

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

November 5, 2012

Jennifer Young Gaudet
Project Manager
HPC Development LLC
46 Mill Plain Road
Danbury, CT 06811

RE: **EM-SPRINT-097-121009** – Sprint Spectrum notice of intent to modify an existing telecommunications facility located at 21 Berkshire Road, Newtown, Connecticut.

Dear Ms. Gaudet:

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 October 5, 2012. 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/jbw

c: The Honorable Patricia E. Llodra, First Selectman, Town of Newtown
Gary Frenette, Ms. Cathy Mockton, Zoning Enforcement Officers, Town of Newtown
Crown Castle



EM-SPRINT-097-121009



HPC Wireless Services
46 Mill Plain Rd.
Floor 2
Danbury, CT, 06811
P.: 203.797.1112

October 5, 2012

ORIGINAL

RECEIVED
OCT - 9 2012
CONNECTICUT
SITING COUNCIL

VIA OVERNIGHT COURIER

Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051
Attn: Ms. Linda Roberts, Executive Director

Re: Sprint Spectrum, L.P. – exempt modification
21 Berkshire Road, Newtown, Connecticut

Dear Ms. Roberts:

This letter and attachments are submitted on behalf of Sprint Spectrum, L.P. (“Sprint”). Sprint is undertaking modifications to certain existing sites in its Connecticut system in order to implement updated technology. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction that constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the First Selectman of the Town of Newtown.

Sprint plans to modify the existing wireless communications facility owned by Crown Castle and located at 21 Berkshire Road in the Town of Newtown (coordinates 41.412778, -73.270833). Attached are a compound plan and elevation depicting the planned changes, and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration. Also included is a power density report reflecting the modification to Sprint’s operations at the site.

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes (“C.G.S.”) Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. Sprint will replace six (6) existing CDMA antennas with three (3) dual-band panel antennas and three (3) dual-pole CDMA antennas on the existing platform with a center

Boston

Albany

Buffalo

Danbury

Philadelphia

Raleigh

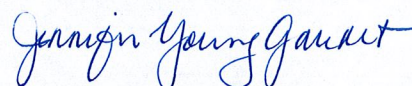
Atlanta

line of approximately 165'. Six (6) RRHs (remote radio heads) will be mounted behind the antennas around the pole. During an interim period of up to one year, the three (3) CDMA antennas will remain. Sprint will also install three (3) hybridflex cables along the existing coaxial cable run, and will remove the coaxial cable at the end of the interim period. The proposed modifications will not extend the height of the approximately 185' structure.

2. The proposed changes will not extend the site boundaries. Sprint will replace two (2) existing cabinets and will add one (1) cabinet on its existing concrete pad. These changes will have no effect on the site boundaries.
3. The proposed changes will not increase the noise level at the existing facility by six decibels or more. The incremental effect of the proposed changes will be negligible.
4. The changes to the facility will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site. As indicated on the attached report prepared by EBI Consulting, Sprint's operations at the site will result in a power density of approximately 11.884%; the combined site operations will result in a total power density of approximately 41.574%.

Please feel free to contact me by phone at (860) 798-7454 or by e-mail at jgaudet@hpcwireless.com with questions concerning this matter. Thank you for your consideration.

Respectfully yours,



Jennifer Young Gaudet

cc: Honorable E. Patricia Llodra, First Selectman, Town of Newtown
Carmine Renzulli (underlying property owner)

Sprint
VISION

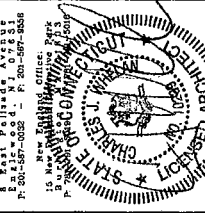
1 INTERNATIONAL BLVD, SUITE 800
MIDLAND, NJ 07945
P. 800-337-9741

Alcatel-Lucent

1 PARKING ROAD
WINDHAM, NH 03586
P. (703) 522-4000

Sa Salient
ARCHITECTS, LLC

8 STATE STREET, SUITE 401
NEWTON, MASSACHUSETTS 02459
P. 617-552-3541 F. 617-552-0031
WWW.SALIENTARCH.COM



APPROVED APPROPRIATE

BY: _____ DATE: _____

PROJECT: NEUTOWN BAY TOWER
SHEET TITLE: WEST ELEVATION

NO.	DATE	DESCRIPTION	BY
1	06/21/10	PRELIMINARY	AD
2	06/21/10	PER CLIENT COMMENTS	MS
3	06/21/10	ISSUED AS FINAL	AD

SITE NUMBER
CT03XC368

SITE NAME
NEUTOWN BAY TOWER

OWNER
CT03XC368

100 WINDHAM ROAD
NEUTOWN, CT 06470

ELEVATION

SHEET NO. **A-2**

CHECKED BY: JHP

ANTENNA CONFIGURATION NOTE

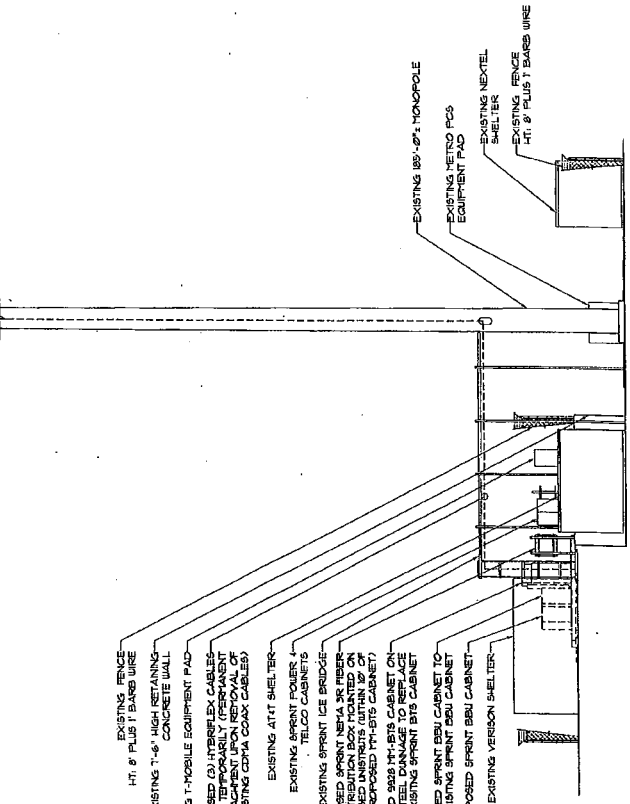
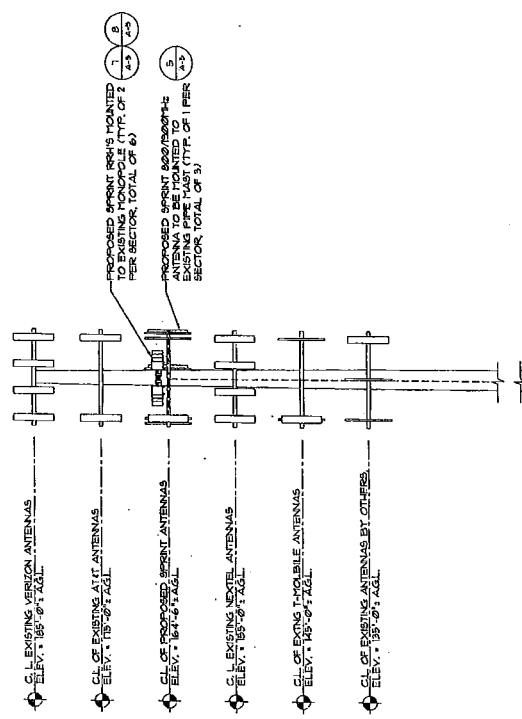
ALL EXISTING CPMA ANTENNAS TO BE VISIBLY REMOVED FROM THE TOWER. ALL ANTENNAS FOR FINAL CONFIGURATION. ANTENNA SEPARATION TO BE FIELD VERIFIED BY THE GENERAL CONTRACTOR.

TOP OF PROPOSED SPRINT ANTENNAS
ELEV. = 167'-6" AGL

CL OF PROPOSED SPRINT ANTENNAS
ELEV. = 167'-6" AGL

TOP OF EXISTING SPRINT ANTENNAS
ELEV. = 167'-6" AGL

CL OF EXISTING SPRINT ANTENNAS
ELEV. = 167'-6" AGL



1 WEST ELEVATION

SCALE = 1/8" = 1'-0"

2 HEIGHT COMPARISON

SCALE = 1/8" = 1'-0"

1 INTERNATIONAL BLVD, SUITE 800
MARTIN, NJ 07095
P: 800.337.7641

1 ROBINSON ROAD
NEWARK, NJ 07102
P: 973.952.1400

8 SOUTH PARKWAY
P.O. BOX 300
P.O. BOX 300
P.O. BOX 300
P.O. BOX 300

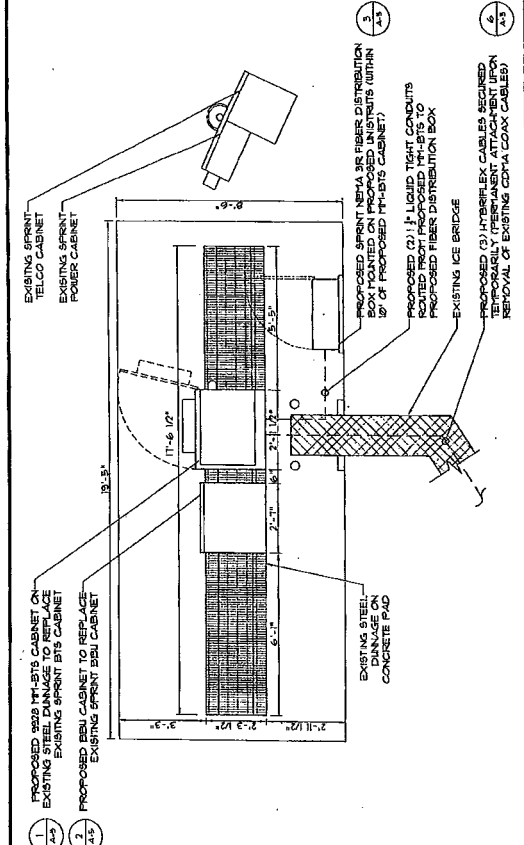


SUBMITTALS		BY
NO.	DATE	DESCRIPTION
1	08/12/08	PRELIMINARY
2	09/24/08	PRELIMINARY COMMENTS
3	09/24/08	ISSUED AS FINAL

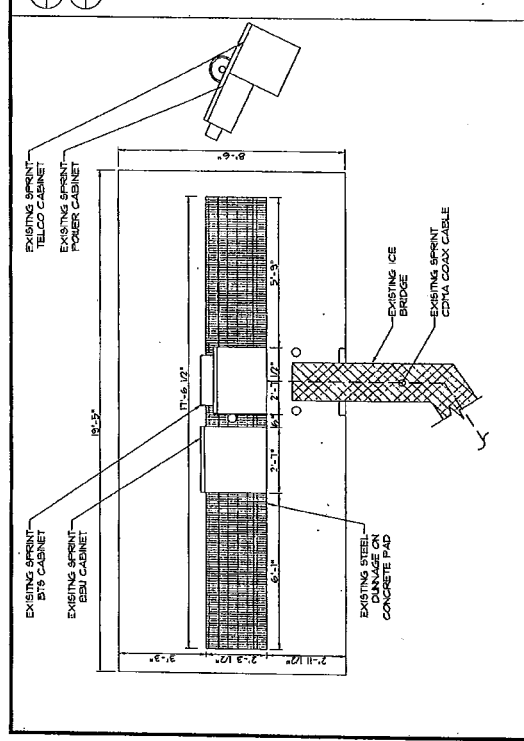
CT03XC368
SITE NUMBER
SITE NAME:
NEUTOUN BAIT TOWER
(CROWN # 0665344)
SITE ADDRESS:
21 BERSKSHIRE ROAD
NEWTON, CT 06452

