



56 Prospect Street,
P.O. Box 270
Hartford, CT 06103

Kathleen M. Shanley
Manager – Transmission Siting
Tel: (860) 728-4527

June 25, 2020

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

**RE: Notice of Exempt Modification
Eversource Site # 29164
626 Glenbrook Road, Stamford, CT 06906
Latitude: 41-04-29.6 N / Longitude: 73-31-7.5 W**

Dear Ms. Bachman:

The Connecticut Light and Power Company doing business as Eversource Energy (“Eversource”) currently maintains multiple antennas and equipment at various mounting heights on an existing 75-foot steel monopole tower located at 626 Glenbrook Road in Stamford. See [Attachment A](#), Parcel Map and Property Card. The tower and property are owned by Eversource. Eversource plans to install one 24-foot tall omni-directional antenna, to be mounted at approximately 70 feet above ground level (“AGL”), and two 7/8-inch diameter coaxial cables. There will be no changes to the area of the fenced compound, the tower or the antennas and equipment currently mounted on the tower. The tower and existing and proposed equipment on the tower are depicted on [Attachment B](#), Construction Drawings, dated March 30, 2020 and [Attachment C](#), Structural Analysis, dated March 9, 2020. The Connecticut Siting Council approved the monopole at this location in Petition No. 829 in November 2007.

The proposed installation is part of Eversource’s program to update the current obsolete analog voice radio communications system to a modern digital voice communications system. The new system will enable the highest level of voice communications under all operating conditions, including during critical emergency and storm restoration activities. The new radio system will also provide for remote control of distribution safety equipment.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies (“R.C.S.A.”) §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this notice is being delivered to David Martin, Mayor for the City of Stamford and Ralph Blessing, Land Use Bureau Chief for the City of Stamford via the United States Postal Service or private carrier. Proof of delivery is attached. See [Attachment D](#), Proof of Delivery of Notice.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2):

1. There will be no change to the height of the existing tower.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the new antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard as shown in the attached Radio Frequency Emissions Report, dated January 24, 2020 (Attachment E – Power Density Report).
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, Eversource respectfully submits that the proposed modifications to the above referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2). One original copy of this notice has been provided via courier to the Council.

Communications regarding this Notice of Exempt Modification should be directed to Kathleen Shanley at (860) 728-4527.

By: 

Kathleen M. Shanley
Manager – Transmission Siting

cc: Honorable David Martin, Mayor, City of Stamford
Ralph Blessing, Land Use Bureau Chief, City of Stamford

Attachments

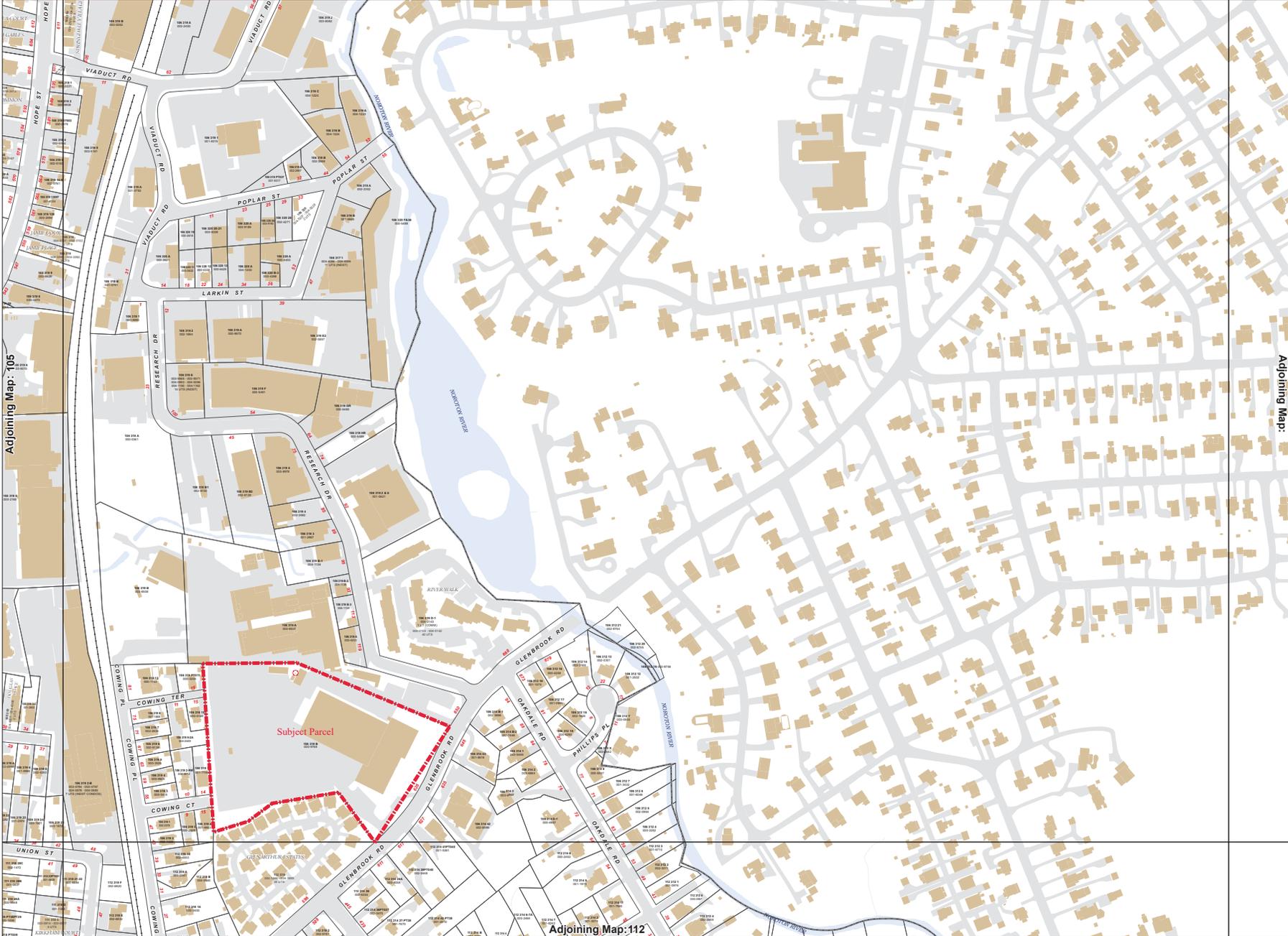
- A. Parcel Map and Property Card
- B. Construction Drawings
- C. Structural Analysis
- D. Proof of Delivery of Notice
- E. Power Density Report

ATTACHMENT A – PARCEL MAP AND PROPERTY CARD

Legend

○ Approximate Tower Location

Adjoining Map: 100



Map: 106

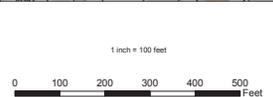
This map is for informational purposes only. All information is subject to verification by user. The map is not intended to represent any warranty. The City of Stamford assumes no legal responsibility for the information contained herein.

This map is not to be used for property boundary descriptions, conveyances, or determination of legal title. Property descriptions must be obtained from surveys or deeds. The City parcel data has been compiled from many sources including parcel records, tax maps, surveys, and other data. Tax maps are not a substitute for survey or deed information.

For more information contact the City of Stamford's Assessor's Office.

This map is formatted for 42" x 36" paper size only. Printing this map on smaller paper will result in the map being truncated.

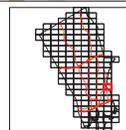
Map Produced March 2016



City of Stamford, Connecticut Assessment Parcel Map

Parcel data current as of October 2018.
Assessment Data displayed on this map as of October 2018 grand list.
Building and Paved Roads based on aerial flight from Spring 2016.
Map Coordinates based on NAD 83 Connecticut State Plane Feet.

- 111 216 84 Map Block Lot
- 13 Address
- 003-6569 Parcel Id
- Parcels
- City Boundaries
- Water Bodies
- Streams and Rivers
- Paved Roads
- Buildings
- Parks
- Railroad



Map: 106

626 GLENBROOK ROAD

Location 626 GLENBROOK ROAD

Mblu 000/ 9768/ / /

Acct# 000-9768

Owner CONNECTICUT LIGHT &
POWER CO

Assessment \$8,747,860

Appraisal \$12,496,930

PID 29164

Building Count 1

Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2019	\$3,914,530	\$8,582,400	\$12,496,930

Assessment			
Valuation Year	Improvements	Land	Total
2019	\$2,740,180	\$6,007,680	\$8,747,860

Owner of Record

Owner CONNECTICUT LIGHT & POWER CO
Co-Owner
Address P O BOX 270
HARTFORD, CT 06141-0270

Sale Price \$0
Book & Page 5084/0339
Sale Date 09/09/1998

Ownership History

Ownership History			
Owner	Sale Price	Book & Page	Sale Date
CONNECTICUT LIGHT & POWER CO	\$0	5084/0339	09/09/1998
CONNECTICUT LIGHT & POWER CO	\$0	2145/0158	07/02/1982

Building Information

Building 1 : Section 1

Year Built: 1960
Living Area: 65,135

Building Attributes	
Field	Description
STYLE	Off/Warehouse
MODEL	Comm/Ind

Grade	C+
Stories:	1
Occupancy	1.00
Exterior Wall 1	Brick
Exterior Wall 2	Concr/Cinder
Roof Structure	Flat
Roof Cover	T&G/Rubber
Interior Wall 1	Minimum
Interior Wall 2	Drywall/Plaste
Interior Floor 1	Concrete Slab
Interior Floor 2	Carpet
Heating Fuel	Gas/LP
Heating Type	Forced Air-Duc
AC Type	Partial A/C
Struct Class	
Bldg Use	Commercial MDL-94
Total Rooms	
Total Bedrms	00
Total Baths	0
Usrflid 218	
Usrflid 219	
1st Floor Use:	200
Heat/AC	Heat/AC Pkgs
Frame Type	Steel
Baths/Plumbing	Average
Ceiling/Wall	Sus-Ceil/Mn WL
Rooms/Prtns	Average
Wall Height	13.00
% Comn Wall	

Building Photo



(<http://images.vgsi.com/photos/StamfordCTPhotos//\00\11\44\7>)

Building Layout

BAS[44638]
UBM[20497]
FB3[20497]
CLP[4680]

(<http://images.vgsi.com/photos/StamfordCTPhotos//Sketches/29>)

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	44,638	44,638
FB3	Fin Bsmt, CWF Heat	20,497	20,497
CLP	Loading Platform	4,680	0
UBM	Basement, Unfinished	20,497	0
		90,312	65,135

Extra Features

Extra Features				Legend
Code	Description	Size	Value	Bldg #
SPR1	Sprinklers - Wet	66455.00 S.F.	\$79,750	1
OH1	Door Overhd Co	13.00 UNITS	\$36,080	1
EL2	Elev Pass	2.00 STOPS	\$67,500	1
H04	Air Con/Sfla	20750.00 S.F.	\$38,910	1

Land

Land Use

Use Code 200
Description Commercial MDL-94
Zone MZN
Neighborhood 0400
Alt Land Appr Category No

Land Line Valuation

Size (Acres) 6.40
Depth
Assessed Value \$6,007,680
Appraised Value \$8,582,400

Outbuildings

Outbuildings						<u>Legend</u>
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
LP4	Pavng Asphlt			100000.00 S.F	\$120,000	1

Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
2018	\$3,914,530	\$8,582,400	\$12,496,930
2017	\$3,914,530	\$8,582,400	\$12,496,930
2016	\$3,771,200	\$7,801,930	\$11,573,130

Assessment			
Valuation Year	Improvements	Land	Total
2018	\$2,740,180	\$6,007,680	\$8,747,860
2017	\$2,740,180	\$6,007,680	\$8,747,860
2016	\$2,639,840	\$5,461,350	\$8,101,190

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ATTACHMENT B – CONSTRUCTION DRAWINGS



EVERSOURCE
ENERGY

107 SELDEN STREET
BERLIN, CT 06037
PHONE: (800) 286-2000



BLACK & VEATCH

6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
PHONE: (913) 458-3595

STAMFORD
626 GLENBROOK RD
STAMFORD, CT 06906

PROJECT SUMMARY

THE GENERAL SCOPE OF WORK CONSISTS OF THE FOLLOWING:

1. INSTALL (1) NEW OMNI/WHIP ANTENNA AT ELEVATION 95'-0"± AGL
2. INSTALL (1) NEW RACK WITH DMR EQUIPMENT IN EXISTING SHELTER

GOVERNING CODES

2018 CONNECTICUT STATE BUILDING CODE (2015 IBC BASIS)
2017 NATIONAL ELECTRIC CODE
TIA-222-H

GENERAL NOTES

THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. 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.

SITE INFORMATION

SITE NAME: STAMFORD
SITE ID NUMBER: 29164
SITE ADDRESS: 626 GLENBROOK RD
STAMFORD, CT 06906
MAP: 000
BLOCK: 9768
ZONE: MZN
LATITUDE: 41° 04' 29.6" N
LONGITUDE: 73° 31' 7.5" W
ELEVATION: 45'± AMSL
FEMA/FIRM DESIGNATION: X

CONTACT INFORMATION

APPLICANTS:
EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037
POWER PROVIDER:
EVERSOURCE ENERGY
(800) 286-2000
PROPERTY OWNER:
FRONTIER
EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037
TELCO PROVIDER:
FRONTIER
(800) 921-8102
EVERSOURCE ENERGY
PROJECT MANAGER:
NIKOLL PRECI
(860) 655-3079
CALL BEFORE YOU DIG:
(800) 922-4455

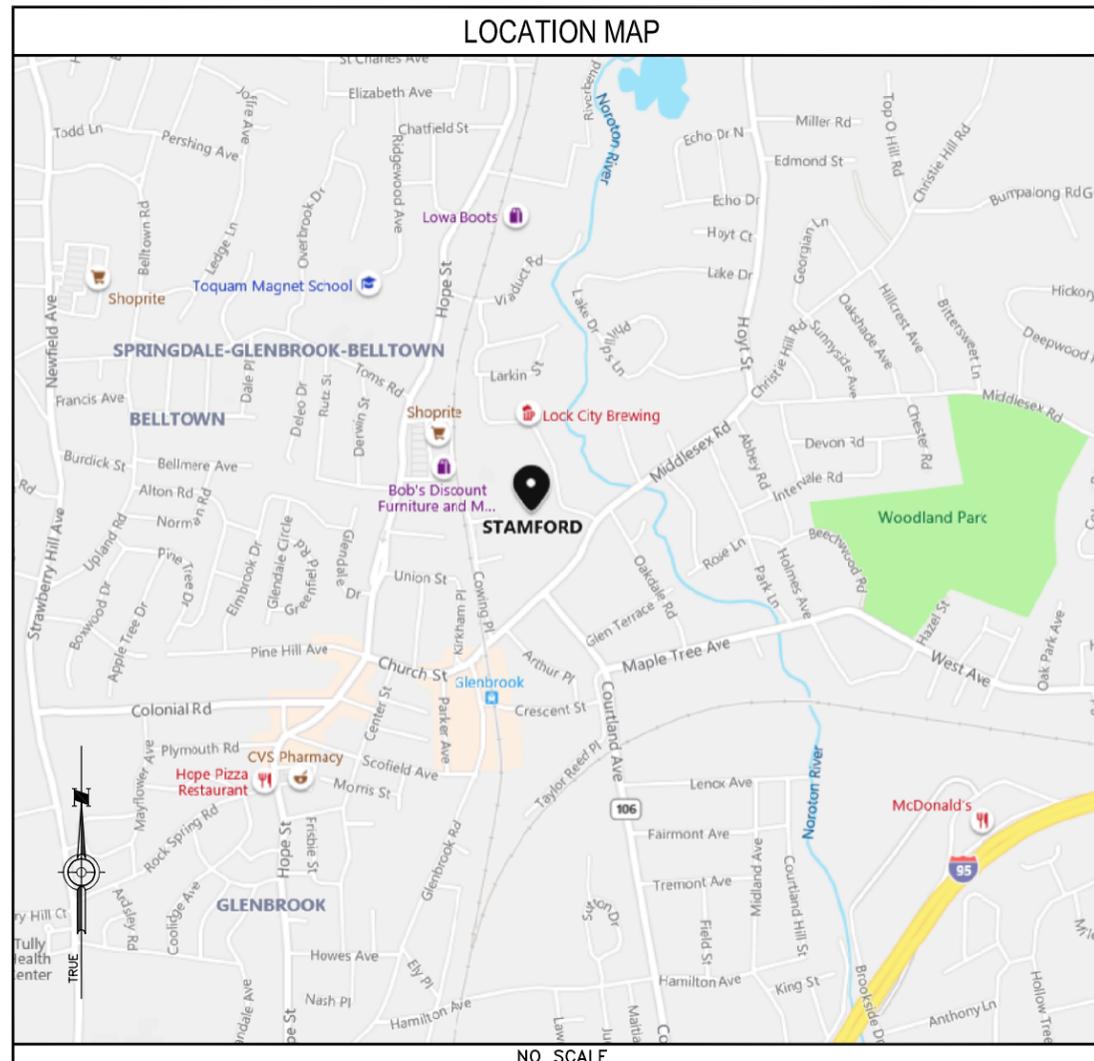
DESIGN TYPE

SITE UPGRADE
MONOPOLE

DRAWING INDEX

SHEET NO:	SHEET TITLE
T-1	TITLE SHEET
C-1	SITE PLAN
C-2	TOWER ELEVATION
G-1	GROUNDING DETAILS
N-1	NOTES & SPECIFICATIONS
N-2	NOTES & SPECIFICATIONS
N-3	NOTES & SPECIFICATIONS

