

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

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

E-Mail: siting.council@ct.gov

www.ct.gov/csc

September 6, 2011

Jennifer A. Herz, Esq.
Brown Rudnick LLP
CityPlace I, 185 Asylum Street
Hartford, CT 06103

RE: **EM-T-MOBILE-060-110818** - Omnipoint Communications, as subsidiary of T-Mobile USA, Inc., notice of intent to modify an existing telecommunications facility located at 1919 Boston Post Road, Guilford, Connecticut.

Dear Attorney Herz:

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

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

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated August 18, 2011. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

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

Very truly yours,

Linda Roberts
Executive Director

LR/CDM/laf

c: The Honorable Joseph S. Mazza, First Selectman, Town of Guilford
Regina Reid, Zoning Enforcement Officer, Town of Guilford
Crown Castle USA, Inc.

JENNIFER A. HERZ
Direct Dial: (860) 509-6527
jherz@brownrudnick.com

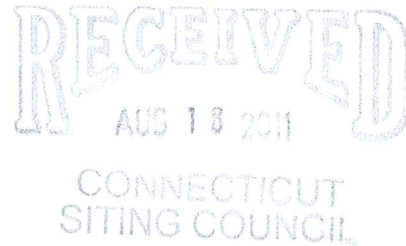
EM-T-MOBILE-060-110818

CityPlace I
185 Asylum
Street
Hartford
Connecticut
06103
tel 860.509.6500
fax 860.509.6501

Via Hand Delivery

August 18, 2011

Robert Stein, Chairman
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051



RE: **Notice of Exempt Modification / Guilford @ 1919 Boston Post Road**

Dear Chairman Stein:

On behalf of T-Mobile Northeast, LLC ("T-Mobile"), enclosed for filing is an original and 5 copies of T-Mobile's Notice of Exempt Modification for the Facility located at 1919 Boston Post Road in Guilford.

I also enclose herewith a check in the amount of \$625.00 representing the filing fee.

I would appreciate it if you would date-stamp the enclosed copy of this transmittal letter and return it to the courier delivering this package.

If you have any questions, please feel free to contact me.

Very truly yours,

BROWN RUDNICK LLP

A handwritten signature in blue ink that reads "Jennifer A. Herz". Below the signature, the name "Jennifer A. Herz" is printed in a standard font.

JH/bh
Enclosures

cc/encl: First Selectman Joseph Mazza

40285785 v1 - HERZJA - 029431/0001

CONNECTICUT SITING COUNCIL

In re:

T-Mobile Northeast, LLC's Notice to Make an
Exempt Modification to an Existing Facility at
1919 Boston Post Road, Guilford, Connecticut.

: **EXEMPT MODIFICATION NO.** _____

:
: August 18, 2011

NOTICE OF EXEMPT MODIFICATION

Pursuant to Conn. Agencies Regs. §§ 16-50j-73 and 16-50j-72(b), T-Mobile Northeast, LLC ("T-Mobile") hereby gives notice to the Connecticut Siting Council ("Council") and the Town of Guilford of T-Mobile's intent to make an exempt modification to the existing monopole tower (the "Tower") located at 1919 Boston Post Road in Guilford, Connecticut. Specifically, T-Mobile plans to upgrade its wireless system in Connecticut by implementing its Universal Mobile Telecommunications System ("UMTS"). UMTS is a third-generation ("3G") technology that utilizes a code division multiple access ("CDMA") base to allow for fast and large data transfers. To accomplish this upgrade, T-Mobile must modify its antenna and equipment configurations at many of its existing sites.

Once the UMTS upgrade is complete, T-Mobile will operate on a more unified communication system, allowing international wireless telephones to function world-wide. Furthermore, UMTS will enhance global positioning system ("GPS") navigation capabilities and provide emergency responders with more advanced tracking capabilities. The proposed UMTS technology is compatible with the existing second-generation ("2G") Global System for Mobile Communication ("GSM") currently on the Tower and the proposed upgrade is expected to enhance the existing 2G system. In order to accomplish the upgrade at this site, T-Mobile plans to add UMTS technology and install associated equipment at the base of the Tower.

Under the Council's regulations (Conn. Agencies Regs. § 16-50j-72(b)), T-Mobile's plans do not constitute a modification subject to the Council's review because T-Mobile will not change the height of the Tower, will not extend the boundaries of the site, 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.

The Tower is a 149-foot monopole tower located at 1919 Boston Post Road in Guilford, Connecticut (latitude N 41° 18' 1.27", longitude W -72° 42' 29.13"). The Tower is owned by Crown Castle. Multiple carriers are currently located on the Tower. Currently, T-Mobile has 3 panel antennas and 3 Tower Mounted Amplifiers ("TMA") with a centerline of 148 feet mounted on the Tower. A site plan with Tower specifications is attached.

T-Mobile plans to install 3 UMTS antennas (Model No. APX16DWV) on the Tower. Additionally, T-Mobile plans to install 3 Twin AWS TMAs. The centerline of the new antennas and TMAs will remain at 148 feet.

To confirm the Tower can support these changes, T-Mobile commissioned Crown Castle to perform a Structural Analysis of the Tower (attached). According to the Structural Analysis Report, dated July 12, 2011, the Tower has "sufficient capacity" for T-Mobile's planned modifications (Structural Analysis Report, page 1).

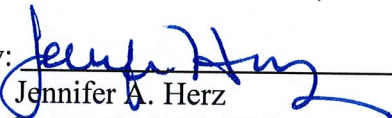
Within the existing compound T-Mobile plans to locate its proposed UMTS equipment cabinet on the existing 13' by 10' (approximately) concrete equipment pad. Additionally, T-Mobile plans to install 6, 1-5/8 inch coax cables to run to its new antennas. Hence, no increase in the size of the boundaries of the site is necessary.

Excluding brief, minor, construction-related noise during the addition of the antennas, TMAs and the installation of the equipment cabinet, the proposed changes to the Tower will not increase noise levels at the site.

The proposed antennas 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 the Federal Communications Commission ("FCC"). The worst-case power density analysis measured at the base of the Tower indicates that T-Mobile's antennas will emit 4.11% of the NCRP's standard for maximum permissible exposure. Collectively, the antennas on the Tower will emit 40.28% of the NCRP's standard for maximum permissible exposure. Therefore, the power density levels will be 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, T-Mobile's proposed plan install antennas, TMAs and ground equipment at this site does not constitute a modification subject to the Council's jurisdiction because T-Mobile 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.*

T-MOBILE NORTHEAST, LLC

By: 

Jennifer A. Herz

Brown Rudnick LLP

185 Asylum Street

Hartford, CT 06103-3402

Email - jherz@brownrudnick.com

Phone - 860.509.6527 /Fax - 860.509.6501

Certificate of Service

This is to certify that on this 18th day of August, 2011, the foregoing Notice of Exempt

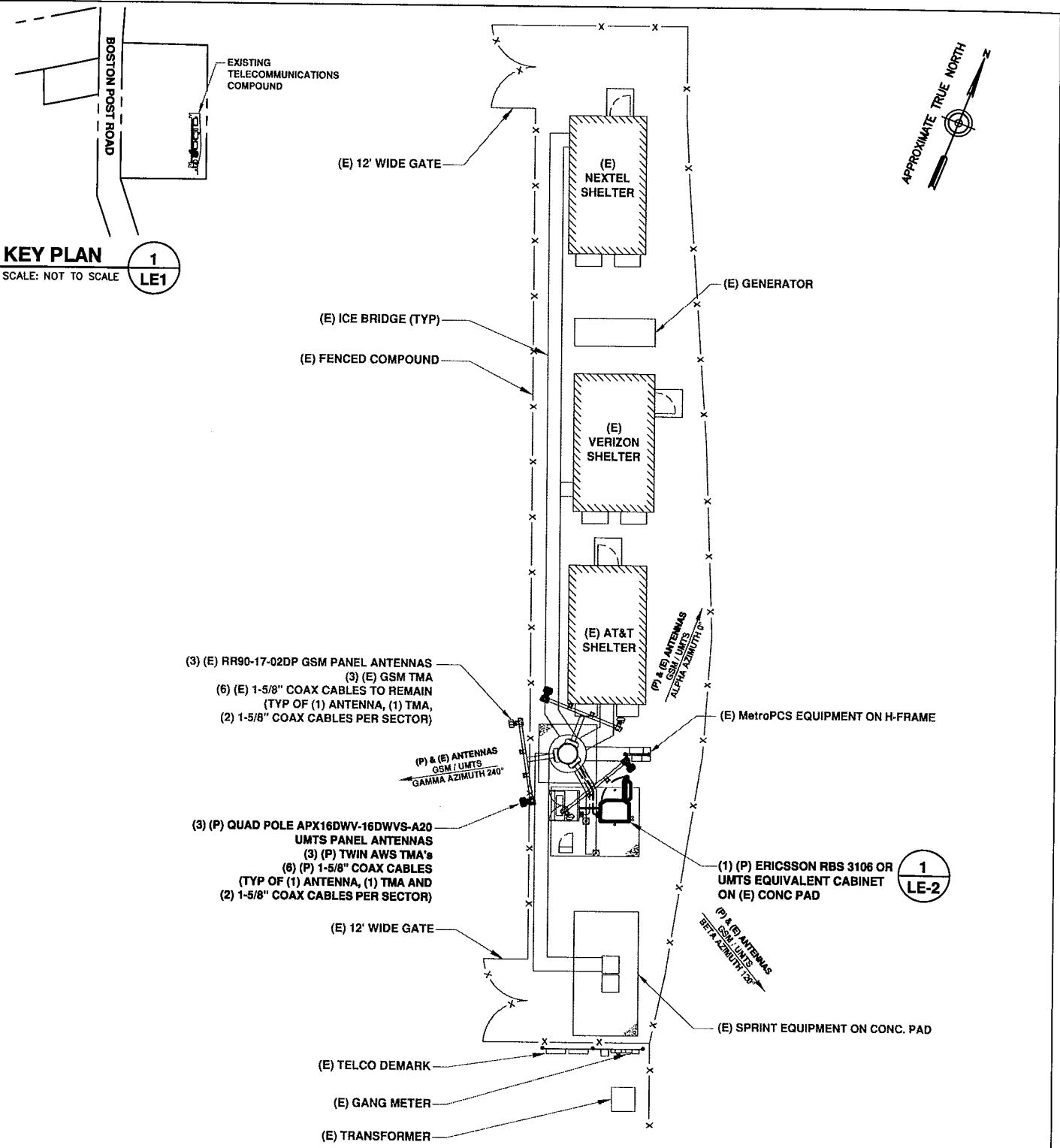
Modification was sent, via first class mail, to the following:

