



**NSS** **NORTHEAST**  
SITE SOLUTIONS  
*Turnkey Wireless Development*

Northeast Site Solutions  
Victoria Masse  
420 Main Street #2, Sturbridge, MA 01566  
860-306-2326  
victoria@northeastsitesolutions.com

July 23, 2021

Members of the Siting Council  
Connecticut Siting Council  
Ten Franklin Square  
New Britain, CT 06051

RE: Exempt Modification Application  
3 Mechanic Street (aka 0 Mechanic Street), Darien CT 06820  
Latitude: 41.196250  
Longitude: -73.431941  
T-Mobile Site#: CT11290C\_L700 4x2

Dear Ms. Bachman:

T-Mobile currently maintains three (3) antennas at the 124-foot level of the existing 115-foot transmission pole at 3 Mechanic Street, Darien CT 06820. The electric transmission pole is owned by CL&P d/b/a Eversource. The property is owned by State of CT DOT. T-Mobile now intends to install three (3) new 600/700/1900/2100 MHz. The new antennas would be installed at the 124-foot level of the tower. T-Mobile also intends to make the following modifications. As shown on the enclosed mount analysis.

Planned Modifications

Remove:

NONE

Remove and Replace:

(3) Andrew SBNHH Antenna (Remove) - (3) RFS APX16DWV 600/700/1900/2100 MHz Antenna (Replace)  
(3) RRUS-11 B12 RRU (Remove) - (3) 4449 B71 B12 RRU (Replace) (At ground level)

Install New:

(6) 1-1/4" Coax

Existing to Remain:

(3) Smart Bias Tees  
(18) 1-1/4" Coax



This facility was originally approved by the CSC in Petition No. 420 dated July 15, 1999. The original approval indicates a structure height of 95' which conflicts with future exempt modification approvals reflecting the tower height as 115'. This was most likely in error and the tower height is 115'. Outside of the discrepancy, the proposed modification complies with the original approval. The top of the antennas were approved to be approximately 10-feet above the top of the tower. Please see the enclosed.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16- SOj-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-SOj-73, a copy of this letter is being sent to First Selectman Jayme Stevenson, Elected Official for the Town of Darien, as well as the property owner and the tower owner.

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. The proposed modifications will not result in an increase in the height of the existing structure.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, T-Mobile respectfully submits that the proposed modifications to the above referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Victoria Masse  
Mobile: 860-306-2326  
Fax: 413-521-0558  
Office: 420 Main Street, Unit 2, Sturbridge MA 01566  
Email: [victoria@northeastsitesolutions.com](mailto:victoria@northeastsitesolutions.com)



**NSS** **NORTHEAST**  
SITE SOLUTIONS

*Turnkey Wireless Development*

Attachments

cc: The Honorable Jayme J. Stevenson – First Selectman - [Jstevenson@darienct.gov](mailto:Jstevenson@darienct.gov)

Darien Town Hall  
2 Renshaw Rd  
Darien, CT, 06820  
(203) 656-7300

Kathleen A. Clark-Buch – Town Administrator - [kbuch@darienct.gov](mailto:kbuch@darienct.gov)

Darien Town Hall  
2 Renshaw Rd, Room 202  
Darien, CT, 06820  
(203) 656-7300

CL&P d/b/a Eversource - as tower owner  
107 SELDEN ST BERLIN CT 06037-1616

State of CT DOT - property owner  
2800 BERLIN TURNPIKE NEWINGTON CT 06111

# Exhibit A

Petition No. 420  
Omnipoint Communications  
Darien, CT  
Staff Report  
July 15, 1999

On July 7, 1999, Connecticut Siting Council (Council) member Edward S. Wilensky and Executive Director Joel M. Rinebold met with J. Brendan Sharkey, Mark Finley, Brian Ragazzine, and Cheatan Dhaduk of Omnipoint Communications, Inc. (Omnipoint) for a field review in the Town of Darien, Connecticut. Omnipoint is petitioning the Council for a determination that no Certificate of Environmental Compatibility and Public Need (Certificate) would be required for modifications to an existing Connecticut Light and Power Company (CL&P) electric transmission line facility in Darien. Omnipoint submits no Certificate would be required because the addition of three antennas and associated equipment would not have a substantial adverse environmental effect.

Omnipoint proposes to attach three PCS antennas to existing CL&P transmission line structure number 1068, located south of Mechanic Street in Darien, Connecticut. Access would be from Mechanic Street. A temporary staging area would be established adjacent to the transmission line structure in the right-of-way. The top of the antenna assembly would extend approximately 10 feet above the top of the existing 95-foot transmission line structure. The proposed antennas are 56 inches in length, 8 inches in width, and 2.75 inches in diameter, and weigh 18 lbs. The antennas would be placed on top of the existing tower structure and no compression post would be required. The communications equipment would be installed upon or eight-foot by 3.75-foot concrete slab, to be placed at the northeast corner of the tower base. Additional screening is recommended around the equipment cabinet at the base of the tower.

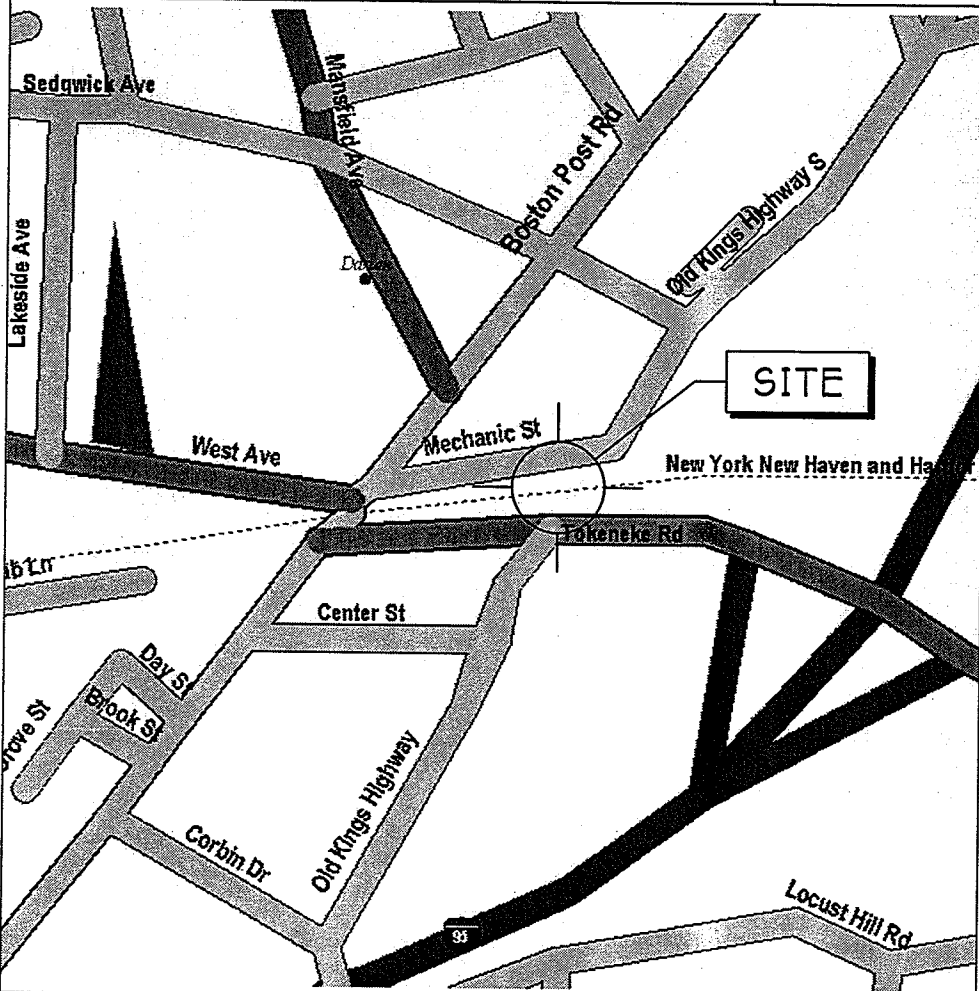
The total calculated radio frequency power density at the base of the tower would be  $0.0149 \text{ mw/cm}^2$ , which is 1.49 percent of the maximum permissible exposure for uncontrolled environments based on Federal Communications Commission (FCC) Bulletin 65, August 1997.

# CL&P POLE #1068 MECHANIC STREET DARIEN, CT

SEARCH AREA: **DARIEN / DOWNTOWN**

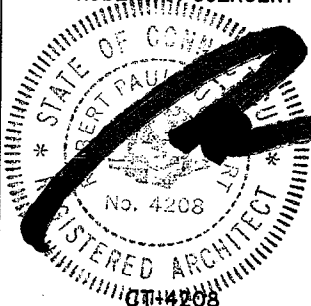
SITE I.D. #: **CT-11-290C**

LOT#:      BLOCK#:      ZONING DISTRICT:      MAP#:



DWG.:	TITLE:
A-1	SITE LAYOUT & KEY PLAN
A-2	EQUIPMENT PLAN
A-3	SOUTH ELEVATION
A-4	CABINET DETAIL
A-5	SUB-BASE DETAIL
A-6	EQUIPMENT ELEVATION
A-7	CABLE TRAY DETAIL
A-8	CABLE ROUTING ELEVATION
A-9	CABLE MOUNT ELEVATION
A-10	ANTENNA MOUNT DETAIL
A-11	ELECTRIC EQUIPMENT MOUNT
A-12	PLANTING DETAIL
A-13	FENCE DETAIL
A-14	GENERAL NOTES
A-15	GENERAL NOTES
A-16	GENERAL NOTES
A-17	CONCRETE NOTES
A-18	MATERIAL LIST
E-1	GENERAL INFORMATION
E-2	SERVICE PLAN
E-3	GROUNDING PLAN
E-4	RISER
E-5	GROUNDING DETAILS
E-6	GROUNDING DETAILS
E-7	GROUNDING DETAILS

ROBERT P. JUENGERT



**DIRECTIONS TO SITE:**

ROUTE 95 SOUTH TO EXIT 11. MAKE RIGHT ONTO BOSTON POST ROAD. GO ONE BLOCK TO A RIGHT ON MECHANIC STREET. SITE IS ON THE RIGHT JUST BEFORE THE SHARP CURVE IN THE ROAD (APPROXIMATELY 150 YARDS DOWN THE ROAD).

ARCNET PROJECT NO. **A99.506-833A**      P.C. **RVa**      DATE: **4/22/99**

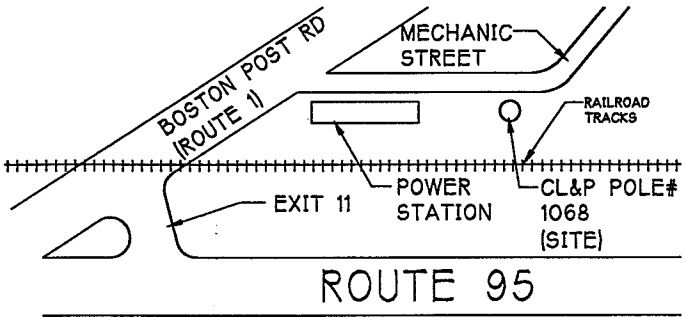


SITE LOCATION MAP

SCALE: NONE

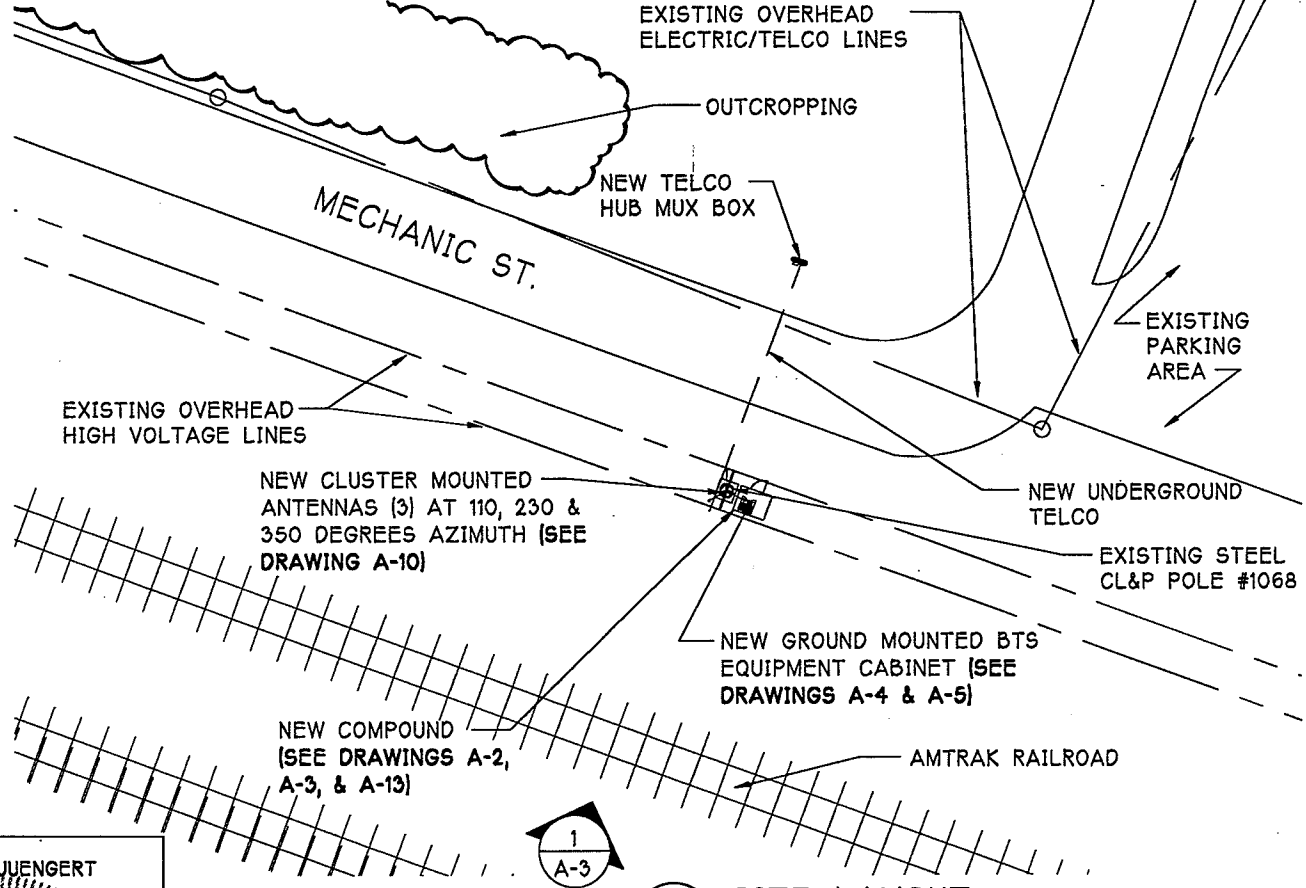


670 North Beers Street, Building 2, Holmdel, NJ 07733  
Tel: 732.739.3200      Fax: 732.739.0440



**NOTE:**  
 1.) FOR ITEMS SUPPLIED BY OTHERS SEE MATERIAL LIST. (DRAWING A-18)  
 2.) NORTH TO BE DETERMINED BY CIVIL ENGINEER

**2**  
**KEY PLAN**  
 A-1 SCALE: NOT TO SCALE



**1**  
**SITE LAYOUT**  
 A-1 SCALE: 1" = 60'

ROBERT P. JUENBERT

**ARCNET ARCHITECTS, INC.**  
 670 North Beers Street, Building 2, Holmdel, NJ 07733  
 Tel: 732.739.3200 Fax: 732.739.0440

P.C. RVa

Drawing Title: **SITE LAYOUT & KEY PLAN**

Client: **OCS**

ARCNET Project No. **A99.506.833A** Drawn: **CS** Date: **4/20/99**

Project: **CL&P POLE #1068**

Address: **MECHANIC STREET DARIEN, CT**

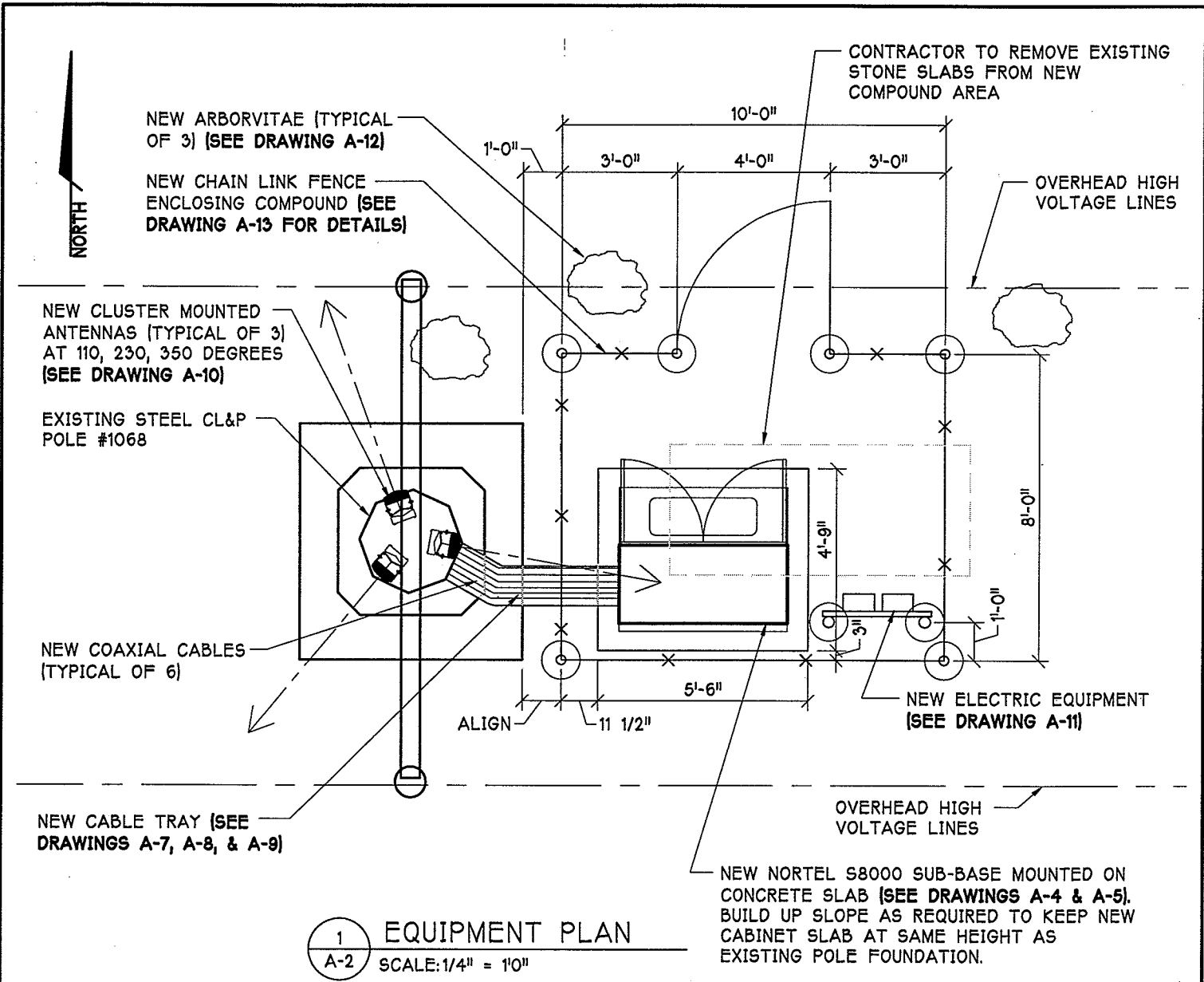
Search Area: **DARIEN / DOWNTOWN**

Site ID No.: **CT-11-290C**

Approved By: \_\_\_\_\_ DATE: \_\_\_\_\_

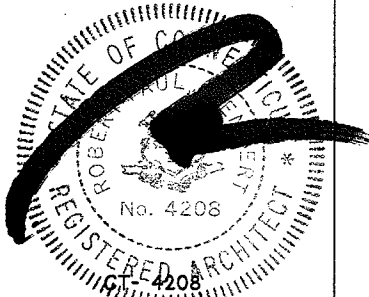
CLIENT: \_\_\_\_\_

Revision No.	Date:
Drawing No.	<b>A-1</b>



1 EQUIPMENT PLAN  
 A-2 SCALE: 1/4" = 1'0"

ROBERT P. JUENGERT



- NOTES:**
1. FOR A LIST OF ITEMS SUPPLIED BY OTHERS SEE MATERIAL LIST, DRAWING A-17
  2. CONTRACTOR TO LOCATE AND MARK-OUT ALL PUBLIC AND PRIVATE UNDERGROUND UTILITIES AND STRUCTURES THROUGH THE USE OF A LOCATING SERVICE PRIOR TO ANY EXCAVATION WORK. HAND DIG IN AREAS OF EXISTING UTILITIES AND/ OR STRUCTURES.
  3. TOWER HAS PASSED STRUCTURAL ANALYSIS FOR THE PROPOSED INSTALLATION.

**ARCNET ARCHITECTS, INC.**  
 670 North Beers Street, Building 2, Holmdel, NJ 07733  
 Tel: 732.739.3200 Fax: 732.739.0440

P.C. Chkd. by: **RVa**  
 P.C. Chkd. by: **R/O**

Drawing Title: **EQUIPMENT PLAN**

Client: **OCS**

ARCNET Project No. **A99.506.833A**

Drawn: **CS** Date: **4/20/99**

Project: **CL&P POLE # 1068**

Address: **MECHANIC STREET DARIEN, CT**

Search Area: **DARIEN / DOWNTOWN**

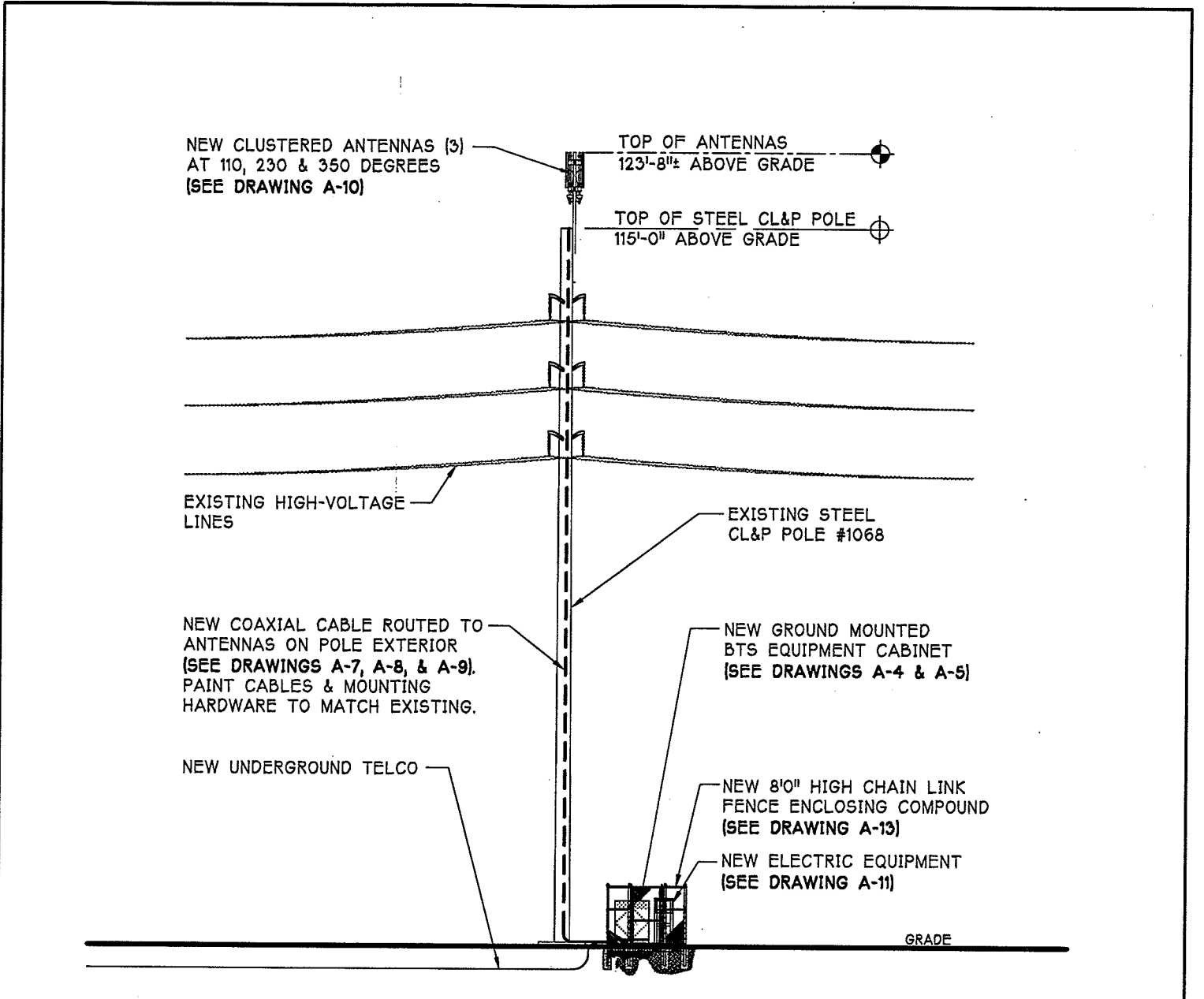
Site ID No.: **CT-11-290C**

Approved By: \_\_\_\_\_ DATE: \_\_\_\_\_

CLIENT: \_\_\_\_\_ DATE: \_\_\_\_\_

REV2Kba	7/16/99
REV1JMc	5/7/99
Revision No.	Date:
Drawing No. <b>A-2</b>	



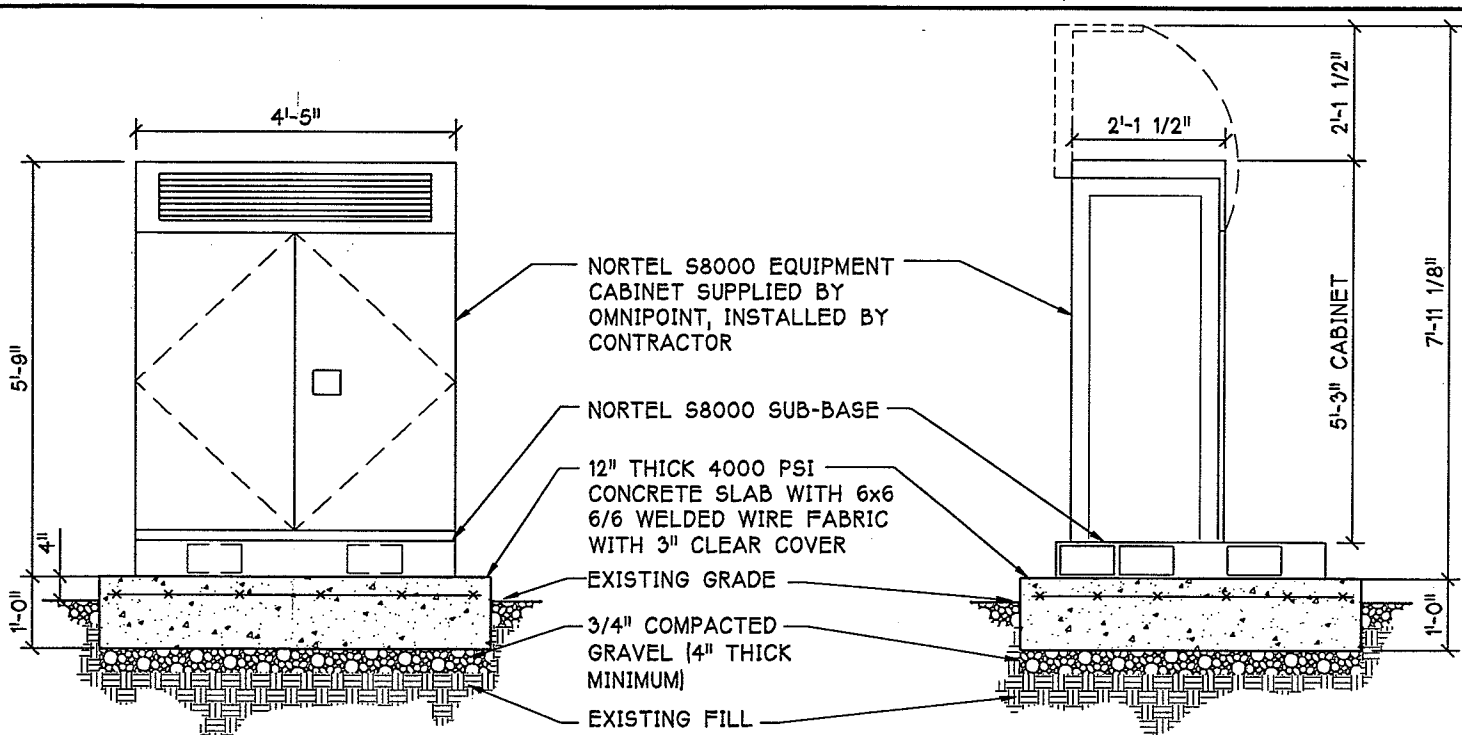


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1 SOUTH ELEVATION  
A-3 SCALE: 1" = 20'0"

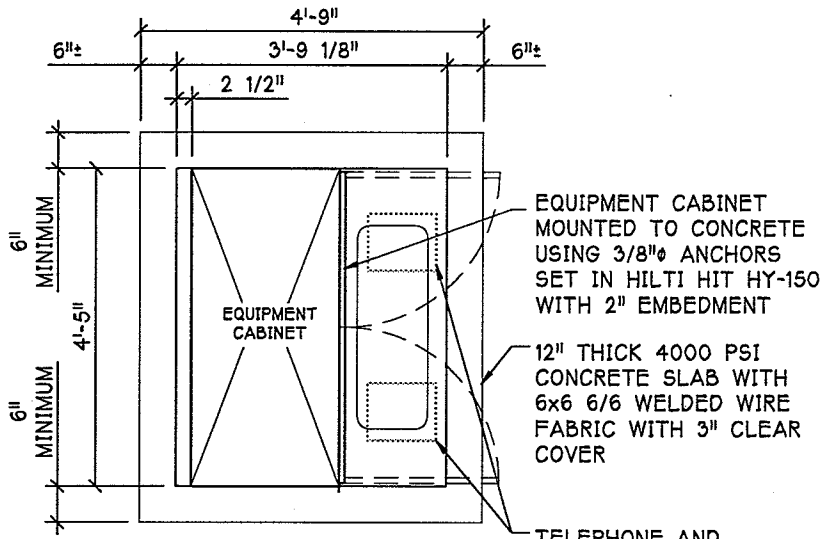
NOTE:  
CL&P TO REMOVE EXISTING  
VINES FROM POLE.

 670 North Beers Street, Building 2, Holmdel, NJ 07733 Tel: 732.739.3200 Fax: 732.739.0440	Drawing Title:		Project:		REVISIONS REV: [JMc] 5/7/99 Revision No. Date:
	SOUTH ELEVATION		CL&P POLE # 1068		
P.C.: RVa P.C. Chkd: [Signature] Chkd. by: [Signature]	Client:		Address:		Drawing No.
	OCS		MECHANIC STREET DARIEN, CT		
ARCNET Project No.		Search Area:		DATE:	
A99.506.833A		DARIEN / DOWNTOWN		CLIENT: _____ DATE: _____	
Drawn: CS		Site ID No.:		A-3	
Date: 4/20/99		CT-II-290C			



1 FRONT VIEW  
A-4 SCALE: 1/2" = 1'-0"

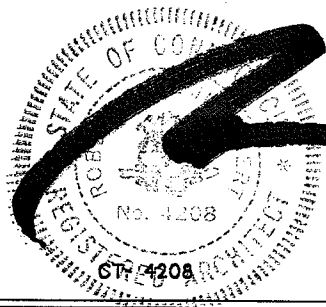
2 SIDE VIEW  
A-4 SCALE: 1/2" = 1'-0"



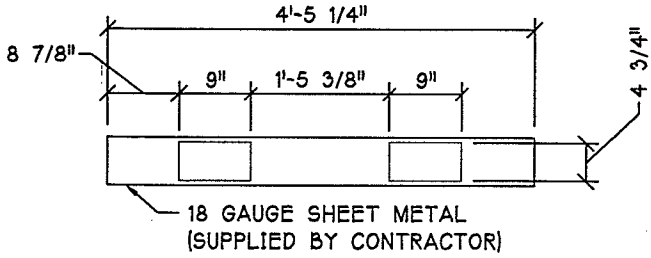
WEIGHT OF CABINET = 1065 lbs.  
WEIGHT OF BASE = 110 lbs.

3 CABINET DETAIL  
A-4 SCALE: 1/2" = 1'-0"

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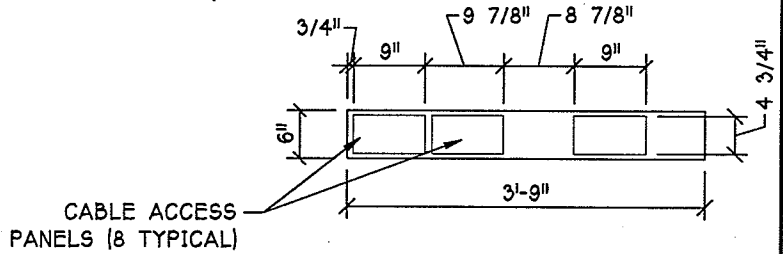
<p>670 North Beers Street, Building 2, Holmdel, NJ 07733 Tel: 732.739.3200 Fax: 732.739.0440</p>	Drawing Title: <b>CABINET DETAIL</b>		Project: <b>CL&amp;P POLE #1068</b>		REVI(JMc) 5/7/99 Revision No. Date: Drawing No. <b>A-4</b>
	Client: <b>OCS</b>		Address: <b>MECHANIC STREET DARIEN, CT</b>		
P.C.: <b>RVa</b>	P.C. Chkd:	Chkd:	ARCNET Project No.: <b>A99.506.833A</b>	Drawn: <b>CS</b>	Date: <b>4/20/99</b>
Approved By:			Search Area: <b>DARIEN / DOWNTOWN</b>		Client: _____ DATE: _____
Site ID No.: <b>CT-11-290C</b>			Approved By:		DATE:



18 GAUGE SHEET METAL  
(SUPPLIED BY CONTRACTOR)

**2 FRONT ELEVATION**

A-5 SCALE: 1/2" = 1'-0"



CABLE ACCESS  
PANELS (8 TYPICAL)

**3 SIDE ELEVATION**

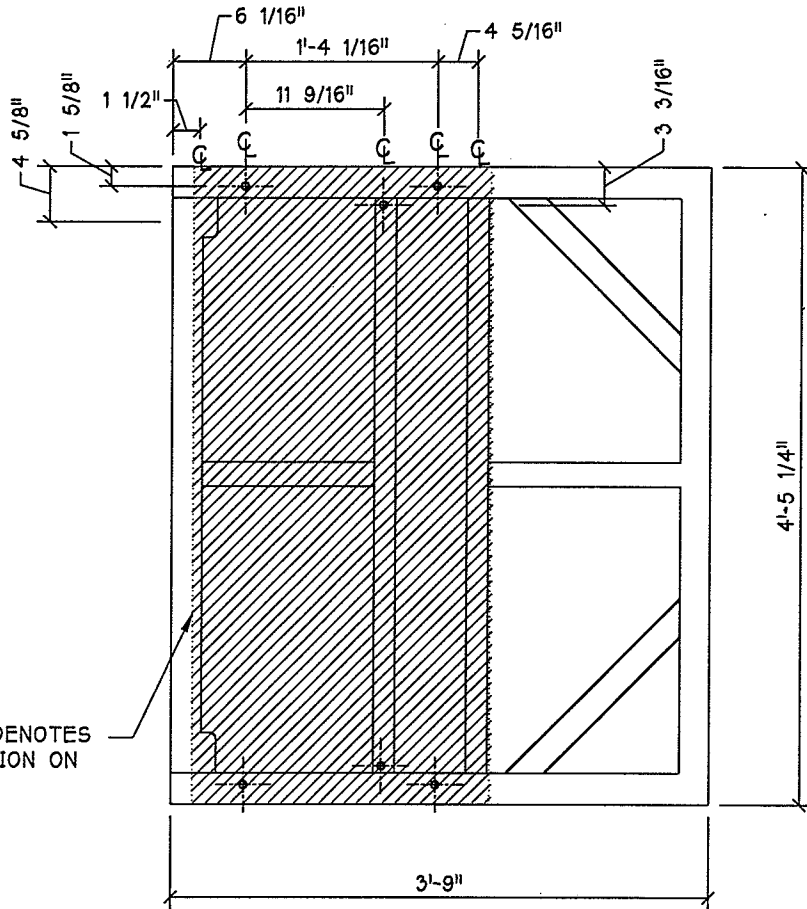
A-5 SCALE: 1/2" = 1'-0"

**NOTES:**

1. \* CONTRACTOR TO VERIFY ALL BOLT LOCATIONS \* ALL HOLES 11/16" TYPICAL \* WEIGHT OF SUB BASE = 110 LBS.

2. IN INSTANCES WHERE THE BTS IS DUNNAGE OR WALL MOUNTED THE CONTRACTOR SHALL PROVIDE AN 18 GAUGE ALUMINUM CLOSURE PANEL 3'-9" X 4'-5". HELD IN PLACE WHEN SANDWICHED BETWEEN SUB-BASE AND GRATING. DRILL (2) WEEP HOLES AT EACH CORNER AND AT CENTER.

3. ALL SUB-BASES TO BE MOUNTED TO SUBSTRATE USING 1/2" HIGH STRENGTH BOLTS. WHERE MOUNTING TO CONCRETE USE HILTI HIT HY 150 SYSTEM WITH 3 1/2" EMBEDMENT. WHERE MOUNTING TO GRATING USE HIGH STRENGTH SADDLE CLIPS.

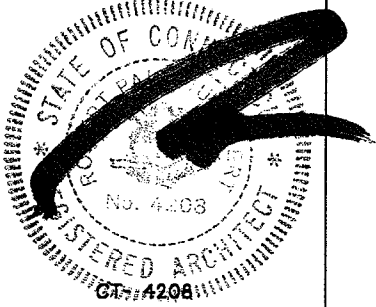


SHADED AREA DENOTES  
CABINET LOCATION ON  
SUB-BASE

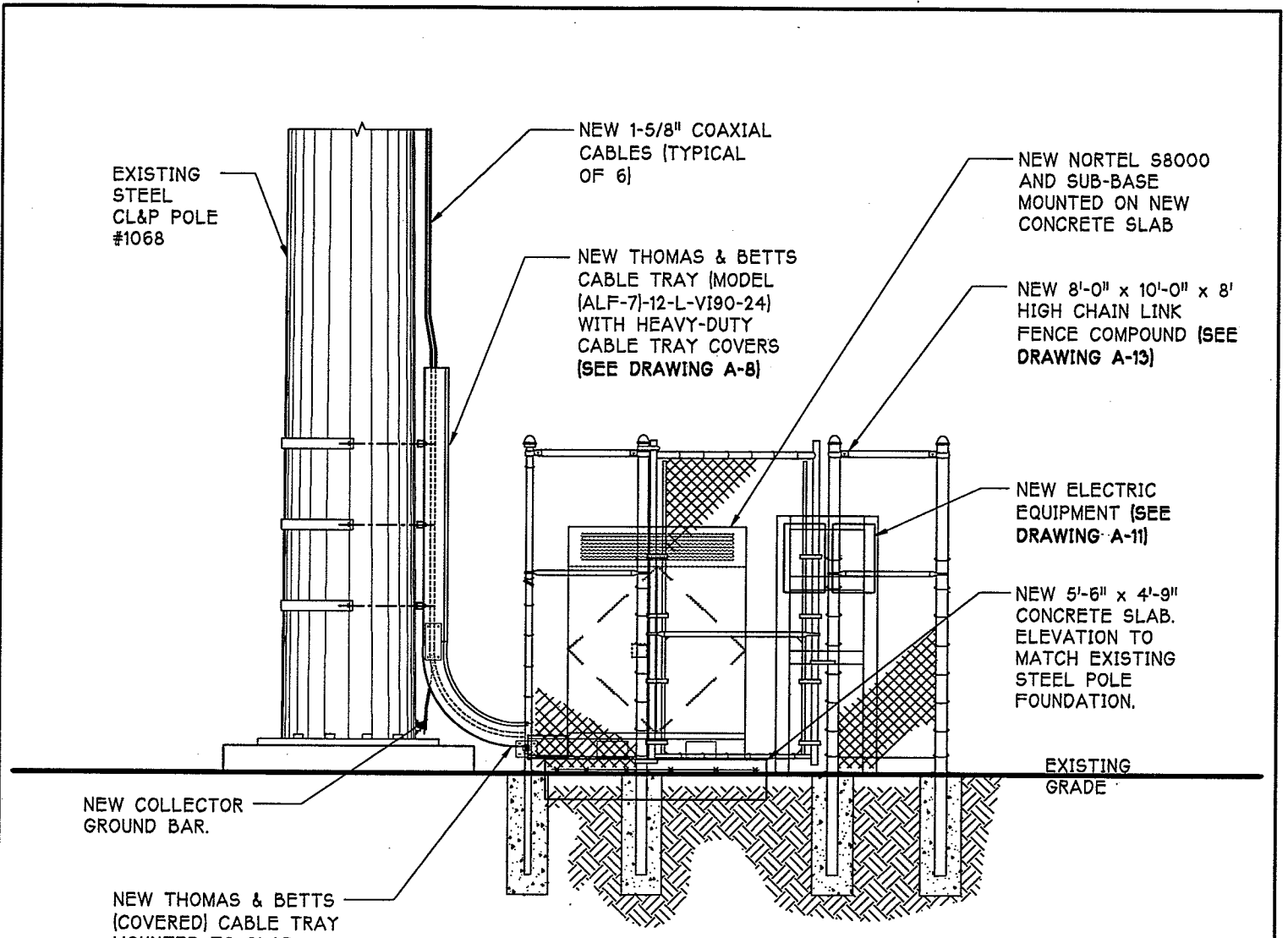
**1 SUB-BASE DETAIL**

A-5 SCALE: 1/2" = 1'-0"

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<p>670 North Beers Street, Building 2, Holmdel, NJ 07733 Tel: 732.739.3200 Fax: 732.739.0440</p>	Drawing Title: <b>SUB-BASE DETAIL</b>		Project: <b>CL&amp;P POLE #1068</b>		Revision No.    Date:  Drawing No. <b>A-5</b>
	Client: 		Address: MECHANIC STREET DARIEN, CT		
P.C.: RVa	P.C. Chkd.: 	Client Project No.: A99.506.833A	Drawn: CS	Date: 4/21/99	Search Area: DARIEN / DOWNTOWN
Approved By:			Site ID No.: CT-11-290C		CLIENT: _____ DATE: _____



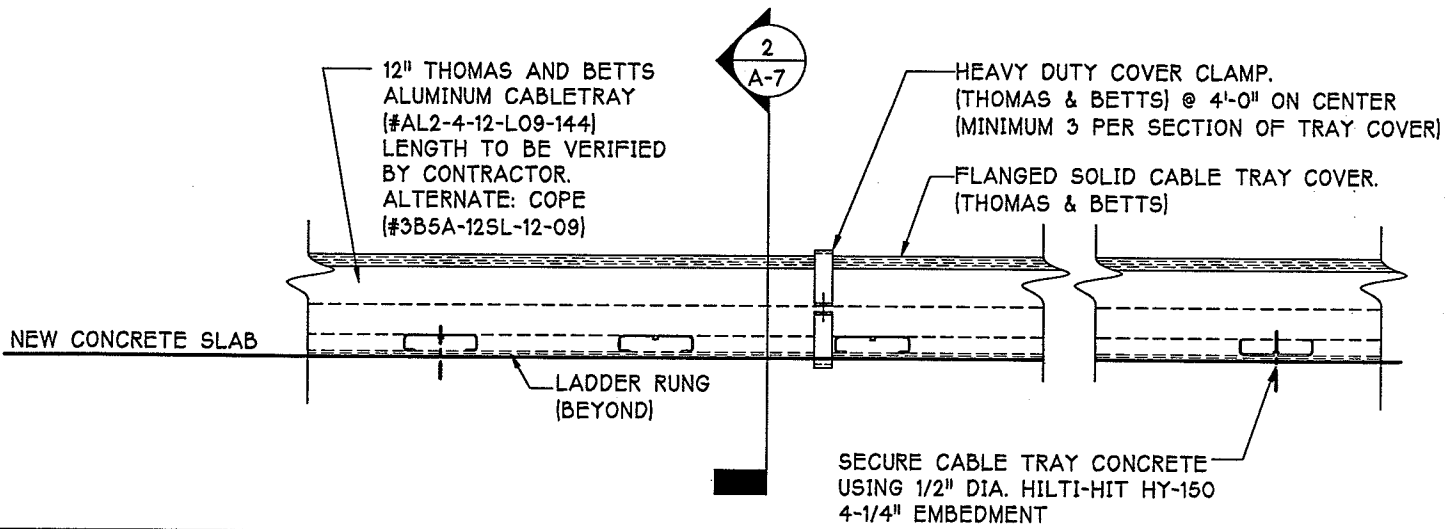
1 EQUIPMENT ELEVATION (FROM SOUTH)  
 A-6 SCALE: 1/4" = 1'-0"

ROBERT P. JUENGERT

STATE OF CONNECTICUT  
 REGISTERED ARCHITECT  
 NO. 4208  
 CT-4208

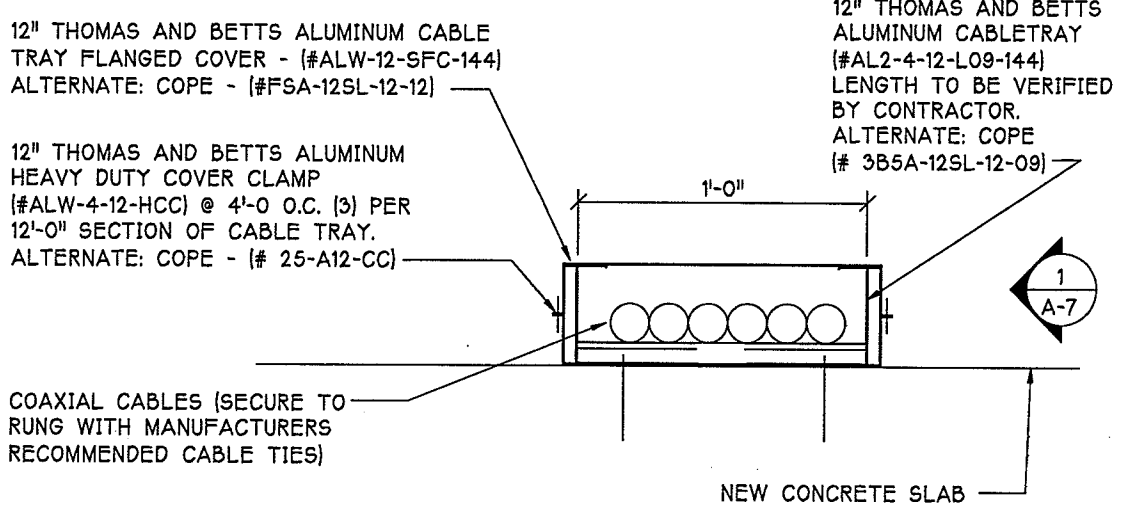
**NOTE:**  
 1.) CONTRACTOR TO VERIFY LENGTHS IN FIELD.  
 2.) BUSHES NOT SHOWN FOR CLARITY.

 670 North Beers Street, Building 2, Holmdel, NJ 07733 Tel: 732.739.3200 Fax: 732.739.0440	Drawing Title: <b>EQUIPMENT ELEVATION</b>		Project: <b>CL&amp;P POLE #1068</b>		REVI(JMc) 5/7/99 Revision No. Date: Drawing No. <b>A-6</b>
	Client: 		Address: MECHANIC STREET DARIEN, CT		
P.Cs: RVa P.C. Chkd: [initials] Chkd. by: [initials]	ARCNET Project No. <b>A99.506.833A</b>		Drawn: CS Date: 4/21/99	Search Area: DARIEN / DOWNTOWN Site ID No: CT-11-290C	
Approved By:			CLIENT: _____ DATE: _____		



NOTE:  
CONTRACTOR TO PAINT "DO NOT STEP OR STAND" ON TOP OF CABLE TRAY COVER IN 3" LETTERS (YELLOW) (SEE PAINT SPECIFICATIONS DRAWING A-15)

1 CABLE TRAY DETAIL  
A-7 SCALE: 1 1/2" = 1'-0"



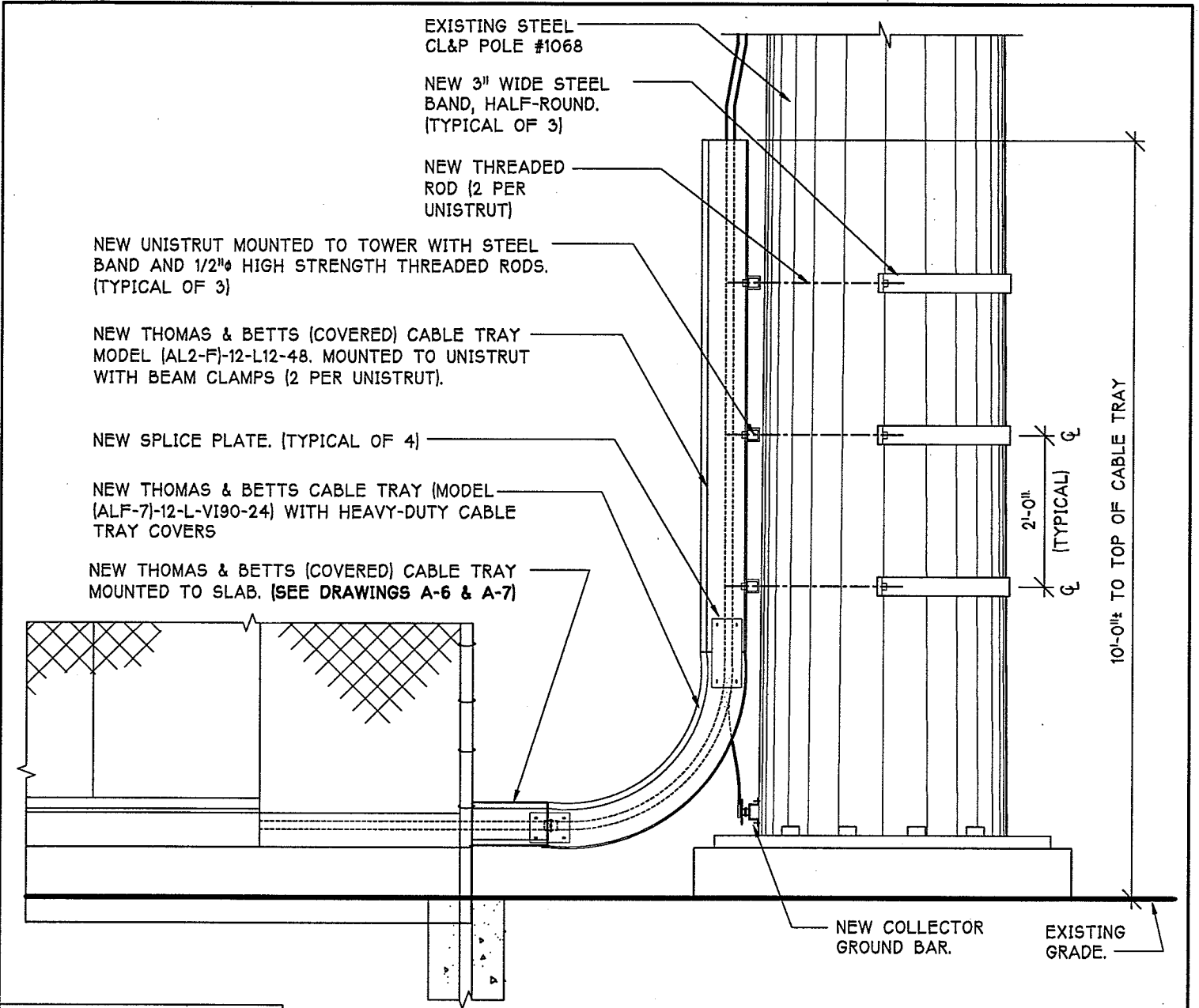
2 CABLE TRAY SECTION  
A-7 SCALE: 1 1/2" = 1'-0"

NOTE:  
ELEVATION OF NEW CONCRETE SLAB TO MATCH ELEVATION OF EXISTING STEEL POLE FOUNDATION

ROBERT P. JUENGERT

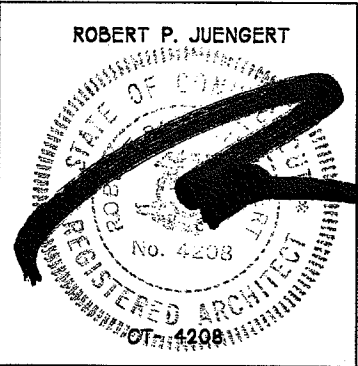
REGISTERED ARCHITECT  
CT# 4208

 670 North Beers Street, Building 2, Holmdel, NJ 07733 Tel: 732.739.3200 Fax: 732.739.0440	Drawing Title: <b>CABLE TRAY DETAIL</b>		Project: <b>CL&amp;P POLE #1068</b> Address: <b>MECHANIC STREET DARIEN, CT</b>		Revision No.    Date: _____ _____ Drawing No. <b>A-7</b>
	Client: <b>OCS</b>		Search Area: <b>DARIEN / DOWNTOWN</b> Site ID No.: <b>CT-11-290C</b>		
P.C.: <b>RVa</b>	P.C. Chkd.: _____	ARCNET Project No.: <b>A99.506.833A</b>	Drawn: <b>CS</b>	Date: <b>4/21/99</b>	Approved By: CLIENT: _____ DATE: _____

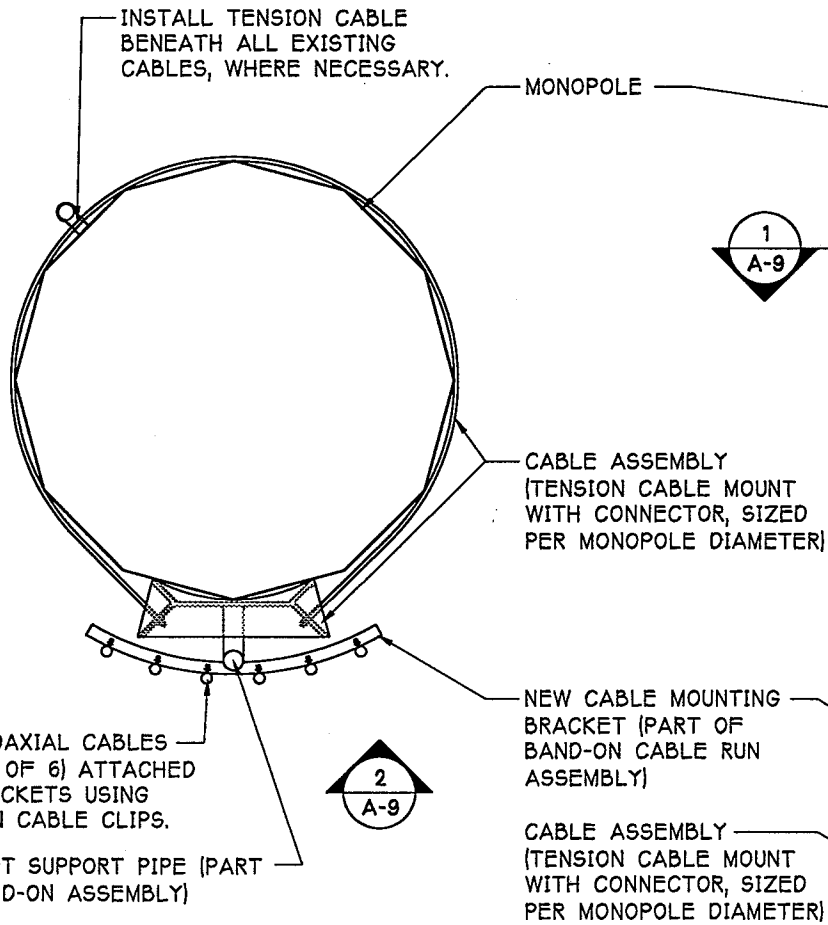


1 CABLE ROUTING ELEVATION  
 A-8 SCALE: 1/2" = 1'-0"

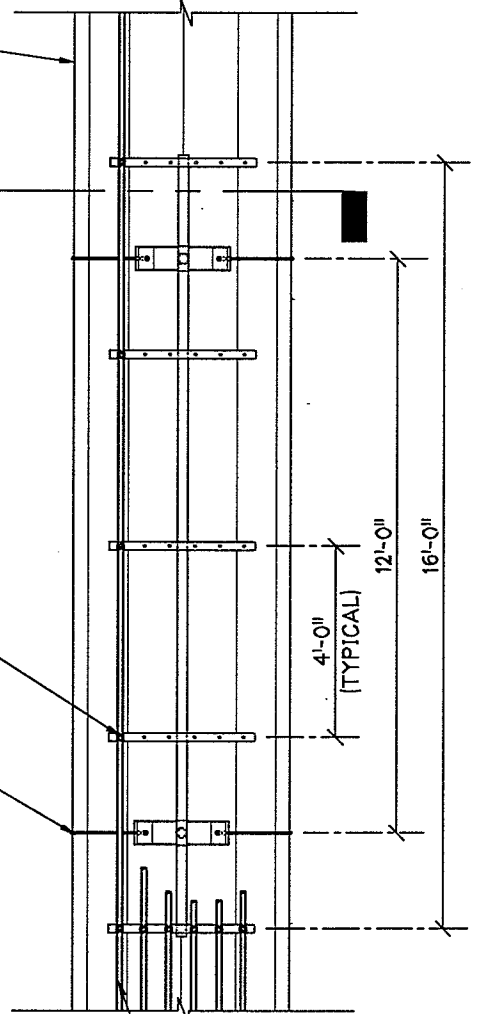
**NOTE:**  
 1.) CONTRACTOR TO VERIFY CABLE TRAY LENGTHS IN FIELD.  
 2.) TOP OF BTS PAD TO MATCH TOP OF EXISTING POLE FOUNDATION.



