned by the Town of Plainville. The Council approved Cellco's shared use of this tower in 2004. Cellco now intends to replace six (6) of its existing antennas with three (3) model BXA-70063-4CF 850 MHz antennas and three (3) model BXA-171063-12CF 2100 MHz antennas, at the same level on the tower. Cellco also intends to install three (3) remote radio heads ("RRHs") behind its 2100 MHz antennas and one (1) HYBRIFLEX™ antenna cable. Included in Attachment 1 are specifications for Cellco's 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 Katherine M. Pugliese, Chairwoman of the Plainville Town Council and Robert E. Lee, Plainville Town Manager for the Town of Plainville.

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. The replaced antennas and RRHs will be located on Cellco's existing platform at the top level of the 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. Far Field Approximation tables for each of Cellco's operating frequencies are included behind Attachment 2. The Far Field calculations demonstrate that Cellco's modified facility will operate well within the RF emissions limits established by the FCC.

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 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:
Katherine M. Pugliese, Chairwoman, Town Council
Robert E. Lee, Town Manager
Sandy M. Carter

ATTACHMENT 1

Amphenol ANTENNA SOLUTIONS

BXA-70063-4CF-EDIN-X

X-Pol | FET Panel | 63° | 13.0 dBd

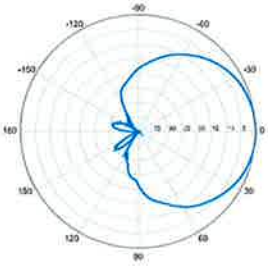
Replace "X" with desired electrical downtilt.

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

Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	65°	63°
Vertical beamwidth	17°	15°
Gain	12.5 dBd (14.6 dBi)	13.0 dBd (15.1 dBi)
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 9, 10, 12, 14	
Impedance	50Ω	
VSWR	≤1.35:1	
Upper sidelobe suppression (0°)	-16.3 dB	-22.1 dB
Front-to-back ratio (+/-30°)	-36.1 dB	-34.9 dB
Null fill	5% (-26.02 dB)	
Isolation between ports	< -25 dB	
Input power with EDIN connectors	500 W	
Input power with NE connectors	300 W	
Lightning protection	Direct Ground	
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)	
Mechanical Characteristics		
Dimensions Length x Width x Depth	1205 x 285 x 133 mm	47.4 x 11.2 x 5.2 in
Depth with z-brackets	173 mm	6.8 in
Weight without mounting brackets	4.5 kg	9.9 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.34 m² Side: 0.16 m²	Front: 3.7 ft² Side: 1.7 ft²
Wind load @ 161 km/hr (100 mph)	Front: 498 N Side: 260 N	Front: 111 lbf Side: 55 lbf

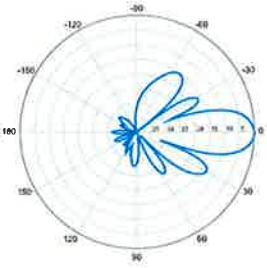
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting & Downtilt Bracket Kit	36210006	40-115 mm 1.57-4.5 in	4.1 kg 9 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-4CF-EDIN-X-FP		

BXA-70063-4CF-EDIN-X



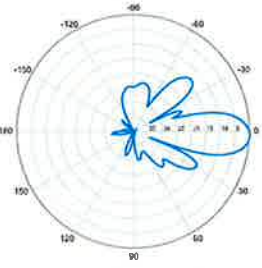
Horizontal | 750 MHz

BXA-70063-4CF-EDIN-0



0° | Vertical | 750 MHz

BXA-70063-4CF-EDIN-2

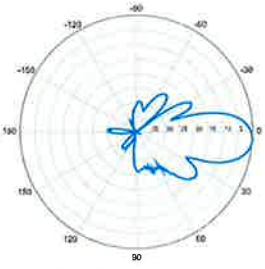


2° | Vertical | 750 MHz

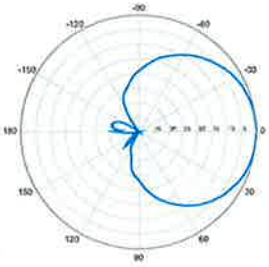
BXA-70063-4CF-EDIN-3

3° | Vertical | 750 MHz

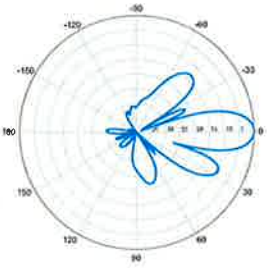
BXA-70063-4CF-EDIN-4



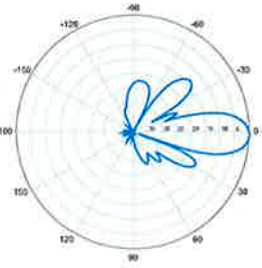
4° | Vertical | 750 MHz



Horizontal | 850 MHz

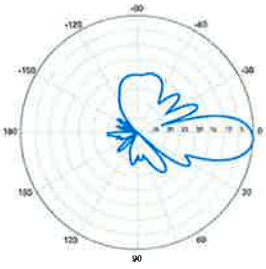


0° | Vertical | 850 MHz



2° | Vertical | 850 MHz

3° | Vertical | 850 MHz

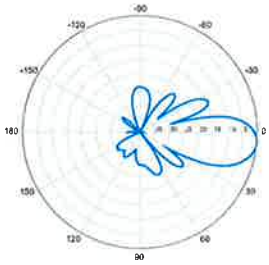


4° | Vertical | 850 MHz

BXA-70063-4CF-EDIN-X

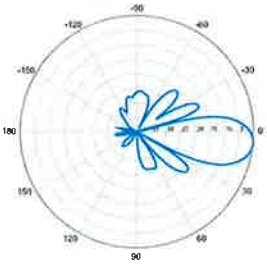
X-Pol | FET Panel | 63° | 13.0 dBd

BXA-70063-4CF-EDIN-5



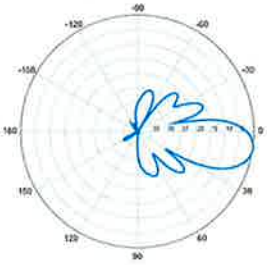
5° | Vertical | 750 MHz

BXA-70063-4CF-EDIN-6



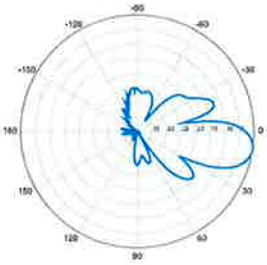
6° | Vertical | 750 MHz

BXA-70063-4CF-EDIN-8



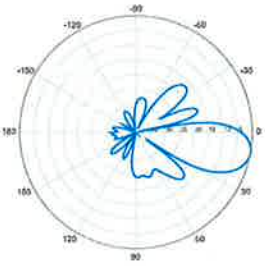
8° | Vertical | 750 MHz

BXA-70063-4CF-EDIN-9

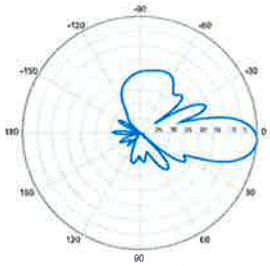


9° | Vertical | 750 MHz

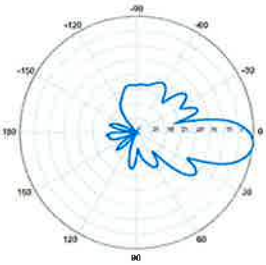
BXA-70063-4CF-EDIN-10



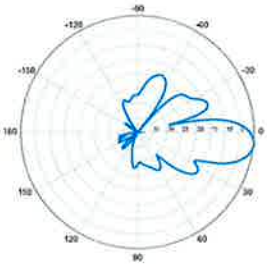
10° | Vertical | 750 MHz



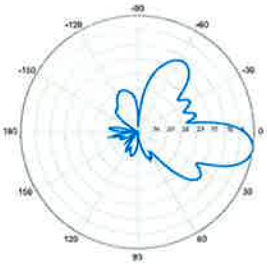
5° | Vertical | 850 MHz



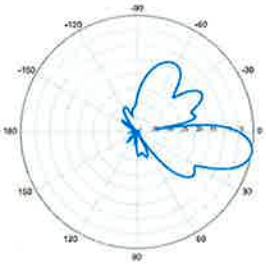
6° | Vertical | 850 MHz



8° | Vertical | 850 MHz

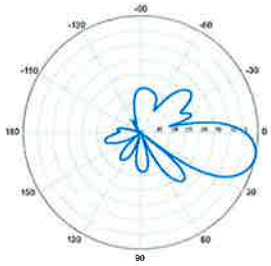


9° | Vertical | 850 MHz



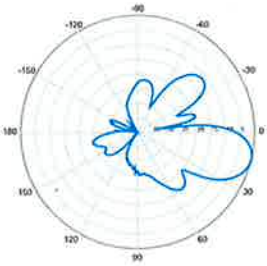
10° | Vertical | 850 MHz

BXA-70063-4CF-EDIN-12

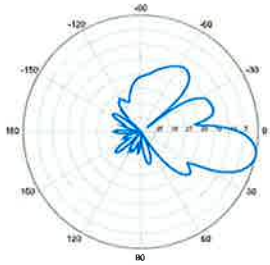


12° | Vertical | 750 MHz

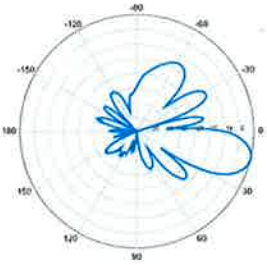
BXA-70063-4CF-EDIN-14



14° | Vertical | 750 MHz



12° | Vertical | 850 MHz



14° | Vertical | 850 MHz

BXA-171063-12CF-EDIN-X

X-Pol | FET Panel | 63° | 19.0 dBi

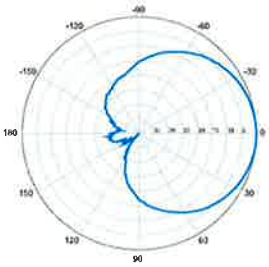
Replace "X" with desired electrical downtilt.

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

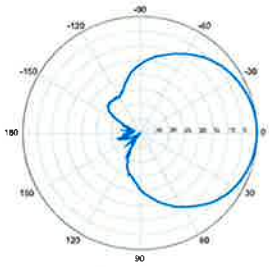
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171063-12CF-EDIN-X-FP		

BXA-171063-12CF-EDIN-X



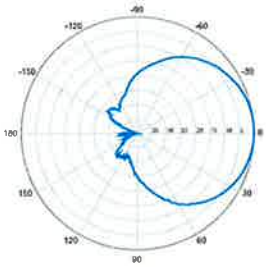
Horizontal | 1710-1880 MHz

BXA-171063-12CF-EDIN-X



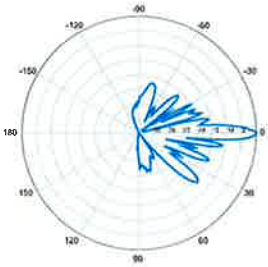
Horizontal | 1850-1990 MHz

BXA-171063-12CF-EDIN-X



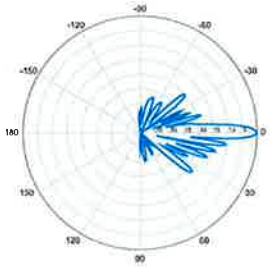
Horizontal | 1920-2170 MHz

BXA-171063-12CF-EDIN-0



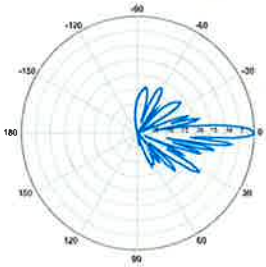
0° | Vertical | 1710-1880 MHz

BXA-171063-12CF-EDIN-0



0° | Vertical | 1850-1990 MHz

BXA-171063-12CF-EDIN-0

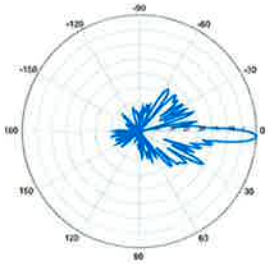


0° | Vertical | 1920-2170 MHz

BXA-171063-12CF-EDIN-X

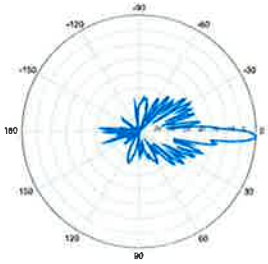
X-Pol | FET Panel | 63° | 19.0 dBi

BXA-171063-12CF-EDIN-2



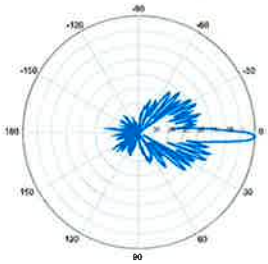
2° | Vertical | 1710-1880 MHz

BXA-171063-12CF-EDIN-2



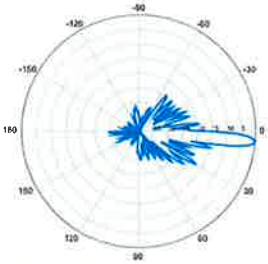
2° | Vertical | 1850-1990 MHz

BXA-171063-12CF-EDIN-2



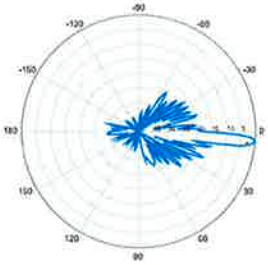
2° | Vertical | 1920-2170 MHz

BXA-171063-12CF-EDIN-5



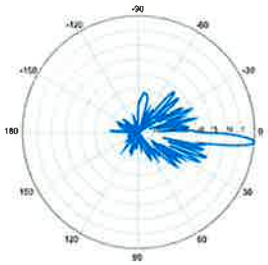
5° | Vertical | 1710-1880 MHz

BXA-171063-12CF-EDIN-5



5° | Vertical | 1850-1990 MHz

BXA-171063-12CF-EDIN-5

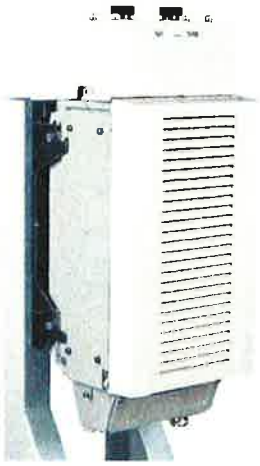


5° | Vertical | 1920-2170 MHz

Alcatel-Lucent RRH2x40-AWS

REMOTE RADIO HEAD

The Alcatel-Lucent RRH2x40-AWS is a high-power, small form-factor Remote Radio Head (RRH) operating in the AWS frequency band (1700/2100MHz - 3GPP Band 4). The Alcatel-Lucent RRH2x40-AWS 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-AWS 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-AWS has two transmit RF paths, 40 W RF output power per transmit path, and is designed to manage up to four-way receive diversity. The device is ideally suited to support macro coverage, with multiple-input multiple-output (MIMO) 2x2 operation in up to 20 MHz of bandwidth.

The Alcatel-Lucent RRH2x40-AWS 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-AWS 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-AWS 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-AWS is compact and weighs less than 20 kg (44 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

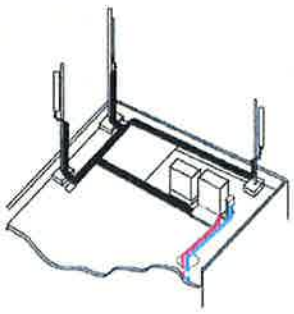
Because of its small size and weight, the Alcatel-Lucent RRH2x40-AWS can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-AWS where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and installation 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-AWS provides more RF power while at the same time consuming less electricity.

Features

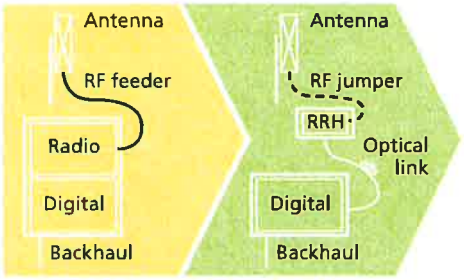
- Zero-footprint deployment
- Easy installation, with a lightweight unit can be carried and set up by one person
- Optimized RF power, with flexible site selection and elimination of a TMA
- Convection-cooled (fanless)
- Noise-free
- Best-in-class power efficiency, with significantly reduced energy consumption

Benefits

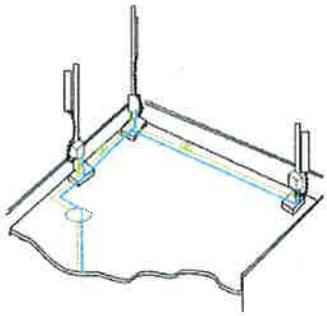
- Leverages existing real estate with lower site costs
- Reduces installation costs, with fewer installation materials and simplified logistics
- Decreases power costs and minimizes environmental impacts, with the potential for eco-sustainable power options
- Improves RF performance and adds flexibility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



Macro



RRH for space-constrained cell sites



Distributed

Technical specifications

Physical dimensions

- Height: 620 mm (24.4 in.)
- Width: 270 mm (10.63 in.)
- Depth: 170m (6.7 in.)
- Weight (without mounting kit): less than 20 kg (44 lb)

Power

- Power supply: -48VDC

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: 1700/2100 MHz (AWS); 3GPP Band 4
- Bandwidth: up to 20 MHz
- RF output power at antenna port: 40 W nominal RF power for each Tx port
- Rx diversity: 2-way or 4-way with optional Rx Diversity module
- Noise figure: below 2.0 dB typical
- Antenna Line Device features
  - ¬ TMA and Remote electrical tilt (RET) support via AISG v2.0

Optical characteristics

Type/number of fibers

- Single-mode variant
  - ¬ One Single Mode Single Fiber per RRH2x, carrying UL and DL using CWDM
  - ¬ Single mode dual fiber (SM/DF)
- Multi-mode variant
  - ¬ Two Multi-mode fibers per RRH2x: one carrying UL, the other carrying DL

Optical fiber length

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

Digital Ports and Alarms

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

CPG2809100912 (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)

