STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

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

Daniel F. Caruso
Chairman

December 11, 2007

Thomas J. Regan, Esq.
Brown Rudnick Berlack Israels LLP
185 Asylum Street, CityPlace I
Hartford, CT 06103-3402

RE: **EM-SPRINT-NEXTEL-107-071114** – Sprint Nextel Corporation notice of intent to modify an existing telecommunications facility located at Grassy Hill Road, Orange, Connecticut.

Dear Attorney Regan:

At a public meeting held on November 29, 2007, the Connecticut Siting Council (Council) acknowledged your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies.

The proposed modifications are to be implemented as specified here and in your notice dated November 14, 2007, including the placement of all necessary equipment and shelters within the tower compound. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,

Daniel F. Caruso
Chairman

DFC/MP/laf

c: The Honorable James M. Zeoli, First Selectman, Town of Orange
Paul Dinice, Zoning Enforcement Officer, Town of Orange

STATE OF CONNECTICUT

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Phone: (860) 827-2935 Fax: (860) 827-2950
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Daniel F. Caruso
Chairman

November 15, 2007

The Honorable James M. Zeoli
First Selectman
Town of Orange
Town Hall
617 Orange Center Road
Orange, CT 06477-2423

RE: **EM-SPRINT-NEXTEL-107-071114** - Sprint Nextel Corporation notice of intent to modify an existing telecommunications facility located at Grassy Hill Road, Orange, Connecticut.

Dear Mr. Zeoli:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

The Council will consider this item at the next meeting scheduled for November 29, 2007, at 1:30 p.m. in Hearing Room One, Ten Franklin Square, New Britain, Connecticut.

If you have any questions or comments regarding this proposal, please call me or inform the Council by November 28, 2007.

Thank you for your cooperation and consideration.

Very truly yours,

S. Derek Phelps / M. P.

S. Derek Phelps
Executive Director

SDP/cm

Enclosure: Notice of Intent

c: Paul Dinice, Zoning Enforcement Officer, Town of Orange

EM-SPRINT-NEXTEL-107-071114 GINAL

CONNEC

In re:

Sprint Nextel Corporation's Notice to Make an Exempt Modification to an Existing Facility off of Grassy Hill Road in Orange, Connecticut.	:	**EXEMPT MODIFICATION NO. _____**
	:	November 14, 2007

NOTICE OF EXEMPT MODIFICATION

Pursuant to Conn. Agencies Regs. §§ 16-50j-73 and 16-50j-72(b), Sprint Nextel Corporation ("Sprint") hereby gives notice to the Connecticut Siting Council ("Council") and the Town of Orange of Sprint's intent to make an exempt modification to its existing monopole (the "Tower") located off of Grassy Hill Road in Orange, Connecticut (Map 60, Block 5, Lot 1). Specifically, Sprint plans to install three WiMAX antennas to its current antenna array. Under the Council's regulations (Conn. Agencies Regs. § 16-50j-72(b)), Sprint's plans do not constitute a modification subject to the Council's review because Sprint will not change the height of the tower, will not extend the boundaries of the compound, will not increase the noise levels at the site and will not increase the total radio frequency electromagnetic radiation power density at the site to levels above applicable standards.

Sprint is currently undertaking an upgrade to its wireless communications system in Connecticut. As part of the upgrade, Sprint is implementing WiMAX technology to enable enhanced wireless data communications. In order to accomplish the upgrade at this site, Sprint plans to add three WiMAX antennas to the existing antenna configuration and install additional WiMAX-related electronic equipment at the base of the Tower.

BROWN RUDNICK
BERLACK ISRAELS LLP
CITYPLACE I
185 ASYLUM STREET
HARTFORD, CT 06103
(860) 509-6500

The Tower is a 140-foot monopole located off of Grassy Hill Road in Orange, Connecticut (latitude 41° 17' 07.75" N, longitude 73° 02' 33.27" W). The property is owned by the Town of Orange and the Tower is owned by Sprint. AT&T, Verizon and T-Mobile are also located on the Tower at 140 feet, 120 feet, and 110 feet, respectively. Currently, Sprint has six antennas spread over three sectors with an antenna centerline at 130 feet. Sprint's base station equipment is located in two cabinets on top of an 18' x 10'-6" equipment pad. A site plan with the specifications of the Tower is attached.

Sprint plans to install three KMW AM-X-WM-17-65-00T (WiMAX) antennas on the three existing pipe mounts where there are currently pipe mounts but no antennas. In addition, Sprint will install six coaxial cables, 1-5/8" in diameter, within the interior of the monopole. To confirm that the Tower can support these changes, Sprint commissioned URS Corporation to perform a structural analysis of the Tower (attached). According to the structural analysis dated October 31, 2007, "the tower and its foundation are considered structurally adequate" to support these changes (p. 3). In addition, Sprint will install two WiMAX radio cabinets on the existing concrete pad at the base of the Tower. No increase in the size of the equipment pad is necessary. Sprint will also mount a global positioning system (GPS) antenna to a post on the existing ice bridge. Excluding brief, minor, construction-related noise during the addition of the antennas and the installation of the base station equipment, Sprint's changes to the Tower will not increase noise levels at the site.

The addition of the new WiMAX antennas to Sprint's existing antenna array will not adversely impact the health and safety of the surrounding community or the people working on the Tower. The total radio frequency exposure measured around the Tower will be well below the National Council on Radiation Protection and Measurements' ("NCRP") standard adopted by

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BERLACK ISRAELS LLP
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HARTFORD, CT 06103
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the Federal Communications Commission ("FCC"). The worst-case power density analysis for the WiMAX antennas, measured at the base of the Tower, indicates that the WiMAX antennas will emit 3.59% of the NCRP's standard for maximum permissible exposure. A cumulative power density analysis indicates that together, the Sprint, T-Mobile, Verizon, AT&T and WiMAX antennas will only emit 22.6061% of the NCRP's standard for maximum permissible exposure. Therefore, power density levels will be well below the FCC mandated radio frequency exposure limits in all locations around the Tower, even with extremely conservative assumptions. The power density analysis is attached.

In conclusion, Sprint's proposed plan to add three WiMAX antennas and associated equipment at the site does not constitute a modification subject to the Council's jurisdiction because Sprint will not increase the height of the Tower, will not extend the boundaries of the site, will not increase the noise levels at the site, and the total radio frequency electromagnetic radiation power density will stay within all applicable standards. *See* Conn. Agencies Regs. § 16-50j-72.

Sprint Nextel Corporation

By: _____

Thomas J. Regan
Brown Rudnick Berlack Israels LLP
185 Asylum Street, CityPlace I
Hartford, CT 06103-3402
Email - tregan@brownrudnick.com
Phone - 860.509.6522
Fax - 860.509.6622

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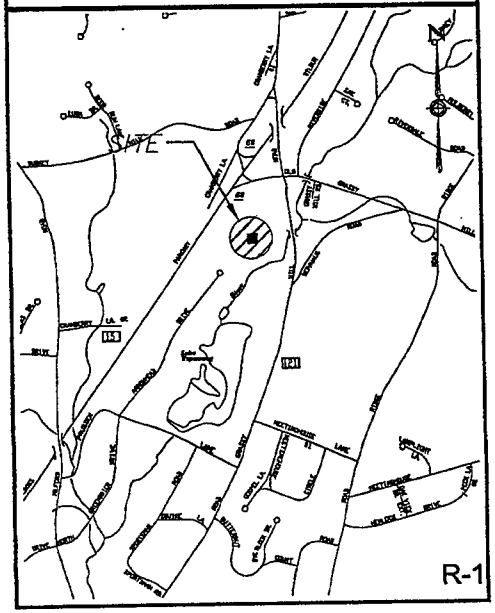
HARTFORD, CT 06103
(860) 509-6500

Sprint Nextel Corp.

ROGERS PROPERTY

CT01YC222/CT23XC313
GRASSY HILL ROAD
ORANGE, CONNECTICUT 06477

PROJECT INDEX — NO SCALE



SHEET INDEX

SHT. NO.	DESCRIPTION
T-1	TITLE SHEET – GENERAL NOTES AND LEGENDS
SC-1	COMPOUND PLAN
SC-2	TOWER ELEVATION

DRIVING DIRECTIONS

FROM 100 CORPORATE PLACE, ROCKY HILL, CT:

START OUT GOING SOUTH ON CORPORATE PL TOWARD WEST ST. 0.1 MILES.
TURN LEFT ONTO WEST ST. <0.1 MILES
MERGE ONTO I-91 S TOWARD NEW HAVEN. 9.6 MILES
MERGE ONTO CT-15 S / WILBUR CROSS PKWY VIA EXIT 17. 23.4 MILES
TAKE EXIT 56 TOWARD CT-121 / ORANGE. 0.2 MILES
TURN RIGHT ONTO GRASSY HILL RD / CT-121. <0.1 MILES
END AT 700 GRASSY HILL RD ORANGE, CT 06477-1652, US
TOTAL EST. TIME: 37 MINUTES TOTAL EST. DISTANCE: 33.54

PROJECT INDEX

SITE NUMBER:	CT01YC222/CT23XC313
SITE NAME:	ROGERS PROPERTY
SITE ADDRESS:	GRASSY HILL ROAD ORANGE, CT 06477
APPLICANT:	SPRINT NEXTEL CORP. 1 INTERNATIONAL BLVD, SUITE 800 MAHWAH, NJ 07495
CONTACT:	JASON DEIBERT (347) 284-8617
PROPERTY OWNER:	TOWN OF ORANGE 663 ORANGE CENTER ROAD ORANGE, CT 06477
JURISDICTION:	CONNECTICUT SITING COUNCIL
MAP & LOT:	MAP 60/LOT 1
ZONING DISTRICT:	RESIDENCE R-1 DISTRICT
LATITUDE:	41°-17'-07.75"
LONGITUDE:	73°-02'-33.27"

Sprint Nextel Corp.
1 INTERNATIONAL BLVD., SUITE 800
MAHWAH, NJ 07495

TRANSCEND WIRELESS, LLC
479 ROUTE 17 NORTH, 2ND FLOOR
MAHWAH, NJ 07430

A&E FIRM
URS CORPORATION AES
500 ENTERPRISE DRIVE, SUITE 3B
ROCKY HILL, CONNECTICUT
1-(860)-529-8882

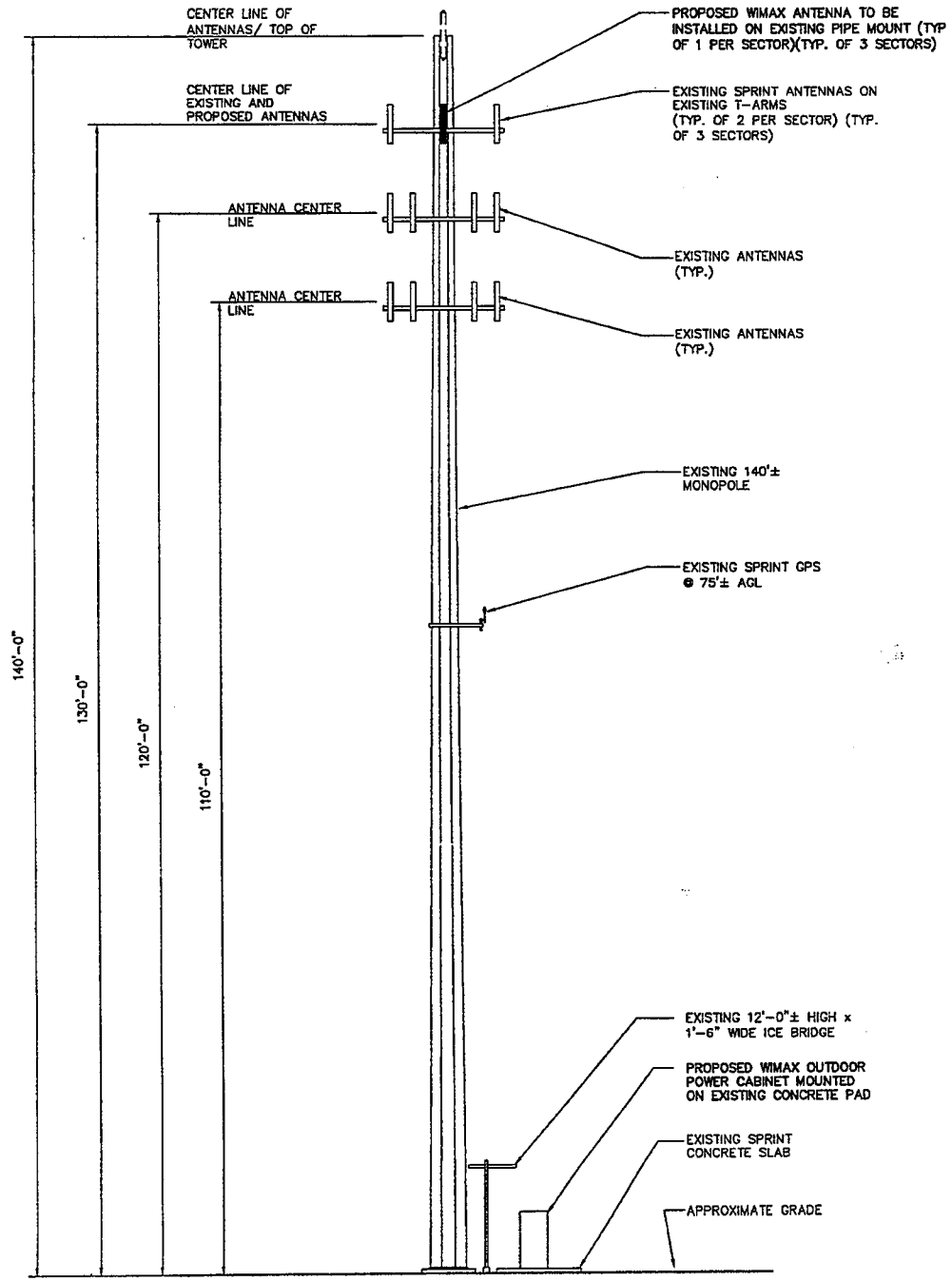
NO.	DATE	REVISIONS	BY	CHK	APP'D
3	10/25/07	SITING COUNCIL	PJS	PJS	AA
2	10/10/07	REVIEW	PJS	PJS	AA
1	10/09/07	REVIEW	PJS	PJS	AA

NOT TO SCALE | DESIGNED BY: PJS | DRAWN BY: PJS

A&E SEAL

ROGERS PROPERTY
CT01YC222/CT23XC313
GRASSY HILL ROAD
ORANGE, CT 06477

PROJECT NO.	DRAWING NAME	DATE	SHEET NO.	REV
TW1-005 36917265	T-1	10/10/07	1 OF 3	B



2 / SC-1 TOWER ELEVATION
SCALE: 1" = 20'-0"

ANTENNA AZIMUTHS:
SECTOR (1) = 30°
SECTOR (2) = 150°
SECTOR (3) = 270°

Sprint Nextel Corp.
1 INTERNATIONAL BLVD., SUITE 800
MAHWAH, NJ 07495

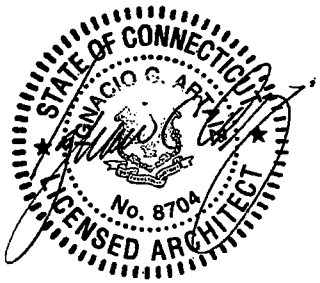
TRANSCEND WIRELESS, LLC
479 ROUTE 17 NORTH, 2ND FLOOR
MAHWAH, NJ 07430

A&E FIRM
URS CORPORATION AES
500 ENTERPRISE DRIVE, SUITE 3B
ROCKY HILL, CONNECTICUT
1-(860)-529-8882

NO.	DATE	REVISIONS	BY	CHK	APP'D
3	10/25/07	SITING COUNCIL	PJS	PJS	AA
2	10/10/07	REVIEW	PJS	PJS	AA
1	10/09/07	REVIEW	PJS	PJS	AA