 670 North Beers Street, Building 2, Holmdel, NJ 07733 Tel: 732.739.3200 Fax: 732.739.0440	Drawing Title: <b>CABLE ROUTING ELEVATION</b>		Project: <b>CL&amp;P POLE #1068</b>		Revision No.    Date:  Drawing No. <b>A-8</b>
	Client: 		Address: MECHANIC STREET DARIEN, CT		
P.C.: RVa	P.G. Chkd: [Signature]	Chkd. By: [Signature]	ARCNET Project No. A99.506.833A	Drawn: CS	Date: 4/21/99
			Search Area: DARIEN / DOWNTOWN		
			Site ID No.: CT-11-290C		
			Approved By: CLIENT: _____ DATE: _____		



**1 CABLE MOUNT PLAN**  
 A-9 SCALE: 1/2" = 1'-0"



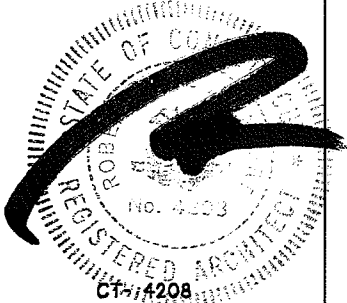
**2 CABLE MOUNT ELEVATION**  
 A-9 SCALE: 1/4" = 1'-0"

NEW COAXIAL CABLES (TOTAL OF 6) ATTACHED TO BRACKETS USING SNAP-IN CABLE CLIPS (BY CABLEWAVE).

**NOTES:**

1. DRAWINGS REPRESENT SIZE & SPACING OF BAND-ON CABLE RUN (PART WA10784, AND CABLE ASSEMBLY PER MONOPOLE SIZE, BY ENGINEERED ENDEAVORS, INC.).
2. ALL STEEL TO BE HOT-DIPPED GALVANIZED.
3. INSTALL BAND-ON CABLE RUN WITH CABLE ASSEMBLY PER MANUFACTURER'S SPECIFICATIONS.

ROBERT P. JUENGERT

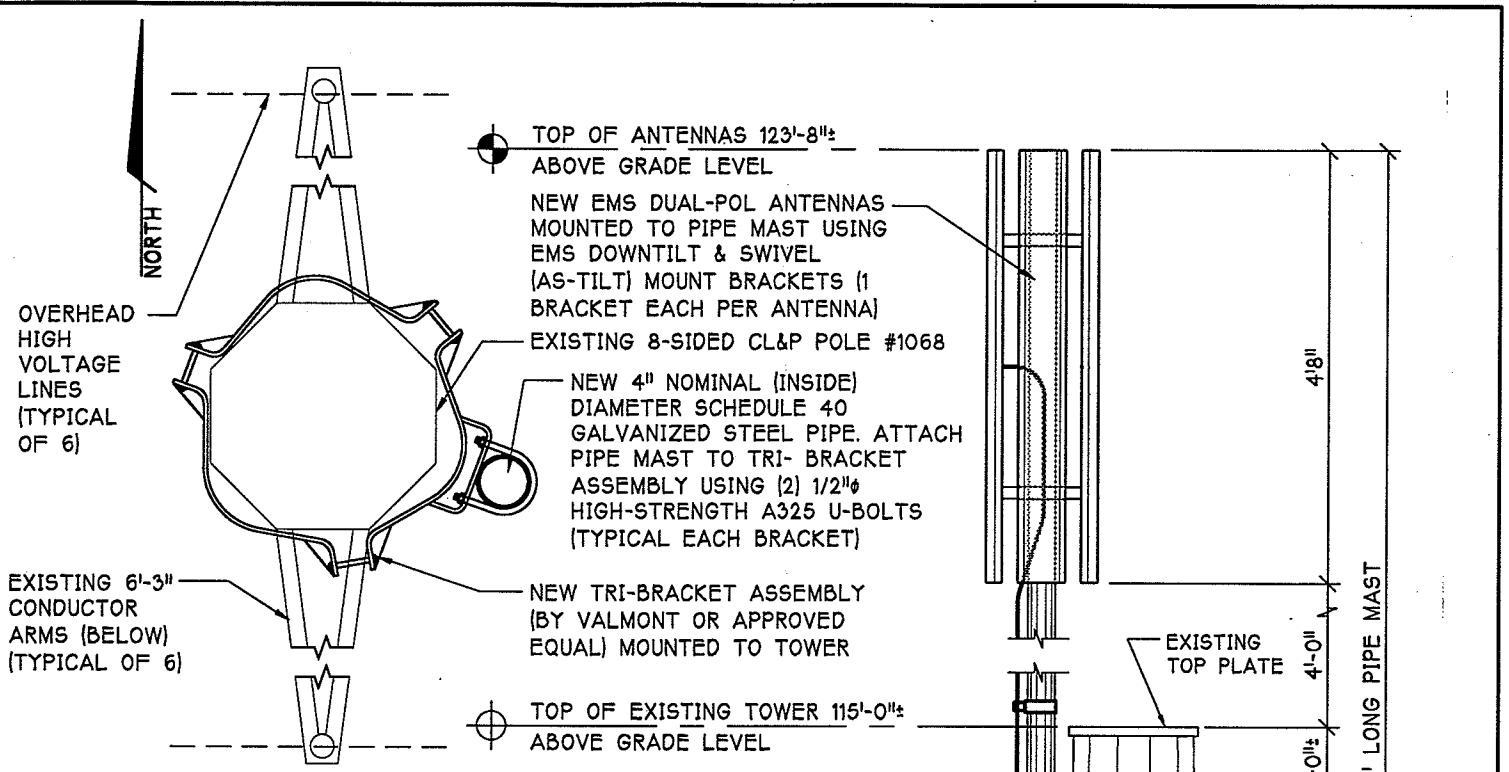


**ARCNET ARCHITECTS, INC.**  
 670 North Beers Street, Building 2, Holmdel, NJ 07733  
 Tel: 732.739.3200 Fax: 732.739.0440

Drawing Title: **CABLE MOUNT ELEVATION**  
 Client: **OCS**  
 ARCNET Project No. **A99.506.833A** Drawn: **CS** Date: **4/21/99**

Project: **CL&P POLE #1068**  
 Address: **MECHANIC STREET DARIEN, CT**  
 Search Area: **DARIEN / DOWNTOWN**  
 Site ID No.: **CT-11-290C**  
 Approved By: \_\_\_\_\_ DATE: \_\_\_\_\_

Revision No.	Date:
Drawing No. <b>A-9</b>	



**2 ANTENNA MOUNT SECTION**  
A-10 SCALE: 1/2" = 1'-0"

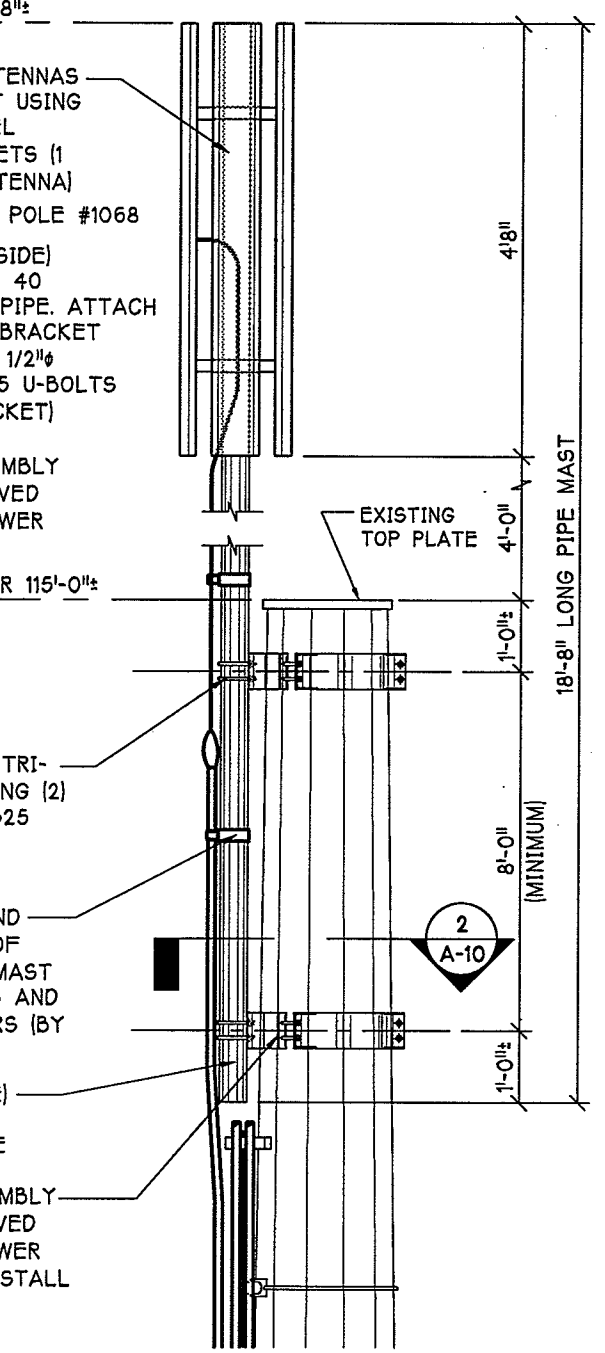
- NOTES:**
1. CONTRACTOR TO POSITION MAST TO Laterally AVOID CLIMBING RUNGS AND MONOPOLE TOP PLATE AS NECESSARY.
  2. VERIFY ALL TOWER DIMENSIONS IN FIELD PRIOR TO CONSTRUCTION.
  - 3.) EXISTING CLIMBING RINGS NOT DRAWN
  - 4.) NORTH TO BE DETERMINED BY CIVIL ENGINEER

ATTACH PIPE MAST TO TRI-BRACKET ASSEMBLY USING (2) 1/2" HIGH-STRENGTH A325 U-BOLTS (TYPICAL EACH BRACKET)

MOUNT NEW JUMPERS AND COAXIAL CABLES (ONE OF EACH SHOWN) TO PIPE MAST USING BUTTERFLY CLIPS AND ROUND-MEMBER ADAPTERS (BY CABLEWAVE)

NEW 4" NOMINAL (INSIDE) DIAMETER SCHEDULE 40 GALVANIZED STEEL PIPE

NEW TRI-BRACKET ASSEMBLY (BY VALMONT OR APPROVED EQUAL) MOUNTED TO TOWER (TYPICAL 2 PLACES - INSTALL PER MANUFACTURER'S SPECIFICATIONS)

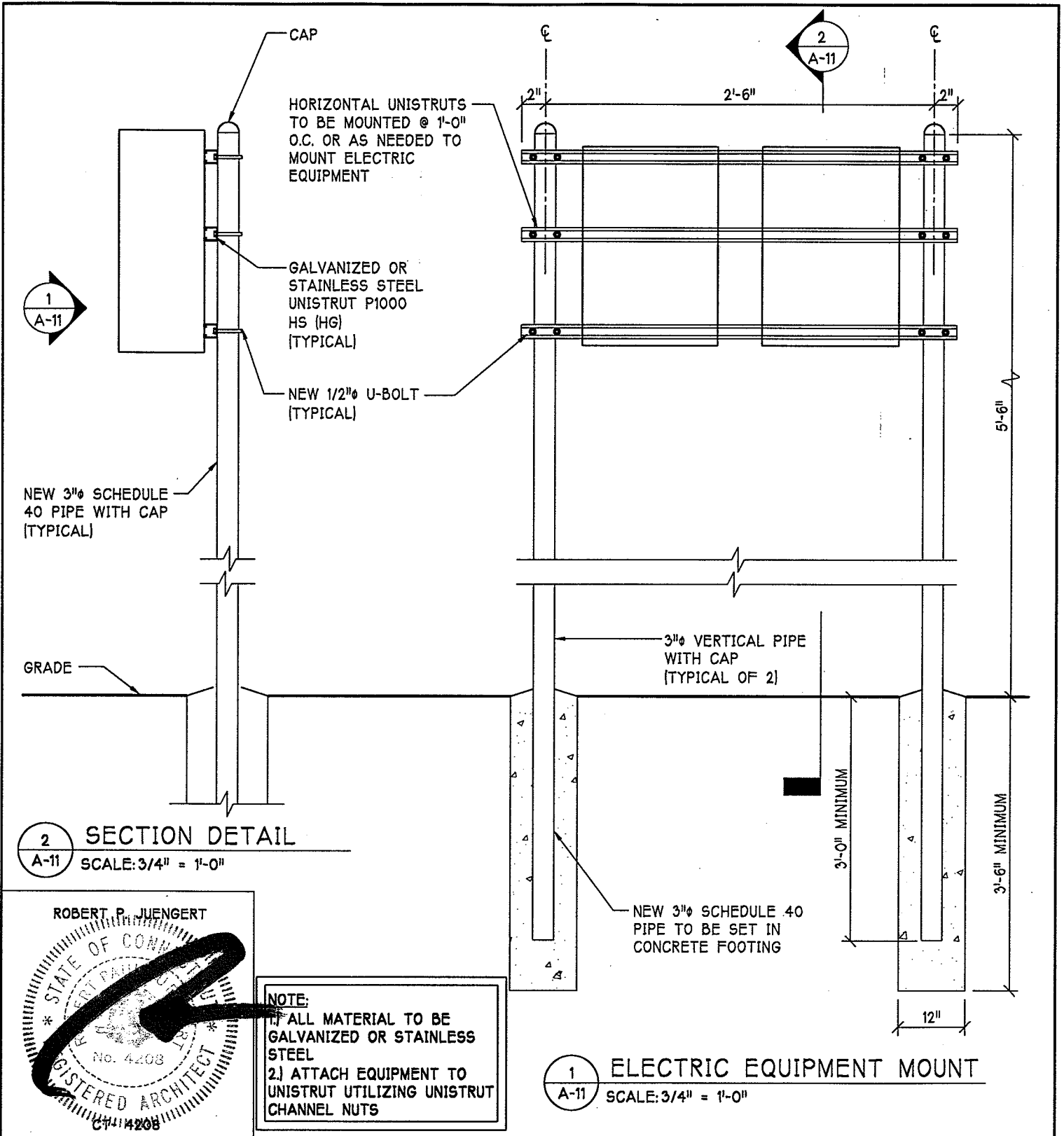


**1 ANTENNA MOUNT ELEVATION**  
A-10 SCALE: 3/8" = 1'-0"

ROBERT P. JUENGERT

<p>670 North Beers Street, Building 2, Holmdel, NJ 07733 Tel: 732.739.3200</p>	Drawing Title: <b>ANTENNA MOUNT DETAIL</b>		Project: <b>CL&amp;P POLE #1088</b>		REVI(JMc) 5/7/99 Revision No. Date: Drawing No. <b>A-10</b>
	Client: 		Address: MECHANIC STREET DARIEN, CT		
P.C.: RVa	P.C. Chkd: 	ARCNET Project No. <b>A99.506.833A</b>	Drawn: <b>CS</b>	Date: <b>4/21/99</b>	Search Area: DARIEN / DOWNTOWN
Approved By: CLIENT: _____ DATE: _____			Site ID No.: CT-11-290C		





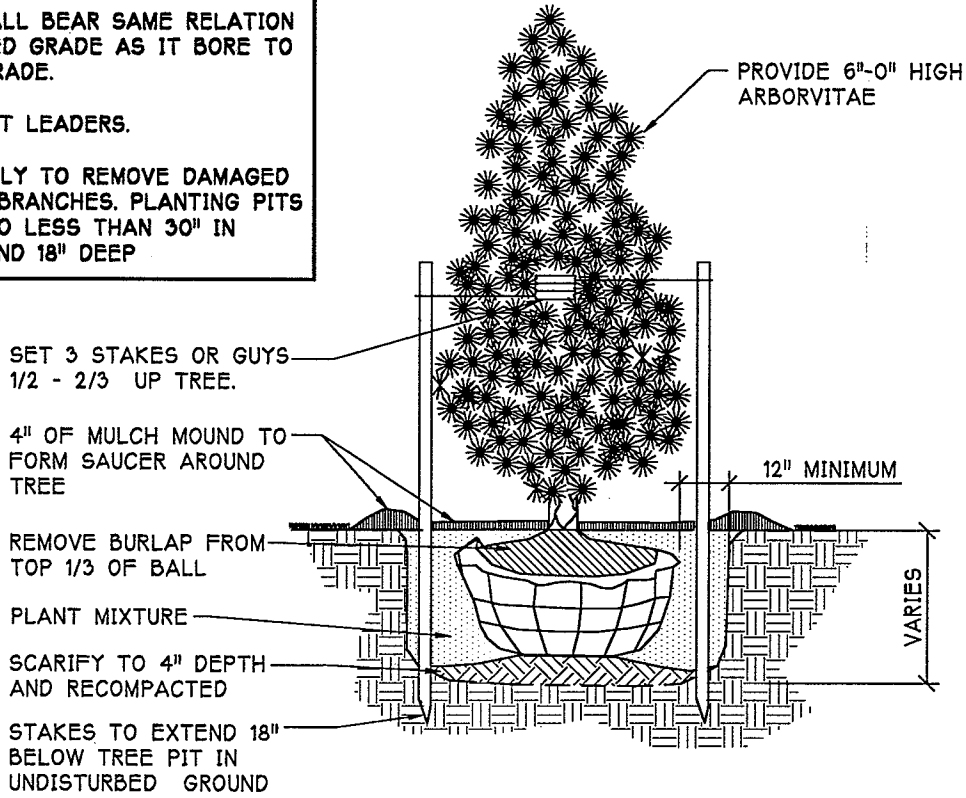
ROBERT P. JUENGERT

STATE OF CONNECTICUT  
REGISTERED ARCHITECT  
No. 4208  
CT 4208

<p>670 North Beers Street, Building 2, Holmdel, NJ 07733 Tel: 732.739.3200 Fax: 732.739.0440</p>	Drawing Title: <b>ELECTRIC EQUIPMENT MOUNT</b>		Project: <b>CL&amp;P POLE #1068</b>		REVI(JMc) 5/7/99 Revision No. Date: Drawing No. <b>A-11</b>
	Client: <b>OCS</b>		Address: <b>MECHANIC STREET DARIEN, CT</b>		
P.C. RVa	P.C. Chkd.	Chkd. by	ARCNET Project No. <b>A99.506.833A</b>	Search Area: <b>DARIEN / DOWNTOWN</b>	CLIENT: _____ DATE: _____
			Drawn: <b>CS</b>	Site ID No.: <b>CT-11-290C</b>	
			Date: <b>4/21/99</b>		

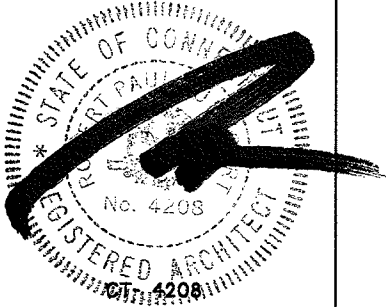
**NOTES:**

- 1) STAKE ALL EVERGREEN TREES
- 2) TREE SHALL BEAR SAME RELATION TO FINISHED GRADE AS IT BORE TO PREVIOUS GRADE.
- 3) NEVER CUT LEADERS.
- 4) PRUNE ONLY TO REMOVE DAMAGED OR BROKEN BRANCHES. PLANTING PITS SHALL BE NO LESS THAN 30" IN DIAMETER AND 18" DEEP



1 PLANTING DETAIL  
A-12 SCALE: 1/8" = 1'-0"

ROBERT P. JUENGERT



<p>670 North Beers Street, Building 2, Holmdel, NJ 07733 Tel: 732.739.3200 Fax: 732.739.0440</p>	Drawing Title: <b>PLANTING DETAIL</b>		Project: <b>CL&amp;P POLE #1068</b> Address: <b>MECHANIC STREET DARIEN, CT</b>		Revision No.    Date:  Drawing No. <b>A-12</b>
	Client: <b>OCS</b>		Search Area: <b>DARIEN / DOWNTOWN</b> Site ID No.: <b>CT-11-290C</b>		
P.C.: <b>RVa</b>	P.C. Child:	ARCNET Project No.: <b>A99.506.833A</b>	Drawn: <b>CS</b>	Date: <b>4/21/99</b>	Approved By: _____ DATE: _____

9 GAUGE TIE WIRES 12" ON CENTER  
(TYPICAL AT TOP & HORIZONTAL BRACE  
RAILS)

1" SCHEDULE 40 PIPE MID-RAIL BRACE  
(TYP. ALL GATES)

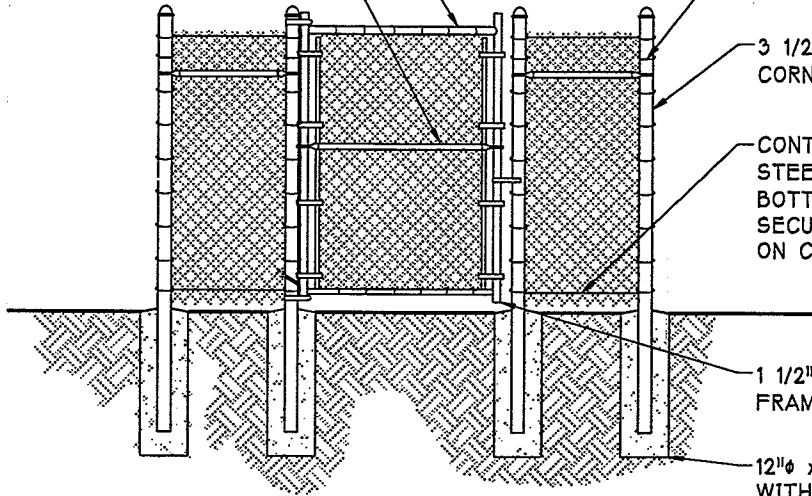
BEVELED TENSION BANDS 12 GAUGE  
PRESSED STEEL 12" ON CENTER (TYPICAL)

3 1/2" (INSIDE DIAMETER) SCHEDULE 40  
CORNER POST (TYPICAL)

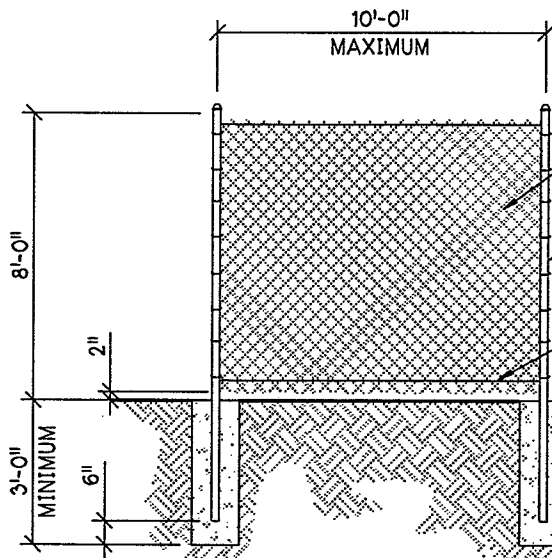
CONTINUOUS 6 GAUGE ALUMINUM COATED  
STEEL TENSION WIRE (TYPICAL TOP &  
BOTTOM). CHAIN LINK FABRIC TO BE  
SECURED WITH 9 GAUGE HOG RINGS 18"  
ON CENTER

1 1/2" (INNER DIAMETER) WELDED GATE  
FRAME (4'-0" WIDE GATE) (TYPICAL OF 2)

12" x 3'-0" DEEP POST FOOTING. FILL  
WITH 4000 PSI CONCRETE.



**2** GATE AND CORNER DETAIL  
A-13 SCALE: NOT TO SCALE



9 GAUGE GALVANIZED (2" MESH)  
CHAIN LINK FENCE FABRIC

2 1/2" SCHEDULE 40 LINE POST  
WITH 7 1/2" 9 GAUGE STEEL  
WIRE SPACED 14" ON CENTER  
(TYPICAL ALL LINE POSTS)

CONTINUOUS 6 GAUGE ALUMINUM  
COATED STEEL TENSION WIRE  
(TYPICAL TOP & BOTTOM). CHAIN  
LINK FABRIC TO BE SECURED  
WITH 9 GAUGE HOG RINGS 18" ON  
CENTER

FINISHED GRADE OR EXISTING  
PAVED SURFACE OR CONCRETE  
SLAB WHERE OCCURS

12" x 3'-0" DEEP POST FOOTING  
(FILL WITH 4000 PSI CONCRETE)

**1** FENCE DETAIL  
A-13 SCALE: NOT TO SCALE

ROBERT P. JUENGERT



670 North Beers Street, Building 2, Holmdel, NJ 07733  
Tel: 732.739.3200 Fax: 732.739.0440

Drawing Title: FENCE DETAIL

Client: OCS

ARCNET Project No. A99.506.833A  
Drawn: CS Date: 4/21/99

Project: CL&P POLE #1088

Address: MECHANIC STREET  
DARIEN, CT

Search Area: DARIEN / DOWNTOWN

Site ID No.: CT-11-290C

Approved By: \_\_\_\_\_ DATE: \_\_\_\_\_  
CLIENT: \_\_\_\_\_

Revision No. Date:

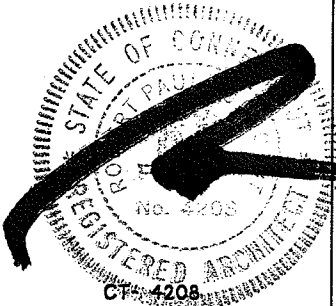
Drawing No.

**A-13**

**GENERAL NOTES:**

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL STATE AND LOCAL CODES AND ORDINANCES.
2. CONTRACTOR SHALL INSTALL ALL EQUIPMENT SUPPLIED BY OMNIPOINT AS NOTED ON THE MATERIAL LIST. ALL ITEMS NOT SPECIFIED IN THE MATERIAL LIST SHALL BE SUPPLIED & INSTALLED BY THE CONTRACTOR.
3. ALL EQUIPMENT SHALL BE INSTALLED PLUMB AND LEVEL.
4. ALL STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST AISC CODE AND ASTM SPECIFICATION. STEEL SHALL CONFORM TO ASTM A-36. PIPE SHALL CONFORM TO ASTM A-501 OR ASTM A-53 (GRADE B)
5. ALL CONNECTIONS OF STRUCTURAL STEEL MEMBERS SHALL BE MADE USING SPECIFIED WELDS WITH WELDING ELECTRODES E-70XX OR SPECIFIED HIGH STRENGTH BOLTS TO BE ASTM A325, THREAD EXCLUDED FROM SHEAR PLANE.
6. ALL STEEL, AFTER FABRICATION, SHALL BE HOT DIPPED GALVANIZED PER ASTM A-123. ALL DAMAGED SURFACES, WELDED AREAS AND AUTHORIZED NON-GALVANIZED MEMBERS OR PARTS (EXISTING OR NEW) SHALL BE PAINTED WITH 2 COATS OF ZRC COLD GALVANIZING COMPOUND MANUFACTURED BY ZRC CHEMICAL PRODUCTS Co. QUINCY, MASS. OR USE THERMAL SPRAYING WITH PLATTZINC 85/15 AS MANUFACTURED BY PLATT BROTHERS & COMPANY WATERBURY, CT 1-800-752-8276.
7. ALL SHOP AND FIELD WELDING SHALL BE DONE BY WELDERS QUALIFIED AS DESCRIBED IN THE "AMERICAN WELDING SOCIETY'S STANDARD QUALIFICATION PROCEDURE" TO PERFORM THE TYPE OF WORK REQUIRED.
8. ALL GALVANIZED PIPE SIZES ARE NOMINAL DIAMETER. (INSIDE DIAMETER)
9. CONTRACTOR SHALL MEASURE AND VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS IN FIELD. ANY UNUSUAL CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND ENGINEER PRIOR TO THE PURCHASE, FABRICATION AND ERECTION OF ANY MATERIAL.
10. INCORRECTLY FABRICATED, DAMAGED, OTHERWISE MISFITTING, OR NON-CONFORMING MATERIALS AND CONDITIONS SHALL BE REPORTED TO THE OWNER, ARCHITECT, AND CONSTRUCTION MANAGER PRIOR TO ANY REMEDIAL OR CORRECTIVE ACTION. ALL ACTIONS SHALL REQUIRE APPROVAL FROM THE OWNER.
11. CONTRACTOR SHALL EXECUTE ALL WORK PREVENTING ANY DAMAGE TO EXISTING STRUCTURES, ESPECIALLY TO ROOF. ANY ROOF WORK INVOLVING ATTACHMENT, REMOVAL OF FINISH SURFACE OR PENETRATION SHALL BE PERFORMED TO PRESERVE EXISTING, ROOFING GUARANTEES AND WARRANTIES. ROOF SHALL BE RESTORED TO COMPLETE WATER TIGHTNESS WITH THE APPROVED MATERIAL AND BY A SUB CONTRACTOR PRE-APPROVED BY THE OWNER IN WRITING.
12. MASONRY PENETRATIONS SHOULD USE ROTARY ACTION ONLY.(NO HAMMERING ACTION.)
13. ALL PENETRATIONS TO BE PROPERLY FIRE-STOPPED WITH 3M F.S.195 WRAP STRIP FIRE-STOP AND CP25 NON-SHRINKING PUTTY FIRE BARRIER SEALANT. MAINTAIN FIRE RATING OF ALL PENETRATED SURFACES.
14. ALL MOUNTS TO WALLS TO BE SEALED AT TOP AND SIDES WITH DOW CORNING CLEAR SILICONE SEALANT OR APPROVED EQUAL. SILICONE APPLICATIONS ARE TO BE TOOLED TO MAINTAIN A FINISHED APPEARANCE.
15. CONTRACTOR SHALL PROMPTLY REMOVE ANY & ALL DEBRIS FROM SITE.
16. CONTRACTOR SHALL PROVIDE A 3/4" CHAMFER ON ALL CONCRETE SLABS.

ROBERT P. JUENGERT



 670 North Beers Street, Building 2, Holmdel, NJ 07733 Tel: 732.739.3200 Fax: 732.739.0440	Drawing Title: <b>GENERAL NOTES</b>	Project: <b>CL&amp;P POLE #1068</b> Address: <b>MECHANIC STREET DARIEN, CT</b> Search Area: <b>DARIEN / DOWNTOWN</b> Site ID No.: <b>CT-11-290C</b>	
	Client: <b>OCS</b>	Approved By: _____ DATE: _____ CLIENT: _____ DATE: _____	Revision No. _____ Date: _____ Drawing No. <b>A-14</b>
P.C. Rv P.C. Chkd: _____ Chkd By: _____	ARCNET Project No. <b>A99.506.833A</b> Drawn: <b>CS</b> Date: <b>4/21/99</b>		

17. WHERE SPECIFIED ON THE CONSTRUCTION DOCUMENTS, THE GENERAL CONTRACTOR SHALL PAINT ALL NEW ANTENNAS, SHROUD AND RELATED HARDWARE TO MATCH EXISTING CONDITIONS BELOW.  
 NOTE ALL PAINT TO BE SHERWIN WILLIAMS OR APPROVED EQUAL, UNLESS OTHERWISE SPECIFIED

**A. ANTENNA PAINT SPECIFICATIONS**

SURFACE PREPARATION:

REMOVE SURFACE CONTAMINATION USING ALCOHOL SOLVENT.

APPLICATION PROCEDURES

PAINTING TO BE DONE INDOORS.

1. APPLY ONE PRIMER COAT OF POLANE 2.8 PLUS FIL D61H75 PRIMER IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
2. APPLY ONE TOP COAT IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
  - a. FOR CELWAVE USE POLANE "HS 2.8 PLUS POLYURETHENE"
  - b. FOR EMS USE POLANE B OR POLANE T POLYURETHANE ENAMEL

**DO NOT USE THESE METAL BASED COLORS ON ANTENNAS:**  
 TURBINE ORANGE...DECIBEL ORANGE... BETA YELLOW... ULTRASONIC CHROME

**B. MOUNTING HARDWARE / CONDUIT PAINT SPECIFICATION**

SURFACE PREPARATION

REMOVE SURFACE CONTAMINATION USING ALCOHOL SOLVENT, ETHANOL. PROSPANOL, ISOPROSPANOL, OR BUTANOL. A TEN PERCENT SOLUTION OF METHYL ETHYL KETONE IN WATER CAN ALSO BE USED WHENEVER STUBBORN OIL OR GREASE IS ENCOUNTERED.

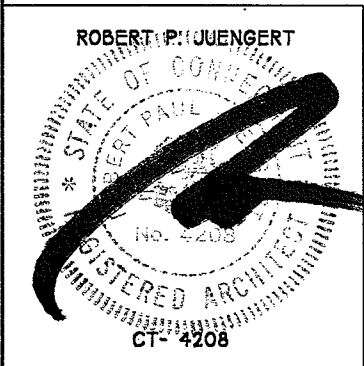
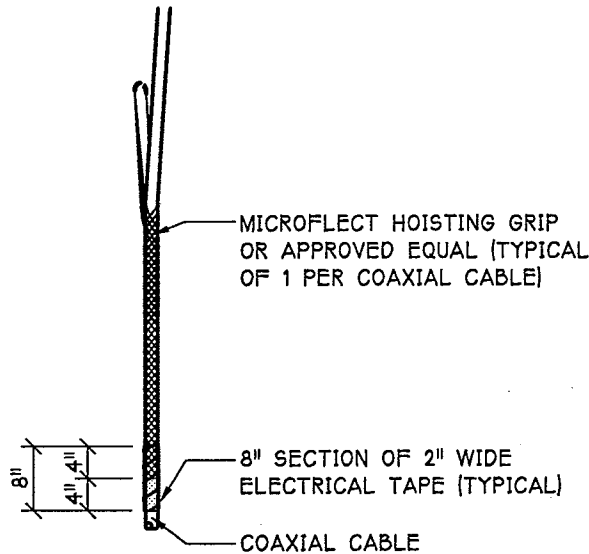
GALVANIZED SURFACES

ONE COAT OF PERMABOND - BONDING AGENT BY CORONADO PAINT CO. #100 - 10 DO NOT LET DRY IMMEDIATELY APPLY ONE COAT OF SHERWIN WILLIAMS S-W A100 FLAT LATEX HOUSE & TRIM, A6 SERIES. LET DRY AND APPLY SECOND COAT OF SHERWIN WILLIAMS S-W A100 FLAT LATEX HOUSE & TRIM, A6 SERIES [4 MILS WET, 1.3 MILS DRY PER COAT].

**C. BTS CLEARANCE LIMIT LINE DEMARCATION**

WHEN SPECIFIED ON CONSTRUCTION DOCUMENTS, THE CONTRACTOR SHALL PAINT A CONTINUOUS 4" WIDE SAFETY LINE WITH CON-LUX ROAD PLEX #17 TRAFFIC YELLOW OR APPROVED EQUAL ON THE WALKING SURFACE ADJACENT TO CABINET TO DENOTE REQUIRED CLEARANCE LIMITS TO CABINET.

18. HOISTING GRIP TAPING DETAIL -



<p>670 North Beers Street, Building 2, Holmdel, NJ 07733                  Tel: 732.739.3200</p>	Drawing Title: <b>GENERAL NOTES</b>			Project: <b>CL&amp;P POLE #1068</b>		Revision No.    Date:  Drawing No.
	Client:			Address: <b>MECHANIC STREET DARIEN, CT</b>		
P.C.s: <b>RVa</b>	P.C. Chkd:	Chkd By:	ARCNET Project No.: <b>A99.506.833A</b>	Drawn: <b>CS</b>	Date: <b>4/21/99</b>	Search Area: <b>DARIEN / DOWNTOWN</b>
			Approved By:		Site ID No.: <b>CT-11-290C</b>	CLIENT: _____ DATE: _____

## CONCRETE NOTES

### FOUNDATION

1. ALL FOOTINGS SHALL BEAR ON SOIL HAVING A MINIMUM SAFE BEARING CAPACITY OF 1.0 TONS PER SQUARE FOOT. SUBGRADE SHALL BE FREE FROM ALL LOOSE SOIL AND DEBRIS. CONFIRM IN FIELD PRIOR TO PLACING FOOTINGS.
2. ELEVATIONS GIVEN CORRESPOND TO THE COMPUTED BOTTOM OF FOOTINGS AND ARE MINIMUM DEPTHS. ADDITIONAL DEPTH MAY BE REQUIRED TO REACH GOOD BEARING. ALL OVER EXCAVATED MATERIALS SHALL BE REPLACED WITH 95% COMPACTED FILL, 3/4" CLEAN STONE, OR CONCRETE.
3. NO FOOTINGS SHALL BE PLACED IN WATER OR ON FROZEN GROUND. AFTER FOOTINGS ARE PLACED THEY SHALL BE PROTECTED AGAINST FROST.
4. FILL AND BACK FILL MATERIAL SHALL BE FREE OF DELETERIOUS ORGANIC MATTER.

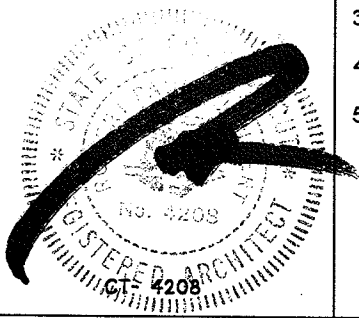
### CAST-IN-PLACE CONCRETE

1. ALL CONCRETE WORK SHALL CONFORM TO THE LATEST EDITION OF THE ACI BUILDING CODE.
2. ALL CONCRETE SHALL ATTAIN 4000 PSI COMPRESSIVE STRENGTH AT 28 DAYS.
3. READY MIX: COMPLY WITH ACI-301 AND ASTM C-94. ALL CONCRETE EXPOSED TO THE GROUND OR WEATHER SHALL BE AIR ENTRAINED.
4. COLD WEATHER CONCRETE POURING SHALL BE IN ACCORDANCE WITH ACI-306.
5. THROUGHOUT CONSTRUCTION THE CONCRETE WORK SHALL BE ADEQUATELY PROTECTED AGAINST DAMAGE DUE TO EXCESSIVE LOADING, CONSTRUCTION EQUIPMENT, MATERIALS OR METHODS, ICE, RAIN, SNOW, EXCESSIVE HEAT AND FREEZING TEMPERATURES.
6. EARLY DRYING OUT OF CONCRETE, ESPECIALLY DURING THE FIRST 24 HOURS, SHALL BE CAREFULLY GUARDED AGAINST. ALL SURFACES SHALL BE PROTECTED USING MOIST CURING OR A MEMBRANE CURING AGENT APPLIED AS SOON AS FORMS ARE REMOVED OR FINISHING OPERATIONS ARE COMPLETE. CARE SHALL BE EXERCISED SO AS NOT TO DAMAGE COATING.
7. APPLY NON-SLIP BROOM FINISH IMMEDIATELY AFTER TROWEL FINISHING.
8. CONTRACTOR TO COORDINATE REQUIREMENTS OF STRUCTURAL, ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS; INCLUDING ANY AND ALL PENETRATIONS SPECIFIED, PRIOR TO POURING CONCRETE.

### REINFORCING

1. ALL REINFORCING BAR DETAILS SHALL CONFORM TO THE LATEST ACI CODE AND DETAILING MANUAL.
2. WHERE REINFORCING IS CALLED OUT IN THE CONSTRUCTION DOCUMENTS IT SHALL BE 3" CLEAR COVER (MINIMUM UNLESS OTHERWISE NOTED)
3. ALL BARS SHALL BE ASTM A-615, GRADE 60
4. WELDED WIRE FABRIC SHALL BE ASTM A-185
5. WHERE CONTINUOUS BARS ARE CALLED FOR, THEY SHALL BE RUN CONTINUOUSLY AROUND CORNERS AND LAPPED AT NECESSARY SPLICES OR HOOKED AT DISCONTINUOUS ENDS. LAP SHALL BE 40 BAR DIAMETERS.

ROBERT P. JUENGERT

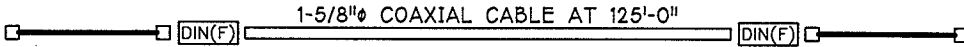


 670 North Beers Street, Building 2, Holmdel, NJ 07733 Tel: 732.739.3200 Fax: 732.739.0440	Drawing Title: <b>CONCRETE NOTES</b>	Project: <b>CL&amp;P POLE #1088</b> Address: <b>MECHANIC STREET DARIEN, CT</b>					
	Client: <b>OCS</b>	Search Area: <b>DARIEN / DOWNTOWN</b> Site ID No.: <b>CT-11-290C</b>					
P.C.: <b>RVa</b>	P.C. Chkd.:	Chkd. by:	ARCNET Project No.: <b>A99.506.833A</b>	Drawn: <b>CS</b>	Date: <b>4/21/99</b>	Approved By: _____ CLIENT: _____ DATE: _____	Revision No. _____ Date: _____ Drawing No. <b>A-17</b>

NORTEL 98000  
EQUIPMENT  
CABINET

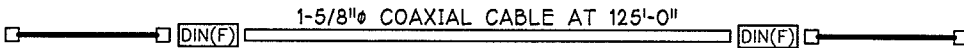
110° SECTOR

1 RED RX



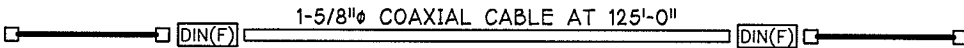
EMS DUAL-POL  
RR90-17-02DP

2 RED TX



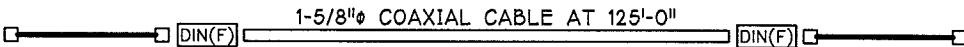
230° SECTOR

1 WHITE RX



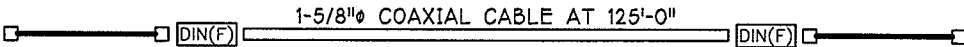
EMS DUAL-POL  
RR90-17-02DP

2 WHITE TX



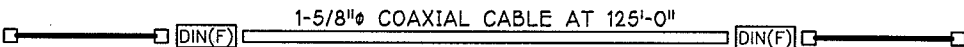
350° SECTOR

1 BLUE RX



EMS DUAL-POL  
RR90-17-02DP

2 BLUE TX



CONTRACTOR:

ADDRESS:

PHONE:

BILL of MATERIALS

No.	QTY.	DESCRIPTION	MANUFACT	PART#
1	1	NORTEL 98000 EQUIPMENT CABINET		
2	6	DIN(M) - DIN(M) 1/2"Øx6'-0" SUPERFLEX JUMPER		
3	6	DIN(M) - DIN(M) 1/2"Øx6'-0" JUMPER		
4	12	1-5/8"Ø DIN(F) CONNECTOR		
5	6	1-5/8"Ø COAXIAL CABLES (SEE DIAGRAM)		
6	3	DUAL-POL ANTENNA	EMS	RR90-17-02DP
7	3	DOWNTILT BRACKET	EMS	MTG-D10-20
8	12	1-5/8"Ø GROUNDING KITS		
9	12	1-5/8"Ø WEATHER-PROOFING KITS		

ROBERT P. JUENGERT



CT-4208



670 North Beers Street, Building 2, Holmdel, NJ 07733  
Tel: 732.739.3200 Fax: 732.739.0440

Drawing Title:  
MATERIAL LIST



Client: A99.506.833A  
Drawn: CS  
Date: 4/21/99

Project: CL&P POLE #1068  
Address: MECHANIC STREET  
DARIEN, CT  
Search Area: DARIEN / DOWNTOWN  
Site ID No: CT-11-290C

Approved By: \_\_\_\_\_ DATE: \_\_\_\_\_  
CLIENT: \_\_\_\_\_

REV2KBa 7/16/99  
REV1JMc 5/7/99  
Revision No. Date:

Drawing No. A-18

This Drawing Is The Property Of DLB Associates, Consulting Engineers P.C. - Last Saved: N:\238\23885E01.DWG, 04/26/99 at 12:25 by DBozard

**DESIGN CRITERIA**

- ELECTRIC:** PROVIDE AND INSTALL A 208V OR 240V, 2P, 60A CIRCUIT FROM A RELIABLE SOURCE TO THE COMMUNICATION CABINET. THIS SOURCE SHALL BE LOCKED ON WITH A CB LOCK. THE CONTRACTOR SHALL PROVIDE (2) SPARE FUSES WHEREVER A FUSED DISCONNECT IS REQUIRED. THE CONTRACTOR SHALL VERIFY (BEFORE ANY CONSTRUCTION IS STARTED) THAT THE POWER SOURCE IS BETWEEN 208V AND 240V LINE TO LINE. IF IT IS NOT BETWEEN THE SPECIFIED VOLTAGE, THEN CALL DLB ASSOCIATES, INC. AT (732) 922-8375 AND ASK FOR MARK WORTHLEY. ALL ELECTRICAL EQUIPMENT SHALL BE LABELED WITH A BLACK PLASTIC TAG WITH WHITE LETTERS "OCS" ENGRAVED IN IT.
- UTILITY METER:** IF A UTILITY METER IS SPECIFIED ON THE DRAWINGS, IT IS THE CONTRACTORS RESPONSIBILITY TO OBTAIN ALL NECESSARY INSPECTIONS, CUT-IN CARDS, ETC., THAT ARE REQUIRED TO SET THE METER. THE CONTRACTOR SHALL MEET WITH THE UTILITY COMPANY TO VERIFY METER AND TAP LOCATION PRIOR TO INSTALLATION. DLB ASSOCIATES BEGINS THE PAPERWORK WITH THE VARIOUS UTILITY COMPANIES AND CAN PROVIDE THE ELECTRICAL DETAILERS NAME AND PHONE NUMBER. CONTACT DLB AT (732) 922-8375 AND ASK FOR MARIA DeVAUGHN FOR UTILITY RELATED QUESTIONS. IF TEMPORARY POWER IS REQUIRED, ALL NEC AND/OR LOCAL ELECTRIC CODES SHALL ADHERED TO. CONTACT OCS PRIOR TO MAKING AND TEMPORARY POWER CONNECTIONS.
- TELEPHONE:** PROVIDE A 1-1/2" CONDUIT (WITH DRAG LINE IN NY AND BELDEN CABLE #8768 IN NJ AND CT) FROM THE COMMUNICATION CABINET TO THE MAIN DEMARCATION POINT (USUALLY LOCATED IN THE BASEMENT). THE MAIN DEMARCATION POINT ALLOWS FOR THE LEAST AMOUNT OF NOISE AND THE MOST AMOUNT OF PROTECTION. FOR COST SAVINGS, A CLOSER DEMARCATION POINT MAY BE SPECIFIED IN MULTIPLE STORY BUILDINGS WITH THE APPROVAL OF THE TELEPHONE COMPANY. FOR NEW TELEPHONE SERVICES IN NJ, NY, & CT, PROVIDE A 4" CONDUIT WITH A DRAGLINE FROM THE SPECIFIED UTILITY POLE TO THE LOCATION OF THE NEW DEMARCATION POINT.
- CONDUIT ROUTING:** THE ROUTING OF THE CONDUIT SHALL BE SUCH THAT THE EASIEST AND MOST PRACTICAL METHODS ARE USED WITHOUT IMPACTING THE BUILDING OWNER AND THE AESTHETIC APPEAL OF THE BUILDING. BECAUSE THE WORK BEING DONE IS IN EXISTING STRUCTURES, IT IS IMPOSSIBLE TO SHOW EVERY JUNCTION BOX, LB, CONDUIT BEND, ETC. IN A TWO DIMENSIONAL PLAN. IT IS FOR THIS REASON THAT THE CONTRACTOR MUST VISIT THE SITE BEFORE ACCEPTING THE OFFER AND UNDERSTAND THE TRUE INSTALLATION OBSTACLES THAT ARE UNIQUE TO THAT BUILDING.

**WIRING METHODS**

- GENERAL:** ALL WIRING IN FINISHED AREAS SHALL BE CONCEALED UNLESS NOTED OTHERWISE. IN UNFINISHED AREAS, SUCH AS BASEMENTS, MECHANICAL ROOMS, ELECTRICAL CLOSETS, ETC. WIRING SHALL BE ROUTED ON THE INTERIOR SURFACE. NO WIRING SHALL BE ROUTED ON THE OUTSIDE SURFACES OF THE BUILDING UNLESS SPECIFICALLY NOTED. ALL NEC AND LOCAL ELECTRIC CODES SHALL BE ADHERED TO. ALL CONDUCTORS SHALL BE COPPER UNLESS OTHERWISE NOTED.
- BELOW GRADE (UNDERGROUND IN EARTH OR FILL):** ALL CONDUITS SHALL HAVE A MINIMUM BURIAL DEPTH OF 24". BRANCH CIRCUITS SHALL CONSIST OF PULLED CONDUCTORS IN DIRECT BURIED SCHEDULE 40 PVC CONDUITS. CONDUITS THAT ARE BURIED UNDER EARTH THAT HAVE HEAVY VEHICLE TRAFFIC OVER IT SHALL BE ENCASED IN CONCRETE. CONCRETE ENCASEMENT SHALL BE 3" MINIMUM ALL AROUND AND BETWEEN CONDUITS. ALL ELBOWS USED WITH PVC CONDUIT SHALL BE SCHEDULE 80 PVC. ALL CONDUIT INSTALLED ABOVE FINISHED GRADE SHALL BE SCHEDULE 80 PVC. PRIOR TO EXCAVATION, A UTILITY MARK OUT SHALL BE DONE TO LOCATE EXISTING UNDERGROUND UTILITIES. PICTURES SHALL BE TAKEN OF ALL UNDERGROUND WORK TO BE VIEWED AT THE PUNCHLIST.
- INDOORS (UNCLASSIFIED AREAS):** ALL FEEDERS SHALL CONSIST OF PULLED CONDUCTORS IN EMT. ALL BRANCH CIRCUITS SHALL CONSIST OF PULLED CONDUCTORS IN EMT., EXCEPT 15 AND 20 AMPERE 1 POLE LIGHTING RECEPTACLE, OR MISCELLANEOUS BRANCH CIRCUITS CONCEALED ABOVE SUSPENDED CEILINGS OR WITHIN DRY WALLS SHALL CONSIST OF TYPE MC METAL CLAD CABLE IF ALLOWED BY CODE. CONNECTIONS TO COMMUNICATION CABINET AND VIBRATING EQUIPMENT SHALL CONSIST OF PULLED CONDUCTORS IN FLEXIBLE METALLIC CONDUIT, MAXIMUM 6' IN LENGTH.
- OUTDOORS OR INDOORS CLASSIFIED 'DAMP' OR 'WET' LOCATIONS:** ALL FEEDERS AND BRANCH CIRCUITS SHALL CONSIST OF PULLED CONDUCTORS IN RGS OR RA CONDUIT. CONNECTIONS TO COMMUNICATION CABINET AND VIBRATING EQUIPMENT SHALL CONSIST OF PULLED CONDUCTORS IN LIQUID TIGHT FLEXIBLE STEEL CONDUIT, MAXIMUM 6' IN LENGTH.