First Selectman Joseph Mazza
Guilford Town Hall
31 Park Street
Guilford, CT 06437

By:


Jennifer A. Herz

40284943 v1 - 029431/0001



KEY PLAN
SCALE: NOT TO SCALE

1
LE1

COMPOUND PLAN

SCALE: 1"=20'-0"

2
LE1

SUBMITTALS	
LE REV A	05-25-11
LE REV 0	07-18-11

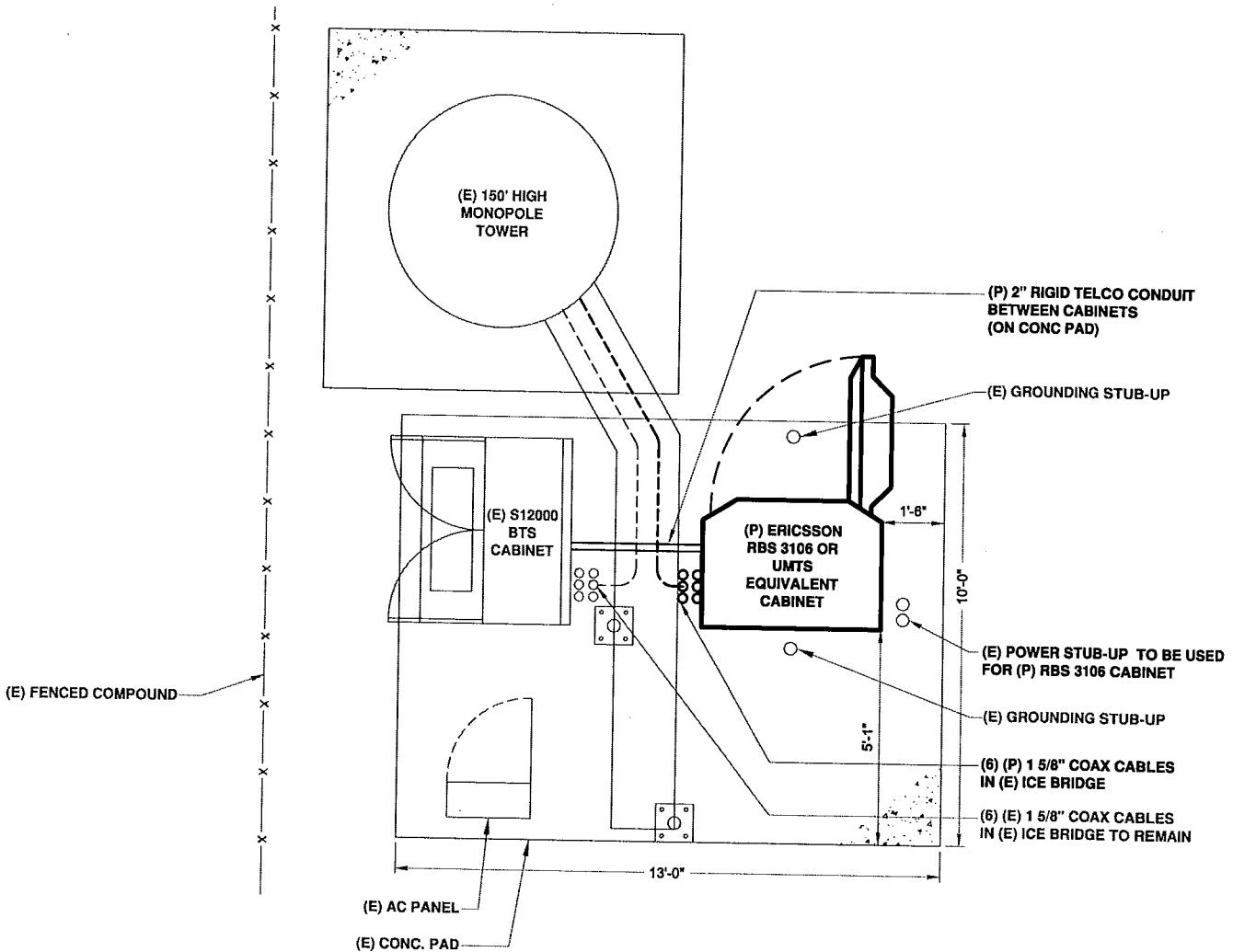
ATLANTIS GROUP
1340 Centre Street
Suite 203
Newton, MA 02459
Office: 617-965-0789
Fax: 617-213-5056

LEASE EXHIBIT
SITE NUMBER: CT11027D
SITE NAME: SPRINT GUILFORD

1919 BOSTON POST ROAD
GUILFORD, CT 06437

DRAWN BY: GC CHECKED BY: SM

NORTHEAST TOWERS
199 BRICKYARD ROAD
FARMINGTON, CT 06032
OFFICE: (860) 677-1999
FOR
T-MOBILE NORTHEAST, LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860) 692-7100
FAX: (860) 692-7159



EQUIPMENT PLAN

SCALE: 1/4"=1'-0"

1
LE2

SUBMITTALS	
LE REV A	05-25-11
LE REV 0	07-18-11

ATLANTIS GROUP
 1340 Centre Street
 Suite 203
 Newton, MA 02459
 Office: 617-965-0789
 Fax: 617-213-5056

LEASE EXHIBIT
 SITE NUMBER: CT11027D
 SITE NAME: SPRINT GUILFORD
 1919 BOSTON POST ROAD
 GUILFORD, CT 06437

NORTHEAST TOWERS
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 BLOOMFIELD, CT 06002
 OFFICE: (860) 692-7100
 FAX: (860) 692-7159

DRAWN BY: GC CHECKED BY: SM

- (3) (E) RR90-17-02DP GSM PANEL ANTENNAS
- (3) (E) GSM TMA
- (6) (E) 1-5/8" COAX CABLES TO REMAIN
(TYP OF (1) ANTENNA, (1) TMA,
(2) 1-5/8" COAX CABLES PER SECTOR)
- (3) (P) QUAD POLE APX16DWV-16DWVS-A20
UMTS PANEL ANTENNAS
- (3) (P) TWIN AWS TMA's
- (6) (P) 1-5/8" COAX CABLES
(TYP OF (1) ANTENNA, (1) TMA AND
(2) 1-5/8" COAX CABLES PER SECTOR)

- TOP OF (E) MONOPOLE TOWER
ELEVATION= 149'± AGL
- RAD CENTER OF (3) EXISTING & (3) PROPOSED ANTENNAS
ELEVATION= 148'± AGL
- RAD CENTER OF (12) EXISTING NEXTEL ANTENNAS
ELEVATION= 139'± AGL
- RAD CENTER OF (3) EXISTING SPRINT ANTENNAS
ELEVATION= 128'± AGL
- RAD CENTER OF (12) EXISTING VERIZON ANTENNAS
ELEVATION= 116'± AGL
- RAD CENTER OF (6) EXISTING AT&T ANTENNAS
ELEVATION= 106'± AGL
- RAD CENTER OF (3) EXISTING MetroPCS ANTENNAS
ELEVATION= 98'± AGL

- (E) 149' HIGH MONOPOLE TOWER
- (6) (P) 1 5/8" COAX CABLES INSIDE MONOPOLE
- (6) (E) 1 5/8" COAX CABLES
INSIDE MONOPOLE TO REMAIN
- (1) (P) ERICSSON RBS 3106 OR
UMTS EQUIVALENT CABINET
ON (E) CONC PAD
- (E) GPS ANTENNA

GRADE
ELEVATION= 0'-0" AGL

NORTH ELEVATION VIEW

SCALE: 1" = 20'-0"

1
LE3

SUBMITTALS	
LE REV A	05-25-11
LE REV 0	07-18-11

ATLANTIS GROUP
 1340 Centre Street
 Suite 203
 Newton, MA 02459
 Office: 617-965-0789
 Fax: 617-213-5056

LEASE EXHIBIT
 SITE NUMBER: CT11027D
 SITE NAME: SPRINT GUILFORD
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NORTHEAST TOWERS
 199 BRICKYARD ROAD
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 FOR
T-MOBILE NORTHEAST, LLC
 35 GRIFFIN ROAD SOUTH
 BLOOMFIELD, CT 06002
 OFFICE: (860) 692-7100
 FAX: (860) 692-7159

Date: July 12, 2011

Veronica Harris
Crown Castle
1200 McArthur Blvd
Mahwah, NJ 07430



2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

Subject: Structural Analysis Report

Carrier Designation: T-Mobile Co-Locate
Carrier Site Number: CT11027D
Carrier Site Name: CT027/Sprint Guilford

Crown Castle Designation: Crown Castle BU Number: 876343
Crown Castle Site Name: GUILFORD WEST STONE PROPERTY
Crown Castle JDE Job Number: 158868
Crown Castle Work Order Number: 413350

Engineering Firm Designation: Crown Castle Project Number: 413350

Site Data: 1919 Boston Post Rd., GUILFORD, New Haven County, CT
Latitude 41° 18' 1.27", Longitude -72° 42' 29.13"
149 Foot - Monopole Tower

Dear Veronica Harris,

Crown Castle is pleased to submit this "Structural Analysis Report" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 413350, in accordance with application 124298, revision 2.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC1: Existing + Reserved + Proposed Equipment

Sufficient Capacity

Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and local code requirements based upon a wind speed of 85 mph fastest mile.