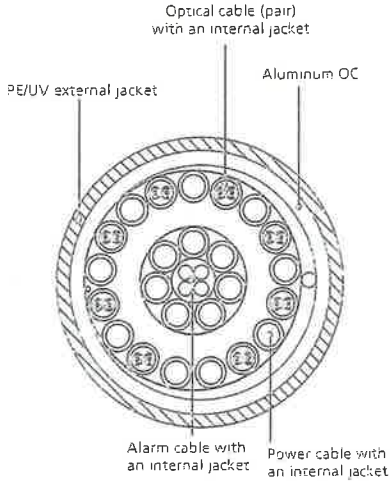


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

Far Field Approximation
with downtilt variation

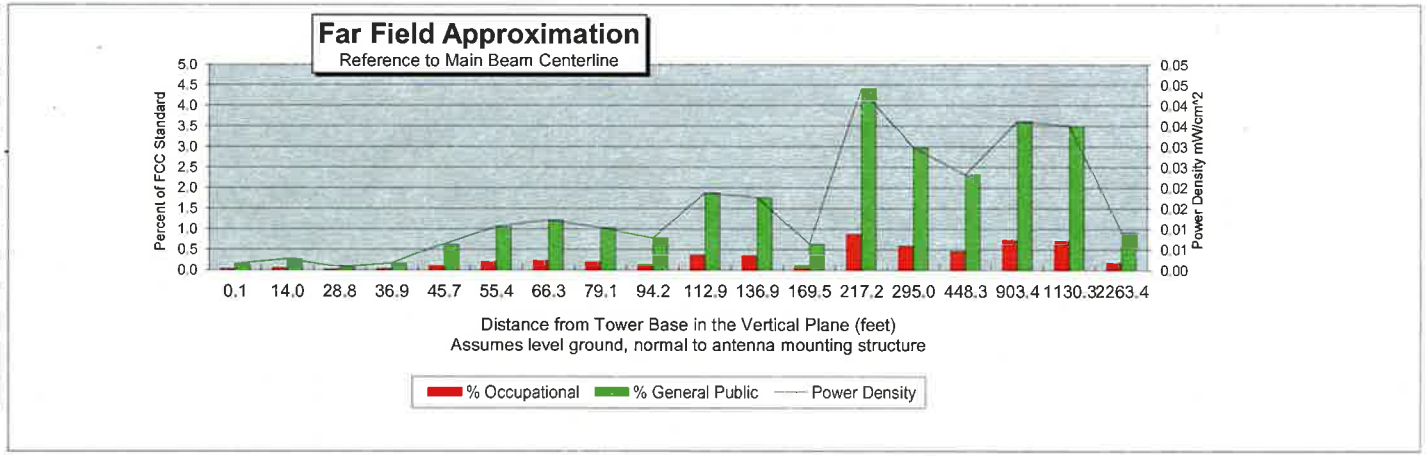
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	Plainville 3, CT
Site #:	
Date:	01/22/14
Name:	Mark Brauer
File Name:	East Haven Cosey Beach, CT

Operating Freq. (MHz)	**1970.0**
Antenna Height (ft):	**82.0**
Antenna Gain (dBi):	**16.1**
Antenna Size (in.):	**48.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**5271.0**



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0	
Solve for r, dx to antenna	79.0	80.2	84.1	87.2	91.2	96.5	103.2	111.8	123.0	137.8	158.1	187.0	231.1	305.4	455.2	906.9	1133.1	2264.8	
Distance from Antenna Structure Base in Horizontal plane	0.1	14.0	28.8	36.9	45.7	55.4	66.3	79.1	94.2	112.9	136.9	169.5	217.2	295.0	448.3	903.4	1130.3	2263.4	
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.04	0.03	0.02	0.04	0.04	0.01	
Percent of Occupational Standard	0.0	0.1	0.0	0.0	0.1	0.2	0.2	0.2	0.2	0.4	0.4	0.1	0.9	0.6	0.5	0.7	0.7	0.2	
Percent of General Population Standard	0.2	0.3	0.1	0.2	0.6	1.1	1.2	1.0	0.8	1.9	1.8	0.6	4.4	3.0	2.3	3.6	3.5	0.9	

Antenna Type BXA-171063-8BF
Max% 4.39%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Po
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

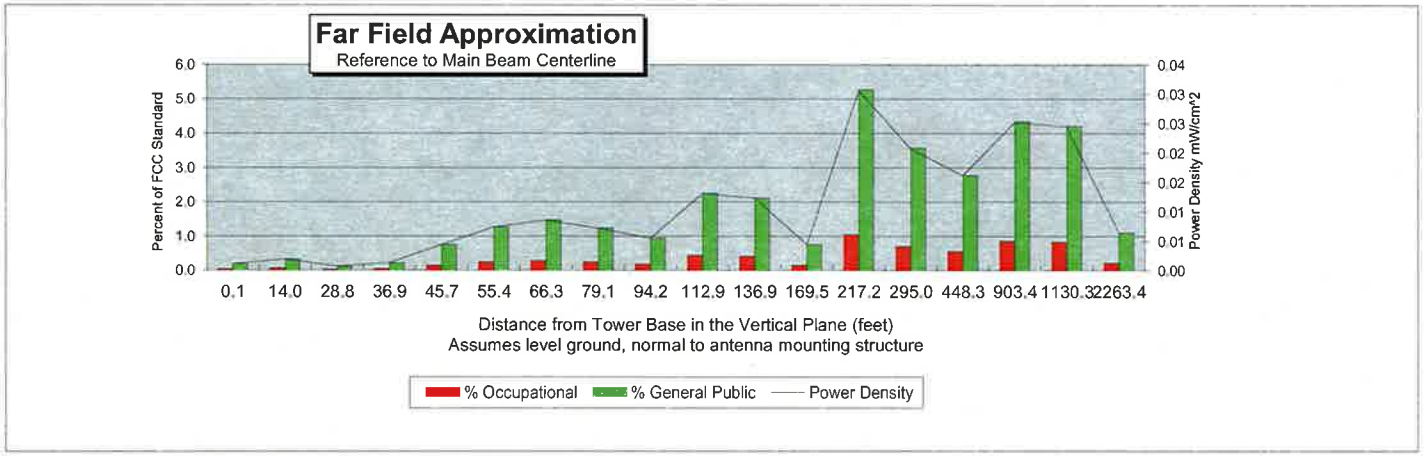
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	Plainville 3, CT
Site #:	
Date:	01/22/14
Name:	Mark Brauer
File Name:	Plainville 3, CT - FF Power

Operating Freq. (MHz)	**869.0**
Antenna Height (ft):	**82.0**
Antenna Gain (dBi):	**15.9**
Antenna Size (in.):	**43.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**3841.0**



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0	
Solve for r, dx to antenna	79.0	80.2	84.1	87.2	91.2	96.5	103.2	111.8	123.0	137.8	158.1	187.0	231.1	305.4	455.2	906.9	1133.1	2264.8	
Distance from Antenna Structure Base in Horizontal plane	0.1	14.0	28.8	36.9	45.7	55.4	66.3	79.1	94.2	112.9	136.9	169.5	217.2	295.0	448.3	903.4	1130.3	2263.4	
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.03	0.02	0.02	0.03	0.02	0.01	
Percent of Occupational Standard	0.0	0.1	0.0	0.0	0.2	0.3	0.3	0.2	0.2	0.5	0.4	0.2	1.1	0.7	0.6	0.9	0.8	0.2	
Percent of General Population Standard	0.2	0.3	0.1	0.2	0.8	1.3	1.5	1.2	0.9	2.3	2.1	0.8	5.3	3.6	2.8	4.3	4.2	1.1	

Antenna Type SC-E 6014 REV2
Max% 5.27%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Po
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

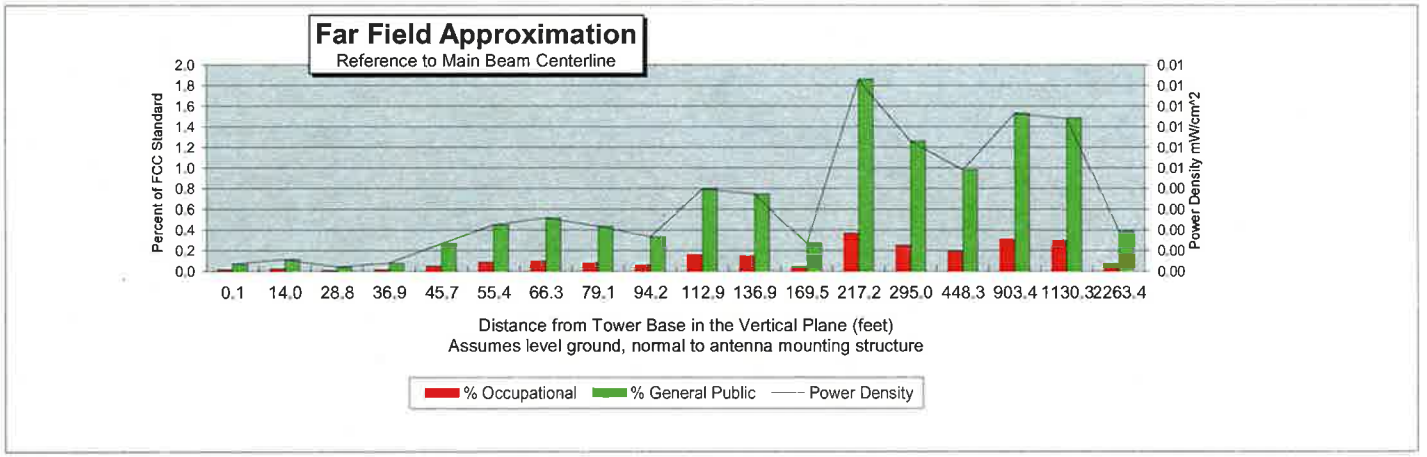
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	Plainville 3, CT
Site #:	
Date:	01/22/14
Name:	Mark Brauer
File Name:	Plainville 3, CT - FF Power

Operating Freq. (MHz)	**746.0**
Antenna Height (ft):	**82.0**
Antenna Gain (dBi):	**16.4**
Antenna Size (in.):	**82.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**1050.0**



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0	
Solve for r, dx to antenna	79.0	80.2	84.1	87.2	91.2	96.5	103.2	111.8	123.0	137.8	158.1	187.0	231.1	305.4	455.2	906.9	1133.1	2264.8	
Distance from Antenna Structure Base in Horizontal plane	0.1	14.0	28.8	36.9	45.7	55.4	66.3	79.1	94.2	112.9	136.9	169.5	217.2	295.0	448.3	903.4	1130.3	2263.4	
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.00	
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.4	0.3	0.2	0.3	0.3	0.1	
Percent of General Population Standard	0.1	0.1	0.0	0.1	0.3	0.4	0.5	0.4	0.3	0.8	0.7	0.3	1.9	1.3	1.0	1.5	1.5	0.4	

Antenna Type APX75-866514
Max% 1.86%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Po
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

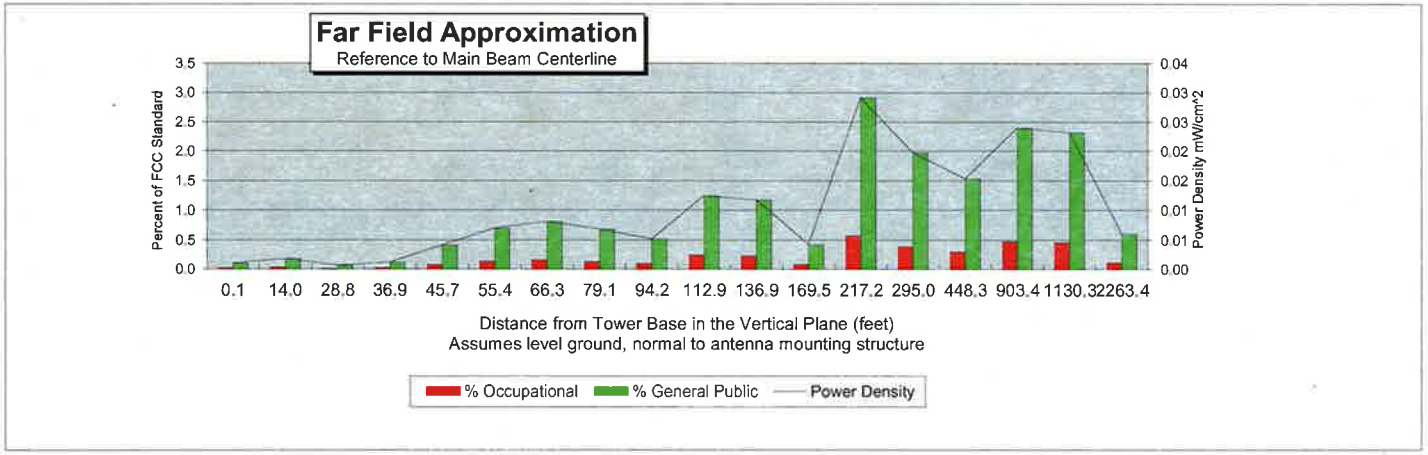
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	Plainville 3, CT
Site #:	
Date:	01/22/14
Name:	Mark Brauer
File Name:	Plainville 3, CT - FF Power

Operating Freq. (MHz)	**2145.0**
Antenna Height (ft):	**82.0**
Antenna Gain (dBi):	**19.1**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**1750.0**



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0	
Solve for r, dx to antenna	79.0	80.2	84.1	87.2	91.2	96.5	103.2	111.8	123.0	137.8	158.1	187.0	231.1	305.4	455.2	906.9	1133.1	2264.8	
Distance from Antenna Structure Base in Horizontal plane	0.1	14.0	28.8	36.9	45.7	55.4	66.3	79.1	94.2	112.9	136.9	169.5	217.2	295.0	448.3	903.4	1130.3	2263.4	
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.03	0.02	0.02	0.02	0.02	0.01	
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.1	0.6	0.4	0.3	0.5	0.5	0.1	
Percent of General Population Standard	0.1	0.2	0.1	0.1	0.4	0.7	0.8	0.7	0.5	1.2	1.2	0.4	2.9	2.0	1.5	2.4	2.3	0.6	

Antenna Type BXA-171063-12CF
Max% 2.91%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Po
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

ATTACHMENT 3

DETAILED STRUCTURAL ANALYSIS AND EVALUATION OF AN EXISTING 85' MONOPOLE FOR PROPOSED ANTENNA ARRANGEMENT

Site I.D.: Plainville 3 CT
Site Address: 1 Central Square
Plainville, CT

prepared for

Verizon Wireless
99 East River Drive
East Hartford, Connecticut 06108

prepared by

URS

36917397.00000
VZ5-149 (Rev. 2)

November 20, 2013

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis of the existing 85' steel monopole structure located at 1 Central Square, Plainville, CT. The analysis was conducted in accordance with the 2005 Connecticut State Building Code which requires a three second gust wind speed of 95 mph which converts to a 77.5 mph fastest mile per 2003 IBC (Table 1609.3.1) and the TIA/EIA-222-F standard for a wind velocity of 80 mph (fastest mile). The wind speed from the TIA/EIA-222-F governs the design at 80 mph (fastest mile) and 69 mph (fastest mile) concurrent with ½" 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 installation is as follows:

Proposed Antenna and Mount	Carrier	Antenna Center Elevation
Remove: **(6) Cellular Modcell SC-E 6014 REV2 Panels**	**Verizon (existing)**	**@ 82.5'**
Install: **(3) Amphenol BXA-171063-12CF-EDIN-2 Panels** **(3) AWS RRH Units** **(3) Amphenol BXA-70063-4CF Panels** **(1) 1 5/8" Fiber Optic Cable** **(1) Raycap DB-T1-6Z-8AB-0Z Distribution Box**	**Verizon (proposed)**	**@ 82.5'**

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 with the existing and proposed antenna loading.**

This analysis is based on:

1) The tower structure's theoretical capacity, not including any assessment of the condition of the tower.
2) Original manufacturers drawings prepared by Engineered Endeavors Inc. (EEI), job number 11122-E01 Rev 1, signed and sealed October 04, 2002.
3) Geotechnical report prepared by Dr. Clarence Welti, P.E., P.C. dated April 26, 2002.
4) Site visit performed from ground level by URS Corp on January 23, 2013.
5) Antenna and mount configuration as specified on the following page 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

2. INTRODUCTION

The subject tower is located at 1 Central Square in Plainville, CT. The structure is a 85' steel monopole designed by EEI.

The inventory is summarized in Table 1:

Table 1: Antenna and Mount Configuration:

Antenna Type	*Carrier*	*Mount*	*Antenna Centerline Elevation*	*Cable*
(3) APX75-866514T0 Panel Antennas (3) Amphenol BXA-171063-8BF Panel Antennas (6) FD9R6004 2C-3L Diplexers	Verizon (existing)	Low Profile Platform	82.5'	(18) 1-1/4"
(3) Amphenol BXA-171063-12CF Panel Antennas **(3) Amphenol BXA-70063-4CF Panel Antennas** **(1) Raycap DB-T1-6Z-8AB-0Z Distribution Box** **(3) AWS RRH Units**	**Verizon (proposed)**	**Shared with Above**	**82.5'**	**Shared with Above**
(1) Omni Antenna (2) Omni Antennas (1) 4-Bay Dipole	Unknown (existing)	Low Profile Platform	62.5'	(4) 7/8"
(2) 2-Bay Dipole Antennas (1) 1-Bay Dipole Antenna (1) Omni Antenna (1) Yagi Antenna (1) Omni Antenna	Unknown (existing)	Low Profile Platform	42.5'	(6) 7/8"

This structural analysis of the communications tower was performed by URS Corporation (URS) for Verizon. 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 arrangements.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

The structural analysis was done 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 TNX Tower 6.0. Two load conditions were evaluated as shown below which were compared to allowable stresses according to AISC and TIA/EIA.

The Connecticut State Building Code requires a three second gust wind speed of 95 mph which converts to a 77.5 mph fastest mile per 2003 IBC (Table 1609.3.1). The TIA/EIA-222-F requires a basic wind speed of 80 mph fastest mile. In this case the wind speed from the TIA/EIA-222-F governs the design.

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 for portions of the structure were within the allowable stresses under the proposed configuration and loading. Detailed analysis and calculations for the proposed load condition are provided in section 6 of this report.

Table 2: Tower Component Stress vs. Capacity Table:

Component / Section No.	*Existing Component Size*	*Controlling Elevation*	*Stress (% Capacity)*	*Pass/Fail*
L1	TP19.17x13x0.1875	37.54'-81'	81.7	Pass
L2	TP24x18.3804x0.25	0-37.54'	92.2	Pass
Anchor Bolt	2.25" dia	Compression & Bending	85	Pass
Base Plate	38" dia x 1.75" thick	Flexure	72	Pass

The monopole foundation is adequate for compression and bending. The pile tip will deflect 0.582" with the proposed loading. A detailed analysis of the foundation is provided in section 6 of this report.

5. CONCLUSIONS

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 with the existing and 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:

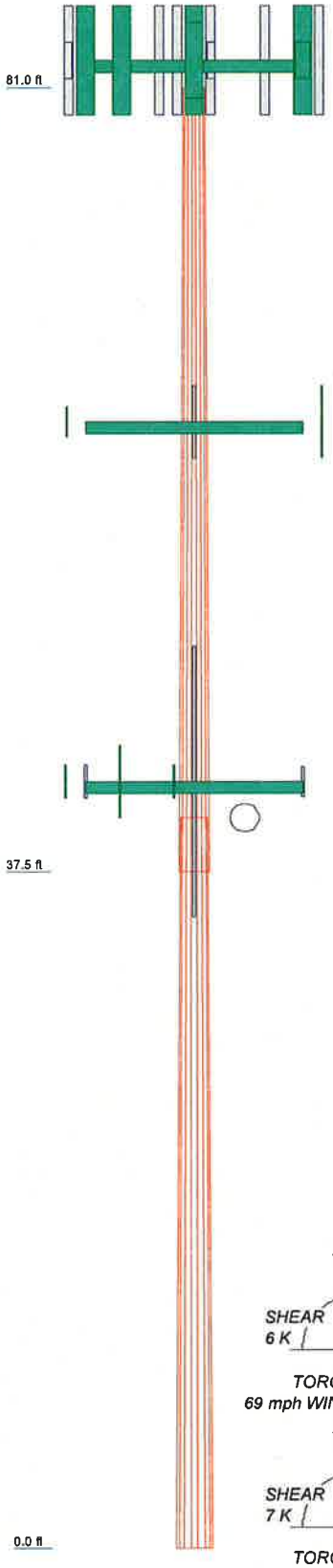
After the Contractor has successfully completed the installation and the work has been accepted, the owner will be responsible for the ongoing and periodic inspection and maintenance of the tower.