SHEET TITLE:
ENLARGED EQUIPMENT
CABINET SCENARIO

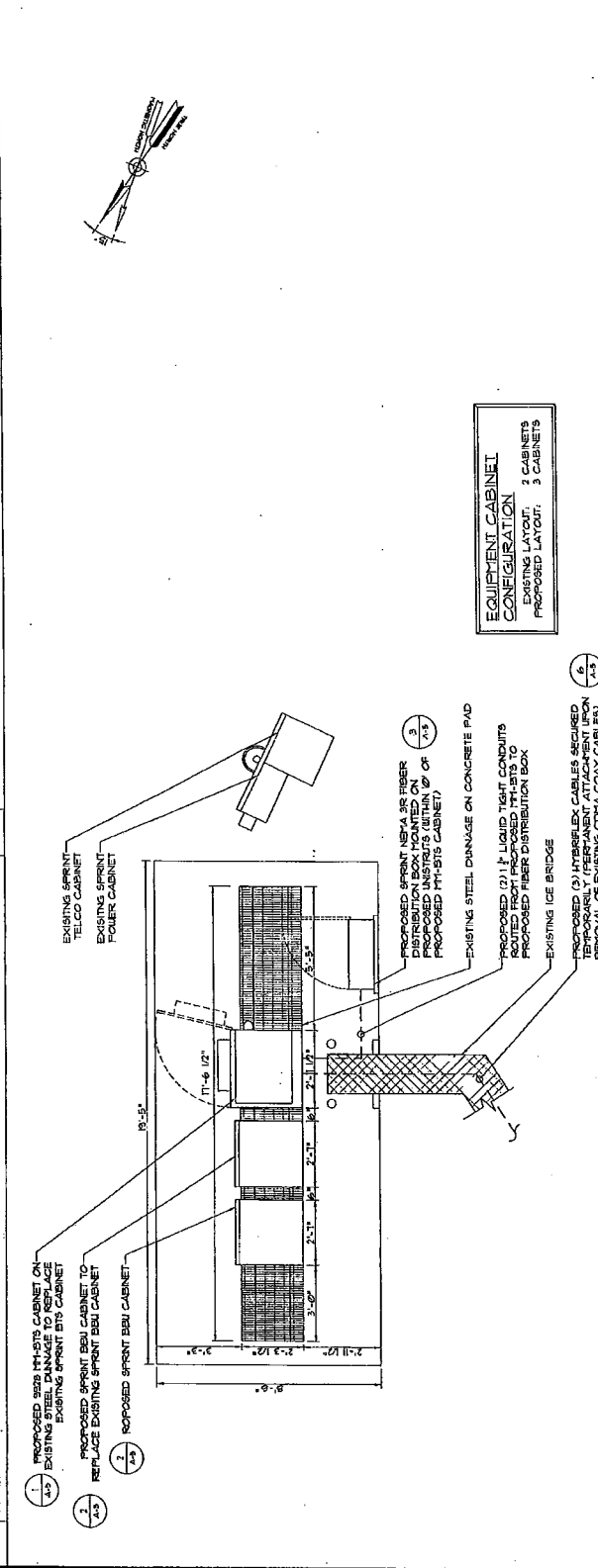
SHEET NO:
A-3
CHECKED BY:
JHP



2 INTERIM EQUIPMENT CABINET LAYOUT
SCALE = 1/2" = 1'-0"



1 EXISTING EQUIPMENT CABINET LAYOUT
SCALE = 1/2" = 1'-0"



3 FINAL EQUIPMENT CABINET LAYOUT
SCALE = 1/2" = 1'-0"

EQUIPMENT CABINET CONFIGURATION
EXISTING LAYOUT: 3 CABINETS
PROPOSED LAYOUT: 3 CABINETS

Sprint VISION
 1 INTERNATIONAL BLVD. SUITE 600
 HARTFORD, CT 06183
 P: 800.337.7641

Alcatel-Lucent
 1 ROSSARS ROAD
 WESTFIELD, MA 01086
 P: (978) 952-1600

Sa Sa Salient ARCHITECTS, LLC
 New Jersey Office:
 5 STATE STREET, SUITE 300
 NEWARK, NJ 07102
 P: 201-587-0022 F: 201-587-8556
 New York Office:
 15 AVENUE OF THE AMERICAS, SUITE 2100
 NEW YORK, NY 10013
 P: 212-512-2200 F: 212-512-2201



SUBMITTALS

NO	DATE	DESCRIPTION	BY
1		PREPARE	AD
1		REVIEW	AD
1		FOR CLIENT COMMENTS	NO
1		ISSUE	NO

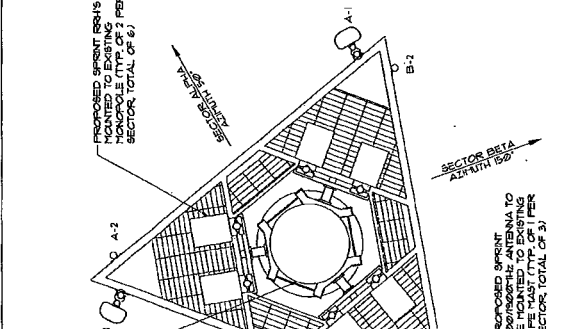
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THE NUMBER: **CT03XC368**
 SITE NAME: **NEUTOWN BAM TOWER**
 (COORDINATES: 606384)
 SITE ADDRESS:
 1185 ROUTE 150
 NEUTOWN, CT 06442

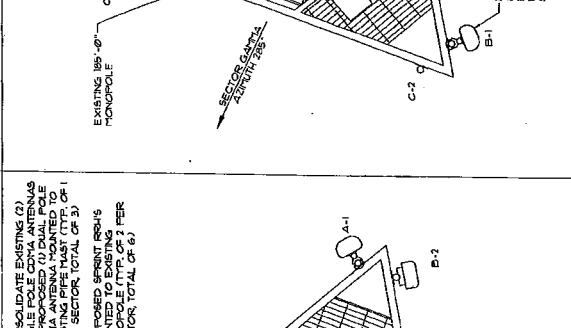
PROJECT TITLE: **ANTENNA SCENARIO AND RF SYSTEM SCHEDULE**

SUBMITTAL NO.: **CT03XC368**
 DATE: **A-4**
 DRAWN BY: **JMP**

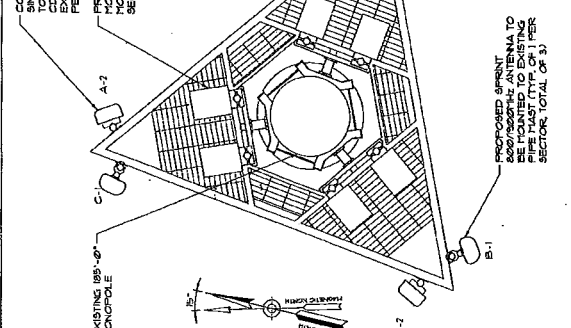
EXISTING ANTENNA PLAN



INTERIM ANTENNA PLAN



FINAL ANTENNA PLAN



ANTENNA SCENARIO
 SCALE = 3/16" = 1' - 0"

POSITION	ANTENNA STATUS	FREQUENCY (MHz)	ANTENNA MAKE	ANTENNA MODEL	EXISTING (FOR REFERENCE)	PROPOSED	AZIMUTHS	MECHANICAL DOWN TILT	ELECTRICAL DOWN TILT	RAD CENTER (AGL)	HYBRIFLEX CABLE LENGTH (FT)	RRH MODEL	TOP COAX JUMPER SIZE (IN)	*TOP COAX JUMPER LENGTH (FT)	TOP COAX MAKE	TOP COAX JUMPER MODEL	COMBINER	*COMBINER JUMPER LENGTH (FT)	ANTENNA COLOR CODING
A-1	PROPOSED	800/1500	RF5	APFA/SPFB-C-A20	6.0°	5.0°	150°	0°	-1°	164'-6"	21B	(1) 800PH2 (1) 1500PH2	1/2	10'	RF5	(2) LCF1-500 (4) LCF1-500	--	--	TBD
B-1	PROPOSED	800/1500	RF5	APFA/SPFB-C-A20	16.0°	5.0°	150°	0°	-1°	164'-6"	21B	(1) 800PH2 (1) 1500PH2	1/2	10'	RF5	(2) LCF1-500 (4) LCF1-500	--	--	TBD
C-1	PROPOSED	800/1500	RF5	APFA/SPFB-C-A20	3.0°	2.5°	225°	0°	-5°	164'-6"	21B	(1) 800PH2 (1) 1500PH2	1/2	10'	RF5	(2) LCF1-500 (4) LCF1-500	--	--	TBD

* CONTRACTOR TO FIELD VERIFY ALL CABLE/JUMPER LENGTHS AGAINST CURRENT BOM.

RF SYSTEM SCHEDULE
 SCALE = NTS.



Pier Structural Engineering Corp.
 55 Northfield Drive E, Suite 198
 Waterloo, ON N2K 3T6
 Tel: 519-885-3806
 Fax: 519-886-0076
 www.p-sec.ca

Specializing in Communication Tower Engineering

May 24, 2012

SNV FINAL LOADING

Eva Morales, Tower Structural Analyst
 Crown Castle USA Inc.
 3530 Toringdon Way, Suite 300
 Charlotte, NC 28277

Subject: Structural Analysis Report

Carrier Designation: Carrier Co-Locate: Sprint PCS
 Carrier Site Number: CT03XC368
 Carrier Site Name: NEWTOWN (CROWN)

Crown Castle Designation: Crown Castle BU Number: 806354
 Crown Castle Site Name: BRG 123 943084
 Crown Castle JDE Job Number: 188690
 Crown Castle WO Number: 497390

Engineering Firm Designation: P-SEC Project Number: 6655

Site Data: ROUTE 34 - WASHINGTON AVEUNE, NEWTOWN, Fairfield County, CT
 Latitude 41° 24' 45.53", Longitude -73° 16' 12.34"
 185-ft EEI Monopole

Dear Eva Morales,

Pier Structural Engineering Corp. (P-SEC) 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 466484, in accordance with application 143917, revision 4.

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:

LC7: 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 2005 CT State Building Code requirements based upon a wind speed of 85 mph fastest mile.

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

Respectfully submitted by:

Martin Piercey, P.E., P.Eng.
 CT PE# 25582

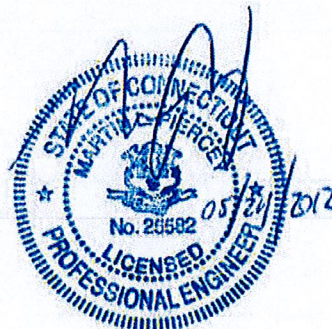


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1) INTRODUCTION

This tower is a 185-ft Monopole tower designed by ENGINEERED ENDEAVORS, INC. in July of 1999. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F. The tower was later modified per Vertical Structures, Inc. modification drawings dated February of 2009.

2) ANALYSIS CRITERIA

The following design parameters have been used in our analysis:

Design Standard:	TIA/EIA-222-F standard and 2005 CT State Building Code
County/State:	Fairfield County, CT
Wind Speeds:	CASE 1 85.0 mph (fastest mile)
	CASE 2 37.6 mph (fastest mile) with 3/4" radial solid ice (per ASCE7 ice map)
	CASE 3 50.0 mph (fastest mile) for Serviceability
Allowable Stress:	Increased 1/3rd

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
165	165	3	rfs celwave	APXVSP18-C-A20	3	1-1/4	1
		3	alcatel lucent	800 EXTERNAL NOTCH FILTER			
		3	alcatel lucent	1900MHz RRH (65MHz)			
		3	alcatel lucent	800MHZ RRH			
		9	rfs celwave	ACU-A20-N			

Notes:
 1) Proposed equipment

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
185	187	3	antel	BXA-171063-12BF	12	1-5/8	1
		3	antel	BXA-70063-6CF-2			
		6	decibel	DB846F65ZAXY			
		6	rfs celwave	FD9R6004/2C-3L			
	185	3	--	Side Arm Mount [SO 103-1]			
		1	--	Platform Mount [LP 601-1]			
182	194	1	decibel	ASP-601	1	1/2	1
	187	1	--	10' Pipe Mount			
	182	3	--	Side Arm Mount [SO 102-1]			
175	177	6	powerwave tech	7700.00	12	1-5/8 5/8 3/8	1
		3	powerwave tech	P65-16-XLH-RR			
		6	powerwave tech	LGP2140X			
		6	ericsson	RRUS-11			
		3	powerwave tech	TT19-08BP111-001			
		1	raycap	DC6-8-60-18-8F			
	175	1	--	Platform Mount [LP 601-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
165	167	6	decibel	DB980H90T2E-M	6	1-5/8	4
	165	1	--	Platform Mount [LP 601-1]	--	--	1
155	158	12	decibel	DB844H90	12	1-1/4	1
	155	1	--	Platform Mount [LP 602-1]			
145	148	3	rfs celwave	APX16DWV-16DWX-S-E-A20	6	1-5/8	2
		3	rfs celwave	ATMPP1412D-1CWA			
		3	rfs celwave	ATMAA1412D-1A20			
		6	ericsson	KRY 112 71			
	145	1	--	Platform Mount [LP 601-1]	6	1-5/8	1
135	137	3	kathrein	800 10504	6	1-5/8	1
		3	kathrein	860 10025			
	135	3	--	T-Arm Mount [TA 602-1]			
102	102	1	gps	GPS_A	1	1/2	1
		1	--	Side Arm Mount [SO 701-1]			
100	100	1	gps	GPS_A	1	1/2	1
		1	--	Side Arm Mount [SO 701-1]			
40	40	1	gps	GPS_A	1	1/2	1
		1	--	Side Arm Mount [SO 701-1]			

Notes:

- 1) Existing equipment
- 2) Reserved equipment
- 3) Existing equipment to be replaced by reserved
- 4) Existing equipment to be replaced by proposed

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)
185	185	12	swedcom	ALP 9212	--	--
175	175	12	swedcom	ALP 11011	--	--
165	165	9	decibel	DB 980	--	--
155	155	12	swedcom	ALP 9011	--	--
145	145	6	ems wireless	RR65-18	--	--
		1	scala	OGB9-900		
110	110	1	generic	GPS	--	--
50	50	1	generic	GPS	--	--

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, dated 2/14/1999	2297011	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	VSI, Proj. No. 2009-004-030 dated 6/12/2009	2381114	CCISITES
4-POST MODIFICATION INSPECTION	VSI, Proj. No. 2009-004-030 dated 6/12/2009	2381114	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EEl, Proj. No. 4743 dated 7/22/1999	822037	CCISITES
4-TOWER MANUFACTURER DRAWINGS	EEl, Proj. No. GS51352 dated 7/22/1999	822035	CCISITES
APPLICATION	Sprint PCS, Revision # 4 dated 5/21/2012	143917	CCISITES

3.1) Analysis Method

tnxTower (6.0.4.0), 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. P-SEC should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary) – LC7

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	185 - 149.497	Pole	TP36.0404x29x0.25	1	-8.6	1435.5	42.8	Pass
L2	149.497 - 114.096	Pole	TP42.4605x34.5478x0.3125	2	-17.3	2114.7	80.1	Pass
L3	114.096 - 76.6771	Pole	TP49.157x40.6983x0.375	3	-27.0	2938.0	93.6	Pass
L4	76.6771 - 38.2552	Pole	TP55.9285x47.1065x0.4375	4	-39.9	3900.1	95.5	Pass
L5	38.2552 - 0	Pole	TP62.5x53.5869x0.5	5	-59.1	5115.2	93.5	Pass
							Summary	
						Pole (L4)	95.5	Pass
						RATING =	95.5	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
2	Anchor Rods	--	83.3	Pass
2	Base Plate	--	86.6	Pass
2	Base Foundation	--	90.9	Pass
Structure Rating (max from all components) =				95.5%

- Notes: 1) See full member breakdown and section capacities in Appendix A.
 2) See additional documentation in Appendix C for supporting calculations.
 3) Stresses up to 105% (steel) and 110% (foundations) are within engineering tolerance and considered acceptable.

4.1) Recommendations

The existing 185-ft monopole located in Fairfield County (BRG 123 943084), CT is **structurally acceptable** based on the TIA/EIA-222-F standard and 2005 CT State Building Code requirements based upon a wind speed of 85 mph fastest mile.

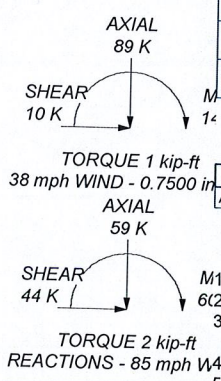
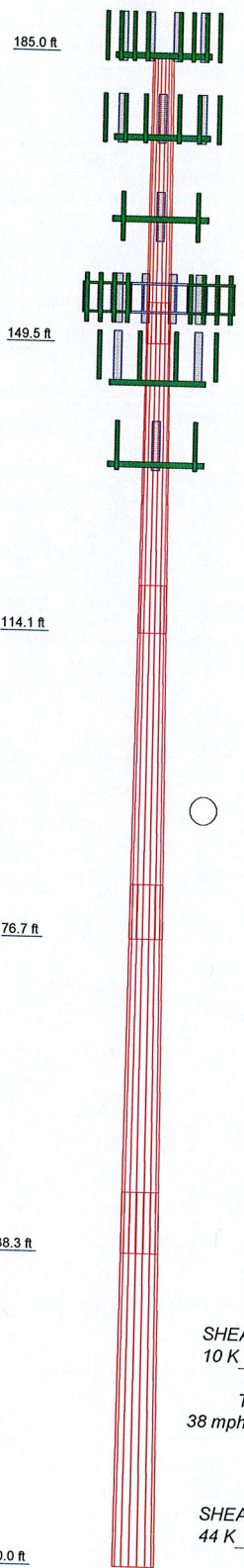
No modifications will be required for the proposed loading.

Should you have any questions, please call us anytime at 519-885-3806.

encl.
 806354-143917 SA Report-20120524.doc

APPENDIX A
TNXTOWER OUTPUT

Section	1	2	3	4	5
Length (ft)	35.6"	40'4"-29'32"	43'2"-3'4"	45'27'32"	45'9"
Number of Sides	18	18	18	18	18
Thickness (in)	0.2500	0.3125	0.3750	0.4375	0.5000
Socket Length (ft)	5'1/8"	5'9"-23'32"	6'7"-13'1/8"	7'5"-7'8"	53.5869
Top Dia (in)	29.0000	34.5478	40.6983	47.1065	62.5000
Bot Dia (in)	36.0404	42.4605	49.1570	55.9285	14.2
Grade			A572-65		
Weight (K)	3.1	5.2	7.8	10.9	14.2



DESIGNED APPURTENANCE LOADING


TYPE	ELEVATION	TYPE	ELEVATION
BXA-171063-12BF w/ Mount Pipe (Carrier 185' E)	185	800 EXTERNAL NOTCH FILTER (Carrier 165' P)	165
BXA-171063-12BF w/ Mount Pipe (Carrier 185' E)	185	1900MHz RRH (65MHz) (Carrier 165' P)	165
BXA-171063-12BF w/ Mount Pipe (Carrier 185' E)	185	1900MHz RRH (65MHz) (Carrier 165' P)	165
BXA-70063-6CF-2 w/ Mount Pipe (Carrier 185' E)	185	1900MHz RRH (65MHz) (Carrier 165' P)	165
BXA-70063-6CF-2 w/ Mount Pipe (Carrier 185' E)	185	800MHz RRH (Carrier 165' P)	165
BXA-70063-6CF-2 w/ Mount Pipe (Carrier 185' E)	185	800MHz RRH (Carrier 165' P)	165
BXA-70063-6CF-2 w/ Mount Pipe (Carrier 185' E)	185	800MHz RRH (Carrier 165' P)	165
(2) DB846F65ZAXY w/ Mount Pipe (Carrier 185' E)	185	(3) ACU-A20-N (Carrier 165' P)	165
(2) DB846F65ZAXY w/ Mount Pipe (Carrier 185' E)	185	(3) ACU-A20-N (Carrier 165' P)	165
(2) DB846F65ZAXY w/ Mount Pipe (Carrier 185' E)	185	(4) DB844H90 w/ Mount Pipe (Carrier 155' E)	155
(2) DB846F65ZAXY w/ Mount Pipe (Carrier 185' E)	185	(4) DB844H90 w/ Mount Pipe (Carrier 155' E)	155
(2) FD9R6004/2C-3L (Carrier 185' E)	185	(4) DB844H90 w/ Mount Pipe (Carrier 155' E)	155
(2) FD9R6004/2C-3L (Carrier 185' E)	185	(4) DB844H90 w/ Mount Pipe (Carrier 155' E)	155
(2) FD9R6004/2C-3L (Carrier 185' E)	185	Platform Mount [LP 601-1] (Carrier 155' E)	155
Side Arm Mount [SO 103-3] (Carrier 185' E)	185	Platform Mount [LP 601-1] (Carrier 155' E)	155
Platform Mount [LP 601-1] (Carrier 185' E)	185	APX16DWW-16DWW-S-E-A20 w/ Mount Pipe (Carrier 145' R)	145
ASP-601 (Carrier 182' E)	182	APX16DWW-16DWW-S-E-A20 w/ Mount Pipe (Carrier 145' R)	145
10' x 2" Mount Pipe (Carrier 182' E)	182	APX16DWW-16DWW-S-E-A20 w/ Mount Pipe (Carrier 145' R)	145
Side Arm Mount [SO 102-3] (Carrier 182' E)	182	APX16DWW-16DWW-S-E-A20 w/ Mount Pipe (Carrier 145' R)	145
(2) 7770.00 w/ Mount Pipe (Carrier 175' E)	175	ATMPP1412D-1CWA (Carrier 145' R)	145
(2) 7770.00 w/ Mount Pipe (Carrier 175' E)	175	ATMPP1412D-1CWA (Carrier 145' R)	145
(2) 7770.00 w/ Mount Pipe (Carrier 175' E)	175	ATMPP1412D-1CWA (Carrier 145' R)	145
(2) 7770.00 w/ Mount Pipe (Carrier 175' E)	175	ATMAA1412D-1A20 (Carrier 145' R)	145
(2) 7770.00 w/ Mount Pipe (Carrier 175' E)	175	ATMAA1412D-1A20 (Carrier 145' R)	145
P65-16-XLH-RR w/ Mount Pipe (Carrier 175' E)	175	RR90-17-02DP w/ Mount Pipe (Carrier 145' E)	145
P65-16-XLH-RR w/ Mount Pipe (Carrier 175' E)	175	RR90-17-02DP w/ Mount Pipe (Carrier 145' E)	145
P65-16-XLH-RR w/ Mount Pipe (Carrier 175' E)	175	RR90-17-02DP w/ Mount Pipe (Carrier 145' E)	145
(2) LGP2140X (Carrier 175' E)	175	Platform Mount [LP 601-1] (Carrier 145' E)	145
(2) LGP2140X (Carrier 175' E)	175	Platform Mount [LP 601-1] (Carrier 145' E)	145
(2) LGP2140X (Carrier 175' E)	175	800 10504 w/ Mount Pipe (Carrier 135' E)	135
(2) RRUS-11 (Carrier 175' E)	175	800 10504 w/ Mount Pipe (Carrier 135' E)	135
(2) RRUS-11 (Carrier 175' E)	175	800 10504 w/ Mount Pipe (Carrier 135' E)	135
(2) RRUS-11 (Carrier 175' E)	175	800 10504 w/ Mount Pipe (Carrier 135' E)	135
TT19-08BP111-001 (Carrier 175' E)	175	860 10025 (Carrier 135' E)	135
TT19-08BP111-001 (Carrier 175' E)	175	860 10025 (Carrier 135' E)	135
TT19-08BP111-001 (Carrier 175' E)	175	860 10025 (Carrier 135' E)	135
DC6-48-60-18-8F (Carrier 175' E)	175	860 10025 (Carrier 135' E)	135
Platform Mount [LP 601-1] (Carrier 175' E)	175	(2) 5' x 2" Pipe Mount (Carrier 135' E)	135
Platform Mount [LP 601-1] (Carrier 165' E)	165	(2) 5' x 2" Pipe Mount (Carrier 135' E)	135
APXVSP18-C-A20 w/ Mount Pipe (Carrier 165' P)	165	(2) 5' x 2" Pipe Mount (Carrier 135' E)	135
APXVSP18-C-A20 w/ Mount Pipe (Carrier 165' P)	165	T-Arm Mount [TA 602-3] (Carrier 135' E)	135
APXVSP18-C-A20 w/ Mount Pipe (Carrier 165' P)	165	GPS_A (Carrier 102' E)	102
800 EXTERNAL NOTCH FILTER (Carrier 165' P)	165	Side Arm Mount [SO 701-1] (Carrier 102' E)	102
800 EXTERNAL NOTCH FILTER (Carrier 165' P)	165	GPS_A (Carrier 100' E)	100
		Side Arm Mount [SO 701-1] (Carrier 100' E)	100
		GPS_A (Carrier 40' E)	40
		Side Arm Mount [SO 701-1] (Carrier 40' E)	40

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

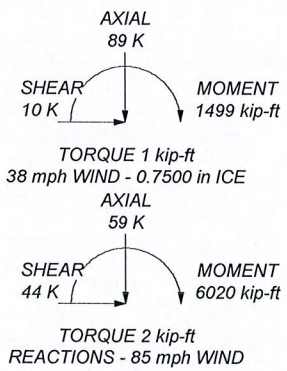
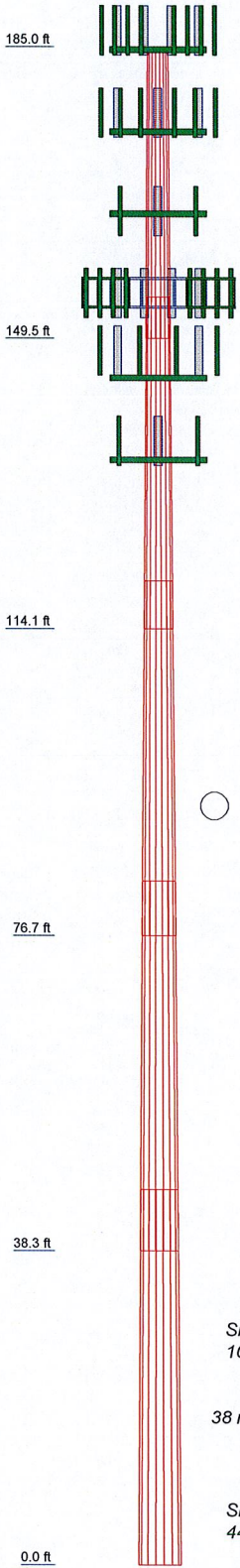
- Tower is located in Fairfield County, Connecticut.
- Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
- Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
- Deflections are based upon a 50 mph wind.
-
- E - Existing, R/MLA - Reserved, P - Proposed
- Proposed loading revision at 165ft elevation
- Reserved loading included at 145ft elevation
- TOWER RATING: 95.5%