NOT TO SCALE | DESIGNED BY: PJS | DRAWN BY: PJS

A&E SEAL

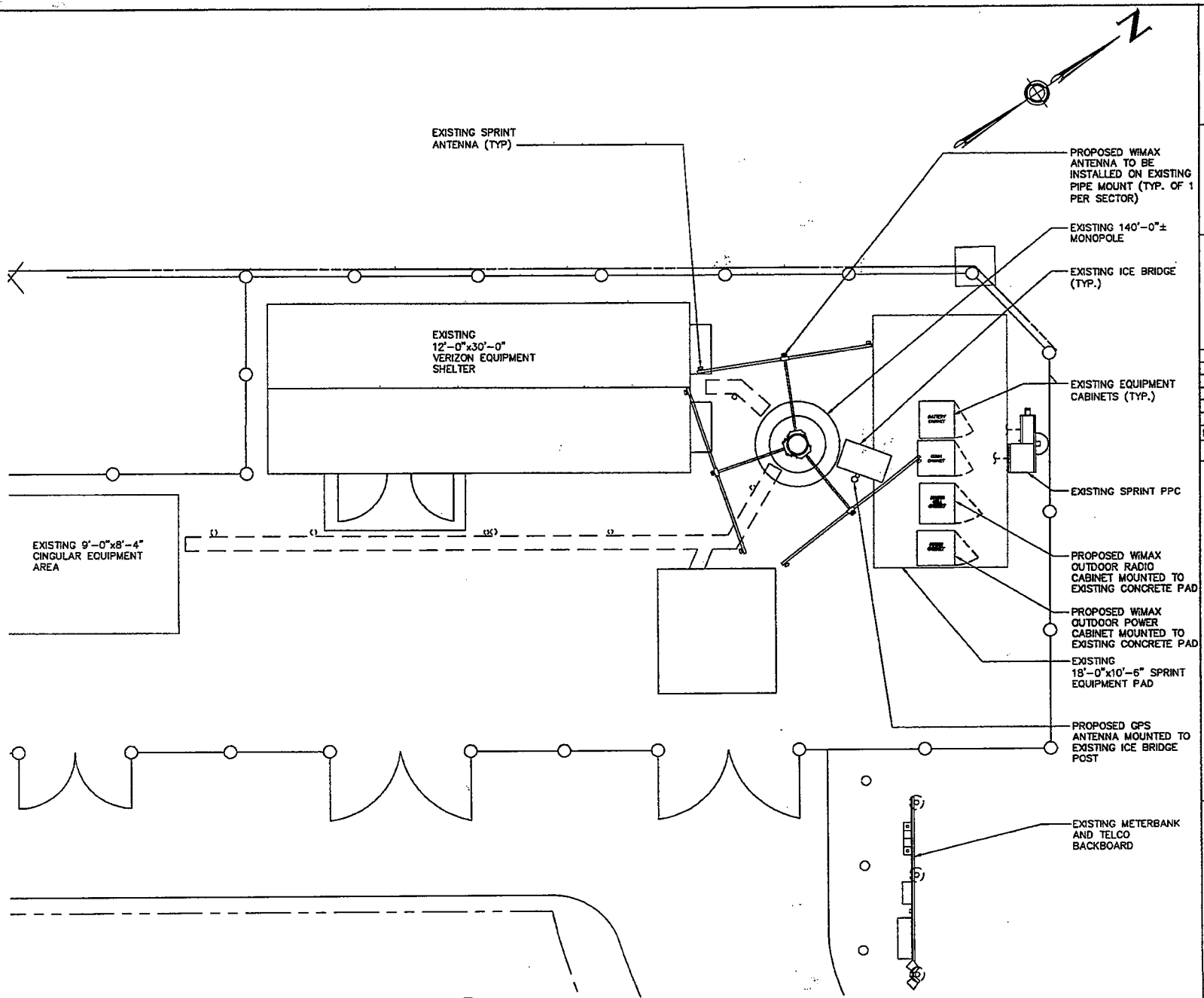


ROGERS PROPERTY

CT01YC222/CT23XC313

GRASSY HILL ROAD
ORANGE, CT 06477

PROJECT NO.	DRAWING NAME	DATE	SHEET NO.	REV
TW1-005 36917265	SC-2	10/10/07	3 OF 3	B



1 / SC-1 COMPOUND PLAN
SCALE: 1" = 10'-0"

ANTENNA AZIMUTHS:
SECTOR (1) = 30°
SECTOR (2) = 150°
SECTOR (3) = 270°

Sprint Nextel Corp.
1 INTERNATIONAL BLVD., SUITE 800
MAHWAH, NJ 07495

TRANSCEND WIRELESS, LLC
479 ROUTE 17 NORTH, 2ND FLOOR
MAHWAH, NJ 07430

A&E FIRM
URS CORPORATION AES
500 ENTERPRISE DRIVE, SUITE 3B
ROCKY HILL, CONNECTICUT
1-(860)-529-8882

NO.	DATE	REVISIONS	BY	CHK	APP'D
4	10/25/07	SITING COUNCIL	PJS	PJS	AA
3	10/10/07	REVIEW	PJS	PJS	AA
2	10/09/07	REVIEW	PJS	PJS	AA

NOT TO SCALE | DESIGNED BY: PJS | DRAWN BY: PJS

A&E SEAL

STATE OF CONNECTICUT
IGNACIO G. ARIAS
No. 8704
LICENSED ARCHITECT

ROGERS PROPERTY

CT01YC222/CT23XC313

GRASSY HILL ROAD
ORANGE, CT 06477

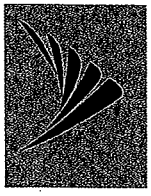
PROJECT NO.	DRAWING NAME	DATE	SHEET NO.	REV
TW1-005 36917265	SC-1	10/10/07	2 OF 3	B

DETAILED STRUCTURAL ANALYSIS AND EVALUATION OF AN EXISTING 140' MONOPOLE TOWER AND ITS FOUNDATION FOR NEW ANTENNA ARRANGEMENT

Site Name: Rogers Property
Grassy Hill Road,
Orange, CT 06477

prepared for

Sprint Nextel Corp.



1 International Blvd.,
Suite 800
Mahwah, NJ 07495

TRANSCEND WIRELESS, LLC
479 ROUTE 17 NORTH,
2ND FLOOR,
MAHWAH, NJ 07495

prepared by

URS

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

36917265.00000
TW1-005

October 31, 2007

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis of the existing 140' steel monopole structure, located off Grassy Hill Road, in Orange, CT. The analysis was conducted in accordance with the 2005 Connecticut State Building Code and the TIA/EIA-222-F standard for a wind velocity of 90 mph (fastest mile) and 78 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 Sprint/Nextel installation is as follows:

Proposed Antenna and Mount	Carrier	Antenna Center Elevation
On the existing Sprint/Nextel T-Arms:		
Install: **(3) KMW AM-X-WM-17-65-00T antennas,** **(6) 1 5/8" dia coaxial cables** **(located within interior of monopole)**	**Sprint/Nextel (Proposed)**	**@ 130'**

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

This analysis is based on:

1) The tower structure's theoretical capacity, not including any assessment of the condition of the tower.

2) Tower geometry and structural member sizes taken from manufacturers design documents for a 140' monopole , prepared by Engineered Endeavors Incorporated, (EEI), on behalf of Sprint PCS, EEI Job # 12364-E01, signed and sealed March 03, 2004.

3) Geotechnical Engineering Report prepared by Dr. Clarence Welti, P.E., P.C., Geotechnical Engineers on behalf of Sprint PCS, dated February 16, 2004.

4) Previous structural analysis report prepared by URS on behalf of Sprint PCS, signed and sealed March 04, 2004.

5) Site documentation conducted by URS during October 2007.

6) Antenna and mount configuration as specified within Section 2 of this report.

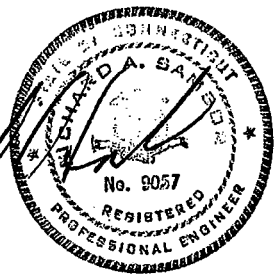
1. EXECUTIVE SUMMARY – *continued*

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.
Manager Facilities Design

RAS/jrm
cc: AA, DR, ICA – URS, CF/Book

2. INTRODUCTION

The subject tower is located off Grassy Hill Road in Orange, CT. The structure is an existing 140' steel monopole, designed and manufactured by Engineered Endeavors Incorporated, (EEI).

The inventory is summarized in the table below:

Antenna Type	Carrier	Mount	Antenna Centerline Elevation	Cable
(3) Allgon 7721antennas	AT&T (existing)	Pipe Mount	140'	(12) 1 5/8" coax cables (within monopole)
(6) Decibel DB950F65T2E-M antennas	Sprint/Nextel (existing)	(3) T-Arms	130'	(6) 1 1/4" coax cables (within monopole)
(3) KMW AM-X-WM-17-65-00T antennas	**Sprint/Nextel (proposed)**	(3) T-Arms (same as above)	**130'**	**(6) 1 5/8" coax cables (within monopole)**
(12) panel antennas	Verizon (existing)	(3) T-Arms	120'	(12) 1 5/8" coax cables (within monopole)
(3) panel antennas and (3) TMA's	T-Mobile (existing)	(3) T-Arms	110'	(12) 1 5/8" coax cables (within monopole)

This structural analysis of the communications tower was performed by URS Corporation (URS) for Sprint/Nextel. 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 conducted in accordance with the 2005 Connecticut State Building Code, TIA/EIA-222-F—Structural Standard for Steel Antenna Towers and Antenna Supporting Structures, and the American Institute of Steel Construction (AISC) Manual of Steel Construction—Allowable Stress Design (ASD).

The analysis was conducted using RISA Tower 5.0. Two load conditions were evaluated as shown below which were compared to allowable stresses according to AISC and TIA/EIA.

Load Condition 1 = 90 mph (fastest mile) Wind Load (without ice) + Tower Dead Load
Load Condition 2 = 78 mph (fastest mile) Wind Load (with ice) + Ice Load + Tower Dead Load

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

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

4. FINDINGS AND EVALUATION

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

Tower Component Stress vs. Capacity Summary

Component/Member	Controlling Component / Elevation	Stress Ratio (% capacity)	Pass/Fail	Notes
Pole Shaft	0'-46.4'	62.9%	Pass	
Anchor Bolts	Tension	50.0%	Pass	
Base Plate		62.0%	Pass	

Foundation	Vector	Overturning Factor (F.O.S)	Pass/Fail	Comments
Concrete Caisson	OTM	3.0	Pass	Min of 1.3 F.O.S reqd.

Note: Overturning Moment (OTM) controls foundation design

5. CONCLUSIONS

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

Limitations/Assumptions:

This report is based on the following:

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

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

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

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

Ongoing and Periodic Inspection and Maintenance:

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

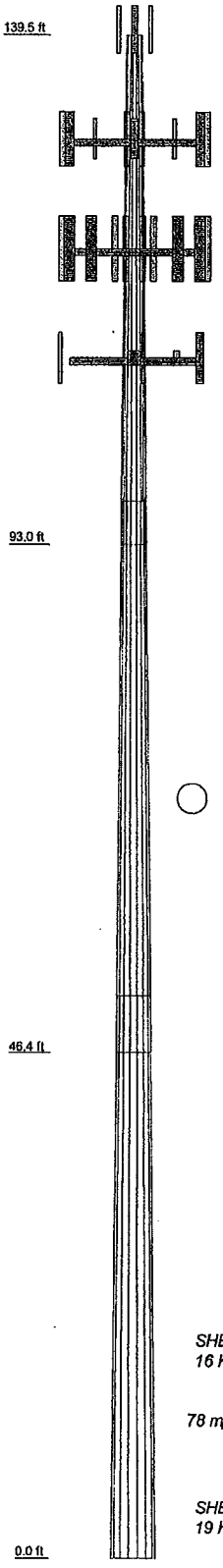
The owner shall refer to TIA/EIA-222-F for recommendations for maintenance and inspection. The frequency of the inspection and maintenance intervals is to be determined by the owner based upon actual site and environmental conditions. It is recommended that a complete and thorough inspection of the entire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

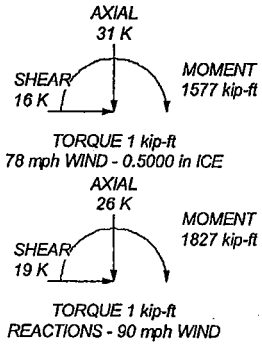
6. DRAWINGS AND DATA

RISA TOWER INPUT/OUTPUT SUMMARY

Section	1	2	3
Length (ft)	46.46	50.58	51.63
Number of Sides	18	18	18
Thickness (in)	0.2500	0.3750	0.3750
Lap Splice (ft)	3.92	5.25	
Top Dia (in)	15.5000	25.5213	35.8741
Bot Dia (in)	26.9900	37.9100	48.5000
Grade		A572-65	
Weight (K)	2.6	6.4	8.7

17.8





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
7721.00 w/Mount Pipe (ATI)	140	Panel Antenna (Verizon)	120
7721.00 w/Mount Pipe (ATI)	140	Panel Antenna (Verizon)	120
7721.00 w/Mount Pipe (ATI)	140	Panel Antenna (Verizon)	120
Valmont Light Duty Tri-Bracket (1) (ATI)	140	Panel Antenna (Verizon)	120
		Panel Antenna (Verizon)	120
T-Arm (3) (Sprint/Nextel)	130	Panel Antenna (Verizon)	120
DB950F65T2E-M (Sprint/Nextel)	130	Panel Antenna (Verizon)	120
KMZ AM-X-WM-17-65-00T (Sprint/Nextel)	130	Panel Antenna (Verizon)	120
		Panel Antenna (Verizon)	120
DB950F65T2E-M (Sprint/Nextel)	130	Panel Antenna (Verizon)	120
DB950F65T2E-M (Sprint/Nextel)	130	Panel Antenna (Verizon)	120
KMZ AM-X-WM-17-65-00T (Sprint/Nextel)	130	T-Arm (3) (T-Mobile)	110
		RR90-17 (T-Mobile)	110
DB950F65T2E-M (Sprint/Nextel)	130	RR90-17 (T-Mobile)	110
DB950F65T2E-M (Sprint/Nextel)	130	RR90-17 (T-Mobile)	110
KMZ AM-X-WM-17-65-00T (Sprint/Nextel)	130	TMA 15.8"x14"x3.1" (T-Mobile)	110
		TMA 15.8"x14"x3.1" (T-Mobile)	110
DB950F65T2E-M (Sprint/Nextel)	130	TMA 15.8"x14"x3.1" (T-Mobile)	110
T-Arm (3) (Verizon)	120	GPS (Sprint/Nextel)	75
Panel Antenna (Verizon)	120	3' GPS Stand-off Mount (Sprint/Nextel)	75

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 90 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 78 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 62.9%

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

Job:	*Existing 140' EEI Monopole*
Project:	*Grassy Hill Road, Orange, CT*
Client: Sprint/Nextel	Drawn by: Staff / App'd:
Code: TIA/EIA-222-F	Date: 10/31/07 / Scale: NTS
Path: P:\08\ERI Files\TW1-005 Orange 36917265.eri	Dwg No. E-1

RISA TOWER DETAILED OUTPUT

RISATower	Job	Page
	Existing 140' EEI Monopole	1 of 22
URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Project Grassy Hill Road, Orange, CT	Date 13:32:58 10/31/07
	Client Sprint/Nextel	Designed by Staff