LOCATION MAP



NO SCALE

DO NOT SCALE DRAWINGS

SUBCONTRACTOR SHALL VERIFY ALL PLANS & EXISTING DIMENSIONS & CONDITIONS ON THE JOB SITE & SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME

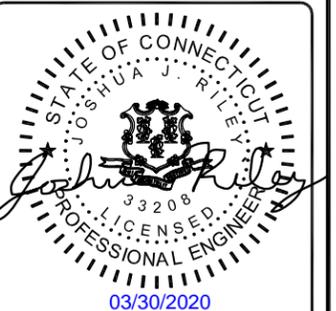


UNDERGROUND SERVICE ALERT
UTILITIES PROTECTION CENTER, INC.
811

48 HOURS BEFORE YOU DIG

PROJECT NO:	403093
DRAWN BY:	KCI
CHECKED BY:	JR

REV	DATE	DESCRIPTION
0	03/13/20	ISSUED FOR FILING

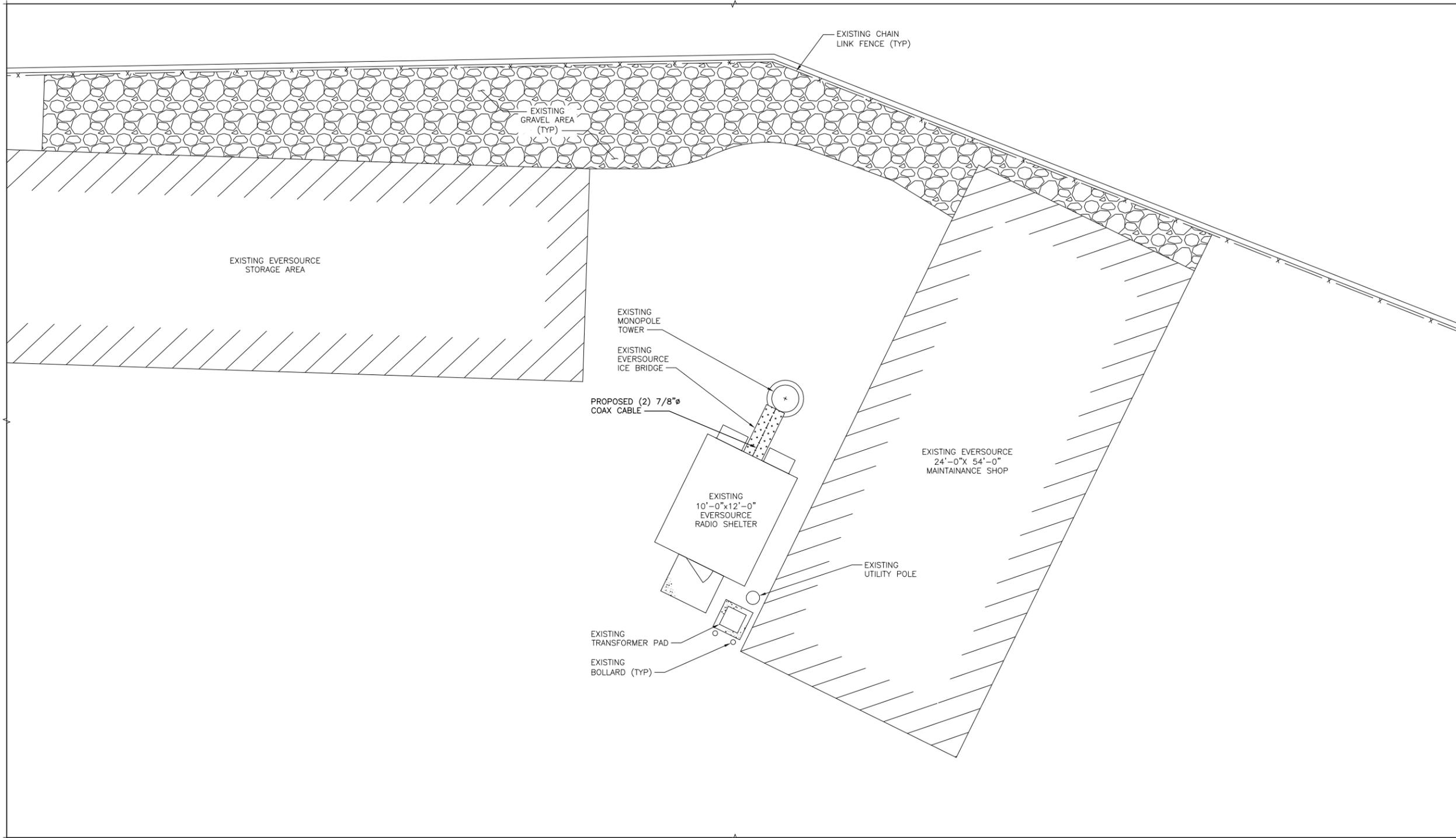


IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

STAMFORD
626 GLENBROOK RD
STAMFORD, CT 06906

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1



PARTIAL SITE PLAN
NO SCALE

EVERSOURCE
ENERGY

107 SELDEN STREET
BERLIN, CT 06037
PHONE: (800) 286-2000

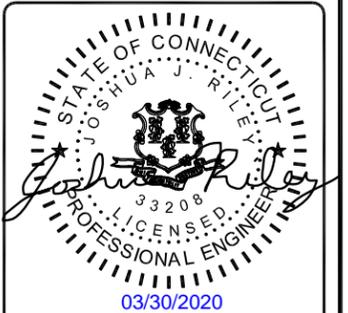


BLACK & VEATCH

6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
PHONE: (913) 458-3595

PROJECT NO:	403093
DRAWN BY:	KCI
CHECKED BY:	JR

REV	DATE	DESCRIPTION
0	03/13/20	ISSUED FOR FILING

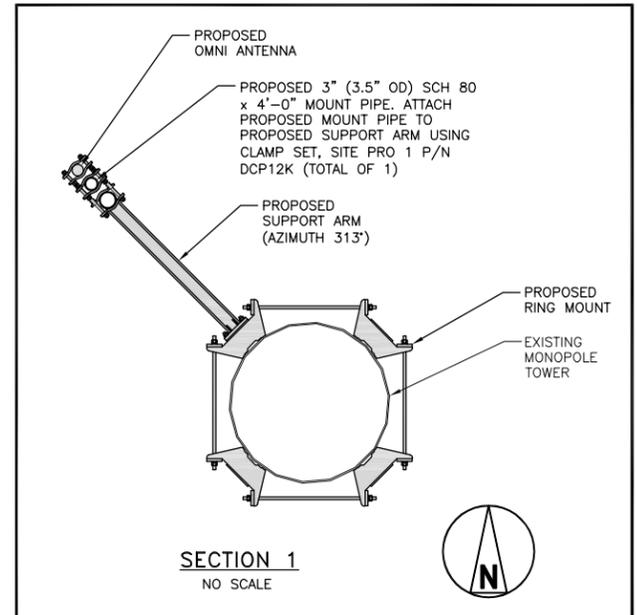
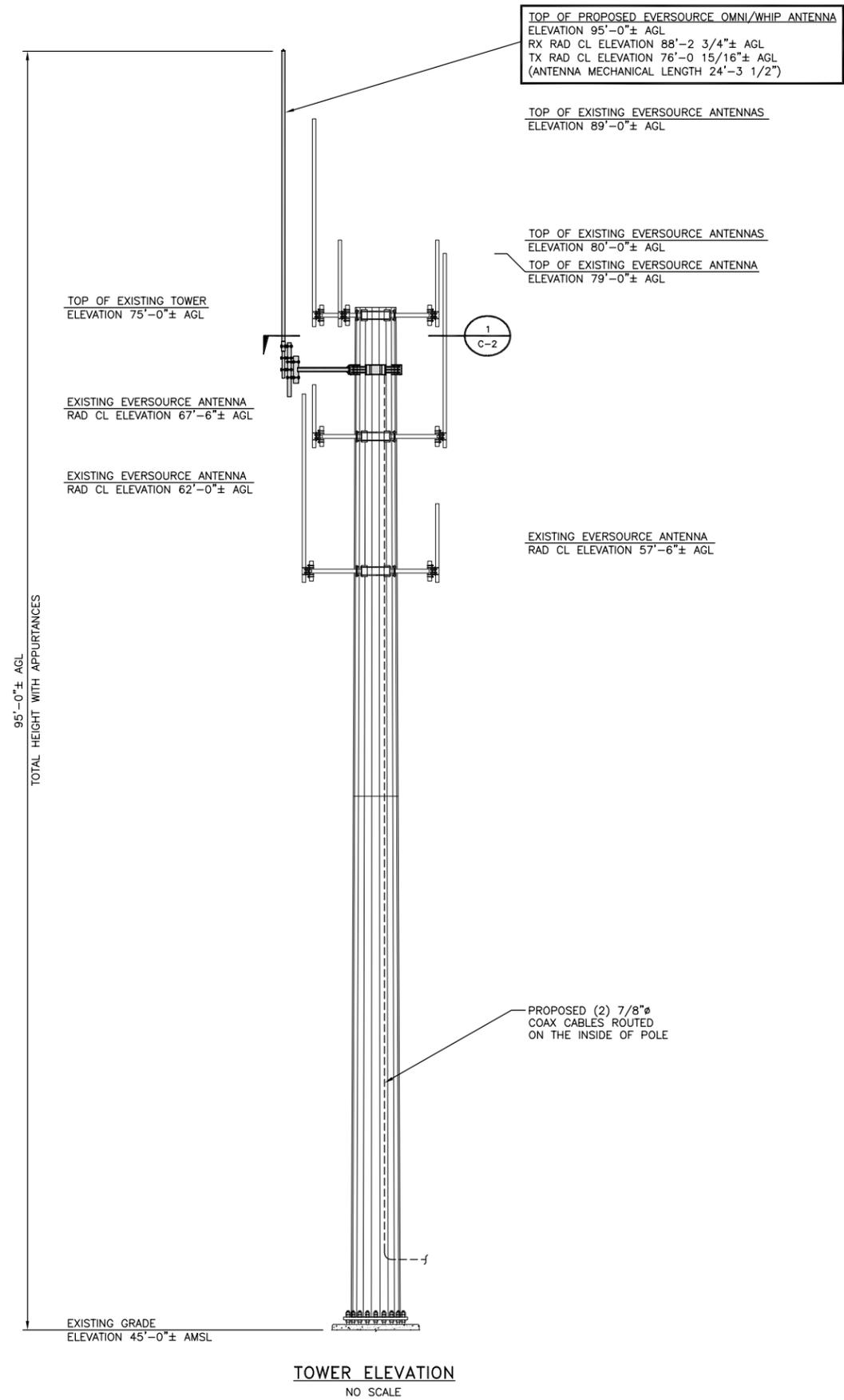


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STAMFORD
626 GLENBROOK RD
STAMFORD, CT 06906

SHEET TITLE
SITE PLAN

SHEET NUMBER
C-1



EVERSOURCE ENERGY

107 SELDEN STREET
BERLIN, CT 06037
PHONE: (800) 286-2000



BLACK & VEATCH

6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
PHONE: (913) 458-3595

PROJECT NO:	403093
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CHECKED BY:	JR

REV	DATE	DESCRIPTION
0	03/13/20	ISSUED FOR FILING



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STAMFORD
626 GLENBROOK RD
STAMFORD, CT 06906

SHEET TITLE
TOWER
ELEVATION

SHEET NUMBER
C-2

SYMBOLS

●	EXOTHERMIC CONNECTION
■	COMPRESSION CONNECTION
⊕	5/8"Øx10'-0" COPPER CLAD STEEL GROUND ROD.
⊕	TEST GROUND ROD WITH INSPECTION SLEEVE
---	GROUNDING CONDUCTOR
(A)	KEY NOTES
— X — X — X — X — X —	CHAINLINK FENCE
— □ — □ — □ — □ — □ —	WOOD FENCE
---	LEASE AREA
▨	ICE BRIDGE
▧	CABLE TRAY
— G — G — G — G — G —	GAS LINE
— E/T — E/T — E/T — E/T —	UNDERGROUND ELECTRICAL/TELCO
— E/C — E/C — E/C — E/C —	UNDERGROUND ELECTRICAL/CONTROL
— E — E — E — E — E —	UNDERGROUND ELECTRICAL
— T — T — T — T — T —	UNDERGROUND TELCO
---	PROPERTY LINE (PL)

ABBREVIATIONS

AC	ALTERNATING CURRENT	MGB	MASTER GROUNDING BAR
AIC	AMPERAGE INTERRUPTION CAPACITY	MIN	MINIMUM
ANI	AUXILIARY NETWORK INTERFACE	MW	MICROWAVE
ATM	ASYNCHRONOUS TRANSFER MODE	MTS	MANUAL TRANSFER SWITCH
ATS	AUTOMATIC TRANSFER SWITCH	NEC	NATIONAL ELECTRICAL CODE
AWG	AMERICAN WIRE GAUGE	OC	ON CENTER
AWS	ADVANCED WIRELESS SERVICES	PP	POLARIZING PRESERVING
BATT	BATTERY	PCU	PRIMARY CONTROL UNIT
BBU	BASEBAND UNIT	PDU	PROTOCOL DATA UNIT
BTC	BARE TINNED COPPER CONDUCTOR	PWR	POWER
BTS	BASE TRANSCEIVER STATION	RECT	RECTIFIER
CCU	CLIMATE CONTROL UNIT	RET	REMOTE ELECTRICAL TILT
CDMA	CODE DIVISION MULTIPLE ACCESS	RMC	RIGID METALLIC CONDUIT
CHG	CHARGING	RF	RADIO FREQUENCY
CLU	CLIMATE UNIT	RUC	RACK USER COMMISSIONING
COMM	COMMON	RRH	REMOTE RADIO HEAD
DC	DIRECT CURRENT	RRU	REMOTE RADIO UNIT
DIA	DIAMETER	RWY	RACEWAY
DWG	DRAWING	SFP	SMALL FORM-FACTOR PLUGGABLE
EC	ELECTRICAL CONDUCTOR	SIAD	SMART INTEGRATED ACCESS DEVICE
EMT	ELECTRICAL METALLIC TUBING	SSC	SITE SOLUTIONS CABINET
FIF	FACILITY INTERFACE FRAME	T1	1544KBPS DIGITAL LINE
GEN	GENERATOR	TDMA	TIME-DIVISION MULTIPLE ACCESS
GPS	GLOBAL POSITIONING SYSTEM	TMA	TOWER MOUNT AMPLIFIER
GSM	GLOBAL SYSTEM FOR MOBILE	TVSS	TRANSIENT VOLTAGE SUPPRESSION SYSTEM
HVAC	HEAT/VENTILATION/AIR CONDITIONING	TYP	TYPICAL
ICF	INTERCONNECTION FRAME	UMTS	UNIVERSAL MOBILE TELECOMMUNICATION SYSTEM
IGR	INTERIOR GROUNDING RING (HALO)	UPS	UNINTERRUPTIBLE POWER SUPPLY (DC POWER PLANT)
LTE	LONG TERM EVOLUTION		

