NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

Northeast Site Solutions
Denise Sabo
199 Brickyard Rd Farmington, CT 06032
860-209-4690
denise@northeastsitesolutions.com

December 5, 2016

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

RE: Notice of Exempt Modification
3 Mechanic Street, Darien CT 06820
Latitude: 41.196250
Longitude: -73.431941
T-Mobile Site#: CT11290C_L700

Dear Ms. Bachman:

T-Mobile currently maintains three (3) antennas at the 120-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 700/1900/2100 MHz. The new antennas would be installed at the 120-foot level of the tower. T-Mobile also intends to make the following modifications.

Planned Modifications:

Remove: NONE

Remove and Replace:
(3) APX16DWV-16DWV-SE-A20 **(Remove)** - (3) SBNHH-1D65SA Flush Mounted **(Replace)**

Install New:
(3) Smart Bias-T
(6) 1-1/4" Coax
(3) RRUS 11 B12 **Ground level Mounted on Ice Bridge**

Existing to Remain: (12) 1-1/4" Coax

While completing the research for this facility we discovered discrepancies dating back to the original zoning. Heights on the zoning approval do not match. This facility was approved by the CT Siting Council. Petition No.420 –on July 15, 1999 (pole #1068). The petition was approved to install antenna on the existing 95-foot tower. The top of the antennas were approved to be approximately 10-feet above the top of the tower. Please see attached. The application and construction drawings from 1999 show the tower height is 115-feet and the top of the antennas are 123.8-feet. There are multiple exempt modifications showing the 115-foot tower height is 120-foot antenna RAD center.

NORTHEAST SITE SOLUTIONS

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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.SA. § 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,

Denise Sabo
Mobile: 860-209-4690
Fax: 413-521-0558
Office: 199 Brickyard Rd, Farmington, CT 06032
Email: denise@northeastsitesolutions.com

Attachments
cc: Jayme Stevenson- First Selectman - as elected official
CL&P d/b/a Eversource - as tower owner
State of CT DOT - property owner

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.

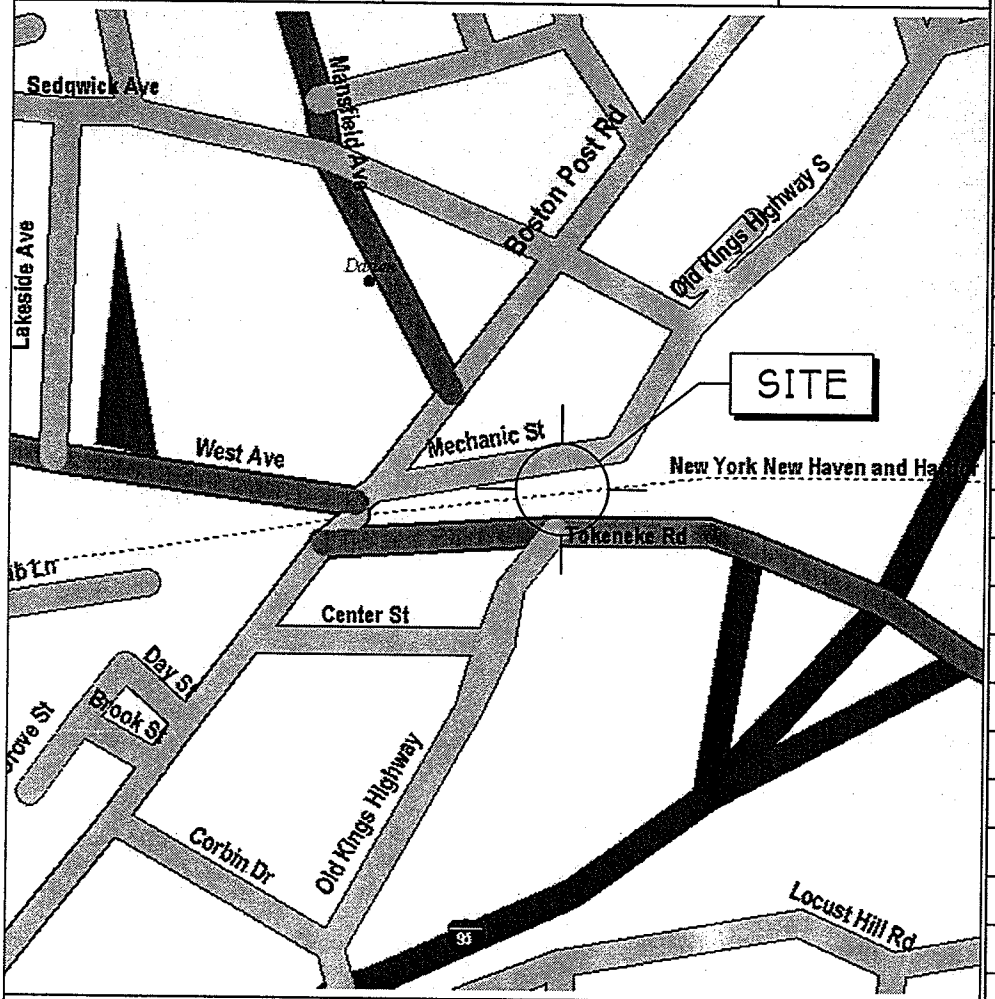
The total calculated radio frequency power density at the base of the tower would be 0.0149 mw/cm^2, which is 1.49 percent of the maximum permissible exposure for uncontrolled environments based on Federal Communications Commission (FCC) Bulletin 65, August 1997.

CL&P POLE #1068
MECHANIC STREET
DARIEN, CT

SEARCH AREA: **DARIEN / DOWNTOWN**

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

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



ROBERT P. JUENGERT

STATE OF CONN... ROBERT PAUL JUENGERT No. 4208 REGISTERED ARCHITECT

CT-4208

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).

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

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

NORTH

SITE LOCATION MAP

SCALE: NONE

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

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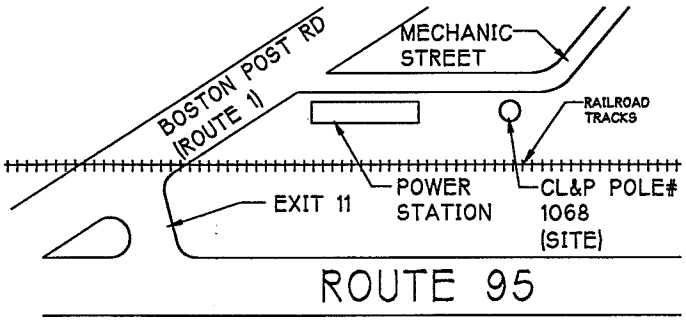
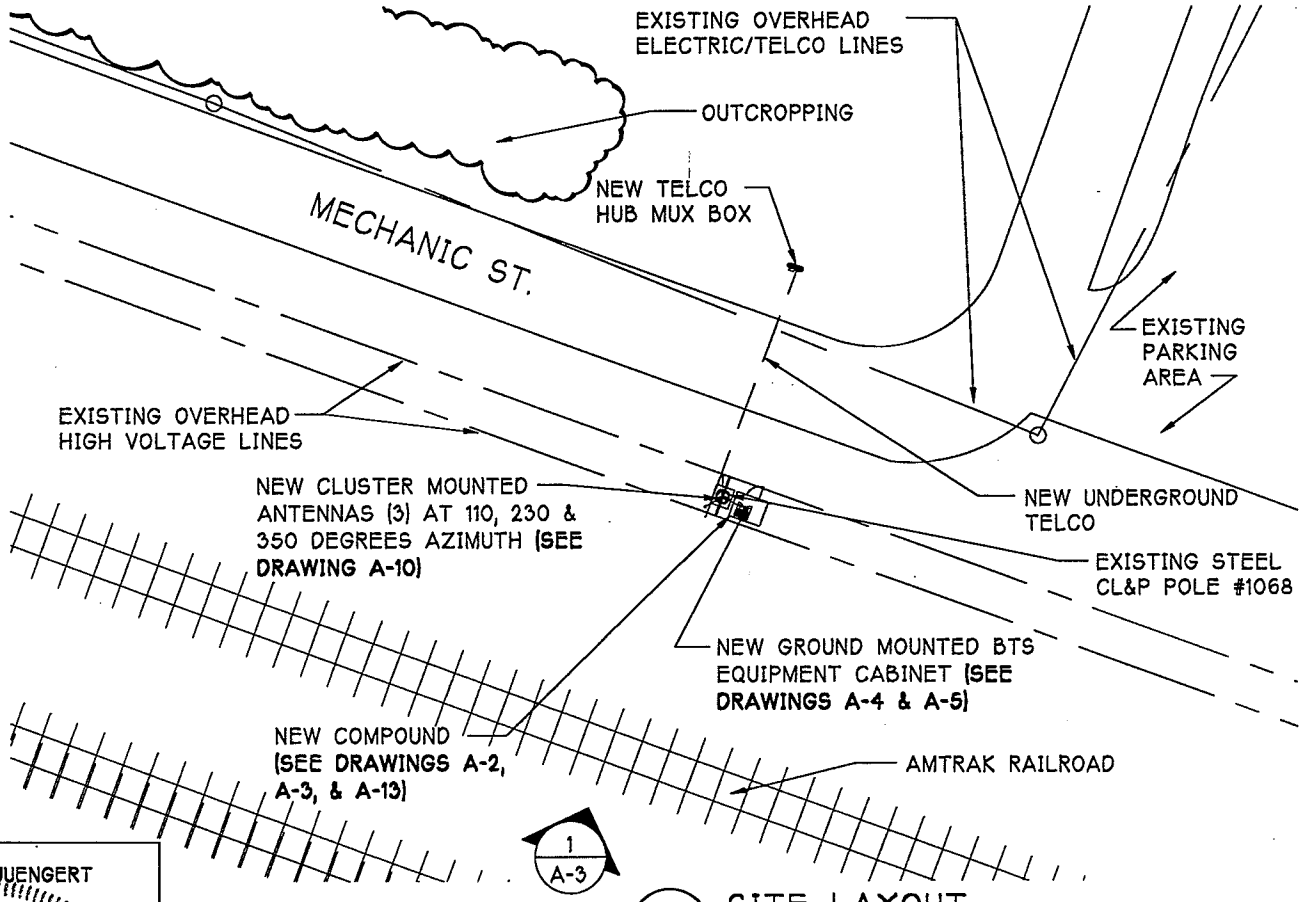


NORTH

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

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



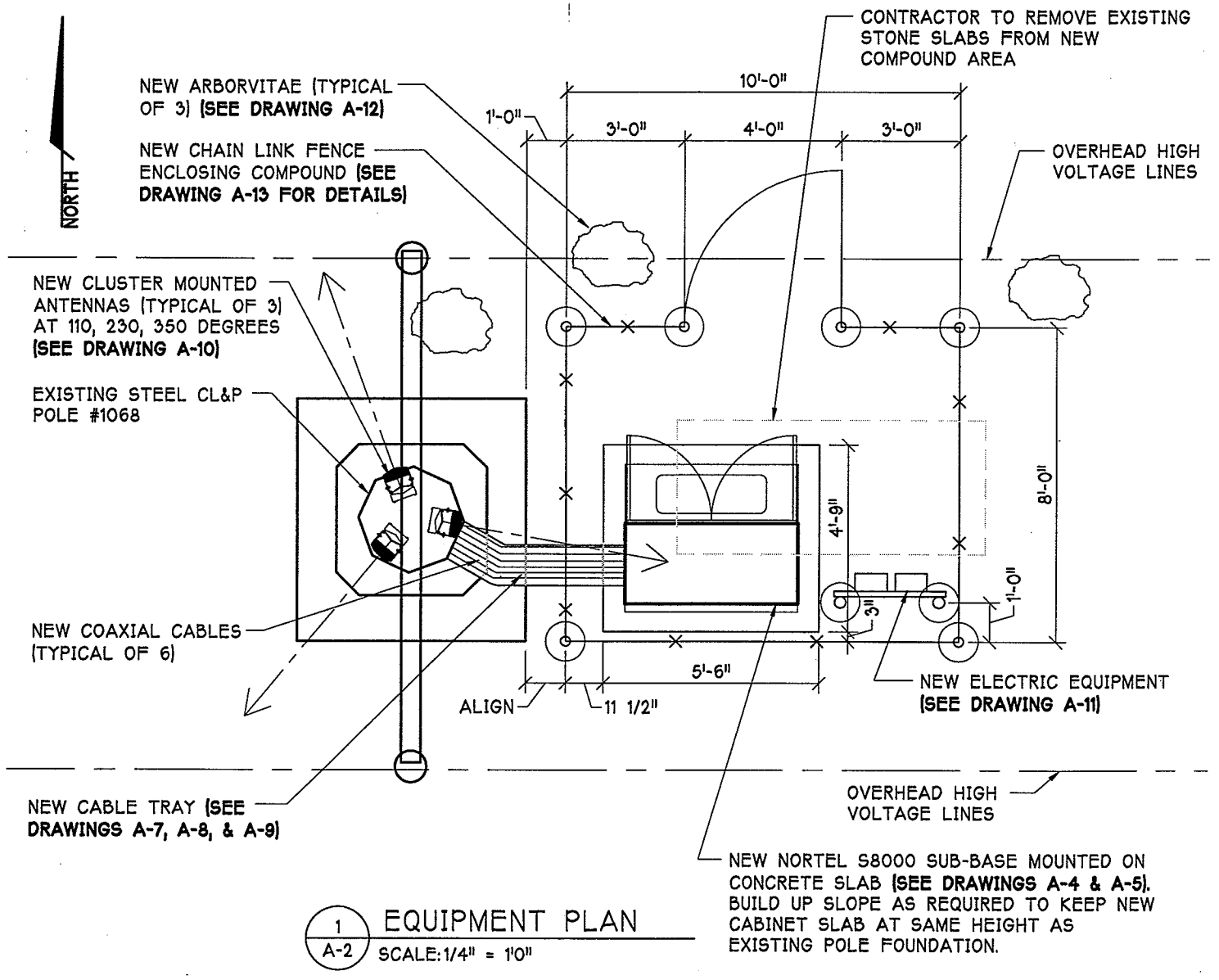
1 / A-1 SITE LAYOUT
SCALE: 1" = 60'

ROBERT P. JUENGERT
STATE OF CONNECTICUT
No. 4208
REGISTERED ARCHITECT

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

	P.C.: RVo	P.C. Chkd.:	Chkd. by:	ARCNET Project No.: A99.506.833A	Drawn: CS	Date: 4/20/99	

Drawing Title: SITE LAYOUT & KEY PLAN
Client: OCS
Project: CL&P POLE #1068
Address: MECHANIC STREET, DARIEN, CT
Search Area: DARIEN / DOWNTOWN
Site ID No.: CT-11-290C
Approved By: CLIENT: _____ DATE: _____
Revision No. | Date:
Drawing No. A-1



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

ROBERT P. JUENGERT

STATE OF CONNECTICUT ROBERT PAUL JUENGERT No. 4208 REGISTERED ARCHITECT

CT-4208

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

Drawing Title: EQUIPMENT PLAN

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:
REV2KBa	7/16/99
REV1(JMc)	5/7/99

P.C.:	P.C. Chkd.:	Chkd. by:	ARCNET Project No.	Drawn:	Date:
RVa	RVa		A99.506.833A	CS	4/20/99

Approved By: CLIENT: _____ DATE: _____

Drawing No. A-2

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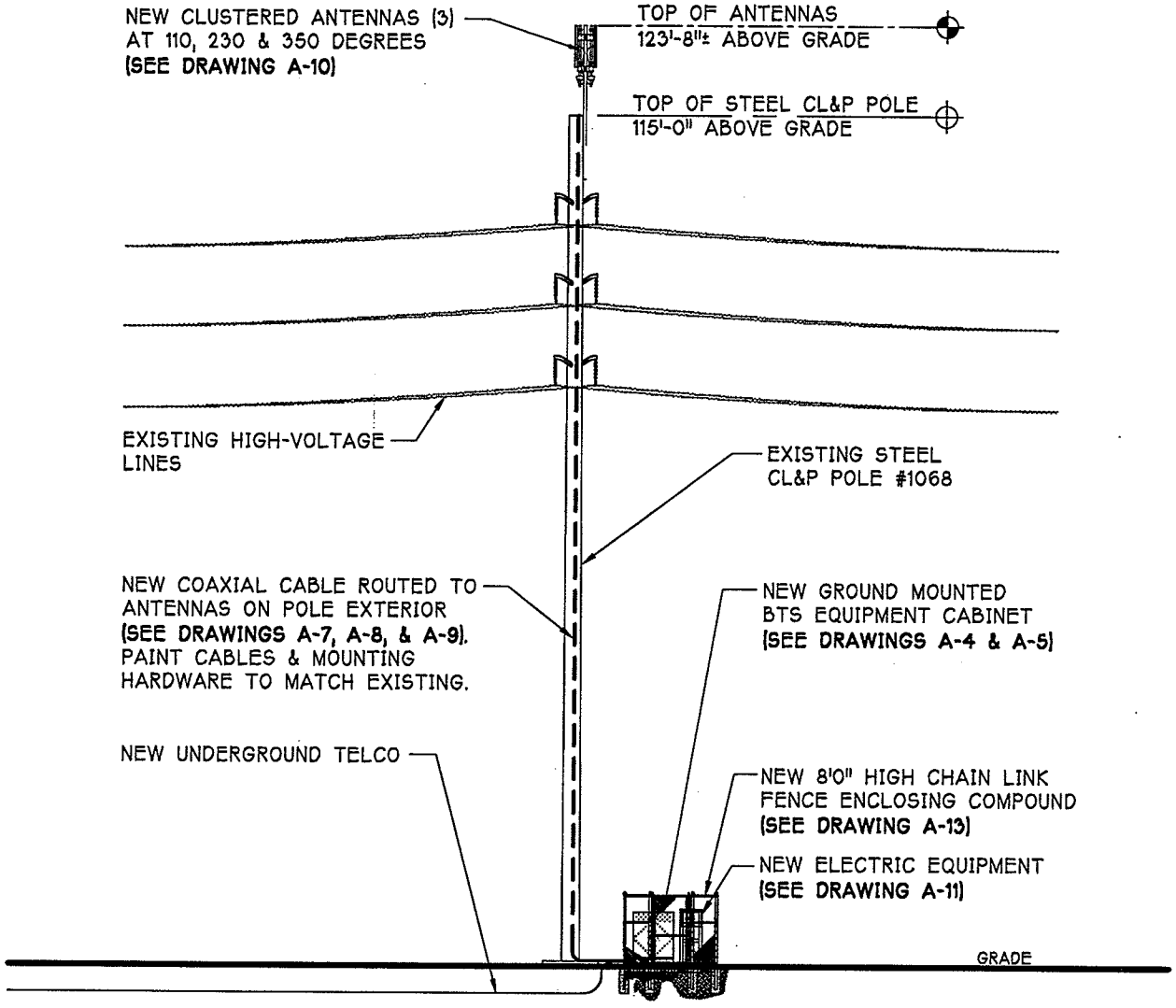

ROBERT P. JUENGERT

STATE OF CONNECTICUT — REGISTERED ARCHITECT — No. 4208

CT-4208

1 / A-3 SOUTH ELEVATION

SCALE: 1" = 20'0"

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

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

Drawing Title:	SOUTH ELEVATION
Client:	OCS
Project:	CL&P POLE # 1068
Address:	MECHANIC STREET, DARIEN, CT
Search Area:	DARIEN / DOWNTOWN
Site ID No.:	CT-11-290C
REV1(JMc)	5/7/99
Revision No.	Date:
P.C.: RVa	P.C. Chkd.:	Chkd. by:
ARCNET Project No.: A99.506.833A	Drawn: CS	Date: 4/20/99
Approved By: CLIENT: _____ DATE: _____	
Drawing No.: A-3	

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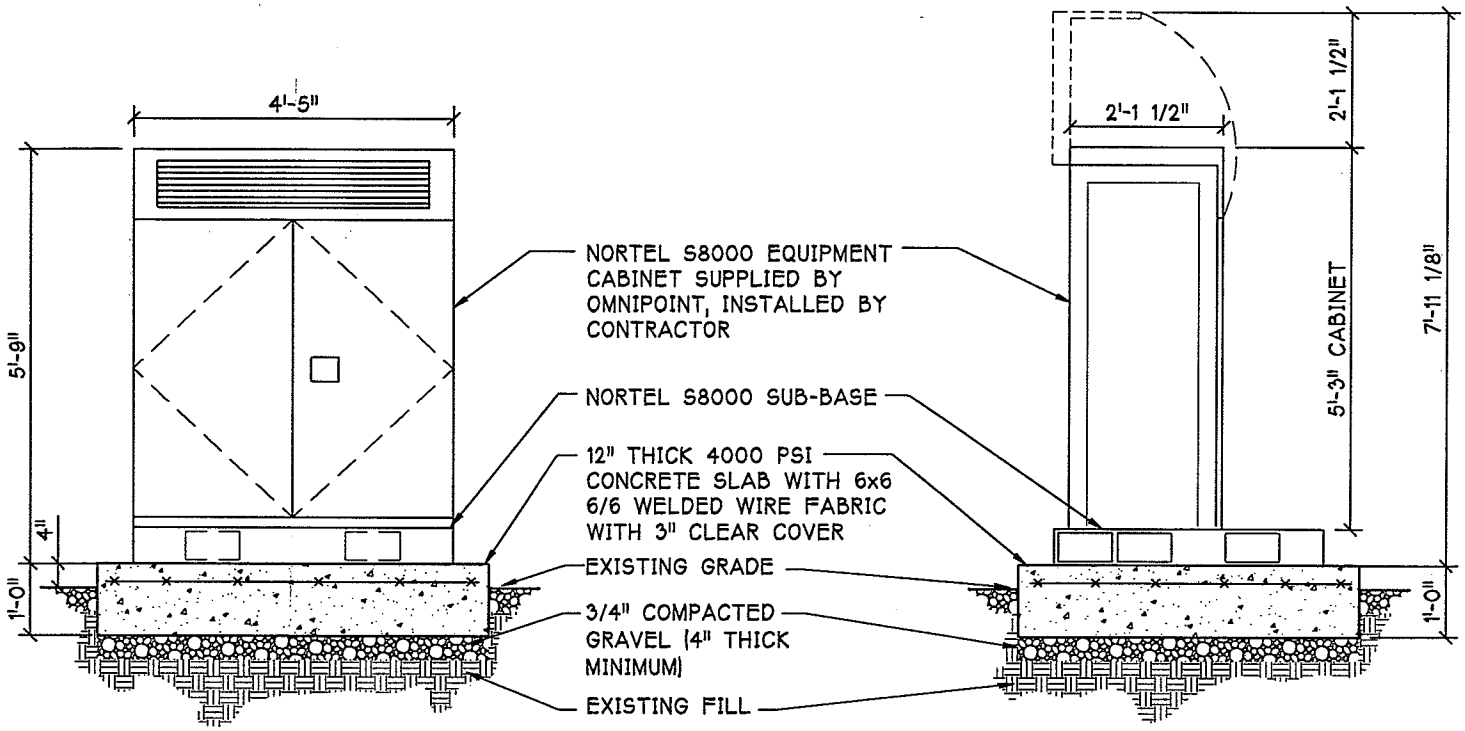
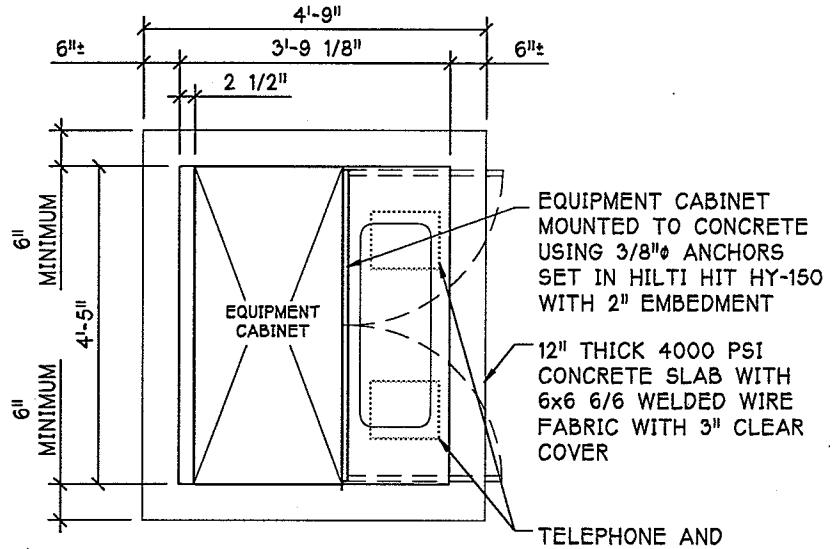