Pier Structural Engineering Corp.
198-55 Northfield Drive East
Waterloo, Ontario N2K 3T6
Phone: (519) 885-3806
FAX: (519) 886-0076

Job: **PSEC 6655 (for SPRINT)**
Project: **806354 - BRG 123 943084**
Client: **CROWN CASTLE** Drawn by: **fchan** App'd:
Code: **TIA/EIA-222-F** Date: **05/24/12** Scale: **NTS**
Path: Dwg No. **E-1**

Section	5	4	3	2	1
Length (ft)	45'9"	45'27/32"	43'2-3/4"	40'4-29/32"	35'6"
Number of Sides	18	18	18	18	18
Thickness (in)	0.5000	0.4375	0.3750	0.3125	0.2500
Socket Length (ft)		7'5-7/8"	6'7-13/16"	5'9-23/32"	5'1/8"
Top Dia (in)	53.5669	47.1065	40.6983	34.5478	29.0000
Bot Dia (in)	62.5000	55.9285	48.1570	42.4605	36.0404
Grade			A572-65		
Weight (K)	14.2	10.9	7.8	5.2	3.1




MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. -----
6. E - Existing, R/MLA - Reserved, P - Proposed
7. Proposed loading revision at 165ft elevation
8. Reserved loading included at 145ft elevation
9. TOWER RATING: 95.5%

 Pier Structural Engineering Corp. Consulting Engineers	198-55 Northfield Drive East Waterloo, Ontario N2K 3T6 Phone: (519) 885-3806 FAX: (519) 886-0076	Job: PSEC 6655 (for SPRINT) Project: 806354 - BRG 123 943084	Client: CROWN CASTLE Code: TIA/EIA-222-F Path:	Drawn by: fchan Date: 05/24/12	App'd: Scale: NTS Dwg No. E-1
	<small>H:\PROJECTS\6655 - CGL - 806354 - BRG 123 943084\S22 - Final Loadings\806354-1-CT-20120924.dwg</small>				

tnxTower Pier Structural Engineering Corp. 198-55 Northfield Drive East Waterloo, Ontario N2K 3T6 Phone: (519) 885-3806 FAX: (519) 886-0076	Job PSEC 6655 (for SPRINT)	Page 1 of 14
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	Client CROWN CASTLE	Designed by fchan

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 Fairfield 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.

E - Existing, R/MLA - Reserved, P - Proposed.

Proposed loading revision at 165ft elevation.

Reserved loading included at 145ft elevation.

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

- | | | |
|--|--|---|
| <ul style="list-style-type: none"> Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification √ Use Code Stress Ratios √ Use Code Safety Factors - Guys √ Escalate Ice Always Use Max Kz Use Special Wind Profile √ Include Bolts In Member Capacity Leg Bolts Are At Top Of Section √ Secondary Horizontal Braces Leg √ Use Diamond Inner Bracing (4 Sided) Add IBC .6D+W Combination | <ul style="list-style-type: none"> Distribute Leg Loads As Uniform Assume Legs Pinned √ Assume Rigid Index Plate √ Use Clear Spans For Wind Area √ Use Clear Spans For KL/r Retension Guys To Initial Tension √ Bypass Mast Stability Checks √ Use Azimuth Dish Coefficients √ Project Wind Area of Appurt. √ Autocalc Torque Arm Areas SR Members Have Cut Ends √ Sort Capacity Reports By Component √ Triangulate Diamond Inner Bracing | <ul style="list-style-type: none"> Treat Feedline Bundles As Cylinder Use ASCE 10 X-Brace Ly Rules √ Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression √ All Leg Panels Have Same Allowable Offset Girt At Foundation √ Consider Feedline Torque √ Include Angle Block Shear Check <li style="text-align: center;">Poles Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets |
|--|--|---|

Tapered Pole Section Geometry

Section	Elevation	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	
L1	185'-149'6"	35'6"	5'1/8"	18	29.0000	36.0404	0.2500	1.0000	A572-65 (65 ksi)
L2	149'6"-114'1-3/16"	40'4-29/32"	5'9-23/32"	18	34.5478	42.4605	0.3125	1.2500	A572-65 (65 ksi)
L3	114'1-3/16"-76'8"	43'2-3/4"	6'7-13/16"	18	40.6983	49.1570	0.3750	1.5000	A572-65

inxTower Pier Structural Engineering Corp. 198-55 Northfield Drive East Waterloo, Ontario N2K 3T6 Phone: (519) 885-3806 FAX: (519) 886-0076	Job PSEC 6655 (for SPRINT)	Page 2 of 14
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	Client CROWN CASTLE	Designed by fchan

Section	Elevation	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	
L4	76'8-5/32"-38'3-1/8"	45'27/32"	7'5-7/8"	18	47.1065	55.9285	0.4375	1.7500	(65 ksi) A572-65
L5	38'3-1/8"-0'	45'9"		18	53.5869	62.5000	0.5000	2.0000	(65 ksi) A572-65

Tapered Pole Properties

Section	Tip Dia.	Area	I	r	C	I/C	J	I/Q	w	w/t
	in	in ²	in ⁴	in	in	in ³	in ⁴	in ²	in	
L1	29.4474	22.8131	2382.3081	10.2063	14.7320	161.7098	4767.7509	11.4087	4.6640	18.656
	36.5964	28.3997	4596.0425	12.7056	18.3085	251.0329	9198.1326	14.2025	5.9031	23.612
L2	36.0761	33.9572	5028.2644	12.1535	17.5503	286.5059	10063.1450	16.9818	5.5304	17.697
	43.1155	41.8055	9382.6455	14.9625	21.5699	434.9872	18777.6370	20.9067	6.9230	22.154
L3	42.4800	47.9948	9859.2279	14.3148	20.6747	476.8735	19731.4288	24.0019	6.5029	17.341
	49.9153	58.0628	17456.3904	17.3176	24.9718	699.0454	34935.7504	29.0369	7.9916	21.311
L4	49.1542	64.8058	17832.3445	16.5675	23.9301	745.1843	35688.1533	32.4090	7.5207	17.19
	56.7913	77.0562	29977.1322	19.6993	28.4117	1055.0990	59993.7092	38.5354	9.0734	20.739
L5	55.8958	84.2489	29996.9203	18.8459	27.2221	1101.9306	60033.3114	42.1325	8.5513	17.103
	63.4642	98.3940	47784.7640	22.0100	31.7500	1505.0319	95632.4044	49.2063	10.1200	20.24

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 185'-149'6"				1	1	1		
L2				1	1	1		
149'6"-114'1-3/16"								
L3				1	1	1		
114'1-3/16"-76'8-5/32"								
L4				1	1	1		
76'8-5/32"-38'3-1/8"								
L5 38'3-1/8"-0'				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	C _A A _A	Weight	
				ft		ft ² /ft	plf	
1-5/8" Line (Carrier 185' E)	A	No	Inside Pole	185' - 5'	12	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.00 0.00 0.00 0.00 0.00	0.82 0.82 0.82 0.82 0.82
** 1/2" Line (Carrier 182' E)	A	No	Inside Pole	182' - 5'	1	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.15 0.15 0.15 0.15

inxTower Pier Structural Engineering Corp. 198-55 Northfield Drive East Waterloo, Ontario N2K 3T6 Phone: (519) 885-3806 FAX: (519) 886-0076	Job PSEC 6655 (for SPRINT)	Page 4 of 14
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	Client CROWN CASTLE	Designed by fchan

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _{Front}	C _A A _{Side}	Weight	
			Horz	Lateral Vert						
			ft	ft	°	ft	ft ²	ft ²	K	
BXA-171063-12BF w/ Mount Pipe (Carrier 185' E)	A	From Leg	4.00		0.0000	185'	No Ice	4.97	5.23	0.0
			0'				1/2" Ice	5.52	6.39	0.1
			2'				1" Ice	6.04	7.26	0.1
							2" Ice	7.09	9.05	0.3
							4" Ice	9.36	12.82	0.7
BXA-171063-12BF w/ Mount Pipe (Carrier 185' E)	B	From Leg	4.00		0.0000	185'	No Ice	4.97	5.23	0.0
			0'				1/2" Ice	5.52	6.39	0.1
			2'				1" Ice	6.04	7.26	0.1
							2" Ice	7.09	9.05	0.3
							4" Ice	9.36	12.82	0.7
BXA-171063-12BF w/ Mount Pipe (Carrier 185' E)	C	From Leg	4.00		0.0000	185'	No Ice	4.97	5.23	0.0
			0'				1/2" Ice	5.52	6.39	0.1
			2'				1" Ice	6.04	7.26	0.1
							2" Ice	7.09	9.05	0.3
							4" Ice	9.36	12.82	0.7
BXA-70063-6CF-2 w/ Mount Pipe (Carrier 185' E)	A	From Leg	4.00		0.0000	185'	No Ice	7.97	5.80	0.0
			0'				1/2" Ice	8.61	6.95	0.1
			2'				1" Ice	9.22	7.82	0.2
							2" Ice	10.46	9.60	0.3
							4" Ice	13.07	13.37	0.8
BXA-70063-6CF-2 w/ Mount Pipe (Carrier 185' E)	B	From Leg	4.00		0.0000	185'	No Ice	7.97	5.80	0.0
			0'				1/2" Ice	8.61	6.95	0.1
			2'				1" Ice	9.22	7.82	0.2
							2" Ice	10.46	9.60	0.3
							4" Ice	13.07	13.37	0.8
BXA-70063-6CF-2 w/ Mount Pipe (Carrier 185' E)	C	From Leg	4.00		0.0000	185'	No Ice	7.97	5.80	0.0
			0'				1/2" Ice	8.61	6.95	0.1
			2'				1" Ice	9.22	7.82	0.2
							2" Ice	10.46	9.60	0.3
							4" Ice	13.07	13.37	0.8
(2) DB846F65ZAXY w/ Mount Pipe (Carrier 185' E)	A	From Leg	4.00		0.0000	185'	No Ice	7.27	7.82	0.0
			0'				1/2" Ice	7.88	9.01	0.1
			2'				1" Ice	8.48	9.91	0.2
							2" Ice	9.72	11.81	0.4
							4" Ice	12.33	15.98	0.9
(2) DB846F65ZAXY w/ Mount Pipe (Carrier 185' E)	B	From Leg	4.00		0.0000	185'	No Ice	7.27	7.82	0.0
			0'				1/2" Ice	7.88	9.01	0.1
			2'				1" Ice	8.48	9.91	0.2
							2" Ice	9.72	11.81	0.4
							4" Ice	12.33	15.98	0.9
(2) DB846F65ZAXY w/ Mount Pipe (Carrier 185' E)	C	From Leg	4.00		0.0000	185'	No Ice	7.27	7.82	0.0
			0'				1/2" Ice	7.88	9.01	0.1
			2'				1" Ice	8.48	9.91	0.2
							2" Ice	9.72	11.81	0.4
							4" Ice	12.33	15.98	0.9
(2) FD9R6004/2C-3L (Carrier 185' E)	A	From Leg	4.00		0.0000	185'	No Ice	0.37	0.08	0.0
			0'				1/2" Ice	0.45	0.14	0.0
			2'				1" Ice	0.54	0.20	0.0
							2" Ice	0.75	0.34	0.0
							4" Ice	1.28	0.74	0.1
(2) FD9R6004/2C-3L (Carrier 185' E)	B	From Leg	4.00		0.0000	185'	No Ice	0.37	0.08	0.0
			0'				1/2" Ice	0.45	0.14	0.0
			2'				1" Ice	0.54	0.20	0.0
							2" Ice	0.75	0.34	0.0
							4" Ice	1.28	0.74	0.1

