Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

September 13, 2018

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

RE: **Notice of Exempt Modification for T-Mobile Crown Site BU: 829013**
T-Mobile Site ID: CT11178D
467 South Quaker Lane, West Hartford, CT 06110
Latitude: 41.74882000 / Longitude: -72.3132000

Dear Ms. Bachman:

T-Mobile currently maintains (9) existing antennas at the 120' level of the existing 119' monopole at 467 South Quaker Lane in West Hartford, CT (also known as 457 South Quaker Lane and 471 South Quaker Lane). The tower is owned by Crown Castle. The property is owned by Church of St. Mark the Evangelist Corp. T-Mobile now intends to replace (6) existing antennas (6) new panel antennas, Swap out (3) RRU's and add (1) Hybrid fiber cable. T-Mobile will also be adding a handrail kit to their antenna platform as well as radio componentry to their existing radio cabinet.

This facility was approved by the Town of West Hartford on March 31, 2000. This approval came with conditions that would not be violated by this modification. Enclosed is a copy of the original approval.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b) (2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to Shari Cantor, Mayor of the Town of West Hartford, Mark McGovern, Director of Community Development for the Town of West Hartford, as well as the property owner, and Crown Castle is the tower owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.

2. The proposed modifications will not require the extension of the site boundary.

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

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.

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

6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, T-Mobile respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: William Stone.

Sincerely,

William Stone
Real Estate Specialist
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
518-373-3543
William.stone@crowncastle.com

Attachments:

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes
Tab 2: Exhibit-2: Structural Modification Report
Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

cc:

Mayor Shari Cantor
Town of West Hartford
50 South Main Street
West Hartford, CT 06107

Mark McGovern
Director of Community Development
Town of West Hartford
50 South Main Street
West Hartford, CT 06107

Church of St Marks the Evangelist Corp
1088 NEW BRITAIN AVENUE
WEST HARTFORD, CT 06110-2426

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

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TOWN PLAN AND ZONING COMMISSION

CERTIFIED MAIL

March 10, 2000

Dennis Brown
Ominipoint Communications, Inc.
100 Filley Street
Bloomfield, CT 06002

SUBJECT: 457 South Quaker Lane – SUP #893

Dear Mr. Brown:

At its regular meeting of March 6, 2000 the West Hartford Town Plan and Zoning Commission gave consideration to the following item:

> **457 South Quaker Lane – St. Mark's Church** – Application (SUP #893) of the Archdiocese of Hartford, R.O., Omnipoint Communications, Inc., Dennis Brown of Omnipoint and Agent for Special Use Permit application. Omnipoint Communications, Inc. proposes to erect a 120 foot tall telecommunications monopole behind St. Mark's Rectory and abutting the right-of-way for Interstate 84. The 120 foot monopole would provide location for Omnipoint antenna and co-location for two other carriers. At the base of the monopole would be an equipment box the size of two filing cabinets. The site would be surrounded by a chain link fenced area, 50' x 50', with security gate and landscape buffering. (Submitted for TPZ receipt on February 7, 2000. Suggest required public hearing be scheduled for March 6, 2000. Required TPZ public hearing scheduled for March 6, 2000.)
> **R-6 ZONE**

After a review of the application and its related exhibits and after consideration of staff technical comments and the public hearing record, the TPZ acted by **majority vote** (Motion/Kearns; Second/Kappes) (Kappes seated for Wirth) to **CONDITIONALLY APPROVE** the subject application. During its discussions and deliberations on this matter, the Commission made the following findings:

1. **The landscape plan shall be revised to substitute the proposed hemlocks with Austrian Pines. The landscape plan shall provide the number, type and size of all proposed plantings.**
2. **As required by Section 177.16.7D(4) Telecommunication towers and antennas of the West Hartford Code of Ordinances the applicant shall make payment to the "Town Abandonment Fund". The applicant shall provide to the Town of West Hartford a statement setting forth the estimated cost of construction for the approved antennas, ancillary facilities and supporting structure, together with a payment equal to 5% of the estimated cost of the**

construction. The payment shall be deposited to the Tower Abandonment Fund.

3. **The proposed Special Use Permit will comply with the finding requirements of Section 177-42A(5a & 5b) of the West Hartford Code of Ordinances.**

You should now contact the Planning Staff to discuss the submission requirements for your plans. A ten dollar ($10) filing fee is required to file a notice of approval on the West Hartford Land Records. My staff will happy to assist you in completing these requirements. The TPZ approval is not final until the legal requirements for filing are completed. The effective date of approval is March 31, 2000.

If you have questions, please feel free to call the Planning Staff at 523-3123.

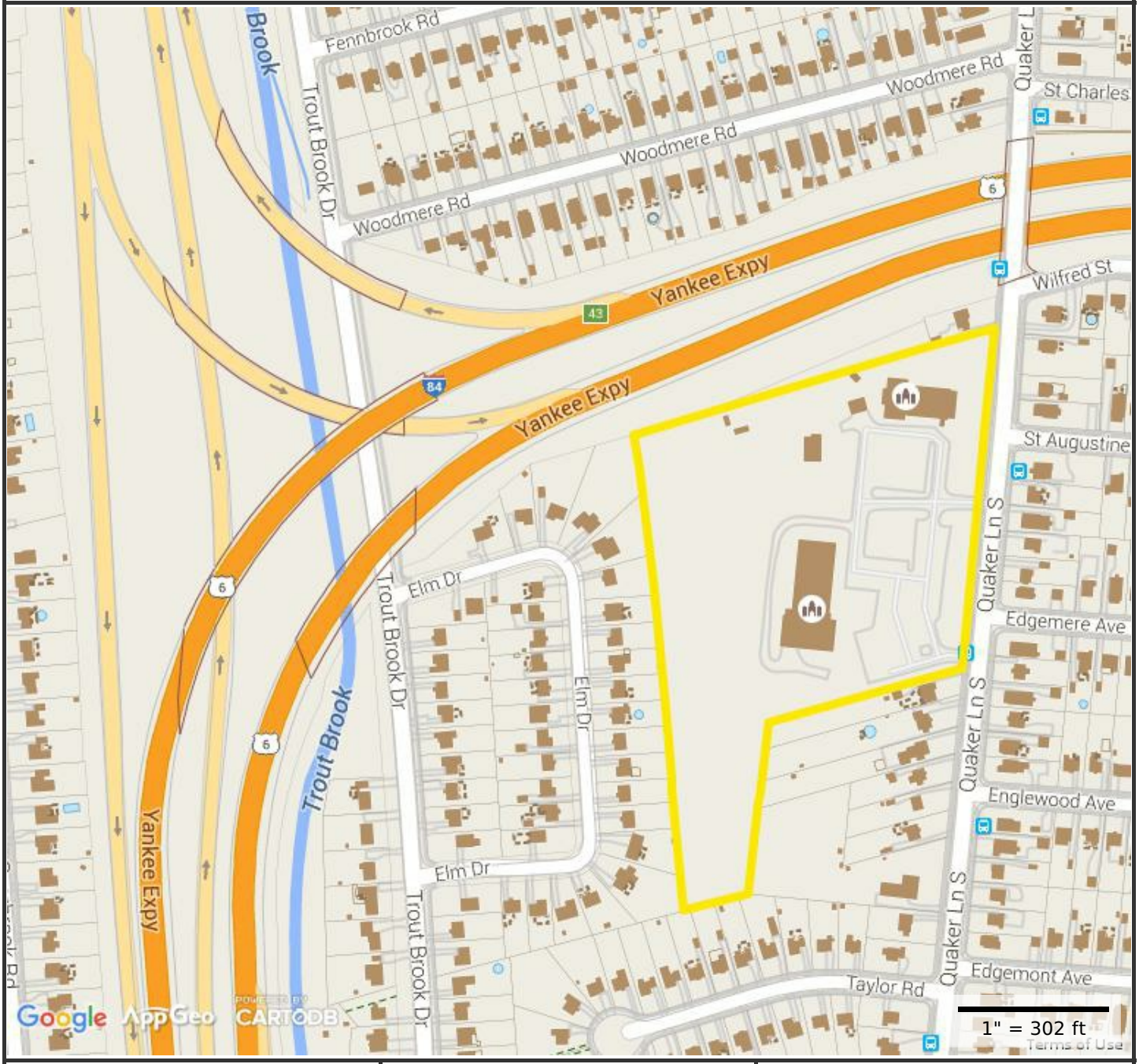
Very truly yours,

Donald R. Foster
Town Planner

C: Ronald Van Winkle, Director of Community
Kevin O'Connor, Corporation Counsel
Norma Cronin, Town Clerk
William Farrell, Town Engineer
Subject TPZ File

457Soqkr-Mar00

CT111178 parcel map



Property Information

Property ID	5096 1 471 0002
Location	471 SOUTH QUAKER LANE
Owner	CHURCH OF ST MARK THE EVANGELIST CORP

TOWN OF WEST HARTFORD

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town of West Hartford, CT makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Parcels updated 5/22/2015
Properties updated Daily

Property Location: 471 SOUTH QUAKER LANE **MAP ID:** G11/ 5096/ 471/ / **Bldg Name:** **State Use:** 901

Vision ID: 18998 **Account #** 5096 1 471 0001 **Bldg #:** 1 of 3 **Sec #:** 1 of 1 **Card** 1 of 3 **Print Date:** 04/20/2016 21:41

CURRENT OWNER	TOPO.	UTILITIES	STRT./ROAD	LOCATION
CHURCH OF ST MARK THE EVANGI	4 Rolling	2 Yes	5 Not Heavy	2 Typical
	1 No	2 Yes		1 No
455 QUAKER LANE SOUTH				1 No
WEST HARTFORD, CT 06110				
Additional Owners:				

SUPPLEMENTAL DATA

Other ID:	509614710001	Tax/Exempt	Exempt
Map #	D28+29/	Nbhd	914900.00
Census #	4968	Data Mailer	
PP CANVAS	Exempt		
District	041	Lot Size	8.16
Zoning	R-6		
GIS ID:		ASSOC PID#	

CURRENT ASSESSMENT

Description	Code	Appraised Value	Assessed Value
EX RES LN	11	1,835,700	1,284,990
EX RS DWL	13	277,400	194,180
EX RS OTB	14	13,500	9,450
EX COM BL	22	3,776,800	2,643,760
	Total	5,903,400	4,132,380

6155
WEST HARTFORD, CT

VISION

RECORD OF OWNERSHIP

RECORD OF OWNERSHIP	BK-VOL/PAGE	SALE DATE	q/u	v/i	SALE PRICE	V.C.
CHURCH OF ST MARK THE EVANGELIST CORP	215/ 42		U	I	0	U

PREVIOUS ASSESSMENTS (HISTORY)

Yr.	Code	Assessed Value	Yr.	Code	Assessed Value	Yr.	Code	Assessed Value
2015	11	1,284,990	2014	11	1,284,990	2013	11	1,284,990
2015	13	194,180	2014	13	194,180	2013	13	194,180
2015	14	9,450	2014	14	9,450	2013	14	9,450
2015	22	2,643,760	2014	22	2,643,760	2013	22	2,643,760
	Total:	4,132,380		Total:	4,132,380		Total:	4,132,380

EXEMPTIONS

Year	Type	Description	Amount
		Total:	

OTHER ASSESSMENTS

Code	Description	Number	Amount	Comm. Int.

This signature acknowledges a visit by a Data Collector or Assessor

APPRAISED VALUE SUMMARY

Appraised Bldg. Value (Card)	276,000
Appraised XF (B) Value (Bldg)	1,400
Appraised OB (L) Value (Bldg)	13,500
Appraised Land Value (Bldg)	1,835,700
Special Land Value	0
Total Appraised Parcel Value	5,903,400
Valuation Method:	C
Adjustment:	0
Net Total Appraised Parcel Value	5,903,400

ASSESSING NEIGHBORHOOD

NBHD/ SUB	NBHD Name	Street Index Name	Tracing	Batch
914/A				

NOTES

CHURCHSCHOOL AND AUDITORIUM.ROOF HEIGHT
ISAVERAGE. A/N 2460SURVEY 6387, FILED
9/25/00 SHOWS PADSITE AND EASEMENT AREA
FOR FUTURE TELE- COMMUNICATIONS TOWER.
10/20030002 PARCEL FOR PAD SITE

BUILDING PERMIT RECORD

Permit ID	Issue Date	Type	Description	Amount	Insp. Date	% Comp.	Date Comp.	Comments
150004320	09/27/2015	BP	Permit	15,000		0		Replacing existing anten
0150002720	07/13/2015	BP	Permit	19,000		0		Structural modifications
140005472	12/22/2014	BP	Permit	15,000		100	10/01/2015	Remove and replace 3 an
110000479	01/01/2014	BP	Permit	5,400		100	10/01/2014	(aka 467)installation of s
130004836	12/13/2013	BP	Permit	29,800		100	10/01/2014	Conversion from oil to g
130004837	12/13/2013	BP	Permit	71,000		100	10/01/2014	Replacement of oil fired
130004835	12/13/2013	BP	Permit	14,800		100	10/01/2014	Conversion of warm air

VISIT/ CHANGE HISTORY

Date	Type	IS	ID	Cd.	Purpose/Result
10/17/2001			TJC	3B	EXTERIOR PARTIAL P

LAND LINE VALUATION SECTION

B #	Use Code	Use Description	Zone	D	Front	Depth	Units		Unit Price	I. Factor	S.A.		C. Factor	ST. Idx	Adj.	Notes- Adj	Special Pricing Spec Use	Special Pricing Spec Calc	S Adj Fact	Adj. Unit Price	Land Value
1	901	Exempt Res	R-6				8.16	AC	224,963.00	1.0000	0		1.00		0.00				1.00		1,835,700

Total Card Land Units:	8.16	AC	Parcel Total Land Area:	8.16 AC	Total Land Value:	1,835,700

Property Location: 471 SOUTH QUAKER LANE **MAP ID:** G11/ 5096/ 471/ / **Bldg Name:** **State Use:** 901

Vision ID: 18998 **Account #** 5096 1 471 0001 **Bldg #:** 1 of 3 **Sec #:** 1 of 1 **Card** 1 of 3 **Print Date:** 04/20/2016 21:41

CONSTRUCTION DETAIL

Element	Cd.	Ch.	Description
Style	05		Colonial
Model	01		Residential
Grade	C05		C 1.10
Stories	2.0		
Occupancy	1		
Exterior Wall 1	20		Brick
Exterior Wall 2			
Roof Structure	0		Typical
Roof Cover	0		Typical
Interior Wall 1	08		Typical
Interior Wall 2			
Interior Flr 1	25		Typical
Interior Flr 2			
Heat Fuel	03		Oil
Heat Type	03		Forced Air
AC Type	2		Yes
# of Bedrooms	3		
Full Bthrms	4		
Half Baths	0		
Extra Fixtures	0		
Total Rooms	12		
Bath Style	02		Typical
Kitchen Style	02		Typical
Extra Kitchens			
Fireplaces	1		
Prefab Fpl(s)			
Bsmt Egress			
Foundation	PF		Conc Per Piers
Bsmt Garage(s)	0		None
Fin Bsmt/RRm			
Bsmt Rec Rm			

CONSTRUCTION DETAIL (CONTINUED)

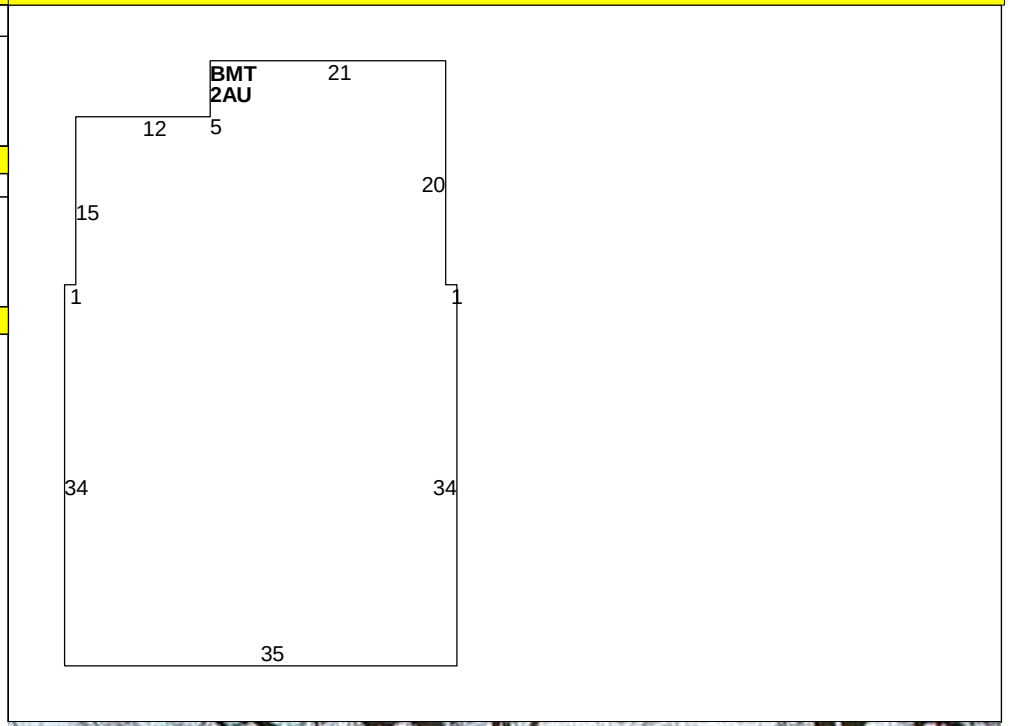
Element	Cd.	Ch.	Description
FBLA			
Int Condition	03		Typical
Attic Access	03		
Dormer LF			

MIXED USE

Code	Description	Percentage
901	Exempt Res	100

COST/MARKET VALUATION

Adj. Base Rate:	92.17
AYB	1945
Dep Code	A
Remodel Rating	
Year Remodeled	1945
Dep %	25
Functional Obslnc	
External Obslnc	
Cost Trend Factor	1
Condition	
% Complete	
Overall % Cond	75
Apprais Val	276,000
Dep % Ovr	0
Dep Ovr Comment	
Misc Imp Ovr	0
Misc Imp Ovr Comment	
Cost to Cure Ovr	0
Cost to Cure Ovr Comment	

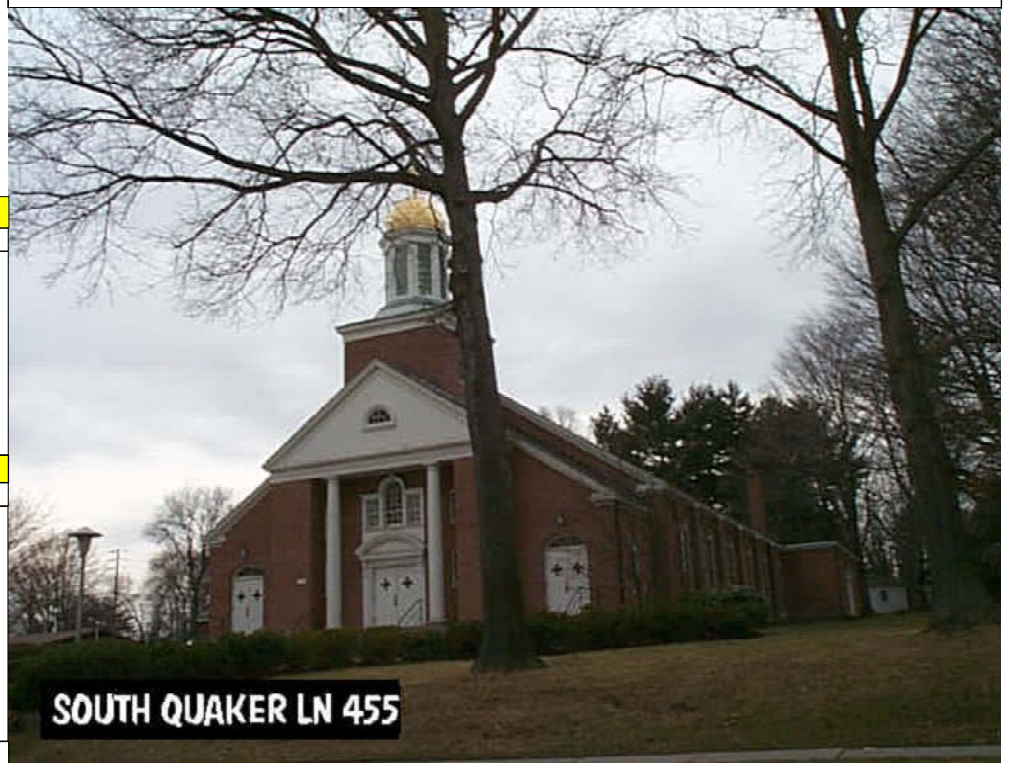


OB-OUTBUILDING & YARD ITEMS(L) / XF-BUILDING EXTRA FEATURES(B)

Code	Description	Sub	Sub Descript	L/B	Units	Unit Price	Yr	Gde	Dp Rt	Cnd	%Cnd	Apr Value
CCP9	Canopy-wood			L	56	6.75	1970	C		7A	50	100
CRG4	Garage - 1.0 St			L	918	26.14	1945	C		A5	64	9,600
CRG4	Garage - 1.0 St			L	247	26.14	1945	C		A5	64	3,800
RP4	Enclosed Porch			B	30	52.87	1986	C	1		83	1,400

BUILDING SUB-AREA SUMMARY SECTION

Code	Description	Living Area	Gross Area	Eff. Area	Unit Cost	Undeprec. Value
2AU	2 STORY U UNFIN ATT	3,580	1,790			
BMT	BSMT UNFIN RES	0	1,790			
	Ttl. Gross Liv/Lease Area:	3,580	3,580			



Property Location: 471 SOUTH QUAKER LANE **MAP ID:** G11/ 5096/ 471/ / **Bldg Name:** **State Use:** 901

Vision ID: 18998 **Account #** 5096 1 471 0001 **Bldg #:** 2 of 3 **Sec #:** 1 of 1 **Card** 2 **of** 3 **Print Date:** 04/20/2016 21:41

CURRENT OWNER	TOPO.	UTILITIES	STRT./ROAD	LOCATION
CHURCH OF ST MARK THE EVANGE	4 Rolling	2 Yes	5 Not Heavy	2 Typical
	1 No	2 Yes		1 No
455 QUAKER LANE SOUTH				1 No
WEST HARTFORD, CT 06110				
Additional Owners:				

SUPPLEMENTAL DATA

Other ID:	509614710001	Tax/Exempt	Exempt
Map #	D28+29/	Nbhd	914900.00
Census #	4968	Data Mailer	
PP CANVAS	Exempt		
District	041	Lot Size	8.16
Zoning	R-6		
GIS ID:		ASSOC PID#	

CURRENT ASSESSMENT

Description	Code	Appraised Value	Assessed Value
EX RES LN	11	1,835,700	1,284,990
EX RS DWL	13	277,400	194,180
EX RS OTB	14	13,500	9,450
EX COM BL	22	3,776,800	2,643,760
	Total	5,903,400	4,132,380

6155
WEST HARTFORD, CT

VISION

RECORD OF OWNERSHIP

	BK-VOL/PAGE	SALE DATE	q/u	v/i	SALE PRICE	V.C.
CHURCH OF ST MARK THE EVANGELIST CORP	215/ 42		U	I	0	U

PREVIOUS ASSESSMENTS (HISTORY)

Yr.	Code	Assessed Value	Yr.	Code	Assessed Value	Yr.	Code	Assessed Value
2015	11	1,284,990	2014	11	1,284,990	2013	11	1,284,990
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2015	22	2,643,760	2014	22	2,643,760	2013	22	2,643,760
	Total:	4,132,380		Total:	4,132,380		Total:	4,132,380

EXEMPTIONS

Year	Type	Description	Amount
		Total:	

OTHER ASSESSMENTS

Code	Description	Number	Amount	Comm. Int.

This signature acknowledges a visit by a Data Collector or Assessor

APPRAISED VALUE SUMMARY

Appraised Bldg. Value (Card)	2,043,400
Appraised XF (B) Value (Bldg)	0
Appraised OB (L) Value (Bldg)	0
Appraised Land Value (Bldg)	0
Special Land Value	0
Total Appraised Parcel Value	5,903,400
Valuation Method:	C
Adjustment:	0
Net Total Appraised Parcel Value	5,903,400

ASSESSING NEIGHBORHOOD

NBHD/ SUB	NBHD Name	Street Index Name	Tracing	Batch
914/A				

NOTES

BUILDING PERMIT RECORD

Permit ID	Issue Date	Type	Description	Amount	Insp. Date	% Comp.	Date Comp.	Comments

VISIT/ CHANGE HISTORY

Date	Type	IS	ID	Cd.	Purpose/Result
10/17/2001			TJC	3B	EXTERIOR PARTIAL P

LAND LINE VALUATION SECTION

B #	Use Code	Use Description	Zone	D	Front	Depth	Units		Unit Price	I. Factor	S.A.		C. Factor	ST. Idx	Adj.	Notes- Adj	Special Pricing Spec Use		Special Pricing Spec Calc		S Adj Fact	Adj. Unit Price	Land Value
2	902	Exempt Commercial	R-6				0	SF	0.00	1.0000	0		1.00		0.00				TR1	TR1	.00		0

Total Card Land Units: 0.00 AC **Parcel Total Land Area:** 8.16 AC **Total Land Value:** 0

Property Location: 471 SOUTH QUAKER LANE **MAP ID:** G11/ 5096/ 471/ / **Bldg Name:** **State Use:** 901

Vision ID: 18998 **Account #** 5096 1 471 0001 **Bldg #:** 2 of 3 **Sec #:** 1 of 1 **Card** 2 of 3 **Print Date:** 04/20/2016 21:41

CONSTRUCTION DETAIL

Element	Cd.	Ch.	Description
Style	CHUI		Church
Model	94		Comm/Ind
Grade	B06		B 0.90
Stories	2		
Occupancy			
Exterior Wall 1	PRE		Precast Panel
Exterior Wall 2			
Roof Structure	GBL		Gable
Roof Cover	CMP		Comp - Shingle
Interior Wall 1	00		Typical
Interior Wall 2			
Floor Type	WF		Wood
Floor Cover	CPT		Carpet
Heating Fuel	00		Typical
Heating Type	05		Steam Boiler
AC Type	2		Central - Zone
As Built Use	CHUI		
Bldg Use	902		Exempt Commercial
# of Bedrooms			
Total Baths			
Type	01		
Wet Sprinkler			
Frame Type	RST		Rigid Steel
Group	CTA		
Wall Height	17		
Adjustment			

CONSTRUCTION DETAIL (CONTINUED)

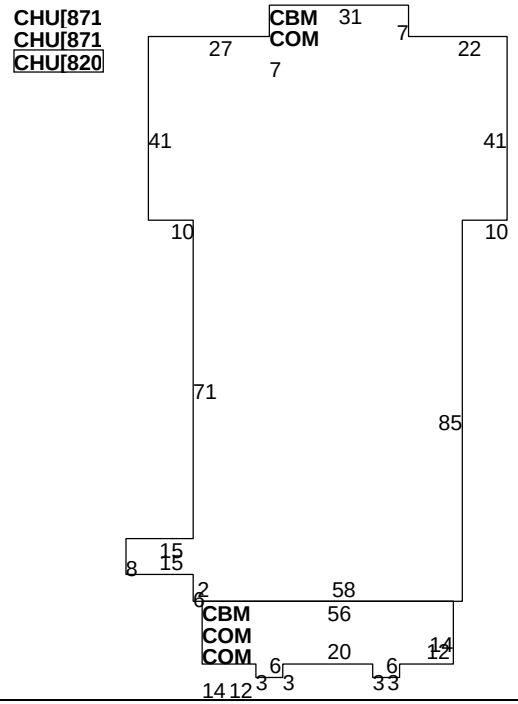
Element	Cd.	Ch.	Description

MIXED USE

Code	Description	Percentage
902	Exempt Commercial	100

COST/MARKET VALUATION

Adj. Base Rate:	143.37
AYB	1945
Dep Code	A
Remodel Rating	
Year Remodeled	
Dep %	36
Functional Obslnc	
External Obslnc	
Cost Trend Factor	
Condition	
% Complete	
Overall % Cond	64
Apprais Val	2,043,400
Dep % Ovr	0
Dep Ovr Comment	
Misc Imp Ovr	0
Misc Imp Ovr Comment	
Cost to Cure Ovr	0
Cost to Cure Ovr Comment	



No Photo On Record

OB-OUTBUILDING & YARD ITEMS(L) / XF-BUILDING EXTRA FEATURES(B)

Code	Description	Sub	Sub Descript	L/B	Units	Unit Price	Yr	Gde	Dp Rt	Cnd	%Cnd	Apr Value

BUILDING SUB-AREA SUMMARY SECTION

Code	Description	Living Area	Gross Area	Eff. Area	Unit Cost	Undeprec. Value
CBM	BSMT COMM - NV	0	9,537			
CHU	CHURCH	18,254	18,254			
COM	COMMERCIAL - NV	0	10,357			
	Ttl. Gross Liv/Lease Area:	18,254	38,148			

Property Location: 471 SOUTH QUAKER LANE **MAP ID:** G11/ 5096/ 471/ / **Bldg Name:** **State Use:** 901

Vision ID: 18998 **Account #** 5096 1 471 0001 **Bldg #:** 3 of 3 **Sec #:** 1 of 1 **Card** 3 of 3 **Print Date:** 04/20/2016 21:41

CURRENT OWNER	TOPO.	UTILITIES	STRT./ROAD	LOCATION
CHURCH OF ST MARK THE EVANGE	4 Rolling	2 Yes	5 Not Heavy	2 Typical
	1 No	2 Yes		1 No
455 QUAKER LANE SOUTH				1 No
WEST HARTFORD, CT 06110				
Additional Owners:				

SUPPLEMENTAL DATA

Other ID:	509614710001	Tax/Exempt	Exempt
Map #	D28+29/	Nbhd	914900.00
Census #	4968	Data Mailer	
PP CANVAS	Exempt		
District	041	Lot Size	8.16
Zoning	R-6		
GIS ID:		ASSOC PID#	

CURRENT ASSESSMENT

Description	Code	Appraised Value	Assessed Value
EX RES LN	11	1,835,700	1,284,990
EX RS DWL	13	277,400	194,180
EX RS OTB	14	13,500	9,450
EX COM BL	22	3,776,800	2,643,760
	Total	5,903,400	4,132,380

6155
WEST HARTFORD, CT

VISION

RECORD OF OWNERSHIP

	BK-VOL/PAGE	SALE DATE	q/u	v/i	SALE PRICE	V.C.
CHURCH OF ST MARK THE EVANGELIST CORP	215/ 42		U	I	0	U

PREVIOUS ASSESSMENTS (HISTORY)

Yr.	Code	Assessed Value	Yr.	Code	Assessed Value	Yr.	Code	Assessed Value
2015	11	1,284,990	2014	11	1,284,990	2013	11	1,284,990
2015	13	194,180	2014	13	194,180	2013	13	194,180
2015	14	9,450	2014	14	9,450	2013	14	9,450
2015	22	2,643,760	2014	22	2,643,760	2013	22	2,643,760
	Total:	4,132,380		Total:	4,132,380		Total:	4,132,380

EXEMPTIONS

Year	Type	Description	Amount
		Total:	

OTHER ASSESSMENTS

Code	Description	Number	Amount	Comm. Int.

This signature acknowledges a visit by a Data Collector or Assessor

APPRAISED VALUE SUMMARY

Appraised Bldg. Value (Card)	1,733,400
Appraised XF (B) Value (Bldg)	0
Appraised OB (L) Value (Bldg)	0
Appraised Land Value (Bldg)	0
Special Land Value	0
Total Appraised Parcel Value	5,903,400
Valuation Method:	C
Adjustment:	0
Net Total Appraised Parcel Value	5,903,400

ASSESSING NEIGHBORHOOD

NBHD/ SUB	NBHD Name	Street Index Name	Tracing	Batch
914/A				

NOTES

BUILDING PERMIT RECORD

Permit ID	Issue Date	Type	Description	Amount	Insp. Date	% Comp.	Date Comp.	Comments

VISIT/ CHANGE HISTORY

Date	Type	IS	ID	Cd.	Purpose/Result
10/17/2001			TJC	3B	EXTERIOR PARTIAL P

LAND LINE VALUATION SECTION

B #	Use Code	Use Description	Zone	D	Front	Depth	Units		Unit Price	I. Factor	S.A.		C. Factor	ST. Idx	Adj.	Notes- Adj	Special Pricing	S Adj Fact	Adj. Unit Price	Land Value
3	902	Exempt Commercial	R-6				0	SF	0.00	1.0000	0		1.00		0.00		TR1	.00		0

Total Card Land Units: 0.00 AC Parcel Total Land Area: 8.16 AC Total Land Value: 0

Property Location: 471 SOUTH QUAKER LANE **MAP ID:** G11/ 5096/ 471/ / **Bldg Name:** **State Use:** 901

Vision ID: 18998 **Account #** 5096 1 471 0001 **Bldg #:** 3 of 3 **Sec #:** 1 of 1 **Card** 3 of 3 **Print Date:** 04/20/2016 21:41

CONSTRUCTION DETAIL

Element	Cd.	Ch.	Description
Style	RCLS		Classroom
Model	94		Comm/Ind
Grade	C10		C 1.10
Stories	1		
Occupancy			
Exterior Wall 1	PRE		Precast Panel
Exterior Wall 2			
Roof Structure	GBL		Gable
Roof Cover	CMP		Comp - Shingle
Interior Wall 1	00		Typical
Interior Wall 2			
Floor Type	CS		Concrete Slab
Floor Cover	NO		None
Heating Fuel	00		Typical
Heating Type	12		None
AC Type	8		None
As Built Use	RCLS		
Bldg Use	902		Exempt Commercial
# of Bedrooms			
Total Baths			
Type	01		
Wet Sprinkler			
Dry Sprinkler			
Class	C		Class C
Frame Type	MS		Masonry
Plumbing	01		LIGHT
Ceiling	3		Not Applicable
Group	CTA		
Wall Height	10		
Adjustment			

CONSTRUCTION DETAIL (CONTINUED)

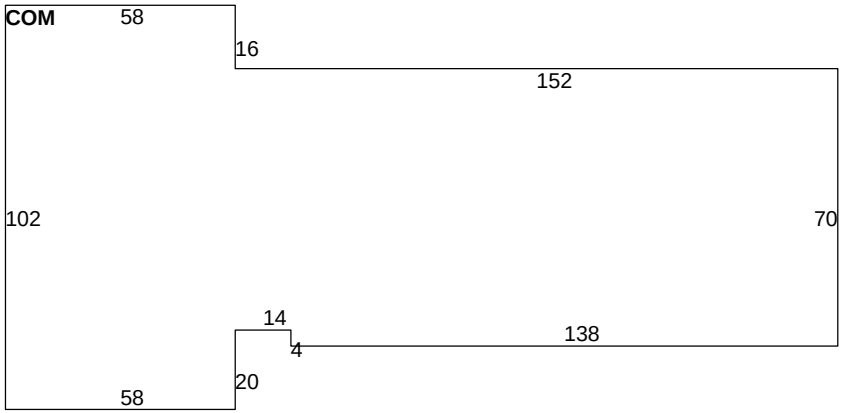
Element	Cd.	Ch.	Description

MIXED USE

Code	Description	Percentage
902	Exempt Commercial	100

COST/MARKET VALUATION

Adj. Base Rate:	129.80
AYB	1970
Dep Code	A
Remodel Rating	
Year Remodeled	
Dep %	26
Functional Obslnc	
External Obslnc	
Cost Trend Factor	
Condition	
% Complete	
Overall % Cond	74
Apprais Val	1,733,400
Dep % Ovr	0
Dep Ovr Comment	
Misc Imp Ovr	0
Misc Imp Ovr Comment	
Cost to Cure Ovr	0
Cost to Cure Ovr Comment	



No Photo On Record

OB-OUTBUILDING & YARD ITEMS(L) / XF-BUILDING EXTRA FEATURES(B)

Code	Description	Sub	Sub Descript	L/B	Units	Unit Price	Yr	Gde	Dp Rt	Cnd	%Cnd	Apr Value

BUILDING SUB-AREA SUMMARY SECTION

Code	Description	Living Area	Gross Area	Eff. Area	Unit Cost	Undeprec. Value
CLS	CLASS ROOM BLDG	16,556	16,556			
COM	COMMERCIAL - NV	0	16,500			
	Ttl. Gross Liv/Lease Area:	16,556	33,056			

T-MOBILE SITE NAME:

WEST HARTFORD-I-84-X43

T-MOBILE SITE NUMBER:

CT11178D

CROWN CASTLE BU NUMBER/APPLICATION NUMBER:

829013/433326

67D92M CONFIGURATION

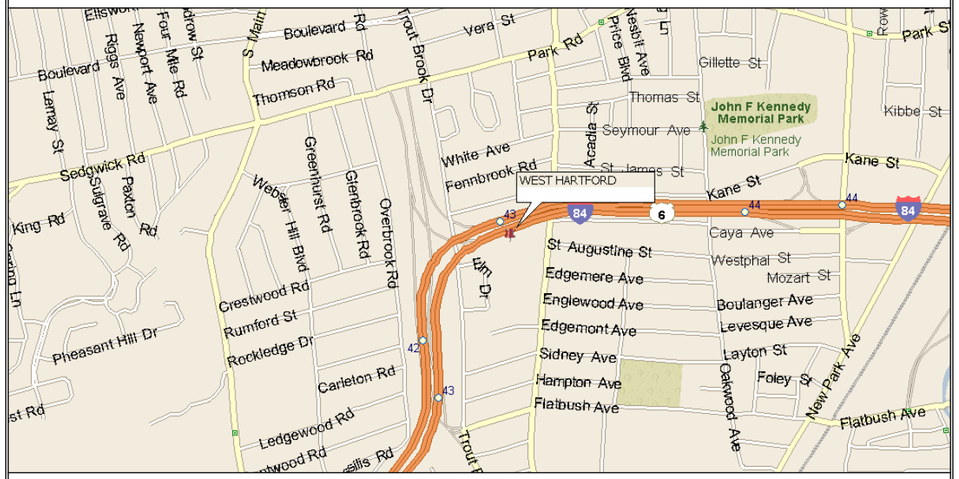
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

EXISTING 119'-0" MONOPOLE

PROJECT SUMMARY

SITE TYPE:	EXISTING EQUIPMENT UPGRADE
SITE ADDRESS:	467 SOUTH QUAKER LANE WEST HARTFORD, CT 06110
JURISDICTION:	HARTFORD COUNTY
NAD83	
LATITUDE:	41.74882000° N
LONGITUDE:	72.73132000° W
TOWER OWNER:	CROWN CASTLE 3200 HORIZON DRIVE, SUITE 150 KING OF PRUSSIA, PA 19406
CONTACT:	JASON SMITH
PHONE:	(610) 635-3225
CUSTOMER/APPLICANT:	T-MOBILE 4 SYLVAN WAY PARSIPPANY, NJ 07054 (973) 397-4800
OCCUPANCY TYPE:	UNMANNED
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION

LOCATION MAP



NO SCALE

DRAWING INDEX

SHEET #	SHEET DESCRIPTION	REV. #
T-1	TITLE SHEET	0
C-1	OVERALL SITE PLAN	0
C-2	ENLARGED SITE PLAN	0
C-3	TOWER ELEVATION & ANTENNA ORIENTATION	0
C-4	ANTENNA, RRU & TMA SCHEDULE	0
C-5	PLUMBING DIAGRAM	0
E-1	ONE-LINE DIAGRAM	0
G-1	GROUNDING PLAN AND DETAILS	0
SP-1	SPECIFICATIONS	0
SP-2	SPECIFICATIONS	0

CONTACT INFORMATION

A&E FIRM:	B+T GROUP 1717 S. BOULDER AVENUE TULSA, OK 74119	ELECTRIC PROVIDER:	TBD
CONTACT:	DUSTIN SPEARS	TELCO PROVIDER:	TBD
PHONE:	(918) 587-4630		

DRIVING DIRECTIONS

DEPART BRADLEY INTERNATIONAL AIRPORT ON TERMINAL RD. ROAD NAME CHANGES TO BRADLEY FIELD CONNECTOR. ROAD NAME CHANGES TO CT-20 [BRADLEY FIELD CONNECTOR]. TAKE RAMP (RIGHT) ONTO I-91 [RICHARD P HORAN MEMORIAL HWY]. AT EXIT 32A-32B, TURN RIGHT ONTO RAMP. TAKE RAMP (LEFT) ONTO I-84 [US-6]. AT EXIT 42, TURN LEFT ONTO RAMP. KEEP LEFT TO STAY ON RAMP. TURN LEFT ONTO TROUT BROOK DR. TURN RIGHT ONTO WOODMERE RD. TURN RIGHT ONTO LOCAL ROAD(S) AND ARRIVE AT WEST HARTFORD.

A/E DOCUMENT REVIEW STATUS

TITLE	SIGNATURE	DATE
T-MOBILE R.E. MGR.:		
T-MOBILE R.F. MGR.:		
T-MOBILE NetOps:		
T-MOBILE CONST. MGR.:		
INTERCONNECT:		
T-MOBILE SITE DEV. MGR.:		
PROPERTY OWNER:		
PLANNING:		

1		ACCEPTED: WITH OR NO COMMENTS, CONSTRUCTION MAY PROCEED
2		NOT ACCEPTED: RESOLVE COMMENTS AND RESUBMIT

ACCEPTANCE DOES NOT CONSTITUTE APPROVAL OF DESIGN, CALCULATIONS, ANALYSIS, TEST METHODS OF MATERIALS DEVELOPED OR SELECTED BY THE SUBCONTRACTOR AND DOES NOT RELIEVE SUBCONTRACTOR FROM FULL COMPLIANCE WITH CONTRACTUAL OBLIGATIONS.

CODE COMPLIANCE

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:

CODE TYPE	CODE
BUILDING/DWELLING	IBC 2012
STRUCTURAL	IBC 2012
MECHANICAL	IMC 2012
ELECTRICAL	NEC 2014

PROJECT DESCRIPTION

THE PROPOSED PROJECT INCLUDES:

- REMOVE (6) EXISTING ANTENNAS.
- REMOVE (3) EXISTING RRUs.
- REMOVE (2) EXISTING DUS41.
- RELOCATE (3) EXISTING ANTENNAS.
- INSTALL (6) NEW ANTENNAS AT 120'-0".
- INSTALL (3) NEW RRUs.
- INSTALL (1) ADDITIONAL 1 5/8" HYBRID CABLE FOR NEW ANTENNAS.
- INSTALL (1) BB5216 & (3) XMU.
- INSTALL (1) HANDRAIL REINFORCEMENT KIT ON EXISTING PLATFORM.

DO NOT SCALE DRAWINGS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 11X17.
CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

SEE SHEETS SP-1 & SP-2 FOR ADDITIONAL CONSTRUCTION NOTES

CALL CONNECTICUT ONE CALL
(800) 922-4455
CALL 3 WORKING DAYS
BEFORE YOU DIG!