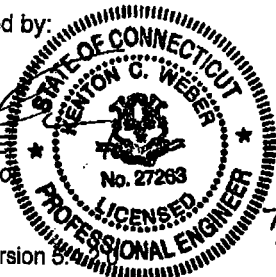
All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at Crown Castle appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Structural analysis prepared by: Calvin Straub, E.I.T./TS

Respectfully submitted by:


Kenton C. Weber, P.E.
Engineering Supervisor



RISA Tower Report - version 5

7/12/11

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1) INTRODUCTION

This tower is a 149 ft Monopole tower designed by Engineered Endeavors, Inc. in June of 2008. The tower was originally designed for a wind speed of 115 mph per TIA-222-G.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
148	148	3	rfs celwave	APX16DWV-16DWV-S-E-A20 w/Mount Pipe	6	1-5/8	-
		3	rfs celwave	ATMAA1412D-1A20			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
148	148	3	ems wireless	RR90-17-02DP w/ Mount Pipe	6	1-5/8	1
		3	ericsson	KRY 112 71/1			
		3	ericsson	KRY 112 71/1	-	-	4
		1	tower mounts	T-Arm Mount [TA 602-3]	-	-	1
139	140	12	decibel	DB848H90E-XY w/ Mount Pipe	12	1-1/4	1
	139	1	tower mounts	T-Arm Mount [TA 602-3]			
128	128	3	decibel	DB980H90E-M w/ Mount Pipe	6	1-5/8	1
		1	tower mounts	T-Arm Mount [TA 602-3]			
116	118	6	allgon	7130.16 w/ Mount Pipe	12 1	1-1/4 1/2	1
		6	antel	LPD-7905/4 w/ Mount Pipe			
		1	maxrad	GPS-TMG-26NMS			
	116	-	-	-	12	1-5/8	3
106	108	1	tower mounts	T-Arm Mount [TA 602-3]	-	-	1
		6	powerwave technologies	7200.40 w/ Mount Pipe	12	7/8	1
	12	powerwave technologies	LGP 21403				
106	106	1	tower mounts	T-Arm Mount [TA 602-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
98	98	3	rfs celwave	APXV18-206517S-C w/ Mount Pipe	6	1-5/8	1
60	60	1	kathrein	738 449	2	1/2	2
		1	kathrein	GPS-C			
55	57	1	lucent	KS24019-L112A	1	1/2	1
	55	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:

- 1) Existing Equipment
- 2) SLA Equipment, controlling, considered
- 3) SLA Feedlines, considered
- 4) Equipment to be Removed

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
150	150	12	Generic	72" x 12" Panel	-	-
140	140	12	Generic	72" x 12" Panel	-	-
130	130	12	Generic	72" x 12" Panel	-	-
120	120	12	Generic	72" x 12" Panel	-	-
110	110	12	Generic	72" x 12" Panel	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Terracon	2302346	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Engineered Endeavors Inc.	2262540	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Engineered Endeavors Inc.	2302343	CCISITES

3.1) Analysis Method

RISATower (version 5.4.2.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

This analysis may be affected if any assumptions are not valid or have been made in error. Crown Castle should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	149 - 135.039	Pole	TP26.77x22x0.1875	1	-2.88	781.03	9.2	Pass
L2	135.039 - 92.1667	Pole	TP40.91x25.0568x0.25	2	-11.93	1575.67	52.4	Pass
L3	92.1667 - 45.2031	Pole	TP56.31x38.49x0.3125	3	-22.00	2589.77	62.6	Pass
L4	45.2031 - 0	Pole	TP71x53.1174x0.375	4	-39.62	3890.11	60.6	Pass
							Summary	
						Pole (L3)	62.6	Pass
						Rating =	62.6	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	36.8	Pass
1	Base Plate	0	37.0	Pass
1	Base Foundation	0	72.2	Pass

Structure Rating (max from all components) =	72.2%
-----------------------------------------------------	--------------

Notes:

- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

The structure and its base foundation have sufficient capacity to carry the existing, reserved, and proposed loading. No modifications are required at this time.

APPENDIX A
RISA TOWER OUTPUT

RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254	Job BU# 876343	Page 1 of 16
	Project	Date 10:10:48 07/12/11
	Client Crown Castle	Designed by CStraub

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 85 mph.

Nominal ice thickness of 0.7500 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

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

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 50 mph.

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

Pressures are calculated at each section.

Stress ratio used in pole design is 1.333.

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	149'-135'15/32"	13'11-17/32"	3'11-1/32"	18	22.0000	26.7700	0.1875	0.7500	A572-65 (65 ksi)
L2	135'15/32"-92'2-1/32"	46'9-15/32"	5'8-1/32"	18	25.0568	40.9100	0.2500	1.0000	A572-65 (65 ksi)
L3	92'2-1/32"-45'2-13/32"	52'7-9/16"	7'6-31/32"	18	38.4900	56.3100	0.3125	1.2500	A572-65 (65 ksi)
L4	45'2-13/32"-0'	52'9-15/32"		18	53.1174	71.0000	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	I/Q in ²	w in	w/t
L1	22.3394	12.9812	780.3007	7.7434	11.1760	69.8193	1561.6281	6.4918	3.5420	18.891
L2	27.1830	15.8199	1412.3200	9.4368	13.5992	103.8535	2826.4984	7.9115	4.3815	23.368
L3	41.5411	32.2637	6738.8611	14.4343	20.7823	324.2600	13486.5893	16.1349	6.7602	27.041
L4	56.5455	62.7766	22062.4907	18.7235	26.9836	817.6252	44154.0117	31.3943	8.6887	23.17
	72.0953	84.0614	52972.5675	25.0719	36.0680	1468.6860	106014.837	42.0387	11.8360	31.563

RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254	Job BU# 876343	Page 2 of 16
	Project	Date 10:10:48 07/12/11
	Client Crown Castle	Designed by CStraub

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft ²	in					in	in
L1 149'-135'15/32'				1	1	1		
L2 135'15/32"-92' 2-1/32"				1	1	1		
L3 92'2-1/32"-45'2 -13/32"				1	1	1		
L4 45'2-13/32"-0'				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	Number Per Row	Clear Spacing	Width or Diameter	Perimeter	Weight
				ft			in	in	in	plf

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number		C_{AA}	Weight
				ft			ft ² /ft	plf
LDF7-50A(1-5/8")	A	No	CaAa (Out Of Face)	148' - 0'	2	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
						1" Ice	0.40	4.46
						2" Ice	0.60	10.54
						4" Ice	1.00	30.04
LDF7-50A(1-5/8")	A	No	CaAa (Out Of Face)	148' - 0'	10	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
						2" Ice	0.00	10.54
						4" Ice	0.00	30.04

LDF6-50A(1-1/4")	A	No	Inside Pole	139' - 0'	12	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66

LDF7-50A(1-5/8")	C	No	Inside Pole	128' - 0'	3	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82

LDF4-50A(1/2")	C	No	Inside Pole	116' - 0'	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15

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Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _{AA}		Weight
						ft ² /ft	plf	
LDF6-50A(1-1/4")	C	No	Inside Pole	116' - 0'	12	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
LDF7-50A(1-5/8")	C	No	Inside Pole	116' - 0'	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82

LDF5-50A(7/8")	A	No	Inside Pole	106' - 0'	12	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
						2" Ice	0.00	0.33
						4" Ice	0.00	0.33

CR 50 1873(1-5/8")	B	No	CaAa (Out Of Face)	98' - 0'	1	No Ice	0.20	0.83
						1/2" Ice	0.30	2.34
						1" Ice	0.40	4.47
						2" Ice	0.60	10.55
						4" Ice	1.00	30.05
LCF158-50JL(1-5/8")	B	No	CaAa (Out Of Face)	98' - 0'	5	No Ice	0.00	0.52
						1/2" Ice	0.00	2.03
						1" Ice	0.00	4.16
						2" Ice	0.00	10.24
						4" Ice	0.00	29.74

LDF4-50A(1/2")	A	No	Inside Pole	60' - 0'	2	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15

LDF4-50A(1/2")	C	No	Inside Pole	55' - 0'	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R	A _F	C _{AA} In Face	C _{AA} Out Face	Weight
			ft ²	ft ²	ft ²	ft ²	K
L1	149'-135'15/32"	A	0.000	0.000	0.000	5.133	0.16
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L2	135'15/32"-92'2-1/32"	A	0.000	0.000	0.000	16.977	0.82
		B	0.000	0.000	0.000	1.155	0.02
		C	0.000	0.000	0.000	0.000	0.52
L3	92'2-1/32"-45'2-13/32"	A	0.000	0.000	0.000	18.598	1.02
		B	0.000	0.000	0.000	9.299	0.16
		C	0.000	0.000	0.000	0.000	0.96
L4	45'2-13/32"-0'	A	0.000	0.000	0.000	17.900	1.00
		B	0.000	0.000	0.000	8.950	0.16
		C	0.000	0.000	0.000	0.000	0.93

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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} In Face ft ²	C_{AA} Out Face ft ²	Weight K
L1	149'-135'15/32"	A	0.893	0.000	0.000	0.000	9.764	0.65
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L2	135'15/32"-92'2-1/32"	A	0.869	0.000	0.000	0.000	32.298	2.46
		B		0.000	0.000	0.000	2.197	0.13
		C		0.000	0.000	0.000	0.000	0.52
L3	92'2-1/32"-45'2-13/32"	A	0.818	0.000	0.000	0.000	34.918	2.76
		B		0.000	0.000	0.000	17.459	1.03
		C		0.000	0.000	0.000	0.000	0.96
L4	45'2-13/32"-0'	A	0.750	0.000	0.000	0.000	32.690	2.55
		B		0.000	0.000	0.000	16.345	0.93
		C		0.000	0.000	0.000	0.000	0.93

Feed Line Center of Pressure

Section	Elevation ft	CP_x in	CP_z in	CP_x Ice in	CP_z Ice in
L1	149'-135'15/32"	0.0000	-0.4702	0.0000	-0.7453
L2	135'15/32"-92'2-1/32"	0.0361	-0.4953	0.0589	-0.8092
L3	92'2-1/32"-45'2-13/32"	0.2242	-0.3883	0.3679	-0.6372
L4	45'2-13/32"-0'	0.2312	-0.4004	0.3815	-0.6607

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C_{AA} Front ft ²	C_{AA} Side ft ²	Weight K	
RR90-17-02DP w/ Mount Pipe	A	From Leg	4.00	0.0000	148'	No Ice	4.59	3.32	0.03
						1/2" Ice	5.09	4.09	0.07
						1" Ice	5.58	4.78	0.11
						2" Ice	6.59	6.23	0.22
						4" Ice	8.73	9.31	0.56
KRY 112 71/1	A	From Leg	4.00	0.0000	148'	No Ice	0.68	0.45	0.01
						1/2" Ice	0.80	0.56	0.02
						1" Ice	0.93	0.68	0.03
						2" Ice	1.22	0.94	0.04
						4" Ice	1.90	1.57	0.11
APX16DWV-16DWV-S-E-A 20 w/Mount Pipe	A	From Leg	4.00	0.0000	148'	No Ice	7.27	3.29	0.06
						1/2" Ice	7.73	3.92	0.10
						1" Ice	8.21	4.57	0.16