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
Length (ft)	43.46	40.46
Number of Sides	18	18
Thickness (in)	0.1875	0.2500
Socket Length (ft)	2.92	
Top Dia (in)	13.0000	18.3804
Bot Dia (in)	19.1700	24.0000
Grade	A572-65	
Weight (K)	1.4	2.3



AXIAL
13 K

SHEAR
6 K

MOMENT
387 kip-ft

TORQUE 2 kip-ft
69 mph WIND - 0.5000 in ICE

AXIAL
10 K

SHEAR
7 K

MOMENT
435 kip-ft

TORQUE 2 kip-ft
REACTIONS - 80 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Low Profile Platform	82.5	BXA-171063-12CF-EDIN-X (Verizon)	82.5
APX75-866514-CT0 (Verizon)	82.5	RH_2X40-AWS (Verizon)	82.5
APX75-866514-CT0 (Verizon)	82.5	RH_2X40-AWS (Verizon)	82.5
APX75-866514-CT0 (Verizon)	82.5	RH_2X40-AWS (Verizon)	82.5
BXA-171063-8BF (Verizon)	82.5	DB-T1-6Z-8AB-0Z (Verizon)	82.5
BXA-171063-8BF (Verizon)	82.5	Low Profile Platform	82.5
BXA-171063-8BF (Verizon)	82.5	20' 4-Bay Dipole	82.5
(2) FD9R6004 2C-3L Diplexer (Verizon)	82.5	1.5" Dia 4' Omni w/Pipe Mount	82.5
		1.5" Dia 4' Omni w/Pipe Mount	82.5
(2) FD9R6004 2C-3L Diplexer (Verizon)	82.5	20' x 1.5" Omni Antenna	82.5
		Low Profile Platform	42.5
(2) FD9R6004 2C-3L Diplexer (Verizon)	82.5	1.5" Dia 4' Omni w/Pipe Mount	42.5
		3' Yagi	42.5
BXA-70063-4CF-EDIN-X (Verizon)	82.5	20' x 1.5" Omni Antenna	42.5
BXA-70063-4CF-EDIN-X (Verizon)	82.5	2 DIPOLE ARRAY	42.5
BXA-70063-4CF-EDIN-X (Verizon)	82.5	2 DIPOLE ARRAY	42.5
BXA-171063-12CF-EDIN-X (Verizon)	82.5	2 DIPOLE ARRAY	42.5
BXA-171063-12CF-EDIN-X (Verizon)	82.5		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 69 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. TOWER RATING: 92.2%

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

Job: ***Plainville Police Station***		
Project: ***Plainville, Connecticut***		
Client: Verizon	Drawn by: Michael Dalickas	App'd:
Code: TIA/EIA-222-F	Date: 11/20/13	Scale: NTS
Path:		Dwg No. E-1

TNX TOWER DETAILED OUTPUT

tnxTower	Job: Plainville Police Station	Page: 1 of 17
URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: 860-529-8882 FAX: 860-529-3991	Project: Plainville, Connecticut	Date: 15:18:33 11/20/13
	Client: Verizon	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:

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.
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	81.00-37.54	43.46	2.92	18	13.0000	19.1700	0.1875	0.7500	A572-65 (65 ksi)
L2	37.54-0.00	40.46		18	18.3804	24.0000	0.2500	1.0000	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	13.2005	7.6250	158.1420	4.5484	6.6040	23.9464	316.4921	3.8132	1.9580	10.443

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
	19.4657	11.2970	514.2874	6.7388	9.7384	52.8105	1029.2515	5.6496	3.0439	16.234
L2	19.0758	14.3865	597.4617	6.4363	9.3373	63.9868	1195.7095	7.1946	2.7950	11.18
	24.3702	18.8456	1342.9976	8.4313	12.1920	110.1540	2687.7623	9.4246	3.7840	15.136

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 81.00-37.54				1	1	1		
L2 37.54-0.00				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 1/4 (Verizon)	C	No	Inside Pole	81.00 - 0.00	18	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
7/8	C	No	Inside Pole	62.50 - 0.00	4	No Ice	0.00	0.54
						1/2" Ice	0.00	0.54
7/8	C	No	Inside Pole	42.50 - 0.00	6	No Ice	0.00	0.54
						1/2" Ice	0.00	0.54
1 5/8" Hybriflex (Verizon)	C	No	Inside Pole	81.00 - 0.00	1	No Ice	0.00	0.21
						1/2" Ice	0.00	0.21

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	81.00-37.54	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.60
L2	37.54-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.66

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	81.00-37.54	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.60
L2	37.54-0.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.66

Discrete Tower Loads

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
Low Profile Platform	C	None		0.0000	82.50	No Ice	15.70	15.70	1.30
						1/2" Ice	20.10	20.10	1.76
Low Profile Platform	C	None		0.0000	62.50	No Ice	15.70	15.70	1.30
						1/2" Ice	20.10	20.10	1.76
Low Profile Platform	C	None		0.0000	42.50	No Ice	15.70	15.70	1.30
						1/2" Ice	20.10	20.10	1.76
APX75-866514-CT0	A	From Face	4.00	0.0000	82.50	No Ice	9.77	6.34	0.06
(Verizon)			0.00			1/2" Ice	10.38	7.53	0.12
			0.00						
APX75-866514-CT0	B	From Face	4.00	0.0000	82.50	No Ice	9.77	6.34	0.06
(Verizon)			0.00			1/2" Ice	10.38	7.53	0.12
			0.00						
APX75-866514-CT0	C	From Face	4.00	0.0000	82.50	No Ice	9.77	6.34	0.06
(Verizon)			0.00			1/2" Ice	10.38	7.53	0.12
			0.00						
BXA-171063-8BF	A	From Face	4.00	0.0000	82.50	No Ice	2.00	1.50	0.01
(Verizon)			4.00			1/2" Ice	2.30	1.80	0.03
			0.00						
BXA-171063-8BF	B	From Face	4.00	0.0000	82.50	No Ice	2.00	1.50	0.01
(Verizon)			4.00			1/2" Ice	2.30	1.80	0.03
			0.00						
BXA-171063-8BF	C	From Face	4.00	0.0000	82.50	No Ice	2.00	1.50	0.01
(Verizon)			4.00			1/2" Ice	2.30	1.80	0.03
			0.00						
(2) FD9R6004 2C-3L	A	From Face	4.00	0.0000	82.50	No Ice	0.37	0.08	0.00
Diplexer			4.00			1/2" Ice	0.45	0.14	0.00
(Verizon)			0.00						
(2) FD9R6004 2C-3L	B	From Face	4.00	0.0000	82.50	No Ice	0.37	0.08	0.00
Diplexer			4.00			1/2" Ice	0.45	0.14	0.00
(Verizon)			0.00						
(2) FD9R6004 2C-3L	C	From Face	4.00	0.0000	82.50	No Ice	0.37	0.08	0.00
Diplexer			4.00			1/2" Ice	0.45	0.14	0.00
(Verizon)			0.00						
BXA-70063-4CF-EDIN-X	A	From Face	4.00	0.0000	82.50	No Ice	5.16	2.52	0.01
(Verizon)			6.00			1/2" Ice	5.55	2.82	0.04
			0.00						
BXA-70063-4CF-EDIN-X	B	From Face	4.00	0.0000	82.50	No Ice	5.16	2.52	0.01
(Verizon)			6.00			1/2" Ice	5.55	2.82	0.04
			0.00						
BXA-70063-4CF-EDIN-X	C	From Face	4.00	0.0000	82.50	No Ice	5.16	2.52	0.01
(Verizon)			6.00			1/2" Ice	5.55	2.82	0.04
			0.00						
BXA-171063-12CF-EDIN-X	A	From Face	4.00	0.0000	82.50	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 Face	4.00	0.0000	82.50	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 Face	4.00	0.0000	82.50	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 Face	4.00	0.0000	82.50	No Ice	2.52	1.59	0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(Verizon)			-6.00 0.00			1/2" Ice	2.75	1.80	0.06
RH_2X40-AWS	B	From Face	4.00	0.0000	82.50	No Ice	2.52	1.59	0.04
(Verizon)			-6.00 0.00			1/2" Ice	2.75	1.80	0.06
RH_2X40-AWS	C	From Face	4.00	0.0000	82.50	No Ice	2.52	1.59	0.04
(Verizon)			-6.00 0.00			1/2" Ice	2.75	1.80	0.06
DB-T1-6Z-8AB-0Z	C	None		0.0000	82.50	No Ice	5.35	2.40	0.04
(Verizon)						1/2" Ice	5.75	2.72	0.07
20' 4-Bay Dipole	A	From Leg	4.00	0.0000	62.50	No Ice	4.00	4.00	0.06
			-6.00 0.00			1/2" Ice	6.00	6.00	0.10
1.5" Dia 4' Omni w/Pipe Mount	A	From Leg	4.00 0.00 0.00	0.0000	62.50	No Ice 1/2" Ice	0.94 1.39	0.94 1.39	0.02 0.03
1.5" Dia 4' Omni w/Pipe Mount	B	From Leg	4.00 -6.00 0.00	0.0000	62.50	No Ice 1/2" Ice	0.94 1.39	0.94 1.39	0.02 0.03
20' x 1.5" Omni Antenna	C	From Leg	4.00 6.00 0.00	0.0000	62.50	No Ice 1/2" Ice	0.20 0.30	0.20 0.30	0.03 0.03
1.5" Dia 4' Omni w/Pipe Mount	C	From Leg	4.00 0.00 0.00	0.0000	42.50	No Ice 1/2" Ice	0.94 1.39	0.94 1.39	0.02 0.03
3' Yagi	A	From Leg	4.00 0.00 0.00	0.0000	42.50	No Ice 1/2" Ice	2.08 3.79	2.08 3.79	0.03 0.05
20' x 1.5" Omni Antenna	A	From Leg	4.00 6.00 0.00	0.0000	42.50	No Ice 1/2" Ice	0.20 0.30	0.20 0.30	0.03 0.03
2 DIPOLE ARRAY	C	From Leg	4.00 6.00 0.00	0.0000	42.50	No Ice 1/2" Ice	0.63 0.79	2.03 2.24	0.01 0.02
2 DIPOLE ARRAY	C	From Leg	4.00 -6.00 0.00	0.0000	42.50	No Ice 1/2" Ice	0.63 0.79	2.03 2.24	0.01 0.02
2 DIPOLE ARRAY	A	From Leg	4.00 -6.00 0.00	0.0000	42.50	No Ice 1/2" Ice	0.63 0.79	2.03 2.24	0.01 0.02

Tower Pressures - No Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 81.00-37.54	58.45	1.177	19	58.255	A	0.000	58.255	58.255	100.00	0.000	0.000

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
					B	0.000	58.255		100.00	0.000	0.000
					C	0.000	58.255		100.00	0.000	0.000
L2 37.54-0.00	18.01	1	16	66.924	A	0.000	66.924	66.924	100.00	0.000	0.000
					B	0.000	66.924		100.00	0.000	0.000
					C	0.000	66.924		100.00	0.000	0.000

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 81.00-37.54	58.45	1.177	14	0.5000	61.876	A	0.000	61.876	61.876	100.00	0.000	0.000
						B	0.000	61.876		100.00	0.000	0.000
						C	0.000	61.876		100.00	0.000	0.000
L2 37.54-0.00	18.01	1	12	0.5000	70.053	A	0.000	70.053	70.053	100.00	0.000	0.000
						B	0.000	70.053		100.00	0.000	0.000
						C	0.000	70.053		100.00	0.000	0.000

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 81.00-37.54	58.45	1.177	7	58.255	A	0.000	58.255	58.255	100.00	0.000	0.000
					B	0.000	58.255		100.00	0.000	0.000
					C	0.000	58.255		100.00	0.000	0.000
L2 37.54-0.00	18.01	1	6	66.924	A	0.000	66.924	66.924	100.00	0.000	0.000
					B	0.000	66.924		100.00	0.000	0.000
					C	0.000	66.924		100.00	0.000	0.000

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	0.60	1.40	A	1	0.65	1	1	1	58.255	1.23	28.23	C
81.00-37.54			B	1	0.65	1	1	1	58.255			
			C	1	0.65	1	1	1	58.255			
L2 37.54-0.00	0.66	2.29	A	1	0.65	1	1	1	66.924	1.20	32.09	C
			B	1	0.65	1	1	1	66.924			
			C	1	0.65	1	1	1	66.924			
Sum Weight:	1.25	3.69						OTM	93.39	2.43		

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
									kip-ft			

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 ft^2	F K	w plf	Ctrl. Face
L1	0.60	1.40	A	1	0.65	1	1	1	58.255	1.23	28.23	C
81.00-37.54			B	1	0.65	1	1	1	58.255			
			C	1	0.65	1	1	1	58.255			
L2 37.54-0.00	0.66	2.29	A	1	0.65	1	1	1	66.924	1.20	32.09	C
			B	1	0.65	1	1	1	66.924			
			C	1	0.65	1	1	1	66.924			
Sum Weight:	1.25	3.69						OTM	93.39 kip-ft	2.43		

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	0.60	1.40	A	1	0.65	1	1	1	58.255	1.23	28.23	C
81.00-37.54			B	1	0.65	1	1	1	58.255			
			C	1	0.65	1	1	1	58.255			
L2 37.54-0.00	0.66	2.29	A	1	0.65	1	1	1	66.924	1.20	32.09	C
			B	1	0.65	1	1	1	66.924			
			C	1	0.65	1	1	1	66.924			
Sum Weight:	1.25	3.69						OTM	93.39 kip-ft	2.43		

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	0.60	1.40	A	1	0.65	1	1	1	58.255	1.23	28.23	C
81.00-37.54			B	1	0.65	1	1	1	58.255			
			C	1	0.65	1	1	1	58.255			
L2 37.54-0.00	0.66	2.29	A	1	0.65	1	1	1	66.924	1.20	32.09	C
			B	1	0.65	1	1	1	66.924			
			C	1	0.65	1	1	1	66.924			
Sum Weight:	1.25	3.69						OTM	93.39 kip-ft	2.43		

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 ft²	F K	w plf	Ctrl. Face
L1	0.60	1.84	A	1	0.65	1	1	1	61.876	0.98	22.49	C
81.00-37.54			B	1	0.65	1	1	1	61.876			
			C	1	0.65	1	1	1	61.876			
L2 37.54-0.00	0.66	2.79	A	1	0.65	1	1	1	70.053	0.95	25.19	C
			B	1	0.65	1	1	1	70.053			
			C	1	0.65	1	1	1	70.053			
Sum Weight:	1.25	4.64						OTM	74.15 kip-ft	1.92		

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	0.60	1.84	A	1	0.65	1	1	1	61.876	0.98	22.49	C
81.00-37.54			B	1	0.65	1	1	1	61.876			
			C	1	0.65	1	1	1	61.876			
L2 37.54-0.00	0.66	2.79	A	1	0.65	1	1	1	70.053	0.95	25.19	C
			B	1	0.65	1	1	1	70.053			
			C	1	0.65	1	1	1	70.053			
Sum Weight:	1.25	4.64						OTM	74.15 kip-ft	1.92		

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	0.60	1.84	A	1	0.65	1	1	1	61.876	0.98	22.49	C
81.00-37.54			B	1	0.65	1	1	1	61.876			
			C	1	0.65	1	1	1	61.876			
L2 37.54-0.00	0.66	2.79	A	1	0.65	1	1	1	70.053	0.95	25.19	C
			B	1	0.65	1	1	1	70.053			
			C	1	0.65	1	1	1	70.053			
Sum Weight:	1.25	4.64						OTM	74.15 kip-ft	1.92		

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	0.60	1.84	A	1	0.65	1	1	1	61.876	0.98	22.49	C
81.00-37.54			B	1	0.65	1	1	1	61.876			
			C	1	0.65	1	1	1	61.876			
L2 37.54-0.00	0.66	2.79	A	1	0.65	1	1	1	70.053	0.95	25.19	C
			B	1	0.65	1	1	1	70.053			
			C	1	0.65	1	1	1	70.053			
Sum Weight:	1.25	4.64						OTM	74.15 kip-ft	1.92		

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	0.60	1.40	A	1	0.65	1	1	1	58.255	0.48	11.03	C
81.00-37.54			B	1	0.65	1	1	1	58.255			
			C	1	0.65	1	1	1	58.255			
L2 37.54-0.00	0.66	2.29	A	1	0.65	1	1	1	66.924	0.47	12.53	C
			B	1	0.65	1	1	1	66.924			
			C	1	0.65	1	1	1	66.924			
Sum Weight:	1.25	3.69						OTM	36.48 kip-ft	0.95		

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	0.60	1.40	A	1	0.65	1	1	1	58.255	0.48	11.03	C
81.00-37.54			B	1	0.65	1	1	1	58.255			
			C	1	0.65	1	1	1	58.255			
L2 37.54-0.00	0.66	2.29	A	1	0.65	1	1	1	66.924	0.47	12.53	C
			B	1	0.65	1	1	1	66.924			
			C	1	0.65	1	1	1	66.924			
Sum Weight:	1.25	3.69						OTM	36.48 kip-ft	0.95		

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	0.60	1.40	A	1	0.65	1	1	1	58.255	0.48	11.03	C
81.00-37.54			B	1	0.65	1	1	1	58.255			

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
			C	1	0.65	1	1	1	58.255			
L2 37.54-0.00	0.66	2.29	A	1	0.65	1	1	1	66.924	0.47	12.53	C
			B	1	0.65	1	1	1	66.924			
			C	1	0.65	1	1	1	66.924			
Sum Weight:	1.25	3.69						OTM	36.48 kip-ft	0.95		

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	0.60	1.40	A	1	0.65	1	1	1	58.255	0.48	11.03	C
81.00-37.54			B	1	0.65	1	1	1	58.255			
			C	1	0.65	1	1	1	58.255			
L2 37.54-0.00	0.66	2.29	A	1	0.65	1	1	1	66.924	0.47	12.53	C
			B	1	0.65	1	1	1	66.924			
			C	1	0.65	1	1	1	66.924			
Sum Weight:	1.25	3.69						OTM	36.48 kip-ft	0.95		

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	3.69					
Bracing Weight	0.00					
Total Member Self-Weight	3.69			-0.73	0.40	
Total Weight	9.54			-0.73	0.40	
Wind 0 deg - No Ice		-0.04	-6.79	-412.10	1.94	-1.32
Wind 30 deg - No Ice		3.36	-5.86	-356.21	-203.95	-1.70
Wind 45 deg - No Ice		4.78	-4.78	-290.52	-289.39	-1.73
Wind 60 deg - No Ice		5.86	-3.36	-205.08	-355.08	-1.64
Wind 90 deg - No Ice		6.79	0.04	0.81	-410.96	-1.13
Wind 120 deg - No Ice		5.90	3.43	206.28	-356.62	-0.32
Wind 135 deg - No Ice		4.83	4.83	291.23	-291.56	0.13
Wind 150 deg - No Ice		3.43	5.90	356.29	-206.61	0.57
Wind 180 deg - No Ice		0.04	6.79	410.63	-1.13	1.32
Wind 210 deg - No Ice		-3.36	5.86	354.75	204.75	1.70
Wind 225 deg - No Ice		-4.78	4.78	289.06	290.19	1.73
Wind 240 deg - No Ice		-5.86	3.36	203.62	355.89	1.64
Wind 270 deg - No Ice		-6.79	-0.04	-2.27	411.77	1.13
Wind 300 deg - No Ice		-5.90	-3.43	-207.74	357.42	0.32
Wind 315 deg - No Ice		-4.83	-4.83	-292.70	292.37	-0.13
Wind 330 deg - No Ice		-3.43	-5.90	-357.75	207.42	-0.57
Member Ice	0.95					
Total Weight Ice	12.55			-1.10	0.79	
Wind 0 deg - Ice		-0.03	-5.86	-358.45	1.99	-1.31