811

CT11178D
BU #: 829013

WEST HARTFORD-I-84-X43

467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

EXISTING MONOPOLE

PROJECT NO:	127044.001.01
CHECKED BY:	RPS

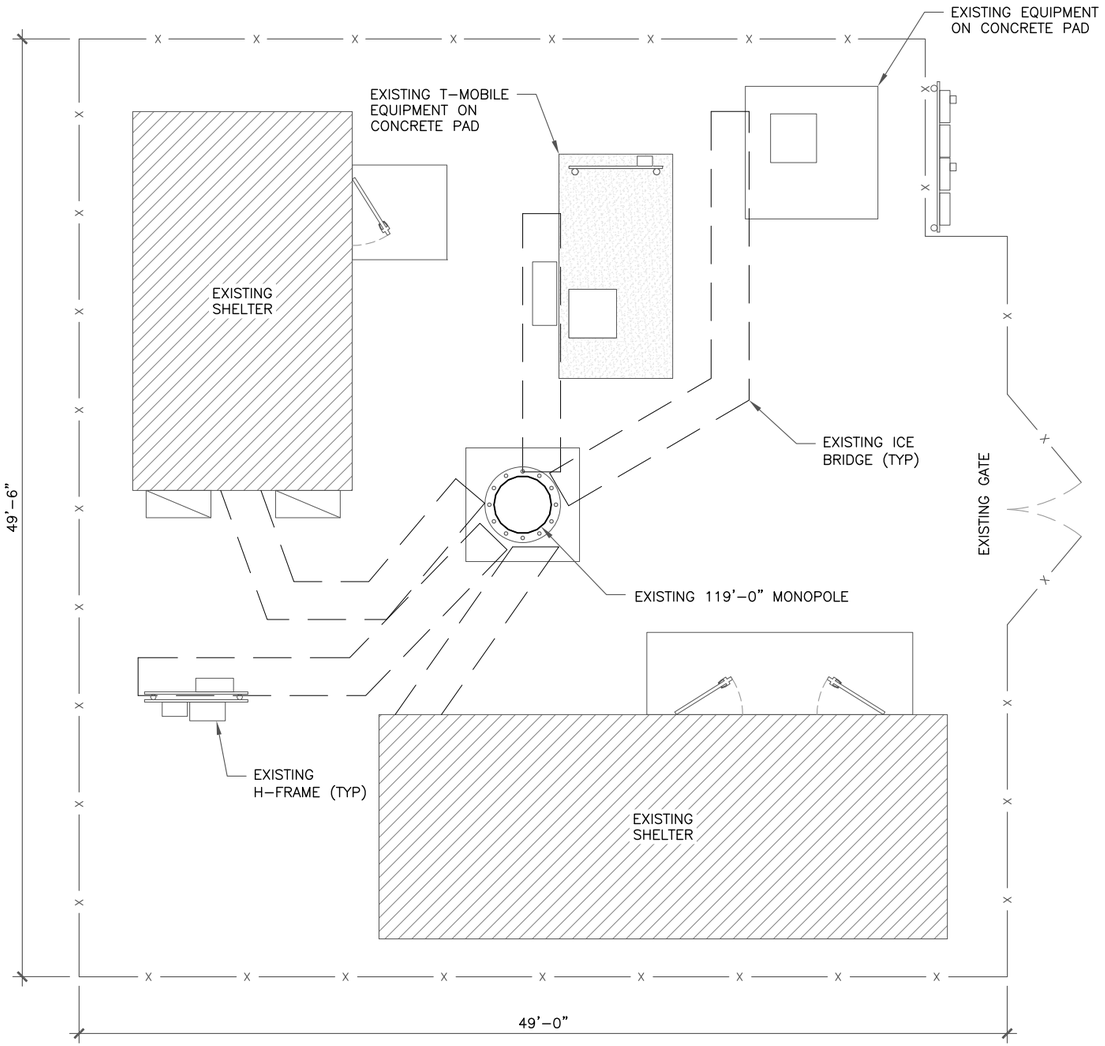
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
A	8/9/18	FWP	PRELIMINARY REVIEW
0	9/6/18	FWP	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/19

STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER
9/6/18

SHEET NUMBER:	REVISION:
T-1	0



1 OVERALL SITE PLAN

SCALE: 0' 1' 5' 10' 20'

N

B+T GRP

T···Mobile

CROWN CASTLE

CT11178D
BU #: 829013

WEST HARTFORD-I-84-X43

467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

EXISTING MONOPOLE

PROJECT NO:	**127044.001.01**
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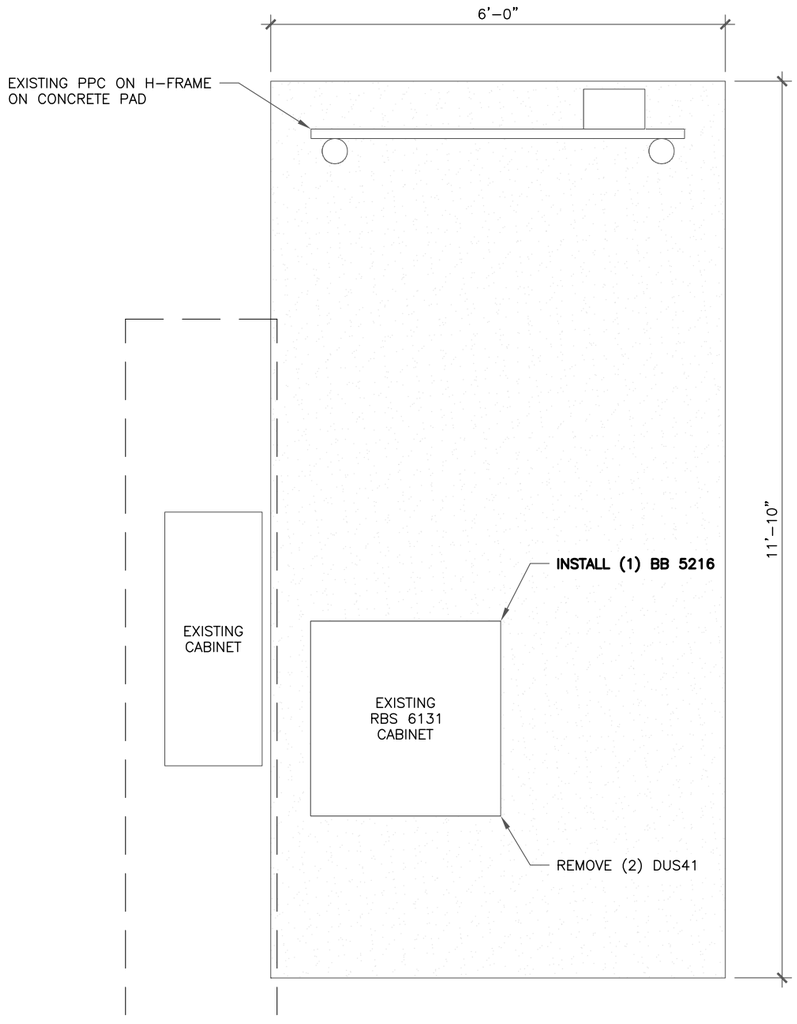
STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER
9/6/18

SHEET NUMBER:	REVISION:
C-1	0



1 ENLARGED SITE PLAN

SCALE: 0' 1' 3' 5'

N

B+T GRP

T···Mobile

CROWN CASTLE

CT11178D
BU #: 829013

WEST HARTFORD-I-84-X43

467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

EXISTING MONOPOLE

PROJECT NO:	127044.001.01
CHECKED BY:	RPS

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
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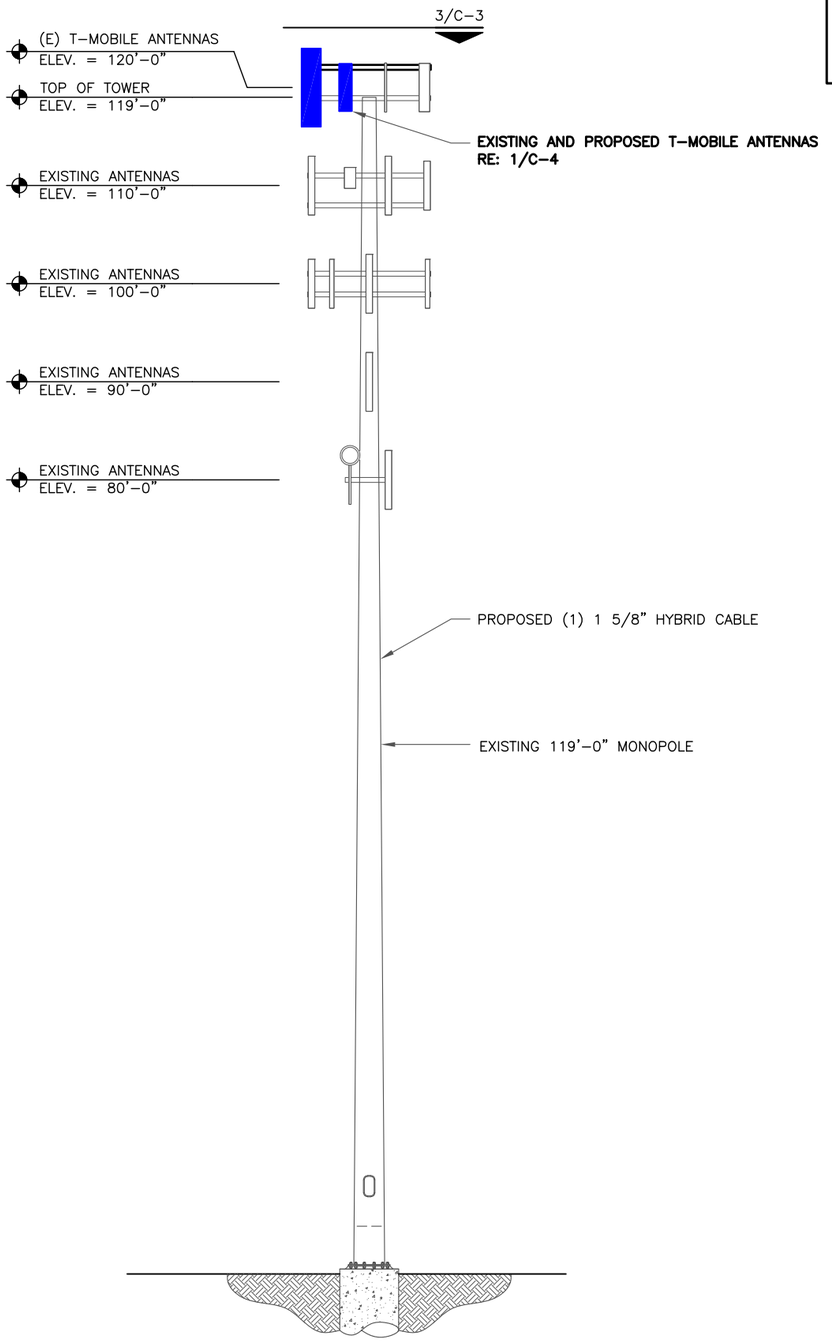
B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/19

STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER
9/6/18

SHEET NUMBER:	REVISION:
C-2	0



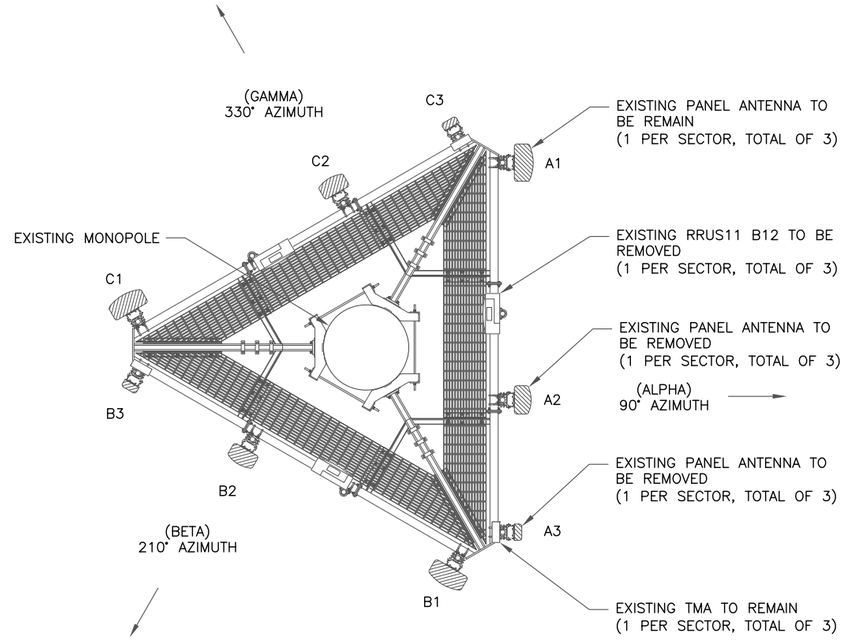
1 PROPOSED TOWER ELEVATION
SCALE: N.T.S.

STRUCTURAL ANALYSIS NOTES:

1. ANTENNA PLACEMENT WAS DETERMINED WITHOUT VERIFICATION OF STRUCTURAL ANALYSIS.
2. REFER TO STRUCTURAL ANALYSIS OR STRUCTURAL LETTER FOR APPROVAL OF ADDITIONAL NEW APPURTENANCES.

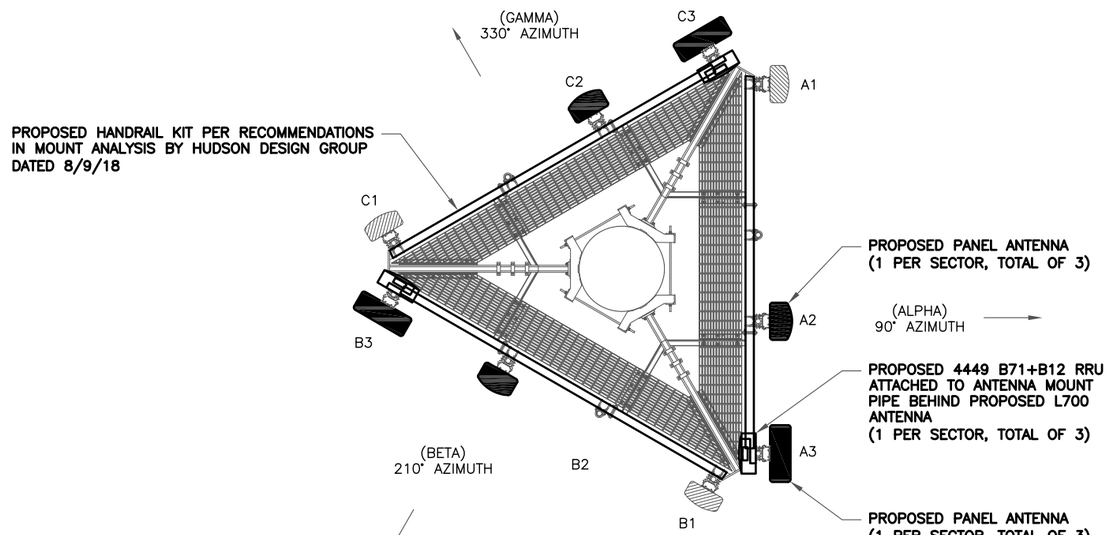
LEGEND:

- NEW
- EXISTING
- FUTURE



2 EXISTING ANTENNA ORIENTATION
SCALE: N.T.S.

N



3 PROPOSED ANTENNA ORIENTATION
SCALE: N.T.S.

N

B+T GRP

T-Mobile

CROWN CASTLE

CT11178D
BU #: 829013

WEST HARTFORD-I-84-X43

467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

EXISTING MONOPOLE

PROJECT NO:	127044.001.01
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31627
LICENSED PROFESSIONAL ENGINEER
9/6/18

SHEET NUMBER:	REVISION:
C-3	0

ANTENNA AND COAXIAL CABLE SCHEDULE										
SECTOR MARK	ANTENNA MODEL	AZIMUTH	MECH TILT	ELEC. TILT	ANTENNA CENTERLINE	SECTOR	TMA/RRU	CABLE	JUMPER TYPE	CABLE LENGTH
A–1 L1900/G1900	ERICSSON AIR32 KRD901146–1_B66A_B2A	90°	0°	0°	120'–0"	LEFT ALPHA	0/0	HYBRID CABLES (2) 1–5/8" COAX	1/2" COAX	140'
A–2 L2100	**ERICSSON AIR3246 B66**	**90°**	**0°**	**0°**	**120'–0"**	**CENTER ALPHA**	**0/0**	(2) 1–5/8" COAX	1/2" COAX	140'
A–3 U2100/ L700/L600	**APXVAARR24_43–U–NA20**	**90°**	**0°**	**0°**	**120'–0"**	**RIGHT ALPHA**	**1/1**	(2) HYBRID CABLES	DC/FIBER	140'
B–1 L1900/G1900	ERICSSON AIR32 KRD901146–1_B66A_B2A	210°	0°	0°	120'–0"	LEFT BETA	0/0	(1) 1–5/8" COAX	1/2" COAX	140'
B–2 L2100	**ERICSSON AIR3246 B66**	**210°**	**0°**	**0°**	**120'–0"**	**CENTER BETA**	**0/0**	–	–	–
B–3 U2100/ L700/L600	**APXVAARR24_43–U–NA20**	**210°**	**0°**	**0°**	**120'–0"**	**RIGHT BETA**	**1/1**	(2) 1–5/8" COAX	1/2" COAX	140'
C–1 L1900/G1900	ERICSSON AIR32 KRD901146–1_B66A_B2A	330°	0°	0°	120'–0"	LEFT GAMMA	0/0	(2) 1–5/8" COAX	1/2" COAX	140'
C–2 L2100	**ERICSSON AIR3246 B66**	**330°**	**0°**	**0°**	**120'–0"**	**CENTER GAMMA**	**0/0**	(2) 1–5/8" COAX	1/2" COAX	140'
C–3 U2100/ L700/L600	**APXVAARR24_43–U–NA20**	**330°**	**0°**	**0°**	**120'–0"**	**RIGHT GAMMA**	**1/1**	–	–	–

NOTE:
AT TIME OF CONSTRUCTION, CONTRACTOR TO VERIFY AZIMUTHS OF EXISTING ANTENNAS. IF DIFFERENT FROM RFDS, PLEASE NOTIFY THE RF ENGINEER AND CONSTRUCTION MANAGER WITH ACTUAL AZIMUTHS TO ENSURE T–MOBILE'S DATABASE IS ACCURATE AND UP–TO–DATE.

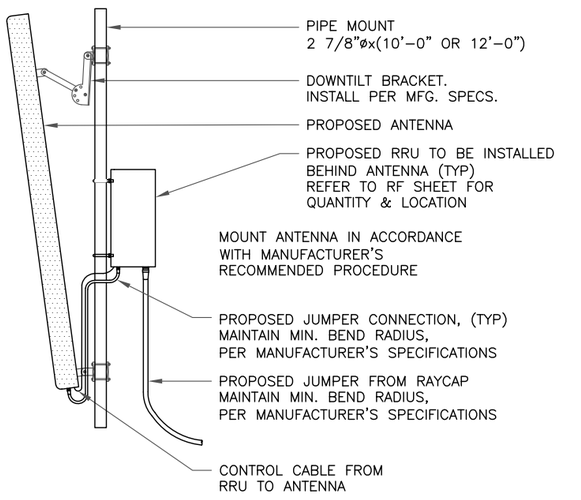
1 ANTENNA, RRU & TMA SCHEDULE

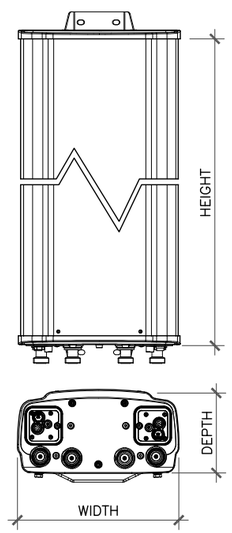
SCALE: N.T.S.

EQUIPMENT NOTES:

1. THE HYBRID CABLE LENGTH SHOWN IS ONLY AN ESTIMATE AND SHOULD NOT BE USED FOR ORDERING MATERIALS. CONFIRM THE REQUIRED HYBRID CABLE LENGTH WITH T–MOBILE PROIR TO ORDERING OR INSTALLATION.
2. THE CONTRACTOR SHALL TEST THE OPTICAL FIBER AFTER INSTALLATION IN ACCORDANCE WITH T–MOBILE STANDARDS AND SUPPLY THE RESULTS TO T–MOBILE.
3. THE CONTRACTOR SHALL CONFIRM THE TOWER TOP EQUIPMENT LIST ABOVE WITH THE FINAL T–MOBILE RFDS PRIOR TO INSTALLATION.
4. ALL EXISTING AND PROPOSED ANTENNA CABLES SHALL BE COLOR CODED PER T–MOBILE STANDARDS.
5. REFER TO EQUIPMENT MANUFACTURER'S SPECIFICATION SHEETS FOR ADDITIONAL INFORMATION NOT LISTED ABOVE.

67D92M CONFIGURATION TOWER LOADING SUMMARY				
EXISTING QUANTITY	REMOVE QUANTITY	EQUIPMENT TYPE	ADD QUANTITY	TOTAL QUANTITY
9	6	PANEL ANTENNA	6	9
3	3	RRUs	3	3
3	0	TMA	0	3





ANTENNA DIMENSIONS (INCHES)				
MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
APXVARR24_43–U–NA20	95.9"	24"	8.7"	128 lbs
AIR3246 B66	58.1"	15.75"	9.4"	50.7 lbs

NOTES:
1. VERIFY ANTENNA DIMENSIONS WITH MANUFACTURER.
2. ANTENNA MOUNTING KIT FOR 2 TO 4.5 O.D. MAST (RFS, MODEL #APM40–2) (QTY. 2)
3. LOCKING TILT MOUNT KIT 0–13 DEGREES DOWNTILT ANGLE
4. VERIFY FINAL ANTENNA MODEL WITH CURRENT VERSION OF THE RFDS.

2 ANTENNA DETAILS

SCALE: N.T.S.

B+T GRP

T···Mobile

CROWN CASTLE

CT11178D
BU #: 829013

WEST HARTFORD-I-84-X43

467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

EXISTING MONOPOLE

PROJECT NO:	127044.001.01
CHECKED BY:	RPS

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
A	8/9/18	FWP	PRELIMINARY REVIEW
0	9/6/18	FWP	CONSTRUCTION

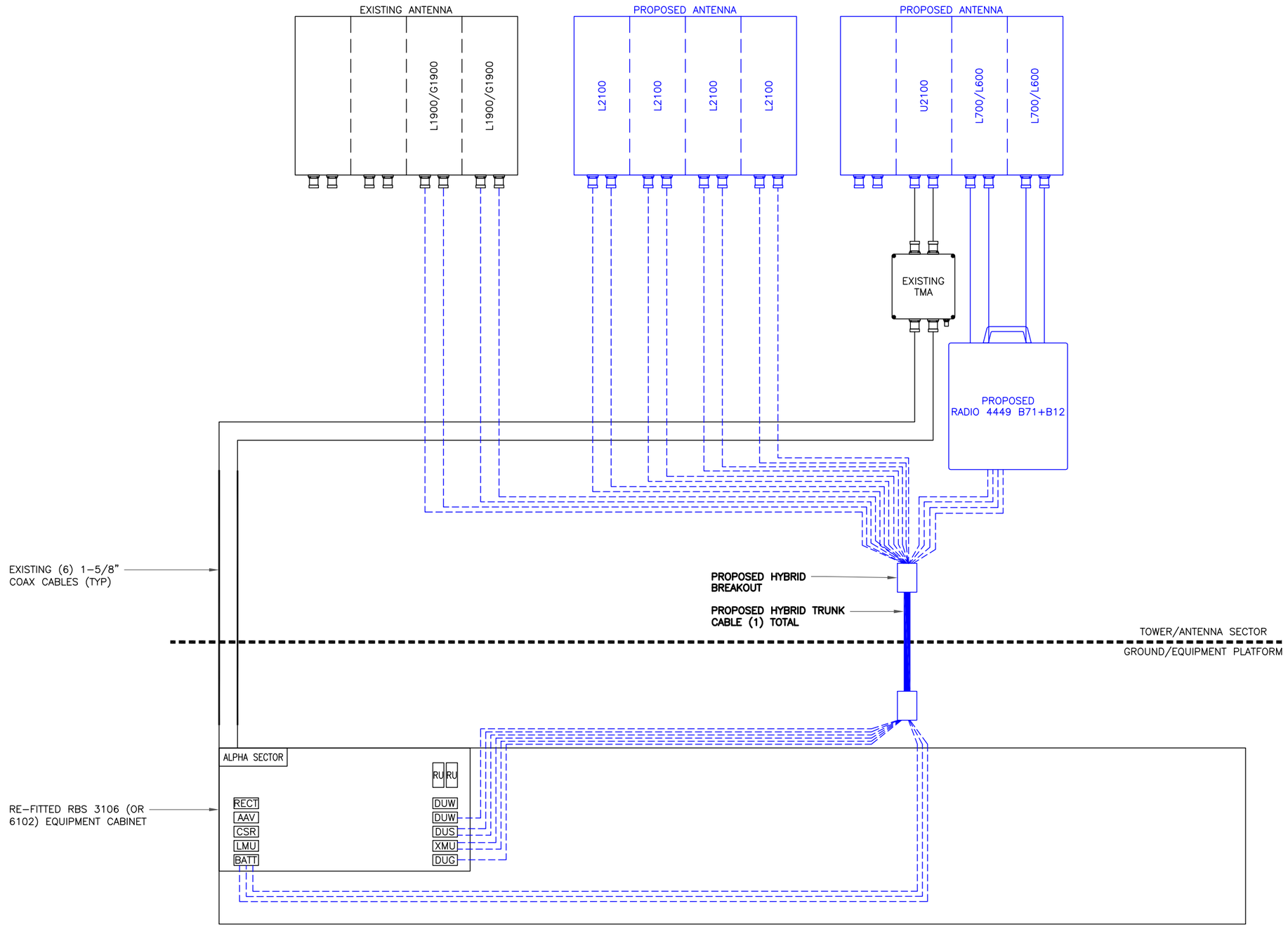
B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/19

STATE OF CONNECTICUT
31627
LICENSED PROFESSIONAL ENGINEER
9/6/18

SHEET NUMBER:	REVISION:
C-4	0

NOTES:
1. TAG ALL EXISTING AND PROPOSED CABLES/JUMPERS PER T–MOBILE SPECIFICATIONS.
2. SEE RF SCHEDULE FOR CABLE AND JUMPER LENGTHS.
3. REFER TO ANTENNA ORIENTATION ON SHEET C–3 FOR EXACT ANTENNA POSITIONING.

ALPHA SECTOR (TYP PER SECTOR)



1 67D92M ANTENNA & CABLING SCHEMATIC (TYP PER SECTOR)
SCALE: N.T.S.

B+T GRP

T···Mobile

CROWN CASTLE

CT11178D
BU #: 829013

WEST HARTFORD-I-84-X43

467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

EXISTING MONOPOLE

PROJECT NO:	127044.001.01
CHECKED BY:	RPS

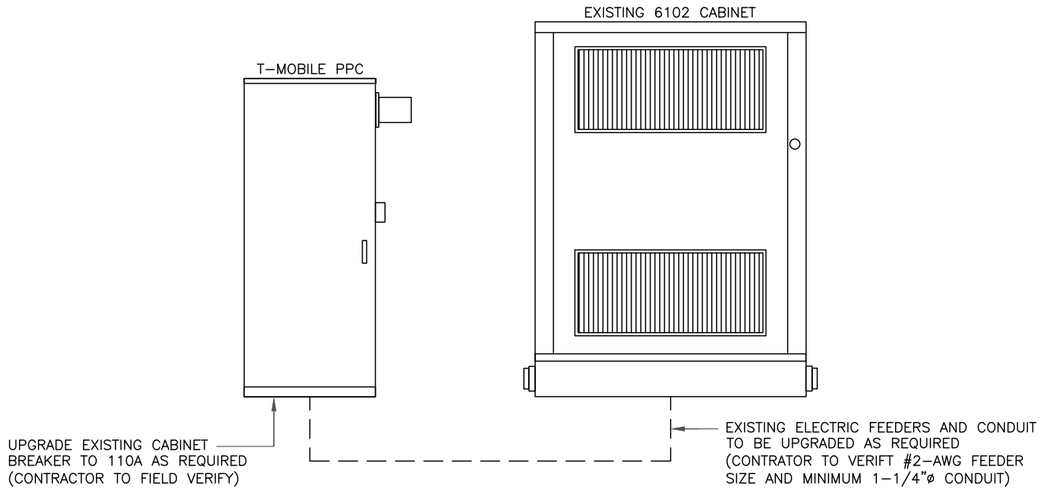
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
A	8/9/18	FWP	PRELIMINARY REVIEW
0	9/6/18	FWP	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/19

STATE OF CONNECTICUT 31627 LICENSED PROFESSIONAL ENGINEER 9/6/18

SHEET NUMBER: C-5
REVISION: 0



1 ONE-LINE DIAGRAM

SCALE: N.T.S.

B+T GRP

T···Mobile

CROWN CASTLE

CT11178D
BU #: 829013

WEST HARTFORD-I-84-X43

467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

EXISTING MONOPOLE

PROJECT NO:	127044.001.01
CHECKED BY:	RPS

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
A	8/9/18	FWP	PRELIMINARY REVIEW
0	9/6/18	FWP	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/19

STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER
9/6/18

SHEET NUMBER: E-1

REVISION: 0

GENERAL ELECTRICAL NOTES:

1. SCOPE:
PROVIDE LABOR, MATERIALS AND EQUIPMENT, ETC. REQUIRED TO COMPLETE THE INSTALLATION SHOWN ON THE DRAWINGS.

2. CODE AND STANDARDS:
INSTALLATION SHALL COMPLY WITH APPLICABLE LAWS AND ORDINANCES, UTILITY COMPANY REGULATIONS AND APPLICABLE REQUIREMENTS OF THE LATEST EDITIONS OF THE:
A. NFC– NATIONAL FIRE CODES
B. UL– UNDERWRITERS LABORATORY
C. NEC– NATIONAL ELECTRIC CODE
D. NEMA– NATIONAL ELECTRIC MANUFACTURERS ASSOCIATION
E. OSHA– OCCUPATIONAL SAFETY AND HEALTH ACT
F. IBC– INTERNATIONAL BUILDING CODE

3. PERMITS:
OBTAIN AND PAY FOR REQUIRED PERMITS, LICENSES, FEES, INSPECTIONS, ETC.

4. COORDINATION:
COORDINATE WORK WITH OTHER TRADES.

5. SUBMITTALS:
SUBMIT BROCHURE FOR APPROVAL ON SERVICE DISCONNECTING MEANS AND OTHER MAJOR SYSTEM COMPONENTS.

6. EXISTING SERVICES:
DO NOT INTERRUPT EXISTING SERVICES WITHOUT WRITTEN PERMISSION OF THE OWNER.

7. EQUIPMENT:
CONNECT ELECTRICALLY OPERATED EQUIPMENT.

8. RECORD DRAWINGS:
MAINTAIN A RECORD OF ALL CHANGES & SUBSTITUTIONS BETWEEN WORK AS SPECIFIED AND INSTALLED. RECORD CHANGED ON A CLEAN SET ON CONTRACT DOCUMENTS WHICH SHALL BE TURNED OVER TO THE CONSTRUCTION MANAGER UPON COMPLETION OF THE PROJECT.

9. IDENTIFICATION:
IDENTIFY SERVICE DISCONNECTING MEAN WITH PERMANENT NAMEPLATE.

10. GUARANTEE/WARRANTY:
GUARANTEE INSTALLATION TO BE FREE OF DEFECTS, SHORTS, GROUNDS, ETC, FOR A PERIOD OF ONE YEAR. FURNISH WARRANTY SO THE DEFECTIVE MATERIAL AND/OR WORKMANSHIP WILL BE REPAIRED IMMEDIATELY UPON NOTIFICATION AT NO COST TO THE OWNER FOR PERIOD OF WARRANTY.

11. CUTTING AND PATCHING:
PROVIDE CUTTING REQUIRED TO DO THE WORK. DO NOT CUT MAJOR STRUCTURAL ELEMENTS WITHOUT APPROVAL. PATCHING SHALL BE OF QUALITY EQUAL TO AND OF MATCHING APPEARANCE WITH EXISTING CONSTRUCTION.

12. DITCHING & BACKFILL:
PROVIDE FOR ALL UNDERGROUND INSTALLED CONDUIT AND/OR CABLES.

13. RACEWAYS:
UNDERGROUND CONDUIT SHALL BE SCHEDULE 40 PVC CONDUIT (MEET NEMA TC2–1990). EXPOSED CONDUIT SHALL BE RIGID GALVANIZED STEEL CONDUIT BEFORE RISING ABOVE GRADE. PLUG AND CAP EACH END OF SPARE AND EMPTY CONDUITS AND PROVIDE TWO SEPARATE PULL STRINGS – 200 LB. TEST POLYETHYLENE CORD. ALL CONDUIT BENDS SHALL BE A MINIMUM OF 24" RADIUS. RGS CONDUITS, WHEN SPECIFIED, SHALL MEET UL–6 FOR GALVANIZED STEEL. ALL FITTINGS SHALL BE SUITABLE FOR USE WITH THREADED RIGID CONDUIT.

14. SUPPORTS:
AS REQUIRED BY THE NEC.

15. CONDUCTORS:
USE 98% CONDUCTIVITY COPPER WITH TYPE XHHW–2 INSULATION, 600V COLOR CODED. USE SOLID CONDUCTORS FOR WIRE UP TO AND INCLUDING #8 AWG. USE STRANDED CONDUCTORS FOR WIRE ABOVE #8 AWG.

16. CONNECTORS FOR POWER CONDUCTORS:
USE PRESSURE TYPE INSULATED TWIST–ON CONNECTORS FOR #10 AWG AND SMALLER. USE SOLDERLESS MECHANICAL TERMINAL LUGS FOR #8 AWG AND LARGER.

17. SERVICE:
240/120V, SINGLE PHASE, 3 WIRE CONNECTION AVAILABLE FROM UTILITY COMPANY. COORDINATE AND PAY ALL FEES.

18. TELEPHONE SERVICE:
PROVIDE EMPTY CONDUITS WITH PULL WIRES AS INDICATED ON DRAWINGS.

19. UTILITY FRAME METER CENTER:
(AS REQUIRED) PROVIDED BY OWNER, INSTALLED BY CONTRACTOR. THE ELECTRICAL DESIGN IN THESE DRAWINGS IS BASED ON A METER CENTER CONFIGURED AS FOLLOWS:

A. A NEMA 3R ENCLOSURE, MOUNTED ON THE FRONT SIDE OF AN EQUIPMENT FRAME INCORPORATING 120/240V, 200A METER SOCKETS AND CIRCUIT BREAKER HOUSINGS. EACH METER/CIRCUIT BREAKER COMBINATION SHALL PROVIDE SERVICE TO ONE (1) CARRIER (OR TOWER LIGHTING, AS REQUIRED). METERS ARE TO BE PROVIDED BY LOCAL POWER COMPANY.

B. TOWERS REQUIRING FAA LIGHTING SHALL BE ALLOCATED ONE METER SOCKET AND CIRCUIT BREAKER HOUSING IN THE METER BANK, CIRCUIT BREAKER TO BE SIZED AS REQUIRED FOR TOWER LIGHTING EQUIPMENT. METER IS TO BE PROVIDED BY LOCAL POWER COMPANY.

20. UTILITY FRAME TELCO CABINET:
PROVIDED BY OWNER, INSTALLED BY CONTRACTOR. THE ELECTRICAL DESIGN ON THESE DRAWINGS IS BASED ON A TELCO CABINET CONFIGURED AS FOLLOWS:

A. A NEMA 3R ENCLOSURE SHALL INCLUDE A 3/4" THICK PLYWOOD BACKBOARD SIZED TO FIT CABINET. A PRE–WIRED 20A, 120V, GFCI DUPLEX RECEPTACLE, SURGE PROTECTORS AND A GROUND BAR. TELCO CABINET SHALL BE MOUNTED TO THE UTILITY SERVICE FRAME.

B. THE TELEPHONE CABINET SHALL ACCOMMODATE ALL TELEPHONE LINES (PROPOSED AND FUTURE) AND CONNECTIONS FOR THEM.

21. POWER CABINET:
PROVIDED BY OWNER, INSTALLED BY CONTRACTOR. THE ELECTRICAL DESIGN ON THESE DRAWINGS IS BASED ON A POWER CABINET CONFIGURED AS FOLLOWS:

A. A NEMA 3R ENCLOSURE SHALL INCLUDE A 120/240V, 1 PHASE, 200A MAIN BREAKER LOAD CENTER. POWER CABINET SHALL BE MOUNTED TO THE EQUIPMENT SLED SERVICE FRAME. SURGE PROTECTION AND A 20A/120V WEATHERPROOF GFCI RECEPTACLE SHALL ALSO BE MOUNTED TO THE EQUIPMENT SERVICE SLED FRAME.

B. LOAD CENTER SHALL HAVE A DOOR TO ALLOW ACCESS TO INTERNAL COMPONENTS.

C. PROVIDE A GROUND WIRE SIZED PER NEC IN ALL CIRCUITS OVER 20 AMPS AND IN ALL CIRCUIT RUNS IN PVC.

22. TELCO CABINET:
PROVIDED BY OWNER, INSTALLED BY CONTRACTOR. THE ELECTRIDAL DESIGN ON THESE DRAWINGS IS BASED ON A TELCO CABINET AS FOLLOWS:

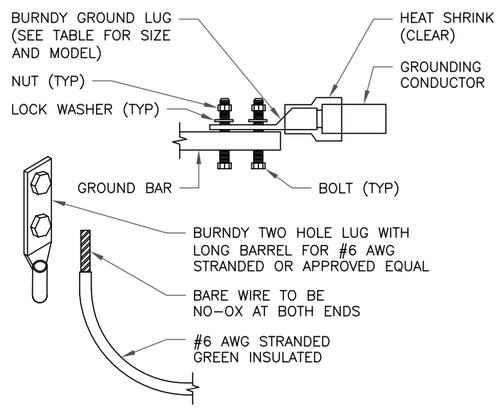
A. A NEMA 3R ENCLOSURE SHALL INCLUDE A 3/4" THICK PLYWOOD BACKBOARD SIZED TO FIT A CABINET. A PRE–WIRED 20A, 120V, GFCI DUPLEX RECEPTACLE (IF REQUIRED), SURGE PROTECTORS AND A GROUND BAR. TELCO CABINET SHALL BE MOUNTED TO THE EQUIPMENT SLED SERVICE FRAME.

B. THE TELEPHONE COMPANY SHALL ACCOMMODATE ALL TELEPHONE LINE (PROPOSED AND FUTURE) AND CONNECTIONS FOR THEM.

WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C–2TC38	3/8" – 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C–2TC38	3/8" – 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C–2TC38	3/8" – 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26–2TC38	3/8" – 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28–2N	1/2" – 16 NC S 2 BOLT

NOTES:

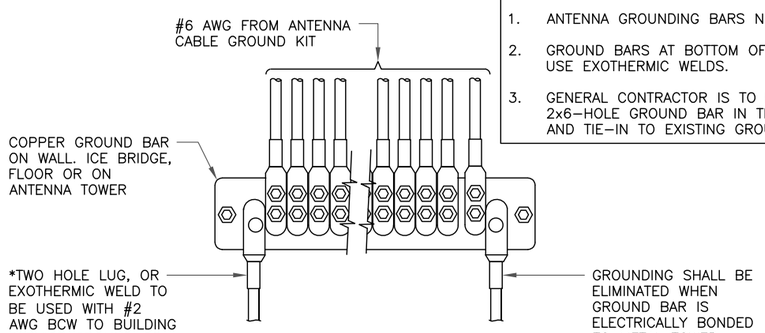
1. ALL HARDWARE BOLTS, NUTS, LOCK WASHERS SHALL BE STAINLESS STEEL. ALL HARDWARE ARE TO BE AS FOLLOWS: BOLT, FLAT WASHER, GROUND BAR, GROUND LUG, FLAT WASHER AND NUT.
2. COPPER SHIELD, ANTIOX, CR NO–OX OR APPROVED EQUAL SHALL BE PLACE WHERE ALL DISSIMILAR METALS CONNECT.
3. ALL LUGS ARE TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS.



1 MECHANICAL LUG CONNECTION
SCALE: N.T.S.

NOTES:

1. ANTENNA GROUNDING BARS NOT TO USE INSULATORS.
2. GROUND BARS AT BOTTOM OF TOWERS SHALL ONLY USE EXOTHERMIC WELDS.
3. GENERAL CONTRACTOR IS TO FURNISH AND INSTALL A 2x6–HOLE GROUND BAR IN THE GBF OF THE RBS AND TIE–IN TO EXISTING GROUND RING.



2 GROUNDWIRE INSTALLATION
SCALE: N.T.S.

B+T GRP

T···Mobile

CROWN CASTLE

CT11178D
BU #: 829013

WEST HARTFORD-I-84-X43

467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

EXISTING MONOPOLE

PROJECT NO:	127044.001.01
CHECKED BY:	RPS

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
A	8/9/18	FWP	PRELIMINARY REVIEW
0	9/6/18	FWP	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/19

STATE OF CONNECTICUT 31627 LICENSED PROFESSIONAL ENGINEER 9/6/18

SHEET NUMBER:	REVISION:
G-1	0

GENERAL REQUIREMENTS SECTION 01 10 00:

PART 1 GENERAL

1.1 INTENT:

A. THESE SPECIFICATIONS AND CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE DONE AND THE MATERIALS TO BE FURNISHED FOR CONSTRUCTION. PLANS ARE NOT TO BE SCALED.

B. THE DRAWINGS AND SPECIFICATIONS ARE INTENDED TO BE FULLY EXPLANATORY AND SUPPLEMENTARY, HOWEVER, SHOULD ANYTHING BE SHOWN, INDICATED OR SPECIFIED ON ONE AND NOT THE OTHER, IT SHALL BE DONE THE SAME AS IF SHOWN, INDICATED OR SPECIFIED IN BOTH.

C. THE INTENTION OF DOCUMENTS IS TO INCLUDE ALL LABOR AND MATERIALS REASONABLY NECESSARY FOR THE PROPER EXECUTION AND COMPLETION OF THE WORK AS STIPULATED IN THE CONTRACT.

D. CONFLICTS: THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL MEASUREMENTS AT THE SITE BEFORE ORDERING MATERIAL OR DOING ANY WORK. NO COMPENSATION SHALL BE ALLOWED DUE TO DIFFERENCE BETWEEN ACTUAL DIMENSIONS AND THOSE ON THE DOCUMENTS. ANY DISCREPANCY SHALL BE REPORTED TO THE OWNER OR HIS AGENT FOR CONSIDERATION.