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in New Haven County, Connecticut.
Basic wind speed of 90 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 78 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	139.50-93.04	46.46	3.92	18	15.5000	26.9900	0.2500	1.0000	A572-65 (65 ksi)
L2	93.04-46.38	50.58	5.25	18	25.5213	37.9100	0.3750	1.5000	A572-65 (65 ksi)
L3	46.38-0.00	51.63		18	35.8741	48.5000	0.3750	1.5000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	15.7391	12.1009	355.5445	5.4138	7.8740	45.1542	711.5567	6.0516	2.2880	9.152
	27.4064	21.2182	1916.7638	9.4927	13.7109	139.7983	3836.0497	10.6111	4.3102	17.241
L2	26.8892	29.9304	2391.0978	8.9269	12.9648	184.4298	4785.3420	14.9680	3.8317	10.218
	38.4948	44.6760	7952.1562	13.3249	19.2583	412.9214	15914.7760	22.3423	6.0122	16.032
L3	37.7313	42.2528	6727.0978	12.6022	18.2240	369.1331	13463.0473	21.1304	5.6538	15.077
	49.2482	57.2808	16760.5346	17.0844	24.6380	680.2717	33543.1232	28.6458	7.8760	21.003

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 139.50-93.04				1	1	1		
L2 93.04-46.38				1	1	1		
L3 46.38-0.00				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 5/8 (AT&T)	C	No	Inside Pole	139.50 - 10.00	6	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
LDF6-50A (1-1/4 FOAM) (Sprint/Nextel)	C	No	Inside Pole	130.00 - 6.00	6	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
LDF7-50A (1-5/8 FOAM) (Sprint/Nextel - proposed)	C	No	Inside Pole	130.00 - 6.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
1 5/8 (Verizon)	C	No	Inside Pole	120.00 - 10.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1 5/8 (T-Mobile)	C	No	Inside Pole	110.00 - 3.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1/2 (Sprint/Nextel - GPS)	C	No	Inside Pole	75.00 - 6.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25

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	139.50-93.04	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	1.17
L2	93.04-46.38	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	1.88
L3	46.38-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00

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
		C	0.000	0.000	0.000	0.000	1.59

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	139.50-93.04	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	1.17
L2	93.04-46.38	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	1.88
L3	46.38-0.00	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	1.59

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
7721.00 w/Mount Pipe (AT&T)	A	From Face	1.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	4.01 4.63	3.74 4.78	0.04 0.08
7721.00 w/Mount Pipe (AT&T)	B	From Face	1.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	4.01 4.63	3.74 4.78	0.04 0.08
7721.00 w/Mount Pipe (AT&T)	C	From Face	1.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	4.01 4.63	3.74 4.78	0.04 0.08
Valmont Light Duty Tri-Bracket (1) (AT&T)	C	From Face	1.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	1.76 2.08	1.76 2.08	0.05 0.07
T-Arm (3) (Sprint/Nextel)	C	None		0.0000	130.00	No Ice 1/2" Ice	21.00 29.00	21.00 29.00	1.01 1.24
DB950F65T2E-M (Sprint/Nextel)	A	From Face	3.50 6.00 0.00	0.0000	130.00	No Ice 1/2" Ice	6.13 6.59	4.24 4.62	0.02 0.05
KMZ AM-X-WM-17-65-00T (Sprint/Nextel)	A	From Face	3.50 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice	3.17 3.51	1.40 1.67	0.02 0.03
DB950F65T2E-M (Sprint/Nextel)	A	From Face	3.50 -6.00 0.00	0.0000	130.00	No Ice 1/2" Ice	6.13 6.59	4.24 4.62	0.02 0.05
DB950F65T2E-M (Sprint/Nextel)	B	From Face	3.50 6.00 0.00	0.0000	130.00	No Ice 1/2" Ice	6.13 6.59	4.24 4.62	0.02 0.05
KMZ AM-X-WM-17-65-00T (Sprint/Nextel)	B	From Face	3.50 0.00	0.0000	130.00	No Ice 1/2" Ice	3.17 3.51	1.40 1.67	0.02 0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
				0.00						
DB950F65T2E-M	B	From Face	3.50	0.0000		130.00	No Ice	6.13	4.24	0.02
(Sprint/Nextel)			-6.00				1/2" Ice	6.59	4.62	0.05
			0.00							
DB950F65T2E-M	C	From Face	3.50	0.0000		130.00	No Ice	6.13	4.24	0.02
(Sprint/Nextel)			6.00				1/2" Ice	6.59	4.62	0.05
			0.00							
KMZ AM-X-WM-17-65-00T	C	From Face	3.50	0.0000		130.00	No Ice	3.17	1.40	0.02
(Sprint/Nextel)			0.00				1/2" Ice	3.51	1.67	0.03
			0.00							
DB950F65T2E-M	C	From Face	3.50	0.0000		130.00	No Ice	6.13	4.24	0.02
(Sprint/Nextel)			-6.00				1/2" Ice	6.59	4.62	0.05
			0.00							
T-Arm (3)	C	None		0.0000		120.00	No Ice	21.00	21.00	1.01
(Verizon)							1/2" Ice	29.00	29.00	1.24
Panel Antenna	A	From Face	3.50	0.0000		120.00	No Ice	7.01	6.08	0.02
(Verizon)			6.00				1/2" Ice	7.42	6.48	0.07
			0.00							
Panel Antenna	A	From Face	3.50	0.0000		120.00	No Ice	7.01	6.08	0.02
(Verizon)			-6.00				1/2" Ice	7.42	6.48	0.07
			0.00							
Panel Antenna	B	From Face	3.50	0.0000		120.00	No Ice	7.01	6.08	0.02
(Verizon)			6.00				1/2" Ice	7.42	6.48	0.07
			0.00							
Panel Antenna	B	From Face	3.50	0.0000		120.00	No Ice	7.01	6.08	0.02
(Verizon)			-6.00				1/2" Ice	7.42	6.48	0.07
			0.00							
Panel Antenna	C	From Face	3.50	0.0000		120.00	No Ice	7.01	6.08	0.02
(Verizon)			6.00				1/2" Ice	7.42	6.48	0.07
			0.00							
Panel Antenna	C	From Face	3.50	0.0000		120.00	No Ice	7.01	6.08	0.02
(Verizon)			-6.00				1/2" Ice	7.42	6.48	0.07
			0.00							
Panel Antenna	A	From Face	3.50	0.0000		120.00	No Ice	2.09	2.79	0.01
(Verizon)			4.00				1/2" Ice	2.39	3.09	0.03
			0.00							
Panel Antenna	A	From Face	3.50	0.0000		120.00	No Ice	2.09	2.79	0.01
(Verizon)			-4.00				1/2" Ice	2.39	3.09	0.03
			0.00							
Panel Antenna	B	From Face	3.50	0.0000		120.00	No Ice	2.09	2.79	0.01
(Verizon)			4.00				1/2" Ice	2.39	3.09	0.03
			0.00							
Panel Antenna	B	From Face	3.50	0.0000		120.00	No Ice	2.09	2.79	0.01
(Verizon)			-4.00				1/2" Ice	2.39	3.09	0.03
			0.00							
Panel Antenna	C	From Face	3.50	0.0000		120.00	No Ice	2.09	2.79	0.01
(Verizon)			4.00				1/2" Ice	2.39	3.09	0.03
			0.00							
Panel Antenna	C	From Face	3.50	0.0000		120.00	No Ice	2.09	2.79	0.01
(Verizon)			-4.00				1/2" Ice	2.39	3.09	0.03
			0.00							
T-Arm (3)	C	None		0.0000		110.00	No Ice	21.00	21.00	1.01
(T-Mobile)							1/2" Ice	29.00	29.00	1.24
RR90-17	A	From Face	3.50	0.0000		110.00	No Ice	4.36	1.97	0.02
(T-Mobile)			-6.00				1/2" Ice	4.77	2.31	0.04
			0.00							
RR90-17	B	From Face	3.50	0.0000		110.00	No Ice	4.36	1.97	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(T-Mobile)			-6.00 0.00			1/2" Ice	4.77	2.31	0.04
RR90-17	C	From Face	3.50	0.0000	110.00	No Ice	4.36	1.97	0.02
(T-Mobile)			-6.00 0.00			1/2" Ice	4.77	2.31	0.04
TMA 15.8"x14"x3.1"	A	From Face	3.50	0.0000	110.00	No Ice	2.10	0.46	0.03
(T-Mobile)			0.00 0.00			1/2" Ice	2.29	0.59	0.04
TMA 15.8"x14"x3.1"	B	From Face	3.50	0.0000	110.00	No Ice	2.10	0.46	0.03
(T-Mobile)			0.00 0.00			1/2" Ice	2.29	0.59	0.04
TMA 15.8"x14"x3.1"	C	From Face	3.50	0.0000	110.00	No Ice	2.10	0.46	0.03
(T-Mobile)			0.00 0.00			1/2" Ice	2.29	0.59	0.04
GPS	C	From Face	3.00	0.0000	75.00	No Ice	1.00	1.00	0.01
(Sprint/Nextel)			0.00 0.00			1/2" Ice	1.50	1.50	0.01
3' GPS Stand-off Mount	C	From Face	1.50	0.0000	75.00	No Ice	2.45	2.45	0.05
(Sprint/Nextel)			0.00 0.00			1/2" Ice	3.98	3.98	0.07

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 139.50-93.04	114.50	1.427	30	82.254	A	0.000	82.254	82.254	100.00	0.000	0.000
					B	0.000	82.254		100.00		
					C	0.000	82.254		100.00		
L2 93.04-46.38	68.89	1.234	25	125.194	A	0.000	125.194	125.194	100.00	0.000	0.000
					B	0.000	125.194		100.00		
					C	0.000	125.194		100.00		
L3 46.38-0.00	22.24	1	21	165.523	A	0.000	165.523	165.523	100.00	0.000	0.000
					B	0.000	165.523		100.00		
					C	0.000	165.523		100.00		

Tower Pressure - With Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	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

Section Elevation	z	K_Z	q_z	t_Z	A_G	Face	A_F	A_R	A_{leg}	Leg %	C_AA_A In Face	C_AA_A Out Face
ft	ft		psf	in	ft^2		ft^2	ft^2	ft^2		ft^2	ft^2
L1 139.50-93.04	114.50	1.427	22	0.5000	86.125	A	0.000	86.125	86.125	100.00	0.000	0.000
						B	0.000	86.125		100.00		
						C	0.000	86.125		100.00		
L2 93.04-46.38	68.89	1.234	19	0.5000	129.083	A	0.000	129.083	129.083	100.00	0.000	0.000
						B	0.000	129.083		100.00		
						C	0.000	129.083		100.00		
L3 46.38-0.00	22.24	1	16	0.5000	169.388	A	0.000	169.388	169.388	100.00	0.000	0.000
						B	0.000	169.388		100.00		
						C	0.000	169.388		100.00		

Tower Pressure - Service

$G_H = 1.690$

Section Elevation	z	K_Z	q_z	A_G	Face	A_F	A_R	A_{leg}	Leg %	C_AA_A In Face	C_AA_A Out Face
ft	ft		psf	ft^2		ft^2	ft^2	ft^2		ft^2	ft^2
L1 139.50-93.04	114.50	1.427	9	82.254	A	0.000	82.254	82.254	100.00	0.000	0.000
					B	0.000	82.254		100.00		
					C	0.000	82.254		100.00		
L2 93.04-46.38	68.89	1.234	8	125.194	A	0.000	125.194	125.194	100.00	0.000	0.000
					B	0.000	125.194		100.00		
					C	0.000	125.194		100.00		
L3 46.38-0.00	22.24	1	6	165.523	A	0.000	165.523	165.523	100.00	0.000	0.000
					B	0.000	165.523		100.00		
					C	0.000	165.523		100.00		

Tower Forces - No Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	Face	e	C_F	R_R	D_F	D_R	A_E	F	w	Ctrl. Face
ft	K	K							ft^2	K	plf	
L1 139.50-93.04	1.17	2.63	A	1	0.65	1	1	1	82.254	2.67	57.44	C
			B	1	0.65	1	1	1	82.254			
			C	1	0.65	1	1	1	82.254			
L2 93.04-46.38	1.88	6.42	A	1	0.65	1	1	1	125.194	3.50	75.02	C
			B	1	0.65	1	1	1	125.194			
			C	1	0.65	1	1	1	125.194			
L3 46.38-0.00	1.59	8.74	A	1	0.65	1	1	1	165.523	3.79	81.79	C
			B	1	0.65	1	1	1	165.523			
			C	1	0.65	1	1	1	165.523			
Sum Weight:	4.63	17.80						OTM	631.05 kip-ft	9.96		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 139.50-93.04	1.17	2.63	A	1	0.65	1	1	1	82.254	2.67	57.44	C
			B	1	0.65	1	1	1	82.254			
			C	1	0.65	1	1	1	82.254			
L2 93.04-46.38	1.88	6.42	A	1	0.65	1	1	1	125.194	3.50	75.02	C
			B	1	0.65	1	1	1	125.194			
			C	1	0.65	1	1	1	125.194			
L3 46.38-0.00	1.59	8.74	A	1	0.65	1	1	1	165.523	3.79	81.79	C
			B	1	0.65	1	1	1	165.523			
			C	1	0.65	1	1	1	165.523			
Sum Weight:	4.63	17.80						OTM	631.05 kip-ft	9.96		

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 ft²	F K	w plf	Ctrl. Face
L1 139.50-93.04	1.17	2.63	A	1	0.65	1	1	1	82.254	2.67	57.44	C
			B	1	0.65	1	1	1	82.254			
			C	1	0.65	1	1	1	82.254			
L2 93.04-46.38	1.88	6.42	A	1	0.65	1	1	1	125.194	3.50	75.02	C
			B	1	0.65	1	1	1	125.194			
			C	1	0.65	1	1	1	125.194			
L3 46.38-0.00	1.59	8.74	A	1	0.65	1	1	1	165.523	3.79	81.79	C
			B	1	0.65	1	1	1	165.523			
			C	1	0.65	1	1	1	165.523			
Sum Weight:	4.63	17.80						OTM	631.05 kip-ft	9.96		

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 ft²	F K	w plf	Ctrl. Face
L1 139.50-93.04	1.17	2.63	A	1	0.65	1	1	1	82.254	2.67	57.44	C
			B	1	0.65	1	1	1	82.254			
			C	1	0.65	1	1	1	82.254			
L2 93.04-46.38	1.88	6.42	A	1	0.65	1	1	1	125.194	3.50	75.02	C
			B	1	0.65	1	1	1	125.194			
			C	1	0.65	1	1	1	125.194			
L3 46.38-0.00	1.59	8.74	A	1	0.65	1	1	1	165.523	3.79	81.79	C
			B	1	0.65	1	1	1	165.523			
			C	1	0.65	1	1	1	165.523			
Sum Weight:	4.63	17.80						OTM	631.05 kip-ft	9.96		

RISATower	Job: Existing 140' EEI Monopole	Page: 8 of 22
URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Project: Grassy Hill Road, Orange, CT	Date: 13:32:58 10/31/07
	Client: Sprint/Nextel	Designed by: Staff

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 139.50-93.04	1.17	3.26	A	1	0.65	1	1	1	86.125	2.10	45.10	C
			B	1	0.65	1	1	1	86.125			
			C	1	0.65	1	1	1	86.125			
L2 93.04-46.38	1.88	7.36	A	1	0.65	1	1	1	129.083	2.71	58.01	C
			B	1	0.65	1	1	1	129.083			
			C	1	0.65	1	1	1	129.083			
L3 46.38-0.00	1.59	9.98	A	1	0.65	1	1	1	169.388	2.91	62.77	C
			B	1	0.65	1	1	1	169.388			
			C	1	0.65	1	1	1	169.388			
Sum Weight:	4.63	20.60						OTM	491.17 kip-ft	7.71		