1 / A-4 FRONT VIEW
SCALE: 1/2" = 1'-0"

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



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

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

ROBERT P. JUENGERT
STATE OF CONNECTICUT
REGISTERED ARCHITECT
No. 4208
CT-4208

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

Drawing Title: CABINET DETAIL
Client: OCS
Project: CL&P POLE #1068
Address: MECHANIC STREET DARIEN, CT
Search Area: DARIEN / DOWNTOWN
Site ID No.: CT-11-290C

P.C.	P.C. Chkd.	Chkd. by	ARCNET Project No.	Drawn	Date
RVa			A99.506.833A	CS	4/20/99

Approved By: CLIENT: _____ DATE: _____

Revision No.	Date
REV1(JMc)	5/7/99

Drawing No. A-4

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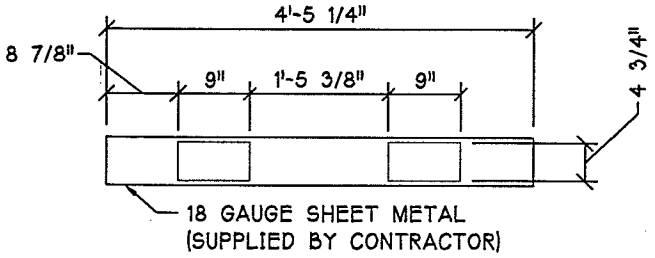
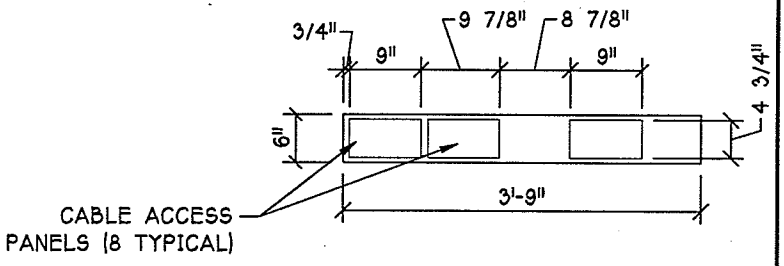


2 / A-5 FRONT ELEVATION
SCALE: 1/2" = 1'-0"

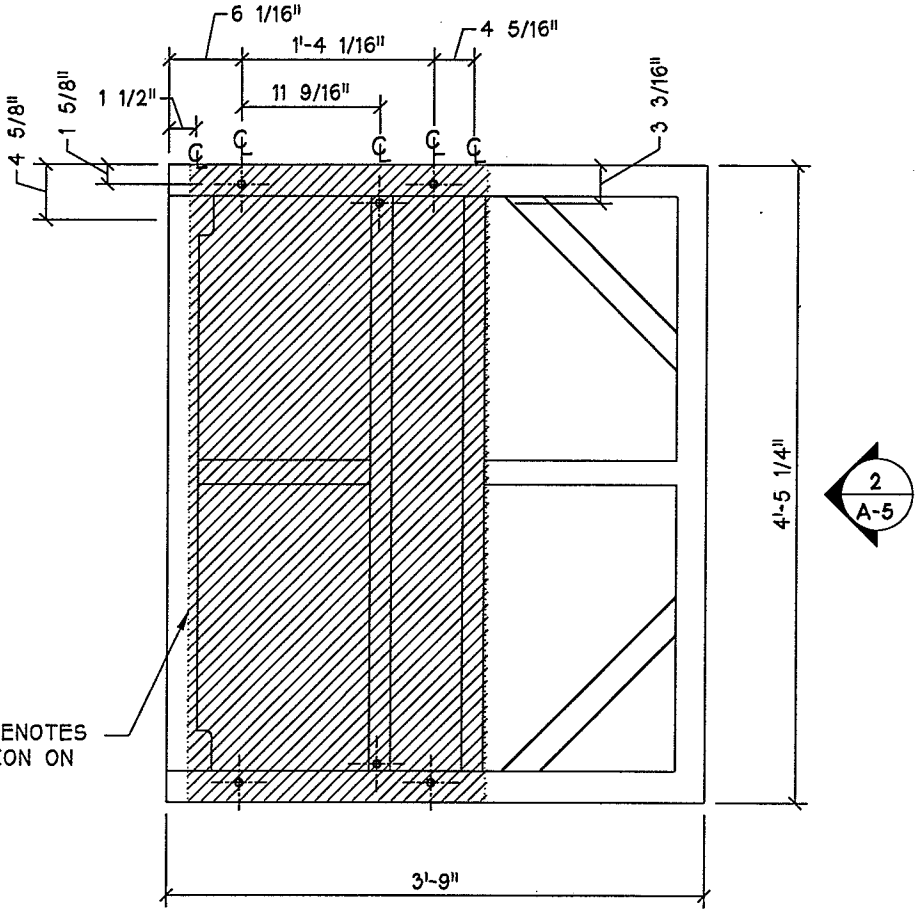


3 / A-5 SIDE ELEVATION
SCALE: 1/2" = 1'-0"

NOTES:
1. * CONTRACTOR TO VERIFY ALL BOLT LOCATIONS * ALL HOLES 11/16ø 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"ø 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.



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

ROBERT P. JUENGERT
STATE OF CONNECTICUT
No. 4208
REGISTERED ARCHITECT
CT-4208

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

Drawing Title: SUB-BASE DETAIL
Client: OCS
Project: CL&P POLE #1068
Address: MECHANIC STREET
DARIEN, CT
Search Area: DARIEN / DOWNTOWN
Site ID No.: CT-11-290C

P.C.:	P.C. Chkd.:	Chkd. by:	ARCNET Project No.	Drawn:	Date:
RVa			A99.506.833A	CS	4/21/99

Approved By:
CLIENT: _____ DATE: _____

Revision No. | Date:

Drawing No. A-5

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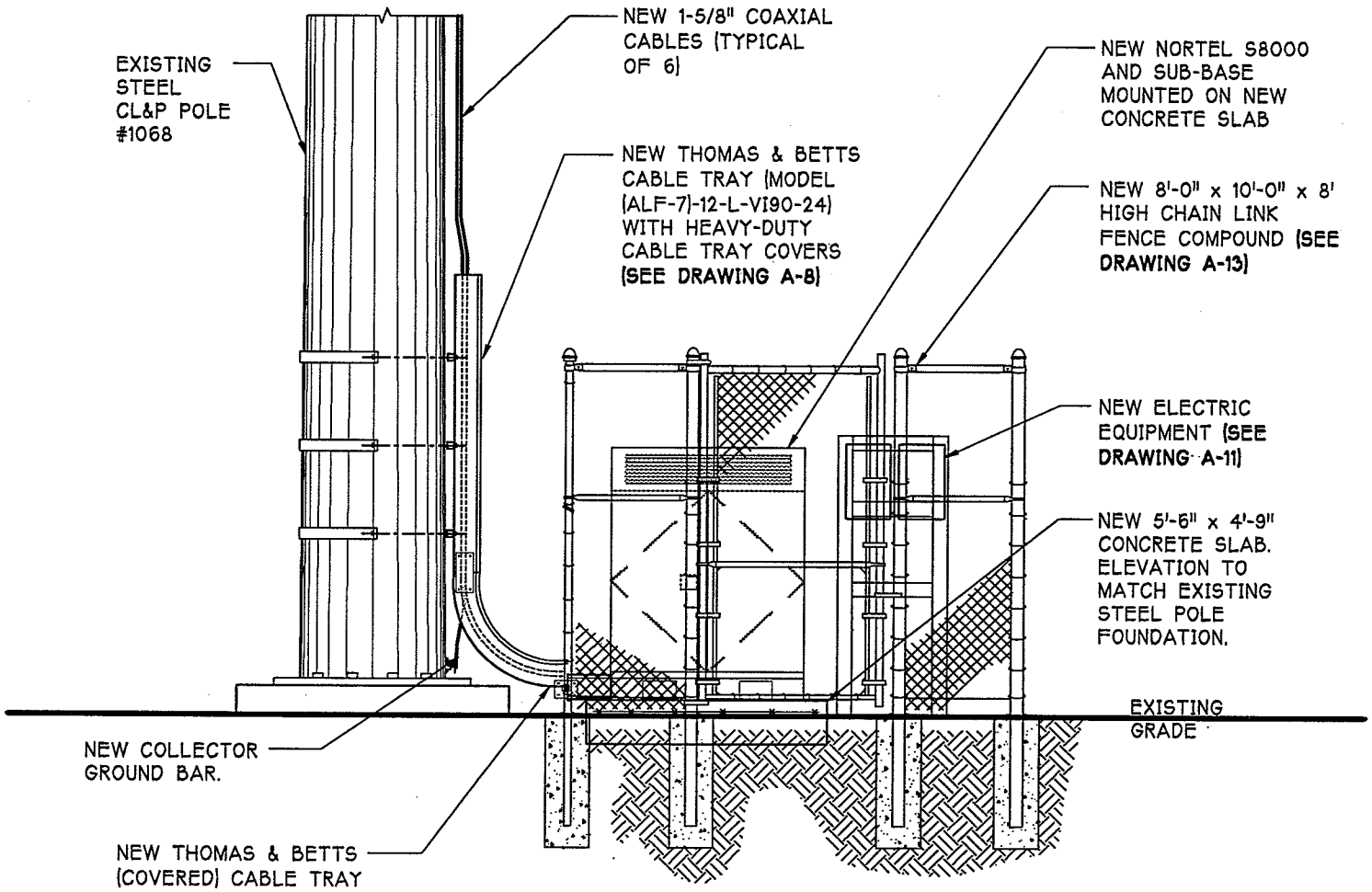

1 / A-6 EQUIPMENT ELEVATION (FROM SOUTH)
SCALE: 1/4" = 1'-0"

ROBERT P. JUENGERT
STATE OF CONNECTICUT
REGISTERED ARCHITECT
CT. 4208

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

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

Drawing Title: EQUIPMENT ELEVATION
Client: OCS
Project: CL&P POLE #1068
Address: MECHANIC STREET, DARIEN, CT
Search Area: DARIEN / DOWNTOWN
Site ID No.: CT-11-290C
REV1(JMc) 5/7/99
Revision No. Date:
P.C.: RVa | P.C. Chkd.: | Chkd. by:
ARCNET Project No.: A99.506.833A | Drawn: CS | Date: 4/21/99
Approved By: CLIENT:_____ DATE:_____
Drawing No.: A-6

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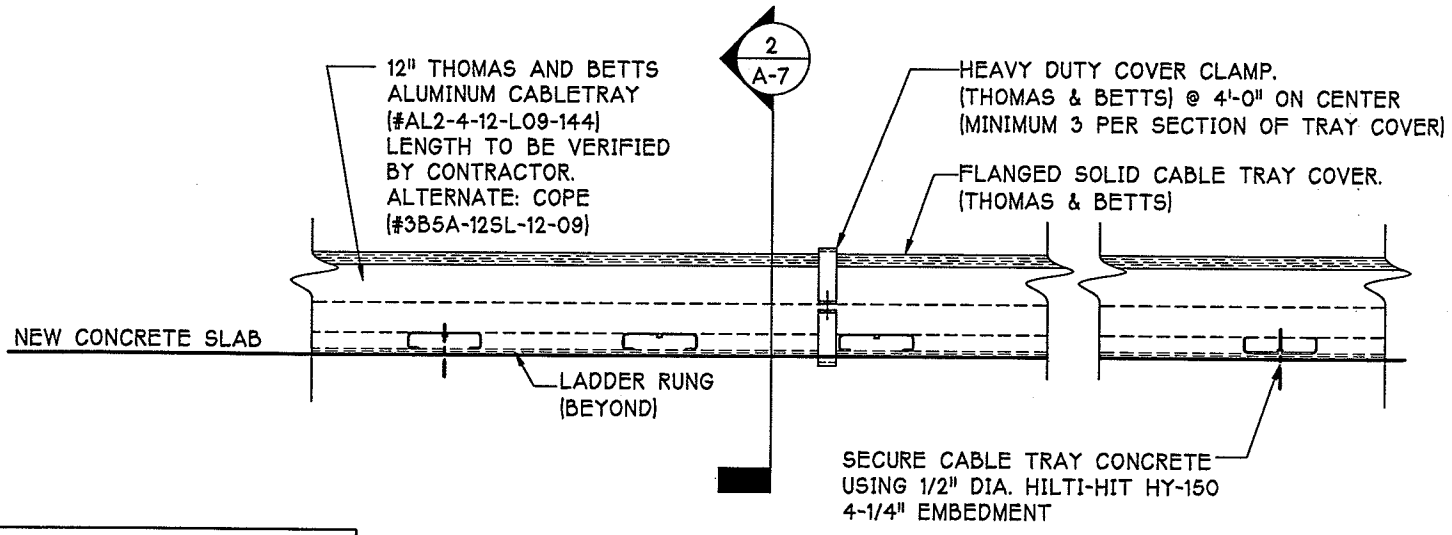
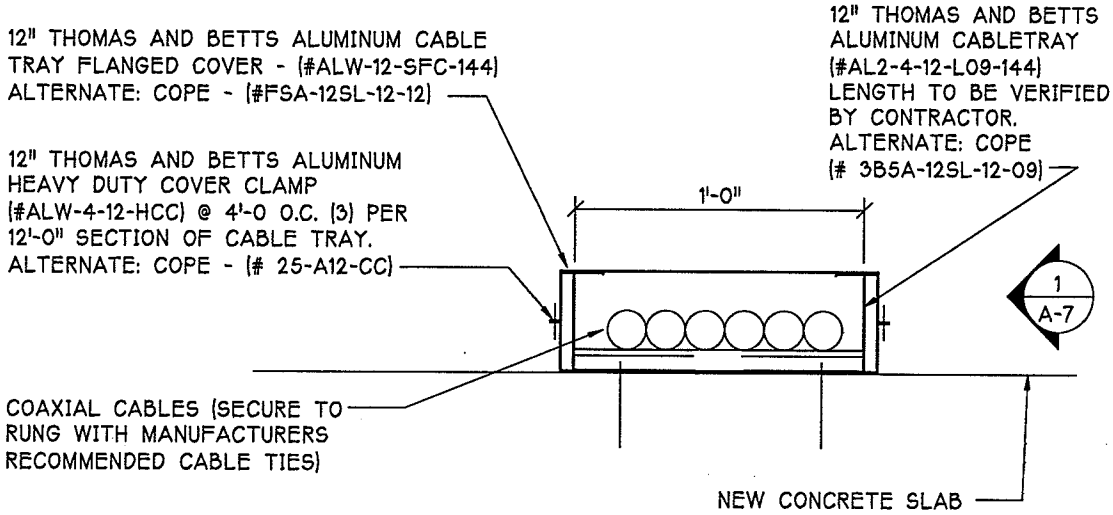


NOTE:
CONTRACTOR TO PAINT"DO NOT STEP OR STAND" ON TOP OF CABLE TRAY COVER IN 3" LETTERS (YELLOW) (SEE PAINT SPECIFICATIONS DRAWING A-15)

1/A-7 CABLE TRAY DETAIL

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



2/A-7 CABLE TRAY SECTION

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

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

ROBERT P. JUENGERT
STATE OF CONNECTICUT
REGISTERED ARCHITECT
CT. 4208

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

Drawing Title:	CABLE TRAY DETAIL
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:	
Drawing No.	A-7
P.C.:	RVa
P.C. Chkd.:	
Chkd. by:	
ARCNET Project No.	A99.506.833A
Drawn:	CS
Date:	4/21/99
Approved By:	CLIENT:_____ DATE:_____

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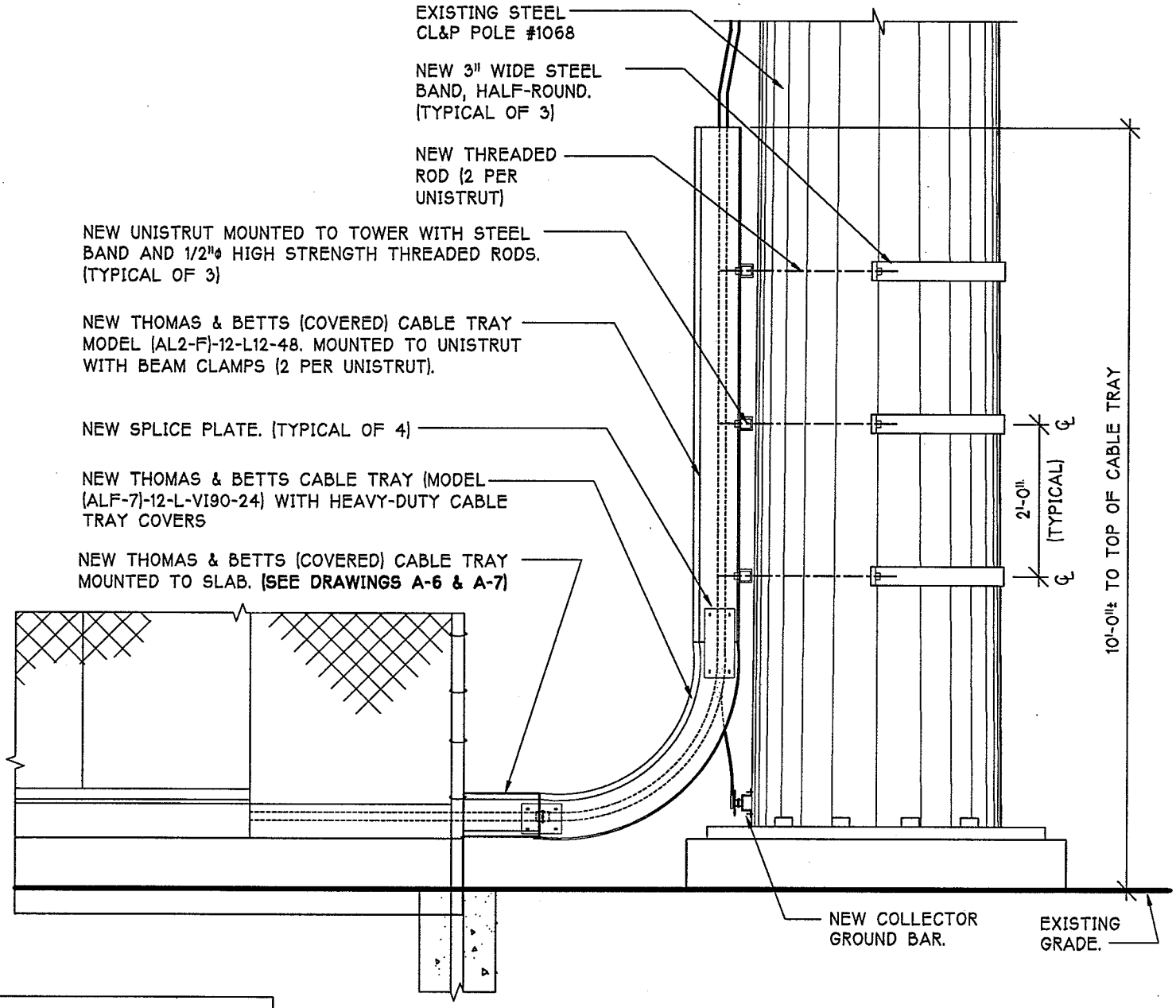


ROBERT P. JUENGERT

STATE OF CONNECTICUT — ROBERT P. JUENGERT — No. 4208 — REGISTERED ARCHITECT

OT-4208

1 / A-8 CABLE ROUTING ELEVATION

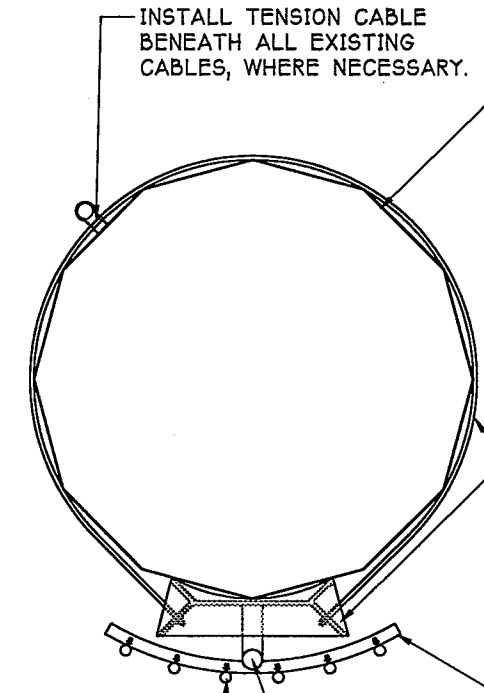
SCALE: 1/2" = 1'-0"

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

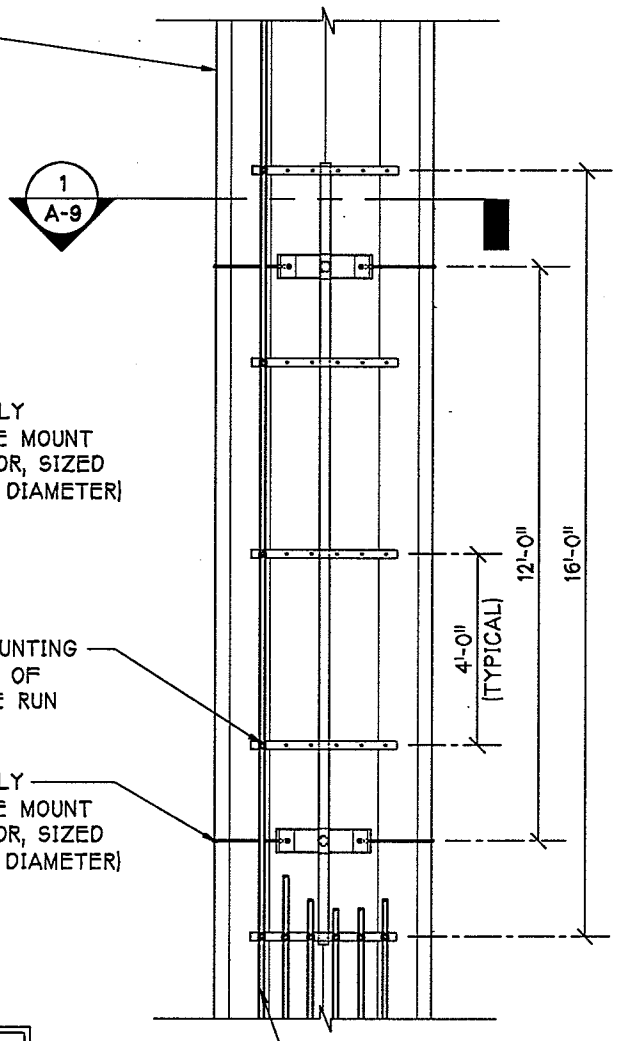
ARCNET ARCHITECTS, INC.
670 North Beers Street, Building 2, Holmdel, NJ 07733
Tel: 732.739.3200 Fax: 732.739.0440

Drawing Title:	CABLE ROUTING ELEVATION
Client:	OCS
Project:	CL&P POLE #1068
Address:	MECHANIC STREET, DARIEN, CT
Search Area:	DARIEN / DOWNTOWN
Site ID No.:	CT-11-290C
Approved By:	CLIENT: _____ DATE: _____

P.C.:	P.C. Chkd:	Chkd. by:	ARCNET Project No.	Drawn:	Date:	Revision No.	Date:	Drawing No.
RVa			A99.506.833A	CS	4/21/99			A-8



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



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

ROBERT P. JUENGERT
STATE OF CONNECTICUT
REGISTERED ARCHITECT
No. 4208
CT-4208

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 SPEFICIATIONS.