1.2 LICENSING REQUIREMENTS:

THE CONTRACTOR IS RESPONSIBLE FOR PROCUREMENT AND MAINTAINING OF ALL APPLICABLE LICENSES AND BONDS.

1.3 STORAGE:

ALL MATERIALS MUST BE STORED IN A LEVEL AND DRY FASHION THAT DOES NOT OBSTRUCT THE FLOW OF OTHER WORK. ANY STORAGE METHOD MUST MEET ALL RECOMMENDATIONS OF THE ASSOCIATED MANUFACTURER.

1.4 CLEAN UP:

THE CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATION OF WASTE MATERIALS OR RUBBISH AT ALL TIMES. TRASH MUST BE REMOVED DAILY.

1.5 QUALITY ASSURANCE:

ALL WORK SHALL BE IN ACCORDANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.

PART 2 PRODUCTS – NOT APPLICABLE TO THIS SECTION

PART 3 EXECUTION – NOT APPLICABLE TO THIS SECTION

ELECTRICAL SECTION 16000:

PART 1 GENERAL

1.1 GENERAL CONDITIONS:

A. THE CONTRACTOR SHALL INSPECT THE SITE WHERE THIS WORK IS TO BE PERFORMED AND FULLY FAMILIARIZE HIMSELF WITH ALL CONDITIONS RELATED TO THIS PROJECT.

B. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS AND LICENSES AND SHALL MAKE ALL DEPOSITS AND PAY ALL FEES REQUIRED FOR THE PERFORMANCE OF WORK UNDER THIS SECTION.

C. DRAWINGS SHOW THE GENERAL ARRANGEMENT OF ALL SYSTEMS AND COMPONENTS COVERED UNDER THIS SECTION. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS. DRAWINGS SHALL NOT BE SCALED TO DETERMINE DIMENSIONS.

1.2 LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES

A. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, AND ALL APPLICABLE LOCAL LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES.

1.3 REFERENCES:

A. THE PUBLICATIONS LISTED BELOW FORM PART OF THIS SPECIFICATION. EACH PUBLICATION SHALL BE THE LATEST REVISION AND ADDENDUM IN EFFECT ON THE DATE OF THIS SPECIFICATION IS ISSUED FOR CONSTRUCTION UNLESS OTHERWISE NOTED. EXCEPT AS MODIFIED BY THE REQUIREMENTS SPECIFIED HEREIN OR THE DETAILS OF THE DRAWINGS, WORK INCLUDED IN THIS SPECIFICATION SHALL CONFIRM TO THE APPLICABLE PROVISIONS OF THESE PUBLICATIONS.

1. ANSI/IEEE (AMERICAN NATIONAL STANDARDS INSTITUTE)
2. IEEE (INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS)
3. ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)
4. ICEA (INSULATED CABLE ENGINEERS ASSOCIATION)
5. NEMA (NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION)
6. NFPA (NATIONAL FIRE PROTECTION ASSOCIATION)
7. OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION)
8. UL (UNDERWRITERS LABORATORIES, INC.)

1.4 SCOPE OF WORK:

A. WORK UNDER THIS SECTION SHALL CONSIST OF FURNISHING ALL LABOR, MATERIAL AND ASSOCIATED SERVICES REQUIRED TO COMPLETELY CONSTRUCT AND LEAVE READY FOR OPERATION SYSTEMS AS SHOWN ON THE DRAWINGS AND HEREIN DESCRIBED.

B. ALL ELECTRICAL EQUIPMENT UNDER THIS CONTRACT SHALL BE PROPERLY TESTED, ADJUSTED AND ALIGNED BY THE CONTRACTOR.

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATING, DRAINING, TRENCHES, BACKFILLING, AND REMOVAL AND EXCESS DIRT.

D. THE CONTRACTOR SHALL FURNISH TO THE OWNER, CERTIFICATES OF FINAL INSPECTION AND APPROVAL FROM THE INSPECTION AUTHORITIES HAVING JURISDICTION.

PART 2 PRODUCTS

2.1 GENERAL:

A. ALL ITEMS OF MATERIALS AND EQUIPMENT SHALL BE NEW, FREE FROM DEFECTS AND OF THE BEST QUALITY NORMALLY USED FOR THE PURPOSE IN GOOD COMMERCIAL PRACTICE.

B. ALL MATERIALS AND EQUIPMENT SHALL BE ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION AS SUITABLE FOR THE USE INTENDED.

C. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE.

D. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING RATING EQUAL TO OR GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 10,000 AIC MINIMUM. VERIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT.

2.2 MATERIALS AND EQUIPMENT:

A. CONDUIT:

1. RIGID GALVANIZED STEEL CONDUIT (RGS) SHALL BE HOT-DIP GALVANIZED INSIDE AND OUTSIDE INCLUDING ENDS AND THREADS AND ENAMELED OR LACQUERED INSIDE IN ADDITION TO GALVANIZING.
2. FLEXIBLE METAL CONDUIT SHALL BE GALVANIZED, ZINC-COATED STEEL, PVC COATED FOR OUTDOOR APPLICATIONS.
3. CONDUIT CLAMPS, STRAPS AND SUPPORTS SHALL BE STEEL OR MALLEABLE IRON. ALL FITTINGS SHALL BE COMPRESSION TYPE AND WATERTIGHT.
4. NON-METALLIC CONDUIT FITTINGS SHALL BE SCHEDULE 40 PVC, HEAVY-WALL RIGID WITH SOLVENT-CEMENT-TYPE JOINTS AS RECOMMENDED BY THE MANUFACTURER.

B. WIRE AND CABLE:

1. WIRE AND CABLE SHALL BE FLAME-RETARDANT, MOISTURE AND HEAT RESISTANT THERMOPLASTIC, SINGLE CONDUCTOR, COPPER, TYPE THHN/THWN, 600 VOLT, SIZES AS INDICATED, #12 AWG MINIMUM.
2. #10 AWG AND SMALLER CONDUCTORS SHALL BE SOLID AND #8 AWG AND LARGER CONDUCTORS SHALL BE STRANDED.
3. SOLDERLESS, PRESSURE-TYPE CONNECTORS CONSTRUCTED OF HIGH-STRENGTH, NON-CORRODIBLE, TIN-PLATED COPPER DESIGNED TO FURNISH HIGH-PULLOUT STRENGTH AND HIGH CONDUCTIVITY JOINTS SHALL BE USED.
4. SUPPORT GRIPS SHALL BE SINGLE WEAVE, CLOSED MESH, HIGH-GRADE, NON-MAGNETIC, TIN-COATED BRONZE, CAPABLE OF SUPPORTING TEN TIMES THE CABLE DEAD WEIGHT, HUBBELL KELLEMS OR APPROVED EQUAL.

C. DISCONNECT SWITCHES:

1. DISCONNECT SWITCHES SHALL BE HEAVY DUTY, DEAD-FRONT, QUICK-MAKE, QUICK-BREAK, EXTERNALLY OPERABLE, HANDLE LOCKABLE AND INTERLOCKED WITH COVER IN CLOSED POSITION, RATING AS INDICATED, UL LABELED FURNISHED IN NEMA 3R ENCLOSURE, SQUARE D CLASS 3110 OR APPROVED EQUAL.

D. SYSTEM GROUNDING:

1. GROUNDING CONDUCTOR SHALL BE BARE, SOLID TINNED COPPER, SIZE AS INDICATED, EXCEPT ABOVE GROUND GROUNDING CONDUCTORS SHALL BE INSULATED.
2. GROUND BUSSES SHALL BE BARE ANNEALED COPPER BARS OF RECTANGULAR CROSS SECTION.
3. CONNECTORS SHALL BE HIGH-CONDUCTIVITY, HEAVY DUTY, LISTED AND LABELED AS GROUNDING CONNECTORS FOR THE MATERIALS USED. USE TWO-HOLE COMPRESSION LUGS WITH HEAT SHRINK FOR MECHANICAL CONNECTIONS.
4. EXOTHERMIC WELDED CONNECTIONS SHALL BE PROVIDED IN KIT FORM AND SELECTED FOR THE SPECIFIC TYPES, SIZES, AND COMBINATIONS OF CONDUCTORS AND OTHER ITEMS TO BE CONNECTED.
5. GROUND RODS SHALL BE COPPER-CLAD STEEL WITH HIGH-STRENGTH STEEL CORE AND ELECTROLYTIC-GRADE COPPER OUTER SHEATH, MOLTEN WELDED TO CORE, 3/4"x10'-0".

E. OTHER MATERIALS:

1. THE CONTRACTOR SHALL PROVIDE OTHER MATERIALS, THOUGH NOT SPECIFICALLY DESCRIBED, WHICH ARE REQUIRED FOR A COMPLETELY OPERATIONAL SYSTEM AND PROPER INSTALLATION OF THE WORK.

B+T GRP

T···Mobile

CROWN CASTLE

CT11178D
BU #: 829013

WEST HARTFORD-I-84-X43

467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

EXISTING MONOPOLE

PROJECT NO:	127044.001.01
CHECKED BY:	RPS

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
A	8/9/18	FWP	PRELIMINARY REVIEW
0	9/6/18	FWP	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/19

STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER
9/6/18

SHEET NUMBER:	REVISION:
SP-1	0

PART 3 EXECUTION

3.1 GENERAL:

A. ALL MATERIALS AND EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE W/ THE MANUFACTURER'S RECOMMENDATION

B. EQUIPMENT SHALL BE TIGHTLY COVER AND PROTECTED AGAINST DIRT OR WATER, AND AGAINST CHEMICAL OR MECHANICAL INJURY DURING INSTALLATION AND CONSTRUCTION PERIODS.

3.2 LABOR AND WORK:

A. ALL LABOR FOR THE INSTALLATION OF MATERIALS AND EQUIPMENT FURNISHED FOR THE ELECTRICAL SYSTEM SHALL BE DONE BY EXPERIENCED MECHANICS OF THE PROPER TRADES.

B. ALL ELECTRICAL EQUIPMENT FURNISHED SHALL BE ADJUSTED, ALIGNED AND TESTED BY THE CONTRACTOR AS REQUIRED TO PRODUCE THE INTENDED PERFORMANCE.

C. UPON COMPLETION OF THE WORK, THE CONTRACTOR SHALL THOROUGHLY CLEAN ALL EXPOSED EQUIPMENT, REMOVE ALL LABELS AND ANY DEBRIS, CRATING OR CARTONS AND LEAVE THE INSTALLATION FINISHED AND READY FOR OPERATION.

3.3 COORDINATION:

A. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ELECTRICAL ITEMS WITH THE OWNER–FURNISHED EQUIPMENT DELIVERY SCHEDULE TO PREVENT UNNECESSARY DELAYS IN THE TOTAL WORK.

3.4 INSTALLATION:

A. CONDUIT

1. ALL ELECTRICAL WIRING SHALL BE INSTALLED IN CONDUIT AS HEREIN SPECIFIED. NO CONDUIT OR TUBING OF LESS THAN 3/4 INCH NOMINAL SIZE SHALL BE USED.
2. PROVIDE RGS CONDUIT FOR ALL EXPOSED, EXTERIOR CONDUIT.
3. PROVIDE SCHEDULE 40 PVC OR RGS CONDUIT BELOW GRADE, 1" MINIMUM, UNLESS NOTED OTHERWISE. ALL 90 DEGREE BENDS TO ABOVE GRADE SHALL BE RGS, MINIMUM BURIAL DEPTH SHALL BE 30" CLEAR TO TOP OF CONDUIT, UNLESS NOTED OTHERWISE.
4. USE GALVANIZED FLEXIBLE STEEL CONDUIT WHERE DIRECT CONNECTION IS NOT DESIRABLE FOR REASONS EQUIPMENT MOVEMENT, VIBRATION OR FOR EASE OF MAINTENANCE. USE LIQUIDTIGHT, PVC COATED FLEXIBLE METAL CONDUIT FOR OUTDOOR APPLICATIONS.
5. INSTALL GALVANIZED FLEXIBLE STEEL CONDUIT AT ALL POINTS OF CONNECTION TO EQUIPMENT MOUNTED ON SUPPORTS TO ALLOW FOR EXPANSION AND CONTRACTION.
6. A RUN OF CONDUIT BETWEEN BOXES OR FITTINGS SHALL NOT CONTAIN MORE THE EQUIVALENT OF FOUR QURATER–BENDS INCLUDING THOSE BENDS LOCATED IMMEDIATELY AT THE BOX OR FITTING. THE RADIUS OF BENDS SHALL NEVER BE SHORTER THAN THAT OF THE CORRESPONDING TRADE ELBOW.
7. WHERE CONDUIT HAS TO BE CUT IN THE FIELD, IT SHALL BE CUT SQUARE WITH A PIPE CUTTER USING CUTTING KNIVES.
8. ALL CONDUITS SHALL BE SWABBED CLEAN BY PULLING AN APPROPRIATE SIZE MANDREL THROUGH THE CONDUIT BEFORE INSTALLATION OF WIRE OR CABLE. CLEAR ALL BLOCKAGES AND REMOVE BURRS, DIRT AND DEBRIS.
9. INSTALL MULE TAPE IN ALL EMPTY CONDUIT IDENTIFY PULL STRINGS AT EACH END WITH ITS DESTINATION.
10. PROVIDE INSULATED GROUNDING BUSHINGS OR ALL CONDUITS STUBBED INTO EQUIPMENT ENCLOSURES OR STUBBED OUT FOR FUTURE USE BY OTHERS.
11. CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL CONDUITS DURING CONSTRUCTION. TEMPORARY OPENINGS IN THE CONDUIT SYSTEM SHALL BE PLUGGED OR CAPPED TO PREVENT ENTRANCE OF MOISTURE OR FOREIGN MATTER. CONTRACTOR SHALL REPLACE ANY CONDUIT CONTAINING FOREIGN MATERIALS THAT CANNOT BE REMOVED.
12. INSTALL 3" RED METALLIC LOCATOR TAPE 12" ABOVE ALL UNDERGROUND CONDUIT AND WIRE.
13. CONDUITS SHALL BE INSTALLED IN SUCH A MANNER AS TO INSURE AGAINST COLLECTION OF TRAPPED CONDENSATION.

B. WIRE AND CABLE:

1. ALL POWER WIRING SHALL BE COLOR CODED AS FOLLOWS

DESCRIPTION	120/270V	208Y/120V	480Y/277V
PHASE A	BLACK	BLACK	BROWN
PHASE B	RED	RED	ORANGE
PHASE C		BLUE	YELLOW
NEUTRAL	WHITE	WHITE	GRAY
GROUND	GREEN	GREEN	GREEN

2. SPLICES SHALL BE MADE ONLY AT OUTLETS, JUNCTION BOXES OR ACCESSIBLE RACEWAYS WITH PRESSURE–TYPE CONNECTORS.
3. PULLING LUBRICANT SHALL BE SOAPSTONE POWDER, POWDERED TALC OR A COMMERCIAL PULLING COMPOUND. NO SOAP SUDS, SOAP FLAKES, OIL OR GREASE SHALL BE USED, AS THESE MAY BE HARMFUL TO CABLE INSULATION. CONTRACTOR SHALL USE NYLON OR HEMP ROPE FOR PULLING CABLE TO AVOID SCORING THE CONDUIT.
4. CABLES SHALL BE NEATLY TRAINED, WITHOUT INTERLACING, AND BE OF SUFFICIENT LENGTH IN ALL BOXES, EQUIPMENT. ETC. TO PERMIT MAKING A NEAT ARRANGEMENT. CABLES SHALL BE SECURED IN A MANNER TO AVOID TENSION ON CONDUCTORS OR TERMINALS AND SHALL BE PROTECTED FROM MECHANICAL INJURY AND FROM MOISTURE. SHARP BENDS OVER CONDUIT BUSHINGS ARE PROHIBITED. DAMAGED CABLES SHALL BE REMOVED AND REPLACE AT THE CONTRACTOR'S EXPENSE.

C. DISCONNECT SWITCHES:

1. INSTALL DISCONNECT SWITCHED LEVEL AND PLUMB. CONNECT TO WIRING SYSTEM AND GROUND AS INDICATED.

D. GROUNDING:

1. ALL METALLIC PARTS OF ELECTRICAL EQUIPMENT WHICH DO NOT CARRY CURRENT SHALL BE GROUNDED IN ACCORDANCE WITH THE REQUIREMENTS OF ARTICLE 250 OF THE NATIONAL ELECTRIC CODE.
2. PROVIDE ELECTRICAL GROUNDING AND BONDING SYSTEMS INDICATED WITH ASSEMBLY OF MATERIALS, INCLUDING GROUNDING ELECTRODES, BONDING JUMPERS AND ADDITIONAL ACCESSORIES AS REQUIRED FOR A COMPLETE INSTALLATION.
3. ROUTE GROUNDING CONNECTIONS AND CONDUCTORS TO GROUND IN THE SHORTEST AND STRAIGHTEST PATHS POSSIBLE TO MINIMIZE TRANSIENT VOLTAGE RISES.
4. TIGHTEN GROUNDING AND BONDING CONNECTORS, INCLUDING SCREWS AND BOLTS, IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED TORQUE TIGHTENING VALUES FOR CONNECTORS AND BOLTS. WHERE MANUFACTURE'S TORQUING REQUIREMENTS ARE NOT AVAILABLE, TIGHTEN CONNECTIONS TO COMPLY WITH TIGHTENING TORQUE VALUES SPECIFIED IN UL 486A TO ASSURE PERMANENT AND EFFECTIVE GROUNDING.
5. ALL UNDERGROUND GROUNDING CONNECTIONS SHALL BE MADE BY THE EXOTHERMIC WELD PROCESS AND INSTALL IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTION.
6. ALL GROUND CONNECTIONS SHALL BE INSPECTED FOR TIGHTNESS. EXOTHERMIC–WELDED CONNECTIONS SHALL BE APPROVED BY THE CONSTRUCTION INSPECTOR BEFORE BEING PERMANENTLY CONCEALED.
7. APPLY CORROSION–RESISTANT FINISH TO FIELD CONNECTION AND PLACES WHERE FACTORY APPLIED PROTECTIVE COATING HAVE BEEN DESTROYED. USE COPPER–BASED "NO–OX" OR APPROVED EQUAL.
8. A SEPARATE, CONTINUOUS, INSULATED EQUIPMENT GROUNDING CONDUCTOR SHALL BE INSTALLED IN ALL FEEDER AND BRACH CIRCUITS.
9. BOND ALL INSULATED GROUNDING BUSHINGS WITH A BARE #6 AWG GROUNDING CONDUCTOR TO A GROUND BUS OR GROUNDING LUG IN ENCLOSURE.
10. DIRECT BURIED GROUND CONDUCTORS SHALL BE INSTALLED AT A NOMINAL DEPTH OF 30" BELOW GRADE, UNLESS NOTED OTHERWISE.
11. ALL GROUNDING CONDUCTORS EMBEDDED IN OR PENETRATING CONCRETE SHALL BE INSULATED OR INSTALLED IN PVC CONDUIT.
12. INSTALL ELECTROLYTIC GROUNDING SYSTEM IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. REMOVE SEALING TAPE FROM LEACHING AND BREATHER HOLES, INSTALL PROTECTIVE BOX FLUSH WITH GRADE.
13. DRIVE GROUND RODS UNTIL TOPS ARE 30" BELOW FINAL GRADE.
14. GROUNDING CONDUCTOR TO EQUIP[MENT GROUND LUGS:
    1) BOLTED TO EQUIPMENT HOUSING WITH STAINLESS STEEL BOLTS AND LOCK WASHERS.
    2) ALL EQUIPMENT TO BE GROUNDED SHALL BE FREE OF PAINT OR ANY OTHER MATERIAL COVERING BARE METAL AT THE POINT OF CONNECTION.

3.5 ACCEPTANCE TESTING:

1. PROVIDE PERSONNEL AND EQUIPMENT, MAKE REQUIRED TESTS AND SUBMIT TEST REPORTS UPON COMPLETE OF TESTS.
2. WHEN MATERIAL AND/OR WORKMANSHIP IS FOUND NOT TO COMPLY WITH THE SPECIFIED REQUIREMENTS, THE NON–COMPLYING ITEMS SHALL BE REMOVED FROM THE JOBSITE AND REPLACED WITH THE ITEMS COMPLYING WITH THE SPECIFIED REQUIREMENTS PROMPTLY AFTER RECEIPT OF NOTICE OF SUCH NON–COMPLIANCE.

A. TEST PROCEDURES:

1. ALL FEEDERS SHALL HAVE THEIR INSULATION TESTED AFTER INSTALLATION, BUT BEFORE CONNECTION TO DEVICES. THE CONDUCTORS SHALL TEST FREE FROM SHORT CIRCUITS AND GROUNDS. TESTING SHALL BE FOR ONE MINUTE, USING 1000V DC. INVESTIGATE ANY VALUES LESS THAN 50 MEGOHMS.
2. PRIOR TO ENERGIZING CIRCUITRY, TEST WIRING DEVICES FOR ELECTRICAL CONTINUITY AND PROPER POLARITY CONNECTIONS.
3. MEASURE AND RECORD VOLTAGES BETWEEN PHASES AN BETWEEN PHASE WIRE AND NEUTRALS. SUBMIT A REPORT OF MAXIMUM AND MINIMUM VOLTAGES.
4. PERFORM GROUND TEST TO MEASURE GROUND RESISTANCE OF GROUNDING SYSTEM USING THE IEEE STANDARD 3–POINT "FALL –OF–POTENTIAL" METHOD. PROVIDE PLOTTED TEST VALUES AND LOCATION SKETCH. NOTIFY THE ENGINEER IMMEDIATELY IF MEASURED VALUE IS OVER 5 OHMS.

END OF SECTION

END OF SPECIFICATION

B+T GRP

T···Mobile

CROWN CASTLE

CT11178D
BU #: 829013

WEST HARTFORD-I-84-X43

467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

EXISTING MONOPOLE

PROJECT NO:	127044.001.01
CHECKED BY:	RPS

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
A	8/9/18	FWP	PRELIMINARY REVIEW
0	9/6/18	FWP	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/19

STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER
9/6/18

SHEET NUMBER:	REVISION:
SP-2	0

Date: **July 2, 2018**

Heather Simeone
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
(919) 661-6351

Subject: Structural Analysis Report

Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11178D
	Carrier Site Name:	West Hartford/I-84/X43
Crown Castle Designation:	**Crown Castle BU Number:**	829013
	Crown Castle Site Name:	West Hartford/I-84/X43
	Crown Castle JDE Job Number:	496734
	Crown Castle Work Order Number:	1591903
	Crown Castle Order Number:	433326 Rev. 6
Engineering Firm Designation:	**TEP Project Number:**	25680.161675
Site Data:	**467 South Quaker Lane (Church of St. Mark), West Hartford, Hartford County, CT 06110** **Latitude *41° 44' 55.59"*, Longitude *-72° 43' 52.86"*** **119 Foot - Monopole Tower**	

Dear Heather Simeone,

Tower Engineering Professionals 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 1211828, in accordance with order 433326, revision 6.

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.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code (2012 International Building Code) based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3.1 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category C and Risk Category II were used in this analysis.

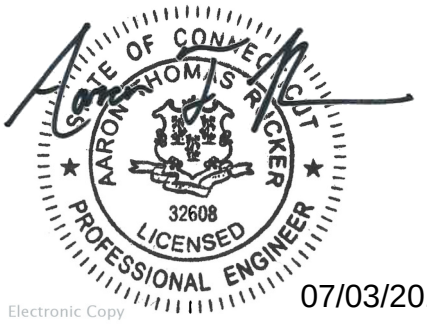
All modifications and equipment proposed in this report shall be installed in accordance with the appurtenances listed in Tables 1 and 2 and the attached drawing for the determined available structural capacity to be effective.

We at *Tower Engineering Professionals* 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: Alex Bramhall, E.I. / AAS

Respectfully submitted by:

Aaron T. Rucker, P.E.



Electronic Copy

07/03/2018

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1) INTRODUCTION

This tower is a 119-ft monopole tower designed by Pirod, Inc. in May of 2000. The tower was originally designed for a wind speed of 80 mph per EIA/TIA-222-F for the appurtenances listed in Table 3. The tower has been modified multiple times in the past to accommodate additional loading. TEP visited the site in July of 2014 to perform a rebar mapping. All information provided to TEP was assumed to be accurate and complete.

2) ANALYSIS CRITERIA

The analysis has been performed in accordance with the ANSI/TIA-222-G-2-2009 Structural Standard for Antenna Supporting Structures and Antennas – Addendum 2 using a nominal 3-second gust wind speed of 97 mph with no ice, 40 mph with 1.0 inch ice thickness, and 60 mph under service loads with the following design criteria:

Type of Analysis: **Rigorous Structural Analysis**
Classification of Structure: **Class II**
Exposure Category: **Exposure C**
Topographic Category: **Category 1**
Earthquake Category: **Not Considered**
Earthquake effects may be ignored per this standard for site locations where Ss does not exceed 1.0. (Hartford County Max Ss = 0.28).

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
120.0	120.0	3	RFS Celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe	2	1-1/2	1
		3	Ericsson	AIR 3246 B66 w/ Mount Pipe			
		3	Ericsson	KRY 112 144/2			
		3	Ericsson	Radio 4449 B12/B71			
		1	Tower Mounts	Handrail Kit			

Notes:
1) See “Appendix B - Base Level Drawing” for assumed feed line configuration.

Table 2 - Existing/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
120.0	120.0	3	Commscope	LNX-6515DS-VTM w/ Mount Pipe	1 1	1-5/8 7/8	3
		3	Ericsson	AIR 21 B2A B4P w/ Mount Pipe			
		3	Ericsson	RRUS 11 B12			
		3	Ericsson	AIR -32 B2A/B66AA w/ Mount Pipe	12	1-5/8	1
		3	Ericsson	KRY 112 144/1			
		1	Tower Mounts	Platform Mount [LP 403-1]			
115.0	115.0	1	Andrew	VHLP2-18	1	1/2	1
		1	Tower Mounts	Side Arm Mount [SO 102-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
110.0	110.0	3	Powerwave Tech.	7770.00 w/ Mount Pipe	12 2 2 2	1-5/8 3/4 7/16 3/8	1
		2	KMW Comm.	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		2	Quintel Tech.	QS66512-3 w/ Mount Pipe			
		1	Andrew	SBNH-1D6565C w/ Mount Pipe			
		1	CCI Antennas	TPA-65R-LCUUUU-H8 w/ Mount Pipe			
		6	CCI Antennas	TPX-070821			
		6	Powerwave Tech.	7020.00			
		6	Powerwave Tech.	LGP21401			
		3	Ericsson	RRUS 11			
		3	Ericsson	RRUS 32			
		3	Ericsson	RRUS 32 B2			
		3	Powerwave Tech.	1001983			
		2	Raycap	DC6-48-60-18-8F			
		1	Tower Mounts	Miscellaneous [NA 507-1]			
		1	Tower Mounts	Platform Mount [LP 712-1]			
100.0	100.0	3	Amphenol	BXA-80063-4BF-EDIN-X w/ Mount Pipe	12	1-5/8	1
		2	Andrew	LNX-6514DS-T4M w/ Mount Pipe			
		1	Antel	BXA-70063-6CF-EDIN-0 w/ Mount Pipe			
		1	RFS Celwave	DB-T1-6Z-8AB-0Z			
		1	Tower Mounts	Platform Mount [LP 403-1]			
		6	Commscope	SBNHH-1D65B w/ Mount Pipe	2	1-5/8	2
		3	Alcatel Lucent	RRH2x60-700			
		3	Alcatel Lucent	RRH2x60-AWS			
		3	Alcatel Lucent	RRH2X60-PCS			
		1	RFS Celwave	DB-T1-6Z-8AB-0Z			
90.0	90.0	3	Kathrein	742 213 w/ Mount Pipe	6	1-5/8	4
80.0	83.0	1	Andrew	VHLP2-23	3 3 3 1	5/8 1/2 1/4 5/16	1
		1	Clearwire	CW Junction Box			
	81.0	3	Argus Tech.	LLPX310R w/ Mount Pipe			
		3	Samsung Telecomm.	Wimax Dap Head			
	80.0	1	Tower Mounts	Side Arm Mount [SO 101-3]			

Notes:
1) Existing equipment
2) Reserved equipment
3) Existing equipment to be removed; not considered in this analysis
4) Abandoned equipment; considered in this analysis

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)
120.0	120.0	12	Generic	1'x4' Panels	12	1-5/8
110.0	110.0	12	Generic	1'x4' Panels	12	1-5/8
100.0	100.0	12	Generic	1'x4' Panels	12	1-5/8

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Supplemental Geotechnical Report	Tower Engineering Professionals	3636697	CCISites
Tower Foundation Drawings	Pirod, Inc.	3636698	CCISites
Rebar Mapping	Tower Engineering Professionals	3636698	CCISites
Tower Manufacturer Drawings	Pirod, Inc.	3525378	CCISites
Tower Reinforcement Drawings	Natcomm Consulting Engineers, Inc.	3525386	CCISites
Post-Modification Inspection	Natcomm Consulting Engineers, Inc.	3974228	CCISites
Tower Reinforcement Drawings	Tower Engineering Professionals	5650111	CCISites
Post-Modification Inspection	SGS Towers, Inc.	5852136	CCISites

3.1) Analysis Method

tnxTower (version 7.0.5.1), 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.

RISA-3D, a commercially available analysis software package, was used to model and analyze the foundation. Selected output from the analysis is included in Appendix C.

3.2) Assumptions

1) The tower and foundation were built in accordance with the manufacturer's specifications.
2) The tower and foundation 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 "Appendix B – Base Level Drawing".
4) All tower components are in sufficient condition to carry their full design capacity.
5) Serviceability with respect to antenna twist, tilt, roll, or lateral translation, is not checked and is left to the carrier or tower owner to ensure conformance. See Table 7.
6) All antenna mounts and mounting hardware are structurally sufficient to carry the full design capacity requirements of appurtenance wind area and weight as provided by the original manufacturer specifications. It is the carrier's responsibility to ensure compliance to the structural limitations of the existing and/or proposed antenna mounts. TEP did not analyze antennas supporting mounts as part of this structural analysis report.

This analysis may be affected if any assumptions are not valid or have been made in error. Tower Engineering Professionals 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 (lb)	ΦP_{allow} (lb)	% Capacity	Pass / Fail
L1	119.083 - 101.083	Pole	TP26x22.13x0.25	1	-8929.87	1479480.00	23.1	Pass
L2	101.083 - 66.5	Pole	TP34.063x24.873x0.313	2	-18889.40	2387960.00	58.7	Pass
L3	66.5 - 32.8333	Pole	TP41.75x32.498x0.375	3	-27587.90	3492730.00	64.1	Pass
L4	32.8333 - 0	Pole	TP49.063x39.849x0.375	4	-39470.60	3984000.00	74.9	Pass
							Summary	
						Pole (L4)	74.9	Pass
						Rating =	**74.9**	**Pass**

Table 6 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Slip Splice Connection	101.1	25.0	Pass
1	Slip Splice Connection	66.5	62.9	Pass
1	Slip Splice Connection	32.8	69.5	Pass
1	Anchor Rods	-	85.1	Pass
1	Base Plate	-	69.4	Pass
1	Base Foundation Soil Interaction	-	78.9	Pass
1	Base Foundation Structural	-	58.2	Pass
1	Rock Anchors	-	88.7	Pass

Structure Rating (max from all components) =	**88.7%**

Notes:
1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.

Table 7 - Dish Twist/Sway Results for 60 mph Service Wind Speed

Elevation (ft)	Dish Model	Beam Deflection		
		Deflection (in)	Tilt (deg)	Twist (deg)
115.0	Andrew VHLP2-18	14.708	1.119	0.020

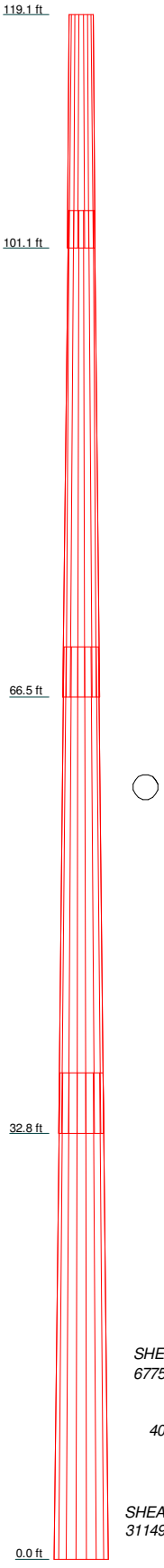
4.1) Recommendations

1) If the load differs from that described in Tables 1 and 2 of this report, "Appendix B – Base Level Drawing" or the provisions of this analysis are found to be invalid, another structural analysis should be performed.
2) The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (lb)
1	18.00	18	0.250	2.92	22.130	26.000		1157.5
2	37.50	18	0.313	3.83	24.873	34.063		3690.1
3	37.50	18	0.375	4.67	32.498	41.750	A572-65	5581.5
4	37.50	18	0.375		39.849	49.063		6695.0
								17124.1



ALL REACTIONS ARE FACTORED

AXIAL
91495 lb

SHEAR
6775 lb

MOMENT
650845 lb-ft

TORQUE 1216 lb-ft
40 mph WIND - 1.000 in ICE

AXIAL
39493 lb

SHEAR
31149 lb

MOMENT
2947866 lb-ft

TORQUE 9435 lb-ft
REACTIONS - 97 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
AIR -32 B2A/B66AA w/ Mount Pipe	120	1001983	110
AIR -32 B2A/B66AA w/ Mount Pipe	120	1001983	110
AIR -32 B2A/B66AA w/ Mount Pipe	120	1001983	110
KRY 112 144/1	120	DC6-48-60-18-8F	110
KRY 112 144/1	120	DC6-48-60-18-8F	110
KRY 112 144/1	120	2.4" Dia x 6-ft Mount Pipe	110
APXVAARR24_43-U-NA20 w/ Mount Pipe	120	2.4" Dia x 6-ft Mount Pipe	110
APXVAARR24_43-U-NA20 w/ Mount Pipe	120	2.4" Dia x 6-ft Mount Pipe	110
APXVAARR24_43-U-NA20 w/ Mount Pipe	120	2.4" Dia x 6-ft Mount Pipe	110
AIR 3246 B66 w/ Mount Pipe	120	2.4" Dia x 6-ft Mount Pipe	110
AIR 3246 B66 w/ Mount Pipe	120	2.4" Dia x 6-ft Mount Pipe	110
AIR 3246 B66 w/ Mount Pipe	120	Platform Mount [LP 712-1]	110
RADIO 4449 B12/B71	120	Miscellaneous [NA 507-1]	110
RADIO 4449 B12/B71	120	7770.00 w/ Mount Pipe	110
RADIO 4449 B12/B71	120	BXA-80063-4BF-EDIN-X w/ Mount Pipe	100
KRY 112 144/2	120	BXA-80063-4BF-EDIN-X w/ Mount Pipe	100
KRY 112 144/2	120	BXA-70063-6CF-EDIN-0 w/ Mount Pipe	100
KRY 112 144/2	120	LNX-6514DS-T4M w/ Mount Pipe	100
2.4" Dia x 6-ft Mount Pipe	120	LNX-6514DS-T4M w/ Mount Pipe	100
2.4" Dia x 6-ft Mount Pipe	120	DB-T1-6Z-8AB-0Z	100
2.4" Dia x 6-ft Mount Pipe	120	(2) SBNHH-1D65B w/ Mount Pipe	100
2.4" Dia x 8.5-ft Mount Pipe	120	(2) SBNHH-1D65B w/ Mount Pipe	100
Platform Mount [LP 404-1] (w/ Handrail Kit)	120	(2) SBNHH-1D65B w/ Mount Pipe	100
2.4" Dia x 6-ft Mount Pipe	115	RRH2x60-700	100
Side Arm Mount [SO 102-3]	115	RRH2x60-700	100
VHLP2-18	115	RRH2x60-700	100
7770.00 w/ Mount Pipe	110	RRH2x60-AWS	100
7770.00 w/ Mount Pipe	110	RRH2x60-AWS	100
AM-X-CD-16-65-00T-RET w/ Mount Pipe	110	RRH2x60-AWS	100
AM-X-CD-16-65-00T-RET w/ Mount Pipe	110	RRH2X60-PCS	100
QS66512-3 w/ Mount Pipe	110	RRH2X60-PCS	100
QS66512-3 w/ Mount Pipe	110	RRH2X60-PCS	100
SBNH-1D6565C w/ Mount Pipe	110	DB-T1-6Z-8AB-0Z	100
TPA-65R-LCUUUU-H8 w/ Mount Pipe	110	Platform Mount [LP 403-1]	100
(2) LGP21401	110	BXA-80063-4BF-EDIN-X w/ Mount Pipe	100
(2) LGP21401	110	2'x3' Ice Shield	97
(2) LGP21401	110	2'x3' Ice Shield	95
(2) TPX-070821	110	742 213 w/ Mount Pipe	90
(2) TPX-070821	110	742 213 w/ Mount Pipe	90
(2) TPX-070821	110	742 213 w/ Mount Pipe	90
(2) 7020.00	110	LLPX310R w/ Mount Pipe	80
(2) 7020.00	110	LLPX310R w/ Mount Pipe	80
(2) 7020.00	110	WIMAX DAP HEAD	80
RRUS 32	110	WIMAX DAP HEAD	80
RRUS 32	110	WIMAX DAP HEAD	80
RRUS 32	110	CW JUNCTION BOX	80
RRUS 32 B2	110	2.4" Dia x 6-ft Mount Pipe	80
RRUS 32 B2	110	2.4" Dia x 6-ft Mount Pipe	80
RRUS 32 B2	110	2.4" Dia x 6-ft Mount Pipe	80
RRUS 11	110	Side Arm Mount [SO 101-3]	80
RRUS 11	110	LLPX310R w/ Mount Pipe	80
RRUS 11	110	VHLP2-23	80

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 74.9%

Tower Engineering Professionals

Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
Phone: (919) 661-6351
FAX: (919) 661-6350

Job: *West Hartford/I-84/X43 (BU 829013)*			
Project: *TEP No. 25680.161675*			
Client: Crown Castle	Drawn by: AAS	App'd:	
Code: TIA-222-G	Date: 07/02/18	Scale: NTS	
Path:		Dwg No. E-1	

Tower Input Data

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

Tower is located in Hartford County, Connecticut.
Basic wind speed of 97 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 40 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
√	Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component	√	Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric				

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	119.08-101.08	18.00	2.917	18	22.130	26.000	0.250	1.000	A572-65 (65 ksi)
L2	101.08-66.50	37.50	3.833	18	24.873	34.063	0.313	1.250	A572-65 (65 ksi)

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
L3	66.50-32.83	37.50	4.667	18	32.498	41.750	0.375	1.500	A572-65 (65 ksi)
L4	32.83-0.00	37.50		18	39.849	49.063	0.375	1.500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	22.471	17.362	1050.090	7.767	11.242	93.407	2101.561	8.683	3.455	13.82
	26.401	20.433	1711.654	9.141	13.208	129.592	3425.561	10.218	4.136	16.544
L2	25.982	24.361	1856.528	8.719	12.635	146.930	3715.500	12.183	3.828	12.248
	34.588	33.476	4817.433	11.981	17.304	278.404	9641.206	16.741	5.445	17.424
L3	33.960	38.235	4984.583	11.404	16.509	301.930	9975.725	19.121	5.060	13.492
	42.394	49.247	10650.982	14.688	21.209	502.192	21315.979	24.628	6.688	17.835
L4	41.628	46.984	9249.061	14.013	20.243	456.899	18510.293	23.496	6.353	16.942
	49.819	57.950	17355.138	17.284	24.924	696.329	34733.112	28.981	7.975	21.267

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 119.08-101.08				1	1	1			
L2 101.08-66.50				1	1	1			
L3 66.50-32.83				1	1	1			
L4 32.83-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
Safety Line 3/8	B	Surface Ar (CaAa)	119.00 - 0.00	1	1	0.250 0.250	0.375		0.220
Rung 5/8" SR (12.5"w, 16"s)	B	Surface Ar (CaAa)	119.00 - 0.00	1	1	0.250 0.250	0.488		0.816
LDF7-50A(1-5/8) (1 TBR)	A	Surface Ar (CaAa)	119.08 - 0.00	2	2	0.500 0.500	1.980		0.820
EC4-50(1/2")	B	Surface Ar (CaAa)	115.00 - 80.00	1	1	0.250 0.250	0.630		0.160
LDF7-50A(1-5/8") (1E + 2R) *** 90' ***	C	Surface Ar (CaAa)	100.00 - 0.00	3	3	0.000 0.000	1.980		0.820
LDF7-50A(1-5/8") (Abandoned)	A	Surface Ar (CaAa)	90.00 - 0.00	6	6	-0.250 -0.250	1.980		0.820
2" Flexible Conduit ***	B	Surface Ar (CaAa)	80.00 - 0.00	2	2	0.250 0.250	2.000		0.340