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _{Front}	C _A A _{Side}	Weight
			Horz	Lateral					
ATMAA1412D-1A20	A	From Leg	4.00	0.0000	148'	2" Ice	9.18	5.92	0.28
						4" Ice	11.23	8.88	0.65
						No Ice	1.17	0.47	0.01
						1/2" Ice	1.31	0.57	0.02
						1" Ice	1.47	0.69	0.03
						2" Ice	1.81	0.95	0.06
RR90-17-02DP w/ Mount Pipe	B	From Leg	4.00	0.0000	148'	4" Ice	2.58	1.57	0.14
						No Ice	4.59	3.32	0.03
						1/2" Ice	5.09	4.09	0.07
						1" Ice	5.58	4.78	0.11
						2" Ice	6.59	6.23	0.22
						4" Ice	8.73	9.31	0.56
KRY 112 71/1	B	From Leg	4.00	0.0000	148'	No Ice	0.68	0.45	0.01
						1/2" Ice	0.80	0.56	0.02
						1" Ice	0.93	0.68	0.03
						2" Ice	1.22	0.94	0.04
						4" Ice	1.90	1.57	0.11
						No Ice	7.27	3.29	0.06
APX16DWV-16DWV-S-E-A 20 w/Mount Pipe	B	From Leg	4.00	0.0000	148'	1/2" Ice	7.73	3.92	0.10
						1" Ice	8.21	4.57	0.16
						2" Ice	9.18	5.92	0.28
						4" Ice	11.23	8.88	0.65
						No Ice	1.17	0.47	0.01
						1/2" Ice	1.31	0.57	0.02
ATMAA1412D-1A20	B	From Leg	4.00	0.0000	148'	1" Ice	1.47	0.69	0.03
						2" Ice	1.81	0.95	0.06
						4" Ice	2.58	1.57	0.14
						No Ice	4.59	3.32	0.03
						1/2" Ice	5.09	4.09	0.07
						1" Ice	5.58	4.78	0.11
RR90-17-02DP w/ Mount Pipe	C	From Leg	4.00	0.0000	148'	2" Ice	6.59	6.23	0.22
						4" Ice	8.73	9.31	0.56
						No Ice	0.68	0.45	0.01
						1/2" Ice	0.80	0.56	0.02
						1" Ice	0.93	0.68	0.03
						2" Ice	1.22	0.94	0.04
KRY 112 71/1	C	From Leg	4.00	0.0000	148'	4" Ice	1.90	1.57	0.11
						No Ice	7.27	3.29	0.06
						1/2" Ice	7.73	3.92	0.10
						1" Ice	8.21	4.57	0.16
						2" Ice	9.18	5.92	0.28
						4" Ice	11.23	8.88	0.65
APX16DWV-16DWV-S-E-A 20 w/Mount Pipe	C	From Leg	4.00	0.0000	148'	No Ice	1.17	0.47	0.01
						1/2" Ice	1.31	0.57	0.02
						1" Ice	1.47	0.69	0.03
						2" Ice	1.81	0.95	0.06
						4" Ice	2.58	1.57	0.14
						No Ice	4.59	3.32	0.03
ATMAA1412D-1A20	C	From Leg	4.00	0.0000	148'	1/2" Ice	5.09	4.09	0.07
						1" Ice	5.58	4.78	0.11
						2" Ice	6.59	6.23	0.22
						4" Ice	8.73	9.31	0.56
						No Ice	0.68	0.45	0.01
						1/2" Ice	0.80	0.56	0.02
T-Arm Mount [TA 602-3]	C	None	0.0000	148'	1" Ice	0.93	0.68	0.03	
					2" Ice	1.22	0.94	0.04	
					4" Ice	1.90	1.57	0.11	
					No Ice	7.27	3.29	0.06	
					1/2" Ice	7.73	3.92	0.10	
					1" Ice	8.21	4.57	0.16	
(2) 8"x2" Antenna Mount Pipe	A	From Leg	4.00	0.0000	148'	2" Ice	9.18	5.92	0.28
						4" Ice	11.23	8.88	0.65
						No Ice	1.17	0.47	0.01
						1/2" Ice	1.31	0.57	0.02
						1" Ice	1.47	0.69	0.03
						2" Ice	1.81	0.95	0.06
						4" Ice	2.58	1.57	0.14
						No Ice	11.59	11.59	0.77
						1/2" Ice	15.44	15.44	0.99
						1" Ice	19.29	19.29	1.21
						2" Ice	26.99	26.99	1.64
						4" Ice	42.39	42.39	2.50
						No Ice	1.90	1.90	0.03
						1/2" Ice	2.73	2.73	0.04
						1" Ice	3.40	3.40	0.06
						2" Ice	4.40	4.40	0.12
						4" Ice	6.50	6.50	0.30

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		CStraub	

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Lateral	Vert						
			ft	ft	°	ft	ft ²	ft ²	K	
(3) 10' x 2" Mount Pipe	B	From Leg	4.00	0'	0.0000	128'	No Ice	2.00	2.00	0.08
							1/2" Ice	3.02	3.02	0.10
							1" Ice	4.07	4.07	0.12
							2" Ice	5.70	5.70	0.18
							4" Ice	8.26	8.26	0.39
(3) 10' x 2" Mount Pipe	C	From Leg	4.00	0'	0.0000	128'	No Ice	2.00	2.00	0.08
							1/2" Ice	3.02	3.02	0.10
							1" Ice	4.07	4.07	0.12
							2" Ice	5.70	5.70	0.18
							4" Ice	8.26	8.26	0.39

(2) 7130.16 w/ Mount Pipe	A	From Leg	4.00	0'	0.0000	116'	No Ice	6.00	7.03	0.04
							1/2" Ice	6.48	7.81	0.09
							1" Ice	6.97	8.57	0.16
							2" Ice	7.97	10.13	0.32
							4" Ice	10.11	13.48	0.74
(2) LPD-7905/4 w/ Mount Pipe	A	From Leg	4.00	0'	0.0000	116'	No Ice	2.70	5.58	0.04
							1/2" Ice	3.06	6.25	0.08
							1" Ice	3.43	6.94	0.12
							2" Ice	4.26	8.37	0.23
							4" Ice	6.11	11.50	0.56
GPS-TMG-26NMS	B	From Leg	4.00	0'	0.0000	116'	No Ice	0.16	0.16	0.00
							1/2" Ice	0.21	0.21	0.00
							1" Ice	0.28	0.28	0.01
							2" Ice	0.44	0.44	0.01
							4" Ice	0.86	0.86	0.05
(2) 7130.16 w/ Mount Pipe	B	From Leg	4.00	0'	0.0000	116'	No Ice	6.00	7.03	0.04
							1/2" Ice	6.48	7.81	0.09
							1" Ice	6.97	8.57	0.16
							2" Ice	7.97	10.13	0.32
							4" Ice	10.11	13.48	0.74
(2) LPD-7905/4 w/ Mount Pipe	B	From Leg	4.00	0'	0.0000	116'	No Ice	2.70	5.58	0.04
							1/2" Ice	3.06	6.25	0.08
							1" Ice	3.43	6.94	0.12
							2" Ice	4.26	8.37	0.23
							4" Ice	6.11	11.50	0.56
(2) 7130.16 w/ Mount Pipe	C	From Leg	4.00	0'	0.0000	116'	No Ice	6.00	7.03	0.04
							1/2" Ice	6.48	7.81	0.09
							1" Ice	6.97	8.57	0.16
							2" Ice	7.97	10.13	0.32
							4" Ice	10.11	13.48	0.74
(2) LPD-7905/4 w/ Mount Pipe	C	From Leg	4.00	0'	0.0000	116'	No Ice	2.70	5.58	0.04
							1/2" Ice	3.06	6.25	0.08
							1" Ice	3.43	6.94	0.12
							2" Ice	4.26	8.37	0.23
							4" Ice	6.11	11.50	0.56
T-Arm Mount [TA 602-3]	C	None			0.0000	116'	No Ice	11.59	11.59	0.77
							1/2" Ice	15.44	15.44	0.99
							1" Ice	19.29	19.29	1.21
							2" Ice	26.99	26.99	1.64
							4" Ice	42.39	42.39	2.50

(2) 7200.40 w/ Mount Pipe	A	From Leg	4.00	0'	0.0000	106'	No Ice	4.35	4.61	0.05
							1/2" Ice	4.90	5.77	0.09
							1" Ice	5.41	6.64	0.14
							2" Ice	6.46	8.42	0.26
							4" Ice	8.66	12.18	0.63

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	Client		Crown Castle		Designed by		CStraub	

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A ₁ Front	C _A A ₂ Side	Weight	
			Horz	Lateral						Vert
(4) LGP 21403	A	From Leg	4.00		0.0000	106'	No Ice	1.29	0.36	0.01
			0'				1/2" Ice	1.45	0.48	0.02
			2'				1" Ice	1.61	0.60	0.03
							2" Ice	1.97	0.87	0.05
							4" Ice	2.79	1.52	0.14
(2) 7200.40 w/ Mount Pipe	B	From Leg	4.00		0.0000	106'	No Ice	4.35	4.61	0.05
			0'				1/2" Ice	4.90	5.77	0.09
			2'				1" Ice	5.41	6.64	0.14
							2" Ice	6.46	8.42	0.26
							4" Ice	8.66	12.18	0.63
(4) LGP 21403	B	From Leg	4.00		0.0000	106'	No Ice	1.29	0.36	0.01
			0'				1/2" Ice	1.45	0.48	0.02
			2'				1" Ice	1.61	0.60	0.03
							2" Ice	1.97	0.87	0.05
							4" Ice	2.79	1.52	0.14
(2) 7200.40 w/ Mount Pipe	C	From Leg	4.00		0.0000	106'	No Ice	4.35	4.61	0.05
			0'				1/2" Ice	4.90	5.77	0.09
			2'				1" Ice	5.41	6.64	0.14
							2" Ice	6.46	8.42	0.26
							4" Ice	8.66	12.18	0.63
(4) LGP 21403	C	From Leg	4.00		0.0000	106'	No Ice	1.29	0.36	0.01
			0'				1/2" Ice	1.45	0.48	0.02
			2'				1" Ice	1.61	0.60	0.03
							2" Ice	1.97	0.87	0.05
							4" Ice	2.79	1.52	0.14
T-Arm Mount [TA 602-3]	C	None			0.0000	106'	No Ice	11.59	11.59	0.77
							1/2" Ice	15.44	15.44	0.99
							1" Ice	19.29	19.29	1.21
							2" Ice	26.99	26.99	1.64
							4" Ice	42.39	42.39	2.50
(2) 8'x2" Antenna Mount Pipe	C	From Leg	4.00		0.0000	106'	No Ice	1.90	1.90	0.03
			0'				1/2" Ice	2.73	2.73	0.04
			0'				1" Ice	3.40	3.40	0.06
							2" Ice	4.40	4.40	0.12
							4" Ice	6.50	6.50	0.30
(2) 8'x2" Antenna Mount Pipe	C	From Leg	4.00		0.0000	106'	No Ice	1.90	1.90	0.03
			0'				1/2" Ice	2.73	2.73	0.04
			0'				1" Ice	3.40	3.40	0.06
							2" Ice	4.40	4.40	0.12
							4" Ice	6.50	6.50	0.30
(2) 8'x2" Antenna Mount Pipe	C	From Leg	4.00		0.0000	106'	No Ice	1.90	1.90	0.03
			0'				1/2" Ice	2.73	2.73	0.04
			0'				1" Ice	3.40	3.40	0.06
							2" Ice	4.40	4.40	0.12
							4" Ice	6.50	6.50	0.30