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

P.C.:	P.C. Chkd:	Chkd. by:	ARCNET Project No.	Drawn:	Date:
RVa			A99.506.833A	CS	4/21/99

Approved By: CLIENT:_____ DATE:_____

Revision No. | Date:

Drawing No. A-9

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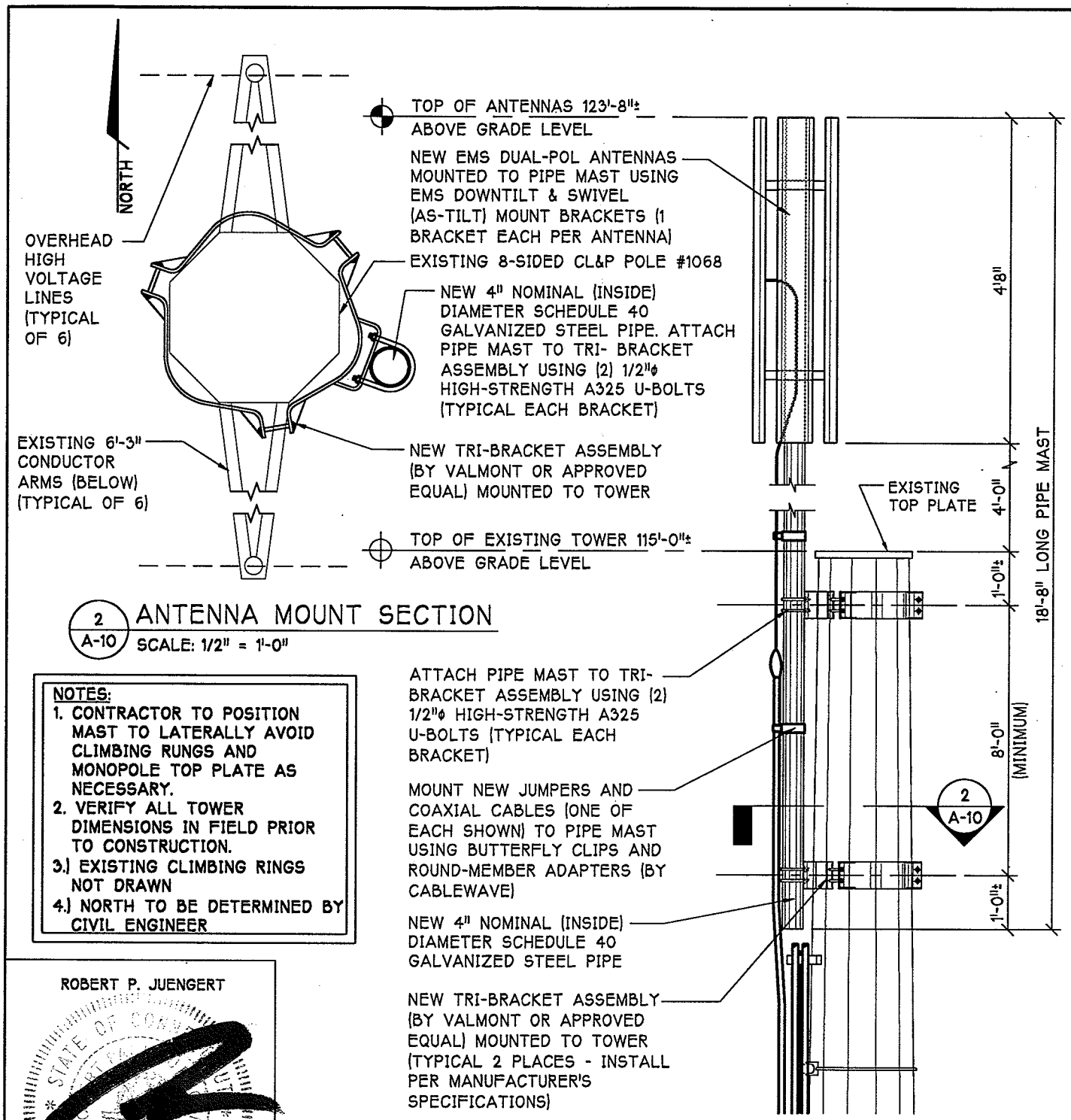

2 / A-10 ANTENNA MOUNT SECTION

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

1 / A-10 ANTENNA MOUNT ELEVATION

SCALE: 3/8" = 1'-0"

ROBERT P. JUENGERT

STATE OF CONNECTICUT — REGISTERED ARCHITECT — No. 4208

CT no. 4208

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

Drawing Title:	ANTENNA MOUNT DETAIL
Client:	OCS
Project:	CL&P POLE #1068
Address:	MECHANIC STREET, DARIEN, CT
Search Area:	DARIEN / DOWNTOWN
Site ID No.:	CT-11-290C
REV1(JMc)	5/7/99
Revision No.	Date:
P.C.: RVa	P.C. Chkd.:
ARCNET Project No.	A99.506.833A
Drawn:	CS
Date:	4/21/99
Approved By: CLIENT: _____ DATE: _____	
Drawing No.	A-10

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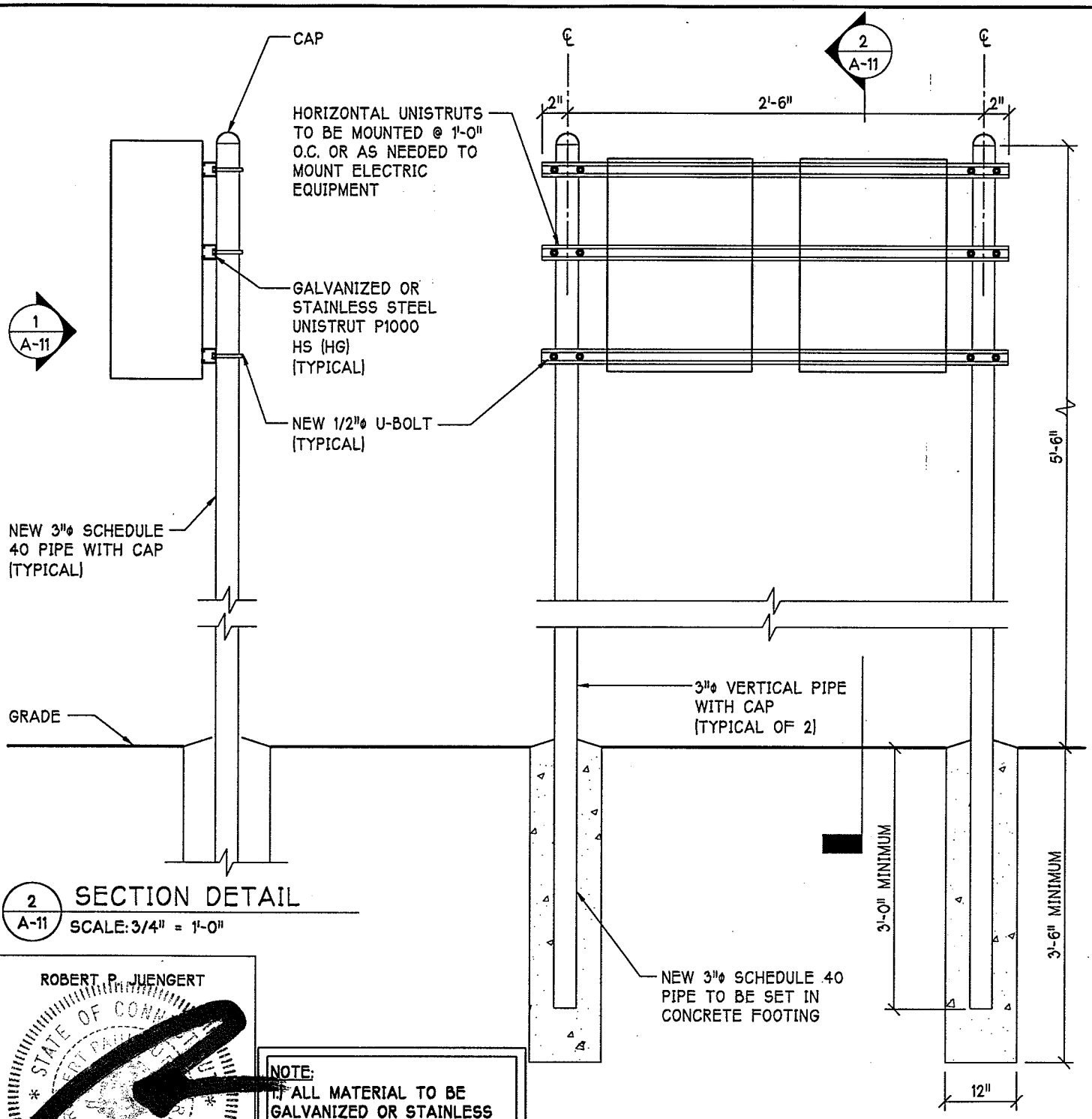


2 / A-11 SECTION DETAIL
SCALE: 3/4" = 1'-0"

1 / A-11 ELECTRIC EQUIPMENT MOUNT
SCALE: 3/4" = 1'-0"

ROBERT P. JUENGERT
STATE OF CONNECTICUT
No. 4208
REGISTERED ARCHITECT
CT 4208

NOTE:
1.) ALL MATERIAL TO BE GALVANIZED OR STAINLESS STEEL
2.) ATTACH EQUIPMENT TO UNISTRUT UTILIZING UNISTRUT CHANNEL NUTS

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

Drawing Title:	ELECTRIC EQUIPMENT MOUNT
Client:	OCS
Project:	CL&P POLE #1068
Address:	MECHANIC STREET DARIEN, CT
Search Area:	DARIEN / DOWNTOWN
Site ID No.:	CT-11-290C
Approved By:	CLIENT: _____ DATE: _____
REV1(JMc)	5/7/99
Revision No.	Date:
Drawing No.	A-11

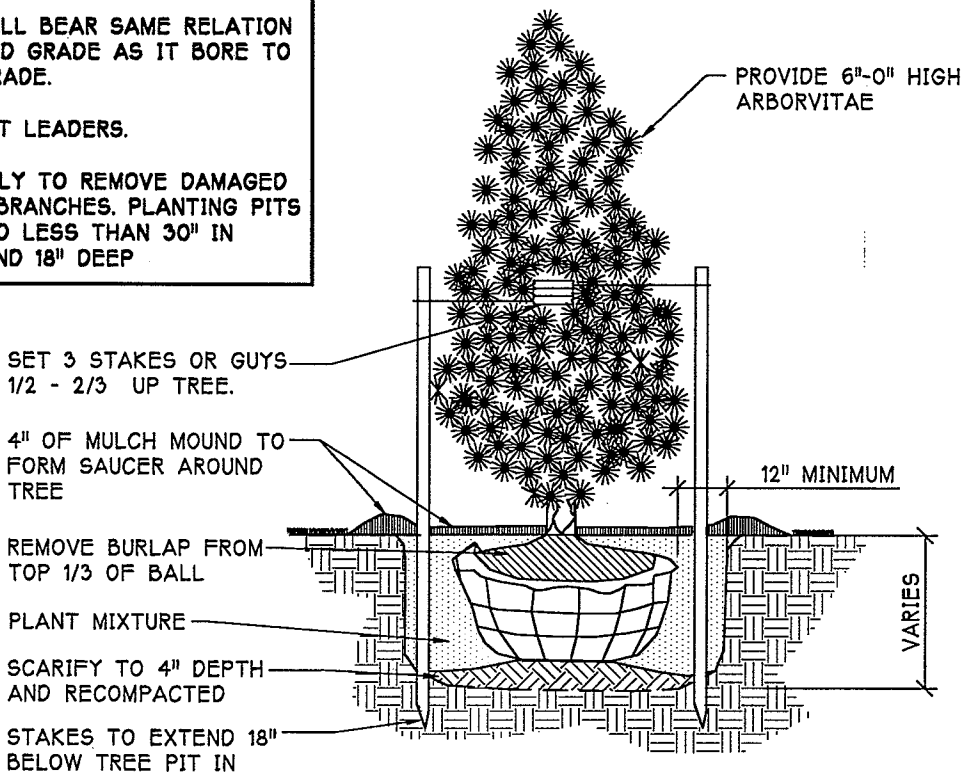
P.C.:	P.C. Chkd:	Chkd. by:	ARCNET Project No.	Drawn:	Date:
RVa			A99.506.833A	CS	4/21/99

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

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No. 4208
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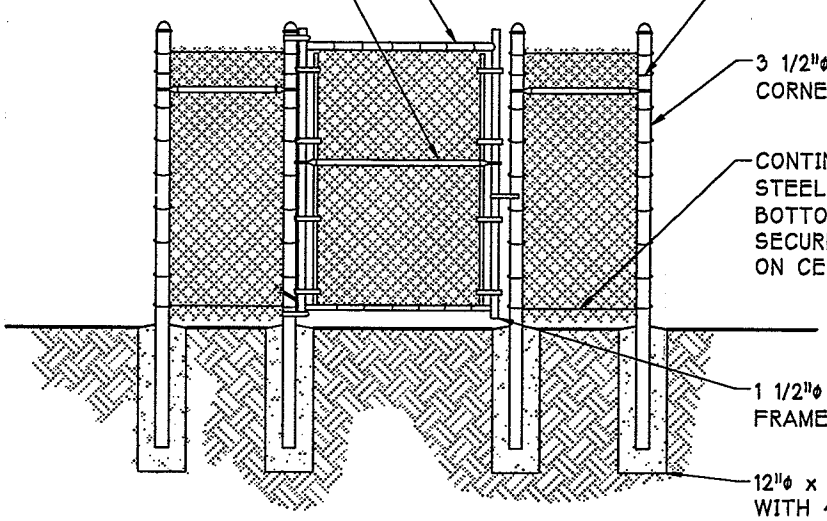
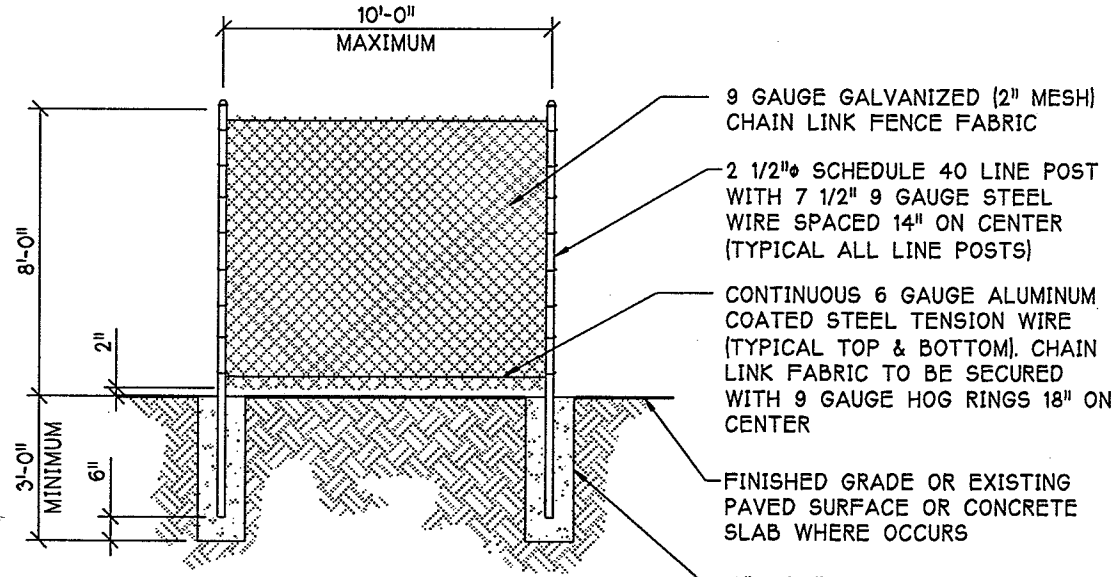
Tel: 732.739.3200 Fax: 732.739.0440

Drawing Title:	PLANTING DETAIL
Client:	OCS
Project:	CL&P POLE #1068
Address:	MECHANIC STREET DARIEN, CT
Search Area:	DARIEN / DOWNTOWN
Site ID No.:	CT-11-290C
P.C.:	RVa
P.C. Chkd.:	
Chkd. by:	
ARCNET Project No.	A99.506.833A
Drawn:	CS
Date:	4/21/99
Approved By:	CLIENT: _____ DATE: _____
Revision No. / Date:	
Drawing No.	A-12



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



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

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STATE OF CONNECTICUT
No. 4208
REGISTERED ARCHITECT
CT- 4208

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

Drawing Title:	FENCE DETAIL
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:	
P.C.:	RVa
P.C. Chkd.:	
Chkd. by:	
ARCNET Project No.:	A99.506.833A
Drawn:	CS
Date:	4/21/99
Approved By:	CLIENT:_____ 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.)

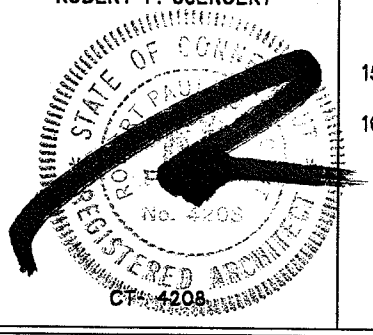
13. ALL PENETRATIONS TO BE PROPERLY FIRE-STOPPED WITH 3M F.S.195 WRAP STRIP FIRE-STOP AND CP25 NON-SHRINKING PUTTY FIRE BARRIER SEALANT. MAINTAIN FIRE RATING OF ALL PENETRATED SURFACES.

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



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

Drawing Title:	GENERAL NOTES
Client:	OCS
Project:	CL&P POLE #1068
Address:	MECHANIC STREET DARIEN, CT
Search Area:	DARIEN / DOWNTOWN
Site ID No.:	CT-11-290C
Approved By:	CLIENT:_____ DATE:_____

P.C.:	P.C. Chkd.:	Chkd. by:	ARCNET Project No.	Drawn:	Date:
RVa			A99.506.833A	CS	4/21/99

Revision No.	Date:

Drawing No. **A-14**

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

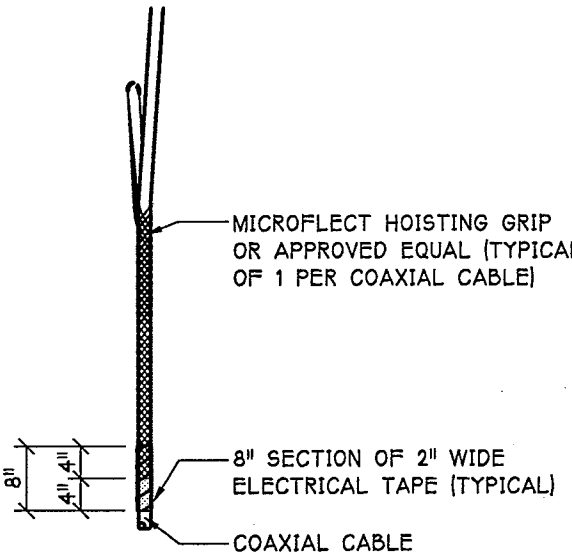
B. MOUNTING HARDWARE / CONDUIT PAINT SPECIFICATION

SURFACE PREPARATION
REMOVE SURFACE CONTAMINATION USING ALCOHOL SOLVENT, ETHANOL. PROPANOL, ISOPROPANOL, 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 -



ROBERT P. JUENGERT
STATE OF CONNECTICUT
No. 4208
REGISTERED ARCHITECT
CT- 4208

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

Drawing Title:	GENERAL NOTES
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:	
P.C.:	RVa
P.C. Chkd.:	
Check By:	
ARCNET Project No.	A99.506.833A
Drawn:	CS
Date:	4/21/99
Approved By: CLIENT: _____ DATE: _____	
Drawing No.	A-15

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.

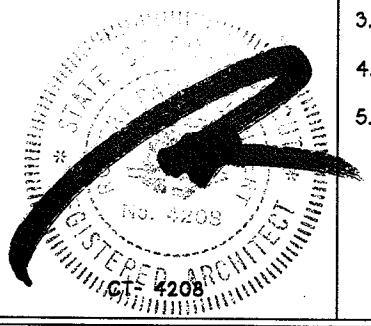
2. WHERE REINFORCING IS CALLED OUT IN THE CONSTRUCTION DOCUMENTS IT SHALL BE 3" CLEAR COVER (MINIMUM UNLESS OTHERWISE NOTED)

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



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

Drawing Title: CONCRETE NOTES

Client: OCS

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

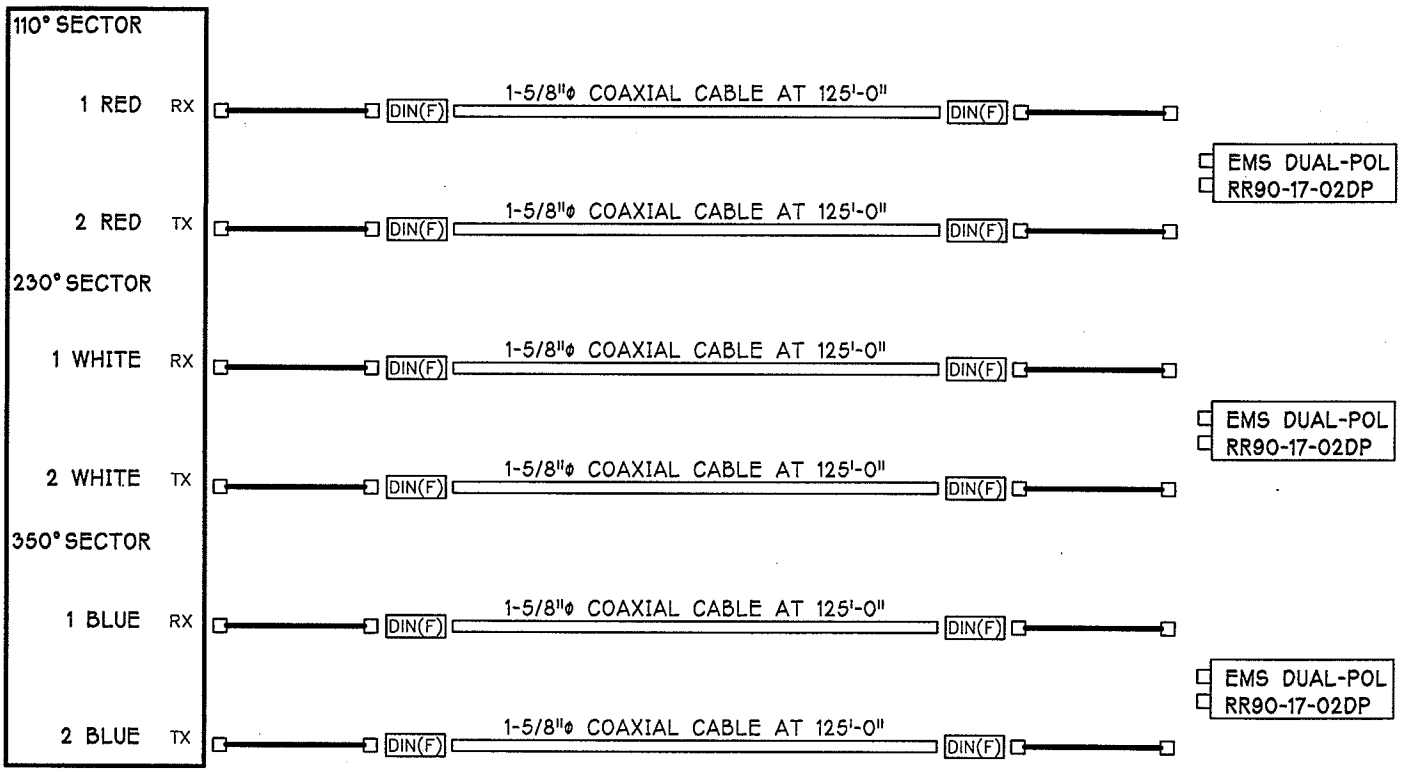
P.C.:	P.C. Chkd.:	Chkd. by:	ARCNET Project No.	Drawn:	Date:
RVa			A99.506.833A	CS	4/21/99

Approved By: CLIENT:_____ DATE: _____

Revision No.	Date:

Drawing No. A-17

NORTEL S8000
EQUIPMENT
CABINET



CONTRACTOR:

ADDRESS:

PHONE:

ROBERT P. JUENGERT

STATE OF CONNECTICUT
No. 4208
REGISTERED ARCHITECT

CT- 4208

BILL of MATERIALS

No.	QTY.	DESCRIPTION	MANUFACT	PART#
1	1	NORTEL S8000 EQUIPMENT CABINET		
2	6	DIN(M) - DIN(M) 1/2"ϕx6'-0" SUPERFLEX JUMPER		
3	6	DIN(M) - DIN(M) 1/2"ϕx6'-0" JUMPER		
4	12	1-5/8"ϕ DIN(F) CONNECTOR		
5	6	1-5/8"ϕ 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"ϕ GROUNDING KITS		
9	12	1-5/8"ϕ WEATHER-PROOFING KITS		

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

Drawing Title: MATERIAL LIST

Client: OCS

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

Approved By:
CLIENT:_____ DATE: _____

Revision No.	Date:
REV2KBa	7/16/99
REV1[JMc]	5/7/99

P.C.	P.C. Chkd.	Chkd.	ARCNET Project No.	Drawn:	Date:
RVa	RVa	RVa	A99.506.833A	CS	4/21/99

Drawing No. A-18

DESIGN CRITERIA

1. 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.
2. 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.
3. 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.
4. 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

1. 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.
2. 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.
3. 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.
4. 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