EVERSOURCE ENERGY

107 SELDEN STREET
BERLIN, CT 06037
PHONE: (800) 286-2000

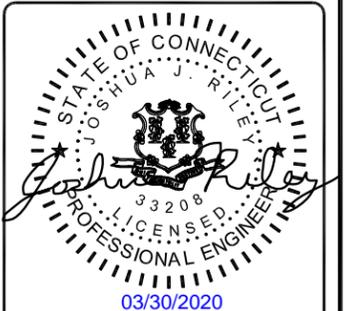


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STAMFORD
626 GLENBROOK RD
STAMFORD, CT 06906

SHEET TITLE
NOTES & SPECIFICATIONS

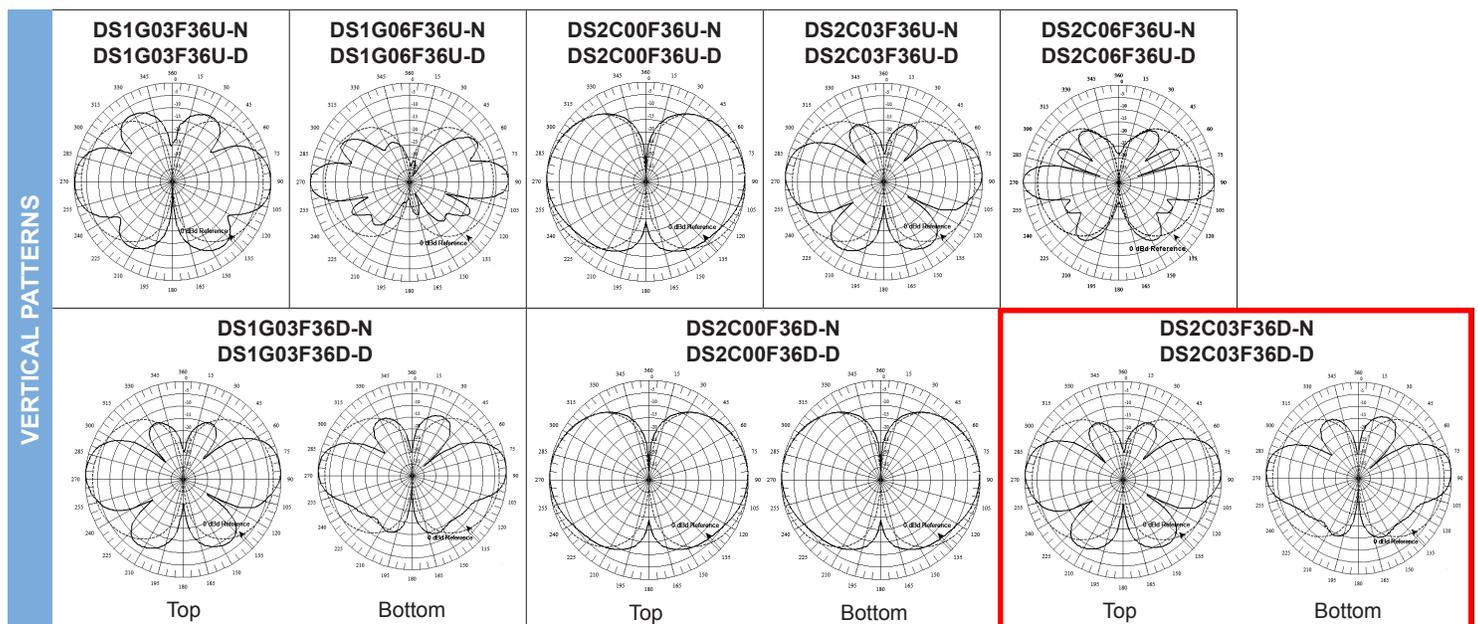
SHEET NUMBER

N-3

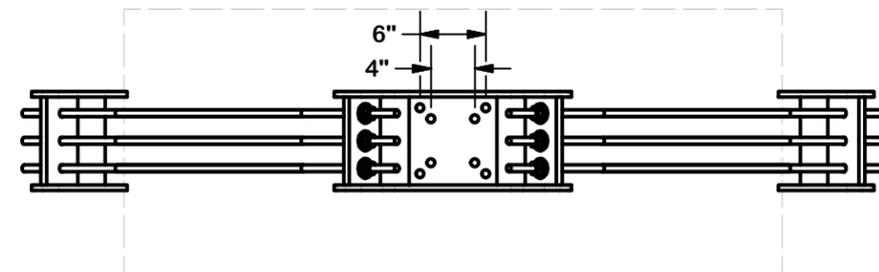
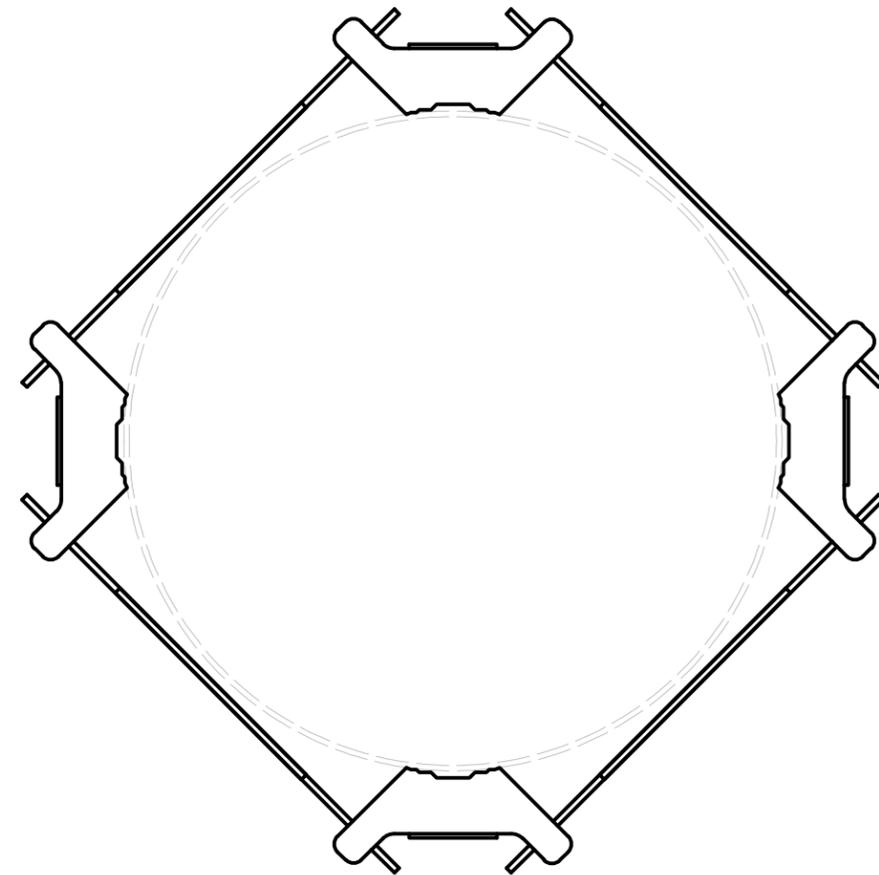
REFERENCE CUTSHEETS

VHF Omni Antennas (160-222 MHz)

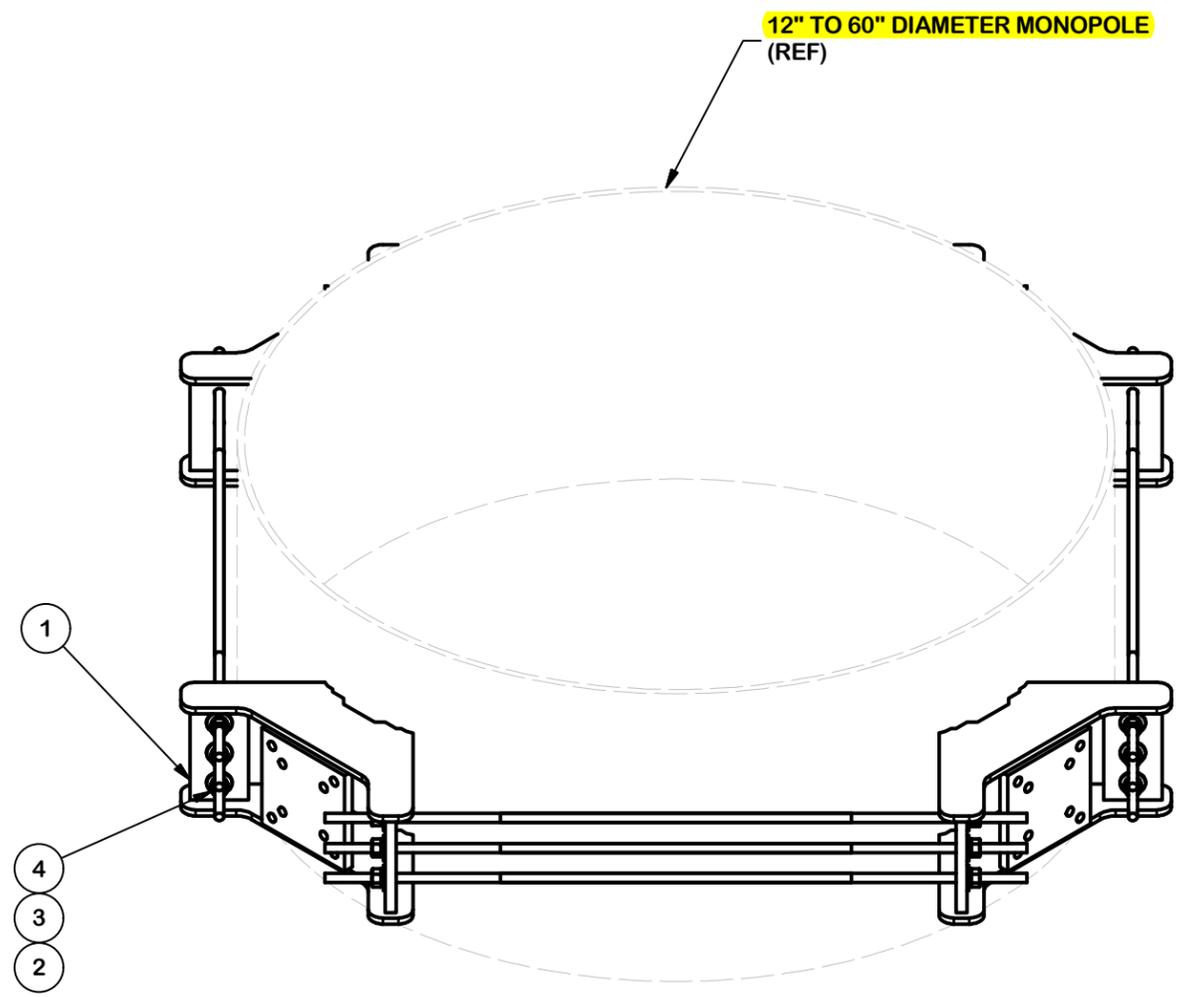
		160-174 MHz						217-222 MHz									
Model Number		DS1G03F36U-N	DS1G03F36U-D	DS1G06F36U-N	DS1G06F36U-D	DS1G03F36D-N	DS1G03F36D-D	DS2C00F36U-N	DS2C00F36U-D	DS2C03F36U-N	DS2C03F36U-D	DS2C06F36U-N	DS2C06F36U-D	DS2C00F36D-N	DS2C00F36D-D	DS2C03F36D-N	DS2C03F36D-D
Input Connector		N(F)	7/16 DIN														
Type		Single		Single		Dual		Single		Single		Single		Dual		Dual	
ELECTRICAL	Bandwidth, MHz	14		14		14		5		5		5		5		5	
	Power, Watts	500		500		350		500		500		500		350		350	
	Gain, dBd	3		6		3		0		3		6		0		3	
	Horizontal Beamwidth, degrees	360		360		360		360		360		360		360		360	
	Vertical Beamwidth, degrees	30		16		30		60		30		16		60		30	
	Beam Tilt, degrees	0		0		0		0		0		0		0		0	
	Isolation (minimum), dB	N/A		N/A		30		N/A		N/A		N/A		30		30	
MECHANICAL	Number of Connectors	1		1		2		1		1		1		2		2	
	Flat Plate Area, ft ² (m ²)	2.53 (0.24)		4.38 (0.41)		4.5 (0.42)		1.9 (0.18)		1.9 (0.18)		2.58 (0.24)		2.4 (0.22)		4.1 (0.38)	
	Lateral Windload Thrust, lbf(N)	95 (423)		164 (730)		169 (752)		53 (236)		69 (307)		108 (480)		90 (400)		169 (752)	
	Survival Wind Speed without ice, mph(kph)	110 (177)		75 (121)		75 (121)		222 (357)		172 (277)		110 (177)		130 (209)		75 (121)	
	with 0.5" radial ice, mph(kph)	93 (150)		60 (97)		65 (105)		193 (311)		150 (241)		96 (154)		115 (185)		65 (105)	
Mounting Hardware included	DSH3V3R		DSH3V3N		DSH3V3N		DSH2V3R		DSH2V3R		DSH3V3N		DSH3V3R		DSH3V3N		
DIMENSIONS	Length, ft(m)	12.7 (3.9)		21.9 (6.7)		22.3 (6.8)		7.7 (2.3)		9.9 (3)		18.1 (5.5)		13.6 (4.1)		24.3 (7.4)	
	Radome O.D., in(cm)	3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)	
	Mast O.D., in(cm)	2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)	
	Net Weight w/o bracket, lb(kg)	37 (16.8)		60 (27.2)		63 (28.6)		19 (8.6)		26 (11.8)		47 (21.3)		40 (18.1)		70 (31.8)	
	Shipping Weight, lb(kg)	67 (30.4)		90 (40.8)		93 (42.2)		39 (17.7)		56 (25.4)		77 (34.9)		70 (31.8)		100 (45.4)	



TOWER/MAST SIZE AT PROPOSED ANTENNA ATTACHMENT = 37 1/2" ± DIAMETER.



PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	4	X-UQB4	QUAD BRACKET WELDMENT		61.57	246.27
2	24	G58FW	5/8" HDG USS FLATWASHER	1/8 in	0.07	1.69
3	24	G58LW	5/8" HDG LOCKWASHER		0.03	0.63
4	24	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	3.12
5	12	G58R-48	5/8" X 48" THREADED ROD (HDG.)		4.43	53.19
6	12	G58R-24	5/8" X 24" THREADED ROD (HDG.)		2.22	26.60
TOTAL WT. #						351.38



TOLERANCE NOTES
 TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
 SAWED, SHEARED AND GAS CUT EDGES (± 0.030")
 DRILLED AND GAS CUT HOLES (± 0.030") - NO CONING OF HOLES
 LASER CUT EDGES AND HOLES (± 0.010") - NO CONING OF HOLES
 BENDS ARE ± 1/2 DEGREE
 ALL OTHER MACHINING (± 0.030")
 ALL OTHER ASSEMBLY (± 0.060")

DESCRIPTION
**QUAD UNIVERSAL RING MOUNT
 FOR POLES 12" TO 60"
 (UQB4)**

SITE PRO 1
 A valmont COMPANY

Engineering Support Team:
 1-888-753-7446

Locations:
 New York, NY
 Atlanta, GA
 Los Angeles, CA
 Plymouth, IN
 Salem, OR
 Dallas, TX

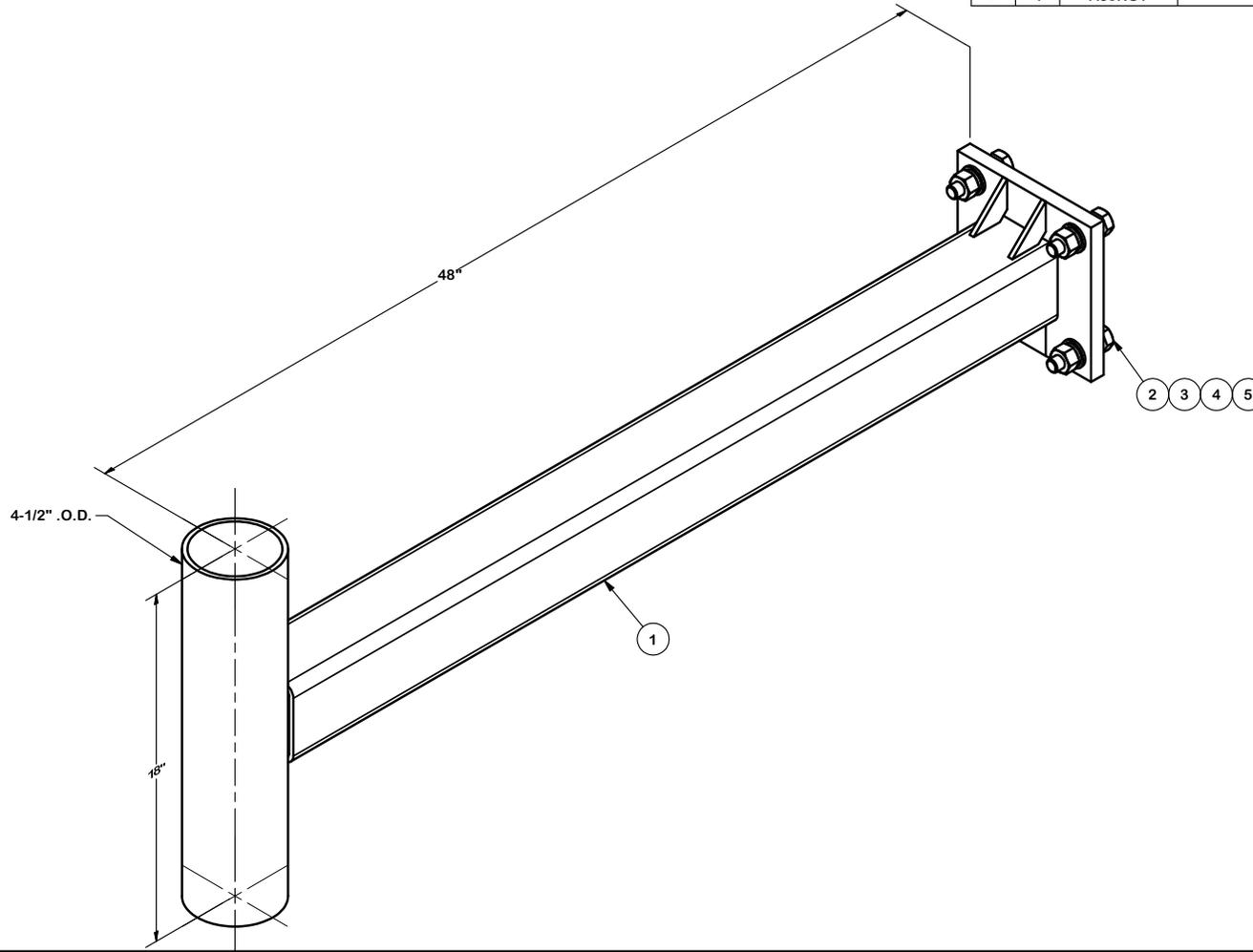
REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	UQB4 revised to meet modern loading	4863	JET	6/3/2019

PROPRIETARY NOTE:
 THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

CPD NO. 4893	DRAWN BY CEK 9/20/2010	ENG. APPROVAL
CLASS 81	SUB 01	DRAWING USAGE CUSTOMER
CHECKED BY BMC 9/20/2010		

PART NO. UQB4	PAGE 1 OF 1
DWG. NO. UQB4	

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	1	X-SV197-48	SUPPORT ARM WELDMENT - 36"		76.32	76.32
2	4	A58234	5/8" x 2-3/4" HDG A325 HEX BOLT		0.36	1.42
3	4	A58FW	5/8" HDG A325 FLATWASHER		0.03	0.14
4	4	G58LW	5/8" HDG LOCKWASHER		0.03	0.10
5	4	A58NUT	5/8" HDG A325 HEX NUT		0.13	0.52
TOTAL WT. #						78.50



TOLERANCE NOTES
TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES ($\pm 0.030"$)
DRILLED AND GAS CUT HOLES ($\pm 0.030"$) - NO CONING OF HOLES
LASER CUT EDGES AND HOLES ($\pm 0.010"$) - NO CONING OF HOLES
BENDS ARE $\pm 1/2$ DEGREE
ALL OTHER MACHINING ($\pm 0.030"$)
ALL OTHER ASSEMBLY ($\pm 0.060"$)

PROPRIETARY NOTE:
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DESCRIPTION
 48"
 SUPPORT
 ARM

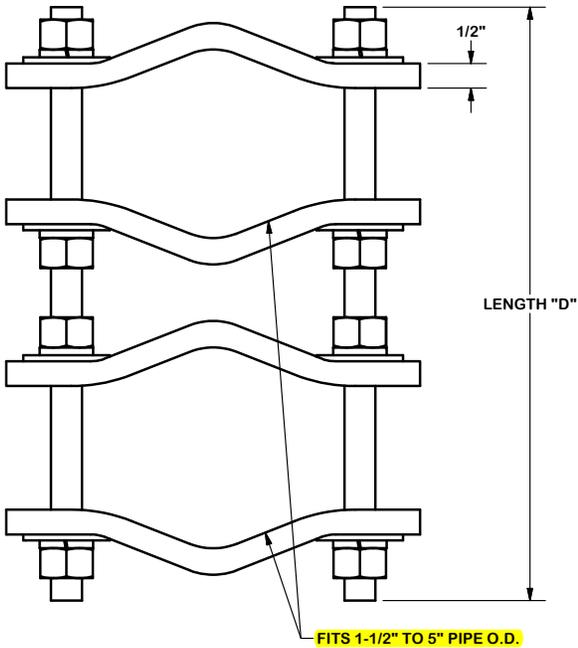
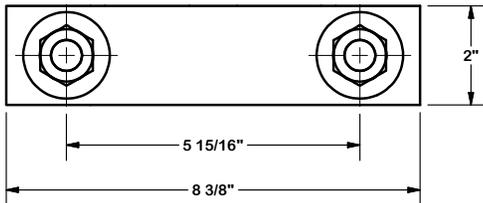
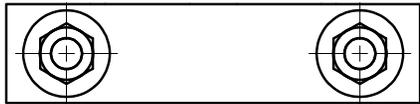
SITE PRO 1
 A valmont COMPANY

Engineering Support Team:
 1-888-753-7446

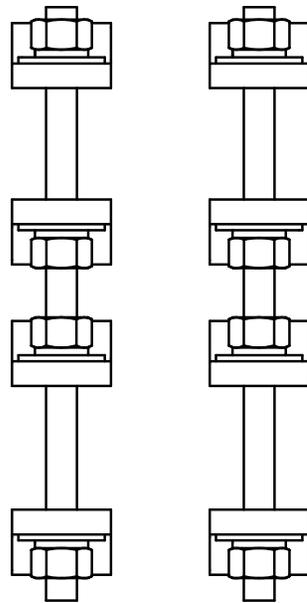
Locations:
 New York, NY
 Atlanta, GA
 Los Angeles, CA
 Plymouth, IN
 Salem, OR
 Dallas, TX

CPD NO. 4470	DRAWN BY CEK 4/14/2011	ENG. APPROVAL
CLASS 81	SUB 01	DRAWING USAGE CUSTOMER
CHECKED BY BMC 4/14/2011		

PART NO. SV197-48	PAGE 1 OF 1
DWG. NO. SV197-48	

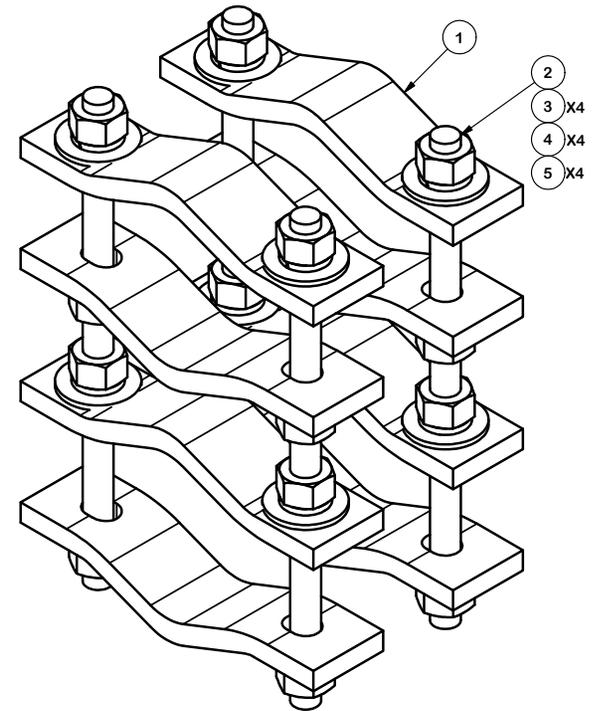


FITS 1-1/2" TO 5" PIPE O.D.



PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	8	DCP	CLAMP HALF, 1/2" THICK, 8-3/8"		2.40	19.20
2	B	C	5/8" THREADED ROD	D	E	F
3	16	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	2.08
4	16	G58LW	5/8" HDG LOCKWASHER		0.03	0.42
5	16	G58FW	5/8" HDG USS FLATWASHER		0.07	1.13

VARIABLE PARTS TABLE						
ASSEMBLY "A"	QTY "B"	PART "C"	LENGTH "D"	UNIT WT. "E"	NET WT. "F"	TOTAL WEIGHT
DCP12K	4	G58R-12	12"	1.05	4.18	27.01
DCP18K	4	G58R-18	18"	1.57	6.27	29.10



TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
 SAWED, SHEARED AND GAS CUT EDGES ($\pm 0.030"$)
 DRILLED AND GAS CUT HOLES ($\pm 0.030"$) - NO CONING OF HOLES
 LASER CUT EDGES AND HOLES ($\pm 0.010"$) - NO CONING OF HOLES
 BENDS ARE $\pm 1/2$ DEGREE
 ALL OTHER MACHINING ($\pm 0.030"$)
 ALL OTHER ASSEMBLY ($\pm 0.060"$)

PROPRIETARY NOTE:
 THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

DESCRIPTION
 PIPE TO PIPE CLAMP SET
 1-1/2" TO 5" PIPE
 1/2" THICK CLAMP

SITE PRO 1
 Engineering Support Team:
 1-888-753-7446

Locations:
 New York, NY
 Atlanta, GA
 Los Angeles, CA
 Plymouth, IN
 Salem, OR
 Dallas, TX

CPD NO.	DRAWN BY	ENG. APPROVAL
	KC8 8/21/2012	
CLASS	SUB	DRAWING USAGE
81	01	CUSTOMER
	CHECKED BY	
	CEK 1/22/2013	

PART NO.	SEE ASSEMBLY "A"
DWG. NO.	DCPxxK

ATTACHMENT C – STRUCTURAL ANALYSIS REPORT

Date: **March 9, 2020**



Black & Veatch Corp.
6800 W. 115th St., Suite 2292
Overland Park, KS 66211
(913) 458-2522

Subject: **Structural Analysis Report**

Eversource Designation: **Site Number:** ES-259
Site Name: StamfordAWC

Engineering Firm Designation: **Black & Veatch Corp. Project Number:** 403093

Site Data: **626 Glenbrook Road, Stamford, Fairfield County, CT**
Latitude 41° 4' 29.6", Longitude -73° 31' 7.5"
75 Foot - Monopole Tower

Black & Veatch Corp. 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:

LC1: Proposed Equipment Configuration

Sufficient Capacity – 11.9%

This analysis utilizes an ultimate 3-second gust wind speed of 130 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: Tapan Pandey

Respectfully submitted by:

Joshua J. Riley, P.E.
Professional Engineer



03/09/2020

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6) APPENDIX B

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1) INTRODUCTION

This tower is a 75 ft Monopole tower designed by Valmont in October of 2007.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	III
Wind Speed:	130 mph ultimate
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Seismic S_s:	0.246
Seismic S₁:	0.069
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)	Note
70.0	83.0	1	dBSpectra	DS2C03F36D-D	2	7/8	-
	70.0	1	site pro 1	SV197-48 [4' SO 701-1]			
		1	site pro 1	UQB4 [SO 104-1]			
		1	generic	4'x3" (3.5" OD) Pipe Mount			

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)	Note
74.0	82.0	1	celwave	PD1142-2B	3	7/8	1
	77.5	1	decibel	DB586-Y			
		1	telewave	ANT150F2			
	74.0	2	tower mounts	Side Arm Mount [SO 701-1]			
		1	tower mounts	Side Arm Mount [SO 702-1]			
65.0	72.0	1	celwave	PD1142-2B	2	7/8	1
	67.5	1	decibel	DB586-Y			
	65.0	1	tower mounts	Side Arm Mount [SO 701-1]			
		1	tower mounts	Side Arm Mount [SO 702-1]			
55.0	62.0	1	celwave	PD1142-2B	2	7/8	1
	57.5	1	telewave	ANT150F2			
	55.0	1	tower mounts	Side Arm Mount [SO 701-1]			
		1	tower mounts	Side Arm Mount [SO 702-1]			

Note:
1) Existing Equipment

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
GEOTECHNICAL REPORTS	Dr. Clarence Welti, P.E., P.C., dated 07/14/2007	-	Eversource
TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Valmont, dated 07/14/2007	-	Eversource
TOWER MANUFACTURER DRAWINGS	Valmont, dated 07/14/2007	-	Eversource
TOWER STRUCTURAL ANALYSIS REPORTS	NATCOMM, Inc., dated 11/17/2008	-	Eversource

3.1) Analysis Method

tnxTower (version 8.0.5.0), 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.
- 3) This analysis was performed under the assumption that all information provided to Black & Veatch is current and correct. This is to include site data, appurtenance loading, tower/foundation details, and geotechnical data.

This analysis may be affected if any assumptions are not valid or have been made in error. Black & Veatch Corp. 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	75 - 38.6667	Pole	TP38.5x32.5x0.4375	1	-7.24	3160.91	3.9	Pass
L2	38.6667 - 0	Pole	TP44x36.6205x0.625	2	-23.10	5285.32	8.4	Pass
							Summary	
						Pole (L2)	8.4	Pass
						Rating =	8.4	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC1

Note	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	8.3	Pass
1	Base Plate		5.6	Pass
1	Base Foundation	0	10.7	Pass
1	Base Foundation Soil Interaction		11.9	Pass

Note:

- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity. Rating per TIA-222-H Section 15.5

Structure Rating (max from all components) =	11.9%
---	--------------

4.1) Recommendations

The tower and its foundation have sufficient capacities to carry the existing and proposed loads. No modifications are required at this time.

Maximum Tower Deflections - Service Wind

<i>Section No.</i>	<i>Elevation ft</i>	<i>Horz. Deflection in</i>	<i>Gov. Load Comb.</i>	<i>Tilt °</i>	<i>Twist °</i>	<i>Check*</i>
L1	75 - 38.6667	0.513	48	0.0499	0.0011	OK
L2	44.7497 - 0	0.218	48	0.0397	0.0006	OK

*Limit State Deformation (TIA-222-H Section 2.8.2)

- 1) Maximum Rotation = 4 Degrees
- 2) Maximum Deflection = 0.03 * Tower Height = 27 in.