APXV18-206517S-C w/ Mount Pipe	A	From Leg	1.00		0.0000	98'	No Ice	5.40	4.70	0.05
			0'				1/2" Ice	5.96	5.86	0.09
			0'				1" Ice	6.48	6.73	0.15
							2" Ice	7.55	8.51	0.28
							4" Ice	9.92	12.28	0.68
APXV18-206517S-C w/ Mount Pipe	B	From Leg	1.00		0.0000	98'	No Ice	5.40	4.70	0.05
			0'				1/2" Ice	5.96	5.86	0.09
			0'				1" Ice	6.48	6.73	0.15
							2" Ice	7.55	8.51	0.28
							4" Ice	9.92	12.28	0.68
APXV18-206517S-C w/	C	From Leg	1.00		0.0000	98'	No Ice	5.40	4.70	0.05

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _{Front}	C _A A _{Side}	Weight
			Horz	Vert					
			Lateral	ft	°	ft	ft ²	ft ²	K
Mount Pipe				0'		1/2" Ice	5.96	5.86	0.09
				0'		1" Ice	6.48	6.73	0.15
						2" Ice	7.55	8.51	0.28
						4" Ice	9.92	12.28	0.68

738 449	A	From Leg	1.00	0'	0.0000	60'	No Ice	0.04	0.04
				0'			1/2" Ice	0.09	0.09
							1" Ice	0.16	0.16
							2" Ice	0.33	0.33
							4" Ice	0.81	0.81
GPS-C	A	From Leg	1.00	0'	0.0000	60'	No Ice	0.14	0.17
				0'			1/2" Ice	0.20	0.23
							1" Ice	0.26	0.30
							2" Ice	0.42	0.47
							4" Ice	0.84	0.90

KS24019-L112A	A	From Leg	3.00	0'	0.0000	55'	No Ice	0.10	0.10
				0'			1/2" Ice	0.18	0.18
				2'			1" Ice	0.26	0.26
							2" Ice	0.42	0.42
							4" Ice	0.74	0.74
Side Arm Mount [SO 701-1]	A	From Leg	1.00	0'	0.0000	55'	No Ice	0.85	1.67
				0'			1/2" Ice	1.14	2.34
							1" Ice	1.43	3.01
							2" Ice	2.01	4.35
							4" Ice	3.17	7.03

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp

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Comb. No.	Description
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	149 - 135.039	Pole	Max Tension	21	0.00	-0.00	0.00
			Max. Compression	14	-7.19	0.00	0.47
			Max. Mx	11	-2.88	35.38	0.09
			Max. My	2	-2.88	0.00	35.48
			Max. Vy	11	-9.21	35.38	0.09
			Max. Vx	2	-9.21	0.00	35.48
			Max. Torque	5			0.03
L2	135.039 - 92.1667	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-23.54	1.50	2.17
			Max. Mx	11	-11.85	648.05	0.17
			Max. My	2	-11.85	0.80	647.35
			Max. Vy	11	-22.02	648.05	0.17
			Max. Vx	2	-22.02	0.80	647.35
			Max. Torque	13			2.66
L3	92.1667 - 45.2031	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-38.05	-0.03	5.77
			Max. Mx	11	-21.82	1758.43	1.12
			Max. My	2	-21.82	0.60	1758.85
			Max. Vy	11	-27.43	1758.43	1.12
			Max. Vx	2	-27.40	0.60	1758.85
			Max. Torque	7			-2.63
L4	45.2031 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-61.33	-2.45	10.36
			Max. Mx	11	-39.30	3371.36	2.22
			Max. My	2	-39.30	0.20	3371.66
			Max. Vy	11	-33.75	3371.36	2.22
			Max. Vx	2	-33.72	0.20	3371.66
			Max. Torque	13			2.32

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Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	61.33	0.00	0.00
	Max. H _x	11	39.32	33.74	0.00
	Max. H _z	2	39.32	0.00	33.71
	Max. M _x	2	3371.66	0.00	33.71
	Max. M _z	5	3370.95	-33.74	0.00
	Max. Torsion	2	2.13	0.00	33.71
	Min. Vert	1	39.32	0.00	0.00
	Min. H _x	5	39.32	-33.74	0.00
	Min. H _z	8	39.32	0.00	-33.71
	Min. M _x	8	-3367.23	0.00	-33.71
	Min. M _z	11	-3371.36	33.74	0.00
	Min. Torsion	8	-2.13	0.00	-33.71

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	39.32	0.00	0.00	-2.19	0.19	0.00
Dead+Wind 0 deg - No Ice	39.32	0.00	-33.71	-3371.66	0.20	-2.13
Dead+Wind 30 deg - No Ice	39.32	16.87	-29.19	-2920.24	-1685.37	-1.56
Dead+Wind 60 deg - No Ice	39.32	29.22	-16.85	-1686.94	-2919.30	-0.58
Dead+Wind 90 deg - No Ice	39.32	33.74	0.00	-2.22	-3370.95	0.56
Dead+Wind 120 deg - No Ice	39.32	29.22	16.85	1682.50	-2919.30	1.55
Dead+Wind 150 deg - No Ice	39.32	16.87	29.19	2915.81	-1685.38	2.13
Dead+Wind 180 deg - No Ice	39.32	0.00	33.71	3367.23	0.20	2.13
Dead+Wind 210 deg - No Ice	39.32	-16.87	29.19	2915.81	1685.78	1.56
Dead+Wind 240 deg - No Ice	39.32	-29.22	16.85	1682.51	2919.71	0.58
Dead+Wind 270 deg - No Ice	39.32	-33.74	0.00	-2.22	3371.36	-0.56
Dead+Wind 300 deg - No Ice	39.32	-29.22	-16.85	-1686.94	2919.71	-1.55
Dead+Wind 330 deg - No Ice	39.32	-16.87	-29.19	-2920.24	1685.78	-2.13
Dead+Ice+Temp	61.33	0.00	-0.00	-10.36	-2.45	-0.00
Dead+Wind 0 deg+Ice+Temp	61.33	0.00	-8.37	-878.02	-2.47	-0.70
Dead+Wind 30 deg+Ice+Temp	61.33	4.19	-7.25	-761.80	-436.51	-0.53
Dead+Wind 60 deg+Ice+Temp	61.33	7.25	-4.18	-444.27	-754.25	-0.21
Dead+Wind 90 deg+Ice+Temp	61.33	8.38	-0.00	-10.51	-870.56	0.16
Dead+Wind 120 deg+Ice+Temp	61.33	7.25	4.18	423.24	-754.25	0.49
Dead+Wind 150 deg+Ice+Temp	61.33	4.19	7.25	740.77	-436.51	0.69
Dead+Wind 180 deg+Ice+Temp	61.33	0.00	8.37	857.00	-2.47	0.70
Dead+Wind 210 deg+Ice+Temp	61.33	-4.19	7.25	740.77	431.58	0.53
Dead+Wind 240 deg+Ice+Temp	61.33	-7.25	4.18	423.24	749.32	0.21
Dead+Wind 270 deg+Ice+Temp	61.33	-8.38	-0.00	-10.51	865.62	-0.16
Dead+Wind 300 deg+Ice+Temp	61.33	-7.25	-4.18	-444.27	749.32	-0.49
Dead+Wind 330 deg+Ice+Temp	61.33	-4.19	-7.25	-761.80	431.58	-0.69
Dead+Wind 0 deg - Service	39.32	0.00	-11.66	-1168.49	0.21	-0.74
Dead+Wind 30 deg - Service	39.32	5.84	-10.10	-1012.23	-583.22	-0.54
Dead+Wind 60 deg - Service	39.32	10.11	-5.83	-585.35	-1010.33	-0.20
Dead+Wind 90 deg - Service	39.32	11.67	0.00	-2.22	-1166.66	0.20
Dead+Wind 120 deg - Service	39.32	10.11	5.83	580.92	-1010.33	0.54
Dead+Wind 150 deg - Service	39.32	5.84	10.10	1007.80	-583.22	0.74
Dead+Wind 180 deg - Service	39.32	0.00	11.66	1164.05	0.21	0.74
Dead+Wind 210 deg - Service	39.32	-5.84	10.10	1007.80	583.64	0.54
Dead+Wind 240 deg - Service	39.32	-10.11	5.83	580.92	1010.74	0.20
Dead+Wind 270 deg - Service	39.32	-11.67	0.00	-2.22	1167.07	-0.20

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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 300 deg - Service	39.32	-10.11	-5.83	-585.35	1010.74	-0.54
Dead+Wind 330 deg - Service	39.32	-5.84	-10.10	-1012.24	583.64	-0.74

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-39.32	0.00	0.00	39.32	0.00	0.000%
2	0.00	-39.32	-33.71	0.00	39.32	33.71	0.000%
3	16.87	-39.32	-29.19	-16.87	39.32	29.19	0.000%
4	29.22	-39.32	-16.85	-29.22	39.32	16.85	0.000%
5	33.74	-39.32	0.00	-33.74	39.32	0.00	0.000%
6	29.22	-39.32	16.85	-29.22	39.32	0.00	0.000%
7	16.87	-39.32	29.19	-16.87	39.32	-16.85	0.000%
8	0.00	-39.32	33.71	0.00	39.32	-29.19	0.000%
9	-16.87	-39.32	29.19	16.87	39.32	-33.71	0.000%
10	-29.22	-39.32	16.85	29.22	39.32	-29.19	0.000%
11	-33.74	-39.32	0.00	33.74	39.32	-16.85	0.000%
12	-29.22	-39.32	-16.85	29.22	39.32	0.00	0.000%
13	-16.87	-39.32	-29.19	16.87	39.32	16.85	0.000%
14	0.00	-61.33	0.00	0.00	61.33	29.19	0.000%
15	0.00	-61.33	-8.37	-0.00	61.33	0.00	0.000%
16	4.19	-61.33	-7.25	-4.19	61.33	8.37	0.000%
17	7.25	-61.33	-4.18	-7.25	61.33	7.25	0.000%
18	8.38	-61.33	0.00	-8.38	61.33	4.18	0.000%
19	7.25	-61.33	4.18	-7.25	61.33	0.00	0.000%
20	4.19	-61.33	7.25	-4.19	61.33	-4.18	0.000%
21	0.00	-61.33	8.37	-0.00	61.33	-7.25	0.000%
22	-4.19	-61.33	7.25	4.19	61.33	-8.37	0.000%
23	-7.25	-61.33	4.18	7.25	61.33	-7.25	0.000%
24	-8.38	-61.33	0.00	8.38	61.33	-4.18	0.000%
25	-7.25	-61.33	-4.18	7.25	61.33	0.00	0.000%
26	-4.19	-61.33	-7.25	4.19	61.33	4.18	0.000%
27	0.00	-39.32	-11.66	0.00	39.32	7.25	0.000%
28	5.84	-39.32	-10.10	-5.84	39.32	11.66	0.000%
29	10.11	-39.32	-5.83	-10.11	39.32	10.10	0.000%
30	11.67	-39.32	0.00	-11.67	39.32	5.83	0.000%
31	10.11	-39.32	5.83	-10.11	39.32	0.00	0.000%
32	5.84	-39.32	10.10	-5.84	39.32	-5.83	0.000%
33	0.00	-39.32	11.66	0.00	39.32	-10.10	0.000%
34	-5.84	-39.32	10.10	5.84	39.32	-11.66	0.000%
35	-10.11	-39.32	5.83	10.11	39.32	-10.10	0.000%
36	-11.67	-39.32	0.00	11.67	39.32	-5.83	0.000%
37	-10.11	-39.32	-5.83	10.11	39.32	0.00	0.000%
38	-5.84	-39.32	-10.10	5.84	39.32	5.83	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	0.00009369