IDENTIFIER	DESCRIPTION
	SAFETY SWITCH
	PANEL BOARD
M	ELECTRIC METER
	ELECTRICAL WIRING (TURNING UP)
	ELECTRICAL WIRING (TURNING DOWN)
CAB	COMMUNICATIONS CABINET
	BACKBOARD
	RECEPTACLE
	NEW UTILITY POLE
	EXISTING UTILITY POLE
	MASTER GROUND BAR
	INSULATED GROUND BAR
	UNINSULATED GROUND BAR

ROBERT P. JUENGERT
STATE OF CONNECTICUT
No. 4208
REGISTERED ARCHITECT
CT-4208

LEGEND

IDENTIFIER	DESCRIPTION
——E——	EXISTING ELECTRIC
——NE——	NEW ELECTRIC
——T——	EXISTING TELEPHONE
——NT——	NEW TELEPHONE
———NE———	NEW UNDERGROUND ELECTRIC
———E———	EXISTING UNDERGROUND ELECTRIC
———NT———	NEW UNDERGROUND TELEPHONE
———T———	EXISTING UNDERGROUND TELEPHONE
——PL——	PROPERTY LINE

ABBREVIATIONS AND LABELS

AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AWG	AMERICAN WIRE GAUGE
C	CONDUIT
CB	CIRCUIT BREAKER
EMT	ELECTRICAL METALLIC TUBING
GND	GROUND
MC	METAL CLAD CABLE
MCB	MAIN CIRCUIT BREAKER
MDP	MAIN DISTRIBUTION PANEL
MGB	MASTER GROUND BAR
MLO	MAIN LUGS ONLY
N	NEUTRAL
NEC	NATIONAL ELECTRIC CODE
PNL	PANEL
PP	POWER PANEL
PVC	POLYVINYL CHLORIDE
RA	RIGID ALUMINUM
RGS	RIGID GALVANIZED STEEL
WP	WEATHER PROOF

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P.C.:	P.C. Chkd.:	Chkd. by:
RVo		

Drawing Title: GENERAL INFORMATION

Client: OCS

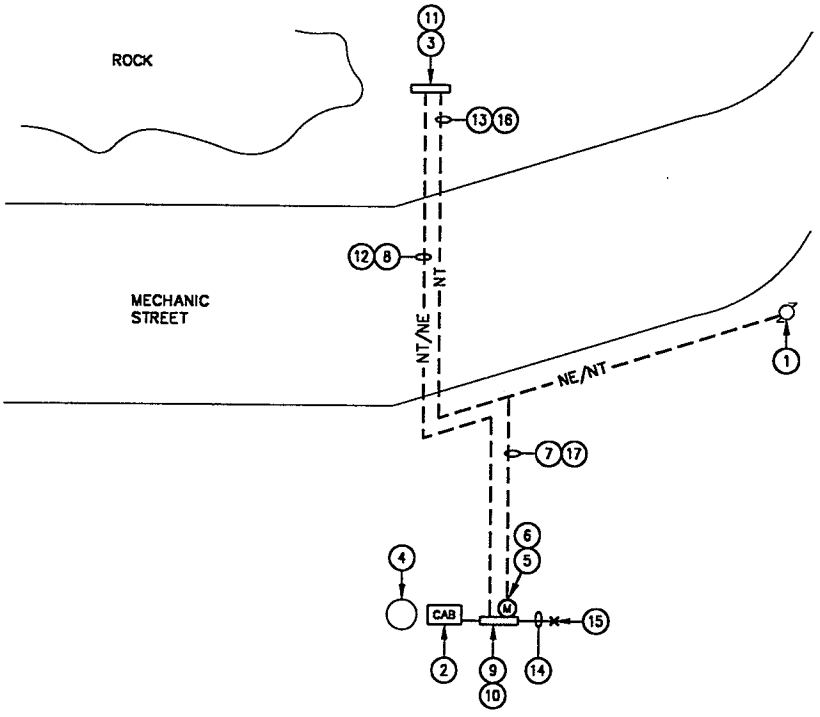
ARCNET Project No.	Drawn:	Date:
A99.506-833A	MW	4/26/99

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

Approved By: CLIENT:_____ DATE:_____

Revision No.	Date:

Drawing No. E-1



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.

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REGISTERED ARCHITECT
CT-11208

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SITE LAYOUT | SCALE: NONE | E-2 | 01

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P.C.: RVa | P.C. Chkd.: | Chkd. by:

Drawing Title: SERVICE PLAN

Client: OCS

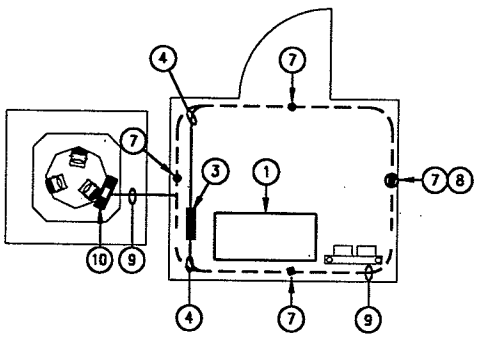
ARCNET Project No.: A99.506-833A | Drawn: MW | Date: 4/26/99

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

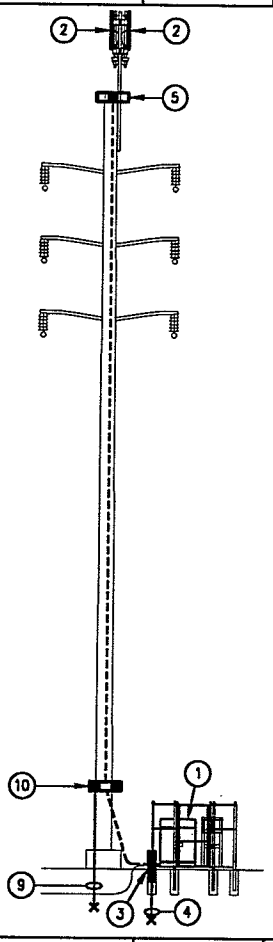
Approved By: CLIENT:_____ DATE: _____

Revision No.	Date:

Drawing No. E-2



SITE PLAN | SCALE: NONE | E-3 01



ELEVATION | SCALE: NONE | E-3 02

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.

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

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CT- 4208

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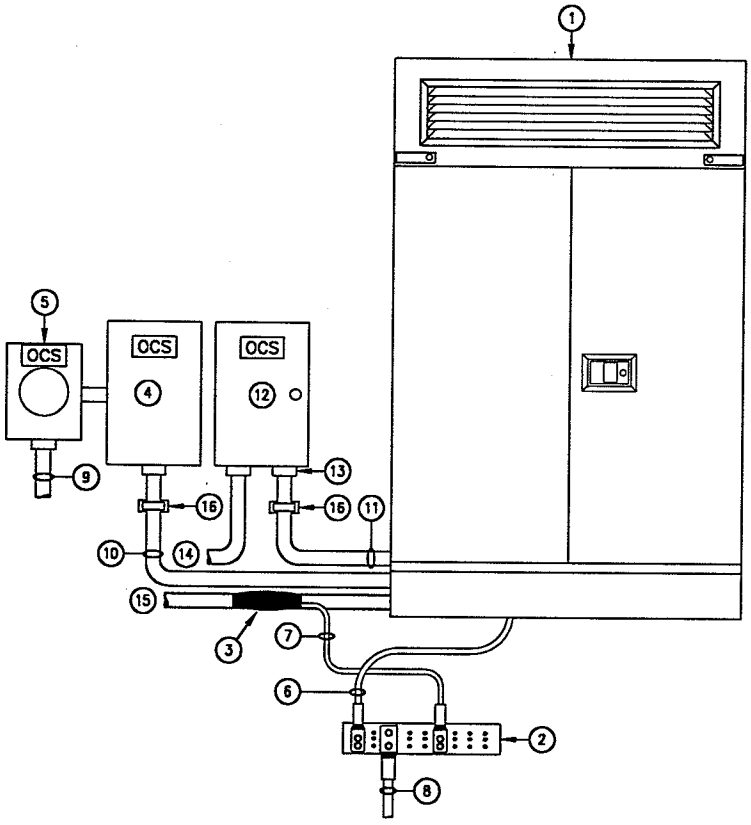
Drawing Title: GROUNDING PLAN
Client: OCS
Project: CL&P POLE # 1068
Address: MECHANIC STREET DARIEN, CT
Search Area: DARIEN / DOWNTOWN
Site ID No: CT-11-290C

P.C.:	P.C. Chkd.:	Chkd. by:	ARCNET Project No.	Drawn:	Date:
RVa			A99.506-833A	MW	4/26/99

Approved By: CLIENT:_____ DATE:_____

Revision No. | Date:

Drawing No. E-3



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 OMNIPOINT.
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

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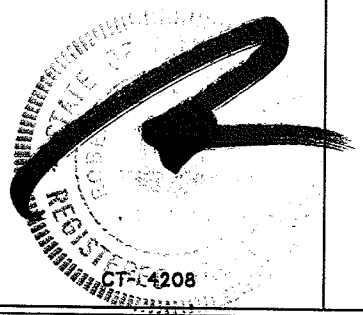

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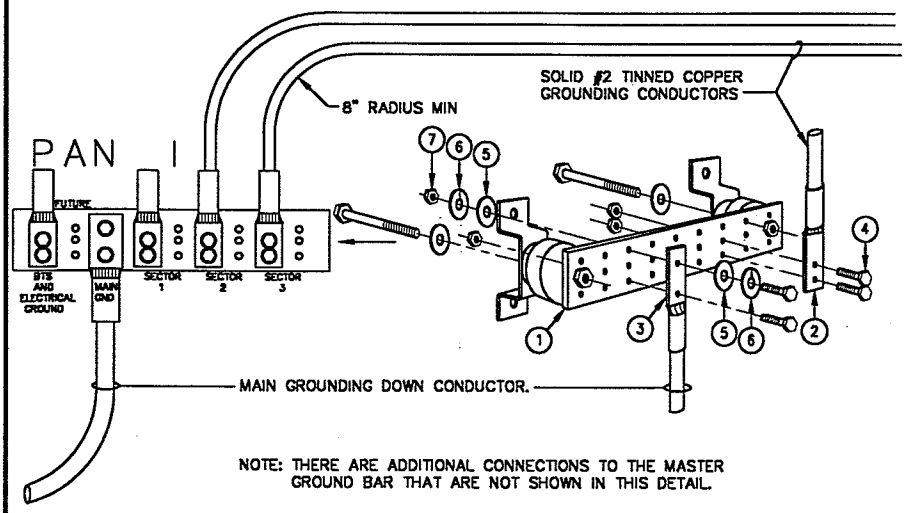
Electrical / Mechanical
Wanamassa, NJ
CT-PE 14722

Drawing Title:	Project:	Revision No.	Date:
RISER	CL&P POLE # 1068		
Client: OCS	Address: MECHANIC STREET DARIEN, CT		
	Search Area: DARIEN / DOWNTOWN		
	Site ID No: CT-11-290C		
	Approved By: CLIENT:_____ DATE:_____	Drawing No.	E-4

P.C.:	P.C. Chkd.:	Chkd. by:	ARCNET Project No.	Drawn:	Date:
RVa			A99.506-833A	MW	4/26/99



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

	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:

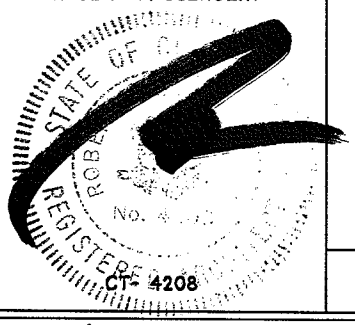
A 2-HOLE MECHANICAL LUG WITH HYDRAULICALLY COMPRESSED LONG BARREL.

B DOUBLE BARREL COPPER HYDRAULICALLY COMPRESSED CONNECTOR.

C CADWELD

D BEAM CLAMP

ROBERT P. JUENGERT



CT- 4208

GROUNDING MATRIX

SCALE: NONE | E-5 / 02

KEY NOTES (Symbols ①, ②, Etc.)

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).

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P.C.:	P.C. Chkd.:	Chkd. by:
RVa		

Drawing Title: GROUNDING DETAILS

Client: OCS

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

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

Approved By: CLIENT:_____ DATE:_____

Revision No.	Date:

Drawing No. E-5

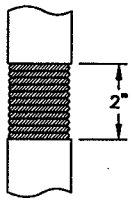

FIGURE 1	SCALE: NONE	E-6 / 01

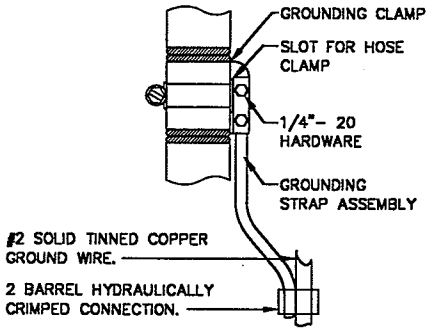

FIGURE 2	SCALE: NONE	E-6 / 02

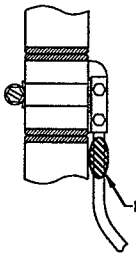

FIGURE 3	SCALE: NONE	E-6 / 03

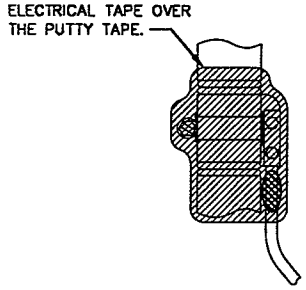

FIGURE 4	SCALE: NONE	E-6 / 04

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CT. 4208

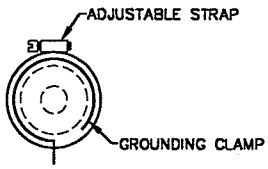

FIGURE 5	SCALE: NONE	E-6 / 05

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.C.	P.C. Chkd.	Chkd. by
RVa		

Drawing Title: GROUNDING DETAILS

Client: OCS

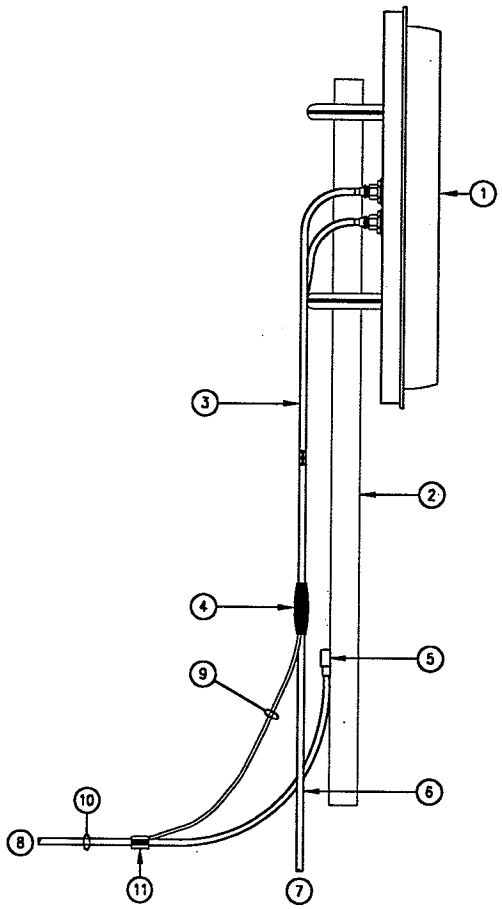
ARCNET Project No.	Drawn	Date
A99.506-833A	MW	4/26/99

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

Approved By: CLIENT:_____ DATE:_____

Revision No.	Date:

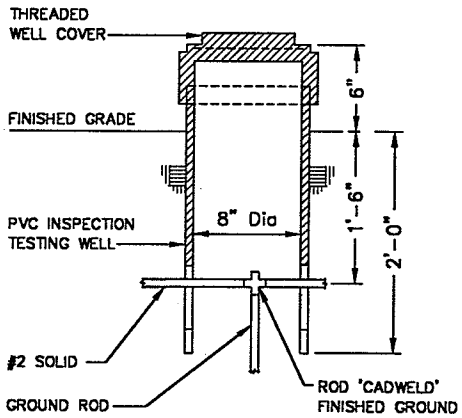
Drawing No. E-6



ANTENNA GROUNDING | SCALE: NONE | E-7 01

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.



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CT-4208

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

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Wanamassa, NJ CT-PE 14722

P.C.: RVa | P.C. Chkd.: | Chkd. No.:

Drawing Title: GROUNDING DETAIL
Client: OCS

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

Project: CL&P POLE # 1068
Address: MECHANIC STREET DARIEN, CT
Search Area: DARIEN / DOWNTOWN
Site ID No.: CT-11-280C

Approved By: CLIENT:_____ DATE:_____

Revision No. | Date:

Drawing No. E-7

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Exhibit B

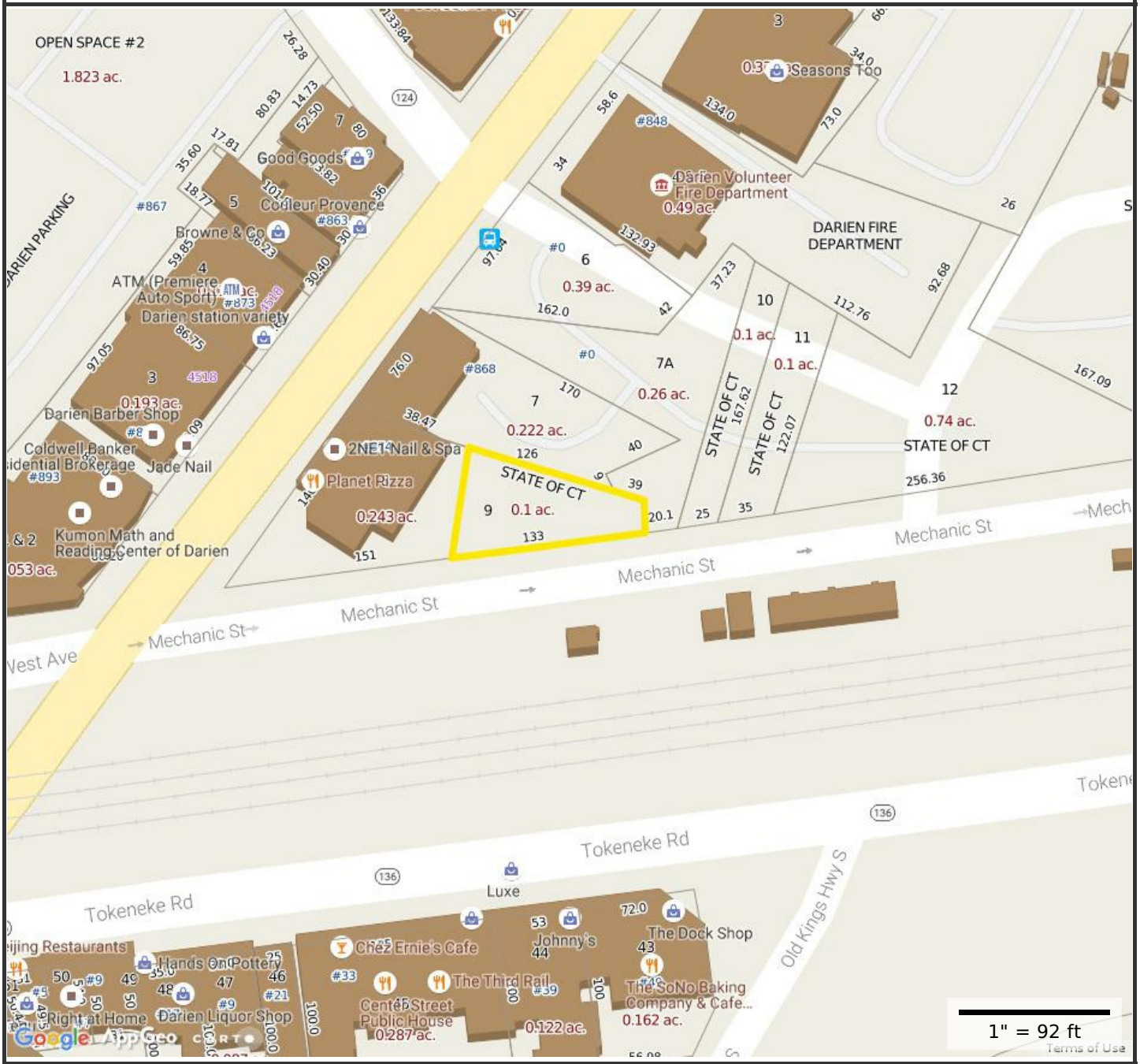
PARID: 29241
STATE OF CT DOT **MECHANIC STREET**

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.

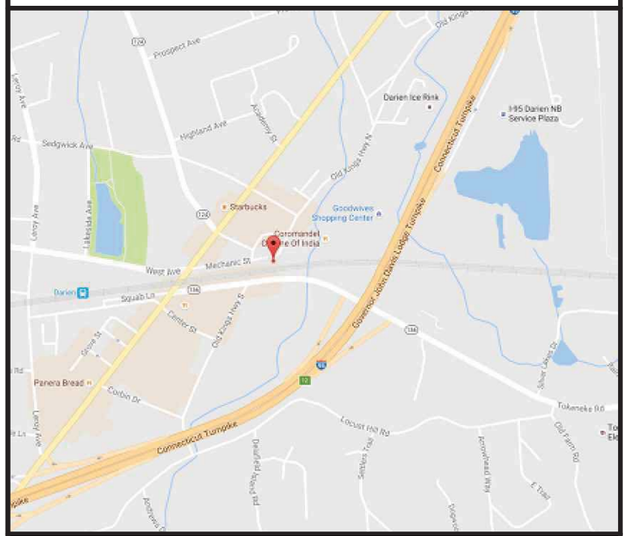
Parcels updated 1/1/2016
Properties updated 3/22/2016

Exhibit C

GENERAL NOTES

1. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTORS SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK.
2. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
3. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
4. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
5. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.
6. THE SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
7. THE SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
8. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWING MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
9. ALL SAFETY PRECAUTIONS MUCH BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

LOCATION MAP



DIRECTIONS

DIRECTIONS FROM BLOOMFIELD, CT:
GET ON I-91 S IN WINDSOR FROM CT-218 E, FOLLOW I-91 S, CT-15 S AND I-95 S TO US-1 N/BOSTON POST RD/POST RD IN DARIEN. TAKE EXIT 11 FROM I-95 S, CONTINUE ON US-1 N/BOSTON POST RD/POST RD. DRIVE TO MECHANIC ST, SHARP RIGHT ONTO US-1 N/BOSTON POST RD/POST RD, TURN RIGHT ONTO MECHANIC ST, DESTINATION WILL BE ON THE RIGHT

T··Mobile·

2016 L700

T-MOBILE SITE NUMBER

CT11290C

115' UTILITY TOWER

EVERSOURCE TOWER NUMBER:
1068

SITE ADDRESS
3 MECHANIC ST
DARIEN, CT 06820

RF CONFIG TYPE
1HP_704Bu

SITE SUMMARY

SITE TYPE:	EXISTING SITE OVERLAY
SITE ADDRESS:	3 MECHANIC ST DARIEN, CT 06820
SITE LATITUDE: SITE LONGITUDE:	41° 04' 39.2" -73° 28' 03.3"
JURISDICTION:	TOWN OF DARIEN
POWER COMPANY: TELEPHONE COMPANY:	EVERSOURCE LIGHTTOWER
TOWER OWNER/MANAGER:	NORTHEAST UTILITIES ROBERT GRAY 860-728-6125 56 PROSPECT ST., FIRST FLOOR HARTFORD, CT 06103 ROBERT.GRAY@NU.COM
WIRELESS CARRIER:	T-MOBILE 35 GRIFFIN RD S BLOOMFIELD, CT 06002 OFFICE: 860-692-7100 FAX: 860-692-7159
ENGINEER:	SMW ENGINEERING GROUP N.C., PLLC 158 BUSINESS CENTER DRIVE BIRMINGHAM, AL 35244 CONTACT: V.G. DUVALL, JR., PE PHONE: 205-252-6985

APPROVALS

DEPARTMENT	NAME/SIGNATURE	DATE
DEVELOPMENT MANAGER		
PROPERTY/TOWER OWNER		
SITE ACQUISITION MANAGER		
CONSTRUCTION MANAGER		
RF ENGINEER		
OPERATIONS MANAGER		

SHEET INDEX

BUILDING CODES

ALL CONSTRUCTION SHALL COMPLY WITH THE LATEST EDITION OF THE (AS ADOPTED BY LOCAL JURISDICTION):

- 2016 CONNECTICUT BUILDING CODE
- 2012 INTERNATIONAL BUILDING CODE W/AMENDMENTS
- 2009 ICC/ANSI A117.1 W/AMENDMENTS
- 2012 INTERNATIONAL EXISTING BUILDING CODE W/AMENDMENTS
- 2012 INTERNATIONAL PLUMBING CODE WITH AMENDMENTS
- 2012 INTERNATIONAL MECHANICAL CODE W/AMENDMENTS
- 2012 INTERNATIONAL ENERGY CONSERVATION CODE W/AMENDMENTS
- 2014 NFPA 70, NATIONAL ELECTRICAL CODE W/AMENDMENTS
- 2012 INTERNATIONAL RESIDENTIAL CODE W/AMENDMENTS

HANDICAP REQUIREMENTS

FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. HANDICAP ACCESS IS NOT REQUIRED.

