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

February 6, 2019

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

RE: **Request of Dish Wireless for an Order to Approve the Shared Use of an Existing Tower at 467 South Quaker Lane, West Hartford, CT 06110**
Crown Site BU: 829013
Latitude: 41° 44′ 55.59″ / Longitude: -72° 43′ 52.86″

Dear Ms. Bachman:

Pursuant to Connecticut General Statutes ("C.G.S.") §16-50aa, as amended, Dish Wireless ("Dish") hereby requests an order from the Connecticut Siting Council ("Council") to approve the shared use by Dish of an existing telecommunication tower at 467 South Quaker Lane, in West Hartford, Connecticut (the "Property"). The existing 120-foot monopole tower is owned by Crown Castle International Corp. ("Crown Castle"). The underlying property is owned by the Church of St. Marks the Evangelist Corporation. Dish requests that the Council find that the proposed shared use of the Crown Castle tower satisfies the criteria of C.G.S. §16-50aa and issue an order approving the proposed shared us. A copy of this filing is being sent to The Honorable Shari Cantor, Mayor, Town of West Hartford, Mr. Mark McGovern, Director of Community Development for the Town of West Hartford, as well as the property owner.

Background

The existing Crown Castle facility consists of a 120-foot monopole tower on an 8.16-acre parcel. T-Mobile maintains antennas at the 120-foot level, AT&T currently maintains antennas at the 110-foot level, Verizon antennas are located at the 100-foot level and Clearwire has an antenna rad center at the 80-foot level. AT&T's equipment is located to north west of the tower, Verizon's equipment shelter is located to the west of the tower, Sprint's equipment is located to the north of the tower.

Dish is licensed by the Federal Communications Commission ("FCC") to provide wireless services throughout the State of Connecticut. Dish and Crown Castle have agreed to the proposed shared use of the 467 South Quaker Lane tower pursuant to mutually acceptable terms and conditions. Likewise, Dish and Crown Castle have agreed to the proposed installation of equipment cabinets on the ground on the south west side of the tower within the existing compound. Crown Castle has authorized Dish to apply for all necessary permits and approvals that may be required to share the existing tower.

Dish proposes to install three (3) panel antennas, eight (8) RRUs, three (3) antenna mounts, one (1) hybrid fiber lines and all related equipment. In addition, Dish will install a ground equipment cabinet within a 5'x7' concrete pad. Included in the Construction Drawings are Dish's project specifications for locations of all proposed site improvements. The Construction Drawings also contain specifications for Dish's proposed antennas and ground work.

C.G.S. § 16-50aa(c)(1) provides that, upon written request for approval of a proposed shared use, "if the Council finds that the proposed shared use of the facility is technically, legally, environmentally and economically feasible and meets public safety concerns, the council shall issue an order approving such a shared use." Dish respectfully submits that the shared use of the tower satisfies these criteria.

A. Technical Feasibility. The existing Crown Castle tower is structurally capable of supporting Dish's proposed improvements. The prosed shared use of this tower is, therefore, technically feasible. A Feasibility Structural Analysis Report ("Structural Report") prepared for this project confirms that this tower can support Dish's proposed loading. A copy of the Structural Report has been included in this application.

B. Legal Feasibility. Under C.G.S. § 16-50aa, the Council has been authorized to issue order approving the shared use of an existing tower such as the Crown Castle tower. This authority complements the Council's prior-existing authority under C.G.S. § 16-50p to issue orders approving the construction of new towers that are subject to the Council's jurisdiction. In addition, § 16-50x(a) directs the Council to "give such consideration to the other state laws and municipal regulations as it shall deem appropriate" in ruling on requests for the shared use of existing tower facilities. Under the statutory authority vested in the Council, an order by the Council approving the requested shared use would permit the Applicant to obtain a building permit for the proposed installations.

C. Environmental Feasibility. The proposed shared use of the Crown Castle tower would have a minimal environmental effect for the following reasons:

1. The proposed installation of three (3) panel antennas, eight (8) RRUs, three (3) antenna mounts, one (1) hybrid fiber lines will have no visual impact on the area of the tower. Dish's equipment cabinet would be installed within the existing facility compound. Dish's shared use of this tower therefore will not cause any significant change or alteration in the physical or environmental characteristics of the existing site.

2. Operation of Dish's antennas at this site would not exceed the RF emissions standard adopted by the Federal Communications Commission ("FCC"). Included in the EME report of this filing are the approximation tables that demonstrate that Dish's proposed facility will operate well within the FCC RF emissions safety standards.

3. Under ordinary operating conditions, the proposed installation would not require the use of any water or sanitary facilities and would not generate air emissions or discharges to water bodies or sanitary facilities. After construction is complete the proposed installations would not generate any increased traffic to the Crown Castle facility other than periodic maintenance. The proposed shared use of the Crown Castle tower, would, therefore, have a minimal environmental effect, and is environmentally feasible.

D. Economic Feasibility. As previously mentioned, Dish has entered into an agreement with Crown Castle for the shared use of the existing facility subject to mutually agreeable terms. The proposed tower sharing is, therefore, economically feasible. (Please see included authorization.)

E. Public Safety Concerns. As discussed above, the tower is structurally capable of supporting Dish's full array of three (3) panel antennas, eight (8) RRUs, three (3) antenna mounts, one (1) hybrid fiber lines and all related equipment. Dish is not aware of any public safety concerns relative to the proposed sharing of the existing Crown Castle tower.

Conclusion

For the reasons discussed above, the proposed shared use of the existing Crown Castle tower at 467 South Quaker Lane satisfies the criteria stated in C.G.S. §16-50aa and advances the General Assembly's and the Council's goal of preventing the unnecessary proliferation of towers in Connecticut. The Applicant, therefore, respectfully requests that the Council issue an order approving the prosed shared use.

Sincerely,

Anne Marie Zsamba, Esq.
Real Estate Specialist
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
(201) 236-9224
AnneMarie.Zsamba@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)

Copies to:

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

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

Church of Saint Marks the Evangelist Corp.
1088 New Britain Avenue
West Hartford, CT 06110-2426

ORIGIN ID:GFLA (518) 373-3523
WILL STONE
CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 07FEB19
ACTWGT: 1.20 LB
CAD: 104924194/INET4100

BILL SENDER

TO **MR. MARK MCGOVERN**
TOWN OF WEST HARTFORD
DIRECTOR COMMUNITY DEVELOPMENT
50 SOUTH MAIN STREET
WEST HARTFORD CT 06107
(201) 236-9224 REF: 1734.7680
INV:
PO: DEPT:

565J2/0E3D/23AD

J191019010701uv

TRK# 0201 **7744 1241 2342**

FRI - 08 FEB 10:30A
PRIORITY OVERNIGHT

EB KXAA

06107
CT-US **BDL**

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
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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.

ORIGIN ID:GFLA (518) 373-3523
WILL STONE
CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 07FEB19
ACTWGT: 1.20 LB
CAD: 104924194/INET4100

BILL SENDER

TO **THE HONORABLE SHARI CANTOR**
TOWN OF WEST HARTFORD
50 SOUTH MAIN STREET

WEST HARTFORD CT 06107
(201) 236-9224 REF: 1734.7680
INV:
PO: DEPT:

565J20E3D/23AD

FedEx Express

J191019010701ur

FRI - 08 FEB 10:30A
PRIORITY OVERNIGHT

TRK# 0201 **7744 1240 2010**

EB KXAA

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SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 07FEB19
ACTWGT: 1.20 LB
CAD: 104924194/INET4100

BILL SENDER

TO CHURCH OF ST. MARKS THE EVANGELIST
1088 NEW BRITAIN AVE
WEST HARTFORD CT 06110
(518) 373-3543 REF: 1734.7680
INV:
PO: DEPT:

565J2/0E3D/23AD

FedEx Express

J191019010701uv

TRK# 0201 7744 1243 1874

FRI - 08 FEB 10:30A
PRIORITY OVERNIGHT

EB KXAA

06110
CT-US BDL

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CROWN CASTLE

3530 Toringdon Way Suite 300
Charlotte, NC 28277

Phone: (704) 405-6565
www.crowncastle.com

November 21, 2018

SAINT GIANNA (BERETTA MOLLA) PARISH CORP
1088 NEW BRITAIN AVENUE
WEST HARTFORD, CT 06110-2426

RE: Letter of Authorization
Site ID: 829013
Site Name: WEST HARTFORD/I-84/X43
Site Address: 467 South Quaker Lane (Church of St. Mar k), West Hartford, CT 06110

Dear SAINT GIANNA (BERETTA MOLLA) PARISH CORP:

DISH NETWORK has proposed adding (3) antennas, adding (5) RRU's, and adding (12) lines.

Please allow this letter to serve as notification that DISH NETWORK has contracted with T-MOBILE USA TOWER LLC (a subsidiary of Crown Castle) to provide services related to local government zoning and permitting. T-MOBILE USA TOWER LLC is working with DISH NETWORK to manage this process.

This letter of authorization is required by CT - TOWN OF WEST HARTFORD for DISH NETWORK to apply for its building permit/zoning approvals which are required for the modification of their existing telecommunications equipment.

This letter neither overrides nor changes your current lease with T-MOBILE USA TOWER LLC.

Please execute this letter of authorization where indicated below, thus granting your authorization for this application and send the original to Sean Dempsey using the self-addressed, stamped, envelope included in this mailing, or the email listed below.

Thank you for your continued cooperation with T-MOBILE USA TOWER LLC.

Sincerely,

Sean Dempsey
Real Estate Specialist
Phone: (704) 405-6565 / E-mail: Sean.Dempsey@crowncastle.com

Approved By:

Name: JOSEPH DEVINE
Date: 29 NOVEMBER 2018
Signature: Joseph Devine
Print Name: JOSEPH DEVINE

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.

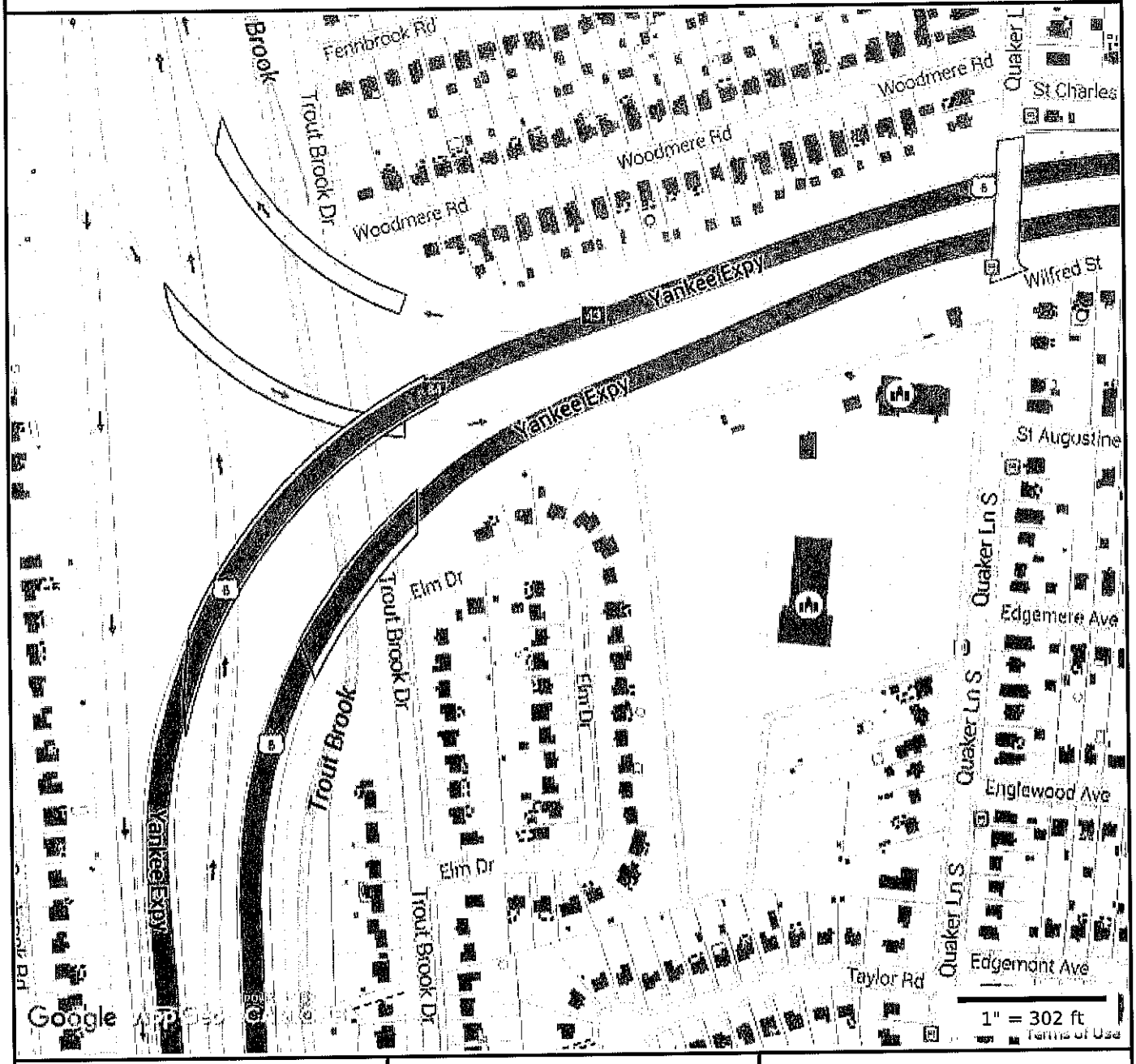
Very truly yours,

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
455 QUAKER LANE SOUTH	1 No	2 Yes		1 No
WEST HARTFORD, CT 06110				1 No
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)	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)

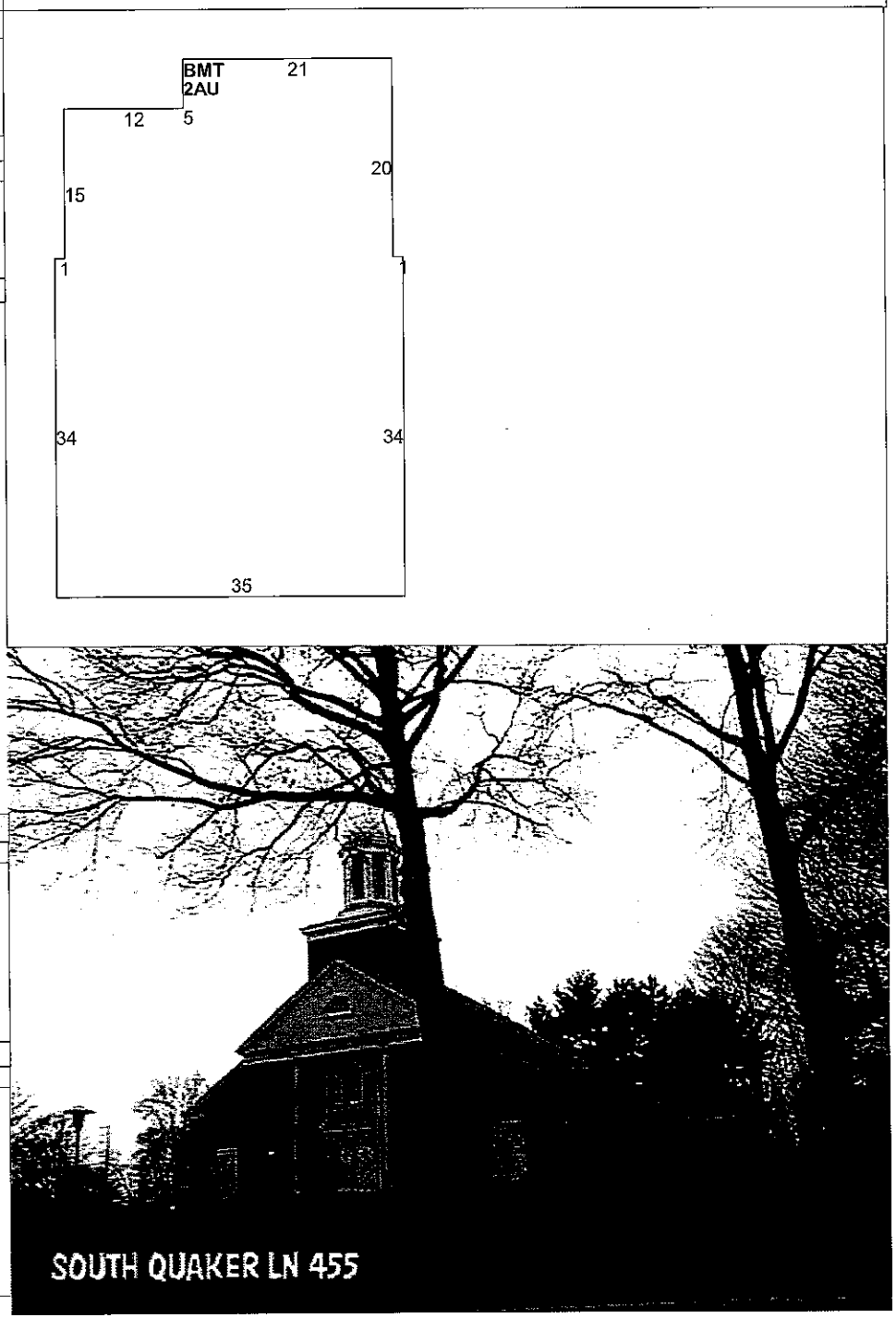
Element	Cd.	Ch.	Description
FBLA			
Int Condition	03		Typical
Attic Access	03		
Dormer LF			

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

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				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
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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)	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	CHU1		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	CMPS		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	CHU1		
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)

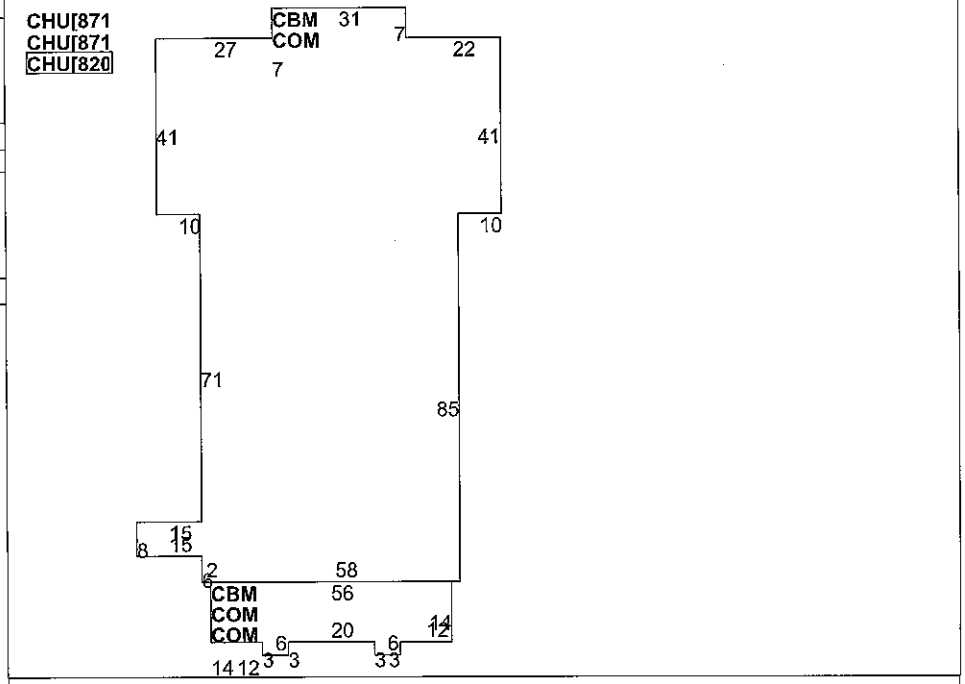
Element	Cd.	Ch.	Description

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 EVANGI	4 Rolling	2 Yes	5 Not Heavy	2 Typical
	1 No	2 Yes		1 No
				1 No

455 QUAKER LANE SOUTH

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	CMPS		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)

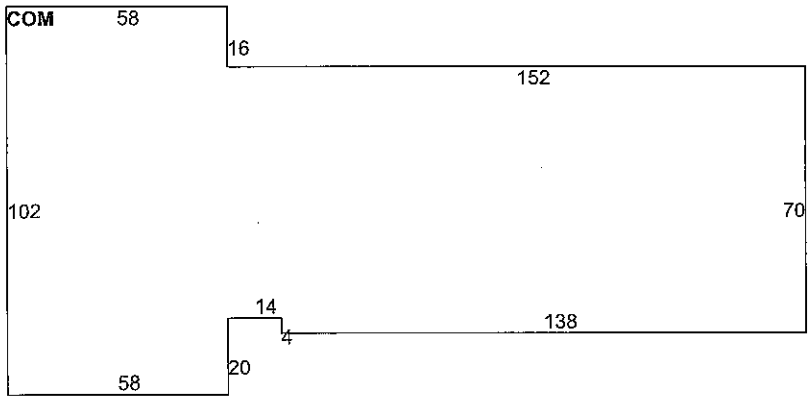
Element	Cd.	Ch.	Description

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 Obsinc	
External Obsinc	
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			

DISH WIRELESS FIRST TIME INSTALL
CONSTRUCTION DRAWINGS

DISH WIRELESS SITE ID:

CT0100003A

TOWER OWNER SITE ID:

829013

SITE ADDRESS:

467 SOUTH QUAKER LANE (CHURCH OF ST. MARK)
WEST HARTFORD, CT 06110
(HARTFORD COUNTY)

SITE SUMMARY

PROJECT SCOPE:	PROJECT CONSISTS OF INSTALLING PROPOSED DISH WIRELESS TELECOMMUNICATION EQUIPMENT, CABLING, AND ANTENNAS AT AN EXISTING TELECOMMUNICATION SITE
SITE TYPE:	CO-LOCATION
TYPE OF OCCUPANCY:	TELECOMMUNICATIONS
TOWER TYPE:	MONOPOLE
TOWER HEIGHT:	120.0'
RAD CENTER:	90.0'
TOWER LATITUDE:	41° 44' 55.59" N (41.748775°)
TOWER LONGITUDE:	-72° 43' 52.86" W (-72.731350°)
ZONING JURISDICTION:	CITY OF WEST HARTFORD
COUNTY:	HARTFORD COUNTY
PARCEL NUMBER:	5096 1 471 0002
ZONING DISTRICT:	R-6
POWER COMPANY:	EVERSOURCE ENERGY 888-544-4826
TELEPHONE COMPANY:	AT&T 866-620-6000

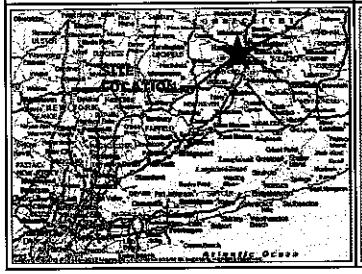
PROJECT DIRECTORY

TOWER OWNER:	CROWN CASTLE 2000 CORPORATE DRIVE CANONSBURG, PA 15317 724-416-2000
APPLICANT:	DISH WIRELESS 9601 S MERIDIAN BLVD ENGLEWOOD, CO 80112 PHONE: (866) 624-6874
SITE DESIGNER:	PM&A 1000 HOLCOMB WOODS PKWY, SUITE 210 ROSWELL, GA 30076 CONTACT: MENDY BENSON PHONE: 678-280-2325

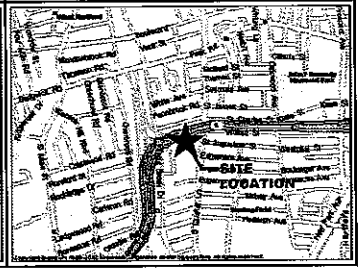
GENERAL NOTES

THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION, THEREFORE HANDICAP ACCESS IS NOT REQUIRED. A TECHNICIAN WILL VISIT THE SITE AS REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE; NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE IS PROPOSED.

VICINITY MAP



LOCAL MAP



CODE COMPLIANCE

ALL WORK AND MATERIALS SHALL BE PERFORMED AND 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 THE LATEST EDITIONS OF THE FOLLOWING:

- 2012 INTERNATIONAL BUILDING CODE
- 2012 INTERNATIONAL RESIDENTIAL CODE
- 2012 INTERNATIONAL ENERGY CONSERVATION CODE
- 2012 INTERNATIONAL PLUMBING CODE
- 2012 INTERNATIONAL MECHANICAL CODE
- 2017 NATIONAL ELECTRIC CODE
- 2012 INTERNATIONAL FIRE CODE
- ANSI/TIA/EIA-222-G
- FAA COMPLIANCE
- FCC COMPLIANCE

DISH WIRELESS PROJECT MANAGER APPROVAL:

SIGNATURE DATE

CONSTRUCTION MANAGER APPROVAL:

SIGNATURE DATE

LEASING/SITE ACQUISITION:

SIGNATURE DATE

RF ENGINEER:

SIGNATURE DATE

LANDLORD/TOWER OWNER APPROVAL:

SIGNATURE DATE

SHEET INDEX

SHEET NO.	DESCRIPTION	REV	DATE
T-1	TITLE SHEET	0	01/14/19
GN-1	GENERAL NOTES	0	01/14/19
GN-2	GENERAL NOTES	0	01/14/19
EN-1	ELECTRICAL NOTES	0	01/14/19
EN-2	ELECTRICAL NOTES	0	01/14/19
C-1	COMPOUND PLAN	0	01/14/19
C-2	EQUIPMENT PLAN	0	01/14/19
C-3	TOWER ELEVATION AND ANTENNA LAYOUT	0	01/14/19
C-3.1	ANTENNA MOUNT (SUPPLEMENTAL)	0	01/14/19
1 OF 2	ANTENNA SCHEDULE & DIAGRAM (SUPPLEMENTAL)	0	01/14/19
2 OF 2	CABLE COLOR CODE (SUPPLEMENTAL)	0	01/14/19
C-4	EQUIPMENT DETAILS	0	01/14/19
C-5	EQUIPMENT DETAILS (SUPPLEMENTAL)	0	01/14/19
C-6	CIVIL DETAILS	0	01/14/19
C-7	CIVIL DETAILS	0	01/14/19
C-8	PLATFORM DETAILS (SUPPLEMENTAL)	0	01/14/19
C-8.1	PLATFORM CANOPY DETAILS (SUPPLEMENTAL)	0	01/14/19
E-1	UTILITY PLAN	0	01/14/19
E-2	ELECTRICAL DETAILS	0	01/14/19
G-1	GROUNDING NOTES AND DETAILS	0	01/14/19
G-2	GROUNDING NOTES AND DETAILS	0	01/14/19
G-3	GROUNDING NOTES AND DETAILS	0	01/14/19
RF-1	RF DATA SHEET (SUPPLEMENTAL)	0	01/14/19
RF-2	PLUMBING DIAGRAM (SUPPLEMENTAL)	0	01/14/19

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STATE OF CONNECTICUT · SHAWN M. SMILEY · PEN.0032757 · LICENSED PROFESSIONAL ENGINEER

1/28/2019

PLANS PREPARED FOR: dish WIRELESS

PROJECT MANAGER: CROWN CASTLE

PLANS PREPARED BY: PM&A P. MARSHALL & ASSOCIATES

DRAWN BY:	JDJ
CHECKED BY:	MSB
APPROVED:	

SUBMITTALS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR REVIEW	12/07/18	JDJ	A
ISSUED FOR CONSTRUCTION	01/14/19	JDJ	0

PM&A PROJECT NUMBER: CCD18-021

DISH WIRELESS SITE ID: CT0100003A

TOWER OWNER SITE ID: 829013

SITE ADDRESS: 467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

SHEET DESCRIPTION: TITLE SHEET

SHEET NUMBER: T-1.0

GENERAL NOTES:

1. EVERY EFFORT HAS BEEN MADE IN THE CONSTRUCTION DOCUMENTS TO PROVIDE A COMPLETE SCOPE OF WORK. MINOR DISCREPANCIES IN THE DRAWINGS AND/OR SPECIFICATIONS SHALL NOT EXCUSE CONTRACTORS FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.

2. ALL REFERENCES TO OWNER HEREIN SHALL BE CONSTRUED TO MEAN THE CARRIER OR ITS DESIGNATED REPRESENTATIVE.

3. BIDDING REQUIREMENTS
   a. PRIOR TO THE SUBMISSION OF BIDS, VISIT THE JOB SITE TO BECOME FAMILIAR WITH ALL CONDITIONS AFFECTING THE PROPOSED PROJECT. VISIT THE SITE WITH THE CONSTRUCTION DOCUMENTS TO VERIFY FIELD DIMENSIONS AND CONDITIONS TO CONFIRM THAT THE PROJECT WILL BE ACCOMPLISHED AS SHOWN.
   b. PROVIDE NOTIFICATION TO OWNER IN WRITING OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO SUBMISSION OF PRICE PROPOSAL. IN THE EVENT OF DISCREPANCIES, PRICE THE MORE COSTLY OR EXTENSIVE WORK, UNLESS DIRECTED OTHERWISE.
   c. WHEN TOWER IS OWNED BY A THIRD PARTY, CONTACT TOWER OWNER REPRESENTATIVE FOR PARTICIPATION IN BID WALK.
   d. WHERE ANCHORING TO A CONCRETE ROOF SLAB, CONFIRM (PRIOR TO SUBMITTING BID) THE PRESENCE OF POST TENSION TENDONS. INCLUDE PROVISIONS FOR X-RAY PROCEDURES TO LOCATE THE TENDONS PRIOR TO CONSTRUCTION.

4. DRAWINGS ARE NOT TO BE SCALED. WRITTEN DIMENSIONS TAKE PRECEDENCE. CONSTRUCTION DOCUMENTS ARE INTENDED FOR DIAGRAMMATIC PURPOSES ONLY, UNO.

5. FIELD VERIFY ALL DIMENSIONS, ELEVATIONS AND EXISTING CONDITIONS PRIOR TO BEGINNING ANY MATERIALS ORDERING, FABRICATION OR CONSTRUCTION WORK ON THIS PROJECT. BRING ANY DISCREPANCIES IMMEDIATELY TO THE ATTENTION OF THE OWNER AND RESOLVE BEFORE PROCEEDING WITH THE WORK.

6. FURNISH ALL MATERIALS, EQUIPMENT, LABOR, AND ANY REQUIREMENTS NECESSARY TO COMPLETE PROJECT AS DESCRIBED IN THE CONSTRUCTION DOCUMENTS AND CONSTRUCTION SOW.

7. SUPERVISE AND DIRECT THE PROJECT DESCRIBED IN THE CONSTRUCTION DOCUMENTS. PROVIDE ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.

8. ALL WORK PERFORMED ON THE PROJECT AND MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES APPLICABLE TO THE WORK.