Maximum Tower Deflections - Design Wind

<i>Section No.</i>	<i>Elevation ft</i>	<i>Horz. Deflection in</i>	<i>Gov. Load Comb.</i>	<i>Tilt °</i>	<i>Twist °</i>	<i>Combined Max</i>	<i>Check*</i>
L1	75 - 38.6667	1.438	49	0.139	0.0031	0.139	OK
L2	44.7497 - 0	0.612	49	0.1115	0.0016	0.112	OK

*Up to 0.5 degree is considered acceptable per SUB090 Section 7

APPENDIX A
TNXTOWER OUTPUT

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
6"x2" Mount Pipe	75	UQB4 [SO 104-3]	70
Lightning Rod 5/8"x5'	75	PD1142-2B	65
Side Arm Mount [SO 702-1]	74	6"x2" Mount Pipe	65
Side Arm Mount [SO 701-1]	74	Side Arm Mount [SO 701-1]	65
Side Arm Mount [SO 701-1]	74	Side Arm Mount [SO 702-1]	65
PD1142-2B	74	DB586-Y	65
6"x2" Mount Pipe	74	6"x2" Mount Pipe	65
DB586-Y	74	6"x2" Mount Pipe	55
6"x2" Mount Pipe	74	2"x2" Mount Pipe	55
ANT150F2	74	Side Arm Mount [SO 701-1]	55
6"x2" Mount Pipe	74	Side Arm Mount [SO 702-1]	55
DS2C03F36D-D	70	ANT150F2	55
4"x3" Mount Pipe	70	PD1142-2B	55
SV197-48 [4' SO 701-1]	70		

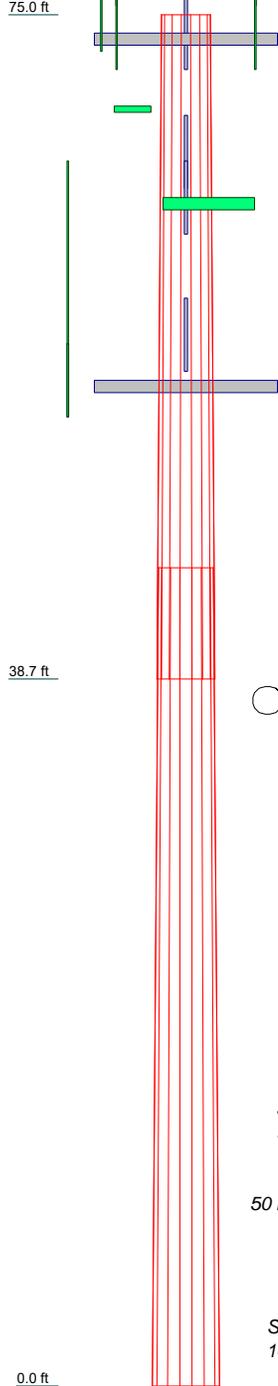
MATERIAL STRENGTH

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

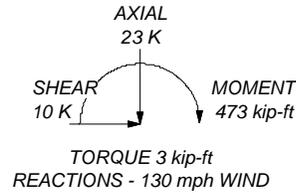
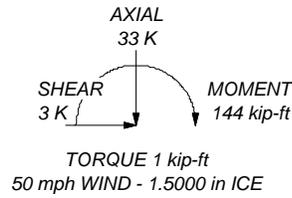
TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 130 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category III.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 8.4%

Section	1	2
Length (ft)	36.33	44.75
Number of Sides	18	18
Thickness (in)	0.4375	0.6250
Socket Length (ft)	6.08	36.6205
Top Dia (in)	32.5000	44.0000
Bot Dia (in)	38.5000	
Grade	A572-65	
Weight (K)	6.0	12.0
		18.0



ALL REACTIONS
ARE FACTORED



BLACK & VEATCH Building a world of difference.	Black & Veatch Corp. 6800 W. 115th Street, Suite 2292 Overland Park, KS 66211 Phone: (913) 458-2522 FAX: (913) 458-8136		Job: ES-259 StamfordAWC Project: 403093
	Client: Eversource Code: TIA-222-H Path:	Drawn by: Tapan Pandey Date: 02/19/20	App'd: Scale: NTS Dwg No. E-1

Tower Input Data

The tower is a monopole.

This tower is designed using the TIA-222-H standard.

The following design criteria apply:

- 1) Tower is located in Fairfield County, Connecticut.
- 2) Tower base elevation above sea level: 51.00 ft.
- 3) Basic wind speed of 130 mph.
- 4) Risk Category III.
- 5) Exposure Category C.
- 6) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- 7) Topographic Category: 1.
- 8) Crest Height: 0.00 ft.
- 9) Nominal ice thickness of 1.5000 in.
- 10) Ice thickness is considered to increase with height.
- 11) Ice density of 56 pcf.
- 12) A wind speed of 50 mph is used in combination with ice.
- 13) Temperature drop of 50 °F.
- 14) Deflections calculated using a wind speed of 60 mph.
- 15) A non-linear (P-delta) analysis was used.
- 16) Pressures are calculated at each section.
- 17) Stress ratio used in pole design is 1.05.
- 18) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification Use Code Stress Ratios ✓ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt. Autocalc Torque Arm Areas Add IBC .6D+W Combination Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder Ignore KL/ry For 60 Deg. Angle Legs	Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-H Bracing Resist. Exemption Use TIA-222-H Tension Splice Exemption <div style="text-align: center; background-color: #e0e0e0; padding: 2px;">Poles</div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known
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Tapered Pole Section Geometry

Section	Elevation	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	
L1	75.00-38.67	36.33	6.08	18	32.5000	38.5000	0.4375	1.7500	A572-65 (65 ksi)
L2	38.67-0.00	44.75		18	36.6205	44.0000	0.6250	2.5000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	It/Q in ²	w in	w/t
L1	32.9339	44.5228	5782.4858	11.3822	16.5100	350.2414	11572.580 4	22.2656	4.9500	11.314
	39.0264	52.8545	9674.1844	13.5122	19.5580	494.6408	19361.098 3	26.4323	6.0060	13.728
L2	38.1076	71.4060	11688.743 5	12.7784	18.6032	628.3191	23392.867 3	35.7098	5.3452	8.552
	44.5824	86.0452	20452.332 9	15.3981	22.3520	915.0113	40931.577 5	43.0308	6.6440	10.63

Tower Elevation	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _r	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 75.00-38.67				1	1	1			
L2 38.67-0.00				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	C	No	Surface Ar (CaAa)	75.00 - 10.00	1	1	0.000 0.000	0.3750		0.22

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	CaAa ft ² /ft	Weight plf
LDF5-50A(7/8)	C	No	No	Inside Pole	74.00 - 0.00	3	No Ice	0.00
							1/2" Ice	0.00
							1" Ice	0.00
							2" Ice	0.00
LDF5-50A(7/8)	C	No	No	Inside Pole	65.00 - 0.00	2	No Ice	0.00
							1/2" Ice	0.00
							1" Ice	0.00
							2" Ice	0.00
LDF5-50A(7/8)	C	No	No	Inside Pole	55.00 - 0.00	2	No Ice	0.00
							1/2" Ice	0.00
							1" Ice	0.00
							2" Ice	0.00
proposed LDF5-50A(7/8)	C	No	No	Inside Pole	70.00 - 0.00	2	No Ice	0.00
							1/2" Ice	0.00
							1" Ice	0.00
							2" Ice	0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section n	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	75.00-38.67	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	1.362	0.000	0.09
L2	38.67-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	1.075	0.000	0.12

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section n	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	75.00-38.67	A	1.821	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	14.593	0.000	0.27
L2	38.67-0.00	A	1.636	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	11.514	0.000	0.26

Feed Line Center of Pressure

Section	Elevation ft	CP _X in	CP _Z in	CP _X Ice in	CP _Z Ice in
L1	75.00-38.67	0.0000	0.3021	0.0000	1.6510
L2	38.67-0.00	0.0000	0.2206	0.0000	1.2529

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	38.67 - 75.00	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K	
6'x2" Mount Pipe	C	From Leg	0.50	0.0000	75.00	No Ice	1.43	1.43	0.02
			0.00			1/2"	1.92	1.92	0.03
			3.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} _{Front}	C _{AA} _{Side}	Weight	
			Horz	Lateral						Vert
			ft	ft	°	ft	ft ²	ft ²	K	
Lightning Rod 5/8"x5'	C	From Leg	0.50		0.0000	75.00	2" Ice			
			0.00				No Ice	0.31	0.31	0.01
			8.50				1/2"	0.83	0.83	0.01
							Ice	1.32	1.32	0.02
							1" Ice	1.96	1.96	0.04
						2" Ice				

Side Arm Mount [SO 702-1]	A	From Leg	0.00		0.0000	74.00	No Ice	0.62	1.49	0.03
			0.00				1/2"	0.74	2.07	0.04
			0.00				Ice	0.89	2.54	0.06
							1" Ice	1.25	3.55	0.12
							2" Ice			
Side Arm Mount [SO 701-1]	B	From Leg	0.00		0.0000	74.00	No Ice	0.85	1.67	0.07
			0.00				1/2"	1.14	2.34	0.08
			0.00				Ice	1.43	3.01	0.09
							1" Ice	2.01	4.35	0.12
							2" Ice			
Side Arm Mount [SO 701-1]	C	From Leg	0.00		0.0000	74.00	No Ice	0.85	1.67	0.07
			0.00				1/2"	1.14	2.34	0.08
			0.00				Ice	1.43	3.01	0.09
							1" Ice	2.01	4.35	0.12
							2" Ice			
PD1142-2B	A	From Leg	6.00		0.0000	74.00	No Ice	2.32	2.32	0.01
			0.00				1/2"	3.75	3.75	0.03
			8.00				Ice	5.18	5.18	0.06
							1" Ice	8.11	8.11	0.14
							2" Ice			
6'x2" Mount Pipe	A	From Leg	6.00		0.0000	74.00	No Ice	1.43	1.43	0.02
			0.00				1/2"	1.92	1.92	0.03
			0.00				Ice	2.29	2.29	0.05
							1" Ice	3.06	3.06	0.09
							2" Ice			
DB586-Y	B	From Leg	3.00		0.0000	74.00	No Ice	1.01	1.01	0.01
			0.00				1/2"	1.28	1.28	0.02
			3.50				Ice	1.56	1.56	0.03
							1" Ice	2.14	2.14	0.06
							2" Ice			
6'x2" Mount Pipe	B	From Leg	3.00		0.0000	74.00	No Ice	1.43	1.43	0.02
			0.00				1/2"	1.92	1.92	0.03
			0.00				Ice	2.29	2.29	0.05
							1" Ice	3.06	3.06	0.09
							2" Ice			
ANT150F2	C	From Leg	3.00		0.0000	74.00	No Ice	1.23	1.23	0.01
			0.00				1/2"	1.53	1.53	0.02
			3.50				Ice	1.84	1.84	0.04
							1" Ice	2.49	2.49	0.07
							2" Ice			
6'x2" Mount Pipe	C	From Leg	3.00		0.0000	74.00	No Ice	1.43	1.43	0.02
			0.00				1/2"	1.92	1.92	0.03
			0.00				Ice	2.29	2.29	0.05
							1" Ice	3.06	3.06	0.09
							2" Ice			

Side Arm Mount [SO 701-1]	A	From Leg	0.00		0.0000	65.00	No Ice	0.85	1.67	0.07
			0.00				1/2"	1.14	2.34	0.08
			0.00				Ice	1.43	3.01	0.09
							1" Ice	2.01	4.35	0.12
							2" Ice			
Side Arm Mount [SO 702-1]	B	From Leg	0.00		0.0000	65.00	No Ice	0.62	1.49	0.03
			0.00				1/2"	0.74	2.07	0.04
			0.00				Ice	0.89	2.54	0.06
							1" Ice	1.25	3.55	0.12
							2" Ice			
DB586-Y	A	From Leg	3.00		0.0000	65.00	No Ice	1.01	1.01	0.01
			0.00				1/2"	1.28	1.28	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	CAAA Front ft ²	CAAA Side ft ²	Weight K
			2.50			Ice 1.56	1.56	0.03
						1" Ice 2.14	2.14	0.06
						2" Ice		
6'x2" Mount Pipe	A	From Leg	3.00	0.0000	65.00	No Ice 1.43	1.43	0.02
			0.00			1/2" 1.92	1.92	0.03
			0.00			Ice 2.29	2.29	0.05
						1" Ice 3.06	3.06	0.09
						2" Ice		
PD1142-2B	B	From Leg	6.00	0.0000	65.00	No Ice 2.32	2.32	0.01
			0.00			1/2" 3.75	3.75	0.03
			7.00			Ice 5.18	5.18	0.06
						1" Ice 8.11	8.11	0.14
						2" Ice		
6'x2" Mount Pipe	B	From Leg	6.00	0.0000	65.00	No Ice 1.43	1.43	0.02
			0.00			1/2" 1.92	1.92	0.03
			0.00			Ice 2.29	2.29	0.05
						1" Ice 3.06	3.06	0.09
						2" Ice		

Side Arm Mount [SO 701-1]	A	From Leg	0.00	0.0000	55.00	No Ice 0.85	1.67	0.07
			0.00			1/2" 1.14	2.34	0.08
			0.00			Ice 1.43	3.01	0.09
						1" Ice 2.01	4.35	0.12
						2" Ice		
Side Arm Mount [SO 702-1]	C	From Leg	0.00	0.0000	55.00	No Ice 0.62	1.49	0.03
			0.00			1/2" 0.74	2.07	0.04
			0.00			Ice 0.89	2.54	0.06
						1" Ice 1.25	3.55	0.12
						2" Ice		
ANT150F2	A	From Leg	3.00	0.0000	55.00	No Ice 1.23	1.23	0.01
			0.00			1/2" 1.53	1.53	0.02
			2.50			Ice 1.84	1.84	0.04
						1" Ice 2.49	2.49	0.07
						2" Ice		
PD1142-2B	C	From Leg	6.00	0.0000	55.00	No Ice 2.32	2.32	0.01
			0.00			1/2" 3.75	3.75	0.03
			7.00			Ice 5.18	5.18	0.06
						1" Ice 8.11	8.11	0.14
						2" Ice		
6'x2" Mount Pipe	C	From Leg	6.00	0.0000	55.00	No Ice 1.43	1.43	0.02
			0.00			1/2" 1.92	1.92	0.03
			0.00			Ice 2.29	2.29	0.05
						1" Ice 3.06	3.06	0.09
						2" Ice		
2'x2" Mount Pipe	C	From Leg	6.00	0.0000	55.00	No Ice 0.34	0.34	0.01
			0.00			1/2" 0.47	0.47	0.01
			0.00			Ice 0.61	0.61	0.02
						1" Ice 0.92	0.92	0.03
						2" Ice		

proposed								
DS2C03F36D-D	C	From Leg	4.00	0.0000	70.00	No Ice 7.29	7.29	0.07
			0.00			1/2" 9.75	9.75	0.12
			13.00			Ice 12.23	12.23	0.19
						1" Ice 17.24	17.24	0.37
						2" Ice		
4'x3" Mount Pipe	C	From Leg	4.00	0.0000	70.00	No Ice 1.07	1.07	0.03
			0.00			1/2" 1.36	1.36	0.04
			0.00			Ice 1.62	1.62	0.05
						1" Ice 2.16	2.16	0.09
						2" Ice		
SV197-48 [4' SO 701-1]	C	From Leg	2.00	0.0000	70.00	No Ice 1.13	2.23	0.09
			0.00			1/2" 1.52	3.12	0.11
			0.00			Ice 1.91	4.01	0.12
						1" Ice 2.68	5.80	0.16

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
UQB4 [SO 104-3]	C	None		0.0000	70.00	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	2.62 2.62 3.30 3.98 5.35 5.35	0.29 0.41 0.53 0.77

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

Comb. No.	Description
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	75 - 38.6667	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-12.33	3.09	-1.51
			Max. Mx	20	-7.24	113.03	0.03
			Max. My	14	-7.24	0.55	-112.50
			Max. Vy	20	-5.64	113.03	0.03
			Max. Vx	14	5.63	0.55	-112.50
			Max. Torque	24			2.97
L2	38.6667 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-32.69	3.09	-1.80
			Max. Mx	20	-23.10	472.19	1.10
			Max. My	14	-23.10	-0.54	-471.08
			Max. Vy	20	-10.30	472.19	1.10
			Max. Vx	14	10.29	-0.54	-471.08
			Max. Torque	24			2.97

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	32.69	0.00	0.00
	Max. H _x	21	17.33	10.30	0.02
	Max. H _z	2	23.11	0.02	10.29
	Max. M _x	2	470.23	0.02	10.29
	Max. M _z	8	470.21	-10.30	-0.02
	Max. Torsion	24	2.97	5.17	8.92
	Min. Vert	5	17.33	-5.13	8.90
	Min. H _x	8	23.11	-10.30	-0.02
	Min. H _z	14	23.11	-0.02	-10.29
	Min. M _x	14	-471.08	-0.02	-10.29
	Min. M _z	20	-472.19	10.30	0.02
	Min. Torsion	12	-2.97	-5.17	-8.92

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturing Moment, M _x kip-ft	Overturing Moment, M _z kip-ft	Torque kip-ft
Dead Only	19.26	0.00	0.00	0.35	0.82	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	23.11	-0.02	-10.29	-470.23	2.52	-2.76
0.9 Dead+1.0 Wind 0 deg - No Ice	17.33	-0.02	-10.29	-469.90	2.27	-2.76
1.2 Dead+1.0 Wind 30 deg - No Ice	23.11	5.13	-8.90	-406.41	-233.29	-1.81
0.9 Dead+1.0 Wind 30 deg - No Ice	17.33	5.13	-8.90	-406.14	-233.32	-1.81
1.2 Dead+1.0 Wind 60 deg - No Ice	23.11	8.91	-5.12	-233.58	-406.32	-0.37
0.9 Dead+1.0 Wind 60 deg - No Ice	17.33	8.91	-5.12	-233.47	-406.19	-0.37