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 30 deg - Ice		2.90	-5.06	-309.98	-176.85	-1.81
Wind 45 deg - Ice		4.12	-4.12	-252.94	-251.05	-1.88
Wind 60 deg - Ice		5.06	-2.90	-178.74	-308.09	-1.82
Wind 90 deg - Ice		5.86	0.03	0.09	-356.56	-1.34
Wind 120 deg - Ice		5.09	2.95	178.61	-309.28	-0.50
Wind 135 deg - Ice		4.16	4.16	252.43	-252.74	-0.02
Wind 150 deg - Ice		2.95	5.09	308.97	-178.92	0.47
Wind 180 deg - Ice		0.03	5.86	356.25	-0.40	1.31
Wind 210 deg - Ice		-2.90	5.06	307.78	178.43	1.81
Wind 225 deg - Ice		-4.12	4.12	250.74	252.63	1.88
Wind 240 deg - Ice		-5.06	2.90	176.54	309.67	1.82
Wind 270 deg - Ice		-5.86	-0.03	-2.30	358.14	1.34
Wind 300 deg - Ice		-5.09	-2.95	-180.81	310.87	0.50
Wind 315 deg - Ice		-4.16	-4.16	-254.63	254.32	0.02
Wind 330 deg - Ice		-2.95	-5.09	-311.18	180.50	-0.47
Total Weight	9.54			-0.73	0.40	
Wind 0 deg - Service		-0.01	-2.65	-161.42	1.00	-0.51
Wind 30 deg - Service		1.31	-2.29	-139.59	-79.42	-0.67
Wind 45 deg - Service		1.87	-1.87	-113.93	-112.80	-0.68
Wind 60 deg - Service		2.29	-1.31	-80.56	-138.46	-0.64
Wind 90 deg - Service		2.65	0.01	-0.13	-160.29	-0.44
Wind 120 deg - Service		2.30	1.34	80.13	-139.06	-0.13
Wind 135 deg - Service		1.89	1.89	113.32	-113.65	0.05
Wind 150 deg - Service		1.34	2.30	138.73	-80.46	0.22
Wind 180 deg - Service		0.01	2.65	159.96	-0.20	0.51
Wind 210 deg - Service		-1.31	2.29	138.13	80.23	0.67
Wind 225 deg - Service		-1.87	1.87	112.47	113.60	0.68
Wind 240 deg - Service		-2.29	1.31	79.09	139.26	0.64
Wind 270 deg - Service		-2.65	-0.01	-1.33	161.09	0.44
Wind 300 deg - Service		-2.30	-1.34	-81.60	139.86	0.13
Wind 315 deg - Service		-1.89	-1.89	-114.78	114.45	-0.05
Wind 330 deg - Service		-1.34	-2.30	-140.19	81.27	-0.22

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
19	Dead+Wind 0 deg+Ice

Comb. No.	Description
20	Dead+Wind 30 deg+Ice
21	Dead+Wind 45 deg+Ice
22	Dead+Wind 60 deg+Ice
23	Dead+Wind 90 deg+Ice
24	Dead+Wind 120 deg+Ice
25	Dead+Wind 135 deg+Ice
26	Dead+Wind 150 deg+Ice
27	Dead+Wind 180 deg+Ice
28	Dead+Wind 210 deg+Ice
29	Dead+Wind 225 deg+Ice
30	Dead+Wind 240 deg+Ice
31	Dead+Wind 270 deg+Ice
32	Dead+Wind 300 deg+Ice
33	Dead+Wind 315 deg+Ice
34	Dead+Wind 330 deg+Ice
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
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	81 - 37.54	Pole	Max Tension	18	0.00	-0.00	-0.00
			Max. Compression	18	-8.91	0.86	1.19
			Max. Mx	14	-6.08	175.83	0.84
			Max. My	2	-6.08	0.50	176.16
			Max. Vy	14	-5.90	175.83	0.84
			Max. Vx	2	-5.90	0.50	176.16
			Max. Torque	29			-1.85
L2	37.54 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-12.55	0.88	1.23
			Max. Mx	14	-9.53	433.12	2.37
			Max. My	2	-9.53	2.02	433.47
			Max. Vy	14	-6.81	433.12	2.37
			Max. Vx	2	-6.81	2.02	433.47
			Max. Torque	29			-1.85

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	19	12.55	0.03	5.86
	Max. H_x	14	9.54	6.79	0.04
	Max. H_z	2	9.54	0.04	6.79
	Max. M_x	2	433.47	0.04	6.79
	Max. M_z	6	432.25	-6.79	-0.04
	Max. Torsion	21	1.84	-4.12	4.12
	Min. Vert	1	9.54	0.00	0.00
	Min. H_x	6	9.54	-6.79	-0.04
	Min. H_z	10	9.54	-0.04	-6.79
	Min. M_x	10	-431.90	-0.04	-6.79
	Min. M_z	14	-433.12	6.79	0.04
	Min. Torsion	29	-1.84	4.12	-4.12

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	9.54	0.00	-0.00	-0.78	0.43	0.00
Dead+Wind 0 deg - No Ice	9.54	-0.04	-6.79	-433.47	2.01	-1.29
Dead+Wind 30 deg - No Ice	9.54	3.36	-5.86	-374.70	-214.54	-1.67
Dead+Wind 45 deg - No Ice	9.54	4.78	-4.78	-305.61	-304.41	-1.70
Dead+Wind 60 deg - No Ice	9.54	5.86	-3.36	-215.74	-373.50	-1.61
Dead+Wind 90 deg - No Ice	9.54	6.79	0.04	0.81	-432.25	-1.11
Dead+Wind 120 deg - No Ice	9.54	5.90	3.43	216.94	-375.08	-0.32
Dead+Wind 135 deg - No Ice	9.54	4.83	4.83	306.29	-306.65	0.13
Dead+Wind 150 deg - No Ice	9.54	3.43	5.90	374.72	-217.29	0.56
Dead+Wind 180 deg - No Ice	9.54	0.04	6.79	431.90	-1.17	1.29
Dead+Wind 210 deg - No Ice	9.54	-3.36	5.86	373.15	215.39	1.67
Dead+Wind 225 deg - No Ice	9.54	-4.78	4.78	304.06	305.26	1.70
Dead+Wind 240 deg - No Ice	9.54	-5.86	3.36	214.19	374.35	1.61
Dead+Wind 270 deg - No Ice	9.54	-6.79	-0.04	-2.37	433.12	1.11
Dead+Wind 300 deg - No Ice	9.54	-5.90	-3.43	-218.50	375.94	0.32
Dead+Wind 315 deg - No Ice	9.54	-4.83	-4.83	-307.86	307.51	-0.13
Dead+Wind 330 deg - No Ice	9.54	-3.43	-5.90	-376.29	218.15	-0.56
Dead+Ice	12.55	-0.00	-0.00	-1.23	0.88	0.00
Dead+Wind 0 deg+Ice	12.55	-0.03	-5.86	-385.66	2.12	-1.29
Dead+Wind 30 deg+Ice	12.55	2.90	-5.06	-333.52	-190.26	-1.78
Dead+Wind 45 deg+Ice	12.55	4.12	-4.12	-272.16	-270.08	-1.84
Dead+Wind 60 deg+Ice	12.55	5.06	-2.90	-192.34	-331.43	-1.79
Dead+Wind 90 deg+Ice	12.55	5.86	0.03	0.04	-383.55	-1.32
Dead+Wind 120 deg+Ice	12.55	5.09	2.95	192.08	-332.67	-0.49
Dead+Wind 135 deg+Ice	12.55	4.16	4.16	271.49	-271.84	-0.02
Dead+Wind 150 deg+Ice	12.55	2.95	5.09	332.33	-192.42	0.46
Dead+Wind 180 deg+Ice	12.55	0.03	5.86	383.21	-0.39	1.29
Dead+Wind 210 deg+Ice	12.55	-2.90	5.06	331.09	192.00	1.78
Dead+Wind 225 deg+Ice	12.55	-4.12	4.12	269.74	271.82	1.84
Dead+Wind 240 deg+Ice	12.55	-5.06	2.90	189.92	333.18	1.79
Dead+Wind 270 deg+Ice	12.55	-5.86	-0.03	-2.47	385.31	1.32
Dead+Wind 300 deg+Ice	12.55	-5.09	-2.95	-194.52	334.44	0.49
Dead+Wind 315 deg+Ice	12.55	-4.16	-4.16	-273.95	273.60	0.02
Dead+Wind 330 deg+Ice	12.55	-2.95	-5.09	-334.78	194.18	-0.46
Dead+Wind 0 deg - Service	9.54	-0.01	-2.65	-170.11	1.06	-0.51
Dead+Wind 30 deg - Service	9.54	1.31	-2.29	-147.11	-83.68	-0.66
Dead+Wind 45 deg - Service	9.54	1.87	-1.87	-120.07	-118.85	-0.67
Dead+Wind 60 deg - Service	9.54	2.29	-1.31	-84.91	-145.88	-0.63
Dead+Wind 90 deg - Service	9.54	2.65	0.01	-0.17	-168.88	-0.44

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 120 deg - Service	9.54	2.30	1.34	84.41	-146.51	-0.13
Dead+Wind 135 deg - Service	9.54	1.89	1.89	119.37	-119.73	0.05
Dead+Wind 150 deg - Service	9.54	1.34	2.30	146.15	-84.76	0.22
Dead+Wind 180 deg - Service	9.54	0.01	2.65	168.52	-0.18	0.51
Dead+Wind 210 deg - Service	9.54	-1.31	2.29	145.53	84.56	0.66
Dead+Wind 225 deg - Service	9.54	-1.87	1.87	118.50	119.72	0.67
Dead+Wind 240 deg - Service	9.54	-2.29	1.31	83.33	146.76	0.63
Dead+Wind 270 deg - Service	9.54	-2.65	-0.01	-1.41	169.75	0.44
Dead+Wind 300 deg - Service	9.54	-2.30	-1.34	-85.99	147.38	0.13
Dead+Wind 315 deg - Service	9.54	-1.89	-1.89	-120.96	120.60	-0.05
Dead+Wind 330 deg - Service	9.54	-1.34	-2.30	-147.73	85.63	-0.22

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	-9.54	0.00	0.00	9.54	0.00	0.000%
2	-0.04	-9.54	-6.79	0.04	9.54	6.79	0.000%
3	3.36	-9.54	-5.86	-3.36	9.54	5.86	0.000%
4	4.78	-9.54	-4.78	-4.78	9.54	4.78	0.000%
5	5.86	-9.54	-3.36	-5.86	9.54	3.36	0.000%
6	6.79	-9.54	0.04	-6.79	9.54	-0.04	0.000%
7	5.90	-9.54	3.43	-5.90	9.54	-3.43	0.000%
8	4.83	-9.54	4.83	-4.83	9.54	-4.83	0.000%
9	3.43	-9.54	5.90	-3.43	9.54	-5.90	0.000%
10	0.04	-9.54	6.79	-0.04	9.54	-6.79	0.000%
11	-3.36	-9.54	5.86	3.36	9.54	-5.86	0.000%
12	-4.78	-9.54	4.78	4.78	9.54	-4.78	0.000%
13	-5.86	-9.54	3.36	5.86	9.54	-3.36	0.000%
14	-6.79	-9.54	-0.04	6.79	9.54	0.04	0.000%
15	-5.90	-9.54	-3.43	5.90	9.54	3.43	0.000%
16	-4.83	-9.54	-4.83	4.83	9.54	4.83	0.000%
17	-3.43	-9.54	-5.90	3.43	9.54	5.90	0.000%
18	0.00	-12.55	0.00	0.00	12.55	0.00	0.000%
19	-0.03	-12.55	-5.86	0.03	12.55	5.86	0.000%
20	2.90	-12.55	-5.06	-2.90	12.55	5.06	0.000%
21	4.12	-12.55	-4.12	-4.12	12.55	4.12	0.000%
22	5.06	-12.55	-2.90	-5.06	12.55	2.90	0.000%
23	5.86	-12.55	0.03	-5.86	12.55	-0.03	0.000%
24	5.09	-12.55	2.95	-5.09	12.55	-2.95	0.000%
25	4.16	-12.55	4.16	-4.16	12.55	-4.16	0.000%
26	2.95	-12.55	5.09	-2.95	12.55	-5.09	0.000%
27	0.03	-12.55	5.86	-0.03	12.55	-5.86	0.000%
28	-2.90	-12.55	5.06	2.90	12.55	-5.06	0.000%
29	-4.12	-12.55	4.12	4.12	12.55	-4.12	0.000%
30	-5.06	-12.55	2.90	5.06	12.55	-2.90	0.000%
31	-5.86	-12.55	-0.03	5.86	12.55	0.03	0.000%
32	-5.09	-12.55	-2.95	5.09	12.55	2.95	0.000%
33	-4.16	-12.55	-4.16	4.16	12.55	4.16	0.000%
34	-2.95	-12.55	-5.09	2.95	12.55	5.09	0.000%
35	-0.01	-9.54	-2.65	0.01	9.54	2.65	0.000%
36	1.31	-9.54	-2.29	-1.31	9.54	2.29	0.000%
37	1.87	-9.54	-1.87	-1.87	9.54	1.87	0.000%
38	2.29	-9.54	-1.31	-2.29	9.54	1.31	0.000%
39	2.65	-9.54	0.01	-2.65	9.54	-0.01	0.000%
40	2.30	-9.54	1.34	-2.30	9.54	-1.34	0.000%
41	1.89	-9.54	1.89	-1.89	9.54	-1.89	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
42	1.34	-9.54	2.30	-1.34	9.54	-2.30	0.000%
43	0.01	-9.54	2.65	-0.01	9.54	-2.65	0.000%
44	-1.31	-9.54	2.29	1.31	9.54	-2.29	0.000%
45	-1.87	-9.54	1.87	1.87	9.54	-1.87	0.000%
46	-2.29	-9.54	1.31	2.29	9.54	-1.31	0.000%
47	-2.65	-9.54	-0.01	2.65	9.54	0.01	0.000%
48	-2.30	-9.54	-1.34	2.30	9.54	1.34	0.000%
49	-1.89	-9.54	-1.89	1.89	9.54	1.89	0.000%
50	-1.34	-9.54	-2.30	1.34	9.54	2.30	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	5	0.00000001	0.00014255
3	Yes	5	0.00000001	0.00069191
4	Yes	5	0.00000001	0.00088246
5	Yes	5	0.00000001	0.00088820
6	Yes	5	0.00000001	0.00013167
7	Yes	5	0.00000001	0.00074434
8	Yes	5	0.00000001	0.00085439
9	Yes	5	0.00000001	0.00074439
10	Yes	5	0.00000001	0.00013215
11	Yes	5	0.00000001	0.00088555
12	Yes	5	0.00000001	0.00087944
13	Yes	5	0.00000001	0.00068880
14	Yes	5	0.00000001	0.00014196
15	Yes	5	0.00000001	0.00080959
16	Yes	5	0.00000001	0.00086646
17	Yes	5	0.00000001	0.00081027
18	Yes	4	0.00000001	0.00000001
19	Yes	5	0.00000001	0.00033560
20	Yes	6	0.00000001	0.00010841
21	Yes	6	0.00000001	0.00014504
22	Yes	6	0.00000001	0.00014881
23	Yes	5	0.00000001	0.00035557
24	Yes	6	0.00000001	0.00011587
25	Yes	6	0.00000001	0.00013711
26	Yes	6	0.00000001	0.00011793
27	Yes	5	0.00000001	0.00031688
28	Yes	6	0.00000001	0.00014734
29	Yes	6	0.00000001	0.00014438
30	Yes	6	0.00000001	0.00010751
31	Yes	5	0.00000001	0.00037392
32	Yes	6	0.00000001	0.00013329
33	Yes	6	0.00000001	0.00014130
34	Yes	6	0.00000001	0.00013072
35	Yes	4	0.00000001	0.00057530
36	Yes	5	0.00000001	0.00006363
37	Yes	5	0.00000001	0.00009494
38	Yes	5	0.00000001	0.00010123
39	Yes	4	0.00000001	0.00055377
40	Yes	5	0.00000001	0.00006740
41	Yes	5	0.00000001	0.00008322
42	Yes	5	0.00000001	0.00006760

43	Yes	4	0.00000001	0.00055292
44	Yes	5	0.00000001	0.00010042
45	Yes	5	0.00000001	0.00009398
46	Yes	5	0.00000001	0.00006267
47	Yes	4	0.00000001	0.00057255
48	Yes	5	0.00000001	0.00008256
49	Yes	5	0.00000001	0.00008762
50	Yes	5	0.00000001	0.00008273

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	81 - 37.54	23.954	49	2.5195	0.0200
L2	40.46 - 0	6.230	49	1.4124	0.0107

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
82.50	Low Profile Platform	49	23.954	2.5195	0.0200	9299
62.50	Low Profile Platform	49	14.828	2.0422	0.0159	2512
42.50	Low Profile Platform	49	6.854	1.4753	0.0112	1217

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	81 - 37.54	60.719	17	6.3946	0.0559
L2	40.46 - 0	15.840	16	3.5902	0.0294

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
82.50	Low Profile Platform	17	60.719	6.3946	0.0559	3733
62.50	Low Profile Platform	17	37.614	5.1866	0.0441	1006
42.50	Low Profile Platform	16	17.422	3.7498	0.0308	484

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	81 - 37.54 (1)	TP19.17x13x0.1875	43.46	0.00	0.0	39.000	11.0503	-6.08	430.96	0.014
L2	37.54 - 0 (2)	TP24x18.3804x0.25	40.46	0.00	0.0	39.000	18.8456	-9.53	734.98	0.013

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	81 - 37.54 (1)	TP19.17x13x0.1875	176.36	41.892	39.000	1.074	0.00	0.000	39.000	0.000
L2	37.54 - 0 (2)	TP24x18.3804x0.25	435.13	47.403	39.000	1.215	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	81 - 37.54 (1)	TP19.17x13x0.1875	5.93	0.537	26.000	0.041	0.56	0.065	26.000	0.003
L2	37.54 - 0 (2)	TP24x18.3804x0.25	6.84	0.363	26.000	0.028	0.13	0.007	26.000	0.000

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	81 - 37.54 (1)	0.014	1.074	0.000	0.041	0.003	1.089 ✔	1.333	H1-3+VT ✔
L2	37.54 - 0 (2)	0.013	1.215	0.000	0.028	0.000	1.229 ✔	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

tnxTower	Job: Plainville Police Station	Page: 17 of 17
URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: 860-529-8882 FAX: 860-529-3991	Project: Plainville, Connecticut	Date: 15:18:33 11/20/13
	Client: Verizon	Designed by: Michael Dalickas