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3	Yes	4	0.0000001	0.00091762
4	Yes	4	0.0000001	0.00095430
5	Yes	4	0.0000001	0.00003908
6	Yes	4	0.0000001	0.00098816
7	Yes	4	0.0000001	0.00089927
8	Yes	4	0.0000001	0.00009361
9	Yes	4	0.0000001	0.00097972
10	Yes	4	0.0000001	0.00093953
11	Yes	4	0.0000001	0.00003911
12	Yes	4	0.0000001	0.00091149
13	Yes	5	0.0000001	0.00001831
14	Yes	4	0.0000001	0.00000288
15	Yes	4	0.0000001	0.00039902
16	Yes	4	0.0000001	0.00043716
17	Yes	4	0.0000001	0.00043738
18	Yes	4	0.0000001	0.00039317
19	Yes	4	0.0000001	0.00043009
20	Yes	4	0.0000001	0.00042661
21	Yes	4	0.0000001	0.00038881
22	Yes	4	0.0000001	0.00042906
23	Yes	4	0.0000001	0.00042846
24	Yes	4	0.0000001	0.00039354
25	Yes	4	0.0000001	0.00043676
26	Yes	4	0.0000001	0.00044086
27	Yes	4	0.0000001	0.00001806
28	Yes	4	0.0000001	0.00006056
29	Yes	4	0.0000001	0.00006610
30	Yes	4	0.0000001	0.00000960
31	Yes	4	0.0000001	0.00007209
32	Yes	4	0.0000001	0.00005841
33	Yes	4	0.0000001	0.00001800
34	Yes	4	0.0000001	0.00007051
35	Yes	4	0.0000001	0.00006363
36	Yes	4	0.0000001	0.00000963
37	Yes	4	0.0000001	0.00006007
38	Yes	4	0.0000001	0.00007516

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	149 - 135.039	17.492	38	1.0722	0.0020
L2	138.956 - 92.1667	15.246	38	1.0591	0.0020
L3	97.8333 - 45.2031	7.206	38	0.7472	0.0016
L4	52.7865 - 0	1.961	38	0.3453	0.0004

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
148'	RR90-17-02DP w/ Mount Pipe	38	17.267	1.0715	0.0020	29134
139'	(4) DB848H90E-XY w/ Mount Pipe	38	15.256	1.0592	0.0020	15367
128'	DB980H90E-M w/ Mount Pipe	38	12.882	1.0104	0.0020	10427
116'	(2) 7130.16 w/ Mount Pipe	38	10.453	0.9201	0.0019	7970

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Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
106'	(2) 7200.40 w/ Mount Pipe	38	8.593	0.8274	0.0017	6658
98'	APXV18-206517S-C w/ Mount Pipe	38	7.233	0.7489	0.0016	5951
60'	738 449	38	2.529	0.4027	0.0006	6081
55'	KS24019-L112A	38	2.125	0.3626	0.0005	6126

Maximum Tower Deflections - Design Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
L1	149 - 135.039	50.435	2	3.0915	0.0059
L2	138.956 - 92.1667	43.962	2	3.0540	0.0059
L3	97.8333 - 45.2031	20.785	12	2.1556	0.0046
L4	52.7865 - 0	5.659	12	0.9964	0.0012

Critical Deflections and Radius of Curvature - Design Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
148'	RR90-17-02DP w/ Mount Pipe	2	49.787	3.0896	0.0059	10197
139'	(4) DB848H90E-XY w/ Mount Pipe	2	43.990	3.0543	0.0059	5376
128'	DB980H90E-M w/ Mount Pipe	12	37.150	2.9137	0.0058	3639
116'	(2) 7130.16 w/ Mount Pipe	12	30.149	2.6538	0.0055	2777
106'	(2) 7200.40 w/ Mount Pipe	12	24.785	2.3866	0.0050	2318
98'	APXV18-206517S-C w/ Mount Pipe	12	20.863	2.1603	0.0046	2071
60'	738 449	12	7.297	1.1619	0.0016	2110
55'	KS24019-L112A	12	6.130	1.0461	0.0013	2125

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L _u	Kl/r	F _a	A	Actual P	Allow. P _a	Ratio P/P _a
	ft		ft	ft		ksi	in ²	K	K	
L1	149 - 135.039 (1)	TP26.77x22x0.1875	13'11-17/32"	0'	0.0	39.000	15.0235	-2.88	585.92	0.005
L2	135.039 - 92.1667 (2)	TP40.91x25.0568x0.25	46'9-15/32"	0'	0.0	38.453	30.7402	-11.85	1182.05	0.010
L3	92.1667 - 45.2031 (3)	TP56.31x38.49x0.3125	52'7-9/16"	0'	0.0	36.660	52.9958	-21.82	1942.81	0.011
L4	45.2031 - 0 (4)	TP71x53.1174x0.375	52'9-15/32"	0'	0.0	34.716	84.0614	-39.30	2918.31	0.013

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Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail	
L1	149 - 135.039	Pole	TP26.77x22x0.1875	1	-2.88	781.03	9.2	Pass	
L2	135.039 - 92.1667	Pole	TP40.91x25.0568x0.25	2	-11.85	1575.67	52.4	Pass	
L3	92.1667 - 45.2031	Pole	TP56.31x38.49x0.3125	3	-21.82	2589.77	62.6	Pass	
L4	45.2031 - 0	Pole	TP71x53.1174x0.375	4	-39.30	3890.11	60.6	Pass	
							Summary		
							Pole (L3)	62.6	Pass
							RATING =	62.6	Pass

APPENDIX B
BASE LEVEL DRAWING



(INSTALLED)
(12) 1-1/4" TO 136 FT LEVEL

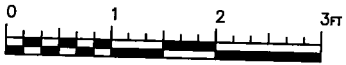
(INSTALLED)
(6) 1-5/8" TO 98 FT LEVEL

(PROPOSED-IN ADDITION)
(6) 1-5/8" TO 148 FT LEVEL
(INSTALLED)
(6) 1-5/8" TO 148 FT LEVEL

(SMA)
(12) 1-5/8" TO 119 FT LEVEL
(INSTALLED)
(1) 1/2" TO 116 FT LEVEL
(12) 1-1/4" TO 116 FT LEVEL

(SMA)
(2) 1/2" TO 63 FT LEVEL
(INSTALLED)
(12) 7/8" TO 106 FT LEVEL

(INSTALLED)
(6) 1-5/8" TO 128 FT LEVEL
(1) 1/2" TO 55 FT LEVEL



: SCALE :

BUSINESS UNIT: 876343 TOWER ID: C_BASELEVEL

APPENDIX C
ADDITIONAL CALCULATIONS

Maximum Allowable Moment of a Circular Pier

Axial Load (Negative for Compression) = kips

<u>Pier Properties</u>		<u>Material Properties</u>	
Concrete:		Concrete compressive strength =	<input type="text" value="4000"/> psi
Pier Diameter =	<input type="text" value="8.5"/> ft	Reinforcement yield strength =	<input type="text" value="60000"/> psi
Concrete Area =	8171.3 in ²	Modulus of elasticity =	<input type="text" value="29000"/> ksi
Reinforcement:		Reinforcement yield strain =	<input type="text" value="0.00207"/>
Clear Cover =	<input type="text" value="3.00"/> in	Limiting compressive strain =	<input type="text" value="0.003"/>
Cage Diameter =	7.91 ft	<u>Seismic Properties</u>	
Bar Size =	<input type="text" value="9"/>	Seismic Zone =	<input type="text" value="1"/>
Bar Diameter =	1.13 in		
Bar Area =	1 in ²		
Number of Bars =	<input type="text" value="48"/>		

Minimum Area of Steel

Required area of steel = 40.86 in²
 Provided area of steel = 48.00 in² OK

Axial Loading

Load factor =
 Reduction factor = 0.9
 Factored axial load = -57.7778 kips

Neutral Axis

Distance from extreme edge to neutral axis = 13.87 in
 Equivalent compression zone factor = 0.85
 Distance from extreme edge to
 equivalent compression zone factor = 11.79 in
 Distance from centroid to neutral axis = 37.13 in

Compression Zone

Area of steel in compression zone = 9.00 in²
 Angle from centroid of pier to intersection of
 equivalent compression zone and edge of pier = 39.75 deg
 Area of concrete in compression = 525.87 in²
 Force in concrete = 0.85 * f_c * Acc = 1787.95 kips
 Total reinforcement forces = -1730.17 kips
 Factored axial load = -57.78 kips
 Force in concrete = -1787.95 kips

 Sum of the forces in concrete = 0.00 kips OK

Maximum Moment

First moment of the concrete
 area in compression about the centroid = 23125.40 in³
 Distance between centroid of concrete
 in compression and centroid of pier = 43.98 in
 Moment of concrete in compression = 78626.36 in-kips
 Total reinforcement moment = 49756.31 in-kips
 Nominal moment strength of column = 128382.67 in-kips
 Factored moment strength of column = 88880.31 in-kips