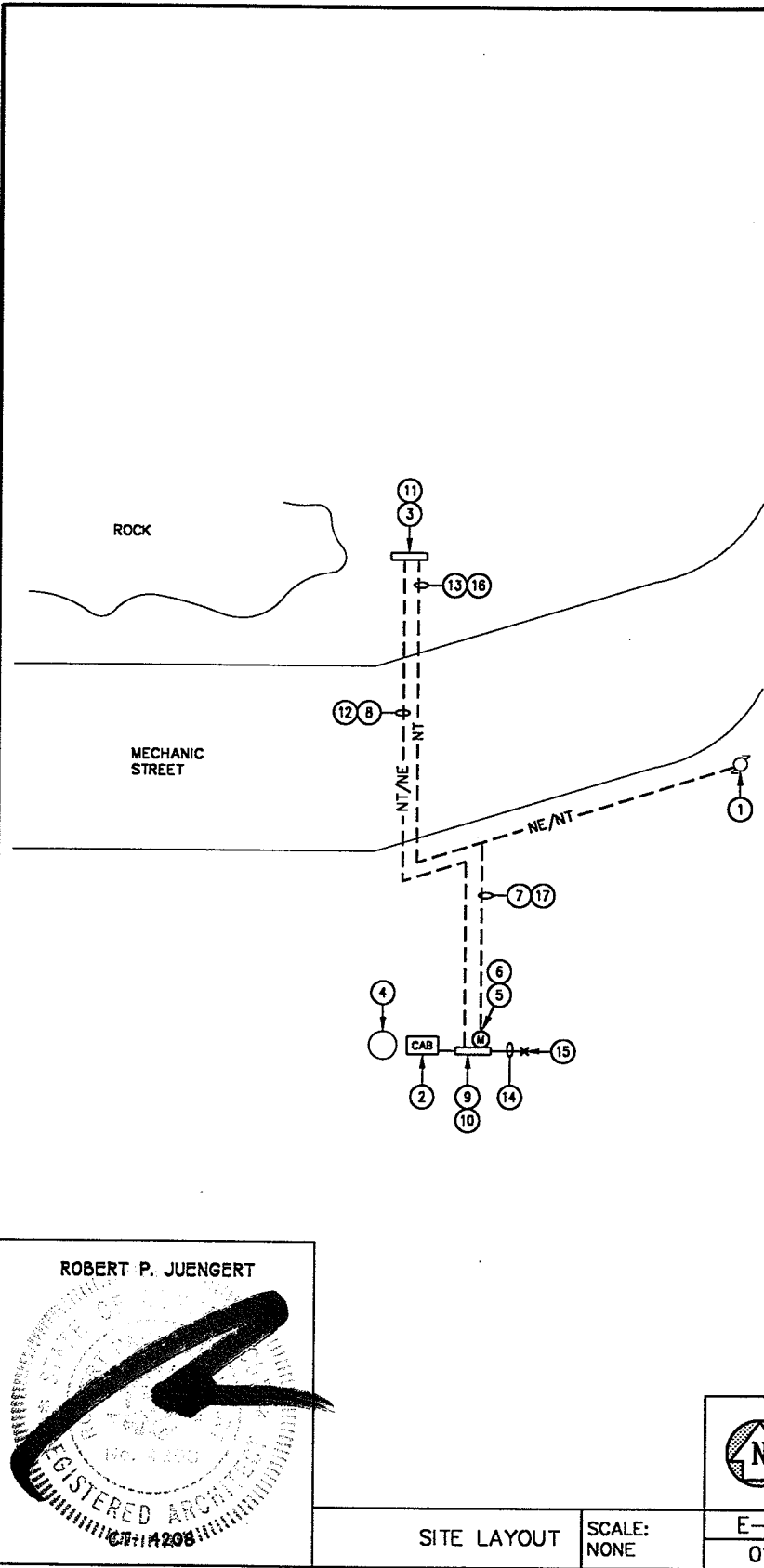
**SYMBOLS**

SYMBOLS		LEGEND		ABBREVIATIONS AND LABELS	
IDENTIFIER	DESCRIPTION	IDENTIFIER	DESCRIPTION	IDENTIFIER	DESCRIPTION
	SAFETY SWITCH		ELECTRICAL WIRING (TURNING UP)		EXISTING ELECTRIC
	PANEL BOARD		ELECTRICAL WIRING (TURNING DOWN)		NEW ELECTRIC
	ELECTRIC METER		ELECTRICAL WIRING (TURNING DOWN)		EXISTING TELEPHONE
	COMMUNICATIONS CABINET		NEW TELEPHONE		NEW UNDERGROUND TELEPHONE
	BACKBOARD		NEW UNDERGROUND ELECTRIC		EXISTING UNDERGROUND ELECTRIC
	RECEPTACLE		EXISTING UNDERGROUND ELECTRIC		NEW UNDERGROUND TELEPHONE
	NEW UTILITY POLE		EXISTING UNDERGROUND TELEPHONE		PROPERTY LINE
	EXISTING UTILITY POLE				
	MASTER GROUND BAR				
	INSULATED GROUND BAR				
	UNINSULATED GROUND BAR				

<p>ARCNET ARCHITECTS, INC. 670 North Beers Street, Building 2, Holmdel, NJ 07733 Tel: 732.739.3200 Fax: 732.739.0440</p>	<p>Drawing Title: <b>GENERAL INFORMATION</b></p>		<p>Project: <b>CL&amp;P POLE # 1068</b></p>		
	<p>Client:  <b>OCS</b></p>		<p>Address: <b>MECHANIC STREET DARIEN, CT</b></p>		
<p>DLB ASSOCIATES, INC. Electrical / Mechanical Wanaonassa, NJ CT-PE 14722</p>		<p>ARCNET Project No. <b>A99.506-833A</b></p>		<p>Search Area: <b>DARIEN / DOWNTOWN</b></p>	
<p>P.C. <b>RVg</b></p>		<p>Drawn: <b>MW</b> Date: <b>4/26/99</b></p>		<p>Site ID No: <b>CT-11-290C</b></p>	
		<p>Approved By: _____ DATE: _____</p>		<p>Revision No. _____ Date: _____</p>	
				<p>Drawing No. <b>E-1</b></p>	



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**KEY NOTES** (Symbols ①, ②, Etc.)

1. PROPOSED TELCO DEMARCATION POINT.
2. NORTEL S8000 CABINET.
3. PAD MOUNTED TELCO EQUIPMENT.
4. EXISTING MONOPOLE.
5. NO TEMPORARY POWER AVAILABLE AT THIS SITE.
6. PROVIDE NEW 200A BYPASS UTILITY APPROVED METER SOCKET.
7. NEW ELECTRIC FEEDER ROUTED UNDERGROUND. PROVIDE (1) 3" CONDUIT WITH DRAG LINE FROM THE UTILITY POLE TO THE NEW METER. APPROXIMATE DISTANCE = 70'.
8. NEW ELECTRIC FEEDER ROUTED UNDERGROUND. PROVIDE A 3/4" CONDUIT WITH 2#12 & 1#12G FROM THE PANEL TO THE TELCO DEMARCATION. APPROXIMATE DISTANCE = 75'.
9. PROVIDE NEW 240/120V, 1 PHASE, 100A, WEATHERPROOF PANEL WITH A MINIMUM OF 12 SPACES AND A 100A MAIN CIRCUIT BREAKER. PROVIDE (1) 40A, 240V, 2 POLE, 1 PHASE AND (1) 20A, 120V, 1 POLE, 1 PHASE CIRCUIT BREAKER.
10. UNISTRUT-MOUNTED ELECTRIC EQUIPMENT. SEE ARCHITECTURAL DRAWINGS FOR MOUNTING AND DETAIL 1/E-4.
11. PROVIDE 120V GFI RECEPTACLE INSIDE TELCO BOX.
12. NEW TELEPHONE SERVICE ROUTED UNDERGROUND. PROVIDE A 1-1/2" CONDUIT WITH 1(6) PAIR, #22 AWG INDIVIDUALLY SHIELDED, SOLID TINNED COPPER CONDUCTOR CABLE (BELDEN CABLE PART #8768). APPROXIMATE DISTANCE = 75'.
13. NEW TELEPHONE SERVICE ROUTED UNDERGROUND. PROVIDE A 4" CONDUIT WITH DRAG LINE. APPROXIMATE DISTANCE = 100'.
14. 2#2 SOLID TINNED COPPER GROUNDS. REMOVE PAINT AND OTHER FOREIGN MATTER IN ORDER TO ACHIEVE A GOOD BOND. APPROXIMATE DISTANCE = 10'.
15. ATTACH TO NEW GROUND RING.
16. TELEPHONE COMPANY TO PULL TELEPHONE LINES IN CONDUIT SUPPLIED BY CONTRACTOR.
17. POWER COMPANY TO PULL ELECTRIC LINES IN CONDUIT PROVIDED BY CONTRACTOR.

**NOTE:** THE CONTRACTOR MUST VERIFY TAP AND METER LOCATION WITH THE UTILITY COMPANY.

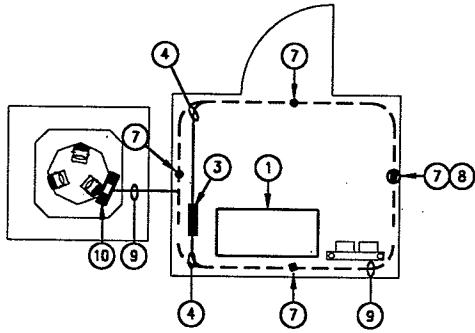
**WARNING:** THE TELCO DEMARC HAS NOT BEEN CONFIRMED BY THE TELEPHONE COMPANY.

**ROBERT P. JUENGERT**

E-2  
01

SITE LAYOUT SCALE: NONE

<p><b>ARCNET</b> ARCHITECTS, INC.</p> <p>670 North Beers Street, Building 2, Holmdel, NJ 07733 Tel: 732.739.3200 Fax: 732.739.0440</p>	Drawing Title: <b>SERVICE PLAN</b>	Project: <b>CL&amp;P POLE # 1068</b>	
	Client: <b>OCS</b>	Address: <b>MECHANIC STREET DARIEN, CT</b>	Search Area: <b>DARIEN / DOWNTOWN</b>
DLB ASSOCIATES, INC. Electrical / Mechanical Wanamassa, NJ CT-PE 14722	P.C.    P.C. Chkd.    Chkd. By <b>RVa</b>	ARCNET Project No. <b>A99.506-833A</b>	Drawn:    Date: <b>MW    4/26/99</b>
		Site ID No.: <b>CT-11-290C</b>	Drawing No. <b>E-2</b>
		Approved By: _____ DATE: _____	



**GENERAL NOTES**

1. WHERE ICE BRIDGES AND ICE SHIELDS ARE USED, BOND ALL POSTS VIA #2 SOLID TINNED WIRE TO THE GROUND RING.
2. FOR NEW FENCE INSTALLATIONS BOND ALL CORNER FENCE POSTS AND GATES.

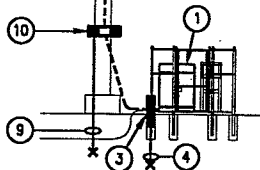
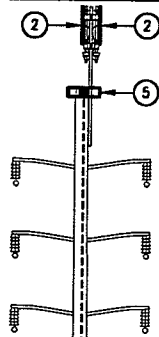
**KEY NOTES** (Symbols ①, ②, Etc.)

1. COMMUNICATIONS CABINET.
2. ANTENNA.
3. ALL COAXIAL CABLES SHALL BE GROUNDED AT THIS POINT VIA CABLE GROUND KITS TO GROUNDING BAR.
4. 2#2 SOLID TINNED COPPER GROUND. ATTACH TO GROUND ELECTRODE. REMOVE PAINT AND OTHER FOREIGN MATTER IN ORDER TO ACHIEVE A GOOD BOND.
5. ALL COAXIAL CABLES SHALL BE GROUNDED TO A GROUND BAR AT THIS POINT VIA CABLE GROUND KITS. NEWTON INSTRUMENT COMPANY OR EQUAL. THIS GROUND BAR SHALL BE LOCATED JUST BELOW THE POINT WHERE ALL CABLES COME TOGETHER AND DESCEND DOWN THE TOWER. THIS GROUND BAR SHALL BE ATTACHED DIRECTLY TO THE TOWER VIA BEAM CLAMP.
6. #2 SOLID TINNED COPPER CONDUCTOR RUN IN A CONTINUOUS LOOP A MINIMUM OF 30" BELOW GRADE. MAINTAIN A 24" CLEARANCE FROM CONCRETE PAD.
7. PROVIDE (4) 3/4" x 10' GROUND RODS. EVENLY SPACE AT A MINIMUM DISTANCE OF 10' BETWEEN RODS. CADWELD GROUND RODS TO GROUND RING.
8. PROVIDE A 8" TEST WELL FOR GROUND ROD. SEE DETAIL 2/E-7.
9. 2#2 SOLID TINNED COPPER CONDUCTOR FROM ISOLATING GROUND BAR TO GROUND RING.
10. ALL COAXIAL CABLES LEAVING THE COMMUNICATION CABINET SHALL BE GROUNDED AT THIS POINT VIA CABLE GROUND KITS. NEWTON INSTRUMENT COMPANY OR EQUAL. THIS GROUND BAR SHALL BE LOCATED AT THE POINT WHERE THE CABLES MAKE A NINETY DEGREE BEND OFF THE TOWER.

SITE PLAN SCALE: NONE



E-3  
01

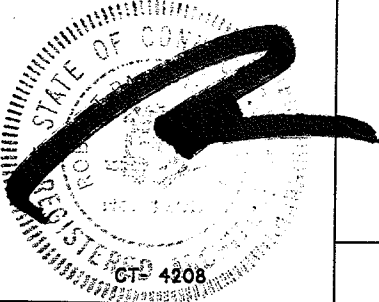


ELEVATION SCALE: NONE

E-3  
02

LEGEND	DESCRIPTION	DETAIL NO.
	MASTER GROUND BAR	1/E-5
	INSULATED GROUND BAR	1/E-5
	UNINSULATED GROUND BAR	1/E-7
	GROUND KIT(S)	E-6
	COAXIAL CABLES	NONE
	ANTENNA	1/E-7

ROBERT P. JUENGERT



Drawing Title: **GROUNDING PLAN**

Client: **OCS**

Project: **CL&P POLE # 1068**  
 Address: **MECHANIC STREET DARIEN, CT**  
 Search Area: **DARIEN / DOWNTOWN**  
 Site ID No.: **CT-11-290C**

ARCNET Project No. **A99.506-833A** Drawn: **MW** Date: **4/26/99**

**ARCNET ARCHITECTS, INC.**  
 670 North Beers Street, Building 2, Holmdel, NJ 07733  
 Tel: 732.739.3200 Fax: 732.739.0440

DLB ASSOCIATES, INC.  
 Electrical / Mechanical  
 Wanamassa, NJ CT-PE 14722

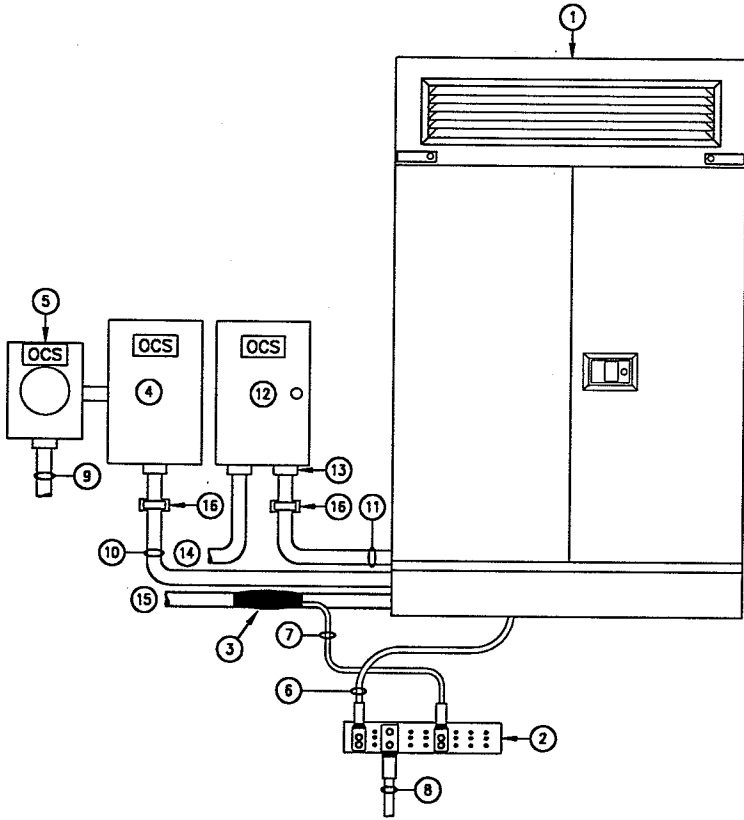
P.C.: **RVa**

Revision No. \_\_\_\_\_ Date: \_\_\_\_\_  
 Drawing No. **E-3**

Approved By: \_\_\_\_\_ DATE: \_\_\_\_\_  
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**KEY NOTES** (Symbols ①, ②, Etc.)

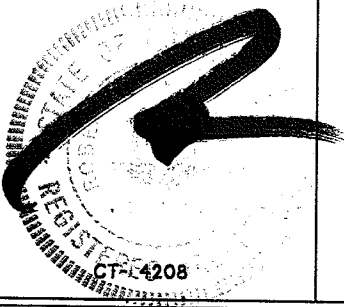
1. NORTEL S8000 CABINET.
2. FIELD LOCATED MASTER GROUND BAR (MGB). MGB SHALL BE LOCATED SUCH THAT ALL GROUNDING CONDUCTORS ATTACHED TO IT ARE COMING FROM ABOVE. (I.E. BOTTOM OF BTS DUNNAGE, SIDE OF CONCRETE PAD, ETC). SEE DETAIL 1/E-5.
3. COAXIAL CABLE GROUNDING KIT. SEE DRAWING E-3 FOR LOCATION OF THE KITS.
4. NEW SQUARE D 240/120V, 100A WITH A 100A MAIN CIRCUIT BREAKER, 1 PHASE, WEATHERPROOF PANEL. PROVIDE A 40A, 240V, 1 PHASE CIRCUIT BREAKER. LABEL WITH A BLACK PLASTIC TAG THAT HAS THE LETTERS "OCS" ENGRAVED IN IT.
5. NEW ELECTRIC METER. SEE DRAWING E-2 FOR ADDITIONAL INFORMATION.
6. 1#2 STRANDED, INSULATED GROUND WIRE FROM COMMUNICATION CABINET TO THE MGB.
7. INTEGRAL GROUND KIT CONDUCTOR WITH TWO HOLE LUG. ATTACH DIRECTLY TO THE MGB OR CONNECT TO A #2 SOLID TINNED COPPER GROUND WIRE VIA CTAP PANDUIT #2-4Q. CONNECT #2 SOLID TO THE MGB VIA LONG BARREL TWO HOLE LUG.
8. MAIN GROUND WIRE FROM THE MGB TO THE GROUND POINT. FOR CONTINUATION SEE DRAWING E-2.
9. CONDUIT FROM THE POWER SOURCE TO THE NEW METER AND NEW PANEL. FOR CONTINUATION SEE DRAWING E-2.
10. 1" SEALTIGHT FLEXIBLE CONDUIT WITH 3#6 & 1#10G FROM NEW PANEL TO THE COMMUNICATION CABINET TERMINATION POINT.
11. 1-1/2" SEALTIGHT FLEXIBLE CONDUIT FROM THE DEMARCATION BOX TO THE COMMUNICATION CABINET. PULL (1) 6 PAIR #22 AWG INDIVIDUALLY SHIELDED TINNED COPPER CONDUCTOR CABLE (BELDEN CABLE PART # 8768). LEAVE 5' OF SLACK WIRE AT BOTH ENDS OF CONDUIT FOR CONNECTIONS.
12. DEMARCATION BOX INSTALLED BY CONTRACTOR AND SUPPLIED BY OMNIPPOINT.
13. MYER'S HUB FOR ALL SIDE CONNECTIONS TO DISCONNECT SWITCH, DEMARCATION BOX, AND NORTEL SUB BASE.
14. CONDUIT WITH DRAG LINE FROM MAIN DEMARCATION SOURCE TO DEMARCATION BOX. FOR CONTINUATION SEE DRAWING E-2.
15. COAXIAL CABLES. REFER TO ARCHITECTURAL DRAWINGS FOR QUANTITY.
16. SINGLE HOLE CONDUIT SUPPORT WITH BACK STRAP.

NORTEL S8000 CABINET RISER

SCALE:  
NONE

E-4  
01

ROBERT P. JUENGERT



**ARCNET**  
ARCHITECTS, INC.

670 North Beers Street, Building 2, Holmdel, NJ 07733  
Tel: 732.739.3200 Fax: 732.739.0440

Drawing Title:  
**RISER**

Client:



Project: **CL&P POLE # 1068**

Address: **MECHANIC STREET  
DARIEN, CT**

Search Area:  
**DARIEN / DOWNTOWN**

Site ID No.:  
**CT-11-290C**

Revision No. Date:

Drawing No.

**E-4**

ARCNET Project No.

**A99.506-833A**

Drawn:

**MW**

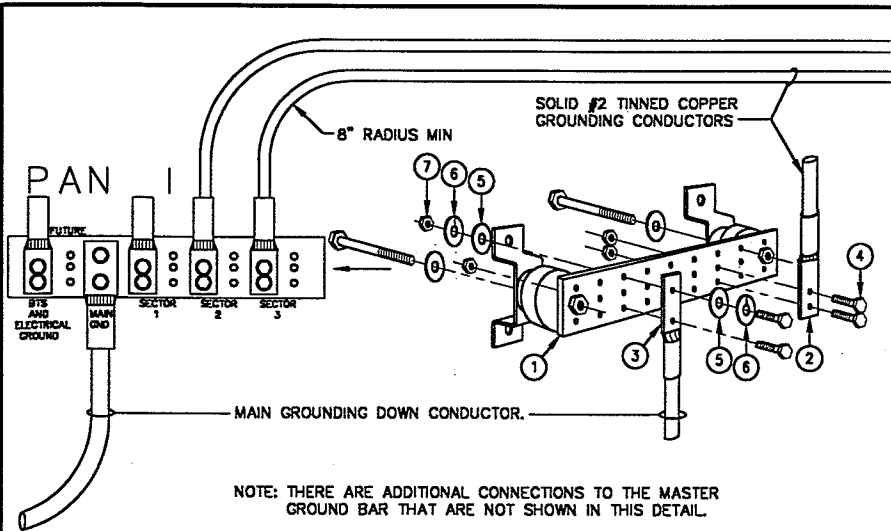
Date:

**4/26/99**

Approved By:

CLIENT: \_\_\_\_\_

DATE: \_\_\_\_\_



NOTE: THERE ARE ADDITIONAL CONNECTIONS TO THE MASTER GROUND BAR THAT ARE NOT SHOWN IN THIS DETAIL.

GENERAL GROUNDING NOTES

1. ANTI OXIDANT COMPOUND SHALL BE APPLIED TO ALL GROUNDING CONNECTIONS (CTAPS, MAIN GND, MGB, ETC.)
2. THE CONNECTIONS TO THE MASTER GROUND BAR MUST FOLLOW THE PANI METHOD. SEE SPECIFICATIONS.
3. THE GROUND RUN SHALL FOLLOW A DOWNWARD PATH FROM THE ANTENNAS TO THE MASTER GROUND BAR.
4. ALL CONNECTIONS SHALL BE MADE WITH AN 8" RADIUS MINIMUM.
5. ANY GROUND WIRES, SOLID OR STRANDED, THAT PASS THROUGH CONDUIT, METALLIC SLEEVE, OR CABLE COVER, SHALL BE BONDED AT BOTH ENDS.
6. WHERE TRAY IS USED BOND ADJACENT TRAY WITH A #6 STRANDED JUMPER VIA TWO HOLE LUGS. BOND BOTH ENDS TO THE #2 SOLID TINNED WIRE.

MASTER GROUND BAR TERMINATION DETAIL

SCALE: NONE

E-5  
01

KEY NOTES (Symbols ①, ②, Etc.)

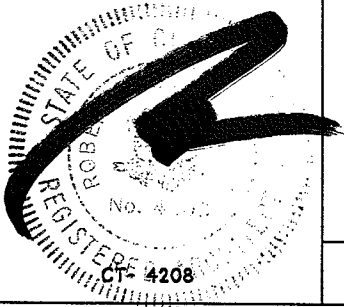
	SOLID #2 TINNED COPPER	GROUND KIT	#2/0 STRANDED (MAIN DOWN CONDUCTOR)	MASTER GROUND BAR	STRUCTURAL OR TOWER STEEL	MAIN GROUNDING ELECTRODE	GROUND ROD
SOLID #2 TINNED COPPER	B or C	B or C		A or C	A, C or D		C
GROUND KIT	B or C			A	A, C or D		
#2/0 STRANDED (MAIN DOWN CONDUCTOR)				A or C	A, C or D	A	C
MASTER GROUND BAR	A or C	A	A or C				
STRUCTURAL OR TOWER STEEL	A, C or D	A, C or D	A, C or D				
GROUND ROD	C		C				

TERMINATION TYPES:

- A 2-HOLE MECHANICAL LUG WITH HYDRAULICALLY COMPRESSED LONG BARREL.
- B DOUBLE BARREL COPPER HYDRAULICALLY COMPRESSED CONNECTOR.
- C CADWELD
- D BEAM CLAMP

1. ALL COAXIAL CABLES LEAVING THE COMMUNICATION CABINET SHALL BE GROUNDED AT THIS POINT VIA CABLE GROUND KITS. NEWTON INSTRUMENT COMPANY OR EQUAL. #B-6142 (GROUND BAR 20" X 4" X 1/4"), #3061-4 (INSULATORS), #3015-8 (5/8" LOCKWASHERS), #A-6056 (WALL MOUNTING BRACKETS), AND #3012-1 (5/8"-11 X 1" H.H.C.S. BOLTS).
2. HYDRAULICALLY COMPRESSED LONG BARREL 2-HOLE GROUNDING LUG FOR GROUNDING CONDUCTORS BETWEEN CABLE AND THE MASTER GROUND BAR TERMINAL. THOMAS & BETTS #54811BE OR EQUAL.
3. HYDRAULICALLY COMPRESSED LONG BARREL 2-HOLE GROUNDING LUG FOR THE MAIN GROUNDING DOWN CONDUCTOR BETWEEN THE MASTER GROUND BAR TERMINAL AND THE MAIN GROUNDING ELECTRODE. THOMAS & BETTS #54862BE OR EQUAL.
4. 3/8" STAINLESS STEEL DIAMETER BOLTS TO CONNECT GROUNDING LUG TO THE GROUND BAR (TYPICAL).
5. 3/8" STAINLESS STEEL DIAMETER FLAT WASHER (TYPICAL).
6. 3/8" STAINLESS STEEL DIAMETER LOCK WASHER (TYPICAL).
7. 3/8" HEX HEAD STAINLESS STEEL NUT (TYPICAL).

ROBERT P. JUENGERT



GROUNDING MATRIX

SCALE: NONE

E-5  
02



670 North Beers Street, Building 2, Holmdel, NJ 07733  
Tel: 732.739.3200 Fax: 732.739.0440

Drawing Title: GROUNDING DETAILS

Client: OCS

Project: CL&P POLE # 1068

Address: MECHANIC STREET DARIEN, CT

Search Area: DARIEN / DOWNTOWN

Site ID No: CT-11-290C

Revision No. Date:

DLB ASSOCIATES, INC. Electrical / Mechanical Wanamassa, NJ CT-PE 14722

P.C. RVa

P.C. Chkd: [Signature]

ARCNET Project No. A99.506-833A

Drawn: MW Date: 4/26/99

Approved By: CLIENT: DATE:

Drawing No. E-5

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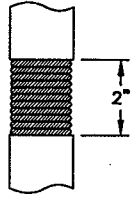


FIGURE 1 SCALE: NONE E-6 01

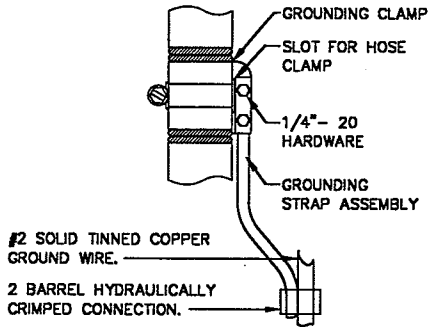


FIGURE 2 SCALE: NONE E-6 02

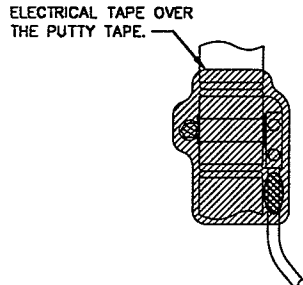
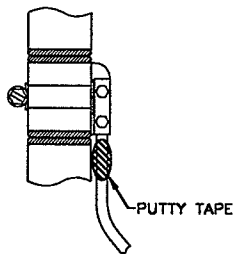


FIGURE 3 SCALE: NONE E-6 03

FIGURE 4 SCALE: NONE E-6 04

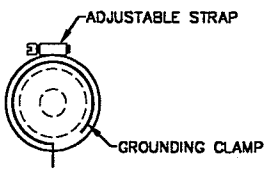
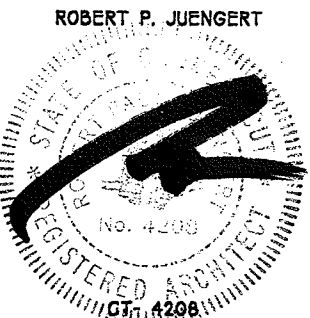


FIGURE 5 SCALE: NONE E-6 05

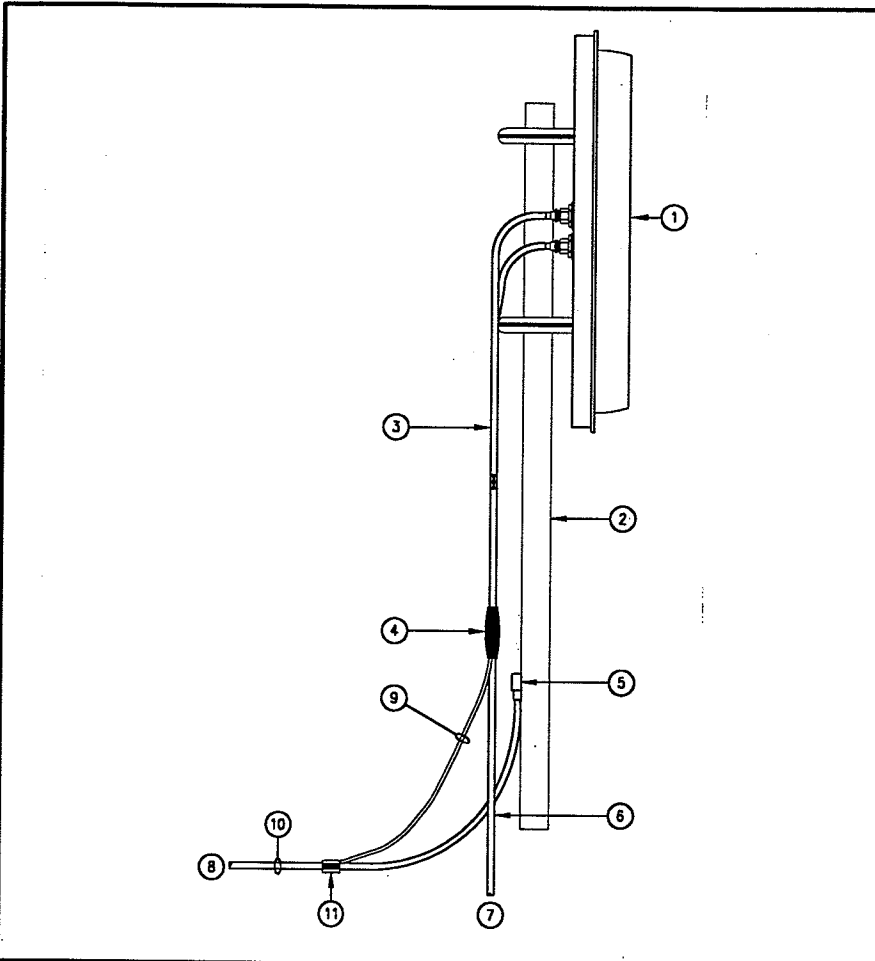
**INSTALLATION:**

1. CUT AND REMOVE A 2 INCH SECTION OF CABLE JACKET SHOWN IN FIGURE #1. USE CARE NOT TO GOUGE OR CRUSH THE CABLE.
2. CLEAN THE EXPOSED SURFACE OF THE OUTER CONDUCTOR WITH BRONZE OR STEEL WOOL UNTIL THE SURFACE IS CLEAN AND BRIGHT. ALSO CLEAN ONE INCH OF THE JACKET EACH SIDE OF THE CUT SURFACE WITH A CLEAN CLOTH.
3. WRAP THE COPPER GROUNDING CLAMP AROUND THE EXPOSED OUTER CONDUCTOR. SECURE THE GROUNDING CLAMP WITH THE STAINLESS STEEL HOSE CLAMP AS SHOWN IN FIGURE #2 AND #5.
4. ATTACH THE TWO HOLE GROUNDING LUG TO THE CABLE GROUNDING CLAMP WITH 1/4" - 20 HARDWARE. SEE FIGURE #2.
5. CLEAN THE SURFACE THOROUGHLY WHERE THE SINGLE HOLE GROUNDING LUG IS TO BE CONNECTED. THE GROUNDING SURFACE MUST BE CLEAN OF ANY PAINT, GREASE, RUST OR OXIDATION FOR A GOOD ELECTRICAL CONTACT. THE GROUNDING SURFACE SHOULD BE A METAL TOWER MEMBER OR DOWN CONDUCTOR LOCATED BELOW THE GROUNDING CLAMP. THE GROUNDING WIRE SHOULD BE RUN STRAIGHT DOWN - NO DRIP LOOP. SEE FIGURE #2.
6. BOLT THE GROUNDING LUG ONTO THE PREPARED SURFACE WITH A 3/8" - 16 HARDWARE. AFTER TIGHTENING, PAINT THE GROUNDING LUG AND SURROUNDING AREA WITH A ZINC BASED CORROSION CONTROL PAINT.
7. WRAP THE GROUNDING LUG AND WIRE AT THE CLAMP ASSEMBLY WITH SEVERAL TURNS OF PUTTY TAPE AS SHOWN IN FIGURE #3. FORM THE PUTTY BY HAND AROUND THE LUG. WRAP THE REMAINDER OF THE PUTTY AROUND THE ENTIRE GROUNDING CLAMP AND LUG, INCLUDING ONE INCH OF CABLE JACKET ON EACH SIDE OF THE CLAMP. FORM THE PUTTY AROUND THE GROUNDING CLAMP AND JACKET BY HAND TO ASSURE A WEATHERPROOF SEAL. SEE FIGURE #4. TO COMPLETE WEATHERPROOFING, APPLY ELECTRICAL TAPE OVER THE PUTTY COVERED CONNECTION. OVERLAP EACH TURN, STRETCHING THE TAPE SLIGHTLY WHILE APPLYING THE FIRST TWO LAYERS AND LIGHTLY WRAPPING THE LAST TWO LAYERS. COMPRESS THE WRAPPINGS WITH BOTH HANDS TO INSURE COMPLETE CONTACT WITH ALL LAYERS OF TAPE.

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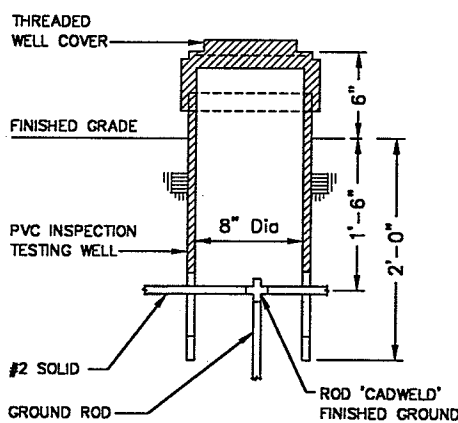
<p><b>ARCNET</b> ARCHITECTS, INC.</p> <p>670 North Beers Street, Building 2, Holmdel, NJ 07733 Tel: 732.739.3200 Fax: 732.739.0440</p>	Drawing Title: <b>GROUNDING DETAILS</b>	Project: <b>CL&amp;P POLE # 1068</b>	
	Client: <b>OCS</b>	Address: <b>MECHANIC STREET DARIEN, CT</b>	Search Area: <b>DARIEN / DOWNTOWN</b>
DLB ASSOCIATES, INC. Electrical / Mechanical Wanaonassa, NJ CT-PE 14722	P.C. Chkd: <b>RVa</b>	ARCNCT Project No. <b>A99.506-833A</b>	Drawing No. <b>E-6</b>
Drawn: <b>MW</b>	Date: <b>4/26/99</b>	Site ID No: <b>CT-11-290C</b>	Approved By: _____ DATE: _____

This Drawing is the Property of DLB Associates, Consulting Engineers P.C. - Last Saved: N:\238\23885E07.DWG, 04/26/99 at 12:32 by DBozard



- KEY NOTES** (Symbols ①, ②, Etc.)
1. ANTENNA.
  2. MAST.
  3. ANTENNA JUMPER (TYPICAL FOR 2).
  4. REFER TO GROUNDING KIT DETAIL. DO NOT INSTALL ON BENDS (TYPICAL FOR 2).
  5. CADWELD TYPE "VS".
  6. ANTENNA COAXIAL CABLE (TYPICAL FOR 2).
  7. TO COMMUNICATION CABINET.
  8. TO COLLECTOR BAR.
  9. #6 INTEGRAL GROUND CONDUCTOR FROM GROUNDING KIT TO #2 SOLID.
  10. #2 SOLID TINNED COPPER GROUNDING CONDUCTOR 8" MINIMUM RADIUS.
  11. 2 BARREL HYDRAULICALLY COMPRESSED CONNECTION PANDUIT CATALOG # CTAP 2-4Q.

**ANTENNA GROUNDING** SCALE: NONE E-7 01



**TEST WELL DETAIL** SCALE: NONE E-7 02

**ROBERT P. JUENGERT**

 670 North Beers Street, Building 2, Holmdel, NJ 07733 Tel: 732.739.3200 Fax: 732.739.0440	Drawing Title: <b>GROUNDING DETAIL</b>		Project: <b>CL&amp;P POLE # 1088</b>		Revision No.    Date: _____    _____ Drawing No. <b>E-7</b>
	Client: <b>OCS</b>		Address: <b>MECHANIC STREET DARIEN, CT</b>		
DLB ASSOCIATES, INC. Electrical / Mechanical Wanamassa, NJ CT-PE 14722	P.C.: <b>RVa</b>	P.C. Chkd: _____ Date: _____	ARCNET Project No.: <b>A99.506-833A</b>	Drawn: <b>MW</b> Date: <b>4/26/99</b>	Search Area: <b>DARIEN / DOWNTOWN</b>
			Site ID No.: <b>CT-11-280C</b>	Approved By: _____ DATE: _____	

# Exhibit B

**PARID: 29241**  
**STATE OF CT DOT**

**MECHANIC STREET**

**Parcel**

---

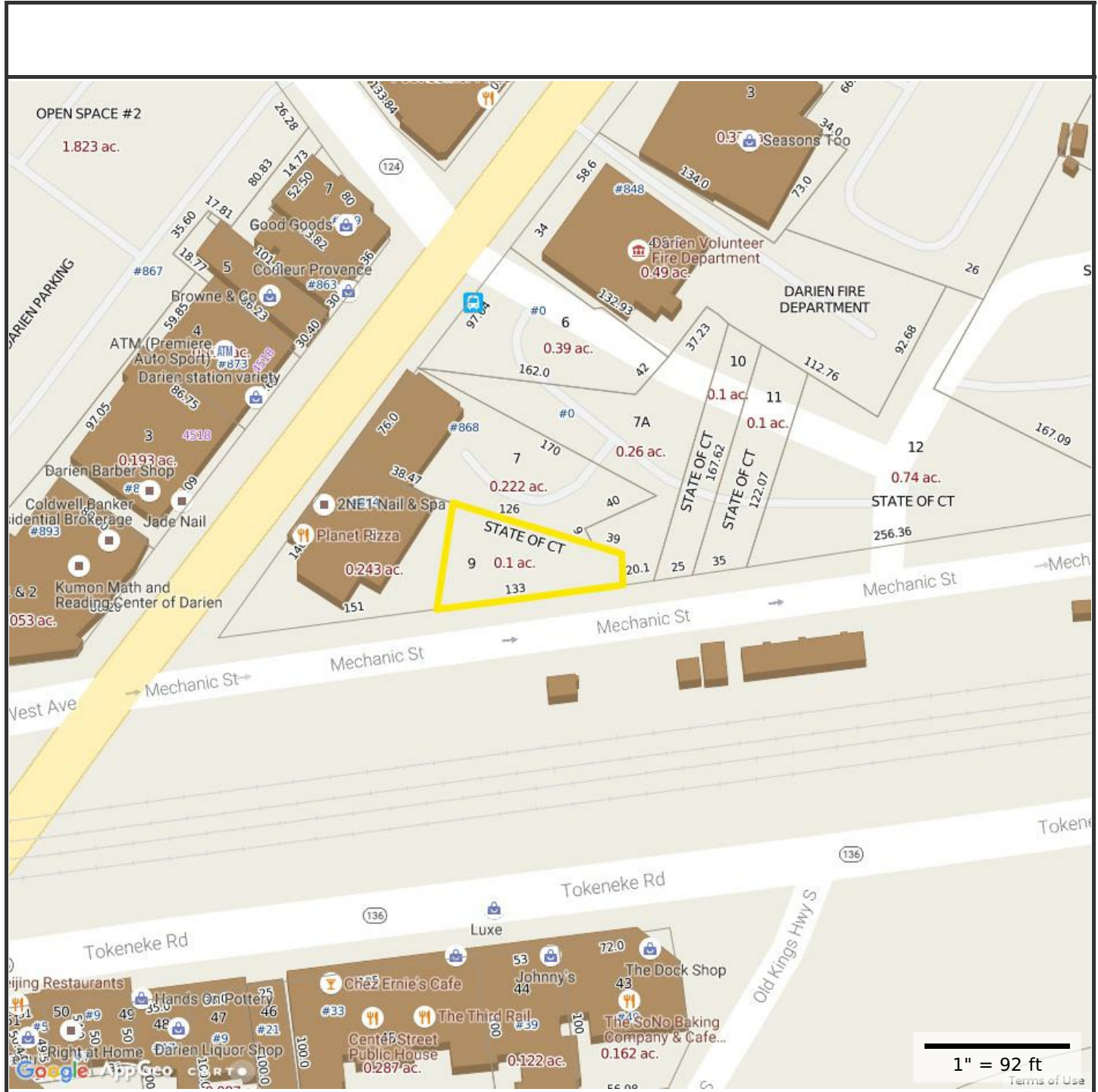
Alt ID	71 9
Address	MECHANIC STREET
Unit	
Neighborhood	3050
Class	300
Land Use Code	901-STATE
Living Units	
Acres	.1
Zoning	CBD
Street1/Street2	8-SECONDARY /-
Topo1/Topo2/Topo3	-/-/-
Util1/Util2/Util3	-/-/-
Notes	TELECOM ANTENNAS & RELATED EQUIP ON CL&P POLE PERS PROP UPDATES 2010, AH, N.C.

**Owners**

---

Owner	Address	City	State	Zip
STATE OF CT DOT	2800 BERLIN TURNPIKE	NEWINGTON	CT	06111





**Property Information**

**Property ID** 29241  
**Location** 0 MECHANIC STREET  
**Owner** STATE OF CT DOT



**MAP FOR REFERENCE ONLY  
 NOT A LEGAL DOCUMENT**

Town of Darien, 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 1/1/2016  
 Properties updated 3/22/2016

# Exhibit C



# T-Mobile

## WIRELESS COMMUNICATIONS FACILITY

### DARIEN/ DTWN + RT-1

### SITE ID: CT11290C

### 3 MECHANIC STREET DARIEN, CT 06820

#### GENERAL NOTES

- ALL WORK SHALL BE IN ACCORDANCE WITH THE 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2016 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
- CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
- CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
- CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
- CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
- CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN "AS-BUILT" SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
- LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
- THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
- DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
- ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
- ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
- ANY AND ALL ERRORS, DISCREPANCIES, AND "MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE T-MOBILE CONSTRUCTION MANAGER DURING THE BIDDING PROCESS. BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO "EXTRA" WILL BE ALLOWED FOR MISSED ITEMS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
- CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
- THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
- COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
- ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
- THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
- CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

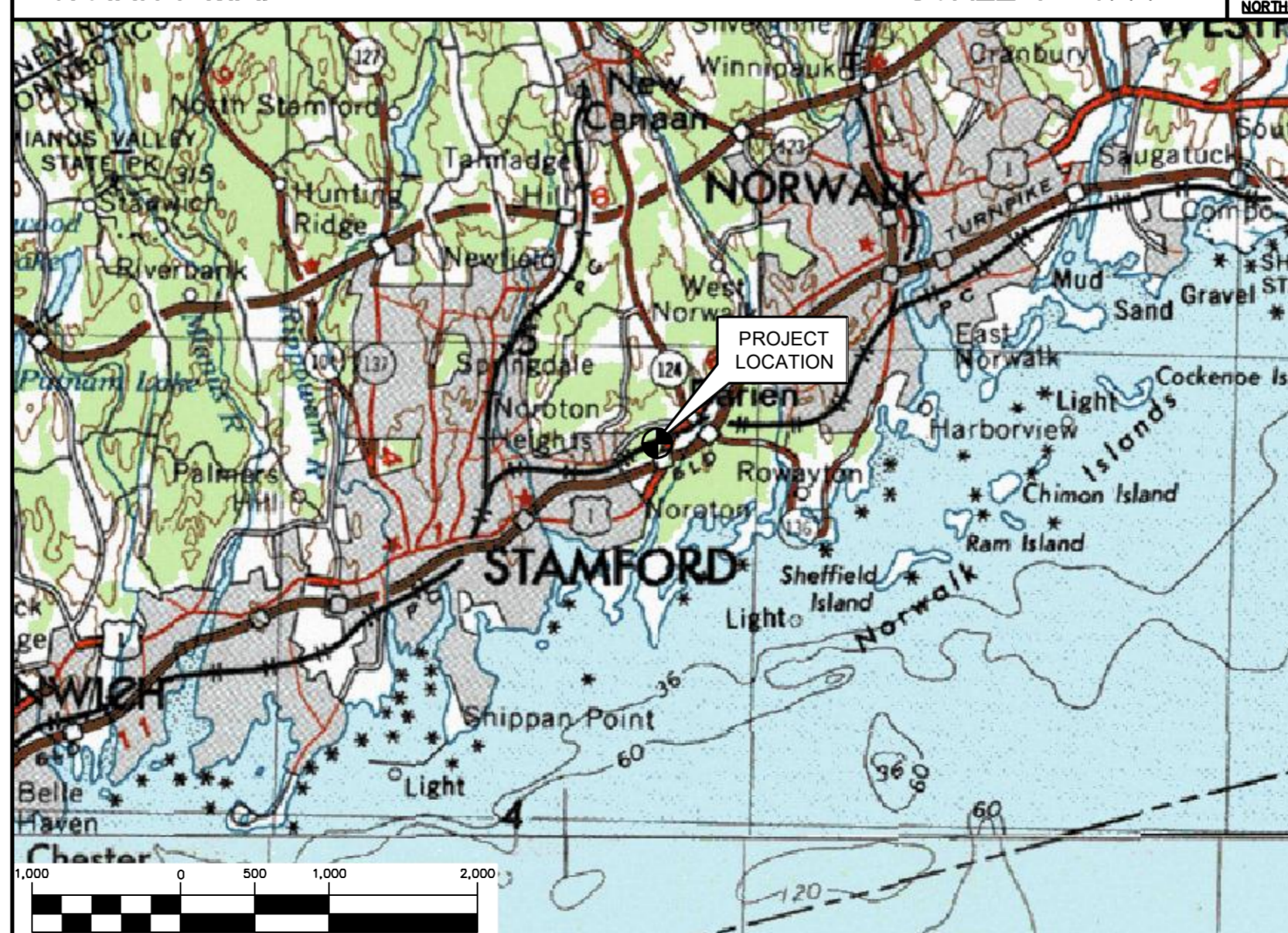
#### SITE DIRECTIONS

**FROM:** 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002 **TO:** 3 MECHANIC STREET DARIEN, CT 06820

- HEAD NORTH ON GRIFFIN ROAD S. TOWARD HARTMAN RD. 0.21 MI.
- TAKE THE 2ND RIGHT ONTO DAY HILL RD. 0.14 MI.
- TAKE THE 1ST RIGHT ONTO BLUE HILLS AVENUE EXT/CT-187 1.89 MI.
- TURN LEFT ONTO CT-305/OLD WINDSOR RD. 2.32 MI.
- STAY STRAIGHT TO GO ONTO BLOOMFIELD AVE/CT-305. 0.01 MI.
- MERGE ONTO I-91 S TOWARD HARTFORD 45.80 MI.
- KEEP RIGHT TOWARD NY CITY 0.08 MI.
- MERGE ONTO I-95 S VIA THE EXIT ON THE LEFT TOWARD NY CITY 34.64 MI.
- TAKE THE US-1/POST RD EXIT, EXIT 13 0.12 MI.
- TURN RIGHT ONTO POST RD/ US-1 N 0.02 MI.
- MAKE A U-TURN ONTO POST RD/ US-1 S 1.04 MI.
- TURN SHARP LEFT ONTO MECHANIC ST. 0.01 MI.

#### VICINITY MAP

SCALE: 1" = 1000'



#### T-MOBILE RF CONFIGURATION

67D94B\_1DP+1QP+1OP

#### PROJECT SUMMARY

- THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:
  - REMOVE (3) EXISTING PANEL ANTENNAS.
  - INSTALL (3) PROPOSED PANEL ANTENNAS.
  - REMOVE (3) EXISTING REMOTE RADIO UNITS FROM RACK AT GRADE.
  - INSTALL (3) PROPOSED REMOTE RADIO UNITS ON RACK AT GRADE.
  - INSTALL (6) COAX CABLES ROUTED FROM RRUs AT GRADE TO ANTENNAS ON TOWER.
  - RELOCATE (3) EXISTING BIAS TEES TO NEW PIPE MAST.
  - REPLACE EXISTING PIPE MAST. REFER TO S-2 FOR DETAILS.