9. CONSTRUCTION COORDINATION REQUIREMENTS
   a. NOTIFY OWNER OF ANY DISCREPANCIES PRIOR TO START OF WORK.
   b. OBTAIN ALL PERMITS. SCHEDULE AND COORDINATE ALL INSPECTIONS.
   c. PROVIDE, AT THE PROJECT SITE, A FULL, CURRENT SET OF CONSTRUCTION DOCUMENTS FOR USE BY ALL PERSONNEL INVOLVED WITH THE PROJECT.
   d. RECEIVE WRITTEN AUTHORIZATION TO PROCEED WITH CONSTRUCTION PRIOR TO STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED BY THE CONSTRUCTION DOCUMENTS.
   e. PERFORM WORK DURING OWNER'S PREFERRED HOURS TO AVOID DISTURBING NORMAL BUSINESS.
   f. PROVIDE FALL PROTECTION IN ACCORDANCE WITH FEDERAL, STATE, LOCAL, AND OWNER REQUIREMENTS.
   g. IF FAA LIGHTING AND MARKING IS PRESENT ON SITE AND IS POWERED BY ELECTRICAL SERVICE THAT IS TO BE INTERRUPTED, MAINTAIN THE NECESSARY LIGHTS DURING CONSTRUCTION AND NOTIFY THE PROPER AUTHORITIES IN THE EVENT OF A DISRUPTION.
   h. PROVIDE A PORTABLE FIRE EXTINGUISHER WITH A RATING OF NOT LESS THAN 2-A OR 2-A10BC WITHIN 75 FEET TRAVEL DISTANCE TO ALL PORTIONS OF PROJECT AREA DURING CONSTRUCTION.
   i. STRUCTURAL COMPONENTS OF ADJACENT FACILITIES SHALL NOT BE ALTERED BY THIS CONSTRUCTION PROJECT, UNO. ENSURE THAT EXCAVATION DOES NOT AFFECT ADJACENT STRUCTURES.
   j. SEAL ALL PENETRATIONS THROUGH FIRE-RATED AREAS WITH U.L. LISTED OR FIRE MARSHALL-APPROVED MATERIALS, IF APPLICABLE.
   k. BURIED UTILITIES MAY EXIST IN THE AREA AND UTILITY INFORMATION SHOWN MAY NOT BE COMPLETE. CONTACT THE UTILITY LOCATE SERVICE A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION.
   l. COORDINATE ALL POWER INSTALLATION WITH POWER COMPANY AS REQUIRED. REPORT POWER INSTALLATION COORDINATION SOLUTION(S) TO OWNER.
   m. PROTECT EXISTING IMPROVEMENTS, EASEMENTS, PAVING, CURBING, ETC. DURING CONSTRUCTION. UPON COMPLETION OF WORK, REPAIR ANY DAMAGE THAT MAY HAVE OCCURRED DUE TO CONSTRUCTION ON OR ABOUT THE PROPERTY.
   n. KEEP GENERAL WORK AREA CLEAN AND HAZARD FREE DURING CONSTRUCTION AND DISPOSE OF ALL DIRT, DEBRIS, AND RUBBISH. REMOVE EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY OR PREMISES. SITE SHALL BE LEFT IN CLEAN CONDITION AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE.
   o. MAINTAIN THE INTEGRITY OF THE BUILDING ENVELOPE AND CONSTRUCT BARRIERS IN THE AREA OF WORK TO PREVENT DAMAGE FROM WEATHER AS WELL AS FROM CONSTRUCTION DUST AND DEBRIS.

10. INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO MANUFACTURER'S SPECIFICATIONS, UNO, OR WHERE LOCAL CODES OR ORDINANCES DIRECT OTHERWISE.

11. PROPOSED CELLULAR EQUIPMENT AND FIXTURES WILL BE FURNISHED BY OWNER AND INSTALLED BY CONTRACTOR, UNLESS NOTED OTHERWISE.

12. ANY SUBSTITUTIONS OF MATERIALS AND/OR EQUIPMENT, MUST BE APPROVED BY OWNER.

13. DOCUMENT ALL CHANGES MADE IN THE FIELD BY MARKING UP THE APPROVED CONSTRUCTION DRAWINGS AND SUBMITTING THE REDLINED SET TO OWNER UPON COMPLETION. DOCUMENT ALL WORK PERFORMED WITH PHOTOGRAPHS TO BE SUBMITTED WITH REDLINED CONSTRUCTION DRAWINGS.

14. PROVIDE SUPPORTS FOR CABLES TO THE ELEVATION OF ALL INITIAL AND FUTURE ANTENNAS IN ACCORDANCE WITH ALL MANUFACTURER'S REQUIREMENTS.

15. CONFIRM THAT THE REQUIREMENTS OF THE STRUCTURAL ANALYSIS, MOUNT ANALYSIS AND ANY ASSOCIATED MODIFICATIONS HAVE BEEN FOLLOWED AND COMPLETED AS REQUIRED TO SUPPORT THE EQUIPMENT ASSOCIATED WITH THIS PROJECT.

16. KNOW AND OBSERVE MANUFACTURER'S MINIMUM BEND RADIUS SPECIFICATIONS BEFORE HANDLING HYBRID CABLES, RF CABLES, AND FIBER OPTIC LINES.

17. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS STIPULATED IN THE CONSTRUCTION SCOPE OF WORK CONTRACT, REGARDLESS OF INCLUSION OR OMISSION FROM THE CONSTRUCTION DRAWING(s).

18. ADHERENCE TO CONSTRUCTION DOCUMENTS AND CONSTRUCTION SOW ARE TO BE FOLLOWED.

ABBREVIATIONS

A/C	AIR CONDITIONING
AFF	ABOVE FINISHED FLOOR
AGL	ABOVE GROUND LEVEL, ABOVE GRADE LEVEL
AWS	ADVANCED WIRELESS SERVICE
BBU	BATTERY BACKUP UNIT
BLDG	BUILDING
BLK	BLOCKING
CLG	CEILING
CLR	CLEAR
CONC	CONCRETE
CONT	CONTINUOUS
D	DEPTH
DBL	DOUBLE
DEG	DEGREE
ø, DIA	DIAMETER
DIAG	DIAGONAL
DN	DOWN
DET	DETAIL
DWG	DRAWING
E	EXISTING
EA	EACH
ELEV, EL	ELEVATION
ELEC	ELECTRICAL
EQ	EQUAL
EQUIP	EQUIPMENT
EXT	EXTERIOR
FIF	FIBER INTERFACE FRAME, FACILITY INTERFACE FRAME
FIN	FINISH
FLUOR	FLUORESCENT
FLR	FLOOR
FT	FOOT, FEET
GA	GAUGE
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GRND	GROUND
GSM	GLOBAL SYSTEM MOBILE
GYP	GYPSUM BOARD
HORZ	HORIZONTAL
HR	HOUR
HT	HEIGHT
ID	INSIDE DIAMETER
IN	INCH, INCHES
INSUL	INSULATION
INT	INTERIOR
L	LENGTH
LBS	POUNDS
LTE	LONG TERM EVOLUTION
MAX	MAXIMUM
MECH	MECHANICAL
MTL	METAL
MFR	MANUFACTURER
MGR	MANAGER
MIMO	MULTIPLE IN MULTIPLE OUT
mMIMO	MASSIVE MULTIPLE IN MULTIPLE OUT
MIN	MINIMUM
MISC	MISCELLANEOUS
NA	NOT APPLICABLE
NIC	NOT IN CONTRACT
NO	NUMBER
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
PCS	PERSONAL COMMUNICATION SERVICE
PDU	POWER DISTRIBUTION UNIT
PROJ	PROJECT
PROP	PROPERTY
PT	PRESSURE TREATED
PVC	POLYVINYL CHLORIDE
REQ	REQUIRED
RF	RADIO FREQUENCY
RM	ROOM
RO	ROUGH OPENING
RRH	REMOTE RADIO HEAD
SHT	SHEET
SIM	SIMILAR
SPEC	SPECIFICATION
SF	SQUARE FOOT
SS	STAINLESS STEEL
STL	STEEL
SUSP	SUSPENDED
TMA	TOWER MOUNTED AMPLIFIER
TND	TINNED
TYP	TYPICAL
UMTS	UNIVERSAL MOBILE TELECOMMUNICATION SERVICE
UNO	UNLESS NOTED OTHERWISE
VERT	VERTICAL
W/	WITH
W/O	WITHOUT
WCS	WIRELESS COMMUNICATION SERVICE
WP	WATER PROOF

SCOPE OF WORK

SCOPE/STATE OF WORK SUMMARY SHOULD INCLUDE THE FOLLOWING:
ALL PURPOSED EQUIPMENT INDICATED IN DRAWINGS IS FOR AN UNMANNED TRANSMISSION FACILITY FOR TELECOMMUNICATIONS WIRELESS SERVICE. THIS IS NOT AN ALL-INCLUSIVE LIST. CONTRACTOR SHALL UTILIZE SPECIFIED EQUIPMENT PART OR ENGINEER APPROVE EQUIVALENT. CONTRACTOR SHALL VERIFY ALL NEEDED EQUIPMENT TO PROVIDE A FUNCTIONAL SITE. THE PROJECT GENERALLY CONSISTS OF THE FOLLOWING:

- INSTALL (3) PROPOSED PANEL ANTENNAS (1 PER SECTOR) (ERICSSON BUILD)
- INSTALL (3) NEW RET's (NOKIA BUILD ONLY)
- INSTALL (3) PROPOSED ANTENNA MOUNTS & ASSOCIATED JUMPERS (1 PER SECTOR)
- INSTALL (8) PROPOSED RRUs AND ASSOCIATED JUMPERS
- INSTALL (1) PROPOSED HYBRID CABLE. UP TO (3) HYBRID CABLES (ROOFTOP)
- INSTALL (1) PROPOSED CABLE LADDER FOR HYBRID SUPPORT (IF APPLICABLE)
- INSTALL (1) PROPOSED METAL PLATFORM w/ CANOPY (IF APPLICABLE) FOR GROUND EQUIPMENT OR CONCRETE PAD (PER DESIGN)
- INSTALL (1) PROPOSED ICE BRIDGE OR 4" RMC ON 4" CONCRETE SLEEPERS (PER DESIGN)
- INSTALL (1) PROPOSED BATTERY BACKUP SYSTEM IN CABINET
- INSTALL (1) PROPOSED PPC CABINET MOUNTED TO NEW H-FRAME
- INSTALL (1) PROPOSED SURGE SUPPRESSION DEVICE
- INSTALL (1) PROPOSED EQUIPMENT CABINET
- INSTALL (1) PROPOSED RBS CHASSIS IN PROPOSED EQUIPMENT CABINET
- INSTALL (1) PROPOSED BASEBAND UNIT IN PROPOSED RBS CHASSIS
- INSTALL (1) PROPOSED POWER CONDUIT FROM PLATFORM TO MEET-ME-POINT DESIGNATED BY POWER COMPANY
- INSTALL (1) PROPOSED METER BASE FOR POWER METER ON NEW H-FRAME
- INSTALL (1) PROPOSED TELCO CONDUIT FROM PLATFORM TO MEET-ME-POINT DESIGNATED BY TELCO PROVIDER
- INSTALL (1) PROPOSED NEMA4 TELCO-FIBER BOX MOUNTED TO NEW H-FRAME
- INSTALL (1) PROPOSED GPS ANTENNA WITH CABLE IN CONDUIT
- INSTALL (1) PROPOSED DISH WIRELESS (3'-0"ø) DISH ANTENNA FACING SOUTH ON PROPOSED PIPE MAST
- INSTALL (1) PROPOSED PIPE MAST FOR DISH ANTENNA

THE SIZE, HEIGHT AND DIRECTIO NOF ALL ANTENNAS SHALL BE ADJUSTED TO MEET SYSTEM REQUIREMENT DEPICTED BY THE LATEST APPROVED RFDS.

PROJECT NOTES

1. THE FOLLOWING INFORMATION HAS BEEN PROVIDED BY DISH WIRELESS FOR THIS PROJECT AND HAS NOT BEEN FIELD VERIFIED AS PART OF THIS PROJECT.
   a. EXISTING TOWER, MOUNT AND EQUIPMENT ELEVATIONS
   b. DESIGN PACKAGE BASED ON THE APPLICATION #: 468466

2. A STRUCTURAL ANALYSIS TO DETERMINE THE TOWER CAPACITY TO SUPPORT THE PROPOSED EQUIPMENT WAS PERFORMED FOR DISH WIRELESS OUTSIDE THE SCOPE OF THIS PROJECT.
   a. STRUCTURAL ANALYSIS BY: UNAVAILABLE
   b. DATED: ---
   c. RESULTS ---

3. CONFIRM THAT THE REQUIREMENTS OF THE STRUCTURAL ANALYSIS AND ANY ASSOCIATED MODIFICATIONS HAVE BEEN FOLLOWED AND COMPLETED AS REQUIRED TO SUPPORT THE EQUIPMENT ASSOCIATED WITH THIS PROJECT.

1/28/2019

PLANS PREPARED FOR:
dish WIRELESS

PROJECT MANAGER:
CROWN CASTLE

PLANS PREPARED BY:
PM&A
P. MARSHALL & ASSOCIATES

DRAWN BY:	JDJ
CHECKED BY:	MSB
APPROVED:	

SUBMITTALS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR REVIEW	12/07/18	JDJ	A
ISSUED FOR CONSTRUCTION	01/14/19	JDJ	0

PM&A PROJECT NUMBER:
CCD18-021

DISH WIRELESS SITE ID:
CT0100003A

TOWER OWNER SITE ID:
829013

SITE ADDRESS:
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

SHEET DESCRIPTION:
GENERAL NOTES

SHEET NUMBER:
GN-1

SITE NOTES:

1. WHEN SITE WORK IS INCLUDED IN SCOPE:
   a. CLEAR AND GRUB SITE OF ALL VEGETATION, PAVING, GRAVEL BASE AND OTHER DEBRIS NOT TO REMAIN. SUBGRADES ARE TO BE SET PRIOR TO LANDSCAPE INSTALLATION.
   b. PROVIDE ELEVATION OF SUBGRADE WITHIN 0.10 FOOT OF ELEVATIONS SHOWN ON PLAN MINUS DEPTH OF TOPSOIL, FILL, AND MULCH.
   c. ROUGH GRADE ALL AREAS WITHIN 1 FOOT OF ELEVATIONS INDICATED BEFORE PLANTING. PROVIDE POSITIVE DRAINAGE AWAY FROM EQUIPMENT SLABS, BUILDINGS AND THROUGH ALL PLANTER AREAS TO AVOID LOW SPOTS AND STANDING WATER.
   d. BLEND NEW GRADES NATURALLY INTO EXISTING GRADES.
   e. MAINTAIN POSITIVE DRAINAGE ON THE SITE AT ALL TIMES.
   f. IF REQUIRED, MAINTAIN CONTINUOUS EROSION CONTROL ON THE DOWNSTREAM SIDE OF THE SITE.
   g. IN LANDSCAPE AREAS, FINISH GRADES ARE TO FOLLOW THE GRADES AND EDGE DETAILS INDICATED AND BE MOUNDED 6 INCHES IN THE CENTER OF THE BED ABOVE THE EDGE OF THE LANDSCAPE AREA.
   h. DO NOT PLACE FILL OR EMBANKMENT MATERIAL ON FROZEN GROUND. DO NOT PLACE FROZEN MATERIALS, SNOW OR ICE IN ANY FILL OR EMBANKMENT.
   i. NOTIFY OWNER IF MODIFICATIONS TO THE PROPOSED GRADING SEEM NECESSARY AND OBTAIN APPROVAL PRIOR TO START OF WORK.
2. FOOTINGS SHALL BEAR ON FIRM, NATURAL, UNDISTURBED SOIL, OR ON ENGINEERED FILL (COMPACTED TO 95% ASTM D1557). ENSURE THAT EXCAVATIONS ARE FREE OF ORGANIC MATERIAL, DEBRIS, OR OTHER FOREIGN MATERIAL. NOTIFY OWNER IF ANY UNUSUAL CONDITIONS ARE ENCOUNTERED.
3. FILL AND SLAB BASE MATERIAL SHALL BE 3/4" MINUS CRUSHED ROCK PLACED IN 8" (MAXIMUM) LOOSE LIFTS AND COMPACTED TO 98% ASTM D1557.

CONCRETE NOTES:

1. CONCRETE AND REINFORCING SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:

CONCRETE CONSTRUCTION	ACI 318, f'c=4 KSI, UNO
CEMENT	ASTM C150, PORTLAND CEMENT TYPE II, UNO
REINFORCING STEEL	ASTM A615 (INCLUDING SUPPLEMENT S1), GRADE 60, fy=60 KSI, UNO
WELDED WIRE FABRIC	ASTM A185
SPIRAL REINFORCEMENT	ASTM A615, GRADE 60, fy=60 KSI
ANCHOR BOLTS	ASTM A307
GRADE 60 REBAR WELDING	ASTM A706

   NOTES: ANY BARS SO NOTED ON THE DRAWINGS SHALL BE GRADE 60, fy=60 KSI. REINFORCING COMPLYING WITH ASTM A615(S1) MAY BE WELDED ONLY IF MATERIAL PROPERTY REPORTS INDICATING CONFORMANCE WITH WELDING PROCEDURES SPECIFIED IN A.W.S. D1.4 ARE SUBMITTED.

2. CONCRETE PROTECTION (COVER) FOR REINFORCING STEEL SHALL BE AS FOLLOWS:

FOOTINGS AND OTHER UNFORMED SURFACES, EARTH FACE		3"
FORMED SURFACES EXPOSED TO EARTH OR WEATHER	(≥ #6 BARS)	2"
FORMED SURFACES EXPOSED TO EARTH OR WEATHER	(≤ #5 BARS)	1 1/2"
SLABS AND WALLS	(INTERIOR FACE)	3/4"

3. AIR ENTRAIN ALL CONCRETE WITH SURFACES EXPOSED TO WEATHER WITH AN AIR-ENTRAINING AGENT CONFORMING TO ASTM C260, C494, C618, C989 AND C1017. AIR ENTRAIN CONCRETE EXPOSED TO FREEZING AND THAWING WHILE MOIST IN ACCORDANCE WITH ACI 318, SECTION 4.4.1.
4. DETAIL REINFORCING STEEL (INCLUDING HOOKS AND BENDS) IN ACCORDANCE WITH ACI 315 AND 318. LAP ALL CONTINUOUS REINFORCEMENT AT LEAST 30 BAR DIAMETERS OR A MINIMUM OF 2'-0". PROVIDE CORNER BARS AT ALL WALL AND FOOTING INTERSECTIONS. LAP CORNER BARS AT LEAST 30 BAR DIAMETERS OR A MINIMUM OF 2'-0". LAP ADJACENT MATS OF WELDED WIRE FABRIC A MINIMUM OF 8" AT SIDES AND ENDS.
5. PERFORM WELDING OF GRADE 60 REINFORCING BARS (IF REQUIRED) USING LOW HYDROGEN ELECTRODES. PERFORM WELDING OF GRADE 40 REINFORCING BARS (IF REQUIRED) USING E70 XX ELECTRODES. DO NOT WELD WITHIN 4" OF COLD BENDS IN REINFORCING STEEL.
6. DO NOT FIELD BEND REINFORCING PARTIALLY EMBEDDED IN CONCRETE UNLESS SPECIFICALLY SO DETAILED OR APPROVED BY THE ENGINEER.
7. SUPPORT BARS ON CHAIRS OR DOBIE BRICKS.
8. FURNISH NON-SHRINK GROUT BY AN APPROVED MANUFACTURER. MIX AND PLACE IN STRICT ACCORDANCE WITH THE MANUFACTURER'S PUBLISHED RECOMMENDATIONS. GROUT STRENGTH SHALL BE AT LEAST EQUAL TO THE MATERIAL ON WHICH IT IS PLACED (4 KSI, MINIMUM).
9. ALL EXPANSION ANCHORS TO BE HILTI BRAND, UNO. TEST ADHESIVE ANCHORS TO CONFIRM CAPACITY UNLESS WAIVED BY ENGINEER AND LOCAL JURISDICTION.

STRUCTURAL STEEL NOTES:

1. STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:

WIDE FLANGE SHAPES	ASTM A992, GRADE 50
SHAPES, PLATES, ANGLES, & RODS	ASTM A36, Fy 36 KSI
SPECIAL SHAPES AND PLATES	ASTM A572, Fy 50 KSI
PIPE COLUMNS	ASTM A53, GR B, Fy 35 KSI
STRUCTURAL TUBING	ASTM A500, GR B, Fy 46KSI
ANCHOR BOLTS	ASTM A307
CONNECTION BOLTS	ASTM A325 TWIST-OFF

2. BASE STRUCTURAL STEEL DESIGN, FABRICATION AND ERECTION (INCLUDING FIELD WELDING, HIGH STRENGTH FIELD BOLTING, EXPANSION BOLTS, AND THREADED EXPANSION ANCHORS) ON THE AISC "SPECIFICATION FOR THE DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS" LATEST EDITION.
3. HOT DIP GALVANIZE AFTER FABRICATION PER A123/A123M-00 ALL STEEL EXPOSED TO WEATHER AND WHERE NOTED.
4. CONFORM TO ALL AISC AND AWS STANDARDS FOR WELDING. PERFORM WELDING BY ANSI/AWS D1.1 CERTIFIED WELDERS USING E70 XX ELECTRODES. USE ONLY PRE-QUALIFIED WELDS AS DEFINED BY AWS.
5. PROVIDE COLD-FORMED STEEL FRAMING MEMBERS OF THE SHAPE, SIZE, AND GAUGE SHOWN ON THE PLANS. PROVIDE MINIMUM SECTION PROPERTIES INDICATED. ALL COLD-FORMED STEEL FRAMING SHALL CONFORM TO THE AISI "SPECIFICATION FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS."
6. FOR BOLTED CONNECTIONS, USE 3/4" DIA., BEARING-TYPE, A325 BOLTS WITH A MINIMUM OF TWO BOLTS, UNO.
7. FOR NON-STRUCTURAL CONNECTIONS FOR STEEL GRATING, USE 5/8" DIA. A307 BOLTS, UNO.
8. PREPARE AND PAINT IN ACCORDANCE WITH THE PAINT MANUFACTURERS WRITTEN INSTRUCTIONS, UNO.
9. TOUCH UP ALL FIELD DRILLING, WELDING AND CUT SURFACES WITH 2 COATS OF GALVACON (ZINC RICH PAINT) OR APPROVED EQUAL.
10. THE STRUCTURAL INTEGRITY OF THE EQUIPMENT PLATFORM HAS NOT BEEN REVIEWED BY FDH INFRASTRUCTURE SERVICES, LLC.

SPECIAL INSPECTIONS:

1. WHEN REQUIRED, PROVIDE SPECIAL INSPECTIONS PERFORMED BY AN INDEPENDENT INSPECTOR, APPROVED BY OWNER'S REPRESENTATIVE AND THE LOCAL JURISDICTION.
2. THE SPECIAL INSPECTOR SHALL PROVIDE A COPY OF THE REPORT TO THE OWNER'S REPRESENTATIVE, STRUCTURAL ENGINEER, CONTRACTOR, AND BUILDING OFFICIAL.

1/28/2019

PLANS PREPARED FOR:

dish WIRELESS

PROJECT MANAGER:

CROWN CASTLE

PLANS PREPARED BY:

PM&A
P. MARSHALL & ASSOCIATES

DRAWN BY:	JDJ
CHECKED BY:	MSB
APPROVED:	

SUBMITTALS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR REVIEW	12/07/18	JDJ	A
ISSUED FOR CONSTRUCTION	01/14/19	JDJ	0

PM&A PROJECT NUMBER:
CCD18-021

DISH WIRELESS SITE ID:
CT0100003A

TOWER OWNER SITE ID:
829013

SITE ADDRESS:
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

SHEET DESCRIPTION:
GENERAL NOTES

SHEET NUMBER:
GN-2

ELECTRICAL NOTES:

GENERAL

GENERAL CONDITIONS:

A. CONTRACTOR SHALL INSPECT THE EXISTING SITE CONDITIONS PRIOR TO SUBMITTING BID. ANY QUESTIONS ARISING DURING THE BID PERIOD IN REGARD TO THE CONTRACTORS FUNCTIONS, THE SCOPE OF WORK, OR ANY OTHER ISSUE RELATED TO THIS PROJECT SHALL BE ISSUED TO CONSTRUCTION MANAGER IN WRITING FOR CLARIFICATION PRIOR TO SUBMITTAL OF BID AND CONTRACT AWARD.

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

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

LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES:

A. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (NEC), AND ALL APPLICABLE LOCAL LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES. CONDUIT BENDS SHALL BE THE RADIUS BEND FOR THE TRADE SIZE OF CONDUIT IN COMPLIANCE WITH THE LATEST EDITIONS OF NEC.

REFERENCES:

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

1. ANSI/IEEE (AMERICAN NATIONAL STANDARDS INSTITUTE)
2. ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)
3. ICEA (INSULATED CABLE ENGINEERS ASSOCIATION)
4. NEMA (NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION)
5. NFPA (NATIONAL FIRE PROTECTION ASSOCIATION)
6. OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION)
7. UL (UNDERWRITERS LABORATORIES, INC.)
8. DISH WIRELESS GROUNDING AND BONDING STANDARDS, LATEST EDITION, AND COMPLY WITH DISH WIRELESS GROUNDING CHECKLIST, LATEST VERSION
9. R56 MOTOROLA STANDARDS

SCOPE OF WORK:

A. WORK UNDER THIS SECTION SHALL CONSIST OF FURNISHING ALL LABOR, MATERIAL, AND ASSOCIATED SERVICES REQUIRED TO COMPLETE REQUIRED CONSTRUCTION AND BE OPERATIONAL.

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 OF TRENCHES, BACKFILLING, AND REMOVAL OF EXCESS DIRT.

D. THE CONTRACTOR SHALL PREPARE A COMPLETE SET OF AS-BUILT DRAWINGS, DOCUMENT ALL WIRING EQUIPMENT CONDITIONS, AND CHANGES WHILE COMPLETING THIS CONTRACT. THE AS-BUILT DRAWINGS SHALL BE SUBMITTED AT COMPLETION OF THE PROJECT.

PRODUCTS

GENERAL:

A. ALL MATERIALS AND EQUIPMENT SHALL BE UL LISTED, NEW, AND FREE FROM DEFECTS.

B. ALL ITEMS OF 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 REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.

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

MATERIALS AND EQUIPMENT:

A. CONDUIT:

1. RIGID METAL CONDUIT (RMC) SHALL BE HOT-DIPPED GALVANIZED INSIDE AND OUTSIDE INCLUDING ENDS AND THREADS AND ENAMELED OR LACQUERED INSIDE IN ADDITION TO GALVANIZING.

2. LIQUID TIGHT FLEXIBLE METAL CONDUIT SHALL BE UL LISTED.

3. CONDUIT CLAMPS, STRAPS AND SUPPORTS SHALL BE STEEL OR MALLEABLE IRON. ALL FITTINGS SHALL BE COMPRESSION AND CONCRETE TIGHT TYPE.

4. NONMETALLIC CONDUIT AND FITTINGS SHALL BE SCHEDULE 40 PVC UNLESS SCHEDULE 80 PVC IS SPECIFIED. INSTALL USING SOLVENT-CEMENT-TYPE JOINTS AS RECOMMENDED BY THE MANUFACTURER.

B. CONDUCTORS AND CABLE:

1. CONDUCTORS AND CABLE SHALL BE FLAME-RETARDANT, MOISTURE AND HEAT RESISTANT THERMOPLASTIC, SINGLE CONDUCTOR, COPPER, TYPE THHN/THWN-2, 600 VOLT, SIZE AS INDICATED, #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR USED.

2. #10 AWG AND SMALLER CONDUCTOR SHALL BE SOLID OR STRANDED AND #8 AWG AND LARGER CONDUCTORS SHALL BE STRANDED.

3. SOLDERLESS, COMPRESSION-TYPE CONNECTORS SHALL BE USED FOR TERMINATION OF ALL STRANDED CONDUCTORS.

4. STRAIN-RELIEF SUPPORTS GRIPS SHALL BE HUBBELL KELLEMS OR APPROVED EQUAL. CABLES SHALL BE SUPPORTED IN ACCORDANCE WITH THE NEC AND CABLE MANUFACTURER'S RECOMMENDATIONS.

5. ALL CONDUCTORS SHALL BE TAGGED AT BOTH ENDS OF THE CONDUCTOR, AT ALL PULL BOXES, J-BOXES, EQUIPMENT AND CABINETS AND SHALL BE IDENTIFIED WITH APPROVED PLASTIC TAGS (ACTION CRAFT, BRADY, OR APPROVED EQUAL).

C. DISCONNECT SWITCHES:

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

D. CHEMICAL ELECTROLYTIC GROUNDING SYSTEM:

1. INSTALL CHEMICAL GROUNDING AS REQUIRED. THE SYSTEM SHALL BE ELECTROLYTIC MAINTENANCE FREE ELECTRODE CONSISTING OF RODS WITH A MINIMUM #2 AWG CU EXOTHERMICALLY WELDED PIGTAIL, PROTECTIVE BOXES, AND BACKFILL MATERIAL. MANUFACTURER SHALL BE LYNCOLE XIT GROUNDING ROD TYPES K2-(*)CS OR K2L-(*)CS (*) LENGTH AS REQUIRED.

2. GROUND ACCESS BOX SHALL BE A POLYPLASTIC BOX FOR NON-TRAFFIC APPLICATIONS, INCLUDING BOLT DOWN FLUSH COVER WITH "BREATHER" HOLES, XIT MODEL #XB-22. ALL DISCONNECT SWITCHES AND CONTROLLING DEVICES SHALL BE PROVIDED WITH ENGRAVED LAMICOID NAMEPLATES INDICATING EQUIPMENT CONTROLLED, BRANCH CIRCUITS ID NUMBERING, AND THE ELECTRICAL POWER SOURCE.

3. BACKFILL MATERIAL SHALL BE LYNCONITE AND LYNCOLE GROUNDING GRAVEL.

E. SYSTEM GROUNDING

1. ALL GROUNDING COMPONENTS SHALL BE TINNED AND GROUNDING CONDUCTOR SHALL BE #2 AWG BARE, SOLID, TINNED, COPPER. ABOVE GRADE GROUNDING CONDUCTORS SHALL BE INSULATED WHERE NOTED.

2. GROUNDING BUSES SHALL BE BARE, TINNED ANNEALED COPPER BARS OF RECTANGULAR CROSS SECTION. STANDARD BUS BARS MGB, SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. THEY SHALL NOT BE FABRICATED OR MODIFIED IN THE FIELD. ALL GROUNDING BUSES SHALL BE IDENTIFIED WITH MINIMUM 3/4" LETTERS BY WAY OF STENCILING OR DESIGNATION PLATE.

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. INTERIOR CONNECTIONS USE TWO-HOLE COMPRESSION LUGS WITH INSPECTION WINDOW AND CLEAR HEAT SHRINK.

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, 5/8"x10'-0". ALL GROUNDING RODS SHALL BE INSTALLED WITH INSPECTION SLEEVES.

6. INSTALL AN EQUIPMENT GROUNDING CONDUCTOR IN ALL CONDUITS IN COMPLIANCE WITH THE DISH WIRELESS SPECIFICATIONS AND NEC. THE EQUIPMENT GROUNDING CONDUCTORS SHALL BE BONDED TO ALL METALLIC JUNCTION BOXES, PULLBOXES, DISCONNECT SWITCHES, STARTERS, AND EQUIPMENT.

F. 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.

2. PROVIDE PULL BOXES AND JUNCTION BOXES WHERE SHOWN OR REQUIRED BY NEC.

G. PANELS AND LOAD CENTERS:

1. ALL PANEL LABELS SHALL BE TYPEWRITTEN.

EXECUTION:

GENERAL:

A. ALL MATERIAL AND EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

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

LABOR AND WORKMANSHIP:

A. ALL LABOR FOR THE INSTALLATION OF MATERIALS AND EQUIPMENT FURNISHED FOR THE ELECTRICAL SYSTEM SHALL BE INSTALLED BY EXPERIENCED WIREMEN, IN A NEAT AND WORKMAN-LIKE MANNER.

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

C. UPON COMPLETION OF 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.

PLANS PREPARED FOR:

dish WIRELESS

PROJECT MANAGER:

CROWN CASTLE

PLANS PREPARED BY:

PM&A
P. MARSHALL & ASSOCIATES

DRAWN BY:	JDJ
CHECKED BY:	MSB
APPROVED:	

SUBMITTALS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR REVIEW	12/07/18	JDJ	A
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PM&A PROJECT NUMBER:
CCD18-021

DISH WIRELESS SITE ID:
CT0100003A

TOWER OWNER SITE ID:
829013

SITE ADDRESS:
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

SHEET DESCRIPTION:
ELECTRICAL NOTES

SHEET NUMBER:
EN-1

ELECTRICAL NOTES (CONTINUED)

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.