Maximum Allowable Moment = ft-kips

Individual Bars

Bar #	Angle from first bar (deg)	Distance to centroid (in)	Distance to neutral axis (in)	Distance to equivalent comp. zone (in)	Strain	Area of steel in compression (in ²)	Stress (ksi)	Axial force (kips)
1	0.00	0.00	-37.13	-39.21	-0.00803	0.00	-60.00	-60.00
2	7.50	6.19	-30.94	-33.02	-0.0066909	0.00	-60.00	-60.00
3	15.00	12.28	-24.85	-26.93	-0.0053747	0.00	-60.00	-60.00
4	22.50	18.15	-18.98	-21.06	-0.004104	0.00	-60.00	-60.00
5	30.00	23.72	-13.41	-15.49	-0.0029004	0.00	-60.00	-60.00
6	37.50	28.88	-8.25	-10.33	-0.0017846	0.00	-51.75	-51.75
7	45.00	33.54	-3.59	-5.67	-0.0007756	0.00	-22.49	-22.49
8	52.50	37.63	0.50	-1.58	0.0001092	0.00	3.17	3.17
9	60.00	41.08	3.95	1.87	0.0008547	1.00	24.79	21.39
10	67.50	43.83	6.70	4.62	0.0014483	1.00	42.00	38.60
11	75.00	45.82	8.69	6.61	0.0018796	1.00	54.51	51.11
12	82.50	47.03	9.90	7.82	0.0021414	1.00	60.00	56.60
13	90.00	47.44	10.31	8.23	0.0022292	1.00	60.00	56.60
14	97.50	47.03	9.90	7.82	0.0021414	1.00	60.00	56.60
15	105.00	45.82	8.69	6.61	0.0018796	1.00	54.51	51.11
16	112.50	43.83	6.70	4.62	0.0014483	1.00	42.00	38.60
17	120.00	41.08	3.95	1.87	0.0008547	1.00	24.79	21.39
18	127.50	37.63	0.50	-1.58	0.0001092	0.00	3.17	3.17
19	135.00	33.54	-3.59	-5.67	-0.0007756	0.00	-22.49	-22.49
20	142.50	28.88	-8.25	-10.33	-0.0017846	0.00	-51.75	-51.75
21	150.00	23.72	-13.41	-15.49	-0.0029004	0.00	-60.00	-60.00
22	157.50	18.15	-18.98	-21.06	-0.004104	0.00	-60.00	-60.00
23	165.00	12.28	-24.85	-26.93	-0.0053747	0.00	-60.00	-60.00
24	172.50	6.19	-30.94	-33.02	-0.0066909	0.00	-60.00	-60.00
25	180.00	0.00	-37.13	-39.21	-0.00803	0.00	-60.00	-60.00
26	187.50	-6.19	-43.32	-45.40	-0.0093691	0.00	-60.00	-60.00
27	195.00	-12.28	-49.41	-51.49	-0.0106853	0.00	-60.00	-60.00
28	202.50	-18.15	-55.28	-57.36	-0.011956	0.00	-60.00	-60.00
29	210.00	-23.72	-60.85	-62.93	-0.0131596	0.00	-60.00	-60.00
30	217.50	-28.88	-66.01	-68.09	-0.0142754	0.00	-60.00	-60.00
31	225.00	-33.54	-70.67	-72.75	-0.0152843	0.00	-60.00	-60.00
32	232.50	-37.63	-74.76	-76.84	-0.0161692	0.00	-60.00	-60.00
33	240.00	-41.08	-78.21	-80.29	-0.0169147	0.00	-60.00	-60.00
34	247.50	-43.83	-80.95	-83.03	-0.0175082	0.00	-60.00	-60.00
35	255.00	-45.82	-82.95	-85.03	-0.0179396	0.00	-60.00	-60.00
36	262.50	-47.03	-84.16	-86.24	-0.0182014	0.00	-60.00	-60.00
37	270.00	-47.44	-84.56	-86.65	-0.0182892	0.00	-60.00	-60.00
38	277.50	-47.03	-84.16	-86.24	-0.0182014	0.00	-60.00	-60.00
39	285.00	-45.82	-82.95	-85.03	-0.0179396	0.00	-60.00	-60.00
40	292.50	-43.83	-80.95	-83.03	-0.0175082	0.00	-60.00	-60.00
41	300.00	-41.08	-78.21	-80.29	-0.0169147	0.00	-60.00	-60.00
42	307.50	-37.63	-74.76	-76.84	-0.0161692	0.00	-60.00	-60.00
43	315.00	-33.54	-70.67	-72.75	-0.0152843	0.00	-60.00	-60.00
44	322.50	-28.88	-66.01	-68.09	-0.0142754	0.00	-60.00	-60.00
45	330.00	-23.72	-60.85	-62.93	-0.0131596	0.00	-60.00	-60.00
46	337.50	-18.15	-55.28	-57.36	-0.011956	0.00	-60.00	-60.00
47	345.00	-12.28	-49.41	-51.49	-0.0106853	0.00	-60.00	-60.00

Monopole Pier and Pad Foundation

BU #: 876343
 Site Name: GUILFORD WEST STC
 App. Number: 124298 Rev. 2



Design Reactions		
Shear, S:	34	kips
Moment, M:	3372	ft-kips
Tower Height, H:	149	ft
Tower Weight, Wt:	40	kips
Base Diameter, BD:	6.92	ft

Foundation Dimensions		
Depth, D:	12	ft
Pad Width, W:	30	ft
Neglected Depth, N:	3.3	ft
Thickness, T:	3.00	ft
Pier Diameter, Pd:	6.50	ft
Ext. Above Grade, E:	1.00	ft
Clear Cover, Cc:	3.0	in

Soil Properties		
Soil Unit Weight, γ :	0.120	kcf
Bearing Capacity, Bc:	8.0	kaf
Angle of Friction, Φ :	0	deg
Cohesion, Cc:	2.000	kaf
Passive Pressure, Pp:	0.000	kcf
Base Friction, μ :	0.20	

Material Properties		
Rebar Yield Strength, Fy:	60000	psi
Concrete Strength, Fc:	4000	psi
Concrete Unit Weight, γ_c :	0.150	kcf
Seismic Zone, z:	1	

Rebar Properties		
Pier Rebar Size, Sp:	9	
Pier Rebar Quantity, mp:	48	
Pad Rebar Size, Spad:	8	
Pad Rebar Quantity, mpad:	58	
Pier Tie Size, St:	4	
Tie Quantity, mt:	20	

Design Checks			
	Capacity/Availability	Demand/Limits	Check
Req'd Pier Diam. (ft)	6.5	7.92	OK
Shear Capacity (kips)	144.06	34.00	OK
Pad Shear - 1-way (kips)	1477.03	1066.86	OK
Pad Shear - 2-way (kips)	3465.63	1627.90	OK
Pier Rebar Area (in ²)	48.00	40.86	OK
Pad Rebar Area (in ²)	45.82	35.72	OK
Pier Moment Capacity (k-ft)	7406.69	3712.00	OK
Pier Bar Spacing (in)	5.16	18 > s > 2	OK
Pad Bar Spacing (in)	5.19	18 > s > 2	OK
Pier Development Length (in)	117	35.52	OK
Pad Development Length (in)	33	35.52	Hooked
Hook Development Length (in)	177.00	14.98	OK
Rebar Hook Length (in)	129.00	19.18	OK

23.6%
72.2%
47.0%
50.1%

Modification Checks			
	Capacity/Availability	Demand/Limits	Check
Sleeve Rebar Area (in ²)	15.8	0.00	Not Used
Sleeve Moment Capacity (k-ft)	7406.69	3712.00	Not Run
Sleeve Rebar Spacing (in)	N/A	18 > s > 2	Not Used
Sleeve Tie Spacing (in)	N/A	6 > s > 4.6	Not Used
Minimum Extra Thickness (in)	0	0	Not Used
Pad Rebar Area-short (in ²)	0.44	0.00	Not Used
Pad Rebar Area-long (in ²)	0.44	0.00	Not Used
Pad Rebar Spacing-short (in)	117.5	18 > s > 2	Not Used
Pad Rebar Spacing-long (in)	117.5	18 > s > 2	Not Used
End Cap Width (ft)	0	0	Not Used
End Cap Rebar Area (in ²)	3.16	0	Not Used
Rebar Spacing (in)	3.00	18 > s > 2	Not Used
Tie Spacing (in)	24.79	36 > s > 4.6	Not Used
Dowel Area (in ²)	2.2	0.00	Not Used
Dowel Embedment (in)	9	6	Not Used
Cone Shear Strength (kips)	25.15	23.76	Not Used
Dowel Edge Dist (in)	12.00	4.78	Not Used
Dowel Spacing (in)	84.00	16.00	Not Used
Dowel Edge Dist (vert) (in)	18.00	4.78	Not Used
Dowel Devel. Length (in)	3.00	13.32	Not Used

Modifications					
Pier Sleeve, ds:	0	in	End Cap Width, Wec:	0	ft
Revised Pier Diameter, dr:	6.5	ft	Revised Width, Wr:	30	ft
PS Rebar Size, Sps:	8		EC Rebar Size, Sec:	8	per side, top & bottom
Rebar Quantity, ms:	20		Rebar Quantity, mec:	4	per side
Tie Size, St:	3		EC Tie Size, Sect:	4	per side
Tie Quantity, mt:	9		Tie Quantity, mect:	15	
Pad Thickness, Te:	0	in	EC Dowel Size, Secd:	6	per side
Revised Pier Thickness, Tr:	3.00	ft	Dowel Quantity, mecd:	5	
Rebar Size, Sp:	3		Rows of Dowels, Nd:	1	
Rebar Quantity (long), ml:	4		Dowel Depth, decd:	9	in
Rebar Quantity (short), msl:	4		Edge Distance, wecd:	12	in
Dowel Size, Sed:	3				
Dowel Quantity, med:	0				

Stiffened or Unstiffened, UngROUTED, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data

BU#: 876343
Site Name: GUILFORD WEST STONE
App #: 124298 Rev. 2
Pole Manufacturer: Other

Reactions		
Moment:	3372	ft-kips
Axial:	40	kips
Shear:	34	kips

If No stiffeners, Criteria: **AISC ASD** <-Only Applicable to Unstiffened Cases

Anchor Rod Data		
Qty:	28	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	79	in

Anchor Rod Results
 Maximum Rod Tension: 71.7 Kips
 Allowable Tension: 195.0 Kips
 Anchor Rod Stress Ratio: 36.8% Pass

Rigid
Service, ASD
Fty*ASIF

Plate Data		
Diam:	85	in
Thick:	2.75	in
Grade:	50	ksi
Single-Rod B-eff:	8.05	in

Base Plate Results
 Base Plate Stress: 18.5 ksi
 Allowable Plate Stress: 50.0 ksi
 Base Plate Stress Ratio: 37.0% Pass

Rigid
Service ASD
0.75*Fy*ASIF
Y.L. Length:
34.64

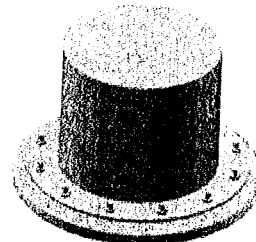
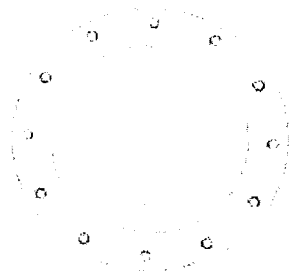
Stiffener Data (Welding at both sides)		
Config:	0	*
Weld Type:	Both	
Groove Depth:	0.25	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	5	in
Height:	18	in
Thick:	0.75	in
Notch:	0.5	in
Grade:	50	ksi
Weld str.:	70	ksi

n/a
Stiffener Results
 Horizontal Weld : n/a
 Vertical Weld: n/a
 Plate Flex+Shear, fb/Fb+(fv/Fv)^2: n/a
 Plate Tension+Shear, ft/Ft+(fv/Fv)^2: n/a
 Plate Comp. (AISC Bracket): n/a