#### PROJECT INFORMATION

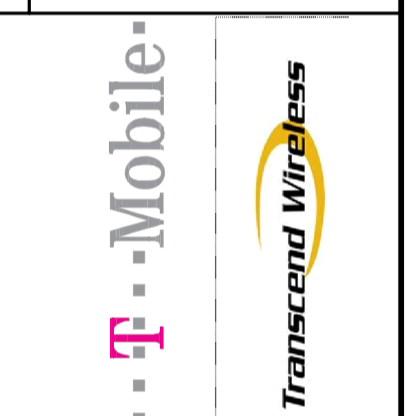
**SITE NAME:** DARIEN/ DTWN + RT-1  
**SITE ID:** CT11290C  
**SITE ADDRESS:** 3 MECHANIC STREET DARIEN, CT 06820  
**APPLICANT:** T-MOBILE NORTHEAST, LLC  
 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002  
**CONTACT PERSON:** DAN REID (PROJECT MANAGER)  
 TRANSCEND WIRELESS, LLC  
 (203) 592-8291  
**ENGINEER:** CENTEK ENGINEERING, INC.  
 63-2 NORTH BRANFORD RD.  
 BRANFORD, CT 06405  
**PROJECT COORDINATES:** LATITUDE: 41°-4'-39.25" N  
 LONGITUDE: 73°-28'-3.29" W  
 GROUND ELEVATION: 55'± AMSL  
 SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

#### SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	B
N-1	DESIGN BASIS AND SITE NOTES	B
C-1	COMPOUND PLAN, ELEVATION AND ANTENNA MOUNTING CONFIG.	B
C-2	TYPICAL DETAILS	B

REV.	DATE	BY	CHK'D BY	DESCRIPTION
B	10/5/18	TUL	CAG	PRELIMINARY CD - ISSUED FOR CLIENT REVIEW
A	10/17/18	ASC	TUL	PRELIMINARY CD - ISSUED FOR CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL



**CENTEK engineering**  
 Centek Solutions  
 (203) 498-0390  
 (203) 498-8897 Fax  
 632 North Branford Road  
 Branford, CT 06405  
 www.CentekEng.com

**T-MOBILE NORTHEAST LLC**  
 WIRELESS COMMUNICATIONS FACILITY  
**DARIEN/ DTWN + RT-1**  
**SITE ID: CT11290C**  
 3 MECHANIC STREET  
 DARIEN, CT 06820

**DATE:** 10/1/18  
**SCALE:** AS NOTED  
**JOB NO.** 18058.58

**TITLE SHEET**

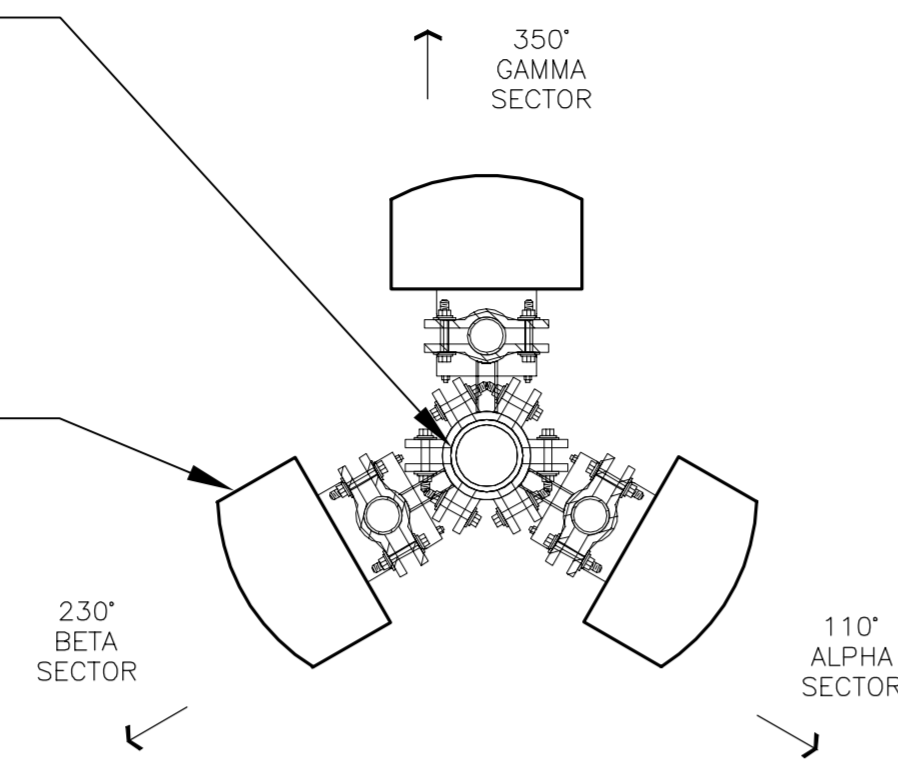
**T-1**  
 Sheet No. 1 of 4



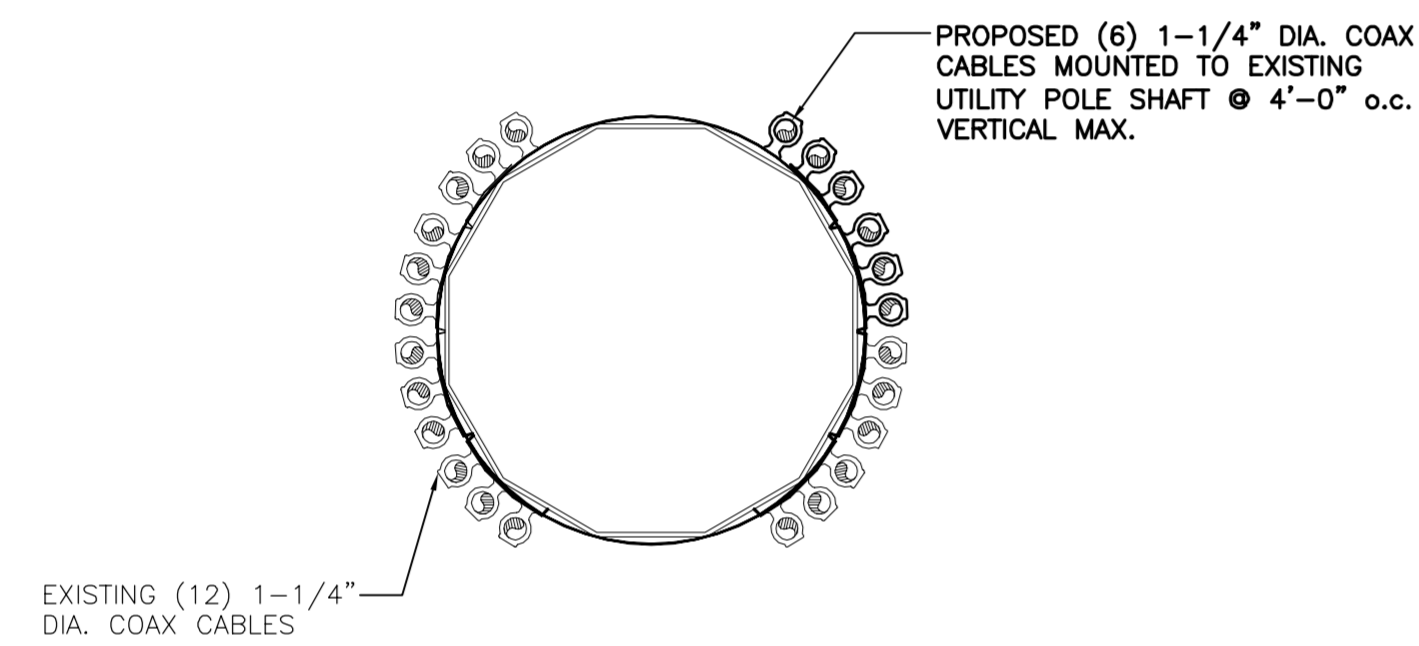


EXISTING T-MOBILE ANTENNA MAST TO BE REMOVED AND REPLACED

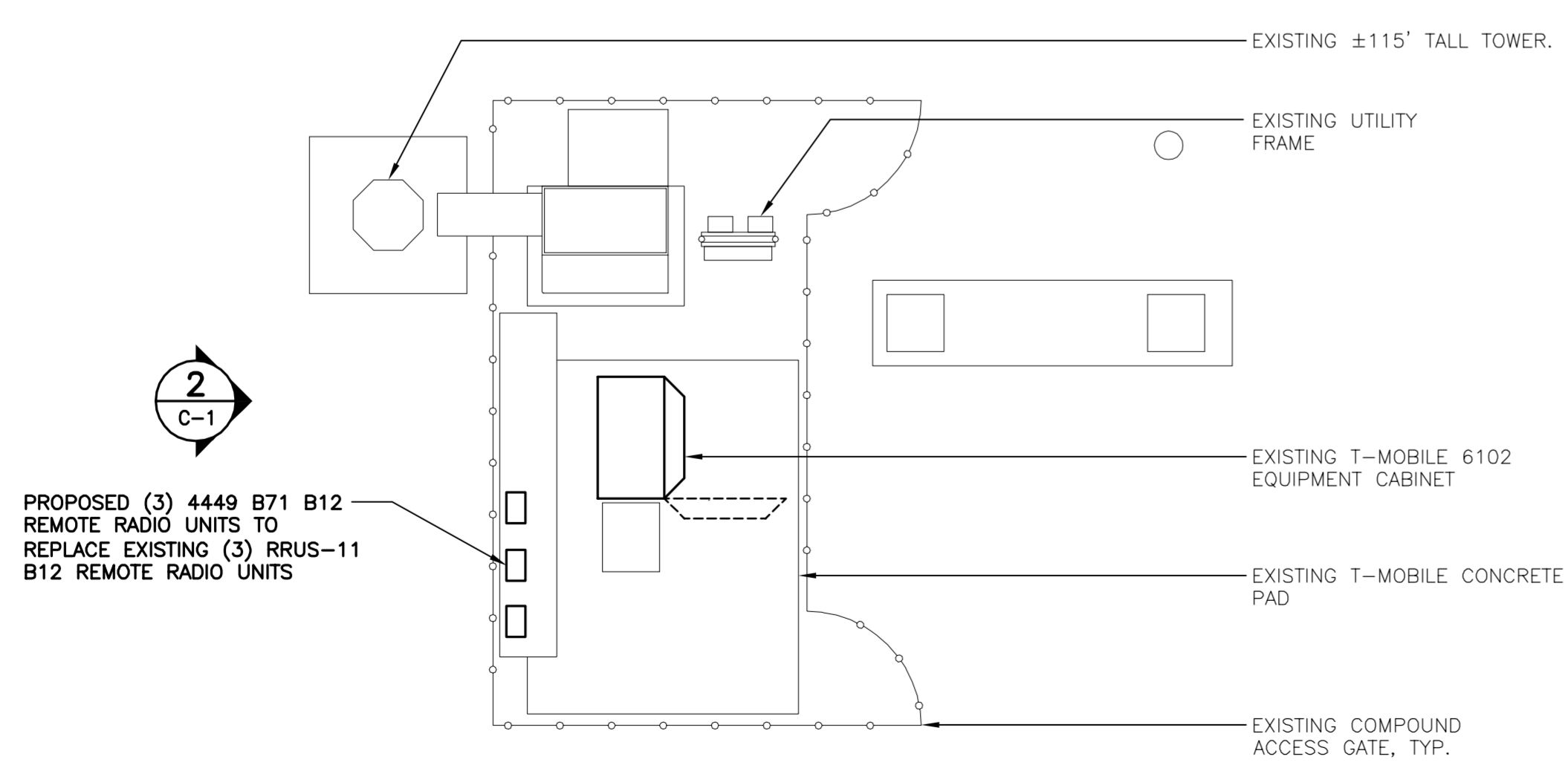
EXISTING T-MOBILE ANTENNA MODEL: SBNHH-1D65A-SR (TYP. OF 3) TO BE REMOVED AND REPLACED



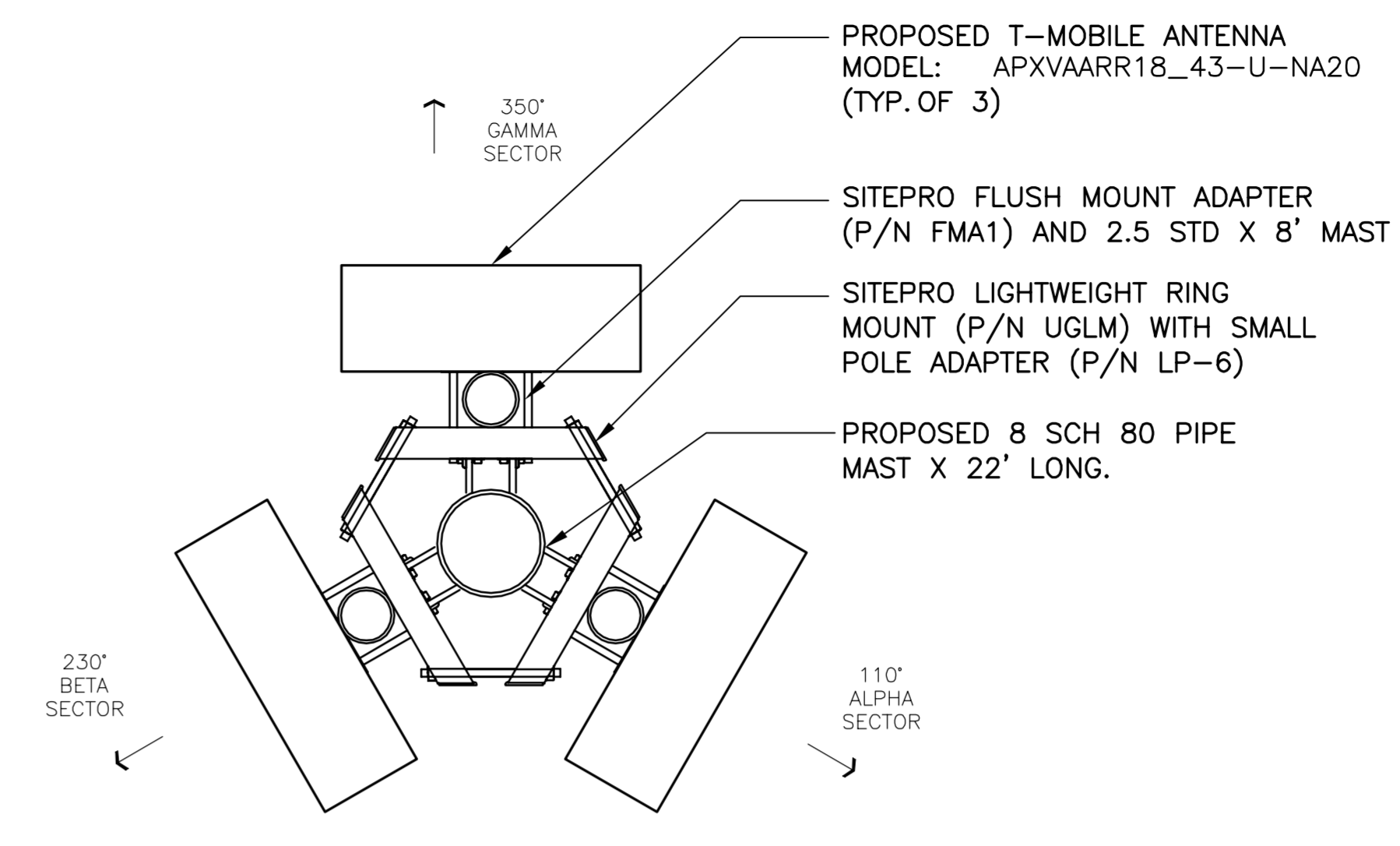
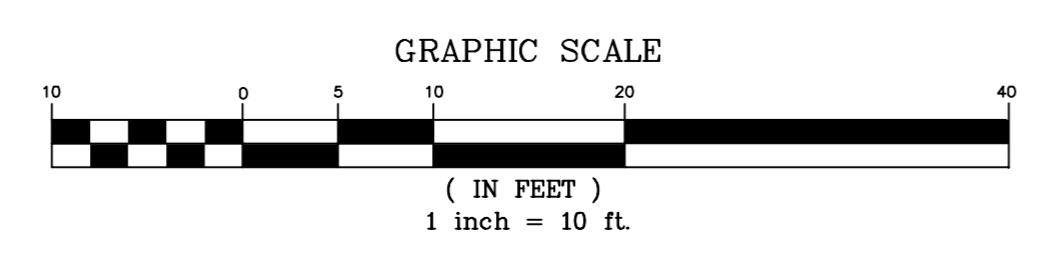
**4 EXISTING ANTENNA MOUNTING CONFIGURATION**  
C-1 SCALE: 1" = 1' 120' ELEVATION



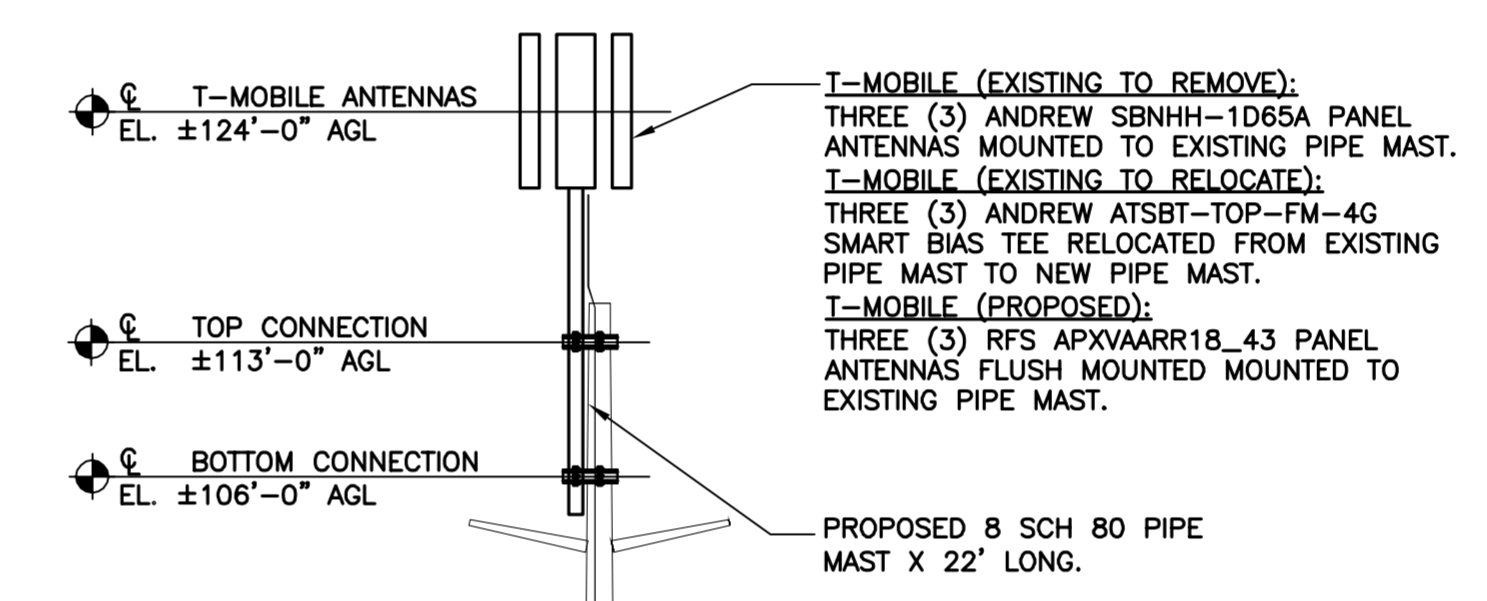
**3 COAX CABLE PLAN**  
C-1 SCALE: NTS



**1 COMPOUND PLAN**  
C-1 SCALE: 1" = 10'

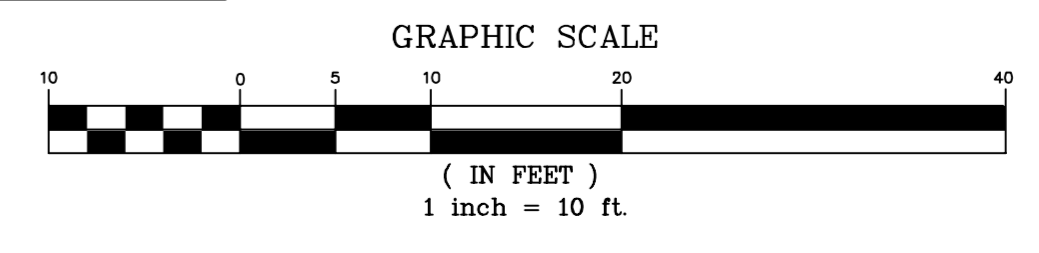


**5 PROPOSED ANTENNA MOUNTING CONFIGURATION**  
C-1 SCALE: 3/8" = 1' 83' ELEVATION



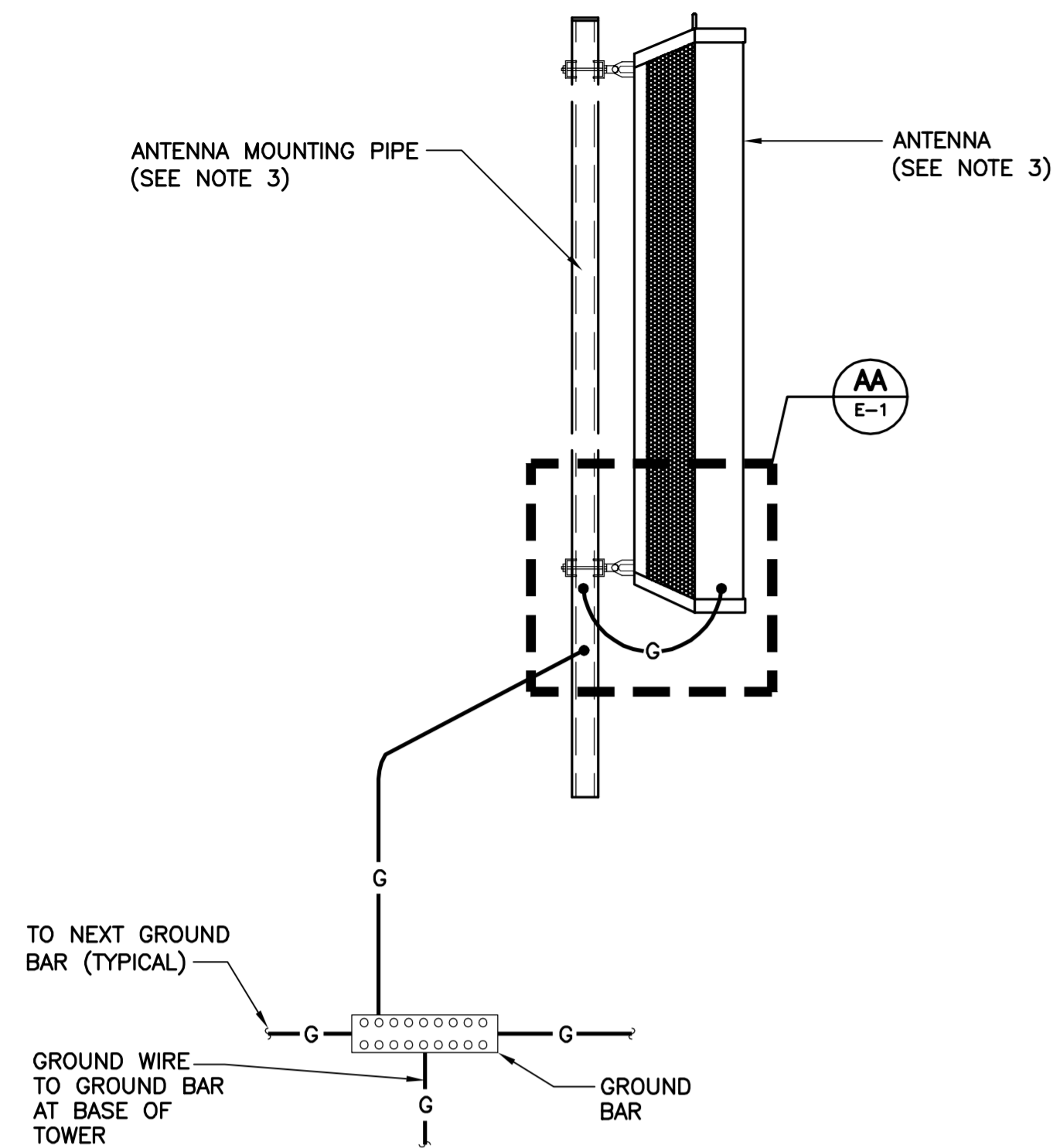
**STRUCTURAL NOTE:**  
REFER TO STRUCTURAL ANALYSIS REPORT OF TOWER AND FOUNDATION AS PREPARED BY CENTEK ENGINEERING INC., DATED: 10/01/18 PROJECT NUMBER: 18058.58

**2 TOWER ELEVATION**  
C-1 SCALE: 1" = 10'



PROFESSIONAL ENGINEER SEAL	PRELIMINARY CD - ISSUED FOR CLIENT REVIEW
	PRELIMINARY CD - ISSUED FOR CLIENT REVIEW
	DATE
B	10/15/18
A	10/17/18
REV.	DATE
	DRAWN BY
	CHK'D BY
	DESCRIPTION
<b>CENTEK engineering</b> <small>Centered on Solutions</small> (203) 488-0390 (203) 488-3397 Fax 632 North Branford Road Branford, CT 06405 www.CentekEng.com	
<b>T-MOBILE NORTHEAST LLC</b> WIRELESS COMMUNICATIONS FACILITY <b>DARIEN/DTWN + RT-1</b> <b>SITE ID: CT11290C</b> 3 MECHANIC STREET DARIEN, CT 06820	
DATE:	10/1/18
SCALE:	AS NOTED
JOB NO.	18058.58
COMPOUND PLAN, ELEVATION AND ANTENNA MOUNTING CONFIG.	
<b>C-1</b>	
Sheet No. 3 of 4	

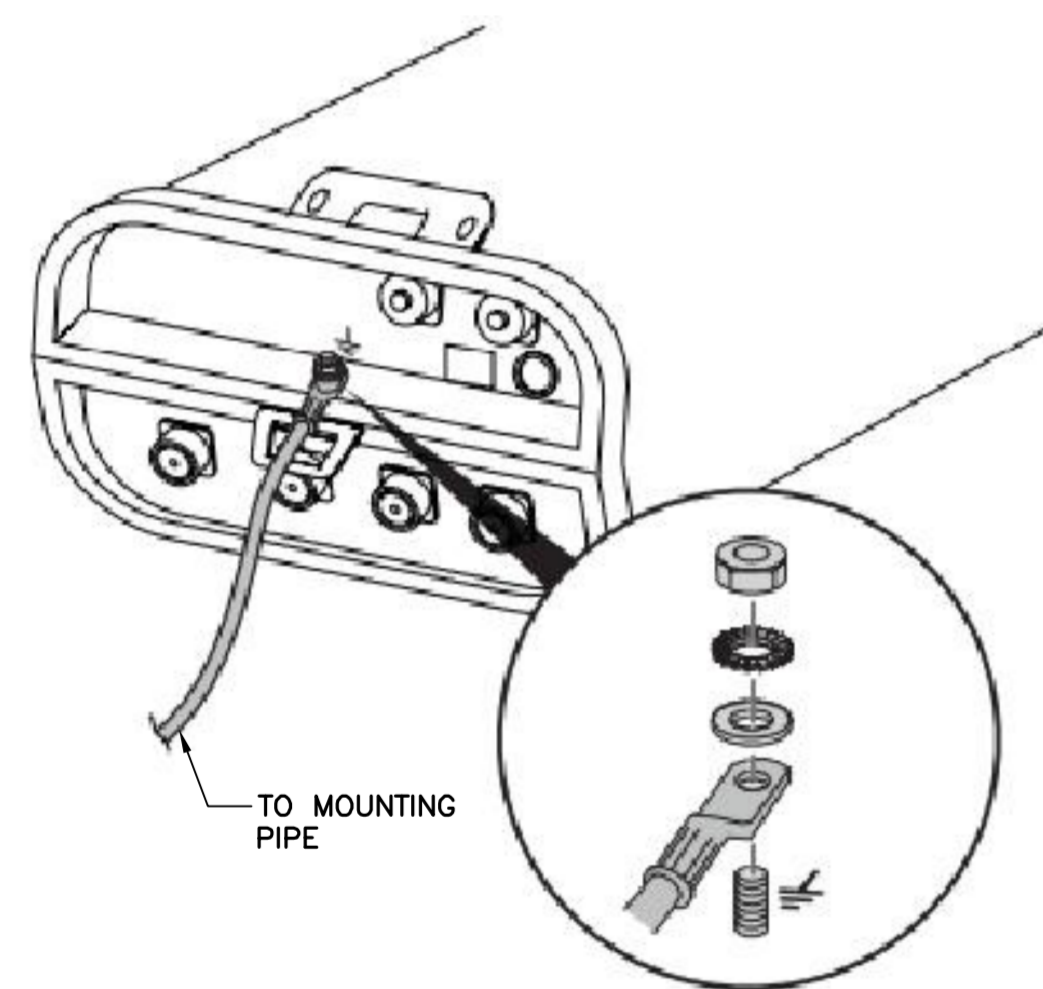




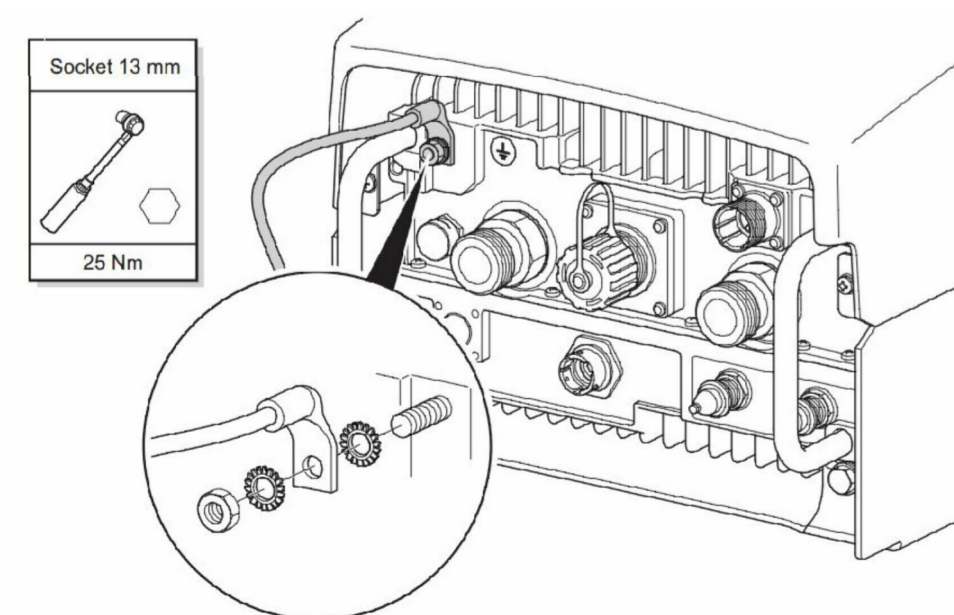
**NOTES:**

1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

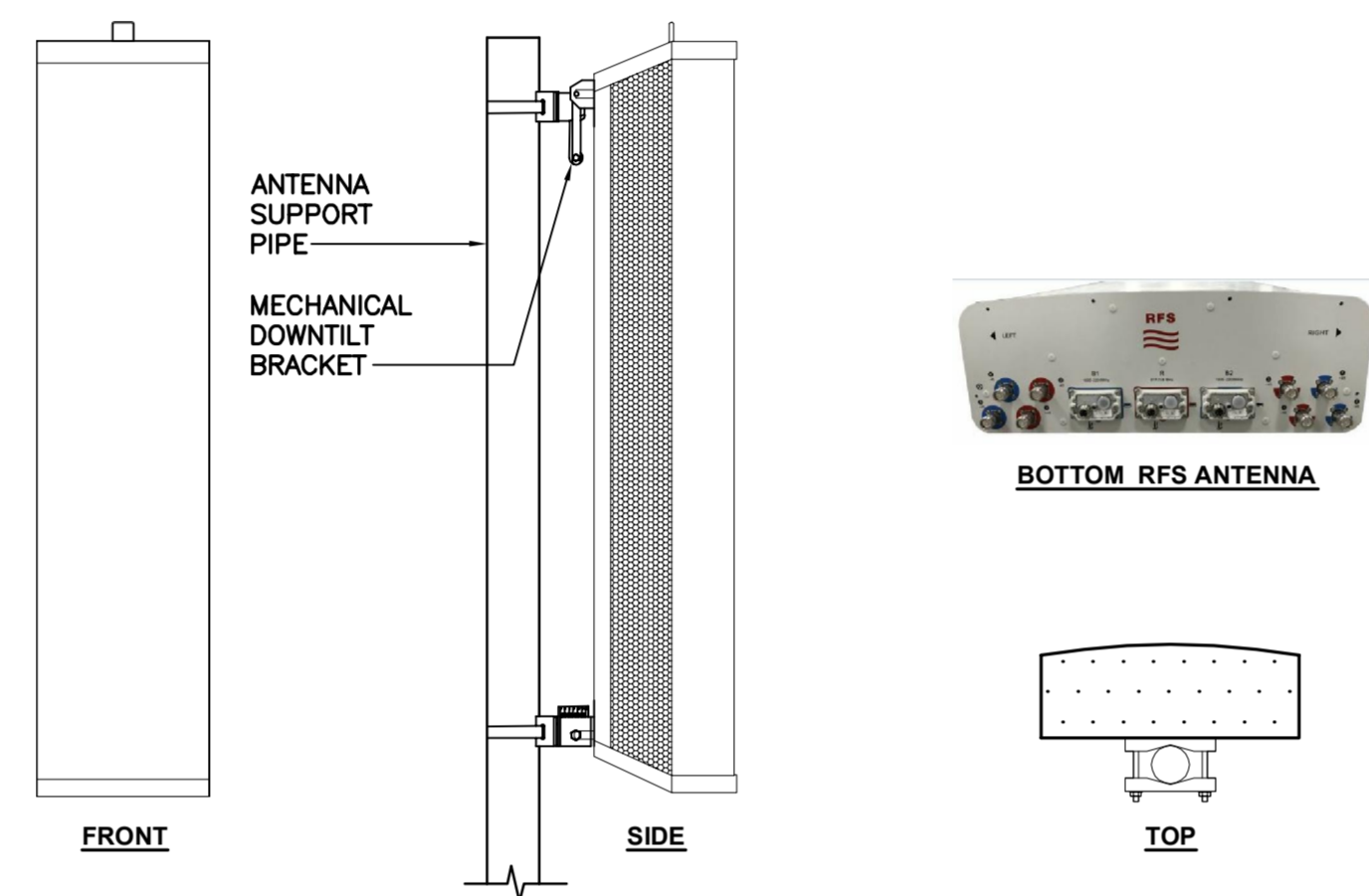
**1 TYPICAL ANTENNA GROUNDING DETAIL**  
SCALE: NONE



**AA TYPICAL ANTENNA GROUNDING DETAIL**  
SCALE: NONE



**2 TYPICAL RRU GROUNDING DETAIL**  
NOT TO SCALE



ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: RFS MODEL: APXVAARR18_43-U-NA20	72"L x 24.0"W x 8.5"D	154 LBS.

**3 PROPOSED ANTENNA DETAIL**  
SCALE: NONE

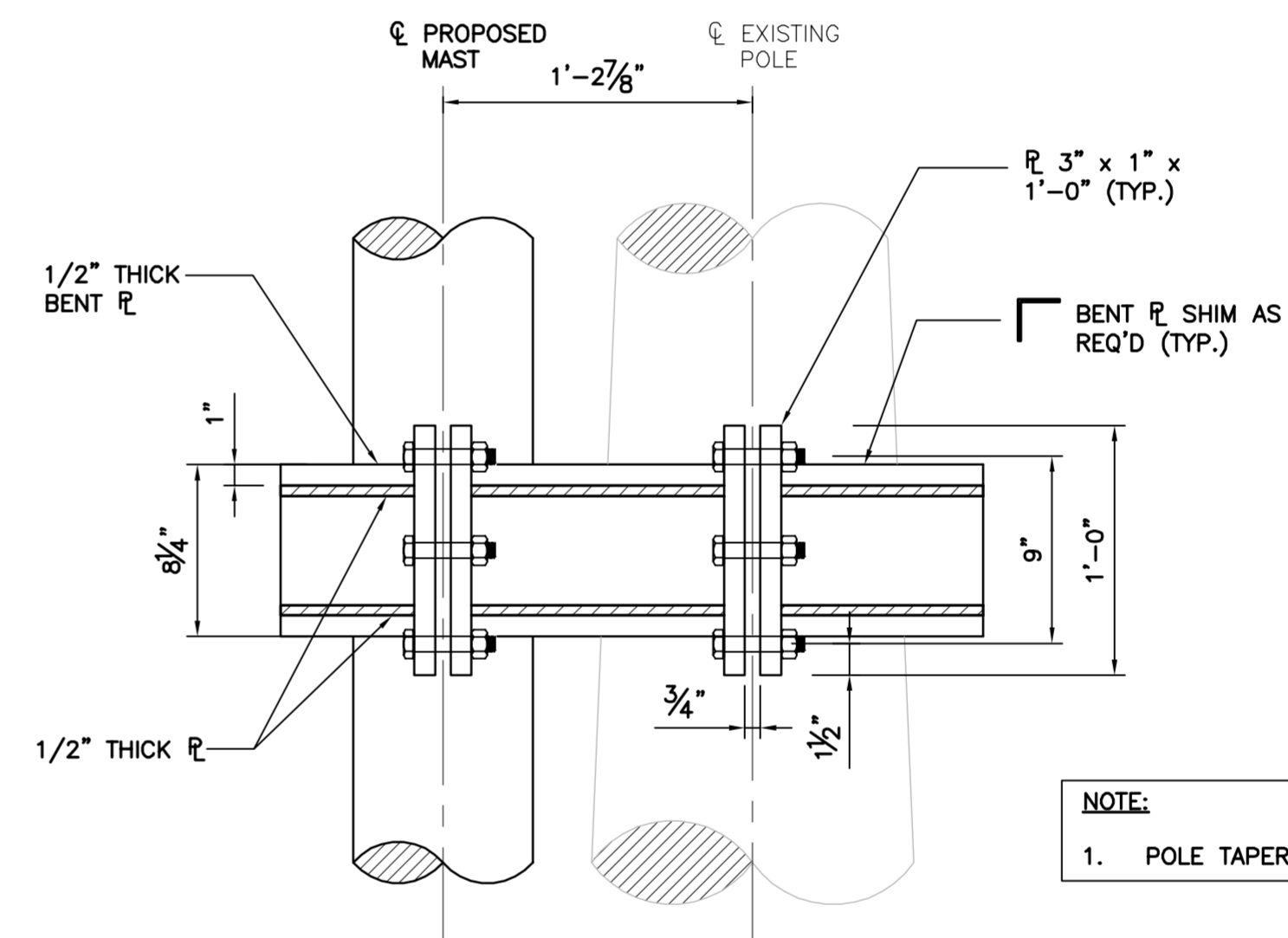


ISOMETRIC VIEW

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RADIO 4449 B71B12	14.9"L x 13.2"W x 10.4"D	74 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

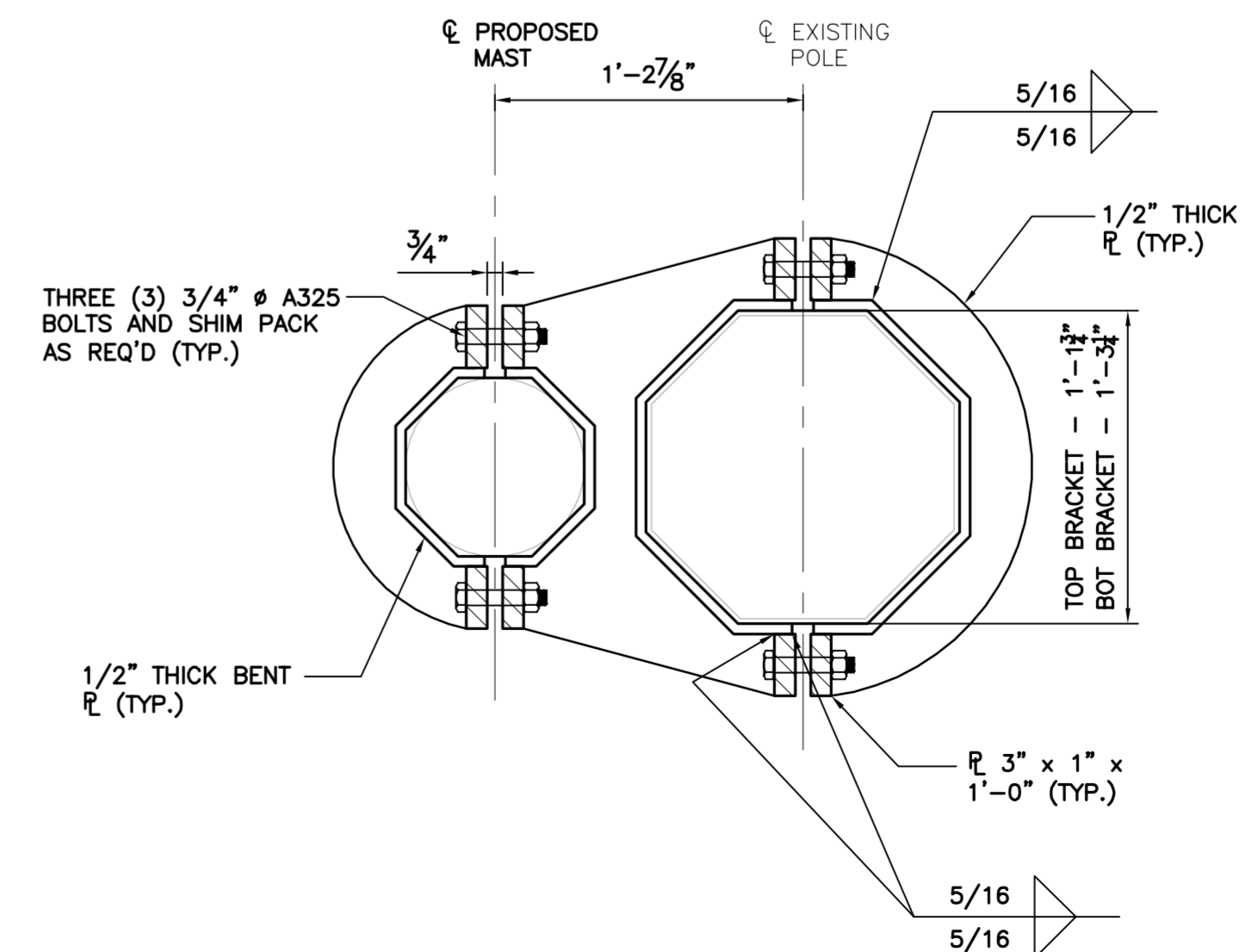
**NOTES:**  
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T-MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.

**4 PROPOSED RRU DETAIL**  
SCALE: NONE



**NOTE:**  
1. POLE TAPER = 0.2099"/FT (V.I.F.)

**5 BRACKET DETAIL**  
SCALE: 1-1/2" = 1'-0"



**6 BRACKET PLAN VIEW**  
SCALE: 1-1/2" = 1'-0"

REV.	DATE	BY	CHK'D BY	DESCRIPTION
B	10/15/18	TJJ	CAG	PRELIMINARY CD - ISSUED FOR CLIENT REVIEW
A	10/17/18	ASC	TJJ	PRELIMINARY CD - ISSUED FOR CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL



**CEN TEK engineering**  
Centered on Solutions  
(203) 488-0380  
(203) 488-3887 Fax  
632 North Branford Road  
Branford, CT 06405  
www.CenTekEng.com

**T-MOBILE NORTHEAST LLC**  
WIRELESS COMMUNICATIONS FACILITY  
**DARIEN/ DTWN + RT-1**  
**SITE ID: CT11290C**  
3 MECHANIC STREET  
DARIEN, CT 06820

DATE: 10/1/18  
SCALE: AS NOTED  
JOB NO. 18058.58

TYPICAL DETAILS

# Exhibit D

**Structural Analysis of  
Antenna Mast and Pole**

*T-Mobile Site Ref: CT11290C*

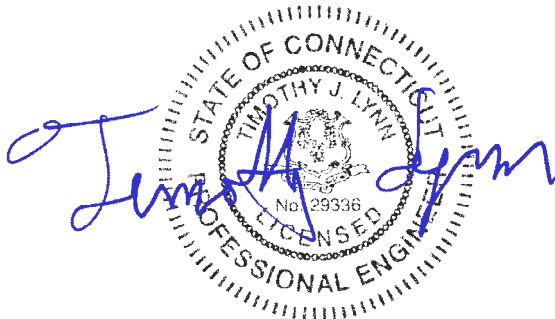
*Eversource Structure No. 1068  
115' Electric Transmission Pole*

*3 Mechanic Street  
Darien, CT*

*CEN TEK Project No. 18058.58*

~~*Date: September 27, 2018*~~

*Rev 6: December 14, 2018*



**Prepared for:**  
**T-Mobile USA**  
**35 Griffin Road**  
**Bloomfield, CT 06002**



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- CONCLUSION

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  - PLS POLE

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- MAST WIND LOAD

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## Introduction

The purpose of this report is to analyze the existing mast and 115' utility pole located at 3 Mechanic Street in Darien, CT for the proposed antenna and equipment upgrade by T-Mobile.

The existing/proposed loads consist of the following:

- **T-MOBILE (Existing to Remain):**  
**Coax Cables:** Eighteen (18) 1-1/4"  $\varnothing$  coax cables running on the outside of the tower as indicated in section 4 of this report.
- **T-MOBILE (Existing to Relocate):**  
**Antennas:** Three (3) Andrew ATSBT-TOP-FM-4G Smart Bias Tees mounted relocated from existing pipe mast to new pipe mast.
- **T-MOBILE (Existing to be Removed):**  
**Antennas:** Three (3) Andrew SBNHH-1D65A panel antennas mounted on a mast with a RAD center elevation of 120-ft above tower base plate.
- **T-MOBILE (Proposed):**  
**Antennas:** Three (3) RFS APXVAARR18\_43 panel antennas mounted on a proposed mast with a RAD center elevation of 124-ft above tower base plate.  
**Coax Cables:** Six (6) 1-1/4"  $\varnothing$  coax cables running on the outside of the tower as indicated in section 4 of this report.

## Primary assumptions used in the analysis

- Design steel stresses are defined by AISC-LRFD 14<sup>th</sup> edition for design of the antenna Mast and antenna supporting elements.
- ASCE Manual No. 48-11, "Design of Steel Transmission Pole Structures", defines allowable steel stresses for evaluation of the utility pole.
- All utility pole members are adequately protected to prevent corrosion of steel members.
- All proposed antenna mounts are modeled as listed above.
- Pipe mast will be properly installed and maintained.
- No residual stresses exist due to incorrect pole erection.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds conform to the requirements of AWS D1.1.
- Pipe mast and utility pole will be in plumb condition.
- Utility pole was properly installed and maintained and all members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
- Any deviation from the analyzed loading will require a new analysis for verification of structural adequacy.

## A n a l y s i s

Structural analysis of the existing antenna mast was independently completed using the current version of RISA-3D computer program licensed to CENTEK Engineering, Inc.

The existing mast was found to be structural inadequate to support the new equipment configuration and will need to be replaced with a 8-in x 21-ft long SCH. 80 pipe (O.D. = 8.625”) connected at two points to the existing tower. The proposed mast was designed to resist loads prescribed by the TIA-222G standard. Section 5 of this report details these gravity and lateral wind loads. NESC prescribed loads were also applied to the mast in order to obtain reactions needed for analyzing the utility pole structure. These loads are developed in Section 7 of this report. Load cases and combinations used in RISA-3D for TIA-222-G loading and for NESC/NU loading are listed in report Sections 6 and 8, respectively.

An envelope solution was first made to determine maximum and minimum forces, stresses, and deflections to confirm the selected section as adequate. Additional analyses were then made to determine the NESC forces to be applied to the pole structure.

The RISA-3D program contains a library of all AISC shapes and corresponding section properties are computed and applied directly within the program. The program’s Steel Code Check option was also utilized. The forces calculated in RISA-3D using NESC guidelines were then applied to the pole using PLS-Pole. Maximum usage for the pole was calculated considering the additional forces from the mast and associated appurtenances.

## D e s i g n B a s i s

Our analysis was performed in accordance with TIA-222-G, ASCE Manual No. 48-11, “Design of Steel Transmission Pole Structures”, NESC C2-2007 and Northeast Utilities Design Criteria.

### ▪ UTILITY POLE ANALYSIS

The purpose of this analysis is to determine the adequacy of the existing utility pole to support the proposed antenna loads. The loading and design requirements were analyzed in accordance with the NU Design Criteria Table, NESC C2-2007 ~ Construction Grade B, and ASCE Manual No. 48-11.

Load cases considered:

#### Load Case 1: NESC Heavy

Wind Pressure.....	4.0 psf
Radial Ice Thickness.....	0.5”
Vertical Overload Capacity Factor.....	1.50
Wind Overload Capacity Factor.....	2.50
Wire Tension Overload Capacity Factor.....	1.65

#### Load Case 2: NESC Extreme

Wind Speed.....	110 mph <sup>(1)</sup>
Radial Ice Thickness.....	0”

Note 1: NESC C2-2007, Section 25, Rule 250C: Extreme Wind Loading, 1.25 x Gust Response Factor (wind speed: 3-second gust)

▪ **MAST ASSEMBLY ANALYSIS**

Mast, appurtenances and connections to the utility tower were analyzed and designed in accordance with the NU Design Criteria Table, TIA-222-G and AISC standards.

Load cases considered:

Load Case 1:

Wind Speed..... 93 mph <sup>(2016 CSBC Appendix-N)</sup>  
 Radial Ice Thickness..... 0"

Load Case 2:

Wind Pressure..... 50 mph wind pressure  
 Radial Ice Thickness..... 0.75"

Results

▪ **MAST ASSEMBLY**

The existing mast was found to be structural inadequate to support the new equipment configuration and will need to be replaced with a 8-in x 21-ft long SCH. 80 pipe.

Member	Stress Ratio (% of capacity)	Result
8" Sch. 80 Pipe	45.0%	<b>PASS</b>

▪ **UTILITY POLE**

This analysis finds that the subject utility pole is adequate to support the proposed antenna mast and related appurtenances. The pole stresses meet the requirements set forth by the ASCE Manual No. 48-11, "Design of Steel Transmission Pole Structures", for the applied NESC Heavy and Hi-Wind load cases. The detailed analysis results are provided in Section 6 of this report. The analysis results are summarized as follows:

A maximum usage of **97.81%** occurs in the utility pole under the **NESC Extreme** loading condition.

POLE SECTION:

The utility pole was found to be **structurally adequate** to support the proposed equipment.

Tower Section	Elevation	Stress Ratio (% of capacity)	Result
Tube Number 4	0.00'-15.08' (AGL)	97.81%	<b>PASS</b>

BASE PLATE:

The base plate was found to be within allowable limits from the PLS output based on 10 bend lines.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Base Plate	Bending	93.44%	<b>PASS</b>

▪ FOUNDATION AND ANCHORS

The existing foundation consists of a 6-ft diameter x 18-ft long reinforced concrete caisson. The base of the tower is connected to the foundation by means of (12) 2.25"Ø, ASTM A432 Grade 60 anchor bolts embedded into the concrete foundation structure.

BASE REACTIONS:

From PLS-Pole analysis of pole based on NESC/NU prescribed loads.

Load Case	Shear	Axial	Moment
NESC Heavy Wind	17.64 kips	47.37 kips	1617.52 ft-kips
NESC Extreme Wind	26.07 kips	24.75 kips	2188.86 ft-kips

Note 1 – 10% increase applied to tower base reactions per OTRM 051

ANCHOR BOLTS:

The anchor bolts were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (% of capacity)	Result
Anchor Bolts	Tension	53.89%	PASS

FOUNDATION:

The foundation was found to be within allowable limits.

Design Limit	Original Design Reaction	Proposed Reaction <sup>(1)</sup>	Result
Shear	29.5 kips	28.7 kips	PASS
Moment	2414.4 ft-kips	2407.8 ft-kips	PASS

| Note 1: 10% increase to PLS base reactions used in foundation analysis per OTRM 051.


Conclusion

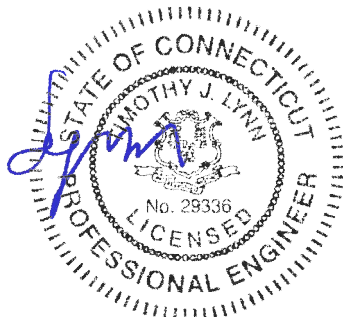
This analysis shows that the subject utility pole is adequate to support the proposed T-Mobile equipment upgrade.

The analysis is based, in part on the information provided to this office by Eversource and T-Mobile. If the existing conditions are different than the information in this report, CENTEK engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:

  
 Timothy J. Lynn, PE  
 Structural Engineer



STANDARD CONDITIONS FOR FURNISHING OF  
PROFESSIONAL ENGINEERING SERVICES ON  
EXISTING STRUCTURES

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of CENTEK engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to CENTEK engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the “as new” condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222.
- All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. CENTEK engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

## GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ RISA - 3 D

RISA-3D Structural Analysis Program is an integrated structural analysis and design software package for buildings, bridges, tower structures, etc.

### Modeling Features:

- Comprehensive CAD-like graphic drawing/editing capabilities that let you draw, modify and load elements as well as snap, move, rotate, copy, mirror, scale, split, merge, mesh, delete, apply, etc.
- Versatile drawing grids (orthogonal, radial, skewed)
- Universal snaps and object snaps allow drawing without grids
- Versatile general truss generator
- Powerful graphic select/unselect tools including box, line, polygon, invert, criteria, spreadsheet selection, with locking
- Saved selections to quickly recall desired selections
- Modification tools that modify single items or entire selections
- Real spreadsheets with cut, paste, fill, math, sort, find, etc.
- Dynamic synchronization between spreadsheets and views so you can edit or view any data in the plotted views or in the spreadsheets
- Simultaneous view of multiple spreadsheets
- Constant in-stream error checking and data validation
- Unlimited undo/redo capability
- Generation templates for grids, disks, cylinders, cones, arcs, trusses, tanks, hydrostatic loads, etc.
- Support for all units systems & conversions at any time
- Automatic interaction with RISASection libraries
- Import DXF, RISA-2D, STAAD and ProSteel 3D files
- Export DXF, SDNF and ProSteel 3D files

### Analysis Features:

- Static analysis and P-Delta effects
- Multiple simultaneous dynamic and response spectra analysis using Gupta, CQC or SRSS mode combinations
- Automatic inclusion of mass offset (5% or user defined) for dynamic analysis
- Physical member modeling that does not require members to be broken up at intermediate joints
- State of the art 3 or 4 node plate/shell elements
- High-end automatic mesh generation — draw a polygon with any number of sides to create a mesh of well-formed quadrilateral (NOT triangular) elements.
- Accurate analysis of tapered wide flanges - web, top and bottom flanges may all taper independently
- Automatic rigid diaphragm modeling
- Area loads with one-way or two-way distributions
- Multiple simultaneous moving loads with standard AASHTO loads and custom moving loads for bridges, cranes, etc.
- Torsional warping calculations for stiffness, stress and design
- Automatic Top of Member offset modeling
- Member end releases & rigid end offsets
- Joint master-slave assignments
- Joints detachable from diaphragms
- Enforced joint displacements
- 1-Way members, for tension only bracing, slipping, etc.



- 1-Way springs, for modeling soils and other effects
- Euler members that take compression up to their buckling load, then turn off.
- Stress calculations on any arbitrary shape
- Inactive members, plates, and diaphragms allows you to quickly remove parts of structures from consideration
- Story drift calculations provide relative drift and ratio to height
- Automatic self-weight calculations for members and plates
- Automatic subgrade soil spring generator

Graphics Features:

- Unlimited simultaneous model view windows
- Extraordinary “true to scale” rendering, even when drawing
- High-speed redraw algorithm for instant refreshing
- Dynamic scrolling stops right where you want
- Plot & print virtually everything with color coding & labeling
- Rotate, zoom, pan, scroll and snap views
- Saved views to quickly restore frequent or desired views
- Full render or wire-frame animations of deflected model and dynamic mode shapes with frame and speed control
- Animation of moving loads with speed control
- High quality customizable graphics printing

Design Features:

- Designs concrete, hot rolled steel, cold formed steel and wood
- ACI 1999/2002, BS 8110-97, CSA A23.3-94, IS456:2000, EC 2-1992 with consistent bar sizes through adjacent spans
- Exact integration of concrete stress distributions using parabolic or rectangular stress blocks
- Concrete beam detailing (Rectangular, T and L)
- Concrete column interaction diagrams
- Steel Design Codes: AISC ASD 9th, LRFD 2nd & 3rd, HSS Specification, CAN/CSA-S16.1-1994 & 2004, BS 5950-1-2000, IS 800-1984, Euro 3-1993 including local shape databases
- AISI 1999 cold formed steel design
- NDS 1991/1997/2001 wood design, including Structural Composite Lumber, multi-ply, full sawn
- Automatic spectra generation for UBC 1997, IBC 2000/2003
- Generation of load combinations: ASCE, UBC, IBC, BOCA, SBC, ACI
- Unbraced lengths for physical members that recognize connecting elements and full lengths of members
- Automatic approximation of K factors
- Tapered wide flange design with either ASD or LRFD codes
- Optimization of member sizes for all materials and all design codes, controlled by standard or user-defined lists of available sizes and criteria such as maximum depths
- Automatic calculation of custom shape properties
- Steel Shapes: AISC, HSS, CAN, ARBED, British, Euro, Indian, Chilean
- Light Gage Shapes: AISI, SSMA, Dale / Incor, Dietrich, Marino\WARE
- Wood Shapes: Complete NDS species/grade database
- Full seamless integration with RISAFoot (Ver 2 or better) for advanced footing design and detailing
- Plate force summation tool

Results Features:

- Graphic presentation of color-coded results and plotted designs
- Color contours of plate stresses and forces with quadratic smoothing, the contours may also be animated
- Spreadsheet results with sorting and filtering of: reactions, member & joint deflections, beam & plate forces/stresses, optimized sizes, code designs, concrete reinforcing, material takeoffs, frequencies and mode shapes
- Standard and user-defined reports
- Graphic member detail reports with force/stress/deflection diagrams and detailed design calculations and expanded diagrams that display magnitudes at any dialed location
- Saved solutions quickly restore analysis and design results.

## GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ PLS-TOWER

PLS-TOWER is a Microsoft Windows program for the analysis and design of steel latticed towers used in electric power lines or communication facilities. Both self-supporting and guyed towers can be modeled. The program performs design checks of structures under user specified loads. For electric power structures it can also calculate maximum allowable wind and weight spans and interaction diagrams between different ratios of allowable wind and weight spans.

### Modeling Features:

- Powerful graphics module (stress usages shown in different colors)
- Graphical selection of joints and members allows graphical editing and checking
- Towers can be shown as lines, wire frames or can be rendered as 3-d polygon surfaces
- Can extract geometry and connectivity information from a DXF CAD drawing
- CAD design drawings, title blocks, drawing borders or photos can be tied to structure model
- XML based post processor interface
- Steel Detailing Neutral File (SDNF) export to link with detailing packages
- Can link directly to line design program PLS-CADD
- Automatic generation of structure files for PLS-CADD
- Databases of steel angles, rounds, bolts, guys, etc.
- Automatic generation of joints and members by symmetries and interpolations
- Automated mast generation (quickly builds model for towers that have regular repeating sections) via graphical copy/paste
- Steel angles and rounds modeled either as truss, beam or tension-only elements
- Guys are easily handled (can be modeled as exact cable elements)

### Analysis Features:

- Automatic handling of tension-only members
- Automatic distribution of loads in 2-part suspension insulators (v-strings, horizontal vees, etc.)
- Automatic calculation of tower dead, ice, and wind loads as well as drag coefficients according to:
  - ASCE 74-1991
  - NESC 2002
  - NESC 2007
  - IEC 60826:2003
  - EN50341-1:2001 (CENELEC)
  - EN50341-3-9:2001 (UK NNA)
  - EN50341-3-17:2001 (Portugal NNA)
  - ESAA C(b)1-2003 (Australia)
  - TPNZ (New Zealand)
  - REE (Spain)
  - EIA/TIA 222-F
  - ANSI/TIA 222-G
  - CSA S37-01
- Automated microwave antenna loading as per EIA/TIA 222-F and ANSI/TIA 222-G
- Minimization of problems caused by unstable joints and mechanisms
- Automatic bandwidth minimization and ability to solve large problems
- Design checks according to (other standards can be added easily):
  - ASCE Standard 10-90

- AS 3995 (Australian Standard 3995)
- BS 8100 (British Standard 8100)
- EN50341-1 (CENELEC, both empirical and analytical methods are available)
- ECCS 1985
- NGT-ECCS
- PN-90/B-03200
- EIA/TIA 222-F
- ANSI/TIA 222-G
- CSA S37-01
- EDF/RTE Resal
- IS 802 (India Standard 802)

Results Features:

- Design summaries printed for each group of members
  - Easy to interpret text, spreadsheet and graphics design summaries
  - Automatic determination of allowable wind and weight spans
  - Automatic determination of interaction diagrams between allowable wind and weight spans
  - Capability to batch run multiple tower configurations and consolidate the results
  - Automated optimum angle member size selection and bolt quantity determination
- Tool for interactive angle member sizing and bolt quantity determination.

*Criteria for Design of PCS Facilities On or  
Extending Above Metal Electric Transmission  
Towers & Analysis of Transmission Towers  
Supporting PCS Masts* <sup>(1)</sup>

*Introduction*

This criteria is the result from an evaluation of the methods and loadings specified by the separate standards, which are used in designing telecommunications towers and electric transmission towers. That evaluation is detailed elsewhere, but in summary; the methods and loadings are significantly different. This criteria specifies the manner in which the appropriate standard is used to design PCS facilities including masts and brackets (hereafter referred to as “masts”), and to evaluate the electric transmission towers to support PCS masts. The intent is to achieve an equivalent level of safety and security under the extreme design conditions expected in Connecticut and Massachusetts.