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	81 - 37.54	Pole	TP19.17x13x0.1875	1	-6.08	574.47	81.7	Pass
L2	37.54 - 0	Pole	TP24x18.3804x0.25	2	-9.53	979.73	92.2	Pass
							Summary	
						Pole (L2)	92.2	Pass
						RATING =	**92.2**	**Pass**

Program Version 6.0.0.8 - 9/7/2011 File:W:/Verizon-VZ5/36917397-VZ5149/08/Rev. 2/ERI Files/85' EEI Monopole - Plainville Police Station.eri

ANCHOR BOLT AND BASE PLATE ANALYSIS

URS

Job	85' Monopole - Plainville, CT	Project No.	VZ5-149 - Rev. 2	Page / Sheet	of / 1 of 6
Description	Anchor Bolt and Base Plate Analysis	Computed by	MCD	Date	11/20/13
		Checked by		Date	

ANCHOR BOLT AND BASEPLATE ANALYSIS

Input Data

Tower Reactions:

Overturning Moment:	$OM := 435 \cdot kips \cdot ft$	*user input*
Shear Force:	$Shear := 7 \cdot kips$	*user input*
Axial Force:	$Axial := 10 \cdot kips$	*user input*

Anchor Bolt Data:

Use ASTM 615 Grade 75

Number of Anchor Bolts = N	$N := 4$	*user input*
Bolt Ultimate Strength:	$F_u := 100 \cdot ksi$	*user input*
Bolt Allowable Strength:	$Fy := 75 \cdot (ksi)$	*user input*
Diameter Of Anchor Bolts	$D := 2.25in$	*user input*
Threaded length per inch	$n := 4.5$	*user input*
Bolt "Column" Distance:	$l := 3in$	*user input*
Bolt Modulus:	$E := 29000 ksi$	*user input*

Base Plate Data:

Use ASTM 572 Grade 60

Plate Yield Strength:	$Fy_{bp} := 60 \cdot ksi$	*user input*
Base Plate Thickness:	$PlateThicknessProvide := 1.75 \cdot in$	*user input*

Geometric Layout Data:

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

Distances for loading condition (see detail):

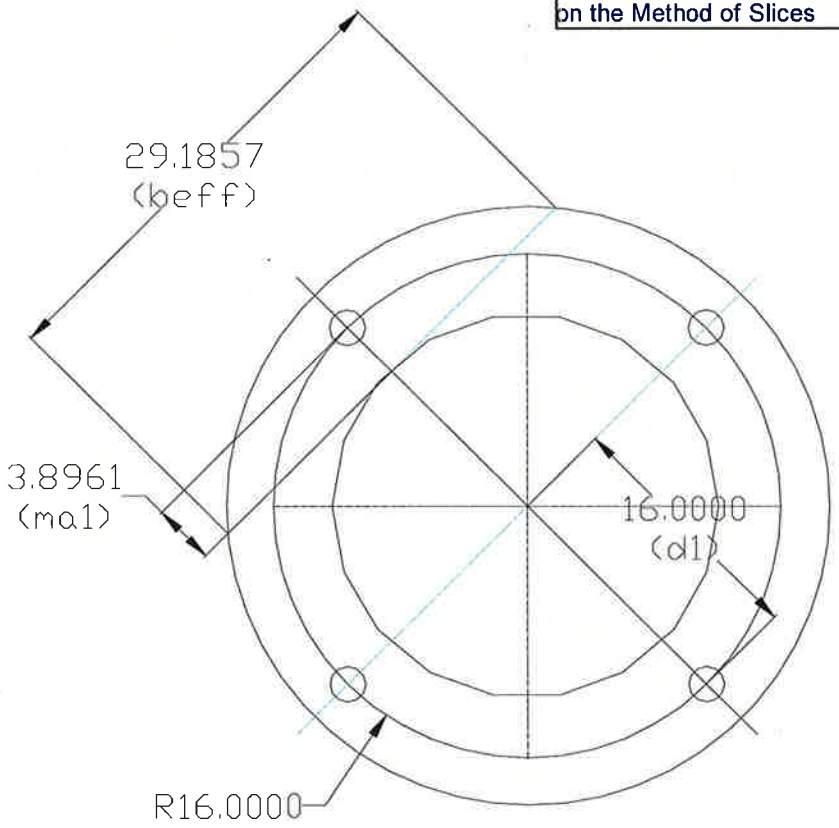
$d_1 := 16.000 \cdot in$ *user input*

$d_2 := 0 \cdot in$ *user input*

$MomentArm_1 := 3.8961 \cdot in$ *user input*

$EffectiveWidth := 29.1857 \cdot in$ *user input*

Note: Effective width is based on the Method of Slices



DETAIL - ANCHOR BOLT AND BASE PLATE

Anchor Bolt Section Properties:

Polar Moment of Inertia (J) divided by Area (A) = Σd

$$\Sigma d := (d_1)^2 \cdot 2 + (d_2)^2 \qquad \Sigma d = 512 \cdot in^2$$

Gross Area of Bolt:

$$A_g := \frac{\pi}{4} \cdot D^2 \qquad A_g = 3.98 \cdot in^2$$

Net Area of Bolt:

$$A_{net} := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n} \right)^2 \qquad A_{net} = 3.25 \cdot in^2$$

Net Diameter:

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

Radius of Gyration of Bolt:

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

Section Modulus of Bolt:

$$S_x := \frac{\pi \cdot D_n^{\ 3}}{32} \qquad S_x = 0.83 \cdot in^3$$

Anchor Bolt Bending Stress:

Maximum Applied Bending:

$$M_x := \left(\frac{Shear}{N} \right) \cdot 1 \qquad M_x = 0.44 \cdot kips \cdot ft$$

$$f_{bx} := \frac{M_x}{S_x} \qquad f_{bx} = 6.36 \cdot ksi$$

Allowable Bending

$$F_{bx} := 1.333 \cdot 0.60 \cdot Fy \qquad F_{bx} = 59.98 \cdot ksi$$

Note: 1.333 increase allowed per TIA/EIA

Anchor Bolt Tensile Stress Check:

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):

$F_{net.area} := 1.333 \cdot (0.60 \cdot A_{net} \cdot Fy)$ $F_{net.area} = 194.81 \cdot kips$

Note: 1.333 increase allowed per TIA/EIA

Maximum Applied Tension:

$$MaxTension := \frac{OM \cdot d_1}{\Sigma d} - \frac{Axial}{N}$$ $MaxTension = 160.62 \cdot kips$

Check Stresses:

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

$AnchorBoltStress := if(F_{net.area} > MaxTension, "Not Overstressed", "Overstressed")$

$AnchorBoltStress = "Not Overstressed"$

$$PercentStressed := 100 \cdot \frac{MaxTension}{F_{net.area}}$$

$PercentStressed = 82.45$

Note: Shear Stress is negligible

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 if a combined stress analysis is not required and set the bending stress to zero:

$$l := \begin{cases} l & \text{if } l > 2 \cdot D_n \\ 0.0\text{in} & \text{otherwise} \end{cases} \qquad l = 0$$

$$f_{bx} := \begin{cases} f_{bx} & \text{if } l > 2 \cdot D_n \\ 0.0\text{ksi} & \text{otherwise} \end{cases} \qquad f_{bx} = 0 \cdot \text{ksi}$$

Allowable Compressive Force:

$$K := 0.65$$

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

$$F_a := \begin{cases} \dfrac{\left[1 - \dfrac{\left(\frac{K \cdot l}{r}\right)^2}{2 \cdot C_c^{\,2}}\right] \cdot Fy}{\dfrac{5}{3} + \dfrac{3 \cdot \left(\frac{K \cdot l}{r}\right)}{8 \cdot C_c} - \dfrac{\left(\frac{K \cdot l}{r}\right)^3}{8 \cdot C_c^{\,3}}} & \text{if } \dfrac{K \cdot l}{r} \le C_c \\ \dfrac{12 \cdot \pi^2 \cdot E}{23 \cdot \left(\frac{K \cdot l}{r}\right)^2} & \text{if } \dfrac{K \cdot l}{r} > C_c \end{cases} \qquad F_a = 45 \cdot \text{ksi}$$

$$F_a := 1.333 \cdot F_a$$ Note: 1.333 increase allowed per TIA/EIA $\qquad F_a = 59.98 \cdot \text{ksi}$

Applied Compressive Force:

$$\text{MaxCompression} := \frac{OM \cdot d_1}{\Sigma d} + \frac{\text{Axial}}{N} \qquad \text{MaxCompression} = 165.62 \cdot \text{kips}$$

$$f_a := \frac{\text{MaxCompression}}{A_{net}} \qquad f_a = 51 \cdot \text{ksi}$$

Check Combined Stresses:

$$\text{StressRatio} := \frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} \qquad \text{StressRatio} = 0.85$$

Condition := if(StressRatio ≤ 1.0, "Not Overstressed" , "Overstressed")

Condition = "Not Overstressed"

Base Plate Analysis:

Force From Bolt(s):

$$C_1 := \frac{OM \cdot d_1}{\Sigma d} + \frac{Axial}{N} \qquad C_1 = 165.63 \times 10^3 \cdot lb$$

Bending Stress In Plate:

$$f_{bp} := \frac{6 \cdot (C_1 \cdot MomentArm_1)}{EffectiveWidth \cdot PlateThicknessProvide^2} \qquad f_{bp} = 43.32 \cdot ksi$$

Check Stresses:

$$BasePlateRatio := \frac{f_{bp}}{1.333 \cdot 0.75 Fy_{bp}} \qquad BasePlateRatio = 0.72$$

BasePlateStress := if(BasePlateRatio < 1, "Not Overstressed", "Is Overstressed")

BasePlateStress = "Not Overstressed"

FOUNDATION ANALYSIS

URS

Job	85' Monopole - Plainville, CT	Project No.	VZ5-149 (Rev. 2)	Page / Sheet	of 1 of 2
Description	Caisson Foundation Evaluation	Computed by	MCD	Date	11/20/13
		Checked by		Date	

Check Foundation Depth TIA/EIA-222-F 7.2.5

Shear Force: $S := 7k$ *USER INPUT*

Overturning Moment: $M := 435ft \cdot k$ *USER INPUT*

Foundation Diameter: $d := 5ft$ *USER INPUT*

Overall Length of Caisson: $L_c := 21ft$ *USER INPUT*

Depth From Top of Caisson to Grade: $L_{pag} := 1ft$ *USER INPUT*

Depth of Caisson Below Ground Level: $LD := L_c - L_{pag}$ $LD = 20.0ft$ *USER INPUT*

Depth Required:

$$LD1 := 2.0ft + \left(\frac{S \cdot ft^2}{3k \cdot d}\right) + 2ft \cdot .5\left(\frac{M \cdot ft}{3 \cdot k\, d} + \frac{S \cdot ft}{2k} + \frac{S^2 ft^3}{18k^2 d^2}\right)^{.5} \quad LD1 = 13.9ft$$

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

Moment Capacity:

Bending Moment: $Mu := 473ft \cdot kip$ *USER INPUT–FROM LPILE*

Moment Capacity: $Mn := 2362kip \cdot ft$ *USER INPUT–FROM LPILE*

Factor of Safety: $FS := \frac{Mn}{Mu}$ $FS = 5.0$

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

Factor of Safety Ratio: $FS_{ratio} := \left(\frac{FS_{reqd}}{FS}\right) = 0.26$

URS

Job	85' Monopole - Plainville, CT	Project No.	VZ5-149 (Rev. 2)	Page / Sheet	2 of 2
Description	Caisson Foundation Evaluation	Computed by	MCD	Date	11/20/13
		Checked by		Date	

Axial Capacity:

Applied Axial Load: $A1 := 10k$ *USER INPUT*

Concrete Weight: $A2 := .150\frac{k}{ft^3}\cdot LD\cdot\pi\frac{d^2}{4}$ $A2 = 58.9\cdot k$

Total Axial Load: $AT := A1 + A2$ $AT = 68.9\cdot k$

Number of Rebar: $n := 12$ *USER INPUT*

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

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

Area of Concrete: $Ag := \pi\cdot\frac{d^2}{4}$ $Ag = 19.6\,ft^{2.0}$

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

Axial Capacity: $Po := n\cdot Ar\cdot fy + (Ag - n\cdot Ar)\cdot 0.85\cdot f'c$ $Po = 10672.8\cdot k$

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

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: W:\Verizon-VZ5\36917397-VZ5149\08\Rev. 2\MathCAD\L-Pile\
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 20, 2013 Time: 15:23:18

Problem Title

Job Number: VZ5-149 (Rev. 2)

Client: Verizon

Engineer: MCD

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	=	100	
- 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 = 21.00 ft

Depth of ground surface below top of pile = 1.00 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	60.0000000
2	21.000000	60.0000000

Input Structural Properties:

Pile Section No. 1:

Section Type	=	Drilled Shaft (Bored Pile)
Section Length	=	21.00000000 ft
Section Diameter	=	60.00000000 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 3 layers

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

Distance from top of pile to top of layer	=	1.00000 ft
Distance from top of pile to bottom of layer	=	5.00000 ft
Effective unit weight at top of layer	=	100.00000 pcf
Effective unit weight at bottom of layer	=	100.00000 pcf
Friction angle at top of layer	=	25.00000 deg.
Friction angle at bottom of layer	=	25.00000 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	=	10.00000 ft
Effective unit weight at top of layer	=	120.00000 pcf
Effective unit weight at bottom of layer	=	120.00000 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	=	22.00000 pci
Subgrade k at bottom of layer	=	22.00000 pci

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

Distance from top of pile to top of layer	=	10.00000 ft
Distance from top of pile to bottom of layer	=	30.00000 ft
Effective unit weight at top of layer	=	60.00000 pcf
Effective unit weight at bottom of layer	=	60.00000 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	=	45.00000 pci
Subgrade k at bottom of layer	=	45.00000 pci

(Depth of lowest soil layer extends 9.00 ft below pile tip)

Summary of Soil Properties

Layer Num.	Soil Type (p-y Curve Criteria)	Uniaxial In-situ qu or Subgrade Mod.	RQD % In-situ GSI	Strain Elastic Epsilon 50	J Factor	Layer Depth kpy ft	Effective Unit Wt. pci	Undrained Cohesion Rock Emass psf	krm	Angle of Friction Test deg.	Rock Mass Test Type	Property
1	Sand (Reese, et al.)	--	--	--	--	1.000	100.000	--	--	25.000	--	--
						5.000	100.000	--	--	25.000	--	--
						1.000						
2	Sand (Reese, et al.)	--	--	--	--	5.000	120.000	--	--	34.000	--	--
						22.000						
						10.000	120.000	--	--	34.000	--	--
						22.000						
3	Sand (Reese, et al.)	--	--	--	--	10.000	60.000	--	--	34.000	--	--
						45.000						
						30.000	60.000	--	--	34.000	--	--
						45.000						

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 = 5886.00000 lbs	M =	4648588. in-lbs	12546.	False
2	1	V = 6828.00000 lbs	M =	5222538. in-lbs	9541.00000000	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:

Length of Section	=	21.00000000	ft
Shaft Diameter	=	60.00000000	in
Concrete Cover Thickness	=	3.29532744	in
Number of Reinforcing Bars	=	12	bars
Yield Stress of Reinforcing Bars	=	60.00000000	ksi
Modulus of Elasticity of Reinforcing Bars	=	29000.	ksi
Gross Area of Shaft	=	2827.43338823	sq. in.
Total Area of Reinforcing Steel	=	18.72000000	sq. in.
Area Ratio of Steel Reinforcement	=	0.66	percent
Edge-to-Edge Bar Spacing	=	12.04842085	in
Rebar Offset	=	0.0000000	in

Axial Structural Capacities:

Nom. Axial Structural Capacity = 0.85 Fc Ac + Fy As	=	10672.826	kips
Tensile Load for Cracking of Concrete	=	-1230.803	kips
Nominal Axial Tensile Capacity	=	-1123.200	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	25.99967	0.00000
2	1.41000	1.56000	22.51638	12.99984
3	1.41000	1.56000	12.99984	22.51638
4	1.41000	1.56000	0.00000	25.99967
5	1.41000	1.56000	-12.99984	22.51638
6	1.41000	1.56000	-22.51638	12.99984
7	1.41000	1.56000	-25.99967	0.00000
8	1.41000	1.56000	-22.51638	-12.99984
9	1.41000	1.56000	-12.99984	-22.51638
10	1.41000	1.56000	0.00000	-25.99967
11	1.41000	1.56000	12.99984	-22.51638
12	1.41000	1.56000	22.51638	-12.99984

Concrete Properties:

Compressive Strength of Concrete	=	4.00000000	ksi
Modulus of Elasticity of Concrete	=	3604.99653259	ksi
Modulus of Rupture of Concrete	=	-0.47434164	ksi
Compression Strain at Peak Stress	=	0.00188627	
Tensile Strain at Fracture of Concrete	=	-0.00011537	
Maximum Coarse Aggregate Size	=	0.75000000	in

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

Number	Axial Thrust Force kips
1	9.541
2	12.546

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 = 9.541 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	Run Msg
0.000000417	1187.1263282	2849103188.	31.8434201	0.0000133	-0.0000117	0.0555479	0.3811497	
0.000000833	2369.2705701	2843124684.	30.9241899	0.0000258	-0.0000242	0.1075032	0.7400846	
0.000001250	3546.4093448	2837127476.	30.6177898	0.0000383	-0.0000367	0.1591141	1.0990199	
0.000001667	4718.5426385	2831125583.	30.4645967	0.0000508	-0.0000492	0.2103806	1.4579555	
0.000002083	5885.6704514	2825121817.	30.3726864	0.0000633	-0.0000617	0.2613027	1.8168915	
0.000002500	7047.7927834	2819117113.	30.3114175	0.0000758	-0.0000742	0.3118804	2.1758278	
0.000002917	8204.9096343	2813111875.	30.2676580	0.0000883	-0.0000867	0.3621137	2.5347644	
0.000003333	9357.0210035	2807106301.	30.2348419	0.0001008	-0.0000992	0.4120026	2.8937014	
0.000003750	10504.	2801100504.	30.2093214	0.0001133	-0.0001117	0.4615472	3.2526387	
0.000004167	10504.	2520990454.	13.6317942	0.0000568	-0.0001932	0.2321245	-5.5665749	C
0.000004583	10504.	2291809504.	13.5548985	0.0000621	-0.0002129	0.2535089	-6.1334531	C
0.000005000	10504.	2100825378.	13.4908770	0.0000675	-0.0002325	0.2748336	-6.7003228	C
0.000005417	10504.	1939223426.	13.4347802	0.0000728	-0.0002522	0.2960549	-7.2674949	C
0.000005833	10504.	1800707467.	13.3871539	0.0000781	-0.0002719	0.3172264	-7.8345898	C
0.000006250	10504.	1680660303.	13.3463053	0.0000834	-0.0002916	0.3383481	-8.4016071	C
0.000006667	10504.	1575619034.	13.3109645	0.0000887	-0.0003113	0.3594199	-8.9685468	C
0.000007083	10504.	1482935561.	13.2801605	0.0000941	-0.0003309	0.3804417	-9.5354087	C
0.000007500	10504.	1400550252.	13.2531382	0.0000994	-0.0003506	0.4014135	-10.1021924	C
0.000007917	10504.	1326837081.	13.2293013	0.0001047	-0.0003703	0.4223351	-10.6688981	C
0.000008333	10504.	1260495227.	13.2081729	0.0001101	-0.0003899	0.4432066	-11.2355250	C
0.000008750	10504.	1200471645.	13.1893669	0.0001154	-0.0004096	0.4640279	-11.8020733	C
0.000009167	10504.	1145904752.	13.1725673	0.0001207	-0.0004293	0.4847988	-12.3685427	C
0.000009583	10504.	1096082806.	13.1575132	0.0001261	-0.0004489	0.5055194	-12.9349329	C
0.0000100	10504.	1050412689.	13.1439871	0.0001314	-0.0004686	0.5261896	-13.5012438	C
0.0000104	10504.	1008396182.	13.1318064	0.0001368	-0.0004882	0.5468092	-14.0674752	C
0.0000108	10504.	969611713.	13.1208165	0.0001421	-0.0005079	0.5673783	-14.6336269	C
0.0000113	10504.	933700168.	13.1108858	0.0001475	-0.0005275	0.5878967	-15.1996986	C
0.0000117	10504.	900353734.	13.1019014	0.0001529	-0.0005471	0.6083644	-15.7656901	C
0.0000121	10504.	869307053.	13.0937659	0.0001582	-0.0005668	0.6287813	-16.3316012	C
0.0000125	10504.	840330151.	13.0863952	0.0001636	-0.0005864	0.6491474	-16.8974318	C
0.0000129	10504.	813222727.	13.0797158	0.0001689	-0.0006061	0.6694625	-17.4631815	C
0.0000133	10504.	787809517.	13.0736634	0.0001743	-0.0006257	0.6897267	-18.0288502	C
0.0000138	10504.	763936501.	13.0681816	0.0001797	-0.0006453	0.7099398	-18.5944376	C
0.0000142	10504.	741467781.	13.0632206	0.0001851	-0.0006649	0.7301018	-19.1599435	C