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 139.50-93.04	1.17	3.26	A	1	0.65	1	1	1	86.125	2.10	45.10	C
			B	1	0.65	1	1	1	86.125			
			C	1	0.65	1	1	1	86.125			
L2 93.04-46.38	1.88	7.36	A	1	0.65	1	1	1	129.083	2.71	58.01	C
			B	1	0.65	1	1	1	129.083			
			C	1	0.65	1	1	1	129.083			
L3 46.38-0.00	1.59	9.98	A	1	0.65	1	1	1	169.388	2.91	62.77	C
			B	1	0.65	1	1	1	169.388			
			C	1	0.65	1	1	1	169.388			
Sum Weight:	4.63	20.60						OTM	491.17 kip-ft	7.71		

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 139.50-93.04	1.17	3.26	A	1	0.65	1	1	1	86.125	2.10	45.10	C
			B	1	0.65	1	1	1	86.125			
			C	1	0.65	1	1	1	86.125			
L2 93.04-46.38	1.88	7.36	A	1	0.65	1	1	1	129.083	2.71	58.01	C
			B	1	0.65	1	1	1	129.083			
			C	1	0.65	1	1	1	129.083			
L3 46.38-0.00	1.59	9.98	A	1	0.65	1	1	1	169.388	2.91	62.77	C
			B	1	0.65	1	1	1	169.388			
			C	1	0.65	1	1	1	169.388			
Sum Weight:	4.63	20.60						OTM	491.17 kip-ft	7.71		

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 ft^2	F K	w plf	Ctrl. Face
L1 139.50-93.04	1.17	3.26	A	1	0.65	1	1	1	86.125	2.10	45.10	C
			B	1	0.65	1	1	1	86.125			
			C	1	0.65	1	1	1	86.125			
L2 93.04-46.38	1.88	7.36	A	1	0.65	1	1	1	129.083	2.71	58.01	C
			B	1	0.65	1	1	1	129.083			
			C	1	0.65	1	1	1	129.083			
L3 46.38-0.00	1.59	9.98	A	1	0.65	1	1	1	169.388	2.91	62.77	C
			B	1	0.65	1	1	1	169.388			
			C	1	0.65	1	1	1	169.388			
Sum Weight:	4.63	20.60						OTM	491.17 kip-ft	7.71		

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 ft^2	F K	w plf	Ctrl. Face
L1 139.50-93.04	1.17	2.63	A	1	0.65	1	1	1	82.254	0.82	17.73	C
			B	1	0.65	1	1	1	82.254			
			C	1	0.65	1	1	1	82.254			
L2 93.04-46.38	1.88	6.42	A	1	0.65	1	1	1	125.194	1.08	23.15	C
			B	1	0.65	1	1	1	125.194			
			C	1	0.65	1	1	1	125.194			
L3 46.38-0.00	1.59	8.74	A	1	0.65	1	1	1	165.523	1.17	25.24	C
			B	1	0.65	1	1	1	165.523			
			C	1	0.65	1	1	1	165.523			
Sum Weight:	4.63	17.80						OTM	194.77 kip-ft	3.07		

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 ft^2	F K	w plf	Ctrl. Face
L1 139.50-93.04	1.17	2.63	A	1	0.65	1	1	1	82.254	0.82	17.73	C
			B	1	0.65	1	1	1	82.254			
			C	1	0.65	1	1	1	82.254			
L2 93.04-46.38	1.88	6.42	A	1	0.65	1	1	1	125.194	1.08	23.15	C
			B	1	0.65	1	1	1	125.194			
			C	1	0.65	1	1	1	125.194			
L3 46.38-0.00	1.59	8.74	A	1	0.65	1	1	1	165.523	1.17	25.24	C
			B	1	0.65	1	1	1	165.523			
			C	1	0.65	1	1	1	165.523			
Sum Weight:	4.63	17.80						OTM	194.77	3.07		

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
									kip-ft			

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 139.50-93.04	1.17	2.63	A	1	0.65	1	1	1	82.254	0.82	17.73	C
			B	1	0.65	1	1	1	82.254			
			C	1	0.65	1	1	1	82.254			
L2 93.04-46.38	1.88	6.42	A	1	0.65	1	1	1	125.194	1.08	23.15	C
			B	1	0.65	1	1	1	125.194			
			C	1	0.65	1	1	1	125.194			
L3 46.38-0.00	1.59	8.74	A	1	0.65	1	1	1	165.523	1.17	25.24	C
			B	1	0.65	1	1	1	165.523			
			C	1	0.65	1	1	1	165.523			
Sum Weight:	4.63	17.80						OTM	194.77 kip-ft	3.07		

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 139.50-93.04	1.17	2.63	A	1	0.65	1	1	1	82.254	0.82	17.73	C
			B	1	0.65	1	1	1	82.254			
			C	1	0.65	1	1	1	82.254			
L2 93.04-46.38	1.88	6.42	A	1	0.65	1	1	1	125.194	1.08	23.15	C
			B	1	0.65	1	1	1	125.194			
			C	1	0.65	1	1	1	125.194			
L3 46.38-0.00	1.59	8.74	A	1	0.65	1	1	1	165.523	1.17	25.24	C
			B	1	0.65	1	1	1	165.523			
			C	1	0.65	1	1	1	165.523			
Sum Weight:	4.63	17.80						OTM	194.77 kip-ft	3.07		

Mast Vectors - No Ice

Section No.	Section Elevation ft	Wind Azimuth °	Directionality	F K	V_x K	V_z K	OTM_x kip-ft	OTM_z kip-ft	Torque kip-ft
L1	139.50-93.04	0	Wind Normal	2.67	0.00	-2.67	-305.54	0.00	0.00
		30	Wind 90	2.67	1.33	-2.31	-264.61	-152.77	0.00
		45	Wind 45	2.67	1.89	-1.89	-216.05	-216.05	0.00
		60	Wind 60	2.67	2.31	-1.33	-152.77	-264.61	0.00

Section No.	Section Elevation ft	Wind Azimuth °	Directionality	F K	V_x K	V_z K	OTM_x kip-ft	OTM_z kip-ft	Torque kip-ft
		90	Wind 90	2.67	2.67	0.00	0.00	-305.54	0.00
		120	Wind Normal	2.67	2.31	1.33	152.77	-264.61	0.00
		135	Wind 45	2.67	1.89	1.89	216.05	-216.05	0.00
		150	Wind 90	2.67	1.33	2.31	264.61	-152.77	0.00
		180	Wind 60	2.67	0.00	2.67	305.54	0.00	0.00
		210	Wind 90	2.67	-1.33	2.31	264.61	152.77	0.00
		225	Wind 45	2.67	-1.89	1.89	216.05	216.05	0.00
		240	Wind Normal	2.67	-2.31	1.33	152.77	264.61	0.00
		270	Wind 90	2.67	-2.67	0.00	0.00	305.54	0.00
		300	Wind 60	2.67	-2.31	-1.33	-152.77	264.61	0.00
		315	Wind 45	2.67	-1.89	-1.89	-216.05	216.05	0.00
		330	Wind 90	2.67	-1.33	-2.31	-264.61	152.77	0.00
L2	93.04-46.38	0	Wind Normal	3.50	0.00	-3.50	-241.16	0.00	0.00
		30	Wind 90	3.50	1.75	-3.03	-208.85	-120.58	0.00
		45	Wind 45	3.50	2.48	-2.48	-170.52	-170.52	0.00
		60	Wind 60	3.50	3.03	-1.75	-120.58	-208.85	0.00
		90	Wind 90	3.50	3.50	0.00	0.00	-241.16	0.00
		120	Wind Normal	3.50	3.03	1.75	120.58	-208.85	0.00
		135	Wind 45	3.50	2.48	2.48	170.52	-170.52	0.00
		150	Wind 90	3.50	1.75	3.03	208.85	-120.58	0.00
		180	Wind 60	3.50	0.00	3.50	241.16	0.00	0.00
		210	Wind 90	3.50	-1.75	3.03	208.85	120.58	0.00
		225	Wind 45	3.50	-2.48	2.48	170.52	170.52	0.00
		240	Wind Normal	3.50	-3.03	1.75	120.58	208.85	0.00
		270	Wind 90	3.50	-3.50	0.00	0.00	241.16	0.00
		300	Wind 60	3.50	-3.03	-1.75	-120.58	208.85	0.00
		315	Wind 45	3.50	-2.48	-2.48	-170.52	170.52	0.00
		330	Wind 90	3.50	-1.75	-3.03	-208.85	120.58	0.00
L3	46.38-0.00	0	Wind Normal	3.79	0.00	-3.79	-84.35	0.00	0.00
		30	Wind 90	3.79	1.90	-3.28	-73.05	-42.18	0.00
		45	Wind 45	3.79	2.68	-2.68	-59.65	-59.65	0.00
		60	Wind 60	3.79	3.28	-1.90	-42.18	-73.05	0.00
		90	Wind 90	3.79	3.79	0.00	0.00	-84.35	0.00
		120	Wind Normal	3.79	3.28	1.90	42.18	-73.05	0.00
		135	Wind 45	3.79	2.68	2.68	59.65	-59.65	0.00
		150	Wind 90	3.79	1.90	3.28	73.05	-42.18	0.00
		180	Wind 60	3.79	0.00	3.79	84.35	0.00	0.00
		210	Wind 90	3.79	-1.90	3.28	73.05	42.18	0.00
		225	Wind 45	3.79	-2.68	2.68	59.65	59.65	0.00
		240	Wind Normal	3.79	-3.28	1.90	42.18	73.05	0.00
		270	Wind 90	3.79	-3.79	0.00	0.00	84.35	0.00
		300	Wind 60	3.79	-3.28	-1.90	-42.18	73.05	0.00
		315	Wind 45	3.79	-2.68	-2.68	-59.65	59.65	0.00
		330	Wind 90	3.79	-1.90	-3.28	-73.05	42.18	0.00

Mast Totals - No Ice

Wind Azimuth °	V_x K	V_z K	OTM_x kip-ft	OTM_z kip-ft	Torque kip-ft
0	0.00	-9.96	-631.05	0.00	0.00
30	4.98	-8.63	-546.50	-315.52	0.00
45	7.04	-7.04	-446.22	-446.22	0.00
60	8.63	-4.98	-315.52	-546.50	0.00
90	9.96	0.00	0.00	-631.05	0.00
120	8.63	4.98	315.52	-546.50	0.00
135	7.04	7.04	446.22	-446.22	0.00

Wind Azimuth °	V_x K	V_z K	OTM_x kip-ft	OTM_z kip-ft	Torque kip-ft
150	4.98	8.63	546.50	-315.52	0.00
180	0.00	9.96	631.05	0.00	0.00
210	-4.98	8.63	546.50	315.52	0.00
225	-7.04	7.04	446.22	446.22	0.00
240	-8.63	4.98	315.52	546.50	0.00
270	-9.96	0.00	0.00	631.05	0.00
300	-8.63	-4.98	-315.52	546.50	0.00
315	-7.04	-7.04	-446.22	446.22	0.00
330	-4.98	-8.63	-546.50	315.52	0.00

Mast Vectors - With Ice

Section No.	Section Elevation ft	Wind Azimuth °	Directionality	F K	V_x K	V_z K	OTM_x kip-ft	OTM_z kip-ft	Torque kip-ft
L1	139.50-93.04	0	Wind Normal	2.10	0.00	-2.10	-239.94	0.00	0.00
		30	Wind 90	2.10	1.05	-1.81	-207.80	-119.97	0.00
		45	Wind 45	2.10	1.48	-1.48	-169.66	-169.66	0.00
		60	Wind 60	2.10	1.81	-1.05	-119.97	-207.80	0.00
		90	Wind 90	2.10	2.10	0.00	0.00	-239.94	0.00
		120	Wind Normal	2.10	1.81	1.05	119.97	-207.80	0.00
		135	Wind 45	2.10	1.48	1.48	169.66	-169.66	0.00
		150	Wind 90	2.10	1.05	1.81	207.80	-119.97	0.00
		180	Wind 60	2.10	0.00	2.10	239.94	0.00	0.00
		210	Wind 90	2.10	-1.05	1.81	207.80	119.97	0.00
		225	Wind 45	2.10	-1.48	1.48	169.66	169.66	0.00
		240	Wind Normal	2.10	-1.81	1.05	119.97	207.80	0.00
		270	Wind 90	2.10	-2.10	0.00	0.00	239.94	0.00
		300	Wind 60	2.10	-1.81	-1.05	-119.97	207.80	0.00
		315	Wind 45	2.10	-1.48	-1.48	-169.66	169.66	0.00
		330	Wind 90	2.10	-1.05	-1.81	-207.80	119.97	0.00
L2	93.04-46.38	0	Wind Normal	2.71	0.00	-2.71	-186.48	0.00	0.00
		30	Wind 90	2.71	1.35	-2.34	-161.50	-93.24	0.00
		45	Wind 45	2.71	1.91	-1.91	-131.86	-131.86	0.00
		60	Wind 60	2.71	2.34	-1.35	-93.24	-161.50	0.00
		90	Wind 90	2.71	2.71	0.00	0.00	-186.48	0.00
		120	Wind Normal	2.71	2.34	1.35	93.24	-161.50	0.00
		135	Wind 45	2.71	1.91	1.91	131.86	-131.86	0.00
		150	Wind 90	2.71	1.35	2.34	161.50	-93.24	0.00
		180	Wind 60	2.71	0.00	2.71	186.48	0.00	0.00
		210	Wind 90	2.71	-1.35	2.34	161.50	93.24	0.00
		225	Wind 45	2.71	-1.91	1.91	131.86	131.86	0.00
		240	Wind Normal	2.71	-2.34	1.35	93.24	161.50	0.00
		270	Wind 90	2.71	-2.71	0.00	0.00	186.48	0.00
		300	Wind 60	2.71	-2.34	-1.35	-93.24	161.50	0.00
		315	Wind 45	2.71	-1.91	-1.91	-131.86	131.86	0.00
		330	Wind 90	2.71	-1.35	-2.34	-161.50	93.24	0.00
L3	46.38-0.00	0	Wind Normal	2.91	0.00	-2.91	-64.74	0.00	0.00
		30	Wind 90	2.91	1.46	-2.52	-56.07	-32.37	0.00
		45	Wind 45	2.91	2.06	-2.06	-45.78	-45.78	0.00
		60	Wind 60	2.91	2.52	-1.46	-32.37	-56.07	0.00
		90	Wind 90	2.91	2.91	0.00	0.00	-64.74	0.00
		120	Wind Normal	2.91	2.52	1.46	32.37	-56.07	0.00
		135	Wind 45	2.91	2.06	2.06	45.78	-45.78	0.00
		150	Wind 90	2.91	1.46	2.52	56.07	-32.37	0.00
		180	Wind 60	2.91	0.00	2.91	64.74	0.00	0.00
		210	Wind 90	2.91	-1.46	2.52	56.07	32.37	0.00

Section No.	Section Elevation ft	Wind Azimuth °	Directionality	F K	V_x K	V_z K	OTM_x kip-ft	OTM_z kip-ft	Torque kip-ft
		225	Wind 45	2.91	-2.06	2.06	45.78	45.78	0.00
		240	Wind Normal	2.91	-2.52	1.46	32.37	56.07	0.00
		270	Wind 90	2.91	-2.91	0.00	0.00	64.74	0.00
		300	Wind 60	2.91	-2.52	-1.46	-32.37	56.07	0.00
		315	Wind 45	2.91	-2.06	-2.06	-45.78	45.78	0.00
		330	Wind 90	2.91	-1.46	-2.52	-56.07	32.37	0.00