PLUMBING REQUIREMENTS

FACILITY HAS NO SANITARY OR POTABLE WATER

CALL BEFORE YOU DIG

811 Know what's below. Call before you dig.

CONNECTICUT CALL BEFORE YOU DIG
STATE WIDE
1-800-922-4455 OR 811
HTTP://WWW.CBYD.COM/#

T··Mobile·
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
OFFICE: 860-692-7100
FAX: 860-692-7159

PLANS PREPARED BY:
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
199 BRICKYARD RD
FARMINGTON, CT 06032

SMW ENGINEERING GROUP, INC.
TOGETHER PLANNING A BETTER TOMORROW

STATE OF CONNECTICUT · JOSHUA A. CRAFT · No. 30787 · LICENSED PROFESSIONAL ENGINEER

11/14/16

SITE INFORMATION:
CT11290C
3 MECHANIC ST
DARIEN, CT 06820

#	DATE	DESCRIPTION:
0	10/09/16	ISSUED FOR CLIENT REV.
1	11/01/16	REVISED PER CLIENT COMMENTS
2	11/08/16	REVISED PER CLIENT COMMENT
3	11/14/16	ISSUED FOR CONSTRUCTION

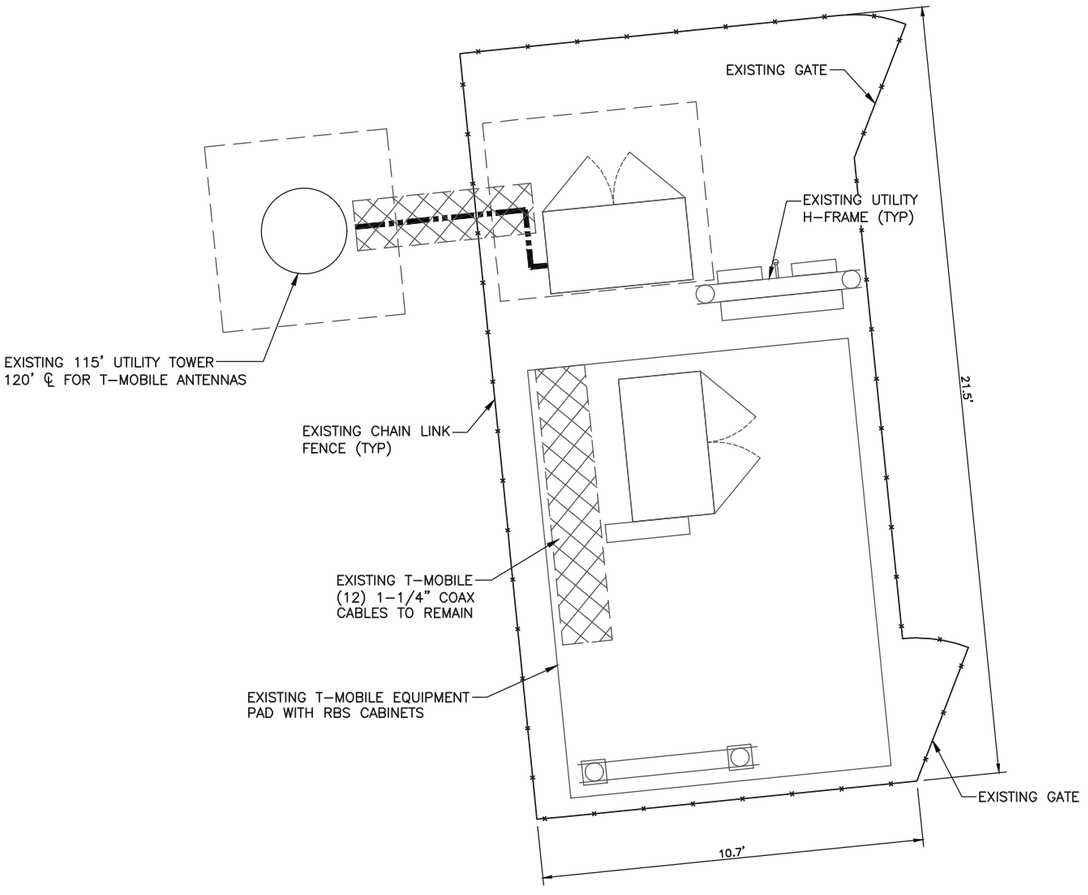
T-MOBILE SITE ID:	EVERSOURCE TOWER #:
CT11290C	1068

SHEET NAME:
TITLE SHEET

SMW #:	SHEET NUMBER:
16-2085	T-1
DESIGNER: ACR	
CHECKED BY: RTB	
ENGINEER: VGD	

SITE NOTES:

1. DIGGING AND/OR TRENCHING INSIDE COMPOUND, MUST BE DONE BY HAND.
2. EXISTING SITE INFORMATION AND LAYOUT SHOWN REPRESENT INFORMATION OBTAINED FROM NSS & T–MOBILE.
3. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO FIELD VERIFY THE EXACT LOCATIONS OF EXISTING UTILITIES WHICH MAY CONFLICT WITH PROPOSED IMPROVEMENTS.
4. LOCATION OF UNDERGROUND UTILITIES WAS NOT PERFORMED.
5. THE ADEQUACY OF EXISTING SITE UTILITIES TO ACCOMMODATE NEW CO–LOCATION LOAD(S) WAS NOT VERIFIED.
6. ALL EXISTING VEGETATION AND IMPROVEMENTS SHOWN ARE TO REMAIN UNLESS OTHERWISE SHOWN IN THESE DRAWINGS.



1 / C–1 EXISTING OVERALL SITE PLAN

T-Mobile
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
OFFICE: 860–692–7100
FAX: 860–692–7159

PLANS PREPARED BY:
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
199 BRICKYARD RD
FARMINGTON, CT 06032

SMW ENGINEERING GROUP, INC.
TOGETHER PLANNING A BETTER TOMORROW

STATE OF CONNECTICUT · KEVIN A. KRAFT · No. 30787 · LICENSED PROFESSIONAL ENGINEER

11/14/16

SITE INFORMATION:
CT11290C
3 MECHANIC ST
DARIEN, CT 06820

#	DATE	DESCRIPTION:
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1	11/01/16	REVISED PER CLIENT COMMENTS
2	11/08/16	REVISED PER CLIENT COMMENT
3	11/14/16	ISSUED FOR CONSTRUCTION

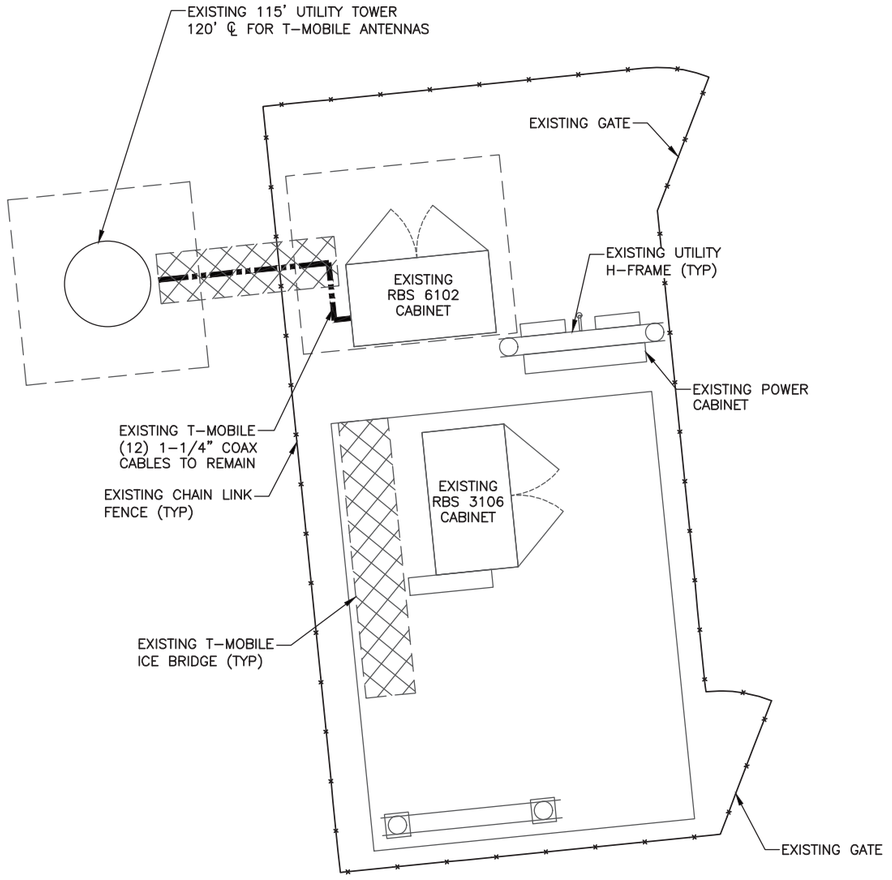
T-MOBILE SITE ID: CT11290C
EVERSOURCE TOWER #: 1068

SHEET NAME:
OVERALL SITE PLAN

SMW #: 16–2085

DESIGNER:	ACR
CHECKED BY:	RTB
ENGINEER:	VGD

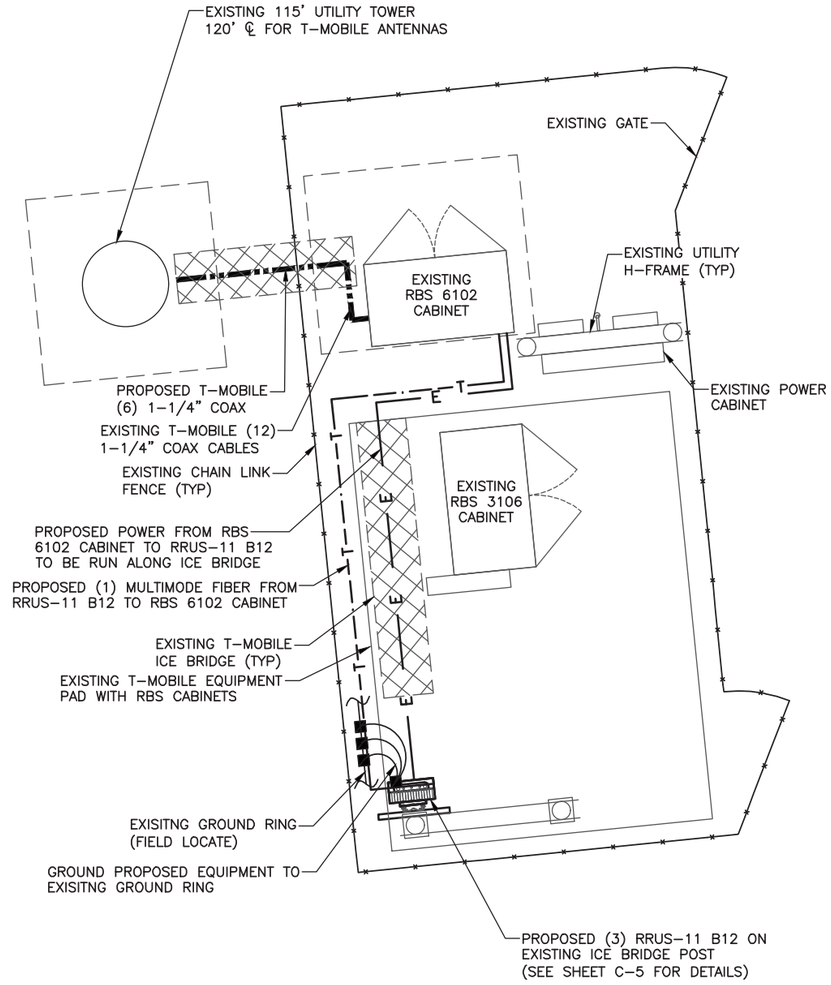
SHEET NUMBER: C-1



0' 4' 8' 12'

1" = 4' (11"x17")

1 / C-2 EXISTING EQUIPMENT PLAN



0' 4' 8' 12'

1" = 4' (11"x17")

2 / C-2 PROPOSED EQUIPMENT PLAN

T-Mobile
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
OFFICE: 860-692-7100
FAX: 860-692-7159

PLANS PREPARED BY:
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
199 BRICKYARD RD
FARMINGTON, CT 06032

SMW ENGINEERING GROUP, INC.
TOGETHER PLANNING A BETTER TOMORROW

STATE OF CONNECTICUT
JOHN A. KRAFT
No. 20782
LICENSED PROFESSIONAL ENGINEER

11/14/16

SITE INFORMATION:

CT11290C
3 MECHANIC ST
DARIEN, CT 06820

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1	11/01/16	REVISED PER CLIENT COMMENTS
2	11/08/16	REVISED PER CLIENT COMMENT
3	11/14/16	ISSUED FOR CONSTRUCTION

T-MOBILE SITE ID: CT11290C

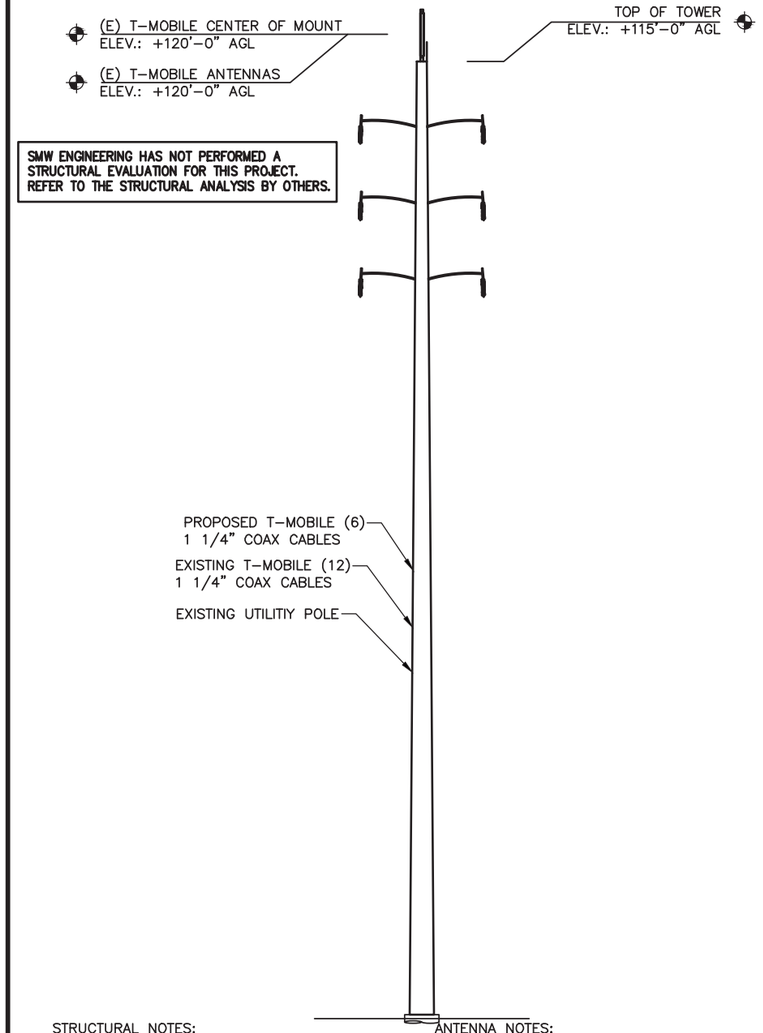
EVERSOURCE TOWER #: 1068

SHEET NAME: EQUIPMENT PLAN

SMW #: 16-2085

DESIGNER:	ACR
CHECKED BY:	RTB
ENGINEER:	VGD

SHEET NUMBER: C-2



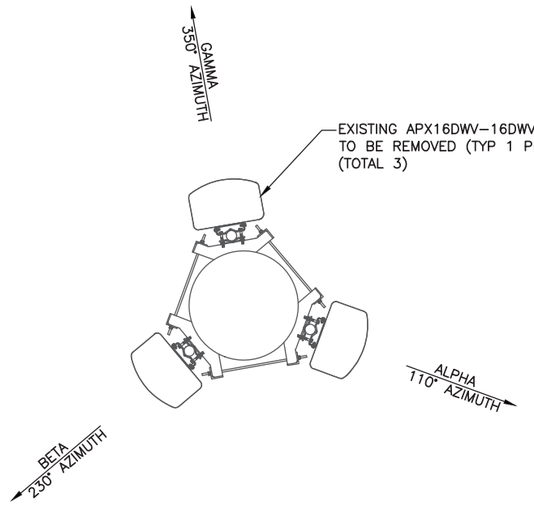
STRUCTURAL NOTES:

1. SMW HAS NOT PERFORMED A STRUCTURAL ANALYSIS OF THE EXISTING TOWER OR PROPOSED ANTENNA MOUNT. REFER TO STRUCTURAL ANALYSIS OR STRUCTURAL LETTER BY OTHERS FOR ADDITIONAL INFORMATION.
2. IF THE TOWER STRUCTURAL ANALYSIS SHOWS THE NEED FOR TOWER REINFORCEMENT REFER TO TOWER REINFORCEMENT DESIGN PRIOR TO THE INSTALLATION OF ANY PROPOSED EQUIPMENT.
3. REFER TO TOWER STRUCTURAL ANALYSIS FOR PROPOSED CABLE ROUTING AND ATTACHMENT DETAILS.
4. TOWER ELEVATION SHOWN IS NOT DRAWN TO SCALE AND IS INTENDED ONLY FOR REFERENCE PURPOSES. REFER TO ORIGINAL TOWER DESIGN FOR ADDITIONAL INFORMATION.

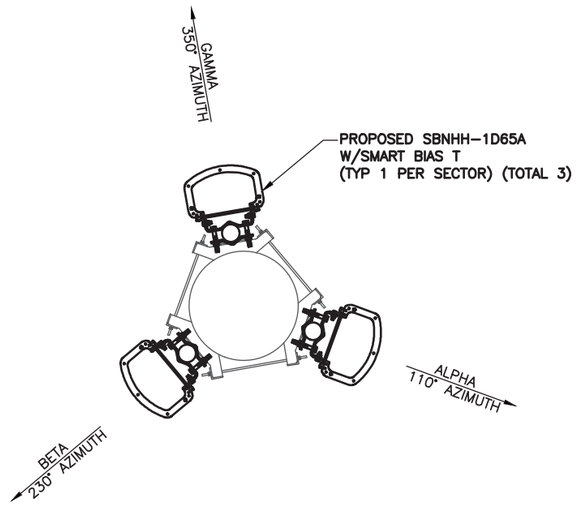
ANTENNA NOTES:

1. THE PRE-APPLICATION & LEASE DIRECTION OF THE ANTENNA SHALL BE ADJUSTED TO MEET SYSTEM REQUIREMENTS.
2. CONTRACTOR SHALL VERIFY HEIGHT OF ANTENNA WITH T-MOBILE PCS PM.
3. CONTRACTOR SHALL VERIFY HEIGHT AND DIRECTION OF MICROWAVE DISHES WITH T-MOBILE PROJECT MANAGER (WHEN APPLICABLE).
4. ALL ANTENNA AZIMUTHS TO BE FROM MAGNETIC NORTH.
5. CONTRACTOR TO USE EXISTING ANTENNA TOP HAT.

1 / C-3 TOWER ELEVATION
NOT TO SCALE



2 / C-3 EXISTING ANTENNA ORIENTATION PLAN
NOT TO SCALE



3 / C-3 PROPOSED ANTENNA ORIENTATION PLAN
NOT TO SCALE

N

T-Mobile
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
OFFICE: 860-692-7100
FAX: 860-692-7159

PLANS PREPARED BY:
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
199 BRICKYARD RD
FARMINGTON, CT 06032

SMW ENGINEERING GROUP, INC.
TOGETHER PLANNING A BETTER TOMORROW

STATE OF CONNECTICUT
KEVIN A. KRAFT
No. 25782
LICENSED PROFESSIONAL ENGINEER

11/14/16

SITE INFORMATION:

CT11290C
3 MECHANIC ST
DARIEN, CT 06820

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3	11/14/16	ISSUED FOR CONSTRUCTION

T-MOBILE SITE ID: CT11290C
EVERSOURCE TOWER #: 1068

SHEET NAME:
TOWER ELEVATION & ANTENNA PLAN

SMW #: 16-2085

DESIGNER:	ACR
CHECKED BY:	RTB
ENGINEER:	VGD

SHEET NUMBER: C-3

TOWER EQUIPMENT SCHEDULE										
ANTENNA MARK	SECTOR	ANTENNA MODEL	ANTENNA ORIENTATION	RAD CENTER	RADIO	TMA MODEL	EQUIPMENT	SURGE PROTECTION	COAX/CABLE	TECHNOLOGY
A1	ALPHA	(1) COMMSCOPE – SBNHH-1D65A (P)	110°	120'			(1) ANDREW SMART BIAS T (P)		(4) 1-1/4" COAX (E) (2) 1-1/4" COAX (P)	U1900/G1900/U1200/ L2100/L700
B1	BETA	(1) COMMSCOPE – SBNHH-1D65A (P)	230°	120'			(1) ANDREW SMART BIAS T (P)		(4) 1-1/4" COAX (E) (2) 1-1/4" COAX (P)	U1900/G1900/U1200/ L2100/L700
C1	GAMMA	(1) COMMSCOPE – SBNHH-1D65A (P)	350°	120'			(1) ANDREW SMART BIAS T (P)		(4) 1-1/4" COAX (E) (2) 1-1/4" COAX (P)	U1900/G1900/U1200/ L2100/L700

TABLE NOTE:
(P) DENOTES PROPOSED EQUIPMENT
(E) DENOTES EXISTING EQUIPMENT

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

TOWER LOADING SUMMARY				
EXISTING QUANTITY	REMOVE QUANTITY	EQUIPMENT TYPE	ADD QUANTITY	TOTAL QUANTITY
3	3	PANEL ANTENNA	3	3
12	0	COAX CABLE	6	18
0	0	TMA	0	0
0	0	DIPLEXER	0	0
0	0	RRUS-11 B12 GROUND MOUNTED	3	3
0	0	SMART BIAS T	3	3

RFDS REFERENCE:
CT11290A-L700-rfds.eng.t-mobile 9-26-2016

T-Mobile
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
OFFICE: 860-692-7100
FAX: 860-692-7159

PLANS PREPARED BY:
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
199 BRICKYARD RD
FARMINGTON, CT 06032

SMW ENGINEERING GROUP, INC.
TOGETHER PLANNING A BETTER TOMORROW

STATE OF CONNECTICUT
JOHN A. TRAFF
No. 20787
LICENSED PROFESSIONAL ENGINEER

11/14/16

SITE INFORMATION:
CT11290C
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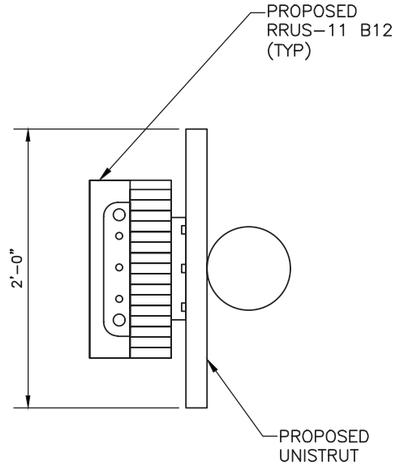
T-MOBILE SITE ID: CT11290C
EVERSOURCE TOWER #: 1068