0.0000146	10504.	720282987.	13.0587362	0.0001904	-0.0006846
0.7502126	-19.7253678	C			
0.0000150	10504.	700275126.	13.0546893	0.0001958	-0.0007042
0.7702721	-20.2907101	C			
0.0000154	10504.	681348771.	13.0510449	0.0002012	-0.0007238
0.7902803	-20.8559703	C			
0.0000158	10504.	663418540.	13.0477717	0.0002066	-0.0007434
0.8102371	-21.4211481	C			
0.0000163	10504.	646407809.	13.0448416	0.0002120	-0.0007630
0.8301423	-21.9862434	C			
0.0000171	10504.	614875720.	13.0399122	0.0002228	-0.0008022
0.8697982	-23.1161852	C			
0.0000179	10504.	586276850.	13.0360824	0.0002336	-0.0008414
0.9092472	-24.2457938	C			
0.0000188	10504.	560220101.	13.0332091	0.0002444	-0.0008806
0.9484889	-25.3750675	C			
0.0000196	10504.	536380948.	13.0311734	0.0002552	-0.0009198
0.9875226	-26.5040044	C			
0.0000204	10504.	514487848.	13.0298760	0.0002660	-0.0009590
1.0263477	-27.6326025	C			
0.0000213	10504.	494311854.	13.0292330	0.0002769	-0.0009981
1.0649637	-28.7608601	C			
0.0000221	10504.	475658576.	13.0291734	0.0002877	-0.0010373
1.1033700	-29.8887751	C			
0.0000229	10504.	458361901.	13.0296365	0.0002986	-0.0010764
1.1415659	-31.0163456	C			
0.0000238	10504.	442279027.	13.0305702	0.0003095	-0.0011155
1.1795509	-32.1435697	C			
0.0000246	10504.	427286518.	13.0319292	0.0003204	-0.0011546
1.2173242	-33.2704454	C			
0.0000254	10621.	417863226.	13.0336746	0.0003313	-0.0011937
1.2548854	-34.3969706	C			
0.0000263	10960.	417513146.	13.0357721	0.0003422	-0.0012328
1.2922338	-35.5231434	C			
0.0000271	11298.	417175301.	13.0381919	0.0003531	-0.0012719
1.3293687	-36.6489617	C			
0.0000279	11637.	416848548.	13.0409077	0.0003641	-0.0013109
1.3662895	-37.7744234	C			
0.0000288	11975.	416531880.	13.0438963	0.0003750	-0.0013500
1.4029956	-38.8995264	C			
0.0000296	12313.	416224401.	13.0471370	0.0003860	-0.0013890
1.4394863	-40.0242687	C			
0.0000304	12651.	415925312.	13.0506115	0.0003970	-0.0014280
1.4757610	-41.1486480	C			
0.0000313	12989.	415633900.	13.0543036	0.0004079	-0.0014671
1.5118191	-42.2726623	C			
0.0000321	13326.	415349526.	13.0581986	0.0004190	-0.0015060
1.5476598	-43.3963094	C			
0.0000329	13663.	415071614.	13.0622835	0.0004300	-0.0015450
1.5832824	-44.5195869	C			
0.0000338	13999.	414799645.	13.0665463	0.0004410	-0.0015840
1.6186864	-45.6424928	C			
0.0000346	14336.	414533151.	13.0709766	0.0004520	-0.0016230
1.6538711	-46.7650248	C			
0.0000354	14672.	414271706.	13.0755647	0.0004631	-0.0016619
1.6888357	-47.8871805	C			
0.0000363	15008.	414014922.	13.0803019	0.0004742	-0.0017008
1.7235795	-49.0089577	C			
0.0000371	15344.	413762449.	13.0851804	0.0004852	-0.0017398
1.7581019	-50.1303541	C			
0.0000379	15679.	413513964.	13.0901929	0.0004963	-0.0017787
1.7924022	-51.2513672	C			
0.0000387	16014.	413269172.	13.0953329	0.0005074	-0.0018176
1.8264796	-52.3719948	C			
0.0000396	16349.	413027804.	13.1005945	0.0005186	-0.0018564
1.8603335	-53.4922343	C			
0.0000404	16684.	412789611.	13.1059723	0.0005297	-0.0018953
1.8939631	-54.6120835	C			
0.0000412	17018.	412554365.	13.1114612	0.0005408	-0.0019342
1.9273676	-55.7315397	C			
0.0000421	17352.	412321856.	13.1170567	0.0005520	-0.0019730
1.9605464	-56.8506006	C			
0.0000429	17686.	412091888.	13.1227547	0.0005632	-0.0020118
1.9934987	-57.9692635	C			
0.0000437	18019.	411864281.	13.1285512	0.0005744	-0.0020506
2.0262238	-59.0875260	C			
0.0000446	18352.	411638869.	13.1344427	0.0005856	-0.0020894
2.0587208	-60.0000000	CY			
0.0000454	18685.	411415495.	13.1404260	0.0005968	-0.0021282
2.0909891	-60.0000000	CY			
0.0000462	19018.	411194015.	13.1464981	0.0006080	-0.0021670
2.1230279	-60.0000000	CY			
0.0000471	19350.	410974296.	13.1526562	0.0006193	-0.0022057
2.1548363	-60.0000000	CY			

0.0000479	19677.	410643471.	13.1577198	0.0006305	-0.0022445
2.1862525	-60.0000000	CY			
0.0000487	19973.	409694797.	13.1562963	0.0006414	-0.0022836
2.2165273	-60.0000000	CY			
0.0000496	20238.	408154371.	13.1485392	0.0006519	-0.0023231
2.2456586	-60.0000000	CY			
0.0000529	21211.	400829845.	13.1037152	0.0006934	-0.0024816
2.3574509	-60.0000000	CY			
0.0000562	21769.	386999894.	12.9810449	0.0007302	-0.0026448
2.4532510	-60.0000000	CY			
0.0000596	22311.	374456276.	12.8696636	0.0007668	-0.0028082
2.5458016	-60.0000000	CY			
0.0000629	22851.	363195089.	12.7673974	0.0008033	-0.0029717
2.6350784	-60.0000000	CY			
0.0000662	23389.	353039722.	12.6773952	0.0008399	-0.0031351
2.7218406	-60.0000000	CY			
0.0000696	23783.	341793840.	12.5642060	0.0008743	-0.0033007
2.8006191	-60.0000000	CY			
0.0000729	23994.	329063276.	12.4208978	0.0009057	-0.0034693
2.8702509	-60.0000000	CY			
0.0000762	24204.	317430629.	12.2906447	0.0009372	-0.0036378
2.9378880	-60.0000000	CY			
0.0000796	24410.	306720096.	12.1641916	0.0009681	-0.0038069
3.0022390	-60.0000000	CY			
0.0000829	24615.	296860445.	12.0489807	0.0009991	-0.0039759
3.0647621	-60.0000000	CY			
0.0000862	24819.	287752886.	11.9437210	0.0010301	-0.0041449
3.1254412	-60.0000000	CY			
0.0000896	25022.	279313329.	11.8473138	0.0010613	-0.0043137
3.1842602	-60.0000000	CY			
0.0000929	25224.	271469749.	11.7588187	0.0010926	-0.0044824
3.2412026	-60.0000000	CY			
0.0000963	25425.	264153362.	11.6755918	0.0011238	-0.0046512
3.2959374	-60.0000000	CY			
0.0000996	25623.	257301819.	11.5944534	0.0011546	-0.0048204
3.3480298	-60.0000000	CY			
0.0001029	25820.	250885809.	11.5194982	0.0011855	-0.0049895
3.3982774	-60.0000000	CY			
0.0001063	26017.	244864226.	11.4501572	0.0012166	-0.0051584
3.4466629	-60.0000000	CY			
0.0001096	26204.	239127572.	11.3835723	0.0012474	-0.0053276
3.4927786	-60.0000000	CY			
0.0001129	26323.	233121038.	11.3019929	0.0012762	-0.0054988
3.5337991	-60.0000000	CY			
0.0001163	26384.	226963295.	11.2091767	0.0013031	-0.0056719
3.5705229	-60.0000000	CY			
0.0001196	26441.	221113428.	11.1210327	0.0013299	-0.0058451
3.6056604	-60.0000000	CY			
0.0001229	26495.	215553096.	11.0323335	0.0013561	-0.0060189
3.6384626	-60.0000000	CY			
0.0001263	26547.	210275561.	10.9469643	0.0013821	-0.0061929
3.6696325	-60.0000000	CY			
0.0001296	26599.	205266619.	10.8665260	0.0014081	-0.0063669
3.6994786	-60.0000000	CY			
0.0001329	26651.	200506023.	10.7906525	0.0014343	-0.0065407
3.7279900	-60.0000000	CY			
0.0001363	26702.	195975505.	10.7190132	0.0014605	-0.0067145
3.7551552	-60.0000000	CY			
0.0001396	26752.	191658541.	10.6513096	0.0014867	-0.0068883
3.7809629	-60.0000000	CY			
0.0001429	26803.	187540149.	10.5872709	0.0015131	-0.0070619
3.8054014	-60.0000000	CY			
0.0001462	26852.	183606711.	10.5266513	0.0015395	-0.0072355
3.8284590	-60.0000000	CY			
0.0001496	26900.	179835767.	10.4659507	0.0015655	-0.0074095
3.8497211	-60.0000000	CY			
0.0001529	26947.	176218506.	10.4056667	0.0015912	-0.0075838
3.8693158	-60.0000000	CY			
0.0001562	26993.	172753215.	10.3484173	0.0016169	-0.0077581
3.8875935	-60.0000000	CY			
0.0001596	27038.	169430351.	10.2940173	0.0016428	-0.0079322
3.9045429	-60.0000000	CY			
0.0001629	27083.	166241137.	10.2422969	0.0016686	-0.0081064
3.9201522	-60.0000000	CY			
0.0001662	27128.	163177503.	10.1930999	0.0016946	-0.0082804
3.9344095	-60.0000000	CY			
0.0001696	27173.	160232012.	10.1462826	0.0017206	-0.0084544
3.9473025	-60.0000000	CY			
0.0001729	27217.	157397799.	10.1017124	0.0017468	-0.0086282
3.9588190	-60.0000000	CY			
0.0001762	27260.	154668518.	10.0592672	0.0017729	-0.0088021
3.9689462	-60.0000000	CY			
0.0001796	27304.	152038293.	10.0188337	0.0017992	-0.0089758
3.9776714	-60.0000000	CY			

0.0001829	27346.	149501678.	9.9803072	0.0018256	-0.0091494	
3.9849815	-60.0000000	CY				
0.0002029	27588.	135958723.	9.7699394	0.0019825	-0.0101925	
3.9916053	-60.0000000	CY				
0.0002229	27811.	124760442.	9.6040359	0.0021409	-0.0112341	
3.9928505	60.0000000	CY				
0.0002429	28020.	115346850.	9.4787818	0.0023026	-0.0122724	
3.9900998	60.0000000	CY				
0.0002629	28200.	107256605.	9.3761588	0.0024651	-0.0133099	
3.9916125	60.0000000	CY				
0.0002829	28296.	100013940.	9.2553155	0.0026185	-0.0143565	
3.9988729	60.0000000	CY				
0.0003029	28321.	93492815.	9.1108739	0.0027598	-0.0154152	
3.9825400	60.0000000	CY				
0.0003229	28338.	87755770.	8.9857824	0.0029017	-0.0164733	
3.9971627	60.0000000	CY				
0.0003429	28353.	82681514.	8.8793482	0.0030449	-0.0175301	
3.9915410	60.0000000	CYT				
0.0003629	28366.	78160465.	8.7884803	0.0031895	-0.0185855	
3.9858574	60.0000000	CYT				
0.0003829	28377.	74108615.	8.7095462	0.0033350	-0.0196400	
3.9977622	60.0000000	CYT				
0.0004029	28381.	70439649.	8.6298410	0.0034771	-0.0206979	
3.9938985	60.0000000	CYT				
0.0004229	28383.	67112988.	8.5584632	0.0036195	-0.0217555	
3.9737045	60.0000000	CYT				
0.0004429	28385.	64085623.	8.4949404	0.0037626	-0.0228124	
3.9846512	60.0000000	CYT				
0.0004629	28385.	61316847.	8.4424159	0.0039081	-0.0238669	
3.9957809	60.0000000	CYT				

Axial Thrust Force = 12.546 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	Run Msg
0.000000417	1187.1091458	2849061950.	32.4240300	0.0000135	-0.0000115	0.0565667	0.3881654	
0.000000833	2369.2532619	2843103914.	31.2152756	0.0000260	-0.0000240	0.1085180	0.7471192	
0.000001250	3546.3919364	2837113549.	30.8123716	0.0000385	-0.0000365	0.1601249	1.1060735	
0.000001667	4718.5251342	2831115081.	30.6109290	0.0000510	-0.0000490	0.2113873	1.4650282	
0.000002083	5885.6528503	2825113368.	30.4900706	0.0000635	-0.0000615	0.2623054	1.8239834	
0.000002500	7047.7750848	2819110034.	30.4095045	0.0000760	-0.0000740	0.3128790	2.1829391	
0.000002917	8204.8918375	2813105773.	30.3519626	0.0000885	-0.0000865	0.3631082	2.5418952	
0.000003333	9357.0031085	2807100933.	30.3088108	0.0001010	-0.0000990	0.4129930	2.9008517	
0.000003750	10504.	2801095706.	30.2752524	0.0001135	-0.0001115	0.4625333	3.2598087	
0.000004167	10504.	2520986135.	13.9112132	0.0000580	-0.0001920	0.2369153	-5.5328117	C
0.000004583	10504.	2291805578.	13.8091233	0.0000633	-0.0002117	0.2582900	-6.0996624	C
0.000005000	10504.	2100821780.	13.7245583	0.0000686	-0.0002314	0.2796142	-6.6664390	C
0.000005417	10504.	1939220104.	13.6534753	0.0000740	-0.0002510	0.3008879	-7.2331416	C
0.000005833	10504.	1800704382.	13.5929863	0.0000793	-0.0002707	0.3221110	-7.7997698	C
0.000006250	10504.	1680657424.	13.5409735	0.0000846	-0.0002904	0.3432835	-8.3663235	C
0.000006667	10504.	1575616335.	13.4956317	0.0000900	-0.0003100	0.3643994	-8.9328445	C
0.000007083	10504.	1482933021.	13.4541165	0.0000953	-0.0003297	0.3854112	-9.4996752	C
0.000007500	10504.	1400547853.	13.4175735	0.0001006	-0.0003494	0.4063729	-10.0664277	C
0.000007917	10504.	1326834808.	13.3852185	0.0001060	-0.0003690	0.4272844	-10.6331019	C
0.000008333	10504.	1260493068.	13.3564242	0.0001113	-0.0003887	0.4481458	-11.1996975	C
0.000008750	10504.	1200469588.	13.3306828	0.0001166	-0.0004084	0.4689569	-11.7662142	C