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
120								
LDF7-50A(1-5/8)	A	No	Inside Pole	119.08 - 0.00	10	No Ice	0.00	0.820
						1/2" Ice	0.00	0.820
						1" Ice	0.00	0.820
MLC HYBRID 6POWER/12FIBER(1-1/2)	A	No	CaAa (Out Of Face)	119.08 - 0.00	2	No Ice	0.00	0.983
						1/2" Ice	0.00	2.205
						1" Ice	0.00	4.038
*** 110' ***								
LDF7-50A(1-5/8")	C	No	Inside Pole	110.00 - 0.00	12	No Ice	0.00	0.820
						1/2" Ice	0.00	0.820
						1" Ice	0.00	0.820
WR-VG102ST-BRDA(7/16") (In Conduit)	C	No	Inside Pole	110.00 - 0.00	2	No Ice	0.00	0.201
						1/2" Ice	0.00	0.201
						1" Ice	0.00	0.201
FB-L98B-002-XXX(3/8) (In Conduit)	C	No	Inside Pole	110.00 - 0.00	1	No Ice	0.00	0.065
						1/2" Ice	0.00	0.065
						1" Ice	0.00	0.065
3" Flexible Conduit	C	No	Inside Pole	110.00 - 0.00	1	No Ice	0.00	1.040
						1/2" Ice	0.00	1.040
						1" Ice	0.00	1.040
WR-VG86ST-BRD(3/4)	C	No	Inside Pole	110.00 - 0.00	2	No Ice	0.00	0.584
						1/2" Ice	0.00	0.584
						1" Ice	0.00	0.584
FB-L98B-034-XXX(3/8)	C	No	Inside Pole	110.00 - 0.00	1	No Ice	0.00	0.057
						1/2" Ice	0.00	0.057
						1" Ice	0.00	0.057
*** 115' ***								
EC4-50(1/2")	B	No	CaAa (Out Of Face)	80.00 - 0.00	1	No Ice	0.00	0.160
						1/2" Ice	0.00	0.850
						1" Ice	0.00	2.151
*** 100' ***								
LDF7-50A(1-5/8")	C	No	Inside Pole	100.00 - 0.00	11	No Ice	0.00	0.820
						1/2" Ice	0.00	0.820
						1" Ice	0.00	0.820
*** 80' ***								
FSJ1-50A(1/4") (In Conduit)	B	No	Inside Pole	80.00 - 0.00	3	No Ice	0.00	0.045
						1/2" Ice	0.00	0.045
						1" Ice	0.00	0.045
HJ4.5-50(5/8") (In Conduit)	B	No	Inside Pole	80.00 - 0.00	3	No Ice	0.00	0.400
						1/2" Ice	0.00	0.400
						1" Ice	0.00	0.400
9207(5/16") (In Conduit)	B	No	Inside Pole	80.00 - 0.00	1	No Ice	0.00	0.600
						1/2" Ice	0.00	0.600
						1" Ice	0.00	0.600
FSJ4-50B(1/2")	B	No	CaAa (Out Of Face)	80.00 - 0.00	3	No Ice	0.00	0.140
						1/2" Ice	0.00	0.763
						1" Ice	0.00	1.997
***								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	119.08-101.08	A	0.000	0.000	7.128	0.000	212.53
		B	0.000	0.000	2.423	0.000	20.79
		C	0.000	0.000	0.000	0.000	112.10
L2	101.08-66.50	A	0.000	0.000	41.613	0.000	523.95
		B	0.000	0.000	9.713	0.000	82.33
		C	0.000	0.000	19.899	0.000	819.34
L3	66.50-32.83	A	0.000	0.000	53.328	0.000	563.14
		B	0.000	0.000	16.372	0.000	142.44
		C	0.000	0.000	19.998	0.000	809.73
L4	32.83-0.00	A	0.000	0.000	52.008	0.000	549.20
		B	0.000	0.000	15.967	0.000	138.92
		C	0.000	0.000	19.503	0.000	789.69

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	119.08-101.08	A	2.256	0.000	0.000	19.060	0.000	883.21
		B		0.000	0.000	24.866	0.000	396.79
		C		0.000	0.000	0.000	0.000	112.10
L2	101.08-66.50	A	2.194	0.000	0.000	84.769	0.000	2533.41
		B		0.000	0.000	59.388	0.000	1418.86
		C		0.000	0.000	43.764	0.000	1465.00
L3	66.50-32.83	A	2.082	0.000	0.000	103.587	0.000	2760.14
		B		0.000	0.000	67.743	0.000	2167.57
		C		0.000	0.000	43.461	0.000	1435.82
L4	32.83-0.00	A	1.864	0.000	0.000	99.192	0.000	2534.89
		B		0.000	0.000	63.686	0.000	1920.84
		C		0.000	0.000	41.470	0.000	1361.01

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	119.08-101.08	0.162	-0.502	0.753	-0.609
L2	101.08-66.50	-0.482	0.158	0.082	0.078
L3	66.50-32.83	-0.597	0.168	-0.022	0.093
L4	32.83-0.00	-0.639	0.180	-0.042	0.108

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	1	Safety Line 3/8	101.08 - 119.00	1.0000	1.0000
L1	2	Rung 5/8" SR (12.5"w, 16"s)	101.08 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	5	LDF7-50A(1-5/8)	119.00 101.08 - 119.08	1.0000	1.0000
L1	18	EC4-50(1/2")	101.08 - 115.00	1.0000	1.0000
L1	21	LDF7-50A(1-5/8")	101.08 - 100.00	1.0000	1.0000
L1	24	LDF7-50A(1-5/8")	101.08 - 90.00	1.0000	1.0000
L1	29	2" Flexible Conduit	101.08 - 80.00	1.0000	1.0000
L2	1	Safety Line 3/8	66.50 - 101.08	1.0000	1.0000
L2	2	Rung 5/8" SR (12.5"w, 16"s)	66.50 - 101.08	1.0000	1.0000
L2	5	LDF7-50A(1-5/8)	66.50 - 101.08	1.0000	1.0000
L2	21	LDF7-50A(1-5/8")	66.50 - 100.00	1.0000	1.0000
L2	24	LDF7-50A(1-5/8")	66.50 - 90.00	1.0000	1.0000
L2	29	2" Flexible Conduit	66.50 - 80.00	1.0000	1.0000
L3	1	Safety Line 3/8	32.83 - 66.50	1.0000	1.0000
L3	2	Rung 5/8" SR (12.5"w, 16"s)	32.83 - 66.50	1.0000	1.0000
L3	5	LDF7-50A(1-5/8)	32.83 - 66.50	1.0000	1.0000
L3	21	LDF7-50A(1-5/8")	32.83 - 66.50	1.0000	1.0000
L3	24	LDF7-50A(1-5/8")	32.83 - 66.50	1.0000	1.0000
L3	29	2" Flexible Conduit	32.83 - 66.50	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
*** 120' ***									
AIR -32 B2A/B66AA w/ Mount Pipe	A	From Centroid-Face	4.00 7.000 0.000	30.000	120.00	No Ice 1/2" Ice 1" Ice	6.75 7.20 7.65	6.07 6.87 7.58	153.07 214.04 281.89
AIR -32 B2A/B66AA w/ Mount Pipe	B	From Centroid-Face	4.00 -7.000 0.000	30.000	120.00	No Ice 1/2" Ice 1" Ice	6.75 7.20 7.65	6.07 6.87 7.58	153.07 214.04 281.89
AIR -32 B2A/B66AA w/ Mount Pipe	C	From Centroid-Face	4.00 -7.000 0.000	30.000	120.00	No Ice 1/2" Ice 1" Ice	6.75 7.20 7.65	6.07 6.87 7.58	153.07 214.04 281.89
KRY 112 144/1	A	From Centroid-Face	4.00 2.500 0.000	30.000	120.00	No Ice 1/2" Ice 1" Ice	0.35 0.43 0.51	0.16 0.22 0.28	11.02 14.12 18.44
KRY 112 144/1	B	From Centroid-Face	4.00 2.500 0.000	30.000	120.00	No Ice 1/2" Ice 1" Ice	0.35 0.43 0.51	0.16 0.22 0.28	11.02 14.12 18.44
KRY 112 144/1	C	From Centroid-Face	4.00 7.000 0.000	30.000	120.00	No Ice 1/2" Ice 1" Ice	0.35 0.43 0.51	0.16 0.22 0.28	11.02 14.12 18.44
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Centroid-Face	4.00 -7.000 0.000	30.000	120.00	No Ice 1/2" Ice 1" Ice	20.48 21.23 21.99	11.02 12.55 14.10	160.82 297.10 444.18
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Centroid-Face	4.00 7.000	30.000	120.00	No Ice 1/2" Ice	20.48 21.23	11.02 12.55	160.82 297.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
		ce	0.000			1" Ice	21.99	14.10	444.18
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Centroid-Face	4.00 2.500 0.000	30.000	120.00	No Ice 1/2" Ice 1" Ice	20.48 21.23 21.99	11.02 12.55 14.10	160.82 297.10 444.18
AIR 3246 B66 w/ Mount Pipe	A	From Centroid-Face	4.00 2.500 0.000	30.000	120.00	No Ice 1/2" Ice 1" Ice	8.18 8.66 9.12	6.56 7.39 8.13	201.32 271.57 349.05
AIR 3246 B66 w/ Mount Pipe	B	From Centroid-Face	4.00 2.500 0.000	30.000	120.00	No Ice 1/2" Ice 1" Ice	8.18 8.66 9.12	6.56 7.39 8.13	201.32 271.57 349.05
AIR 3246 B66 w/ Mount Pipe	C	From Centroid-Face	4.00 7.000 0.000	30.000	120.00	No Ice 1/2" Ice 1" Ice	8.18 8.66 9.12	6.56 7.39 8.13	201.32 271.57 349.05
RADIO 4449 B12/B71	A	From Centroid-Face	4.00 -7.000 0.000	30.000	120.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	1.30 1.44 1.60	75.00 92.20 112.11
RADIO 4449 B12/B71	B	From Centroid-Face	4.00 7.000 0.000	30.000	120.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	1.30 1.44 1.60	75.00 92.20 112.11
RADIO 4449 B12/B71	C	From Centroid-Face	4.00 2.500 0.000	30.000	120.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	1.30 1.44 1.60	75.00 92.20 112.11
KRY 112 144/2	A	From Centroid-Face	4.00 -7.000 0.000	30.000	120.00	No Ice 1/2" Ice 1" Ice	0.48 0.57 0.66	0.23 0.30 0.38	9.70 13.78 19.25
KRY 112 144/2	B	From Centroid-Face	4.00 -7.000 0.000	30.000	120.00	No Ice 1/2" Ice 1" Ice	0.48 0.57 0.66	0.23 0.30 0.38	9.70 13.78 19.25
KRY 112 144/2	C	From Centroid-Face	4.00 -7.000 0.000	30.000	120.00	No Ice 1/2" Ice 1" Ice	0.48 0.57 0.66	0.23 0.30 0.38	9.70 13.78 19.25
2.4" Dia x 6-ft Mount Pipe	A	From Centroid-Face	4.00 -2.500 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice	1.43 1.93 2.30	1.43 1.93 2.30	21.96 32.81 47.71
2.4" Dia x 6-ft Mount Pipe	B	From Centroid-Face	4.00 -2.500 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice	1.43 1.93 2.30	1.43 1.93 2.30	21.96 32.81 47.71
2.4" Dia x 6-ft Mount Pipe	C	From Centroid-Face	4.00 -2.500 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice	1.43 1.93 2.30	1.43 1.93 2.30	21.96 32.81 47.71
2.4" Dia x 8.5-ft Mount Pipe	B	From Leg	1.00 0.000 3.000	0.000	120.00	No Ice 1/2" Ice 1" Ice	2.02 2.90 3.71	2.02 2.90 3.71	25.93 41.14 61.95
Platform Mount [LP 404-1] (w/ Handrail Kit)	C	None		0.000	120.00	No Ice 1/2" Ice 1" Ice	32.79 44.63 56.47	32.79 44.63 56.47	2043.00 2475.48 2907.96
*** 115' ***									
2.4" Dia x 6-ft Mount Pipe	C	From Leg	0.50 0.000 0.000	0.000	115.00	No Ice 1/2" Ice 1" Ice	1.43 1.93 2.30	1.43 1.93 2.30	21.96 32.81 47.71
Side Arm Mount [SO 102-3]	C	None		0.000	115.00	No Ice 1/2" Ice 1" Ice	3.00 3.48 3.96	3.00 3.48 3.96	81.00 111.00 141.00
*** 110' ***									
7770.00 w/ Mount Pipe	A	From Centroid-Face	4.00 -6.000 0.000	30.000	110.00	No Ice 1/2" Ice 1" Ice	5.75 6.18 6.61	4.25 5.01 5.71	55.38 102.81 156.64

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
7770.00 w/ Mount Pipe	B	From Centroid-Face	4.00 -6.000 0.000	20.000	110.00	No Ice 1/2" Ice 1" Ice	5.75 6.18 6.61	4.25 5.01 5.71	55.38 102.81 156.64
7770.00 w/ Mount Pipe	C	From Centroid-Face	4.00 -6.000 0.000	30.000	110.00	No Ice 1/2" Ice 1" Ice	5.75 6.18 6.61	4.25 5.01 5.71	55.38 102.81 156.64
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Centroid-Face	4.00 -2.000 0.000	30.000	110.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.30 7.48 8.37	74.05 139.04 211.91
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Centroid-Face	4.00 -2.000 0.000	30.000	110.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.30 7.48 8.37	74.05 139.04 211.91
QS66512-3 w/ Mount Pipe	A	From Centroid-Face	4.00 6.000 0.000	30.000	110.00	No Ice 1/2" Ice 1" Ice	8.37 8.93 9.46	8.46 9.66 10.55	130.55 206.24 290.07
QS66512-3 w/ Mount Pipe	C	From Centroid-Face	4.00 6.000 0.000	30.000	110.00	No Ice 1/2" Ice 1" Ice	8.37 8.93 9.46	8.46 9.66 10.55	130.55 206.24 290.07
SBNH-1D6565C w/ Mount Pipe	B	From Centroid-Face	4.00 -2.000 0.000	20.000	110.00	No Ice 1/2" Ice 1" Ice	11.69 12.42 13.16	9.85 11.38 12.94	99.25 189.04 288.81
TPA-65R-LCUUUU-H8 w/ Mount Pipe	B	From Centroid-Face	4.00 6.000 0.000	20.000	110.00	No Ice 1/2" Ice 1" Ice	13.54 14.24 14.95	10.96 12.49 14.04	114.45 217.61 330.97
(2) LGP21401	A	From Centroid-Face	4.00 -6.000 0.000	30.000	110.00	No Ice 1/2" Ice 1" Ice	1.10 1.24 1.38	0.21 0.27 0.35	14.10 21.26 30.32
(2) LGP21401	B	From Centroid-Face	4.00 -6.000 0.000	20.000	110.00	No Ice 1/2" Ice 1" Ice	1.10 1.24 1.38	0.21 0.27 0.35	14.10 21.26 30.32
(2) LGP21401	C	From Centroid-Face	4.00 -6.000 0.000	30.000	110.00	No Ice 1/2" Ice 1" Ice	1.10 1.24 1.38	0.21 0.27 0.35	14.10 21.26 30.32
(2) TPX-070821	A	From Centroid-Face	4.00 6.000 0.000	30.000	110.00	No Ice 1/2" Ice 1" Ice	0.47 0.56 0.66	0.10 0.15 0.20	7.50 10.95 15.73
(2) TPX-070821	B	From Centroid-Face	4.00 6.000 0.000	20.000	110.00	No Ice 1/2" Ice 1" Ice	0.47 0.56 0.66	0.10 0.15 0.20	7.50 10.95 15.73
(2) TPX-070821	C	From Centroid-Face	4.00 6.000 0.000	30.000	110.00	No Ice 1/2" Ice 1" Ice	0.47 0.56 0.66	0.10 0.15 0.20	7.50 10.95 15.73
(2) 7020.00	A	From Centroid-Face	4.00 6.000 0.000	30.000	110.00	No Ice 1/2" Ice 1" Ice	0.10 0.15 0.20	0.17 0.24 0.31	2.20 5.16 9.33
(2) 7020.00	B	From Centroid-Face	4.00 6.000 0.000	20.000	110.00	No Ice 1/2" Ice 1" Ice	0.10 0.15 0.20	0.17 0.24 0.31	2.20 5.16 9.33
(2) 7020.00	C	From Centroid-Face	4.00 6.000 0.000	30.000	110.00	No Ice 1/2" Ice 1" Ice	0.10 0.15 0.20	0.17 0.24 0.31	2.20 5.16 9.33
RRUS 32	A	From Centroid-Face	4.00 2.000 0.000	30.000	110.00	No Ice 1/2" Ice 1" Ice	2.86 3.08 3.32	1.78 1.97 2.17	55.12 77.39 102.93
RRUS 32	B	From Centroid-Face	4.00 2.000 0.000	20.000	110.00	No Ice 1/2" Ice 1" Ice	2.86 3.08 3.32	1.78 1.97 2.17	55.12 77.39 102.93

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
RRUS 32	C	From Centroid-Face	4.00 2.000 0.000	30.000	110.00	No Ice 1/2" Ice 1" Ice	2.86 3.08 3.32	1.78 1.97 2.17	55.12 77.39 102.93
RRUS 32 B2	A	From Centroid-Face	4.00 2.000 0.000	30.000	110.00	No Ice 1/2" Ice 1" Ice	2.73 2.95 3.18	1.67 1.86 2.05	52.90 73.96 98.21
RRUS 32 B2	B	From Centroid-Face	4.00 2.000 0.000	20.000	110.00	No Ice 1/2" Ice 1" Ice	2.73 2.95 3.18	1.67 1.86 2.05	52.90 73.96 98.21
RRUS 32 B2	C	From Centroid-Face	4.00 2.000 0.000	30.000	110.00	No Ice 1/2" Ice 1" Ice	2.73 2.95 3.18	1.67 1.86 2.05	52.90 73.96 98.21
RRUS 11	A	From Centroid-Face	4.00 -2.000 0.000	30.000	110.00	No Ice 1/2" Ice 1" Ice	2.79 3.00 3.21	1.19 1.34 1.50	50.70 71.57 95.48
RRUS 11	B	From Centroid-Face	4.00 -2.000 0.000	20.000	110.00	No Ice 1/2" Ice 1" Ice	2.79 3.00 3.21	1.19 1.34 1.50	50.70 71.57 95.48
RRUS 11	C	From Centroid-Face	4.00 -2.000 0.000	30.000	110.00	No Ice 1/2" Ice 1" Ice	2.79 3.00 3.21	1.19 1.34 1.50	50.70 71.57 95.48
1001983	A	From Centroid-Face	4.00 6.000 0.000	30.000	110.00	No Ice 1/2" Ice 1" Ice	0.18 0.23 0.30	0.08 0.13 0.18	2.00 3.59 6.10
1001983	B	From Centroid-Face	4.00 6.000 0.000	20.000	110.00	No Ice 1/2" Ice 1" Ice	0.18 0.23 0.30	0.08 0.13 0.18	2.00 3.59 6.10
1001983	C	From Centroid-Face	4.00 6.000 0.000	30.000	110.00	No Ice 1/2" Ice 1" Ice	0.18 0.23 0.30	0.08 0.13 0.18	2.00 3.59 6.10
DC6-48-60-18-8F	B	From Centroid-Face	4.00 6.000 0.000	20.000	110.00	No Ice 1/2" Ice 1" Ice	1.21 1.89 2.11	1.21 1.89 2.11	32.80 54.76 79.58
DC6-48-60-18-8F	B	From Centroid-Face	4.00 -6.000 0.000	20.000	110.00	No Ice 1/2" Ice 1" Ice	1.21 1.89 2.11	1.21 1.89 2.11	32.80 54.76 79.58
2.4" Dia x 6-ft Mount Pipe	A	From Centroid-Face	4.00 2.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	1.43 1.93 2.30	1.43 1.93 2.30	21.96 32.81 47.71
2.4" Dia x 6-ft Mount Pipe	B	From Centroid-Face	4.00 2.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	1.43 1.93 2.30	1.43 1.93 2.30	21.96 32.81 47.71
2.4" Dia x 6-ft Mount Pipe	C	From Centroid-Face	4.00 2.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	1.43 1.93 2.30	1.43 1.93 2.30	21.96 32.81 47.71
2.4" Dia x 6-ft Mount Pipe	A	From Centroid-Face	4.00 -6.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.43 1.93 2.31	21.90 37.81 55.56
2.4" Dia x 6-ft Mount Pipe	B	From Centroid-Face	4.00 -6.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.43 1.93 2.31	21.90 37.81 55.56
2.4" Dia x 6-ft Mount Pipe	C	From Centroid-Face	4.00 -6.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.43 1.93 2.31	21.90 37.81 55.56
Platform Mount [LP 712-1]	C	None		0.000	110.00	No Ice 1/2" Ice 1" Ice	24.53 29.94 35.35	24.53 29.94 35.35	1335.00 1645.59 1956.18

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
Miscellaneous [NA 507-1]	C	None		0.000	110.00	No Ice	4.80	4.80	245.00
						1/2" Ice	6.70	6.70	294.00
						1" Ice	8.60	8.60	343.00
100									
BXA-80063-4BF-EDIN-X w/ Mount Pipe	A	From Centroid-Face	4.00 7.000 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	4.62 4.99 5.36	3.47 4.04 4.63	29.82 70.14 116.05
BXA-80063-4BF-EDIN-X w/ Mount Pipe	B	From Centroid-Face	4.00 7.000 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	4.62 4.99 5.36	3.47 4.04 4.63	29.82 70.14 116.05
BXA-80063-4BF-EDIN-X w/ Mount Pipe	C	From Centroid-Face	4.00 7.000 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	4.62 4.99 5.36	3.47 4.04 4.63	29.82 70.14 116.05
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	A	From Centroid-Face	4.00 -2.500 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	7.81 8.36 8.87	5.80 6.95 7.82	42.25 103.01 171.49
LNX-6514DS-T4M w/ Mount Pipe	B	From Centroid-Face	4.00 -2.500 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	8.44 8.98 9.51	7.42 8.45 9.34	79.33 151.64 232.88
LNX-6514DS-T4M w/ Mount Pipe	C	From Centroid-Face	4.00 -2.500 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	8.44 8.98 9.51	7.42 8.45 9.34	79.33 151.64 232.88
DB-T1-6Z-8AB-0Z	C	From Centroid-Face	4.00 2.500 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	4.80 5.07 5.35	2.00 2.19 2.39	44.00 80.13 120.22
(2) SBNHH-1D65B w/ Mount Pipe	A	From Centroid-Face	4.00 -2.500 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	8.29 8.85 9.37	7.00 8.19 9.08	76.26 144.68 221.06
(2) SBNHH-1D65B w/ Mount Pipe	B	From Centroid-Face	4.00 -2.500 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	8.29 8.85 9.37	7.00 8.19 9.08	76.26 144.68 221.06
(2) SBNHH-1D65B w/ Mount Pipe	C	From Centroid-Face	4.00 -2.500 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	8.29 8.85 9.37	7.00 8.19 9.08	76.26 144.68 221.06
RRH2x60-700	A	From Centroid-Face	4.00 -2.500 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	60.00 82.72 109.06
RRH2x60-700	B	From Centroid-Face	4.00 -2.500 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	60.00 82.72 109.06
RRH2x60-700	C	From Centroid-Face	4.00 -2.500 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	60.00 82.72 109.06
RRH2x60-AWS	A	From Centroid-Face	4.00 2.500 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	60.00 82.72 109.06
RRH2x60-AWS	B	From Centroid-Face	4.00 2.500 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	60.00 82.72 109.06
RRH2x60-AWS	C	From Centroid-Face	4.00 2.500 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	60.00 82.72 109.06
RRH2X60-PCS	A	From Centroid-Face	4.00 -7.000 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	2.20 2.39 2.59	1.72 1.90 2.09	55.00 75.35 98.71
RRH2X60-PCS	B	From Centroid-Fa	4.00 -7.000	0.000	100.00	No Ice 1/2" Ice	2.20 2.39	1.72 1.90	55.00 75.35

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
		ce	0.000			1" Ice	2.59	2.09	98.71
RRH2X60-PCS	C	From	4.00	0.000	100.00	No Ice	2.20	1.72	55.00
		Centroid-Fa	-7.000			1/2" Ice	2.39	1.90	75.35
		ce	0.000			1" Ice	2.59	2.09	98.71
DB-T1-6Z-8AB-0Z	A	From	4.00	0.000	100.00	No Ice	4.80	2.00	44.00
		Centroid-Fa	-2.500			1/2" Ice	5.07	2.19	80.13
		ce	0.000			1" Ice	5.35	2.39	120.22
Platform Mount [LP 403-1]	C	None		0.000	100.00	No Ice	18.85	18.85	1500.00
						1/2" Ice	24.30	24.30	1796.56
						1" Ice	29.75	29.75	2093.12
*** 90' ***									
742 213 w/ Mount Pipe	A	From Leg	0.50	30.000	90.00	No Ice	5.37	4.62	48.92
			0.000			1/2" Ice	5.95	6.00	93.54
			0.000			1" Ice	6.50	6.98	145.83
742 213 w/ Mount Pipe	B	From Leg	0.50	0.000	90.00	No Ice	5.37	4.62	48.92
			0.000			1/2" Ice	5.95	6.00	93.54
			0.000			1" Ice	6.50	6.98	145.83
742 213 w/ Mount Pipe	C	From Leg	0.50	-10.000	90.00	No Ice	5.37	4.62	48.92
			0.000			1/2" Ice	5.95	6.00	93.54
			0.000			1" Ice	6.50	6.98	145.83
2'x3' Ice Shield	C	From Leg	0.50	-10.000	95.00	No Ice	0.72	1.18	72.00
			0.000			1/2" Ice	0.99	1.61	132.00
			0.000			1" Ice	1.26	2.04	192.00
2'x3' Ice Shield	C	From Leg	0.50	-10.000	97.00	No Ice	0.72	1.18	72.00
			0.000			1/2" Ice	0.99	1.61	132.00
			0.000			1" Ice	1.26	2.04	192.00
*** 80' ***									
LLPX310R w/ Mount Pipe	A	From Leg	1.00	30.000	80.00	No Ice	4.45	2.87	43.87
			-2.000			1/2" Ice	4.79	3.40	80.95
			1.000			1" Ice	5.13	3.94	123.32
LLPX310R w/ Mount Pipe	B	From Leg	1.00	30.000	80.00	No Ice	4.45	2.87	43.87
			-2.000			1/2" Ice	4.79	3.40	80.95
			1.000			1" Ice	5.13	3.94	123.32
LLPX310R w/ Mount Pipe	C	From Leg	1.00	30.000	80.00	No Ice	4.45	2.87	43.87
			-2.000			1/2" Ice	4.79	3.40	80.95
			1.000			1" Ice	5.13	3.94	123.32
WIMAX DAP HEAD	A	From Leg	1.00	30.000	80.00	No Ice	1.55	0.68	33.00
			-2.000			1/2" Ice	1.70	0.80	44.58
			1.000			1" Ice	1.87	0.92	58.46
WIMAX DAP HEAD	B	From Leg	1.00	30.000	80.00	No Ice	1.55	0.68	33.00
			-2.000			1/2" Ice	1.70	0.80	44.58
			1.000			1" Ice	1.87	0.92	58.46
WIMAX DAP HEAD	C	From Leg	1.00	30.000	80.00	No Ice	1.55	0.68	33.00
			-2.000			1/2" Ice	1.70	0.80	44.58
			1.000			1" Ice	1.87	0.92	58.46
CW JUNCTION BOX	A	From Leg	0.50	30.000	80.00	No Ice	1.20	0.60	0.00
			0.000			1/2" Ice	1.34	0.70	10.34
			3.000			1" Ice	1.48	0.81	22.81
2.4" Dia x 6-ft Mount Pipe	A	From Leg	1.00	0.000	80.00	No Ice	1.43	1.43	21.96
			2.000			1/2" Ice	1.93	1.93	32.81
			0.000			1" Ice	2.30	2.30	47.71
2.4" Dia x 6-ft Mount Pipe	B	From Leg	1.00	0.000	80.00	No Ice	1.43	1.43	21.96
			2.000			1/2" Ice	1.93	1.93	32.81
			0.000			1" Ice	2.30	2.30	47.71
2.4" Dia x 6-ft Mount Pipe	C	From Leg	1.00	0.000	80.00	No Ice	1.43	1.43	21.96
			2.000			1/2" Ice	1.93	1.93	32.81
			0.000			1" Ice	2.30	2.30	47.71

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
Side Arm Mount [SO 101-3]	C	None		0.000	80.00	No Ice	7.50	7.50	252.00
						1/2" Ice	8.90	8.90	333.00
						1" Ice	10.30	10.30	414.00
***									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight lb
*** 115' ***											
VHLP2-18	C	Paraboloid w/Shroud (HP)	From Leg	1.00	0.000		115.00	2.00	No Ice	3.14	31.00
				0.000					1/2" Ice	3.41	49.00
				0.000					1" Ice	3.68	66.00
*** 80' ***											
VHLP2-23	A	Paraboloid w/Shroud (HP)	From Leg	1.00	-30.000		80.00	2.18	No Ice	3.73	30.00
				2.000					1/2" Ice	4.02	50.00
				3.000					1" Ice	4.31	70.00
***											

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice

Comb. No.	Description
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L1	119.083 - 101.083	Pole	Max Tension	26	0.00	-0.03	0.45
			Max. Compression	26	-27572.54	-478.06	-6159.50
			Max. Mx	20	-8931.82	170584.38	-1460.12
			Max. My	14	-8945.14	1409.46	-170299.56
			Max. Vy	8	15310.97	-170296.78	941.71
			Max. Vx	2	-15168.97	-1567.91	168593.14
			Max. Torque	22			9402.19
L2	101.083 - 66.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-54632.25	1083.64	-7413.96
			Max. Mx	8	-18889.43	-930676.17	1921.81
			Max. My	14	-18904.59	4141.51	-926590.21
			Max. Vy	8	25906.70	-930676.17	1921.81
			Max. Vx	14	25749.56	4141.51	-926590.21
			Max. Torque	22			10082.86
L3	66.5 - 32.8333	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-70976.54	4.18	-7619.83
			Max. Mx	8	-27587.87	-1826420.61	917.58
			Max. My	14	-27590.01	4911.76	-1819347.90
			Max. Vy	8	28600.06	-1826420.61	917.58
			Max. Vx	14	28607.51	4911.76	-1819347.90

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Torque	22			9468.20
L4	32.8333 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-91494.80	-1306.30	-7471.21
			Max. Mx	8	-39470.62	-2947865.69	-64.55
			Max. My	14	-39470.59	5696.45	-2943216.95
			Max. Vy	8	31085.57	-2947865.69	-64.55
			Max. Vx	14	31178.05	5696.45	-2943216.95
			Max. Torque	22			9444.44

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	33	91494.80	-11.43	-6774.82
	Max. H_x	20	39493.42	31005.24	-2.83
	Max. H_z	2	39493.42	-66.65	31112.85
	Max. M_x	2	2938326.03	-66.65	31112.85
	Max. M_z	8	2947865.69	-31056.60	-28.14
	Max. Torsion	22	9435.35	26609.55	15331.90
	Min. Vert	23	29620.07	26609.55	15331.90
	Min. H_x	8	39493.42	-31056.60	-28.14
	Min. H_z	14	39493.42	13.46	-31149.12
	Min. M_x	14	-2943216.95	13.46	-31149.12
	Min. M_z	20	-2944625.06	31005.24	-2.83
	Min. Torsion	10	-9286.96	-26669.69	-15337.39

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	32911.18	-0.00	0.00	829.57	1015.40	-0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	39493.42	66.65	-31112.85	-2938326.03	-9104.25	-3916.03
0.9 Dead+1.6 Wind 0 deg - No Ice	29620.07	66.65	-31112.85	-2910427.56	-9302.02	-3911.07
1.2 Dead+1.6 Wind 30 deg - No Ice	39493.42	15399.83	-26643.38	-2530574.93	-1465781.66	964.68
0.9 Dead+1.6 Wind 30 deg - No Ice	29620.07	15399.83	-26643.38	-2506516.62	-1451985.02	959.71
1.2 Dead+1.6 Wind 60 deg - No Ice	39493.42	26647.37	-15408.46	-1464371.28	-2533506.25	5488.67
0.9 Dead+1.6 Wind 60 deg - No Ice	29620.07	26647.37	-15408.46	-1450545.32	-2509456.40	5475.04
1.2 Dead+1.6 Wind 90 deg - No Ice	39493.42	31056.60	28.14	62.69	-2947865.69	8398.17
0.9 Dead+1.6 Wind 90 deg - No Ice	29620.07	31056.60	28.14	-160.30	-2919873.65	8379.44

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
1.2 Dead+1.6 Wind 120 deg - No Ice	39493.42	26669.69	15337.39	1454039.50	-2533922.75	9286.96
0.9 Dead+1.6 Wind 120 deg - No Ice	29620.07	26669.69	15337.39	1439838.83	-2509867.90	9268.37
1.2 Dead+1.6 Wind 150 deg - No Ice	39493.42	15355.79	26633.95	2529606.68	-1456222.56	7689.85
0.9 Dead+1.6 Wind 150 deg - No Ice	29620.07	15355.79	26633.95	2505044.05	-1442539.85	7676.38
1.2 Dead+1.6 Wind 180 deg - No Ice	39493.42	-13.46	31149.12	2943216.95	5695.61	3799.30
0.9 Dead+1.6 Wind 180 deg - No Ice	29620.07	-13.46	31149.12	2914741.53	5306.75	3794.43
1.2 Dead+1.6 Wind 210 deg - No Ice	39493.42	-15335.86	26644.77	2531803.51	1461798.00	-1129.55
0.9 Dead+1.6 Wind 210 deg - No Ice	29620.07	-15335.86	26644.77	2507205.97	1447397.32	-1124.56
1.2 Dead+1.6 Wind 240 deg - No Ice	39493.42	-26632.24	15353.55	1461017.72	2533608.98	-5373.41
0.9 Dead+1.6 Wind 240 deg - No Ice	29620.07	-26632.24	15353.55	1446704.16	2508916.22	-5359.83
1.2 Dead+1.6 Wind 270 deg - No Ice	39493.42	-31005.24	2.83	4132.83	2944625.06	-8474.09
0.9 Dead+1.6 Wind 270 deg - No Ice	29620.07	-31005.24	2.83	3820.56	2916030.20	-8455.51
1.2 Dead+1.6 Wind 300 deg - No Ice	39493.42	-26609.55	-15331.90	-1452595.76	2530308.50	-9435.35
0.9 Dead+1.6 Wind 300 deg - No Ice	29620.07	-26609.55	-15331.90	-1438905.09	2505668.92	-9416.87
1.2 Dead+1.6 Wind 330 deg - No Ice	39493.42	-15364.52	-26576.96	-2522072.21	1460477.01	-7819.65
0.9 Dead+1.6 Wind 330 deg - No Ice	29620.07	-15364.52	-26576.96	-2498100.56	1446136.42	-7806.13
1.2 Dead+1.0 Ice+1.0 Temp	91494.80	-0.00	0.03	7471.21	-1306.30	-0.81
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	91494.80	-3.66	-6769.67	-635181.67	-1469.68	-327.05
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	91494.80	2957.95	-5142.55	-503319.53	-295622.34	328.18
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	91494.80	5132.88	-2964.99	-287089.75	-511560.11	881.78
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	91494.80	6124.27	17.37	8933.04	-608383.28	1180.78
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	91494.80	5149.65	2977.91	302969.15	-513114.07	1192.40
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	91494.80	2974.77	5154.71	519582.96	-296685.06	887.89
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	91494.80	11.43	6774.82	650841.09	-2106.49	310.42
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	91494.80	-2948.67	5142.63	518406.48	291959.03	-352.41
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	91494.80	-5130.56	2957.07	301499.85	508506.82	-866.76
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	91494.80	-6116.75	-13.00	6630.30	604823.00	-1194.03
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	91494.80	-5140.94	-2977.25	-287836.37	509517.48	-1216.32
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	91494.80	-2976.16	-5146.48	-503492.90	294334.55	-907.93
Dead+Wind 0 deg - Service	32911.18	14.26	-6656.93	-624825.76	-1146.38	-845.04
Dead+Wind 30 deg - Service	32911.18	3294.96	-5700.64	-538020.78	-311228.03	208.23
Dead+Wind 60 deg - Service	32911.18	5701.50	-3296.81	-311057.88	-538513.53	1184.38
Dead+Wind 90 deg - Service	32911.18	6644.90	6.02	676.11	-626724.85	1812.52

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
Dead+Wind 120 deg - Service	32911.18	5706.27	3281.60	310173.81	-538588.10	2004.26
Dead+Wind 150 deg - Service	32911.18	3285.54	5698.62	539113.23	-309182.65	1660.69
Dead+Wind 180 deg - Service	32911.18	-2.88	6664.70	627165.72	1999.74	821.45
Dead+Wind 210 deg - Service	32911.18	-3281.27	5700.94	539579.59	311944.34	-242.95
Dead+Wind 240 deg - Service	32911.18	-5698.26	3285.06	311652.93	540094.33	-1159.89
Dead+Wind 270 deg - Service	32911.18	-6633.91	0.61	1538.37	627600.47	-1830.13
Dead+Wind 300 deg - Service	32911.18	-5693.40	-3280.43	-308545.24	539397.98	-2037.55
Dead+Wind 330 deg - Service	32911.18	-3287.41	-5686.43	-536200.10	311673.52	-1688.35

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
1	0.00	-32911.18	0.00	0.00	32911.18	-0.00	0.000%
2	66.65	-39493.42	-31112.85	-66.65	39493.42	31112.85	0.000%
3	66.65	-29620.07	-31112.85	-66.65	29620.07	31112.85	0.000%
4	15399.83	-39493.42	-26643.38	-15399.83	39493.42	26643.38	0.000%
5	15399.83	-29620.07	-26643.38	-15399.83	29620.07	26643.38	0.000%
6	26647.37	-39493.42	-15408.46	-26647.37	39493.42	15408.46	0.000%
7	26647.37	-29620.07	-15408.46	-26647.37	29620.07	15408.46	0.000%
8	31056.60	-39493.42	28.14	-31056.60	39493.42	-28.14	0.000%
9	31056.60	-29620.07	28.14	-31056.60	29620.07	-28.14	0.000%
10	26669.69	-39493.42	15337.39	-26669.69	39493.42	-15337.39	0.000%
11	26669.69	-29620.07	15337.39	-26669.69	29620.07	-15337.39	0.000%
12	15355.79	-39493.42	26633.95	-15355.79	39493.42	-26633.95	0.000%
13	15355.79	-29620.07	26633.95	-15355.79	29620.07	-26633.95	0.000%
14	-13.46	-39493.42	31149.12	13.46	39493.42	-31149.12	0.000%
15	-13.46	-29620.07	31149.12	13.46	29620.07	-31149.12	0.000%
16	-15335.86	-39493.42	26644.77	15335.86	39493.42	-26644.77	0.000%
17	-15335.86	-29620.07	26644.77	15335.86	29620.07	-26644.77	0.000%
18	-26632.24	-39493.42	15353.55	26632.24	39493.42	-15353.55	0.000%
19	-26632.24	-29620.07	15353.55	26632.24	29620.07	-15353.55	0.000%
20	-31005.24	-39493.42	2.83	31005.24	39493.42	-2.83	0.000%
21	-31005.24	-29620.07	2.83	31005.24	29620.07	-2.83	0.000%
22	-26609.55	-39493.42	-15331.90	26609.55	39493.42	15331.90	0.000%
23	-26609.55	-29620.07	-15331.90	26609.55	29620.07	15331.90	0.000%
24	-15364.52	-39493.42	-26576.96	15364.52	39493.42	26576.96	0.000%
25	-15364.52	-29620.07	-26576.96	15364.52	29620.07	26576.96	0.000%
26	0.00	-91494.80	0.00	0.00	91494.80	-0.03	0.000%
27	-3.66	-91494.80	-6769.54	3.66	91494.80	6769.67	0.000%
28	2957.88	-91494.80	-5142.44	-2957.95	91494.80	5142.55	0.000%
29	5132.77	-91494.80	-2964.93	-5132.88	91494.80	2964.99	0.000%
30	6124.14	-91494.80	17.37	-6124.27	91494.80	-17.37	0.000%
31	5149.54	-91494.80	2977.84	-5149.65	91494.80	-2977.91	0.000%
32	2974.71	-91494.80	5154.59	-2974.77	91494.80	-5154.71	0.000%
33	11.43	-91494.80	6774.67	-11.43	91494.80	-6774.82	0.000%
34	-2948.61	-91494.80	5142.51	2948.67	91494.80	-5142.63	0.000%
35	-5130.45	-91494.80	2957.00	5130.56	91494.80	-2957.07	0.000%
36	-6116.62	-91494.80	-13.00	6116.75	91494.80	13.00	0.000%
37	-5140.83	-91494.80	-2977.19	5140.94	91494.80	2977.25	0.000%
38	-2976.10	-91494.80	-5146.37	2976.16	91494.80	5146.48	0.000%
39	14.26	-32911.18	-6656.93	-14.26	32911.18	6656.93	0.000%
40	3294.96	-32911.18	-5700.64	-3294.96	32911.18	5700.64	0.000%
41	5701.49	-32911.18	-3296.81	-5701.50	32911.18	3296.81	0.000%
42	6644.90	-32911.18	6.02	-6644.90	32911.18	-6.02	0.000%
43	5706.27	-32911.18	3281.60	-5706.27	32911.18	-3281.60	0.000%
44	3285.54	-32911.18	5698.62	-3285.54	32911.18	-5698.62	0.000%

Load Comb.	Sum of Applied Forces PX lb	PY lb	PZ lb	Sum of Reactions PX lb	PY lb	PZ lb	% Error
45	-2.88	-32911.18	6664.69	2.88	32911.18	-6664.70	0.000%
46	-3281.27	-32911.18	5700.94	3281.27	32911.18	-5700.94	0.000%
47	-5698.26	-32911.18	3285.06	5698.26	32911.18	-3285.06	0.000%
48	-6633.91	-32911.18	0.61	6633.91	32911.18	-0.61	0.000%
49	-5693.40	-32911.18	-3280.43	5693.40	32911.18	3280.43	0.000%
50	-3287.41	-32911.18	-5686.43	3287.41	32911.18	5686.43	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00020954
3	Yes	5	0.00000001	0.00009444
4	Yes	6	0.00000001	0.00005463
5	Yes	5	0.00000001	0.00054761
6	Yes	6	0.00000001	0.00004738
7	Yes	5	0.00000001	0.00047384
8	Yes	5	0.00000001	0.00047176
9	Yes	5	0.00000001	0.00021214
10	Yes	6	0.00000001	0.00006993
11	Yes	5	0.00000001	0.00070681
12	Yes	6	0.00000001	0.00004567
13	Yes	5	0.00000001	0.00045740
14	Yes	5	0.00000001	0.00022921
15	Yes	5	0.00000001	0.00010301
16	Yes	6	0.00000001	0.00005213
17	Yes	5	0.00000001	0.00052104
18	Yes	6	0.00000001	0.00006245
19	Yes	5	0.00000001	0.00062816
20	Yes	5	0.00000001	0.00048445
21	Yes	5	0.00000001	0.00021779
22	Yes	6	0.00000001	0.00004502
23	Yes	5	0.00000001	0.00045221
24	Yes	6	0.00000001	0.00006653
25	Yes	5	0.00000001	0.00067177
26	Yes	4	0.00000001	0.00010287
27	Yes	5	0.00000001	0.00047272
28	Yes	5	0.00000001	0.00054062
29	Yes	5	0.00000001	0.00053297
30	Yes	5	0.00000001	0.00049021
31	Yes	5	0.00000001	0.00060466
32	Yes	5	0.00000001	0.00056711
33	Yes	5	0.00000001	0.00049829
34	Yes	5	0.00000001	0.00056701
35	Yes	5	0.00000001	0.00059183
36	Yes	5	0.00000001	0.00049102
37	Yes	5	0.00000001	0.00053986
38	Yes	5	0.00000001	0.00055963
39	Yes	4	0.00000001	0.00029430
40	Yes	4	0.00000001	0.00044459
41	Yes	4	0.00000001	0.00042275
42	Yes	4	0.00000001	0.00063219
43	Yes	4	0.00000001	0.00095525
44	Yes	4	0.00000001	0.00052895
45	Yes	4	0.00000001	0.00030035

46	Yes	4	0.00000001	0.00039345
47	Yes	4	0.00000001	0.00070297
48	Yes	4	0.00000001	0.00064085
49	Yes	4	0.00000001	0.00062252
50	Yes	4	0.00000001	0.00084592