INSTALLATION:

A. CONDUIT:

1. ALL ELECTRICAL WIRING SHALL BE INSTALLED IN CONDUIT AS SPECIFIED. NO CONDUIT OR TUBING OF LESS THAN 3/4 INCH TRADE SIZE.
2. PROVIDE RIGID PVC SCHEDULE 80 CONDUITS FOR ALL RISERS, OR WHERE RMC OTHERWISE NOTED.
3. INSTALL SCHEDULE 40 PVC CONDUIT WITH A MINIMUM COVER OF 24" UNDER ROADWAYS, PARKING LOTS, STREETS, AND ALLEYS. CONDUIT SHALL HAVE A MINIMUM COVER OF 18" IN ALL OTHER NON-TRAFFIC APPLICATIONS (REFER TO 2017 NEC, TABLE 300.5).
4. USE GALVANIZED FLEXIBLE STEEL CONDUIT WHERE DIRECT CONNECTION TO EQUIPMENT WITH MOVEMENT, VIBRATION, OR FOR EASE OF MAINTENANCE. USE LIQUID TIGHT, FLEXIBLE METAL CONDUIT FOR OUTDOOR APPLICATIONS. INSTALL GALVANIZED FLEXIBLE STEEL CONDUIT AT ALL POINTS OF CONNECTION TO EQUIPMENT MOUNTED ON SUPPORT TO ALLOW FOR EXPANSION AND CONTRACTION.
5. A RUN OF CONDUIT BETWEEN BOXES OR EQUIPMENT SHALL NOT CONTAIN MORE THAN THE EQUIVALENT OF THREE 90 DEGREE BENDS MAX. CONDUIT BEND SHALL BE MADE WITH THE UL LISTED BENDER OR FACTORY 90 DEGREE ELBOWS MAY BE USED.
6. FIELD FABRICATED CONDUITS SHALL BE CUT SQUARE WITH A CONDUIT CUTTING TOOL AND REAMED TO PROVIDE A SMOOTH INSIDE SURFACE.
7. PROVIDE INSULATED GROUNDING BUSHING FOR ALL CONDUITS.
8. 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 CONDUITS CONTAINING FOREIGN MATERIALS THAT CANNOT BE REMOVED.
9. ALL CONDUITS SHALL BE SWABBED CLEAN BY PULLING AN APPROPRIATE SIZE MANDREL THROUGH THE CONDUIT BEFORE INSTALLATION OF CONDUCTORS OR CABLES. CONDUIT SHALL BE FREE OF DIRT AND DEBRIS.
10. INSTALL PULL STRINGS IN ALL CLEAN EMPTY CONDUITS. IDENTIFY PULL STRINGS AT EACH END.
11. INSTALL 2" HIGHLY VISIBLE AND DETECTABLE TAPE 12" ABOVE ALL UNDERGROUND CONDUITS AND CONDUCTORS.
12. CONDUITS SHALL BE INSTALLED IN SUCH A MANNER AS TO INSURE AGAINST COLLECTION OF TRAPPED CONDENSATION.
13. PROVIDE CORE DRILLING AS NECESSARY FOR PENETRATIONS TO ALLOW FOR RACEWAYS AND CABLES TO BE ROUTED THROUGH THE BUILDING. DO NOT PENETRATE STRUCTURAL MEMBERS AND/OR SLEEVES. PENETRATIONS IN FIRE RATED CONSTRUCTION SHALL BE EFFECTIVELY SEALED WITH FIRE RATED MATERIAL WHICH SHALL MAINTAIN THE FIRE RATING OF THE WALL OR STRUCTURE. FIRE STOPS AT FLOOR PENETRATIONS SHALL PREVENT PASSAGE OF WATER, SMOKE, FIRE, AND FUMES. ALL MATERIAL SHALL BE UL APPROVED FOR THE PURPOSE.

B. CONDUCTORS AND CABLE:

1. SPLICES SHALL BE MADE ONLY AT OUTLETS, JUNCTION BOXES, OR ACCESSIBLE RACEWAY CONDUITS APPROVED FOR THIS PURPOSE.
2. PULLING LUBRICANTS SHALL BE UL APPROVED. CONTRACTOR SHALL USE NYLON OR HEMP ROPE FOR PULLING CONDUCTOR OR CABLES INTO THE CONDUIT.
3. CABLES SHALL BE NEATLY TRAINED, WITHOUT INTERLACING, AND BE OF SUFFICIENT LENGTH IN ALL BOXES AND EQUIPMENT TO PERMIT MAKING A NEAT ARRANGEMENT. CABLES SHALL BE SECURED IN A MANNER TO AVOID TENSION ON CONDUCTORS OR TERMINALS. CONDUCTORS SHALL BE PROTECTED FROM MECHANICAL INJURY AND MOISTURE. SHARP BENDS OVER CONDUIT BUSHINGS IS PROHIBITED. DAMAGED CABLES SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE.

C. DISCONNECT SWITCHES:

1. INSTALL DISCONNECT SWITCHES LEVEL AND PLUMB. CONNECT TO WIRING SYSTEM AND GROUNDING SYSTEM 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 THE BUILDING MANUFACTURER, DISH WIRELESS GROUNDING AND BONDING STANDARDS, LATEST EDITION, AND COMPLY WITH DISH WIRELESS GROUNDING CHECKLIST, LATEST VERSION, AND THE NATIONAL ELECTRICAL CODE.
2. PROVIDE ELECTRICAL GROUNDING AND BONDING SYSTEM INDICATED WITH ASSEMBLY OF MATERIALS, INCLUDING GROUNDING ELECTRODES, BONDING JUMPERS AND ADDITIONAL ACCESSORIES AS REQUIRED FOR A COMPLETE INSTALLATION.
3. ALL GROUNDING CONDUCTORS SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND WITH GRADUAL BEND AS REQUIRED. GROUNDING CONDUCTORS SHALL NOT BE LOOPED OR SHARPLY BENT. ROUTE GROUNDING CONNECTIONS AND CONDUCTORS TO GROUND IN THE SHORTEST AND STRAIGHTEST PATHS POSSIBLE TO MINIMIZE TRANSIENT VOLTAGE RISES.
4. BUILDINGS AND/OR NEW TOWERS GREATER THAN 75 FEET IN HEIGHT AND WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWER, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM. THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 AWG COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY). SEE STANDARD 8.3.2.2.
5. TIGHTEN GROUNDING AND BONDING CONNECTORS, INCLUDING SCREWS AND BOLTS, IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED TORQUE TIGHTENING VALUES FOR CONNECTORS AND BOLTS. WHERE MANUFACTURER'S TORQUING REQUIREMENTS ARE NOT AVAILABLE, TIGHTEN CONNECTIONS TO COMPLY WITH TIGHTENING TORQUE VALUES SPECIFIED IN UL TO ASSURE PERMANENT AND EFFECTIVE GROUNDING.
6. CONTRACTOR SHALL VERIFY THE LOCATIONS OF GROUNDING TIE-IN-POINTS TO THE EXISTING GROUNDING SYSTEM. ALL UNDERGROUND GROUNDING CONNECTIONS SHALL BE MADE BY THE EXOTHERMIC WELD PROCESS AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
7. ALL GROUNDING CONNECTIONS SHALL BE INSPECTED FOR TIGHTNESS. EXOTHERMIC WELDED CONNECTIONS SHALL BE APPROVED BY THE INSPECTOR HAVING JURISDICTION BEFORE BEING PERMANENTLY CONCEALED.
8. APPLY CORROSION-RESISTANT FINISH TO FIELD CONNECTIONS AND PLACES WHERE FACTORY APPLIED PROTECTIVE COATINGS HAVE BEEN DESTROYED. USE KOPR-SHIELD ANTI-OXIDATION COMPOUND ON ALL COMPRESSION GROUNDING CONNECTIONS.
9. A SEPARATE, CONTINUOUS, INSULATED EQUIPMENT GROUNDING CONDUCTOR SHALL BE INSTALLED IN ALL FEEDER AND BRANCH CIRCUITS.
10. BOND ALL INSULATED GROUNDING BUSHINGS WITH A BARE #6 AWG GROUNDING CONDUCTOR TO A GROUND BUS.
11. DIRECT BURIED GROUNDING CONDUCTORS SHALL BE INSTALLED AT A NOMINAL DEPTH OF 30" MINIMUM BELOW GRADE, OR 6" BELOW THE FROST LINE, USE THE GREATER OF THE TWO DISTANCES.
12. ALL GROUNDING CONDUCTORS EMBEDDED IN OR PENETRATING CONCRETE SHALL BE INSTALLED IN SCHEDULE 40 PVC CONDUIT.
13. THE INSTALLATION OF CHEMICAL ELECTROLYTIC GROUNDING SYSTEM SHALL BE IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. REMOVE SEALING TAPE FROM LEACHING AND BREATHER HOLES. INSTALL PROTECTIVE BOX FLUSH WITH GRADE.
14. DRIVE GROUND RODS UNTIL TOPS ARE A MINIMUM DISTANCE OF 30" DEPTH OR 6" BELOW FROST LINE, USING THE GREATER OF THE TWO DISTANCES.
15. CONTRACTOR SHALL REPAIR, AND/OR REPLACE, EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTORS EXPENSE.

ACCEPTANCE TESTING:

A. CERTIFIED PERSONNEL USING CERTIFIED EQUIPMENT SHALL PERFORM REQUIRED TESTS AND SUBMIT WRITTEN TEST REPORTS UPON COMPLETION.

B. WHEN MATERIAL AND/OR WORKMANSHIP IS FOUND NOT TO COMPLY WITH THE SPECIFIED REQUIREMENTS, THE NON-COMPLYING ITEMS SHALL BE REMOVED FROM THE PROJECT SITE AND REPLACED WITH ITEMS COMPLYING WITH THE SPECIFIED REQUIREMENTS PROMPTLY AFTER RECEIPT OF NOTICE FOR NON-COMPLIANCE.

C. TEST PROCEDURES:

1. ALL FEEDERS SHALL HAVE INSULATION TESTED AFTER INSTALLATION, BEFORE CONNECTION TO DEVICES. THE CONDUCTORS SHALL TEST FREE FROM SHORT CIRCUITS AND GROUNDS. TESTING SHALL BE FOR ONE MINUTE USING 1000V DC. PROVIDE WRITTEN DOCUMENTATION FOR ALL TEST RESULTS.
2. PRIOR TO ENERGIZING CIRCUITRY, TEST WIRING DEVICES FOR ELECTRICAL CONTINUITY AND PROPER POLARITY CONNECTIONS.
3. MEASURE AND RECORD VOLTAGES BETWEEN PHASES AND BETWEEN PHASE CONDUCTORS AND NEUTRALS. SUBMIT A REPORT OF MAXIMUM AND MINIMUM VOLTAGES.
4. PERFORM GROUNDING TEST TO MEASURE GROUNDING 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.

1/28/2019

PLANS PREPARED FOR:

dish WIRELESS

PROJECT MANAGER:

CROWN CASTLE

PLANS PREPARED BY:

PM&A
P. MARSHALL & ASSOCIATES

DRAWN BY:	JDJ
CHECKED BY:	MSB
APPROVED:	

SUBMITTALS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR REVIEW	12/07/18	JDJ	A
ISSUED FOR CONSTRUCTION	01/14/19	JDJ	0

PM&A PROJECT NUMBER:

CCD18-021

DISH WIRELESS SITE ID:

CT0100003A

TOWER OWNER SITE ID:

829013

SITE ADDRESS:

467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

SHEET DESCRIPTION:

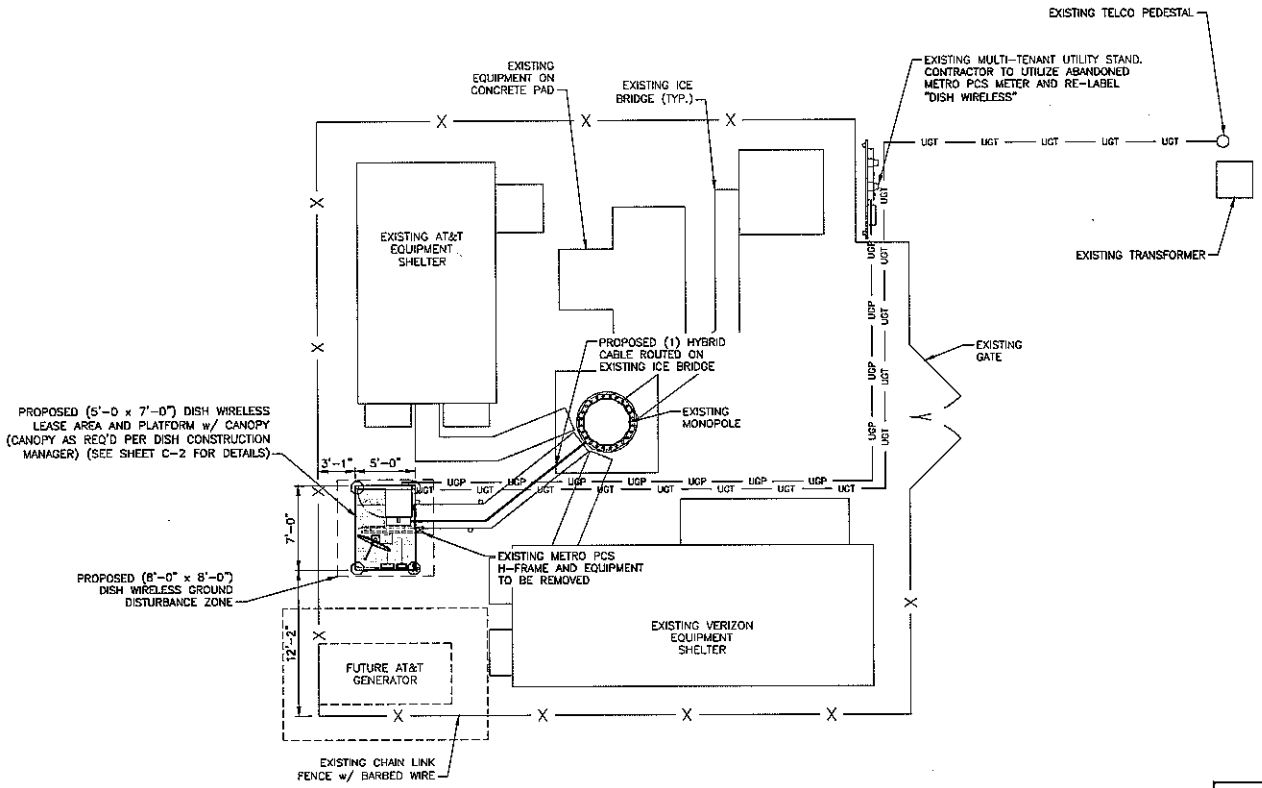
ELECTRICAL NOTES

SHEET NUMBER:

EN-2

PROPOSED SATELLITE DISH LOCATION TO BE VERIFIED IN THE FIELD AT TIME OF CONSTRUCTION

HYBRID CABLE LENGTHS:
EQUIPMENT PLATFORM TO TOWER = ±20'-0"
TOWER TO RAD CENTER = ±90'-0"



COMPOUND PLAN
SCALE: 1" = 10'

10 0 10
SCALE: 1" = 10'

STATE OF CONNECTICUT
SHAYNE A.M. SMITH
PEN.0032757
LICENSED PROFESSIONAL ENGINEER
1/28/2019

PLANS PREPARED FOR:
dish WIRELESS

PROJECT MANAGER:
CROWN CASTLE

PLANS PREPARED BY:
PM&A
P. MARSHALL & ASSOCIATES

DRAWN BY:	JDJ
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APPROVED:	

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SITE ADDRESS:
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

SHEET DESCRIPTION:
COMPOUND PLAN

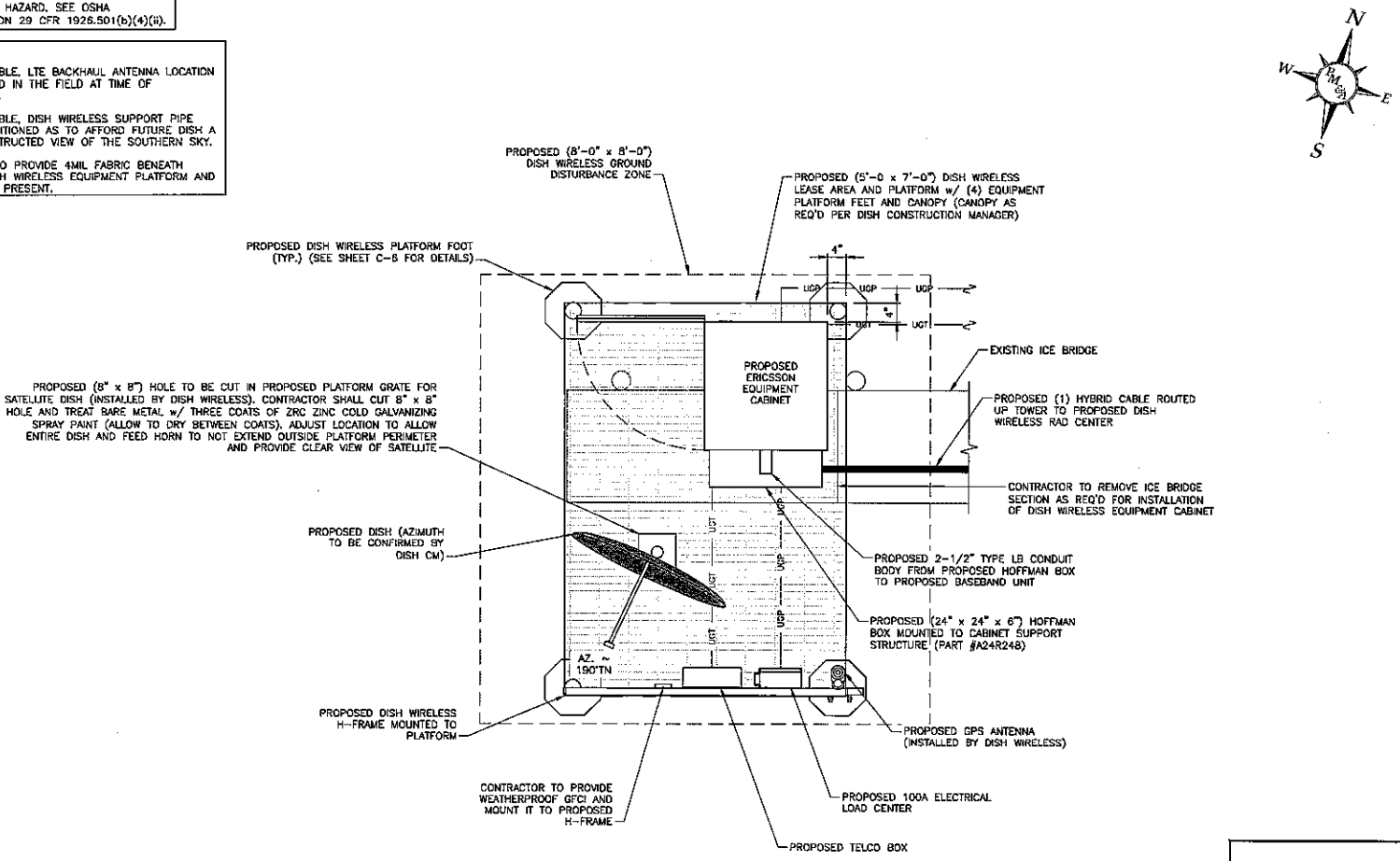
SHEET NUMBER:
C-1

SAFETY NOTE:

WHEN APPLICABLE, CONTRACTOR SHALL COVER PROPOSED (8'x8") HOLE IN PLATFORM GRATE TO PREVENT TRIPPING HAZARD. SEE OSHA STANDARDS, SECTION 29 CFR 1926.501(b)(4)(ii).

NOTES:

1. WHEN APPLICABLE, LTE BACKHAUL ANTENNA LOCATION TO BE VERIFIED IN THE FIELD AT TIME OF CONSTRUCTION.
2. WHEN APPLICABLE, DISH WIRELESS SUPPORT PIPE SHALL BE POSITIONED AS TO AFFORD FUTURE DISH A CLEAR, UNOBSTRUCTED VIEW OF THE SOUTHERN SKY.
3. CONTRACTOR TO PROVIDE 4MIL FABRIC BENEATH PROPOSED DISH WIRELESS EQUIPMENT PLATFORM AND LEGS IF NONE PRESENT.



EQUIPMENT PLAN
SCALE: 1/2" = 1'-0"

PLANS PREPARED FOR:
dish WIRELESS

PROJECT MANAGER:
CROWN CASTLE

PLANS PREPARED BY:
PM&A
P. MARSHALL & ASSOCIATES

DRAWN BY:	JDJ
CHECKED BY:	MSB
APPROVED:	

SUBMITTALS:

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TOWER OWNER SITE ID:
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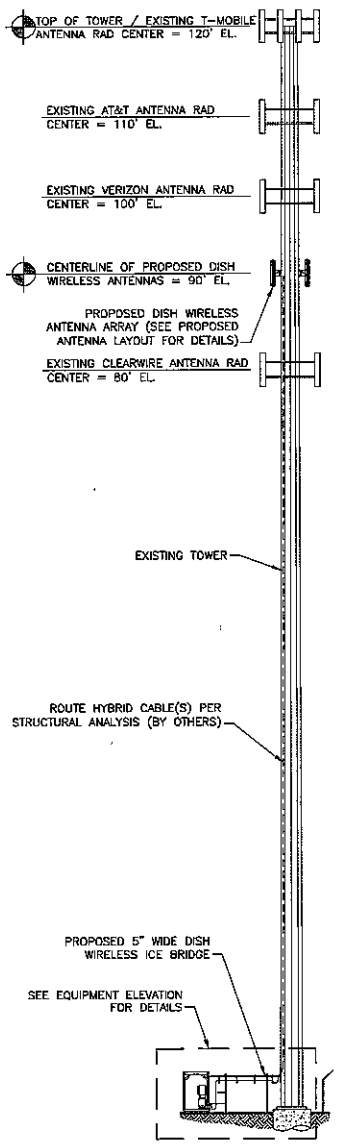
SITE ADDRESS:
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

SHEET DESCRIPTION:
EQUIPMENT PLAN

SHEET NUMBER:
C-2



TOWER ELEVATION
NOT TO SCALE

ANTENNA LAYOUT NOTES:

1. THIS ANTENNA ORIENTATION PLAN IS A SCHEMATIC. THE CONTRACTOR SHALL VERIFY TOWER ORIENTATION AND FIELD COORDINATE REQUIRED ADJUSTMENTS TO ACHIEVE THE DESIRED ANTENNA AZIMUTHS.
2. ANTENNA CENTERLINE HEIGHT REFERENCED FROM GROUND AT BASE OF TOWER, ASSUMING HEIGHT OF 0'-0" AT SAID REFERENCE POINT.
3. ALL ANTENNAS, CABLES AND MOUNTS SHALL BE INSTALLED IN ACCORDANCE WITH THE TOWER ENGINEER'S RECOMMENDATIONS IN A MANNER CONSISTENT WITH THE STRUCTURAL ANALYSIS REPORT.
4. ALL ANTENNA BRACKETS PER ANTENNA MANUFACTURER, OR EQUAL. CONTRACTOR TO COORDINATE REQUIRED MECHANICAL DOWN TILT WITH DISH WIRELESS.
5. ALL ANTENNA INFORMATION TO BE CONFIRMED WITH DISH WIRELESS RF DESIGN PRIOR TO INSTALLATION.
6. VERIFY POSITIONS AND AZIMUTH OF ANTENNAS WITH DISH WIRELESS PRIOR TO INSTALLATION.
7. SECTOR FRAMES AND ANTENNAS SHOULD HAVE IDENTIFYING TORQUE MARKS SHOWN AFTER INSTALLATION.
8. ALL CLOSE-OUT PHOTOS ADHERE TO CLOSE-OUT DOCUMENTATION.

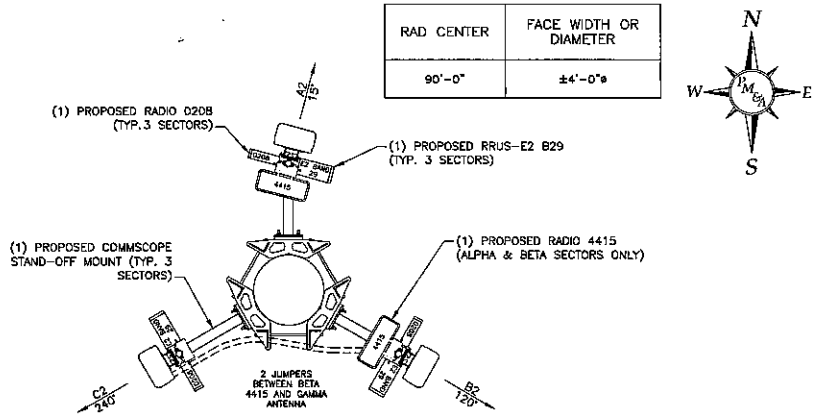
EQUIPMENT TESTING:

CONTRACTOR SHALL COMPLETE THE FOLLOWING REQUIREMENTS:

1. ANTENNAS & RF JUMPERS:
   - ALL RF JUMPERS & ANTENNA PORTS MUST HAVE DOCUMENTED PASSING SYSTEM SWEEP TEST.
   - PIM TESTING IS REQUIRED FOR ALL INSTALLED ANTENNAS & FEEDLINES.
   - SYSTEM SWEEPS SHALL BE AT A RETURN LOSS OF ≤ -16db.
   - ALL SWEEPS MUST BE PROVIDED IN A PDF AS WELL AS ANRITSU (OR EQUAL) DATA FILE FORMAT.
   - FINAL ACCEPTANCE: PERFORM ALL TECHNICAL TESTS SPECIFIED IN THE CONSTRUCTION SOW, SECTION XIV.
2. HYBRID CABLES:
   - ALL FIBER PAIRS MUST HAVE A DOCUMENTED PASSING POWER & A FIBER INSPECTION SCOPE TEST.
   - PASSING POWER TEST SHALL BE ≤ 3db.
   - REQUIRED FIBER TEST GEAR SHALL BE VIAVI JDSU FIT-SD103; P5000I FIBER SCOPE DIGITAL INSPECTION KIT; VIAVI 2303/11, OLS-35 OPTICAL LASER LIGHT SOURCE 1310/1550 NM, SM, INTERCHANGEABLE ADAPTER OR EQUAL.
   - ALL FIBER TEST RESULTS MUST BE PROVIDED IN PDF FORMAT.
   - FINAL ACCEPTANCE: PERFORM ALL TECHNICAL TESTS SPECIFIED IN THE CONSTRUCTION SOW, SECTION XIV.

ADD MID TOWER GROUND BUS BAR WHERE APPLICABLE PER LIGHTNING ZONE REQUIREMENTS.

RAD CENTER	FACE WIDTH OR DIAMETER
90'-0"	±4'-0"ø

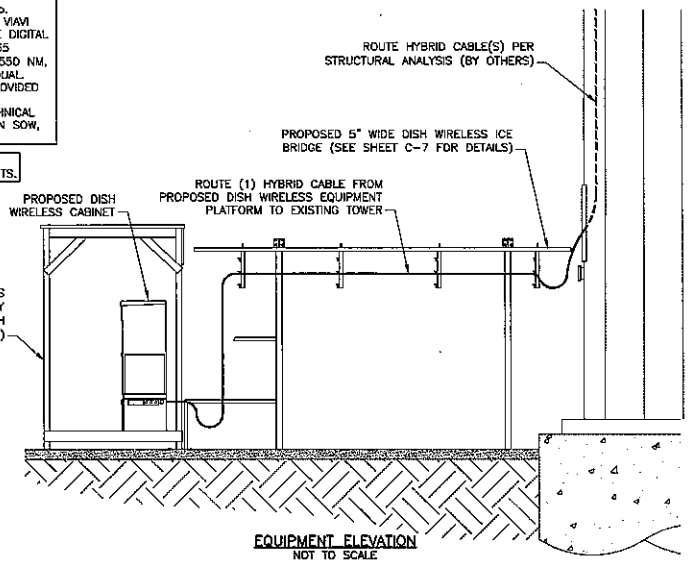


PROPOSED ANTENNA LAYOUT
NOT TO SCALE

PROPOSED RET RUN FROM 4415 RRU TO ANTENNA (FOR ALPHA SECTOR AND DAISY CHAINED TO BETA AND GAMMA SECTORS) ALONG TOWER STRUCTURE, NOT IN OPEN AIR.

NOTES:

1. DISH WIRELESS TO CONFIRM WITH TOWER OWNER THE VERTICAL LEASE AREA RIGHTS AVAILABLE PRIOR TO CONSTRUCTION. EXISTING EQUIPMENT MAY OBSTRUCT DESIRED DISH WIRELESS RAD-CENTER.
2. TOWER FACE WIDTH/DIAMETER IS AN ESTIMATE FROM STRUCTURAL ANALYSIS.



EQUIPMENT ELEVATION
NOT TO SCALE

INSTALLER NOTE:

1. SCHEMATIC LAYOUT ONLY. REFER TO SHEETS C-1 AND C-2 FOR EXACT EQUIPMENT LAYOUT, SIZES AND LOCATIONS OF ICE BRIDGE.
2. ALL CABLE SUPPORTS SHOULD BE BLOCKS AND GROMMETS. NO SNAP-INS ARE ALLOWED.

1/28/2019

PLANS PREPARED FOR:
dish WIRELESS

PROJECT MANAGER:
CROWN CASTLE

PLANS PREPARED BY:
PM&A
P. MARSHALL & ASSOCIATES

DRAWN BY:	JDJ
CHECKED BY:	MSB
APPROVED:	

SUBMITTALS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR REVIEW	12/07/18	JDJ	A
ISSUED FOR CONSTRUCTION	01/14/19	JDJ	0

PM&A PROJECT NUMBER:
CCD18-021

DISH WIRELESS SITE ID:
CT0100003A

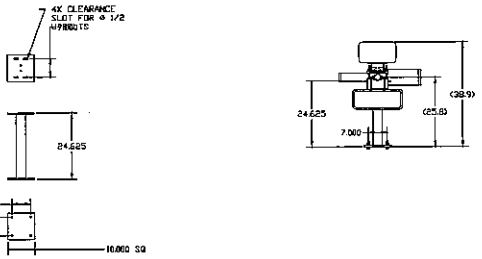
TOWER OWNER SITE ID:
829013

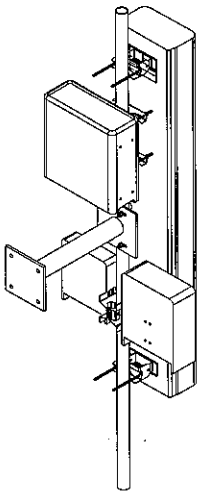
SITE ADDRESS:
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

SHEET DESCRIPTION:
TOWER ELEVATION & ANTENNA LAYOUT

SHEET NUMBER:
C-3

MC-SA24-B STAND-OFF
SUPPORT
10" X 24-5/8" LONG
ONE 2-3/8" X 108"
PIPE CONFIG.