ANSI Standard TIA-222 covering the design of telecommunications structures specifies a working strength/allowable stress design approach. This approach applies the loads from extreme weather loading conditions, and designs the structure so that it does not exceed some defined percentage of failure strength (allowable stress).

ANSI Standard C2-2007 (National Electrical Safety Code) covering the design of electric transmission metal structures is based upon an ultimate strength/yield stress design approach. This approach applies a multiplier (overload capacity factor) to the loads possible from extreme weather loading conditions, and designs the structure so that it does not exceed its ultimate strength (yield stress).

Each standard defines the details of how loads are to be calculated differently. Most of the NU effort in “unifying” both codes was to establish what level of strength each approach would provide, and then increasing the appropriate elements of each to achieve a similar level of security under extreme weather loadings.

Two extreme weather conditions are considered. The first is an extreme wind condition (hurricane) based upon a 50-year recurrence (2% annual probability). The second is a winter condition combining wind and ice loadings.

The following sections describe the design criteria for any PCS mast extending above the top of an electric transmission tower, and the analysis criteria for evaluating the loads on the transmission tower from such a mast from the lower portions of such a mast, and loads on the pre-existing electric lower portions of such a mast, and loads on the pre-existing electric transmission tower and the conductors it supports.

| Note 1: Prepared from documentation provide from Northeast Utilities.

## PCS Mast

The PCS facility (mast, external cable/trays, including the initial and any planned future support platforms, antennas, etc. extending the full height above the top level of the electric transmission structure) shall be designed in accordance with the provisions of TIA 222-G:

## ELECTRIC TRANSMISSION TOWER

The electric transmission tower shall be analyzed using yield stress theory in accordance with the attached table titled “NU Design Criteria”. This specifies uniform loadings (different from the TIA loadings) on the each of the following components of the installed facility:

- PCS mast for its total height above ground level, including the initial and planned future support platforms, antennas, etc. above the top of an electric transmission structure.
- Conductors are related devices and hardware.
- Electric transmission structure. The loads from the PCS facility and from the electric conductors shall be applied to the structure at conductor and PCS mast attachment points, where those load transfer to the tower.

The uniform loadings and factors specified for the above components in the table are based upon the National Electrical Safety Code 2007 Edition Extreme Wind (Rule 250C) and Combined Ice and Wind (Rule 250B-Heavy) Loadings. These provide equivalent loadings compared to TIA and its loads and factors with the exceptions noted above. (Note that the NESC does not require the projected wind surfaces of structures and equipment to be increased by the ice covering.)

In the event that the electric transmission tower is not sufficient to support the additional loadings of the PCS mast, reinforcement will be necessary to upgrade the strength of the overstressed members.

# Eversource Overhead Transmission Standards

## Attachment A Eversource Design Criteria

Attachment A NU Design Criteria		Basic Wind Speed	Pressure	Height factor	Gust Factor	Load or Stress Factor	Force Coef. - Shape Factor	
		V (MPH)	Q (PSF)	Kz	Gh			
Ice Condition	TIA/EIA	Antenna Mount	TIA	TIA (0.75Wi )	TIA	TIA	TIA, Section 3.1.1.1 disallowed for connection design	TIA
	NESC Heavy	Tower/Pole Analysis with antennas extending above top of Tower/Pole (Yield Stress)	—	4	1	1	2.50	1.6 Flat Surfaces 1.3 Round Surfaces
		Tower/Pole Analysis with antennas below top of Tower/Pole (on two faces)	—	4	1	1	2.50	1.6 Flat Surfaces 1.3 Round Surfaces
Conductors:		Conductor Loads Provided by NU						
High Wind Condition	TIA/EIA	Antenna Mount	85	TIA	TIA	TIA	TIA, Section 3.1.1.1 disallowed for connection design	TIA
	NESC Extreme Wind	Tower/Pole Analysis with antennas extending above top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250C: Extreme Wind Loading Apply a 1.25 X Gust Response Factor to all telecommunication equipment projected above top of tower/pole and apply a 1.0 x Gust Response Factor to the tower/pole structure					1.6 Flat Surfaces 1.3 Round Surfaces
		Tower/Pole Analysis with antennas below top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250C: Extreme Wind Loading Height above ground is based on overall height to top of tower/pole					1.6 Flat Surfaces 1.3 Round Surfaces
Conductors:		Conductor Loads Provided by NU						
NESC Extreme Ice with Wind Condition *		Tower/Pole Analysis with antennas extending above top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250D: Extreme Ice with Wind Loading 4 PSF Wind Load 1.25 X Gust Response Factor Apply a 1.25 X Gust Response Factor to all telecommunication equipment projected above top of tower/pole and apply a 1.0 x Gust Response Factor to the tower/pole structure					1.6 Flat Surfaces 1.3 Round Surfaces
		Tower/Pole Analysis with antennas below top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250D: Extreme Ice with Wind Loading 4 PSF Wind Load Height above ground is based on overall height to top of tower/pole					1.6 Flat Surfaces 1.3 Round Surfaces
	Conductors:		Conductor Loads Provided by NU					
* Only for structures installed after 2007								

### Communication Antennas on Transmission Structures

# Eversource Overhead Transmission Standards

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mount as specified below, and shall include the wireless communication mast and antenna loads per NESC criteria)

The strength reduction factor obtained from the field investigation shall be applied to the members or connections that are showing signs of deterioration from their original condition

With the written approval of Eversource Transmission Line Engineering on a case by case the existing structures may be analyzed initially using the current NESC code, then it is permitted to use the original design code with the original conductor load should the existing tower fail the current NESC code.

The structure shall be analyzed using yield stress theory in accordance with Attachment A, "Eversource Design Criteria." This specifies uniform loadings (different from the TIA loadings) on each of the following components of the installed facility:

- a) Wireless communication mast for its total height above ground level, including the initial and any planned future equipment (Support Platforms, Antennas, TMA's etc.) above the top of an electric transmission structure.
- b) Conductors and related devices and hardware (wire loads will be provided by Eversource).
- c) Electric Transmission Structure
  - i) The loads from the wireless communication equipment components based on NESC and Eversource Criteria in Attachment A, and from the electric conductors shall be applied to the structure at conductor and wireless communication mast attachment points, where those loads transfer to the tower.
  - ii) Shape Factor Multiplier:

NESC Structure Shape	Cd
Polyround (for polygonal steel poles)	1.3
Flat	1.6
Open Lattice	3.2
Pole with Coaxial Cable	1.6

- iii) When Coaxial Cables are mounted alongside the pole structure, the shape multiplier shall be:

Mount Type	Cable Cd	Pole Cd
Coaxial Cables on outside periphery (One layer)	1.45	1.45
Coaxial Cables mounted on stand offs	1.6	1.6

- d) The uniform loadings and factors specified for the above components in Attachment A, "Eversource Design Criteria" are based upon the National Electric Safety Code 2007 Edition Extreme Wind (Rule 250C) and Combined Ice and Wind (Rule 250B-Heavy) Loadings. These provide equivalent loadings compared to the TIA and its loads and factors with the exceptions noted above.

**Note:** The NESC does not require ice load be included in the supporting structure. (Ice on conductors and shield wire only, and Eversource will provide these loads).

- e) Mast reaction loads shall be evaluated for local effects on the transmission structure members at the attachment points.

<b>Communication Antennas on Transmission Structures</b>			
<b>Eversource</b> Approved by: CPS (CT/WMA) JCC (NH/EMA)	<b>Design</b>	<b>OTRM 059</b>	<b>Rev. 0</b>
		<b>Page 3 of 10</b>	<b>06/07/2018</b>



Job :  
Description:

Spec. Number  
Computed by  
Checked by

Page of  
Sheet of  
Date 5/26/09  
Date

**INPUT DATA**

TOWER ID: 

1068
------

Structure Height (ft) : 

115
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Wind Zone : Central CT (green)

Wind Speed : 110 mph

Tower Type :  Suspension  
 Strain

Extreme Wind Model : PCS Addition

**Shield Wire Properties:**

	BACK	AHEAD
NAME =	OPGW-012	OPGW-012
DESCRIPTION =	2-Groove	2-Groove
STRANDING =	12 #8 FOCAS	12 #8 FOCAS
DIAMETER =	0.635 in	0.635 in
WEIGHT =	0.563 lb/ft	0.563 lb/ft

**Conductor Properties:**

		BACK	AHEAD		
Number of Conductors per phase	NAME =	BITTERN	BITTERN	1	Number of Conductors per phase
	1272.000	1272.000			
	45/7 ACSR	45/7 ACSR			
	DIAMETER = 1.345 in	1.345 in			
	WEIGHT = 1.432 lb/ft	1.432 lb/ft			

Insulator Weight = 

200
-----

 lbs

Broken Wire Side = AHEAD SPAN

**Horizontal Line Tensions:**

	BACK		AHEAD	
	Shield	Conductor	Shield	Conductor
NESC HEAVY =	3,800	10,000	3,800	10,000
EXTREME WIND =	2,500	6,751	2,500	6,751
LONG. WIND =	na	na	na	na
250D COMBINED =	na	na	na	na
NESC W/O OLF =	na	na	na	na
60 DEG F NO WIND =	1,319	4,289	1,319	4,289

**Line Geometry:**

					SUM
LINE ANGLE (deg) =	BACK:	2	AHEAD:	2	3
WIND SPAN (ft) =	BACK:	210	AHEAD:	210	420
WEIGHT SPAN (ft) =	BACK:	217	AHEAD:	217	434



Job :  
Description:

Spec. Number  
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Date

**WIRE LOADING AT ATTACHMENTS**

TOWER ID: 1068

Wind Span = 420 ft  
Weight Span = 434 ft  
Total Angle = 3 degrees

Broken Wire Span = AHEAD SPAN  
Type of Insulator Attachment = SUSPENSION

**1. NESC RULE 250B Heavy Loading:**

	INTACT CONDITION			BROKEN WIRE CONDITION		
	Horizontal	Longitudinal	Vertical	Horizontal	Longitudinal	Vertical
Shield Wire =	901 lb	0 lb	826 lb	450 lb	4,369 lb	413 lb
Conductor =	1,685 lb	0 lb	2,279 lb	842 lb	11,496 lb	1,140 lb

**2. NESC RULE 250C Transverse Extreme Wind Loading:**

	Horizontal	Longitudinal	Vertical
Shield Wire =	828 lb	0 lb	244 lb
Conductor =	1,830 lb	0 lb	1,021 lb

**3. NESC RULE 250C Longitudinal Extreme Wind Loading:**

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	244 lb
Conductor =	#VALUE!	#VALUE!	1,021 lb

**4. NESC RULE 250D Extreme Ice & Wind Loading:**

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	1,127 lb
Conductor =	#VALUE!	#VALUE!	2,287 lb

**5. NESC RULE 250B w/o OLF's**

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	551 lb
Conductor =	#VALUE!	#VALUE!	1,519 lb

**6. 60 Deg. F, No Wind**

	Horizontal	Longitudinal	Vertical
Shield Wire =	69 lb	0 lb	244 lb
Conductor =	225 lb	0 lb	1,021 lb

**7. Construction**

	Horizontal	Longitudinal	Vertical
Shield Wire =	104 lb	0 lb	367 lb
Conductor =	337 lb	0 lb	1,532 lb

**NOTE: All loads include required overload factors (OLF's).**



Job :  
Description:

Spec. Number  
Computed by  
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Date 5/26/09  
Date

**INPUT DATA**

TOWER ID: 

1068
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Structure Height (ft) : 

115
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Wind Zone : Central CT (green)

Wind Speed : 110 mph

Tower Type :  Suspension  
 Strain

Extreme Wind Model : PCS Addition

**Shield Wire Properties:**

	BACK	AHEAD
NAME =	OPGW-012	OPGW-012
DESCRIPTION =	2-Groove	2-Groove
STRANDING =	12 #8 FOCAS	12 #8 FOCAS
DIAMETER =	0.635 in	0.635 in
WEIGHT =	0.563 lb/ft	0.563 lb/ft

**Conductor Properties:**

		BACK	AHEAD		
Number of Conductors per phase	1	LINNET 336 26/7 ACSR	LINNET 336 26/7 ACSR	1	Number of Conductors per phase
DIAMETER =		0.720 in	0.720 in		
WEIGHT =		0.462 lb/ft	0.462 lb/ft		

Insulator Weight = 

200
-----

 lbs

Broken Wire Side = AHEAD SPAN

**Horizontal Line Tensions:**

	BACK		AHEAD	
	Shield	Conductor	Shield	Conductor
NESC HEAVY =	3,800	5,000	3,800	5,000
EXTREME WIND =	2,500	3,464	2,500	3,464
LONG. WIND =	na	na	na	na
250D COMBINED =	na	na	na	na
NESC W/O OLF =	na	na	na	na
60 DEG F NO WIND =	1,319	1,943	1,319	1,943

**Line Geometry:**

	BACK:		AHEAD:		SUM
LINE ANGLE (deg) =	BACK:	2	AHEAD:	2	3
WIND SPAN (ft) =	BACK:	210	AHEAD:	210	420
WEIGHT SPAN (ft) =	BACK:	217	AHEAD:	217	434



Job :  
Description:

Spec. Number  
Computed by  
Checked by

Page of  
Sheet of  
Date 5/26/09  
Date

**WIRE LOADING AT ATTACHMENTS**

TOWER ID: 

1068
------

Wind Span = 

420 ft
--------

  
 Weight Span = 

434 ft
--------

  
 Total Angle = 

3 degrees
-----------

Broken Wire Span = 

AHEAD SPAN
------------

  
 Type of Insulator Attachment = 

SUSPENSION
------------

**1. NESC RULE 250B Heavy Loading:**

	INTACT CONDITION			BROKEN WIRE CONDITION		
	Horizontal	Longitudinal	Vertical	Horizontal	Longitudinal	Vertical
Shield Wire =	901 lb	0 lb	826 lb	450 lb	4,369 lb	413 lb
Conductor =	1,034 lb	0 lb	1,395 lb	517 lb	5,748 lb	697 lb

**2. NESC RULE 250C Transverse Extreme Wind Loading:**

	Horizontal	Longitudinal	Vertical
Shield Wire =	828 lb	0 lb	244 lb
Conductor =	972 lb	0 lb	601 lb

**3. NESC RULE 250C Longitudinal Extreme Wind Loading:**

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	244 lb
Conductor =	#VALUE!	#VALUE!	601 lb

**4. NESC RULE 250D Extreme Ice & Wind Loading:**

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	1,127 lb
Conductor =	#VALUE!	#VALUE!	1,529 lb

**5. NESC RULE 250B w/o OLF's**

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	551 lb
Conductor =	#VALUE!	#VALUE!	930 lb

**6. 60 Deg. F. No Wind**

	Horizontal	Longitudinal	Vertical
Shield Wire =	69 lb	0 lb	244 lb
Conductor =	102 lb	0 lb	601 lb

**7. Construction**

	Horizontal	Longitudinal	Vertical
Shield Wire =	104 lb	0 lb	367 lb
Conductor =	153 lb	0 lb	901 lb

**NOTE: All loads include required overload factors (OLF's).**

# ANTENNA MAST DESIGN

## STRUCT. NO. 1068

### 3 MECHANIC STREET DARIEN, CT 06820



VICINITY MAP



### PROJECT SUMMARY

SITE ADDRESS: 3 MECHANIC STREET  
DARIEN, CT 06820

PROJECT COORDINATES: LAT: 41°-04'-39.25N  
LON: 73°-28'-03.29W  
ELEV: ±55' AMSL

EVERSOURCE STRUCT NO: 1068

EVERSOURCE CONTACT: JOEL SZARKOWICZ  
860.728.4503

T-MOBILE SITE REF.: CT11290C

T-MOBILE CONTACT: DAN REID  
203.592.8291

ANTENNA CL HEIGHT: 124'-0"

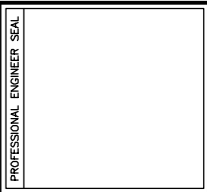
ENGINEER OF RECORD: CENTEK ENGINEERING, INC.  
63-2 NORTH BRANFORD ROAD  
BRANFORD, CT 06405

CEN TEK CONTACT: TIMOTHY J LYNN, PE  
203.433.7507

### SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	3
N-1	DESIGN BASIS & GENERAL NOTES	3
N-2	STRUCTURAL STEEL NOTES	3
MI-1	MODIFICATION INSPECTION REQUIREMENTS	3
S-1	TOWER ELEVATION & FEEDLINE PLAN	3
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REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
3	11/29/18	T.J.L.	C.A.G.	ISSUED FOR CONSTRUCTION - ADDED WELD TO S-3
2	11/19/18	T.J.L.	C.A.G.	ISSUED FOR CONSTRUCTION
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0	10/01/18	T.J.L.	C.A.G.	ISSUED FOR CONSTRUCTION



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EVERSOURCE STRUCTURE 1068

3 MECHANIC STREET  
DARIEN, CT 06820

DATE: 10/1/18  
SCALE: AS SHOWN  
JOB NO. 18058.58

**TITLE SHEET**

SHEET NO.  
**T-1**  
Sheet No. 1 of 7

## DESIGN BASIS

1. GOVERNING CODE: 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CT STATE SUPPLEMENT.
2. TIA-222-G, ASCE MANUAL NO. 48-11 – "DESIGN OF STEEL TRANSMISSION POLE STRUCTURES SECOND EDITION", NESC C2-2007 AND NORTHEAST UTILITIES DESIGN CRITERIA.
3. DESIGN CRITERIA

### WIND LOAD: (ANTENNA MAST)

NOMINAL DESIGN WIND SPEED (V) = 93 MPH (2018 CSBC: APPENDIX 'N')

### WIND LOAD: (UTILITY POLE & FOUNDATION)

BASIC WIND SPEED (V) = 110 MPH (3-SECOND GUST) BASED ON NESC C2-2007, SECTION 25 RULE 250C.

## GENERAL NOTES

1. REFER TO STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING, INC., FOR T-MOBILE, DATED 11/1/18.
2. TOWER GEOMETRY AND STRUCTURE MEMBER SIZES WERE OBTAINED FROM THE TOWER DESIGN DRAWINGS PREPARED BY UNIVERSAL POLE BRACKET CORP.; SHOP ORDER T-6291 DATED MAY 17, 1967.
3. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE GOVERNING BUILDING CODE.
4. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS SCOPE OF WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
5. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK. THIS INCLUDES VERIFYING ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA. CONTRACTOR SHALL TAKE FIELD MEASUREMENTS NECESSARY TO ASSURE PROPER FIT OF ALL FINISHED WORK.
6. PCS MAST INSTALLATION SHALL BE CONDUCTED BY FIELD CREWS EXPERIENCED IN THE ASSEMBLY AND ERECTION OF TRANSMISSION STRUCTURES. ALL SAFETY PROCEDURES, RIGGING AND ERECTION METHODS SHALL BE STANDARD TO THE INDUSTRY AND IN COMPLIANCE WITH OSHA.
7. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.
8. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
9. NO DRILLING WELDING OR TAPING IS PERMITTED ON CL&P OWNED EQUIPMENT.

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DESIGN BASIS  
AND GENERAL  
NOTES

SHEET NO.  
**N-1**  
Sheet No. 2 of 7



# STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD).
2. MATERIAL SPECIFICATIONS
  - A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
  - B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI).
  - C. STRUCTURAL STEEL (TOWER REINF. SOLID ROUND BAR)---ASTM A572\_GR50 (50 KSI)
  - D. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
  - E. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
  - F. PIPE---ASTM A53 GRADE B (FY = 35 KSI)
3. FASTENER SPECIFICATIONS
  - A. CONNECTION BOLTS---ASTM A325-N, UNLESS OTHERWISE SCHEDULED.
  - B U-BOLTS---ASTM A307
  - C. ANCHOR RODS---ASTM F1554
  - D. WELDING ELECTRODES---ASTM E70XX FOR A36 & A572\_GR50 STEELS, ASTM E80XX FOR A572\_GR65 STEEL.
  - E. BLIND BOLTS---AS1252 PROPERTY CLASS 8.8 (FU=120 KSI).
4. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
5. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
6. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
7. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
8. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
9. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
10. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
11. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
12. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES APPEARANCE AND QUALITY OF WELDS, AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING THE SCHEDULED ELECTRODES AND WELDING SHALL CONFORM TO AISC AND D1.1 WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION" 9TH EDITION. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.
13. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
14. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
15. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
16. ALL BOLTS SHALL BE INSTALLED PER THE REQUIREMENTS OF AISC 14TH EDITION & RCSC "SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH STRENGTH BOLTS".
17. ALL BOLTS SHALL BE INSTALLED AS SNUG-TIGHT CONNECTIONS UNLESS OTHERWISE INDICATED. CONNECTIONS SPECIFIED AS PRETENSIONED OR SLIP-CRITICAL SHALL BE TIGHTENED TO A BOLT TENSION NOT LESS THAN THAT GIVEN IN TABLE J3.1 OF AISC 14TH EDITION.
18. LOCK WASHER ARE NOT PERMITTED FOR A325 BOLTED STEEL ASSEMBLIES.
19. LOAD INDICATOR WASHERS SHALL BE UTILIZED ON ALL PRETENSIONED OR SLIP-CRITICAL CONNECTIONS.
20. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
21. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
22. FABRICATE BEAMS WITH MILL CAMBER UP.
23. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
24. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.

REV.	DATE	BY	DESCRIPTION
3	11/29/18	T.J.L.	CAG ISSUED FOR CONSTRUCTION - ADDED WELD TO S-3
2	11/19/18	T.J.L.	CAG
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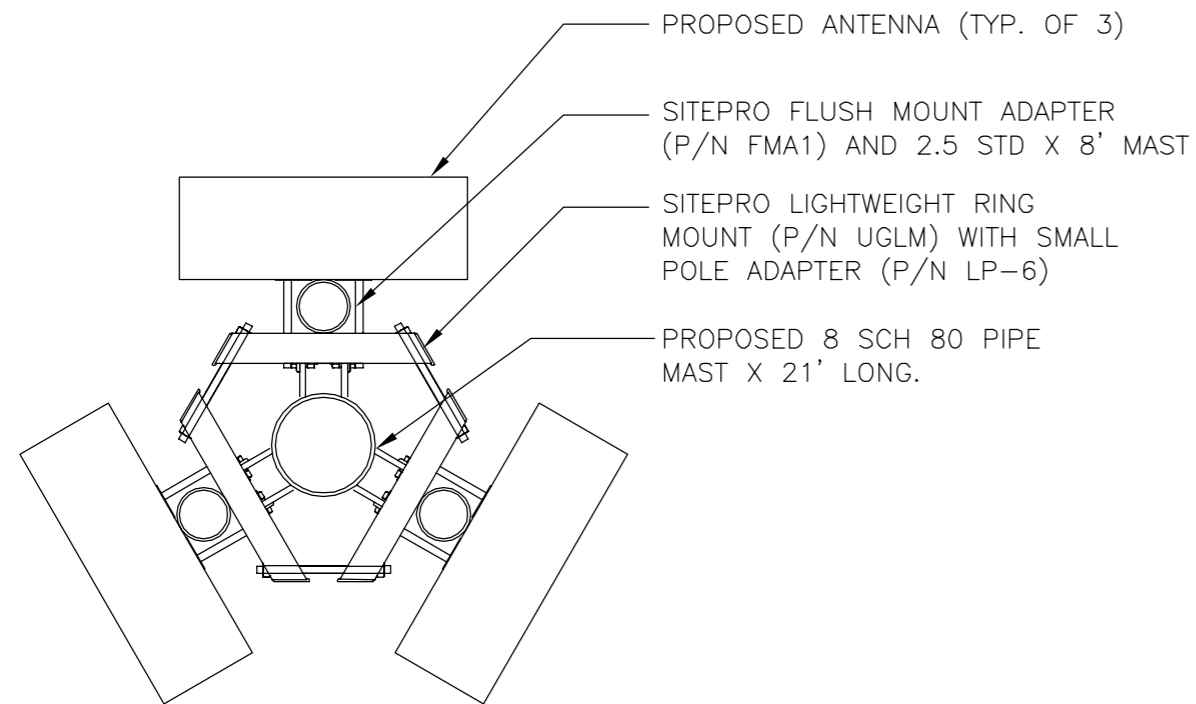
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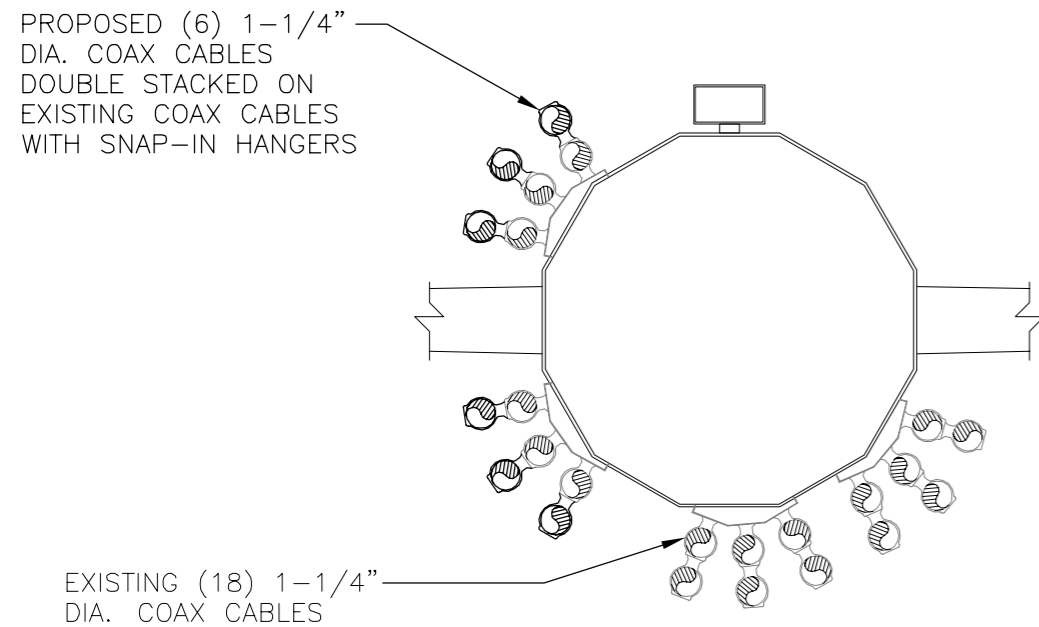
STRUCTURAL  
 STEEL NOTES



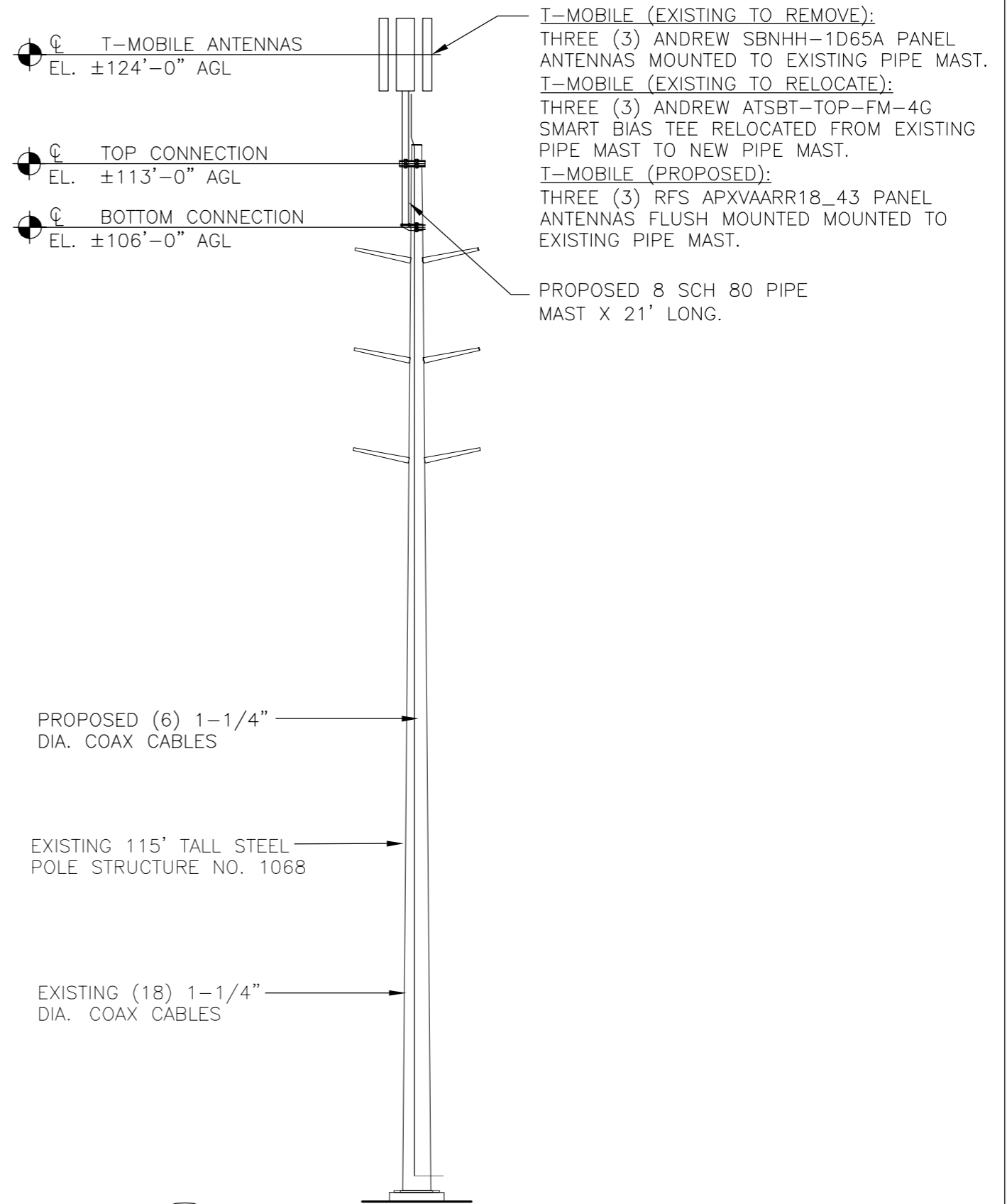




**2** ANTENNA MOUNTING DETAIL  
S-1 SCALE: 3/4" = 1'-0"



**3** COAX CABLE PLAN  
S-1 SCALE: NTS



**1** TOWER + MAST ELEVATION  
EL-1 SCALE: NOT TO SCALE

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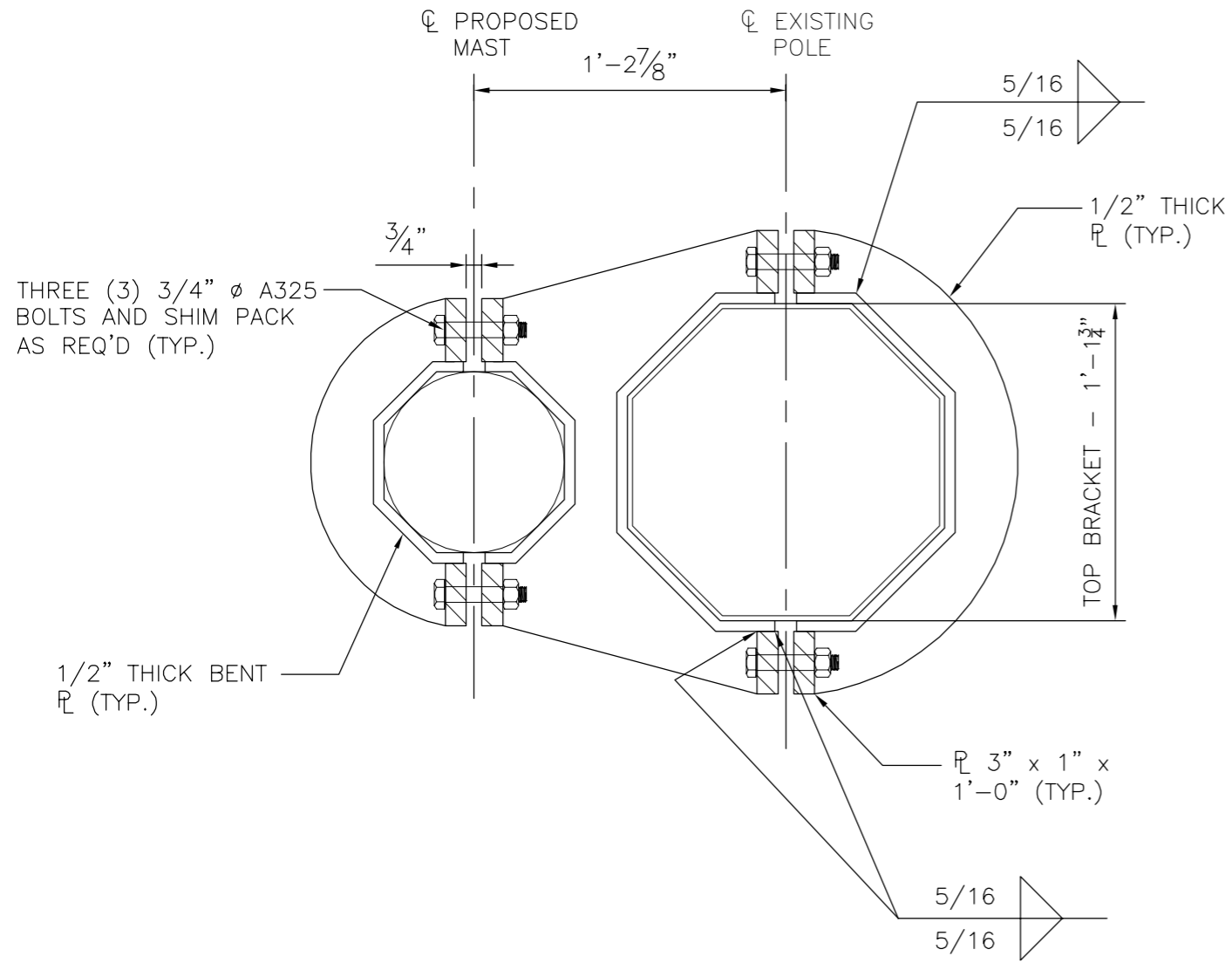
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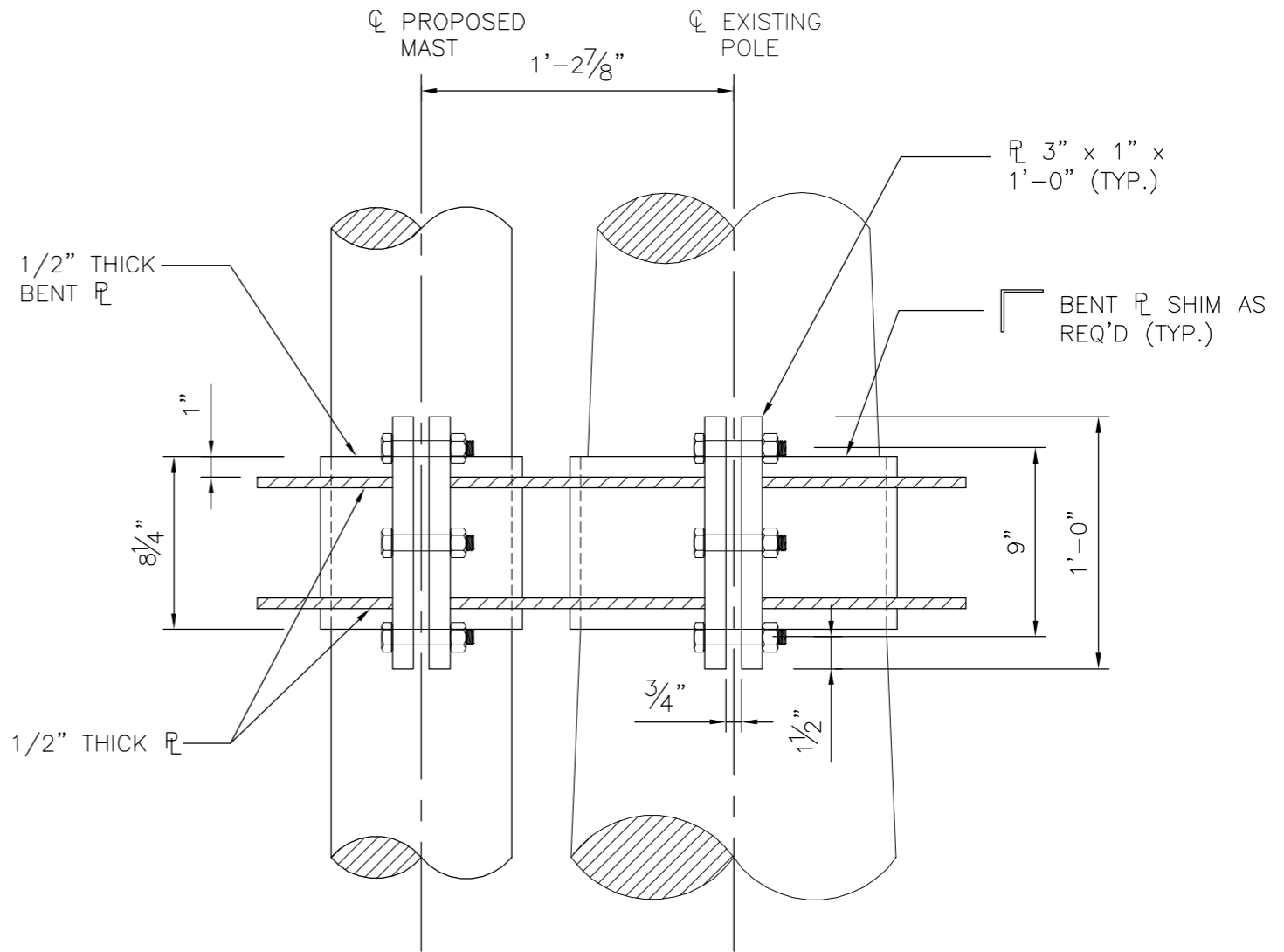
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TOWER  
ELEVATION AND  
FEEDLINE PLAN

SHEET NO.  
**S-1**  
Sheet No. 5 of 7



**2** TOP BRACKET PLAN VIEW  
S-2 SCALE: 1-1/2" = 1'-0"



**1** TOP BRACKET DETAIL  
S-2 SCALE: 1-1/2" = 1'-0"

**NOTE:**  
1. POLE TAPER = 0.2099"/FT (V.I.F.)

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REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION

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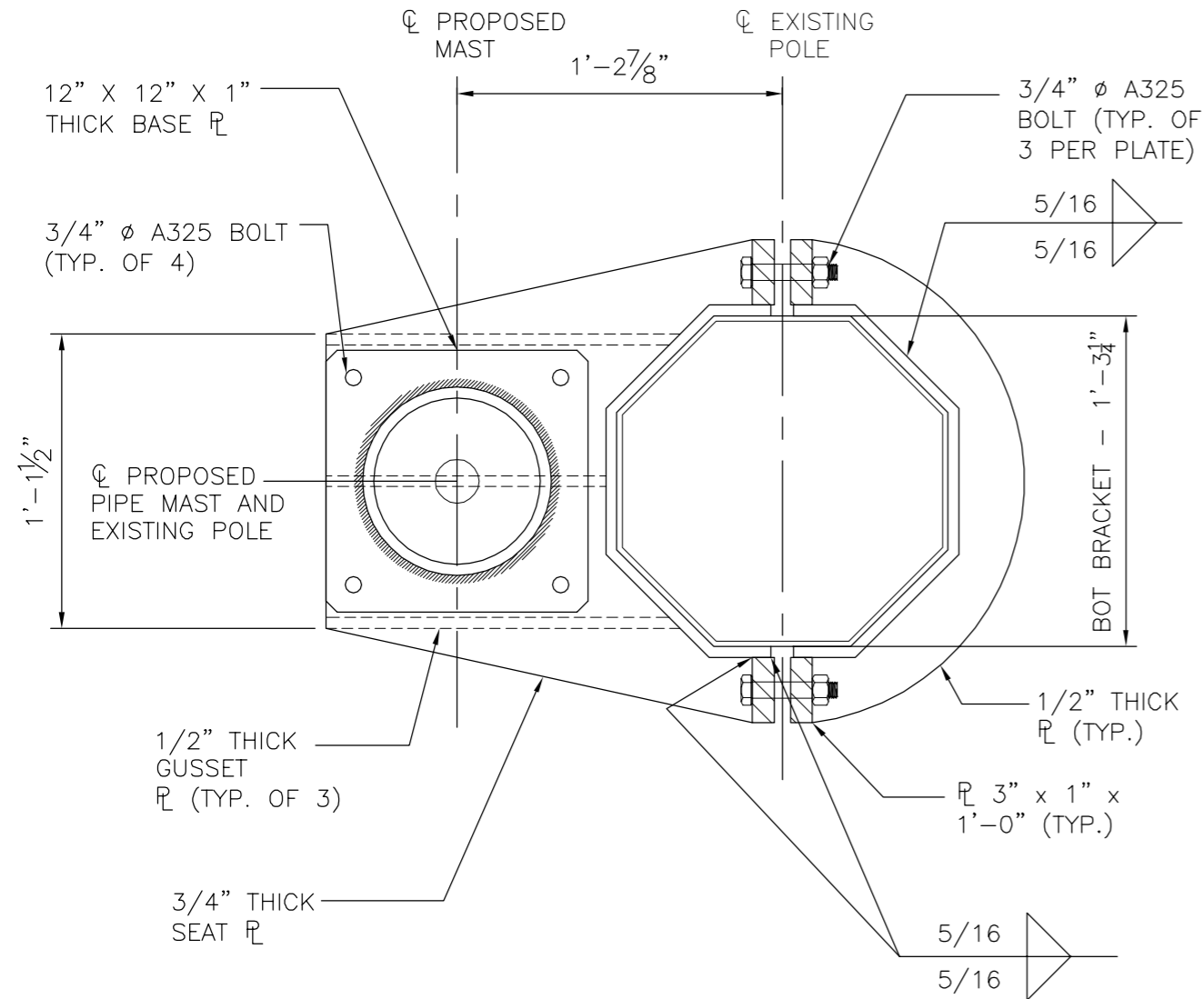
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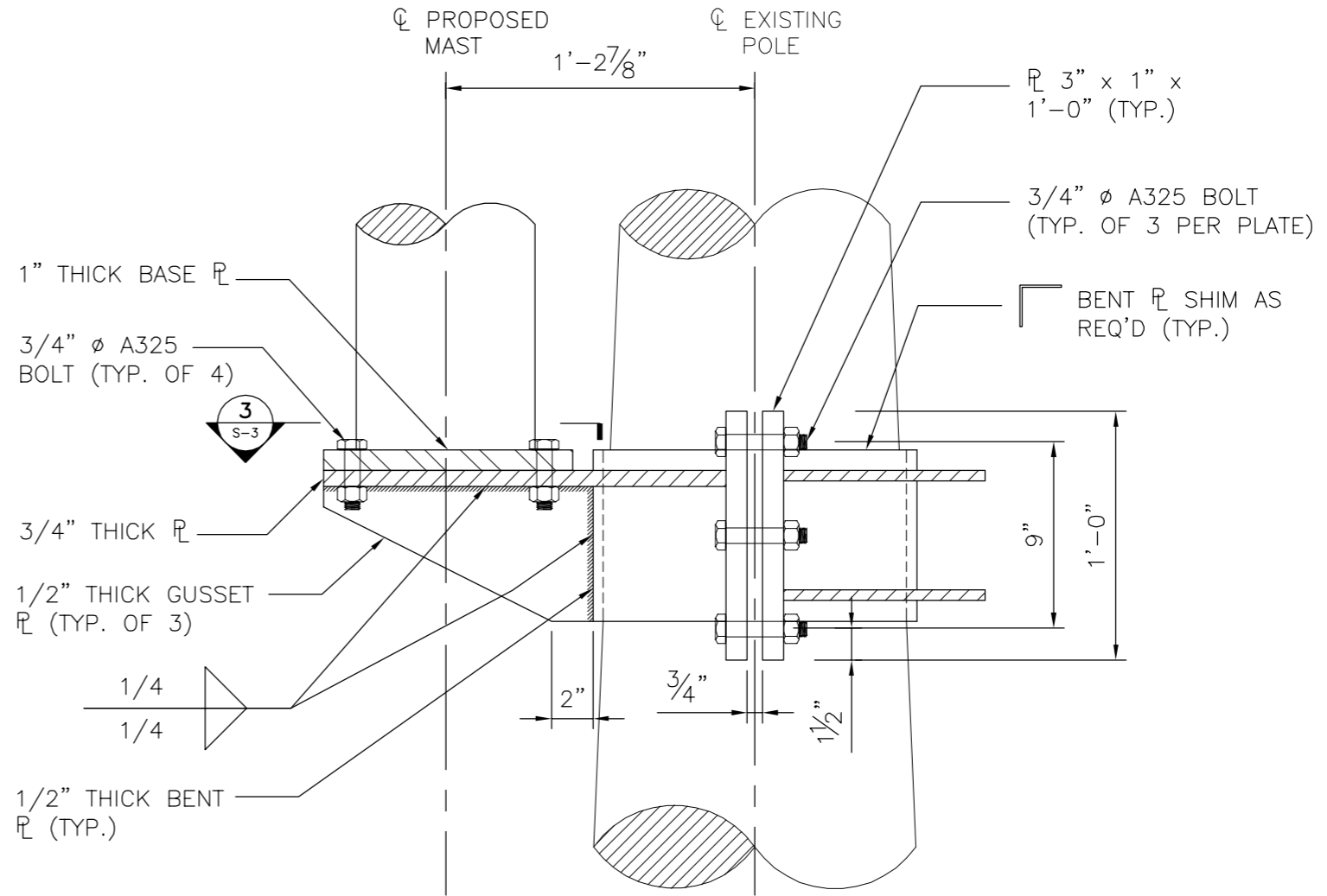
TOP CONNECTION DETAILS

SHEET NO.  
**S-2**  
Sheet No. 6 of 7

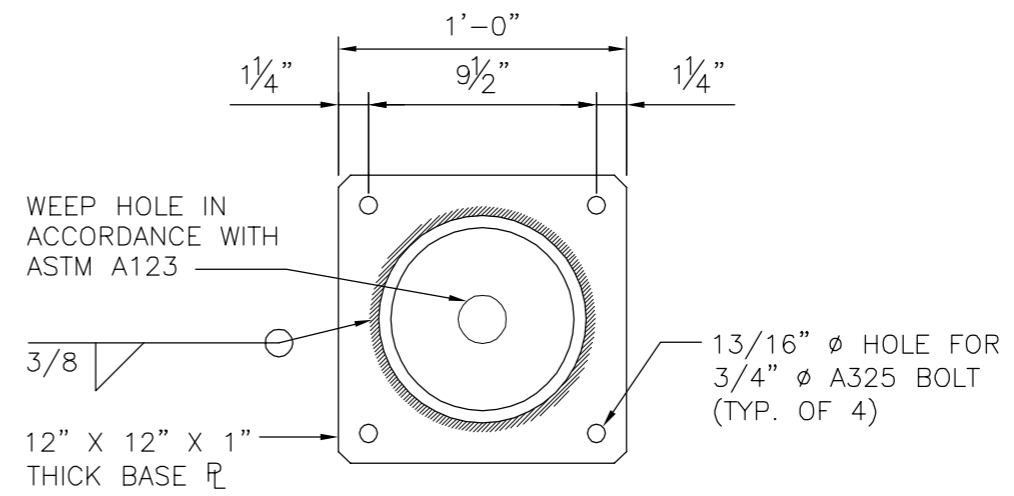


**2** **BOTTOM BRACKET PLAN VIEW**  
S-3 SCALE: 1-1/2" = 1'-0"

**NOTE:**  
1. POLE TAPER = 0.2099"/FT (V.I.F.)



**1** **BOTTOM BRACKET DETAIL**  
S-3 SCALE: 1-1/2" = 1'-0"



**3** **BOTTOM PLATE DETAIL**  
S-3 SCALE: 1" = 1'-0"

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2	11/19/18	T.J.L.	CAG	ISSUED FOR CONSTRUCTION
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**BOTTOM CONNECTION DETAILS**

SHEET NO. **S-3**  
Sheet No. 3 of 7

**Development of Design Heights, Exposure Coefficients,  
 and Velocity Pressures Per TIA-222-G**

**Wind Speeds**

Basic Wind Speed  $V := 93$  mph (User Input - 2016 CSBC Appendix N)  
 Basic Wind Speed with Ice  $V_i := 50$  mph (User Input per Annex B of TIA-222-G)

**Input**

Structure Type = Structure\_Type := Pole (User Input)  
 Structure Category = SC := III (User Input)  
 Exposure Category = Exp := C (User Input)  
 Structure Height = h := 115 ft (User Input)  
 Height to Center of Antennas =  $z_{ant} := 124$  ft (User Input)  
 Radial Ice Thickness =  $t_i := 0.75$  in (User Input per Annex B of TIA-222-G)  
 Radial Ice Density =  $\rho_d := 56.00$  pcf (User Input)  
 Topographic Factor =  $K_{zt} := 1.0$  (User Input)  
 $K_a := 1.0$  (User Input)  
 Gust Response Factor =  $G_H := 1.35$  (User Input)

**Output**

Wind Direction Probability Factor =  $K_d := \begin{cases} 0.95 & \text{if Structure\_Type = Pole} \\ 0.85 & \text{if Structure\_Type = Lattice} \end{cases} = 0.95$  (Per Table 2-2 of TIA-222-G)

Importance Factors =  $I_{Wind} := \begin{cases} 0.87 & \text{if SC = 1} \\ 1.00 & \text{if SC = 2} \\ 1.15 & \text{if SC = 3} \end{cases} = 1.15$  (Per Table 2-3 of TIA-222-G)

$I_{Wind\_w\_Ice} := \begin{cases} 0 & \text{if SC = 1} \\ 1.00 & \text{if SC = 2} \\ 1.00 & \text{if SC = 3} \end{cases} = 1$

$I_{ice} := \begin{cases} 0 & \text{if SC = 1} \\ 1.00 & \text{if SC = 2} \\ 1.25 & \text{if SC = 3} \end{cases} = 1.25$

$$K_{iz} := \left( \frac{z_{ant}}{33} \right)^{0.1} = 1.142$$

$$t_{iz,ant} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 2.14$$

Velocity Pressure Coefficient Antennas =  $K_{z_{ant}} := 2.01 \left( \frac{z_{ant}}{z_g} \right)^{\frac{2}{\alpha}} = 1.324$

Velocity Pressure w/o Ice Antennas =  $q_{z_{ant}} := 0.00256 \cdot K_d \cdot K_{z_{ant}} \cdot V^2 \cdot I_{Wind} = 32.033$

Velocity Pressure with Ice Antennas =  $q_{ice,ant} := 0.00256 \cdot K_d \cdot K_{z_{ant}} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 8.051$

**Development of Wind & Ice Load on Mast**

**Mast Data:**

	(8" Sch. 80 Pipe)	(User Input)
Mast Shape =	Round	(User Input)
Mast Diameter =	$D_{mast} := 8.625$ in	(User Input)
Mast Length =	$L_{mast} := 22$ ft	(User Input)
Mast Thickness =	$t_{mast} := 0.5$ in	(User Input)
Velocity Coefficient =	$C := \sqrt{I \cdot Kz_{ant}} \cdot V \cdot \frac{D_{mast}}{12} = 77$	
Mast Force Coefficient =	$CF_{mast} = 0.6$	

**Wind Load (without ice)**

Mast Projected Surface Area =  $A_{mast} := \frac{D_{mast}}{12} = 0.719$  s/ft

Total Mast Wind Force =  $qz_{ant} \cdot G_H \cdot CF_{mast} \cdot A_{mast} = 19$  plf **BLC 5**

**Wind Load (with ice)**

Mast Projected Surface Area w/ Ice =  $A_{ICE_{mast}} := \frac{(D_{mast} + 2 \cdot t_{iz. ant})}{12} = 1.075$  s/ft

Total Mast Wind Force w/ Ice =  $qz_{ice. ant} \cdot G_H \cdot CF_{mast} \cdot A_{ICE_{mast}} = 7$  plf **BLC 4**

**Gravity Loads (without ice)**

Weight of the mast = Self Weight (Computed internally by Risa-3D) plf **BLC 1**

**Gravity Loads (ice only)**

Ice Area per Linear Foot =  $A_{i_{mast}} := \frac{\pi}{4} \left[ (D_{mast} + t_{iz. ant} \cdot 2)^2 - D_{mast}^2 \right] = 72.4$  sq in

Weight of Ice on Mast =  $W_{ICE_{mast2}} := Id \cdot \frac{A_{i_{mast}}}{144} = 28$  plf **BLC 3**

**Development of Wind & Ice Load on Antennas**

**Antenna Data:**

Antenna Model =	RFSAPXVAARR18_43	
Antenna Shape =	Flat	(User Input)
Antenna Height =	$L_{ant} := 72$	in (User Input)
Antenna Width =	$W_{ant} := 24$	in (User Input)
Antenna Thickness =	$T_{ant} := 8.5$	in (User Input)
Antenna Weight =	$WT_{ant} := 132$	lbs (User Input)
Number of Antennas =	$N_{ant} := 3$	(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 3.0$	
Antenna Force Coefficient =	$Ca_{ant} = 1.22$	

**Wind Load (without ice)**

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 12$	sf
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 36$	sf

**Total Antenna Wind Force =**  $F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 1903$  lbs **BLC 5**

**Wind Load (with ice)**

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{iz,ant}) \cdot (W_{ant} + 2 \cdot t_{iz,ant})}{144} = 15$	sf
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 44.9$	sf

**Total Antenna Wind Force w/ Ice =**  $F_{i,ant} := qz_{ice,ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 597$  lbs **BLC 4**

**Gravity Load (without ice)**

**Weight of All Antennas =**  $WT_{ant} \cdot N_{ant} = 396$  lbs **BLC 2**

**Gravity Loads (ice only)**

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1 \times 10^4$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz,ant}) \cdot (W_{ant} + 2 \cdot t_{iz,ant}) \cdot (T_{ant} + 2 \cdot t_{iz,ant}) - V_{ant} = 1 \times 10^4$	cu in

Weight of Ice on Each Antenna =  $W_{ICEant} := \frac{V_{ice}}{1728} \cdot \rho_{ice} = 418$  lbs

**Weight of Ice on All Antennas =**  $W_{ICEant} \cdot N_{ant} = 1253$  lbs **BLC 3**

**Development of Wind & Ice Load on Antennas**

**Antenna Data:**

Antenna Model =	CommscopeATSBT-TOP-FM-4G Bias Tee		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 5.63$	in	(User Input)
Antenna Width =	$W_{ant} := 3.7$	in	(User Input)
Antenna Thickness =	$T_{ant} := 2.0$	in	(User Input)
Antenna Weight =	$WT_{ant} := 2$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.5$		
Antenna Force Coefficient =	$Ca_{ant} = 1.2$		

**Wind Load (without ice)**

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.1$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 0.4$	sf	
<b>Total Antenna Wind Force =</b>	<b><math>F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 23</math></b>	lbs	<b>BLC 5</b>