inxTower Pier Structural Engineering Corp. 198-55 Northfield Drive East Waterloo, Ontario N2K 3T6 Phone: (519) 885-3806 FAX: (519) 886-0076	Job	PSEC 6655 (for SPRINT)	Page	5 of 14
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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight	
			Horz	Lateral						Vert
			ft	ft	°	ft	ft ²	ft ²	K	
(2) FD9R6004/2C-3L (Carrier 185' E)	C	From Leg	4.00	0'	0.0000	185'	4" Ice	1.28	0.74	0.1
							No Ice	0.37	0.08	0.0
							1/2" Ice	0.45	0.14	0.0
							1" Ice	0.54	0.20	0.0
							2" Ice	0.75	0.34	0.0
Side Arm Mount [SO 103-3] (Carrier 185' E)	C	None			0.0000	185'	4" Ice	1.28	0.74	0.1
							No Ice	9.50	9.50	0.2
							1/2" Ice	11.80	11.80	0.3
							1" Ice	14.10	14.10	0.4
							2" Ice	18.70	18.70	0.6
Platform Mount [LP 601-1] (Carrier 185' E)	C	None			0.0000	185'	4" Ice	27.90	27.90	1.0
							No Ice	28.47	28.47	1.1
							1/2" Ice	33.59	33.59	1.5
							1" Ice	38.71	38.71	1.9
							2" Ice	48.95	48.95	2.7
** ASP-601 (Carrier 182' E)	A	From Leg	2.00	0'	0.0000	182'	No Ice	2.34	2.34	0.0
				12'			1/2" Ice	4.21	4.21	0.0
							1" Ice	6.08	6.08	0.0
							2" Ice	9.83	9.83	0.1
							4" Ice	17.32	17.32	0.1
10' x 2" Mount Pipe (Carrier 182' E)	A	From Leg	2.00	0'	0.0000	182'	No Ice	2.00	2.00	0.1
							1/2" Ice	3.02	3.02	0.1
							1" Ice	4.07	4.07	0.1
							2" Ice	5.70	5.70	0.2
							4" Ice	8.26	8.26	0.4
Side Arm Mount [SO 102-3] (Carrier 182' E)	A	From Leg	1.00	0'	0.0000	182'	No Ice	3.00	3.00	0.1
							1/2" Ice	3.48	3.48	0.1
							1" Ice	3.96	3.96	0.1
							2" Ice	4.92	4.92	0.2
							4" Ice	6.84	6.84	0.3
** (2) 7770.00 w/ Mount Pipe (Carrier 175' E)	A	From Leg	4.00	0'	0.0000	175'	No Ice	6.12	4.25	0.1
				2'			1/2" Ice	6.63	5.01	0.1
							1" Ice	7.13	5.71	0.2
							2" Ice	8.16	7.16	0.3
							4" Ice	10.36	10.41	0.7
(2) 7770.00 w/ Mount Pipe (Carrier 175' E)	B	From Leg	4.00	0'	0.0000	175'	No Ice	6.12	4.25	0.1
							1/2" Ice	6.63	5.01	0.1
							1" Ice	7.13	5.71	0.2
							2" Ice	8.16	7.16	0.3
							4" Ice	10.36	10.41	0.7
(2) 7770.00 w/ Mount Pipe (Carrier 175' E)	C	From Leg	4.00	0'	0.0000	175'	No Ice	6.12	4.25	0.1
							1/2" Ice	6.63	5.01	0.1
							1" Ice	7.13	5.71	0.2
							2" Ice	8.16	7.16	0.3
							4" Ice	10.36	10.41	0.7
P65-16-XLH-RR w/ Mount Pipe (Carrier 175' E)	A	From Leg	4.00	0'	0.0000	175'	No Ice	8.64	6.36	0.1
							1/2" Ice	9.29	7.54	0.1
							1" Ice	9.91	8.43	0.2
							2" Ice	11.18	10.24	0.4
							4" Ice	13.83	14.10	0.9
P65-16-XLH-RR w/ Mount Pipe (Carrier 175' E)	B	From Leg	4.00	0'	0.0000	175'	No Ice	8.64	6.36	0.1
							1/2" Ice	9.29	7.54	0.1
							1" Ice	9.91	8.43	0.2
							2" Ice	11.18	10.24	0.4
							4" Ice	13.83	14.10	0.9

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	Client	CROWN CASTLE	Designed by	fchan

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A ₁ Front	C _A A ₁ Side	Weight
			Horz	Vert					
							ft ²	ft ²	K
P65-16-XLH-RR w/ Mount Pipe (Carrier 175' E)	C	From Leg	4.00	0.0000	175'	4" Ice	13.83	14.10	0.9
			0'			No Ice	8.64	6.36	0.1
			2'			1/2" Ice	9.29	7.54	0.1
						1" Ice	9.91	8.43	0.2
						2" Ice	11.18	10.24	0.4
(2) LGP2140X (Carrier 175' E)	A	From Leg	4.00	0.0000	175'	4" Ice	13.83	14.10	0.9
			0'			No Ice	1.26	0.38	0.0
			2'			1/2" Ice	1.42	0.49	0.0
						1" Ice	1.58	0.62	0.0
						2" Ice	1.94	0.89	0.1
(2) LGP2140X (Carrier 175' E)	B	From Leg	4.00	0.0000	175'	4" Ice	2.75	1.54	0.1
			0'			No Ice	1.26	0.38	0.0
			2'			1/2" Ice	1.42	0.49	0.0
						1" Ice	1.58	0.62	0.0
						2" Ice	1.94	0.89	0.1
(2) LGP2140X (Carrier 175' E)	C	From Leg	4.00	0.0000	175'	4" Ice	2.75	1.54	0.1
			0'			No Ice	1.26	0.38	0.0
			2'			1/2" Ice	1.42	0.49	0.0
						1" Ice	1.58	0.62	0.0
						2" Ice	1.94	0.89	0.1
(2) RRUS-11 (Carrier 175' E)	A	From Leg	4.00	0.0000	175'	4" Ice	2.75	1.54	0.1
			0'			No Ice	4.42	1.19	0.1
			2'			1/2" Ice	4.71	1.35	0.1
						1" Ice	5.00	1.53	0.1
						2" Ice	5.61	1.90	0.2
(2) RRUS-11 (Carrier 175' E)	B	From Leg	4.00	0.0000	175'	4" Ice	6.94	2.75	0.4
			0'			No Ice	4.42	1.19	0.1
			2'			1/2" Ice	4.71	1.35	0.1
						1" Ice	5.00	1.53	0.1
						2" Ice	5.61	1.90	0.2
(2) RRUS-11 (Carrier 175' E)	C	From Leg	4.00	0.0000	175'	4" Ice	6.94	2.75	0.4
			0'			No Ice	4.42	1.19	0.1
			2'			1/2" Ice	4.71	1.35	0.1
						1" Ice	5.00	1.53	0.1
						2" Ice	5.61	1.90	0.2
TT19-08BP111-001 (Carrier 175' E)	A	From Leg	4.00	0.0000	175'	4" Ice	6.94	2.75	0.4
			0'			No Ice	0.64	0.52	0.0
			2'			1/2" Ice	0.75	0.62	0.0
						1" Ice	0.87	0.73	0.0
						2" Ice	1.13	0.98	0.0
TT19-08BP111-001 (Carrier 175' E)	B	From Leg	4.00	0.0000	175'	4" Ice	1.77	1.58	0.1
			0'			No Ice	0.64	0.52	0.0
			2'			1/2" Ice	0.75	0.62	0.0
						1" Ice	0.87	0.73	0.0
						2" Ice	1.13	0.98	0.0
TT19-08BP111-001 (Carrier 175' E)	C	From Leg	4.00	0.0000	175'	4" Ice	1.77	1.58	0.1
			0'			No Ice	0.64	0.52	0.0
			2'			1/2" Ice	0.75	0.62	0.0
						1" Ice	0.87	0.73	0.0
						2" Ice	1.13	0.98	0.0
DC6-48-60-18-8F (Carrier 175' E)	C	From Leg	4.00	0.0000	175'	4" Ice	1.77	1.58	0.1
			0'			No Ice	2.22	2.22	0.0
			2'			1/2" Ice	2.44	2.44	0.0
						1" Ice	2.66	2.66	0.1
						2" Ice	3.15	3.15	0.1
Platform Mount [LP 601-1]	C	None		0.0000	175'	4" Ice	4.21	4.21	0.3
						No Ice	28.47	28.47	1.1

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	Client		CROWN CASTLE		Designed by	fchan

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A ₁ Front ft ²	C _A A ₁ Side ft ²	Weight K
(Carrier 175' E)						1/2" Ice 33.59	33.59	1.5
						1" Ice 38.71	38.71	1.9
						2" Ice 48.95	48.95	2.7
						4" Ice 69.43	69.43	4.3
**								
Platform Mount [LP 601-1] (Carrier 165' E)	C	None		0.0000	165'	No Ice 28.47	28.47	1.1
						1/2" Ice 33.59	33.59	1.5
						1" Ice 38.71	38.71	1.9
						2" Ice 48.95	48.95	2.7
						4" Ice 69.43	69.43	4.3
**								
APXVSP18-C-A20 w/ Mount Pipe (Carrier 165' P)	A	From Leg	4.00 0' 0'	0.0000	165'	No Ice 8.50	6.95	0.1
						1/2" Ice 9.15	8.13	0.1
						1" Ice 9.77	9.02	0.2
						2" Ice 11.03	10.84	0.4
						4" Ice 13.68	14.85	0.9
APXVSP18-C-A20 w/ Mount Pipe (Carrier 165' P)	B	From Leg	4.00 0' 0'	0.0000	165'	No Ice 8.50	6.95	0.1
						1/2" Ice 9.15	8.13	0.1
						1" Ice 9.77	9.02	0.2
						2" Ice 11.03	10.84	0.4
						4" Ice 13.68	14.85	0.9
APXVSP18-C-A20 w/ Mount Pipe (Carrier 165' P)	C	From Leg	4.00 0' 0'	0.0000	165'	No Ice 8.50	6.95	0.1
						1/2" Ice 9.15	8.13	0.1
						1" Ice 9.77	9.02	0.2
						2" Ice 11.03	10.84	0.4
						4" Ice 13.68	14.85	0.9
800 EXTERNAL NOTCH FILTER (Carrier 165' P)	A	From Leg	4.00 0' 0'	0.0000	165'	No Ice 0.77	0.37	0.0
						1/2" Ice 0.89	0.46	0.0
						1" Ice 1.02	0.56	0.0
						2" Ice 1.30	0.79	0.0
						4" Ice 1.97	1.34	0.1
800 EXTERNAL NOTCH FILTER (Carrier 165' P)	B	From Leg	4.00 0' 0'	0.0000	165'	No Ice 0.77	0.37	0.0
						1/2" Ice 0.89	0.46	0.0
						1" Ice 1.02	0.56	0.0
						2" Ice 1.30	0.79	0.0
						4" Ice 1.97	1.34	0.1
800 EXTERNAL NOTCH FILTER (Carrier 165' P)	C	From Leg	4.00 0' 0'	0.0000	165'	No Ice 0.77	0.37	0.0
						1/2" Ice 0.89	0.46	0.0
						1" Ice 1.02	0.56	0.0
						2" Ice 1.30	0.79	0.0
						4" Ice 1.97	1.34	0.1
1900MHz RRH (65MHz) (Carrier 165' P)	A	From Leg	4.00 0' 0'	0.0000	165'	No Ice 2.70	2.77	0.1
						1/2" Ice 2.94	3.01	0.1
						1" Ice 3.18	3.26	0.1
						2" Ice 3.70	3.78	0.2
						4" Ice 4.85	4.93	0.4
1900MHz RRH (65MHz) (Carrier 165' P)	B	From Leg	4.00 0' 0'	0.0000	165'	No Ice 2.70	2.77	0.1
						1/2" Ice 2.94	3.01	0.1
						1" Ice 3.18	3.26	0.1
						2" Ice 3.70	3.78	0.2
						4" Ice 4.85	4.93	0.4
1900MHz RRH (65MHz) (Carrier 165' P)	C	From Leg	4.00 0' 0'	0.0000	165'	No Ice 2.70	2.77	0.1
						1/2" Ice 2.94	3.01	0.1
						1" Ice 3.18	3.26	0.1
						2" Ice 3.70	3.78	0.2
						4" Ice 4.85	4.93	0.4
800MHZ RRH	A	From Leg	4.00	0.0000	165'	No Ice 2.49	2.07	0.1