BY: J. LAPALME
10/30/2018

MC-RM1550-3 "OR" MC-RM1030-3 COMMSCOPE RING MOUNTS
AND MC-SA24-B COMMSCOPE STAND-OFF
W ERICSSON GEAR

SCALE 1:16

dish TECHNOLOGIES

TITLE	TOP VIEW, MONOPOLE MC-SA24-B CONFIG.	
SIZE B	DWG. NO. N/A	REV. WC01
SCALE NONE	SHEET 1 OF 1	

SUPPLEMENTAL INFORMATION

PLANS PREPARED FOR:
dish WIRELESS

PROJECT MANAGER:
CROWN CASTLE

PLANS PREPARED BY:
PM&A
P. MARSHALL & ASSOCIATES

DRAWN BY:	JDJ
CHECKED BY:	MSB
APPROVED:	

SUBMITTALS:

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CT0100003A

TOWER OWNER SITE ID:
829013

SITE ADDRESS:
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

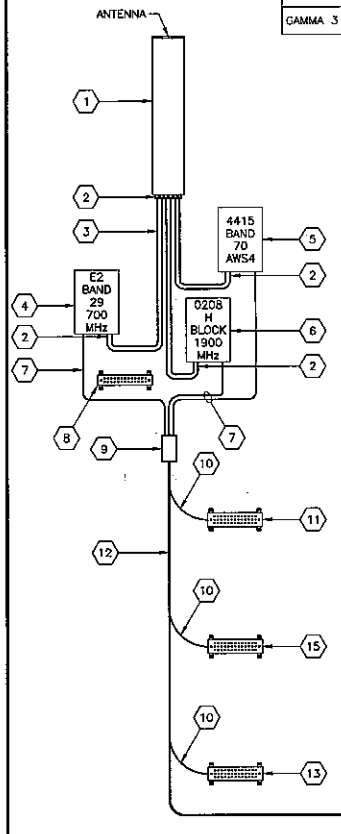
SHEET DESCRIPTION:
ANTENNA MOUNT

SHEET NUMBER:
C3.1

ANTENNA SCHEDULE

SECTOR	ANTENNA MANUFACTURER/MODEL NUMBER	PRIMARY FEEDER (COAX/HYBRID CABLES)	AZIMUTH	RAD CENTER	MECH D-TILT	ELECT D-TILT	RRU MANUFACTURER/MODEL NUMBER	RRU TECHNOLOGY	RRU LOCATION	PRIMARY FEEDER SIZE	JUMPER SIZE	JUMPER QTY	JUMPER LENGTH
ALPHA 1	N/A	N/A	N/A	N/A	N/A	N/A	ERICSSON E2	BAND 29	SECTOR	N/A	1/2"	2	10'-0"
ALPHA 2	COMBA ODI-D065R16M18JJ-GQ V2	COMMSCOPE LDF4-50A - 1/2"ø	15°	90'	0°	2100MHz - 2° 700MHz - 4°	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ALPHA 3	N/A	N/A	N/A	N/A	N/A	N/A	ERICSSON 0208	H-BLOCK	SECTOR	N/A	1/2"	2	10'-0"
							ERICSSON 4415	BAND 70	SECTOR	N/A	1/2"	2	10'-0"
BETA 1	N/A	N/A	N/A	N/A	N/A	N/A	ERICSSON E2	BAND 29	SECTOR	N/A	1/2"	2	10'-0"
BETA 2	COMBA ODI-D065R16M18JJ-GQ V2	SHARED w/ ALPHA	120°	90'	0°	2100MHz - 2° 700MHz - 4°	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BETA3	N/A	N/A	N/A	N/A	N/A	N/A	ERICSSON 0208	H-BLOCK	SECTOR	N/A	1/2"	2	10'-0"
							ERICSSON 4415 (SHARED)	BAND 70	SECTOR	N/A	1/2"	2	10'-0"
GAMMA 1	N/A	N/A	N/A	N/A	N/A	N/A	ERICSSON E2	BAND 29	SECTOR	N/A	1/2"	2	10'-0"
GAMMA 2	COMBA ODI-D065R16M18JJ-GQ V2	SHARED w/ ALPHA	240°	90'	0°	2100MHz - 1° 700MHz - 4°	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GAMMA 3	N/A	BETA 4415 - GAMMA ANTENNA JUMPERS	N/A	N/A	N/A	N/A	ERICSSON 0208	H-BLOCK	SECTOR	N/A	1/2"	2	10'-0"
							RRU 4415 SHARED FROM BETA	BAND 70	SECTOR	N/A	1/2"	2	20'-0"

TYPICAL SECTOR



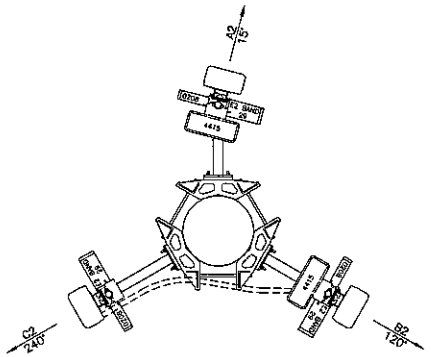
1. ANTENNA - COMBA ODI-D65R16M18JJ-GQ V2 DS 0-0-0 (DISH PROVIDED)
2. CLAMSHELL WEATHERPROOFING (CONTRACTOR PROVIDED)
3. PROPOSED (6 EA.) 1/2" COAX JUMPERS (LENGTH VARIES) FROM RRU's TO ANTENNA (DISH PROVIDED)
4. RRU - E2 BAND 29 700 MHz (DISH PROVIDED)
5. RRU - 4415 BAND 70 AWS4 (DISH PROVIDED)
6. RRU - 0208 H BLOCK 1900 MHz (DISH PROVIDED)
7. DC/FIBER JUMPER CABLES (RRU TO ANTENNA)
8. SECTOR GROUND BUS BAR -12" x 2" x 1/4" (DISH PROVIDED)
9. FIBER/POWER BREAKOUT CYLINDER
10. GROUND KIT ON HYBRID CABLE
11. UPPER TOWER GROUND BUS BAR -12" x 4" x 1/4" (DISH PROVIDED)
12. HYBRID CABLE
13. LOWER TOWER GROUND BUS BAR -12" x 4" x 1/4" (DISH PROVIDED)
14. EQUIPMENT GROUND BUS BAR -12" x 4" x 1/4" (DISH PROVIDED)
15. ADD ADDITIONAL BUS BARS AND GROUND KITS ON TOWER IN 50, 100, OR 200 FOOT INCREMENTS BASED ON TOWER HEIGHT AND LIGHTNING ZONE REQUIREMENTS

NOTE:

PROPOSED RET CABLE 4415 RRU TO ANTENNA (1) PER SECTOR. BETA SECTOR TO BE DAISY CHAINED TO GAMMA ALONG TOWER STRUCTURE, NOT IN OPEN AIR.

NOTE:

CONTRACTOR TO REFER TO, CONFIRM DOWNTILT CHANGES AND VALIDATE, THE LATEST RFDS PRIOR TO CONSTRUCTION.



WEIGHT (EXCLUDING MOUNTING HARDWARE)

19.84 lbs (9kg) — 0208 H BLOCK 1900 MHz

46.0 lbs (21kg) — 4415 BAND 70 AWS4

52.9 lbs (24kg) — E2 BAND 29 700 MHz

SUPPLEMENTAL INFORMATION

PLANS PREPARED FOR:

dish WIRELESS

PROJECT MANAGER:

CROWN CASTLE

PLANS PREPARED BY:

PM&A
P. MARSHALL & ASSOCIATES

DRAWN BY:	JDJ
CHECKED BY:	MSB
APPROVED:	

SUBMITTALS:

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829013

SITE ADDRESS:

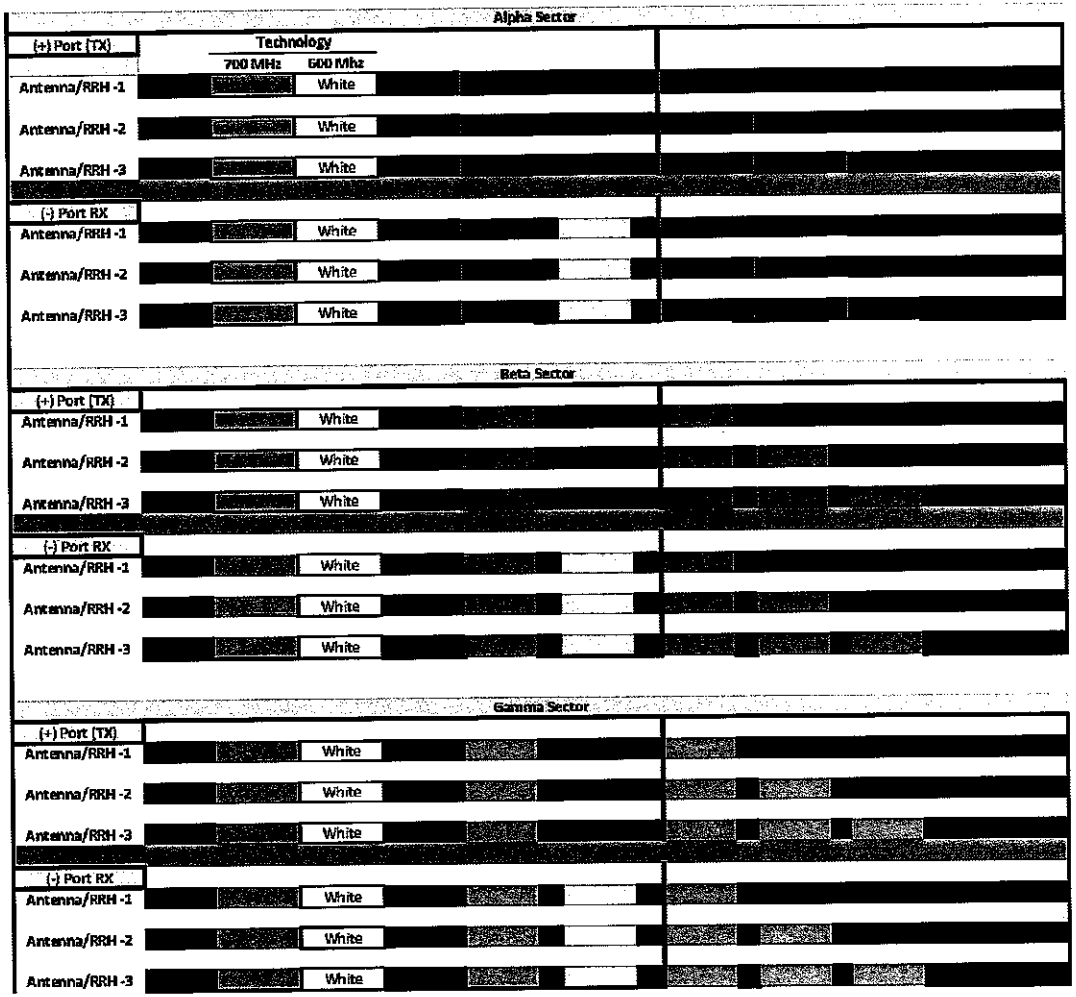
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

SHEET DESCRIPTION:

ANTENNA SCHEDULE AND DIAGRAM

SHEET NUMBER:

1 OF 2



CABLE COLOR CODE

NOTE:
CONTRACTOR TO REFER TO, AND VALIDATE, THE LATEST RFDS PRIOR TO CONSTRUCTION.

SUPPLEMENTAL INFORMATION

PLANS PREPARED FOR:
dish WIRELESS

PROJECT MANAGER:
CROWN CASTLE

PLANS PREPARED BY:
PM&A
P. MARSHALL & ASSOCIATES

DRAWN BY:	JDJ
CHECKED BY:	MSB
APPROVED:	

SUBMITTALS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR REVIEW	12/07/18	JDJ	A
ISSUED FOR CONSTRUCTION	01/14/19	JDJ	0

PM&A PROJECT NUMBER:
CCD18-021

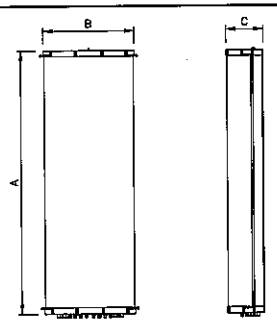
DISH WIRELESS SITE ID:
CT0100003A

TOWER OWNER SITE ID:
829013

SITE ADDRESS:
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

SHEET DESCRIPTION:
CABLE COLOR CODE

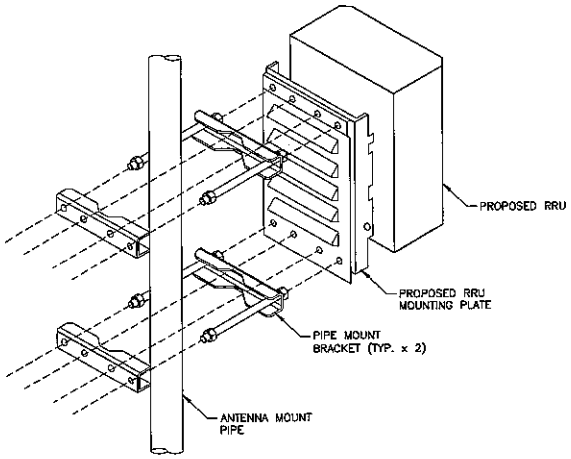
SHEET NUMBER:
2 OF 2



FRONT SIDE

ANTENNA SPECIFICATIONS				
MODEL	LENGTH (A)	WIDTH (B)	DEPTH (C)	WEIGHT (lb)
COMBA – ODI-065R16M18JJ-GQ V2	78.7"	14.0"	7.6"	57.3
PANORAMA – WMMG-7-27	6.10"	6.10"	2.95"	2.43

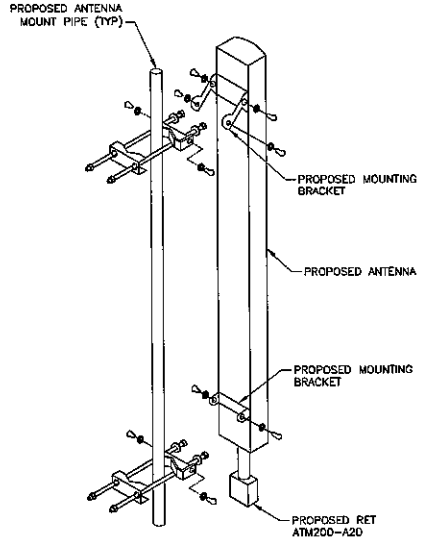
ANTENNA SPECIFICATIONS
NOT TO SCALE



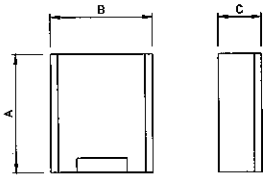
NOTES:

1. ERICSSON VIA DISH WIRELESS SUPPLIES RRU, RRU PIPE-MOUNTING BRACKET. SUBCONTRACTOR SHALL INSTALL ALL MOUNTING HARDWARE INCLUDING RRU PIPE-MOUNTING BRACKET.
2. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED

REMOTE RADIO UNIT (RRU) PIPE MOUNT
NOT TO SCALE



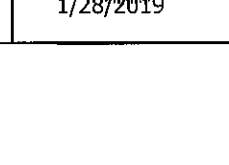
ANTENNA MOUNTING
NOT TO SCALE



FRONT SIDE

RADIO SPECIFICATIONS				
MODEL	LENGTH (A)	WIDTH (B)	DEPTH (C)	WEIGHT (lb)
ERICSSON – RADIO 4415	18.54"	13.64"	4.84"	44.09
ERICSSON – RADIO 0208	13.82"	11.73"	3.31"	18.52
RRUS-E2 B29	20.39"	18.50"	7.48"	52.90

RADIO SPECIFICATIONS
NOT TO SCALE



1/28/2019

PLANS PREPARED FOR:
dish WIRELESS

PROJECT MANAGER:
CROWN CASTLE

PLANS PREPARED BY:
PM&A
P. MARSHALL & ASSOCIATES

DRAWN BY:	JDJ
CHECKED BY:	MSB
APPROVED:	

SUBMITTALS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR REVIEW	12/07/18	JDJ	A
ISSUED FOR CONSTRUCTION	01/14/19	JDJ	0

PM&A PROJECT NUMBER:
CCD18-021

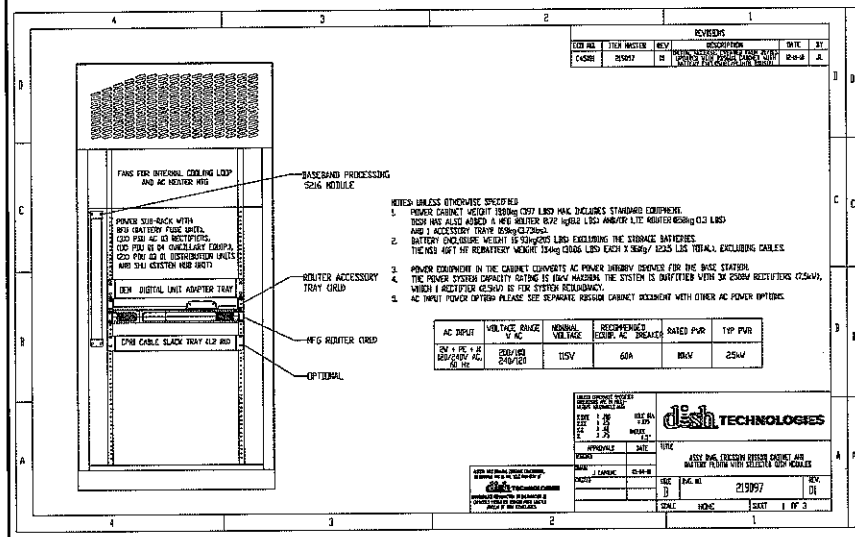
DISH WIRELESS SITE ID:
CT0100003A

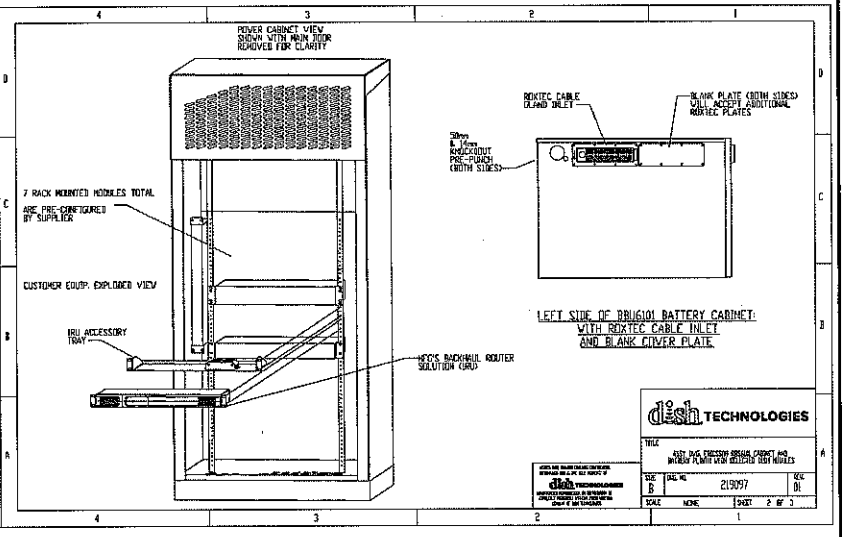
TOWER OWNER SITE ID:
829013

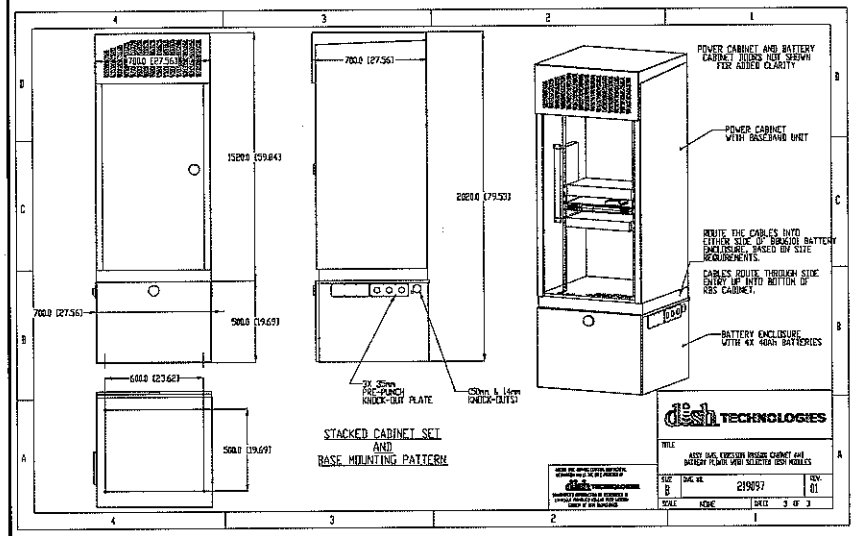
SITE ADDRESS:
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

SHEET DESCRIPTION:
EQUIPMENT DETAILS

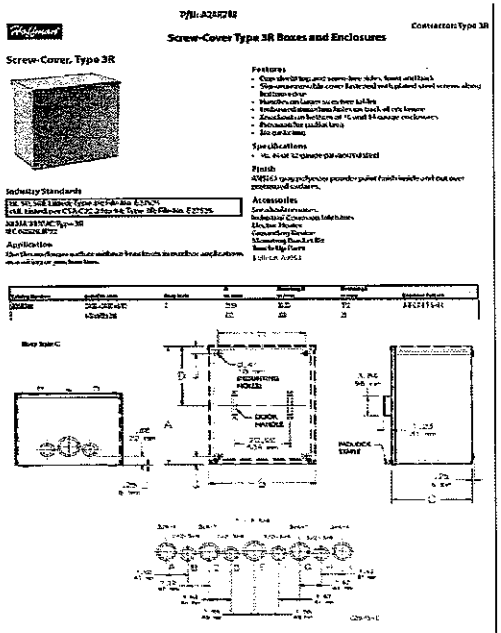
SHEET NUMBER:
C-4







STACKED CABINET SET AND BASE MOUNTING PATTERN



HOFFMAN BOX DETAILS
NOT TO SCALE

SUPPLEMENTAL INFORMATION

PLANS PREPARED FOR:
dish WIRELESS

PROJECT MANAGER:
CROWN CASTLE

PLANS PREPARED BY:
PM&A
P. MARSHALL & ASSOCIATES

DRAWN BY: JDJ
CHECKED BY: MSB
APPROVED:

SUBMITTALS:

DESCRIPTION	DATE	BY	REV
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ISSUED FOR CONSTRUCTION	01/14/19	JDJ	0

PM&A PROJECT NUMBER:
CCD18-021

DISH WIRELESS SITE ID:
CT0100003A

TOWER OWNER SITE ID:
829013

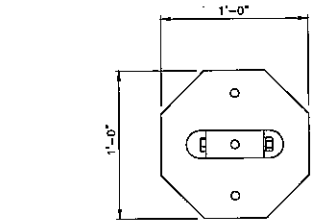
SITE ADDRESS:
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

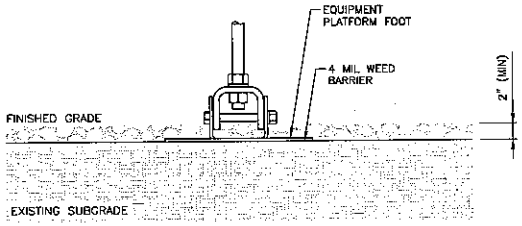
SHEET DESCRIPTION:
EQUIPMENT DETAILS

SHEET NUMBER:
C-5

CABINET	DIMENSIONS	WEIGHT FULLY LOADED
CABINET	79.53"Hx27.56"Wx27.56"D	738.7 lbs
DISH	3'-0"ø	28.0 lbs

EQUIPMENT LOADING
NOT TO SCALE





NOTE:

1. CONTRACTOR TO BURY PLATFORM FEET WITH A MINIMUM OF 2" OF FILL PER EXISTING SITE SURFACE
2. WEED BARRIER FABRIC TO BE ADDED AT DISCRETION OF DISH WIRELESS CONSTRUCTION MANAGER AT TIME OF CONSTRUCTION. TO BE INSTALLED AS ONE SHEET 8'-0" x 8'-0" UNDER ALL FOUR FEET OF THE PLATFORM (4 MIL BLACK PLASTIC)

EQUIPMENT PLATFORM FOOT DETAIL
NOT TO SCALE

1/28/2019

PLANS PREPARED FOR:
dish WIRELESS

PROJECT MANAGER:
CROWN CASTLE

PLANS PREPARED BY:
PM&A
P. MARSHALL & ASSOCIATES

DRAWN BY:	JDJ
CHECKED BY:	MSB
APPROVED:	

SUBMITTALS:

DESCRIPTION	DATE	BY	REV
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ISSUED FOR CONSTRUCTION	01/14/19	JDJ	0

PM&A PROJECT NUMBER:
CCD18-021

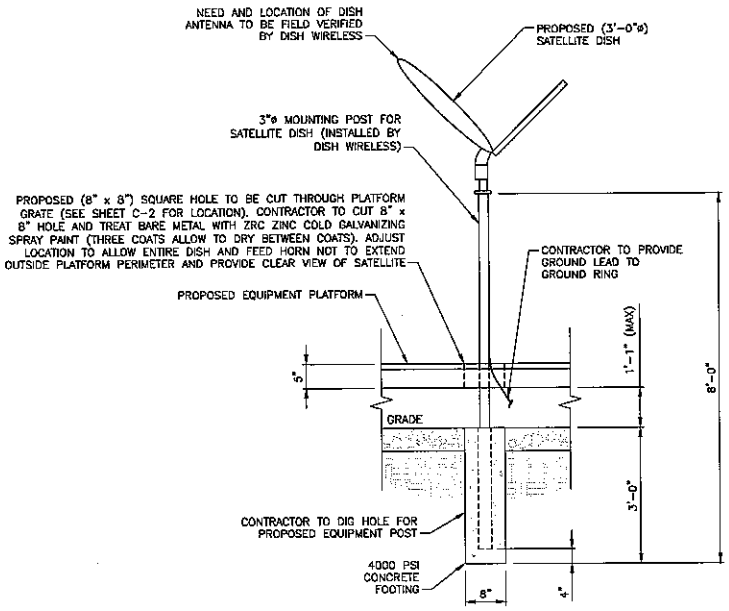
DISH WIRELESS SITE ID:
CT0100003A

TOWER OWNER SITE ID:
829013

SITE ADDRESS:
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

SHEET DESCRIPTION:
CIVIL DETAILS

SHEET NUMBER:
C-6



EQUIPMENT POST ELEVATION
NOT TO SCALE

STATE OF CONNECTICUT
SHAWN A.M. SWEENEY
PEN.0022757
LICENSED PROFESSIONAL ENGINEER
1/28/2019

PLANS PREPARED FOR:
dish WIRELESS

PROJECT MANAGER:
CROWN CASTLE

PLANS PREPARED BY:
PM&A
P. MARSHALL & ASSOCIATES

DRAWN BY:	JDJ
CHECKED BY:	MSB
APPROVED:	

SUBMITTALS:

DESCRIPTION	DATE	BY	REV
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ISSUED FOR CONSTRUCTION	01/14/19	JDJ	0

PM&A PROJECT NUMBER:
CCD18-021

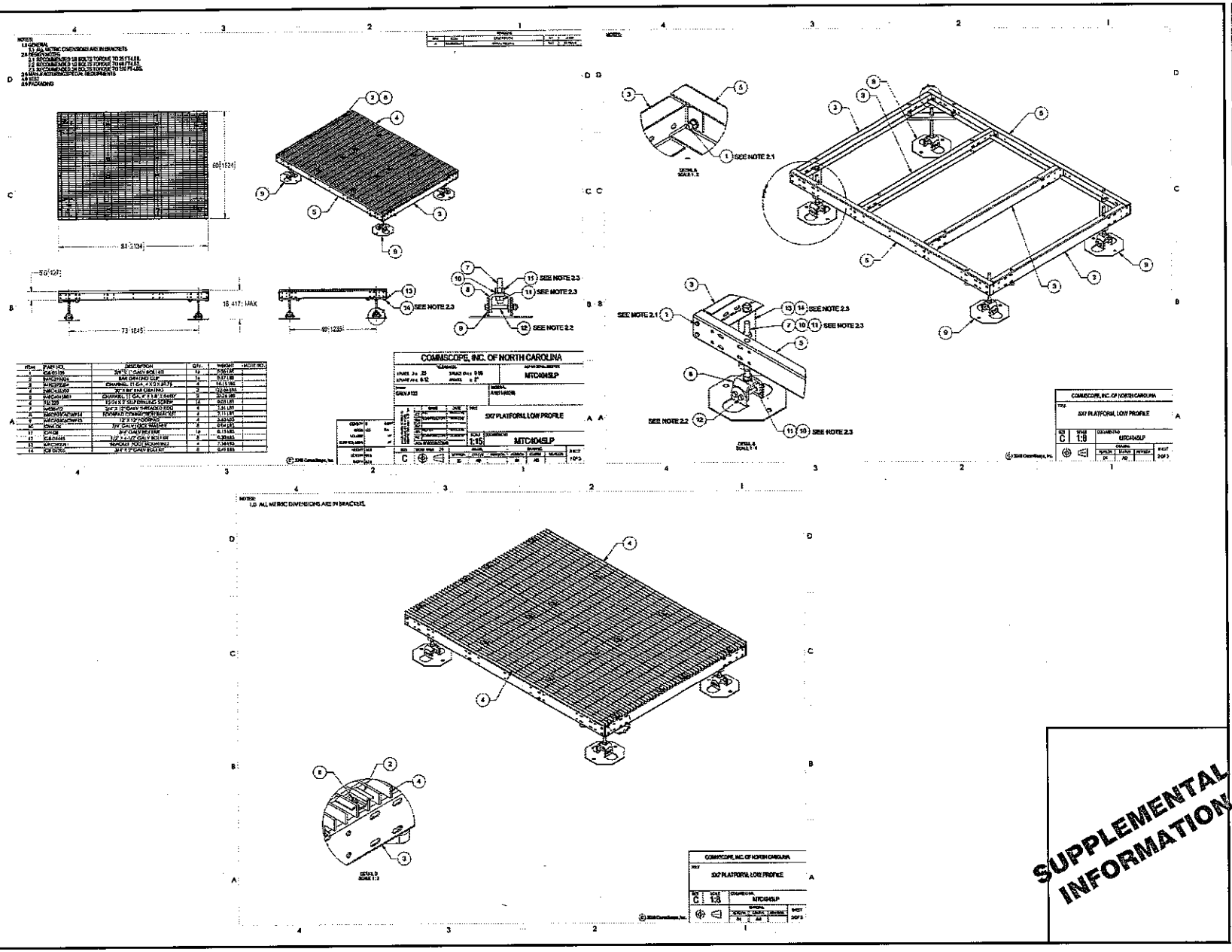
DISH WIRELESS SITE ID:
CT0100003A

TOWER OWNER SITE ID:
829013

SITE ADDRESS:
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

SHEET DESCRIPTION:
CIVIL DETAILS

SHEET NUMBER:
C-7



PLANS PREPARED FOR:

dish WIRELESS

PROJECT MANAGER:

CROWN CASTLE

PLANS PREPARED BY:

PM&A
P. MARSHALL & ASSOCIATES

DRAWN BY:	JDJ
CHECKED BY:	MSB
APPROVED:	

SUBMITTALS:

DESCRIPTION	DATE	BY	REV
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ISSUED FOR CONSTRUCTION	01/14/19	JDJ	0

PM&A PROJECT NUMBER:

CCD18-021

DISH WIRELESS SITE ID:

CT0100003A

TOWER OWNER SITE ID:

829013

SITE ADDRESS:

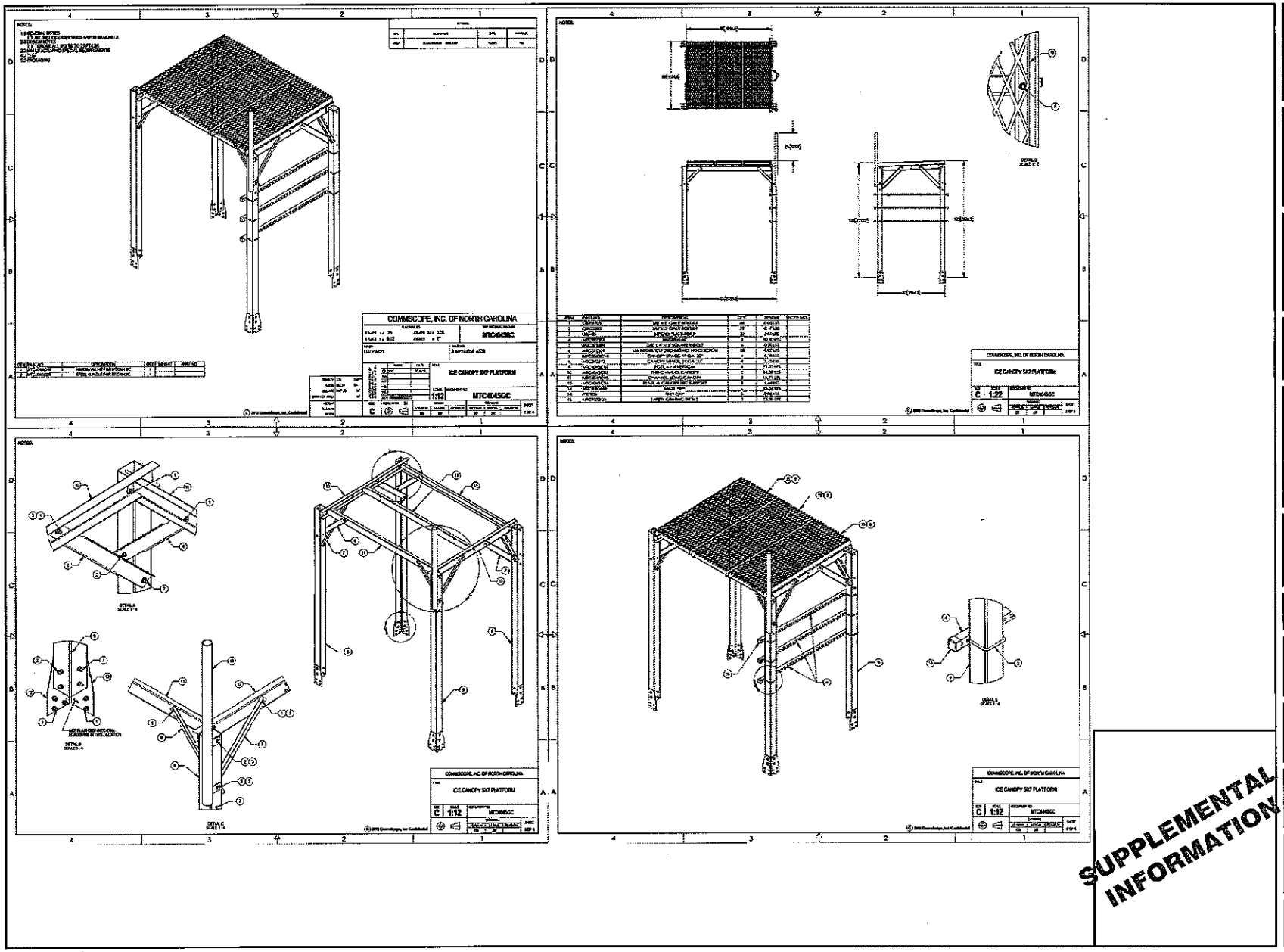
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

SHEET DESCRIPTION:

PLATFORM DETAILS

SHEET NUMBER:

C-8



SUPPLEMENTAL INFORMATION

PLANS PREPARED FOR:

dish WIRELESS

PROJECT MANAGER:

CROWN CASTLE

PLANS PREPARED BY:

PM&A
P. MARSHALL & ASSOCIATES

DRAWN BY:	JDJ
CHECKED BY:	MSB
APPROVED:	

SUBMITTALS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR REVIEW	12/07/18	JDJ	A
ISSUED FOR CONSTRUCTION	01/14/19	JDJ	0

PM&A PROJECT NUMBER:

CCD18-021

DISH WIRELESS SITE ID:

CT0100003A

TOWER OWNER SITE ID:

829013

SITE ADDRESS:

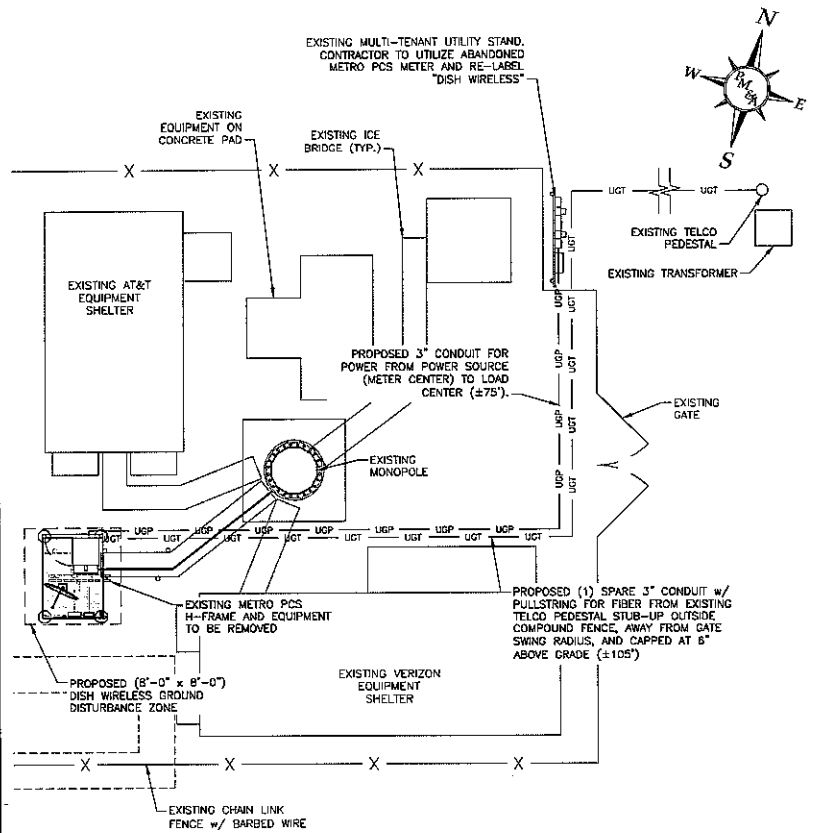
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

SHEET DESCRIPTION:

PLATFORM CANOPY DETAILS

SHEET NUMBER:

C-8.1



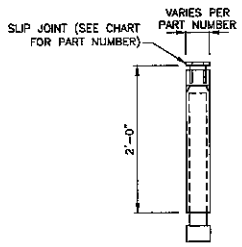
COMPOUND UTILITY PLAN
SCALE: 1" = 10'

10 0 10
SCALE: 1" = 10'

NOTES:
1. CONTRACTOR SHALL ARRANGE CONDUITS, WIRING, EQUIPMENT AND OTHER WORK AS SHOWN ON THIS PLAN AND SHEET E-2, PROVIDING REQUIRED CLEARANCES AND ACCESS PER NEC. WHERE FIELD ADJUSTMENTS ARE NECESSARY, COORDINATE WITH SITE CM AND DISH WIRELESS.
2. PULL BOX(ES) ARE REQUIRED WHEN THE EQUIVALENT OF THREE 90 DEGREE BENDS MAX, INCLUDING THE BENDS LOCATED AT AN OUTLET OR FITTING, ARE USED BETWEEN PULL POINTS; 150 FEET OF CONDUIT LENGTH IS EQUIVALENT TO AN ADDITIONAL 90 DEGREES.

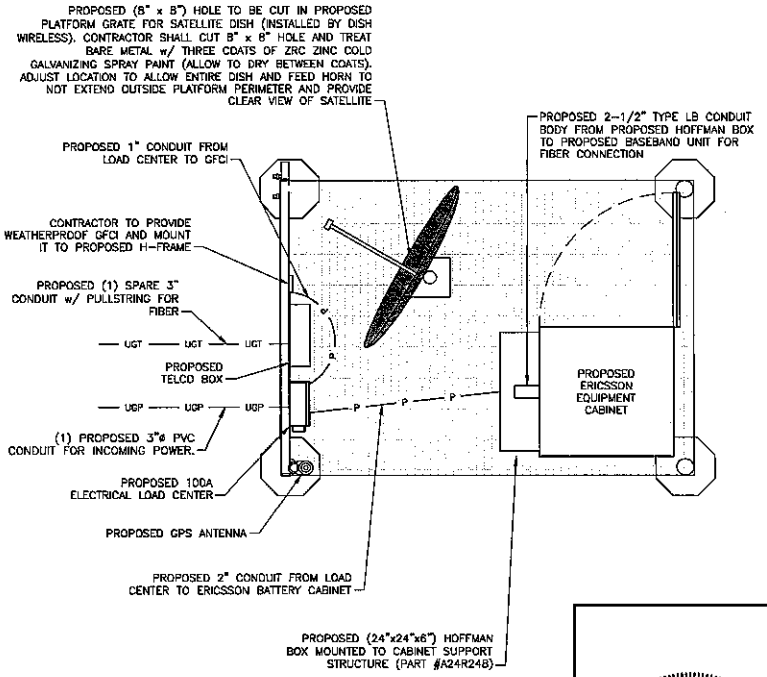
UTILITY NOTES:
1. CONTRACTOR TO COORDINATE SERVICE ROUTING & CONNECTION WITH LOCAL TELEPHONE AND POWER COMPANIES.
2. CONTRACTOR SHALL FOLLOW LOCAL UTILITY COMPANY STANDARDS WHEN CONNECTING TO UTILITIES, PROVIDING REQUIRED CLEARANCES AND ACCESS PER NEC. LOCAL AND STATE BUILDING CODES SHALL GOVERN IN CASES WHERE UTILITY CO. STANDARDS DIFFER.
3. CONTRACTOR TO PROVIDE SPARE 3" TELCO CONDUIT w/ PULLSTRING FOR POTENTIAL FUTURE FIBER APPLICATIONS.

NOTE:
CONTRACTOR TO INSTALL EXPANSION FITTING SLIP JOINT AT METER CENTER CONDUIT TERMINATION, AS PER LOCAL UTILITY POLICY, ORDINANCE AND/OR SPECIFIED REQUIREMENT.



CARLON EXPANSION FITTINGS

COUPLING END PART #	MALE TERMINAL ADAPTER END PART #	SIZE	STD. CTN. QTY.	TRAVEL LENGTH
E945D	E945DX	1/2"	20	4"
E945E	E945EX	3/4"	15	4"
E945F	E945FX	1"	10	4"
E945G	E945GX	1 1/4"	5	4"
E945H	E945HX	1 1/2"	5	4"
E945J	E945JX	2"	15	8"
E945K	E945KX	2 1/2"	10	8"
E945L	E945LX	3"	10	8"
E945M	E945MX	3 1/2"	5	8"
E945N	E945NX	4"	5	8"
E945P	E945PX	5"	1	8"
E945R	E945RX	6"	1	8"



EQUIPMENT PLATFORM UTILITY PLAN
NOT TO SCALE

NOTES:
1. ELECTRICAL ROUTING IS A SCHEMATIC. THE CONTRACTOR SHALL VERIFY EQUIPMENT LOCATION AND ELECTRICAL ROUTING PRIOR TO INSTALLATION.

INSTALLER NOTE:
SCHEMATIC LAYOUT ONLY. REFER TO COMPOUND PLAN DRAWING FOR EXACT EQUIPMENT LAYOUT.

PLANS PREPARED FOR:
dish WIRELESS

PROJECT MANAGER:
CROWN CASTLE

PLANS PREPARED BY:
PM&A
P. MARSHALL & ASSOCIATES

DRAWN BY:	JDJ
CHECKED BY:	MSB
APPROVED:	

SUBMITTALS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR REVIEW	12/07/18	JDJ	A
ISSUED FOR CONSTRUCTION	01/14/19	JDJ	B

PM&A PROJECT NUMBER:
CCD18-021

DISH WIRELESS SITE ID:
CT0100003A

TOWER OWNER SITE ID:
829013

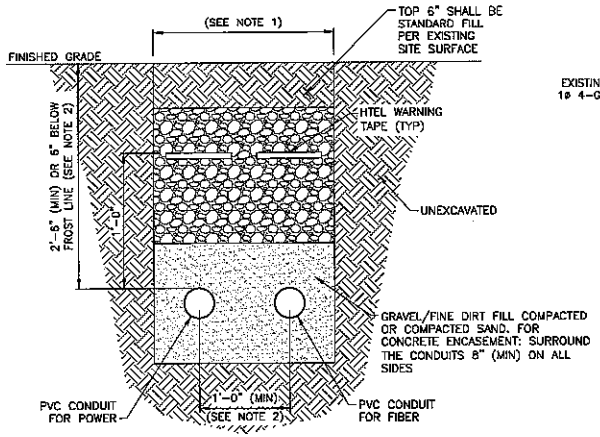
SITE ADDRESS:
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

SHEET DESCRIPTION:
UTILITY PLANS

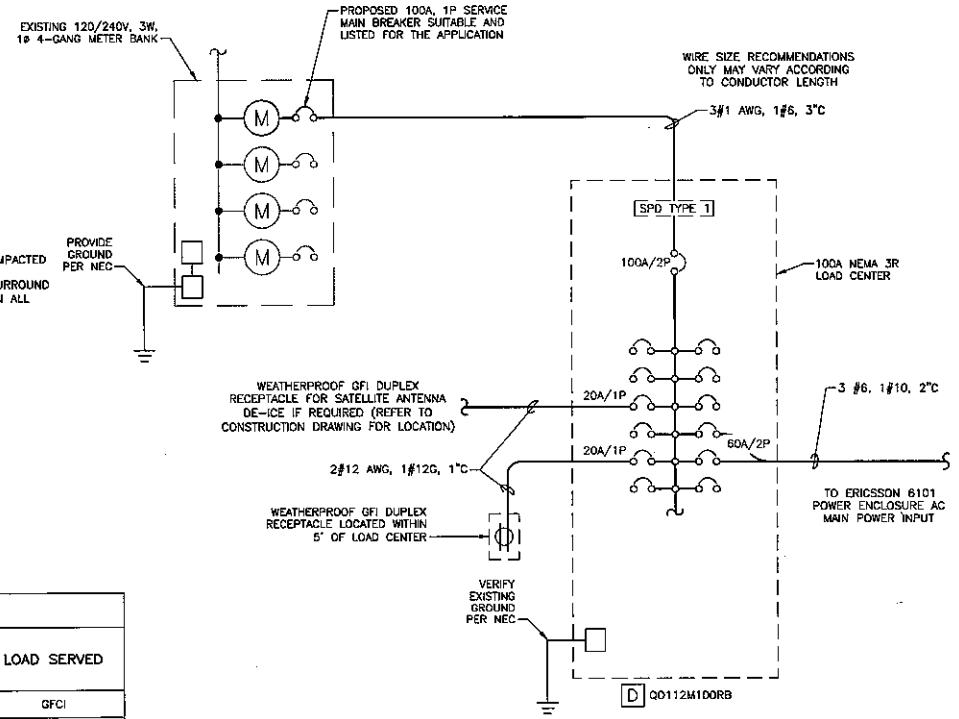
SHEET NUMBER:
E-1

CONDUIT TRENCH NOTE:

1. WIDTH OF TRENCH AS REQUIRED BY UTILITY COMPANY OR PER QUANTITY OF CONDUITS AND LOCAL CODE REQUIREMENTS
2. VERIFY DISTANCE PER LOCAL CODE, UTILITY COMPANY, AND CLIENT REQUIREMENTS



CONDUIT TRENCH DETAIL
NOT TO SCALE



ELECTRICAL ONE-LINE DIAGRAM
NOT TO SCALE

PROPOSED 100A, 120/240V, POWER PANEL

LOAD SERVED	VOLT AMPERES (WATTS) L1	VOLT AMPERES (WATTS) L2	TRIP	CKT#	PHASE	CKT#	TRIP	VOLT AMPERES (WATTS) L1	VOLT AMPERES (WATTS) L2	LOAD SERVED
RECTIFIER	2000		60	1	A	2	20	180		GFCI
		2000		3	B	4	20		180	GFCI
SPARE	-		-	5	A	6	-	-		SPARE
SPARE		-	-	7	B	8	-		-	SPARE
SPARE	-		-	9	A	10	-	-		SPARE
SPARE		-	-	11	B	12	-		-	SPARE
VOLT AMPS	2000	2000						180	180	VOLT AMPS

L1 VOLT AMPERES	2180	2180	L2 VOLT AMPERES
L1 AMPS	18.2	18.2	L2 AMPS
	18.2		MAX AMPS
	22.8		MAX AMPS x125%

STATE OF CONNECTICUT · SHAWN A.M. SMILEY · PEN.0032757 · LICENSED PROFESSIONAL ENGINEER
1/28/2019

PLANS PREPARED FOR:
dish WIRELESS

PROJECT MANAGER:
CROWN CASTLE

PLANS PREPARED BY:
PM&A
P. MARSHALL & ASSOCIATES

DRAWN BY:	JDJ
CHECKED BY:	MSB
APPROVED:	

SUBMITTALS:

DESCRIPTION	DATE	BY	REV
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CT0100003A

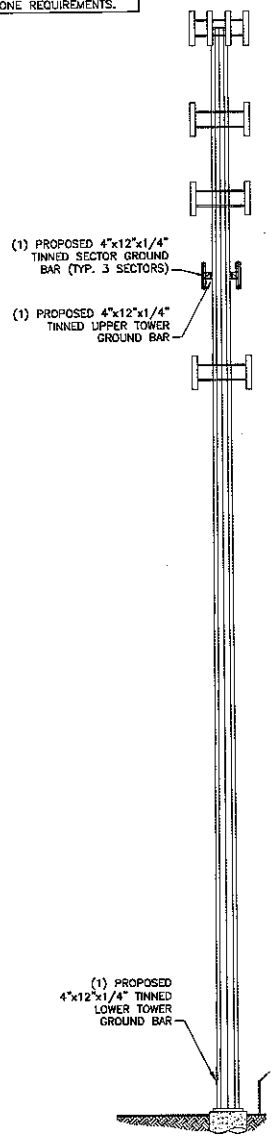
TOWER OWNER SITE ID:
829013

SITE ADDRESS:
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

SHEET DESCRIPTION:
UTILITY PLANS

SHEET NUMBER:
E-2

NOTE: ADD MID TOWER GROUND BUS BAR WHERE APPLICABLE PER LIGHTNING ZONE REQUIREMENTS.



TOWER ELEVATION GROUNDING
NOT TO SCALE

LEGEND

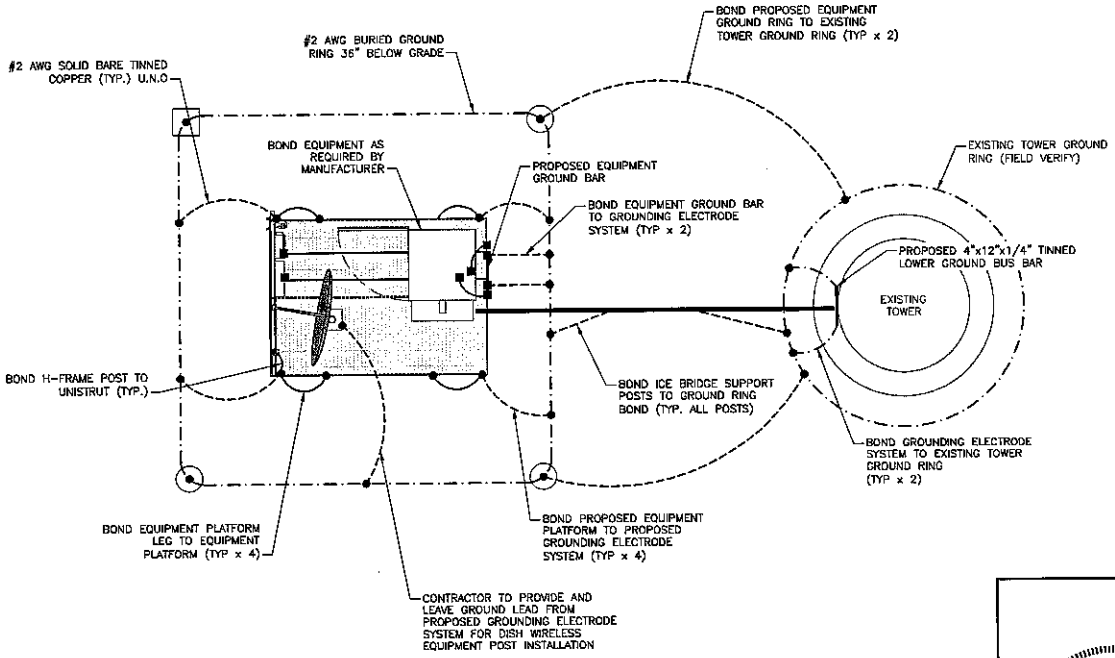
- GROUNDING CONDUCTOR – ABOVE GRADE
- GROUNDING CONDUCTOR – BELOW GRADE
- GROUNDING ELECTRODE SYSTEM
- EXOTHERMIC CONNECTION
- MECHANICAL CONNECTION
- GROUND INSPECTION/TEST WELL
- GROUND ROD

INSTALLER NOTE:

SCHEMATIC LAYOUT ONLY. REFER TO SHEETS C-1 AND C-2 FOR EXACT EQUIPMENT LAYOUT, SIZES AND LOCATIONS OF ICE BRIDGE AND ANTENNA SUPPORT STRUCTURE.

TOWER GROUNDING NOTE:

ALL CONNECTIONS TO BE MECHANICAL ON TOWER. EXOTHERMIC WELDS ARE ONLY ALLOWED AT GRADE.



TYPICAL GROUNDING PLAN SCHEMATIC
NOT TO SCALE

PLANS PREPARED FOR:
dish WIRELESS

PROJECT MANAGER:
CROWN CASTLE

PLANS PREPARED BY:
PM&A
P. MARSHALL & ASSOCIATES

DRAWN BY:	JDJ
CHECKED BY:	MSB
APPROVED:	

SUBMITTALS:

DESCRIPTION	DATE	BY	REV
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PM&A PROJECT NUMBER:
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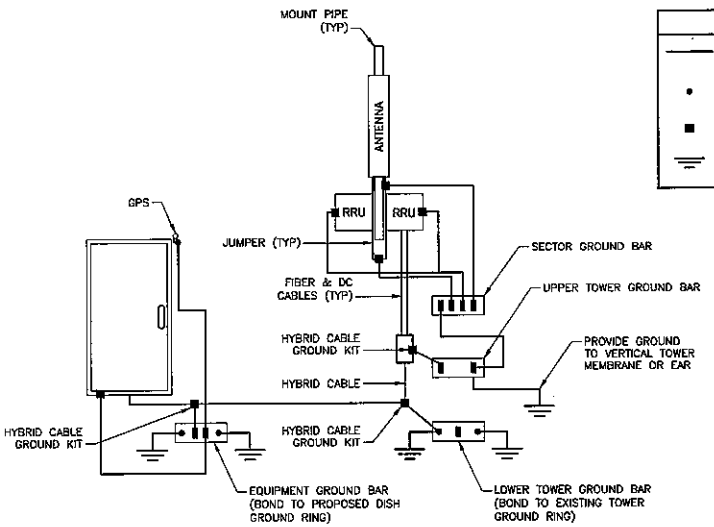
DISH WIRELESS SITE ID:
CT0100003A

TOWER OWNER SITE ID:
829013

SITE ADDRESS:
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

SHEET DESCRIPTION:
GROUNDING NOTES AND DETAILS

SHEET NUMBER:
G-1

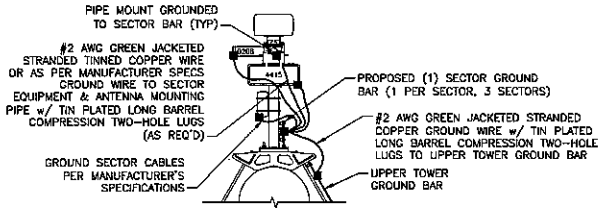


GROUNDING RISER DIAGRAM (TYP. PER SECTOR)
NOT TO SCALE

LEGEND	
	GROUNDING CONDUCTOR – ABOVE GRADE
•	EXOTHERMIC CONNECTION
■	MECHANICAL CONNECTION
	GROUND ROD

TOWER GROUNDING NOTE:

ALL CONNECTIONS TO BE MECHANICAL ON TOWER. ALL GROUNDS TO BE MECHANICAL CONNECTION ABOVE GRADE. EXOTHERMIC WELDS ARE ONLY ALLOWED AT GRADE.



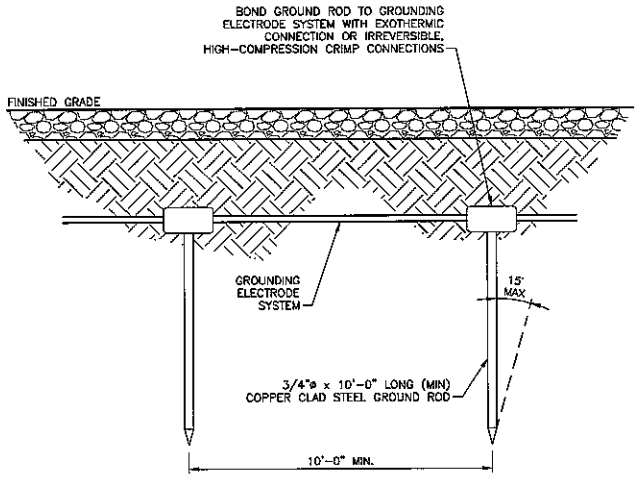
NOTE:

1. SEE SHEET G-3 FOR GROUND BAR DETAILS.
2. #2 STRANDED GREEN INSULATED COPPER WIRE FROM RADIOS AND ANTENNAS TO ANTENNA BUSBAR.
3. #2 STRANDED GREEN INSULATED COPPER WIRE FROM ANTENNA BUS BAR TO TOP TOWER BUSBAR.
4. ADD MID GROUND BUS BAR WHERE APPLICABLE PER LIGHTNING ZONE REQUIREMENTS.

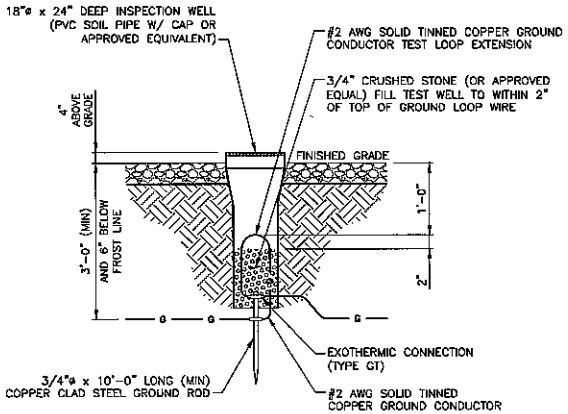
NOTE:

GROUNDING SHOWN FOR (1) SECTOR ONLY. GROUNDING REQUIRED FOR ALL (3) SECTORS.

GROUND BAR AT MOUNT
NOT TO SCALE



GROUND ROD DETAIL
NOT TO SCALE



TEST WELL DETAIL
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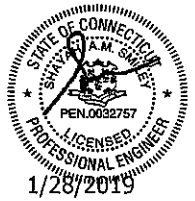


1/28/2019

PLANS PREPARED FOR:
dish WIRELESS

PROJECT MANAGER:
CROWN CASTLE

PLANS PREPARED BY:
PM&A
P. MARSHALL & ASSOCIATES

DRAWN BY:	JDJ
CHECKED BY:	MSB
APPROVED:	

SUBMITTALS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR REVIEW	12/07/18	JDJ	A
ISSUED FOR CONSTRUCTION	01/14/19	JDJ	0

PM&A PROJECT NUMBER:
CCD18-021

DISH WIRELESS SITE ID:
CT0100003A

TOWER OWNER SITE ID:
829013

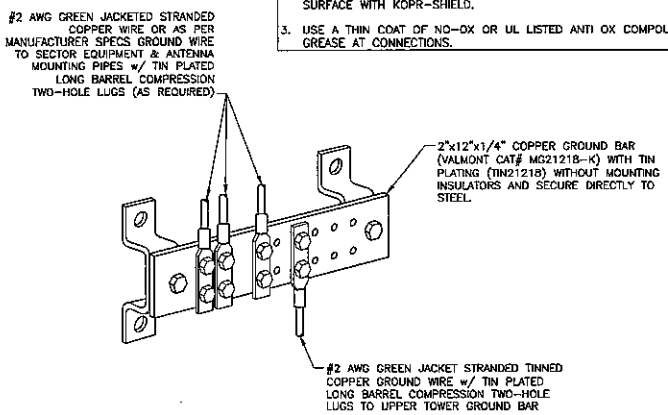
SITE ADDRESS:
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

SHEET DESCRIPTION:
GROUNDING NOTES AND DETAILS

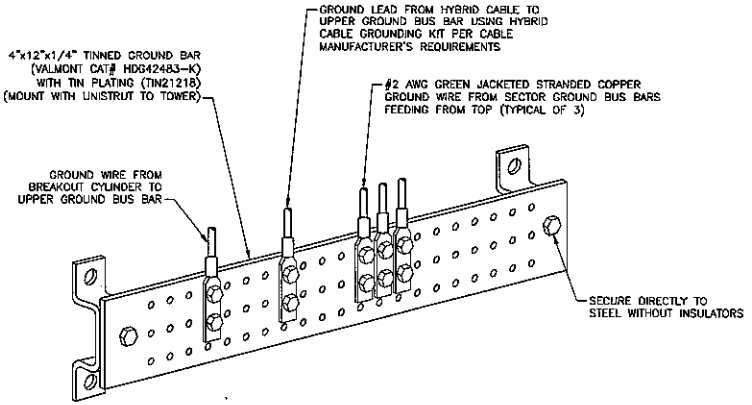
SHEET NUMBER:
G-2

NOTES:

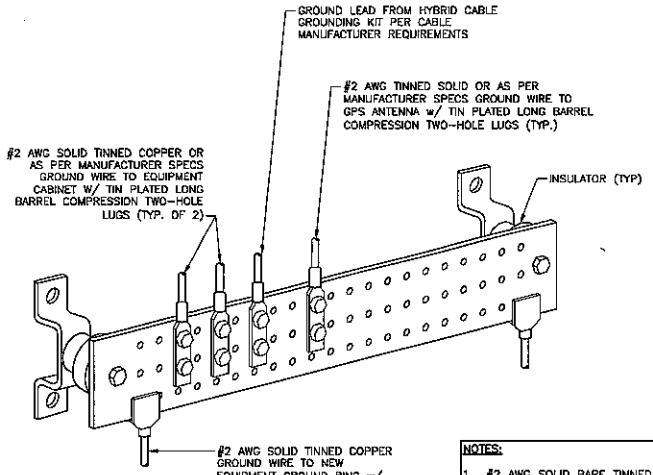
1. ALL HARDWARE SHALL BE 18-8 STAINLESS STEEL INCLUDING BELLEVILLE WASHERS, COAT ALL SURFACES WITH KOPR-SHIELD BEFORE MATING.
2. IF BONDING TO STEEL: INSERT A TOOTH WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACE WITH KOPR-SHIELD.
3. USE A THIN COAT OF NO-OX OR UL LISTED ANTI OX COMPOUND OR EQUIVALENT GREASE AT CONNECTIONS.



SECTOR GROUND BAR DETAIL
NOT TO SCALE



UPPER TOWER GROUND BAR DETAIL
NOT TO SCALE



EQUIPMENT GROUND BAR DETAIL
NOT TO SCALE

NOTES:

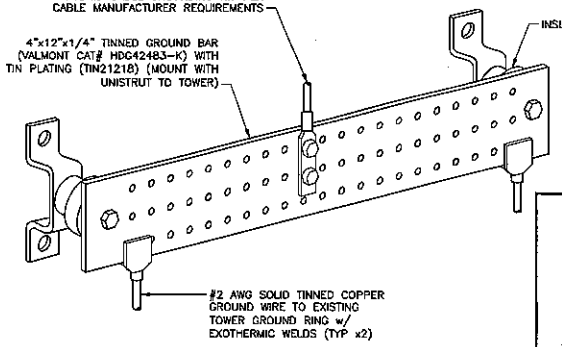
1. #2 AWG SOLID BARE TINNED COPPER CONDUCTOR FROM EACH ICE BRIDGE POST TO EXTERNAL GROUNDING SYSTEM USING EXOTHERMIC WELDS.
2. IN CASES OF SHEATHED STRANDED CONDUCTORS, CONNECTOR SHALL HAVE INSPECTION WINDOW AND NO MORE THAN 1/8" GAP BETWEEN CONNECTOR BODY AND SHEATH.