Maximum Tower Deflections - Service Wind

Section No.	*Elevation*	*Horz. Deflection*	*Gov. Load Comb.*	*Tilt*	*Twist*
	ft	*in*		°	°
L1	119.083 - 101.083	15.672	48	1.129	0.022
L2	104 - 66.5	12.163	48	1.078	0.014
L3	70.3333 - 32.8333	5.558	48	0.748	0.005
L4	37.5 - 0	1.587	48	0.390	0.002

Critical Deflections and Radius of Curvature - Service Wind

Elevation	*Appurtenance*	*Gov. Load Comb.*	*Deflection*	*Tilt*	*Twist*	*Radius of Curvature*
ft			*in*	°	°	*ft*
120.00	AIR -32 B2A/B66AA w/ Mount Pipe	48	15.672	1.129	0.022	24799
115.00	VHLP2-18	48	14.708	1.119	0.020	24799
110.00	7770.00 w/ Mount Pipe	48	13.538	1.104	0.017	13651
100.00	BXA-80063-4BF-EDIN-X w/ Mount Pipe	48	11.273	1.053	0.012	7678
97.00	2'x3' Ice Shield	48	10.622	1.031	0.011	7312
95.00	2'x3' Ice Shield	48	10.196	1.014	0.010	7089
90.00	742 213 w/ Mount Pipe	48	9.160	0.967	0.009	6585
83.00	VHLP2-23	48	7.787	0.893	0.007	5987
80.00	LLPX310R w/ Mount Pipe	48	7.228	0.860	0.007	5762

Maximum Tower Deflections - Design Wind

Section No.	*Elevation*	*Horz. Deflection*	*Gov. Load Comb.*	*Tilt*	*Twist*
	ft	*in*		°	°
L1	119.083 - 101.083	73.546	8	5.293	0.103
L2	104 - 66.5	57.104	8	5.061	0.064
L3	70.3333 - 32.8333	26.114	8	3.513	0.024
L4	37.5 - 0	7.458	8	1.831	0.009

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
120.00	AIR -32 B2A/B66AA w/ Mount Pipe	8	73.546	5.293	0.103	5475
115.00	VHLP2-18	8	69.031	5.248	0.092	5475
110.00	7770.00 w/ Mount Pipe	8	63.548	5.181	0.079	3013
100.00	BXA-80063-4BF-EDIN-X w/ Mount Pipe	8	52.933	4.945	0.056	1686
97.00	2'x3' Ice Shield	8	49.879	4.839	0.051	1601
95.00	2'x3' Ice Shield	8	47.880	4.762	0.048	1550
90.00	742 213 w/ Mount Pipe	8	43.022	4.544	0.041	1433
83.00	VHLP2-23	8	36.580	4.198	0.034	1295
80.00	LLPX310R w/ Mount Pipe	8	33.956	4.039	0.031	1244

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
L1	119.083 - 101.083 (1)	TP26x22.13x0.25	18.00	0.00	0.0	19.935	-8929.87	1479480.00	0.006
L2	101.083 - 66.5 (2)	TP34.063x24.873x0.313	37.50	0.00	0.0	32.544	-18889.40	2387960.00	0.008
L3	66.5 - 32.8333 (3)	TP41.75x32.498x0.375	37.50	0.00	0.0	47.876	-27587.90	3492730.00	0.008
L4	32.8333 - 0 (4)	TP49.063x39.849x0.375	37.50	0.00	0.0	57.950	-39470.60	3984000.00	0.010

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	119.083 - 101.083 (1)	TP26x22.13x0.25	171465.83	762729.17	0.225	0.00	762729.17	0.000
L2	101.083 - 66.5 (2)	TP34.063x24.873x0.313	930675.00	1608483.33	0.579	0.00	1608483.33	0.000
L3	66.5 - 32.8333 (3)	TP41.75x32.498x0.375	1826425.00	2884758.33	0.633	0.00	2884758.33	0.000
L4	32.8333 - 0 (4)	TP49.063x39.849x0.375	2947866.67	3989300.00	0.739	0.00	3989300.00	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u lb	ϕV_n lb	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u lb-ft	ϕT_n lb-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	119.083 -	TP26x22.13x0.25	15338.90	739739.00	0.021	5493.46	1527325.00	0.004

Section No.	Elevation ft	Size	Actual V_u lb	ϕV_n lb	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u lb-ft	ϕT_n lb-ft	Ratio $\frac{T_u}{\phi T_n}$
L2	101.083 (1) 101.083 - 66.5	TP34.063x24.873x0.313	25906.70	1193980.00	0.022	8431.33	3220900.00	0.003
L3	(2) 66.5 - 32.8333	TP41.75x32.498x0.375	28600.10	1746370.00	0.016	8408.58	5776566.67	0.001
L4	(3) 32.8333 - 0 (4)	TP49.063x39.849x0.375	31085.60	1992000.00	0.016	8398.17	7988358.00	0.001

Pole Interaction Design Data

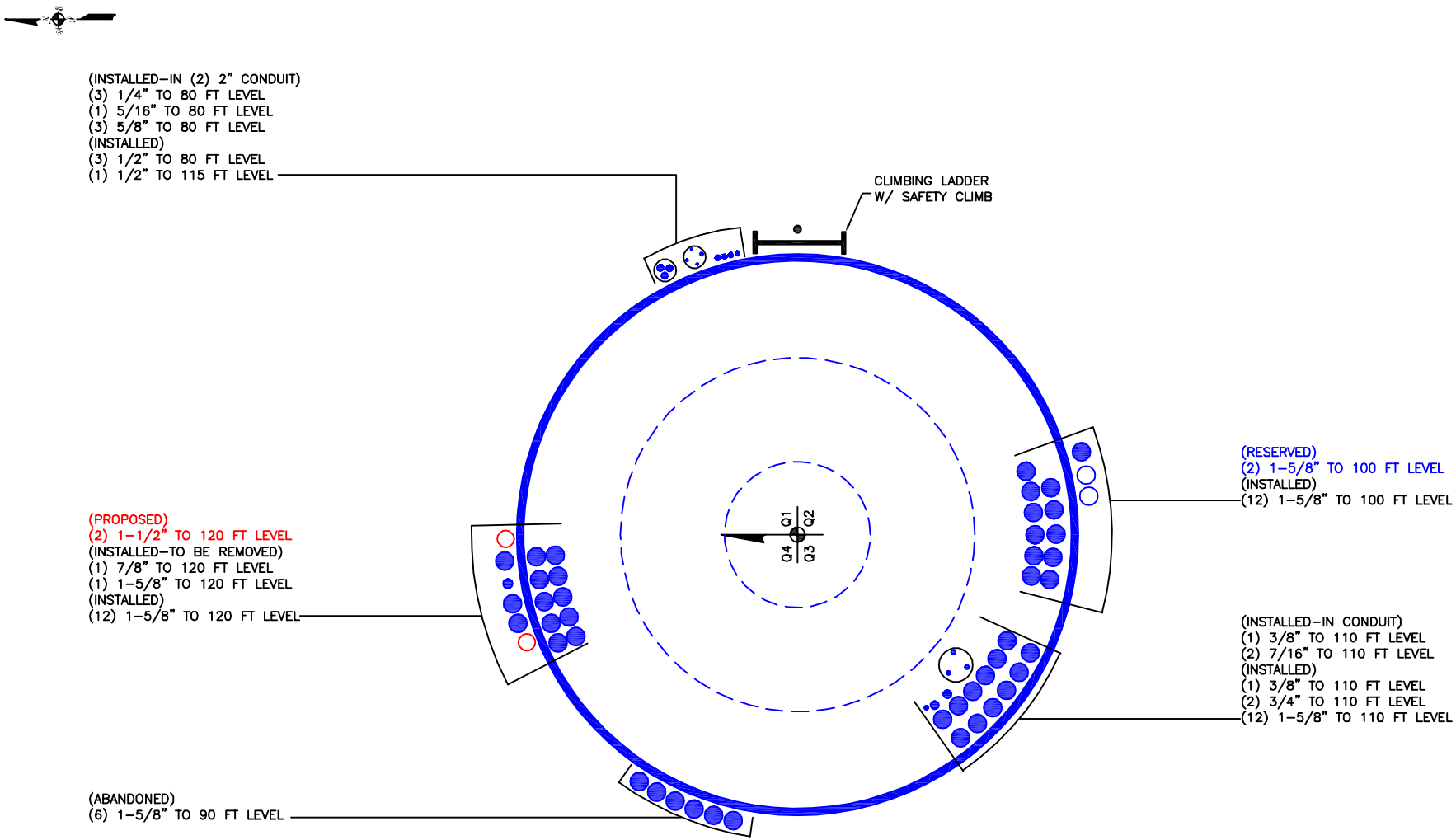
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	119.083 - 101.083 (1)	0.006	0.225	0.000	0.021	0.004	0.231	1.000	4.8.2
L2	101.083 - 66.5 (2)	0.008	0.579	0.000	0.022	0.003	0.587	1.000	4.8.2
L3	66.5 - 32.8333 (3)	0.008	0.633	0.000	0.016	0.001	0.641	1.000	4.8.2
L4	32.8333 - 0 (4)	0.010	0.739	0.000	0.016	0.001	0.749	1.000	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
L1	119.083 - 101.083	Pole	TP26x22.13x0.25	1	-8929.87	1479480.00	23.1	Pass
L2	101.083 - 66.5	Pole	TP34.063x24.873x0.313	2	-18889.40	2387960.00	58.7	Pass
L3	66.5 - 32.8333	Pole	TP41.75x32.498x0.375	3	-27587.90	3492730.00	64.1	Pass
L4	32.8333 - 0	Pole	TP49.063x39.849x0.375	4	-39470.60	3984000.00	74.9	Pass
							Summary	
						Pole (L4)	74.9	Pass
						Rating =	**74.9**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 829013 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

TOWER ENGINEERING PROFESSIONALS

West Hartford/I-84/X43 (BU 829013)

TEP #: 25680.161675

Analysis: ADB 7/2/2018

Check: AAS 7/2/2018

18-Sided, Tubular Polygon Tower Section

Reaction Input		
Elevation:	101.1	ft
Moment:	171.47	kip-ft
Axial:	8.93	kip
Shear:	15.34	kip
Torsion:	5.49	kip-ft

Section Properties		
Diameter:	26.00	in
Thickness:	0.2500	in
No. of Sides:	18	
Flat Width:	4.14	in
Area:	20.43	in^2

Material Properties		
F_y:	65	ksi
E:	29000	ksi

Actual Slip-Splice Length:	35.00	in
Required Slip-Splice Length:	38.25	in (per TIA-222-G 4.9.7.1)

Check Bending

S:	131.67	in^3			
F'_y:	71.47	ksi	(reduced to account for actual slip-splice length per TIA-222-G 13.3.5)		
ϕM_n:	705.73	kip-ft	24.3%	**PASS**	$0.9*F'_y*S$

Check Axial

ϕP_n:	1314.18	kip	0.7%	**PASS**	$0.9*F'_y*A_g$

Check Shear

ϕV_n:	657.09	kip	2.3%	**PASS**	$0.9*0.5*F'_y*A_g$

Check Torsion

J:	3423.31	in^4			
c:	13.00	in			
ϕT_n:	1411.46	kip-ft	0.4%	**PASS**	$0.9*F'_y*(J/c)$

Interaction:	**25.0%**	**PASS**	$(P_u/\varphi P_n) + (M_u/\varphi M_n) + [(V_u/\varphi V_n) + T_u/\phi T_n)]^2$

TOWER ENGINEERING PROFESSIONALS

West Hartford/I-84/X43 (BU 829013)

TEP #: 25680.161675

Analysis: ADB 7/2/2018

Check: AAS 7/2/2018

18-Sided, Tubular Polygon Tower Section

Reaction Input		
Elevation:	66.5	ft
Moment:	930.68	kip-ft
Axial:	18.89	kip
Shear:	25.91	kip
Torsion:	8.43	kip-ft

Section Properties		
Diameter:	34.06	in
Thickness:	0.3125	in
No. of Sides:	18	
Flat Width:	5.46	in
Area:	33.47	in^2

Material Properties		
F_y:	65	ksi
E:	29000	ksi

Actual Slip-Splice Length:	46.00	in
Required Slip-Splice Length:	50.16	in (per TIA-222-G 4.9.7.1)

Check Bending

S:	282.86	in^3			
F'_y:	70.82	ksi	(reduced to account for actual slip-splice length per TIA-222-G 13.3.5)		
ϕM_n:	1502.33	kip-ft	61.9%	**PASS**	$0.9*F'_y*S$

Check Axial

ϕP_n:	2133.50	kip	0.9%	**PASS**	$0.9*F'_y*A_g$

Check Shear

ϕV_n:	1066.75	kip	2.4%	**PASS**	$0.9*0.5*F'_y*A_g$

Check Torsion

J:	9634.87	in^4			
c:	17.03	in			
ϕT_n:	3004.67	kip-ft	0.3%	**PASS**	$0.9*F'_y*(J/c)$

Interaction:	62.9%	**PASS**	$(P_u/\varphi P_n) + (M_u/\varphi M_n) + [(V_u/\varphi V_n) + T_u/\phi T_n)]^2$

TOWER ENGINEERING PROFESSIONALS

West Hartford/I-84/X43 (BU 829013)

TEP #: 25680.161675

Analysis: ADB 7/2/2018

Check: AAS 7/2/2018

18-Sided, Tubular Polygon Tower Section

Reaction Input		
Elevation:	32.8	ft
Moment:	1826.43	kip-ft
Axial:	27.59	kip
Shear:	28.60	kip
Torsion:	8.41	kip-ft

Section Properties		
Diameter:	41.75	in
Thickness:	0.3750	in
No. of Sides:	18	
Flat Width:	6.70	in
Area:	49.24	in^2

Material Properties		
F_y:	65	ksi
E:	29000	ksi

Actual Slip-Splice Length:	56.00	in
Required Slip-Splice Length:	61.50	in (per TIA-222-G 4.9.7.1)

Check Bending

S:	510.23	in^3			
F'$_y$:	69.60	ksi	(reduced to account for actual slip-splice length per TIA-222-G 13.3.5)		
ϕM_n:	2663.44	kip-ft	68.6%	**PASS**	$0.9*F'_y*S$

Check Axial

ϕP_n:	3084.76	kip	0.9%	**PASS**	$0.9*F'_y*A_g$

Check Shear

ϕV_n:	1542.38	kip	1.9%	**PASS**	$0.9*0.5*F'_y*A_g$

Check Torsion

J:	21302.0	in^4			
c:	20.88	in			
ϕT_n:	5326.87	kip-ft	0.2%	**PASS**	$0.9*F'_y*(J/c)$

Interaction:	69.5%	**PASS**	$(P_u/\varphi P_n)+(M_u/\varphi M_n)+[(V_u/\varphi V_n)+T_u/\phi T_n)]^2$

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

TIA Rev G Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#: *829013*
Site Name: *West Hartford/I-84/X43*
App #: *433326 Rev. 6*
Pole Manufacturer: *Other*

Reactions		
Mu:	2947.87	ft-kips
Axial, Pu:	39.49	kips
Shear, Vu:	31.15	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

Anchor Rod Data		
Qty:	33	
Diam:	1.25	in
Rod Material:	Other	
Strength (Fu):	125	ksi
Yield (Fy):	105	ksi
Bolt Circle:	54	in

If No stiffeners, Criteria: AISC LRFD <-Only Applcable to Unstiffened Cases

Plate Data		
Diam:	58	in
Thick:	1.5	in
Grade:	50	ksi
Single-Rod B-eff:	4.72	in

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:	0.25	in
Width:	4	in
Height:	12	in
Thick:	0.75	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	49.0625	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Anchor Rod Results

		Stiffened
Max Rod (Cu+ Vu/ή):	82.5 Kips	AISC LRFD
Allowable Axial, Φ*Fu*Anet:	96.9 Kips	φ*Tn
Anchor Rod Stress Ratio:	85.1% **Pass**	

Base Plate Results Flexural Check

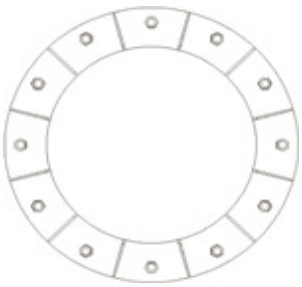
		Stiffened
Base Plate Stress:	27.5 ksi	AISC LRFD
Allowable Plate Stress:	45.0 ksi	φ*Fy
Base Plate Stress Ratio:	61.1% **Pass**	Y.L. Length: N/A, Roark

Stiffener Results

Horizontal Weld :	69.3% **Pass**
Vertical Weld:	46.2% **Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	19.7% **Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2	69.4% **Pass**
Plate Comp. (AISC Bracket):	67.9% **Pass**

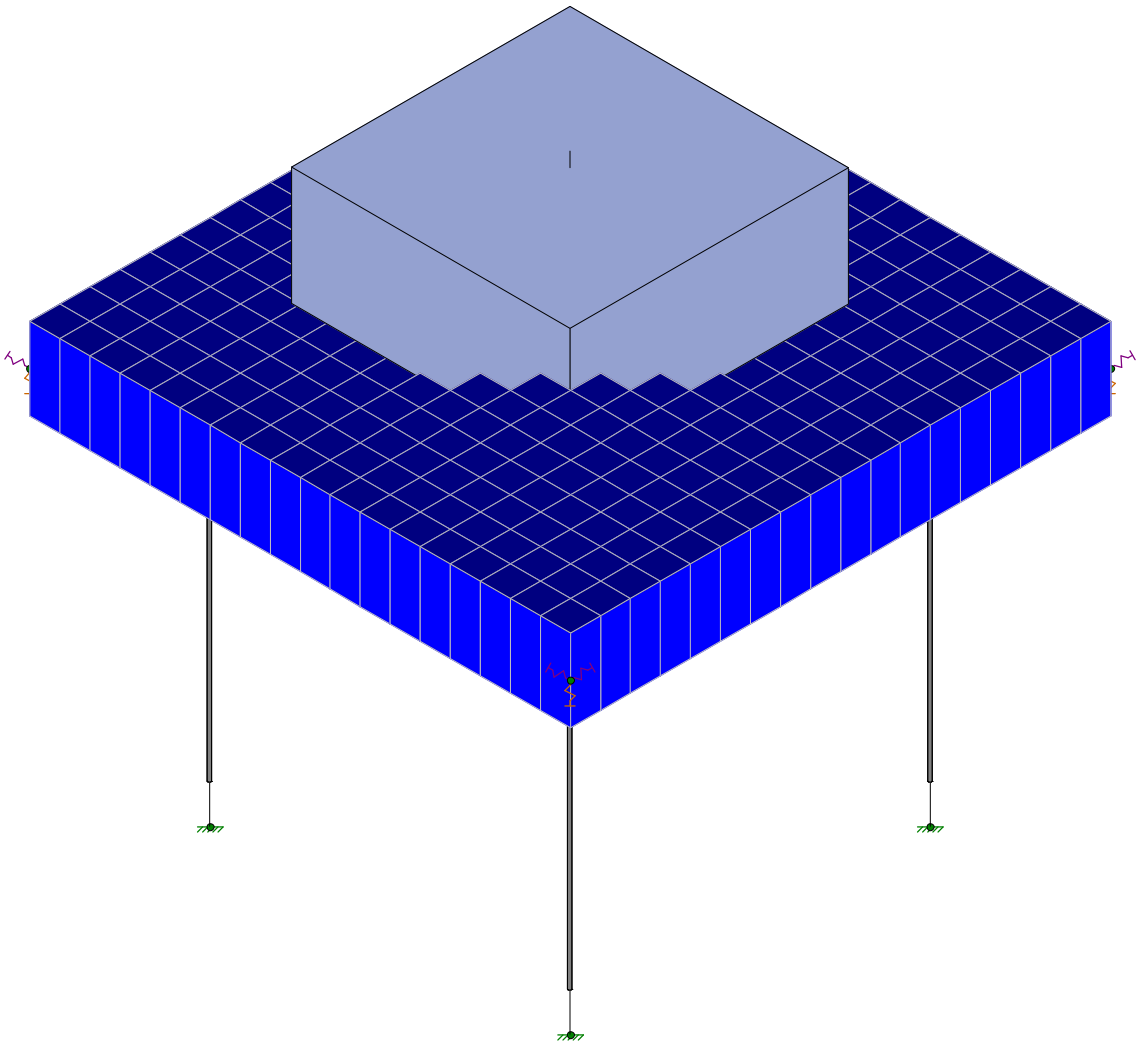
Pole Results

Pole Punching Shear Check:	9.3% **Pass**



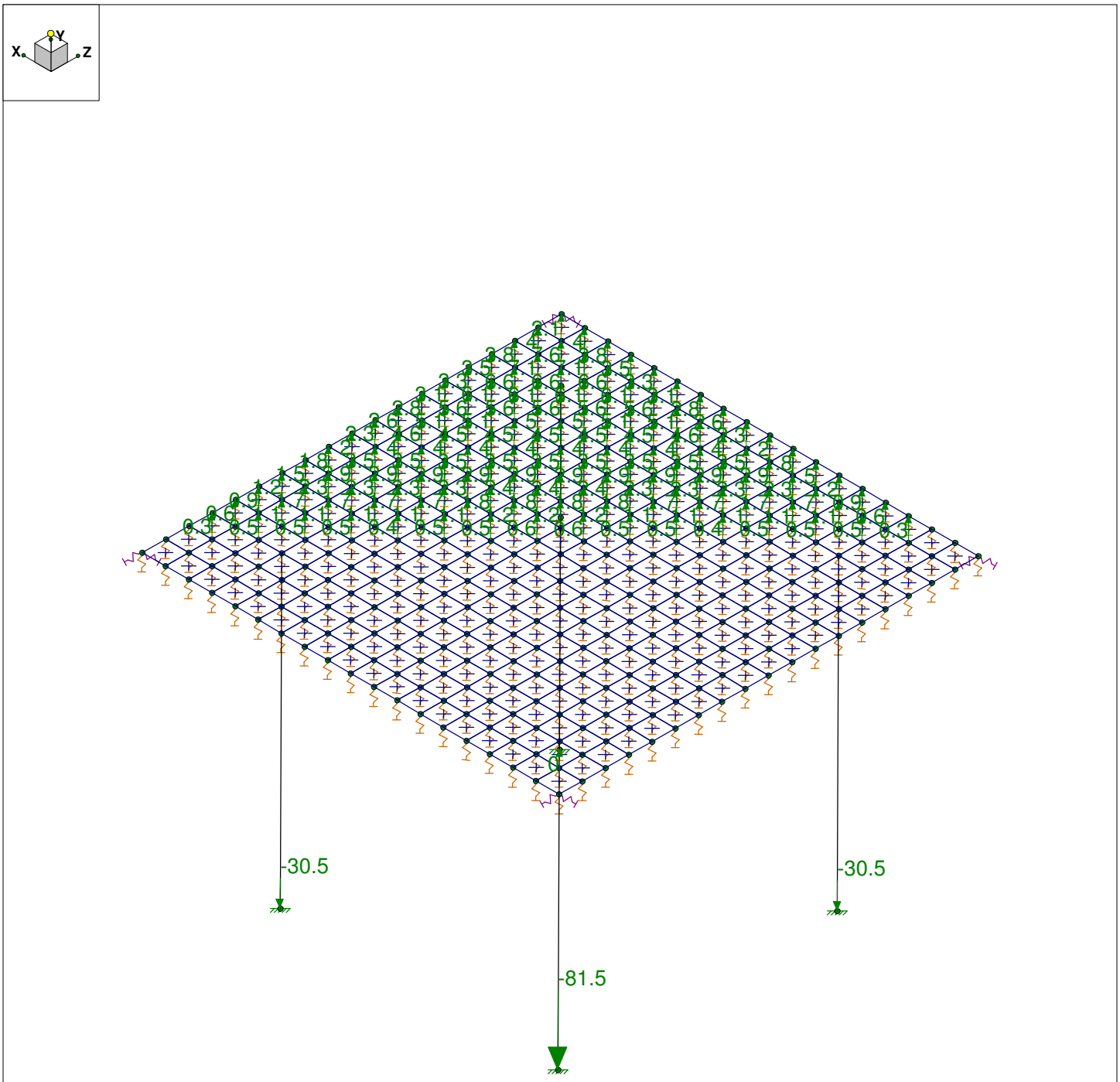
* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

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



Envelope Only Solution

Crown Castle	West Hartford/I-84/X43 (BU 829013)	SK - 1
ADB		July 2, 2018 at 4:01 PM
TEP No. 25680.161675		829013.02S_Foundation.r3d



Y-direction Reaction Units are k and k-ft

Crown Castle	West Hartford/I-84/X43 (BU 829013)	SK - 2
ADB		July 2, 2018 at 4:08 PM
TEP No. 25680.161675		829013.02S_Foundation.r3d

Concrete Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E...	Density[lb/f...	f'c[ksi]	Lambda	Flex Steel[...	Shear Stee...
1	Conc3000NW	3156	1372	.15	.6	145	3	1	60	60
2	Conc3500NW	3409	1482	.15	.6	145	3.5	1	60	60
3	Conc4000NW	3644	1584	.15	.6	145	4	1	60	60
4	Conc3000LW	2085	907	.15	.6	109.999	3	.75	60	60
5	Conc3500LW	2252	979	.15	.6	109.999	3.5	.75	60	60
6	Conc4000LW	2408	1047	.15	.6	109.999	4	.75	60	60

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N8	N12			1" WF Rock	Column	None	A722	Typical
2	M2	N7	N11			1" WF Rock	Column	None	A722	Typical
3	M3	N6	N10			1" WF Rock	Column	None	A722	Typical
4	M4	N5	N9			1" WF Rock	Column	None	A722	Typical
5	M5	TL1	N367			CRECT102X1...	Column	Rectangular	Conc3000...	Typical
6	M6	N367	TOWER			6' rigid offset	Column	None	RIGID	Typical

Joint Loads and Enforced Displacements (BLC 1 : Dead)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	TL1	L	Y	-32.9

Joint Loads and Enforced Displacements (BLC 2 : Wind 0)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	TL1	L	X	19.5
2	TL1	L	Mz	-1842.4

Joint Loads and Enforced Displacements (BLC 3 : Wind 90)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	TL1	L	Z	19.5
2	TL1	L	Mx	1842.4

Joint Loads and Enforced Displacements (BLC 4 : Wind 45)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	TL1	L	X	13.8
2	TL1	L	Mz	-1302.8
3	TL1	L	Z	13.8
4	TL1	L	Mx	1302.8

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Dead	DL		-1		1				324
2	Wind 0	WL				2				
3	Wind 90	WL				2				
4	Wind 45	WL				4				
5	Prestress	None						4		

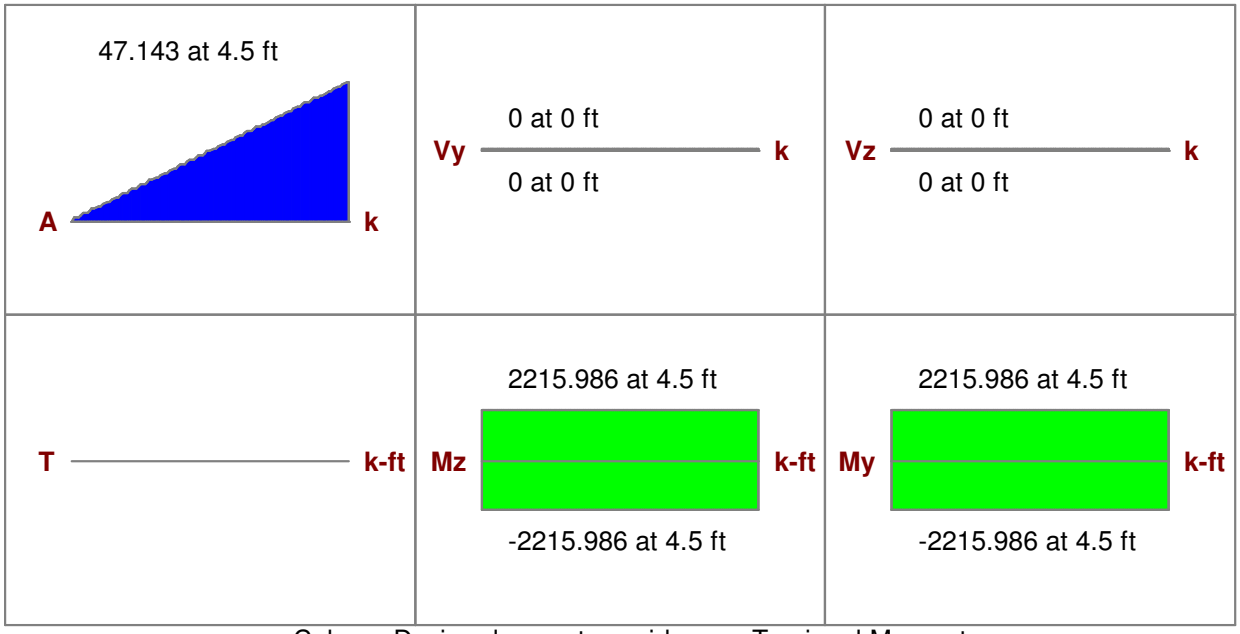
Load Combinations

	Description	So...	P...	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
1	1.2D+1.6Wind 0	Yes	Y		1	1.2	2	1.6	5	1														
2	1.2D+1.6Wind 90	Yes	Y		1	1.2	3	1.6	5	1														
3	1.2D+1.6Wind 45	Yes	Y		1	1.2	4	1.6	5	1														
4	0.9D+1.6Wind 0	Yes	Y		1	.9	2	1.6	5	1														
5	0.9D+1.6Wind 90	Yes	Y		1	.9	3	1.6	5	1														
6	0.9D+1.6Wind 45	Yes	Y		1	.9	4	1.6	5	1														
7	Prestress	Yes	Y		5	1																		

Column: ***M5***

Shape:	**CRECT102X102**	Concrete Stress Block:	**Rectangular**
Material:	**Conc3000NW**	Cracked Sections Used:	**Yes**
Length:	**4.5 ft**	Cracked 'I' Factor:	**.70**
I Joint:	**TL1**	Effective 'I':	**6.31419e+6 in^4**
J Joint:	**N367**	Biaxial Bending Solution:	**PCA Load Contour**

Code Check: **0.570 (LC 1)**
Report Based On 97 Sections



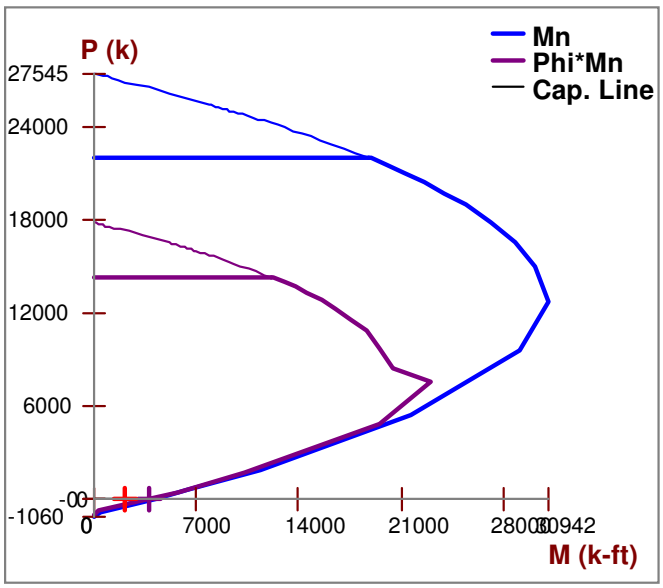
Column Design does not consider any Torsional Moments

Warning: Exact Integration selected but PCA method used
Custom rebar layout does not meet min steel (As,min) per Global Parameters

ACI 318-11 Code Check

		Bending Check	**0.570**	Shear Check	**0.000 (y)**
Gov LC	**7**	Location	**4.5 ft**	Location	**0 ft**
Gov Pu	**0 k**	Gov Muy	**2215.986 k-ft**	Gov Vuy	**0 k**
phi*Pn		Gov Muz	**0 k-ft**	Gov Vuz	**0 k**
Phi eff.	**.9**	phi*Mnoy	**-.9 k-ft**	phi*Vny	**1111.305 k**
		phi*Mnoz		phi*Vnz	**1111.305 k**
Tension Bar Fy	**60 ksi**	Concrete Weight	**145 lb/ft^3**		
Shear Bar Fy	**60 ksi**	λ	**1**	Sway yy	**No**
F'c	**3 ksi**	E_Concrete	**3156 ksi**	Sway zz	**No**
Flex. Rebar Set	**ASTM A615**	Shear Rebar Set	**ASTM A615**	Thres. Torsion	**917.543k-ft(LC:1)**
Flex. Bars	**9 #6 , 9 #6 , 11 #6 , 11 #6**				
Shear Bars	**#4 @6in**				

Column Interaction Diagram



Span Information

Span	Span Length (ft)	I-Face Dist. (in)	J-Face Dist. (in)
1	**0 - 4.5**	**0**	**0**

Column Steel

Span	Main Bars	UC Max	Gov LC	Loc (ft)	Pu (k)	Muy (k-ft)	Muz (k-ft)
1	**40 #6**	**0.570**	**7**	**4.5 ft**	**0**	**2215.986**	**0**

Axial Span Results

Span	Phi_eff	Pn (k)	Po (k)	Rho Gross	As Prvd (in^2)
1	**.9**		**27545.425**	**.0017**	**17.671**

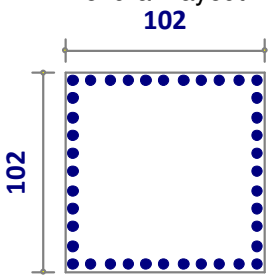
Bending Span Results

Span	ecc. y (ft)	ecc. z (ft)	NA y-y (ft)	NA z-z (ft)	Mny (k-ft)	Mnz (k-ft)	Mnoy (k-ft)	Mnoz (k-ft)
1	**0**	**0**		**3.949**	**4319.59**			

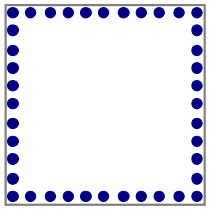
Rebar Detailing

Span	Region(ft)	Shear Steel
1	4.5 -	9 #4 @6in
	0 -	

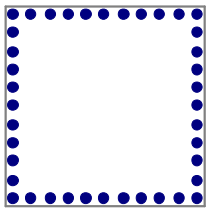
Flexural Layout



Total No. of Bars - Top : 4.5 ft
11#6 Top
9#6 Left
9#6 Right
11#6 Bottom



Total No. of Bars - Middle : 2.25 ft
11#6 Top
9#6 Left
9#6 Right
11#6 Bottom



Total No. of Bars - Bottom : 0 ft
11#6 Top
9#6 Left
9#6 Right
11#6 Bottom

Monopole on Mat Foundation with Rock Anchors - TIA-222-G

Site Data	
Site Name:	West Hartford/I-84/X43
CCI Number:	BU 829013
TEP Job Number:	25680.161675

Factored Reactions from TNX		
Axial	39.493	k
Shear	31.149	k
Moment	2947.866	k-ft

Mat and Pier Properties		
Mat Width	16.5	ft
Mat Length	16.5	ft
Mat Thickness	2.5	ft
Pier Type	Square	
Pier Width/Diam.	8.5	ft
Pier Height	4.5	ft

Soil Properties		
q_{allow}	10.8	ksf
FS	2.0	
Subgrade Mod.	390	kcf
Rock Weight	160	pcf
Rock Cone Angle	30	deg

Rock Anchor Properties		
Type of Bar	WilliamsForm150	
Bar Size	1.00	in
Net Area	0.85	in^2
Ultimate Stress, Fu	150.0	ksi
Yield Stress, Fy	120.0	ksi
Bar Diameter	1.000	in
Steel/Grout Bond[1]	230	psi
Grout/Rock Allow Bond	50	psi
FS	2	
Drilled Shaft Diam.	3.75	in

[1] Ultimate Bond Values

Mat Foundation Results

Bearing Stress	12.8	ksf
Bearing Capacity, ϕq_{allow}	16.3	ksf
% Capacity	78.9%	**Pass**

Mat and Pier Structural Results

Bending Moment	670.2	kft
Flexural Capacity, ϕMn	1151.3	kft
% Capacity	58.2%	**Pass**

Rock Anchor Steel Results

Max Tension Force	81.5	k
Anchor Capacity, ϕPn	91.8	k
% Capacity	88.7%	**Pass**

Rock Anchor Pullout Results

Req. Bond Length, ld	12.5	ft
Req. Cone Height, h	12.2	ft
Total Req. Embedment	19.3	ft
Pullout Capacity, phiTn	97.9	k
% Capacity	83.2%	**Pass**

		PASS	PASS	West Hartford/I-84/X43 (BU 829013)	
	Results Summary:	LC1	LC2	TEP #:	25680.161675
	Soil Interaction:	N/A	N/A	Analysis: ADB	7/2/2018
Drilled Caisson Tool - Pier	Foundation Structural:	34.3%	7.2%	Check: AAS	7/2/2018

Code Revisions: TIA-222-G ACI 318-11

Tower Type: Monopole

	LC1	LC2	
Moment:	872.05	192.08	kip-ft
Axial (download):	39.49	91.50	kip
Shear:	31.15	6.78	kip
Axial (uplift):			kip

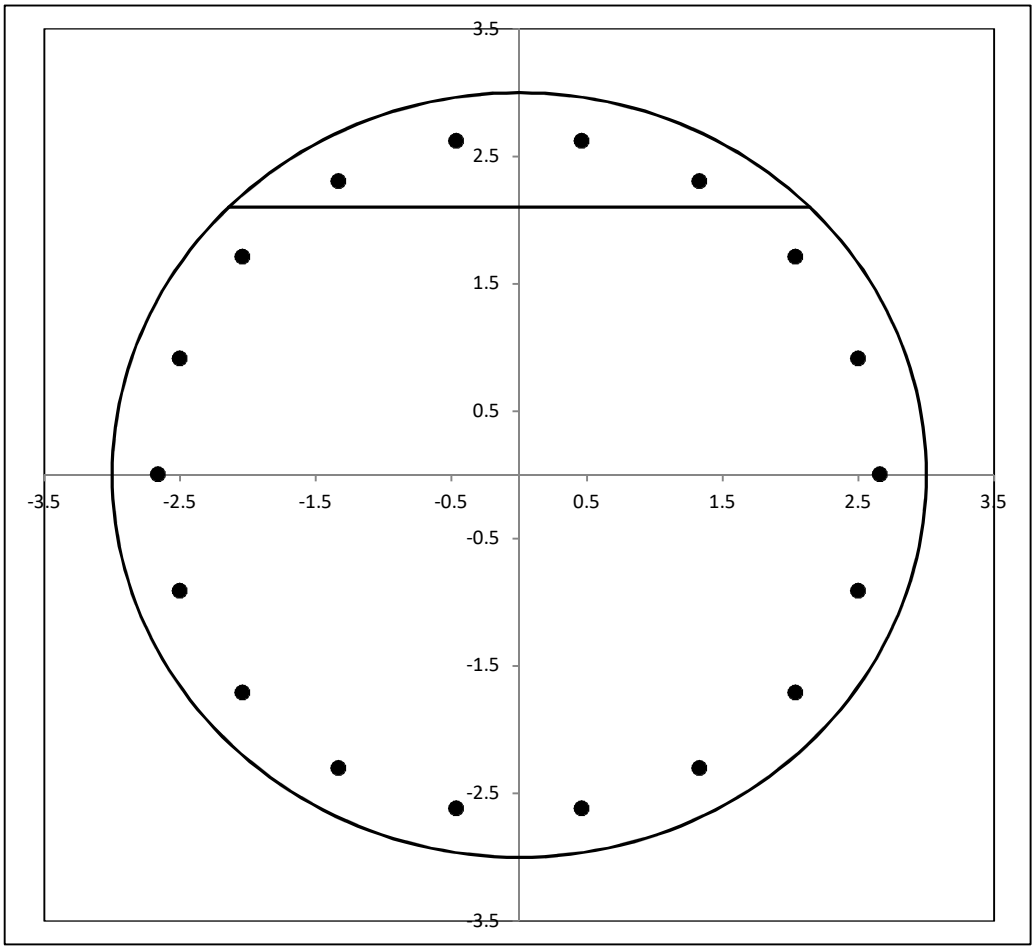
Shaft Information

Diameter:	6.00	ft
Projection:	0.50	ft
Caisson Length:	4.50	ft
f'c:	3.000	ksi
Max εc:	0.003	in/in

Cage 1 Reinforcement

Tie Bar Size:	4	*(fy = 60.0 ksi)*
Clear Cover to Tie:	3.00	*in (Cage Ø = 63.87in)*
Tie Bar Spacing:	6.00	in
Vertical Bar Size:	9	
Vertical Bar Quantity:	18	*(ρ =0.442%)*
fy:	60.0	ksi
E:	29,000	ksi

Reinforcement Capacity



		LC1	LC2	
	Vu =	31.1	6.8	kip
	Vc =	448.2	451.0	kip
fy,tie = 60.0	Vs =	269.8	269.8	kip
	ϕVn =	538.5	540.6	kip
	Capacity =	5.8%	1.3%	
		PASS	PASS	

	LC1	LC2	
Mu =	872.1	192.1	kip-ft
ϕMn =	2541.8	2655.4	kip-ft
Capacity =	34.3%	7.2%	
	PASS	PASS	

Date: **May 9, 2018**

Charles McGuirt
Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

Hudson Design Group LLC
45 Beechwood Drive
N. Andover, MA 01845
(978) 557-5553

Subject:	**Mount Structural Analysis**	
Carrier Designation:	**T-Mobile Equipment Change-Out**	
	Carrier Site Number:	CT11178D
	Carrier Site Name:	WEST HARTFORD/I-84/X43
Crown Castle Designation:	**Crown Castle BU Number:**	829013
	Crown Castle Site Name:	WEST HARTFORD/I-84/X43
	Crown Castle JDE Number:	496734
	Crown Castle PO Number:	1181203
	Crown Castle Application Number:	433326 Rev. 1
Engineering Firm Designation:	**Crown Castle Report Designation:**	3712509
Site Data:	**467 South Quaker Lane, West Hartford, CT, 06110** **Latitude: 41° 44' 55.59" Longitude: -72° 43' 52.86"**	
Structure Information:	**Tower Height & Type:**	**120 ft Monopole**
	Mount Elevation:	**120 ft**
	Mount Width & Type:	**14 ft Platform**

Dear Charles McGuirt,

Hudson Design Group LLC (HDG) is pleased to submit this "Mount Structural Analysis Report" to determine the structural integrity of T-Mobile's antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

Based upon our analysis, we have determined the adequacy of the antenna mounting system that will support the existing and proposed loading to be:

Platform Mount (Single) — Insufficient

This analysis has been performed in accordance with the 2012 International Building Code and the TIA-222-G based on a basic wind speed of 105 mph as required for use in the TIA-222-G Standard Annex B. Exposure Category B with a maximum topographic factor, K_{zt}, of 1.0 and Risk Category II were used in this analysis.