**Wind Load (with ice)**

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{iz,ant}) \cdot (W_{ant} + 2 \cdot t_{iz,ant})}{144} = 0.5$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 1.6$	sf	
<b>Total Antenna Wind Force w/ Ice =</b>	<b><math>F_{ant} := qz_{ice,ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 21</math></b>	lbs	<b>BLC 4</b>

**Gravity Load (without ice)**

<b>Weight of All Antennas =</b>	<b><math>WT_{ant} \cdot N_{ant} = 6</math></b>	lbs	<b>BLC 2</b>
---------------------------------	--	-----	--------------

**Gravity Loads (ice only)**

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 42$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz,ant}) \cdot (W_{ant} + 2 \cdot t_{iz,ant}) \cdot (T_{ant} + 2 \cdot t_{iz,ant}) - V_{ant} = 455$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot \rho_d = 15$	lbs	
<b>Weight of Ice on All Antennas =</b>	<b><math>W_{ICEant} \cdot N_{ant} = 44</math></b>	lbs	<b>BLC 3</b>

**Development of Wind & Ice Load on Antenna Mounts**

**Mount Data:**

Mount Type: Lightweight Ring Mount with Flush Adapters

Mount Shape = Flat (User Input)

Mount Projected Surface Area =  $CaAa := 0$  sf (User Input)

Mount Projected Surface Area w/ Ice =  $CaAa_{ice} := 0$  sf (User Input)

Mount Weight =  $WT_{mnt} := 305$  lbs (User Input)

Mount Weight w/ Ice =  $WT_{mnt.ice} := 425$  lbs

**Wind Load (without ice)**

Total Mount Wind Force =  $F_{mnt} := qz_{ant} \cdot G_H \cdot CaAa = 0$  lbs **BLC 5**

**Wind Load (with ice)**

Total Mount Wind Force =  $F_{mnt} := qz_{ice.ant} \cdot G_H \cdot CaAa_{ice} = 0$  lbs **BLC 4**

**Gravity Loads (without ice)**

Weight of All Mounts =  $WT_{mnt} = 305$  lbs **BLC 2**

**Gravity Loads (ice only)**

Weight of Ice on All Mounts =  $WT_{mnt.ice} - WT_{mnt} = 120$  lbs **BLC 3**



**Development of Wind & Ice Load on Coax Cables**

**Coax Cable Data:**

Coax Type =	HELIAX 1-1/4"	
Shape =	Round	(User Input)
Coax Outside Diameter =	$D_{\text{coax}} := 1.55$	in (User Input)
Coax Cable Length =	$L_{\text{coax}} := 15$	ft (User Input)
Weight of Coax per foot =	$W_{t_{\text{coax}}} := 0.66$	plf (User Input)
Total Number of Coax =	$N_{\text{coax}} := 24$	(User Input)
Total Number of Exterior Coax =	$N_{e_{\text{coax}}} := 24$	(User Input)
No. of Coax Projecting Outside Face of Mast =	$NP_{\text{coax}} := 4$	(User Input)
Coax aspect ratio,	$Ar_{\text{coax}} := \frac{(L_{\text{coax}} \cdot 12)}{D_{\text{coax}}} = 116.1$	
Coax Cable Force Factor Coefficient =	$Ca_{\text{coax}} = 1.2$	

**Wind Load (without ice)**

Coax projected surface area =  $A_{\text{coax}} := \frac{(NP_{\text{coax}} \cdot D_{\text{coax}})}{12} = 0.5$  s/ft

Total Coax Wind Force =  $F_{\text{coax}} := Ca_{\text{coax}} \cdot qz_{\text{ant}} \cdot G_H \cdot A_{\text{coax}} = 27$  plf **BLC 5**

**Wind Load (with ice)**

Coax projected surface area w/ Ice =  $A_{\text{ICE}_{\text{coax}}} := \frac{(NP_{\text{coax}} \cdot D_{\text{coax}} + 2 \cdot t_{\text{iz. ant}})}{12} = 0.9$  s/ft

Total Coax Wind Force w/ Ice =  $F_{i_{\text{coax}}} := Ca_{\text{coax}} \cdot qz_{\text{ice. ant}} \cdot G_H \cdot A_{\text{ICE}_{\text{coax}}} = 11$  plf **BLC 4**

**Gravity Loads (without ice)**

Weight of all cables w/o ice  $WT_{\text{coax}} := W_{t_{\text{coax}}} \cdot N_{\text{coax}} = 16$  plf **BLC 2**

**Gravity Loads (ice only)**

Ice Area per Linear Foot =  $A_{i_{\text{coax}}} := \frac{\pi}{4} [(D_{\text{coax}} + 2 \cdot t_{\text{iz. ant}})^2 - D_{\text{coax}}^2] = 24.8$  sq in

Ice Weight All Coax per foot =  $WT_{i_{\text{coax}}} := N_{\text{coax}} \cdot Id \cdot \frac{A_{i_{\text{coax}}}}{144} = 232$  plf **BLC 3**

**(Global) Model Settings**

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI 1999: ASD
Wood Code	AF&PA NDS-91/97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-02
Masonry Code	ACI 530-05: ASD
Aluminum Code	AA ADM1-05: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

**(Global) Model Settings, Continued**

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Om Z	1
Om X	1
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1.5
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	0
Footing Concrete f'c (ksi)	3
Footing Concrete Ec (ksi)	4000
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	3.5
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

**Hot Rolled Steel Properties**

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	58	1.2
3	A992	29000	11154	.3	.65	.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1
6	A53 Gr. B	29000	11154	.3	.65	.49	35	1.5	58	1.2

### Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in <sup>2</sup> ]	I <sub>yy</sub> [in <sup>4</sup> ]	I <sub>zz</sub> [in <sup>4</sup> ]	J [in <sup>4</sup> ]
1	Existing Mast	PIPE_8.0X	Column	Wide Flange	A53 Gr. B	Typical	11.9	100	100	199

### Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	L <sub>byy</sub> [ft]	L <sub>bzz</sub> [ft]	L <sub>comp top</sub> [ft]	L <sub>comp bot</sub> [ft]	L-torqu...	K <sub>yy</sub>	K <sub>zz</sub>	C <sub>b</sub>	Function
1	M1	Existing Mast	21			L <sub>byy</sub>						Lateral

### Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	BOTMA...	TOPMA...			Existing Mast	Column	Wide Flange	A53 Gr. B	Typical

### Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	BOTMAST	0	0	0	0	
2	TOPCONNECTION	0	7	0	0	
3	TOPMAST	0	21	0	0	

### Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	TOPCONNECTION	Reaction		Reaction			
2	BOTMAST	Reaction	Reaction	Reaction		Reaction	

### Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.396	18
2	M1	Y	-.006	18
3	M1	Y	-.305	18

### Member Point Loads (BLC 3 : Weight of Ice Only)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-1.253	18
2	M1	Y	-.044	18
3	M1	Y	-.12	18

### Member Point Loads (BLC 4 : TIA Wind with Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.597	18
2	M1	X	.021	18

### Member Point Loads (BLC 5 : TIA Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	1.903	18
2	M1	X	.023	18

**Member Distributed Loads (BLC 2 : Weight of Appurtenances)**

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...]	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-0.16	-0.16	9	15

**Member Distributed Loads (BLC 3 : Weight of Ice Only)**

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...]	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-0.028	-0.028	0	0
2	M1	Y	-0.232	-0.232	9	15

**Member Distributed Loads (BLC 4 : TIA Wind with Ice)**

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.007	.007	0	15
2	M1	X	.011	.011	9	15

**Member Distributed Loads (BLC 5 : TIA Wind)**

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.019	.019	0	15
2	M1	X	.027	.027	9	15

**Basic Load Cases**

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Self Weight	None		-1						
2	Weight of Appurtenances	None					3	1		
3	Weight of Ice Only	None					3	2		
4	TIA Wind with Ice	None					2	2		
5	TIA Wind	None					2	2		

**Load Combinations**

	Description	So...	P...	S...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...
1	1.2D + 1.6W	Yes	Y		1	1.2	2	1.2	5	1.6				
2	0.9D + 1.6W	Yes	Y		1	.9	2	.9	5	1.6				
3	1.2D + 1.0Di + 1.0...	Yes	Y		1	1.2	2	1.2	3	1	4	1		

**Envelope Joint Reactions**

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	TOPCONNEC...	max	-1.829	3	0	3	0	3	0	3	0	3	0	3
2		min	-8.88	1	0	1	0	1	0	1	0	1	0	1
3	BOTMAST	max	5.084	1	5.381	3	0	3	0	3	0	3	0	3
4		min	1.04	3	1.488	2	0	1	0	1	0	1	0	1
5	Totals:	max	-0.789	3	5.381	3	0	3						
6		min	-3.797	1	1.488	2	0	1						



**Envelope Joint Displacements**

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [... LC	Y Rotation [... LC	Z Rotation [... LC			
1	BOTMAST	max	0	3	0	3	0	3	0	3	0	3	2.531e-03	1
2		min	0	1	0	1	0	1	0	1	0	1	5.183e-04	3
3	TOPCONNECT...	max	0	3	0	2	0	3	0	3	0	3	-1.088e-03	3
4		min	0	1	-0.002	3	0	1	0	1	0	1	-5.308e-03	1
5	TOPMAST	max	2.397	1	0	2	0	3	0	3	0	3	-3.546e-03	3
6		min	.49	3	-0.003	3	0	1	0	1	0	1	-1.734e-02	1

**Envelope AISC 14th(360-10): LRFD Steel Code Checks**

Member	Shape	Code Check	Loc...	LC	Shea..Loc.....	L..phi*Pn..	phi*Pn..	phi*M...	phi*M... ..	Eqn
1	M1	PIPE_8.0X	.450	7	1	.047	7	1	254.613 374.85 81.375 81.375	1..H1-1b

### **Joint Reactions**

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	TOPCONNECTION	-8.88	0	0	0	0	0
2	1	BOTMAST	5.084	1.984	0	0	0	0
3	1	Totals:	-3.797	1.984	0			
4	1	COG (ft):	X: 0	Y: 13.794	Z: 0			

### **Joint Reactions**

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	TOPCONNECTION	-8.875	0	0	0	0	0
2	2	BOTMAST	5.078	1.488	0	0	0	0
3	2	Totals:	-3.797	1.488	0			
4	2	COG (ft):	X: 0	Y: 13.794	Z: 0			

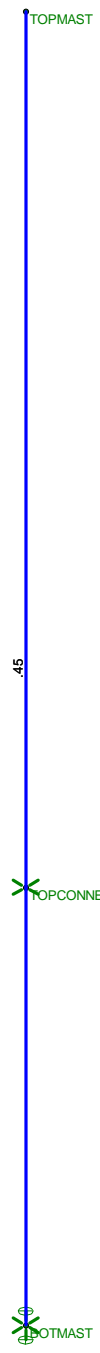


### **Joint Reactions**

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	TOPCONNECTION	-1.829	0	0	0	0	0
2	3	BOTMAST	1.04	5.381	0	0	0	0
3	3	Totals:	-0.789	5.381	0			
4	3	COG (ft):	X: 0	Y: 14.078	Z: 0			

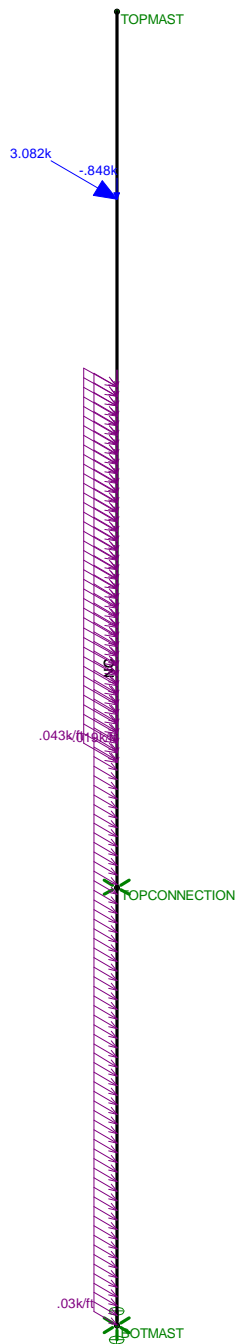


Code Check (Env)	
Black	No Calc
Red	> 1.0
Magenta	.90-1.0
Green	.75-.90
Cyan	.50-.75
Blue	0-.50



Member Code Checks Displayed (Enveloped)  
Envelope Only Solution

CEN TEK	Structure #1068 - Mast Unity Check	
TJL		Oct 31, 2018 at 3:40 PM
18058.58 /T-Mobile CT112...		TIA.r3d



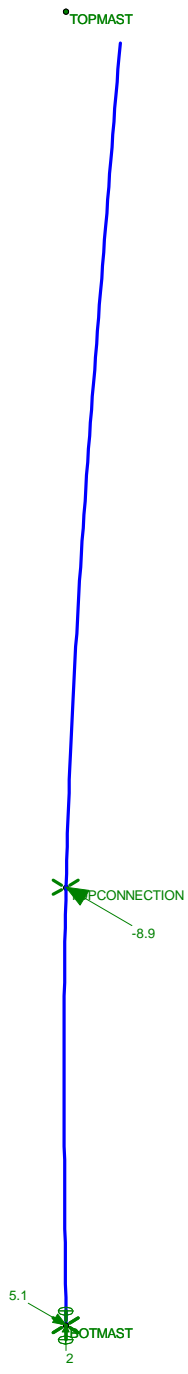
Member Code Checks Displayed  
Loads: LC 1, 1.2D + 1.6W

CEN TEK	Structure #1068 - Mast LC #1 Loads	Oct 31, 2018 at 3:40 PM
TJL		TIA.r3d
18058.58 /T-Mobile CT112...		



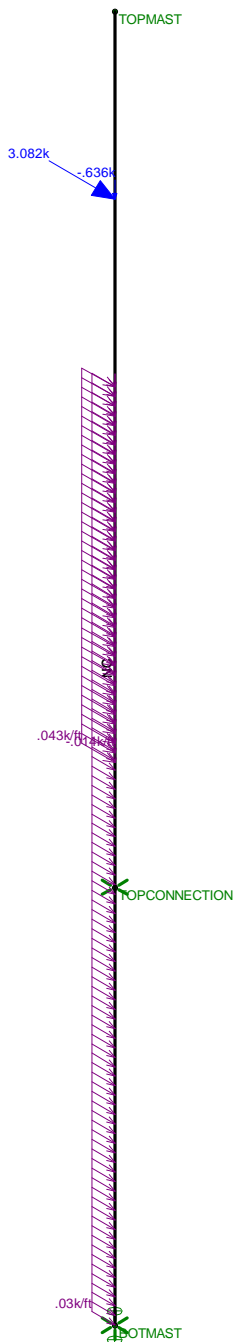
Code Check (LC 1)

Black	No Calc
Red	> 1.0
Magenta	.90-1.0
Green	.75-.90
Cyan	.50-.75
Blue	0-.50



Member Code Checks Displayed  
Results for LC 1, 1.2D + 1.6W  
Reaction and Moment Units are k and k-ft

CENTEK	Structure #1068 - Mast LC #1 Reactions and Deflected Shape	Oct 31, 2018 at 3:41 PM
TJL		TIA.r3d
18058.58 /T-Mobile CT112...		



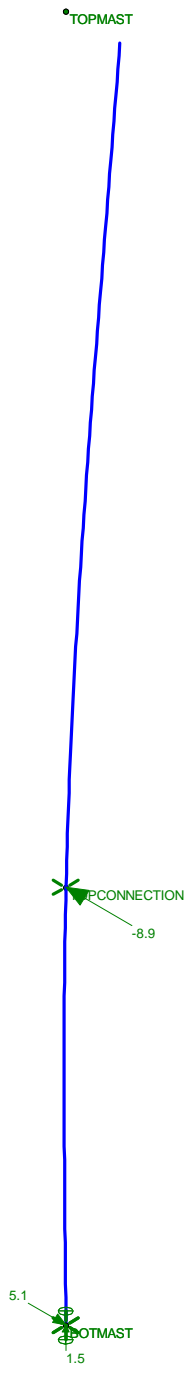
Member Code Checks Displayed  
Loads: LC 2, 0.9D + 1.6W

CEN TEK	Structure #1068 - Mast LC #2 Loads	Oct 31, 2018 at 3:41 PM
TJL		TIA.r3d
18058.58 /T-Mobile CT112...		



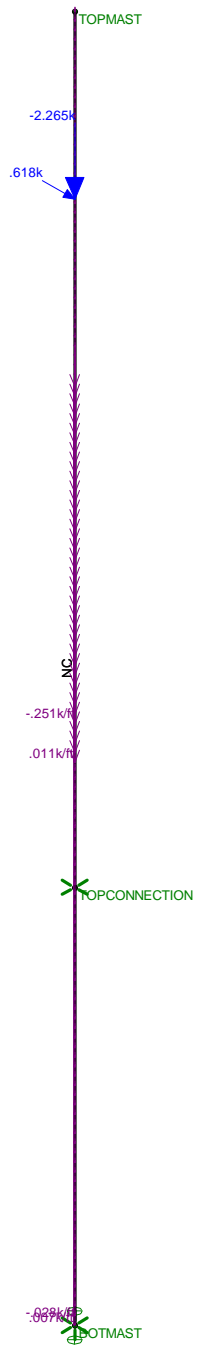
Code Check (LC 2)

No Calc
> 1.0
.90-1.0
.75-.90
.50-.75
0-.50



Member Code Checks Displayed  
Results for LC 2, 0.9D + 1.6W  
Reaction and Moment Units are k and k-ft

CEN TEK	Structure #1068 - Mast LC #2 Reactions and Deflected Shape	Oct 31, 2018 at 3:42 PM
TJL		TIA.r3d
18058.58 /T-Mobile CT112...		



Member Code Checks Displayed  
Loads: LC 3, 1.2D + 1.0Di + 1.0Wi

CEN TEK	Structure #1068 - Mast LC #3 Loads	Oct 31, 2018 at 3:41 PM
TJL		TIA.r3d
18058.58 /T-Mobile CT112...		



Code Check (LC 3)	
No Calc	
> 1.0	
.90-1.0	
.75-.90	
.50-.75	
0-.50	

TOPMAST

TOPCONNECTION  
-1.8

1  
BOTMAST  
5.4

Member Code Checks Displayed  
Results for LC 3, 1.2D +1.0Di + 1.0Wi  
Reaction and Moment Units are k and k-ft

CENTEK

TJL

18058.58 /T-Mobile CT112...

Structure #1068 - Mast  
LC #3 Reactions and Deflected Shape

Oct 31, 2018 at 3:42 PM

TIA.r3d



**Mast Top Connection:**

**Maximum Design Reactions at Brace:**

Vertical =	Vert := 0-kips	(User Input)
Horizontal =	Horz := 8.9-kips	(User Input)
Moment =	Moment := 0	(User Input)

**Bolt Data:**

Bolt Grade =	A325	(User Input)
Number of Bolts =	$n_b := 6$	(User Input)
Bolt Diameter =	$d_b := 0.75\text{in}$	(User Input)
Nomianl Tensile Strength =	$F_{nt} := 90\text{-ksi}$	(User Input)
Nomianl Shear Strength =	$F_{nv} := 54\text{-ksi}$	(User Input)
Resistance Factor =	$\phi := 0.75$	(User Input)
Bolt Eccentricity from C.L. Mast =	$e := 14.875\text{-in}$	(User Input)
Vertical Spacing Between Top and Bottom Bolts =	$S_{vert} := 9\text{-in}$	(User Input)
Horizontal Spacing Between Bolts =	$S_{horz} := 17.75\text{-in}$	(User Input)
BoltArea =	$a_b := \frac{1}{4} \cdot \pi \cdot d_b^2 = 0.442\text{-in}^2$	

**Check Bolt Stresses:**

**Wind Acting Parallel to Stiffener Plate:**

Shear Stress per Bolt =

$$f_v := \frac{\text{Vert}}{n_b \cdot a_b} = 0 \text{ ksi}$$

$$\text{Condition1} := \text{if}(f_v < \phi \cdot F_{nv}, \text{"OK"}, \text{"Overstressed"})$$

Condition1 = "OK"

$$\frac{f_v}{(\phi \cdot F_{nv})} = 0\%$$

Tensile Stress Adjusted for Shear =

$$F'_{nt} := \begin{cases} \left( 1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v \right) & \text{if } 1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v \leq F_{nt} = 90 \text{ ksi} \\ F_{nt} & \text{otherwise} \end{cases}$$

Tension Force Each Bolt =

$$F_{\text{tension.bolt}} := \frac{\text{Horz}}{n_b} + \frac{\text{Vert} \cdot e}{S_{\text{vert}} \cdot 2} = 1.483 \text{ kips}$$

Tension Stress Each Bolt =

$$f_t := \frac{F_{\text{tension.bolt}}}{a_b} = 3.4 \text{ ksi}$$

$$\text{Condition2} := \text{if}(f_t < \phi \cdot F'_{nt}, \text{"OK"}, \text{"Overstressed"})$$

Condition2 = "OK"

$$\frac{f_t}{(\phi \cdot F'_{nt})} = 5\%$$

**Wind Acting Perpendicular to Stiffener Plate:**

Shear Stress per Bolt =

$$f_v := \frac{\sqrt{\text{Vert}^2 + \text{Horz}^2}}{n_b \cdot a_b} = 3.358 \text{ ksi}$$

$$\text{Condition3} := \text{if}(f_v < \phi \cdot F_{nv}, \text{"OK"}, \text{"Overstressed"})$$

Condition3 = "OK"

$$\frac{f_v}{(\phi \cdot F_{nv})} = 8.3\%$$

Tensile Stress Adjusted for Shear =

$$F'_{nt} := \begin{cases} \left( 1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v \right) & \text{if } 1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v \leq F_{nt} = 90 \text{ ksi} \\ F_{nt} & \text{otherwise} \end{cases}$$

Tension Force per Bolt =

$$F_{\text{tension.conn}} := \frac{\text{Horz} \cdot e}{n_b} + \frac{\text{Vert} \cdot e}{S_{\text{vert}} \cdot 2} = 2.486 \text{ kips}$$

Tension Stress Each Bolt =

$$f_t := \frac{F_{\text{tension.conn}}}{a_b} = 5.627 \text{ ksi}$$

$$\text{Condition4} := \text{if}(f_t < \phi \cdot F'_{nt}, \text{"OK"}, \text{"Overstressed"})$$

Condition4 = "OK"

$$\frac{f_t}{(\phi \cdot F'_{nt})} = 8.3\%$$

**Mast Connection to Bottom Bracket:**

**Design Reactions at Brace:**

Axial = Axial := 2.0-kips (User Input)  
 Shear = Shear := 5.1-kips (User Input)  
 Moment = Moment := 0-kips-ft (User Input)

**Anchor Bolt Data:**

Bolt Grade = A325 (User Input)  
 Design Shear Stress =  $F_V := 40.5$ -ksi (User Input)  
 Design Tension Stress =  $F_T := 67.5$ -ksi (User Input)  
 Total Number of Bolts =  $n_b := 4$  (User Input)  
 Number of Bolts Tension Side Parallel =  $n_{b.par} := 2$  (User Input)  
 Number of Bolts Tension Side Diagonal =  $n_{b.diag} := 1$  (User Input)  
 Bolt Diameter =  $d_b := 0.75$ in (User Input)  
 Bolt Spacing X Direction =  $S_x := 9.5$ -in (User Input)  
 Bolt Spacing Z Direction =  $S_z := 9.5$ -in (User Input)

**Base Plate Data:**

Base Plate Steel = A36 (User Input)  
 Allowable Yield Stress =  $F_y := 36$ -ksi (User Input)  
 Base Plate Width =  $Pl_w := 12$ -in (User Input)  
 Base Plate Thickness =  $Pl_t := 1.00$ -in (User Input)  
 Bolt Edge Distance =  $B_E := 1.25$ -in (User Input)  
 Pole Diameter =  $D_p := 8.625$ -in (User Input)

**Base Plate Data:**

Weld Grade = E70XX (User Input)  
 Weld Yield Stress =  $F_{yw} := 70$ -ksi (User Input)  
 Weld Size =  $sw := 0.375$ -in (User Input)

**Anchor Bolt Check:**

BoltArea =	$a_b := \frac{1}{4} \cdot \pi \cdot d_b^2 = 0.442 \cdot \text{in}^2$
Bolt Spacing Diag. Direction =	$S_{\text{diag}} := \sqrt{S_x^2 + S_z^2} = 13.44 \cdot \text{in}$
Tension Load per Bolt Parallel =	$T_{\text{par}} := \frac{\text{Moment}}{S_x \cdot n_{b,\text{par}}} - \frac{\text{Axial}}{n_b} = -0.5 \cdot \text{kips}$
Tension Load per Bolt Diagonal =	$T_{\text{diag}} := \frac{\text{Moment}}{S_{\text{diag}} \cdot n_{b,\text{diag}}} - \frac{\text{Axial}}{n_b} = -0.5 \cdot \text{kips}$
Tension per bolt =	$T := \text{if}(T_{\text{par}} > T_{\text{diag}}, T_{\text{par}}, T_{\text{diag}}) = -0.5 \cdot \text{kips}$
Actual Tensile Stress =	$f_t := \frac{T}{a_b} = -1.13 \cdot \text{ksi}$
	Condition2 := if( $f_t < F_T$ , "OK", "Overstressed")
	Condition2 = "OK"

**Base Plate Check:**

Design Bending Stress =	$F_b := 0.9 \cdot F_y = 32.4 \cdot \text{ksi}$
Plate Bending Width =	$Z := (P_l \cdot W \cdot \sqrt{2} - D_p) = 8.35 \cdot \text{in}$
Moment Arm =	$K := \frac{(S_{\text{diag}} - D_p)}{2} = 2.41 \cdot \text{in}$
Load per Bolt Diagonal =	$P_{\text{diag}} := \frac{\text{Moment}}{S_{\text{diag}} \cdot n_{b,\text{diag}}} + \frac{\text{Axial}}{n_b} = 0.5 \cdot \text{kips}$
Moment in Base Plate =	$M := K \cdot P_{\text{diag}} = 1.2 \cdot \text{kips} \cdot \text{in}$
Section Modulus =	$S_Z := \frac{1}{6} \cdot Z \cdot P_t^2 = 1.39 \cdot \text{in}^3$
Bending Stress =	$f_b := \frac{M}{S_Z} = 0.86 \cdot \text{ksi}$
	Condition3 := if( $f_b < F_b$ , "OK", "Overstressed")
	Condition3 = "OK"

**Base Plate to PCS Mast Weld Check:**

Design Weld Stress =  $F_w := 0.45 \cdot F_{yw} = 31.5 \text{ ksi}$

Weld Area =  $A_w := \frac{\pi}{4} \cdot \left[ (D_p + 2sw \cdot 0.707)^2 - D_p^2 \right] = 7.4 \text{ in}^2$

Weld Moment of Inertia =  $I_w := \frac{\pi}{64} \cdot \left[ (D_p + 2sw \cdot 0.707)^4 - D_p^4 \right] = 73.22 \text{ in}^4$

$c := \frac{D_p}{2} + sw \cdot 0.707 = 4.58 \text{ in}$

Section Modulus of Weld =  $S_w := \frac{I_w}{c} = 15.99 \text{ in}^3$

Weld Stress =  $f_w := \frac{\text{Moment}}{S_w} + \frac{\text{Shear}}{A_w} = 0.69 \text{ ksi}$

Condition4 := if( $f_w < F_w$ , "OK", "Overstressed")

Condition4 = "OK"

**Mast Bottom Connection:**

**Maximum Design Reactions at Brace:**

Vertical =	Vert := 2.0-kips	(User Input)
Horizontal =	Horz := 5.1-kips	(User Input)
Moment =	Moment := 0-ft-kips	(User Input)

**Bolt Data:**

Bolt Grade =	A325	(User Input)
Number of Bolts =	$n_b := 6$	(User Input)
Bolt Diameter =	$d_b := 0.75\text{in}$	(User Input)
Nomianl Tensile Strength =	$F_{nt} := 90\text{-ksi}$	(User Input)
Nomianl Shear Strength =	$F_{nv} := 54\text{-ksi}$	(User Input)
Resistance Factor =	$\phi := 0.75$	(User Input)
Bolt Eccentricity from C.L. Mast =	$e := 14.875\text{-in}$	(User Input)
Horizontal Spacing Between Bolts =	$S_{\text{horz}} := 19.25\text{-in}$	(User Input)
Vertical Spacing Between Top and Bottom Bolts =	$S_{\text{vert}} := 9\text{-in}$	(User Input)
BoltArea =	$a_b := \frac{1}{4} \cdot \pi \cdot d_b^2 = 0.442\text{-in}^2$	

**Check Bolt Stresses:**

**Wind Acting Parallel to Stiffener Plate:**

Shear Stress per Bolt =

$$f_v := \frac{\text{Vert}}{n_b \cdot a_b} = 0.755 \text{ ksi}$$

Condition1 := if( $f_v < \phi \cdot F_{nv}$ , "OK", "Overstressed")

$$\frac{f_v}{(\phi \cdot F_{nv})} = 1.9\%$$

Condition1 = "OK"

Tensile Stress Adjusted for Shear =

$$F'_{nt} := \begin{cases} \left( 1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v \right) & \text{if } 1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v \leq F_{nt} = 90 \text{ ksi} \\ F_{nt} & \text{otherwise} \end{cases}$$

Tension Force Each Bolt =

$$F_{\text{tension.bolt}} := \frac{\text{Horz}}{n_b} + \frac{(\text{Vert} \cdot e + \text{Moment})}{2 \cdot S_{\text{vert}}} = 2.503 \text{ kips}$$

Tension Stress Each Bolt =

$$f_t := \frac{F_{\text{tension.bolt}}}{a_b} = 5.7 \text{ ksi}$$

Condition2 := if( $f_t < \phi \cdot F'_{nt}$ , "OK", "Overstressed")

$$\frac{f_t}{(\phi \cdot F'_{nt})} = 8.4\%$$

Condition2 = "OK"

**Wind Acting Perpendicular to Stiffener Plate:**

Shear Stress per Bolt =

$$f_v := \sqrt{\left( \frac{\text{Vert}}{n_b \cdot a_b} + \frac{\text{Moment} \cdot 2}{S_{\text{horz}} \cdot n_b \cdot a_b} \right)^2 + \left( \frac{\text{Horz}}{n_b \cdot a_b} \right)^2} = 2.067 \text{ ksi}$$

Condition3 := if( $f_v < \phi \cdot F_{nv}$ , "OK", "Overstressed")

$$\frac{f_v}{(\phi \cdot F_{nv})} = 5.1\%$$

Condition3 = "OK"

Tensile Stress Adjusted for Shear =

$$F'_{nt} := \begin{cases} \left( 1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v \right) & \text{if } 1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v \leq F_{nt} = 90 \text{ ksi} \\ F_{nt} & \text{otherwise} \end{cases}$$

Tension Force per Bolt =

$$F_{\text{tension.conn}} := \frac{\text{Horz} \cdot e}{n_b} + \frac{\text{Vert} \cdot e}{2 \cdot S_{\text{vert}}} = 2.966 \text{ kips}$$

Tension Stress Each Bolt =

$$f_t := \frac{F_{\text{tension.conn}}}{a_b} = 6.715 \text{ ksi}$$

Condition4 := if( $f_t < \phi \cdot F'_{nt}$ , "OK", "Overstressed")

$$\frac{f_t}{(\phi \cdot F'_{nt})} = 9.9\%$$

Condition4 = "OK"

**Basic Components**

Heavy Wind Pressure =	p := 4.00	psf	(User Input NESC 2007 Figure 250-1 & Table 250-1)
Basic Windspeed =	V := 110	mph	(User Input NESC 2007 Figure 250-2(e) )
Radial Ice Thickness =	Ir := 0.50	in	(User Input)
Radial Ice Density =	Id := 56.0	pcf	(User Input)

**Factors for Extreme Wind Calculation**

Elevation of Top of Mast Above Grade =	TME := 127	ft	(User Input)
Multiplier Gust Response Factor =	m := 1.25		(User Input - Only for NESC Extreme wind case)
NESC Factor =	kv := 1.43		(User Input from NESC 2007 Table 250-3 equation)
Importance Factor =	I := 1.0		(User Input from NESC 2007 Section 250.C.2)

Velocity Pressure Coefficient =  $K_z := 2.01 \cdot \left( \frac{TME}{900} \right)^{\frac{2}{9.5}} = 1.331$  (NESC 2007 Table 250-2)

Exposure Factor =  $E_s := 0.346 \left[ \frac{33}{(0.67 \cdot TME)} \right]^{\frac{1}{7}} = 0.302$  (NESC 2007 Table 250-3)

Response Term =  $B_s := \frac{1}{\left( 1 + 0.375 \cdot \frac{TME}{220} \right)} = 0.822$  (NESC 2007 Table 250-3)

Gust Response Factor =  $G_{rf} := \frac{\left[ 1 + \left( 2.7 \cdot E_s \cdot B_s \cdot \frac{1}{2} \right) \right]}{k_v^2} = 0.851$  (NESC 2007 Table 250-3)

Wind Pressure =  $q_z := 0.00256 \cdot K_z \cdot V^2 \cdot G_{rf} \cdot I = 35.1$  psf (NESC 2007 Section 250.C.2)

**Shape Factors**

Shape Factor for Round Members =	$C_{dR} := 1.3$	(User Input)
Shape Factor for Flat Members =	$C_{dF} := 1.6$	(User Input)
Shape Factor for Coax Cables Attached to Outside of Pole =	$C_{d_{coax}} := 1.6$	(User Input)

**Overload Factors**

NU Design Criteria Table

**Overload Factors for Wind Loads:**

NESC Heavy Loading =	2.5	(User Input)	Apply in Risa-3D Analysis
NESC Extreme Loading =	1.0	(User Input)	Apply in Risa-3D Analysis

**Overload Factors for Vertical Loads:**

NESC Heavy Loading =	1.5	(User Input)	Apply in Risa-3D Analysis
NESC Extreme Loading =	1.0	(User Input)	Apply in Risa-3D Analysis



**Development of Wind & Ice Load on PCS Mast**

**Mast Data:**

(Pipe 8" Sch. 80)

Mast Shape =	Round	(User Input)
Mast Diameter =	$D_{mast} := 8.625$ in	(User Input)
Mast Length =	$L_{mast} := 22$ ft	(User Input)
Mast Thickness =	$t_{mast} := 0.5$ in	(User Input)

**Wind Load (NESC Extreme)**

Mast Projected Surface Area =  $A_{mast} := \frac{D_{mast}}{12} = 0.719$  sq ft

Total Mast Wind Force (Above NU Structure) =  $qz \cdot C_{d_{coax}} \cdot A_{mast} \cdot m = 50$  plf **BLC 5** Coax on Mast Above Tower

Total Mast Wind Force (Below NU Structure) =  $qz \cdot C_{dR} \cdot A_{mast} = 33$  plf **BLC 5**

**Wind Load (NESE Heavy)**

Mast Projected Surface Area w/ Ice =  $A_{ICE_{mast}} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 0.802$  sq ft

Total Mast Wind Force w/ Ice =  $p \cdot C_{d_{coax}} \cdot A_{ICE_{mast}} = 5$  plf **BLC 4**

**Gravity Loads (without ice)**

Weight of the mast = Self Weight (Computed internally by Risa-3D) plf **BLC 1**

**Gravity Loads (ice only)**

Ice Area per Linear Foot =  $A_{i_{mast}} := \frac{\pi}{4} [(D_{mast} + Ir \cdot 2)^2 - D_{mast}^2] = 14.3$  sq in

Weight of Ice on Mast =  $W_{ICE_{mast}} := Id \cdot \frac{A_{i_{mast}}}{144} = 6$  plf **BLC 3**

**Development of Wind & Ice Load on Antennas**

**Proposed Antenna Data:**

Antenna Model =	RFSAPXVAARR18_43	
Antenna Shape =	Flat	(User Input)
Antenna Height =	$L_{ant} := 72$	in (User Input)
Antenna Width =	$W_{ant} := 24$	in (User Input)
Antenna Thickness =	$T_{ant} := 8.5$	in (User Input)
Antenna Weight =	$WT_{ant} := 132$	lbs (User Input)
Number of Antennas =	$N_{ant} := 3$	(User Input)

**Wind Load (NESC Extreme)**

*Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously*

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 12$	sf
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 36$	sf

**Total Antenna Wind Force =**  $F_{ant} := qz \cdot C_d \cdot F \cdot A_{ant} = 2525$  lbs **BLC 5**

**Wind Load (NESC Heavy)**

*Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously*

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 12.7$	sf
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 38$	sf

**Total Antenna Wind Force w/ Ice =**  $F_{i_{ant}} := p \cdot C_d \cdot F \cdot A_{ICEant} = 243$  lbs **BLC 4**

**Gravity Load (without ice)**

**Weight of All Antennas =**  $WT_{ant} \cdot N_{ant} = 396$  lbs **BLC 2**

**Gravity Load (ice only)**

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1 \times 10^4$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 1) \cdot (W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 2650$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot \rho_d = 86$	lbs

**Weight of Ice on All Antennas =**  $W_{ICEant} \cdot N_{ant} = 258$  lbs **BLC 3**

**Development of Wind & Ice Load on Antennas**

**Proposed Antenna Data:**

Antenna Model =	Commscope ATSBT-TOP-FM-4G Bias Tee		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 5.63$	in	(User Input)
Antenna Width =	$W_{ant} := 3.7$	in	(User Input)
Antenna Thickness =	$T_{ant} := 2.0$	in	(User Input)
Antenna Weight =	$WT_{ant} := 2$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

**Wind Load (NESC Extreme)**

*Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously*

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.1$	sf
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 0.4$	sf

**Total Antenna Wind Force =**

$F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 30$  lbs **BLC 5**

**Wind Load (NESC Heavy)**

*Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously*

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 0.2$	sf
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 0.6$	sf

**Total Antenna Wind Force w/ Ice =**

$F_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 4$  lbs **BLC 4**

**Gravity Load (without ice)**

**Weight of All Antennas =**

$WT_{ant} \cdot N_{ant} = 6$  lbs **BLC 2**

**Gravity Load (ice only)**

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 42$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 1) \cdot (W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 52$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 2$	lbs
<b>Weight of Ice on All Antennas =</b>	$W_{ICEant} \cdot N_{ant} = 5$	lbs <b>BLC 3</b>

**Development of Wind & Ice Load on Mount**

**Mount Data:**

Model =	Lightweight Ring Mount with Flush Adapters
Mount Shape =	Flat
Mount Projected Surface Area =	CdAa := 0 sf (User Input)
Mount Projected Surface Area w/ Ice =	CdAa <sub>ice</sub> := 0 sf (User Input)
Mount Weight =	WT <sub>mnt</sub> := 305 lbs (User Input)
Mount Weight w/ Ice =	WT <sub>mnt.ice</sub> := 425 lbs (User Input)

**Gravity Loads (without ice)**

Weight of All Mounts =  $W_{t\_mnt1} := W_{T\_mnt} = 305$  lbs

**Gravity Load (ice only)**

Weight of Ice on All Mounts =  $W_{t\_ice.mnt1} := (W_{T\_mnt.ice} - W_{T\_mnt}) = 120$  lbs

**Wind Load (NESC Heavy)**

Total Mount Wind Force w/ Ice =  $F_{i\_mnt1} := p \cdot CdAa_{ice} = 0$  lbs

**Wind Load (NESC Extreme)**

Total Mount Wind Force =  $F_{mnt1} := qz \cdot CdAa \cdot m = 0$  lbs

**Development of Wind & Ice Load on Coax Cables**

**Coax Cable Data:**

Coax Type =	HELIAX 1-1/4"	
Shape =	Round	(User Input)
Coax Outside Diameter =	$D_{\text{coax}} := 1.55$	in (User Input)
Coax Cable Length =	$L_{\text{coax}} := 15$	ft (User Input)
Weight of Coax per foot =	$Wt_{\text{coax}} := 0.66$	plf (User Input)
Total Number of Coax =	$N_{\text{coax}} := 24$	(User Input)
No. of Coax Projecting Outside Face of PCS Mast =	$NP_{\text{coax}} := 4$	(User Input)

**Wind Load (NESC Extreme)**

Coax projected surface area =  $A_{\text{coax}} := \frac{(NP_{\text{coax}} D_{\text{coax}})}{12} = 0.5$  s/ft

Total Coax Wind Force (Above NU Structure) =  $F_{\text{coax}} := qz \cdot Cd_{\text{coax}} \cdot A_{\text{coax}} \cdot m = 36$  plf **BLC 5**

**Wind Load (NESC Heavy)**

Coax projected surface area w/ Ice =  $A_{\text{ICE}_{\text{coax}}} := \frac{(NP_{\text{coax}} D_{\text{coax}} + 2 \cdot 1r)}{12} = 0.6$  s/ft

Total Coax Wind Force w/ Ice =  $F_{\text{ICE}_{\text{coax}}} := p \cdot Cd_{\text{coax}} \cdot A_{\text{ICE}_{\text{coax}}} = 4$  plf **BLC 4**

**Gravity Loads (without ice)**

Weight of all cables w/o ice  $WT_{\text{coax}} := Wt_{\text{coax}} \cdot N_{\text{coax}} = 16$  plf **BLC 2**

**Gravity Load (ice only)**

Ice Area per Linear Foot =  $A_{\text{ice}_{\text{coax}}} := \frac{\pi}{4} \left[ (D_{\text{coax}} + 2 \cdot 1r)^2 - D_{\text{coax}}^2 \right] = 3.2$  sq in

Ice Weight All Coax per foot =  $WT_{\text{ice}_{\text{coax}}} := N_{\text{coax}} \cdot Id \cdot \frac{A_{\text{ice}_{\text{coax}}}}{144} = 30$  plf **BLC 3**

**(Global) Model Settings**

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 9th: ASD
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI 1999: ASD
Wood Code	AF&PA NDS-91/97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-02
Masonry Code	ACI 530-05: ASD
Aluminum Code	AA ADM1-05: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

**(Global) Model Settings, Continued**

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Om Z	1
Om X	1
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1.5
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	0
Footing Concrete f'c (ksi)	3
Footing Concrete Ec (ksi)	4000
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	3.5
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

**Hot Rolled Steel Properties**

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	58	1.2
3	A992	29000	11154	.3	.65	.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1
6	A53 Gr. B	29000	11154	.3	.65	.49	35	1.5	58	1.2

### Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in <sup>2</sup> ]	I <sub>yy</sub> [in <sup>4</sup> ]	I <sub>zz</sub> [in <sup>4</sup> ]	J [in <sup>4</sup> ]
1	Existing Mast	PIPE_8.0X	Column	Wide Flange	A53 Gr. B	Typical	11.9	100	100	199

### Hot Rolled Steel Design Parameters

	Label	Shape	Length...	L <sub>byy</sub> [ft]	L <sub>bzz</sub> [ft]	L <sub>comp to...</sub>	L <sub>comp bo...</sub>	K <sub>yy</sub>	K <sub>zz</sub>	C <sub>m-yy</sub>	C <sub>m-zz</sub>	C <sub>b</sub>	y sway	z sway	Function
1	M1	Existing ...	21			L <sub>byy</sub>									Lateral

### Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	BOTMA...	TOPMA...			Existing Mast	Column	Wide Flange	A53 Gr. B	Typical

### Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	BOTMAST	0	0	0	0	
2	TOPCONNECTION	0	7	0	0	
3	TOPMAST	0	21	0	0	

### Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	TOPCONNECTION	Reaction		Reaction			
2	BOTMAST	Reaction	Reaction	Reaction		Reaction	

### Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.396	18
2	M1	Y	-.006	18
3	M1	Y	-.305	18

### Member Point Loads (BLC 3 : Weight of Ice Only)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.258	18
2	M1	Y	-.005	18
3	M1	Y	-.12	18

### Member Point Loads (BLC 4 : NESC Heavy Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.243	18
2	M1	X	.004	18

### Member Point Loads (BLC 5 : NESC Extreme Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	2.525	18
2	M1	X	.03	18



**Member Distributed Loads (BLC 2 : Weight of Appurtenances)**

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...]	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-0.16	-0.16	9	15

**Member Distributed Loads (BLC 3 : Weight of Ice Only)**

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...]	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-0.06	-0.06	0	0
2	M1	Y	-0.3	-0.3	9	15

**Member Distributed Loads (BLC 4 : NESC Heavy Wind)**

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.005	.005	0	15
2	M1	X	.004	.004	9	15

**Member Distributed Loads (BLC 5 : NESC Extreme Wind)**

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.05	.05	9	15
2	M1	X	.033	.033	0	9
3	M1	X	.036	.036	9	15

**Basic Load Cases**

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...)	Surface...
1	Self Weight	None		-1						
2	Weight of Appurtenances	None					3	1		
3	Weight of Ice Only	None					3	2		
4	NESC Heavy Wind	None					2	2		
5	NESC Extreme Wind	None					2	3		

**Load Combinations**

	Description	So...P...	S...	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..
1	NESC Heavy Wind	Yes		1	1.5	2	1.5	3	1.5	4	2.5			
2	NESC Extreme Wind	Yes		1	1	2	1	5	1					
3	Self Weight			1	1									

**Envelope Joint Reactions**

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	TOPCONNEC...	max	-1.892	1	0	2	0	2	0	2	0	2	0	2
2		min	-7.645	2	0	1	0	1	0	1	0	1	0	1
3	BOTMAST	max	4.277	2	3.514	1	0	2	0	2	0	2	0	2
4		min	1.027	1	1.653	2	0	1	0	1	0	1	0	1
5	Totals:	max	-0.865	1	3.514	1	0	2						
6		min	-3.368	2	1.653	2	0	1						



### Envelope Joint Displacements

Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [... LC	Y Rotation [... LC	Z Rotation [... LC		
1	BOTMAST	max	0	2	0	2	0	2	0	2	1.696e-03	2
2		min	0	1	0	1	0	1	0	1	4.101e-04	1
3	TOPCONNECT...	max	0	2	0	2	0	2	0	2	-8.743e-04	1
4		min	0	1	0	1	0	1	0	1	-3.602e-03	2
5	TOPMAST	max	1.614	2	0	2	0	2	0	2	-2.824e-03	1
6		min	.392	1	-.002	1	0	1	0	1	-1.164e-02	2

### Envelope AISC ASD Steel Code Checks

Mem...	Shape	Code Check	Loc[ft]	LC	She...Lo... ..	Fa [...Ft [...	Fb y..Fb z.....	C...C...AS...
1	M1 PIPE_8.0X	.694	7	2	.054	7	2	14.2.. 21 23.1 23.1 1 .6 .85 H1-2



Company : Centek  
Designer : TJL  
Job Number : 18058.58 /T-Mobile CT11290C  
Model Name : Structure # 1068 - Mast

Dec 14, 2018  
10:07 AM  
Checked By: CAG

---

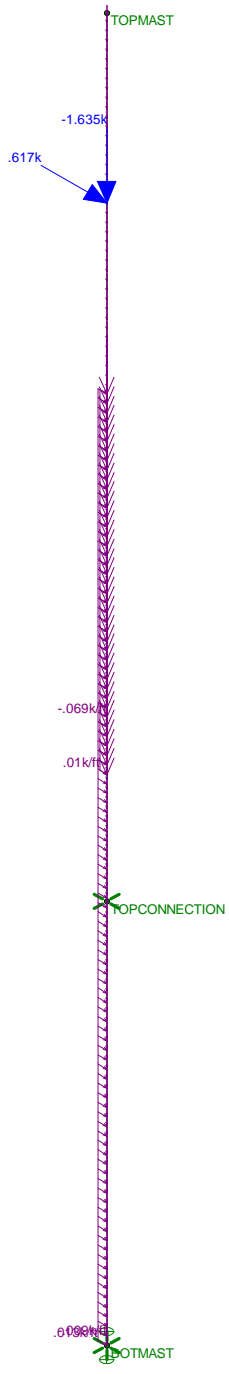
### Joint Reactions (By Combination)

---

LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	TOPCONNECTION	-1.892	0	0	0	0
2	1	BOTMAST	1.027	3.514	0	0	0
3	1	Totals:	-.865	3.514	0		
4	1	COG (ft):	X: 0	Y: 14.167	Z: 0		

**Joint Reactions (By Combination)**

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	TOPCONNECTION	-7.645	0	0	0	0	0
2	2	BOTMAST	4.277	1.653	0	0	0	0
3	2	Totals:	-3.368	1.653	0			
4	2	COG (ft):	X: 0	Y: 13.794	Z: 0			



Loads: LC 1, NESC Heavy Wind

Centek	Structure # 1068 - Mast LC #1 Loads	
TJL		Dec 14, 2018 at 10:06 AM
18058.58 /T-Mobile CT112...		NESC.r3d



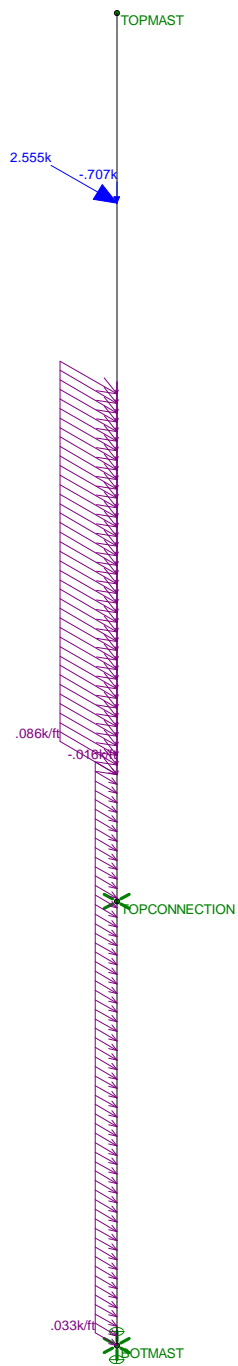
TOPMAST

TOPCONNECTION  
-1.9

1  
BOTMAST  
3.5

Results for LC 1, NESC Heavy Wind  
Reaction and Moment Units are k and k-ft

Centek	Structure # 1068 - Mast LC #1 Reactions	
TJL		Dec 14, 2018 at 10:07 AM
18058.58 /T-Mobile CT112...		NESC.r3d



Loads: LC 2, NESC Extreme Wind

Centek	Structure # 1068 - Mast LC #2 Loads	
TJL		Dec 14, 2018 at 10:06 AM
18058.58 /T-Mobile CT112...		NESC.r3d



TOPMAST

PCONNECTION  
-7.6

4.3  
BOTMAST  
1.7

Results for LC 2, NESC Extreme Wind  
Reaction and Moment Units are k and k-ft

Centek	Structure # 1068 - Mast LC #2 Reactions	
TJL		Dec 14, 2018 at 10:07 AM
18058.58 /T-Mobile CT112...		NESC.r3d



**Coax Cable on CL&P Pole**

Coaxial Cable Span

$$\text{CoaxSpan} := \begin{pmatrix} 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \end{pmatrix} \cdot \text{ft} \quad (\text{User Input})$$

Heavy Wind Pressure =  $p := 4 \text{ psf}$  (User Input)

Radial Ice Thickness =  $I_r := 0.5 \text{ in}$  (User Input)

Radial Ice Density =  $I_d := 56 \text{ pcf}$  (User Input)

Basic Windspeed =  $V := 110 \text{ mph}$  (User Input NESC 2007 Figure 250-2(e))

Height to Top of Coax Above Grade =  $TC := 115 \text{ ft}$  (User Input)

NESC Factor =  $k_v := 1.43$  (User Input from NESC 2007 Table 250-3 equation)

Importance Factor =  $I := 1.0$  (User Input from NESC 2007 Section 250.C.2)

Velocity Pressure Coefficient =  $K_z := 2.01 \cdot \left( \frac{0.67TC}{900} \right)^{\frac{2}{9.5}} = 1.198$  (NESC 2007 Table 250-2)

Exposure Factor =  $E_s := 0.346 \left[ \frac{33}{(0.67 \cdot TC)} \right]^{\frac{1}{7}} = 0.307$  (NESC 2007 Table 250-3)

Response Term =  $B_s := \frac{1}{\left( 1 + 0.375 \cdot \frac{TC}{220} \right)} = 0.836$  (NESC 2007 Table 250-3)

Gust Response Factor =  $G_{rf} := \frac{\left[ 1 + \left( 2.7 \cdot E_s \cdot B_s \cdot \frac{1}{2} \right) \right]}{k_v^2} = 0.859$  (NESC 2007 Table 250-3)

Wind Pressure =  $q_z := 0.00256 \cdot K_z \cdot V^2 \cdot G_{rf} \cdot I = 31.9 \text{ psf}$  (NESC 2007 Section 250.C.2)

Diameter of Coax Cable =	$D_{\text{coax}} := 1.55\text{-in}$	<i>(User Input)</i>
Weight of Coax Cable =	$W_{\text{coax}} := 0.66\text{-plf}$	<i>(User Input)</i>
Number of Coax Cables =	$N_{\text{coax}} := 24$	<i>(User Input)</i>
Number of Projected Coax Cables =	$NP_{\text{coax}} := 3$	<i>(User Input)</i>
Shape Factor =	$Cd_{\text{coax}} := 1.6$	<i>(User Input)</i>
Overload Factor for NESC Heavy Wind Transverse Load =	$OF_{\text{HWT}} := 2.5$	<i>(User Input)</i>
Overload Factor for NESC Heavy Wind Vertical Load =	$OF_{\text{HWV}} := 1.5$	<i>(User Input)</i>
Overload Factor for NESC Extreme Wind Transverse Load =	$OF_{\text{EWT}} := 1.0$	<i>(User Input)</i>
Overload Factor for NESC Extreme Wind Vertical Load =	$OF_{\text{EWV}} := 1.0$	<i>(User Input)</i>
Wind Area without Ice =	$A := (NP_{\text{coax}} \cdot D_{\text{coax}}) = 4.65\text{-in}$	
Wind Area with Ice =	$A_{\text{ice}} := (NP_{\text{coax}} \cdot D_{\text{coax}} + 2 \cdot Ir) = 5.65\text{-in}$	
Ice Area per Liner Ft =	$Ai_{\text{coax}} := \frac{\pi}{4} \cdot [(D_{\text{coax}} + 2 \cdot Ir)^2 - D_{\text{coax}}^2] = 0.022\text{ft}^2$	
Weight of Ice on All Coax Cables =	$W_{\text{ice}} := Ai_{\text{coax}} \cdot Id \cdot N_{\text{coax}} = 30.055\text{-plf}$	

Heavy Wind Vertical Load =

$$\text{Heavy\_Wind}_{\text{Vert}} := \overrightarrow{[(N_{\text{coax}} \cdot W_{\text{coax}} + W_{\text{ice}}) \cdot \text{CoaxSpan} \cdot OF_{\text{HWV}}]}$$

Heavy Wind Transverse Load =

$$\text{Heavy\_Wind}_{\text{Trans}} := \overrightarrow{(p \cdot A_{\text{ice}} \cdot Cd_{\text{coax}} \cdot \text{CoaxSpan} \cdot OF_{\text{HWT}})}$$

$\begin{pmatrix} 688 \\ 688 \\ 688 \\ 688 \\ 688 \\ 688 \\ 688 \\ 688 \\ 688 \\ 688 \end{pmatrix}$	lb	$\begin{pmatrix} 75 \\ 75 \\ 75 \\ 75 \\ 75 \\ 75 \\ 75 \\ 75 \\ 75 \\ 75 \end{pmatrix}$	lb
--	----	--	----

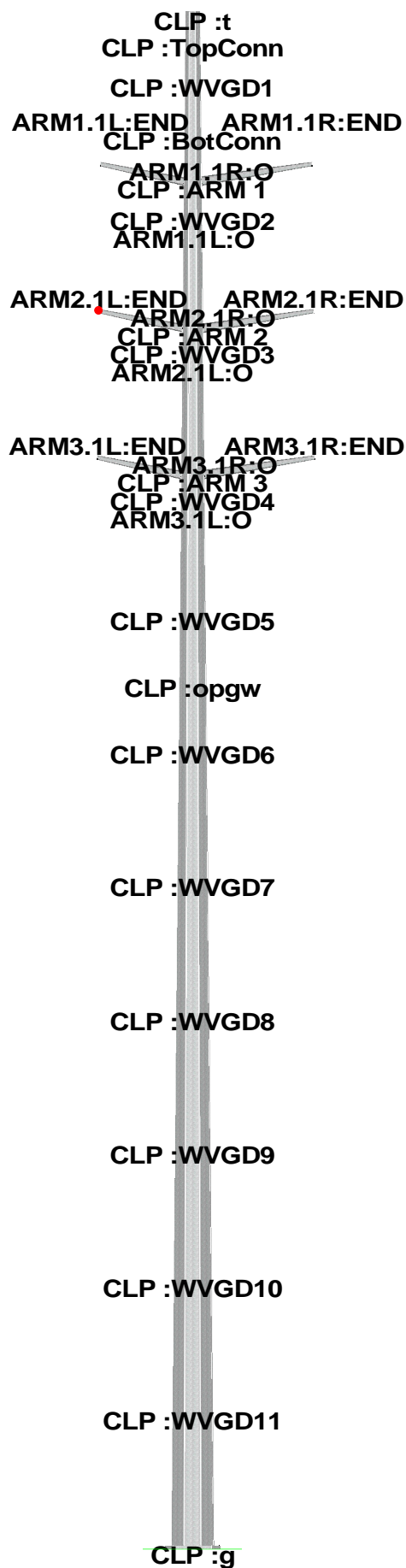
Extreme Wind Vertical Load =

$$\text{Extreme\_Wind}_{\text{Vert}} := \overrightarrow{(N_{\text{coax}} \cdot W_{\text{coax}} \cdot \text{CoaxSpan} \cdot OF_{\text{EWV}})}$$

Extreme Wind Transverse Load =

$$\text{Extreme\_Wind}_{\text{Trans}} := \overrightarrow{[(qz \cdot psf \cdot A \cdot Cd_{\text{coax}}) \cdot \text{CoaxSpan} \cdot OF_{\text{EWT}}]}$$

$\begin{pmatrix} 158 \\ 158 \\ 158 \\ 158 \\ 158 \\ 158 \\ 158 \\ 158 \\ 158 \\ 158 \end{pmatrix}$	lb	$\begin{pmatrix} 198 \\ 198 \\ 198 \\ 198 \\ 198 \\ 198 \\ 198 \\ 198 \\ 198 \\ 198 \end{pmatrix}$	lb
--	----	--	----



Project Name : 18058.58 - Darien, CT  
 Project Notes: Structure # 1068/ T-Mobile CT11290C  
 Project File : J:\Jobs\1805800.WI\58\_CT11290C\05\_Structural\Backup Documentation\Rev (6)\Calcs\PLS Pole\CLP Pole 1068.pol  
 Date run : 10:04:34 AM Friday, December 14, 2018  
 by : PLS-POLE Version 12.50  
 Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

The model has 0 warnings.