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight
			Horz	Lateral					
(Carrier 165' P)									
			0'			1/2" Ice	2.71	2.27	0.1
			0'			1" Ice	2.93	2.48	0.1
						2" Ice	3.41	2.93	0.2
800MHZ RRH (Carrier 165' P)	B	From Leg	4.00		0.0000	165'	4" Ice	4.46	3.93
			0'				No Ice	2.49	2.07
			0'				1/2" Ice	2.71	2.27
							1" Ice	2.93	2.48
							2" Ice	3.41	2.93
800MHZ RRH (Carrier 165' P)	C	From Leg	4.00		0.0000	165'	4" Ice	4.46	3.93
			0'				No Ice	2.49	2.07
			0'				1/2" Ice	2.71	2.27
							1" Ice	2.93	2.48
							2" Ice	3.41	2.93
(3) ACU-A20-N (Carrier 165' P)	A	From Leg	4.00		0.0000	165'	4" Ice	4.46	3.93
			0'				No Ice	0.08	0.14
			0'				1/2" Ice	0.12	0.19
							1" Ice	0.17	0.25
							2" Ice	0.30	0.40
(3) ACU-A20-N (Carrier 165' P)	B	From Leg	4.00		0.0000	165'	4" Ice	0.67	0.80
			0'				No Ice	0.08	0.14
			0'				1/2" Ice	0.12	0.19
							1" Ice	0.17	0.25
							2" Ice	0.30	0.40
(3) ACU-A20-N (Carrier 165' P)	C	From Leg	4.00		0.0000	165'	4" Ice	0.67	0.80
			0'				No Ice	0.08	0.14
			0'				1/2" Ice	0.12	0.19
							1" Ice	0.17	0.25
							2" Ice	0.30	0.40
**							4" Ice	0.67	0.80
(4) DB844H90 w/ Mount Pipe (Carrier 155' E)	A	From Leg	4.00		0.0000	155'	No Ice	3.30	4.92
			0'				1/2" Ice	3.69	5.60
			3'				1" Ice	4.12	6.28
							2" Ice	5.01	7.71
(4) DB844H90 w/ Mount Pipe (Carrier 155' E)	B	From Leg	4.00		0.0000	155'	4" Ice	6.92	10.83
			0'				No Ice	3.30	4.92
			3'				1/2" Ice	3.69	5.60
							1" Ice	4.12	6.28
							2" Ice	5.01	7.71
(4) DB844H90 w/ Mount Pipe (Carrier 155' E)	C	From Leg	4.00		0.0000	155'	4" Ice	6.92	10.83
			0'				No Ice	3.30	4.92
			3'				1/2" Ice	3.69	5.60
							1" Ice	4.12	6.28
							2" Ice	5.01	7.71
Platform Mount [LP 602-1] (Carrier 155' E)	C	None			0.0000	155'	4" Ice	6.92	10.83
							No Ice	32.03	32.03
							1/2" Ice	38.71	38.71
							1" Ice	45.39	45.39
							2" Ice	58.75	58.75
							4" Ice	85.47	85.47
**									
APX16DWV-16DWV-S-E-A 20 w/ Mount Pipe (Carrier 145' R)	A	From Leg	4.00		0.0000	145'	No Ice	7.47	3.50
			0'				1/2" Ice	8.00	4.27
			3'				1" Ice	8.52	4.96
							2" Ice	9.60	6.41
APX16DWV-16DWV-S-E-A	B	From Leg	4.00		0.0000	145'	4" Ice	11.88	9.50
							No Ice	7.47	3.50

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A ₁ Front ft ²	C _A A ₁ Side ft ²	Weight K
20 w/ Mount Pipe (Carrier 145' R)			0' 3'			1/2" Ice 8.00 1" Ice 8.52 2" Ice 9.60 4" Ice 11.88	4.27 4.96 6.41 9.50	0.1 0.2 0.3 0.7
APX16DWV-16DWV-S-E-A 20 w/ Mount Pipe (Carrier 145' R)	C	From Leg	4.00 0' 3'	0.0000	145'	No Ice 7.47 1/2" Ice 8.00 1" Ice 8.52 2" Ice 9.60 4" Ice 11.88	3.50 4.27 4.96 6.41 9.50	0.1 0.1 0.2 0.3 0.7
ATMPP1412D-1CWA (Carrier 145' R)	A	From Leg	4.00 0' 3'	0.0000	145'	No Ice 1.17 1/2" Ice 1.32 1" Ice 1.48 2" Ice 1.82 4" Ice 2.61	0.42 0.53 0.65 0.92 1.57	0.0 0.0 0.0 0.1 0.1
ATMPP1412D-1CWA (Carrier 145' R)	B	From Leg	4.00 0' 3'	0.0000	145'	No Ice 1.17 1/2" Ice 1.32 1" Ice 1.48 2" Ice 1.82 4" Ice 2.61	0.42 0.53 0.65 0.92 1.57	0.0 0.0 0.0 0.1 0.1
ATMPP1412D-1CWA (Carrier 145' R)	C	From Leg	4.00 0' 3'	0.0000	145'	No Ice 1.17 1/2" Ice 1.32 1" Ice 1.48 2" Ice 1.82 4" Ice 2.61	0.42 0.53 0.65 0.92 1.57	0.0 0.0 0.0 0.1 0.1
ATMAA1412D-1A20 (Carrier 145' R)	A	From Leg	4.00 0' 3'	0.0000	145'	No Ice 1.17 1/2" Ice 1.31 1" Ice 1.47 2" Ice 1.81 4" Ice 2.58	0.47 0.57 0.69 0.95 1.57	0.0 0.0 0.0 0.1 0.1
ATMAA1412D-1A20 (Carrier 145' R)	B	From Leg	4.00 0' 3'	0.0000	145'	No Ice 1.17 1/2" Ice 1.31 1" Ice 1.47 2" Ice 1.81 4" Ice 2.58	0.47 0.57 0.69 0.95 1.57	0.0 0.0 0.0 0.1 0.1
ATMAA1412D-1A20 (Carrier 145' R)	C	From Leg	4.00 0' 3'	0.0000	145'	No Ice 1.17 1/2" Ice 1.31 1" Ice 1.47 2" Ice 1.81 4" Ice 2.58	0.47 0.57 0.69 0.95 1.57	0.0 0.0 0.0 0.1 0.1
RR90-17-02DP w/ Mount Pipe (Carrier 145' E)	A	From Leg	4.00 0' 3'	0.0000	145'	No Ice 4.59 1/2" Ice 5.09 1" Ice 5.58 2" Ice 6.59 4" Ice 8.73	3.32 4.09 4.78 6.23 9.31	0.0 0.1 0.1 0.2 0.6
RR90-17-02DP w/ Mount Pipe (Carrier 145' E)	B	From Leg	4.00 0' 3'	0.0000	145'	No Ice 4.59 1/2" Ice 5.09 1" Ice 5.58 2" Ice 6.59 4" Ice 8.73	3.32 4.09 4.78 6.23 9.31	0.0 0.1 0.1 0.2 0.6
RR90-17-02DP w/ Mount Pipe (Carrier 145' E)	C	From Leg	4.00 0' 3'	0.0000	145'	No Ice 4.59 1/2" Ice 5.09 1" Ice 5.58 2" Ice 6.59 4" Ice 8.73	3.32 4.09 4.78 6.23 9.31	0.0 0.1 0.1 0.2 0.6
Platform Mount [LP 601-1] (Carrier 145' E)	C	None		0.0000	145'	No Ice 28.47 1/2" Ice 33.59 1" Ice 38.71	28.47 33.59 38.71	1.1 1.5 1.9

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A ₁ Front ft ²	C _A A ₁ Side ft ²	Weight K	
						2" Ice	48.95	48.95	2.7
						4" Ice	69.43	69.43	4.3
**									
800 10504 w/ Mount Pipe (Carrier 135' E)	A	From Leg	4.00 0' 2'	0.0000	135'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.59 4.01 4.42 5.34 7.38	3.18 3.91 4.58 5.98 8.98	0.0 0.1 0.1 0.2 0.5
800 10504 w/ Mount Pipe (Carrier 135' E)	B	From Leg	4.00 0' 2'	0.0000	135'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.59 4.01 4.42 5.34 7.38	3.18 3.91 4.58 5.98 8.98	0.0 0.1 0.1 0.2 0.5
800 10504 w/ Mount Pipe (Carrier 135' E)	C	From Leg	4.00 0' 2'	0.0000	135'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.59 4.01 4.42 5.34 7.38	3.18 3.91 4.58 5.98 8.98	0.0 0.1 0.1 0.2 0.5
860 10025 (Carrier 135' E)	A	From Leg	4.00 0' 2'	0.0000	135'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.18 0.25 0.33 0.51 0.98	0.15 0.21 0.29 0.47 0.93	0.0 0.0 0.0 0.0 0.1
860 10025 (Carrier 135' E)	B	From Leg	4.00 0' 2'	0.0000	135'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.18 0.25 0.33 0.51 0.98	0.15 0.21 0.29 0.47 0.93	0.0 0.0 0.0 0.0 0.1
860 10025 (Carrier 135' E)	C	From Leg	4.00 0' 2'	0.0000	135'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.18 0.25 0.33 0.51 0.98	0.15 0.21 0.29 0.47 0.93	0.0 0.0 0.0 0.0 0.1
(2) 5' x 2" Pipe Mount (Carrier 135' E)	A	From Leg	4.00 0' 0'	0.0000	135'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.00 1.39 1.70 2.35 3.78	1.00 1.39 1.70 2.35 3.78	0.0 0.0 0.0 0.1 0.2
(2) 5' x 2" Pipe Mount (Carrier 135' E)	B	From Leg	4.00 0' 0'	0.0000	135'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.00 1.39 1.70 2.35 3.78	1.00 1.39 1.70 2.35 3.78	0.0 0.0 0.0 0.1 0.2
(2) 5' x 2" Pipe Mount (Carrier 135' E)	C	From Leg	4.00 0' 0'	0.0000	135'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.00 1.39 1.70 2.35 3.78	1.00 1.39 1.70 2.35 3.78	0.0 0.0 0.0 0.1 0.2
T-Arm Mount [TA 602-3] (Carrier 135' E)	C	None		0.0000	135'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.59 15.44 19.29 26.99 42.39	11.59 15.44 19.29 26.99 42.39	0.8 1.0 1.2 1.6 2.5
**									
GPS_A (Carrier 102' E)	A	From Leg	2.00 0' 0'	0.0000	102'	No Ice 1/2" Ice 1" Ice	0.30 0.37 0.44	0.30 0.37 0.44	0.0 0.0 0.0

inxTower Pier Structural Engineering Corp. 198-55 Northfield Drive East Waterloo, Ontario N2K 3T6 Phone: (519) 885-3806 FAX: (519) 886-0076	Job PSEC 6655 (for SPRINT)	Page 11 of 14
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	Client CROWN CASTLE	Designed by fchan

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{A,A} Front ft ²	C _{A,A} Side ft ²	Weight K					
Side Arm Mount [SO 701-1] (Carrier 102' E)	A	From Leg	1.00 0' 0'	0.0000	102'	2" Ice	0.58	0.58	0.0				
						4" Ice	0.86	0.86	0.1				
						No Ice	0.85	1.67	0.1				
						1/2" Ice	1.14	2.34	0.1				
						1" Ice	1.43	3.01	0.1				
						2" Ice	2.01	4.35	0.1				
**													
GPS_A (Carrier 100' E)	A	From Leg	2.00 0' 0'	0.0000	100'	No Ice	0.30	0.30	0.0				
						1/2" Ice	0.37	0.37	0.0				
						1" Ice	0.44	0.44	0.0				
						2" Ice	0.58	0.58	0.0				
						4" Ice	0.86	0.86	0.1				
						No Ice	0.85	1.67	0.1				
Side Arm Mount [SO 701-1] (Carrier 100' E)	A	From Leg	1.00 0' 0'	0.0000	100'	1/2" Ice	1.14	2.34	0.1				
						1" Ice	1.43	3.01	0.1				
						2" Ice	2.01	4.35	0.1				
						4" Ice	3.17	7.03	0.2				
						**							
						GPS_A (Carrier 40' E)	A	From Leg	2.00 0' 0'	0.0000	40'	No Ice	0.30
1/2" Ice	0.37	0.37	0.0										
1" Ice	0.44	0.44	0.0										
2" Ice	0.58	0.58	0.0										
4" Ice	0.86	0.86	0.1										
No Ice	0.85	1.67	0.1										
Side Arm Mount [SO 701-1] (Carrier 40' E)	A	From Leg	1.00 0' 0'	0.0000	40'	1/2" Ice	1.14	2.34	0.1				
						1" Ice	1.43	3.01	0.1				
						2" Ice	2.01	4.35	0.1				
						4" Ice	3.17	7.03	0.2				

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	185 - 149.497	Pole	Max Tension	14	0.0	-0.0	0.0
			Max. Compression	14	-20.7	1.8	-0.2
			Max. Mx	11	-8.6	433.6	0.3
			Max. My	2	-8.6	0.4	433.5
			Max. Vy	11	-23.3	433.6	0.3
			Max. Vx	2	-23.3	0.4	433.5
			Max. Torque	11			-1.1
L2	149.497 - 114.096	Pole	Max Tension	1	0.0	0.0	0.0
			Max. Compression	14	-35.3	4.8	-0.7
			Max. Mx	11	-17.3	1414.0	0.2
			Max. My	2	-17.3	0.9	1413.2
			Max. Vy	11	-31.8	1414.0	0.2
			Max. Vx	2	-31.8	0.9	1413.2
			Max. Torque	4			0.9
L3	114.096 -	Pole	Max Tension	1	0.0	0.0	0.0

tnxTower Pier Structural Engineering Corp. 198-55 Northfield Drive East Waterloo, Ontario N2K 3T6 Phone: (519) 885-3806 FAX: (519) 886-0076	Job	PSEC 6655 (for SPRINT)	Page	12 of 14
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	Client	CROWN CASTLE	Designed by	fchan