SHEET NAME:
TOWER EQUIPMENT SCHEDULE

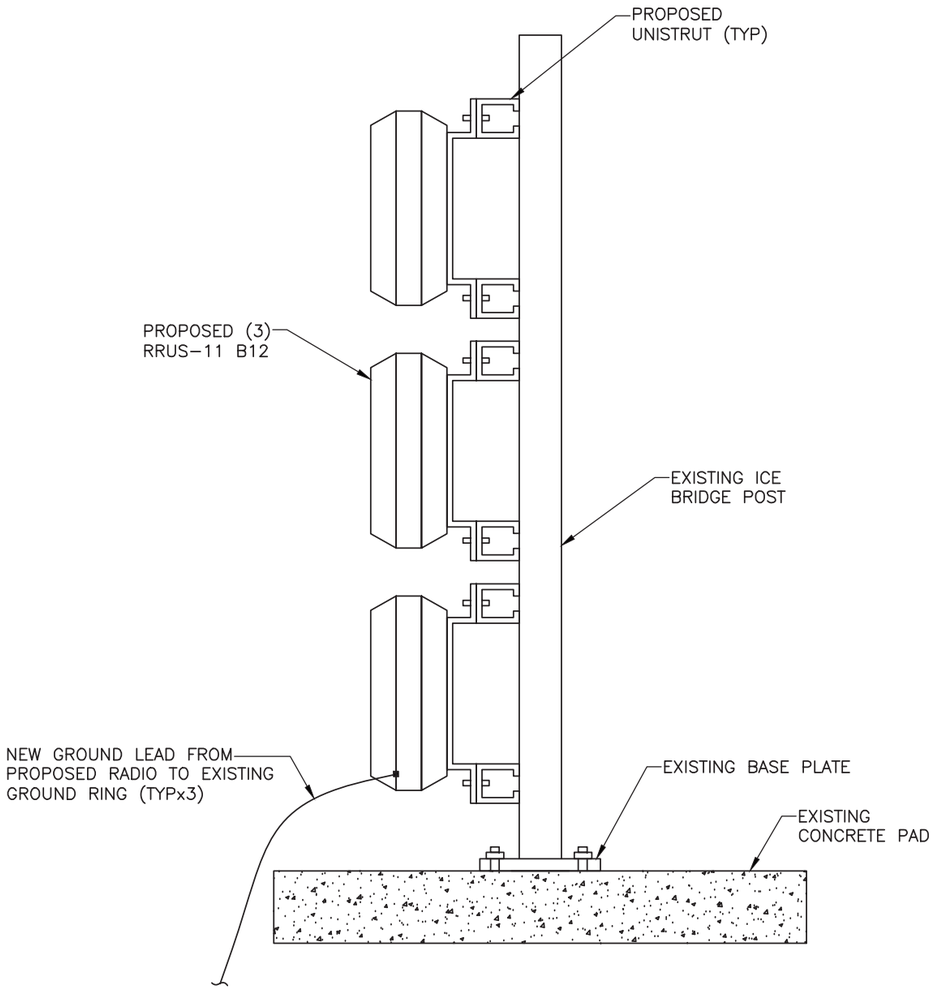
SMW #: 16-2085

DESIGNER:	ACR
CHECKED BY:	RTB
ENGINEER:	VGD

SHEET NUMBER:
C-4



TOP VIEW



SIDE VIEW

T-Mobile
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
OFFICE: 860-692-7100
FAX: 860-692-7159

PLANS PREPARED BY:
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
199 BRICKYARD RD
FARMINGTON, CT 06032

SMW ENGINEERING GROUP, INC.
TOGETHER PLANNING A BETTER TOMORROW

STATE OF CONNECTICUT
KEVIN A. KRAFT
No. 20787
LICENSED PROFESSIONAL ENGINEER

11/14/16

SITE INFORMATION:
CT11290C
3 MECHANIC ST
DARIEN, CT 06820

#	DATE	DESCRIPTION:
0	10/09/16	ISSUED FOR CLIENT REV.
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3	11/14/16	ISSUED FOR CONSTRUCTION

T-MOBILE SITE ID: CT11290C
EVERSOURCE TOWER #: 1068

SHEET NAME:
EQUIPMENT DETAIL

SMW #: 16–2085

DESIGNER:	ACR
CHECKED BY:	RTB
ENGINEER:	VGD

SHEET NUMBER:
C-5

GENERAL ELECTRICAL NOTES:

1. ALL WORK IS TO COMPLY WITH THE LATEST EDITION OF THE NATIONAL ELECTRIC CODE (NEC) AND ANY LOCAL ORDINANCES, CODES, AND ALL OTHER ADMINISTRATIVE AUTHORITIES HAVING JURISDICTION. THE CONTRACTOR SHALL FURNISH AND PAY FOR ALL PERMITS AND RELATED FEES.

2. ALL EQUIPMENT AND MATERIAL FURNISHED AND INSTALLED UNDER THIS CONTRACT SHALL BE UNDERWRITERS LABORATORIES (U.L.) LISTED, NEW, FREE FROM DEFECTS, AND SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE BY OWNER OR HIS REPRESENTATIVE. SHOULD ANY TROUBLE DEVELOP DURING THIS PERIOD DUE TO FAULTY WORKMANSHIP, MATERIAL, OR EQUIPMENT, THE CONTRACTOR SHALL FURNISH ALL NECESSARY MATERIALS AND LABOR TO CORRECT THE TROUBLE WITHOUT COST TO THE OWNER.

3. ALL WORK SHALL BE EXECUTED IN A WORKMAN LIKE MANNER AND SHALL PRESENT A NEAT MECHANICAL APPEARANCE WHEN COMPLETED. CONTRACTOR SHOULD AVOID DAMAGE TO EXISTING UTILITIES WHEREVER POSSIBLE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING RELATED TO ELECTRICAL WORK, AND SHALL RESTORE ALL EXISTING LANDSCAPING, SPRINKLER SYSTEMS, CONDUITS, WIRING, PIPING, ETC. DAMAGED BY THE ELECTRICAL WORK TO MATCH EXISTING CONDITIONS.

4. ELECTRICAL WORK SHALL INCLUDE, BUT NOT BE LIMITED TO, ALL LABOR, MATERIALS AND EQUIPMENT REQUIRED TO COMPLETE ELECTRICAL POWER AND LIGHTING SYSTEMS, TELEPHONE AND COMMUNICATION SYSTEMS, PANELBOARDS, CONDUIT, CONTROL WIRING, GROUNDING, ETC. AS INDICATED ON ELECTRICAL DRAWINGS AND/OR AS REQUIRED BY GOVERNING CODES.

5. PRIOR TO INSTALLING ANY ELECTRICAL WORK, THE CONTRACTOR SHALL VISIT THE JOB SITE AND VERIFY EXISTING SITE LOCATIONS AND CONDITIONS AND UTILITY SERVICE REQUIREMENTS OF THE JOB, AND BY REFERENCE TO ENGINEERING AND EQUIPMENT SUPPLIERS' DRAWINGS. SHOULD THERE BE ANY QUESTION OR PROBLEM CONCERNING THE NECESSARY PROVISIONS TO BE MADE. PROPER DIRECTIONS SHALL BE OBTAINED BEFORE PROCEEDING WITH ANY WORK.

6. PROVIDE POWER AND TELEPHONE TO SERVICE POINTS PER UTILITY COMPANY REQUIREMENTS. CONTRACTOR SHALL CONTACT UTILITY SERVICE PLANNERS AND OBTAIN ALL SERVICE REQUIREMENTS AND INCLUDE COSTS FOR SUCH IN THEIR BID.

7. SERVICE EQUIPMENT SHALL HAVE A SHORT CIRCUIT WITHSTAND RATING EXCEEDING THE MAXIMUM AVAILABLE FAULT CURRENT AT THE SUPPLY TERMINAL ON THE UTILITY TRANSFORMER SECONDARY, THE INSULATION SHALL BE FREE FROM ANY SHORT CIRCUITS AND GROUNDS. CONTRACTOR TO OBTAIN THE AVAILABLE SHORT CIRCUIT CURRENT FROM THE ELECTRICAL SERVICE PROVIDER.

8. ALL WIRES SHALL BE STRANDED COPPER WITH THHN/THWN AND 600 VOLTS INSULATION. ALL GROUND CONDUCTORS TO BE PROPERLY SIZED COPPER. (STRANDED OR SOLID)

9. IN THE EVENT OF ANY CONFLICT OR INCONSISTENCY BETWEEN ITEMS SHOWN ON THE PLANS AND/OR SPECIFICATIONS, THE NOTE, SPECIFICATION OR CODE WHICH PRESCRIBES AND ESTABLISHES THE HIGHEST STANDARD OF PERFORMANCE SHALL PREVAIL.

10. SERVICE CONDUITS SHALL HAVE NO MORE THAN (4) –50° BENDS IN ANY SINGLE RUN. THE CONTRACTOR SHALL PROVIDE PULL BOXES AS NEEDED WHERE CONDUIT REQUIREMENTS EXCEED THESE CONDITIONS. PULL WIRES AND CAPS SHALL BE PROVIDED AT ALL SPARE CONDUITS FOR FUTURE USE.

11. ALL ELECTRICAL EQUIPMENT SHALL BE ANCHORED TO WITHSTAND LOCAL WIND SPEED REQUIREMENTS AND DESIGNED FOR OUTDOOR EXPOSURE.

12. ALL COAX, POWER AND TELEPHONE SYSTEM CONDUITS SHALL HAVE A MINIMUM 24" SCH. 80 PVC RADIUS SWEEPS TO EQUIPMENT, PULLBOXES, GUY, ETC., UNLESS OTHERWISE NOTED, OR AS REQUIRED BY UTILITY COMPANIES.

13. FUSE TYPE SHALL BE BUSSMAN RKI LOW PEAK FUSE (LPN–RK–140).

14. UPON COMPLETION OF THE JOB, THE CONTRACTOR SHALL FURNISH AS–BUILT DRAWINGS TO THE OWNER.

15. GENERAL GROUNDING CRITERIA
    1ST STEP: GROUND TO EXISTING BUILDING STRUCTURAL STEEL AND TO THE EXISTING COLD WATER METAL PIPE LINE. (WHERE APPLICABLE) THEN TEST GROUNDING RESISTANCE FOR 5 OHMS OR LESS OVERALL GROUND RESISTANCE. WHERE THE EFFECTIVE RESISTANCE DOES NOT MEET THIS CRITERIA, PROVIDE SUPPLEMENTAL GROUNDING AND RE–TEST UNTIL GROUND RESISTANCE FALLS BELOW THIS LEVEL.

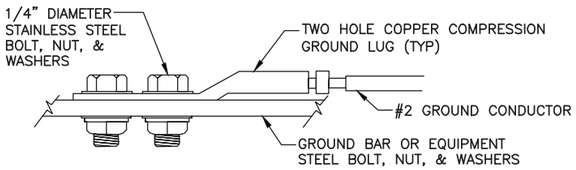
16. SUPPLEMENTAL GROUND MAY CONSIST OF ONE OR MORE OF THE FOLLOWING:
    COUNTERPOISE, USER GROUND, GROUND ROD AND/OR GROUND WELL IN EXTREMELY ADVERSE SOIL CONDITIONS. WHERE THE EXISTING BUILDING STEEL DOES NOT PROVIDE AN EFFECTIVE GROUND RESISTANCE, THEN THE CONTRACTOR SHALL PROVIDE A SEPARATE GROUND CONDUCTOR FROM ROOF MOUNTED BTS EQUIPMENT LOCATIONS EITHER DOWN THROUGH THE INSIDE OF THE BUILDING OR DOWN THE OUTSIDE OF THE BUILDING, DEPENDING UPON OWNER PREFERENCE. WHERE THE GROUND CONDUCTOR FROM THE ROOF MOUNTED EQUIPMENT IS ROUTED IN CONDUIT, THE CONDUIT SHALL BE EFFECTIVELY GROUNDED TO THE GROUND CONDUCTOR AT BOTH ENDS OF THE CONDUIT. (GUY INSTALLATIONS):

    FOR INSTALLATIONS WHERE WOODEN STRUCTURES, TOWERS, CONCRETE SILOS ETC. ARE ENCOUNTERED A PARATE DOWNLEAD SHALL BE PROVIDED FROM THE 3 ANTENNAS SEPARATED BY A MINIMUM OF 12 INCHES FROM THE COAXIAL CABLES. THE GROUND CONDUCTOR SHALL BE SECURELY FASTENED TO THE EXTERIOR OF OUTSIDE STRUCTURES WITH NONMETALLIC GROUND STRAPS EVERY 10 FEET. AGAIN, AS FOR TENANT IMPROVEMENT PROJECTS, TEST THE GROUND RESISTANCE FOR GUY INSTALLATIONS AND PROCEED PER THE ABOVE STEPS.

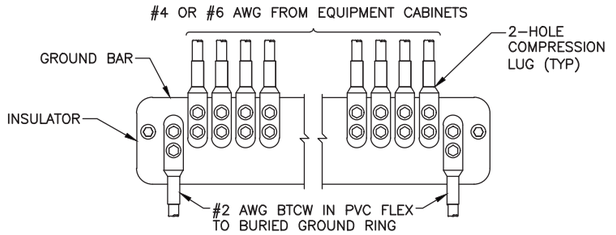
17. CONTRACTOR TO COLOR PHASE CONDUCTORS BLACK (B PHASE), RED (A PHASE), WHITE (NEUTRAL), AND GREEN (GROUND).

18. CONTRACTOR TO PROVIDE GUTTER TAP.

19. THERE SHALL BE A MINIMUM CLEARANCE OF 48" BETWEEN FRONT OF ELECTRICAL EQUIPMENT AND ANY WALL OR OBSTRUCTION.



1 E-1 TWO HOLE LUG CONNECTION DETAIL
NOT TO SCALE



2 E-1 GROUND BAR DETAIL
NOT TO SCALE

T-Mobile
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
OFFICE: 860–692–7100
FAX: 860–692–7159

PLANS PREPARED BY:
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
199 BRICKYARD RD
FARMINGTON, CT 06032

SMW ENGINEERING GROUP, INC.
TOGETHER PLANNING A BETTER TOMORROW

STATE OF CONNECTICUT · KEVIN A. KNAPP · No. 30703 · LICENSED PROFESSIONAL ENGINEER

11/14/16

SITE INFORMATION:
CT11290C
3 MECHANIC ST
DARIEN, CT 06820

#	DATE	DESCRIPTION:
0	10/09/16	ISSUED FOR CLIENT REV.
1	11/01/16	REVISED PER CLIENT COMMENTS
2	11/08/16	REVISED PER CLIENT COMMENT
3	11/14/16	ISSUED FOR CONSTRUCTION

T-MOBILE SITE ID: CT11290C
EVERSOURCE TOWER #: 1068

SHEET NAME:
ELECTRICAL & GROUNDING DETAILS

SMW #: 16–2085

DESIGNER:	ACR
CHECKED BY:	RTB
ENGINEER:	VGD

SHEET NUMBER: E-1

Exhibit D

CENTEK engineering

Centered on Solutions℠

Structural Analysis of Antenna Mast and Pole

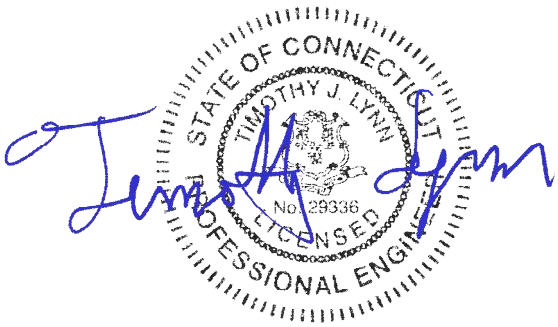
T-Mobile Site Ref: CT11290C

Eversource Structure No. 1068
115' Electric Transmission Pole

3 Mechanic Street
Darien, CT

CENTEK Project No. 16162.04

Date: October 31, 2016



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

Table of Contents

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 be removed):

  Antennas: Three (3) RFS APX16DWV-16DWVS-E-A20 panel antennas mounted on a mast with a RAD center elevation of 120-ft above tower base plate.

- T-MOBILE (Existing to remain):

  Coax Cables: Twelve (12) 1-1/4" ∅ coax cables running on the outside of the tower as indicated in section 4 of this report.

- **T-MOBILE (Proposed):**

  Antennas: Three (3) Andrew SBNHH-1D65A panel antennas and three (3) Andrew ATSBT-TOP-FM-4G Smart Bias Tees mounted on a mast with a RAD center elevation of 120-ft above tower base plate.
  Coax Cables: Six (6) 1-1/4" ∅ coax cables running on the outside of the tower as indicated in section 4 of this report.

Primary assumptions used in the analysis

- ASCE Manual No. 72, "Design of Steel Transmission Pole Structures Second Edition", defines 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.

Analysis

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 consisting of a 4-in x 17.5-ft long SCH. 80 pipe (O.D. = 4.5") connected at two points to the existing tower was analyzed for its ability 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.

Design Basis

Our analysis was performed in accordance with TIA-222-G, ASCE Manual No. 72 – "Design of Steel Transmission Pole Structures Second Edition", 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. 72.

  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 (1)
Radial Ice Thickness…….	0"

  Note 1: NESC C2-2007, Section25, 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 (2016 CSBC Appendix-N)
  Radial Ice Thickness…..…….. 0”

  Load Case 2:
  Wind Pressure..…….. 50 mph wind pressure
  Radial Ice Thickness…..…….. 0.75”

R e s u l t s

- MAST ASSEMBLY

  The existing mast was determined to be structurally **adequate**.

Member	Stress Ratio (% of capacity)	Result
4” Sch. 80 Pipe	64.7%	**PASS**
1/2” ∅ ASTM A307 U-Bolt	20.2%	**PASS**

- 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. 72, “Design of Steel Transmission Pole Structures Second Edition”, for the applied NESC Heavy and Hi-Wind load cases. The detailed analysis results are provided in Section 9 of this report. The analysis results are summarized as follows:

  A maximum usage of **88.21%** occurs in the utility pole base plate under the **NESC Extreme** loading condition.

  POLE SECTION:

  The utility pole was found to be within allowable limits.

Tower Section	Elevation	Stress Ratio (% of capacity)	Result
Tube Number 4	0’-15.08’ (AGL)	87.41%	**PASS**

  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	88.21%	**PASS**

- 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"∅, 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	16.42 kips	45.83 kips	1478.55 ft-kips
NESC Extreme Wind	24.56 kips	25.20 kips	1954.18 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	52.35%	**PASS**

FOUNDATION:

The foundation was found to be within allowable limits.

Design Limit	Original Design Reaction	Proposed Reaction (1)	Result
Shear	29.5 kips	27.1 kips	**PASS**
Moment	2414.4 ft-kips	2149.6 ft-kips	**PASS**

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

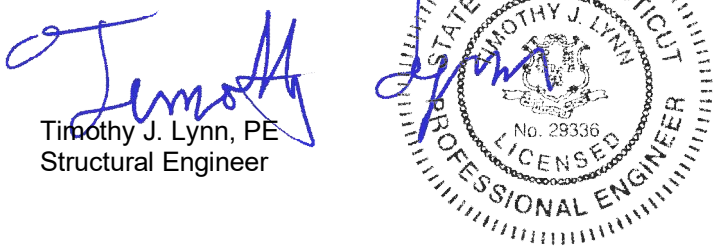
Conclusion

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-3D

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 (1)

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.

P C S M a s t

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:

E L E C T R I C T R A N S M I S S I O N T O W E R

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.

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 (.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	1.00	1.00	2.50	1.6 Flat Surfaces 1.3 Round Surfaces
		Tower/Pole Analysis with Antennas below top of Tower/Pole (on two faces)	-----	4	1.00	1.00	2.50	1.6 Flat Surfaces 1.3 Round Surfaces
		Conductors:	Conductor loads provided by NU					
High Wind Condtion	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	Use NESC C2-2007, Section 25, Rule 250C: Extreme Wind Loading 1.25 x Gust Response Factor Height above ground level based on top of Mast/Antenna					1.6 Flat Surfaces 1.3 Round Surfaces
		Tower/Pole Analysis with Antennas below top of Tower/Pole	Use NESC C2-2007, Section 25, Rule 250C: Extreme Wind Loading Height above ground level based on top of Tower/Pole					1.6 Flat Surfaces 1.3 Round Surfaces
		Conductors:	Conductor loads provided by NU					
NESC Extreme Ice with Wind Conditon*		Tower/Pole Analysis with antennas extending above top of Tower/Pole	Use NESC C2-2007, Section 25, Rule 250D: Extreme Ice with Wind Loading 4PSF Wind Load 1.25 x Gust Response Factor Height above ground level based on top of Mast/Antenna					1.6 Flat Surfaces 1.3 Round Surfaces
		Tower/Pole Analysis with Antennas below top of Tower/Pole	Use NESC C2-2007, Section 25, Rule 250D: Extreme Ice with Wind Loading 4PSF Wind Load Height above ground level based on top of Tower/Pole					1.6 Flat Surfaces 1.3 Round Surfaces
		Conductors:	Conductor loads provided by NU					
		* Only for Structures Installed after 2007						

Shape Factor Criteria shall be per TIA Shape Factors.

2) STEP 2 - The electric transmission structure analysis and evaluation shall be performed in accordance with NESC requirements and shall include the mast and antenna loads determined from NESC applied loading conditions (not TIA/EIA Loads) on the structure and mount as specified below, and shall include the wireless communication mast and antenna loads per NESC criteria)

The structure shall be analyzed using yield stress theory in accordance with Attachment A, "NU 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 NU).

c) Electric Transmission Structure

i) The loads from the wireless communication equipment components based on NESC and NU 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

iii) When Coaxial Cables are mounted along side 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	1.3

d) The uniform loadings and factors specified for the above components in Attachment A, "NU 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 NU will provide these loads).

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

Northeast Utilities System

Job :
Description:

Spec. Number
Computed by
Checked by

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Date

INPUT DATA

TOWER ID: 1068

Structure Height (ft) : 115

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	
NAME =	*BITTERN*	*BITTERN*	
Number of Conductors per phase: 1	1272.000	1272.000	1 Number of Conductors per phase
	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**

Northeast Utilities System

Job :		Spec. Number	Page of
Description:		Computed by	Sheet of
		Checked by	Date 5/26/09
			Date

WIRE LOADING AT ATTACHMENTS

TOWER ID: 1068

Wind Span =	420	ft	Broken Wire Span =	AHEAD SPAN
Weight Span =	434	ft	Type of Insulator Attachment =	SUSPENSION
Total Angle =	3	degrees		

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).