We at HDG 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.

Mount structural analysis prepared by: HDG
Respectfully Submitted by:

Michael Cabral
Structural Dept. Head

STATE OF CONNECTICUT
DANIEL HAMM
24178
LICENSED
PROFESSIONAL ENGINEER

Daniel P. Hamm, P.E.
Principal

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1) INTRODUCTION

This mount is a 14' low profile platform. No original structural design documents or fabrication drawings were available for the existing mounts. A mount mapping was not performed at this site. HDG performed a visual assessment using field photographs and mount mapping data from similar mounts to perform this analysis. The mount is installed at an elevation of 120 ft on the 120 ft Monopole.

2) ANALYSIS CRITERIA

The mount structural analysis was conducted in accordance with the requirements of TIA-222-G, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a basic wind speed of 105 mph with no ice, 50 mph with a 2.28 inch escalated ice thickness, Exposure Category B and Topographic category 1 with a crest height of 0 ft. In addition, the mounts have been analyzed for various live loading conditions consisting of a 250 pound man live load applied individually at the midpoint and cantilevered ends of horizontal members as well as a 500 pound man live load applied individually at mount pipe locations using a 3-second gust wind speed of 30 mph.

Table 1 - Proposed Equipment Loading Information

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Proposed Mount Type	Note
120	120	3	RFS/Celwave	APXVAARR24_43-U-NA20	-	1,2
	120	3	Ericsson	4449 B12/B71 RRH	-	1,2

Notes:
1) Proposed Equipment
2) Existing Mount to Remain

Table 2 - Existing and Reserved Equipment Loading Information

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Existing Mount Type	Note
120	120	6	Ericsson	AIR 32 B2a/B66Aa	14' Platform	1
	120	3	Ericsson	KRY 112 144/1 TMA	14' Platform	1

Notes:
1) Existing Equipment

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
RFDS	T-Mobile	-	ON FILE

3.1) Analysis Method

RAM Elements (Version 14.0.1), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

3.2) Assumptions

1) The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
2) The configuration of antennas, mounts, and other appurtenances are as specified in Table 1 and 2 and the referenced drawings.
3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
4) Steel grades have been assumed as follows, unless noted otherwise:

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Square, Rectangular)	ASTM A500 (GR B)
Pipe	ASTM A53 (GR 53)
Connection Bolts	ASTM A325

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 antenna mounting system.

4) ANALYSIS RESULTS

Table 4(a) - Mount Component Stresses vs. Capacity (Platform Mount, Alpha Sector)

Notes	Component	Member No.	Centerline (ft)	% Capacity	Pass / Fail
1	Face Horizontal	84	152	169	Fail
1	Standoff Members	36	152	171	Fail
2	Mount-to-Tower Connection	-	152	84	Pass

Table 4(b) - Mount Component Stresses vs. Capacity (Platform Mount, Beta Sector)

Notes	Component	Beam No.	Centerline (ft)	% Capacity	Pass / Fail
1	Face Horizontal	84	152	169	Fail
1	Standoff Members	36	152	171	Fail
2	Mount-to-Tower Connection	-	152	84	Pass

Table 4(c) - Mount Component Stresses vs. Capacity (Platform Mount, Gamma Sector)

Notes	Component	Beam No.	Centerline (ft)	% Capacity	Pass / Fail
1	Face Horizontal	84	152	169	Fail
1	Standoff Members	36	152	171	Fail
2	Mount-to-Tower Connection	-	152	84	Pass

Structure Rating (max from all components) =	181%

Notes:
1) See additional documentation in "Appendix C – Analysis Output" for calculations supporting the % Capacity consumed.
2) See additional documentation in "Appendix D – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

The Mount has insufficient capacity to support the proposed loading. We recommend installing a handrail reinforcement kit.

APPENDIX A

WIRE FRAME AND RENDERED MODELS

Bentley

Current Date: 5/9/2018 2:19 PM
Units system: English
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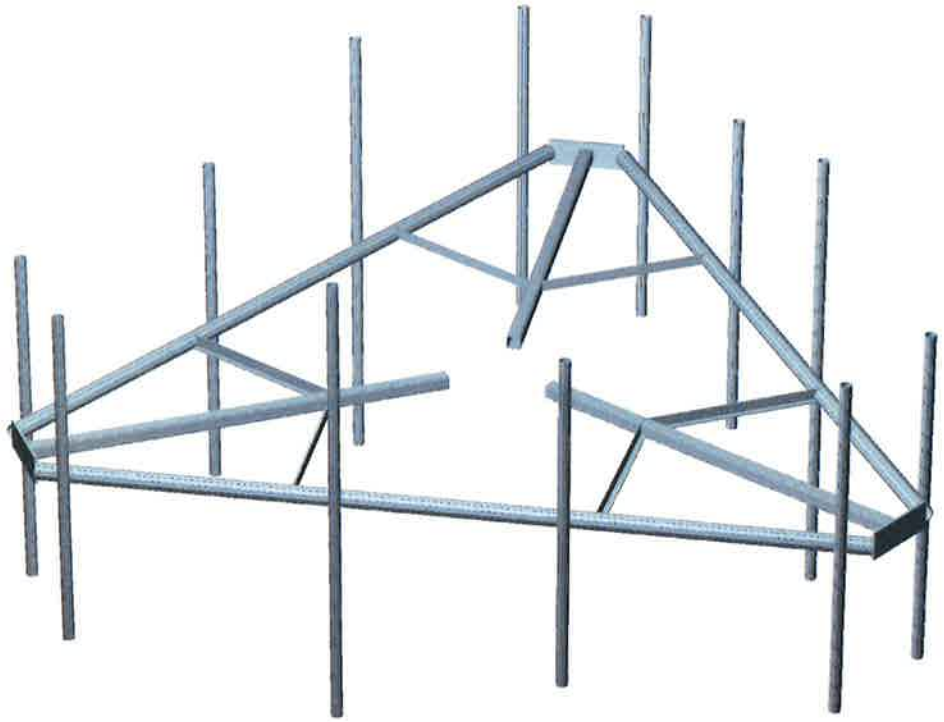

Bentley

Current Date: 5/9/2018 2:19 PM
Units system: English
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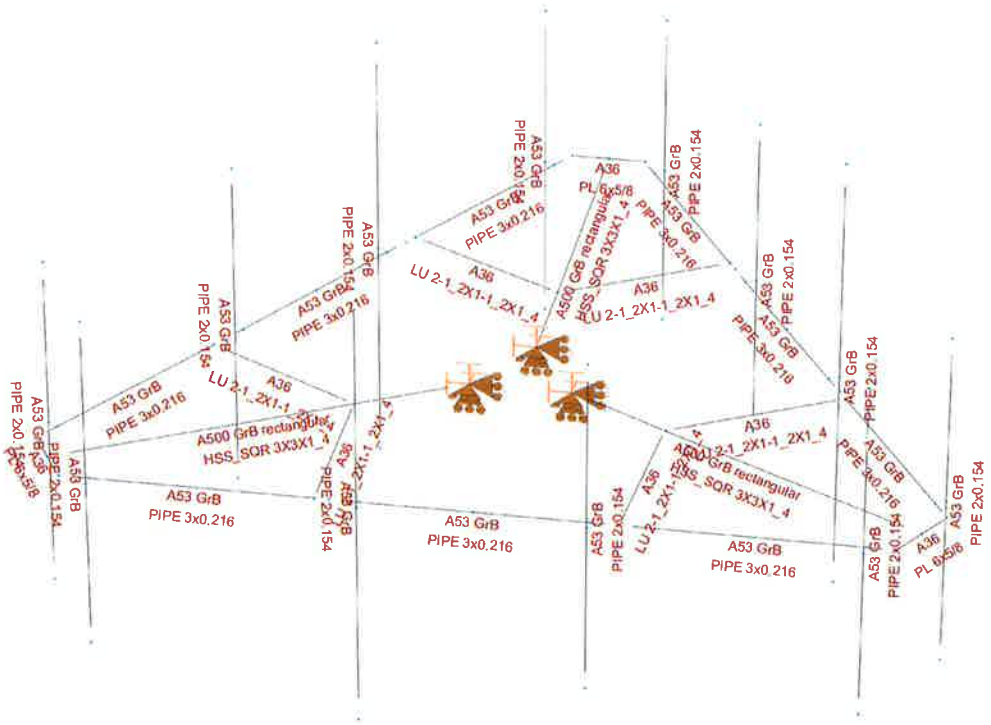

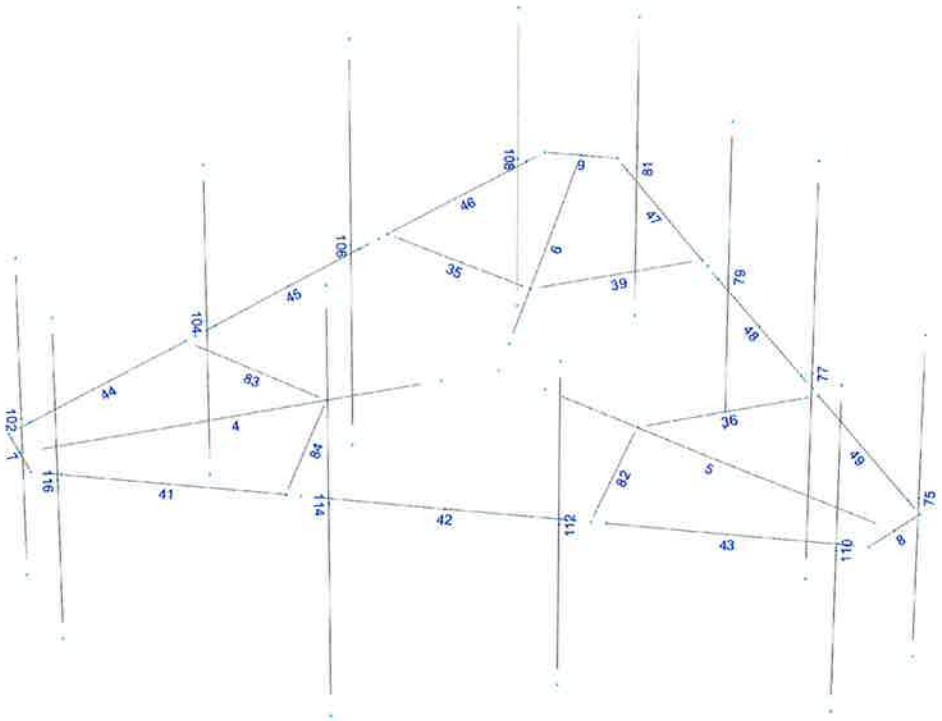
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Y
X
Z

APPENDIX B

RAM ELEMENTS INPUT CALCULATIONS

Date: 5/9/2018
Project Name: WEST HARTFORD/I-84/X43
Project Number: 829013
Designed By: BD **Checked By:** MSC

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2.6.5.2 Velocity Pressure Coeff:

$K_z = 2.01\ (z/z_g)^{2/\alpha}$

z=	120 (ft)
z_g=	1200 (ft)
α=	7.0

K_z= 1.041

$K_{zmin} \le K_z \le 2.01$

Table 2-4

Exposure	Z_g	α	K_{zmin}	K_e
B	1200 ft	7.0	0.70	0.9
C	900 ft	9.5	0.85	1.0
D	700 ft	11.5	1.03	1.1

2.6.6.4 Topographic Factor:

Table 2-5

Topo. Category	K_t	f
2	0.43	1.25
3	0.53	2.0
4	0.72	1.5

$K_{zt} = [1+(K_e K_t/K_h)]^2$

$K_h = e^{(f*z/H)}$

K_{zt}= #DIV/0!

K_h=	#DIV/0!
K_e=	0 (from Table 2-4)
K_t=	0 (from Table 2-5)
f=	0 (from Table 2-5)
z=	120
H=	0 (Ht. of the crest above surrounding terrain)
K_{zt}=	1.00
K_{iz} =	1.14 (from Sec. 2.6.8)

(If Category 1 then K_{zt} =1.0)

Category= 1

2.6.8 Design Ice Thickness

Max Ice Thickness = t_i = 1.00 in

$t_{iz} = 2.0*t_i*I*K_{iz}*(Kzt)^{0.35}$ t_{iz} = 2.28 in

Date: 5/9/2018
Project Name: WEST HARTFORD/I-84/X43
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2.6.7 Gust Effect Factor

2.6.7.1 Self Supporting Lattice Structures

Gh = 1.0 Latticed Structures > 600 ft

Gh = 0.85 Latticed Structures 450 ft or less

Gh = 0.85 + 0.15 [h/150 - 3.0] h= ht. of structure

h=	120	Gh=	0.85

2.6.7.2 Guyed Masts Gh= 0.85

2.6.7.3 Pole Structures Gh= 1.1

2.6.9 Appurtenances Gh= 1.0

2.6.7.4 Structures Supported on Other Structures
(Cantilivered tubular or latticed spines, pole, structures on buildings (ht. : width ratio > 5)

Gh=	1.35	Gh=	1.00

2.6.9.2 Design Wind Force on Appurtenances

$F = q_z * Gh * (EPA)_A$

$q_z = 0.00256 * K_z * K_{zt} * K_d * V_{max}^2 * I$

q_z=	27.91	K_z=	1.041	
$q_{z\,(ice)}$=	6.33	K_{zt}=	1.0	
$q_{z\,(30)}$=	2.28	K_d=	0.95	
		V_{max}=	105	mph
		$V_{max\,(ice)}$=	50	mph
		V_{30}=	30	mph
		I=	1.0	

Table 2-2

Structure Type	Wind Direction Probability Factor, Kd
Latticed structures with triangular, square or rectangular cross sections	0.85
Tubular pole structures, latticed structures with other cross sections, appurtenances	0.95

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Determine Ca:

Table 2-8

Force Coefficients (Ca) for Appurtenances				
Member Type		Aspect Ratio ≤ 2.5	Aspect Ratio = 7	Aspect Ratio ≥ 25
		Ca	Ca	Ca
Flat		1.2	1.4	2.0
Round	C < 32 (Subcritical)	0.7	0.8	1.2
	32 ≤ C ≤ 64 (Transitional)	$3.76/(C^{0.485})$	$3.37/(C^{0.415})$	$38.4/(C^{1.0})$
	C > 64 (Supercritical)	0.5	0.6	0.6

Aspect Ratio is the overall length/width ratio in the plane normal to the wind direction.
(Aspect ratio is independent of the spacing between support points of a linear appurtenance.

Note: Linear interpolation may be used for aspect ratios other than those shown.

Ice Thickness = 2.28 in | **Angle =** 0 (deg) | **Equivalent Angle =** 180 (deg)

Appurtenances	Height	Width	Depth	Flat Area	Aspect Ratio	Ca	Force (lbs)	Force (lbs) (w/ Ice)	Force (lbs) (30 mph)
APXVAARR24_43-U-NA20 Antenna	95.9	24.0	8.7	15.98	4.00	1.27	565	160	46
AIR 32 B2a/B66Aa Antenna	56.6	12.9	8.7	5.07	4.39	1.28	182	60	15
4449 B12/B71 RRH	15.0	13.2	9.3	1.38	1.14	1.20	46	18	4
KRY 112 144/1 TMA	6.9	6.1	2.8	0.29	1.13	1.20	10	6	1
2" Pipe	2.4	12.0		0.20	0.20	1.20	7	6	1
3" Pipe	3.5	12.0		0.29	0.29	1.20	10	7	1
L2-1/2x1-1/2	2.5	12.0		0.21	0.21	2.00	12	10	1
HSS 3x3	3.0	12.0		0.25	0.25	2.00	14	11	1

Date: 5/9/2018
Project Name: WEST HARTFORD/I-84/X43
Project Number: 829013
Designed By: BD Checked By: MSC

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WIND LOADS

Angle =	30	(deg)	Ice Thickness =	2.28	in.	Equivalent Angle =	210	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Aspect Ratio	Aspect Ratio	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
APXVAARR24_43-U-NA20 Antenna	95.9	24.0	8.7	15.98	5.79	4.00	11.02	1.27	1.53	565	248	486
AIR 32 B2a/B66Aa Antenna	56.6	12.9	8.7	5.07	3.42	4.39	6.51	1.28	1.38	182	132	169
4449 B12/B71 RRH	15.0	13.2	9.3	1.38	0.97	1.14	1.61	1.20	1.20	46	32	43
KRY 112 144/1 TMA	6.9	6.1	2.8	0.29	0.13	1.13	2.46	1.20	1.20	10	4	8

WIND LOADS WITH ICE:

APXVAARR24_43-U-NA20 Antenna	100.5	28.6	13.3	19.92	9.24	3.52	7.58	1.25	1.42	157	83	139
AIR 32 B2a/B66Aa Antenna	61.2	17.5	13.3	7.41	5.63	3.50	4.61	1.24	1.29	58	46	55
4449 B12/B71 RRH	19.6	17.8	13.9	2.41	1.88	1.10	1.41	1.20	1.20	18	14	17
KRY 112 144/1 TMA	11.5	10.7	7.4	0.85	0.58	1.08	1.56	1.20	1.20	6	4	6

WIND LOADS AT 30 MPH:

APXVAARR24_43-U-NA20 Antenna	95.9	24.0	8.7	15.98	5.79	4.00	11.02	1.27	1.53	46	20	40
AIR 32 B2a/B66Aa Antenna	56.6	12.9	8.7	5.07	3.42	4.39	6.51	1.28	1.38	15	11	14
4449 B12/B71 RRH	15.0	13.2	9.3	1.38	0.97	1.14	1.61	1.20	1.20	4	3	3
KRY 112 144/1 TMA	6.9	6.1	2.8	0.29	0.13	1.13	2.46	1.20	1.20	1	0	1

Date: 5/9/2018
Project Name: WEST HARTFORD/I-84/X43
Project Number: 829013
Designed By: BD Checked By: MSC

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WIND LOADS

Angle =	60	(deg)	Ice Thickness =	2.28	in.	Equivalent Angle =	240	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
APXVAARR24_43-U-NA20 Antenna	95.9	24.0	8.7	15.98	5.79	4.00	11.02	1.27	1.53	565	248	327
AIR 32 B2a/B66Aa Antenna	56.6	12.9	8.7	5.07	3.42	4.39	6.51	1.28	1.38	182	132	144
4449 B12/B71 RRH	15.0	13.2	9.3	1.38	0.97	1.14	1.61	1.20	1.20	46	32	36
KRY 112 144/1 TMA	6.9	6.1	2.8	0.29	0.13	1.13	2.46	1.20	1.20	10	4	6

WIND LOADS WITH ICE:

APXVAARR24_43-U-NA20 Antenna	100.5	28.6	13.3	19.92	9.24	3.52	7.58	1.25	1.42	157	83	102
AIR 32 B2a/B66Aa Antenna	61.2	17.5	13.3	7.41	5.63	3.50	4.61	1.24	1.29	58	46	49
4449 B12/B71 RRH	19.6	17.8	13.9	2.41	1.88	1.10	1.41	1.20	1.20	18	14	15
KRY 112 144/1 TMA	11.5	10.7	7.4	0.85	0.58	1.08	1.56	1.20	1.20	6	4	5

WIND LOADS AT 30 MPH:

APXVAARR24_43-U-NA20 Antenna	95.9	24.0	8.7	15.98	5.79	4.00	11.02	1.27	1.53	46	20	27
AIR 32 B2a/B66Aa Antenna	56.6	12.9	8.7	5.07	3.42	4.39	6.51	1.28	1.38	15	11	12
4449 B12/B71 RRH	15.0	13.2	9.3	1.38	0.97	1.14	1.61	1.20	1.20	4	3	3
KRY 112 144/1 TMA	6.9	6.1	2.8	0.29	0.13	1.13	2.46	1.20	1.20	1	0	0

Date: 5/9/2018
Project Name: WEST HARTFORD/I-84/X43
Project Number: 829013
Designed By: BD Checked By: MSC

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WIND LOADS

Angle =	90	(deg)	Ice Thickness =	2.28	in.	Equivalent Angle =	270	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
APXVAARR24_43-U-NA20 Antenna	95.9	24.0	8.7	15.98	5.79	4.00	11.02	1.27	1.53	565	248	248
AIR 32 B2a/B66Aa Antenna	56.6	12.9	8.7	5.07	3.42	4.39	6.51	1.28	1.38	182	132	132
4449 B12/B71 RRH	15.0	13.2	9.3	1.38	0.97	1.14	1.61	1.20	1.20	46	32	32
KRY 112 144/1 TMA	6.9	6.1	2.8	0.29	0.13	1.13	2.46	1.20	1.20	10	4	4

WIND LOADS WITH ICE:

APXVAARR24_43-U-NA20 Antenna	100.5	28.6	13.3	19.92	9.24	3.52	7.58	1.25	1.42	157	83	83
AIR 32 B2a/B66Aa Antenna	61.2	17.5	13.3	7.41	5.63	3.50	4.61	1.24	1.29	58	46	46
4449 B12/B71 RRH	19.6	17.8	13.9	2.41	1.88	1.10	1.41	1.20	1.20	18	14	14
KRY 112 144/1 TMA	11.5	10.7	7.4	0.85	0.58	1.08	1.56	1.20	1.20	6	4	4

WIND LOADS AT 30 MPH:

APXVAARR24_43-U-NA20 Antenna	95.9	24.0	8.7	15.98	5.79	4.00	11.02	1.27	1.53	46	20	20
AIR 32 B2a/B66Aa Antenna	56.6	12.9	8.7	5.07	3.42	4.39	6.51	1.28	1.38	15	11	11
4449 B12/B71 RRH	15.0	13.2	9.3	1.38	0.97	1.14	1.61	1.20	1.20	4	3	3
KRY 112 144/1 TMA	6.9	6.1	2.8	0.29	0.13	1.13	2.46	1.20	1.20	1	0	0

Date: 5/9/2018

Project Name: WEST HARTFORD/I-84/X43

Project Number: 829013

Designed By: BD Checked By: MSC

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WIND LOADS

Angle =	120	(deg)	Ice Thickness =	2.28	in.	Equivalent Angle =	300	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
APXVAARR24_43-U-NA20 Antenna	95.9	24.0	8.7	15.98	5.79	4.00	11.02	1.27	1.53	565	248	327
AIR 32 B2a/B66Aa Antenna	56.6	12.9	8.7	5.07	3.42	4.39	6.51	1.28	1.38	182	132	144
4449 B12/B71 RRH	15.0	13.2	9.3	1.38	0.97	1.14	1.61	1.20	1.20	46	32	36
KRY 112 144/1 TMA	6.9	6.1	2.8	0.29	0.13	1.13	2.46	1.20	1.20	10	4	6

WIND LOADS WITH ICE:

APXVAARR24_43-U-NA20 Antenna	100.5	28.6	13.3	19.92	9.24	3.52	7.58	1.25	1.42	157	83	102
AIR 32 B2a/B66Aa Antenna	61.2	17.5	13.3	7.41	5.63	3.50	4.61	1.24	1.29	58	46	49
4449 B12/B71 RRH	19.6	17.8	13.9	2.41	1.88	1.10	1.41	1.20	1.20	18	14	15
KRY 112 144/1 TMA	11.5	10.7	7.4	0.85	0.58	1.08	1.56	1.20	1.20	6	4	5

WIND LOADS AT 30 MPH:

APXVAARR24_43-U-NA20 Antenna	95.9	24.0	8.7	15.98	5.79	4.00	11.02	1.27	1.53	46	20	27
AIR 32 B2a/B66Aa Antenna	56.6	12.9	8.7	5.07	3.42	4.39	6.51	1.28	1.38	15	11	12
4449 B12/B71 RRH	15.0	13.2	9.3	1.38	0.97	1.14	1.61	1.20	1.20	4	3	3
KRY 112 144/1 TMA	6.9	6.1	2.8	0.29	0.13	1.13	2.46	1.20	1.20	1	0	0

Date: 5/9/2018
Project Name: WEST HARTFORD/I-84/X43
Project Number: 829013
Designed By: BD Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle =	150	(deg)	Ice Thickness =	2.28	In.	Equivalent Angle =	330	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
APXVAARR24_43-U-NA20 Antenna	95.9	24.0	8.7	15.98	5.79	4.00	11.02	1.27	1.53	565	248	486
AIR 32 B2a/B66Aa Antenna	56.6	12.9	8.7	5.07	3.42	4.39	6.51	1.28	1.38	182	132	169
4449 B12/B71 RRH	15.0	13.2	9.3	1.38	0.97	1.14	1.61	1.20	1.20	46	32	43
KRY 112 144/1 TMA	6.9	6.1	2.8	0.29	0.13	1.13	2.46	1.20	1.20	10	4	8

WIND LOADS WITH ICE:

APXVAARR24_43-U-NA20 Antenna	100.5	28.6	13.3	19.92	9.24	3.52	7.58	1.25	1.42	157	83	139
AIR 32 B2a/B66Aa Antenna	61.2	17.5	13.3	7.41	5.63	3.50	4.61	1.24	1.29	58	46	55
4449 B12/B71 RRH	19.6	18.2	13.9	2.47	1.88	1.07	1.41	1.20	1.20	19	14	18
KRY 112 144/1 TMA	11.5	16.3	7.4	1.30	0.58	0.70	1.56	1.20	1.20	10	4	8

WIND LOADS AT 30 MPH:

APXVAARR24_43-U-NA20 Antenna	95.9	24.0	8.7	15.98	5.79	4.00	11.02	1.27	1.53	46	20	40
AIR 32 B2a/B66Aa Antenna	56.6	12.9	8.7	5.07	3.42	4.39	6.51	1.28	1.38	15	11	14
4449 B12/B71 RRH	15.0	13.2	9.3	1.38	0.97	1.14	1.61	1.20	1.20	4	3	3
KRY 112 144/1 TMA	6.9	6.1	2.8	0.29	0.13	1.13	2.46	1.20	1.20	1	0	1

Date: 5/9/2018
Project Name: WEST HARTFORD/I-84/X43
Project Number: 829013
Designed By: BD **Checked By:** MSC

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ICE WEIGHT CALCULATIONS

Thickness of ice: 1 in.
Density of ice: 56 pcf

APXVAARR24_43-U-NA20 Antenna

Weight of ice based on total radial SF area:

Height (in):	95.9	
Width (in):	24.0	
Depth (in):	8.7	
Total weight of ice on object:		234 lbs
Weight of object:	128 lbs	
Combined weight of ice and object:		362 lbs

AIR 32 B2a/B66Aa Antenna

Weight of ice based on total radial SF area:

Height (in):	56.6	
Width (in):	12.9	
Depth (in):	8.7	
Total weight of ice on object:		97 lbs
Weight of object:	133 lbs	
Combined weight of ice and object:		230 lbs

4449 B12/B71 RRH

Weight of ice based on total radial SF area:

Height (in):	15.0	
Width (in):	13.2	
Depth (in):	9.3	
Total weight of ice on object:		35 lbs
Weight of object:	74 lbs	
Combined weight of ice and object:		109 lbs

KRY 112 144/1 TMA

Weight of ice based on total radial SF area:

Height (in):	6.9	
Width (in):	6.1	
Depth (in):	2.8	
Total weight of ice on object:		7 lbs
Weight of object:	11 lbs	
Combined weight of ice and object:		18 lbs

2" pipe

Per foot weight of ice:

diameter (in):	2.38	
Per foot weight of ice on object:		4 plf

3" Pipe

Per foot weight of ice:

diameter (in):	3.5	
Per foot weight of ice on object:		5 plf

HSS 3x3

Weight of ice based on total radial SF area:

Height (in):	3	
Width (in):	3	
Per foot weight of ice on object:		6 plf

L2-1/2x1-1/2x1/4 Angles

Weight of ice based on total radial SF area:

Thickness (in):	0.25	
Height (in):	2.5	
Width (in):	1.5	
Per foot weight of ice on object:		5 plf

PL 6x5/8

Weight of ice based on total radial SF area:

Height (in):	6	
Width (in):	0.625	
Per foot weight of ice on object:		7 plf

Bentley

Current Date: 5/9/2018 2:20 PM
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Load data

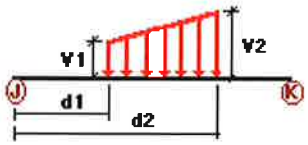
GLOSSARY

Comb : Indicates if load condition is a load combination

Load Conditions

Condition	Description	Comb.	Category
DL	Dead Load	No	DL
W0	Wind Load 0/60/120 deg	No	WIND
W30	Wind Load 30/90/150 deg	No	WIND
Di	Ice Load	No	LL
Wi0	Ice Wind Load 0/60/120 deg	No	WIND
Wi30	Ice Wind Load 30/90/150 deg	No	WIND
WL0	WL 30 mph 0/60/120 deg	No	WIND
WL30	WL 30 mph 30/90/150 deg	No	WIND
LL1	250 lb Live Load Center of Mount	No	LL
LL2	250 lb Live Load End of Mount	No	LL
LLa1	500 lb Live Load Antenna 1	No	LL
LLa3	500 lb Live Load Antenna 3	No	LL
LLa4	500 lb Live Load Antenna 4	No	LL
W180	-W0	Yes	
W210	-W30	Yes	
Wi180	-Wi0	Yes	
Wi210	-Wi30	Yes	
WL180	-WL0	Yes	
WL210	-WL30	Yes	

Distributed force on members

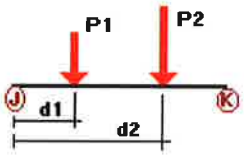


Condition	Member	Dir1	Val1 [Kip/ft]	Val2 [Kip/ft]	Dist1 [ft]	%	Dist2 [ft]	%
DL	41	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	42	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	43	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	44	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	45	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	46	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	47	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	48	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	49	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
W0	4	Z	-0.014	-0.014	0.00	Yes	100.00	Yes

	5	Z	-0.014	-0.014	0.00	Yes	100.00	Yes
	35	Z	-0.012	-0.012	0.00	Yes	100.00	Yes
	36	Z	-0.012	-0.012	0.00	Yes	100.00	Yes
	39	Z	-0.012	-0.012	0.00	Yes	100.00	Yes
	41	Z	-0.01	-0.01	0.00	Yes	100.00	Yes
	42	Z	-0.01	-0.01	0.00	Yes	100.00	Yes
	43	Z	-0.01	-0.01	0.00	Yes	100.00	Yes
	44	Z	-0.01	-0.01	0.00	Yes	100.00	Yes
	45	Z	-0.01	-0.01	0.00	Yes	100.00	Yes
	46	Z	-0.01	-0.01	0.00	Yes	100.00	Yes
	47	Z	-0.01	-0.01	0.00	Yes	100.00	Yes
	48	Z	-0.01	-0.01	0.00	Yes	100.00	Yes
	49	Z	-0.01	-0.01	0.00	Yes	100.00	Yes
	75	Z	-0.007	-0.007	0.00	Yes	100.00	Yes
	77	Z	-0.007	-0.007	0.00	Yes	100.00	Yes
	79	Z	-0.007	-0.007	0.00	Yes	100.00	Yes
	81	Z	-0.007	-0.007	0.00	Yes	100.00	Yes
	83	Z	-0.012	-0.012	0.00	Yes	100.00	Yes
	102	Z	-0.007	-0.007	0.00	Yes	100.00	Yes
	104	Z	-0.007	-0.007	0.00	Yes	100.00	Yes
	106	Z	-0.007	-0.007	0.00	Yes	100.00	Yes
	108	Z	-0.007	-0.007	0.00	Yes	100.00	Yes
W30	4	X	-0.014	-0.014	0.00	Yes	100.00	Yes
	5	X	-0.014	-0.014	0.00	Yes	100.00	Yes
	6	X	-0.014	-0.014	0.00	Yes	100.00	Yes
	35	X	-0.012	-0.012	0.00	Yes	100.00	Yes
	36	X	-0.012	-0.012	0.00	Yes	100.00	Yes
	39	X	-0.012	-0.012	0.00	Yes	100.00	Yes
	44	X	-0.01	-0.01	0.00	Yes	100.00	Yes
	45	X	-0.01	-0.01	0.00	Yes	100.00	Yes
	46	X	-0.01	-0.01	0.00	Yes	100.00	Yes
	47	X	-0.01	-0.01	0.00	Yes	100.00	Yes
	48	X	-0.01	-0.01	0.00	Yes	100.00	Yes
	49	X	-0.01	-0.01	0.00	Yes	100.00	Yes
	75	X	-0.007	-0.007	0.00	Yes	100.00	Yes
	77	X	-0.007	-0.007	0.00	Yes	100.00	Yes
	79	X	-0.007	-0.007	0.00	Yes	100.00	Yes
	81	X	-0.007	-0.007	0.00	Yes	100.00	Yes
	82	X	-0.012	-0.012	0.00	Yes	100.00	Yes
	83	X	-0.012	-0.012	0.00	Yes	100.00	Yes
	84	X	-0.012	-0.012	0.00	Yes	100.00	Yes
	102	X	-0.007	-0.007	0.00	Yes	100.00	Yes
	104	X	-0.007	-0.007	0.00	Yes	100.00	Yes
	106	X	-0.007	-0.007	0.00	Yes	100.00	Yes
	108	X	-0.007	-0.007	0.00	Yes	100.00	Yes
	110	X	-0.007	-0.007	0.00	Yes	100.00	Yes
	112	X	-0.007	-0.007	0.00	Yes	100.00	Yes
	114	X	-0.007	-0.007	0.00	Yes	100.00	Yes
	116	X	-0.007	-0.007	0.00	Yes	100.00	Yes
Di	4	Y	-0.006	-0.006	0.00	Yes	100.00	Yes
	5	Y	-0.006	-0.006	0.00	Yes	100.00	Yes
	6	Y	-0.006	-0.006	0.00	Yes	100.00	Yes
	7	Y	-0.007	-0.007	0.00	Yes	100.00	Yes
	8	Y	-0.007	-0.007	0.00	Yes	100.00	Yes
	9	Y	-0.007	-0.007	0.00	Yes	100.00	Yes
	35	Y	-0.005	-0.005	0.00	Yes	100.00	Yes
	36	Y	-0.005	-0.005	0.00	Yes	100.00	Yes
	39	Y	-0.005	-0.005	0.00	Yes	100.00	Yes
	41	Y	-0.005	-0.005	0.00	Yes	100.00	Yes
	42	Y	-0.005	-0.005	0.00	Yes	100.00	Yes

43	Y	-0.005	-0.005	0.00	Yes	100.00	Yes
44	Y	-0.005	-0.005	0.00	Yes	100.00	Yes
45	Y	-0.005	-0.005	0.00	Yes	100.00	Yes
46	Y	-0.005	-0.005	0.00	Yes	100.00	Yes
47	Y	-0.005	-0.005	0.00	Yes	100.00	Yes
48	Y	-0.005	-0.005	0.00	Yes	100.00	Yes
49	Y	-0.005	-0.005	0.00	Yes	100.00	Yes
75	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
77	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
79	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
81	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
82	Y	-0.005	-0.005	0.00	Yes	100.00	Yes
83	Y	-0.005	-0.005	0.00	Yes	100.00	Yes
84	Y	-0.005	-0.005	0.00	Yes	100.00	Yes
102	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
104	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
106	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
108	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
110	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
112	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
114	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
116	Y	-0.004	-0.004	0.00	Yes	100.00	Yes

Concentrated forces on members



Condition	Member	Dir1	Value1 [Kip]	Dist1 [ft]	%
DL	75	y	-0.067	0.64	No
		y	-0.067	5.36	No
		y	-0.011	2.00	No
	77	y	-0.064	0.00	No
		y	-0.064	8.00	No
	79	y	-0.074	2.00	No
	81	y	-0.067	0.64	No
		y	-0.067	5.36	No
		y	-0.011	2.00	No
	102	y	-0.067	0.64	No
		y	-0.067	5.36	No
		y	-0.011	2.00	No
	104	y	-0.074	2.00	No
	106	y	-0.064	0.00	No
		y	-0.064	8.00	No
	108	y	-0.067	0.64	No
		y	-0.067	5.36	No
		y	-0.011	2.00	No
	110	y	-0.067	0.64	No
		y	-0.067	5.36	No
		y	-0.011	2.00	No
	112	y	-0.074	2.00	No
	114	y	-0.064	0.00	No

		y	-0.064	8.00	No
	116	y	-0.067	0.64	No
		y	-0.067	5.36	No
		y	-0.011	2.00	No
W0	75	z	-0.072	0.64	No
		z	-0.072	5.36	No
	77	z	-0.164	0.00	No
		z	-0.164	8.00	No
	79	z	-0.036	2.00	No
	81	z	-0.072	0.64	No
		z	-0.072	5.36	No
	102	z	-0.072	0.64	No
		z	-0.072	5.36	No
	104	z	-0.036	2.00	No
	106	z	-0.164	0.00	No
		z	-0.164	8.00	No
	108	z	-0.072	0.64	No
		z	-0.072	5.36	No
	110	z	-0.091	0.64	No
		z	-0.091	5.36	No
	112	z	-0.046	2.00	No
	114	z	-0.283	0.00	No
		z	-0.283	8.00	No
	116	z	-0.091	0.64	No
		z	-0.091	5.36	No
W30	75	x	-0.085	0.64	No
		x	-0.085	5.36	No
		x	-0.008	2.00	No
	77	x	-0.243	0.00	No
		x	-0.243	8.00	No
	79	x	-0.043	2.00	No
	81	x	-0.085	0.64	No
		x	-0.085	5.36	No
		x	-0.008	2.00	No
	102	x	-0.085	0.64	No
		x	-0.085	5.36	No
		x	-0.008	2.00	No
	104	x	-0.043	2.00	No
	106	x	-0.243	0.00	No
		x	-0.243	8.00	No
	108	x	-0.085	0.64	No
		x	-0.085	5.36	No
		x	-0.008	2.00	No
	110	x	-0.066	0.64	No
		x	-0.066	5.36	No
		x	-0.004	2.00	No
	112	x	-0.032	2.00	No
	114	x	-0.124	0.00	No
		x	-0.124	8.00	No
	116	x	-0.066	0.64	No
		x	-0.066	5.36	No
		x	-0.004	2.00	No
Di	75	y	-0.049	0.64	No
		y	-0.049	5.36	No
		y	-0.007	2.00	No
	77	y	-0.117	0.00	No
		y	-0.117	8.00	No
	79	y	-0.035	2.00	No
	81	y	-0.049	0.64	No
		y	-0.049	5.36	No

		y	-0.007	2.00	No
	102	y	-0.049	0.64	No
		y	-0.049	5.36	No
		y	-0.007	2.00	No
	104	y	-0.035	2.00	No
	106	y	-0.117	0.00	No
		y	-0.117	8.00	No
	108	y	-0.049	0.64	No
		y	-0.049	5.36	No
		y	-0.007	2.00	No
	110	y	-0.049	0.64	No
		y	-0.049	5.36	No
		y	-0.007	2.00	No
	112	y	-0.035	2.00	No
	114	y	-0.117	0.00	No
		y	-0.117	8.00	No
	116	y	-0.049	0.64	No
		y	-0.049	5.36	No
		y	-0.007	2.00	No
Wi0	75	z	-0.025	0.64	No
		z	-0.025	5.36	No
	77	z	-0.051	0.00	No
		z	-0.051	8.00	No
	79	z	-0.015	2.00	No
	81	z	-0.025	0.64	No
		z	-0.025	5.36	No
	102	z	-0.025	0.64	No
		z	-0.025	5.36	No
	104	z	-0.015	2.00	No
	106	z	-0.051	0.00	No
		z	-0.051	8.00	No
	108	z	-0.025	0.64	No
		z	-0.025	5.36	No
	110	z	-0.03	0.64	No
		z	-0.03	5.36	No
	112	z	-0.018	2.00	No
	114	z	-0.08	0.00	No
		z	-0.08	8.00	No
	116	z	-0.03	0.64	No
		z	-0.03	5.36	No
Wi30	75	x	-0.028	0.64	No
		x	-0.028	5.36	No
		x	-0.006	2.00	No
	77	x	-0.07	0.00	No
		x	-0.07	8.00	No
	79	x	-0.017	2.00	No
	81	x	-0.028	0.64	No
		x	-0.028	5.36	No
		x	-0.006	2.00	No
	102	x	-0.028	0.64	No
		x	-0.028	5.36	No
		x	-0.006	2.00	No
	104	x	-0.017	2.00	No
	106	x	-0.07	0.00	No
		x	-0.07	8.00	No
	108	x	-0.028	0.64	No
		x	-0.028	5.36	No
		x	-0.006	2.00	No
	110	x	-0.023	0.64	No
		x	-0.023	5.36	No

		x	-0.004	2.00	No
	112	x	-0.014	2.00	No
	114	x	-0.042	0.00	No
		x	-0.042	8.00	No
	116	x	-0.023	0.64	No
		x	-0.023	5.36	No
		x	-0.004	2.00	No
WL0	75	z	-0.006	0.64	No
		z	-0.006	5.36	No
	77	z	-0.014	0.00	No
		z	-0.014	8.00	No
	79	z	-0.003	2.00	No
	81	z	-0.006	0.64	No
		z	-0.006	5.36	No
	102	z	-0.006	0.64	No
		z	-0.006	5.36	No
	104	z	-0.003	2.00	No
	106	z	-0.014	0.00	No
		z	-0.014	8.00	No
	108	z	-0.006	0.64	No
		z	-0.006	5.36	No
	110	z	-0.008	0.64	No
		z	-0.008	5.36	No
	112	z	-0.004	2.00	No
	114	z	-0.023	0.00	No
		z	-0.023	8.00	No
	116	z	-0.008	0.64	No
		z	-0.008	5.36	No
WL30	75	x	-0.007	0.64	No
		x	-0.007	5.36	No
		x	-0.001	2.00	No
	77	x	-0.02	0.00	No
		x	-0.02	8.00	No
	79	x	-0.003	2.00	No
	81	x	-0.007	0.64	No
		x	-0.007	5.36	No
		x	-0.001	2.00	No
	102	x	-0.007	0.64	No
		x	-0.007	5.36	No
		x	-0.001	2.00	No
	104	x	-0.003	2.00	No
	106	x	-0.02	0.00	No
		x	-0.02	8.00	No
	108	x	-0.007	0.64	No
		x	-0.007	5.36	No
		x	-0.001	2.00	No
	110	x	-0.006	0.64	No
		x	-0.006	5.36	No
		x	-0.001	2.00	No
	112	x	-0.003	2.00	No
	114	x	-0.01	0.00	No
		x	-0.01	8.00	No
	116	x	-0.006	0.64	No
		x	-0.006	5.36	No
		x	-0.001	2.00	No
LL1	42	y	-0.25	2.40	No
LL2	43	y	-0.25	4.50	No
LLa1	81	y	-0.50	3.00	No
	102	y	-0.50	3.00	No
	110	y	-0.50	3.00	No