Mast Totals - With Ice

Wind Azimuth °	V_x K	V_z K	OTM_x kip-ft	OTM_z kip-ft	Torque kip-ft
0	0.00	-7.71	-491.17	0.00	0.00
30	3.86	-6.68	-425.36	-245.58	0.00
45	5.45	-5.45	-347.31	-347.31	0.00
60	6.68	-3.86	-245.58	-425.36	0.00
90	7.71	0.00	0.00	-491.17	0.00
120	6.68	3.86	245.58	-425.36	0.00
135	5.45	5.45	347.31	-347.31	0.00
150	3.86	6.68	425.36	-245.58	0.00
180	0.00	7.71	491.17	0.00	0.00
210	-3.86	6.68	425.36	245.58	0.00
225	-5.45	5.45	347.31	347.31	0.00
240	-6.68	3.86	245.58	425.36	0.00
270	-7.71	0.00	0.00	491.17	0.00
300	-6.68	-3.86	-245.58	425.36	0.00
315	-5.45	-5.45	-347.31	347.31	0.00
330	-3.86	-6.68	-425.36	245.58	0.00

Mast Vectors - Service

Section No.	Section Elevation ft	Wind Azimuth °	Directionality	F K	V_x K	V_z K	OTM_x kip-ft	OTM_z kip-ft	Torque kip-ft
L1	139.50-93.04	0	Wind Normal	0.82	0.00	-0.82	-94.30	0.00	0.00
		30	Wind 90	0.82	0.41	-0.71	-81.67	-47.15	0.00
		45	Wind 45	0.82	0.58	-0.58	-66.68	-66.68	0.00
		60	Wind 60	0.82	0.71	-0.41	-47.15	-81.67	0.00
		90	Wind 90	0.82	0.82	0.00	0.00	-94.30	0.00
		120	Wind Normal	0.82	0.71	0.41	47.15	-81.67	0.00
		135	Wind 45	0.82	0.58	0.58	66.68	-66.68	0.00
		150	Wind 90	0.82	0.41	0.71	81.67	-47.15	0.00
		180	Wind 60	0.82	0.00	0.82	94.30	0.00	0.00
		210	Wind 90	0.82	-0.41	0.71	81.67	47.15	0.00
		225	Wind 45	0.82	-0.58	0.58	66.68	66.68	0.00
		240	Wind Normal	0.82	-0.71	0.41	47.15	81.67	0.00
		270	Wind 90	0.82	-0.82	0.00	0.00	94.30	0.00
		300	Wind 60	0.82	-0.71	-0.41	-47.15	81.67	0.00
		315	Wind 45	0.82	-0.58	-0.58	-66.68	66.68	0.00
		330	Wind 90	0.82	-0.41	-0.71	-81.67	47.15	0.00
L2	93.04-46.38	0	Wind Normal	1.08	0.00	-1.08	-74.43	0.00	0.00
		30	Wind 90	1.08	0.54	-0.94	-64.46	-37.22	0.00

Section No.	Section Elevation ft	Wind Azimuth °	Directionality	F K	V_x K	V_z K	OTM_x kip-ft	OTM_z kip-ft	Torque kip-ft
		45	Wind 45	1.08	0.76	-0.76	-52.63	-52.63	0.00
		60	Wind 60	1.08	0.94	-0.54	-37.22	-64.46	0.00
		90	Wind 90	1.08	1.08	0.00	0.00	-74.43	0.00
		120	Wind Normal	1.08	0.94	0.54	37.22	-64.46	0.00
		135	Wind 45	1.08	0.76	0.76	52.63	-52.63	0.00
		150	Wind 90	1.08	0.54	0.94	64.46	-37.22	0.00
		180	Wind 60	1.08	0.00	1.08	74.43	0.00	0.00
		210	Wind 90	1.08	-0.54	0.94	64.46	37.22	0.00
		225	Wind 45	1.08	-0.76	0.76	52.63	52.63	0.00
		240	Wind Normal	1.08	-0.94	0.54	37.22	64.46	0.00
		270	Wind 90	1.08	-1.08	0.00	0.00	74.43	0.00
		300	Wind 60	1.08	-0.94	-0.54	-37.22	64.46	0.00
		315	Wind 45	1.08	-0.76	-0.76	-52.63	52.63	0.00
		330	Wind 90	1.08	-0.54	-0.94	-64.46	37.22	0.00
L3	46.38-0.00	0	Wind Normal	1.17	0.00	-1.17	-26.03	0.00	0.00
		30	Wind 90	1.17	0.59	-1.01	-22.55	-13.02	0.00
		45	Wind 45	1.17	0.83	-0.83	-18.41	-18.41	0.00
		60	Wind 60	1.17	1.01	-0.59	-13.02	-22.55	0.00
		90	Wind 90	1.17	1.17	0.00	0.00	-26.03	0.00
		120	Wind Normal	1.17	1.01	0.59	13.02	-22.55	0.00
		135	Wind 45	1.17	0.83	0.83	18.41	-18.41	0.00
		150	Wind 90	1.17	0.59	1.01	22.55	-13.02	0.00
		180	Wind 60	1.17	0.00	1.17	26.03	0.00	0.00
		210	Wind 90	1.17	-0.59	1.01	22.55	13.02	0.00
		225	Wind 45	1.17	-0.83	0.83	18.41	18.41	0.00
		240	Wind Normal	1.17	-1.01	0.59	13.02	22.55	0.00
		270	Wind 90	1.17	-1.17	0.00	0.00	26.03	0.00
		300	Wind 60	1.17	-1.01	-0.59	-13.02	22.55	0.00
		315	Wind 45	1.17	-0.83	-0.83	-18.41	18.41	0.00
		330	Wind 90	1.17	-0.59	-1.01	-22.55	13.02	0.00

Mast Totals - Service

Wind Azimuth °	V_x K	V_z K	OTM_x kip-ft	OTM_z kip-ft	Torque kip-ft
0	0.00	-3.07	-194.77	0.00	0.00
30	1.54	-2.66	-168.67	-97.38	0.00
45	2.17	-2.17	-137.72	-137.72	0.00
60	2.66	-1.54	-97.38	-168.67	0.00
90	3.07	0.00	0.00	-194.77	0.00
120	2.66	1.54	97.38	-168.67	0.00
135	2.17	2.17	137.72	-137.72	0.00
150	1.54	2.66	168.67	-97.38	0.00
180	0.00	3.07	194.77	0.00	0.00
210	-1.54	2.66	168.67	97.38	0.00
225	-2.17	2.17	137.72	137.72	0.00
240	-2.66	1.54	97.38	168.67	0.00
270	-3.07	0.00	0.00	194.77	0.00
300	-2.66	-1.54	-97.38	168.67	0.00
315	-2.17	-2.17	-137.72	137.72	0.00
330	-1.54	-2.66	-168.67	97.38	0.00

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	17.80					
Bracing Weight	0.00					
Total Member Self-Weight	17.80			0.27	0.00	
Total Weight	26.18			0.27	0.00	
Wind 0 deg - No Ice		0.00	-19.37	-1780.98	0.00	0.00
Wind 30 deg - No Ice		9.69	-16.78	-1542.34	-890.63	0.32
Wind 45 deg - No Ice		13.70	-13.70	-1259.26	-1259.54	0.46
Wind 60 deg - No Ice		16.78	-9.69	-890.35	-1542.61	0.56
Wind 90 deg - No Ice		19.37	0.00	0.27	-1781.26	0.65
Wind 120 deg - No Ice		16.78	9.69	890.90	-1542.61	0.56
Wind 135 deg - No Ice		13.70	13.70	1259.81	-1259.54	0.46
Wind 150 deg - No Ice		9.69	16.78	1542.89	-890.63	0.32
Wind 180 deg - No Ice		0.00	19.37	1781.53	0.00	0.00
Wind 210 deg - No Ice		-9.69	16.78	1542.89	890.63	-0.32
Wind 225 deg - No Ice		-13.70	13.70	1259.81	1259.54	-0.46
Wind 240 deg - No Ice		-16.78	9.69	890.90	1542.61	-0.56
Wind 270 deg - No Ice		-19.37	0.00	0.27	1781.26	-0.65
Wind 300 deg - No Ice		-16.78	-9.69	-890.35	1542.61	-0.56
Wind 315 deg - No Ice		-13.70	-13.70	-1259.26	1259.54	-0.46
Wind 330 deg - No Ice		-9.69	-16.78	-1542.34	890.63	-0.32
Member Ice	2.81					
Total Weight Ice	30.59			0.39	0.00	
Wind 0 deg - Ice		0.00	-16.22	-1527.02	0.00	0.00
Wind 30 deg - Ice		8.11	-14.05	-1322.39	-763.70	0.36
Wind 45 deg - Ice		11.47	-11.47	-1079.65	-1080.04	0.51
Wind 60 deg - Ice		14.05	-8.11	-763.32	-1322.77	0.62
Wind 90 deg - Ice		16.22	0.00	0.39	-1527.41	0.72
Wind 120 deg - Ice		14.05	8.11	764.09	-1322.77	0.62
Wind 135 deg - Ice		11.47	11.47	1080.43	-1080.04	0.51
Wind 150 deg - Ice		8.11	14.05	1323.16	-763.70	0.36
Wind 180 deg - Ice		0.00	16.22	1527.80	0.00	0.00
Wind 210 deg - Ice		-8.11	14.05	1323.16	763.70	-0.36
Wind 225 deg - Ice		-11.47	11.47	1080.43	1080.04	-0.51
Wind 240 deg - Ice		-14.05	8.11	764.09	1322.77	-0.62
Wind 270 deg - Ice		-16.22	0.00	0.39	1527.41	-0.72
Wind 300 deg - Ice		-14.05	-8.11	-763.32	1322.77	-0.62
Wind 315 deg - Ice		-11.47	-11.47	-1079.65	1080.04	-0.51
Wind 330 deg - Ice		-8.11	-14.05	-1322.39	763.70	-0.36
Total Weight	26.18			0.27	0.00	
Wind 0 deg - Service		0.00	-5.98	-549.50	0.00	0.00
Wind 30 deg - Service		2.99	-5.18	-475.84	-274.89	0.10
Wind 45 deg - Service		4.23	-4.23	-388.47	-388.75	0.14
Wind 60 deg - Service		5.18	-2.99	-274.61	-476.12	0.17
Wind 90 deg - Service		5.98	0.00	0.27	-549.77	0.20
Wind 120 deg - Service		5.18	2.99	275.16	-476.12	0.17
Wind 135 deg - Service		4.23	4.23	389.02	-388.75	0.14
Wind 150 deg - Service		2.99	5.18	476.39	-274.89	0.10
Wind 180 deg - Service		0.00	5.98	550.04	0.00	0.00
Wind 210 deg - Service		-2.99	5.18	476.39	274.89	-0.10
Wind 225 deg - Service		-4.23	4.23	389.02	388.75	-0.14
Wind 240 deg - Service		-5.18	2.99	275.16	476.12	-0.17
Wind 270 deg - Service		-5.98	0.00	0.27	549.77	-0.20
Wind 300 deg - Service		-5.18	-2.99	-274.61	476.12	-0.17
Wind 315 deg - Service		-4.23	-4.23	-388.47	388.75	-0.14
Wind 330 deg - Service		-2.99	-5.18	-475.84	274.89	-0.10

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice+Temp
19	Dead+Wind 0 deg+Ice+Temp
20	Dead+Wind 30 deg+Ice+Temp
21	Dead+Wind 45 deg+Ice+Temp
22	Dead+Wind 60 deg+Ice+Temp
23	Dead+Wind 90 deg+Ice+Temp
24	Dead+Wind 120 deg+Ice+Temp
25	Dead+Wind 135 deg+Ice+Temp
26	Dead+Wind 150 deg+Ice+Temp
27	Dead+Wind 180 deg+Ice+Temp
28	Dead+Wind 210 deg+Ice+Temp
29	Dead+Wind 225 deg+Ice+Temp
30	Dead+Wind 240 deg+Ice+Temp
31	Dead+Wind 270 deg+Ice+Temp
32	Dead+Wind 300 deg+Ice+Temp
33	Dead+Wind 315 deg+Ice+Temp
34	Dead+Wind 330 deg+Ice+Temp
35	Dead+Wind 0 deg - Service
36	Dead+Wind 30 deg - Service
37	Dead+Wind 45 deg - Service
38	Dead+Wind 60 deg - Service
39	Dead+Wind 90 deg - Service
40	Dead+Wind 120 deg - Service
41	Dead+Wind 135 deg - Service
42	Dead+Wind 150 deg - Service
43	Dead+Wind 180 deg - Service
44	Dead+Wind 210 deg - Service
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	139.5 - 93.04	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-9.24	0.00	-0.12
			Max. Mx	6	-6.41	-298.45	-0.09
			Max. My	10	-6.41	0.00	-298.54
			Max. Vy	6	12.06	-298.45	-0.09
			Max. Vx	10	12.06	0.00	-298.54
			Max. Torque	6			-0.16
L2	93.04 - 46.377	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-17.90	0.00	-0.39
			Max. Mx	6	-14.38	-924.31	-0.28
			Max. My	10	-14.38	0.00	-924.59
			Max. Vy	6	15.59	-924.31	-0.28
			Max. Vx	10	15.59	0.00	-924.59
			Max. Torque	23			-0.73
L3	46.377 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-30.59	0.00	-0.39
			Max. Mx	6	-26.17	-1826.40	-0.28
			Max. My	10	-26.17	0.00	-1826.68
			Max. Vy	6	19.39	-1826.40	-0.28
			Max. Vx	10	19.39	0.00	-1826.68
			Max. Torque	23			-0.73

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	30.59	0.00	-16.22
	Max. H_x	14	26.18	19.37	-0.00
	Max. H_z	2	26.18	0.00	19.37
	Max. M_x	2	1826.11	0.00	19.37
	Max. M_z	6	1826.40	-19.37	-0.00
	Max. Torsion	31	0.73	16.22	0.00
	Min. Vert	1	26.18	0.00	0.00
	Min. H_x	6	26.18	-19.37	-0.00
	Min. H_z	10	26.18	0.00	-19.37
	Min. M_x	10	-1826.68	0.00	-19.37
	Min. M_z	14	-1826.40	19.37	-0.00
	Min. Torsion	23	-0.73	-16.22	0.00

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	26.18	0.00	0.00	0.27	0.00	0.00
Dead+Wind 0 deg - No Ice	26.18	0.00	-19.37	-1826.11	0.00	0.00
Dead+Wind 30 deg - No Ice	26.18	9.69	-16.78	-1581.42	-913.20	0.33
Dead+Wind 45 deg - No Ice	26.18	13.70	-13.70	-1291.18	-1291.46	0.46
Dead+Wind 60 deg - No Ice	26.18	16.78	-9.69	-912.92	-1581.71	0.56
Dead+Wind 90 deg - No Ice	26.18	19.37	0.00	0.28	-1826.40	0.65
Dead+Wind 120 deg - No Ice	26.18	16.78	9.69	913.48	-1581.71	0.56
Dead+Wind 135 deg - No Ice	26.18	13.70	13.70	1291.74	-1291.46	0.46