0.000009167	10504.	1145902789.	13.3075786	0.0001220	-0.0004280
0.4897177	-12.3326520	C			
0.000009583	10504.	1096080928.	13.2867685	0.0001273	-0.0004477
0.5104280	-12.8990108	C			
0.0000100	10504.	1050410890.	13.2679665	0.0001327	-0.0004673
0.5310879	-13.4652899	C			
0.0000104	10504.	1008394454.	13.2509322	0.0001380	-0.0004870
0.5516974	-14.0314894	C			
0.0000108	10504.	969610052.	13.2354624	0.0001434	-0.0005066
0.5722562	-14.5976090	C			
0.0000113	10504.	933698569.	13.2213839	0.0001487	-0.0005263
0.5927643	-15.1636486	C			
0.0000117	10504.	900352191.	13.2085482	0.0001541	-0.0005459
0.6132217	-15.7296080	C			
0.0000121	10504.	869305564.	13.1968275	0.0001595	-0.0005655
0.6336283	-16.2954868	C			
0.0000125	10504.	840328712.	13.1861107	0.0001648	-0.0005852
0.6539841	-16.8612849	C			
0.0000129	10504.	813221334.	13.1763014	0.0001702	-0.0006048
0.6742889	-17.4270022	C			
0.0000133	10504.	787808167.	13.1673150	0.0001756	-0.0006244
0.6945427	-17.9926382	C			
0.0000138	10504.	763935193.	13.1590773	0.0001809	-0.0006441
0.7147454	-18.5581930	C			
0.0000142	10504.	741466510.	13.1515227	0.0001863	-0.0006637
0.7348970	-19.1236661	C			
0.0000146	10504.	720281753.	13.1445933	0.0001917	-0.0006833
0.7549973	-19.6890575	C			
0.0000150	10504.	700273927.	13.1382373	0.0001971	-0.0007029
0.7750464	-20.2543668	C			
0.0000154	10504.	681347604.	13.1324089	0.0002025	-0.0007225
0.7950441	-20.8195939	C			
0.0000158	10504.	663417404.	13.1270669	0.0002078	-0.0007422
0.8149903	-21.3847385	C			
0.0000163	10504.	646406701.	13.1221743	0.0002132	-0.0007618
0.8348851	-21.9498004	C			
0.0000171	10504.	614874667.	13.1136077	0.0002240	-0.0008010
0.8745198	-23.0796753	C			
0.0000179	10504.	586275845.	13.1064800	0.0002348	-0.0008402
0.9139476	-24.2092165	C			
0.0000188	10504.	560219141.	13.1006026	0.0002456	-0.0008794
0.9531680	-25.3384224	C			
0.0000196	10504.	536380029.	13.0958193	0.0002565	-0.0009185
0.9921803	-26.4672910	C			
0.0000204	10504.	514486966.	13.0919993	0.0002673	-0.0009577
1.0309840	-27.5958204	C			
0.0000213	10504.	494311007.	13.0890323	0.0002781	-0.0009969
1.0695785	-28.7240088	C			
0.0000221	10504.	475657761.	13.0868248	0.0002890	-0.0010360
1.1079631	-29.8518542	C			
0.0000229	10504.	458361116.	13.0852969	0.0002999	-0.0010751
1.1461373	-30.9793547	C			
0.0000238	10504.	442278269.	13.0843799	0.0003108	-0.0011142
1.1841004	-32.1065083	C			
0.0000246	10504.	427285786.	13.0840145	0.0003216	-0.0011534
1.2218518	-33.2333129	C			
0.0000254	10671.	419862023.	13.0841491	0.0003326	-0.0011924
1.2593910	-34.3597667	C			
0.0000263	11010.	419446815.	13.0847387	0.0003435	-0.0012315
1.2967172	-35.4858676	C			
0.0000271	11349.	419047838.	13.0857441	0.0003544	-0.0012706
1.3338299	-36.6116134	C			
0.0000279	11688.	418663596.	13.0871304	0.0003653	-0.0013097
1.3707284	-37.7370023	C			
0.0000288	12026.	418292761.	13.0888672	0.0003763	-0.0013487
1.4074121	-38.8620319	C			
0.0000296	12364.	417934157.	13.0909272	0.0003873	-0.0013877
1.4438803	-39.9867003	C			
0.0000304	12702.	417586737.	13.0932863	0.0003983	-0.0014267
1.4801324	-41.1110053	C			
0.0000313	13039.	417249563.	13.0959231	0.0004092	-0.0014658
1.5161677	-42.2349447	C			
0.0000321	13376.	416921794.	13.0988181	0.0004203	-0.0015047
1.5519856	-43.3585163	C			
0.0000329	13713.	416602678.	13.1019541	0.0004313	-0.0015437
1.5875853	-44.4817180	C			
0.0000338	14050.	416291531.	13.1053155	0.0004423	-0.0015827
1.6229663	-45.6045474	C			
0.0000346	14386.	415987738.	13.1088883	0.0004533	-0.0016217
1.6581278	-46.7270024	C			
0.0000354	14722.	415690741.	13.1126598	0.0004644	-0.0016606
1.6930691	-47.8490807	C			
0.0000363	15058.	415400033.	13.1166185	0.0004755	-0.0016995
1.7277896	-48.9707798	C			

0.0000371	15394.	415115152.	13.1207539	0.0004866	-0.0017384
1.7622886	-50.0920976 C				
0.0000379	15729.	414835676.	13.1250566	0.0004977	-0.0017773
1.7965653	-51.2130316 C				
0.0000387	16064.	414561218.	13.1295178	0.0005088	-0.0018162
1.8306190	-52.3335795 C				
0.0000396	16399.	414291425.	13.1341296	0.0005199	-0.0018551
1.8644491	-53.4537388 C				
0.0000404	16734.	414025973.	13.1388849	0.0005310	-0.0018940
1.8980547	-54.5735071 C				
0.0000412	17068.	413764561.	13.1437770	0.0005422	-0.0019328
1.9314352	-55.6928819 C				
0.0000421	17402.	413506915.	13.1487998	0.0005533	-0.0019717
1.9645899	-56.8118608 C				
0.0000429	17735.	413252778.	13.1539477	0.0005645	-0.0020105
1.9975179	-57.9304412 C				
0.0000437	18069.	413001917.	13.1592156	0.0005757	-0.0020493
2.0302186	-59.0486205 C				
0.0000446	18402.	412754111.	13.1645987	0.0005869	-0.0020881
2.0626912	-60.0000000 CY				
0.0000454	18735.	412509159.	13.1700928	0.0005981	-0.0021269
2.0949348	-60.0000000 CY				
0.0000462	19067.	412266872.	13.1756938	0.0006094	-0.0021656
2.1269488	-60.0000000 CY				
0.0000471	19400.	412027074.	13.1813979	0.0006206	-0.0022044
2.1587324	-60.0000000 CY				
0.0000479	19727.	411685668.	13.1861149	0.0006318	-0.0022432
2.1901362	-60.0000000 CY				
0.0000487	20024.	410746531.	13.1845643	0.0006427	-0.0022823
2.2204279	-60.0000000 CY				
0.0000496	20290.	409204937.	13.1765733	0.0006533	-0.0023217
2.2495607	-60.0000000 CY				
0.0000529	21267.	401887851.	13.1310718	0.0006949	-0.0024801
2.3613829	-60.0000000 CY				
0.0000562	21826.	388014596.	13.0071745	0.0007317	-0.0026433
2.4571249	-60.0000000 CY				
0.0000596	22369.	375418480.	12.8960951	0.0007684	-0.0028066
2.5498261	-60.0000000 CY				
0.0000629	22908.	364104456.	12.7925753	0.0008049	-0.0029701
2.6390002	-60.0000000 CY				
0.0000662	23446.	353901539.	12.7014489	0.0008415	-0.0031335
2.7256583	-60.0000000 CY				
0.0000696	23844.	342672371.	12.5882084	0.0008759	-0.0032991
2.8044947	-60.0000000 CY				
0.0000729	24056.	329910433.	12.4440530	0.0009074	-0.0034676
2.8740532	-60.0000000 CY				
0.0000762	24266.	318242951.	12.3135173	0.0009389	-0.0036361
2.9416961	-60.0000000 CY				
0.0000796	24472.	307502240.	12.1871635	0.0009699	-0.0038051
3.0061078	-60.0000000 CY				
0.0000829	24677.	297610171.	12.0711170	0.0010009	-0.0039741
3.0685224	-60.0000000 CY				
0.0000862	24881.	288472687.	11.9650879	0.0010320	-0.0041430
3.1290921	-60.0000000 CY				
0.0000896	25084.	280005422.	11.8679704	0.0010632	-0.0043118
3.1878005	-60.0000000 CY				
0.0000929	25286.	272136109.	11.7788176	0.0010944	-0.0044806
3.2446312	-60.0000000 CY				
0.0000963	25487.	264801545.	11.6965551	0.0011258	-0.0046492
3.2995231	-60.0000000 CY				
0.0000996	25685.	257927445.	11.6148093	0.0011566	-0.0048184
3.3514962	-60.0000000 CY				
0.0001029	25883.	251490328.	11.5392882	0.0011876	-0.0049874
3.4016230	-60.0000000 CY				
0.0001063	26079.	245448953.	11.4694185	0.0012186	-0.0051564
3.4498864	-60.0000000 CY				
0.0001096	26268.	239712079.	11.4029357	0.0012496	-0.0053254
3.4959782	-60.0000000 CY				
0.0001129	26389.	233704859.	11.3214354	0.0012784	-0.0054966
3.5369724	-60.0000000 CY				
0.0001163	26450.	227531027.	11.2281543	0.0013053	-0.0056697
3.5735833	-60.0000000 CY				
0.0001196	26507.	221664786.	11.1395298	0.0013321	-0.0058429
3.6086004	-60.0000000 CY				
0.0001229	26562.	216096068.	11.0521064	0.0013585	-0.0060165
3.6415549	-60.0000000 CY				
0.0001263	26614.	210803715.	10.9662710	0.0013845	-0.0061905
3.6725967	-60.0000000 CY				
0.0001296	26666.	205780699.	10.8853916	0.0014106	-0.0063644
3.7023138	-60.0000000 CY				
0.0001329	26717.	201006730.	10.8091002	0.0014367	-0.0065383
3.7306951	-60.0000000 CY				
0.0001363	26768.	196463489.	10.7370647	0.0014629	-0.0067121
3.7577292	-60.0000000 CY				

0.0001396	26819.	192134406.	10.6689849	0.0014892	-0.0068858
3.7834046	-60.0000000 CY				
0.0001429	26869.	188004455.	10.6045886	0.0015156	-0.0070594
3.8077098	-60.0000000 CY				
0.0001462	26919.	184059981.	10.5436289	0.0015420	-0.0072330
3.8306329	-60.0000000 CY				
0.0001496	26967.	180283942.	10.4843760	0.0015683	-0.0074067
3.8519783	-60.0000000 CY				
0.0001529	27014.	176656478.	10.4237550	0.0015940	-0.0075810
3.8714276	-60.0000000 CY				
0.0001562	27060.	173181424.	10.3661843	0.0016197	-0.0077553
3.8895586	-60.0000000 CY				
0.0001596	27105.	169849200.	10.3114777	0.0016455	-0.0079295
3.9063598	-60.0000000 CY				
0.0001629	27150.	166651005.	10.2594646	0.0016714	-0.0081036
3.9218194	-60.0000000 CY				
0.0001662	27195.	163578745.	10.2099879	0.0016974	-0.0082776
3.9359254	-60.0000000 CY				
0.0001696	27239.	160624962.	10.1629032	0.0017235	-0.0084515
3.9486657	-60.0000000 CY				
0.0001729	27283.	157782772.	10.1180774	0.0017496	-0.0086254
3.9600277	-60.0000000 CY				
0.0001762	27327.	155045812.	10.0753874	0.0017758	-0.0087992
3.9699989	-60.0000000 CY				
0.0001796	27370.	152408188.	10.0347196	0.0018021	-0.0089729
3.9785663	-60.0000000 CY				
0.0001829	27413.	149864439.	9.9959688	0.0018284	-0.0091466
3.9857167	-60.0000000 CY				
0.0002029	27655.	136286854.	9.7862588	0.0019858	-0.0101892
3.9922364	-60.0000000 CY				
0.0002229	27877.	125056923.	9.6193796	0.0021443	-0.0112307
3.9934507	60.0000000 CY				
0.0002429	28085.	115616945.	9.4933370	0.0023061	-0.0122689
3.9908317	60.0000000 CY				
0.0002629	28265.	107506325.	9.3902959	0.0024689	-0.0133061
3.9904471	60.0000000 CY				
0.0002829	28364.	100253927.	9.2720371	0.0026232	-0.0143518
3.9991846	60.0000000 CY				
0.0003029	28389.	93720343.	9.1276184	0.0027649	-0.0154101
3.9835434	60.0000000 CY				
0.0003229	28407.	87968667.	9.0017080	0.0029068	-0.0164682
3.9977139	60.0000000 CY				
0.0003429	28421.	82881225.	8.8946803	0.0030501	-0.0175249
3.9898926	60.0000000 CYT				
0.0003629	28434.	78348802.	8.8031358	0.0031948	-0.0185802
3.9871669	60.0000000 CYT				
0.0003829	28445.	74286342.	8.7237940	0.0033405	-0.0196345
3.9982760	60.0000000 CYT				
0.0004029	28450.	70610386.	8.6471190	0.0034841	-0.0206909
3.9917159	60.0000000 CYT				
0.0004229	28452.	67275432.	8.5751155	0.0036266	-0.0217484
3.9714965	60.0000000 CYT				
0.0004429	28453.	64240517.	8.5110360	0.0037697	-0.0228053
3.9864670	60.0000000 CYT				
0.0004629	28453.	61465049.	8.5504448	0.0039581	-0.0238169
3.9998577	60.0000000 CYT				

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 No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain
1	9.541	28348.147	0.00300000
2	12.546	28416.175	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 = 5886.000 lbs
Applied moment at pile head = 4648588.000 in-lbs
Axial thrust load on pile head = 12546.000 lbs

Depth Distrib. X Lat. Load 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
lb/inch								
0.00	0.5141	4648588.	5886.0000	-0.002892	0.000	2.831E+12	0.000	
0.000	0.000							
2.520	0.5069	4663512.	5886.0001	-0.002888	0.000	2.831E+12	0.000	
0.000	0.000							
5.040	0.4996	4678436.	5886.0000	-0.002884	0.000	2.831E+12	0.000	
0.000	0.000							
7.560	0.4923	4693360.	5886.0000	-0.002880	0.000	2.831E+12	0.000	
0.000	0.000							
10.080	0.4851	4708284.	5886.0000	-0.002876	0.000	2.831E+12	0.000	
0.000	0.000							
12.600	0.4778	4723207.	5885.6387	-0.002872	0.000	2.831E+12	-0.2867	
1.5120	0.000							
15.120	0.4706	4738129.	5883.4274	-0.002867	0.000	2.831E+12	-1.4683	
7.8624	0.000							
17.640	0.4634	4753041.	5878.2843	-0.002863	0.000	2.831E+12	-2.6135	
14.2128	0.000							
20.160	0.4562	4767936.	5870.3011	-0.002859	0.000	2.831E+12	-3.7224	
20.5632	0.000							
22.680	0.4490	4782808.	5859.5692	-0.002855	0.000	2.831E+12	-4.7950	
26.9136	0.000							
25.200	0.4418	4797649.	5846.1797	-0.002850	0.000	2.831E+12	-5.8316	
33.2640	0.000							
27.720	0.4346	4812453.	5830.2235	-0.002846	0.000	2.831E+12	-6.8320	
39.6144	0.000							
30.240	0.4274	4827213.	5811.7916	-0.002842	0.000	2.830E+12	-7.7965	
45.9648	0.000							
32.760	0.4203	4841924.	5790.9743	-0.002838	0.000	2.830E+12	-8.7251	
52.3152	0.000							
35.280	0.4131	4856579.	5767.8622	-0.002833	0.000	2.830E+12	-9.6179	
58.6656	0.000							
37.800	0.4060	4871173.	5742.5452	-0.002829	0.000	2.830E+12	-10.4749	
65.0160	0.000							
40.320	0.3989	4885701.	5715.1135	-0.002825	0.000	2.830E+12	-11.2963	
71.3664	0.000							
42.840	0.3918	4900156.	5685.6566	-0.002820	0.000	2.830E+12	-12.0822	
77.7168	0.000							
45.360	0.3847	4914535.	5654.2641	-0.002816	0.000	2.830E+12	-12.8325	
84.0672	0.000							
47.880	0.3776	4928832.	5621.0253	-0.002811	0.000	2.830E+12	-13.5475	
90.4176	0.000							
50.400	0.3705	4943042.	5586.0293	-0.002807	0.000	2.830E+12	-14.2271	
96.7680	0.000							
52.920	0.3634	4957163.	5549.3650	-0.002803	0.000	2.830E+12	-14.8715	
103.1184	0.000							
55.440	0.3564	4971188.	5511.1210	-0.002798	0.000	2.830E+12	-15.4808	
109.4688	0.000							
57.960	0.3493	4985116.	5471.3859	-0.002794	0.000	2.829E+12	-16.0550	
115.8192	0.000							
60.480	0.3423	4998941.	5095.4625	-0.002789	0.000	2.829E+12	-282.2968	
2078.3100	0.000							
63.000	0.3353	5010973.	4367.9533	-0.002785	0.000	2.829E+12	-295.0915	
2218.0188	0.000							
65.520	0.3283	5021132.	3609.1693	-0.002780	0.000	2.829E+12	-307.1180	
2357.7276	0.000							
68.040	0.3213	5029339.	2821.0443	-0.002776	0.000	2.829E+12	-318.3781	
2497.4364	0.000							
70.560	0.3143	5035525.	2005.5071	-0.002771	0.000	2.829E+12	-328.8737	
2637.1452	0.000							
73.080	0.3073	5039622.	1164.4817	-0.002767	0.000	2.829E+12	-338.6067	
2776.8540	0.000							
75.600	0.3003	5041569.	299.8876	-0.002763	0.000	2.829E+12	-347.5791	
2916.5628	0.000							
78.120	0.2934	5041308.	-586.3609	-0.002758	0.000	2.829E+12	-355.7927	
3056.2716	0.000							
80.640	0.2864	5038788.	-1492.3539	-0.002754	0.000	2.829E+12	-363.2494	

3195.9804	0.000						
83.160	0.2795	5033961.	-2416.1863	-0.002749	0.000	2.829E+12	-369.9510
3335.6892	0.000						
85.680	0.2726	5026784.	-3355.9578	-0.002745	0.000	2.829E+12	-375.8994
3475.3980	0.000						
88.200	0.2657	5017221.	-4309.7728	-0.002740	0.000	2.829E+12	-381.0966
3615.1068	0.000						
90.720	0.2588	5005236.	-5275.7401	-0.002736	0.000	2.829E+12	-385.5442
3754.8156	0.000						
93.240	0.2519	4990804.	-6251.9736	-0.002731	0.000	2.829E+12	-389.2442
3894.5244	0.000						
95.760	0.2450	4973899.	-7236.5912	-0.002727	0.000	2.830E+12	-392.1984
4034.2332	0.000						
98.280	0.2381	4954504.	-8227.7160	-0.002722	0.000	2.830E+12	-394.4086
4173.9420	0.000						
100.800	0.2313	4932604.	-9223.4751	-0.002718	0.000	2.830E+12	-395.8765
4313.6508	0.000						
103.320	0.2244	4908189.	-10222.	-0.002714	0.000	2.830E+12	-396.6039
4453.3596	0.000						
105.840	0.2176	4881256.	-11221.	-0.002709	0.000	2.830E+12	-396.5926
4593.0684	0.000						
108.360	0.2108	4851805.	-12220.	-0.002705	0.000	2.830E+12	-395.8442
4732.7772	0.000						
110.880	0.2040	4819839.	-13216.	-0.002701	0.000	2.830E+12	-394.3606
4872.4860	0.000						
113.400	0.1972	4785369.	-14207.	-0.002696	0.000	2.831E+12	-392.1432
5012.1948	0.000						
115.920	0.1904	4748409.	-15191.	-0.002692	0.000	2.831E+12	-389.1938
5151.9036	0.000						
118.440	0.1836	4708976.	-16167.	-0.002688	0.000	2.831E+12	-385.5140
5291.6124	0.000						
120.960	0.1768	4667096.	-17617.	-0.002684	0.000	2.831E+12	-765.3796
10908.	0.000						
123.480	0.1701	4620355.	-19533.	-0.002680	0.000	2.831E+12	-755.4152
11194.	0.000						
126.000	0.1633	4568817.	-21423.	-0.002675	0.000	2.832E+12	-743.9654
11479.	0.000						
128.520	0.1566	4512554.	-23281.	-0.002671	0.000	2.832E+12	-731.0332
11765.	0.000						
131.040	0.1499	4451648.	-25105.	-0.002667	0.000	2.832E+12	-716.6215
12051.	0.000						
133.560	0.1431	4386192.	-26891.	-0.002663	0.000	2.832E+12	-700.7329
12337.	0.000						
136.080	0.1364	4316285.	-28635.	-0.002660	0.000	2.833E+12	-683.3703
12622.	0.000						
138.600	0.1297	4242039.	-30333.	-0.002656	0.000	2.833E+12	-664.5360
12908.	0.000						
141.120	0.1230	4163573.	-31983.	-0.002652	0.000	2.834E+12	-644.2326
13194.	0.000						
143.640	0.1164	4081015.	-33579.	-0.002648	0.000	2.834E+12	-622.4624
13480.	0.000						
146.160	0.1097	3994504.	-35118.	-0.002645	0.000	2.834E+12	-599.2274
13765.	0.000						
148.680	0.1030	3904188.	-36597.	-0.002641	0.000	2.835E+12	-574.5297
14051.	0.000						
151.200	0.0964	3810223.	-38012.	-0.002638	0.000	2.835E+12	-548.3712
14337.	0.000						
153.720	0.0897	3712776.	-39359.	-0.002634	0.000	2.836E+12	-520.7536
14623.	0.000						
156.240	0.0831	3612022.	-40634.	-0.002631	0.000	2.837E+12	-491.6785
14909.	0.000						
158.760	0.0765	3508145.	-41835.	-0.002628	0.000	2.837E+12	-461.1475
15194.	0.000						
161.280	0.0699	3401340.	-42957.	-0.002625	0.000	2.838E+12	-429.1617
15480.	0.000						
163.800	0.0633	3291809.	-43996.	-0.002622	0.000	2.838E+12	-395.7224
15766.	0.000						
166.320	0.0566	3179765.	-44949.	-0.002619	0.000	2.839E+12	-360.8306
16052.	0.000						
168.840	0.0501	3065430.	-45813.	-0.002616	0.000	2.839E+12	-324.4872
16337.	0.000						
171.360	0.0435	2949034.	-46583.	-0.002614	0.000	2.840E+12	-286.6929
16623.	0.000						
173.880	0.0369	2830817.	-47256.	-0.002611	0.000	2.840E+12	-247.4482
16909.	0.000						
176.400	0.0303	2711029.	-47828.	-0.002609	0.000	2.841E+12	-206.7536
17195.	0.000						
178.920	0.0237	2589927.	-48296.	-0.002606	0.000	2.842E+12	-164.6094
17480.	0.000						
181.440	0.0172	2467780.	-48656.	-0.002604	0.000	2.842E+12	-121.0157
17766.	0.000						
183.960	0.0106	2344865.	-48904.	-0.002602	0.000	2.843E+12	-75.9726
18052.	0.000						
186.480	0.004051	2221467.	-49037.	-0.002600	0.000	2.844E+12	-29.4798