NOTE:

GROUND FROM SATELLITE DISH TO EQUIPMENT GROUND RING WHEN APPLICABLE

NOTE:

#2 AWG SOLID TINNED COPPER GROUND CONDUCTOR FROM ICE BRIDGE POSTS TO SHELTER GROUND RING USING EXOTHERMIC WELDS.



LOWER TOWER GROUND BAR DETAIL
NOT TO SCALE

STATE OF CONNECTICUT
MATTHEW A.M. SHEEHY
PEN.0032757
LICENSED
PROFESSIONAL ENGINEER
1/28/2019

PLANS PREPARED FOR:
dish WIRELESS

PROJECT MANAGER:
CROWN CASTLE

PLANS PREPARED BY:
PM&A
P. MARSHALL & ASSOCIATES

DRAWN BY:	JDJ
CHECKED BY:	MSB
APPROVED:	

SUBMITTALS:

DESCRIPTION	DATE	BY	REV
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ISSUED FOR CONSTRUCTION	01/14/19	JDJ	0

PM&A PROJECT NUMBER:
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DISH WIRELESS SITE ID:
CT0100003A

TOWER OWNER SITE ID:
829013

SITE ADDRESS:
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

SHEET DESCRIPTION:
GROUNDING NOTES AND DETAILS

SHEET NUMBER:
G-3

dish

RF Design Data Sheet

Site Information			
State	CT	Site ID	CT0100003A
Site Name	829013	Tower Type	MONOPOLE
Address	471 Quaker Ln S	City	West Hartford
Latitude (degrees)	41.748775	Zip	06110
Longitude (degrees)	-72.73135	Tower Owner	Crown
RFDS Revision	0.0	Issue Date	11/12/2018
RF Engineer	Chirag.Nagpal	9582894567	Chirag.Nagpal@ericsson.com

Design Information			
Technology	NB-IoT		
Vendor	Ericsson		
Site Configuration	4415-2 No Band 29		
Site Type - Equipment - Band	AWS-4		
Sector Information (Expected Configuration)	**Sector-1 (Alpha)**	**Sector-2 (Beta)**	**Sector-3 (Gamma)**
LTE Sector Number	CT0100003A_1	CT0100003A_2	CT0100003A_3
Antenna Center Line (ft)	90	90	90
Antenna Model Number	ODI2-065R18K-GQ	ODI2-065R18K-GQ	ODI2-065R18K-GQ
Number of Antennas / Sector	1	1	1
Antenna Dimensions (LxWxD) (in)	53.5 x 9.8 x 2.4	53.5 x 9.8 x 2.4	53.5 x 9.8 x 2.4
Antenna Weight (lbs.)	25	25	25
Antenna Manufacturer	Comba	Comba	Comba
Horizontal Beamwidth	64	64	64
Gain (dBd)	17.8	17.8	17.8
Azimuth (deg) (Relative to True North)	15	120	240
Antenna Downtilt (Mechanical)	0	0	0
Antenna Downtilt 2100 (Electrical)	2	2	1
Antenna Downtilt 700 (Electrical)	4	4	4
Radio Model (Band 70)	Radio 4415	Radio 4415	-
Radio Quantity (Band 70)	1	1	-
Radio Model (H-Block)	Radio 0208	Radio 0208	Radio 0208
Radio Quantity (H-Block)	1	1	1
Radio Model (700 band)	-	-	-
Radio Quantity (700 band)	-	-	-
Number of Feeders / Sector	4	4	4
Feeder Diameter (Nominal) (in)	1/2	1/2	1/2
Feeder Length (m)	3	3	3
700 MHz Radio location	-	-	-
700 MHz Coax Cable Type (in)	-	-	-
TX/RX Diplexer Model			
TX/RX Diplexer Qty			
TX/RX Diplexer Dim (inch) / Wt (lbs)			

Description of Cabling Configuration Changes / Additions

Mandatory : Append Sketches indicating Locations of all new Antennas, Cabling, Duplexor, Diplexors (if applicable), TMA's etc.

Sector Alpha	
Sector Beta	
Sector Gamma	
General Comments	12/11/18 - NEW RFDS

NOTE:

CONTRACTOR TO REFER TO, AND VALIDATE, THE LATEST RFDS PRIOR TO CONSTRUCTION.

SUPPLEMENTAL INFORMATION

PLANS PREPARED FOR:

dish WIRELESS

PROJECT MANAGER:

CROWN CASTLE

PLANS PREPARED BY:

PM&A
P. MARSHALL & ASSOCIATES

DRAWN BY:	JDJ
CHECKED BY:	MSB
APPROVED:	

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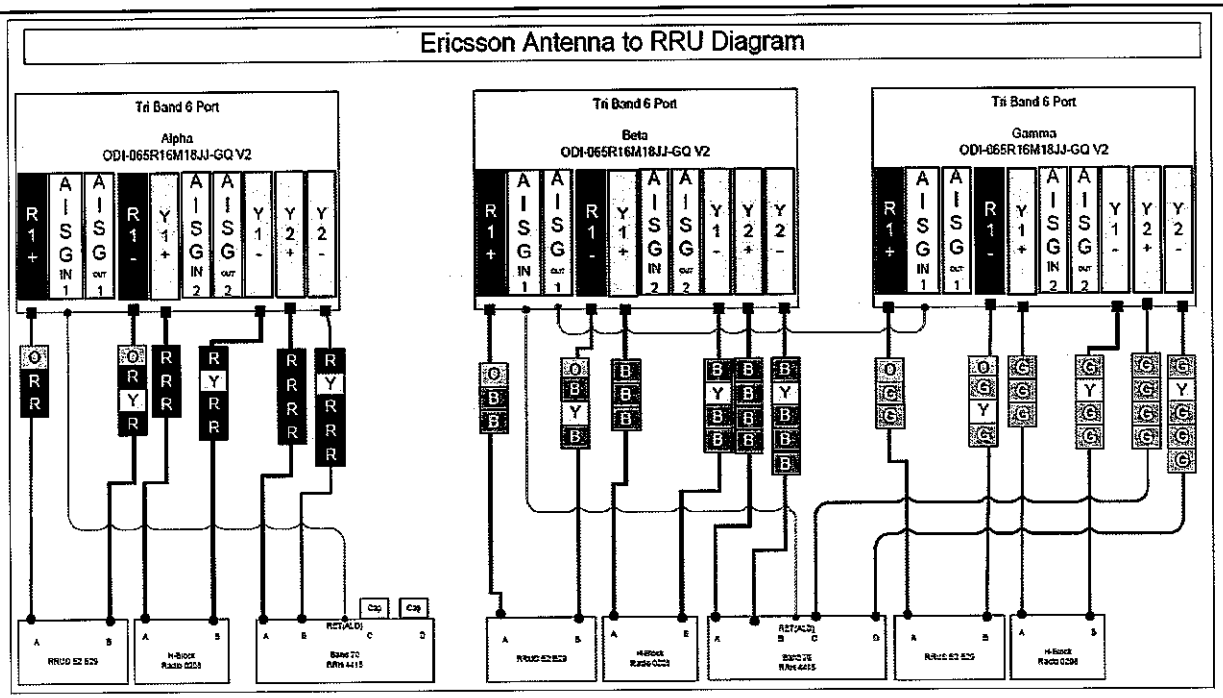
829013

SITE ADDRESS:
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

SHEET DESCRIPTION:
RF DATA SHEET

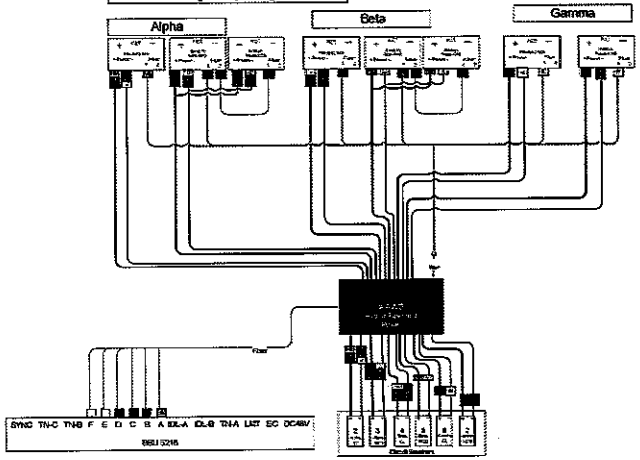
SHEET NUMBER:
RF-1

Ericsson Antenna to RRU Diagram



Ericsson 3-3-2 Configuration Plumbing diagram

Ericsson LTE BBU TO RRU Fiber and Power Diagram
(Rosenberger Hybrid cable is used when length ≤ 90m)



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SUPPLEMENTAL INFORMATION

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dish WIRELESS

PROJECT MANAGER:
CROWN CASTLE

PLANS PREPARED BY:
PM&A
P. MARSHALL & ASSOCIATES

DRAWN BY:	JDJ
CHECKED BY:	MSB
APPROVED:	

SUBMITTALS:

DESCRIPTION	DATE	BY	REV
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ISSUED FOR CONSTRUCTION	01/14/19	JDJ	0

PM&A PROJECT NUMBER:
CCD18-021

DISH WIRELESS SITE ID:
CT0100003A

TOWER OWNER SITE ID:
829013

SITE ADDRESS:
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

SHEET DESCRIPTION:
PLUMBING DIAGRAM

SHEET NUMBER:
RF-2

Date: **December 06, 2018**

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

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

Subject:	**Structural Analysis Report**	
Carrier Designation:	***DISH Network* Co-Locate** **Carrier Site Number:**	 CT0100003A
Crown Castle Designation:	**Crown Castle BU Number:** **Crown Castle Site Name:** **Crown Castle JDE Job Number:** **Crown Castle Work Order Number:** **Crown Castle Order Number:**	829013 WEST HARTFORD/I-84/X43 545209 1663144 468466 Rev. 3
Engineering Firm Designation:	**Crown Castle Project Number:**	1663144
Site Data:	**467 South Quaker Lane (Church of St. Mark),** **West Hartford, Hartford County, CT** **Latitude *41° 44' 55.59"*, Longitude *-72° 43' 52.86"*** **119.083 Foot - Monopole Tower**	

Dear Denice Nicholson,

Crown Castle is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower.

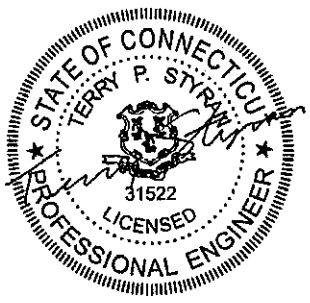
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Proposed Equipment Configuration **Sufficient Capacity**

This analysis utilizes an ultimate 3-second gust wind speed of 125 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Daniel Chen / RTC

Respectfully submitted by:



Terry P. Styran, P.E.
Senior Project Engineer

12/6/2018

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 119.083 ft. Monopole tower designed by Pirod Manufactures Inc. The tower has been modified multiple times in the past to accommodate additional loading.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	125 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	2 in
Wind Speed with Ice:	50 mph
Seismic Ss:	0.181
Seismic S1:	0.064
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
90.0	90.0	3	comba telecom	ODI2-065R18K-GQ w/ Mount Pipe	1	7/8
		3	ericsson	RADIO 0208		
		2	ericsson	RADIO 4415		
		1	tower mounts	Side Arm Mount [SO 201-3]		

Table 2 - Other Considered Equipment

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	3	ericsson	AIR -32 B2A/B66AA w/ Mount Pipe	2 12	1-1/2 1-5/8
		3	ericsson	AIR 3246 B66 w/ Mount Pipe		
		3	ericsson	KRY 112 144/1		
		3	ericsson	KRY 112 144/2		
		3	ericsson	RADIO 4449 B12/B71		
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		
		1	tower mounts	Platform Mount [LP 404-1]		
115.0	115.0	1	andrew	VHLP2-18	1	1/2
		1	tower mounts	Side Arm Mount [SO 102-3]		
110.0	110.0	1	andrew	SBNH-1D6565C w/ Mount Pipe	2 2 2 12 1	3/8 7/16 3/4 1-5/8 Conduit
		1	cci antennas	TPA-65R-LCUUUU-H8 w/ Mount Pipe		
		6	cci antennas	TPX-070821		
		3	ericsson	RRUS 11		
		3	ericsson	RRUS 32		
		3	ericsson	RRUS 32 B2		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		2	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe		
		3	powerwave technologies	1001983		
		6	powerwave technologies	7020.00		
		3	powerwave technologies	7770.00 w/ Mount Pipe		
		6	powerwave technologies	LGP21401		
		2	quintel technology	QS66512-3 w/ Mount Pipe		
		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	alcatel lucent	RRH2X60-PCS	14	1-5/8
		3	alcatel lucent	RRH2x60-700		
		3	alcatel lucent	RRH2x60-AWS		
		3	amphenol	BXA-80063-4BF-EDIN-X w/ Mount Pipe		
		2	andrew	LNX-6514DS-T4M w/ Mount Pipe		
		1	antel	BXA-70063-6CF-EDIN-0 w/ Mount Pipe		
		6	commscope	SBNHH-1D65B w/ Mount Pipe		
		2	rfs celwave	DB-T1-6Z-8AB-0Z		
		1	tower mounts	Platform Mount [LP 403-1]		
80.0	83.0	1	andrew	VHLP2-23	1 1 3 1	5/16 1-1/2 1-5/8 Conduit
	81.0	6	alcatel lucent	800MHZ 2X50W RRH		
		3	alcatel lucent	PCS 1900MHZ 4X45W-65MHZ		
		3	commscope	NNVV-65B-R4 w/ Mount Pipe		
		3	nokia	AAHC w/ Mount Pipe		
	80.0	1	clearwire	CW JUNCTION BOX		
		1	site pro	VFA10-HD3L4NP		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	TEP	3636697	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	TEP (Mapping)	3636698	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Pirod	3525378	CCISITES

Document	Remarks	Reference	Source
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	TEP	5650111	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Natcomm	3525386	CCISITES
4-POST-MODIFICATION INSPECTION	SGS	5852136	CCISITES
4-POST-MODIFICATION INSPECTION	Natcomm	3974228	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

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

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	119.083 - 101.083	Pole	TP26x22.13x0.25	1	-8.76	1533.96	22.1	Pass
L2	101.083 - 66.5	Pole	TP34.063x24.873x0.313	2	-21.69	2475.52	58.6	Pass
L3	66.5 - 32.8333	Pole	TP41.75x32.498x0.375	3	-30.53	3620.55	66.5	Pass
L4	32.8333 - 0	Pole	TP49.063x39.849x0.375	4	-42.63	4126.52	78.7	Pass
							Summary	
						Pole (L4)	78.7	Pass
						Rating =	78.7	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	95.0	Pass
1	Base Plate	0	96.4	Pass
1	Base Foundation Structure	0	63.6	Pass
1	Base Foundation Soil Interaction	0	91.0	Pass

Structure Rating (max from all components) =	96.4%

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

4.1) Recommendations

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

Length (ft)	18.00	37.50	37.50	37.50				
Number of Sides	18	18	18	18				
Thickness (in)	0.250	0.313	0.375	0.375				
Socket Length (ft)	2.92	3.83	4.67					
Top Dia (in)	22.130	24.873	32.498	39.949				
Bot Dia (in)	26.000	34.063	41.750	49.063				
Grade					A572-65			
Weight (K)	1.2	3.7	5.6	6.7				17.1

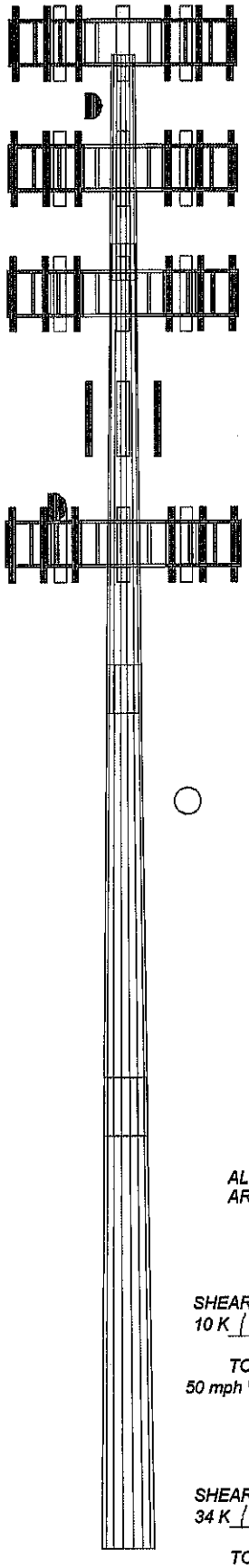
119.1 ft

101.1 ft

66.5 ft

32.8 ft

0.0 ft



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-H Standard.
3. Tower designed for a 125 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.70 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TIA-222-H Annex S
9. TOWER RATING: 78.7%

ALL REACTIONS ARE FACTORED

AXIAL 84 K

SHEAR 10 K

MOMENT 937 kip-ft

TORQUE 0 kip-ft

50 mph WIND - 1.700 in ICE

AXIAL 43 K

SHEAR 34 K

MOMENT 3204 kip-ft

TORQUE 1 kip-ft

REACTIONS - 125 mph WIND

CROWN CASTLE

The Pathway to Possible

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
Phone: (724) 416-2000
FAX:

Job: *BU# 829013*			
Project:			
Client: Crown Castle	Drawn by: Daniel Chen		App'd:
Code: TIA-222-H	Date: 12/05/18		Scale:
Path: R:\SA Models - Letters\Work Area\DChen\WP\829013.WO.18631441829013.eri			Dwg No

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

3) Tower is located in Hartford County, Connecticut.
4) Tower base elevation above sea level: 119.00 ft.
5) Basic wind speed of 125 mph.
6) Risk Category II.
7) Exposure Category C.
8) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
9) Topographic Category: 1.
10) Crest Height 0.00 ft.
11) Nominal ice thickness of 1.700 in.
12) Ice thickness is considered to increase with height.
13) Ice density of 56 pcf.
14) A wind speed of 50 mph is used in combination with ice.
15) Temperature drop of 50 °F.
16) Deflections calculated using a wind speed of 60 mph.
17) TIA-222-H Annex S.
18) A non-linear (P-delta) analysis was used.
19) Pressures are calculated at each section.
20) Stress ratio used in pole design is 1.05.
21) 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-H Bracing Resist. Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-H 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	Ignore KL/ry For 60 Deg. Angle Legs	Pole Without Linear Attachments
		Pole With Shroud Or No Appurtenances
		Outside and Inside Corner Radii Are Known

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

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	(65 ksi) 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	22.433	17.362	1050.090	7.767	11.242	93.407	2101.561	8.683	3.455	13.82
	26.363	20.433	1711.654	9.141	13.208	129.592	3425.561	10.218	4.136	16.544
L2	25.934	24.361	1856.528	8.719	12.635	146.930	3715.500	12.183	3.828	12.248
	34.540	33.476	4817.433	11.981	17.304	278.404	9641.206	16.741	5.445	17.424
L3	33.902	38.235	4984.583	11.404	16.509	301.930	9975.724	19.121	5.060	13.492
	42.336	49.247	10650.982	14.688	21.209	502.192	21315.979	24.628	6.688	17.835
L4	41.570	46.984	9249.061	14.013	20.243	456.899	18510.293	23.496	6.353	16.942
	49.762	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	Exclude From Torque Calculation	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	No	Surface Af (CaAa)	119.00 - 0.00	1	1	0.250 0.250	0.000	0.750	0.220
LDF7-50A(1-5/8)	A	No	Surface Af (CaAa)	119.08 - 0.00	2	2	0.500 0.500	0.000	3.960	0.820
EC4-50(1/2")	B	No	Surface Af (CaAa)	115.00 - 80.00	1	1	0.250 0.250	0.000	1.260	0.160
LDF7-50A(1-5/8")	C	No	Surface Af (CaAa)	100.00 - 0.00	3	3	0.000 0.000	0.000	3.960	0.820
*** 2" Flexible Conduit ***	B	No	Surface Af (CaAa)	80.00 - 0.00	2	2	0.250 0.250	0.000	4.000	0.340
Level 90 DSHYBKIT-18612-XXM(7/8) ****	A	No	Surface Af (CaAa)	90.00 - 0.00	1	1	0.000 0.020	0.000	1.750	1.240

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
120									
LDF7-50A(1-5/8)	A	No	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
							2" Ice	0.00	0.820
MLC HYBRID 6POWER/12FIBER(1-1/2)	A	No	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
							2" Ice	0.00	9.536
*** 110' ***									
LDF7-50A(1-5/8")	C	No	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
							2" Ice	0.00	0.820
WR-VG102ST-BRDA(7/16")	C	No	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
							2" Ice	0.00	0.201
FB-L98B-002-XXX(3/8)	C	No	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
							2" Ice	0.00	0.065
3" Flexible Conduit	C	No	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
							2" Ice	0.00	1.040
WR-VG86ST-BRD(3/4)	C	No	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
							2" Ice	0.00	0.584
FB-L98B-034-XXX(3/8)	C	No	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
							2" Ice	0.00	0.057
*** 115' ***									
EC4-50(1/2")	B	No	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
							2" Ice	0.00	6.586
*** 100' ***									
LDF7-50A(1-5/8")	C	No	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
							2" Ice	0.00	0.820
*** 80' ***									
9207(5/16")	B	No	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
							2" Ice	0.00	0.600
HB158-21U6M48-30F(1-5/8)	B	No	No	Inside Pole	80.00 - 0.00	3	No Ice	0.00	2.390
							1/2" Ice	0.00	2.390
							1" Ice	0.00	2.390
							2" Ice	0.00	2.390
MLC6C-06C-008R-008R(1-1/2)	B	No	No	Inside Pole	0.00 - 0.00	1	No Ice	0.00	1.520
							1/2" Ice	0.00	1.520
							1" Ice	0.00	1.520
							2" Ice	0.00	1.520
***									
****									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	119.08-101.08	A	0.000	0.000	0.000	0.000	0.21
		B	0.000	0.000	0.000	0.000	0.01
		C	0.000	0.000	0.000	0.000	0.11
L2	101.08-66.50	A	0.000	0.000	0.000	0.000	0.44
		B	0.000	0.000	0.000	0.000	0.13
		C	0.000	0.000	0.000	0.000	0.82
L3	66.50-32.83	A	0.000	0.000	0.000	0.000	0.44
		B	0.000	0.000	0.000	0.000	0.30
		C	0.000	0.000	0.000	0.000	0.81
L4	32.83-0.00	A	0.000	0.000	0.000	0.000	0.43
		B	0.000	0.000	0.000	0.000	0.29
		C	0.000	0.000	0.000	0.000	0.79

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	119.08-101.08	A	1.917	0.000	0.000	0.000	0.000	0.65
		B		0.000	0.000	12.206	0.000	0.20
		C		0.000	0.000	0.000	0.000	0.11
L2	101.08-66.50	A	1.865	0.000	0.000	9.011	0.000	1.44
		B		0.000	0.000	21.345	0.000	0.66
		C		0.000	0.000	0.000	0.000	1.10
L3	66.50-32.83	A	1.770	0.000	0.000	12.555	0.000	1.45
		B		0.000	0.000	12.555	0.000	0.95
		C		0.000	0.000	0.000	0.000	1.08
L4	32.83-0.00	A	1.585	0.000	0.000	11.622	0.000	1.34
		B		0.000	0.000	11.622	0.000	0.88
		C		0.000	0.000	0.000	0.000	1.03

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	0.000	0.000	2.108	1.033
L2	101.08-66.50	0.000	0.000	1.039	0.420
L3	66.50-32.83	0.000	0.000	0.161	-0.052
L4	32.83-0.00	0.000	0.000	0.168	-0.052

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

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	5	LDF7-50A(1-5/8)	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 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	32	2" Flexible Conduit	100.00 101.08 - 80.00	1.0000	1.0000
L1	37	DSHYBKIT-18612-XXM(7/8)	101.08 - 90.00	1.0000	1.0000
L2	1	Safety Line 3/8	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	32	2" Flexible Conduit	66.50 - 80.00	1.0000	1.0000
L2	37	DSHYBKIT-18612-XXM(7/8)	66.50 - 90.00	1.0000	1.0000
L3	1	Safety Line 3/8	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	32	2" Flexible Conduit	32.83 - 66.50	1.0000	1.0000
L3	37	DSHYBKIT-18612-XXM(7/8)	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 K
Level 120									
AIR -32 B2A/B66AA w/ Mount Pipe	A	From Leg	4.00 0.000 0.000	0.000	120.00	No Ice	6.75	6.07	0.15
						1/2" Ice	7.20	6.87	0.21
						1" Ice	7.65	7.58	0.28
						2" Ice	8.57	9.06	0.44
AIR -32 B2A/B66AA w/ Mount Pipe	B	From Leg	4.00 0.000 0.000	0.000	120.00	No Ice	6.75	6.07	0.15
						1/2" Ice	7.20	6.87	0.21
						1" Ice	7.65	7.58	0.28
						2" Ice	8.57	9.06	0.44
AIR -32 B2A/B66AA w/ Mount Pipe	C	From Leg	4.00 0.000 0.000	0.000	120.00	No Ice	6.75	6.07	0.15
						1/2" Ice	7.20	6.87	0.21
						1" Ice	7.65	7.58	0.28
						2" Ice	8.57	9.06	0.44
AIR 3246 B66 w/ Mount Pipe	A	From Leg	4.00 0.000 0.000	0.000	120.00	No Ice	8.18	6.56	0.20
						1/2" Ice	8.66	7.39	0.27
						1" Ice	9.12	8.13	0.35
						2" Ice	10.09	9.65	0.53
AIR 3246 B66 w/ Mount Pipe	B	From Leg	4.00 0.000 0.000	0.000	120.00	No Ice	8.18	6.56	0.20
						1/2" Ice	8.66	7.39	0.27
						1" Ice	9.12	8.13	0.35
						2" Ice	10.09	9.65	0.53
AIR 3246 B66 w/ Mount	C	From Leg	4.00	0.000	120.00	No Ice	8.18	6.56	0.20

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Pipe			0.000 0.000			1/2" Ice 1" Ice 2" Ice	8.66 9.12 10.09	7.39 8.13 9.65	0.27 0.35 0.53
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.00 0.000 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	20.48 21.23 21.99 23.44	11.02 12.55 14.10 16.45	0.16 0.30 0.44 0.78
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.00 0.000 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	20.48 21.23 21.99 23.44	11.02 12.55 14.10 16.45	0.16 0.30 0.44 0.78
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.00 0.000 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	20.48 21.23 21.99 23.44	11.02 12.55 14.10 16.45	0.16 0.30 0.44 0.78
KRY 112 144/1	A	From Leg	4.00 0.000 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.35 0.43 0.51 0.70	0.17 0.23 0.30 0.46	0.01 0.01 0.02 0.03
KRY 112 144/1	B	From Leg	4.00 0.000 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.35 0.43 0.51 0.70	0.17 0.23 0.30 0.46	0.01 0.01 0.02 0.03
KRY 112 144/1	C	From Leg	4.00 0.000 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.35 0.43 0.51 0.70	0.17 0.23 0.30 0.46	0.01 0.01 0.02 0.03
KRY 112 144/2	A	From Leg	4.00 0.000 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.48 0.57 0.66 0.88	0.23 0.30 0.38 0.55	0.01 0.01 0.02 0.04
KRY 112 144/2	B	From Leg	4.00 0.000 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.48 0.57 0.66 0.88	0.23 0.30 0.38 0.55	0.01 0.01 0.02 0.04
KRY 112 144/2	C	From Leg	4.00 0.000 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.48 0.57 0.66 0.88	0.23 0.30 0.38 0.55	0.01 0.01 0.02 0.04
RADIO 4449 B12/B71	A	From Leg	4.00 0.000 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.65 1.81 1.98 2.34	1.16 1.30 1.45 1.76	0.07 0.09 0.11 0.16
RADIO 4449 B12/B71	B	From Leg	4.00 0.000 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.65 1.81 1.98 2.34	1.16 1.30 1.45 1.76	0.07 0.09 0.11 0.16
RADIO 4449 B12/B71	C	From Leg	4.00 0.000 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.65 1.81 1.98 2.34	1.16 1.30 1.45 1.76	0.07 0.09 0.11 0.16
2.4" Dia x 6-ft Mount Pipe	A	From Leg	4.00	0.000	120.00	No Ice	1.43	1.43	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000 0.000			1/2" Ice	1.93 2.30	1.93 2.30	0.03 0.05
						1" Ice 2" Ice	3.06	3.06	0.09
2.4" Dia x 6-ft Mount Pipe	B	From Leg	4.00 0.000 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.93 2.30 3.06	1.43 1.93 2.30 3.06	0.02 0.03 0.05 0.09
2.4" Dia x 6-ft Mount Pipe	C	From Leg	4.00 0.000 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.93 2.30 3.06	1.43 1.93 2.30 3.06	0.02 0.03 0.05 0.09
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" Ice	2.02 2.90 3.71 4.76	2.02 2.90 3.71 4.76	0.03 0.04 0.06 0.12
Platform Mount [LP 404-1]	C	None		0.000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	32.79 44.63 56.47 80.15	32.79 44.63 56.47 80.15	2.04 2.48 2.91 3.77
Level 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 2" Ice	1.43 1.93 2.30 3.06	1.43 1.93 2.30 3.06	0.02 0.03 0.05 0.09
Side Arm Mount [SO 102-3]	C	None		0.000	115.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.00 3.48 3.96 4.92	3.00 3.48 3.96 4.92	0.08 0.11 0.14 0.20
Level 110 7770.00 w/ Mount Pipe	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
7770.00 w/ Mount Pipe	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
7770.00 w/ Mount Pipe	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
SBNH-1D6565C w/ Mount Pipe	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	11.68 12.40 13.14 14.51	9.84 11.37 12.91 15.27	0.09 0.18 0.28 0.52
TPA-65R-LCUUUU-H8 w/ Mount Pipe	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	13.54 14.24 14.95 16.31	10.96 12.49 14.04 16.39	0.11 0.22 0.33 0.59
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35 10.42	6.30 7.48 8.37 10.18	0.07 0.14 0.21 0.38

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.00 0.000 0.000	0.000	110.00	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	8.26 8.82 9.35 10.42	6.30 7.48 8.37 10.18	0.07 0.14 0.21 0.38
QS66512-3 w/ Mount Pipe	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.37 8.93 9.46 10.53	8.46 9.66 10.55 12.35	0.13 0.21 0.29 0.49
QS66512-3 w/ Mount Pipe	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.37 8.93 9.46 10.53	8.46 9.66 10.55 12.35	0.13 0.21 0.29 0.49
DC6-48-60-18-8F	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.79 1.27 1.45 1.83	0.79 1.27 1.45 1.83	0.02 0.04 0.05 0.10
DC6-48-60-18-8F	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.79 1.27 1.45 1.83	0.79 1.27 1.45 1.83	0.02 0.04 0.05 0.10
(2) LGP21401	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.10 1.24 1.38 1.69	0.21 0.27 0.35 0.52	0.01 0.02 0.03 0.05
(2) LGP21401	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.10 1.24 1.38 1.69	0.21 0.27 0.35 0.52	0.01 0.02 0.03 0.05
(2) LGP21401	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.10 1.24 1.38 1.69	0.21 0.27 0.35 0.52	0.01 0.02 0.03 0.05
RRUS 11	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.78 2.99 3.21 3.66	1.19 1.33 1.49 1.83	0.05 0.07 0.09 0.15
RRUS 11	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.78 2.99 3.21 3.66	1.19 1.33 1.49 1.83	0.05 0.07 0.09 0.15
RRUS 11	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.78 2.99 3.21 3.66	1.19 1.33 1.49 1.83	0.05 0.07 0.09 0.15
RRUS 32 B2	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.73 2.95 3.18 3.66	1.67 1.86 2.05 2.46	0.05 0.07 0.10 0.16
RRUS 32 B2	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	2.73 2.95 3.18 3.66	1.67 1.86 2.05 2.46	0.05 0.07 0.10 0.16