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
1.2 Dead+1.0 Wind 90 deg - No Ice	23.11	10.30	0.02	1.95	-470.21	1.17
0.9 Dead+1.0 Wind 90 deg - No Ice	17.33	10.30	0.02	1.84	-470.02	1.17
1.2 Dead+1.0 Wind 120 deg - No Ice	23.11	8.93	5.16	237.07	-407.85	2.39
0.9 Dead+1.0 Wind 120 deg - No Ice	17.33	8.93	5.16	236.75	-407.72	2.39
1.2 Dead+1.0 Wind 150 deg - No Ice	23.11	5.17	8.92	408.79	-235.93	2.97
0.9 Dead+1.0 Wind 150 deg - No Ice	17.33	5.17	8.92	408.30	-235.96	2.97
1.2 Dead+1.0 Wind 180 deg - No Ice	23.11	0.02	10.29	471.08	-0.54	2.76
0.9 Dead+1.0 Wind 180 deg - No Ice	17.33	0.02	10.29	470.54	-0.79	2.76
1.2 Dead+1.0 Wind 210 deg - No Ice	23.11	-5.13	8.90	407.26	235.26	1.81
0.9 Dead+1.0 Wind 210 deg - No Ice	17.33	-5.13	8.90	406.78	234.80	1.81
1.2 Dead+1.0 Wind 240 deg - No Ice	23.11	-8.91	5.12	234.43	408.29	0.37
0.9 Dead+1.0 Wind 240 deg - No Ice	17.33	-8.91	5.12	234.11	407.67	0.37
1.2 Dead+1.0 Wind 270 deg - No Ice	23.11	-10.30	-0.02	-1.10	472.19	-1.17
0.9 Dead+1.0 Wind 270 deg - No Ice	17.33	-10.30	-0.02	-1.21	471.50	-1.17
1.2 Dead+1.0 Wind 300 deg - No Ice	23.11	-8.93	-5.16	-236.23	409.82	-2.39
0.9 Dead+1.0 Wind 300 deg - No Ice	17.33	-8.93	-5.16	-236.11	409.20	-2.39
1.2 Dead+1.0 Wind 330 deg - No Ice	23.11	-5.17	-8.92	-407.94	237.91	-2.97
0.9 Dead+1.0 Wind 330 deg - No Ice	17.33	-5.17	-8.92	-407.67	237.44	-2.97
1.2 Dead+1.0 Ice+1.0 Temp	32.69	0.00	0.00	1.80	3.09	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	32.69	-0.01	-2.94	-138.57	3.74	-0.94
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	32.69	1.46	-2.54	-119.45	-66.63	-0.61
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	32.69	2.54	-1.46	-67.84	-118.31	-0.12
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	32.69	2.94	0.01	2.44	-137.46	0.40
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	32.69	2.55	1.48	72.55	-118.94	0.81
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	32.69	1.48	2.55	123.71	-67.71	1.01
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	32.69	0.01	2.94	142.21	2.50	0.94
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	32.69	-1.46	2.54	123.09	72.87	0.61
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	32.69	-2.54	1.46	71.47	124.55	0.12
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	32.69	-2.94	-0.01	1.20	143.69	-0.40
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	32.69	-2.55	-1.48	-68.91	125.17	-0.81
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	32.69	-1.48	-2.55	-120.07	73.94	-1.01
Dead+Wind 0 deg - Service	19.26	-0.00	-1.96	-89.29	1.11	-0.53
Dead+Wind 30 deg - Service	19.26	0.98	-1.70	-77.14	-43.80	-0.34
Dead+Wind 60 deg - Service	19.26	1.70	-0.98	-44.22	-76.76	-0.07
Dead+Wind 90 deg - Service	19.26	1.96	0.00	0.64	-88.93	0.22
Dead+Wind 120 deg - Service	19.26	1.70	0.98	45.43	-77.05	0.46
Dead+Wind 150 deg - Service	19.26	0.99	1.70	78.13	-44.30	0.57

Load Combination	Vertical	Shear _x	Shear _z	Overturning Moment, M _x	Overturning Moment, M _z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 180 deg - Service	19.26	0.00	1.96	90.00	0.53	0.53
Dead+Wind 210 deg - Service	19.26	-0.98	1.70	77.84	45.45	0.34
Dead+Wind 240 deg - Service	19.26	-1.70	0.98	44.92	78.40	0.07
Dead+Wind 270 deg - Service	19.26	-1.96	-0.00	0.06	90.57	-0.22
Dead+Wind 300 deg - Service	19.26	-1.70	-0.98	-44.72	78.69	-0.46
Dead+Wind 330 deg - Service	19.26	-0.99	-1.70	-77.43	45.95	-0.57

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-19.26	0.00	0.00	19.26	0.00	0.000%
2	-0.02	-23.11	-10.29	0.02	23.11	10.29	0.000%
3	-0.02	-17.33	-10.29	0.02	17.33	10.29	0.000%
4	5.13	-23.11	-8.90	-5.13	23.11	8.90	0.000%
5	5.13	-17.33	-8.90	-5.13	17.33	8.90	0.000%
6	8.91	-23.11	-5.12	-8.91	23.11	5.12	0.000%
7	8.91	-17.33	-5.12	-8.91	17.33	5.12	0.000%
8	10.30	-23.11	0.02	-10.30	23.11	-0.02	0.000%
9	10.30	-17.33	0.02	-10.30	17.33	-0.02	0.000%
10	8.93	-23.11	5.16	-8.93	23.11	-5.16	0.000%
11	8.93	-17.33	5.16	-8.93	17.33	-5.16	0.000%
12	5.17	-23.11	8.92	-5.17	23.11	-8.92	0.000%
13	5.17	-17.33	8.92	-5.17	17.33	-8.92	0.000%
14	0.02	-23.11	10.29	-0.02	23.11	-10.29	0.000%
15	0.02	-17.33	10.29	-0.02	17.33	-10.29	0.000%
16	-5.13	-23.11	8.90	5.13	23.11	-8.90	0.000%
17	-5.13	-17.33	8.90	5.13	17.33	-8.90	0.000%
18	-8.91	-23.11	5.12	8.91	23.11	-5.12	0.000%
19	-8.91	-17.33	5.12	8.91	17.33	-5.12	0.000%
20	-10.30	-23.11	-0.02	10.30	23.11	0.02	0.000%
21	-10.30	-17.33	-0.02	10.30	17.33	0.02	0.000%
22	-8.93	-23.11	-5.16	8.93	23.11	5.16	0.000%
23	-8.93	-17.33	-5.16	8.93	17.33	5.16	0.000%
24	-5.17	-23.11	-8.92	5.17	23.11	8.92	0.000%
25	-5.17	-17.33	-8.92	5.17	17.33	8.92	0.000%
26	0.00	-32.69	0.00	0.00	32.69	0.00	0.000%
27	-0.01	-32.69	-2.94	0.01	32.69	2.94	0.000%
28	1.46	-32.69	-2.54	-1.46	32.69	2.54	0.000%
29	2.54	-32.69	-1.46	-2.54	32.69	1.46	0.000%
30	2.94	-32.69	0.01	-2.94	32.69	-0.01	0.000%
31	2.55	-32.69	1.48	-2.55	32.69	-1.48	0.000%
32	1.48	-32.69	2.55	-1.48	32.69	-2.55	0.000%
33	0.01	-32.69	2.94	-0.01	32.69	-2.94	0.000%
34	-1.46	-32.69	2.54	1.46	32.69	-2.54	0.000%
35	-2.54	-32.69	1.46	2.54	32.69	-1.46	0.000%
36	-2.94	-32.69	-0.01	2.94	32.69	0.01	0.000%
37	-2.55	-32.69	-1.48	2.55	32.69	1.48	0.000%
38	-1.48	-32.69	-2.55	1.48	32.69	2.55	0.000%
39	-0.00	-19.26	-1.96	0.00	19.26	1.96	0.000%
40	0.98	-19.26	-1.70	-0.98	19.26	1.70	0.000%
41	1.70	-19.26	-0.98	-1.70	19.26	0.98	0.000%
42	1.96	-19.26	0.00	-1.96	19.26	-0.00	0.000%
43	1.70	-19.26	0.98	-1.70	19.26	-0.98	0.000%
44	0.99	-19.26	1.70	-0.99	19.26	-1.70	0.000%
45	0.00	-19.26	1.96	-0.00	19.26	-1.96	0.000%
46	-0.98	-19.26	1.70	0.98	19.26	-1.70	0.000%
47	-1.70	-19.26	0.98	1.70	19.26	-0.98	0.000%
48	-1.96	-19.26	-0.00	1.96	19.26	0.00	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
49	-1.70	-19.26	-0.98	1.70	19.26	0.98	0.000%
50	-0.99	-19.26	-1.70	0.99	19.26	1.70	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.0000001	0.0000001
2	Yes	4	0.0000001	0.0000001
3	Yes	4	0.0000001	0.0000001
4	Yes	4	0.0000001	0.0000001
5	Yes	4	0.0000001	0.0000001
6	Yes	4	0.0000001	0.0000001
7	Yes	4	0.0000001	0.0000001
8	Yes	4	0.0000001	0.0000001
9	Yes	4	0.0000001	0.0000001
10	Yes	4	0.0000001	0.0000001
11	Yes	4	0.0000001	0.0000001
12	Yes	4	0.0000001	0.0000001
13	Yes	4	0.0000001	0.0000001
14	Yes	4	0.0000001	0.0000001
15	Yes	4	0.0000001	0.0000001
16	Yes	4	0.0000001	0.0000001
17	Yes	4	0.0000001	0.0000001
18	Yes	4	0.0000001	0.0000001
19	Yes	4	0.0000001	0.0000001
20	Yes	4	0.0000001	0.0000001
21	Yes	4	0.0000001	0.0000001
22	Yes	4	0.0000001	0.0000001
23	Yes	4	0.0000001	0.0000001
24	Yes	4	0.0000001	0.0000001
25	Yes	4	0.0000001	0.0000001
26	Yes	4	0.0000001	0.0000001
27	Yes	4	0.0000001	0.0000001
28	Yes	4	0.0000001	0.0000001
29	Yes	4	0.0000001	0.0000001
30	Yes	4	0.0000001	0.0000655
31	Yes	4	0.0000001	0.0000001
32	Yes	4	0.0000001	0.0000622
33	Yes	4	0.0000001	0.0000632
34	Yes	4	0.0000001	0.0000640
35	Yes	4	0.0000001	0.0000643
36	Yes	4	0.0000001	0.0000642
37	Yes	4	0.0000001	0.0000637
38	Yes	4	0.0000001	0.0000624
39	Yes	4	0.0000001	0.0000001
40	Yes	4	0.0000001	0.0000001
41	Yes	4	0.0000001	0.0000001
42	Yes	4	0.0000001	0.0000001
43	Yes	4	0.0000001	0.0000001
44	Yes	4	0.0000001	0.0000001
45	Yes	4	0.0000001	0.0000001
46	Yes	4	0.0000001	0.0000001
47	Yes	4	0.0000001	0.0000001
48	Yes	4	0.0000001	0.0000001
49	Yes	4	0.0000001	0.0000001
50	Yes	4	0.0000001	0.0000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	75 - 38.6667	0.513	48	0.0499	0.0011
L2	44.7497 - 0	0.218	48	0.0397	0.0006

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
75.00	6"x2" Mount Pipe	48	0.513	0.0499	0.0011	370620
74.00	Side Arm Mount [SO 702-1]	48	0.502	0.0497	0.0011	370620
70.00	DS2C03F36D-D	48	0.459	0.0488	0.0010	370620
65.00	Side Arm Mount [SO 701-1]	48	0.407	0.0475	0.0009	185310
55.00	Side Arm Mount [SO 701-1]	48	0.307	0.0444	0.0007	92655

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	75 - 38.6667	2.660	22	0.2569	0.0058
L2	44.7497 - 0	1.133	22	0.2063	0.0029

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
75.00	6"x2" Mount Pipe	22	2.660	0.2569	0.0058	72235
74.00	Side Arm Mount [SO 702-1]	22	2.604	0.2558	0.0057	72235
70.00	DS2C03F36D-D	22	2.383	0.2514	0.0053	72235
65.00	Side Arm Mount [SO 701-1]	22	2.110	0.2455	0.0048	36117
55.00	Side Arm Mount [SO 701-1]	22	1.594	0.2301	0.0038	18059

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	KI/r	A in ²	P _u K	φP _n K	Ratio P _u / φP _n
L1	75 - 38.6667 (1)	TP38.5x32.5x0.4375	36.33	0.00	0.0	51.459 6	-7.24	3010.39	0.002
L2	38.6667 - 0 (2)	TP44x36.6205x0.625	44.75	0.00	0.0	86.045 2	-23.10	5033.64	0.005

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	75 - 38.6667 (1)	TP38.5x32.5x0.4375	113.08	2902.04	0.039	0.00	2902.04	0.000
L2	38.6667 - 0 (2)	TP44x36.6205x0.625	473.03	5665.07	0.083	0.00	5665.07	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	75 - 38.6667 (1)	TP38.5x32.5x0.4375	5.66	903.12	0.006	2.39	2930.93	0.001
L2	38.6667 - 0 (2)	TP44x36.6205x0.625	10.32	1510.09	0.007	2.39	5736.18	0.000

Pole Interaction Design Data

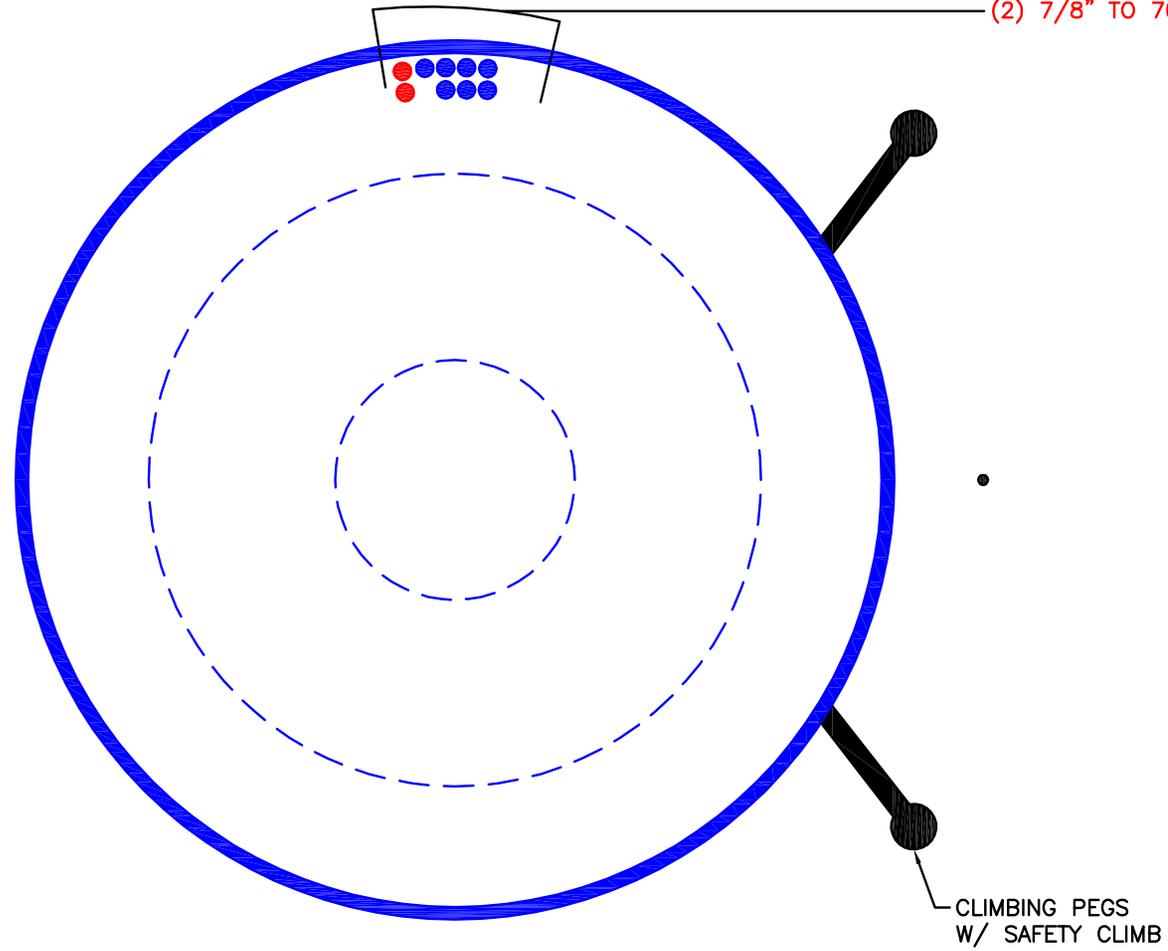
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	75 - 38.6667 (1)	0.002	0.039	0.000	0.006	0.001	0.041	1.050	4.8.2
L2	38.6667 - 0 (2)	0.005	0.083	0.000	0.007	0.000	0.088	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	75 - 38.6667	Pole	TP38.5x32.5x0.4375	1	-7.24	3160.91	3.9	Pass
L2	38.6667 - 0	Pole	TP44x36.6205x0.625	2	-23.10	5285.32	8.4	Pass
Summary								
Pole (L2)							8.4	Pass
RATING =							8.4	Pass