18338.	0.000						
189.000	-0.002498	2097882.	-49051.	-0.002598	0.000	2.844E+12	18.4628
18624.	0.000						
191.520	-0.009043	1974414.	-48942.	-0.002596	0.000	2.844E+12	67.8557
18909.	0.000						
194.040	-0.0156	1851377.	-48707.	-0.002595	0.000	2.845E+12	118.6993
19195.	0.000						
196.560	-0.0221	1729094.	-48342.	-0.002593	0.000	2.845E+12	170.9943
19481.	0.000						
199.080	-0.0287	1607897.	-47844.	-0.002591	0.000	2.846E+12	224.7415
19767.	0.000						
201.600	-0.0352	1488126.	-47208.	-0.002590	0.000	2.847E+12	279.9416
20052.	0.000						
204.120	-0.0417	1370134.	-46431.	-0.002589	0.000	2.847E+12	336.5957
20338.	0.000						
206.640	-0.0482	1254279.	-45509.	-0.002588	0.000	2.848E+12	394.7047
20624.	0.000						
209.160	-0.0547	1140930.	-44440.	-0.002587	0.000	2.849E+12	454.2698
20910.	0.000						
211.680	-0.0613	1030466.	-43218.	-0.002586	0.000	2.849E+12	515.2921
21195.	0.000						
214.200	-0.0678	923274.	-41841.	-0.002585	0.000	2.849E+12	577.7730
21481.	0.000						
216.720	-0.0743	819752.	-40304.	-0.002584	0.000	2.849E+12	641.7135
21767.	0.000						
219.240	-0.0808	720304.	-38605.	-0.002583	0.000	2.849E+12	707.1152
22053.	0.000						
221.760	-0.0873	625347.	-36739.	-0.002583	0.000	2.849E+12	773.9793
22339.	0.000						
224.280	-0.0938	535306.	-34702.	-0.002582	0.000	2.849E+12	842.3072
22624.	0.000						
226.800	-0.1003	450613.	-32491.	-0.002582	0.000	2.849E+12	912.1002
22910.	0.000						
229.320	-0.1068	371712.	-30103.	-0.002581	0.000	2.849E+12	983.3596
23196.	0.000						
231.840	-0.1133	299056.	-27533.	-0.002581	0.000	2.849E+12	1056.0868
23482.	0.000						
234.360	-0.1198	233106.	-24779.	-0.002581	0.000	2.849E+12	1130.2830
23767.	0.000						
236.880	-0.1263	174335.	-21835.	-0.002581	0.000	2.849E+12	1205.9494
24053.	0.000						
239.400	-0.1328	123221.	-18699.	-0.002581	0.000	2.849E+12	1283.0871
24339.	0.000						
241.920	-0.1394	80256.	-15366.	-0.002581	0.000	2.849E+12	1361.6970
24625.	0.000						
244.440	-0.1459	45938.	-11834.	-0.002580	0.000	2.849E+12	1441.7801
24910.	0.000						
246.960	-0.1524	20776.	-8097.9530	-0.002580	0.000	2.849E+12	1523.3369
25196.	0.000						
249.480	-0.1589	5287.2809	-4154.5248	-0.002580	0.000	2.849E+12	1606.3680
25482.	0.000						
252.000	-0.1654	0.000	0.000	-0.002580	0.000	2.849E+12	1690.8739
12884.	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	=	0.5141493	inches
Computed slope at pile head	=	-0.0028925	radians
Maximum bending moment	=	5041569.	inch-lbs
Maximum shear force	=	-49051.	lbs
Depth of maximum bending moment	=	75.6000000	inches below pile head
Depth of maximum shear force	=	189.0000000	inches below pile head
Number of iterations	=	6	
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 = 6828.000 lbs
Applied moment at pile head = 5222538.000 in-lbs
Axial thrust load on pile head = 9541.000 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	0.5811	5222538.	6828.0000	-0.003268	0.000	2.828E+12	0.000	0.000	0.000
2.520	0.5729	5239823.	6827.9998	-0.003263	0.000	2.828E+12	0.000	0.000	0.000
5.040	0.5647	5257108.	6828.0000	-0.003259	0.000	2.828E+12	0.000	0.000	0.000
7.560	0.5565	5274393.	6828.0000	-0.003254	0.000	2.828E+12	0.000	0.000	0.000
10.080	0.5483	5291678.	6827.9999	-0.003249	0.000	2.828E+12	0.000	0.000	0.000
12.600	0.5401	5308962.	6827.5916	-0.003245	0.000	2.828E+12	-0.3241	1.5120	0.000
15.120	0.5319	5326245.	6825.0921	-0.003240	0.000	2.828E+12	-1.6597	7.8624	0.000
17.640	0.5238	5343517.	6819.2787	-0.003235	0.000	2.828E+12	-2.9542	14.2128	0.000
20.160	0.5156	5360769.	6810.2548	-0.003230	0.000	2.827E+12	-4.2076	20.5632	0.000
22.680	0.5075	5377996.	6798.1237	-0.003225	0.000	2.827E+12	-5.4202	26.9136	0.000
25.200	0.4994	5395187.	6782.9884	-0.003221	0.000	2.827E+12	-6.5919	33.2640	0.000
27.720	0.4913	5412337.	6764.9518	-0.003216	0.000	2.827E+12	-7.7229	39.6144	0.000
30.240	0.4832	5429437.	6744.1165	-0.003211	0.000	2.827E+12	-8.8132	45.9648	0.000
32.760	0.4751	5446481.	6720.5846	-0.003206	0.000	2.827E+12	-9.8629	52.3152	0.000
35.280	0.4670	5463463.	6694.4583	-0.003201	0.000	2.827E+12	-10.8722	58.6656	0.000
37.800	0.4590	5480375.	6665.8395	-0.003196	0.000	2.827E+12	-11.8411	65.0160	0.000
40.320	0.4509	5497213.	6634.8298	-0.003192	0.000	2.827E+12	-12.7697	71.3664	0.000
42.840	0.4429	5513968.	6601.5306	-0.003187	0.000	2.827E+12	-13.6582	77.7168	0.000
45.360	0.4348	5530637.	6566.0429	-0.003182	0.000	2.827E+12	-14.5065	84.0672	0.000
47.880	0.4268	5547214.	6528.4679	-0.003177	0.000	2.827E+12	-15.3149	90.4176	0.000
50.400	0.4188	5563694.	6488.9061	-0.003172	0.000	2.827E+12	-16.0834	96.7680	0.000
52.920	0.4109	5580071.	6447.4579	-0.003167	0.000	2.826E+12	-16.8120	103.1184	0.000
55.440	0.4029	5596341.	6404.2236	-0.003162	0.000	2.826E+12	-17.5010	109.4688	0.000
57.960	0.3949	5612500.	6359.3030	-0.003157	0.000	2.826E+12	-18.1503	115.8192	0.000
60.480	0.3870	5628544.	5934.3162	-0.003152	0.000	2.826E+12	-319.1409	2078.3100	0.000
63.000	0.3790	5642561.	5111.8515	-0.003147	0.000	2.826E+12	-333.6089	2218.0188	0.000
65.520	0.3711	5654459.	4254.0211	-0.003142	0.000	2.826E+12	-347.2088	2357.7276	0.000
68.040	0.3632	5664152.	3363.0101	-0.003137	0.000	2.826E+12	-359.9428	2497.4364	0.000
70.560	0.3553	5671559.	2440.9980	-0.003132	0.000	2.826E+12	-371.8128	2637.1452	0.000
73.080	0.3474	5676605.	1490.1591	-0.003127	0.000	2.826E+12	-382.8212	2776.8540	0.000
75.600	0.3395	5679220.	512.6622	-0.003122	0.000	2.826E+12	-392.9700	2916.5628	0.000
78.120	0.3317	5679339.	-489.3292	-0.003117	0.000	2.826E+12	-402.2613	3056.2716	0.000
80.640	0.3238	5676904.	-1513.6571	-0.003111	0.000	2.826E+12	-410.6973	3195.9804	0.000
83.160	0.3160	5671860.	-2558.1687	-0.003106	0.000	2.826E+12	-418.2801	3335.6892	0.000
85.680	0.3082	5664160.	-3620.7164	-0.003101	0.000	2.826E+12	-425.0118	3475.3980	0.000
88.200	0.3004	5653761.	-4699.1582	-0.003096	0.000	2.826E+12	-430.8944	3615.1068	0.000

90.720	0.2926	5640625.	-5791.3570	-0.003091	0.000	2.826E+12	-435.9301
3754.8156	0.000						
93.240	0.2848	5624721.	-6895.1814	-0.003086	0.000	2.826E+12	-440.1210
3894.5244	0.000						
95.760	0.2770	5606022.	-8008.5047	-0.003081	0.000	2.826E+12	-443.4690
4034.2332	0.000						
98.280	0.2693	5584506.	-9129.2057	-0.003076	0.000	2.826E+12	-445.9762
4173.9420	0.000						
100.800	0.2615	5560159.	-10255.	-0.003071	0.000	2.827E+12	-447.6447
4313.6508	0.000						
103.320	0.2538	5532968.	-11384.	-0.003066	0.000	2.827E+12	-448.4764
4453.3596	0.000						
105.840	0.2461	5502929.	-12514.	-0.003061	0.000	2.827E+12	-448.4733
4593.0684	0.000						
108.360	0.2383	5470042.	-13644.	-0.003057	0.000	2.827E+12	-447.6372
4732.7772	0.000						
110.880	0.2307	5434313.	-14769.	-0.003052	0.000	2.827E+12	-445.9703
4872.4860	0.000						
113.400	0.2230	5395751.	-15890.	-0.003047	0.000	2.827E+12	-443.4742
5012.1948	0.000						
115.920	0.2153	5354373.	-17004.	-0.003042	0.000	2.828E+12	-440.1509
5151.9036	0.000						
118.440	0.2076	5310199.	-18108.	-0.003037	0.000	2.828E+12	-436.0022
5291.6124	0.000						
120.960	0.2000	5263257.	-19748.	-0.003033	0.000	2.828E+12	-865.6436
10908.	0.000						
123.480	0.1924	5210817.	-21915.	-0.003028	0.000	2.828E+12	-854.4030
11194.	0.000						
126.000	0.1847	5152952.	-24052.	-0.003023	0.000	2.829E+12	-841.4838
11479.	0.000						
128.520	0.1771	5089742.	-26154.	-0.003019	0.000	2.829E+12	-826.8894
11765.	0.000						
131.040	0.1695	5021282.	-28217.	-0.003014	0.000	2.829E+12	-810.6231
12051.	0.000						
133.560	0.1619	4947673.	-30237.	-0.003010	0.000	2.830E+12	-792.6878
12337.	0.000						
136.080	0.1543	4869031.	-32210.	-0.003005	0.000	2.830E+12	-773.0868
12622.	0.000						
138.600	0.1468	4785479.	-34132.	-0.003001	0.000	2.831E+12	-751.8227
12908.	0.000						
141.120	0.1392	4697152.	-35997.	-0.002997	0.000	2.831E+12	-728.8984
13194.	0.000						
143.640	0.1317	4604197.	-37803.	-0.002993	0.000	2.832E+12	-704.3164
13480.	0.000						
146.160	0.1241	4506769.	-39545.	-0.002989	0.000	2.832E+12	-678.0792
13765.	0.000						
148.680	0.1166	4405035.	-41218.	-0.002985	0.000	2.832E+12	-650.1890
14051.	0.000						
151.200	0.1091	4299171.	-42820.	-0.002981	0.000	2.833E+12	-620.6481
14337.	0.000						
153.720	0.1016	4189366.	-44344.	-0.002977	0.000	2.833E+12	-589.4582
14623.	0.000						
156.240	0.0941	4075818.	-45789.	-0.002973	0.000	2.834E+12	-556.6213
14909.	0.000						
158.760	0.0866	3958735.	-47148.	-0.002970	0.000	2.835E+12	-522.1391
15194.	0.000						
161.280	0.0791	3838336.	-48418.	-0.002966	0.000	2.835E+12	-486.0129
15480.	0.000						
163.800	0.0716	3714851.	-49595.	-0.002963	0.000	2.836E+12	-448.2442
15766.	0.000						
166.320	0.0642	3588519.	-50675.	-0.002960	0.000	2.837E+12	-408.8340
16052.	0.000						
168.840	0.0567	3459590.	-51654.	-0.002957	0.000	2.837E+12	-367.7834
16337.	0.000						
171.360	0.0493	3328326.	-52527.	-0.002954	0.000	2.838E+12	-325.0931
16623.	0.000						
173.880	0.0418	3194998.	-53290.	-0.002951	0.000	2.838E+12	-280.7638
16909.	0.000						
176.400	0.0344	3059886.	-53940.	-0.002948	0.000	2.839E+12	-234.7961
17195.	0.000						
178.920	0.0270	2923284.	-54471.	-0.002945	0.000	2.840E+12	-187.1902
17480.	0.000						
181.440	0.0196	2785492.	-54881.	-0.002943	0.000	2.840E+12	-137.9462
17766.	0.000						
183.960	0.0122	2646824.	-55165.	-0.002940	0.000	2.841E+12	-87.0643
18052.	0.000						
186.480	0.004747	2507604.	-55318.	-0.002938	0.000	2.842E+12	-34.5442
18338.	0.000						
189.000	-0.002654	2368164.	-55337.	-0.002936	0.000	2.843E+12	19.6143
18624.	0.000						
191.520	-0.0100	2228849.	-55217.	-0.002934	0.000	2.844E+12	75.4117
18909.	0.000						
194.040	-0.0174	2090012.	-54954.	-0.002932	0.000	2.844E+12	132.8486
19195.	0.000						

196.560	-0.0248	1952019.	-54545.	-0.002930	0.000	2.844E+12	191.9257
19481.	0.000						
199.080	-0.0322	1815245.	-53985.	-0.002929	0.000	2.845E+12	252.6438
19767.	0.000						
201.600	-0.0396	1680075.	-53270.	-0.002927	0.000	2.846E+12	315.0038
20052.	0.000						
204.120	-0.0470	1546906.	-52395.	-0.002926	0.000	2.846E+12	379.0069
20338.	0.000						
206.640	-0.0543	1416143.	-51358.	-0.002924	0.000	2.847E+12	444.6542
20624.	0.000						
209.160	-0.0617	1288204.	-50152.	-0.002923	0.000	2.848E+12	511.9469
20910.	0.000						
211.680	-0.0691	1163516.	-48775.	-0.002922	0.000	2.849E+12	580.8864
21195.	0.000						
214.200	-0.0764	1042517.	-47223.	-0.002921	0.000	2.849E+12	651.4741
21481.	0.000						
216.720	-0.0838	925655.	-45490.	-0.002920	0.000	2.849E+12	723.7114
21767.	0.000						
219.240	-0.0911	813389.	-43573.	-0.002919	0.000	2.849E+12	797.5999
22053.	0.000						
221.760	-0.0985	706187.	-41468.	-0.002919	0.000	2.849E+12	873.1410
22339.	0.000						
224.280	-0.1059	604531.	-39170.	-0.002918	0.000	2.849E+12	950.3362
22624.	0.000						
226.800	-0.1132	508910.	-36676.	-0.002918	0.000	2.849E+12	1029.1872
22910.	0.000						
229.320	-0.1206	419824.	-33981.	-0.002917	0.000	2.849E+12	1109.6953
23196.	0.000						
231.840	-0.1279	337786.	-31081.	-0.002917	0.000	2.849E+12	1191.8621
23482.	0.000						
234.360	-0.1353	263316.	-27972.	-0.002917	0.000	2.849E+12	1275.6890
23767.	0.000						
236.880	-0.1426	196947.	-24650.	-0.002916	0.000	2.849E+12	1361.1772
24053.	0.000						
239.400	-0.1500	139223.	-21110.	-0.002916	0.000	2.849E+12	1448.3281
24339.	0.000						
241.920	-0.1573	90695.	-17348.	-0.002916	0.000	2.849E+12	1537.1427
24625.	0.000						
244.440	-0.1647	51930.	-13360.	-0.002916	0.000	2.849E+12	1627.6220
24910.	0.000						
246.960	-0.1720	23500.	-9142.5309	-0.002916	0.000	2.849E+12	1719.7667
25196.	0.000						
249.480	-0.1794	5991.5207	-4690.5170	-0.002916	0.000	2.849E+12	1813.5776
25482.	0.000						
252.000	-0.1867	0.000	0.000	-0.002916	0.000	2.849E+12	1909.0549
12884.	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	=	0.5811469	inches
Computed slope at pile head	=	-0.0032680	radians
Maximum bending moment	=	5679339.	inch-lbs
Maximum shear force	=	-55337.	lbs
Depth of maximum bending moment	=	78.1200000	inches below pile head
Depth of maximum shear force	=	189.0000000	inches below pile head
Number of iterations	=	6	
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
1	1	V = 5886.0000	M = 4648588.	12546.	0.51414934	5041569.	
		Rotation radians = -0.00289249					-49051.
2	1	V = 6828.0000	M = 5222538.	9541.00000000	0.58114686	5679339.	
		Rotation radians = -0.00326799					-55337.

The analysis ended normally.