Loads from file: j:\jobs\1805800.wi\58\_ct11290c\05\_structural\backup documentation\rev (6)\calcs\pls pole\clp pole # 1068.lca

\*\*\* Analysis Results:

Maximum element usage is 97.81% for Steel Pole "CLP " in load case "EXTREME"  
 Maximum insulator usage is 28.79% for Clamp "C17" in load case "EXTREME"

Summary of Joint Support Reactions For All Load Cases:

Load Case	Joint Label	Long. Force (kips)	Tran. Force (kips)	Vert. Force (kips)	Shear Force (kips)	Tran. Moment (ft-k)	Long. Moment (ft-k)	Bending Moment (ft-k)	Vert. Moment (ft-k)	Found. Usage %
NESC HEAVY	CLP :g	-0.10	-17.64	-47.37	17.64	1617.51	-5.43	1617.52	0.00	0.00
EXTREME	CLP :g	-0.03	-26.07	-24.75	26.07	2188.86	-1.35	2188.86	-0.00	0.00

Summary of Tip Deflections For All Load Cases:

Note: postive tip load results in positive deflection

Load Case	Joint Label	Long. Defl. (in)	Tran. Defl. (in)	Vert. Defl. (in)	Resultant Defl. (in)	Long. Rot. (deg)	Tran. Rot. (deg)	Twist (deg)
NESC HEAVY	CLP :t	0.22	89.85	-4.00	89.94	0.01	-6.81	0.00
EXTREME	CLP :t	0.05	121.03	-7.28	121.25	0.00	-9.55	0.00

Tubes Summary:

Pole Label	Tube Num.	Weight (lbs)	Load Case	Maximum Usage %	Resultant Moment (ft-k)
CLP	1	1854	EXTREME	96.86	379.48
CLP	2	3496	EXTREME	97.25	1121.28
CLP	3	4553	EXTREME	89.99	1804.18
CLP	4	2253	EXTREME	97.81	2188.86

\*\*\* Overall summary for all load cases - Usage = Maximum Stress / Allowable Stress

Summary of Steel Pole Usages:

Steel Pole Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
CLP	97.81	EXTREME	22	13365.5

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
ARM1.1R	55.24	NESC HEAVY	1	97.0
ARM1.1L	40.79	NESC HEAVY	1	67.4
ARM2.1R	55.52	NESC HEAVY	1	97.0
ARM2.1L	41.22	NESC HEAVY	1	67.4
ARM3.1R	55.96	NESC HEAVY	1	97.0
ARM3.1L	41.88	NESC HEAVY	1	67.4

\*\*\* Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC HEAVY	78.43	CLP	Steel Pole
EXTREME	97.81	CLP	Steel Pole

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Segment Number
NESC HEAVY	78.43	CLP	17
EXTREME	97.81	CLP	22

Summary of Base Plate Usages by Load Case:

Load Case	Pole Bend Label	Bend Line #	Length (in)	Vertical Load (kips)	X Moment (ft-k)	Y Bending Moment (ft-k)	Stress (ksi)	Bolt Sum (ft-k)	# Bolts Acting On Bend Line	Max Bolt Load For Bend Line (kips)	Minimum Plate Thickness (in)	Usage %
NESC HEAVY	CLP	1	15.491	46.156	1617.507	-5.435	39.164	63.726	3	79.793	2.321	71.21
EXTREME	CLP	1	15.491	23.542	2188.864	-1.349	51.393	83.623	3	104.563	2.658	93.44

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Segment Number
NESC HEAVY	55.96	ARM3.1R	1
EXTREME	25.90	ARM3.1R	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
C1	Clamp	9.45	NESC HEAVY	0.0
C2	Clamp	9.45	NESC HEAVY	0.0
C3	Clamp	9.45	NESC HEAVY	0.0
C4	Clamp	9.45	NESC HEAVY	0.0

C5	Clamp	9.45	NESC HEAVY	0.0
C6	Clamp	9.45	NESC HEAVY	0.0
C7	Clamp	2.31	NESC HEAVY	0.0
C8	Clamp	2.31	NESC HEAVY	0.0
C9	Clamp	2.31	NESC HEAVY	0.0
C10	Clamp	2.31	NESC HEAVY	0.0
C11	Clamp	2.31	NESC HEAVY	0.0
C12	Clamp	2.31	NESC HEAVY	0.0
C13	Clamp	2.31	NESC HEAVY	0.0
C14	Clamp	2.31	NESC HEAVY	0.0
C15	Clamp	2.31	NESC HEAVY	0.0
C16	Clamp	2.31	NESC HEAVY	0.0
C17	Clamp	28.79	EXTREME	0.0
C18	Clamp	15.28	EXTREME	0.0
C19	Clamp	2.31	NESC HEAVY	0.0
C20	Clamp	4.07	NESC HEAVY	0.0

\*\*\* Weight of structure (lbs):  
 Weight of Tubular Davit Arms: 493.2  
 Weight of Steel Poles: 13365.5  
 Total: 13858.7

\*\*\* End of Report

```

*****
*
*               PLS-POLE
*       POLE AND FRAME ANALYSIS AND DESIGN
*       Copyright Power Line Systems, Inc. 1999-2011
*
*****

```

```

Project Name : 18058.58 - Darien, CT
Project Notes: Structure # 1068/ T-Mobile CT11290C
Project File : J:\Jobs\1805800.WI\58_CT11290C\05_Structural\Backup Documentation\Rev (6)\Calcs\PLS Pole\CLP Pole 1068.pol
Date run      : 10:04:34 AM Friday, December 14, 2018
by           : PLS-POLE Version 12.50
Licensed to  : Centek Engineering Inc

```

Successfully performed nonlinear analysis

The model has 0 warnings.



Modeling options:

```

Offset Arms from Pole/Mast: Yes
Offset Braces from Pole/Mast: Yes
Offset Guys from Pole/Mast: Yes
Offset Posts from Pole/Mast: Yes
Offset Strains from Pole/Mast: No
Use Alternate Convergence Process: No
Steel poles checked with ASCE/SEI 48-11

```

```

Default Modulus of Elasticity for Steel = 29000.00 (ksi)
Default Weight Density for Steel = 490.00 (lbs/ft^3)

```

Steel Pole Properties:

Steel Pole Ultimate Property	Stock Ultimate Number	Length	Default Embedded	Base Plate	Shape	Tip Diameter	Base Diameter	Taper	Default Drag	Tubes	Modulus of Elasticity	Weight Density	Shape At	Strength Check	Distance From
------------------------------	-----------------------	--------	------------------	------------	-------	--------------	---------------	-------	--------------	-------	-----------------------	----------------	----------	----------------	---------------

Trans. Load	Long. Label	Length (ft)	Length (ft)	Coef.	Override (ksi)	Override (lbs/ft^3)	Base	Type	Tip (ft)
-------------	-------------	-------------	-------------	-------	----------------	---------------------	------	------	----------

CLP 1068	1068	115.00	0	Yes	8F	13.26	37.4	0	1.6	4 tubes	0	0	Calculated	0.000
----------	------	--------	---	-----	----	-------	------	---	-----	---------	---	---	------------	-------

Steel Tubes Properties:

Property	Pole No.	Tube Length (ft)	Thickness (in)	Lap Length (ft)	Lap Factor	Lap Gap (in)	Yield Stress (ksi)	Moment Cap. (ft-k)	Tube Weight (lbs)	Center of Gravity (ft)	Calculated Taper (in/ft)	Tube Top Diameter (in)	Tube Bot. Diameter (in)	1.5x Diam. Lap Length (ft)	Actual Overlap (ft)
CLP 1068	1	38	0.25	2.833	0.000	0.000	50.000	0.000	1854	20.57	0.22619	13.26	21.86	2.670	2.833
CLP 1068	2	39.833	0.3125	4.000	0.000	0.000	65.000	0.000	3496	21.12	0.22619	20.72	29.73	3.638	4.000
CLP 1068	3	34	0.375	5.083	0.000	0.000	65.000	0.000	4553	17.69	0.22619	28.20	35.89	4.392	5.083
CLP 1068	4	15.083	0.375	0.000	0.000	0.000	65.000	0.000	2253	7.66	0.22619	33.99	37.40	0.000	0.000

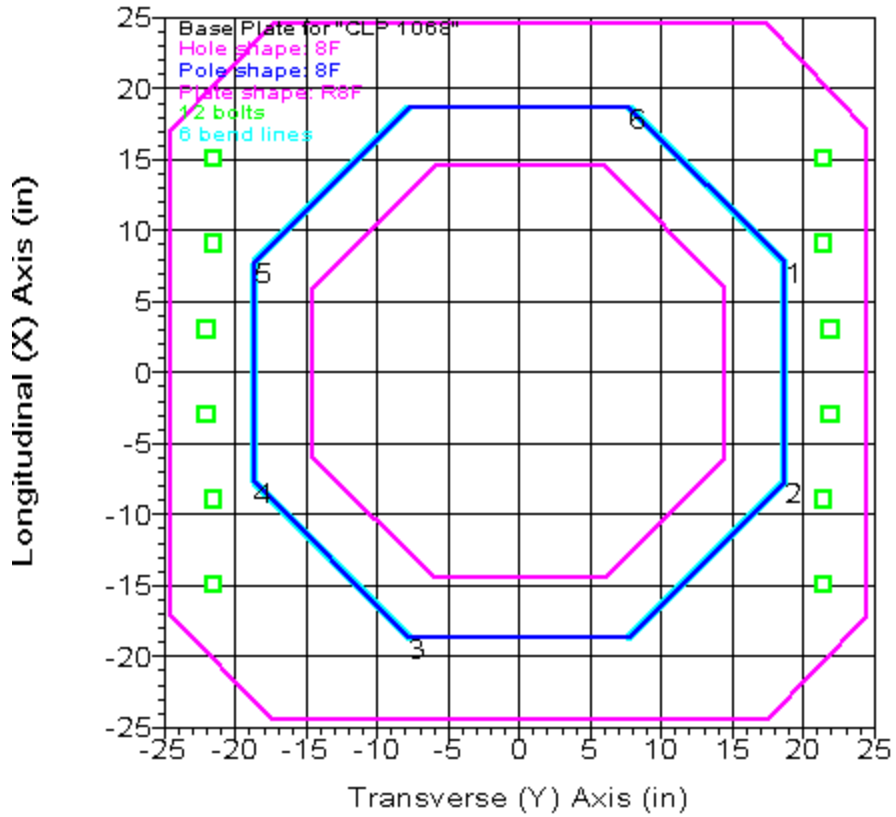
Base Plate Properties:

Property	Pole Diam. (in)	Plate Shape	Plate Thick. (in)	Plate Weight (lbs)	Bend Line Length (in)	Hole Diam. (in)	Hole Shape	Steel Density (lbs/ft^3)	Steel Yield Stress (ksi)	Bolt Diam. (in)	Bolt Pattern (in)	Num. Of Bolts	Bolt Cage X Inertia (in^4)	Bolt Cage Y Inertia (in^4)
CLP 1068	49.000	R8F	2.750	1210	0.000	29.000	8F	490.00	55.000	2.250	44.000	12	22402.05	5009.80

Base Plate Bolt Coordinates for Property "CLP 1068":

Bolt X Coord.	Bolt Y Coord.	Bolt Angle (deg)
0.1364	1	0
0.4091	0.9773	0
0.6818	0.9773	0





**Steel Pole Connectivity:**

Pole Label	Tip Joint	Base X of Joint (ft)	Base Y of Joint (ft)	Base Z of Joint (ft)	Inclin. About X (deg)	Inclin. About Y (deg)	Property Set	Attach. Labels	Base Connect	Embed % Override	Embed C. Override (ft)
CLP		0	0	0	0	0	CLP 1068	17 labels		0.00	0

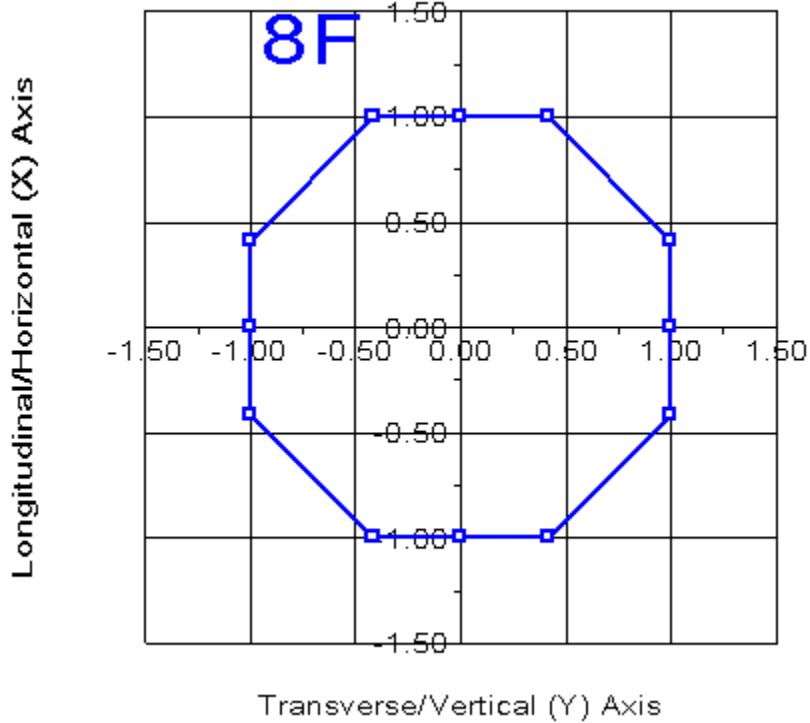
**Relative Attachment Labels for Steel Pole "CLP ":**

Joint Label	Distance From Origin/Top Joint (ft)	Global Z of Attach (ft)
CLP :ARM 1	12.67	0.00
CLP :ARM 2	23.67	0.00
CLP :ARM 3	34.67	0.00
CLP :WVGD1	0.00	110.00
CLP :WVGD2	0.00	100.00

```

CLP :WVGD3      0.00      90.00
CLP :WVGD4      0.00      80.00
CLP :WVGD5      0.00      70.00
CLP :WVGD6      0.00      60.00
CLP :WVGD7      0.00      50.00
CLP :WVGD8      0.00      40.00
CLP :WVGD9      0.00      30.00
CLP :WVGD10     0.00      20.00
CLP :WVGD11     0.00      10.00
CLP :TopConn    0.00     113.00
CLP :BotConn    0.00     106.00
CLP :opgw       0.00      65.00

```



**Pole Steel Properties:**

Element Label	Joint Label	Joint Position	Rel. Dist.	Outer Diam.	Area (in <sup>2</sup> )	T-Moment Inertia (in <sup>4</sup> )	L-Moment Inertia (in <sup>4</sup> )	D/t	W/t Max.	Fy (ksi)	Fa Min. (ksi)	T-Moment Capacity (ft-k)	L-Moment Capacity (ft-k)
CLP	CLP :t	CLP :t Ori	0.00	13.26	10.78	241.33	241.33	0.00	17.8	50.00	50.00	151.63	151.63
CLP	CLP :TopConn	CLP :TopConn End	2.00	13.72	11.16	267.38	267.38	0.00	18.6	50.00	50.00	162.45	162.45
CLP	CLP :TopConn	CLP :TopConn Ori	2.00	13.72	11.16	267.38	267.38	0.00	18.6	50.00	50.00	162.45	162.45
CLP	CLP :WVGD1	CLP :WVGD1 End	5.00	14.39	11.72	309.86	309.86	0.00	19.7	50.00	50.00	179.39	179.39
CLP	CLP :WVGD1	CLP :WVGD1 Ori	5.00	14.39	11.72	309.86	309.86	0.00	19.7	50.00	50.00	179.39	179.39

CLP	CLP :BotConn	CLP :BotConn	End	9.00	15.30	12.47	373.19	373.19	0.00	21.2	50.00	50.00	203.28	203.28
CLP	CLP :BotConn	CLP :BotConn	Ori	9.00	15.30	12.47	373.19	373.19	0.00	21.2	50.00	50.00	203.28	203.28
CLP	CLP :ARM 1	CLP :ARM 1	End	12.67	16.13	13.15	438.41	438.41	0.00	22.6	50.00	50.00	226.51	226.51
CLP	CLP :ARM 1	CLP :ARM 1	Ori	12.67	16.13	13.15	438.41	438.41	0.00	22.6	50.00	50.00	226.51	226.51
CLP	CLP :WVGD2	CLP :WVGD2	End	15.00	16.66	13.59	483.52	483.52	0.00	23.5	50.00	50.00	241.92	241.92
CLP	CLP :WVGD2	CLP :WVGD2	Ori	15.00	16.66	13.59	483.52	483.52	0.00	23.5	50.00	50.00	241.92	241.92
CLP	CLP :ARM 2	CLP :ARM 2	End	23.67	18.62	15.22	678.43	678.43	0.00	26.7	50.00	50.00	303.68	303.68
CLP	CLP :ARM 2	CLP :ARM 2	Ori	23.67	18.62	15.22	678.43	678.43	0.00	26.7	50.00	50.00	303.68	303.68
CLP	CLP :WVGD3	CLP :WVGD3	End	25.00	18.92	15.46	712.31	712.31	0.00	27.2	50.00	50.00	313.78	313.78
CLP	CLP :WVGD3	CLP :WVGD3	Ori	25.00	18.92	15.46	712.31	712.31	0.00	27.2	50.00	50.00	313.78	313.78
CLP	CLP :ARM 3	CLP :ARM 3	End	34.67	21.11	17.28	993.14	993.14	0.00	30.8	50.00	50.00	392.14	392.14
CLP	CLP :ARM 3	CLP :ARM 3	Ori	34.67	21.11	17.28	993.14	993.14	0.00	30.8	50.00	50.00	392.14	392.14
CLP	CLP :WVGD4	CLP :WVGD4	End	35.00	21.18	17.34	1003.84	1003.84	0.00	30.9	50.00	50.00	394.97	394.97
CLP	CLP :WVGD4	CLP :WVGD4	Ori	35.00	21.18	17.34	1003.84	1003.84	0.00	30.9	50.00	50.00	394.97	394.97
CLP	#CLP :0	SpliceT	End	35.17	21.22	17.37	1009.29	1009.29	0.00	31.0	50.00	50.00	396.41	396.41
CLP	#CLP :0	SpliceT	Ori	35.17	21.22	17.37	1009.29	1009.29	0.00	31.0	50.00	50.00	396.41	396.41
CLP	#CLP :1	SpliceB	End	38.00	21.36	21.79	1275.90	1275.90	0.00	24.2	65.00	65.00	647.16	647.16
CLP	#CLP :1	SpliceB	Ori	38.00	21.36	21.79	1275.90	1275.90	0.00	24.2	65.00	65.00	647.16	647.16
CLP	CLP :WVGD5	CLP :WVGD5	End	45.00	22.94	23.43	1586.03	1586.03	0.00	26.3	65.00	65.00	748.94	748.94
CLP	CLP :WVGD5	CLP :WVGD5	Ori	45.00	22.94	23.43	1586.03	1586.03	0.00	26.3	65.00	65.00	748.94	748.94
CLP	CLP :opgw	CLP :opgw	End	50.00	24.07	24.60	1835.88	1835.88	0.00	27.8	65.00	65.00	826.20	826.20
CLP	CLP :opgw	CLP :opgw	Ori	50.00	24.07	24.60	1835.88	1835.88	0.00	27.8	65.00	65.00	826.20	826.20
CLP	CLP :WVGD6	CLP :WVGD6	End	55.00	25.20	25.78	2110.68	2110.68	0.00	29.3	65.00	65.00	907.24	907.24
CLP	CLP :WVGD6	CLP :WVGD6	Ori	55.00	25.20	25.78	2110.68	2110.68	0.00	29.3	65.00	65.00	907.24	907.24
CLP	CLP :WVGD7	CLP :WVGD7	End	65.00	27.47	28.12	2739.89	2739.89	0.00	32.3	65.00	64.93	1079.55	1079.55
CLP	CLP :WVGD7	CLP :WVGD7	Ori	65.00	27.47	28.12	2739.89	2739.89	0.00	32.3	65.00	64.93	1079.55	1079.55
CLP	#CLP :2	SpliceT	End	71.00	28.82	29.52	3171.56	3171.56	0.00	34.1	65.00	63.40	1162.81	1162.81
CLP	#CLP :2	SpliceT	Ori	71.00	28.82	29.52	3171.56	3171.56	0.00	34.1	65.00	63.40	1162.81	1162.81
CLP	CLP :WVGD8	CLP :WVGD8	End	75.00	29.10	35.70	3893.75	3893.75	0.00	28.0	65.00	65.00	1449.44	1449.44
CLP	CLP :WVGD8	CLP :WVGD8	Ori	75.00	29.10	35.70	3893.75	3893.75	0.00	28.0	65.00	65.00	1449.44	1449.44
CLP	CLP :WVGD9	CLP :WVGD9	End	85.00	31.36	38.51	4887.70	4887.70	0.00	30.5	65.00	65.00	1688.23	1688.23
CLP	CLP :WVGD9	CLP :WVGD9	Ori	85.00	31.36	38.51	4887.70	4887.70	0.00	30.5	65.00	65.00	1688.23	1688.23
CLP	CLP :WVGD10	CLP :WVGD10	End	95.00	33.63	41.32	6037.86	6037.86	0.00	33.0	65.00	64.30	1924.41	1924.41
CLP	CLP :WVGD10	CLP :WVGD10	Ori	95.00	33.63	41.32	6037.87	6037.87	0.00	33.0	65.00	64.30	1924.41	1924.41
CLP	#CLP :3	SpliceT	End	99.92	34.74	42.70	6664.16	6664.16	0.00	34.2	65.00	63.26	2022.70	2022.70
CLP	#CLP :3	SpliceT	Ori	99.92	34.74	42.70	6664.16	6664.16	0.00	34.2	65.00	63.26	2022.70	2022.70
CLP	CLP :WVGD11	CLP :WVGD11	End	105.00	35.14	43.20	6899.42	6899.42	0.00	34.7	65.00	62.89	2058.03	2058.03
CLP	CLP :WVGD11	CLP :WVGD11	Ori	105.00	35.14	43.20	6899.42	6899.42	0.00	34.7	65.00	62.89	2058.03	2058.03
CLP	CLP :g	CLP :g	End	115.00	37.40	46.01	8335.60	8335.60	0.00	37.2	65.00	60.77	2257.31	2257.31

**Tubular Davit Properties:**

Davit Steel	Stock	Steel Thickness	Base	Tip	Taper	Drag	Modulus	Geometry	Strength	Vertical	Tension	Compres.	Long.	Yield	Weight
Property Number	Shape	Diameter	Diameter	Diameter	Coef.	of	Elasticity	Type	Check Capacity	Capacity	Capacity	Capacity	Capacity	Stress	Density
Label	or Depth	or Depth	Elasticity	Type	Override										
At End	(in)	(in)	(in)	(in/ft)	(ksi)	(lbs)	(lbs)	(lbs)	(lbs)	(ksi)	(lbs/ft^3)				
D281-6S	8T	0.1875	6.875	3.5	0	1.3	29000	1 point	Calculated	0	0	0	0	50	0
D281-8D	8T	0.1875	7.875	3.5	0	1.3	29000	1 point	Calculated	0	0	0	0	50	0

**Intermediate Joints for Davit Property "D281-6S":**

Joint Horz. Vert.  
Label Offset Offset

```

(ft) (ft)
-----
END 6.25 -1.25

```

Intermediate Joints for Davit Property "D281-8D":

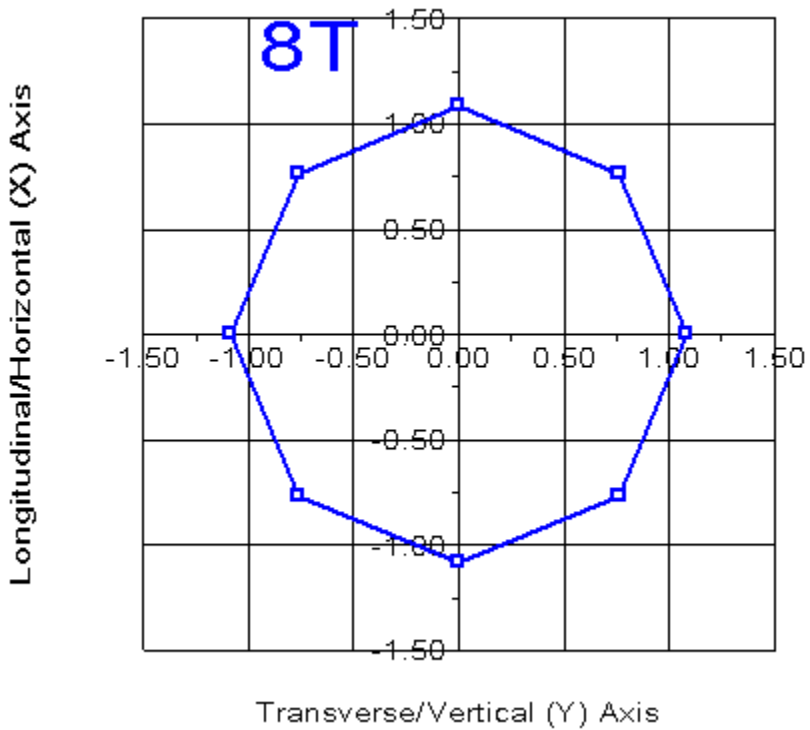
```

Joint Horz. Vert.
Label Offset Offset
      (ft) (ft)
-----
END 8.25 -1.25

```

Tubular Davit Arm Connectivity:

Davit Label	Attach Label	Davit Property Set	Azimuth (deg)
ARM1.1R	CLP :ARM 1	D281-8D	0
ARM1.1L	CLP :ARM 1	D281-6S	180
ARM2.1R	CLP :ARM 2	D281-8D	0
ARM2.1L	CLP :ARM 2	D281-6S	180
ARM3.1R	CLP :ARM 3	D281-8D	0
ARM3.1L	CLP :ARM 3	D281-6S	180



**Tubular Davit Arm Steel Properties:**

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Outer Diam. (in)	Area (in <sup>2</sup> )	V-Moment Inertia (in <sup>4</sup> )	H-Moment Inertia (in <sup>4</sup> )	D/t	W/t Max.	Fy (ksi)	Fa Min. (ksi)	V-Moment Capacity (ft-k)	H-Moment Capacity (ft-k)
ARM1.1R	ARM1.1R:O	Origin	0.00	7.88	4.78	37.32	37.32	0.00	13.3	50.00	50.00	36.49	36.49
ARM1.1R	ARM1.1R:END	End	8.34	3.50	2.06	2.99	2.99	0.00	3.6	50.00	50.00	6.58	6.58
ARM1.1L	ARM1.1L:O	Origin	0.00	6.88	4.16	24.58	24.58	0.00	11.0	50.00	50.00	27.52	27.52
ARM1.1L	ARM1.1L:END	End	6.37	3.50	2.06	2.99	2.99	0.00	3.6	50.00	50.00	6.58	6.58
ARM2.1R	ARM2.1R:O	Origin	0.00	7.88	4.78	37.32	37.32	0.00	13.3	50.00	50.00	36.49	36.49
ARM2.1R	ARM2.1R:END	End	8.34	3.50	2.06	2.99	2.99	0.00	3.6	50.00	50.00	6.58	6.58
ARM2.1L	ARM2.1L:O	Origin	0.00	6.88	4.16	24.58	24.58	0.00	11.0	50.00	50.00	27.52	27.52
ARM2.1L	ARM2.1L:END	End	6.37	3.50	2.06	2.99	2.99	0.00	3.6	50.00	50.00	6.58	6.58
ARM3.1R	ARM3.1R:O	Origin	0.00	7.88	4.78	37.32	37.32	0.00	13.3	50.00	50.00	36.49	36.49
ARM3.1R	ARM3.1R:END	End	8.34	3.50	2.06	2.99	2.99	0.00	3.6	50.00	50.00	6.58	6.58
ARM3.1L	ARM3.1L:O	Origin	0.00	6.88	4.16	24.58	24.58	0.00	11.0	50.00	50.00	27.52	27.52
ARM3.1L	ARM3.1L:END	End	6.37	3.50	2.06	2.99	2.99	0.00	3.6	50.00	50.00	6.58	6.58

\*\*\* Insulator Data

**Clamp Properties:**

Label	Stock Number	Holding Capacity (lbs)
CLAMP		3e+004

**Clamp Insulator Connectivity:**

Clamp Label	Structure And Tip Attach	Property Set	Min. Required Vertical Load (uplift) (lbs)
C1	ARM1.1R:END	CLAMP	No Limit
C2	ARM1.1L:END	CLAMP	No Limit
C3	ARM2.1R:END	CLAMP	No Limit
C4	ARM2.1L:END	CLAMP	No Limit
C5	ARM3.1R:END	CLAMP	No Limit
C6	ARM3.1L:END	CLAMP	No Limit
C7	CLP :WVGD1	CLAMP	No Limit
C8	CLP :WVGD2	CLAMP	No Limit
C9	CLP :WVGD3	CLAMP	No Limit
C10	CLP :WVGD4	CLAMP	No Limit
C11	CLP :WVGD5	CLAMP	No Limit
C12	CLP :WVGD6	CLAMP	No Limit
C13	CLP :WVGD7	CLAMP	No Limit
C14	CLP :WVGD8	CLAMP	No Limit
C15	CLP :WVGD9	CLAMP	No Limit
C16	CLP :WVGD10	CLAMP	No Limit
C17	CLP :TopConn	CLAMP	No Limit

C18	CLP :BotConn	CLAMP	No Limit
C19	CLP :WVGD11	CLAMP	No Limit
C20	CLP :opgw	CLAMP	No Limit

\*\*\* Loads Data

Loads from file: j:\jobs\1805800.wi\58\_ct11290c\05\_structural\backup documentation\rev (6)\calcs\pls pole\cl&p pole # 1068.lca

Insulator dead and wind loads are already included in the point loads printed below.

Loading Method Parameters:

Structure Height Summary (used for calculating wind/ice adjust with height):

Z of ground for wind height adjust 0.00 (ft) and structure Z coordinate that will be put on the centerline ground profile in PLS-CADD.  
 Ground elevation shift 0.00 (ft)  
 Z of ground with shift 0.00 (ft)  
 Z of structure top (highest joint) 115.00 (ft)  
 Structure height 115.00 (ft)  
 Structure height above ground 115.00 (ft)

Vector Load Cases:

Load Case	Dead	Wind	SF for Steel Poles	SF for Wood Poles	SF for Conc. Ult.	SF for Conc. First	SF for Conc. Zero	SF for Guys and Tubular Arms	SF for Non Braces	SF for Insuls.	SF for Found.	Point Loads	Wind/Ice Model	Trans. Wind Pressure (psf)	Longit. Wind Pressure (psf)
Ice Description Thick.	Ice Temperature	Area	Deflection	Deflection	Deflection	Deflection	Deflection	Deflection	Deflection	Deflection	Deflection	Deflection	Deflection	Deflection	Deflection
Check	Limit	Factor	Factor	Factor	Factor	Factor	Factor	Factor	Factor	Factor	Factor	Factor	Factor	Factor	Factor
(in)	(lbs/ft^3)	(deg F)	(in)	(in)	(in)	(in)	(in)	(in)	(in)	(in)	(in)	(in)	(in)	(in)	(in)
NESC HEAVY	1.5000	2.5000	1.00000	0.6500	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	21 loads	Wind on All	4	0
0.000	0.000	0.0	No Limit			0									
EXTREME	1.0000	1.0000	1.00000	0.6500	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	21 loads	NESC 2012	31	0
0.000	0.000	0.0	No Limit			0									

Point Loads for Load Case "NESC HEAVY":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
CLP :TopConn	1395	1034	0	Linnet
ARM1.1L:END	2279	1685	0	BITTERN
ARM1.1R:END	2279	1685	0	BITTERN
ARM2.1L:END	2279	1685	0	BITTERN
ARM2.1R:END	2279	1685	0	BITTERN
ARM3.1L:END	2279	1685	0	BITTERN
ARM3.1R:END	2279	1685	0	BITTERN
CLP :opgw	826	901	0	OPGW-012
CLP :WVGD1	688	75	0	Coax Cable
CLP :WVGD2	688	75	0	Coax Cable
CLP :WVGD3	688	75	0	Coax Cable
CLP :WVGD4	688	75	0	Coax Cable
CLP :WVGD5	688	75	0	Coax Cable
CLP :WVGD6	688	75	0	Coax Cable
CLP :WVGD7	688	75	0	Coax Cable
CLP :WVGD8	688	75	0	Coax Cable

CLP :WVGD9	688	75	0	Coax Cable
CLP :WVGD10	688	75	0	Coax Cable
CLP :WVGD11	688	75	0	Coax Cable
CLP :TopConn	0	1892	0	Mast Top Connection
CLP :BotConn	3514	-1027	0	Mast Bottom Connection

Point Loads for Load Case "EXTREME":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
CLP :TopConn	601	972	0	Linnet
ARM1.LL:END	1021	1830	0	BITTERN
ARM1.IR:END	1021	1830	0	BITTERN
ARM2.LL:END	1021	1830	0	BITTERN
ARM2.IR:END	1021	1830	0	BITTERN
ARM3.LL:END	1021	1830	0	BITTERN
ARM3.IR:END	1021	1830	0	BITTERN
CLP :opgw	244	828	0	OPGW-012
CLP :WVGD1	158	198	0	Coax Cable
CLP :WVGD2	158	198	0	Coax Cable
CLP :WVGD3	158	198	0	Coax Cable
CLP :WVGD4	158	198	0	Coax Cable
CLP :WVGD5	158	198	0	Coax Cable
CLP :WVGD6	158	198	0	Coax Cable
CLP :WVGD7	158	198	0	Coax Cable
CLP :WVGD8	158	198	0	Coax Cable
CLP :WVGD9	158	198	0	Coax Cable
CLP :WVGD10	158	198	0	Coax Cable
CLP :WVGD11	158	198	0	Coax Cable
CLP :TopConn	0	7645	0	Mast Top Connection
CLP :BotConn	1653	-4277	0	Mast Bottom Connection

Detailed Pole Loading Data for Load Case "EXTREME":

Notes: Does not include loads from equipment, arms, guys, braces, etc. or user input loads.  
Wind load is calculated for the undeformed shape of a pole.

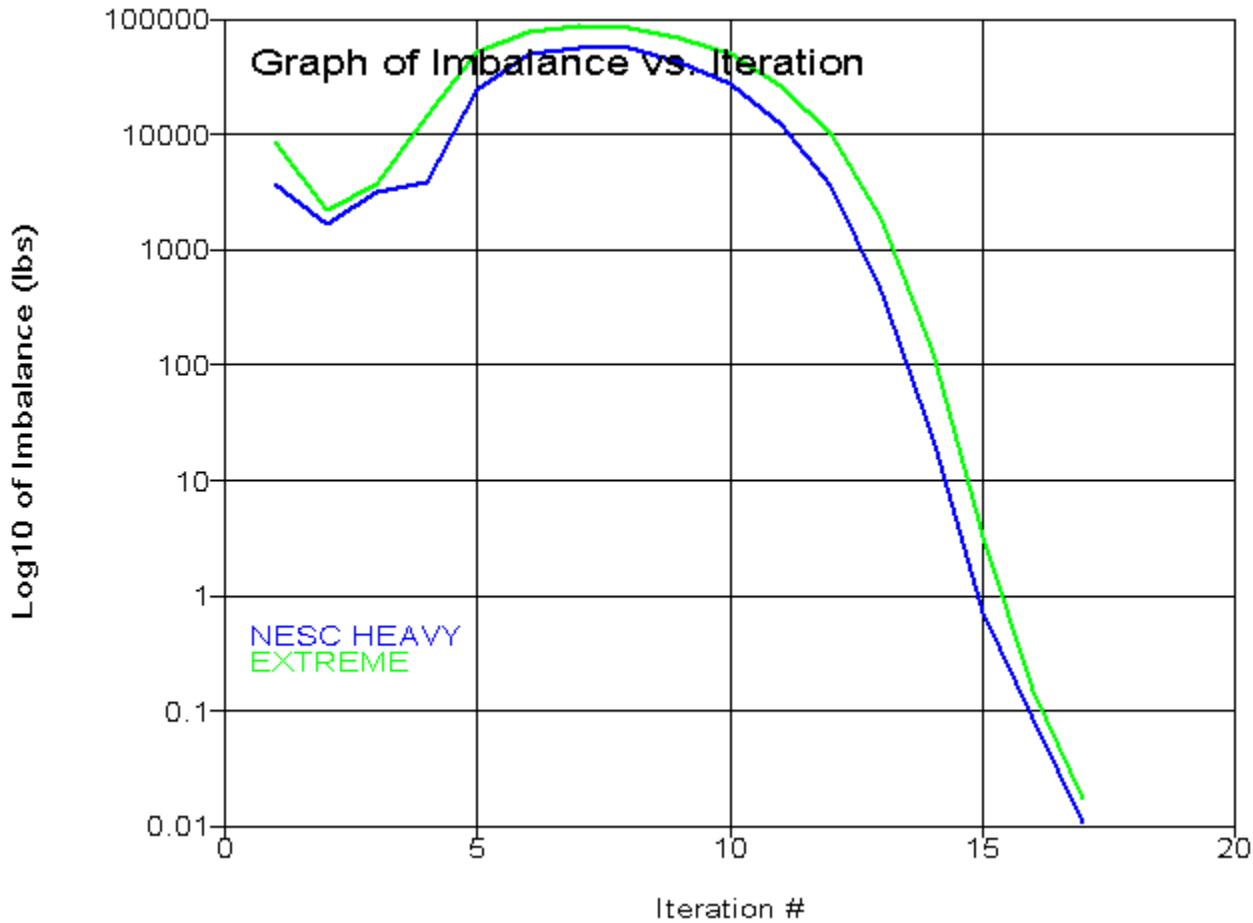
Pole Label	Top Joint	Bottom Joint	Section Top Z (ft)	Section Bottom Z (ft)	Section Average Elevation (ft)	Outer Diameter (in)	Reynolds Number	Drag Coef.	Adjusted Wind Pressure (psf)	Adjusted Ice Thickness (in)	Pole Vert. Load (lbs)	Pole Wind Load (lbs)	Pole Vertical Ice Load (lbs)	Pole Ice Wind Load (lbs)	Tran. Wind Load (lbs)	Long. Wind Load (lbs)
CLP	CLP :t	CLP :TopConn	115.00	113.00	114.00	13.489	1.14e+006	1.000	31.88	0.00	74.64	71.67	0.00	0.00	71.67	0.00
CLP	CLP :TopConn	CLP :WVGD1	113.00	110.00	111.50	14.055	1.19e+006	1.000	31.88	0.00	116.74	112.01	0.00	0.00	112.01	0.00
CLP	CLP :WVGD1	CLP :BotConn	110.00	106.00	108.00	14.846	1.25e+006	1.000	31.88	0.00	164.59	157.75	0.00	0.00	157.75	0.00
CLP	CLP :BotConn	CLP :ARM 1	106.00	102.33	104.16	15.714	1.33e+006	1.000	31.88	0.00	159.98	153.19	0.00	0.00	153.19	0.00
CLP	CLP :ARM 1	CLP :WVGD2	102.33	100.00	101.17	16.392	1.39e+006	1.000	31.88	0.00	106.03	101.46	0.00	0.00	101.46	0.00
CLP	CLP :WVGD2	CLP :ARM 2	100.00	91.33	95.67	17.636	1.49e+006	1.000	31.88	0.00	424.93	406.19	0.00	0.00	406.19	0.00
CLP	CLP :ARM 2	CLP :WVGD3	91.33	90.00	90.67	18.767	1.59e+006	1.000	31.88	0.00	69.43	66.31	0.00	0.00	66.31	0.00
CLP	CLP :WVGD3	CLP :ARM 3	90.00	80.33	85.17	20.011	1.69e+006	1.000	31.88	0.00	538.68	514.04	0.00	0.00	514.04	0.00
CLP	CLP :ARM 3	CLP :WVGD4	80.33	80.00	80.17	21.142	1.79e+006	1.000	31.88	0.00	19.44	18.53	0.00	0.00	18.53	0.00
CLP	CLP :WVGD4		80.00	79.83	79.92	21.199	1.79e+006	1.000	31.88	0.00	9.86	9.40	0.00	0.00	9.40	0.00
CLP			79.83	77.00	78.42	21.288	1.8e+006	1.000	31.88	0.00	376.80	160.20	0.00	0.00	160.20	0.00
CLP		CLP :WVGD5	77.00	70.00	73.50	22.150	1.87e+006	1.000	31.88	0.00	538.70	411.88	0.00	0.00	411.88	0.00
CLP	CLP :WVGD5	CLP :opgw	70.00	65.00	67.50	23.507	1.99e+006	1.000	31.88	0.00	408.65	312.22	0.00	0.00	312.22	0.00
CLP	CLP :opgw	CLP :WVGD6	65.00	60.00	62.50	24.638	2.08e+006	1.000	31.88	0.00	428.58	327.24	0.00	0.00	327.24	0.00
CLP	CLP :WVGD6	CLP :WVGD7	60.00	50.00	55.00	26.334	2.23e+006	1.000	31.88	0.00	916.93	699.55	0.00	0.00	699.55	0.00



CLP	CLP :WVGD7		50.00	44.00	47.00	28.144	2.38e+006	1.000	31.88	0.00	588.42	448.57	0.00	0.00	448.57	0.00
CLP		CLP :WVGD8	44.00	40.00	42.00	28.962	2.45e+006	1.000	31.88	0.00	886.29	307.75	0.00	0.00	307.75	0.00
CLP	CLP :WVGD8	CLP :WVGD9	40.00	30.00	35.00	30.233	2.56e+006	1.000	31.88	0.00	1262.62	803.12	0.00	0.00	803.12	0.00
CLP	CLP :WVGD9	CLP :WVGD10	30.00	20.00	25.00	32.495	2.75e+006	1.000	31.88	0.00	1358.18	863.21	0.00	0.00	863.21	0.00
CLP	CLP :WVGD10		20.00	15.08	17.54	34.182	2.89e+006	1.000	31.88	0.00	702.89	446.47	0.00	0.00	446.47	0.00
CLP		CLP :WVGD11	15.08	10.00	12.54	34.938	2.95e+006	1.000	31.88	0.00	1485.74	471.76	0.00	0.00	471.76	0.00
CLP	CLP :WVGD11	CLP :g	10.00	0.00	5.00	36.269	3.07e+006	1.000	31.88	0.00	1517.86	963.46	0.00	0.00	963.46	0.00

\*\*\* Analysis Results:

Maximum element usage is 97.81% for Steel Pole "CLP " in load case "EXTREME"  
 Maximum insulator usage is 28.79% for Clamp "C17" in load case "EXTREME"



\*\*\* Analysis Results for Load Case No. 1 "NESC HEAVY" - Number of iterations in SAPS 17

Equilibrium Joint Positions and Rotations for Load Case "NESC HEAVY":

Joint Label	X-Displ (ft)	Y-Displ (ft)	Z-Displ (ft)	X-Rot (deg)	Y-Rot (deg)	Z-Rot (deg)	X-Pos (ft)	Y-Pos (ft)	Z-Pos (ft)
CLP :g	0	0	0	0.0000	0.0000	0.0000	0	0	0
CLP :t	0.01829	7.487	-0.3335	-6.8099	0.0149	0.0002	0.01829	7.487	114.7
CLP :TopConn	0.01777	7.25	-0.3194	-6.8099	0.0149	0.0002	0.01777	7.25	112.7

CLP :WVGD1	0.01699	6.894	-0.2982	-6.7957	0.0149	0.0002	0.01699	6.894	109.7
CLP :BotConn	0.01596	6.423	-0.2703	-6.7413	0.0149	0.0002	0.01596	6.423	105.7
CLP :ARM 1	0.01501	5.994	-0.2451	-6.6681	0.0148	0.0002	0.01501	5.994	102.1
CLP :WVGD2	0.01441	5.725	-0.2294	-6.5950	0.0147	0.0002	0.01441	5.725	99.77
CLP :ARM 2	0.01223	4.754	-0.1747	-6.2135	0.0141	0.0002	0.01223	4.754	91.16
CLP :WVGD3	0.0119	4.611	-0.1669	-6.1388	0.0140	0.0002	0.0119	4.611	89.83
CLP :ARM 3	0.00962	3.625	-0.1162	-5.4943	0.0129	0.0001	0.00962	3.625	80.21
CLP :WVGD4	0.009546	3.594	-0.1147	-5.4693	0.0129	0.0001	0.009546	3.594	79.89
CLP :WVGD5	0.0074	2.702	-0.07439	-4.7359	0.0116	0.0001	0.0074	2.702	69.93
CLP :opgw	0.006414	2.305	-0.05843	-4.3513	0.0109	0.0001	0.006414	2.305	64.94
CLP :WVGD6	0.005491	1.942	-0.04505	-3.9597	0.0102	0.0001	0.005491	1.942	59.95
CLP :WVGD7	0.003845	1.317	-0.02508	-3.1752	0.0086	0.0000	0.003845	1.317	49.97
CLP :WVGD8	0.002494	0.8281	-0.01273	-2.4250	0.0069	0.0000	0.002494	0.8281	39.99
CLP :WVGD9	0.001427	0.4599	-0.005628	-1.7720	0.0053	0.0000	0.001427	0.4599	29.99
CLP :WVGD10	0.0006474	0.2026	-0.001991	-1.1575	0.0036	0.0000	0.0006474	0.2026	20
CLP :WVGD11	0.0001685	0.05116	-0.0004782	-0.5712	0.0018	-0.0000	0.0001685	0.05116	10
ARM1.1R:O	0.01499	5.989	-0.3231	-6.6681	0.0148	0.0002	0.01499	6.661	102
ARM1.1R:END	0.015	6.082	-1.404	-7.8401	0.0148	0.0002	0.015	15	102.2
ARM1.1L:O	0.01503	5.999	-0.1671	-6.6681	0.0148	0.0002	0.01503	5.326	102.2
ARM1.1L:END	0.01556	6.17	0.4991	-5.9497	0.0149	0.0003	0.01556	-0.7522	104.1
ARM2.1R:O	0.0122	4.749	-0.2586	-6.2135	0.0141	0.0002	0.0122	5.525	91.07
ARM2.1R:END	0.01224	4.84	-1.274	-7.3918	0.0141	0.0002	0.01224	13.87	91.31
ARM2.1L:O	0.01225	4.759	-0.09072	-6.2135	0.0141	0.0002	0.01225	3.983	91.24
ARM2.1L:END	0.01274	4.915	0.5266	-5.4874	0.0142	0.0003	0.01274	-2.111	93.11
ARM3.1R:O	0.009599	3.621	-0.2004	-5.4943	0.0129	0.0001	0.009599	4.501	80.13
ARM3.1R:END	0.009657	3.709	-1.112	-6.6825	0.0130	0.0001	0.009657	12.84	80.47
ARM3.1L:O	0.009641	3.629	-0.03199	-5.4943	0.0129	0.0001	0.009641	2.75	80.3
ARM3.1L:END	0.01007	3.762	0.5078	-4.7560	0.0130	0.0002	0.01007	-3.367	82.09

Joint Support Reactions for Load Case "NESC HEAVY":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Comp. Force (kips)	Z Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
CLP :g	-0.10	0.0	-17.64	0.0	0.0	-47.37	0.0	0.0	50.54	0.0	1617.51	0.0	-5.4	0.0	0.0	0.00	0.0	0.0

Detailed Steel Pole Usages for Load Case "NESC HEAVY":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Trans. Mom. (Local Mx) (ft-k)	Long. Mom. (Local My) (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Tran. Shear (kips)	Long. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Usage %
CLP	CLP :t	Origin	0.00	89.85	0.22	-4.00	-0.00	-0.00	0.0	-0.06	0.02	-0.00	-0.01	0.00	0.00	0.00	0.01	0.0	4
CLP	CLP :TopConn	End	2.00	87.00	0.21	-3.83	0.05	-0.00	0.0	-0.06	0.02	-0.00	-0.00	0.02	0.00	0.00	0.02	0.0	2
CLP	CLP :TopConn	Origin	2.00	87.00	0.21	-3.83	0.05	-0.00	-0.0	-1.24	3.16	-0.00	-0.11	0.00	0.59	0.00	1.02	2.0	4
CLP	CLP :WVGD1	End	5.00	82.73	0.20	-3.58	9.52	-0.01	-0.0	-1.24	3.16	-0.00	-0.11	2.65	0.21	0.00	2.79	5.6	2
CLP	CLP :WVGD1	Origin	5.00	82.73	0.20	-3.58	9.52	-0.01	0.0	-2.12	3.40	-0.00	-0.18	2.65	0.23	0.00	2.86	5.7	2
CLP	CLP :BotConn	End	9.00	77.07	0.19	-3.24	23.14	-0.02	0.0	-2.12	3.40	-0.00	-0.17	5.69	0.22	0.00	5.88	11.8	2
CLP	CLP :BotConn	Origin	9.00	77.07	0.19	-3.24	23.14	-0.02	0.0	-5.98	2.90	-0.01	-0.48	5.69	0.19	0.00	6.18	12.4	2
CLP	CLP :ARM 1	End	12.67	71.93	0.18	-2.94	33.77	-0.05	0.0	-5.98	2.90	-0.01	-0.45	7.46	0.18	0.00	7.92	15.8	2
CLP	CLP :ARM 1	Origin	12.67	71.93	0.18	-2.94	42.79	-0.05	-0.0	-10.56	6.88	-0.01	-0.80	9.45	0.42	0.00	10.28	20.6	2
CLP	CLP :WVGD2	End	15.00	68.70	0.17	-2.75	58.82	-0.08	-0.0	-10.56	6.88	-0.01	-0.78	12.16	0.40	0.00	12.96	25.9	2
CLP	CLP :WVGD2	Origin	15.00	68.70	0.17	-2.75	58.82	-0.08	-0.0	-11.66	7.16	-0.01	-0.86	12.16	0.42	0.00	13.04	26.1	2
CLP	CLP :ARM 2	End	23.67	57.05	0.15	-2.10	120.92	-0.20	-0.0	-11.66	7.16	-0.01	-0.77	19.92	0.37	0.00	20.70	41.4	2
CLP	CLP :ARM 2	Origin	23.67	57.05	0.15	-2.10	129.93	-0.20	-0.0	-16.47	11.14	-0.02	-1.08	21.41	0.58	0.00	22.51	45.0	2
CLP	CLP :WVGD3	End	25.00	55.33	0.14	-2.00	144.74	-0.22	-0.0	-16.47	11.14	-0.02	-1.06	23.08	0.57	0.00	24.16	48.3	2
CLP	CLP :WVGD3	Origin	25.00	55.33	0.14	-2.00	144.74	-0.22	-0.0	-17.66	11.38	-0.02	-1.14	23.08	0.58	0.00	24.24	48.5	2