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+Wind 150 deg - No Ice	26.18	9.69	16.78	1581.99	-913.20	0.33
Dead+Wind 180 deg - No Ice	26.18	0.00	19.37	1826.68	0.00	0.00
Dead+Wind 210 deg - No Ice	26.18	-9.69	16.78	1581.99	913.20	-0.33
Dead+Wind 225 deg - No Ice	26.18	-13.70	13.70	1291.74	1291.46	-0.46
Dead+Wind 240 deg - No Ice	26.18	-16.78	9.69	913.48	1581.71	-0.56
Dead+Wind 270 deg - No Ice	26.18	-19.37	0.00	0.28	1826.40	-0.65
Dead+Wind 300 deg - No Ice	26.18	-16.78	-9.69	-912.92	1581.71	-0.56
Dead+Wind 315 deg - No Ice	26.18	-13.70	-13.70	-1291.18	1291.46	-0.46
Dead+Wind 330 deg - No Ice	26.18	-9.69	-16.78	-1581.42	913.20	-0.33
Dead+Ice+Temp	30.59	0.00	0.00	0.39	0.00	0.00
Dead+Wind 0 deg+Ice+Temp	30.59	0.00	-16.22	-1576.52	0.00	0.00
Dead+Wind 30 deg+Ice+Temp	30.59	8.11	-14.05	-1365.25	-788.46	0.36
Dead+Wind 45 deg+Ice+Temp	30.59	11.47	-11.47	-1114.65	-1115.05	0.51
Dead+Wind 60 deg+Ice+Temp	30.59	14.05	-8.11	-788.06	-1365.66	0.63
Dead+Wind 90 deg+Ice+Temp	30.59	16.22	0.00	0.41	-1576.93	0.73
Dead+Wind 120 deg+Ice+Temp	30.59	14.05	8.11	788.87	-1365.66	0.63
Dead+Wind 135 deg+Ice+Temp	30.59	11.47	11.47	1115.46	-1115.06	0.51
Dead+Wind 150 deg+Ice+Temp	30.59	8.11	14.05	1366.07	-788.46	0.36
Dead+Wind 180 deg+Ice+Temp	30.59	0.00	16.22	1577.33	0.00	0.00
Dead+Wind 210 deg+Ice+Temp	30.59	-8.11	14.05	1366.07	788.46	-0.36
Dead+Wind 225 deg+Ice+Temp	30.59	-11.47	11.47	1115.46	1115.06	-0.51
Dead+Wind 240 deg+Ice+Temp	30.59	-14.05	8.11	788.87	1365.66	-0.63
Dead+Wind 270 deg+Ice+Temp	30.59	-16.22	0.00	0.41	1576.93	-0.73
Dead+Wind 300 deg+Ice+Temp	30.59	-14.05	-8.11	-788.06	1365.66	-0.63
Dead+Wind 315 deg+Ice+Temp	30.59	-11.47	-11.47	-1114.65	1115.05	-0.51
Dead+Wind 330 deg+Ice+Temp	30.59	-8.11	-14.05	-1365.25	788.46	-0.36
Dead+Wind 0 deg - Service	26.18	0.00	-5.98	-563.83	0.00	0.00
Dead+Wind 30 deg - Service	26.18	2.99	-5.18	-488.26	-282.06	0.10
Dead+Wind 45 deg - Service	26.18	4.23	-4.23	-398.61	-398.89	0.14
Dead+Wind 60 deg - Service	26.18	5.18	-2.99	-281.77	-488.54	0.17
Dead+Wind 90 deg - Service	26.18	5.98	0.00	0.29	-564.12	0.20
Dead+Wind 120 deg - Service	26.18	5.18	2.99	282.34	-488.54	0.17
Dead+Wind 135 deg - Service	26.18	4.23	4.23	399.18	-398.89	0.14
Dead+Wind 150 deg - Service	26.18	2.99	5.18	488.83	-282.06	0.10
Dead+Wind 180 deg - Service	26.18	0.00	5.98	564.40	0.00	0.00
Dead+Wind 210 deg - Service	26.18	-2.99	5.18	488.83	282.06	-0.10
Dead+Wind 225 deg - Service	26.18	-4.23	4.23	399.18	398.89	-0.14
Dead+Wind 240 deg - Service	26.18	-5.18	2.99	282.34	488.54	-0.17
Dead+Wind 270 deg - Service	26.18	-5.98	0.00	0.29	564.12	-0.20
Dead+Wind 300 deg - Service	26.18	-5.18	-2.99	-281.77	488.54	-0.17
Dead+Wind 315 deg - Service	26.18	-4.23	-4.23	-398.61	398.89	-0.14
Dead+Wind 330 deg - Service	26.18	-2.99	-5.18	-488.26	282.06	-0.10

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-26.18	0.00	0.00	26.18	0.00	0.000%
2	0.00	-26.18	-19.37	0.00	26.18	19.37	0.000%
3	9.69	-26.18	-16.78	-9.69	26.18	16.78	0.000%
4	13.70	-26.18	-13.70	-13.70	26.18	13.70	0.000%
5	16.78	-26.18	-9.69	-16.78	26.18	9.69	0.000%
6	19.37	-26.18	0.00	-19.37	26.18	-0.00	0.000%
7	16.78	-26.18	9.69	-16.78	26.18	-9.69	0.000%
8	13.70	-26.18	13.70	-13.70	26.18	-13.70	0.000%
9	9.69	-26.18	16.78	-9.69	26.18	-16.78	0.000%
10	0.00	-26.18	19.37	0.00	26.18	-19.37	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
11	-9.69	-26.18	16.78	9.69	26.18	-16.78	0.000%
12	-13.70	-26.18	13.70	13.70	26.18	-13.70	0.000%
13	-16.78	-26.18	9.69	16.78	26.18	-9.69	0.000%
14	-19.37	-26.18	0.00	19.37	26.18	-0.00	0.000%
15	-16.78	-26.18	-9.69	16.78	26.18	9.69	0.000%
16	-13.70	-26.18	-13.70	13.70	26.18	13.70	0.000%
17	-9.69	-26.18	-16.78	9.69	26.18	16.78	0.000%
18	0.00	-30.59	0.00	0.00	30.59	0.00	0.000%
19	0.00	-30.59	-16.22	0.00	30.59	16.22	0.000%
20	8.11	-30.59	-14.05	-8.11	30.59	14.05	0.000%
21	11.47	-30.59	-11.47	-11.47	30.59	11.47	0.000%
22	14.05	-30.59	-8.11	-14.05	30.59	8.11	0.000%
23	16.22	-30.59	0.00	-16.22	30.59	0.00	0.000%
24	14.05	-30.59	8.11	-14.05	30.59	-8.11	0.000%
25	11.47	-30.59	11.47	-11.47	30.59	-11.47	0.000%
26	8.11	-30.59	14.05	-8.11	30.59	-14.05	0.000%
27	0.00	-30.59	16.22	0.00	30.59	-16.22	0.000%
28	-8.11	-30.59	14.05	8.11	30.59	-14.05	0.000%
29	-11.47	-30.59	11.47	11.47	30.59	-11.47	0.000%
30	-14.05	-30.59	8.11	14.05	30.59	-8.11	0.000%
31	-16.22	-30.59	0.00	16.22	30.59	0.00	0.000%
32	-14.05	-30.59	-8.11	14.05	30.59	8.11	0.000%
33	-11.47	-30.59	-11.47	11.47	30.59	11.47	0.000%
34	-8.11	-30.59	-14.05	8.11	30.59	14.05	0.000%
35	0.00	-26.18	-5.98	0.00	26.18	5.98	0.000%
36	2.99	-26.18	-5.18	-2.99	26.18	5.18	0.000%
37	4.23	-26.18	-4.23	-4.23	26.18	4.23	0.000%
38	5.18	-26.18	-2.99	-5.18	26.18	2.99	0.000%
39	5.98	-26.18	0.00	-5.98	26.18	0.00	0.000%
40	5.18	-26.18	2.99	-5.18	26.18	-2.99	0.000%
41	4.23	-26.18	4.23	-4.23	26.18	-4.23	0.000%
42	2.99	-26.18	5.18	-2.99	26.18	-5.18	0.000%
43	0.00	-26.18	5.98	0.00	26.18	-5.98	0.000%
44	-2.99	-26.18	5.18	2.99	26.18	-5.18	0.000%
45	-4.23	-26.18	4.23	4.23	26.18	-4.23	0.000%
46	-5.18	-26.18	2.99	5.18	26.18	-2.99	0.000%
47	-5.98	-26.18	0.00	5.98	26.18	0.00	0.000%
48	-5.18	-26.18	-2.99	5.18	26.18	2.99	0.000%
49	-4.23	-26.18	-4.23	4.23	26.18	4.23	0.000%
50	-2.99	-26.18	-5.18	2.99	26.18	5.18	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00002923
3	Yes	5	0.00000001	0.00007335
4	Yes	5	0.00000001	0.00008124
5	Yes	5	0.00000001	0.00007141
6	Yes	4	0.00000001	0.00009599
7	Yes	5	0.00000001	0.00007397
8	Yes	5	0.00000001	0.00008131
9	Yes	5	0.00000001	0.00007199
10	Yes	4	0.00000001	0.00002925
11	Yes	5	0.00000001	0.00007199

12	Yes	5	0.00000001	0.00008131
13	Yes	5	0.00000001	0.00007397
14	Yes	4	0.00000001	0.00009599
15	Yes	5	0.00000001	0.00007141
16	Yes	5	0.00000001	0.00008124
17	Yes	5	0.00000001	0.00007335
18	Yes	4	0.00000001	0.00000001
19	Yes	5	0.00000001	0.00004875
20	Yes	5	0.00000001	0.00013947
21	Yes	5	0.00000001	0.00015592
22	Yes	5	0.00000001	0.00013695
23	Yes	5	0.00000001	0.00004905
24	Yes	5	0.00000001	0.00014040
25	Yes	5	0.00000001	0.00015613
26	Yes	5	0.00000001	0.00013778
27	Yes	5	0.00000001	0.00004879
28	Yes	5	0.00000001	0.00013778
29	Yes	5	0.00000001	0.00015613
30	Yes	5	0.00000001	0.00014040
31	Yes	5	0.00000001	0.00004905
32	Yes	5	0.00000001	0.00013695
33	Yes	5	0.00000001	0.00015592
34	Yes	5	0.00000001	0.00013947
35	Yes	4	0.00000001	0.00000857
36	Yes	4	0.00000001	0.00011877
37	Yes	4	0.00000001	0.00013357
38	Yes	4	0.00000001	0.00011090
39	Yes	4	0.00000001	0.00001528
40	Yes	4	0.00000001	0.00012163
41	Yes	4	0.00000001	0.00013406
42	Yes	4	0.00000001	0.00011326
43	Yes	4	0.00000001	0.00000859
44	Yes	4	0.00000001	0.00011326
45	Yes	4	0.00000001	0.00013406
46	Yes	4	0.00000001	0.00012163
47	Yes	4	0.00000001	0.00001528
48	Yes	4	0.00000001	0.00011090
49	Yes	4	0.00000001	0.00013357
50	Yes	4	0.00000001	0.00011877

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	139.5 - 93.04	21.624	43	1.3565	0.0018
L2	96.957 - 46.377	10.399	43	1.0390	0.0008
L3	51.627 - 0	2.886	43	0.5263	0.0003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
140.00	7721.00 w/Mount Pipe	43	21.624	1.3565	0.0018	38838
130.00	T-Arm (3)	43	18.949	1.3007	0.0015	20441

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
120.00	T-Arm (3)	43	16.192	1.2367	0.0013	9958
110.00	T-Arm (3)	43	13.555	1.1619	0.0010	6582
75.00	GPS	43	6.065	0.7698	0.0005	4437

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	139.5 - 93.04	69.888	10	4.3831	0.0057
L2	96.957 - 46.377	33.629	10	3.3598	0.0027
L3	51.627 - 0	9.336	10	1.7027	0.0012

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
140.00	7721.00 w/Mount Pipe	10	69.888	4.3831	0.0057	12147
130.00	T-Arm (3)	10	61.248	4.1912	0.0049	6392
120.00	T-Arm (3)	10	52.342	3.9765	0.0041	3113
110.00	T-Arm (3)	10	43.825	3.7356	0.0034	2056
75.00	GPS	10	19.619	2.5602	0.0018	1378

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	139.5 - 93.04 (1)	TP26.99x15.5x0.25	46.46	0.00	0.0	39.000	20.4495	-6.41	797.53	0.008
L2	93.04 - 46.377 (2)	TP37.91x25.5213x0.375	50.58	0.00	0.0	39.000	43.1455	-14.38	1682.67	0.009
L3	46.377 - 0 (3)	TP48.5x35.8741x0.375	51.63	0.00	0.0	39.000	57.2808	-26.17	2233.95	0.012

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	139.5 - 93.04	TP26.99x15.5x0.25	298.54	27.598	39.000	0.708	0.00	0.000	39.000	0.000

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 $\frac{f_{by}}{F_{by}}$
L2	93.04 - 46.377 (1)	TP37.91x25.5213x0.375	924.59	28.820	39.000	0.739	0.00	0.000	39.000	0.000
L3	46.377 - 0 (2) (3)	TP48.5x35.8741x0.375	1826.68	32.223	39.000	0.826	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	139.5 - 93.04	TP26.99x15.5x0.25	12.06	0.590	26.000	0.045	0.00	0.000	26.000	0.000
L2	93.04 - 46.377 (1)	TP37.91x25.5213x0.375	15.59	0.361	26.000	0.028	0.00	0.000	26.000	0.000
L3	46.377 - 0 (2) (3)	TP48.5x35.8741x0.375	19.39	0.339	26.000	0.026	0.00	0.000	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	139.5 - 93.04	0.008	0.708	0.000	0.045	0.000	0.716 ✔	1.333	H1-3+VT ✔
L2	93.04 - 46.377 (1)	0.009	0.739	0.000	0.028	0.000	0.748 ✔	1.333	H1-3+VT ✔
L3	46.377 - 0 (2) (3)	0.012	0.826	0.000	0.026	0.000	0.838 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	139.5 - 93.04	Pole	TP26.99x15.5x0.25	1	-6.41	1063.11	53.7	Pass
L2	93.04 - 46.377	Pole	TP37.91x25.5213x0.375	2	-14.38	2243.00	56.1	Pass
L3	46.377 - 0	Pole	TP48.5x35.8741x0.375	3	-26.17	2977.86	62.9	Pass
							Summary	
						Pole (L3)	62.9	Pass
						RATING =	**62.9**	**Pass**

ANCHOR BOLT AND BASE PLATE ANALYSIS

URS

Job	140' EEI Monopole - Orange, CT	Project No.	TW1-005	Page	of
Description	Anchor Bolt and Base Plate Analysis	Computed by	JRM	Sheet	1 of 6
		Checked by		Date	10/31/07
				Date	

ANCHOR BOLT AND BASE PLATE ANALYSIS

Input Data

Tower Reactions:

Overturning Moment:	$OM := 1827 \cdot ft \cdot kips$	*user input*
Shear Force:	$Shear := 19.0 \cdot kips$	*user input*
Axial Force:	$Axial := 26.0 \cdot kips$	*user input*

Anchor Bolt Data:

Use ASTM A615 Grade 75	*user input*	
Number of Anchor Bolts = N	$N := 16$	*user input*
Diameter of Bolt Circle:	$D_{bc} := 57in$	*user input*
Bolt "Column" Distance:	$l_c := 3.0in$	*user input*
Bolt Ultimate Strength:	$F_u := 100 \cdot ksi$	*user input*
Bolt Yield Strength:	$Fy := 75 \cdot ksi$	*user input*
Bolt Modulus:	$E := 29000 \cdot ksi$	*user input*
Anchor Bolt Diameter	$D := 2.25in$	*user input*
Threads per Inch:	$n := 4.5$	*user input*

Base Plate Data:

Use ASTM A572 Grade 60		*user input*
Plate Yield Strength:	$Fy_{bp} := 60 \cdot ksi$	*user input*
Base Plate Thickness:	$PlateThickness := 2.0 \cdot in$	*user input*
Base Plate Diameter:	$D_{bp} := 63 \cdot in$	*user input*
Outer Pole Diameter:	$D_{pole} := 48.50in$	*user input*

Geometric Layout Data:

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

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

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

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

$d_1 = 10.91 \cdot in$ $d_7 = 10.91 \cdot in$

$d_2 = 20.15 \cdot in$ $d_8 = 0.00 \cdot in$

$d_3 = 26.33 \cdot in$ $d_9 = -10.91 \cdot in$

$d_4 = 28.50 \cdot in$ $d_{10} = -20.15 \cdot in$

$d_5 = 26.33 \cdot in$ $d_{11} = -26.33 \cdot in$

$d_6 = 20.15 \cdot in$ etc.