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
RRUS 32 B2	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.73 2.95 3.18 3.66	1.67 1.86 2.05 2.46	0.05 0.07 0.10 0.16
1001983	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.18 0.23 0.30 0.44	0.08 0.13 0.18 0.30	0.00 0.00 0.01 0.01
1001983	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.18 0.23 0.30 0.44	0.08 0.13 0.18 0.30	0.00 0.00 0.01 0.01
1001983	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.18 0.23 0.30 0.44	0.08 0.13 0.18 0.30	0.00 0.00 0.01 0.01
RRUS 32	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.86 3.08 3.32 3.81	1.78 1.97 2.17 2.58	0.06 0.08 0.10 0.16
RRUS 32	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.86 3.08 3.32 3.81	1.78 1.97 2.17 2.58	0.06 0.08 0.10 0.16
RRUS 32	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.86 3.08 3.32 3.81	1.78 1.97 2.17 2.58	0.06 0.08 0.10 0.16
(2) TPX-070821	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.47 0.56 0.66 0.87	0.10 0.15 0.20 0.33	0.01 0.01 0.02 0.03
(2) TPX-070821	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.47 0.56 0.66 0.87	0.10 0.15 0.20 0.33	0.01 0.01 0.02 0.03
(2) TPX-070821	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.47 0.56 0.66 0.87	0.10 0.15 0.20 0.33	0.01 0.01 0.02 0.03
(2) 7020.00	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.10 0.15 0.20 0.33	0.17 0.24 0.31 0.48	0.00 0.01 0.01 0.02
(2) 7020.00	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.10 0.15 0.20 0.33	0.17 0.24 0.31 0.48	0.00 0.01 0.01 0.02
(2) 7020.00	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	0.10 0.15 0.20 0.33	0.17 0.24 0.31 0.48	0.00 0.01 0.01 0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
2.4" Dia x 6-ft Mount Pipe	A	From Leg	4.00 0.000 0.000	0.000	110.00	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.93 2.30 3.06	1.43 1.93 2.30 3.06	0.02 0.03 0.05 0.09
2.4" Dia x 6-ft Mount Pipe	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.93 2.30 3.06	1.43 1.93 2.30 3.06	0.02 0.03 0.05 0.09
2.4" Dia x 6-ft Mount Pipe	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.93 2.30 3.06	1.43 1.93 2.30 3.06	0.02 0.03 0.05 0.09
2.4" Dia x 6-ft Mount Pipe	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	1.43 1.93 2.31 3.14	0.02 0.04 0.06 0.10
2.4" Dia x 6-ft Mount Pipe	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	1.43 1.93 2.31 3.14	0.02 0.04 0.06 0.10
2.4" Dia x 6-ft Mount Pipe	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	1.43 1.93 2.31 3.14	0.02 0.04 0.06 0.10
Platform Mount [LP 712-1]	C	None		0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	24.53 29.94 35.35 46.17	24.53 29.94 35.35 46.17	1.34 1.65 1.96 2.58
Miscellaneous [NA 507-1]	C	None		0.000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.80 6.70 8.60 12.40	4.80 6.70 8.60 12.40	0.25 0.29 0.34 0.44
Level 100 LNX-6514DS-T4M w/ Mount Pipe	B	From Leg	4.00 0.000 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.32 8.88 9.40 10.47	7.00 8.19 9.08 10.90	0.06 0.13 0.20 0.38
LNX-6514DS-T4M w/ Mount Pipe	C	From Leg	4.00 0.000 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.32 8.88 9.40 10.47	7.00 8.19 9.08 10.90	0.06 0.13 0.20 0.38
BXA-80063-4BF-EDIN-X w/ Mount Pipe	A	From Leg	4.00 0.000 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.62 4.99 5.36 6.13	3.47 4.04 4.63 5.83	0.03 0.07 0.12 0.23
BXA-80063-4BF-EDIN-X w/ Mount Pipe	B	From Leg	4.00 0.000 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.62 4.99 5.36 6.13	3.47 4.04 4.63 5.83	0.03 0.07 0.12 0.23
BXA-80063-4BF-EDIN-X w/ Mount Pipe	C	From Leg	4.00 0.000 0.000	0.000	100.00	No Ice 1/2" Ice	4.62 4.99 5.36	3.47 4.04 4.63	0.03 0.07 0.12

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	6.13	5.83	0.23
						2" Ice			
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	A	From Leg	4.00 0.000 0.000	0.000	100.00	No Ice	7.81	5.80	0.04
						1/2" Ice	8.36	6.95	0.10
						1" Ice	8.87	7.82	0.17
						2" Ice	9.93	9.60	0.34
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00 0.000 0.000	0.000	100.00	No Ice	8.39	7.08	0.08
						1/2" Ice	8.95	8.28	0.15
						1" Ice	9.48	9.19	0.22
						2" Ice	10.56	11.03	0.40
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.00 0.000 0.000	0.000	100.00	No Ice	8.39	7.08	0.08
						1/2" Ice	8.95	8.28	0.15
						1" Ice	9.48	9.19	0.22
						2" Ice	10.56	11.03	0.40
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.00 0.000 0.000	0.000	100.00	No Ice	8.39	7.08	0.08
						1/2" Ice	8.95	8.28	0.15
						1" Ice	9.48	9.19	0.22
						2" Ice	10.56	11.03	0.40
DB-T1-6Z-8AB-0Z	C	From Leg	4.00 0.000 0.000	0.000	100.00	No Ice	4.80	2.00	0.04
						1/2" Ice	5.07	2.19	0.08
						1" Ice	5.35	2.39	0.12
						2" Ice	5.93	2.81	0.21
RRH2X60-PCS	A	From Leg	4.00 0.000 0.000	0.000	100.00	No Ice	2.20	1.72	0.06
						1/2" Ice	2.39	1.90	0.08
						1" Ice	2.59	2.09	0.10
						2" Ice	3.01	2.48	0.16
RRH2X60-PCS	B	From Leg	4.00 0.000 0.000	0.000	100.00	No Ice	2.20	1.72	0.06
						1/2" Ice	2.39	1.90	0.08
						1" Ice	2.59	2.09	0.10
						2" Ice	3.01	2.48	0.16
RRH2X60-PCS	C	From Leg	4.00 0.000 0.000	0.000	100.00	No Ice	2.20	1.72	0.06
						1/2" Ice	2.39	1.90	0.08
						1" Ice	2.59	2.09	0.10
						2" Ice	3.01	2.48	0.16
RRH2x60-700	A	From Leg	4.00 0.000 0.000	0.000	100.00	No Ice	3.50	1.82	0.06
						1/2" Ice	3.76	2.05	0.08
						1" Ice	4.03	2.29	0.11
						2" Ice	4.58	2.79	0.17
RRH2x60-700	B	From Leg	4.00 0.000 0.000	0.000	100.00	No Ice	3.50	1.82	0.06
						1/2" Ice	3.76	2.05	0.08
						1" Ice	4.03	2.29	0.11
						2" Ice	4.58	2.79	0.17
RRH2x60-700	C	From Leg	4.00 0.000 0.000	0.000	100.00	No Ice	3.50	1.82	0.06
						1/2" Ice	3.76	2.05	0.08
						1" Ice	4.03	2.29	0.11
						2" Ice	4.58	2.79	0.17
RRH2x60-AWS	A	From Leg	4.00 0.000 0.000	0.000	100.00	No Ice	3.50	1.82	0.06
						1/2" Ice	3.76	2.05	0.08
						1" Ice	4.03	2.29	0.11
						2" Ice	4.58	2.79	0.17
RRH2x60-AWS	B	From Leg	4.00 0.000 0.000	0.000	100.00	No Ice	3.50	1.82	0.06
						1/2" Ice	3.76	2.05	0.08
						Ice	4.03	2.29	0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	4.58	2.79	0.17
						2" Ice			
RRH2x60-AWS	C	From Leg	4.00	0.000	100.00	No Ice	3.50	1.82	0.06
			0.000			1/2"	3.76	2.05	0.08
			0.000			Ice	4.03	2.29	0.11
						1" Ice	4.58	2.79	0.17
						2" Ice			
DB-T1-6Z-8AB-0Z	A	From Leg	4.00	0.000	100.00	No Ice	4.80	2.00	0.04
			0.000			1/2"	5.07	2.19	0.08
			0.000			Ice	5.35	2.39	0.12
						1" Ice	5.93	2.81	0.21
						2" Ice			
Platform Mount [LP 403-1]	C	None		0.000	100.00	No Ice	18.85	18.85	1.50
						1/2"	24.30	24.30	1.80
						Ice	29.75	29.75	2.09
						1" Ice	40.65	40.65	2.69
						2" Ice			
Level 90									
Side Arm Mount [SO 201-3]	C	None		0.000	90.00	No Ice	5.71	5.71	0.29
						1/2"	7.91	7.91	0.35
						Ice	10.11	10.11	0.41
						1" Ice	14.51	14.51	0.54
						2" Ice			
6' x 2" Horizontal Mount Pipe	A	From Leg	2.00	0.000	90.00	No Ice	0.50	0.50	0.03
			0.000			1/2"	1.06	1.06	0.17
			0.000			Ice	1.44	1.44	0.32
						1" Ice	2.22	2.22	0.65
						2" Ice			
6' x 2" Horizontal Mount Pipe	B	From Leg	2.00	0.000	90.00	No Ice	0.50	0.50	0.03
			0.000			1/2"	1.06	1.06	0.17
			0.000			Ice	1.44	1.44	0.32
						1" Ice	2.22	2.22	0.65
						2" Ice			
6' x 2" Horizontal Mount Pipe	C	From Leg	2.00	0.000	90.00	No Ice	0.50	0.50	0.03
			0.000			1/2"	1.06	1.06	0.17
			0.000			Ice	1.44	1.44	0.32
						1" Ice	2.22	2.22	0.65
						2" Ice			
ODI2-065R18K-GQ w/ Mount Pipe	A	From Leg	2.00	0.000	90.00	No Ice	5.09	3.00	0.05
			0.000			1/2"	5.50	3.71	0.08
			0.000			Ice	5.92	4.38	0.13
						1" Ice	6.77	5.76	0.24
						2" Ice			
ODI2-065R18K-GQ w/ Mount Pipe	B	From Leg	2.00	0.000	90.00	No Ice	5.09	3.00	0.05
			0.000			1/2"	5.50	3.71	0.08
			0.000			Ice	5.92	4.38	0.13
						1" Ice	6.77	5.76	0.24
						2" Ice			
ODI2-065R18K-GQ w/ Mount Pipe	C	From Leg	2.00	0.000	90.00	No Ice	5.09	3.00	0.05
			0.000			1/2"	5.50	3.71	0.08
			0.000			Ice	5.92	4.38	0.13
						1" Ice	6.77	5.76	0.24
						2" Ice			
(2) RADIO 4415	A	From Leg	2.00	0.000	90.00	No Ice	1.86	0.87	0.05
			0.000			1/2"	2.03	1.00	0.06
			0.000			Ice	2.20	1.14	0.08
						1" Ice	2.58	1.44	0.12
						2" Ice			
(2) RADIO 0208	B	From Leg	2.00	0.000	90.00	No Ice	1.40	0.38	0.02
			0.000			1/2"	1.55	0.47	0.03
			0.000			Ice	1.71	0.57	0.04
						1" Ice	2.04	0.80	0.07
						2" Ice			
RADIO 0208	C	From Leg	2.00	0.000	90.00	No Ice	1.40	0.38	0.02
			0.000			1/2"	1.55	0.47	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			Ice	1.71	0.57	0.04
						1" Ice	2.04	0.80	0.07
						2" Ice			
Level 80									
AAHC w/ Mount Pipe	A	From Leg	4.00 0.000 1.000	0.000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.41 4.73 5.06 5.74	2.69 3.08 3.49 4.36	0.12 0.16 0.20 0.31
AAHC w/ Mount Pipe	B	From Leg	4.00 0.000 1.000	0.000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.41 4.73 5.06 5.74	2.69 3.08 3.49 4.36	0.12 0.16 0.20 0.31
AAHC w/ Mount Pipe	C	From Leg	4.00 0.000 1.000	0.000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.41 4.73 5.06 5.74	2.69 3.08 3.49 4.36	0.12 0.16 0.20 0.31
NNVV-65B-R4 w/ Mount Pipe	A	From Leg	4.00 0.000 1.000	0.000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	12.51 13.11 13.67 14.82	7.41 8.60 9.50 11.33	0.10 0.19 0.29 0.52
NNVV-65B-R4 w/ Mount Pipe	B	From Leg	4.00 0.000 1.000	0.000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	12.51 13.11 13.67 14.82	7.41 8.60 9.50 11.33	0.10 0.19 0.29 0.52
NNVV-65B-R4 w/ Mount Pipe	C	From Leg	4.00 0.000 1.000	0.000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	12.51 13.11 13.67 14.82	7.41 8.60 9.50 11.33	0.10 0.19 0.29 0.52
CW JUNCTION BOX	A	From Leg	4.00 0.000 0.000	0.000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.20 1.34 1.48 1.79	0.60 0.70 0.81 1.06	0.00 0.01 0.02 0.05
PCS 1900MHZ 4X45W-65MHZ	A	From Leg	4.00 0.000 1.000	0.000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.32 2.53 2.74 3.19	2.24 2.44 2.65 3.09	0.06 0.08 0.11 0.17
PCS 1900MHZ 4X45W-65MHZ	B	From Leg	4.00 0.000 1.000	0.000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.32 2.53 2.74 3.19	2.24 2.44 2.65 3.09	0.06 0.08 0.11 0.17
PCS 1900MHZ 4X45W-65MHZ	C	From Leg	4.00 0.000 1.000	0.000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.32 2.53 2.74 3.19	2.24 2.44 2.65 3.09	0.06 0.08 0.11 0.17
(2) 800MHZ 2X50W RRH	A	From Leg	4.00 0.000 1.000	0.000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.13 2.32 2.51 2.92	1.77 1.95 2.13 2.51	0.05 0.07 0.10 0.16
(2) 800MHZ 2X50W RRH	B	From Leg	4.00 0.000 1.000	0.000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.13 2.32 2.51 2.92	1.77 1.95 2.13 2.51	0.05 0.07 0.10 0.16
(2) 800MHZ 2X50W RRH	C	From Leg	4.00	0.000	80.00	No Ice	2.13	1.77	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000 1.000			1/2" Ice 1" Ice 2" Ice	2.32 2.51 2.92	1.95 2.13 2.51	0.07 0.10 0.16
2.4" Dia x 8-ft Mount Pipe	A	From Leg	4.00 0.000 0.000	0.000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.90 2.73 3.40 4.40	1.90 2.73 3.40 4.40	0.03 0.04 0.06 0.12
2.4" Dia x 8-ft Mount Pipe	B	From Leg	4.00 0.000 0.000	0.000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.90 2.73 3.40 4.40	1.90 2.73 3.40 4.40	0.03 0.04 0.06 0.12
2.4" Dia x 8-ft Mount Pipe	C	From Leg	4.00 0.000 0.000	0.000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.90 2.73 3.40 4.40	1.90 2.73 3.40 4.40	0.03 0.04 0.06 0.12
(1) Site Pro 1 VFA10-HD3L4NP	A	From Leg	2.00 0.000 0.000	0.000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	11.40 17.30 22.60 35.00	7.00 11.30 15.30 24.20	0.55 0.65 0.80 0.95
(1) Site Pro 1 VFA10-HD3L4NP	B	From Leg	2.00 0.000 0.000	0.000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	11.40 17.30 22.60 35.00	7.00 11.30 15.30 24.20	0.55 0.65 0.80 0.95
(1) Site Pro 1 VFA10-HD3L4NP	C	From Leg	2.00 0.000 0.000	0.000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	11.40 17.30 22.60 35.00	7.00 11.30 15.30 24.20	0.55 0.65 0.80 0.95
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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 K
Level 115 VHLP2-18	C	Paraboloid w/Shroud (HP)	From Leg	1.00 0.000 0.000	0.000		115.00	2.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.14 3.41 3.68 4.21	0.03 0.05 0.07 0.10
Level 80 VHLP2-23	C	Paraboloid w/Shroud (HP)	From Leg	4.00 0.000 3.000	0.000		80.00	2.18	No Ice 1/2" Ice 1" Ice 2" Ice	3.73 4.02 4.31 4.90	0.03 0.05 0.07 0.11
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Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 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 K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	119.083 - 101.083	Pole	Max Tension	26	0.00	0.00	-0.00
			Max. Compression	26	-23.91	-1.89	-0.80
			Max. Mx	8	-8.76	-168.64	0.43
			Max. My	14	-8.78	0.41	-167.46
			Max. Vy	8	15.14	-168.64	0.43
			Max. Vx	2	-15.02	-0.97	167.31
			Max. Torque	4			-1.66
L2	101.083 - 66.5	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	26	-54.21	-1.11	1.07
			Max. Mx	8	-21.69	-959.18	3.53
			Max. My	2	-21.73	-5.46	953.08
			Max. Vy	8	28.93	-959.18	3.53
			Max. Vx	2	-28.63	-5.46	953.08
			Max. Torque	4			-1.66
L3	66.5 - 32.8333	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-67.26	-1.65	2.21
			Max. Mx	8	-30.53	-1957.87	7.88
			Max. My	2	-30.55	-12.38	1940.61
			Max. Vy	8	31.83	-1957.87	7.88
			Max. Vx	2	-31.47	-12.38	1940.61
			Max. Torque	18			1.20
L4	32.8333 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-84.11	-2.36	3.69
			Max. Mx	8	-42.63	-3204.01	12.80
			Max. My	2	-42.64	-20.09	3173.26
			Max. Vy	8	34.48	-3204.01	12.80
			Max. Vx	2	-34.12	-20.09	3173.26
			Max. Torque	18			1.19

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	30	84.11	-9.75	0.03
	Max. H_x	21	32.00	34.36	-0.10
	Max. H_z	2	42.66	-0.20	34.09
	Max. M_x	2	3173.26	-0.20	34.09
	Max. M_z	8	3204.01	-34.45	0.12
	Max. Torsion	18	1.19	29.52	-17.07
	Min. Vert	25	32.00	17.02	29.46
	Min. H_x	8	42.66	-34.45	0.12
	Min. H_z	14	42.66	0.12	-34.07
	Min. M_x	14	-3170.27	0.12	-34.07
	Min. M_z	20	-3195.93	34.36	-0.10
	Min. Torsion	6	-1.19	-29.59	17.11

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	35.55	0.00	0.00	-0.41	0.22	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	42.66	0.20	-34.09	-3173.26	-20.09	0.68
0.9 Dead+1.0 Wind 0 deg - No Ice	32.00	0.20	-34.09	-3140.73	-19.96	0.67
1.2 Dead+1.0 Wind 30 deg - No Ice	42.66	17.18	-29.55	-2751.61	-1600.13	1.08
0.9 Dead+1.0 Wind 30 deg - No Ice	32.00	17.18	-29.55	-2723.39	-1583.86	1.08
1.2 Dead+1.0 Wind 60 deg - No Ice	42.66	29.59	-17.11	-1593.57	-2755.32	1.19
0.9 Dead+1.0 Wind 60 deg - No Ice	32.00	29.59	-17.11	-1577.18	-2727.25	1.18
1.2 Dead+1.0 Wind 90 deg - No Ice	42.66	34.45	-0.12	-12.80	-3204.01	0.98
0.9 Dead+1.0 Wind 90 deg -	32.00	34.45	-0.12	-12.54	-3171.41	0.97

Load Combination	Vertical K	Shear$_x$ K	Shear$_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
No Ice 1.2 Dead+1.0 Wind 120 deg - No Ice	42.66	29.57	16.87	1568.22	-2753.96	0.51
0.9 Dead+1.0 Wind 120 deg - No Ice	32.00	29.57	16.87	1552.33	-2725.90	0.51
1.2 Dead+1.0 Wind 150 deg - No Ice	42.66	16.96	29.50	2744.97	-1578.32	0.23
0.9 Dead+1.0 Wind 150 deg - No Ice	32.00	16.96	29.50	2717.07	-1562.27	0.23
1.2 Dead+1.0 Wind 180 deg - No Ice	42.66	-0.12	34.07	3170.27	12.37	-0.51
0.9 Dead+1.0 Wind 180 deg - No Ice	32.00	-0.12	34.07	3138.04	12.18	-0.51
1.2 Dead+1.0 Wind 210 deg - No Ice	42.66	-17.11	29.49	2744.41	1594.08	-1.08
0.9 Dead+1.0 Wind 210 deg - No Ice	32.00	-17.11	29.49	2716.52	1577.73	-1.07
1.2 Dead+1.0 Wind 240 deg - No Ice	42.66	-29.52	17.07	1588.26	2748.49	-1.19
0.9 Dead+1.0 Wind 240 deg - No Ice	32.00	-29.52	17.07	1572.17	2720.35	-1.18
1.2 Dead+1.0 Wind 270 deg - No Ice	42.66	-34.36	0.10	9.10	3195.93	-0.98
0.9 Dead+1.0 Wind 270 deg - No Ice	32.00	-34.36	0.10	9.14	3163.26	-0.98
1.2 Dead+1.0 Wind 300 deg - No Ice	42.66	-29.52	-16.93	-1575.45	2748.67	-0.68
0.9 Dead+1.0 Wind 300 deg - No Ice	32.00	-29.52	-16.93	-1559.24	2720.53	-0.67
1.2 Dead+1.0 Wind 330 deg - No Ice	42.66	-17.02	-29.46	-2742.17	1585.48	-0.23
0.9 Dead+1.0 Wind 330 deg - No Ice	32.00	-17.02	-29.46	-2714.05	1569.21	-0.23
1.2 Dead+1.0 Ice+1.0 Temp	84.11	0.00	-0.00	-3.69	-2.36	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	84.11	0.05	-9.27	-902.46	-7.77	0.28
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	84.11	4.67	-8.04	-783.20	-455.26	0.39
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	84.11	8.04	-4.65	-455.30	-782.32	0.39
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	84.11	9.75	-0.03	-7.35	-936.59	0.29
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	84.11	8.03	4.59	440.84	-781.28	0.11
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	84.11	4.61	8.02	773.43	-449.14	-0.03
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	84.11	-0.03	9.26	894.24	0.91	-0.25
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	84.11	-4.65	8.02	774.04	448.77	-0.39
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	84.11	-8.03	4.64	446.56	775.66	-0.39
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	84.11	-9.74	0.03	-1.02	929.64	-0.29
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	84.11	-8.02	-4.61	-450.00	774.96	-0.14
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	84.11	-4.62	-8.01	-780.37	445.59	0.03
Dead+Wind 0 deg - Service	35.55	0.04	-7.03	-650.94	-3.94	0.14
Dead+Wind 30 deg - Service	35.55	3.54	-6.09	-564.49	-327.90	0.23
Dead+Wind 60 deg - Service	35.55	6.10	-3.53	-327.05	-564.76	0.25
Dead+Wind 90 deg - Service	35.55	7.10	-0.03	-2.94	-656.77	0.20
Dead+Wind 120 deg - Service	35.55	6.10	3.48	321.21	-564.47	0.11
Dead+Wind 150 deg - Service	35.55	3.50	6.08	562.48	-323.43	0.05
Dead+Wind 180 deg - Service	35.55	-0.03	7.02	649.69	2.71	-0.11
Dead+Wind 210 deg -	35.55	-3.53	6.08	562.37	327.01	-0.22

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Service Dead+Wind 240 deg - Service	35.55	-6.08	3.52	325.33	563.70	-0.25
Service Dead+Wind 270 deg - Service	35.55	-7.08	0.02	1.55	655.46	-0.20
Service Dead+Wind 300 deg - Service	35.55	-6.08	-3.49	-323.33	563.74	-0.14
Service Dead+Wind 330 deg - Service	35.55	-3.51	-6.07	-562.55	325.25	-0.05

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-35.55	0.00	0.00	35.55	0.00	0.000%
2	0.20	-42.66	-34.09	-0.20	42.66	34.09	0.000%
3	0.20	-32.00	-34.09	-0.20	32.00	34.09	0.000%
4	17.18	-42.66	-29.55	-17.18	42.66	29.55	0.000%
5	17.18	-32.00	-29.55	-17.18	32.00	29.55	0.000%
6	29.59	-42.66	-17.11	-29.59	42.66	17.11	0.000%
7	29.59	-32.00	-17.11	-29.59	32.00	17.11	0.000%
8	34.45	-42.66	-0.12	-34.45	42.66	0.12	0.000%
9	34.45	-32.00	-0.12	-34.45	32.00	0.12	0.000%
10	29.57	-42.66	16.87	-29.57	42.66	-16.87	0.000%
11	29.57	-32.00	16.87	-29.57	32.00	-16.87	0.000%
12	16.96	-42.66	29.50	-16.96	42.66	-29.50	0.000%
13	16.96	-32.00	29.50	-16.96	32.00	-29.50	0.000%
14	-0.12	-42.66	34.07	0.12	42.66	-34.07	0.000%
15	-0.12	-32.00	34.07	0.12	32.00	-34.07	0.000%
16	-17.11	-42.66	29.49	17.11	42.66	-29.49	0.000%
17	-17.11	-32.00	29.49	17.11	32.00	-29.49	0.000%
18	-29.52	-42.66	17.07	29.52	42.66	-17.07	0.000%
19	-29.52	-32.00	17.07	29.52	32.00	-17.07	0.000%
20	-34.36	-42.66	0.10	34.36	42.66	-0.10	0.000%
21	-34.36	-32.00	0.10	34.36	32.00	-0.10	0.000%
22	-29.52	-42.66	-16.93	29.52	42.66	16.93	0.000%
23	-29.52	-32.00	-16.93	29.52	32.00	16.93	0.000%
24	-17.02	-42.66	-29.46	17.02	42.66	29.46	0.000%
25	-17.02	-32.00	-29.46	17.02	32.00	29.46	0.000%
26	0.00	-84.11	0.00	-0.00	84.11	0.00	0.000%
27	0.05	-84.11	-9.27	-0.05	84.11	9.27	0.000%
28	4.67	-84.11	-8.04	-4.67	84.11	8.04	0.000%
29	8.04	-84.11	-4.65	-8.04	84.11	4.65	0.000%
30	9.75	-84.11	-0.03	-9.75	84.11	0.03	0.000%
31	8.03	-84.11	4.59	-8.03	84.11	-4.59	0.000%
32	4.61	-84.11	8.02	-4.61	84.11	-8.02	0.000%
33	-0.03	-84.11	9.26	0.03	84.11	-9.26	0.000%
34	-4.65	-84.11	8.02	4.65	84.11	-8.02	0.000%
35	-8.03	-84.11	4.64	8.03	84.11	-4.64	0.000%
36	-9.74	-84.11	0.03	9.74	84.11	-0.03	0.000%
37	-8.02	-84.11	-4.61	8.02	84.11	4.61	0.000%
38	-4.62	-84.11	-8.01	4.62	84.11	8.01	0.000%
39	0.04	-35.55	-7.03	-0.04	35.55	7.03	0.000%
40	3.54	-35.55	-6.09	-3.54	35.55	6.09	0.000%
41	6.10	-35.55	-3.53	-6.10	35.55	3.53	0.000%
42	7.10	-35.55	-0.03	-7.10	35.55	0.03	0.000%
43	6.10	-35.55	3.48	-6.10	35.55	-3.48	0.000%
44	3.50	-35.55	6.08	-3.50	35.55	-6.08	0.000%
45	-0.03	-35.55	7.02	0.03	35.55	-7.02	0.000%
46	-3.53	-35.55	6.08	3.53	35.55	-6.08	0.000%
47	-6.08	-35.55	3.52	6.08	35.55	-3.52	0.000%
48	-7.08	-35.55	0.02	7.08	35.55	-0.02	0.000%
49	-6.08	-35.55	-3.49	6.08	35.55	3.49	0.000%
50	-3.51	-35.55	-6.07	3.51	35.55	6.07	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	0.00007634
3	Yes	5	0.00000001	0.00003401
4	Yes	6	0.00000001	0.00007207
5	Yes	5	0.00000001	0.00068283
6	Yes	6	0.00000001	0.00006797
7	Yes	5	0.00000001	0.00064285
8	Yes	4	0.00000001	0.00097492
9	Yes	4	0.00000001	0.00059066
10	Yes	6	0.00000001	0.00006988
11	Yes	5	0.00000001	0.00066204
12	Yes	6	0.00000001	0.00006927
13	Yes	5	0.00000001	0.00065603
14	Yes	4	0.00000001	0.00071059
15	Yes	4	0.00000001	0.00041869
16	Yes	6	0.00000001	0.00006782
17	Yes	5	0.00000001	0.00064169
18	Yes	6	0.00000001	0.00007178
19	Yes	5	0.00000001	0.00068031
20	Yes	5	0.00000001	0.00007095
21	Yes	4	0.00000001	0.00094503
22	Yes	6	0.00000001	0.00006838
23	Yes	5	0.00000001	0.00064736
24	Yes	6	0.00000001	0.00006939
25	Yes	5	0.00000001	0.00065719
26	Yes	4	0.00000001	0.00001821
27	Yes	5	0.00000001	0.00056844
28	Yes	5	0.00000001	0.00087087
29	Yes	5	0.00000001	0.00084619
30	Yes	5	0.00000001	0.00058275
31	Yes	5	0.00000001	0.00084019
32	Yes	5	0.00000001	0.00084201
33	Yes	5	0.00000001	0.00056275
34	Yes	5	0.00000001	0.00082698
35	Yes	5	0.00000001	0.00084898
36	Yes	5	0.00000001	0.00057759
37	Yes	5	0.00000001	0.00083469
38	Yes	5	0.00000001	0.00083558
39	Yes	4	0.00000001	0.00008176
40	Yes	4	0.00000001	0.00048814
41	Yes	4	0.00000001	0.00040885
42	Yes	4	0.00000001	0.00008138
43	Yes	4	0.00000001	0.00044762
44	Yes	4	0.00000001	0.00043408
45	Yes	4	0.00000001	0.00006863
46	Yes	4	0.00000001	0.00040764
47	Yes	4	0.00000001	0.00048577
48	Yes	4	0.00000001	0.00008707
49	Yes	4	0.00000001	0.00041885
50	Yes	4	0.00000001	0.00043635

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	119.083 - 101.083	16.001	42	1.133	0.002
L2	104 - 66.5	12.473	42	1.086	0.002
L3	70.3333 -	5.763	42	0.769	0.001

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L4	32.8333 37.5 - 0	1.655	42	0.405	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
120.00	AIR -32 B2A/B66AA w/ Mount Pipe	42	16.001	1.133	0.002	27026
115.00	VHLP2-18	42	15.033	1.124	0.002	27026
110.00	7770.00 w/ Mount Pipe	42	13.857	1.111	0.002	14876
100.00	LNX-6514DS-T4M w/ Mount Pipe	42	11.575	1.063	0.002	8267
90.00	Side Arm Mount [SO 201-3]	42	9.436	0.982	0.001	6924
83.00	VHLP2-23	42	8.041	0.911	0.001	6217
80.00	AAHC w/ Mount Pipe	42	7.471	0.878	0.001	5957

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	119.083 - 101.083	78.087	8	5.536	0.011
L2	104 - 66.5	60.877	8	5.306	0.009
L3	70.3333 - 32.8333	28.132	8	3.757	0.003
L4	37.5 - 0	8.078	8	1.980	0.001

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	78.087	5.536	0.012	5639
115.00	VHLP2-18	8	73.366	5.492	0.011	5639
110.00	7770.00 w/ Mount Pipe	8	67.628	5.426	0.010	3103
100.00	LNX-6514DS-T4M w/ Mount Pipe	8	56.498	5.192	0.008	1721
90.00	Side Arm Mount [SO 201-3]	8	46.062	4.795	0.006	1437
83.00	VHLP2-23	8	39.251	4.450	0.005	1287
80.00	AAHC w/ Mount Pipe	8	36.471	4.291	0.004	1232