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
	76.6771		Max. Compression	14	-48.9	8.5	-0.6
			Max. Mx	11	-27.0	2658.8	0.5
			Max. My	2	-27.0	1.7	2656.3
			Max. Vy	11	-36.1	2658.8	0.5
			Max. Vx	2	-36.1	1.7	2656.3
			Max. Torque	4			1.4
L4	76.6771 - 38.2552	Pole	Max Tension	1	0.0	0.0	0.0
			Max. Compression	14	-65.6	12.6	-1.0
			Max. Mx	11	-39.9	4094.1	0.4
			Max. My	2	-39.9	2.5	4088.0
			Max. Vy	11	-40.0	4094.1	0.4
			Max. Vx	2	-40.0	2.5	4088.0
			Max. Torque	4			1.4
L5	38.2552 - 0	Pole	Max Tension	1	0.0	0.0	0.0
			Max. Compression	14	-89.0	17.0	-1.1
			Max. Mx	11	-59.1	6019.7	0.6
			Max. My	2	-59.1	3.5	6008.3
			Max. Vy	11	-43.9	6019.7	0.6
			Max. Vx	2	-43.8	3.5	6008.3
			Max. Torque	4			1.6

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	89.0	-0.0	0.0
	Max. H _x	11	59.1	43.9	0.0
	Max. H _z	2	59.1	0.0	43.8
	Max. M _x	2	6008.3	0.0	43.8
	Max. M _z	5	6012.6	-43.9	0.0
	Max. Torsion	4	1.6	-38.0	21.9
	Min. Vert	11	59.1	43.9	0.0
	Min. H _x	5	59.1	-43.9	0.0
	Min. H _z	8	59.1	0.0	-43.8
	Min. M _x	8	-6007.2	0.0	-43.8
	Min. M _z	11	-6019.7	43.9	0.0
	Min. Torsion	10	-1.6	38.0	-21.9

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	185 - 149.497	46.217	36	2.1601	0.0024
L2	154.503 - 114.096	32.747	36	2.0078	0.0014
L3	119.904 - 76.6771	19.508	36	1.5842	0.0009
L4	83.3229 - 38.2552	9.223	36	1.0551	0.0005
L5	45.7474 - 0	2.773	36	0.5464	0.0002

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Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
185'	BXA-171063-12BF w/ Mount Pipe	36	46.217	2.1601	0.0024	38596
182'	ASP-601	36	44.864	2.1501	0.0023	38596
175'	(2) 7770.00 w/ Mount Pipe	36	41.714	2.1250	0.0021	19297
165'	Platform Mount [LP 601-1]	36	37.274	2.0792	0.0017	9648
155'	(4) DB844H90 w/ Mount Pipe	36	32.958	2.0119	0.0015	6490
145'	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	36	28.824	1.9151	0.0012	5397
135'	800 10504 w/ Mount Pipe	36	24.914	1.7939	0.0011	4674
102'	GPS_A	36	13.980	1.3246	0.0007	4061
100'	GPS_A	36	13.422	1.2955	0.0007	4082
40'	GPS_A	36	2.183	0.4741	0.0002	4082

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 P/P _a
L1	185 - 149.497 (1)	TP36.0404x29x0.25	35'6"	0'	0.0	39.00	27.6121	-8.6	1076.9	0.008
L2	149.497 - 114.096 (2)	TP42.4605x34.5478x0.3125	40'4-29/3 2"	0'	0.0	39.00	40.6776	-17.3	1586.4	0.011
L3	114.096 - 76.6771 (3)	TP49.157x40.6983x0.375	43'2-3/4"	0'	0.0	39.00	56.5149	-27.0	2204.1	0.012
L4	76.6771 - 38.2552 (4)	TP55.9285x47.1065x0.4375	45'27/32"	0'	0.0	39.00	75.0196	-39.9	2925.8	0.014
L5	38.2552 - 0 (5)	TP62.5x53.5869x0.5	45'9"	0'	0.0	39.00	98.3940	-59.1	3837.4	0.015

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M _x kip-ft	Actual f _{bx} ksi	Allow. F _{bx} ksi	Ratio f _{bx} /F _{bx}	Actual M _y kip-ft	Actual f _{by} ksi	Allow. F _{by} ksi	Ratio f _{by} /F _{by}
L1	185 - 149.497 (1)	TP36.0404x29x0.25	433.7	-21.94	39.00	0.563	0.0	0.00	39.00	0.000
L2	149.497 - 114.096 (2)	TP42.4605x34.5478x0.3125	1414.1	-41.21	39.00	1.057	0.0	0.00	39.00	0.000
L3	114.096 - 76.6771 (3)	TP49.157x40.6983x0.375	2658.9	-48.19	39.00	1.236	0.0	0.00	39.00	0.000
L4	76.6771 - 38.2552 (4)	TP55.9285x47.1065x0.4375	4094.1	-49.14	39.00	1.260	0.0	0.00	39.00	0.000
L5	38.2552 - 0 (5)	TP62.5x53.5869x0.5	6019.7	-48.00	39.00	1.231	0.0	0.00	39.00	0.000

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	Client CROWN CASTLE	Designed by fchan

Pole Interaction Design Data

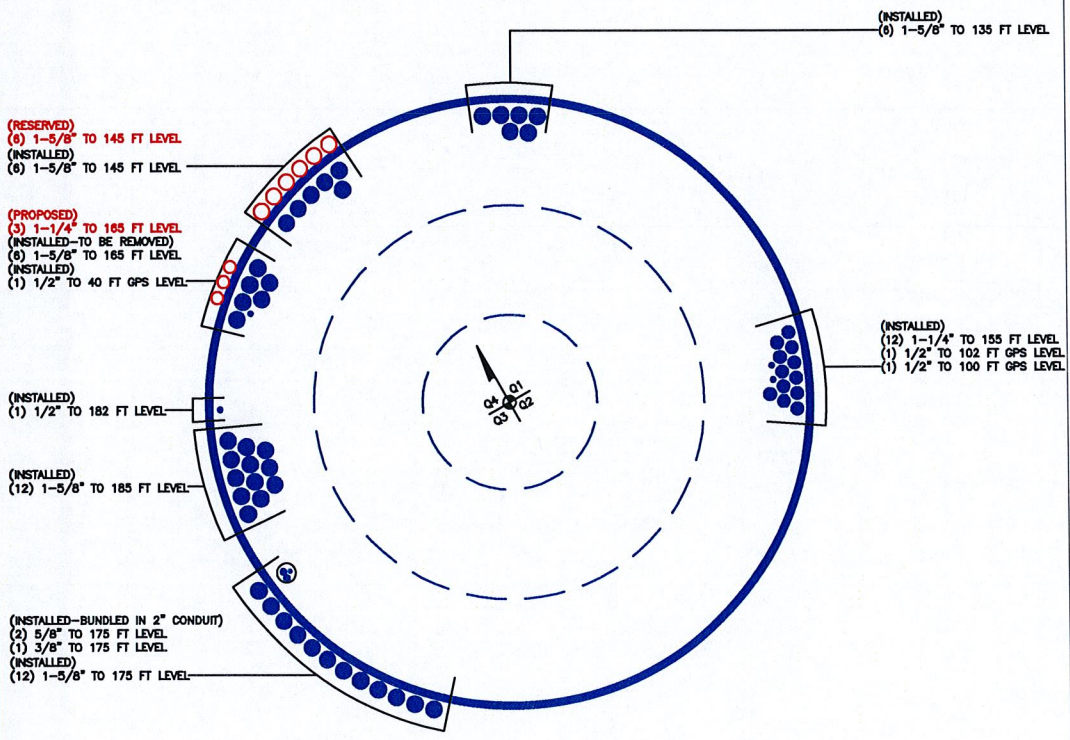
Section No.	Elevation ft	Size	Ratio	Ratio	Ratio	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
			P_a	f_{bx}	f_{by}			
L1	185 - 149.497 (1)	TP36.0404x29x0.25	0.008	0.563	0.000	0.571	1.333	H1-3 ✓
L2	149.497 - 114.096 (2)	TP42.4605x34.5478x0.3125	0.011	1.057	0.000	1.068	1.333	H1-3 ✓
L3	114.096 - 76.6771 (3)	TP49.157x40.6983x0.375	0.012	1.236	0.000	1.248	1.333	H1-3 ✓
L4	76.6771 - 38.2552 (4)	TP55.9285x47.1065x0.4375	0.014	1.260	0.000	1.274	1.333	H1-3 ✓
L5	38.2552 - 0 (5)	TP62.5x53.5869x0.5	0.015	1.231	0.000	1.246	1.333	H1-3 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail	
L1	185 - 149.497	Pole	TP36.0404x29x0.25	1	-8.6	1435.5	42.8	Pass	
L2	149.497 - 114.096	Pole	TP42.4605x34.5478x0.3125	2	-17.3	2114.7	80.1	Pass	
L3	114.096 - 76.6771	Pole	TP49.157x40.6983x0.375	3	-27.0	2938.0	93.6	Pass	
L4	76.6771 - 38.2552	Pole	TP55.9285x47.1065x0.4375	4	-39.9	3900.1	95.5	Pass	
L5	38.2552 - 0	Pole	TP62.5x53.5869x0.5	5	-59.1	5115.2	93.5	Pass	
							Summary		
							Pole (L4)	95.5	Pass
							RATING =	95.5	Pass

APPENDIX B
BASE LEVEL DRAWING

TX LINE LAYOUT



BUSINESS UNIT: 806354 TOWER ID: C_BASELEVEL

Clients



Professional Stamp

Revisions

No.	Description	Date
A	ISSUED FOR REVIEW	05.24.12

THE INFORMATION CONTAINED IN THIS SET OF DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO THE CLIENT NAMED IS STRICTLY PROHIBITED

Engineering Firm
P-SEC
 PIER STRUCTURAL ENGINEERING CORP
 55 NORTHFIELD DR. E, SUITE 198
 WATERLOO, ON N2K 3T6
 ph: 519-885-3806
 fx: 519-886-0076
 www.p-sec.ca

PS&E Job No.
 6655

Site Name
 806354
 BRG 123 943084

Site Design

Sheet Title
 TX LINES

Drawn by	FC	Sheet	A-1
Checked by			
Approved By			

APPENDIX C
ADDITIONAL CALCULATIONS

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

TIA Rev F

Site Data

BU#:	806354
Site Name:	806354
App #:	143917 rev.4
Pole Manufacturer:	Other

Reactions		
Moment:	6020	ft-kips
Axial:	59	kips
Shear:	44	kips

Anchor Rod Data

Qty:	24	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	73	in

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

Anchor Rod Results

Maximum Rod Tension: 162.5 Kips
 Allowable Tension: 195.0 Kips
 Anchor Rod Stress Ratio: 83.3% **Pass**

Stiffened
Service, ASD
Fty*ASIF

Plate Data

Diam:	79	in
Thick:	2.5	in
Grade:	60	ksi
Single-Rod B-eff:	8.27	in

Base Plate Results

Base Plate Stress: 30.3 ksi
 Allowable Plate Stress: 60.0 ksi
 Base Plate Stress Ratio: 50.4% **Pass**

Flexural Check

Stiffened
Service, ASD
0.75*Fy*ASIF
Y.L. Length:
N/A, Roark

Stiffener Data (Welding at both sides)

Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.5	in
Fillet V. Weld:	0.375	in
Width:	7	in
Height:	15	in
Thick:	0.75	in
Notch:	0.5	in
Grade:	50	ksi
Weld str.:	70	ksi

Stiffener Results

Horizontal Weld : 86.6% **Pass**
 Vertical Weld: 59.9% **Pass**
 Plate Flex+Shear, fb/Fb+(fv/Fv)^2: 30.4% **Pass**
 Plate Tension+Shear, ft/Ft+(fv/Fv)^2: 62.6% **Pass**
 Plate Comp. (AISC Bracket): 80.9% **Pass**

Pole Results

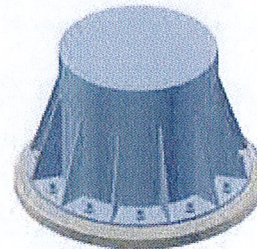
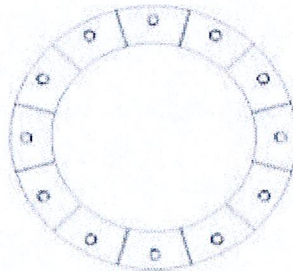
Pole Punching Shear Check: 15.1% **Pass**