Pole Results
 Pole Punching Shear Check: n/a

Pole Data		
Diam:	71	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

(Bearing and Stability Checks) Tool for TIA Rev F or G - Application (MP, SST with unitbase)

Site Data

BU#: 876343
Site Name: GUILFORD WEST STONE PROPERTY
App #: 124298 Rev. 2

Enter Load Factors Below:

For P (DL)	1.3	<---- Enter Factor
For P,V, and M (WL)	1.3	<---- Enter Factor

Pad & Pier Data

Base PL Dist. Above Pier:	0.01	in
Pier Dist. Above Grade:	1	in
Pad Bearing Depth, D:	12	ft
Pad Thickness, T:	3	ft
Pad Width=Length, L:	30	ft
Pier Cross Section Shape:	Square	<--Pull Down
Enter Pier Side Width:	8.5	ft
Concrete Density:	150.0	pcf
Pier Cross Section Area:	72.25	ft^2
Pier Height:	9.08	ft
Soil (above pad) Height:	9.00	ft

Soil Parameters

Unit Weight, γ :	120.0	pcf
Ultimate Bearing Capacity, q_n :	16.00	ksf
Strength Reduct. factor, ϕ :	0.5	
Angle of Friction, Φ :	0.0	degrees
Undrained Shear Strength, C_u :	2.00	ksf
Allowable Bearing: $\phi * q_n$:	8.00	ksf
Passive Pres. Coeff., K_p :	1.00	

Forces/Moments due to Wind and Lateral Soil

Minimum of ($\phi * \text{Ultimate Pad Passive Force, } V_u$):	44.2	kips
Pad Force Location Above D:	1.48	ft
ϕ (Passive Pressure Moment):	65.54	ft-kips
Factored O.T. M(WL), "1.6W":	4917.7	ft-kips
Factored OT (MW-Msoil), M1	4852.18	ft-kips

Resistance due to Foundation Gravity

Soil Wedge Projection grade, a:	0.00	ft
Sum of Soil Wedges Wt:	0.00	kips
Soil Wedges ecc, K1:	0.00	ft
Ftg+Soil above Pad wt:	1397.4	kips
Unfactored (Total ftg-soil Wt):	1397.41	kips
1.2D. No Soil Wedges.	1780.89	kips
0.9D. With Soil Wedges	1345.67	kips

Resistance due to Cohesion (Vertical)

$\phi * (1/2 * C_u) (\text{Total Vert. Planes})$	169.77	kips
Cohesion Force Eccentricity, K2	14.60	ft

Monopole Base Reaction Forces

TIA Revision:	F	<--Pull Down
Unfactored DL Axial, PD:	40	kips
Unfactored WL Axial, PW:	40	kips
Unfactored WL Shear, V:	34	kips
Unfactored WL Moment, M:	3372	ft-kips

Load Factor Shaft Factored Loads

1.30	1.2D+1.6W, P_u :	104	kips
0.90	0.9D+1.6W, P_u :	88	kips
1.30	V_u :	44.2	kips
	M_u :	4383.6	ft-kips

1.2D+1.6W Load Combination, Bearing Results:

(No Soil Wedges) [Reaction+Conc+Soil]	1780.89	P1="1.2D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil), M1	4852.18	ft-kips

Orthogonal Direction:

$ecc1 = M1/P1 = 2.72 \text{ ft}$
 Orthogonal $qu = 2.70 \text{ ksf}$
 $qu/\phi * q_n \text{ Ratio} = 33.72\% \text{ Pass}$

Diagonal Direction:

$ecc2 = (0.707M1)/P1 = 1.93 \text{ ft}$
 Diagonal $qu = 2.60 \text{ ksf}$
 $qu/\phi * q_n \text{ Ratio} = 32.56\% \text{ Pass}$

Run

<-- Press Upon Completing All Input

Overturning Stability Check

0.9D+1.6W Load Combination, Bearing Results:

(w/ Soil Wedges) [Reaction+Conc+Soil]	1345.67	P2="0.9D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil) - 0.9(M of Wedge + M of Cohesion), M2	2620.72	ft-kips

$Orthogonal \ ecc3 = M2/P2 = 1.95 \text{ ft}$
 Ortho Non Bearing Length, NBL = 3.90 ft
 Orthogonal $qu = 1.88 \text{ ksf}$
 Diagonal $qu = 1.81 \text{ ksf}$

Max Reaction Moment (ft-kips) so that $qu = \phi * q_n = 100\%$ Capacity Rating

Actual M:	3372.00		
M Orthogonal:	14097.37	23.92%	Pass
M Diagonal:	13958.29	24.16%	Pass

Technical Memo

To: Northeast Tower Inc
From: Amir Uzzaman - Radio Frequency Engineer
cc: Jason Overbey
Subject: Power Density Report for CT11027D
Date: August 8, 2011

1. Introduction:

This report is the result of an Electromagnetic Field Intensities (EMF - Power Densities) study for the T-Mobile antenna installation on a Monopole at 1919 Boston Post Road, Guilford, CT. This study incorporates the most conservative consideration for determining the practical combined worst case power density levels that would be theoretically encountered from locations surrounding the transmitting location.

2. Discussion:

The following assumptions were used in the calculations:

- 1) The emissions from T-Mobile transmitters are in the (1935-1944.8), (1980.2-1984.8), (2140-2145), (2110-2120)MHz frequency Band.
- 2) The antenna array consists of three sectors, with 2 antennas per sector.
- 3) The model number for GSM antenna is RR90-17-02DP.
- 3) The model number for UMTS antenna is APX16DWV-16DWV.
- 4) GSM antenna center line height is 148 ft.
- 4) UMTS antenna center line height is 148 ft.
- 5) The maximum transmit power from any GSM sector is 1567.91 Watts Effective Radiated Power (EIRP) assuming 8 channels per sector.
- 5) The maximum transmit power from any UMTS sector is 2209.48 Watts Effective Radiated Power (EIRP) assuming 2 channels per sector.
- 6) All the antennas are simultaneously transmitting and receiving, 24 hours a day.
- 7) Power levels emitting from the antennas are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 8) The average ground level of the studied area does not change significantly with respect to the transmitting location.

Equations given in "FCC OET Bulletin 65, Edition 97-01" were then used with the above information to perform the calculations.

3. Conclusion:

Based on the above worst case assumptions, the power density calculation from the T-Mobile antenna installation on a Monopole at 1919 Boston Post Road, Guilford, CT, is 0.0411 mW/cm². This value represents 4.11% of the Maximum Permissible Exposure (MPE) standard of 1 milliwatt per square centimeter (mW/cm²) set forth in the FCC/ANSI/IEEE C95.1-1991. Furthermore, the proposed antenna location for T-Mobile will not interfere with existing public safety communications, AM or FM radio broadcasts, TV, Police Communications, HAM Radio communications or any other signals in the area. The combined Power Density from other carriers is 36.16533%. The combined Power Density for the site is 40.275% of the M.P.E. standard.

Connecticut Market

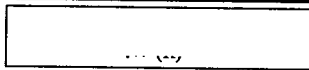


Worst Case Power Density

Site: CT11027D
Site Address: 1919 Boston Post Road
Town: Guilford
Tower Height: 149 ft.
Tower Style: Monopole

GSM Data		UMTS Data	
Base Station TX output	20 W	Base Station TX output	40 W
Number of channels	8	Number of channels	2
Antenna Model	RR90-17-02DP	Antenna Model	APX16DWV-16DWV
Cable Size	1 5/8 in.	Cable Size	1 5/8 in.
Cable Length	180 ft.	Cable Length	180 ft.
Antenna Height	148.0 ft.	Antenna Height	148.0 ft.
Ground Reflection	1.6	Ground Reflection	1.6
Frequency	1945.0 MHz	Frequency	2.1 GHz
Jumper & Connector loss	4.50 dB	Jumper & Connector loss	1.50 dB
Antenna Gain	16.5 dBi	Antenna Gain	18.0 dBi
Cable Loss per foot	0.0116 dB	Cable Loss per foot	0.0116 dB
Total Cable Loss	2.0880 dB	Total Cable Loss	2.0880 dB
Total Attenuation	6.5880 dB	Total Attenuation	3.5880 dB
Total EIRP per Channel (In Watts)	52.92 dBm 195.99 W	Total EIRP per Channel (In Watts)	60.43 dBm 1104.74 W
Total EIRP per Sector (In Watts)	61.95 dBm 1567.91 W	Total EIRP per Sector (In Watts)	63.44 dBm 2209.48 W
nsg	9.9120	nsg	14.4120
Power Density (S) = 0.017059 mW/cm ²		Power Density (S) = 0.024040 mW/cm ²	
T-Mobile Worst Case % MPE =		4.1099%	

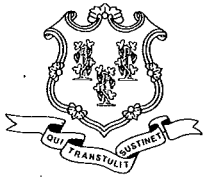
Equation Used:



Office of Engineering and Technology (OET) Bulletin 65, Edition 97-01, August 1997

Co-Location Total

Carrier	% of Standard
Verizon	7.4121 %
Verizon	1.4495 %
Cingular UMTS	1.4858 %
Pocket	6.4159 %
SNET/Cingular	2.5400 %
SNET/Cingular	11.0966 %
Sprint	2.8553 %
Nextel	2.9102 %
Other Antenna Systems	
Total Excluding T-Mobile	36.1653 %
T-Mobile	4.1099
Total % MPE for Site	40.2753%



STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

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August 18, 2011

The Honorable Joseph S. Mazza
First Selectman
Town of Guilford
Town Hall
31 Park Street
Guilford, CT 06437

RE: **EM-T-MOBILE-060-110818** - Omnipoint Communications, as subsidiary of T-Mobile USA, Inc., notice of intent to modify an existing telecommunications facility located at 1919 Boston Post Road, Guilford, Connecticut.

Dear First Selectman Mazza:

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.

If you have any questions or comments regarding this proposal, please call me or inform the Council by September 1, 2011.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts
Executive Director

LR/jbw

Enclosure: Notice of Intent

c: Regina Reid, Zoning Enforcement Officer, Town of Guilford

Great meeting you last night. It is always nice to put a face with a name when I sign these letters