LLa3	77	y	-0.50	4.00	No
	106	y	-0.50	4.00	No
	114	y	-0.50	4.00	No
LLa4	75	y	-0.50	3.00	No
	108	y	-0.50	3.00	No
	116	y	-0.50	3.00	No

Self weight multipliers for load conditions

Condition	Description	Self weight multiplier			
		Comb.	MultX	MultY	MultZ
DL	Dead Load	No	0.00	-1.00	0.00
W0	Wind Load 0/60/120 deg	No	0.00	0.00	0.00
W30	Wind Load 30/90/150 deg	No	0.00	0.00	0.00
Di	Ice Load	No	0.00	0.00	0.00
Wi0	Ice Wind Load 0/60/120 deg	No	0.00	0.00	0.00
Wi30	Ice Wind Load 30/90/150 deg	No	0.00	0.00	0.00
WL0	WL 30 mph 0/60/120 deg	No	0.00	0.00	0.00
WL30	WL 30 mph 30/90/150 deg	No	0.00	0.00	0.00
LL1	250 lb Live Load Center of Mount	No	0.00	0.00	0.00
LL2	250 lb Live Load End of Mount	No	0.00	0.00	0.00
LLa1	500 lb Live Load Antenna 1	No	0.00	0.00	0.00
LLa3	500 lb Live Load Antenna 3	No	0.00	0.00	0.00
LLa4	500 lb Live Load Antenna 4	No	0.00	0.00	0.00
W180	-W0	Yes	0.00	0.00	0.00
W210	-W30	Yes	0.00	0.00	0.00
Wi180	-Wi0	Yes	0.00	0.00	0.00
Wi210	-Wi30	Yes	0.00	0.00	0.00
WL180	-WL0	Yes	0.00	0.00	0.00
WL210	-WL30	Yes	0.00	0.00	0.00

Earthquake (Dynamic analysis only)

Condition	a/g	Ang. [Deg]	Damp. [%]
DL	0.00	0.00	0.00
W0	0.00	0.00	0.00
W30	0.00	0.00	0.00
Di	0.00	0.00	0.00
Wi0	0.00	0.00	0.00
Wi30	0.00	0.00	0.00
WL0	0.00	0.00	0.00
WL30	0.00	0.00	0.00
LL1	0.00	0.00	0.00
LL2	0.00	0.00	0.00
LLa1	0.00	0.00	0.00
LLa3	0.00	0.00	0.00
LLa4	0.00	0.00	0.00
W180	0.00	0.00	0.00
W210	0.00	0.00	0.00
Wi180	0.00	0.00	0.00

Wi210	0.00	0.00	0.00
WL180	0.00	0.00	0.00
WL210	0.00	0.00	0.00

Bentley

Current Date: 5/9/2018 2:20 PM
Units system: English
File name: W:\STRUCTURAL DEPARTMENT\ANALYSIS SOFTWARE\RAM Elements\RAM Projects\CROWN CASTLE\829013\829013.etz\

Geometry data

GLOSSARY

Cb22, Cb33	: Moment gradient coefficients
Cm22, Cm33	: Coefficients applied to bending term in interaction formula
d0	: Tapered member section depth at J end of member
DJX	: Rigid end offset distance measured from J node in axis X
DJY	: Rigid end offset distance measured from J node in axis Y
DJZ	: Rigid end offset distance measured from J node in axis Z
DKX	: Rigid end offset distance measured from K node in axis X
DKY	: Rigid end offset distance measured from K node in axis Y
DKZ	: Rigid end offset distance measured from K node in axis Z
dL	: Tapered member section depth at K end of member
Ig factor	: Inertia reduction factor (Effective Inertia/Gross Inertia) for reinforced concrete members
K22	: Effective length factor about axis 2
K33	: Effective length factor about axis 3
L22	: Member length for calculation of axial capacity
L33	: Member length for calculation of axial capacity
LB pos	: Lateral unbraced length of the compression flange in the positive side of local axis 2
LB neg	: Lateral unbraced length of the compression flange in the negative side of local axis 2
RX	: Rotation about X
RY	: Rotation about Y
RZ	: Rotation about Z
TO	: 1 = Tension only member 0 = Normal member
TX	: Translation in X
TY	: Translation in Y
TZ	: Translation in Z

Nodes

Node	X [ft]	Y [ft]	Z [ft]	Rigid Floor
1	0.00	0.00	0.00	0
3	4.1136	0.00	-2.375	0
4	0.6761	0.00	-8.3289	0
5	7.5511	0.00	3.5789	0
24	-4.1136	0.00	-2.375	0
25	-7.5511	0.00	3.5789	0
26	-0.6761	0.00	-8.3289	0
31	0.00	0.00	4.75	0
32	6.875	0.00	4.75	0
33	-6.875	0.00	4.75	0
42	-1.85E-06	0.00	-8.3289	0
45	-7.2131	0.00	4.1645	0
46	7.2131	0.00	4.1645	0
47	-0.866	0.00	0.50	0
48	0.866	0.00	0.50	0
49	0.00	0.00	-1.00	0
152	5.3011	0.00	-0.3182	0
153	2.9261	0.00	-4.4318	0
158	-2.9261	0.00	-4.4318	0
159	-5.3011	0.00	-0.3182	0
160	2.375	0.00	4.75	0
161	-2.375	0.00	4.75	0

168	5.4261	0.00	-0.1017	0
169	2.8011	0.00	-4.6483	0
174	-2.8011	0.00	-4.6483	0
175	-5.4261	0.00	-0.1017	0
176	-2.625	0.00	4.75	0
177	2.625	0.00	4.75	0
178	2.625	0.00	1.5155	0
181	3.86E-06	0.00	-3.0311	0
182	-2.625	0.00	1.5155	0
231	7.3011	0.00	3.1459	0
232	7.4743	0.00	3.0459	0
233	7.4743	-3.00	3.0459	0
234	7.4743	3.00	3.0459	0
235	5.0511	0.00	-0.7512	0
236	5.2243	-4.00	-0.8512	0
237	5.2243	0.00	-0.8512	0
238	5.2243	4.00	-0.8512	0
239	3.1761	0.00	-3.9988	0
240	3.3493	0.00	-4.0988	0
241	3.3493	-3.00	-4.0988	0
242	3.3493	3.00	-4.0988	0
243	0.9261	0.00	-7.8959	0
244	1.0993	3.00	-7.9959	0
245	1.0993	0.00	-7.9959	0
246	1.0993	-3.00	-7.9959	0
279	-7.3011	0.00	3.1459	0
280	-7.4743	3.00	3.0459	0
281	-7.4743	0.00	3.0459	0
282	-7.4743	-3.00	3.0459	0
283	-5.0511	0.00	-0.7512	0
284	-5.2243	0.00	-0.8512	0
285	-5.2243	-3.00	-0.8512	0
286	-5.2243	3.00	-0.8512	0
287	-3.1761	0.00	-3.9988	0
288	-3.3493	-4.00	-4.0988	0
289	-3.3493	0.00	-4.0988	0
290	-3.3493	4.00	-4.0988	0
291	-0.9261	0.00	-7.8959	0
292	-1.0993	0.00	-7.9959	0
293	-1.0993	-3.00	-7.9959	0
294	-1.0993	3.00	-7.9959	0
295	6.375	0.00	4.75	0
296	6.375	3.00	4.95	0
297	6.375	0.00	4.95	0
298	6.375	-3.00	4.95	0
299	1.875	0.00	4.75	0
300	1.875	0.00	4.95	0
301	1.875	-3.00	4.95	0
302	1.875	3.00	4.95	0
303	-1.875	0.00	4.75	0
304	-1.875	-4.00	4.95	0
305	-1.875	0.00	4.95	0
306	-1.875	4.00	4.95	0
307	-6.375	0.00	4.75	0
308	-6.375	0.00	4.95	0
309	-6.375	-3.00	4.95	0
310	-6.375	3.00	4.95	0

Restraints

Node	TX	TY	TZ	RX	RY	RZ
47	1	1	1	1	1	1
48	1	1	1	1	1	1
49	1	1	1	1	1	1

Members

Member	NJ	NK	Description	Section	Material	d0 [in]	dL [in]	lg factor
4	45	47		HSS_SQR 3X3X1_4	A500 GrB rectangular	0.00	0.00	0.00
5	48	46		HSS_SQR 3X3X1_4	A500 GrB rectangular	0.00	0.00	0.00
6	49	42		HSS_SQR 3X3X1_4	A500 GrB rectangular	0.00	0.00	0.00
7	33	25		PL 6x5/8	A36	0.00	0.00	0.00
8	32	5		PL 6x5/8	A36	0.00	0.00	0.00
9	4	26		PL 6x5/8	A36	0.00	0.00	0.00
35	181	174		LU 2-1_2X1-1_2X1_4	A36	0.00	0.00	0.00
36	178	168		LU 2-1_2X1-1_2X1_4	A36	0.00	0.00	0.00
39	169	181		LU 2-1_2X1-1_2X1_4	A36	0.00	0.00	0.00
41	33	161		PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
42	161	160		PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
43	160	32		PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
44	25	159		PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
45	159	158		PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
46	158	26		PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
47	4	153		PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
48	153	152		PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
49	152	5		PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
75	234	233		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
77	238	236		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
79	242	241		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
81	244	246		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
82	160	178		LU 2-1_2X1-1_2X1_4	A36	0.00	0.00	0.00
83	175	182		LU 2-1_2X1-1_2X1_4	A36	0.00	0.00	0.00
84	182	176		LU 2-1_2X1-1_2X1_4	A36	0.00	0.00	0.00
102	280	282		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
104	286	285		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
106	290	288		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
108	294	293		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
110	296	298		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
112	302	301		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
114	306	304		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
116	310	309		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00

Orientation of local axes

Member	Rotation [Deg]	Axes23	NX	NY	NZ
75	0.00	2	-0.50	0.00	-0.866
77	0.00	2	-0.50	0.00	-0.866
79	0.00	2	-0.50	0.00	-0.866
81	0.00	2	-0.50	0.00	-0.866
102	0.00	2	-0.50	0.00	0.866
104	0.00	2	-0.50	0.00	0.866

106	0.00	2	-0.50	0.00	0.866
108	0.00	2	-0.50	0.00	0.866

APPENDIX C

RAM ELEMENTS ANALYSIS OUTPUT

Bentley

Current Date: 5/9/2018 2:20 PM
Units system: English
File name: W:\STRUCTURAL DEPARTMENT\ANALYSIS SOFTWARE\RAM Elements\RAM Projects\CROWN CASTLE\829013\829013.etz\

Steel Code Check

Report: Summary - For all selected load conditions

Load conditions to be included in design :

LC1=1.2DL+1.6W0
LC2=1.2DL+1.6W30
LC3=1.2DL-1.6W0
LC4=1.2DL-1.6W30
LC5=0.9DL+1.6W0
LC6=0.9DL+1.6W30
LC7=0.9DL-1.6W0
LC8=0.9DL-1.6W30
LC9=1.2DL+Di+Wi0
LC10=1.2DL+Di+Wi30
LC11=1.2DL+Di-Wi0
LC12=1.2DL+Di-Wi30
LC13=1.2DL
LC14=0.9DL
LC15=1.2DL+1.5LL1
LC16=1.2DL+1.5LL2
LC17=1.2DL+WL0+1.5LLa1
LC18=1.2DL+WL30+1.5LLa1
LC19=1.2DL-WL0+1.5LLa1
LC20=1.2DL-WL30+1.5LLa1
LC25=1.2DL+WL0+1.5LLa3
LC26=1.2DL+WL30+1.5LLa3
LC27=1.2DL-WL0+1.5LLa3
LC28=1.2DL-WL30+1.5LLa3
LC29=1.2DL+WL0+1.5LLa4
LC30=1.2DL+WL30+1.5LLa4
LC31=1.2DL-WL0+1.5LLa4
LC32=1.2DL-WL30+1.5LLa4

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	HSS_SQR 3X3X1_4	**4**	LC1 at 100.00%	1.04	N.G.	
			LC10 at 100.00%	1.25	N.G.	
			LC11 at 100.00%	1.28	N.G.	
			LC12 at 100.00%	1.23	N.G.	
			LC13 at 100.00%	0.74	OK	
			LC14 at 100.00%	0.56	OK	
			LC15 at 100.00%	0.87	OK	
			LC16 at 100.00%	0.72	OK	
			LC17 at 100.00%	1.35	N.G.	
			LC18 at 100.00%	1.34	N.G.	
			LC19 at 100.00%	**1.35**	**N.G.**	Eq. H1-1b
			LC2 at 100.00%	0.82	OK	
			LC20 at 100.00%	1.34	N.G.	
			LC25 at 100.00%	1.20	N.G.	
			LC26 at 100.00%	1.20	N.G.	
			LC27 at 100.00%	1.21	N.G.	
			LC28 at 100.00%	1.19	N.G.	
			LC29 at 100.00%	1.35	N.G.	
			LC3 at 100.00%	1.05	N.G.	
			LC30 at 100.00%	1.34	N.G.	
			LC31 at 100.00%	1.35	N.G.	

	LC32 at 100.00%	1.34	N.G.	
	LC4 at 100.00%	0.80	OK	
	LC5 at 100.00%	0.85	OK	
	LC6 at 100.00%	0.63	OK	
	LC7 at 100.00%	0.86	OK	
	LC8 at 100.00%	0.61	OK	
	LC9 at 100.00%	1.27	N.G.	
5	LC1 at 0.00%	0.93	OK	
	LC10 at 0.00%	1.24	N.G.	
	LC11 at 0.00%	1.26	N.G.	
	LC12 at 0.00%	1.25	N.G.	
	LC13 at 0.00%	0.74	OK	
	LC14 at 0.00%	0.56	OK	
	LC15 at 0.00%	0.88	OK	
	LC16 at 0.00%	1.12	N.G.	
	LC17 at 0.00%	1.35	N.G.	
	LC18 at 0.00%	1.34	N.G.	
	LC19 at 0.00%	1.35	N.G.	
	LC2 at 0.00%	0.80	OK	
	LC20 at 0.00%	1.34	N.G.	
	LC25 at 0.00%	1.20	N.G.	
	LC26 at 0.00%	1.19	N.G.	
	LC27 at 0.00%	1.20	N.G.	
	LC28 at 0.00%	1.20	N.G.	
	LC29 at 0.00%	1.35	N.G.	
	LC3 at 0.00%	0.95	OK	
	LC30 at 0.00%	1.34	N.G.	
	LC31 at 0.00%	**1.35**	**N.G.**	Eq. H1-1b
	LC32 at 0.00%	1.34	N.G.	
	LC4 at 0.00%	0.83	OK	
	LC5 at 0.00%	0.75	OK	
	LC6 at 0.00%	0.62	OK	
	LC7 at 0.00%	0.76	OK	
	LC8 at 0.00%	0.64	OK	
	LC9 at 0.00%	1.25	N.G.	
6	LC1 at 0.00%	0.81	OK	
	LC10 at 0.00%	1.29	N.G.	
	LC11 at 0.00%	1.24	N.G.	
	LC12 at 0.00%	1.29	N.G.	
	LC13 at 0.00%	0.75	OK	
	LC14 at 0.00%	0.56	OK	
	LC15 at 0.00%	0.70	OK	
	LC16 at 0.00%	0.70	OK	
	LC17 at 0.00%	1.35	N.G.	
	LC18 at 0.00%	1.36	N.G.	
	LC19 at 0.00%	1.34	N.G.	
	LC2 at 0.00%	1.21	N.G.	
	LC20 at 0.00%	1.36	N.G.	
	LC25 at 0.00%	1.20	N.G.	
	LC26 at 0.00%	1.21	N.G.	
	LC27 at 0.00%	1.20	N.G.	
	LC28 at 0.00%	1.21	N.G.	
	LC29 at 0.00%	1.35	N.G.	
	LC3 at 0.00%	0.76	OK	Eq. H1-1b
	LC30 at 0.00%	1.36	N.G.	
	LC31 at 0.00%	1.34	N.G.	
	LC32 at 0.00%	**1.36**	**N.G.**	Eq. H1-1b
	LC4 at 0.00%	1.20	N.G.	
	LC5 at 0.00%	0.62	OK	
	LC6 at 0.00%	1.02	N.G.	
	LC7 at 0.00%	0.57	OK	
	LC8 at 0.00%	1.02	N.G.	

		LC9 at 0.00%	1.25	N.G.
LU 2-1_2X1-1_2X1_4	35	LC1 at 0.00%	0.85	OK
		LC10 at 0.00%	1.54	N.G.
		LC11 at 0.00%	1.55	N.G.
		LC12 at 0.00%	1.57	N.G.
		LC13 at 0.00%	0.91	OK
		LC14 at 0.00%	0.68	OK
		LC15 at 0.00%	0.87	OK
		LC16 at 0.00%	0.85	OK
		LC17 at 0.00%	1.48	N.G.
		LC18 at 0.00%	1.48	N.G.
		LC19 at 0.00%	1.48	N.G.
		LC2 at 0.00%	0.88	OK
		LC20 at 0.00%	1.48	N.G.
		LC25 at 0.00%	1.70	N.G.
		LC26 at 0.00%	1.70	N.G.
		LC27 at 0.00%	1.70	N.G.
		LC28 at 0.00%	**1.70**	**N.G.** Eq. H2-1
		LC29 at 0.00%	1.46	N.G.
		LC3 at 0.00%	1.07	N.G.
		LC30 at 0.00%	1.45	N.G.
		LC31 at 0.00%	1.46	N.G.
		LC32 at 0.00%	1.46	N.G.
		LC4 at 0.00%	1.13	N.G.
		LC5 at 0.00%	0.63	OK
		LC6 at 0.00%	0.66	OK
		LC7 at 0.00%	0.84	OK
		LC8 at 0.00%	0.90	OK
		LC9 at 0.00%	1.54	N.G.
	36	LC1 at 0.00%	0.87	OK
		LC10 at 0.00%	1.58	N.G.
		LC11 at 0.00%	1.56	N.G.
		LC12 at 0.00%	1.54	N.G.
		LC13 at 0.00%	0.91	OK
		LC14 at 0.00%	0.68	OK
		LC15 at 0.00%	0.98	OK
		LC16 at 0.00%	1.18	N.G.
		LC17 at 0.00%	1.48	N.G.
		LC18 at 0.00%	1.49	N.G.
		LC19 at 0.00%	1.49	N.G.
		LC2 at 0.00%	1.23	N.G.
		LC20 at 0.00%	1.48	N.G.
		LC25 at 0.00%	1.70	N.G.
		LC26 at 0.00%	**1.71**	**N.G.** Eq. H2-1
		LC27 at 0.00%	1.71	N.G.
		LC28 at 0.00%	1.70	N.G.
		LC29 at 0.00%	1.46	N.G.
		LC3 at 0.00%	1.01	N.G.
		LC30 at 0.00%	1.47	N.G.
		LC31 at 0.00%	1.47	N.G.
		LC32 at 0.00%	1.46	N.G.
		LC4 at 0.00%	0.76	OK
		LC5 at 0.00%	0.64	OK
		LC6 at 0.00%	1.00	OK
		LC7 at 0.00%	0.78	OK
		LC8 at 0.00%	0.53	OK
		LC9 at 0.00%	1.54	N.G.
	39	LC1 at 100.00%	0.86	OK
		LC10 at 100.00%	1.52	N.G.
		LC11 at 100.00%	1.50	N.G.
		LC12 at 100.00%	1.49	N.G.

	LC13 at 100.00%	0.90	OK	
	LC14 at 100.00%	0.67	OK	
	LC15 at 100.00%	0.86	OK	
	LC16 at 100.00%	0.93	OK	
	LC17 at 100.00%	1.44	N.G.	
	LC18 at 100.00%	1.45	N.G.	
	LC19 at 100.00%	1.44	N.G.	
	LC2 at 100.00%	1.06	N.G.	
	LC20 at 100.00%	1.44	N.G.	
	LC25 at 100.00%	1.58	N.G.	
	LC26 at 100.00%	**1.58**	**N.G.**	Eq. H2-1
	LC27 at 100.00%	1.58	N.G.	
	LC28 at 100.00%	1.58	N.G.	
	LC29 at 100.00%	1.47	N.G.	
	LC3 at 100.00%	1.00	OK	
	LC30 at 100.00%	1.47	N.G.	
	LC31 at 100.00%	1.47	N.G.	
	LC32 at 100.00%	1.47	N.G.	
	LC4 at 100.00%	0.85	OK	
	LC5 at 100.00%	0.64	OK	
	LC6 at 100.00%	0.83	OK	
	LC7 at 100.00%	0.78	OK	
	LC8 at 100.00%	0.62	OK	
	LC9 at 100.00%	1.50	N.G.	
82	LC1 at 100.00%	1.10	N.G.	
	LC10 at 100.00%	1.51	N.G.	
	LC11 at 100.00%	1.51	N.G.	
	LC12 at 100.00%	1.54	N.G.	
	LC13 at 100.00%	0.91	OK	
	LC14 at 100.00%	0.68	OK	
	LC15 at 100.00%	1.26	N.G.	
	LC16 at 100.00%	1.17	N.G.	
	LC17 at 100.00%	1.47	N.G.	
	LC18 at 100.00%	1.46	N.G.	
	LC19 at 100.00%	1.46	N.G.	
	LC2 at 100.00%	0.86	OK	
	LC20 at 100.00%	1.47	N.G.	
	LC25 at 100.00%	1.62	N.G.	
	LC26 at 100.00%	1.61	N.G.	
	LC27 at 100.00%	1.61	N.G.	
	LC28 at 100.00%	**1.62**	**N.G.**	Eq. H2-1
	LC29 at 100.00%	1.49	N.G.	
	LC3 at 100.00%	0.80	OK	
	LC30 at 100.00%	1.48	N.G.	
	LC31 at 100.00%	1.49	N.G.	
	LC32 at 100.00%	1.50	N.G.	
	LC4 at 100.00%	1.02	N.G.	
	LC5 at 100.00%	0.87	OK	
	LC6 at 100.00%	0.63	OK	
	LC7 at 100.00%	0.57	OK	
	LC8 at 100.00%	0.80	OK	
	LC9 at 100.00%	1.55	N.G.	
83	LC1 at 100.00%	0.82	OK	
	LC10 at 100.00%	1.49	N.G.	
	LC11 at 100.00%	1.52	N.G.	
	LC12 at 100.00%	1.52	N.G.	
	LC13 at 100.00%	0.90	OK	
	LC14 at 100.00%	0.67	OK	
	LC15 at 100.00%	0.96	OK	
	LC16 at 100.00%	0.86	OK	
	LC17 at 100.00%	1.44	N.G.	
	LC18 at 100.00%	1.44	N.G.	

		LC19 at 100.00%	1.45	N.G.	
		LC2 at 100.00%	0.75	OK	
		LC20 at 100.00%	1.45	N.G.	
		LC25 at 100.00%	1.58	N.G.	
		LC26 at 100.00%	1.58	N.G.	
		LC27 at 100.00%	**1.59**	**N.G.**	Eq. H2-1
		LC28 at 100.00%	1.59	N.G.	
		LC29 at 100.00%	1.46	N.G.	
		LC3 at 100.00%	0.99	OK	
		LC30 at 100.00%	1.46	N.G.	
		LC31 at 100.00%	1.47	N.G.	
		LC32 at 100.00%	1.47	N.G.	
		LC4 at 100.00%	1.12	N.G.	
		LC5 at 100.00%	0.59	OK	
		LC6 at 100.00%	0.52	OK	
		LC7 at 100.00%	0.77	OK	
		LC8 at 100.00%	0.89	OK	
		LC9 at 100.00%	1.48	N.G.	
	84	LC1 at 0.00%	1.18	N.G.	
		LC10 at 0.00%	1.54	N.G.	
		LC11 at 0.00%	1.52	N.G.	
		LC12 at 0.00%	1.52	N.G.	
		LC13 at 0.00%	0.90	OK	
		LC14 at 0.00%	0.67	OK	
		LC15 at 0.00%	1.24	N.G.	
		LC16 at 0.00%	0.97	OK	
		LC17 at 0.00%	1.47	N.G.	
		LC18 at 0.00%	1.47	N.G.	
		LC19 at 0.00%	1.46	N.G.	
		LC2 at 0.00%	0.98	OK	
		LC20 at 0.00%	1.46	N.G.	
		LC25 at 0.00%	**1.69**	**N.G.**	Eq. H2-1
		LC26 at 0.00%	1.69	N.G.	Eq. H2-1
		LC27 at 0.00%	1.68	N.G.	
		LC28 at 0.00%	1.68	N.G.	
		LC29 at 0.00%	1.45	N.G.	
		LC3 at 0.00%	0.81	OK	
		LC30 at 0.00%	1.45	N.G.	
		LC31 at 0.00%	1.44	N.G.	
		LC32 at 0.00%	1.44	N.G.	
		LC4 at 0.00%	0.89	OK	
		LC5 at 0.00%	0.96	OK	
		LC6 at 0.00%	0.76	OK	
		LC7 at 0.00%	0.59	OK	
		LC8 at 0.00%	0.66	OK	
		LC9 at 0.00%	1.56	N.G.	
PIPE 2x0.154	**75**	LC1 at 50.00%	0.36	OK	
		LC10 at 46.88%	0.08	OK	
		LC11 at 50.00%	0.07	OK	
		LC12 at 46.88%	0.08	OK	
		LC13 at 46.88%	0.01	OK	
		LC14 at 46.88%	0.01	OK	
		LC15 at 46.88%	0.01	OK	
		LC16 at 46.88%	0.01	OK	
		LC17 at 50.00%	0.02	OK	
		LC18 at 46.88%	0.02	OK	
		LC19 at 50.00%	0.02	OK	
		LC2 at 50.00%	0.41	OK	
		LC20 at 46.88%	0.02	OK	
		LC25 at 50.00%	0.02	OK	
		LC26 at 46.88%	0.02	OK	
		LC27 at 50.00%	0.02	OK	

	LC28 at 46.88%	0.02	OK	
	LC29 at 50.00%	0.02	OK	
	LC3 at 50.00%	0.36	OK	
	LC30 at 46.88%	0.02	OK	
	LC31 at 50.00%	0.02	OK	
	LC32 at 46.88%	0.02	OK	
	LC4 at 50.00%	**0.41**	**OK**	Eq. H1-1b
	LC5 at 50.00%	0.36	OK	
	LC6 at 50.00%	0.41	OK	
	LC7 at 50.00%	0.36	OK	
	LC8 at 50.00%	0.41	OK	
	LC9 at 50.00%	0.07	OK	
77	LC1 at 50.00%	1.25	N.G.	
	LC10 at 50.00%	0.31	OK	
	LC11 at 50.00%	0.23	OK	
	LC12 at 50.00%	0.31	OK	
	LC13 at 46.88%	0.01	OK	
	LC14 at 46.88%	0.01	OK	
	LC15 at 46.88%	0.01	OK	
	LC16 at 46.88%	0.01	OK	
	LC17 at 50.00%	0.06	OK	
	LC18 at 50.00%	0.09	OK	
	LC19 at 50.00%	0.06	OK	
	LC2 at 50.00%	1.81	N.G.	
	LC20 at 50.00%	0.09	OK	
	LC25 at 50.00%	0.06	OK	
	LC26 at 50.00%	0.09	OK	
	LC27 at 50.00%	0.06	OK	
	LC28 at 50.00%	0.09	OK	
	LC29 at 50.00%	0.06	OK	
	LC3 at 50.00%	1.25	N.G.	
	LC30 at 50.00%	0.09	OK	
	LC31 at 50.00%	0.06	OK	
	LC32 at 50.00%	0.09	OK	
	LC4 at 50.00%	**1.81**	**N.G.**	Eq. H1-1b
	LC5 at 50.00%	1.25	N.G.	
	LC6 at 50.00%	1.81	N.G.	
	LC7 at 50.00%	1.25	N.G.	
	LC8 at 50.00%	1.81	N.G.	
	LC9 at 50.00%	0.23	OK	
79	LC1 at 46.88%	0.10	OK	
	LC10 at 46.88%	0.02	OK	
	LC11 at 46.88%	0.01	OK	
	LC12 at 46.88%	0.02	OK	
	LC13 at 46.88%	0.01	OK	
	LC14 at 46.88%	0.01	OK	
	LC15 at 46.88%	0.01	OK	
	LC16 at 46.88%	0.01	OK	
	LC17 at 46.88%	0.01	OK	
	LC18 at 46.88%	0.01	OK	
	LC19 at 46.88%	0.01	OK	
	LC2 at 46.88%	**0.11**	**OK**	Eq. H1-1b
	LC20 at 46.88%	0.01	OK	
	LC25 at 46.88%	0.01	OK	
	LC26 at 46.88%	0.01	OK	
	LC27 at 46.88%	0.01	OK	
	LC28 at 46.88%	0.01	OK	
	LC29 at 46.88%	0.01	OK	
	LC3 at 46.88%	0.10	OK	
	LC30 at 46.88%	0.01	OK	
	LC31 at 46.88%	0.01	OK	
	LC32 at 46.88%	0.01	OK	

	LC4 at 46.88%	0.11	OK	
	LC5 at 46.88%	0.10	OK	
	LC6 at 46.88%	0.11	OK	
	LC7 at 46.88%	0.10	OK	
	LC8 at 46.88%	0.11	OK	
	LC9 at 46.88%	0.01	OK	
81	LC1 at 50.00%	0.36	OK	
	LC10 at 46.88%	0.08	OK	
	LC11 at 50.00%	0.07	OK	
	LC12 at 46.88%	0.08	OK	
	LC13 at 46.88%	0.01	OK	
	LC14 at 46.88%	0.01	OK	
	LC15 at 46.88%	0.01	OK	
	LC16 at 46.88%	0.01	OK	
	LC17 at 50.00%	0.02	OK	
	LC18 at 46.88%	0.02	OK	
	LC19 at 50.00%	0.02	OK	
	LC2 at 50.00%	**0.41**	**OK**	Eq. H1-1b
	LC20 at 46.88%	0.02	OK	
	LC25 at 50.00%	0.02	OK	
	LC26 at 46.88%	0.02	OK	
	LC27 at 50.00%	0.02	OK	
	LC28 at 46.88%	0.02	OK	
	LC29 at 50.00%	0.02	OK	
	LC3 at 50.00%	0.36	OK	
	LC30 at 46.88%	0.02	OK	
	LC31 at 50.00%	0.02	OK	
	LC32 at 46.88%	0.02	OK	
	LC4 at 50.00%	0.41	OK	
	LC5 at 50.00%	0.36	OK	
	LC6 at 50.00%	0.41	OK	
	LC7 at 50.00%	0.36	OK	
	LC8 at 50.00%	0.41	OK	
	LC9 at 50.00%	0.07	OK	
102	LC1 at 50.00%	0.36	OK	
	LC10 at 46.88%	0.08	OK	
	LC11 at 50.00%	0.07	OK	
	LC12 at 46.88%	0.08	OK	
	LC13 at 46.88%	0.01	OK	
	LC14 at 46.88%	0.01	OK	
	LC15 at 46.88%	0.01	OK	
	LC16 at 46.88%	0.01	OK	
	LC17 at 50.00%	0.02	OK	
	LC18 at 46.88%	0.02	OK	
	LC19 at 50.00%	0.02	OK	
	LC2 at 50.00%	**0.41**	**OK**	Eq. H1-1b
	LC20 at 46.88%	0.02	OK	
	LC25 at 50.00%	0.02	OK	
	LC26 at 46.88%	0.02	OK	
	LC27 at 50.00%	0.02	OK	
	LC28 at 46.88%	0.02	OK	
	LC29 at 50.00%	0.02	OK	
	LC3 at 50.00%	0.36	OK	
	LC30 at 46.88%	0.02	OK	
	LC31 at 50.00%	0.02	OK	
	LC32 at 46.88%	0.02	OK	
	LC4 at 50.00%	0.41	OK	
	LC5 at 50.00%	0.36	OK	
	LC6 at 50.00%	0.41	OK	
	LC7 at 50.00%	0.36	OK	
	LC8 at 50.00%	0.41	OK	
	LC9 at 50.00%	0.07	OK	

104	LC1 at 46.88%	0.10	OK	
	LC10 at 46.88%	0.02	OK	
	LC11 at 46.88%	0.01	OK	
	LC12 at 46.88%	0.02	OK	
	LC13 at 46.88%	0.01	OK	
	LC14 at 46.88%	0.01	OK	
	LC15 at 46.88%	0.01	OK	
	LC16 at 46.88%	0.01	OK	
	LC17 at 46.88%	0.01	OK	
	LC18 at 46.88%	0.01	OK	
	LC19 at 46.88%	0.01	OK	
	LC2 at 46.88%	0.11	OK	
	LC20 at 46.88%	0.01	OK	
	LC25 at 46.88%	0.01	OK	
	LC26 at 46.88%	0.01	OK	
	LC27 at 46.88%	0.01	OK	
	LC28 at 46.88%	0.01	OK	
	LC29 at 46.88%	0.01	OK	
	LC3 at 46.88%	0.10	OK	
	LC30 at 46.88%	0.01	OK	
	LC31 at 46.88%	0.01	OK	
	LC32 at 46.88%	0.01	OK	
	LC4 at 46.88%	**0.11**	**OK**	Eq. H1-1b
	LC5 at 46.88%	0.10	OK	
	LC6 at 46.88%	0.11	OK	
	LC7 at 46.88%	0.10	OK	
	LC8 at 46.88%	0.11	OK	
	LC9 at 46.88%	0.01	OK	
106	LC1 at 50.00%	1.25	N.G.	
	LC10 at 50.00%	0.31	OK	
	LC11 at 50.00%	0.23	OK	
	LC12 at 50.00%	0.31	OK	
	LC13 at 46.88%	0.01	OK	
	LC14 at 46.88%	0.01	OK	
	LC15 at 46.88%	0.01	OK	
	LC16 at 46.88%	0.01	OK	
	LC17 at 50.00%	0.06	OK	
	LC18 at 50.00%	0.09	OK	
	LC19 at 50.00%	0.06	OK	
	LC2 at 50.00%	**1.81**	**N.G.**	Eq. H1-1b
	LC20 at 50.00%	0.09	OK	
	LC25 at 50.00%	0.06	OK	
	LC26 at 50.00%	0.09	OK	
	LC27 at 50.00%	0.06	OK	
	LC28 at 50.00%	0.09	OK	
	LC29 at 50.00%	0.06	OK	
	LC3 at 50.00%	1.25	N.G.	
	LC30 at 50.00%	0.09	OK	
	LC31 at 50.00%	0.06	OK	
	LC32 at 50.00%	0.09	OK	
	LC4 at 50.00%	1.81	N.G.	
	LC5 at 50.00%	1.25	N.G.	
	LC6 at 50.00%	1.81	N.G.	
	LC7 at 50.00%	1.25	N.G.	
	LC8 at 50.00%	1.81	N.G.	
	LC9 at 50.00%	0.23	OK	
108	LC1 at 50.00%	0.36	OK	
	LC10 at 46.88%	0.08	OK	
	LC11 at 50.00%	0.07	OK	
	LC12 at 46.88%	0.08	OK	
	LC13 at 46.88%	0.01	OK	

	LC14 at 46.88%	0.01	OK	
	LC15 at 46.88%	0.01	OK	
	LC16 at 46.88%	0.01	OK	
	LC17 at 50.00%	0.02	OK	
	LC18 at 46.88%	0.02	OK	
	LC19 at 50.00%	0.02	OK	
	LC2 at 50.00%	0.41	OK	
	LC20 at 46.88%	0.02	OK	
	LC25 at 50.00%	0.02	OK	
	LC26 at 46.88%	0.02	OK	
	LC27 at 50.00%	0.02	OK	
	LC28 at 46.88%	0.02	OK	
	LC29 at 50.00%	0.02	OK	
	LC3 at 50.00%	0.36	OK	
	LC30 at 46.88%	0.02	OK	
	LC31 at 50.00%	0.02	OK	
	LC32 at 46.88%	0.02	OK	
	LC4 at 50.00%	**0.41**	**OK**	Eq. H1-1b
	LC5 at 50.00%	0.36	OK	
	LC6 at 50.00%	0.41	OK	
	LC7 at 50.00%	0.36	OK	
	LC8 at 50.00%	0.41	OK	
	LC9 at 50.00%	0.07	OK	
110	LC1 at 50.00%	**0.28**	**OK**	Eq. H1-1b
	LC10 at 46.88%	0.05	OK	
	LC11 at 50.00%	0.06	OK	
	LC12 at 46.88%	0.05	OK	
	LC13 at 46.88%	0.01	OK	
	LC14 at 46.88%	0.01	OK	
	LC15 at 46.88%	0.01	OK	
	LC16 at 46.88%	0.01	OK	
	LC17 at 46.88%	0.02	OK	
	LC18 at 46.88%	0.01	OK	
	LC19 at 46.88%	0.02	OK	
	LC2 at 50.00%	0.24	OK	
	LC20 at 46.88%	0.01	OK	
	LC25 at 46.88%	0.02	OK	
	LC26 at 46.88%	0.01	OK	
	LC27 at 46.88%	0.02	OK	
	LC28 at 46.88%	0.01	OK	
	LC29 at 46.88%	0.02	OK	
	LC3 at 50.00%	0.28	OK	
	LC30 at 46.88%	0.01	OK	
	LC31 at 46.88%	0.02	OK	
	LC32 at 46.88%	0.01	OK	
	LC4 at 50.00%	0.24	OK	
	LC5 at 50.00%	0.28	OK	
	LC6 at 50.00%	0.24	OK	
	LC7 at 50.00%	0.28	OK	
	LC8 at 50.00%	0.24	OK	
	LC9 at 50.00%	0.06	OK	
112	LC1 at 46.88%	0.05	OK	
	LC10 at 46.88%	0.01	OK	
	LC11 at 46.88%	0.02	OK	
	LC12 at 46.88%	0.01	OK	
	LC13 at 46.88%	0.01	OK	
	LC14 at 46.88%	0.01	OK	
	LC15 at 46.88%	0.01	OK	
	LC16 at 46.88%	0.01	OK	
	LC17 at 46.88%	0.01	OK	
	LC18 at 46.88%	0.01	OK	
	LC19 at 46.88%	0.01	OK	

	LC2 at 46.88%	**0.07**	**OK**	Eq. H1-1b
	LC20 at 46.88%	0.01	OK	
	LC25 at 46.88%	0.01	OK	
	LC26 at 46.88%	0.01	OK	
	LC27 at 46.88%	0.01	OK	
	LC28 at 46.88%	0.01	OK	
	LC29 at 46.88%	0.01	OK	
	LC3 at 46.88%	0.05	OK	
	LC30 at 46.88%	0.01	OK	
	LC31 at 46.88%	0.01	OK	
	LC32 at 46.88%	0.01	OK	
	LC4 at 46.88%	0.07	OK	
	LC5 at 46.88%	0.05	OK	
	LC6 at 46.88%	0.07	OK	
	LC7 at 46.88%	0.05	OK	
	LC8 at 46.88%	0.07	OK	
	LC9 at 46.88%	0.02	OK	
114	LC1 at 50.00%	**1.46**	**N.G.**	Eq. H1-1b
	LC10 at 50.00%	0.14	OK	
	LC11 at 50.00%	0.26	OK	
	LC12 at 50.00%	0.14	OK	
	LC13 at 46.88%	0.01	OK	
	LC14 at 46.88%	0.01	OK	
	LC15 at 46.88%	0.01	OK	
	LC16 at 46.88%	0.01	OK	
	LC17 at 50.00%	0.08	OK	
	LC18 at 46.88%	0.03	OK	
	LC19 at 50.00%	0.08	OK	
	LC2 at 50.00%	0.71	OK	
	LC20 at 46.88%	0.03	OK	
	LC25 at 50.00%	0.08	OK	
	LC26 at 46.88%	0.03	OK	
	LC27 at 50.00%	0.08	OK	
	LC28 at 46.88%	0.03	OK	
	LC29 at 50.00%	0.08	OK	
	LC3 at 50.00%	1.46	N.G.	
	LC30 at 46.88%	0.03	OK	
	LC31 at 50.00%	0.08	OK	
	LC32 at 46.88%	0.03	OK	
	LC4 at 50.00%	0.71	OK	
	LC5 at 50.00%	1.46	N.G.	
	LC6 at 50.00%	0.71	OK	
	LC7 at 50.00%	1.46	N.G.	
	LC8 at 50.00%	0.71	OK	
	LC9 at 50.00%	0.26	OK	
116	LC1 at 50.00%	0.28	OK	
	LC10 at 46.88%	0.05	OK	
	LC11 at 50.00%	0.06	OK	
	LC12 at 46.88%	0.05	OK	
	LC13 at 46.88%	0.01	OK	
	LC14 at 46.88%	0.01	OK	
	LC15 at 46.88%	0.01	OK	
	LC16 at 46.88%	0.01	OK	
	LC17 at 46.88%	0.02	OK	
	LC18 at 46.88%	0.01	OK	
	LC19 at 46.88%	0.02	OK	
	LC2 at 50.00%	0.24	OK	
	LC20 at 46.88%	0.01	OK	
	LC25 at 46.88%	0.02	OK	
	LC26 at 46.88%	0.01	OK	
	LC27 at 46.88%	0.02	OK	
	LC28 at 46.88%	0.01	OK	

		LC29 at 46.88%	0.02	OK	
		LC3 at 50.00%	**0.28**	**OK**	Eq. H1-1b
		LC30 at 46.88%	0.01	OK	
		LC31 at 46.88%	0.02	OK	
		LC32 at 46.88%	0.01	OK	
		LC4 at 50.00%	0.24	OK	
		LC5 at 50.00%	0.28	OK	
		LC6 at 50.00%	0.24	OK	
		LC7 at 50.00%	0.28	OK	
		LC8 at 50.00%	0.24	OK	
		LC9 at 50.00%	0.06	OK	
PIPE 3x0.216	**41**	LC1 at 93.75%	0.31	OK	
		LC10 at 93.75%	0.38	OK	
		LC11 at 93.75%	0.38	OK	
		LC12 at 93.75%	0.37	OK	
		LC13 at 93.75%	0.22	OK	
		LC14 at 93.75%	0.17	OK	
		LC15 at 0.00%	0.21	OK	
		LC16 at 93.75%	0.28	OK	
		LC17 at 93.75%	0.60	OK	
		LC18 at 93.75%	0.60	OK	
		LC19 at 93.75%	**0.60**	**OK**	Eq. H3-6
		LC2 at 93.75%	0.37	OK	
		LC20 at 93.75%	0.60	OK	
		LC25 at 0.00%	0.40	OK	
		LC26 at 0.00%	0.40	OK	Eq. H3-6
		LC27 at 0.00%	0.40	OK	
		LC28 at 0.00%	0.40	OK	
		LC29 at 95.83%	0.47	OK	
		LC3 at 93.75%	0.34	OK	
		LC30 at 93.75%	0.48	OK	
		LC31 at 93.75%	0.48	OK	
		LC32 at 95.83%	0.47	OK	
		LC4 at 95.83%	0.37	OK	
		LC5 at 93.75%	0.26	OK	
		LC6 at 93.75%	0.31	OK	
		LC7 at 93.75%	0.29	OK	
		LC8 at 95.83%	0.32	OK	
		LC9 at 93.75%	0.37	OK	
	42	LC1 at 100.00%	0.32	OK	
		LC10 at 100.00%	0.41	OK	
		LC11 at 100.00%	0.38	OK	
		LC12 at 100.00%	0.39	OK	
		LC13 at 100.00%	0.23	OK	
		LC14 at 100.00%	0.18	OK	
		LC15 at 100.00%	0.20	OK	
		LC16 at 100.00%	0.32	OK	
		LC17 at 0.00%	0.52	OK	
		LC18 at 0.00%	0.51	OK	
		LC19 at 0.00%	0.51	OK	
		LC2 at 100.00%	0.39	OK	
		LC20 at 0.00%	0.52	OK	Eq. H1-1b
		LC25 at 100.00%	0.37	OK	
		LC26 at 100.00%	0.37	OK	
		LC27 at 100.00%	0.36	OK	
		LC28 at 100.00%	0.36	OK	
		LC29 at 100.00%	0.55	OK	
		LC3 at 100.00%	0.31	OK	
		LC30 at 100.00%	**0.55**	**OK**	Eq. H1-1b
		LC31 at 100.00%	0.54	OK	
		LC32 at 100.00%	0.54	OK	
		LC4 at 100.00%	0.37	OK	