Northeast Utilities System

Job :
Description:

Spec. Number
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Page of
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Date 5/26/09
Date

INPUT DATA

TOWER ID: 1068

Structure Height (ft) : 115

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	
NAME =	*LINNET*	*LINNET*	
Number of Conductors per phase: 1	336	336	1 Number of Conductors per phase
	26/7 ACSR	26/7 ACSR	
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:

					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**

Northeast Utilities System

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	Broken Wire Span =	AHEAD SPAN
Weight Span =	434	ft	Type of Insulator Attachment =	SUSPENSION
Total Angle =	3	degrees		

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

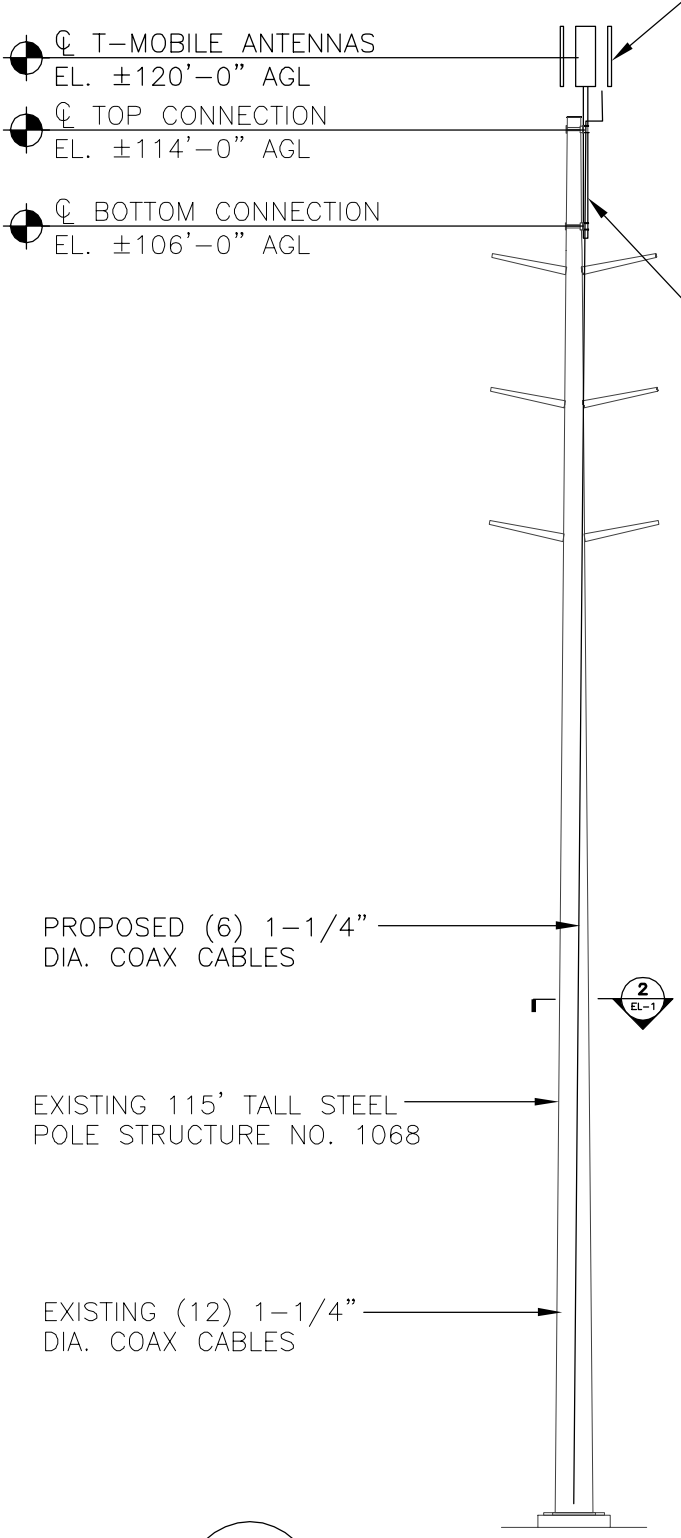
6. 60 Deg. F, No Wind

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

7. Construction

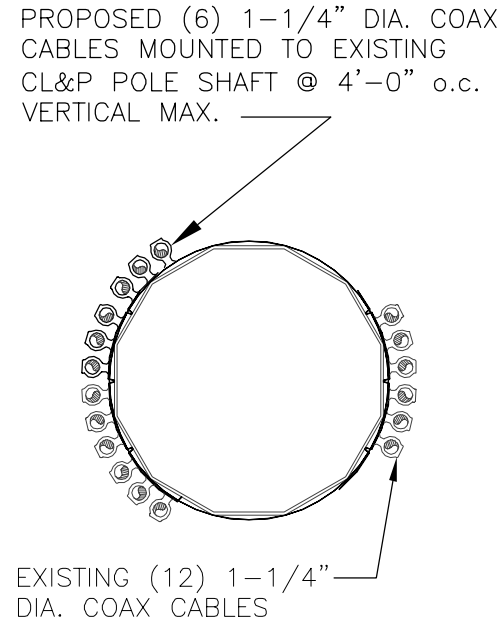
	Horizontal	Longitudinal	Vertical
Shield Wire =	104 lb	0 lb	367 lb
Conductor =	153 lb	0 lb	901 lb

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



1 EL-1 **TOWER + MAST ELEVATION**

SCALE: NOT TO SCALE



2 EL-1 **COAX MOUNTING PLAN**

NOT TO SCALE

REVISIONS		
00	10/31/16	ISSUED FOR REVIEW

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CT11290C
EVERSOURCE 1068

3 MECHANIC STREET
DARIEN, CT 06820

PROJECT NO:	16162.04
DRAWN BY:	TJL
CHECKED BY:	CFC
SCALE:	AS NOTED
DATE:	10/31/16

T-Mobile

TOWER AND MAST ELEVATION

EL-1

DWG. 1 OF 1

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Subject:	Loads on T-Mobile Equipmnet Structure # 1068
Location:	Darien, CT
Rev. 0: 10/24/16	Prepared by: T.J.L. Checked by: C.F.C. Job No. 16162.04

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 = — $z_{AT\&T} := 120$ ft (User Input)

Radial Ice Thickness = — $Ir := 0.75$ in (User Input per Annex B of TIA-222-G)

Radial Ice Density = — $Id := 56.00$ pcf (User Input)

$K_a := 1$ (User Input)

Output

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

Importance Factor = — $I := \begin{cases} 0.87 & \text{if SC = 1} \\ 1.00 & \text{if SC = 2} \\ 1.15 & \text{if SC = 3} \end{cases} = 1.15$ (Table 2-3 of TIA/EIA-222-G)

Velocity Pressure Coefficient = — $Kz_{AT\&T} := 2.01\left(\left(\frac{z_{AT\&T}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.315$

Velocity Pressure w/o Ice = — $qz_{AT\&T} := 0.00256 \cdot K_d \cdot Kz_{AT\&T} \cdot V^2 \cdot I = 31.813$

Velocity Pressure with Ice = — $qz_{ice.AT\&T} := 0.00256 \cdot K_d \cdot Kz_{AT\&T} \cdot V_i^2 \cdot I = 9.195$

Gust Response Factor = — $G_H := 1.35$

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Subject:	Loads on T-Mobile Equipmnet Structure # 1068
Location:	Darien, CT
Rev. 0: 10/24/16	Prepared by: T.J.L. Checked by: C.F.C. Job No. 16162.04

Development of Wind & Ice Load on Mast

Mast Data: (Pipe 4" Sch. 80) (User Input)

Mast Shape = Round (User Input)

Mast Diameter = $D_{mast} := 4.5$ in (User Input)

Mast Length = $L_{mast} := 17.5$ ft (User Input)

Mast Thickness = $t_{mast} := 0.337$ in (User Input)

Mast Aspect Ratio = $Ar_{mast} := \frac{12 L_{mast}}{D_{mast}} = 46.7$

Mast Force Coefficient = $Ca_{mast} = 1.2$

Wind Load (without ice)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 0.375$ sf/ft

Total Mast Wind Force = $qz_{AT\&T} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 19$ plf **BLC 5**

Wind Load (with ice)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 0.5$ sf/ft

Total Mast Wind Force w/ Ice = $qz_{ice.AT\&T} \cdot G_H \cdot Ca_{mast} \cdot AICE_{mast} = 7$ 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 = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + Ir \cdot 2)^2 - D_{mast}^2\right] = 12.4$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 5$ plf **BLC 3**

Development of Wind & Ice Load on Antennas

Proposed Antenna Data:

Antenna Model =	Andrew SBNHH-1D65A		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 55.5$	in	(User Input)
Antenna Width =	$W_{ant} := 11.9$	in	(User Input)
Antenna Thickness =	$T_{ant} := 7.1$	in	(User Input)
Antenna Weight =	$WT_{ant} := 34$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.7$		
Antenna Force Coefficient =	$Ca_{ant} = 1.3$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.6$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 13.8$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 766$	lbs	**BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 5.3$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 15.9$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 256$	lbs	**BLC 4**

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 102$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 4689$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 1879$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 61$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 183$	lbs	**BLC 3**

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Subject:	Loads on T-Mobile Equipmnet Structure # 1068
Location:	Darien, CT
Rev. 0: 10/24/16	Prepared by: T.J.L. Checked by: C.F.C. Job No. 16162.04

Development of Wind & Ice Load on Antennas

Proposed Antenna Data:

Antenna Model =	Andrew ATSBT-TOP-FM-4G		
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 =	$T_{ant} := 2$	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	
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 22$	lbs	**BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 0.3$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 0.8$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 12$	lbs	**BLC 4**

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 6$	lbs	**BLC 2**

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 =	$V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 88$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 3$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 9$	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 =	$D_{coax} := 1.55$	in	(User Input)
Coax Cable Length =	$L_{coax} := 15$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 0.66$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 18$		(User Input)
No. of Coax Projecting Outside Face of Mast =	$NP_{coax} := 4$		(User Input)

Coax aspect ratio, $Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 116.1$

Coax Cable Force Factor Coefficient = $Ca_{coax} = 1.2$

Wind Load (without ice)

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

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

Wind Load (with ice)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot Ir)}{12} = 0.6$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.AT\&T} \cdot G_H \cdot AICE_{coax} = 10$ plf **BLC 4**

Gravity Loads (without ice)

Weight of all cables w/o ice = $WT_{coax} := Wt_{coax} \cdot N_{coax} = 12$ plf **BLC 2**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[(D_{coax} + 2 \cdot Ir)^2 - D_{coax}^2\right] = 5.4$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 38$ plf **BLC 3**

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63-2 North Branford Road
Branford, CT 06405
Ph. 203-488-0580 / Fax. 203-488-8587

Subject: **Analysis of TIA-222G Wind and Ice Loads for Analysis of Mast Only**
Tabulated Load Cases
Location: **Darien, CT**
Date: 10/28/16 Prepared by: T.J.L. Checked by: C.F.C. Job No. 16162.04

Load Case	Description
1	Self Weight (Mast)
2	Weight of Appurtenances
3	Weight of Ice Only
4	TIA Wind with Ice
5	TIA Wind

Footnotes:

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Subject: **Analysis of TIA-222G Wind and Ice Loads for Analysis of Mast Only**
Load Combinations Table

Location: **Darien, CT**

Date: 10/28/16 Prepared by: T.J.L. Checked by: C.F.C. Job No. 16162.04

Load Combination	Description	Envelope Soultion	Wind Factor	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	1.2D + 1.6W		1	Y	1	1.2	2	1.2	5	1.6				
2	0.9D + 1.6W		1	Y	1	0.9	2	0.9	5	1.6				
3	1.2D + 1.0Di + 1.0Wi		1	Y	1	1.2	2	1.2	3	1.0	4	1.0		

Footnotes:
BLC = Basic Load Case
D = Dead Load
Di = Dead Load of Ice
W = Wind Load
W = Wind Load w/ Ice

Global

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Increase Nailing Capacity for Wind?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automaticly Iterate Stiffness for Walls?	No
Maximum Iteration Number 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-97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-02
Masonry Code	ACI 530-05: ASD
Aluminum Code	AA ADM1-05: ASD - Building

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, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct Z	.035
Ct X	.035
T Z (sec)	Not Entered
T X (sec)	Not Entered
R Z	8.5
R X	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Seismic Detailing Code	ASCE 7-05
Om Z	1
Om X	1
Rho Z	1
Rho X	1

Footing Overturning Safety Factor	1.5
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	0
Footing Concrete f'c (ksi)	3
Footing Concrete Ec (ksi)	4000
Lamda	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 Design Parameters

	Label	Shape	Lengt...	Lbyy[ft]	Lbzz[ft]	Lcomp t...	Lcomp b...	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Existing Mast	17.5									Lateral

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Existing Mast	PIPE_4.0X	Beam	Pipe	A53 Gr. B	Typical	4.14	9.12	9.12	18.2

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design R...
1	M1	BOTMA...	TOPMA...			Existing Mast	Beam	Pipe	A53 Gr. B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From ...
1	BOTMAST	0	0	0	0	
2	BOTCONNECTION	0	1	0	0	
3	TOPCONNECTION	0	9	0	0	
4	TOPMAST	0	17.5	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]	Footing
1	BOTCONNECTION	Reaction	Reaction	Reaction		Fixed		
2	TOPCONNECTION	Reaction	Reaction	Reaction		Fixed		

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.102	15
2	M1	Y	-.006	15

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.183	15
2	M1	Y	-.009	15

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.256	15
2	M1	X	.012	15

Member Point Loads (BLC 5 : TIA Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.766	15
2	M1	X	.022	15

Joint Loads and Enforced Displacements

Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*s^2*ft)]
No Data to Print ...			

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.012	-.012	0	15

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

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.005	-.005	0	0
2	M1	Y	-.038	-.038	0	15

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

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.007	.007	0	0
2	M1	X	.01	.01	0	15

Member Distributed Loads (BLC 5 : TIA Wind)

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

Basic Load Cases

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

Load Combinations

	Description	Sol...	PDelta	SR..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact...
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 + 1.0Wi	Yes	Y		1	1.2	2	1.2	3	1	4	1								

Envelope Member Section Forces

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torqu...	LC	y-y Mo..	LC	z-z Mo...	LC
1	M1	1	max	0	1	0	1	0	1	0	1	0	1	0	1
2			min	0	1	0	3	0	1	0	1	0	1	0	1
3		2	max	.046	3	-.246	3	0	1	0	1	0	1	3.449	1
4			min	.015	2	-1.135	1	0	1	0	1	0	1	.743	3
5		3	max	-.088	2	-.321	3	0	1	0	1	0	1	9.121	1
6			min	-.279	3	-1.457	1	0	1	0	1	0	1	1.983	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torqu...	LC	y-y Mo...	LC	z-z Mo...	LC
7		4	max	.516	3	1.48	1	0	1	0	1	0	1	2.755	1
8			min	.173	2	.32	3	0	1	0	1	0	1	.599	3
9		5	max	0	1	.006	1	0	1	0	1	0	1	0	1
10			min	0	1	.003	3	0	1	0	1	0	1	0	1

Envelope Member Section Stresses

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
1	M1	1	max	0	1	0	1	0	1	0	1	0	1	0	1	0	1
2			min	0	1	0	3	0	1	0	1	0	1	0	1	0	1
3		2	max	.011	3	-.119	3	0	1	-2.2	3	10.212	1	0	1	0	1
4			min	.004	2	-.548	1	0	1	-10.212	1	2.2	3	0	1	0	1
5		3	max	-.021	2	-.155	3	0	1	-5.872	3	27.002	1	0	1	0	1
6			min	-.067	3	-.704	1	0	1	-27.002	1	5.872	3	0	1	0	1
7		4	max	.125	3	.715	1	0	1	-1.773	3	8.156	1	0	1	0	1
8			min	.042	2	.155	3	0	1	-8.156	1	1.773	3	0	1	0	1
9		5	max	0	1	.003	1	0	1	0	1	0	1	0	1	0	1
10			min	0	1	.001	3	0	1	0	1	0	1	0	1	0	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	BOTCONNE...	max	.813	1	.372	3	0	1	0	1	NC	NC	0	1
2		min	.172	3	.117	2	0	1	0	1	NC	NC	0	1
3	TOPCONNE...	max	-.712	3	1.119	3	0	1	0	1	NC	NC	0	1
4		min	-3.254	1	.364	2	0	1	0	1	NC	NC	0	1
5	Totals:	max	-.54	3	1.491	3	0	1						
6		min	-2.441	1	.481	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	.091	1	0	2	0	1	0	1	0	1	7.568e-3	1
2		min	.02	3	0	3	0	1	0	1	0	1	1.633e-3	3
3	BOTCONNEC...	max	0	3	0	2	0	1	0	1	0	1	7.559e-3	1
4		min	0	1	0	3	0	1	0	1	0	1	1.631e-3	3
5	TOPCONNEC...	max	0	1	0	2	0	1	0	1	0	1	-3.517e-3	3
6		min	0	3	0	3	0	1	0	1	0	1	-1.623e-2	1
7	TOPMAST	max	3.125	1	0	2	0	1	0	1	0	1	-7.6e-3	3
8		min	.678	3	0	3	0	1	0	1	0	1	-3.499e-2	1

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

	Member	Shape	Code Check	Loc...	LC	Sh...	Loc[ft]	Dir	LC	phi*Pn...	phi*...	phi*...	phi*...	...	Eqn
1	M1	PIPE_4.0X	.647	8.932	1	.045	9.115		1	46.719	130...	14.5...	14.5...	...	H1...

Joint Reactions

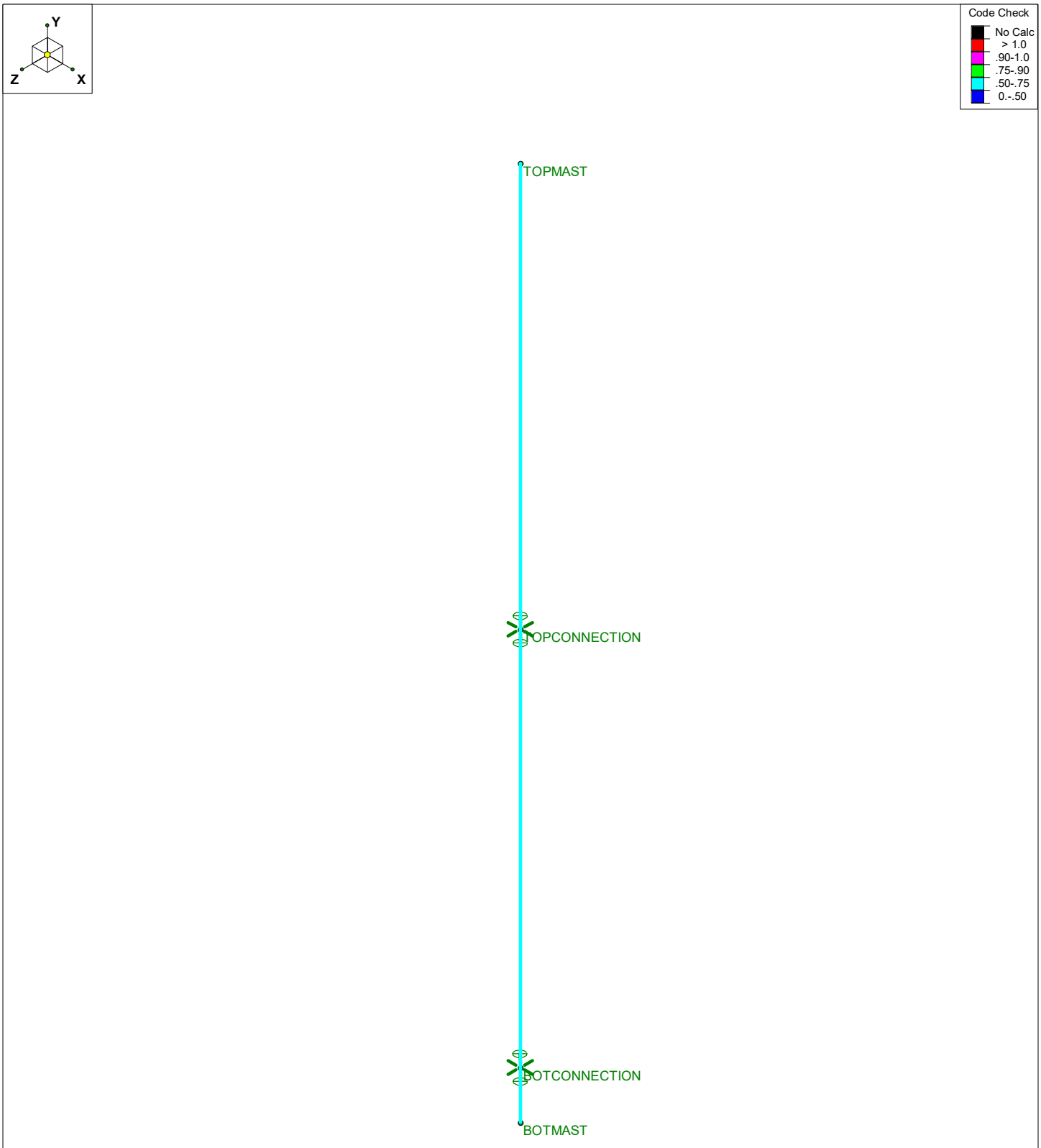
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	BOTCONNECTION	.813	.157	0	0	NC	0
2	1	TOPCONNECTION	-3.254	.485	0	0	NC	0
3	1	Totals:	-2.441	.641	0			
4	1	COG (ft):	X: 0	Y: 9.592	Z: 0			

Joint Reactions

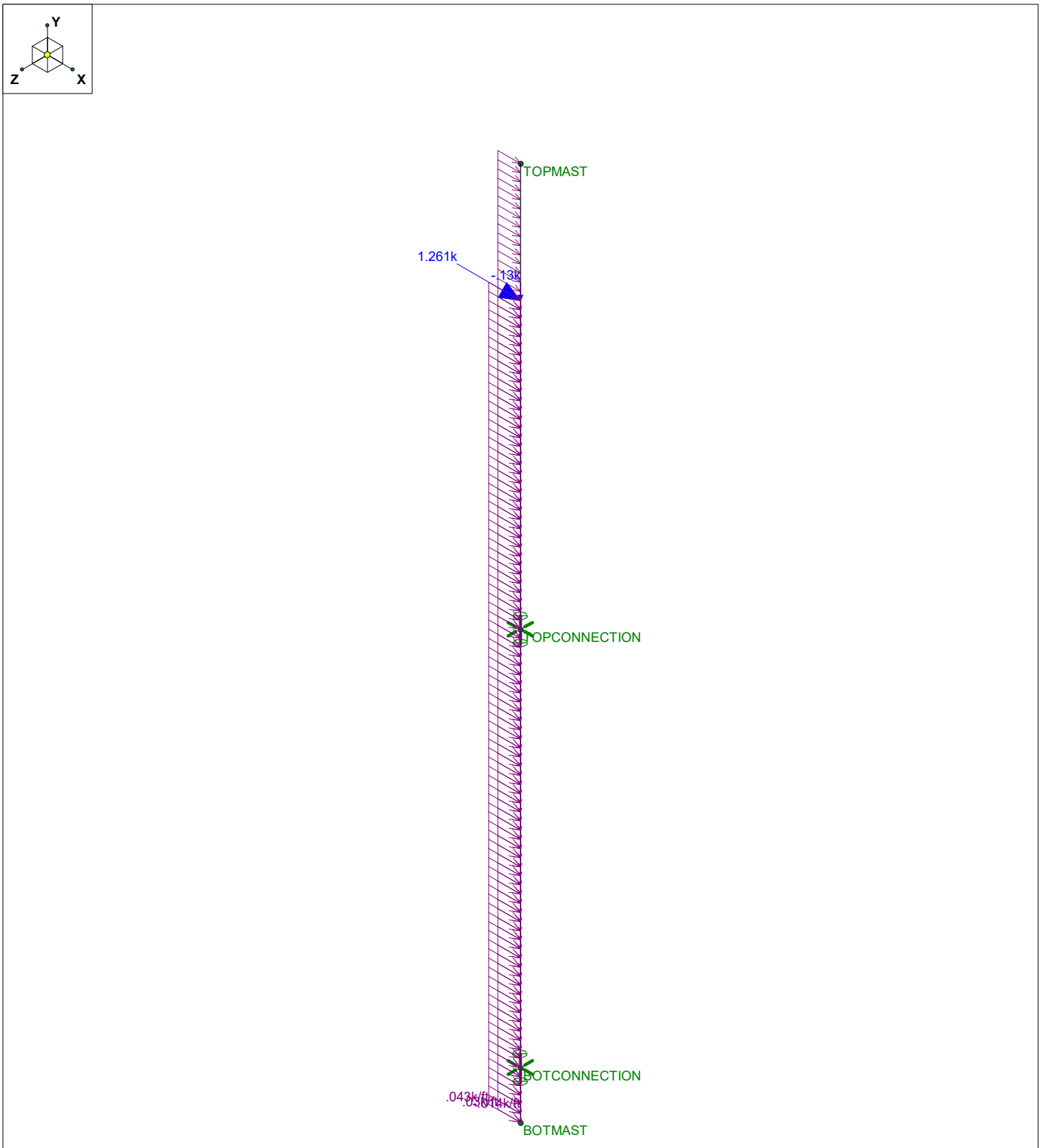
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	BOTCONNECTION	.812	.117	0	0	NC	0
2	2	TOPCONNECTION	-3.253	.364	0	0	NC	0
3	2	Totals:	-2.441	.481	0			
4	2	COG (ft):	X: 0	Y: 9.592	Z: 0			

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	BOTCONNECTION	.172	.372	0	0	NC	0
2	3	TOPCONNECTION	-.712	1.119	0	0	NC	0
3	3	Totals:	-.54	1.491	0			
4	3	COG (ft):	X: 0	Y: 9.439	Z: 0			