Critical Distances For Bending in Plate:

Outer Pole Radius: $R_{pole} := \frac{D_{pole}}{2}$ $R_{pole} = 24.25 \cdot in$

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

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

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

$MA_3 = 2.08 \cdot in$ $MA_9 = 0.00 \cdot in$

$MA_4 = 4.25 \cdot in$ $MA_{10} = 0.00 \cdot in$

$MA_5 = 2.08 \cdot in$ $MA_{11} = 0.00 \cdot in$

$MA_6 = 0.00 \cdot in$ etc.

Effective Width of Baseplate for Bending: $EffectiveWidth := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2}$ $EffectiveWidth = 32.17 \cdot in$

Anchor Bolt Analysis:

Polar Moment of Inertia I_p:

$$I_p := \sum_i \left(d_i\right)^2 \qquad I_p = 6.498 \times 10^3 \cdot in^2$$

Gross Area of Bolt:

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

Net Area of Bolt:

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

Net Diameter:

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

Radius of Gyration of Bolt:

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

Section Modulus of Bolt:

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

Anchor Bolt Bending Stress:

Maximum Applied Bending:

$$M_x := \left(\frac{Shear}{N}\right) \cdot l \qquad M_x = 0.297 \cdot ft \cdot kips$$

$$f_{bx} := \frac{M_x}{S_x} \qquad f_{bx} = 4.3 \cdot ksi$$

Allowable Bending

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

Note: 1.333 increase allowed per TIA/EIA

Check Tensile Forces:

Maximum Tensile Force (Gross Area):

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

Note: 1.333 increase allowed per TIA/EIA

Maximum Tensile Force (Net Area):

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

Note: 1.333 increase allowed per TIA/EIA

Applied Tension:

$$MaxTension := \frac{OM \cdot R_{bc}}{I_p} - \frac{Axial}{N} \qquad MaxTension = 94.5 \cdot kips$$

Check Stresses:

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

$$\frac{MaxTension}{F_{net.area}} = 0.49$$

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

Condition = "OK"

Check Compression & Combined Stresses (if required):

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

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

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

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

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

Allowable Compressive Force:

$$K := 0.65$$

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

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

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

Applied Compressive Force:

$$MaxCompression := \frac{OM \cdot R_{bc}}{I_p} + \frac{Axial}{N} \qquad MaxCompression = 97.8 \cdot kips$$

$$f_a := \frac{MaxCompression}{A_n} \qquad f_a = 30.1 \cdot ksi$$

Check Combined Stresses:

$$\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} = 0.50$$

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

Base Plate Analysis:

Force from Bolt(s):

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

$C_1 = 38.4 \cdot kips$ $C_7 = 38.4 \cdot kips$

$C_2 = 69.6 \cdot kips$ $C_8 = 1.6 \cdot kips$

$C_3 = 90.5 \cdot kips$ $C_9 = -35.2 \cdot kips$

$C_4 = 97.8 \cdot kips$ $C_{10} = -66.4 \cdot kips$

$C_5 = 90.5 \cdot kips$ $C_{11} = -87.2 \cdot kips$

$C_6 = 69.6 \cdot kips$ etc.

Bending Stress in Plate:

$$f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{EffectiveWidth \cdot PlateThickness^2} \qquad f_{bp} = 36.9 \cdot ksi$$

Check Stresses:

$$\frac{f_{bp}}{1.333 \cdot 0.75 Fy_{bp}} = 0.62$$

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

Condition = "OK"

FOUNDATION ANALYSIS

URS

Job	140' EEI Monopole - Orange, CT	Project No.	TW1-005	Page / Sheet	of / 1 of 1
Description	Caisson Foundation Evaluation	Computed by	JRM	Date	10/30/07
		Checked by		Date	

Check Foundation Depth TIA/EIA-222-F 7.2.5

Shear Force: $S := 19k$ *USER INPUT*

Overturning Moment: $M := 1827ft \cdot k$ *USER INPUT*

Foundation Diameter: $d := 6.5ft$ *USER INPUT*

Depth Provided: $LD := 28.0ft$ *USER INPUT*

Depth Required: $LD1 := 2.0ft + \left(\frac{S \cdot ft^2}{3k \cdot d}\right) + 2ft^{.5}\left(\frac{M \cdot ft}{3 \cdot k\,d} + \frac{S \cdot ft}{2k} + \frac{S^2 ft^3}{18k^2 d^2}\right)^{.5}$ $LD1 = 23.3\,ft$

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

Moment Capacity:

Bending Moment: $Mu := 1935ft \cdot k$ *USER INPUT–FROM LPILE*

Moment Capacity: $Mn := 5735ft \cdot k$ *USER INPUT–FROM LPILE*

Factor of Safety: $FS := \frac{Mn}{Mu}$ $FS = 3.0$

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

Axial Capacity:

Applied Axial Load: $A1 := 26k$ *USER INPUT*

Concrete Weight: $A2 := .150\frac{k}{ft^3} \cdot LD \cdot \pi\frac{d^2}{4}$ $A2 = 139.4 \cdot k$

Total Axial Load: $AT := A1 + A2$ $AT = 165.4 \cdot k$

Number of Rebar: $n := 22$ *USER INPUT*

Area of Rebar: $Ar := 1.560in^2$ *USER INPUT* #11

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

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

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

Axial Capacity: $Po := n \cdot Ar \cdot fy + (Ag - n \cdot Ar) \cdot 0.85 \cdot f'c$ $Po = 18188.9 \cdot k$

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

LPILE Plus for Windows, Version 4

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

This program is licensed to:

J Mead

URS

Name of input data file: P:\08\LPile\Orange.LPD
Name of output file: P:\08\LPile\Orange.lpo
Name of plot output file: P:\08\LPile\Orange.lpp
Name of runtime file: P:\08\LPile\Orange.lpr

Time and Date of Analysis

Date: October 31, 2007 Time: 13:39:58

Problem Title

Foundation Stiffness of Concrete Pile with Nonlinear EI

Program Options

Units Used in Computations - US Customary Units, inches, pounds

Basic Program Options:

Analysis Type 3:
- Computations of Ultimate Bending Moment Capacity and Pile Response
  Using Nonlinear EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers
  (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip

- Analysis for fixed-length pile or shaft only
- Analysis includes computation of foundation stiffness matrix elements
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 250
- Deflection tolerance for closure = 1.0000E-04 in
- Maximum number of iterations allowed = 100
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 8

Pile Structural Properties and Geometry

Pile Length = 336.00 in
Depth of ground surface below top of pile = 12.00 in
Slope angle of ground surface = .00 deg.

Structural properties of pile defined using 2 points

Point	Depth X in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	.000	78.000	1.8170E+06	4.7784E+03	3.0000E+06
2	336.000	78.000	1.8170E+06	4.7784E+03	3.0000E+06

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of moment of inertia and modulus of are not used for any computations other than total stress due to combined axial loading and bending.

Soil and Rock Layering Information

The soil profile is modelled using 4 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 12.000 in
Distance from top of pile to bottom of layer = 48.000 in
p-y subgrade modulus k for top of soil layer = 1.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 1.000 lbs/in**3

Layer 2 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 48.000 in

Distance from top of pile to bottom of layer = 84.000 in
p-y subgrade modulus k for top of soil layer = 12.300 lbs/in**3
p-y subgrade modulus k for bottom of layer = 21.500 lbs/in**3

Layer 3 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 84.000 in
Distance from top of pile to bottom of layer = 324.000 in
p-y subgrade modulus k for top of soil layer = 21.500 lbs/in**3
p-y subgrade modulus k for bottom of layer = 83.100 lbs/in**3

Layer 4 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 324.000 in
Distance from top of pile to bottom of layer = 420.000 in
p-y subgrade modulus k for top of soil layer = 83.100 lbs/in**3
p-y subgrade modulus k for bottom of layer = 83.100 lbs/in**3

(Depth of lowest layer extends 84.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Distribution of effective unit weight of soil with depth
is defined using 8 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	.00	.07234
2	48.00	.07234
3	48.00	.07234
4	84.00	.07234
5	84.00	.03762
6	324.00	.03762
7	324.00	.03762
8	420.00	.03762

Shear Strength of Soils

Distribution of shear strength parameters with depth
defined using 8 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50/k_rm %	RQD %
1	.000	.00000	34.00	------	------
2	48.000	.00000	34.00	------	------
3	48.000	.00000	34.00	------	------
4	84.000	.00000	34.00	------	------

5	84.000	.00000	34.00	------	------
6	324.000	.00000	34.00	------	------
7	324.000	.00000	34.00	------	------
8	420.000	.00000	34.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) E50 is reported for clay strata.
(3) k_rm is reported for rock strata.
(4) RQD is input and reported only for rock materials.
(5) Internal default values for E50 will be generated when input value is 0.

Static loading criteria was used for computation of p-y curves

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Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 19000.000 lbs
Bending moment at pile head = 21924000.000 in-lbs
Axial load at pile head = 26000.000 lbs

(Non-zero moment for this load indicates pile-head is free to rotate
under the applied pile-head load)

Computations of Ultimate Moment Capacity and Nonlinear Bending Stiffness

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Pile Description:

The pile shape is a circular solid pile.

Outside Diameter = 78.000 In

Material Properties:

Compressive Strength of Concrete = 4. Kip/In**2
Yield stress for rebar = 60. Kip/In**2
Modulus of elasticity of steel = 29000. Kip/In**2
Number of reinforcing bars = 22
Area of single rebar = 1.56000 In**2
Number of rows of reinforcing bars = 11
Cover Thickness = 4.000 In

Ultimate squash load capacity = 18188.94 Kip

Distribution and Area of Steel Reinforcement

Row Number	Area of Reinforcement In**2	Distance to Centroidal Axis In
1	3.120000	34.6438
2	3.120000	31.8371
3	3.120000	26.4512
4	3.120000	18.9224
5	3.120000	9.8606
6	3.120000	.0000
7	3.120000	-9.8606
8	3.120000	-18.9224
9	3.120000	-26.4512
10	3.120000	-31.8371
11	3.120000	-34.6438

Axial Thrust Force = 26.000 Kip

Bending Moment in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches
7.187E+06	7.187E+12	.00000100	.00004056	40.564
7.194E+06	1.437E+12	.00000500	.00009644	19.289
1.225E+07	1.361E+12	.00000900	.00016894	18.771
1.740E+07	1.339E+12	.00001300	.00024192	18.609
2.252E+07	1.325E+12	.00001700	.00031541	18.554
2.762E+07	1.315E+12	.00002100	.00038943	18.544
3.268E+07	1.307E+12	.00002500	.00046398	18.559
3.770E+07	1.300E+12	.00002900	.00053911	18.590
4.270E+07	1.294E+12	.00003300	.00061482	18.631
4.766E+07	1.288E+12	.00003700	.00069116	18.680
5.131E+07	1.251E+12	.00004100	.00076136	18.570
5.383E+07	1.196E+12	.00004500	.00082586	18.353
5.568E+07	1.136E+12	.00004900	.00088943	18.152
5.728E+07	1.081E+12	.00005300	.00094783	17.884
6.328E+07	7.624E+11	.00008300	.00134184	16.167
6.581E+07	5.824E+11	.00011300	.00169474	14.998
6.736E+07	4.711E+11	.00014300	.00204489	14.300
6.796E+07	3.929E+11	.00017300	.00235030	13.586
6.840E+07	3.369E+11	.00020300	.00266261	13.116
6.884E+07	2.954E+11	.00023300	.00301415	12.936
6.910E+07	2.627E+11	.00026300	.00334198	12.707
6.917E+07	2.361E+11	.00029300	.00366784	12.518
6.924E+07	2.142E+11	.00032300	.00397880	12.318

Ultimate moment capacity at concrete strain of 0.003 = 6.882E+07 In-lb

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

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Specified shear force at pile head = 19000.000 lbs
Specified bending moment at pile head = 21924000.000 in-lbs
Specified axial load at pile head = 26000.000 lbs

(Non-zero moment for this load does not indicate free-head conditions)

Depth X in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Flx. Rig. EI lbs-in**2	Soil Res p lbs/in
0.000	.887099	2.19E+07	19000.0	-.005647	476.0	1.33E+12	0.000
10.752	.827343	2.21E+07	19000.0	-.005468	480.4	1.33E+12	0.000
21.504	.769517	2.23E+07	18964.4	-.005288	484.9	1.33E+12	-7.313
32.256	.713639	2.25E+07	18846.4	-.005106	489.3	1.32E+12	-14.455
43.008	.659728	2.27E+07	18657.7	-.004922	493.6	1.32E+12	-20.457
53.760	.607802	2.29E+07	16610.5	-.004737	497.8	1.32E+12	-357.625
64.512	.557878	2.31E+07	12044.1	-.004550	501.2	1.32E+12	-492.832
75.264	.509971	2.32E+07	6001.7	-.004362	503.3	1.32E+12	-631.092
86.016	.464089	2.32E+07	-1585.0	-.004173	503.9	1.32E+12	-800.940
96.768	.420235	2.32E+07	-10891.1	-.003985	502.5	1.32E+12	-928.111
107.520	.378402	2.30E+07	-21490.9	-.003797	498.8	1.32E+12	-1040.840
118.272	.338576	2.27E+07	-33205.8	-.003612	492.5	1.32E+12	-1134.915
129.024	.300729	2.23E+07	-45815.7	-.003429	483.5	1.33E+12	-1206.758
139.776	.264823	2.17E+07	-59064.8	-.003251	471.4	1.33E+12	-1253.373
150.528	.230807	2.10E+07	-72668.1	-.003078	456.2	1.33E+12	-1272.280
161.280	.198616	2.01E+07	-86316.4	-.002911	437.9	1.33E+12	-1261.432
172.032	.168174	1.91E+07	-99680.3	-.002753	416.4	1.33E+12	-1219.134
182.784	.139391	1.80E+07	-112413.8	-.002603	391.9	1.34E+12	-1143.937
193.536	.112163	1.67E+07	-124156.0	-.002463	364.6	1.34E+12	-1034.536
204.288	.086376	1.53E+07	-134532.3	-.002335	334.8	1.35E+12	-889.648
215.040	.061905	1.38E+07	-143153.8	-.002219	302.7	1.35E+12	-707.895
225.792	.038615	1.23E+07	-149616.1	-.002115	268.9	1.36E+12	-487.713
236.544	.016366	1.06E+07	-153496.1	-.002026	233.9	1.39E+12	-227.227
247.296	-.004996	8.98E+06	-154348.3	-.001950	198.3	1.41E+12	75.923
258.048	-.025620	7.34E+06	-151699.3	-.001889	162.9	1.44E+12	424.543
268.800	-.045841	5.74E+06	-145031.6	-.001876	128.6	7.19E+12	825.278
279.552	-.065970	4.24E+06	-133735.6	-.001869	96.3429	7.19E+12	1286.054
290.304	-.086031	2.88E+06	-117146.1	-.001863	67.2925	7.19E+12	1810.550
301.056	-.106045	1.74E+06	-94557.9	-.001860	42.7485	7.19E+12	2402.509
311.808	-.126030	863891.3	-67976.1	-.001858	23.9840	7.19E+12	2514.605
322.560	-.146002	280137.9	-40523.2	-.001857	11.4541	7.19E+12	2633.870
333.312	-.165968	11500.2	-8602.4	-.001857	5.6880	7.19E+12	3162.473

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of total stress due to combined axial stress and bending may not be representative of actual conditions.