APPENDIX B
BASE LEVEL DRAWING

(EXISTING FEEDLINES)
(3) 7/8" TO 74.0 FT LEVEL
(2) 7/8" TO 65.0 FT LEVEL
(2) 7/8" TO 55.0 FT LEVEL
(PROPOSED FEEDLINES)
(2) 7/8" TO 70.0 FT LEVEL



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APPENDIX C
ADDITIONAL CALCULATIONS

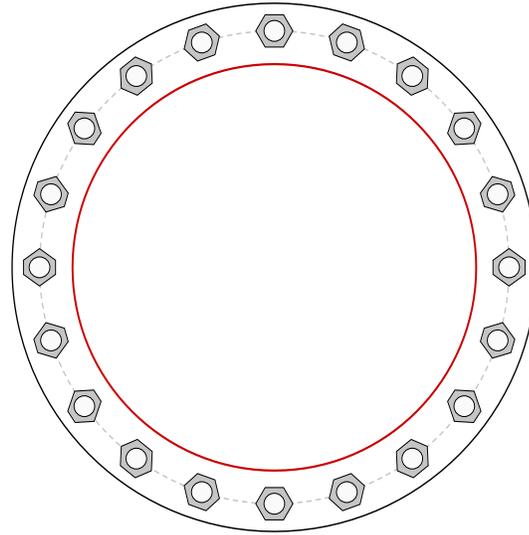
Monopole Base Plate Connection

Site Info	
	ES-259
	StamfordAWC

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
I_{gr} (in)	0.9375

Applied Loads	
Moment (kip-ft)	473.03
Axial Force (kips)	23.10
Shear Force (kips)	10.32

*TIA-222-H Section 15.5 Applied



Connection Properties	Analysis Results
-----------------------	------------------

Anchor Rod Data
(20) 2-1/4" ϕ bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 51.18" BC
Base Plate Data
57.18" OD x 3" Plate (S-128; $F_y=60$ ksi, $F_u=80$ ksi)
Stiffener Data
N/A
Pole Data
44" x 0.625" 18-sided pole (A572-65; $F_y=65$ ksi, $F_u=80$ ksi)

Anchor Rod Summary		<i>(units of kips, kip-in)</i>
$P_u_c = 23.32$	$\phi P_n_c = 268.39$	Stress Rating
$V_u = 0.52$	$\phi V_n = 120.77$	8.3%
$M_u = n/a$	$\phi M_n = n/a$	Pass
Base Plate Summary		
Max Stress (ksi):	3.19	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	5.6%	Pass

Drilled Pier Foundation

ES-259
StamfordAWC

TIA-222 Revison:	H
Tower Type:	Monopole

Applied Loads		
	Comp.	Uplift
Moment (kip-ft)	473	
Axial Force (kips)	23	
Shear Force (kips)	10	

Material Properties		
Concrete Strength, f _c :	3	ksi
Rebar Strength, F _y :	60	ksi

Pier Design Data		
Depth	27	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
<i>From 0.5' above grade to 27' below grade</i>		
Pier Diameter	6	ft
Rebar Quantity	24	
Rebar Size	11	
Clear Cover to Ties	3	in
Tie Size	5	

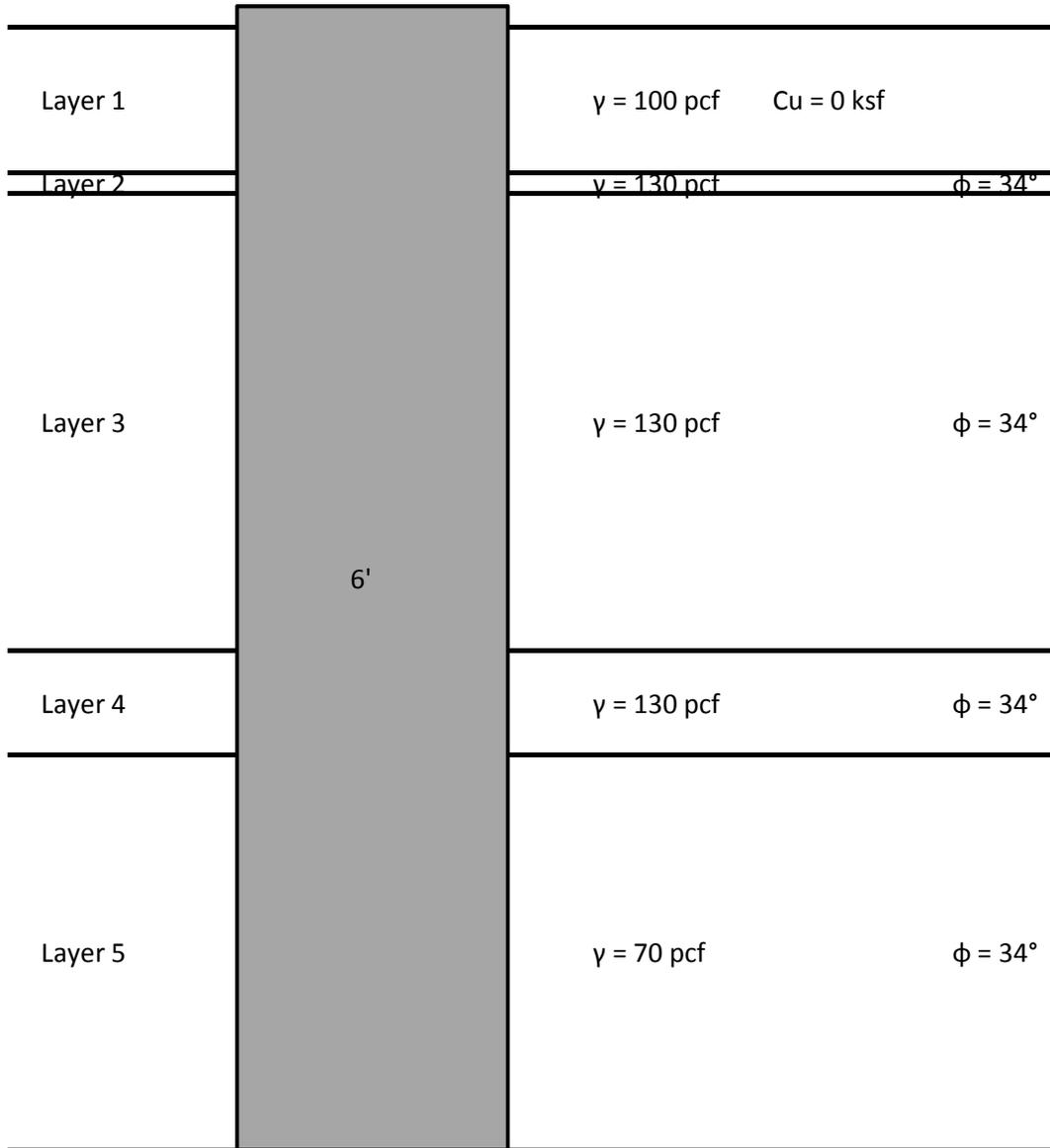
Analysis Results		
Soil Lateral Capacity	Compression	Uplift
D _{v=0} (ft from TOC)	8.73	-
Soil Safety Factor	19.67	-
Max Moment (kip-ft)	540.78	-
Rating*	6.4%	-
Soil Vertical Capacity	Compression	Uplift
Skin Friction (kips)	463.10	-
End Bearing (kips)	678.58	-
Weight of Concrete (kips)	119.84	-
Total Capacity (kips)	1141.69	-
Axial (kips)	142.84	-
Rating*	11.9%	-
Reinforced Concrete Capacity	Compression	Uplift
Critical Depth (ft from TOC)	8.59	-
Critical Moment (kip-ft)	540.75	-
Critical Moment Capacity	4825.35	-
Rating*	10.7%	-
Soil Interaction Rating*		11.9%
Structural Foundation Rating*		10.7%

*Rating per TIA-222-H Section 15.5

Check Limitation	
Apply TIA-222-H Section 15.5:	<input checked="" type="checkbox"/>
N/A	<input type="checkbox"/>

Soil Profile			
Groundwater Depth	17.5	ft	# of Layers
			5

Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ _{soil} (pcf)	γ _{concrete} (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	3.5	3.5	100	150	0		0.000	0.000	0.00	0.00			Cohesionless
2	3.5	4	0.5	130	150		34	0.316	0.316				10	Cohesionless
3	4	15	11	130	150		34	0.000	0.000	1.00	1.00			Cohesionless
4	15	17.5	2.5	130	150		34	0.000	0.000	1.80	1.80			Cohesionless
5	17.5	27	9.5	70	87.6		34	0.000	0.000	1.80	1.80	32		Cohesionless



Maximum Allowable Moment of a Circular Pier

Depth

Solve

Maximum Shaft Superimposed Forces	
TIA Revision:	H
Leg Load Type:	Compression
Max. Factored Shaft Pu:	54.98809 kips
Max Axial Force Type:	Compression

Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Loads Already Factored	
For M (WL)	1.3 <--- Enter Factor
For P (DL)	1.3 <--- Enter Factor

Load Factor	Shaft Factored Loads
1.00	Pu: 54.98809 kips

Material Properties	
Concrete Comp. strength, f_c	3000 psi
Reinforcement yield strength, F_y	60 ksi
Reinforcing Modulus of Elasticity, E	29000 ksi
Reinforcement yield strain	0.00207
Limiting compressive strain	0.003
ACI 318 Code	
Select Analysis ACI Code=	2014

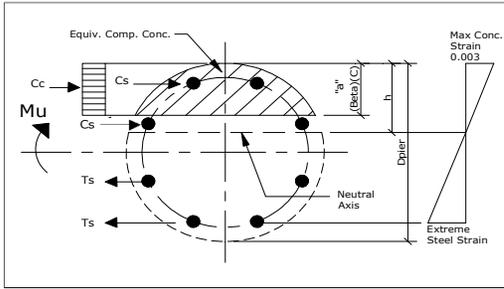
Pier Properties	
Concrete:	
Pier Diameter =	6.0 ft
Concrete Area =	4071.5 in ²

Reinforcement 1:	
Reinforcement F_y	60.00
Cage Diameter	63.38 in
Cage Diameter =	5.28 ft
Vertical Bar Size =	11
Bar Diameter =	1.41 in
Bar Area =	1.56 in ²
Number of Bars =	24
As 1 =	37.44 in ²

Reinforcement 2:	
Reinforcement F_y	60.00
Cage Diameter	#VALUE! in
Cage Diameter =	#VALUE! ft
Vertical Bar Size =	#N/A
Bar Diameter =	#N/A in
Bar Area =	#N/A in ²
Number of Bars =	0
As 2 =	#N/A in ²

Reinforcement 3:	
Reinforcement F_y	60.00
Cage Diameter	#VALUE! in
Cage Diameter =	#VALUE! ft
Vertical Bar Size =	#N/A
Bar Diameter =	#N/A in
Bar Area =	#N/A in ²
Number of Bars =	0
As 3 =	#N/A in ²

A s/ Aconc, Rho: 0.0092 | 0.92%



Initial angle

Bar #	first bar (deg)	center of shaft (in)	neutral axis (in)	to (in)	Strain	steel in (in ²)	Stress (ksi)	Axial force (kips)	Moment (in-kips)
1	0.00	31.6875	10.25	8.061645	0.0021	1.56	60.00	89.622	2839.90
2	15.00	30.60777462	9.17	6.98192	0.0019	1.56	54.78	81.47122	2493.65
3	30.00	27.44217998	6.00	3.816325	0.0012	1.56	35.86	51.95893	1425.87
4	45.00	22.40644613	0.96	-1.21941	0.0002	0	5.76	8.989663	201.43
5	60.00	15.84375	-5.60	-7.78211	-0.0012	0	-33.46	-52.1932	-826.94
6	75.00	8.201328492	-13.24	-15.4245	-0.0027	0	-60.00	-93.6	-767.64
7	90.00	1.94109E-15	-21.44	-23.6259	-0.0044	0	-60.00	-93.6	0.00
8	105.00	-8.201328492	-29.64	-31.8272	-0.0061	0	-60.00	-93.6	767.64
9	120.00	-15.84375	-37.29	-39.4696	-0.0077	0	-60.00	-93.6	1482.98
10	135.00	-22.40644613	-43.85	-46.0323	-0.0090	0	-60.00	-93.6	2097.24
11	150.00	-27.44217998	-48.88	-51.068	-0.0101	0	-60.00	-93.6	2568.59
12	165.00	-30.60777462	-52.05	-54.2336	-0.0107	0	-60.00	-93.6	2864.89
13	180.00	-31.6875	-53.13	-55.3134	-0.0109	0	-60.00	-93.6	2965.95
14	195.00	-30.60777462	-52.05	-54.2336	-0.0107	0	-60.00	-93.6	2864.89
15	210.00	-27.44217998	-48.88	-51.068	-0.0101	0	-60.00	-93.6	2568.59
16	225.00	-22.40644613	-43.85	-46.0323	-0.0090	0	-60.00	-93.6	2097.24
17	240.00	-15.84375	-37.29	-39.4696	-0.0077	0	-60.00	-93.6	1482.98
18	255.00	-8.201328492	-29.64	-31.8272	-0.0061	0	-60.00	-93.6	767.64
19	270.00	-5.82328E-15	-21.44	-23.6259	-0.0044	0	-60.00	-93.6	0.00
20	285.00	8.201328492	-13.24	-15.4245	-0.0027	0	-60.00	-93.6	-767.64
21	300.00	15.84375	-5.60	-7.78211	-0.0012	0	-33.46	-52.1932	-826.94
22	315.00	22.40644613	0.96	-1.21941	0.0002	0	5.76	8.989663	201.43
23	330.00	27.44217998	6.00	3.816325	0.0012	1.56	35.86	51.95893	1425.87
24	345.00	30.60777462	9.17	6.98192	0.0019	1.56	54.78	81.47122	2493.65

Bar Size	db (in)	Ab (in ²)	Effective Ab (in ²)
3	0.375	0.110	0.110
4	0.500	0.200	0.200
5	0.625	0.310	0.310
6	0.750	0.440	0.440
7	0.875	0.600	0.600
8	1.000	0.790	0.790
9	1.128	1.000	1.000
10	1.270	1.270	1.270
11	1.410	1.560	1.560
14	1.693	2.250	2.250
18	2.257	4.000	4.000

Reduction factor, ϕ_{2002} = 0.90 <--- ϕ based on ACI 318 2002, Section 9.3.2.2 and corresponding commentaries. Transition zone equation for $\phi=0.48+83(\epsilon)$
 Reduction factor, ϕ_{2005} = 0.90 <--- ϕ based on ACI 318 2005/2008, Section 9.3.2.2 and corresponding commentaries. Transition zone equation for $\phi=0.65+(\epsilon) - 0.002(250/3)$
 Reduction factor, ϕ_{2014} = 0.90 <--- ϕ based on ACI 318 2014, Section 21.2 and corresponding commentaries. Transition zone equation for ties: $\phi=0.65+0.25(\epsilon - \epsilon_t) / (0.005 - \epsilon_t)$. Transition zone equation for spirals: $\phi=0.75+0.15(\epsilon - \epsilon_t) / (0.005 - \epsilon_t)$.