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	119.083 - 101.083 (1)	TP26x22.13x0.25	18.00	0.00	0.0	19.935	-8.76	1460.91	0.006
L2	101.083 - 66.5 (2)	TP34.063x24.873x0.313	37.50	0.00	0.0	32.544	-21.69	2357.64	0.009
L3	66.5 - 32.8333 (3)	TP41.75x32.498x0.375	37.50	0.00	0.0	47.876	-30.53	3448.14	0.009
L4	32.8333 - 0 (4)	TP49.063x39.849x0.375	37.50	0.00	0.0	57.950	-42.63	3930.02	0.011

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	119.083 - 101.083 (1)	TP26x22.13x0.25	168.64	753.16	0.224	0.00	753.16	0.000
L2	101.083 - 66.5 (2)	TP34.063x24.873x0.313	959.18	1588.07	0.604	0.00	1588.07	0.000
L3	66.5 - 32.8333 (3)	TP41.75x32.498x0.375	1957.88	2847.93	0.687	0.00	2847.93	0.000
L4	32.8333 - 0 (4)	TP49.063x39.849x0.375	3204.04	3935.25	0.814	0.00	3935.25	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	119.083 - 101.083 (1)	TP26x22.13x0.25	15.14	349.86	0.043	1.00	754.50	0.001
L2	101.083 - 66.5 (2)	TP34.063x24.873x0.313	28.93	571.15	0.051	0.98	1610.02	0.001
L3	66.5 - 32.8333 (3)	TP41.75x32.498x0.375	31.83	840.23	0.038	0.98	2904.84	0.000
L4	32.8333 - 0 (4)	TP49.063x39.849x0.375	34.48	1017.03	0.034	0.98	4269.87	0.000

Pole Interaction Design Data

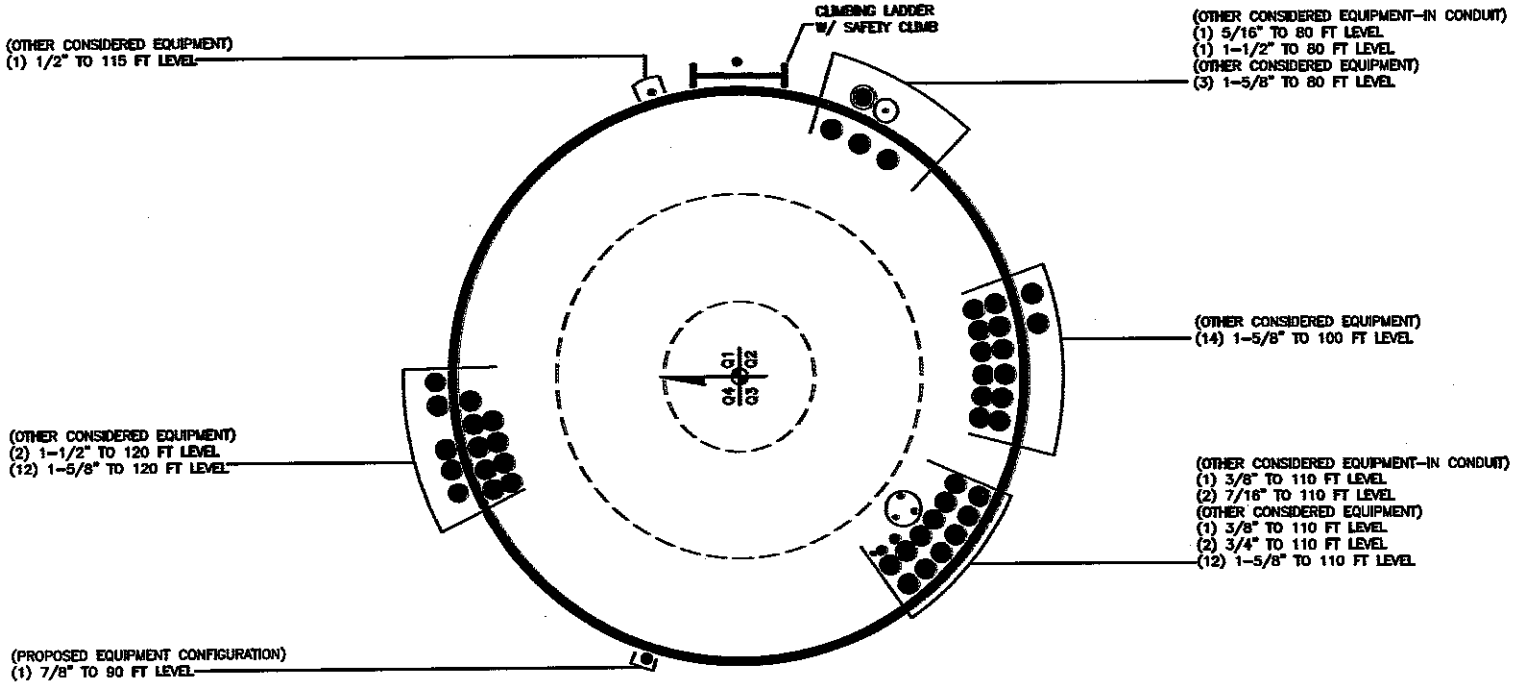
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	119.083 - 101.083 (1)	0.006	0.224	0.000	0.043	0.001	0.232	1.050	4.8.2
L2	101.083 - 66.5 (2)	0.009	0.604	0.000	0.051	0.001	0.616	1.050	4.8.2
L3	66.5 - 32.8333 (3)	0.009	0.687	0.000	0.038	0.000	0.698	1.050	4.8.2
L4	32.8333 - 0 (4)	0.011	0.814	0.000	0.034	0.000	0.826	1.050	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	119.083 - 101.083	Pole	TP26x22.13x0.25	1	-8.76	1533.96	22.1	Pass
L2	101.083 - 66.5	Pole	TP34.063x24.873x0.313	2	-21.69	2475.52	58.6	Pass
L3	66.5 - 32.8333	Pole	TP41.75x32.498x0.375	3	-30.53	3620.55	66.5	Pass
L4	32.8333 - 0	Pole	TP49.063x39.849x0.375	4	-42.63	4126.52	78.7	Pass
							Summary	
						Pole (L4)	78.7	Pass
						RATING =	**78.7**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT:829013 TOWER ID:C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Monopole Base Plate Connection

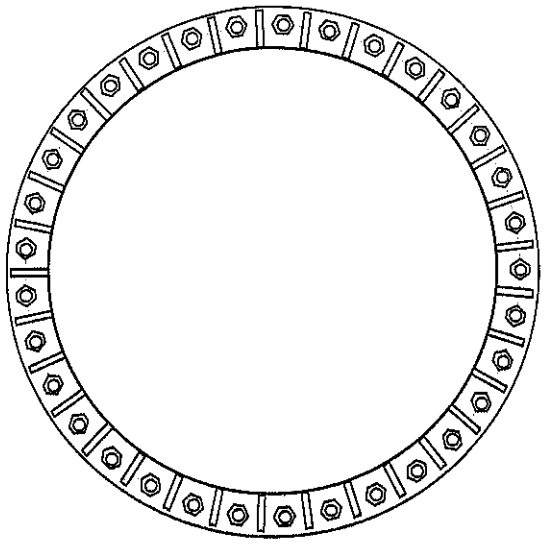
CROWN CASTLE

Site Info	
BU #	829013
Site Name	West Hartford/I-84/X4
Order #	468466 Rev 3

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	2

Applied Loads	
Moment (kip-ft)	3204.04
Axial Force (kips)	42.63
Shear Force (kips)	34.48

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(33) 1-1/4" ø bolts (A687 N; Fy=105 ksi, Fu=125 ksi) on 54" BC

Base Plate Data

58" OD x 1.5" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

Stiffener Data

(33) 12"H x 4"W x 0.75"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.5" fillet
vert. weld: 0.25" fillet

Pole Data

49.0625" x 0.375" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary		*(units of kips, kip-in)*
Pu_t = 84.99	ϕPn_t = 90.84	**Stress Rating**
Vu = 1.04	ϕVn = 57.52	**95.0%**
Mu = 1.36	ϕMn = 21.58	Pass

Base Plate Summary		
Max Stress (ksi):	29.89	(Roark's Flexural)
Allowable Stress (ksi):	45	
Stress Rating:	**63.3%**	Pass

Stiffener Summary		
Horizontal Weld:	**71.8%**	Pass
Vertical Weld:	**47.8%**	Pass
Plate Flexure+Shear:	**19.2%**	Pass
Plate Tension+Shear:	**70.8%**	Pass
Plate Compression:	**96.4%**	Pass
Pole Summary		
Punching Shear:	**8.6%**	Pass

BU: 829013
WO: 1663144

Done By: DC
Checked By: RTC
Date: 12/6/2018

CROWN CASTLE

Foundation Analysis - Rock Anchors

Factored Loads from tnx:

$M := 3204kip \cdot ft$ Moment

$A := 43kip$ Axial

$S := 34 \cdot kip$ Shear

Foundation Properties:

$d_{pier} := 8.5ft$ Pier Diameter

$L_{pier} := 4.5ft$ Pier Length

$w_{mat} := 16.5 \cdot ft$ Mat Width

$l_{mat} := 16.5 \cdot ft$ Mat Length

$t_{mat} := 2.5 \cdot ft$ Mat Thickness

$depth := 6.5 \cdot ft$ Depth Below Grade

$\gamma_{conc} := 150 \cdot \frac{lbf}{ft^3}$ Concrete Weight

$\gamma_{soil} := 115 \cdot \frac{lbf}{ft^3}$ Soil Weight

$N_T := 4$ Total Number of Rock Anchors

Steel Anchor Nominal Tensile Strength:

$R_n := 130kip$

$\phi := 0.75$

$\phi R_n := \phi \cdot R_n = 97.5 \cdot kip$

Direction 1: Orthongonal Direction

Anchor loads

$N_{ef} := 2$ Number of anchors at extreme fiber

$y := 66 \cdot in$ Distance from neutral axis to anchor

$$\phi M_{RH} := \phi R_n \cdot N_{ef} \cdot 2 \cdot y = 2145 \cdot kip \cdot ft$$

Direction 2: Diagonal Direction

Total Induced factored moment on anchors

$N_1 := 1$ Number of Anchors at y1

$y_1 := 93.352 \cdot in$ Distance from neutral axis to anchor

$$\phi M_{RD} := \phi R_n \cdot N_1 \cdot 2 \cdot y_1 = 1516.97 \cdot kip \cdot ft$$

Controlling Anchor Moment Resistance

$$\phi M_R := \min\left(\phi M_{RH}, \phi M_{RD}\right) = 1516.97 \cdot kip \cdot ft$$

Net Applied Moment to the original foundation

The design methodology is that the post-installed Rock Anchors provide additional moment resistance. The net applied moment, tower axial and shear reaction will be resisted by the original Drilled Pier Foundation.

Reactions to be analyzed for Pier foundation

$$M_{net} := M - \phi M_R = 1687.03 \cdot kip \cdot ft$$

$A = 43 \cdot kip$

$S = 34 \cdot kip$

Pier and Pad Foundation

BU # :	829013
Site Name:	West Hartford/I-84/
App. Number:	468466 Rev 3

TIA-222 Revision:	H
Tower Type:	Monopole

Top & Bot. Pad Reln. Different?:	☐
Block Foundation?:	☐

Superstructure Analysis Reactions		
Compression, P_{comp}:	43	kips
Base Shear, Vu_comp:	34	kips
Moment, M_u:	1687.03	ft-kips
Tower Height, H:	119.1	ft
BP Dist. Above Fdn, bp_{dist}:	3.25	in

Pier Properties		
Pier Shape:	Square	
Pier Diameter, dpier:	8.5	ft
Ext. Above Grade, E:	0.5	ft
Pier Rebar Size, Sc:	6	
Pier Rebar Quantity, mc:	40	
Pier Tie/Spiral Size, St:	4	
Pier Tie/Spiral Quantity, mt:	8	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties		
Depth, D:	6.5	ft
Pad Width, W:	16.5	ft
Pad Thickness, T:	2.5	ft
Pad Rebar Size (Bottom), Sp:	7	
Pad Rebar Quantity (Bottom), mp:	17	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties		
Rebar Grade, Fy:	60000	psi
Concrete Compressive Strength, F'c:	3000	psi
Dry Concrete Density, δc:	150	pcf

Soil Properties		
Total Soil Unit Weight, γ:	115	pcf
Ultimate Net Bearing, Qnet:	16.250	ksf
Cohesion, Cu:	3.250	ksf
Friction Angle, φ:		degrees
SPT Blow Count, N_{blows}:		
Base Friction, μ:	0.3	
Neglected Depth, N:	3.33	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, gw:	N/A	ft

<--Toggle between Gross and Net

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	305.77	34.00	10.6%	Pass
Bearing Pressure (ksf)	12.75	5.82	45.6%	Pass
*Overturning (kip*ft)*	2124.47	1934.24	91.0%	Pass
*Pier Flexure (Comp.) (kip*ft)*	3762.12	1840.03	48.6%	Pass
Pier Compression (kip)	33474.87	101.52	0.3%	Pass
*Pad Flexure (kip*ft)*	1151.24	769.03	63.6%	Pass
Pad Shear - 1-way (kips)	417.87	227.77	51.9%	Pass
Pad Shear - 2-way (Comp) (ksi)	0.164	0.000	0.0%	Pass
*Flexural 2-way (Comp) (kip*ft)*	2178.27	1104.02	48.3%	Pass

**Rating per TIA-222-H Section 15.5*

Soil Rating*:	91.0%
Structural Rating*:	63.6%

Version 3.1.0

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-10	**Elevation:**	118.67 ft (NAVD 88)
Risk Category:	II	**Latitude:**	41.748775
Soil Class:	D - Stiff Soil	**Longitude:**	-72.73135

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

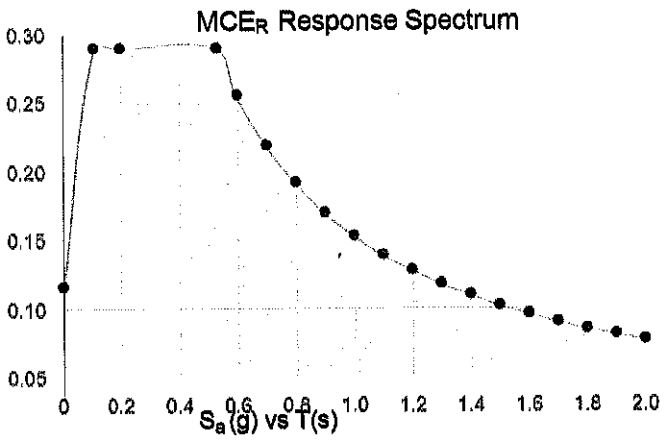
Seismic

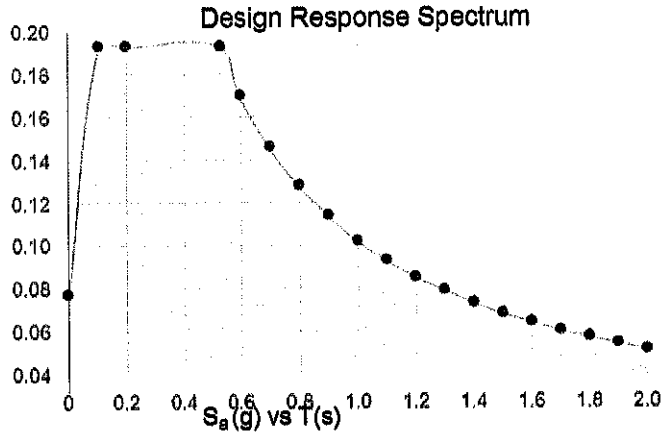
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.181	S_{DS} :	0.193
S_1 :	0.064	S_{D1} :	0.102
F_a :	1.600	T_L :	6.000
F_v :	2.400	PGA :	0.091
S_{MS} :	0.290	PGA_M :	0.146
S_{M1} :	0.153	F_{PGA} :	1.600
		I_e :	1

Seismic Design Category B





Data Accessed: Tue Dec 04 2018

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Tue Dec 04 2018

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

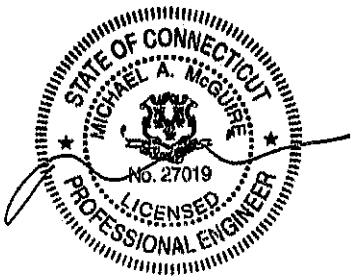
RF EMISSIONS COMPLIANCE REPORT

Crown Castle on behalf of Dish Network, LLC

Site Name: WEST HARTFORD/I-84/X43
Crown Castle Site BU: 829013
Dish Network, LLC Site #: CT0100003A
467 South Quaker Lane
West Hartford, CT
2/5/2019

Report Status:

Dish Network, LLC Is Compliant



sealed 6feb2019 mike@h2dc.com
H2DC PLLC CT CoA#: 0001714

Prepared By:

Sitesafe, LLC

8618 Westwood Center Drive,
Suite 315

Vienna, VA 22182

Voice 703-276-1100
Fax 703-276-1169

Engineering Statement in Re:
Electromagnetic Energy Analysis
Crown Castle
West Hartford, CT

My signature on the cover of this document indicates:

That I, Michael A McGuire, am currently and actively licensed to provide (in this state/jurisdiction as indicated within the professional electrical engineering seal on the cover of this document) professional electrical engineering services, as an employee of Hurricane Hill Development Company, PLLC , a duly authorized/registered engineering firm (in this state, as applicable) on behalf of SiteSafe, LLC; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission ("the FCC" and "the FCC Rules") both in general and specifically as they apply to the FCC's Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; and

That the technical information serving as the basis for this report was supplied by Crown Castle (See attached Site Summary and Carrier documents), and that Dish Network, LLC's installations involve communications equipment, antennas and associated technical equipment at a location referred to as the "WEST HARTFORD/I-84/X43" ("the site"); and

That Dish Network, LLC proposes to operate at the site with transmit antennas listed in the carrier summary and with a maximum effective radiated power as specified by Dish Network, LLC and shown on the worksheet, and that worst-case 100% duty cycle have been assumed; and

That in addition to the emitters specified in the worksheet, there are additional collocated point-to-point microwave facilities on this structure and, the antennas used are highly directional oriented at angles at or just below the horizontal and, that the energy present at ground level is typically so low as to be considered insignificant and have not been included in this analysis; and

That this analysis has been performed with the assumption that the ground immediately surrounding the tower is primarily flat or falling; and

That at this time, the FCC requires that certain licensees address specific levels of radio-frequency energy to which workers or members of the public might possibly be exposed (at §1.1307(b) of the FCC Rules); and

That such consideration of possible exposure of humans to radio-frequency radiation must utilize the standards set by the FCC, which is the Federal Agency having jurisdiction over communications facilities; and

That the FCC rules define two tiers of permissible exposure guidelines: 1) "uncontrolled environments," defined as situations in which persons may not be aware of (the "general public"), or may not be able to control their exposure to a transmission facility; and (2) "controlled environments," which defines situations in which persons are aware of their potential for exposure (industry personnel); and

That this statement specifically addresses the uncontrolled environment (which is more conservative than the controlled environment) and the limit set forth in the FCC rules for

licensees of Dish Network, LLC's operating frequency as shown on the attached antenna worksheet; and

That when applying the uncontrolled environment standards, the predicted Maximum Power Density at two meters above ground level from the proposed Dish Network, LLC operation is no more than 0.156% of the maximum in any accessible area on the ground and

That it is understood per FCC Guidelines and OET65 Appendix A, that regardless of the existent radio-frequency environment, only those licenses whose contributions exceed five percent of the exposure limit pertinent to their operation(s) bear any responsibility for bringing any non-compliant area(s) into compliance; and

That when applying the uncontrolled environment standards, the cumulative predicted energy density from the proposed operation is no more than 10.711% of the maximum in any accessible area up to two meters above the ground per OET-65; and

That the calculations provided in this report are based on data provided by the client and antenna pattern data supplied by the antenna manufacturer, in accordance with FCC guidelines listed in OET-65. Horizontal and vertical antenna patterns are combined for modeling purposes to accurately reflect the energy two meters above ground level where on-axis energy refers to maximum energy two meters above the ground along the azimuth of the antenna and where area energy refers to the maximum energy anywhere two meters above the ground regardless of the antenna azimuth, accounting for cumulative energy from multiple antennas for the carrier and frequency range indicated; and

That the Occupational Safety and Health Administration has policies in place which address worker safety in and around communications sites, thus individual companies will be responsible for their employees' training regarding Radio Frequency Safety.

In summary, it is stated here that the proposed operation at the site would not result in exposure of the Public to excessive levels of radio-frequency energy as defined in the FCC Rules and Regulations, specifically 47 CFR 1.1307 and that Dish Network, LLC's proposed operation is completely compliant.

Finally, it is stated that access to the tower should be restricted to communication industry professionals, and approved contractor personnel trained in radio-frequency safety; and that the instant analysis addresses exposure levels at two meters above ground level and does not address exposure levels on the tower, or in the immediate proximity of the antennas.

Crown Castle
WEST HARTFORD/I-84/X43
Site Summary

Carrier	Area Maximum Percentage MPE
AT&T Mobility, LLC	0.282 %
AT&T Mobility, LLC	0.556 %
AT&T Mobility, LLC	0.752 %
AT&T Mobility, LLC	0.656 %
AT&T Mobility, LLC	0.699 %
AT&T Mobility, LLC	0.8 %
Dish Network, LLC (Proposed)	0.156 %
Sprint	0.495 %
Sprint	0.495 %
Sprint	0.688 %
Sprint	0.466 %
T-Mobile	0.156 %
T-Mobile	0.169 %
T-Mobile	0.493 %
T-Mobile	0.133 %
Verizon Wireless	1.062 %
Verizon Wireless	0.745 %
Verizon Wireless	1.074 %
Verizon Wireless	0.835 %
Composite Site MPE:	10.711 %

AT&T Mobility, LLC
WEST HARTFORD/I-84/X43
Carrier Summary

Frequency:	2300	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	2.81719	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.28172	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
CCI Antennas	TPA-65R-LCUUUU-H8	110	80	2729	1.077501	0.10775	2.381292	0.238129
Quintel	QS66512-2	110	210	2858	1.364156	0.136416	2.691736	0.269174
Quintel	QS66512-2	110	330	2858	1.357104	0.13571	2.691736	0.269174

AT&T Mobility, LLC
WEST HARTFORD/I-84/X43
Carrier Summary

Frequency:	737	MHz
Maximum Permissible Exposure (MPE):	491.33	µW/cm^2
Maximum power density at ground level:	2.73005	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.55564	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
CCI Antennas	TPA-65R-LCUUUU-H8	110	80	3632	1.797384	0.365818	1.894267	0.385536
Quintel	QS66512-2	110	210	2239	1.892133	0.385102	2.648065	0.538955
Quintel	QS66512-2	110	330	2239	1.890719	0.384814	2.648065	0.538955

AT&T Mobility, LLC
WEST HARTFORD/I-84/X43
Carrier Summary

Frequency:	2100	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	7.51874	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.75187	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Kathrein-Scala	800-10966	110	80	7364	3.630327	0.363033	7.364509	0.736451
Kathrein-Scala	800-10965	110	210	7114	2.663047	0.266305	6.239142	0.623914
Kathrein-Scala	800-10965	110	330	7114	2.596882	0.259688	6.239142	0.623914

AT&T Mobility, LLC
WEST HARTFORD/I-84/X43
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	6.55946	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.65595	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Kathrein-Scala	800-10966	110	80	6168	3.009878	0.300988	5.579532	0.557953
Kathrein-Scala	800-10965	110	210	6168	2.236801	0.22368	4.847119	0.484712
Kathrein-Scala	800-10965	110	330	6168	2.247915	0.224792	4.847118	0.484712

AT&T Mobility, LLC
WEST HARTFORD/I-84/X43
Carrier Summary

Frequency:	763	MHz
Maximum Permissible Exposure (MPE):	508.67	µW/cm^2
Maximum power density at ground level:	3.55721	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.69932	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Kathrein-Scala	800-10966	110	80	3623	2.349899	0.461972	3.103665	0.610157
Kathrein-Scala	800-10965	110	210	2959	1.959552	0.385233	2.529623	0.497305
Kathrein-Scala	800-10965	110	330	2959	1.971269	0.387536	2.529623	0.497305

AT&T Mobility, LLC
WEST HARTFORD/I-84/X43
Carrier Summary

Frequency:	850	MHz
Maximum Permissible Exposure (MPE):	566.67	µW/cm^2
Maximum power density at ground level:	4.53102	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.79959	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Powerwave	7770	110	80	1094	0.8818	0.155612	1.389321	0.245174
CCI Antennas	TPA-65R-LCUUUU-H8	110	80	3632	1.548743	0.273308	3.079484	0.543438
Powerwave	7770	110	210	1094	0.8818	0.155612	1.389321	0.245174
Quintel	QS66512-2	110	210	1996	2.132857	0.376387	2.774119	0.48955
Powerwave	7770	110	330	1094	0.88289	0.155804	1.389321	0.245174
Quintel	QS66512-2	110	330	1996	2.142145	0.378026	2.774119	0.48955

Dish Network, LLC (Proposed)
WEST HARTFORD/I-84/X43
Carrier Summary

Frequency:	1995	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	1.55883	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.15588	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Comba	ODI2-065R18K-GQ	90	15	1081	0.70363	0.070363	0.994583	0.099458
Comba	ODI2-065R18K-GQ	90	120	1081	0.70363	0.070363	0.994583	0.099458
Comba	ODI2-065R18K-GQ	90	240	1081	0.70363	0.070363	0.994583	0.099458

Sprint
WEST HARTFORD/I-84/X43
Carrier Summary

Frequency:	1990	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	4.94876	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.49488	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Commscope	NNVV-65B-R4	81	0	2781	2.596005	0.2596	4.910815	0.491081
Commscope	NNVV-65B-R4	81	120	2781	2.596004	0.2596	4.910815	0.491081
Commscope	NNVV-65B-R4	81	240	2781	2.596004	0.2596	4.910815	0.491081

Sprint
WEST HARTFORD/I-84/X43
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	4.94876	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.49488	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Commscope	NNVV-65B-R4	81	0	2781	2.596005	0.2596	4.910815	0.491081
Commscope	NNVV-65B-R4	81	120	2781	2.596004	0.2596	4.910815	0.491081
Commscope	NNVV-65B-R4	81	240	2781	2.596004	0.2596	4.910815	0.491081

Sprint
WEST HARTFORD/I-84/X43
Carrier Summary

Frequency:	862	MHz
Maximum Permissible Exposure (MPE):	574.67	µW/cm^2
Maximum power density at ground level:	3.95585	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.68837	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Commscope	NNVV-65B-R4	81	0	1563	2.819666	0.490661	3.904552	0.679446
Commscope	NNVV-65B-R4	81	120	1563	2.804525	0.488026	3.904553	0.679447
Commscope	NNVV-65B-R4	81	240	1563	2.819666	0.490661	3.904552	0.679446

Sprint
WEST HARTFORD/I-84/X43
Carrier Summary

Frequency:	2500	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	4.66058	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.46606	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Nokia	AAHC	81	0	3389	3.656821	0.365682	4.616	0.4616
Nokia	AAHC	81	120	3389	3.670828	0.367083	4.616	0.4616
Nokia	AAHC	81	240	3389	3.656821	0.365682	4.616	0.4616

T-Mobile
WEST HARTFORD/I-84/X43
Carrier Summary

Frequency:	700	MHz
Maximum Permissible Exposure (MPE):	466.67	µW/cm^2
Maximum power density at ground level:	0.7271	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.15581	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
RFS	APXVAARR24_43-U-NA20	120	90	1307	0.59696	0.12792	0.624084	0.133732
RFS	APXVAARR24_43-U-NA20	120	210	1307	0.596731	0.127871	0.624084	0.133732
RFS	APXVAARR24_43-U-NA20	120	330	1307	0.59696	0.12792	0.624084	0.133732

T-Mobile
WEST HARTFORD/I-84/X43
Carrier Summary

Frequency:	600	MHz
Maximum Permissible Exposure (MPE):	400	µW/cm^2
Maximum power density at ground level:	0.67687	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.16922	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
RFS	APXVAARR24_43-U-NA20	120	90	1251	0.614239	0.15356	0.630207	0.157552
RFS	APXVAARR24_43-U-NA20	120	210	1251	0.615649	0.153912	0.630207	0.157552
RFS	APXVAARR24_43-U-NA20	120	330	1251	0.614239	0.15356	0.630207	0.157552

T-Mobile
WEST HARTFORD/I-84/X43
Carrier Summary

Frequency:	2100	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	4.9303	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.49303	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Ericsson	AIR 32 B2A-B66AA	120	90	2313	3.425622	0.342562	3.425622	0.342562
Ericsson	AIR 3246	120	90	2313	0.793881	0.079388	0.907227	0.090723
Ericsson	AIR 32 B2A-B66AA	120	210	2313	3.406468	0.340647	3.420056	0.342006
Ericsson	AIR 3246	120	210	2313	0.794185	0.079419	0.907227	0.090723
Ericsson	AIR 32 B2A-B66AA	120	330	2313	3.425622	0.342562	3.425622	0.342562
Ericsson	AIR 3246	120	330	2313	0.793882	0.079388	0.907227	0.090723

T-Mobile
WEST HARTFORD/I-84/X43
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	1.32947	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.13295	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Ericsson	AIR 32 B2A-B66AA	120	90	2313	0.793881	0.079388	0.907227	0.090723
Ericsson	AIR 32 B2A-B66AA	120	210	2313	0.794185	0.079419	0.907227	0.090723
Ericsson	AIR 32 B2A-B66AA	120	330	2313	0.793882	0.079388	0.907227	0.090723

Verizon Wireless
WEST HARTFORD/I-84/X43
Carrier Summary

Frequency:	850	MHz
Maximum Permissible Exposure (MPE):	566.67	µW/cm^2
Maximum power density at ground level:	6.01955	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	1.06227	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Antel	BXA-80063-4CF	100	60	3192	4.515804	0.796907	5.933411	1.047073
Antel	BXA-80063-4CF	100	180	3192	4.515803	0.796906	5.93341	1.047072
Antel	BXA-80063-4CF	100	300	3192	4.521562	0.797923	5.93341	1.047072

Verizon Wireless
WEST HARTFORD/I-84/X43
Carrier Summary

Frequency:	2100	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	7.44934	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.74493	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
ANDREW	SBNHH-1D65B	100	60	5154	4.668221	0.466822	7.137465	0.713747
ANDREW	SBNHH-1D65B	100	180	5154	4.661319	0.466132	7.137465	0.713747
ANDREW	SBNHH-1D65B	100	300	5154	4.661319	0.466132	7.137465	0.713747

Verizon Wireless
WEST HARTFORD/I-84/X43
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	10.73951	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	1.07395	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
ANDREW	SBNHH-1D65B	100	60	4583	8.169732	0.816973	10.622636	1.062264
ANDREW	SBNHH-1D65B	100	180	4583	8.288787	0.828879	10.622635	1.062263
ANDREW	SBNHH-1D65B	100	300	4583	8.288787	0.828879	10.622638	1.062264

Verizon Wireless
WEST HARTFORD/I-84/X43
Carrier Summary

Frequency:	751	MHz
Maximum Permissible Exposure (MPE):	500.67	µW/cm^2
Maximum power density at ground level:	4.17837	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.83456	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
ANDREW	SBNHH-1D65B	100	60	1362	1.033099	0.206345	1.667973	0.33315
ANDREW	LNX-6514DS-VTM	100	60	1885	1.700994	0.339746	2.609572	0.521219
ANDREW	SBNHH-1D65B	100	180	1362	1.034398	0.206604	1.667973	0.33315
ANDREW	LNX-6514DS-VTM	100	180	1885	1.700994	0.339746	2.609572	0.521219
ANDREW	SBNHH-1D65B	100	300	1362	1.034398	0.206604	1.667973	0.33315
ANDREW	LNX-6514DS-VTM	100	300	1885	1.700429	0.339633	2.609572	0.521219