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

Pile-head deflection = .8871 in
Computed slope at pile head = -5.6467E-03
Maximum bending moment = 23223094.894 lbs-in
Maximum shear force = -154444.493 lbs
Depth of maximum bending moment = 84.672 in
Depth of maximum shear force = 244.608 in
Number of iterations = 7
Number of zero deflection points = 1

Summary of Pile-head Response

Definition of symbols for pile-head boundary conditions:

y = pile-head displacment, in
M = pile-head moment, lbs-in
V = pile-head shear force, lbs
S = pile-head slope, radians
R = rotational stiffness of pile-head, in-lbs/rad

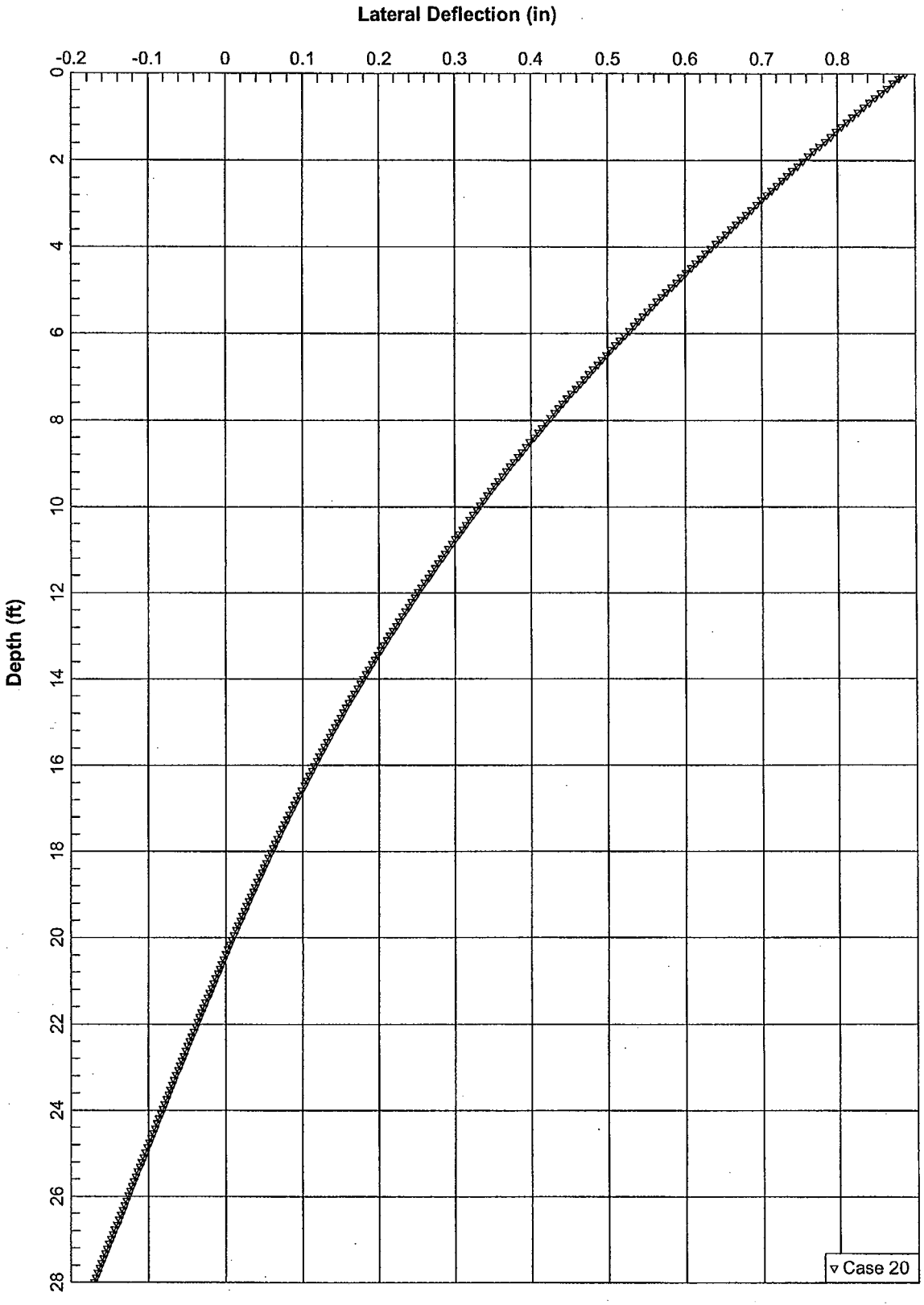
BC Type	Boundary Condition 1	Boundary Condition 2	Axial Load lbs	Pile Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 19000.000	M= 2.19E+07	26000.0000	.8871	2.322E+07	-1.544E+05

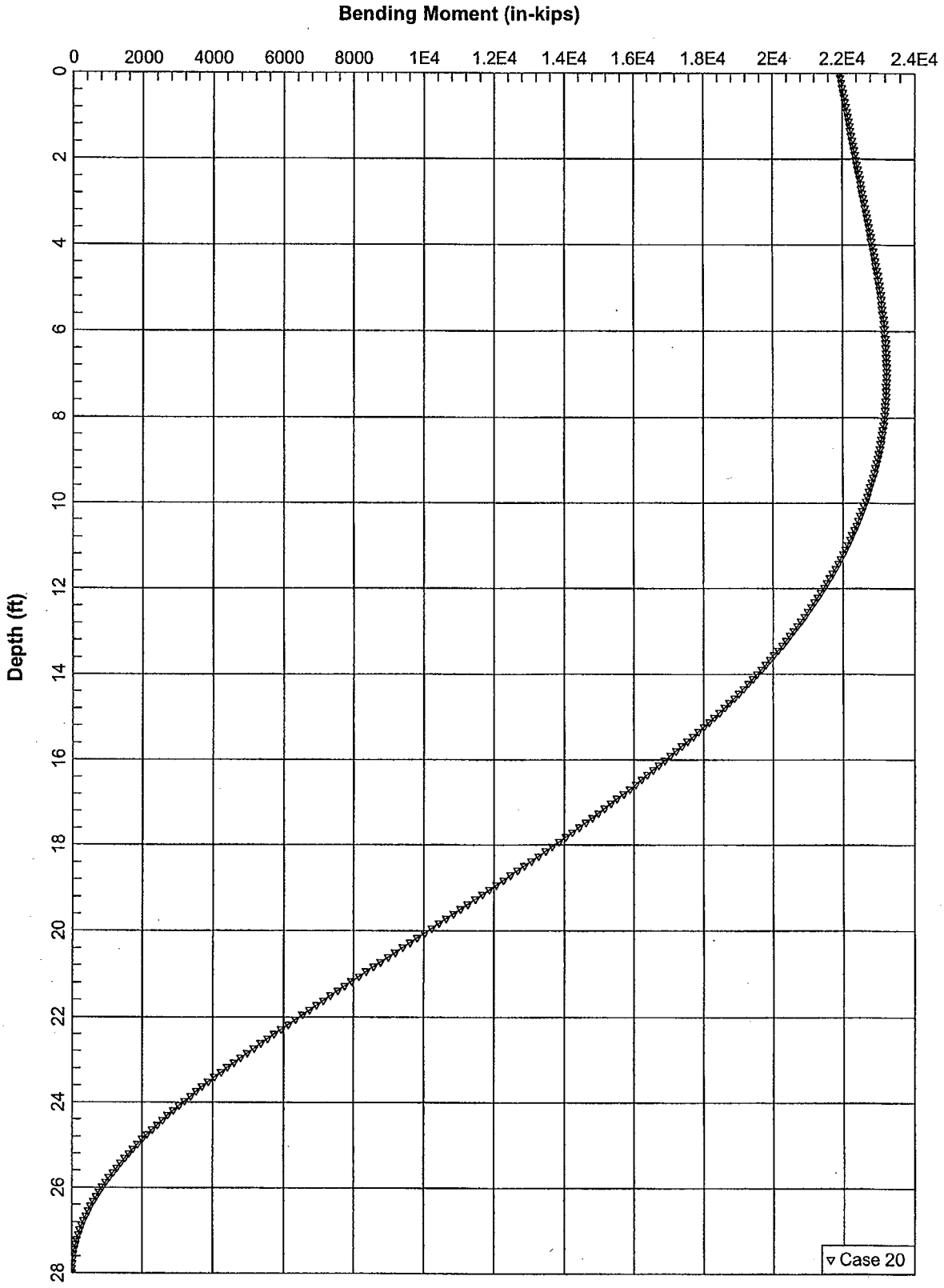
Computed Pile-head Stiffness Matrix Members
K22, K23, K32, K33 for Superstructure

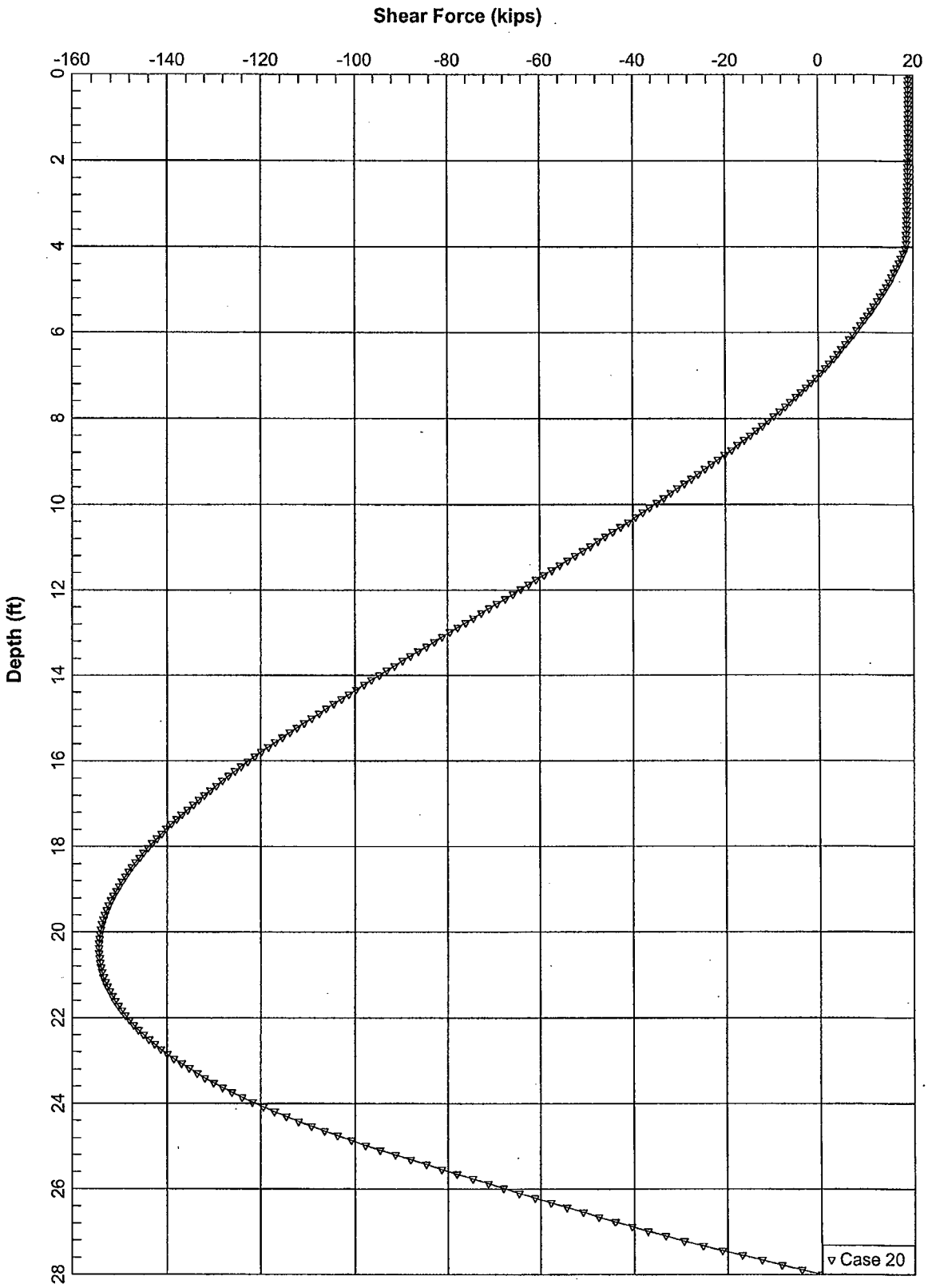
Lateral Load lbs	K22 lbs/in	K23 lbs/Rad	Bending Moment in-lbs	K32 in-lbs/in	K33 in-lbs/Rad
1900.0000	1.09176E+06	2.32342E+08	2.19240E+06	2.32342E+08	5.88763E+10
5719.5699	1.09176E+06	2.32342E+08	6.59978E+06	2.32342E+08	5.88763E+10
9065.3038	1.09176E+06	8.68171E+07	1.04604E+07	2.32342E+08	2.08505E+10
11439.1398	1.09176E+06	7.78689E+07	1.31996E+07	2.32342E+08	1.79911E+10
13280.4301	1.09176E+06	7.54655E+07	1.53242E+07	2.32342E+08	1.70955E+10
14784.8738	1.09176E+06	7.44076E+07	1.70602E+07	2.32342E+08	1.66549E+10

16056.8628	1.09176E+06	7.38256E+07	1.85279E+07	2.32342E+08	1.63930E+10
17158.7098	1.09176E+06	7.34636E+07	1.97993E+07	2.32342E+08	1.62184E+10
18130.6077	1.09176E+06	7.32294E+07	2.09208E+07	2.32342E+08	1.61041E+10
19000.0000	1.09176E+06	7.30441E+07	2.19240E+07	2.32342E+08	1.60057E+10

The analysis ended normally.


Lateral Deflection (in)
-0.2
-0.1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
Case 20


Bending Moment (in-kips)
0
2000
4000
6000
8000
1E4
1.2E4
1.4E4
1.6E4
1.8E4
2E4
2.2E4
2.4E4
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
Case 20


Shear Force (kips)
-160
-140
-120
-100
-80
-60
-40
-20
0
20
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
Case 20

Rogers Property,CT01YC222 (700 Grassy Hill Road, Orange, CT) - Siting Council Power Density Calculations

Sprint Nextel Directional Antennas ESMR - 2657 MHz 130'

Note: Power densities are in mW/ cm²

Transmitters:	Frequency in MHz	CT Standard mW/ cm²	Number of Channels	ERP (W) per channel	Centerline of Tx antennas AGL (ft.)**	Power density calculated at base of tower	% of CT Standard
WiMAX	2657	1.0000	3	562	130	0.0358549	3.59%
CDMA	1962.5	1.0000	11	266.07	130	0.0622415	6.22%
From previous filings:per CSC power density data base							
AT&T							1.83%
Verizon							7.70%
T-Mobile							3.26%
Total % of CT Standard							22.6061%