CLP	CLP :ARM 3	End	34.67	43.50	0.12	-1.39	254.76	-0.44	-0.0	-17.66	11.38	-0.02	-1.02	32.51	0.52	0.00	33.54	67.1	2
CLP	CLP :ARM 3	Origin	34.67	43.50	0.12	-1.39	263.75	-0.44	-0.0	-22.61	15.25	-0.03	-1.31	33.65	0.70	0.00	34.98	70.0	2
CLP	CLP :WVGD4	End	35.00	43.12	0.11	-1.38	268.79	-0.45	-0.0	-22.61	15.25	-0.03	-1.30	34.05	0.70	0.00	35.37	70.7	2
CLP	CLP :WVGD4	Origin	35.00	43.12	0.11	-1.38	268.79	-0.45	-0.0	-23.31	15.39	-0.03	-1.34	34.05	0.70	0.00	35.42	70.8	2
CLP	SpliceT	End	35.17	42.93	0.11	-1.37	271.36	-0.45	-0.0	-23.31	15.39	-0.03	-1.34	34.25	0.70	0.00	35.61	71.2	2
CLP	SpliceT	Origin	35.17	42.93	0.11	-1.37	271.36	-0.45	-0.0	-23.63	15.42	-0.03	-1.36	34.25	0.70	0.00	35.63	71.3	2
CLP	SpliceB	End	38.00	39.76	0.11	-1.22	315.04	-0.53	-0.0	-23.63	15.42	-0.03	-1.08	31.66	0.56	0.00	32.76	50.4	2
CLP	SpliceB	Origin	38.00	39.76	0.11	-1.22	315.04	-0.53	-0.0	-24.41	15.48	-0.03	-1.12	31.66	0.56	0.00	32.80	50.5	2
CLP	CLP :WVGD5	End	45.00	32.42	0.09	-0.89	423.38	-0.76	-0.0	-24.41	15.48	-0.03	-1.04	36.77	0.52	0.00	37.82	58.2	2
CLP	CLP :WVGD5	Origin	45.00	32.42	0.09	-0.89	423.38	-0.76	-0.0	-25.92	15.65	-0.04	-1.11	36.77	0.53	0.00	37.89	58.3	2
CLP	CLP :opgw	End	50.00	27.66	0.08	-0.70	501.61	-0.94	-0.0	-25.92	15.65	-0.04	-1.05	39.49	0.50	0.00	40.56	62.4	2
CLP	CLP :opgw	Origin	50.00	27.66	0.08	-0.70	501.61	-0.94	-0.0	-27.41	16.64	-0.04	-1.11	39.49	0.54	0.00	40.62	62.5	2
CLP	CLP :WVGD6	End	55.00	23.31	0.07	-0.54	584.79	-1.15	-0.0	-27.41	16.64	-0.04	-1.06	41.93	0.51	0.00	43.00	66.2	2
CLP	CLP :WVGD6	Origin	55.00	23.31	0.07	-0.54	584.79	-1.14	-0.0	-29.27	16.80	-0.05	-1.14	41.93	0.52	0.00	43.08	66.3	2
CLP	CLP :WVGD7	End	65.00	15.80	0.05	-0.30	752.75	-1.62	-0.0	-29.27	16.80	-0.05	-1.04	45.32	0.47	0.00	46.36	74.0	2
CLP	CLP :WVGD7	Origin	65.00	15.80	0.05	-0.30	752.75	-1.62	-0.0	-31.26	16.93	-0.05	-1.11	45.32	0.48	0.00	46.43	74.1	2
CLP	SpliceT	End	71.00	12.09	0.04	-0.20	854.31	-1.94	-0.0	-31.26	16.93	-0.05	-1.06	46.63	0.45	0.00	47.69	78.4	2
CLP	SpliceT	Origin	71.00	12.09	0.04	-0.20	854.31	-1.94	-0.0	-32.48	16.96	-0.06	-1.10	46.63	0.46	0.00	47.73	78.4	2
CLP	CLP :WVGD8	End	75.00	9.94	0.03	-0.15	922.14	-2.18	-0.0	-32.48	16.96	-0.06	-0.91	41.39	0.38	0.00	42.31	65.1	2
CLP	CLP :WVGD8	Origin	75.00	9.94	0.03	-0.15	922.14	-2.18	-0.0	-34.91	17.13	-0.07	-0.98	41.39	0.38	0.00	42.38	65.2	2
CLP	CLP :WVGD9	End	85.00	5.52	0.02	-0.07	1093.47	-2.84	-0.0	-34.91	17.13	-0.07	-0.91	42.15	0.35	0.00	43.06	66.2	2
CLP	CLP :WVGD9	Origin	85.00	5.52	0.02	-0.07	1093.47	-2.83	-0.0	-37.75	17.31	-0.08	-0.98	42.15	0.36	0.00	43.13	66.4	2
CLP	CLP :WVGD10	End	95.00	2.43	0.01	-0.02	1266.53	-3.59	-0.0	-37.75	17.31	-0.08	-0.91	42.37	0.33	0.00	43.29	67.3	2
CLP	CLP :WVGD10	Origin	95.00	2.43	0.01	-0.02	1266.53	-3.59	-0.0	-40.12	17.45	-0.08	-0.97	42.37	0.33	0.00	43.35	67.4	2
CLP	SpliceT	End	99.92	1.38	0.00	-0.01	1352.32	-4.00	-0.0	-40.12	17.45	-0.08	-0.94	42.35	0.32	0.00	43.29	68.4	2
CLP	SpliceT	Origin	99.92	1.38	0.00	-0.01	1352.32	-4.00	-0.0	-41.85	17.49	-0.09	-0.98	42.35	0.32	0.00	43.33	68.5	2
CLP	CLP :WVGD11	End	105.00	0.61	0.00	-0.01	1441.23	-4.46	-0.0	-41.85	17.49	-0.09	-0.97	44.10	0.32	0.00	45.07	71.7	2
CLP	CLP :WVGD11	Origin	105.00	0.61	0.00	-0.01	1441.23	-4.46	-0.0	-44.93	17.63	-0.10	-1.04	44.10	0.32	0.00	45.14	74.9	2
CLP	CLP :g	End	115.00	0.00	0.00	0.00	1617.51	-5.43	-0.0	-44.93	17.63	-0.10	-0.98	43.61	0.30	0.00	44.58	73.4	2

Detailed Tubular Davit Arm Usages for Load Case "NESC HEAVY":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
ARM1.1R	ARM1.1R:O	Origin	0.00	71.87	0.18	-3.88	-19.91	-0.01	0.0	1.64	2.39	0.00	0.34	27.28	0.00	0.00	27.62	55.2	1
ARM1.1R	ARM1.1R:END	End	8.34	72.98	0.18	-16.85	0.00	0.00	0.0	1.64	2.39	0.00	0.80	0.00	2.43	0.00	4.27	8.5	3
ARM1.1L	ARM1.1L:O	Origin	0.00	71.98	0.18	-2.00	-10.92	0.00	0.0	-2.31	1.71	-0.00	-0.56	19.84	0.00	0.00	20.40	40.8	1
ARM1.1L	ARM1.1L:END	End	6.37	74.04	0.19	5.99	-0.00	0.00	0.0	-2.31	1.71	-0.00	-1.12	0.00	1.74	0.00	3.22	6.4	3
ARM2.1R	ARM2.1R:O	Origin	0.00	56.99	0.15	-3.10	-20.01	-0.01	0.0	1.62	2.40	0.00	0.34	27.42	0.00	0.00	27.76	55.5	1
ARM2.1R	ARM2.1R:END	End	8.34	58.09	0.15	-15.29	0.00	0.00	0.0	1.62	2.40	0.00	0.79	0.00	2.44	0.00	4.30	8.6	3
ARM2.1L	ARM2.1L:O	Origin	0.00	57.10	0.15	-1.09	-11.04	0.00	0.0	-2.29	1.73	-0.00	-0.55	20.06	0.00	0.00	20.61	41.2	1
ARM2.1L	ARM2.1L:END	End	6.37	58.98	0.15	6.32	-0.00	0.00	0.0	-2.29	1.73	-0.00	-1.11	0.00	1.76	0.00	3.25	6.5	3
ARM3.1R	ARM3.1R:O	Origin	0.00	43.45	0.12	-2.40	-20.18	-0.00	0.0	1.59	2.42	0.00	0.33	27.65	0.00	0.00	27.98	56.0	1
ARM3.1R	ARM3.1R:END	End	8.34	44.50	0.12	-13.34	0.00	0.00	0.0	1.59	2.42	0.00	0.77	0.00	2.46	0.00	4.33	8.7	3
ARM3.1L	ARM3.1L:O	Origin	0.00	43.55	0.12	-0.38	-11.23	0.00	0.0	-2.27	1.76	-0.00	-0.55	20.39	0.00	0.00	20.94	41.9	1
ARM3.1L	ARM3.1L:END	End	6.37	45.15	0.12	6.09	-0.00	0.00	0.0	-2.27	1.76	-0.00	-1.10	0.00	1.79	0.00	3.29	6.6	3

Summary of Clamp Capacities and Usages for Load Case "NESC HEAVY":

Clamp Force      Input      Factored      Usage

Label	Holding Capacity (kips)	Holding Capacity (kips)	%
C1	2.834	30.00	9.45
C2	2.834	30.00	9.45
C3	2.834	30.00	9.45
C4	2.834	30.00	9.45
C5	2.834	30.00	9.45
C6	2.834	30.00	9.45
C7	0.692	30.00	2.31
C8	0.692	30.00	2.31
C9	0.692	30.00	2.31
C10	0.692	30.00	2.31
C11	0.692	30.00	2.31
C12	0.692	30.00	2.31
C13	0.692	30.00	2.31
C14	0.692	30.00	2.31
C15	0.692	30.00	2.31
C16	0.692	30.00	2.31
C17	3.242	30.00	10.81
C18	3.661	30.00	12.20
C19	0.692	30.00	2.31
C20	1.222	30.00	4.07

Equilibrium Joint Positions and Rotations for Load Case "EXTREME":

Joint Label	X-Displ (ft)	Y-Displ (ft)	Z-Displ (ft)	X-Rot (deg)	Y-Rot (deg)	Z-Rot (deg)	X-Pos (ft)	Y-Pos (ft)	Z-Pos (ft)
CLP :g	0	0	0	0.0000	0.0000	0.0000	0	0	0
CLP :t	0.004388	10.09	-0.6065	-9.5462	0.0035	0.0001	0.004388	10.09	114.4
CLP :TopConn	0.004265	9.754	-0.5788	-9.5461	0.0035	0.0001	0.004265	9.754	112.4
CLP :WVGD1	0.004081	9.257	-0.5374	-9.5071	0.0035	0.0001	0.004081	9.257	109.5
CLP :BotConn	0.003835	8.6	-0.4831	-9.3586	0.0035	0.0001	0.003835	8.6	105.5
CLP :ARM 1	0.003611	8.009	-0.4351	-9.1718	0.0035	0.0001	0.003611	8.009	101.9
CLP :WVGD2	0.00347	7.64	-0.4058	-9.0281	0.0035	0.0001	0.00347	7.64	99.59
CLP :ARM 2	0.002952	6.324	-0.3051	-8.3743	0.0034	0.0001	0.002952	6.324	91.02
CLP :WVGD3	0.002875	6.131	-0.2911	-8.2584	0.0033	0.0001	0.002875	6.131	89.71
CLP :ARM 3	0.002332	4.814	-0.2008	-7.3132	0.0031	0.0001	0.002332	4.814	80.13
CLP :WVGD4	0.002314	4.772	-0.1981	-7.2781	0.0031	0.0001	0.002314	4.772	79.8
CLP :WVGD5	0.0018	3.59	-0.1277	-6.2762	0.0028	0.0000	0.0018	3.59	69.87
CLP :opgw	0.001563	3.064	-0.1	-5.7622	0.0026	0.0000	0.001563	3.064	64.9
CLP :WVGD6	0.00134	2.584	-0.07679	-5.2430	0.0025	0.0000	0.00134	2.584	59.92
CLP :WVGD7	0.0009417	1.756	-0.04226	-4.2104	0.0021	0.0000	0.0009417	1.756	49.96
CLP :WVGD8	0.0006127	1.107	-0.02097	-3.2256	0.0017	0.0000	0.0006127	1.107	39.98
CLP :WVGD9	0.0003515	0.6167	-0.008784	-2.3657	0.0013	0.0000	0.0003515	0.6167	29.99
CLP :WVGD10	0.00016	0.2726	-0.002705	-1.5517	0.0009	0.0000	0.00016	0.2726	20
CLP :WVGD11	4.175e-005	0.06906	-0.0004132	-0.7694	0.0005	0.0000	4.175e-005	0.06906	10
ARM1.1R:O	0.003603	8	-0.5423	-9.1718	0.0035	0.0001	0.003603	8.672	101.8
ARM1.1R:END	0.003578	8.094	-1.923	-9.6831	0.0035	0.0001	0.003578	17.02	101.7
ARM1.1L:O	0.003619	8.018	-0.328	-9.1718	0.0035	0.0001	0.003619	7.346	102
ARM1.1L:END	0.003773	8.293	0.6421	-9.0275	0.0035	0.0002	0.003773	1.371	104.2
ARM2.1R:O	0.002945	6.315	-0.4181	-8.3743	0.0034	0.0001	0.002945	7.091	90.91
ARM2.1R:END	0.00293	6.41	-1.684	-8.8980	0.0034	0.0001	0.00293	15.44	90.9
ARM2.1L:O	0.00296	6.332	-0.1921	-8.3743	0.0034	0.0001	0.00296	5.556	91.14
ARM2.1L:END	0.0031	6.577	0.6937	-8.2175	0.0034	0.0001	0.0031	-0.4489	93.27
ARM3.1R:O	0.002325	4.807	-0.3128	-7.3132	0.0031	0.0001	0.002325	5.686	80.02
ARM3.1R:END	0.002323	4.9	-1.426	-7.8534	0.0031	0.0001	0.002323	14.03	80.15
ARM3.1L:O	0.002339	4.821	-0.08889	-7.3132	0.0031	0.0001	0.002339	3.942	80.24
ARM3.1L:END	0.002459	5.027	0.6842	-7.1399	0.0031	0.0001	0.002459	-2.102	82.26

Joint Support Reactions for Load Case "EXTREME":

Joint Label	X Force (kips)	X Usage % (kips)	Y Force (kips)	Y Usage %	H-Shear Usage % (kips)	Z Comp. Force (kips)	Usage %	Uplift Usage %	Result. Force (kips)	Usage %	X Moment (ft-k)	X-M. Usage % (ft-k)	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage % (ft-k)	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
CLP :g	-0.03	0.0	-26.07	0.0	0.0	-24.75	0.0	0.0	35.95	0.0	2188.86	0.0	-1.3	0.0	0.0	-0.00	0.0	0.0

Detailed Steel Pole Usages for Load Case "EXTREME":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Trans. Mom. (Local Mx) (ft-k)	Long. Mom. (Local My) (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Tran. Shear (kips)	Long. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
CLP	CLP :t	Origin	0.00	121.03	0.05	-7.28	-0.00	-0.00	0.0	-0.04	0.04	-0.00	-0.00	0.00	0.01	0.00	0.01	0.0	4
CLP	CLP :TopConn	End	2.00	117.05	0.05	-6.95	0.08	-0.00	0.0	-0.04	0.04	-0.00	-0.00	0.03	0.00	0.00	0.03	0.1	2
CLP	CLP :TopConn	Origin	2.00	117.05	0.05	-6.95	0.08	-0.00	-0.0	0.70	8.74	-0.00	0.06	0.00	1.62	0.00	2.81	5.6	4

CLP	CLP :WVGD1	End	5.00	111.08	0.05	-6.45	26.31	-0.00	-0.0	0.70	8.74	-0.00	0.06	7.33	0.59	0.00	7.47	14.9	2
CLP	CLP :WVGD1	Origin	5.00	111.08	0.05	-6.45	26.31	-0.00	0.0	0.43	9.12	-0.00	0.04	7.33	0.62	0.00	7.45	14.9	2
CLP	CLP :BotConn	End	9.00	103.20	0.05	-5.80	62.79	-0.01	0.0	0.43	9.12	-0.00	0.03	15.45	0.58	0.00	15.51	31.0	2
CLP	CLP :BotConn	Origin	9.00	103.20	0.05	-5.80	62.79	-0.01	0.0	-2.08	5.34	-0.00	-0.17	15.45	0.34	0.00	15.62	31.2	2
CLP	CLP :ARM 1	End	12.67	96.11	0.04	-5.22	82.41	-0.01	0.0	-2.08	5.34	-0.00	-0.16	18.19	0.32	0.00	18.36	36.7	2
CLP	CLP :ARM 1	Origin	12.67	96.11	0.04	-5.22	88.93	-0.01	0.0	-3.81	9.45	-0.00	-0.29	19.63	0.57	0.00	19.94	39.9	2
CLP	CLP :WVGD2	End	15.00	91.68	0.04	-4.87	110.94	-0.02	0.0	-3.81	9.45	-0.00	-0.28	22.93	0.55	0.00	23.23	46.5	2
CLP	CLP :WVGD2	Origin	15.00	91.68	0.04	-4.87	110.94	-0.02	0.0	-4.26	9.93	-0.00	-0.31	22.93	0.58	0.00	23.27	46.5	2
CLP	CLP :ARM 2	End	23.67	75.88	0.04	-3.66	197.05	-0.04	0.0	-4.26	9.93	-0.00	-0.28	32.45	0.52	0.00	32.74	65.5	2
CLP	CLP :ARM 2	Origin	23.67	75.88	0.04	-3.66	203.60	-0.04	0.0	-6.22	14.11	-0.00	-0.41	33.52	0.74	0.00	33.96	67.9	2
CLP	CLP :WVGD3	End	25.00	73.57	0.03	-3.49	222.36	-0.05	0.0	-6.22	14.11	-0.00	-0.40	35.44	0.72	0.00	35.86	71.7	2
CLP	CLP :WVGD3	Origin	25.00	73.57	0.03	-3.49	222.36	-0.05	0.0	-6.77	14.60	-0.01	-0.44	35.44	0.75	0.00	35.90	71.8	2
CLP	CLP :ARM 3	End	34.67	57.77	0.03	-2.41	363.55	-0.10	0.0	-6.77	14.60	-0.01	-0.39	46.36	0.67	0.00	46.77	93.5	2
CLP	CLP :ARM 3	Origin	34.67	57.77	0.03	-2.41	370.13	-0.10	0.0	-8.90	18.75	-0.01	-0.52	47.20	0.86	0.00	47.74	95.5	2
CLP	CLP :WVGD4	End	35.00	57.27	0.03	-2.38	376.31	-0.10	0.0	-8.90	18.75	-0.01	-0.51	47.64	0.86	0.00	48.18	96.4	2
CLP	CLP :WVGD4	Origin	35.00	57.27	0.03	-2.38	376.31	-0.10	0.0	-9.05	18.98	-0.01	-0.52	47.64	0.87	0.00	48.19	96.4	2
CLP	SpliceT	End	35.17	57.01	0.03	-2.36	379.48	-0.10	0.0	-9.05	18.98	-0.01	-0.52	47.87	0.87	0.00	48.42	96.8	2
CLP	SpliceT	Origin	35.17	57.01	0.03	-2.36	379.48	-0.10	0.0	-9.30	19.06	-0.01	-0.54	47.87	0.87	0.00	48.43	96.9	2
CLP	SpliceB	End	38.00	52.79	0.03	-2.10	433.47	-0.12	0.0	-9.30	19.06	-0.01	-0.43	43.54	0.70	0.00	43.99	67.7	2
CLP	SpliceB	Origin	38.00	52.79	0.03	-2.10	433.47	-0.12	0.0	-9.91	19.32	-0.01	-0.45	43.54	0.70	0.00	44.01	67.7	2
CLP	CLP :WVGD5	End	45.00	43.07	0.02	-1.53	568.68	-0.18	0.0	-9.91	19.32	-0.01	-0.42	49.36	0.65	0.00	49.80	76.6	2
CLP	CLP :WVGD5	Origin	45.00	43.07	0.02	-1.53	568.68	-0.17	0.0	-10.73	19.83	-0.01	-0.46	49.36	0.67	0.00	49.83	76.7	2
CLP	CLP :opgw	End	50.00	36.77	0.02	-1.20	667.83	-0.22	0.0	-10.73	19.83	-0.01	-0.44	52.55	0.64	0.00	53.00	81.5	2
CLP	CLP :opgw	Origin	50.00	36.77	0.02	-1.20	667.83	-0.22	0.0	-11.49	20.94	-0.01	-0.47	52.55	0.68	0.00	53.03	81.6	2
CLP	CLP :WVGD6	End	55.00	31.01	0.02	-0.92	772.50	-0.27	0.0	-11.49	20.94	-0.01	-0.45	55.35	0.64	0.00	55.81	85.9	2
CLP	CLP :WVGD6	Origin	55.00	31.01	0.02	-0.92	772.50	-0.27	0.0	-12.58	21.56	-0.01	-0.49	55.35	0.66	0.00	55.85	85.9	2
CLP	CLP :WVGD7	End	65.00	21.07	0.01	-0.51	988.07	-0.38	0.0	-12.58	21.56	-0.01	-0.45	59.44	0.61	0.00	59.89	92.2	2
CLP	CLP :WVGD7	Origin	65.00	21.07	0.01	-0.51	988.07	-0.38	0.0	-13.79	22.20	-0.01	-0.49	59.44	0.63	0.00	59.94	92.3	2
CLP	SpliceT	End	71.00	16.15	0.01	-0.34	1121.28	-0.46	0.0	-13.79	22.20	-0.01	-0.47	61.15	0.60	0.00	61.63	97.2	2
CLP	SpliceT	Origin	71.00	16.15	0.01	-0.34	1121.28	-0.46	0.0	-14.72	22.50	-0.01	-0.50	61.15	0.60	0.00	61.66	97.2	2
CLP	CLP :WVGD8	End	75.00	13.29	0.01	-0.25	1211.28	-0.52	0.0	-14.72	22.50	-0.01	-0.41	54.33	0.50	0.00	54.75	84.2	2
CLP	CLP :WVGD8	Origin	75.00	13.29	0.01	-0.25	1211.28	-0.52	0.0	-16.18	23.16	-0.02	-0.45	54.33	0.51	0.00	54.79	84.3	2
CLP	CLP :WVGD9	End	85.00	7.40	0.00	-0.11	1442.84	-0.69	0.0	-16.18	23.16	-0.02	-0.42	55.56	0.48	0.00	55.99	86.1	2
CLP	CLP :WVGD9	Origin	85.00	7.40	0.00	-0.11	1442.84	-0.69	0.0	-17.99	24.00	-0.02	-0.47	55.56	0.49	0.00	56.04	86.2	2
CLP	CLP :WVGD10	End	95.00	3.27	0.00	-0.03	1682.80	-0.88	0.0	-17.99	24.00	-0.02	-0.44	56.24	0.46	0.00	56.68	88.1	2
CLP	CLP :WVGD10	Origin	95.00	3.27	0.00	-0.03	1682.80	-0.88	0.0	-19.43	24.69	-0.02	-0.47	56.24	0.47	0.00	56.72	88.2	2
CLP	SpliceT	End	99.92	1.87	0.00	-0.01	1804.18	-0.98	0.0	-19.43	24.69	-0.02	-0.45	56.44	0.46	0.00	56.90	89.9	2
CLP	SpliceT	Origin	99.92	1.87	0.00	-0.01	1804.18	-0.98	0.0	-20.69	25.03	-0.02	-0.48	56.44	0.46	0.00	56.93	90.0	2
CLP	CLP :WVGD11	End	105.00	0.83	0.00	-0.00	1931.40	-1.10	0.0	-20.69	25.03	-0.02	-0.48	59.03	0.46	0.00	59.52	94.6	2
CLP	CLP :WVGD11	Origin	105.00	0.83	0.00	-0.00	1931.40	-1.10	0.0	-22.60	25.75	-0.03	-0.52	59.03	0.47	0.00	59.56	94.7	2
CLP	CLP :g	End	115.00	0.00	0.00	0.00	2188.86	-1.35	0.0	-22.60	25.75	-0.03	-0.49	58.94	0.44	0.00	59.44	97.8	2

Detailed Tubular Davit Arm Usages for Load Case "EXTREME":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
ARM1.1R	ARM1.1R:O	Origin	0.00	96.01	0.04	-6.51	-8.68	-0.00	0.0	1.85	1.04	0.00	0.39	11.90	0.00	0.00	12.29	24.6	1
ARM1.1R	ARM1.1R:END	End	8.34	97.12	0.04	-23.08	0.00	0.00	0.0	1.85	1.04	0.00	0.90	0.00	1.06	0.00	2.04	4.1	3
ARM1.1L	ARM1.1L:O	Origin	0.00	96.21	0.04	-3.94	-2.19	0.00	0.0	-2.08	0.34	-0.00	-0.50	3.99	0.00	0.00	4.49	9.0	1
ARM1.1L	ARM1.1L:END	End	6.37	99.52	0.05	7.70	-0.00	0.00	0.0	-2.08	0.34	-0.00	-1.01	0.00	0.35	0.00	1.18	2.4	3
ARM2.1R	ARM2.1R:O	Origin	0.00	75.78	0.04	-5.02	-8.90	-0.00	0.0	1.83	1.07	0.00	0.38	12.19	0.00	0.00	12.57	25.1	1
ARM2.1R	ARM2.1R:END	End	8.34	76.92	0.04	-20.21	0.00	0.00	0.0	1.83	1.07	0.00	0.89	0.00	1.08	0.00	2.08	4.2	3
ARM2.1L	ARM2.1L:O	Origin	0.00	75.98	0.04	-2.31	-2.38	0.00	0.0	-2.08	0.37	-0.00	-0.50	4.33	0.00	0.00	4.83	9.7	1

ARM2.1L	ARM2.1L:END	End	6.37	78.92	0.04	8.32	-0.00	0.00	0.0	-2.08	0.37	-0.00	-1.01	0.00	0.38	0.00	1.21	2.4	3
ARM3.1R	ARM3.1R:O	Origin	0.00	57.68	0.03	-3.75	-9.17	-0.00	0.0	1.81	1.10	0.00	0.38	12.57	0.00	0.00	12.95	25.9	1
ARM3.1R	ARM3.1R:END	End	8.34	58.80	0.03	-17.11	0.00	0.00	0.0	1.81	1.10	0.00	0.88	0.00	1.12	0.00	2.13	4.3	3
ARM3.1L	ARM3.1L:O	Origin	0.00	57.85	0.03	-1.07	-2.64	0.00	0.0	-2.07	0.41	-0.00	-0.50	4.79	0.00	0.00	5.29	10.6	1
ARM3.1L	ARM3.1L:END	End	6.37	60.33	0.03	8.21	-0.00	0.00	0.0	-2.07	0.41	-0.00	-1.01	0.00	0.42	0.00	1.24	2.5	3

**Summary of Clamp Capacities and Usages for Load Case "EXTREME":**

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
C1	2.096	30.00	30.00	6.99
C2	2.096	30.00	30.00	6.99
C3	2.096	30.00	30.00	6.99
C4	2.096	30.00	30.00	6.99
C5	2.096	30.00	30.00	6.99
C6	2.096	30.00	30.00	6.99
C7	0.253	30.00	30.00	0.84
C8	0.253	30.00	30.00	0.84
C9	0.253	30.00	30.00	0.84
C10	0.253	30.00	30.00	0.84
C11	0.253	30.00	30.00	0.84
C12	0.253	30.00	30.00	0.84
C13	0.253	30.00	30.00	0.84
C14	0.253	30.00	30.00	0.84
C15	0.253	30.00	30.00	0.84
C16	0.253	30.00	30.00	0.84
C17	8.638	30.00	30.00	28.79
C18	4.585	30.00	30.00	15.28
C19	0.253	30.00	30.00	0.84
C20	0.863	30.00	30.00	2.88



\*\*\* Overall summary for all load cases - Usage = Maximum Stress / Allowable Stress

Summary of Steel Pole Usages:

Steel Pole Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
CLP	97.81	EXTREME	22	13365.5

Base Plate Results by Bend Line:

Pole Label	Load Case	Bend Line #	Start X (ft)	Start Y (ft)	End X (ft)	End Y (ft)	Length (in)	Bending Stress (ksi)	Mom. Sum (ft-k)	Bolt # Acting	Bolts	Bolt Max Load (kips)	Min Plate Thickness (in)	Actual Thickness (in)	Usage %
CLP	NESC HEAVY	1	0.645	1.558	-0.645	1.558	15.491	39.164	63.726	3	79.793	2.321	2.750	71.21	
CLP	NESC HEAVY	2	-0.645	1.558	-1.558	0.645	15.492	34.812	56.645	1.5	78.693	2.188	2.750	63.30	
CLP	NESC HEAVY	3	-1.558	-0.645	-0.645	-1.558	15.492	30.768	50.065	1.5	-69.758	2.057	2.750	55.94	
CLP	NESC HEAVY	4	-0.645	-1.558	0.645	-1.558	15.491	35.355	57.528	3	-72.100	2.205	2.750	64.28	
CLP	NESC HEAVY	5	0.645	-1.558	1.558	-0.645	15.492	31.407	51.104	1.5	-71.001	2.078	2.750	57.10	
CLP	NESC HEAVY	6	1.558	0.645	0.645	1.558	15.492	34.174	55.606	1.5	77.451	2.168	2.750	62.13	
CLP	EXTREME	1	0.645	1.558	-0.645	1.558	15.491	51.393	83.623	3	104.563	2.658	2.750	93.44	
CLP	EXTREME	2	-0.645	1.558	-1.558	0.645	15.492	45.321	73.744	1.5	102.389	2.496	2.750	82.40	
CLP	EXTREME	3	-1.558	-0.645	-0.645	-1.558	15.492	43.425	70.660	1.5	-98.157	2.444	2.750	78.95	
CLP	EXTREME	4	-0.645	-1.558	0.645	-1.558	15.491	49.450	80.462	3	-100.640	2.608	2.750	89.91	
CLP	EXTREME	5	0.645	-1.558	1.558	-0.645	15.492	43.584	70.918	1.5	-98.466	2.448	2.750	79.24	
CLP	EXTREME	6	1.558	0.645	0.645	1.558	15.492	45.162	73.486	1.5	102.081	2.492	2.750	82.11	

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
ARM1.1R	55.24	NESC HEAVY	1	97.0
ARM1.1L	40.79	NESC HEAVY	1	67.4
ARM2.1R	55.52	NESC HEAVY	1	97.0
ARM2.1L	41.22	NESC HEAVY	1	67.4
ARM3.1R	55.96	NESC HEAVY	1	97.0
ARM3.1L	41.88	NESC HEAVY	1	67.4

\*\*\* Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC HEAVY	78.43	CLP Steel Pole	Steel Pole
EXTREME	97.81	CLP Steel Pole	Steel Pole

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Segment Number
NESC HEAVY	78.43	CLP	22
EXTREME	97.81	CLP	22

NESC HEAVY	78.43	CLP	17
EXTREME	97.81	CLP	22

Summary of Base Plate Usages by Load Case:

Load Case	Pole Label	Bend Line #	Length (in)	Vertical Load (kips)	X Moment (ft-k)	Y Bending Moment (ft-k)	Stress (ksi)	Bolt Moment (ft-k)	# Bolts Acting On Sum Bend Line	Max Bolt Load For Bend Line (kips)	Minimum Plate Thickness (in)	Usage %
NESC HEAVY	CLP	1	15.491	46.156	1617.507	-5.435	39.164	63.726	3	79.793	2.321	71.21
EXTREME	CLP	1	15.491	23.542	2188.864	-1.349	51.393	83.623	3	104.563	2.658	93.44

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Label	Davit Segment Number
NESC HEAVY	55.96	ARM3.1R	1
EXTREME	25.90	ARM3.1R	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
C1	Clamp	9.45	NESC HEAVY	0.0
C2	Clamp	9.45	NESC HEAVY	0.0
C3	Clamp	9.45	NESC HEAVY	0.0
C4	Clamp	9.45	NESC HEAVY	0.0
C5	Clamp	9.45	NESC HEAVY	0.0
C6	Clamp	9.45	NESC HEAVY	0.0
C7	Clamp	2.31	NESC HEAVY	0.0
C8	Clamp	2.31	NESC HEAVY	0.0
C9	Clamp	2.31	NESC HEAVY	0.0
C10	Clamp	2.31	NESC HEAVY	0.0
C11	Clamp	2.31	NESC HEAVY	0.0
C12	Clamp	2.31	NESC HEAVY	0.0
C13	Clamp	2.31	NESC HEAVY	0.0
C14	Clamp	2.31	NESC HEAVY	0.0
C15	Clamp	2.31	NESC HEAVY	0.0
C16	Clamp	2.31	NESC HEAVY	0.0
C17	Clamp	28.79	EXTREME	0.0
C18	Clamp	15.28	EXTREME	0.0
C19	Clamp	2.31	NESC HEAVY	0.0
C20	Clamp	4.07	NESC HEAVY	0.0

Loads At Insulator Attachments For All Load Cases:

Load Case	Insulator Label	Insulator Type	Structure Attach Label	Structure Attach Load X (kips)	Structure Attach Load Y (kips)	Structure Attach Load Z (kips)	Structure Attach Load Res. (kips)
NESC HEAVY	C1	Clamp	ARM1.1R:END	0.000	1.685	2.279	2.834
NESC HEAVY	C2	Clamp	ARM1.1L:END	0.000	1.685	2.279	2.834
NESC HEAVY	C3	Clamp	ARM2.1R:END	0.000	1.685	2.279	2.834

NESC HEAVY	C4	Clamp	ARM2.1L:END	0.000	1.685	2.279	2.834
NESC HEAVY	C5	Clamp	ARM3.1R:END	0.000	1.685	2.279	2.834
NESC HEAVY	C6	Clamp	ARM3.1L:END	0.000	1.685	2.279	2.834
NESC HEAVY	C7	Clamp	CLP :WVGD1	0.000	0.075	0.688	0.692
NESC HEAVY	C8	Clamp	CLP :WVGD2	0.000	0.075	0.688	0.692
NESC HEAVY	C9	Clamp	CLP :WVGD3	0.000	0.075	0.688	0.692
NESC HEAVY	C10	Clamp	CLP :WVGD4	0.000	0.075	0.688	0.692
NESC HEAVY	C11	Clamp	CLP :WVGD5	0.000	0.075	0.688	0.692
NESC HEAVY	C12	Clamp	CLP :WVGD6	0.000	0.075	0.688	0.692
NESC HEAVY	C13	Clamp	CLP :WVGD7	0.000	0.075	0.688	0.692
NESC HEAVY	C14	Clamp	CLP :WVGD8	0.000	0.075	0.688	0.692
NESC HEAVY	C15	Clamp	CLP :WVGD9	0.000	0.075	0.688	0.692
NESC HEAVY	C16	Clamp	CLP :WVGD10	0.000	0.075	0.688	0.692
NESC HEAVY	C17	Clamp	CLP :TopConn	0.000	2.926	1.395	3.242
NESC HEAVY	C18	Clamp	CLP :BotConn	0.000	-1.027	3.514	3.661
NESC HEAVY	C19	Clamp	CLP :WVGD11	0.000	0.075	0.688	0.692
NESC HEAVY	C20	Clamp	CLP :opgw	0.000	0.901	0.826	1.222
EXTREME	C1	Clamp	ARM1.1R:END	0.000	1.830	1.021	2.096
EXTREME	C2	Clamp	ARM1.1L:END	0.000	1.830	1.021	2.096
EXTREME	C3	Clamp	ARM2.1R:END	0.000	1.830	1.021	2.096
EXTREME	C4	Clamp	ARM2.1L:END	0.000	1.830	1.021	2.096
EXTREME	C5	Clamp	ARM3.1R:END	0.000	1.830	1.021	2.096
EXTREME	C6	Clamp	ARM3.1L:END	0.000	1.830	1.021	2.096
EXTREME	C7	Clamp	CLP :WVGD1	0.000	0.198	0.158	0.253
EXTREME	C8	Clamp	CLP :WVGD2	0.000	0.198	0.158	0.253
EXTREME	C9	Clamp	CLP :WVGD3	0.000	0.198	0.158	0.253
EXTREME	C10	Clamp	CLP :WVGD4	0.000	0.198	0.158	0.253
EXTREME	C11	Clamp	CLP :WVGD5	0.000	0.198	0.158	0.253
EXTREME	C12	Clamp	CLP :WVGD6	0.000	0.198	0.158	0.253
EXTREME	C13	Clamp	CLP :WVGD7	0.000	0.198	0.158	0.253
EXTREME	C14	Clamp	CLP :WVGD8	0.000	0.198	0.158	0.253
EXTREME	C15	Clamp	CLP :WVGD9	0.000	0.198	0.158	0.253
EXTREME	C16	Clamp	CLP :WVGD10	0.000	0.198	0.158	0.253
EXTREME	C17	Clamp	CLP :TopConn	0.000	8.617	0.601	8.638
EXTREME	C18	Clamp	CLP :BotConn	0.000	-4.277	1.653	4.585
EXTREME	C19	Clamp	CLP :WVGD11	0.000	0.198	0.158	0.253
EXTREME	C20	Clamp	CLP :opgw	0.000	0.828	0.244	0.863

**Overturning Moments For User Input Concentrated Loads:**

Moments are static equivalents based on central axis of 0,0 (i.e. a single pole).

Load Case	Total Tran. Load (kips)	Total Long. Load (kips)	Total Vert. Load (kips)	Transverse Overturning Moment (ft-k)	Longitudinal Overturning Moment (ft-k)	Torsional Moment (ft-k)
NESC HEAVY	13.735	0.000	26.977	1279.499	-0.000	-0.000
EXTREME	18.326	0.000	10.362	1727.513	-0.000	-0.000

\*\*\* Weight of structure (lbs):  
 Weight of Tubular Davit Arms: 493.2  
 Weight of Steel Poles: 13365.5  
 Total: 13858.7

\*\*\* End of Report

**Anchor Bolt Analysis:**

**Input Data:**

Bolt Force:

Maximum Tension Force per Bolt =	$T_{Max} := 105\text{-kips}$	(User Input from PLS-Pole)
Maximum Shear Force at Base =	$V_{base} := 26.1\text{-kips}$	(User Input from PLS-Pole)

Anchor Bolt Data:

UseASTMA432 Grade 60		
Number of Anchor Bolts =	$N := 12$	(User Input)
Bolt "Column" Distance =	$l := 3.0\text{-in}$	(User Input)
Bolt Ultimate Strength =	$F_u := 90\text{-ksi}$	(User Input)
Bolt Yield Strength =	$F_y := 60\text{-ksi}$	(User Input)
Bolt Modulus =	$E := 29000\text{-ksi}$	(User Input)
Diameter of Anchor Bolts =	$D := 2.25\text{-in}$	(User Input)
Threads per Inch =	$n := 4.5$	(User Input)

**Anchor Bolt Analysis:**

Stress Area of Bolt =	$A_s := \frac{\pi}{4} \cdot \left( D - \frac{0.9743\text{-in}}{n} \right)^2 = 3.248\text{-in}^2$
Maximum Shear Force per Bolt =	$V_{Max} := \frac{V_{base}}{N} = 2.2 \times 10^3\text{ lbf}$
Shear Stress per Bolt =	$f_v := \frac{V_{Max}}{A_s} = 669.7\text{ psi}$
Tensile Stress Permitted =	$F_t := \min(F_y, 0.83 \cdot F_u) = 60\text{-ksi}$
Shear Stress Permitted =	$F_v := 0.65 F_y = 39\text{-ksi}$
Permitted Axial Tensile Stress in Conjunction with Shear =	$F_{tv} := F_t \cdot \sqrt{1 - \left( \frac{f_v}{F_v} \right)^2} = 59.99\text{-ksi}$
Bolt Tension % of Capacity =	$\frac{T_{Max}}{F_{tv} \cdot A_s} = 53.89\%$
Condition1 =	Condition1 := if $\left( \frac{T_{Max}}{F_{tv} \cdot A_s} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$
	Condition1 = "OK"

# Exhibit E



March 14, 2019

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

## Emissions Analysis for Site: **CT11290C – Eversource Structure # 1068**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **3 Mechanic Street, Darien, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately  $400 \mu\text{W}/\text{cm}^2$  and  $467 \mu\text{W}/\text{cm}^2$  respectively. The general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) frequency bands is  $1000 \mu\text{W}/\text{cm}^2$ . Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.



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

Additional details can be found in FCC OET 65.

## CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **3 Mechanic Street, Darien, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

- 1) 1 GSM channels (PCS Band - 1900 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 15 Watts per Channel.
- 2) 1 UMTS channel (AWS Band – 2100 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.
- 3) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.
- 4) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 5) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.
- 6) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.



- 7) Cable losses were factored in the calculations for this site. Since all of the proposed radios are ground mounted the following cable loss values were used. For each ground mounted 600 MHz radio there was 1.03 dB of cable loss calculated into the system gains / losses for this site. For each ground mounted 700 MHz radio there was 1.12 dB of cable loss calculated into the system gains / losses for this site. For each ground mounted 1900 MHz (PCS) radio there was 1.95 dB of cable loss calculated into the system gains / losses for this site. For each ground mounted 2100 MHz (AWS) radio there was 2.06 dB of cable loss calculated into the system gains / losses for this site. These values were calculated based upon the manufacturers specifications for 160 feet of 1-1/4" coax
- 8) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 9) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 10) The antennas used in this modeling are the **RFS APXVAARR18\_43-U-NA20** for 600 MHz, 700 MHz, 1900 MHz (PCS) and 2100 MHz (AWS) channels. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 11) The antenna mounting height centerline of the proposed antennas is **124 feet** above ground level (AGL).
- 12) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.
- 13) All calculations were done with respect to uncontrolled / general population threshold limits.





### T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	RFS APXVAARR18_43-U-NA20	Make / Model:	RFS APXVAARR18_43-U-NA20	Make / Model:	RFS APXVAARR18_43-U-NA20
Gain:	12.85 / 13.55 / 15.85 / 17.15 dBd	Gain:	12.85 / 13.55 / 15.85 / 17.15 dBd	Gain:	12.85 / 13.55 / 15.85 / 17.15 dBd
Height (AGL):	124 feet	Height (AGL):	124 feet	Height (AGL):	124 feet
Frequency Bands	600 MHz / 700 MHz / 1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	600 MHz / 700 MHz / 1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	600 MHz / 700 MHz / 1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	10	Channel Count	10	Channel Count	10
Total TX Power(W):	375	Total TX Power(W):	375	Total TX Power(W):	375
ERP (W):	9,413.94	ERP (W):	9,413.94	ERP (W):	9,413.94
Antenna A1 MPE%	3.11	Antenna B1 MPE%	3.11	Antenna C1 MPE%	3.11

Site Composite MPE%	
Carrier	MPE%
T-Mobile (Per Sector Max)	3.11 %
No Additional Carriers	NA
<b>Site Total MPE %:</b>	<b>3.11 %</b>

T-Mobile Sector A Total:	3.11 %
T-Mobile Sector B Total:	3.11 %
T-Mobile Sector C Total:	3.11 %
Site Total:	3.11 %

### T-Mobile Maximum MPE Power Values (Per Sector)

T-Mobile_Frequency Band / Technology (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ( $\mu\text{W}/\text{cm}^2$ )	Frequency (MHz)	Allowable MPE ( $\mu\text{W}/\text{cm}^2$ )	Calculated % MPE
T-Mobile PCS - 1900 MHz GSM	1	368.21	124	0.95	PCS - 1900 MHz	1000.00	0.10%
T-Mobile PCS - 1900 MHz LTE	2	981.88	124	5.07	PCS - 1900 MHz	1000.00	0.51%
T-Mobile AWS - 2100 MHz UMTS	1	1,291.40	124	3.33	AWS - 2100 MHz	1000.00	0.33%
T-Mobile AWS - 2100 MHz LTE	2	1,937.10	124	10.00	AWS - 2100 MHz	1000.00	1.00%
T-Mobile 600 MHz LTE	2	608.22	124	3.14	600 MHz	400.00	0.78%
T-Mobile 700 MHz LTE	2	349.97	124	1.81	700 MHz	467.00	0.39%
						<b>Total:</b>	<b>3.11%</b>

## Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector A:	3.11 %
Sector B:	3.11 %
Sector C:	3.11 %
T-Mobile Maximum MPE % (Per Sector):	3.11 %
Site Total:	3.11 %
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **3.11%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

# Exhibit F

August 15, 2019

Mr. Mark Richard  
T-Mobile  
35 Griffin Rd. South  
Bloomfield, CT 06002

RE: T-Mobile Antenna Site CT-11290C, Mechanic St, Darien CT, Eversource Structure 1068

Dear Mr. Richard:

Based on our reviews of the site drawings, the structural analysis and foundation review provided by Centek Engineering, along with a third party review performed by Paul J. Ford and Company, we accept the proposed modification.

Please work with Christopher Gelinias of Eversource Real Estate to process the site lease amendment. Please do not hesitate to contact us with questions or concerns. Christopher can be contacted at 860-665-2008, and I can be contacted at 860-728-4503.

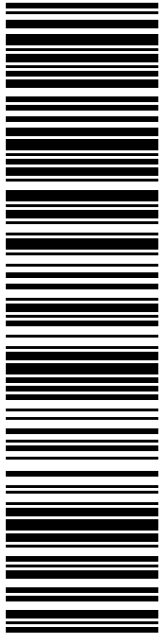
Sincerely,



Joel Szarkowicz  
Transmission Line Engineering

Ref: 18058.58 - CT11290C Structural Analysis Rev6 18.12.14  
18058.58 - CT11290C CD Rev1 19.05.13 (S&S)

# Exhibit G



**USPS TRACKING #**

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Cut on dotted line.

### Instructions

1. Each Click-N-Ship® label is unique. Labels are to be used as printed and used only once. DO NOT PHOTO COPY OR ALTER LABEL.
2. Place your label so it does not wrap around the edge of the package.
3. Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.
4. To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.
5. Mail your package on the "Ship Date" you selected when creating this label.

### Click-N-Ship® Label Record

**USPS TRACKING # :**  
**9405 5036 9930 0469 4099 55**

Trans. #: 540432300	Priority Mail® Postage: <b>\$15.50</b>
Print Date: 08/10/2021	Total: <b>\$15.50</b>
Ship Date: 08/10/2021	
Expected Delivery Date: 08/13/2021	

**From:** DEBORAH CHASE      Ref#: 290-L700  
NORTHEAST SITE SOLUTIONS  
420 MAIN ST  
STE 1  
STURBRIDGE MA 01566-1359


**To:** LISA A MATTHEWS  
CT SITING COUNCIL  
10 FRANKLIN SQ  
NEW BRITAIN CT 06051-2655

\* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.



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Check the status of your shipment on the USPS Tracking® page at usps.com

# Exhibit H



**UNITED STATES  
POSTAL SERVICE®**

**Click-N-Ship®**

**P**

usps.com  
**US POSTAGE**  
 Flat Rate Env  
 \$7.95

9405 5036 9930 0459 1202 66 0079 5000 0020 6820

U.S. POSTAGE PAID  
click-n-ship®

08/01/2021 Mailed from 01566

**PRIORITY MAIL 2-DAY™**

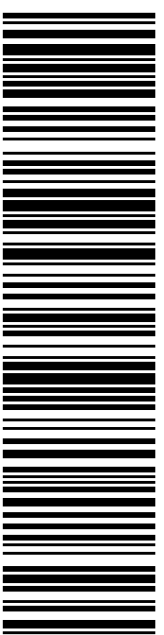
Expected Delivery Date: 08/05/21  
 Ref#: 290-L700  
**0006**

DEB CHASE  
 NORTHEAST SITE SOLUTIONS  
 420 MAIN ST  
 STE 1  
 STURBRIDGE MA 01566-1359

**C014**

SHIP TO: JAYME J STEVENSON  
 FIRST SELECTMAN-DARIEN  
 2 RENSRAW RD  
 DARIEN CT 06820-5344

**USPS TRACKING #**



**9405 5036 9930 0459 1202 66**

Electronic Rate Approved #038555749



Cut on dotted line.

### Instructions

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### Click-N-Ship® Label Record

**USPS TRACKING # :**  
**9405 5036 9930 0459 1202 66**

Trans. #: 539575756	Priority Mail® Postage: <b>\$7.95</b>
Print Date: 07/29/2021	Total: <b>\$7.95</b>
Ship Date: 08/01/2021	
Expected Delivery Date: 08/05/2021	

**From:** DEB CHASE  
 NORTHEAST SITE SOLUTIONS  
 420 MAIN ST  
 STE 1  
 STURBRIDGE MA 01566-1359

Ref#: 290-L700

**To:** JAYME J STEVENSON  
 FIRST SELECTMAN-DARIEN  
 2 RENSRAW RD  
 DARIEN CT 06820-5344

\* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.



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Tracking Number: 9405503699300459120266

Remov

Your item was delivered in or at the mailbox at 8:53 am on August 7, 2021 in DARIEN, CT 06820.

## Status

 **Delivered, In/At Mailbox**

August 7, 2021 at 8:53 am  
DARIEN, CT 06820

USPS Tracking Plus™ Available 

Get Updates 

Delivered

Text & Email Updates



Tracking History



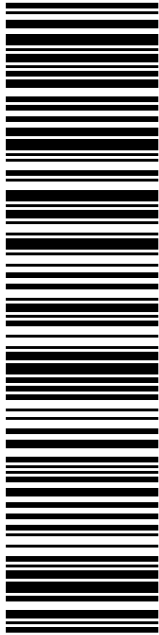
USPS Tracking Plus™



Product Information



See Less 



**USPS TRACKING #**

**9405 5036 9930 0459 1202 35**

Electronic Rate Approved #038555749

**SHIP**

TO: CHRIS GELINAS  
EVERSOURCE  
107 SELDEN ST  
BERLIN CT 06037-1616

**P**

**PRIORITY MAIL 2-DAY™**

DEB CHASE  
NORTHEAST SITE SOLUTIONS  
420 MAIN ST  
STE 1  
STURBRIDGE MA 01566-1359

Expected Delivery Date: 08/05/21  
Ref#: 290-L700  
**0006**

**C015**

**UNITED STATES POSTAL SERVICE®**

**Click-N-Ship®**

**U.S. POSTAGE PAID**

Flat Rate Env  
\$7.95  
usps.com 9405 5036 9930 0459 1202 35 0079 5000 0010 6037

Mailed from 01566  
08/01/2021



Cut on dotted line.

### Instructions

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### Click-N-Ship® Label Record

**USPS TRACKING # :**  
**9405 5036 9930 0459 1202 35**

Trans. #: 539575756	Priority Mail® Postage: <b>\$7.95</b>
Print Date: 07/29/2021	Total: <b>\$7.95</b>
Ship Date: 08/01/2021	
Expected Delivery Date: 08/05/2021	

<b>From:</b> DEB CHASE NORTHEAST SITE SOLUTIONS 420 MAIN ST STE 1 STURBRIDGE MA 01566-1359	<b>Ref#:</b> 290-L700
<b>To:</b> CHRIS GELINAS EVERSOURCE 107 SELDEN ST BERLIN CT 06037-1616	

\* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.



Thank you for shipping with the United States Postal Service!  
Check the status of your shipment on the USPS Tracking® page at usps.com

**Tracking Number:** 9405503699300459120235

Your item was delivered in or at the mailbox at 10:41 am on August 9, 2021 in BERLIN, CT 06037.

**USPS Tracking Plus™ Available** 

## Status

 **Delivered, In/At Mailbox**

August 9, 2021 at 10:41 am  
BERLIN, CT 06037

**Get Updates** 

**Delivered**

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**Text & Email Updates**



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**Tracking History**



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**USPS Tracking Plus™**



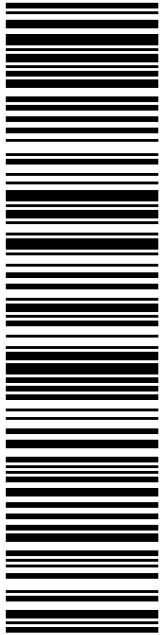
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**Product Information**



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**See Less** 



**USPS TRACKING #**

**9405 5036 9930 0459 1202 59**

Electronic Rate Approved #038555749

**SHIP TO:**

STATE OF CT DEPT. OF TRANSPORTATION (DOT)  
2800 BERLIN TPKE  
NEWINGTON CT 06111-4113

**P**

usps.com 9405 5036 9930 0459 1202 59 0079 5000 0010 6111  
**US POSTAGE**  
Flat Rate Envoy

08/01/2021 Mailed from 01566


**U.S. POSTAGE PAID**  
click-n-ship®

**PRIORITY MAIL 2-DAY™**


DEB CHASE  
NORTHEAST SITE SOLUTIONS  
420 MAIN ST  
STE 1  
STURBRIDGE MA 01566-1359

Expected Delivery Date: 08/05/21  
Ref#: 290-L700  
**0006**

**C013**



**UNITED STATES POSTAL SERVICE®**





Cut on dotted line.

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### Click-N-Ship® Label Record

**USPS TRACKING # :**  
**9405 5036 9930 0459 1202 59**

Trans. #: 539575756	Priority Mail® Postage: <b>\$7.95</b>
Print Date: 07/29/2021	Total: <b>\$7.95</b>
Ship Date: 08/01/2021	
Expected Delivery Date: 08/05/2021	

**From:** DEB CHASE  
NORTHEAST SITE SOLUTIONS  
420 MAIN ST  
STE 1  
STURBRIDGE MA 01566-1359

Ref#: 290-L700

**To:** STATE OF CT DEPT. OF TRANSPORTATION (DOT)  
2800 BERLIN TPKE  
NEWINGTON CT 06111-4113

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Thank you for shipping with the United States Postal Service!  
Check the status of your shipment on the USPS Tracking® page at usps.com

**Tracking Number:** 9405503699300459120259

Your item was picked up at a postal facility at 8:34 am on August 7, 2021 in NEWINGTON, CT 06131.

**USPS Tracking Plus™ Available** 

### Status

 **Delivered, Individual Picked Up at Postal Facility**

August 7, 2021 at 8:34 am  
NEWINGTON, CT 06131

**Get Updates** 

**Delivered**

**Text & Email Updates**



**Tracking History**



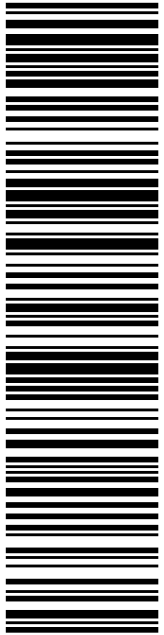
**USPS Tracking Plus™**



**Product Information**



See Less 



**USPS TRACKING #**

**9405 5036 9930 0459 1202 73**

Electronic Rate Approved #038555749

**SHIP TO:** KATHLEEN A CLARK-BUCH  
TOWN PLANNER  
2 RENSRAW RD  
RM 202  
DARIEN CT 06820-5344

**DEB CHASE**  
NORTHEAST SITE SOLUTIONS  
420 MAIN ST  
STE 1  
STURBRIDGE MA 01566-1359

Expected Delivery Date: 08/05/21  
Ref#: 290-L700  
**0006**

**P**

08/01/2021

usps.com  
**US POSTAGE**  
Flat Rate Env  
**U.S. POSTAGE PAID**  
click-n-ship®

Mailed from 01566

**UNITED STATES POSTAL SERVICE®**

**Click-N-Ship®**



Cut on dotted line.

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### Click-N-Ship® Label Record

**USPS TRACKING # :**  
**9405 5036 9930 0459 1202 73**

Trans. #: 539575756	Priority Mail® Postage: <b>\$7.95</b>
Print Date: 07/29/2021	Total: <b>\$7.95</b>
Ship Date: 08/01/2021	
Expected Delivery Date: 08/05/2021	

**From:** DEB CHASE  
NORTHEAST SITE SOLUTIONS  
420 MAIN ST  
STE 1  
STURBRIDGE MA 01566-1359

Ref#: 290-L700

**To:** KATHLEEN A CLARK-BUCH  
TOWN PLANNER  
2 RENSRAW RD  
RM 202  
DARIEN CT 06820-5344

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Thank you for shipping with the United States Postal Service!  
Check the status of your shipment on the USPS Tracking® page at usps.com

Tracking Number: 9405503699300459120273

Remove X

### Status

 **Delivered, In/At Mailbox**

August 7, 2021 at 8:53 am  
DARIEN, CT 06820

Your item was delivered in or at the mailbox at 8:53 am on August 7, 2021 in DARIEN, CT 06820.

USPS Tracking Plus™ Available 

Get Updates 

Delivered

Text & Email Updates 

Tracking History 

USPS Tracking Plus™ 

Product Information 

See Less 