	LC5 at 100.00%	0.26	OK	
	LC6 at 100.00%	0.33	OK	
	LC7 at 100.00%	0.25	OK	
	LC8 at 100.00%	0.32	OK	
	LC9 at 100.00%	0.40	OK	
43	LC1 at 0.00%	0.31	OK	
	LC10 at 0.00%	0.46	OK	
	LC11 at 0.00%	0.47	OK	
	LC12 at 0.00%	0.46	OK	
	LC13 at 0.00%	0.25	OK	
	LC14 at 0.00%	0.19	OK	
	LC15 at 0.00%	0.22	OK	
	LC16 at 0.00%	0.34	OK	
	LC17 at 0.00%	0.51	OK	
	LC18 at 0.00%	0.50	OK	
	LC19 at 0.00%	0.51	OK	
	LC2 at 0.00%	0.37	OK	
	LC20 at 0.00%	0.51	OK	
	LC25 at 0.00%	0.46	OK	
	LC26 at 0.00%	0.46	OK	
	LC27 at 0.00%	0.46	OK	
	LC28 at 0.00%	0.46	OK	
	LC29 at 0.00%	0.63	OK	
	LC3 at 0.00%	0.34	OK	
	LC30 at 0.00%	0.63	OK	
	LC31 at 0.00%	**0.63**	**OK**	Eq. H3-6
	LC32 at 0.00%	0.63	OK	
	LC4 at 0.00%	0.38	OK	
	LC5 at 0.00%	0.26	OK	
	LC6 at 0.00%	0.31	OK	
	LC7 at 0.00%	0.28	OK	
	LC8 at 0.00%	0.32	OK	
	LC9 at 0.00%	0.46	OK	
44	LC1 at 93.75%	0.25	OK	
	LC10 at 93.75%	0.46	OK	
	LC11 at 93.75%	0.46	OK	
	LC12 at 93.75%	0.46	OK	
	LC13 at 93.75%	0.24	OK	
	LC14 at 93.75%	0.18	OK	
	LC15 at 93.75%	0.29	OK	
	LC16 at 93.75%	0.24	OK	
	LC17 at 93.75%	0.49	OK	
	LC18 at 93.75%	0.49	OK	
	LC19 at 93.75%	0.49	OK	
	LC2 at 12.50%	0.30	OK	
	LC20 at 93.75%	0.49	OK	
	LC25 at 93.75%	0.46	OK	
	LC26 at 93.75%	0.46	OK	
	LC27 at 93.75%	0.46	OK	
	LC28 at 93.75%	0.46	OK	
	LC29 at 93.75%	0.62	OK	
	LC3 at 93.75%	0.24	OK	
	LC30 at 93.75%	**0.62**	**OK**	Eq. H3-6
	LC31 at 93.75%	0.62	OK	
	LC32 at 93.75%	0.62	OK	
	LC4 at 12.50%	0.29	OK	
	LC5 at 95.83%	0.19	OK	
	LC6 at 12.50%	0.26	OK	
	LC7 at 93.75%	0.18	OK	
	LC8 at 12.50%	0.25	OK	
	LC9 at 93.75%	0.46	OK	

45	LC1 at 100.00%	0.27	OK	
	LC10 at 0.00%	0.38	OK	
	LC11 at 0.00%	0.38	OK	
	LC12 at 0.00%	0.39	OK	
	LC13 at 0.00%	0.23	OK	
	LC14 at 0.00%	0.17	OK	
	LC15 at 0.00%	0.27	OK	
	LC16 at 0.00%	0.22	OK	
	LC17 at 100.00%	0.51	OK	
	LC18 at 100.00%	0.51	OK	
	LC19 at 100.00%	0.52	OK	
	LC2 at 100.00%	0.28	OK	
	LC20 at 100.00%	0.52	OK	Eq. H1-1b
	LC25 at 0.00%	0.36	OK	
	LC26 at 0.00%	0.35	OK	
	LC27 at 0.00%	0.35	OK	
	LC28 at 0.00%	0.36	OK	
	LC29 at 0.00%	0.54	OK	
	LC3 at 100.00%	0.28	OK	
	LC30 at 0.00%	0.53	OK	
	LC31 at 0.00%	0.53	OK	
	LC32 at 0.00%	**0.54**	**OK**	Eq. H1-1b
	LC4 at 100.00%	0.29	OK	
	LC5 at 100.00%	0.22	OK	
	LC6 at 100.00%	0.24	OK	
	LC7 at 100.00%	0.23	OK	
	LC8 at 100.00%	0.24	OK	
	LC9 at 0.00%	0.38	OK	
46	LC1 at 6.25%	0.33	OK	
	LC10 at 6.25%	0.38	OK	
	LC11 at 6.25%	0.37	OK	
	LC12 at 6.25%	0.37	OK	
	LC13 at 6.25%	0.22	OK	
	LC14 at 6.25%	0.17	OK	
	LC15 at 6.25%	0.23	OK	
	LC16 at 6.25%	0.21	OK	
	LC17 at 6.25%	**0.60**	**OK**	Eq. H3-6
	LC18 at 6.25%	0.60	OK	
	LC19 at 6.25%	0.60	OK	
	LC2 at 6.25%	0.37	OK	
	LC20 at 6.25%	0.60	OK	
	LC25 at 100.00%	0.40	OK	Eq. H3-6
	LC26 at 100.00%	0.40	OK	
	LC27 at 100.00%	0.40	OK	
	LC28 at 100.00%	0.40	OK	
	LC29 at 6.25%	0.47	OK	
	LC3 at 4.17%	0.31	OK	
	LC30 at 6.25%	0.48	OK	
	LC31 at 6.25%	0.47	OK	
	LC32 at 4.17%	0.47	OK	
	LC4 at 4.17%	0.34	OK	
	LC5 at 6.25%	0.27	OK	
	LC6 at 6.25%	0.31	OK	
	LC7 at 4.17%	0.25	OK	
	LC8 at 6.25%	0.29	OK	
	LC9 at 6.25%	0.38	OK	
47	LC1 at 93.75%	0.34	OK	
	LC10 at 93.75%	0.46	OK	
	LC11 at 93.75%	0.46	OK	
	LC12 at 93.75%	0.46	OK	
	LC13 at 93.75%	0.24	OK	
	LC14 at 93.75%	0.18	OK	

	LC15 at 93.75%	0.25	OK	
	LC16 at 93.75%	0.30	OK	
	LC17 at 93.75%	0.49	OK	
	LC18 at 95.83%	0.49	OK	
	LC19 at 93.75%	0.49	OK	
	LC2 at 95.83%	0.37	OK	
	LC20 at 93.75%	0.50	OK	
	LC25 at 93.75%	0.46	OK	
	LC26 at 93.75%	0.46	OK	
	LC27 at 93.75%	0.46	OK	
	LC28 at 93.75%	0.46	OK	
	LC29 at 93.75%	0.62	OK	
	LC3 at 95.83%	0.33	OK	
	LC30 at 93.75%	0.62	OK	
	LC31 at 93.75%	0.62	OK	
	LC32 at 93.75%	**0.62**	**OK**	Eq. H3-6
	LC4 at 93.75%	0.39	OK	
	LC5 at 93.75%	0.27	OK	
	LC6 at 95.83%	0.31	OK	
	LC7 at 95.83%	0.27	OK	
	LC8 at 93.75%	0.32	OK	
	LC9 at 93.75%	0.46	OK	
48	LC1 at 0.00%	0.30	OK	
	LC10 at 0.00%	0.40	OK	
	LC11 at 0.00%	0.39	OK	
	LC12 at 0.00%	0.37	OK	
	LC13 at 0.00%	0.23	OK	
	LC14 at 0.00%	0.17	OK	
	LC15 at 100.00%	0.25	OK	
	LC16 at 100.00%	0.32	OK	
	LC17 at 100.00%	0.52	OK	Eq. H1-1b
	LC18 at 100.00%	0.51	OK	
	LC19 at 100.00%	0.51	OK	
	LC2 at 0.00%	0.34	OK	
	LC20 at 100.00%	0.51	OK	
	LC25 at 0.00%	0.35	OK	
	LC26 at 0.00%	0.36	OK	
	LC27 at 0.00%	0.36	OK	
	LC28 at 0.00%	0.35	OK	
	LC29 at 0.00%	0.53	OK	
	LC3 at 0.00%	0.32	OK	
	LC30 at 0.00%	**0.54**	**OK**	Eq. H1-1b
	LC31 at 0.00%	0.54	OK	
	LC32 at 0.00%	0.53	OK	
	LC4 at 0.00%	0.33	OK	
	LC5 at 0.00%	0.24	OK	
	LC6 at 0.00%	0.28	OK	
	LC7 at 0.00%	0.26	OK	
	LC8 at 0.00%	0.28	OK	
	LC9 at 0.00%	0.37	OK	
49	LC1 at 0.00%	0.24	OK	
	LC10 at 6.25%	0.37	OK	
	LC11 at 6.25%	0.37	OK	
	LC12 at 6.25%	0.38	OK	
	LC13 at 6.25%	0.22	OK	
	LC14 at 6.25%	0.17	OK	
	LC15 at 6.25%	0.27	OK	
	LC16 at 6.25%	0.34	OK	
	LC17 at 6.25%	0.60	OK	
	LC18 at 6.25%	0.60	OK	
	LC19 at 6.25%	0.60	OK	
	LC2 at 87.50%	0.29	OK	

		LC20 at 6.25%	**0.60**	**OK**	Eq. H3-6
		LC25 at 100.00%	0.40	OK	
		LC26 at 100.00%	0.40	OK	
		LC27 at 100.00%	0.40	OK	
		LC28 at 100.00%	0.40	OK	Eq. H3-6
		LC29 at 6.25%	0.47	OK	
		LC3 at 6.25%	0.23	OK	
		LC30 at 6.25%	0.47	OK	
		LC31 at 6.25%	0.47	OK	
		LC32 at 6.25%	0.47	OK	
		LC4 at 87.50%	0.30	OK	
		LC5 at 0.00%	0.19	OK	
		LC6 at 87.50%	0.25	OK	
		LC7 at 0.00%	0.18	OK	
		LC8 at 87.50%	0.26	OK	
		LC9 at 6.25%	0.37	OK	
PL 6x5/8	**7**	LC1 at 0.00%	0.51	OK	
		LC10 at 0.00%	0.59	OK	
		LC11 at 0.00%	0.58	OK	
		LC12 at 0.00%	0.58	OK	
		LC13 at 0.00%	0.34	OK	
		LC14 at 0.00%	0.26	OK	
		LC15 at 0.00%	0.44	OK	
		LC16 at 50.00%	0.36	OK	
		LC17 at 0.00%	0.60	OK	
		LC18 at 0.00%	0.60	OK	
		LC19 at 0.00%	0.60	OK	
		LC2 at 50.00%	0.63	OK	Eq. H3-6
		LC20 at 0.00%	0.60	OK	
		LC25 at 0.00%	0.66	OK	
		LC26 at 0.00%	**0.66**	**OK**	Eq. H3-1
		LC27 at 0.00%	0.66	OK	
		LC28 at 0.00%	0.66	OK	
		LC29 at 50.00%	0.60	OK	
		LC3 at 0.00%	0.52	OK	
		LC30 at 50.00%	0.60	OK	
		LC31 at 50.00%	0.60	OK	
		LC32 at 50.00%	0.60	OK	
		LC4 at 50.00%	0.63	OK	Eq. H3-6
		LC5 at 0.00%	0.44	OK	
		LC6 at 50.00%	0.55	OK	
		LC7 at 0.00%	0.44	OK	
		LC8 at 50.00%	0.55	OK	
		LC9 at 0.00%	0.59	OK	
	8	LC1 at 0.00%	0.52	OK	
		LC10 at 53.13%	0.59	OK	
		LC11 at 53.13%	0.59	OK	
		LC12 at 53.13%	0.59	OK	
		LC13 at 53.13%	0.35	OK	
		LC14 at 53.13%	0.26	OK	
		LC15 at 0.00%	0.45	OK	
		LC16 at 53.13%	0.49	OK	
		LC17 at 53.13%	0.60	OK	
		LC18 at 53.13%	0.60	OK	
		LC19 at 53.13%	0.60	OK	
		LC2 at 100.00%	0.62	OK	Eq. H3-6
		LC20 at 53.13%	0.60	OK	
		LC25 at 53.13%	0.66	OK	
		LC26 at 53.13%	0.66	OK	
		LC27 at 53.13%	**0.66**	**OK**	Eq. H3-1
		LC28 at 53.13%	0.66	OK	
		LC29 at 0.00%	0.60	OK	

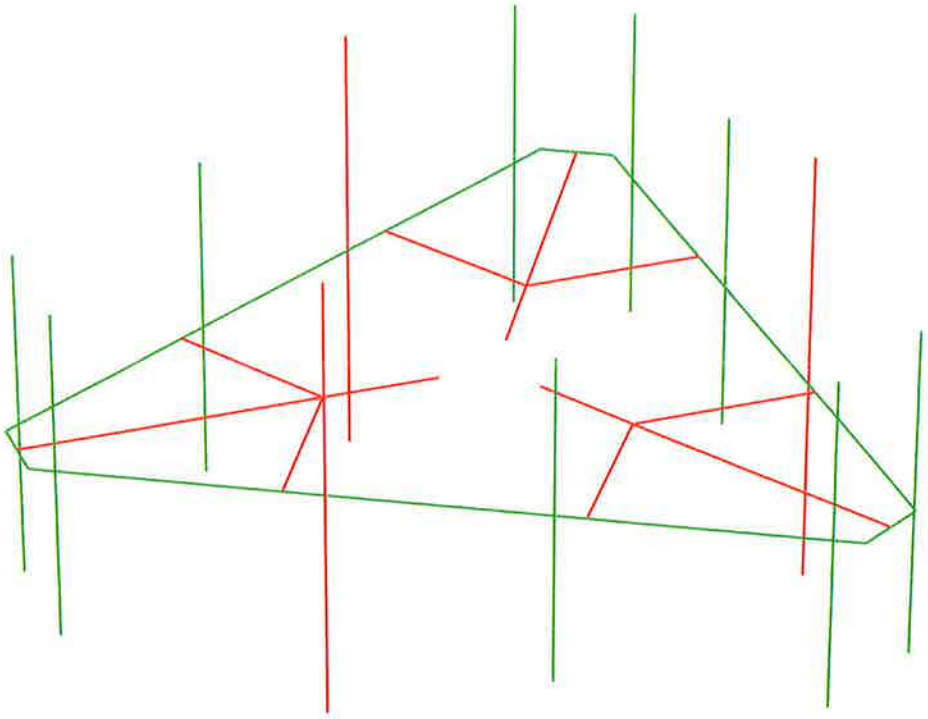
	LC3 at 0.00%	0.52	OK	
	LC30 at 0.00%	0.60	OK	
	LC31 at 0.00%	0.60	OK	
	LC32 at 0.00%	0.60	OK	
	LC4 at 100.00%	0.63	OK	Eq. H3-6
	LC5 at 0.00%	0.44	OK	
	LC6 at 100.00%	0.54	OK	
	LC7 at 0.00%	0.45	OK	
	LC8 at 100.00%	0.55	OK	
	LC9 at 53.13%	0.58	OK	
9	LC1 at 50.00%	0.58	OK	Eq. H3-6
	LC10 at 53.13%	0.58	OK	
	LC11 at 53.13%	0.59	OK	
	LC12 at 53.13%	0.59	OK	
	LC13 at 53.13%	0.35	OK	
	LC14 at 53.13%	0.26	OK	
	LC15 at 53.13%	0.33	OK	
	LC16 at 53.13%	0.35	OK	
	LC17 at 53.13%	0.60	OK	
	LC18 at 53.13%	0.60	OK	
	LC19 at 53.13%	0.60	OK	
	LC2 at 0.00%	0.37	OK	
	LC20 at 53.13%	0.60	OK	
	LC25 at 53.13%	0.67	OK	
	LC26 at 53.13%	0.66	OK	
	LC27 at 53.13%	0.66	OK	
	LC28 at 53.13%	**0.67**	**OK**	Eq. H3-1
	LC29 at 0.00%	0.60	OK	
	LC3 at 50.00%	0.57	OK	
	LC30 at 0.00%	0.60	OK	
	LC31 at 0.00%	0.60	OK	
	LC32 at 0.00%	0.60	OK	
	LC4 at 100.00%	0.37	OK	
	LC5 at 50.00%	0.50	OK	
	LC6 at 0.00%	0.30	OK	
	LC7 at 50.00%	0.49	OK	
	LC8 at 100.00%	0.30	OK	
	LC9 at 53.13%	0.59	OK	

Bentley

Current Date: 5/9/2018 2:20 PM
Units system: English
File name: W:\STRUCTURAL DEPARTMENT\ANALYSIS SOFTWARE\RAM Elements\RAM Projects\CROWN CASTLE\829013\829013.etz\

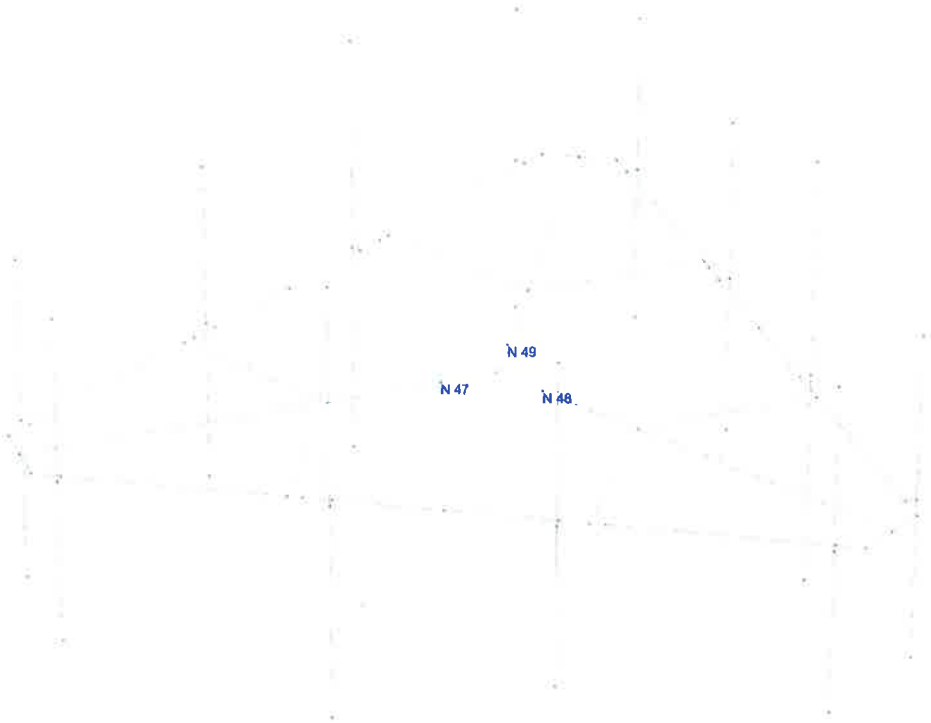
Design status

- Not designed
- Error on design
- Design O.K.
- With warnings



APPENDIX D

ADDITIONAL CALCUATIONS


N 49
N 47
N 48


Y
X

Bentley

Current Date: 5/9/2018 2:21 PM
Units system: English
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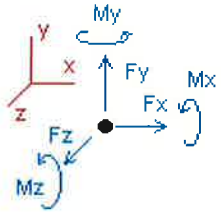
Analysis result

Reactions



Direction of positive forces and moments

	Forces [Kip]			Moments [Kip*ft]		
Node	**FX**	**FY**	**FZ**	**MX**	**MY**	**MZ**
Condition **W180=-W0**						
47	0.50297	0.00514	-1.06564	-0.02992	-1.01771	-0.01324
48	-0.42075	0.00381	-0.75428	-0.02727	0.66658	0.01250
49	-0.08222	-0.00894	-1.59704	-0.04740	0.09619	0.00189
SUM	0.00000	0.00000	-3.41696	-0.10459	-0.25494	0.00115
Condition **W210=-W30**						
47	-1.24933	-0.00930	0.69502	0.01274	0.15544	0.05675
48	-1.48069	0.01007	-0.55777	-0.00999	-0.16851	0.05893
49	-0.95380	-0.00077	-0.13725	-0.00159	1.64044	0.02555
SUM	-3.68381	0.00000	0.00000	0.00116	1.62737	0.14123
Condition **Wi180=-Wi0**						
47	0.11186	0.00219	-0.23738	-0.01135	-0.22724	-0.00628
48	-0.08820	0.00168	-0.15300	-0.01039	0.13352	0.00603
49	-0.02366	-0.00387	-0.34162	-0.02045	0.02819	0.00069
SUM	0.00000	0.00000	-0.73200	-0.04219	-0.06554	0.00044
Condition **Wi210=-Wi30**						
47	-0.25968	-0.00512	0.15351	0.00902	0.03594	0.02888
48	-0.32267	0.00540	-0.11651	-0.00805	-0.05178	0.02968
49	-0.17764	-0.00028	-0.03700	-0.00054	0.30638	0.01233
SUM	-0.76000	0.00000	0.00000	0.00042	0.29054	0.07089
Condition **WL180=-WL0**						
47	0.02878	0.00045	-0.06483	-0.00246	-0.06319	-0.00126
48	-0.02200	0.00033	-0.03964	-0.00225	0.03495	0.00120
49	-0.00678	-0.00078	-0.08753	-0.00413	0.00801	0.00015
SUM	0.00000	0.00000	-0.19200	-0.00883	-0.02022	0.00010

Condition **WL210=-WL30**						
47	-0.06383	-0.00096	0.04017	0.00166	0.01352	0.00540
48	-0.08296	0.00102	-0.02916	-0.00145	-0.01289	0.00568
49	-0.04821	-0.00006	-0.01101	-0.00012	0.08331	0.00221
SUM	-0.19500	0.00000	0.00000	0.00008	0.08394	0.01329
Condition **LC1=1.2DL+1.6W0**						
47	-0.70338	1.08656	1.64637	-2.09206	1.62820	-3.66900
48	0.57199	1.09765	1.14874	-2.09440	-1.06677	3.67284
49	0.13139	1.11309	2.67203	4.35415	-0.15332	-0.01490
SUM	0.00000	3.29730	5.46714	0.16770	0.40812	-0.01106
Condition **LC2=1.2DL+1.6W30**						
47	2.10030	1.10965	-1.17068	-2.16031	-0.24884	-3.78098
48	2.26789	1.08763	0.83432	-2.12205	0.26937	3.59855
49	1.52591	1.10002	0.33635	4.28086	-2.62411	-0.05275
SUM	5.89410	3.29730	0.00000	-0.00149	-2.60358	-0.23519
Condition **LC3=1.2DL-1.6W0**						
47	0.90613	1.10299	-1.76366	-2.18779	-1.62847	-3.71136
48	-0.77441	1.10983	-1.26497	-2.18166	1.06628	3.71284
49	-0.13172	1.08448	-2.43851	4.20247	0.15450	-0.00885
SUM	0.00000	3.29730	-5.46714	-0.16698	-0.40769	-0.00737
Condition **LC4=1.2DL-1.6W30**						
47	-1.89754	1.07990	1.05338	-2.11954	0.24857	-3.59938
48	-2.47031	1.11984	-0.95055	-2.15401	-0.26986	3.78713
49	-1.52624	1.09755	-0.10283	4.27576	2.62530	0.02900
SUM	-5.89410	3.29730	0.00000	0.00221	2.60401	0.21675
Condition **LC5=0.9DL+1.6W0**						
47	-0.72872	0.81287	1.66103	-1.55708	1.62824	-2.74646
48	0.59729	0.82171	1.16327	-1.55989	-1.06671	2.74963
49	0.13143	0.83839	2.64284	3.28458	-0.15347	-0.01193
SUM	0.00000	2.47297	5.46714	0.16761	0.40806	-0.00875
Condition **LC6=0.9DL+1.6W30**						
47	2.07496	0.83596	-1.15601	-1.62533	-0.24881	-2.85844
48	2.29319	0.81170	0.84885	-1.58754	0.26943	2.67534
49	1.52595	0.82532	0.30716	3.21128	-2.62426	-0.04978
SUM	5.89410	2.47297	0.00000	-0.00158	-2.60364	-0.23288
Condition **LC7=0.9DL-1.6W0**						
47	0.88079	0.82930	-1.74900	-1.65281	-1.62844	-2.78882
48	-0.74911	0.83389	-1.25044	-1.64715	1.06634	2.78963
49	-0.13168	0.80978	-2.46770	3.13289	0.15435	-0.00588
SUM	0.00000	2.47297	-5.46714	-0.16707	-0.40775	-0.00507

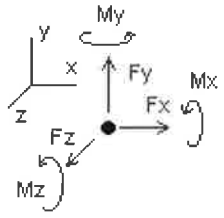
Condition **LC8=0.9DL-1.6W30**						
47	-1.92289	0.80621	1.06805	-1.58456	0.24861	-2.67684
48	-2.44501	0.84391	-0.93602	-1.61951	-0.26980	2.86392
49	-1.52620	0.82286	-0.13202	3.20619	2.62515	0.03197
SUM	-5.89410	2.47297	0.00000	0.00212	2.60395	0.21906
Condition **LC9=1.2DL+Di+Wi0**						
47	0.05875	1.82725	0.13849	-3.55446	0.22719	-6.09264
48	-0.08228	1.84270	0.05531	-3.50897	-0.13381	6.12160
49	0.02353	1.84000	0.53820	7.10614	-0.02699	-0.04570
SUM	0.00000	5.50995	0.73200	0.04271	0.06639	-0.01674
Condition **LC10=1.2DL+Di+Wi30**						
47	0.43029	1.83456	-0.25240	-3.57482	-0.03599	-6.12781
48	0.15219	1.83898	0.01882	-3.51131	0.05149	6.09795
49	0.17752	1.83641	0.23358	7.08623	-0.30519	-0.05733
SUM	0.76000	5.50995	0.00000	0.00010	-0.28968	-0.08719
Condition **LC11=1.2DL+Di-Wi0**						
47	0.28247	1.83163	-0.33627	-3.57715	-0.22729	-6.10521
48	-0.25869	1.84607	-0.25068	-3.52976	0.13323	6.13365
49	-0.02379	1.83225	-0.14504	7.06523	0.02938	-0.04431
SUM	0.00000	5.50995	-0.73200	-0.04167	-0.06468	-0.01587
Condition **LC12=1.2DL+Di-Wi30**						
47	-0.08907	1.82432	0.05462	-3.55678	0.03589	-6.07005
48	-0.49316	1.84979	-0.21420	-3.52742	-0.05207	6.15731
49	-0.17777	1.83584	0.15958	7.08514	0.30757	-0.03268
SUM	-0.76000	5.50995	0.00000	0.00094	0.29139	0.05458
Condition **LC13=1.2DL**						
47	0.10138	1.09478	-0.05865	-2.13993	-0.00013	-3.69018
48	-0.10121	1.10374	-0.05811	-2.13803	-0.00024	3.69284
49	-0.00017	1.09878	0.11676	4.27831	0.00059	-0.01188
SUM	0.00000	3.29730	0.00000	0.00036	0.00021	-0.00922
Condition **LC14=0.9DL**						
47	0.07603	0.82108	-0.04398	-1.60494	-0.00010	-2.76764
48	-0.07591	0.82780	-0.04359	-1.60352	-0.00018	2.76963
49	-0.00012	0.82409	0.08757	3.20873	0.00044	-0.00891
SUM	0.00000	2.47297	0.00000	0.00027	0.00016	-0.00691
Condition **LC15=1.2DL+1.5LL1**						
47	0.11676	1.30503	-0.06728	-2.75852	0.01232	-4.18314
48	-0.11650	1.31965	-0.06664	-2.76893	-0.01292	4.19012
49	-0.00026	1.04761	0.13392	4.01082	0.00077	-0.01172
SUM	0.00000	3.67230	0.00000	-1.51664	0.00016	-0.00475

Condition **LC16=1.2DL+1.5LL2**						
47	0.11067	1.07599	-0.06747	-2.21660	0.00065	-3.47296
48	-0.10807	1.54342	-0.06244	-3.31229	0.00018	5.52983
49	-0.00260	1.05289	0.12991	4.00433	-0.00037	0.11498
SUM	0.00000	3.67230	0.00000	-1.52455	0.00046	2.17186
Condition **LC17=1.2DL+WL0+1.5LLa1**						
47	0.13305	1.84171	-0.02875	-3.72180	0.06283	-6.71915
48	-0.13947	1.85629	-0.05311	-3.97453	-0.03529	6.57613
49	0.00643	1.84929	0.27386	7.70592	-0.00713	0.12894
SUM	0.00000	5.54730	0.19200	0.00959	0.02042	-0.01408
Condition **LC18=1.2DL+WL30+1.5LLa1**						
47	0.22565	1.84312	-0.13375	-3.72592	-0.01388	-6.72581
48	-0.07851	1.85560	-0.06359	-3.97532	0.01255	6.57166
49	0.04786	1.84857	0.19735	7.70192	-0.08242	0.12688
SUM	0.19500	5.54730	0.00000	0.00068	-0.08375	-0.02727
Condition **LC19=1.2DL-WL0+1.5LLa1**						
47	0.19060	1.84261	-0.15842	-3.72672	-0.06354	-6.72167
48	-0.18347	1.85695	-0.13239	-3.97902	0.03462	6.57854
49	-0.00713	1.84774	0.09881	7.69766	0.00890	0.12925
SUM	0.00000	5.54730	-0.19200	-0.00807	-0.02003	-0.01388
Condition **LC20=1.2DL-WL30+1.5LLa1**						
47	0.09799	1.84120	-0.05341	-3.72260	0.01317	-6.71501
48	-0.24443	1.85764	-0.12191	-3.97823	-0.01322	6.58301
49	-0.04856	1.84846	0.17532	7.70167	0.08419	0.13130
SUM	-0.19500	5.54730	0.00000	0.00084	0.08413	-0.00070
Condition **LC25=1.2DL+WL0+1.5LLa3**						
47	0.15803	1.84054	-0.04409	-3.52458	0.06370	-5.85990
48	-0.16516	1.85735	-0.06694	-3.33367	-0.03487	5.97522
49	0.00713	1.84940	0.30303	6.86768	-0.00604	-0.13133
SUM	0.00000	5.54730	0.19200	0.00943	0.02279	-0.01602
Condition **LC26=1.2DL+WL30+1.5LLa3**						
47	0.25064	1.84195	-0.14910	-3.52869	-0.01301	-5.86655
48	-0.10421	1.85667	-0.07742	-3.33446	0.01297	5.97074
49	0.04857	1.84868	0.22652	6.86367	-0.08133	-0.13339
SUM	0.19500	5.54730	0.00000	0.00052	-0.08137	-0.02920
Condition **LC27=1.2DL-WL0+1.5LLa3**						
47	0.21558	1.84144	-0.17376	-3.52949	-0.06268	-5.86241
48	-0.20916	1.85802	-0.14622	-3.33816	0.03504	5.97762
49	-0.00642	1.84785	0.12798	6.85942	0.00999	-0.13103
SUM	0.00000	5.54730	-0.19200	-0.00823	-0.01766	-0.01582

Condition **LC28=1.2DL-WL30+1.5LLa3**						
47	0.12298	1.84003	-0.06876	-3.52538	0.01403	-5.85576
48	-0.27012	1.85870	-0.13574	-3.33737	-0.01280	5.98210
49	-0.04786	1.84857	0.20450	6.86343	0.08528	-0.12897
SUM	-0.19500	5.54730	0.00000	0.00068	0.08651	-0.00263
Condition **LC29=1.2DL+WL0+1.5LLa4**						
47	0.13295	1.84176	-0.02866	-3.96587	0.06298	-6.57759
48	-0.13950	1.85613	-0.05317	-3.73121	-0.03531	6.71694
49	0.00655	1.84940	0.27384	7.70650	-0.00720	-0.15325
SUM	0.00000	5.54730	0.19200	0.00943	0.02048	-0.01390
Condition **LC30=1.2DL+WL30+1.5LLa4**						
47	0.22556	1.84317	-0.13367	-3.96999	-0.01373	-6.58425
48	-0.07854	1.85545	-0.06365	-3.73200	0.01254	6.71246
49	0.04798	1.84868	0.19732	7.70250	-0.08249	-0.15531
SUM	0.19500	5.54730	0.00000	0.00051	-0.08369	-0.02709
Condition **LC31=1.2DL-WL0+1.5LLa4**						
47	0.19050	1.84265	-0.15833	-3.97079	-0.06340	-6.58011
48	-0.18349	1.85679	-0.13245	-3.73570	0.03460	6.71934
49	-0.00701	1.84785	0.09878	7.69825	0.00883	-0.15294
SUM	0.00000	5.54730	-0.19200	-0.00824	-0.01997	-0.01370
Condition **LC32=1.2DL-WL30+1.5LLa4**						
47	0.09789	1.84125	-0.05333	-3.96667	0.01331	-6.57345
48	-0.24445	1.85748	-0.12197	-3.73491	-0.01324	6.72382
49	-0.04844	1.84857	0.17530	7.70225	0.08412	-0.15088
SUM	-0.19500	5.54730	0.00000	0.00068	0.08419	-0.00052

Envelope for nodal reactions

Note.- **Ic** is the controlling load condition



Direction of positive forces and moments

Envelope of nodal reactions for :

W180=-W0
W210=-W30
Wi180=-Wi0
Wi210=-Wi30
WL180=-WL0
WL210=-WL30
LC1=1.2DL+1.6W0
LC2=1.2DL+1.6W30

LC3=1.2DL-1.6W0
LC4=1.2DL-1.6W30
LC5=0.9DL+1.6W0
LC6=0.9DL+1.6W30
LC7=0.9DL-1.6W0
LC8=0.9DL-1.6W30
LC9=1.2DL+Di+Wi0
LC10=1.2DL+Di+Wi30
LC11=1.2DL+Di-Wi0
LC12=1.2DL+Di-Wi30
LC13=1.2DL
LC14=0.9DL
LC15=1.2DL+1.5LL1
LC16=1.2DL+1.5LL2
LC17=1.2DL+WL0+1.5LLa1
LC18=1.2DL+WL30+1.5LLa1
LC19=1.2DL-WL0+1.5LLa1
LC20=1.2DL-WL30+1.5LLa1
LC25=1.2DL+WL0+1.5LLa3
LC26=1.2DL+WL30+1.5LLa3
LC27=1.2DL-WL0+1.5LLa3
LC28=1.2DL-WL30+1.5LLa3
LC29=1.2DL+WL0+1.5LLa4
LC30=1.2DL+WL30+1.5LLa4
LC31=1.2DL-WL0+1.5LLa4
LC32=1.2DL-WL30+1.5LLa4

Node		Forces						Moments					
		Fx [Kip]	lc	Fy [Kip]	lc	Fz [Kip]	lc	Mx [Kip*ft]	lc	My [Kip*ft]	lc	Mz [Kip*ft]	lc
47	Max	2.100	LC2	1.843	LC30	1.661	LC5	0.01274	W210	1.62824	LC5	0.05675	W210
	Min	-1.923	LC8	-0.009	W210	-1.764	LC3	-3.97079	LC31	-1.62847	LC3	-6.72581	LC18
48	Max	2.293	LC6	1.859	LC28	1.163	LC5	-0.00145	WL210	1.06634	LC7	6.72382	LC32
	Min	-2.470	LC4	0.000	WL180	-1.265	LC3	-3.97902	LC19	-1.06677	LC1	0.00120	WL180
49	Max	1.526	LC6	1.849	LC29	2.672	LC1	7.70650	LC29	2.62530	LC4	0.13130	LC20
	Min	-1.526	LC4	-0.009	W180	-2.468	LC7	-0.04740	W180	-2.62426	LC6	-0.15531	LC30

Date: 5/9/2018
Project Name: WEST HARTFORD/I-84/X43
Project Number: 829013
Designed By: BD **Checked By:** MSC

HUDSON Design Group LLC

CHECK CONNECTION CAPACITY (Worse Case)

Reference: AISC Steel Construction Manual 9th Edition (ASD)

Bolt Type =	Threaded Rod
Bolt Diameter =	1/2 in.
Steel Grade =	A36

Allowable Tensile Load =

F_{Tall} = **3750** lbs.

Allowable Shear Load =

F_{Vall}= 1940 lbs.

WIND FORCES

Reaction **F =** 2672 lbs.

GRAVITY LOADS

Ice and Equipment 1859 lbs.

No. of Supports = 1
No. of Bolts / Support = 2

Tension Design Load /Bolts =

f_t= 1336.00 lbs. < 3750 lbs. **Therefore, OK !**

Shear Design Load / Bolts=

f_v= 929.50 lbs. < 1940 lbs. **Therefore, OK !**

CHECK COMBINED TENSION AND SHEAR

f_t / F_T	+	f_v / F_V	≤	1.0			
0.356	+	0.479	=	0.835	<	1.0	**Therefore, OK !**

EBI Consulting
environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CT11178D

West Hartford/I-84/X43
467 South Quaker Lane (Church of St. Mark)
West Hartford, CT 06110
July 25, 2018

EBI Project Number: 6218005237

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**19.95 %**

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

EBI Consulting
environmental | engineering | due diligence

July 25, 2018

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Emissions Analysis for Site: **CT11178D – West Hartford/I-84/X43**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **467 South Quaker Lane (Church, West Hartford, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located 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 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ 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 population 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 population 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 ($\mu W/cm^2$). The general population exposure limits for the 600 MHz and 700 MHz Band are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) bands is 1000 $\mu W/cm^2$. 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 T-Mobile Wireless antenna facility located at **467 South Quaker Lane, West Hartford, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was focused at the base of the tower. 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 equipment was calculated using the following assumptions:

1) 2 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

4) 4 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

6) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

7) 1 microwave backhaul channel (10GHz) was considered for the proposed facility. This channel has a transmit power of 1 Watt.

8) 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.

9) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

10) The antennas used in this modeling are the **Ericsson AIR3246 B66, Ericsson AIR32 B66A/B2A** and the **RFS APXVAARR24_43-U-NA20** for 600 MHz, 700 MHz, 1900 MHz (PCS) and 2100 MHz (AWS) channels. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

11) The antenna mounting height centerline of the proposed antennas is **120 feet** above ground level (AGL).

12) 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.

13) All calculations were done with respect to uncontrolled / general population threshold limits.

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR3246 B66	Make / Model:	Ericsson AIR3246 B66	Make / Model:	Ericsson AIR3246 B66
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	120	Height (AGL):	120	Height (AGL):	120
Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240
ERP (W):	9,337.08	ERP (W):	9,337.08	ERP (W):	9,337.08
Antenna A1 MPE%	**2.58**	Antenna B1 MPE%	**2.58**	Antenna C1 MPE%	**2.58**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR32 B66A/B2A	Make / Model:	Ericsson AIR32 B66A/B2A	Make / Model:	Ericsson AIR32 B66A/B2A
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	120	Height (AGL):	120	Height (AGL):	120
Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180
ERP (W):	7,002.81	ERP (W):	7,002.81	ERP (W):	7,002.81
Antenna A2 MPE%	**1.94**	Antenna B2 MPE%	**1.94**	Antenna C2 MPE%	**1.94**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Gain:	16.35 / 12.95 / 13.35 dBd	Gain:	16.35 / 12.95 / 13.35 dBd	Gain:	16.35 / 12.95 / 13.35 dBd
Height (AGL):	120	Height (AGL):	120	Height (AGL):	120
Frequency Bands	2100 MHz / 600 MHz / 700 MHz	Frequency Bands	2100 MHz / 600 MHz / 700 MHz	Frequency Bands	2100 MHz / 600 MHz / 700 MHz
Channel Count	6	Channel Count	6	Channel Count	6
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180
ERP (W):	5,070.20	ERP (W):	5,070.20	ERP (W):	5,070.20
Antenna A3 MPE%	**2.30**	Antenna B3 MPE%	**2.30**	Antenna C3 MPE%	**2.30**

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**6.82 %**
AT&T	**4.96**
Clearwire	**0.34**
Verizon Wireless	**7.83**
Site Total MPE %:	**19.95 %**

T-Mobile Sector A Total:	6.82 %
T-Mobile Sector B Total:	6.82 %
T-Mobile Sector C Total:	6.82 %
Site Total:	19.95 %

T-Mobile Max Power Values (Per Sector)

T-Mobile _Max Power Values (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile AWS - 2100 MHz LTE	4	2,334.27	120	25.83	AWS - 2100 MHz	1000.00	2.57%
T-Mobile PCS - 1900 MHz LTE	2	2,334.27	120	12.91	PCS - 1900 MHz	1000.00	1.29%
T-Mobile PCS - 1900 MHz GSM	2	1,167.14	120	6.46	PCS - 1900 MHz	1000.00	0.65%
T-Mobile AWS - 2100 MHz UMTS	2	1,294.56	120	7.16	AWS - 2100 MHz	1000.00	0.72%
T-Mobile 600 MHz LTE	2	591.73	120	3.27	600 MHz	400.00	0.82%
T-Mobile 700 MHz LTE	2	648.82	120	3.59	700 MHz	467.00	0.77%
						Total:	**6.82 %**

Summary

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

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector A:	6.82 %
Sector B:	6.82 %
Sector C:	6.82 %
T-Mobile Maximum MPE % (Per Sector):	6.82 %
Site Total:	19.95 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **19.95%** of the allowable FCC established general population 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.