Pole Data

Diam:	62.5	in
Thick:	0.5	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



PROJECT No: 6655
 PROJECT NAME: 806354 - BRG 123 943084
CROWN CASTLE
 DATE: 5/24/2012 16:42

ENG: FC
 CHK: MLP
 PAGE: of

EIA-222-F

SINGLE GLOBAL FOUNDATION WITH PIER(S) CHECKS

Global Tower Reactions		Allowable Loads	Calculated Reactions	Allowable Resistance			
<input type="radio"/> TIA-G	Maximum Moment	6,020.00 k-ft	Disturbing Moment	6,328.0	6,960.4 k-ft	pass	90.9% [GOVERNS]
<input checked="" type="radio"/> EIA-F	Axial Load	59.00 kips	Maximum Bearing	3.22	6.00 kips	pass	53.7%
	Shear Load	44.00 kips	Punching Shear	860.7	3,108.6 kips	pass	27.7%
SF=2.20							

Soil Parameters	Soils Report	Pier Geometry	Pad Geometry
ϕ	30.0 °	Qty of Piers	Width (Bm) 28.00 ft
Water Level	20.00 ft (6.10 m)	Width (Bp) 8.00 ft	Width (Wm) 28.00 ft
Soil Dry Density (γ_{dry})	0.120 kcf (18.8 kN/m ³)	Width (Wp) 8.00 ft	Height (Hm) 3.00 ft
Soil Sub Density (γ_{sub})	0.057 kcf (8.95 kN/m ³)	Height (Hp) 4.00 ft	Depth (D) 6.00 ft
All. Bearing Pressure	6.000 ksf (287.3 kPa)	Pier Type	<input type="checkbox"/> Check if Mat is a Square Bell (This is for small foundations)
Bearing Safety Factor	2	Conc Dry D	0.150 kcf (23.6)

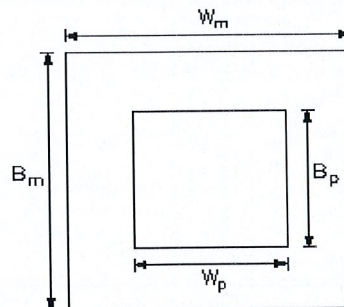
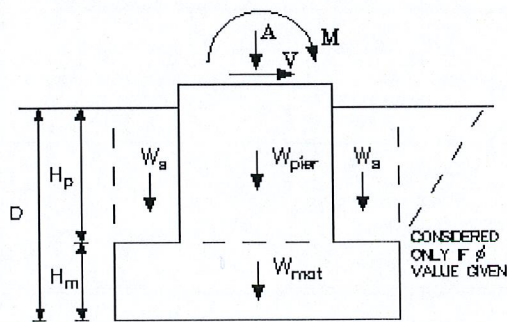
Volume of Concrete/Soil	Concrete (96.6cuyd)			
	1 Pier	Mat	Soil	
Depth (above)	1.00	--	--	ft
Depth (dry)	3.00	3.00	3.00	ft
Depth (submerged)	0.00	0.00	0.00	ft
Volume (above)	64.00	--	--	ft ³
Volume (dry)	192.00	2,352.00	2462.98	ft ³
Volume (submerged)	0.00	0	0.00	ft ³
Total	256	2352	2463	ft ³

Calculations	Factored	Allowable
Axial Download	--	59.0 kips
Weight of Concrete (not factored)	--	391.2 kips(96.6yds)
Weight of Soil (not factored)	--	295.6
Total Download (P)	--	745.8 kips
Resisting Moment Arm	--	14.0 ft
Moment Resistance	--	6960.4 k-ft (divide by 1.5 - cl. 7.2.4.5)

Concrete Reinforcing Design		
f _c	4.000 ksi	(27.6 MPa)
f _y	60.00 ksi	(413.7 MPa)

Bearing Capacity Check		
Contact Area	--	784.00 ft ²
Calculate eccentricity e	--	8.49 ft >L/6]
Calculate (c = L/2 - e)	--	5.51 ft
1) q _{max} = P/A * (1+6e/L)	--	--
2) q _{max} = 2P / b*3c	--	3.22 ksf [GOV]
q _{allowable}	--	6.00 ksf (not factored)

Check for 2-Way Shear (Punching)		
Shear Area (b _o x d)	--	113.78 ft ²
Factored Bearing Stress	--	1.28 ksf
Factored Shear Force	--	860.67 kips
Factored Shear Resistance	--	3108.6 kips
Check for 2-way Shear	--	0.28 (ACI-318)



M = 6020.0 k-ft
 A = 59.0 kips
 V = 44.0 kips

B_p = 8.00 ft
 W_p = 8.00 ft
 H_p = 4.00 ft

B_m = 28.00 ft
 W_m = 28.00 ft
 H_m = 3.00 ft
 D = 6.00 ft

V_{mat} = 2608.0 cuft

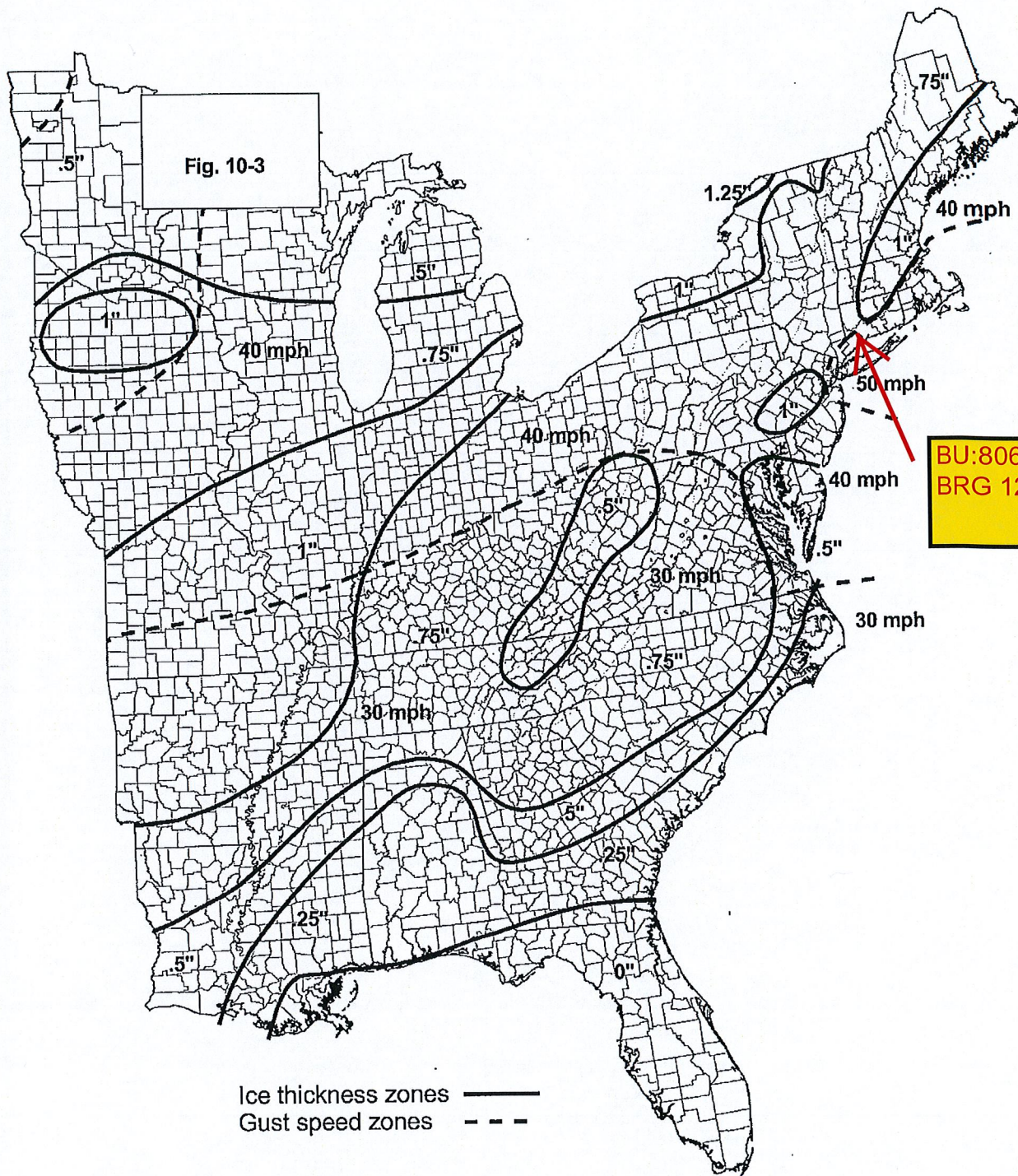


FIGURE 10-2 (continued) 50-YEAR MEAN RECURRENCE INTERVAL UNIFORM ICE THICKNESSES DUE TO FREEZING RAIN WITH CONCURRENT 3-SECOND GUST SPEEDS: CONTIGUOUS 48 STATES.



EBI Consulting

environmental | engineering | due diligence

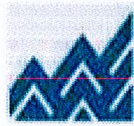
RADIO FREQUENCY EMISSIONS ANALYSIS REPORT EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

Sprint Existing Facility

Site ID: CT03XC368

Newtown
21 Berkshire Road
Newtown, CT 06470

August 26, 2012



EBI Consulting

environmental | engineering | due diligence

August 26, 2012

Sprint

Attn: RF Engineering Manager
1 International Boulevard, Suite 800
Mahwah, NJ 07495

Re: Emissions Values for Site CT03XC368 – Newtown

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at 21 Berkshire Road, Newtown, CT, for the purpose of determining whether the emissions from the proposed Sprint equipment upgrades on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The number of $\mu\text{W}/\text{cm}^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The general population exposure limit for the cellular band is approximately 567 $\mu\text{W}/\text{cm}^2$, and the general population exposure limit for the PCS band is 1000 $\mu\text{W}/\text{cm}^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.



Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

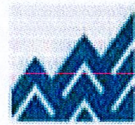
Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed upgrades to the existing Sprint Wireless antenna facility located at 21 Berkshire Road, Newtown, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario. Actual values seen from this site will be dramatically less than those shown in this report. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

For all calculations, all emissions were calculated using the following assumptions:

- 1) 3 CDMA Carriers (1900 MHz) were considered for each sector of the proposed installation.
- 2) 1 CDMA Carrier (850 MHz) was considered for each sector of the proposed installation
- 3) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation 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.
- 4) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The actual gain in this direction was used per the manufactures supplied specifications.
- 5) The antenna used in this modeling is the RFS APXVSP18-C-A20. This is based on feedback from the carrier with regards to anticipated antenna selection. This antenna has a 15.9 dBd gain value at its main lobe at 1900 MHz and 13.4 dBd at its main lobe for 850 MHz. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario.



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- 6) The antenna mounting height centerline of the proposed antennas is **164.5 feet** above ground level (AGL)
- 7) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculation were done with respect to uncontrolled / general public threshold limits

Site ID	CT03XC368 - Newtown
Site Address	21 Berkshire Road, Newtown, CT 06470
Site Type	Monopole

Sector 1

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Antenna Gain in direction of sample point (dBi)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	RFS	APXVSP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	3	15.9	164.5	158.5	1/2 "	0.5	0	2080.4211	29.77136	2.97714%
1a	RFS	APXVSP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	13.4	164.5	158.5	1/2 "	0.5	0	389.96892	5.580556	0.98422%

Sector total Power Density Value: 3.961%

Sector 2

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Antenna Gain in direction of sample point (dBi)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
2a	RFS	APXVSP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	3	15.9	164.5	158.5	1/2 "	0.5	0	2080.4211	29.77136	2.97714%
2a	RFS	APXVSP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	13.4	164.5	158.5	1/2 "	0.5	0	389.96892	5.580556	0.98422%

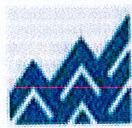
Sector total Power Density Value: 3.961%

Sector 3

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Antenna Gain in direction of sample point (dBi)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
3a	RFS	APXVSP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	3	15.9	164.5	158.5	1/2 "	0.5	0	2080.4211	29.77136	2.97714%
3a	RFS	APXVSP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	13.4	164.5	158.5	1/2 "	0.5	0	389.96892	5.580556	0.98422%

Sector total Power Density Value: 3.961%

Site Composite MPE %	
Carrier	MPE %
Sprint	11.884%
AT&T	9.130%
Metro PCS	2.630%
Verizon Wireless	11.300%
Nextel	2.370%
T-Mobile	4.260%
Total Site MPE %	41.574%



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Summary

All calculations performed for this analysis yielded results that were well within the allowable limits for general public exposure to RF Emissions.

The anticipated Maximum Composite contributions from the Sprint facility are **11.884% (3.961% from each sector)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **41.574%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government

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