Actual Reduction Factor, f , per selected ACI code: 0.90

Axial Load (Negative for Compression) = -54.99 kips

Neutral Axis

Distance from extreme edge to neutral axis, $h =$	14.56	in
Equivalent compression zone factor =	0.85	
Distance from extreme edge to equivalent compression zone factor, $a =$	12.37	in
Distance from centroid to neutral axis =	21.44	in

Compression Zone

Area of steel in compression zone, $A_{sc} =$	7.80	in ²	
Angle from centroid of pier to intersection of equivalent compression zone and edge of pier =	48.98	deg	<--- 1/2 of total angle
Area of concrete in compression, $A_{cc} =$	466.24	in ²	
Force in concrete = $0.85 * f_c * A_{cc}$, $F_c =$	1188.91	kips	<--- ϕ Not Involved = Concrete Pn
Total reinforcement forces, $F_s =$	-1133.92	kips	<--- ϕ Not Involved = Total Steel Pn
$\phi =$	0.900		
Magnified, Superimposed Axial (comp=negative), $P_u =$	-54.99	kips	<--- Pu
Balance Force in concrete, $F_s + F_u =$	-1188.91	kips	
Shaft Comp. Capacity, $\phi P_n =$	49.49	kips	<--- $\phi P_n = P_u$
Sum of the axial forces in the shaft =	-0.0003836249418	kips	OK

Maximum Moment

First moment of the concrete area in compression about the centroid =	13360.83	in ³
Distance between centroid of concrete in compression and centroid of pier =	28.66	in
Moment of concrete in compression =	34070.12	in-kips
Total reinforcement moment =	30421.25	in-kips
Nominal Moment strength of Drilled Shaft $M_n =$	64491.37	in-kips
Moment Capacity of Drilled Shaft, $\phi M_n =$	58042.24	in-kips
$\phi M_n =$	4836.85	ft-kips

Final Results		
$\phi_i, \phi =$	ϕ_n for ties: $\phi=0.65+0.25(\epsilon - \epsilon_t) / (0.005 - \epsilon_t)$	T
Shaft $\phi \cdot M_n =$	4836.85	ft-kips
Distance from Edge of Shaft to N.A. =		in
Shaft Beta =		
Maximum Tensile Strain =	0.01000	<----- $\epsilon_t > 0.0050$, Tension Controlled
Shaft Tension Cap., $\phi T_n = (\phi \cdot 0.9) \cdot (\text{Total As}) / F_y =$	2021.76	kips
Shaft Max Comp., $(\phi = 0.65) \cdot (0.80) \cdot (0.85 \cdot f_c \cdot (A_g - A_{st}) + A_{st} \cdot F_y) =$	6517.30	kips

ATTACHMENT D – PROOF OF DELIVERY OF NOTICE

Ref: CT578100-ES-259 Date: 25Jun20
Dep: BL GRAPHICS Wgt: 0.70 LBS

SHIPPING: 0.00
SPECIAL: 0.00
HANDLING: 0.00
TOTAL: 0.00

DV: 0.00

Svcs: PRIORITY OVERNIGHT
TRK: 1714 2090 5428

ORIGIN ID:RSPA (800) 301-3077
BL GRAPHICS
BL GRAPHICS
355 RESEARCH PARKWAY

SHIP DATE: 25JUN20
ACTWGT: 0.70 LB MAN
CAD: 0785627/CAFE3311

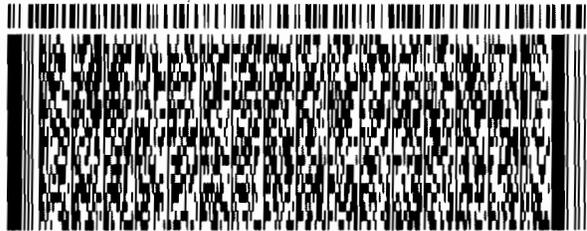
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UNITED STATES US

BILL THIRD PARTY

TO **RALPH BLESSING, LAND USE BUREAU**
CITY OF STAMFORD
888 WASHINGTON BOULEVARD
7TH FLOOR
STAMFORD CT 06901

REF: CT578100-ES-259

DEPT: BL GRAPHICS



FedEx
Express



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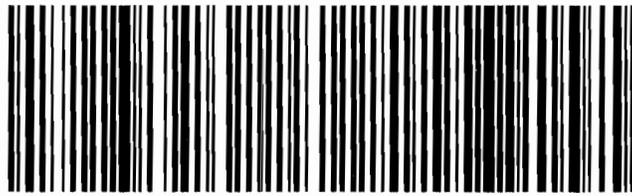
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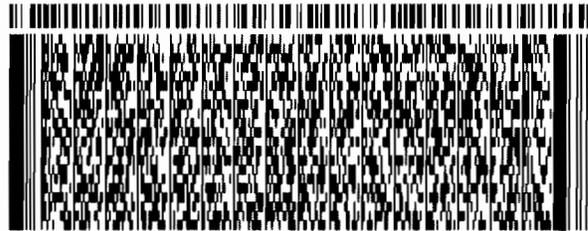
BILL THIRD PARTY

TO HONORABLE DAVID MARTIN, MAYOR
CITY OF STAMFORD
888 WASHINGTON BOULEVARD
10TH FLOOR
STAMFORD CT 06901

565CL/CTDP-0542

DEPT: BL GRAPHICS

REF: CT578100-ES-259



FedEx
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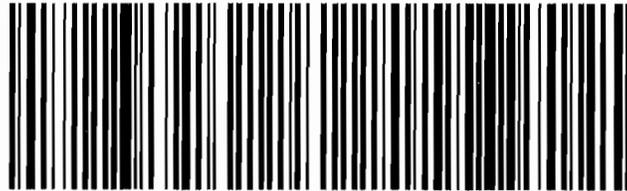
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FRI - 26 JUN 10:30A
PRIORITY OVERNIGHT

E4 JSDA

06901
CT-US JFK

REF: 1367 48-404 PRT: 25JUN 09:20 44



ATTACHMENT E - POWER DENSITY REPORT



C Squared Systems, LLC
65 Dartmouth Drive
Auburn, NH 03032
603-644-2800
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Calculated Radio Frequency Emissions Report



ES-259

626 Glenbrook Road

Stamford, CT 06906

January 24, 2020

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1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed Eversource installation to be located at 626 Glenbrook Road in Stamford, CT.

Eversource is proposing to install one omnidirectional antenna as part of its 220 MHz communications system.

This report considers the planned antenna configuration as provided by Eversource along with power density information of the existing antennas to calculate the % MPE (Maximum Permissible Exposure) of the proposed facility at ground level.

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter (mW/cm^2). The general population exposure limits for the various frequency ranges are defined in the attached "FCC Limits for Maximum Permissible Exposure (MPE)" in Attachment B of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

3. Power Density Calculation Methods

The power density calculation results were generated using the following formula as outlined in FCC bulletin OET 65, and Connecticut Siting Council recommendations:

$$\text{Power Density} = \left(\frac{1.6^2 \times 1.64 \times \text{ERP}}{4\pi \times R^2} \right) \times \text{Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power = 1.64 x ERP

R = Radial Distance = $\sqrt{(H^2 + V^2)}$

H = Horizontal Distance from antenna

V = Vertical Distance from radiation center of antenna

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

These calculations assume that the antennas are operating at 100 percent capacity and full power, and that all antenna channels are transmitting simultaneously. Obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not consider actual terrain elevations which could attenuate the signal. As a result, the calculated power density and corresponding % MPE levels reported below are much higher than the actual levels will be from the final installation.

4. Calculated % MPE Results

Table 1 below outlines the power density information for the site. The Eversource omnidirectional antenna has a narrow vertical beamwidth of 30°; therefore, the majority of the RF power is focused out towards the horizon. As a result, there will be less RF power directed below the antennas relative to the horizon, and consequently lower power density levels around the base of the facility. Please refer to Attachment C, for the vertical pattern of the proposed Eversource antenna. The calculated results in Table 1 include a nominal 10 dB off-beam pattern loss to account for the lower relative gain below the antennas.

Carrier	Antenna Height (Feet)	Operating Frequency (MHz)	Number of Trans.	ERP Per Transmitter (Watts)	Power Density (mw/cm ²)	Limit	% MPE
CL&P	75	37.78	1	120	0.0009	0.2000	0.45%
Yankee Gas	55	37.84	1	120	0.0018	0.2000	0.90%
CL&P	65	48.34	1	120	0.0012	0.2000	0.62%
CL&P	65	937.7	1	240	0.0025	0.6251	0.40%
CL&P	65	938.4	1	240	0.0025	0.6256	0.40%
Yankee Gas	75	153.0575	1	100	0.0008	0.2000	0.38%
CL&P	50	940.1125	1	200	0.0037	0.6267	0.59%
Eversource	82	37.78	1	300	0.0019	0.2000	0.93%
Eversource	62	37.84	1	300	0.0034	0.2000	1.72%
Eversource	72	48.34	1	300	0.0025	0.2000	1.24%
Eversource	67.5	937.7	1	240	0.0023	0.6251	0.37%
Eversource	67.5	938.4	1	240	0.0023	0.6256	0.36%
Eversource	77.5	152.3075	1	100	0.0007	0.2000	0.35%
Eversource	57.5	173.35	1	380	0.0052	0.2000	2.58%
Eversource	76	217	4	124	0.0036	0.2000	1.82%
						Total	9.37%

Table 1: Proposed Facility % MPE ^{1 2 3}

¹ The existing CSC filing for Eversource (f.k.a. CL&P and Yankee Gas) should be removed and replaced with the updated Eversource values provided in Table 1. Please note that % MPE values listed are rounded to two decimal points and the total % MPE listed is a summation of each unrounded contribution. Therefore, summing each rounded value may not identically match the total value reflected in the table.

² The proposed antenna information listed for Eversource (highlighted in blue) is based upon information provided by Eversource through its agents.

³ Existing antenna information listed for Eversource are in reference to Antenna Inventory document dated December 26, 2019.

5. Conclusion

The above analysis concludes that RF exposure at ground level with the proposed antenna installation will be below the maximum power density limits as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Using the conservative calculation methods discussed herein, the highest expected percent of Maximum Permissible Exposure at ground level with the proposed installation is **9.37% of the FCC General Population/Uncontrolled limit**.

As noted previously, the calculated % MPE levels are more conservative (higher) than the actual levels will be from the finished installation.

6. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in FCC OET Bulletin 65 Edition 97-01, IEEE Std. C95.1, and IEEE Std. C95.3.



Report Prepared By: Cory Goulet
Associate RF Engineer
C Squared Systems, LLC

January 24, 2020

Date



Reviewed/Approved By: Keith Vellante
Director of RF Services
C Squared Systems, LLC

January 27, 2020

Date

Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

IEEE C95.1-2005, IEEE Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz IEEE-SA Standards Board

IEEE C95.3-2002 (R2008), IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields With Respect to Human Exposure to Such Fields, 100 kHz-300 GHz IEEE-SA Standards Board

Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure⁴

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f ²)*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

(B) Limits for General Population/Uncontrolled Exposure⁵

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz * Plane-wave equivalent power density

Table 2: FCC Limits for Maximum Permissible Exposure (MPE)

⁴ Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure

⁵ General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure

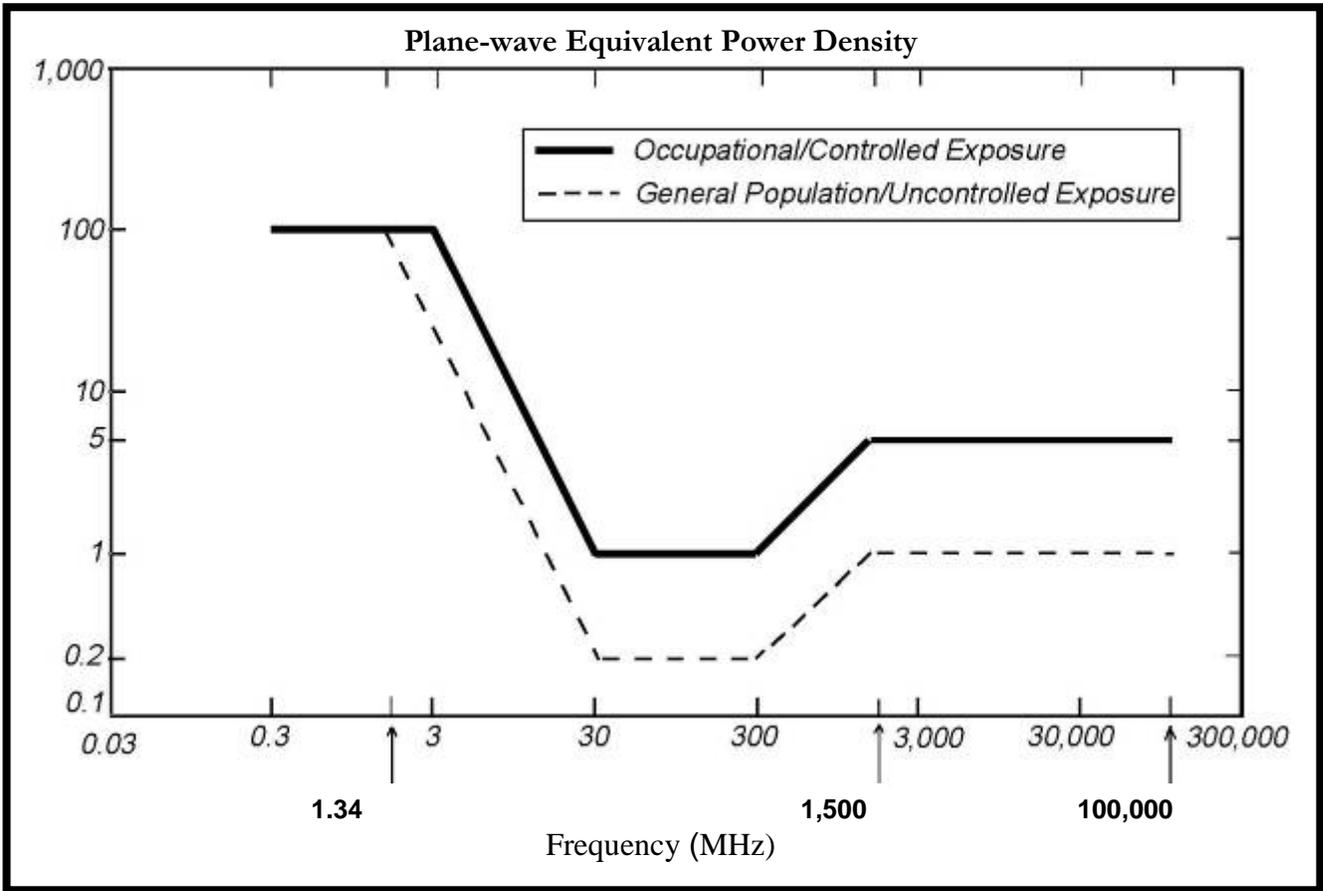
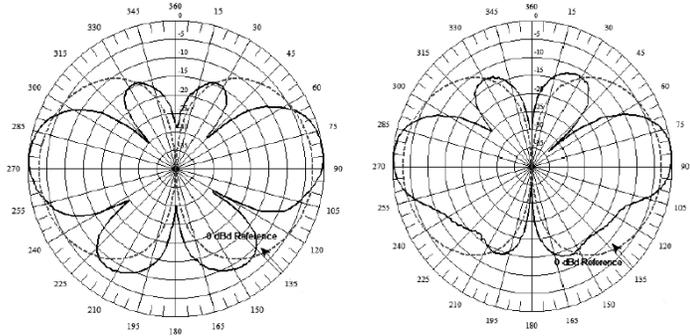


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: Eversource Antenna Data Sheets and Electrical Patterns

<p>217 MHz</p> <p>Manufacturer: dbSpectra Model #: DS2C03F36D Frequency Band: 217-222 MHz Gain: 3.0 dBd Vertical Beamwidth: 30° Horizontal Beamwidth: 360° Polarization: Vertical Length: 24.3'</p>	<p style="text-align: center;">DS2C03F36D-N DS2C03F36D-D</p>  <p style="text-align: center;">Top Bottom</p>
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