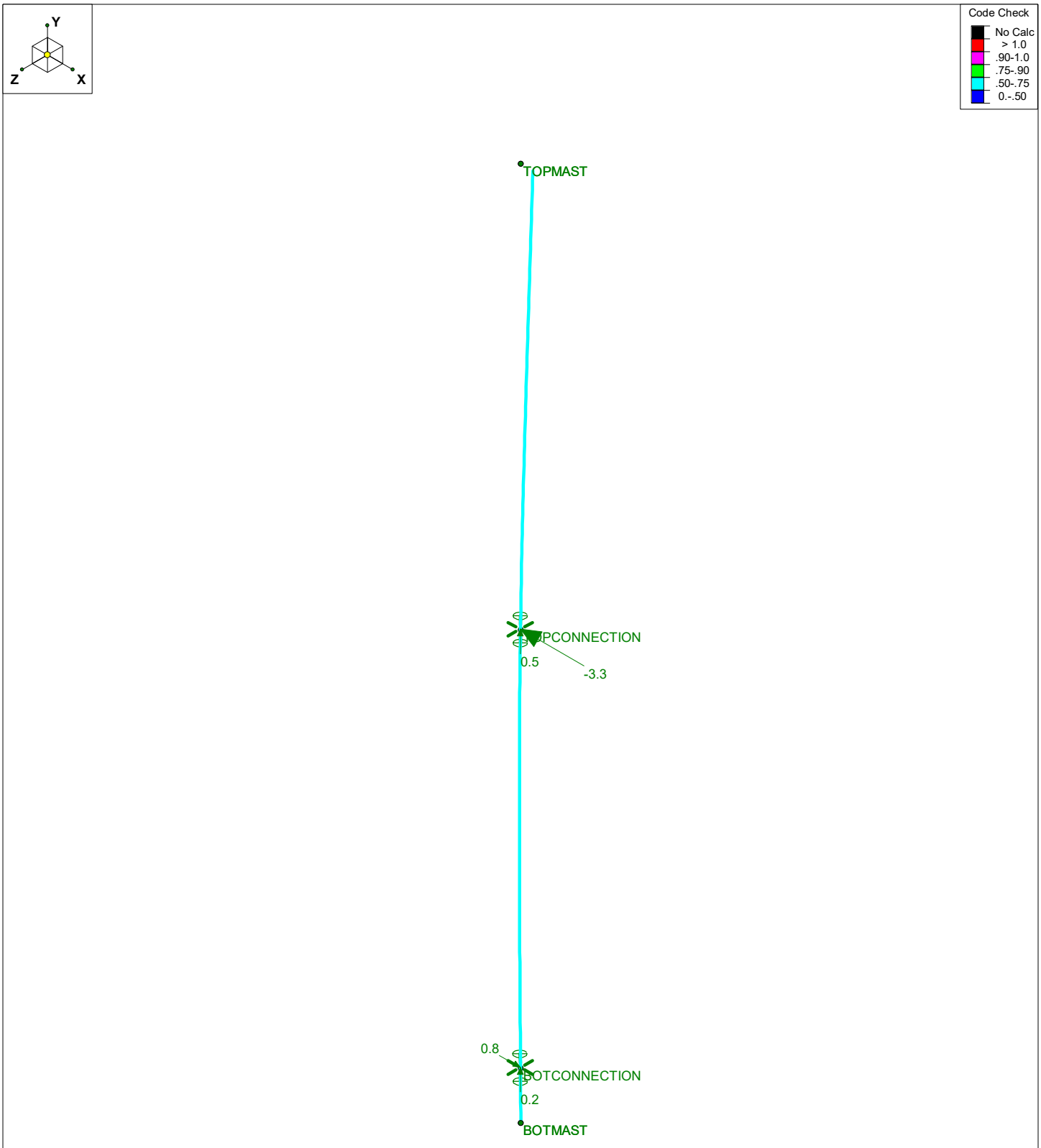


CENTEK Engineering, INC.		
tjl, cfc	Strcuture #1068 - Mast	Nov 8, 2016 at 11:21 AM
16162.04 /T-Mobile CT112...	Unity Check	TIA.r3d

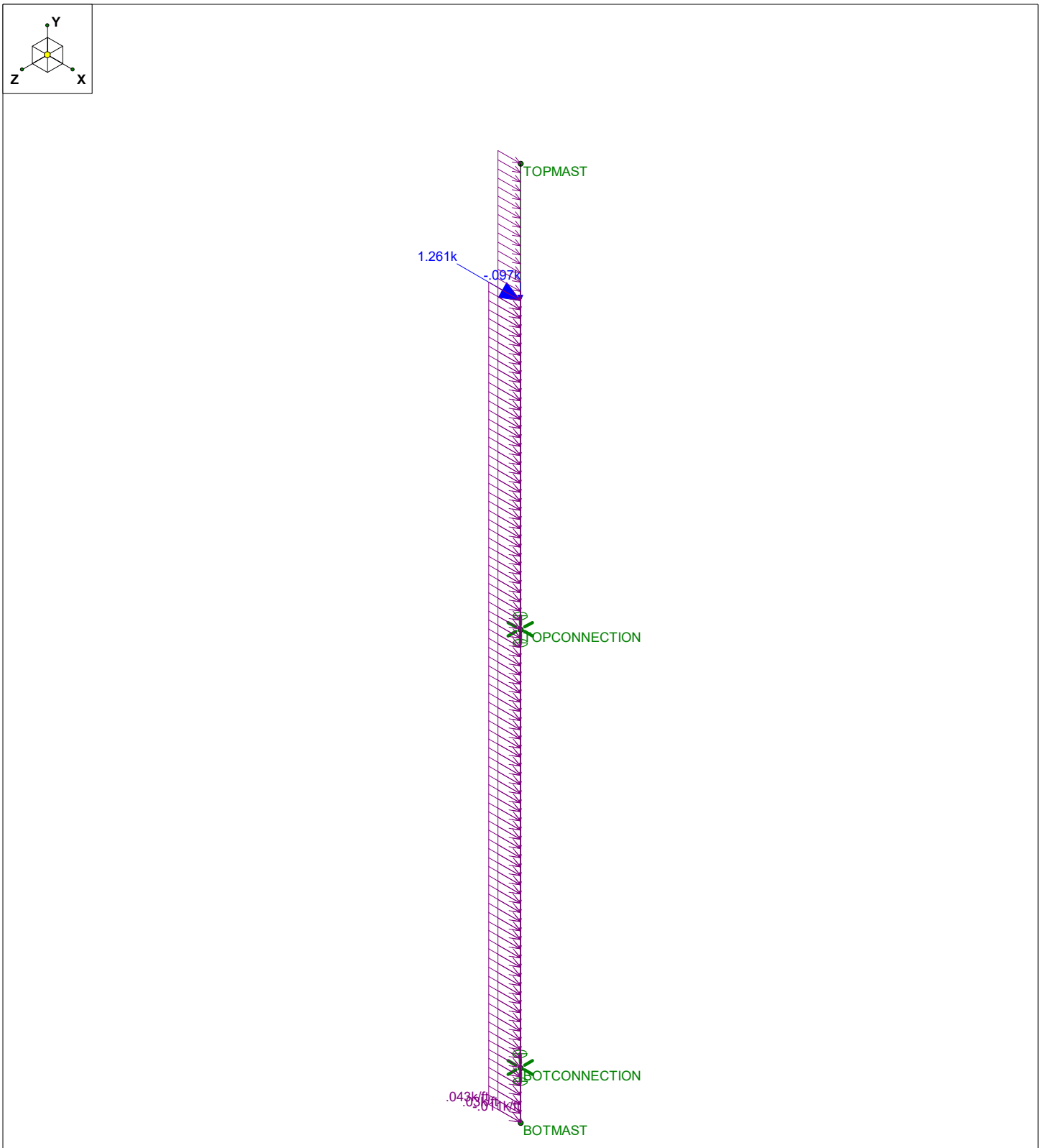


Loads: LC 1, 1.2D + 1.6W

CENTEK Engineering, INC.		
tjl, cfc	Strcuture #1068 - Mast	Nov 8, 2016 at 12:00 PM
16162.04 /T-Mobile CT112...	LC #1 Loads	TIA.r3d

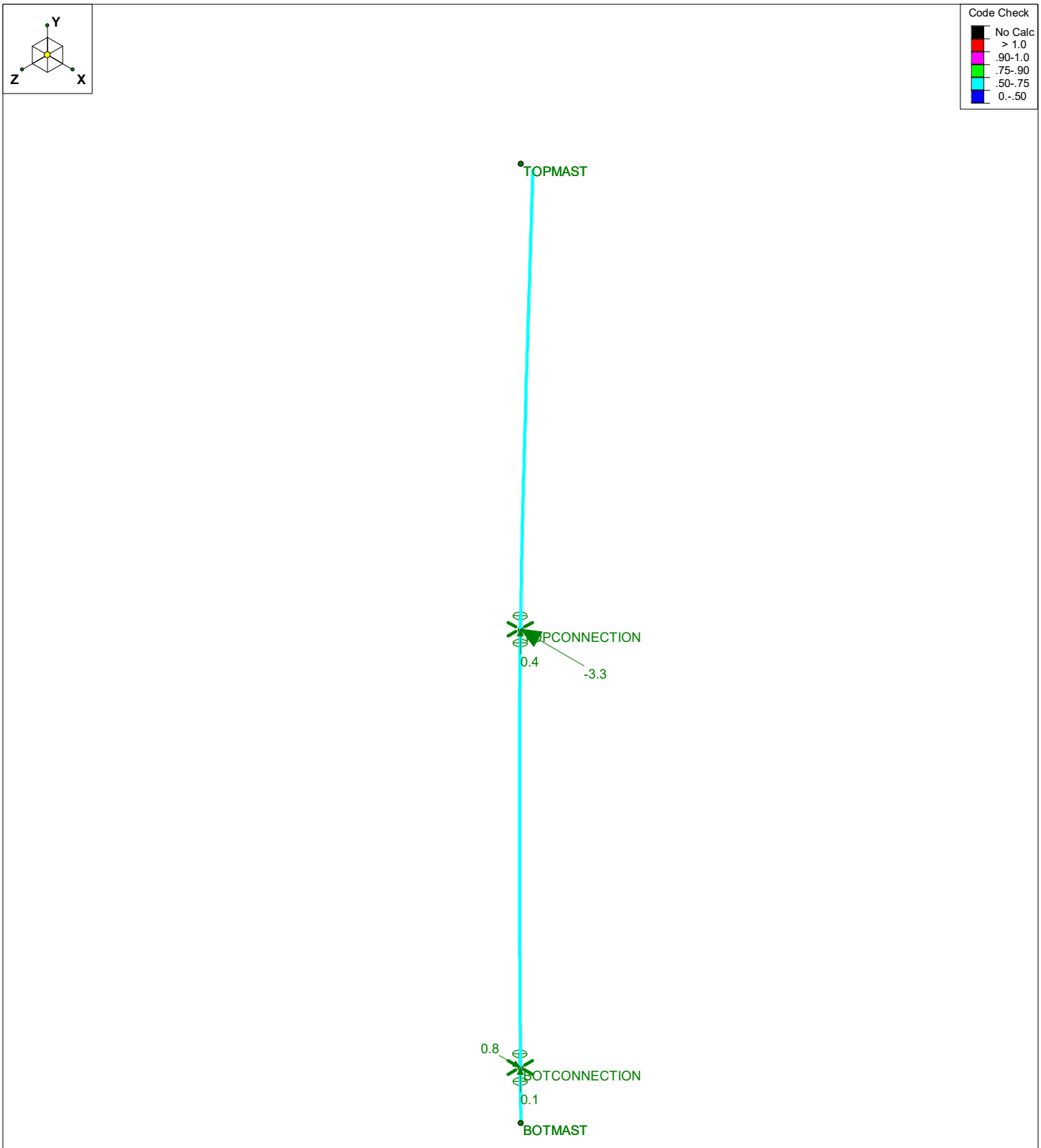


CENTEK Engineering, INC.		
tjl, cfc	Strcuture #1068 - Mast	Nov 8, 2016 at 12:01 PM
16162.04 /T-Mobile CT112...	LC #1 Reactions and Deflected Shape	TIA.r3d

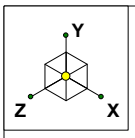


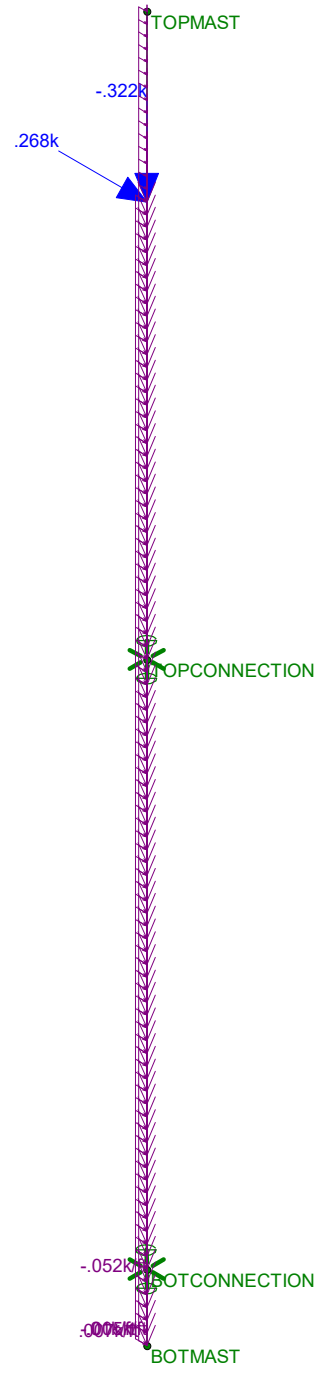
Loads: LC 2, 0.9D + 1.6W

CENTEK Engineering, INC.		
tjl, cfc	Strcuture #1068 - Mast	Nov 8, 2016 at 12:01 PM
16162.04 /T-Mobile CT112...	LC #2 Loads	TIA.r3d



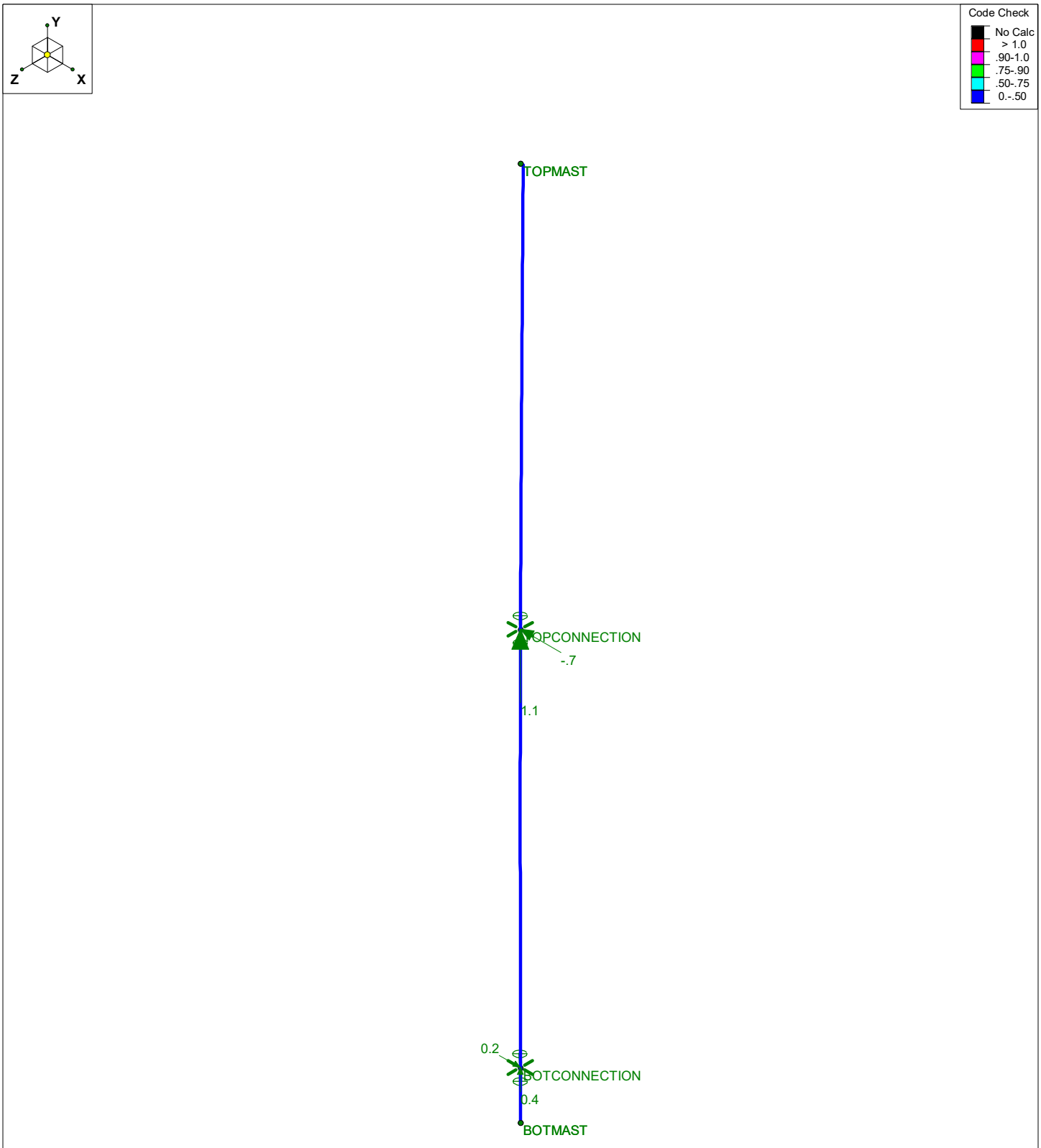
CENTEK Engineering, INC.		
tjl, cfc	Strcuture #1068 - Mast	Nov 8, 2016 at 12:02 PM
16162.04 /T-Mobile CT112...	LC #2 Reactions and Deflected Shape	TIA.r3d





Loads: LC 3, 1.2D +1.0Di + 1.0Wi

CENTEK Engineering, INC.		
tjl, cfc	Strcuture #1068 - Mast	Nov 8, 2016 at 12:01 PM
16162.04 /T-Mobile CT112...	LC #3 Loads	TIA.r3d



CENTEK Engineering, INC.		
tjl, cfc	Strcuture #1068 - Mast	Nov 8, 2016 at 12:02 PM
16162.04 /T-Mobile CT112...	LC #3 Reactions and Deflected Shape	TIA.r3d

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63-2 North Branford Road P: (203) 488-0580
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Subject:	Mast Connection to CL&P Pole #1068
Location:	Darien, CT
Rev. 0: 10/28/16	Prepared by: T.J.L. Checked by: C.F.C. Job No. 16162.04

Design Basis:

New 1/2 Φ A36 U-bolts will be used to attach the antenna mast to the two (2) existing collars on the existing NU Pole. The connections are assumed to be pinned therefore the bolts have only horizontal and vertical reactions to withstand. The bolts will be checked for tension and shear from the horizontal force resulting from the direction of the wind and for their capacity of friction resistance agaist the vertical force. The existing collar rods will also be checked for tension.

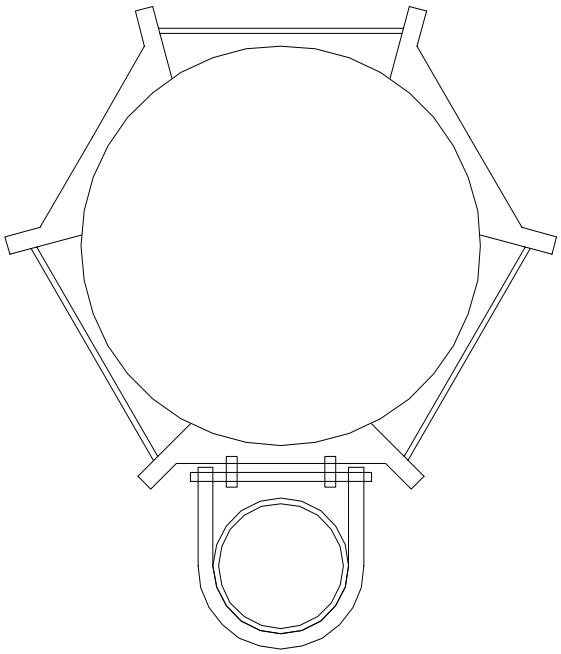
Check U-Bolts to Collar:

Design Reactions at Connection:

Horizontal =	Horizontal := 3.2·kips
Vertical =	Vertical := 0.5·kips
Moment =	Moment := 0·kips·ft

Bolt Data:

Bolt Grade =	A307
Number of Bolts =	$n_b := 4$ (2 U-Bolts)
Bolt Diameter =	$d_b := 0.5in$
Bolt Area =	$a_b := \frac{1}{4}\cdot\pi\cdot d_b^{\,2} = 0.196\cdot in^2$
Coefficient of Friction =	$\mu_f := 0.6$
Design Tensile Stress =	$F_t := 33.8\cdot ksi$
Design Shear Stress =	$F_v := 20.3\cdot ksi$
Friction Resistance =	$F_{f.all} := 0.25\cdot\mu_f\cdot F_t = 5.07\cdot ksi$



Check Bolt Stresses:

Tension Force Each Bolt = $F_{tension.bolt} := \frac{Horizontal}{n_b} = 0.8 \cdot kips$

Tension Stress Each Bolt = $F_{t.act} := \frac{F_{tension.bolt}}{a_b} = 4.1 \cdot ksi$

$Condition1 := if(F_{t.act} < F_t, "OK", "Overstressed")$

Condition1 = "OK"

Shear Force Each Bolt = $F_{shear.bolt} := \frac{Horizontal}{n_b} = 0.8 \cdot kips$

Shear Stress Each Bolt = $F_{v.act} := \frac{F_{shear.bolt}}{a_b} = 4.1 \cdot ksi$

$Condition2 := if(F_{v.act} < F_v, "OK", "Overstressed")$

Condition2 = "OK"

Friction Force Each Bolt = $F_{friction.bolt} := \frac{Vertical}{n_b} = 0.125 \cdot kips$

$F_{f.act} := \frac{F_{friction.bolt}}{a_b} = 0.637 \cdot ksi$

$Condition3 := if(F_{f.act} < F_{f.all}, "OK", "NG")$

Condition3 = "OK"

Check Existing Collar:

Bolt Data:

Bolt Grade = A36

Number of Bolts, nb = $n_b := 6$ (3 Rods per Side)

Bolt Diameter, db = $d_b := 0.625in$

Bolt Area, ab = $a_b := \frac{1}{4}\cdot\pi\cdot d_b^{\,2} = 0.307\cdot in^2$

Design Tensile Stress = $F_t := 33.8\cdot ksi$

Design Shear Stress = $F_v := 20.3\cdot ksi$

Friction Resistance = $F_{f.all} := 0.25\cdot\mu_f\cdot F_t = 5.07\cdot ksi$

Tension Force Each Bolt = $F_{tension.bolt} := \frac{Horizontal}{n_b} = 0.533\cdot kips$

Tension Stress Each Bolt = $F_{t.act} := \frac{F_{tension.bolt}}{a_b} = 1.7\cdot ksi$

$Condition1 := if\left(F_{t.act} < F_t, "OK", "Overstressed"\right)$

Condition1 = "OK"

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63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject:	Load Analysis of T-Mobile Equipment on Structure #1068
Location:	Darien, CT
Rev. 0: 10/28/16	Prepared by: T.J.L Checked by: C.F.C. Job No. 16162.04

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 PCS Mast Above Grade =	TME := 122.5	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 =	$Kz := 2.01\cdot\left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.321$		(NESC 2007 Table 250-2)
Exposure Factor =	$Es := 0.346\left[\frac{33}{(0.67\cdot TME)}\right]^{\frac{1}{7}} = 0.304$		(NESC 2007 Table 250-3)
Response Term =	$Bs := \frac{1}{\left(1 + 0.375\cdot\frac{TME}{220}\right)} = 0.827$		(NESC 2007 Table 250-3)
Gust Response Factor =	$Grf := \frac{\left[1 + \left(2.7\cdot Es\cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.854$		(NESC 2007 Table 250-3)
Wind Pressure =	$qz := 0.00256\cdot Kz\cdot V^2\cdot Grf\cdot I = 34.9$	psf	(NESC 2007 Section 250.C.2)

Shape Factors

NUS Design Criteria Issued April 12, 2007

Shape Factor for Round Members =	$Cd_R := 1.3$	(User Input)
Shape Factor for Flat Members =	$Cd_F := 1.6$	(User Input)
Shape Factor for Coax Cables Attached to Outside of Pole =	$Cd_{coax} := 1.45$	(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

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Subject:	Load Analysis of T-Mobile Equipment on Structure #1068
Location:	Darien, CT
Rev. 0: 10/28/16	Prepared by: T.J.L Checked by: C.F.C. Job No. 16162.04

Development of Wind & Ice Load on PCS Mast

Mast Data: (Pipe 4" Sch. 80)

Mast Shape =	Round		(User Input)
Mast Diameter =	$D_{mast} := 4.5$	in	(User Input)
Mast Length =	$L_{mast} := 17.5$	ft	(User Input)
Mast Thickness =	$t_{mast} := 0.337$	in	(User Input)

Wind Load (NESC Extreme)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 0.375$ sf/ft

Total Mast Wind Force (Below NU Structure) = $qz \cdot Cd_R \cdot A_{mast} \cdot m = 21$ plf **BLC 5**

Wind Load (NESE Heavy)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 0.458$ sf/ft

Total Mast Wind Force w/ Ice = $p \cdot Cd_R \cdot AICE_{mast} = 2$ 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 = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + Ir \cdot 2)^2 - D_{mast}^2\right] = 7.9$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 3$ plf **BLC 3**

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject:	Load Analysis of T-Mobile Equipment on Structure #1068
Location:	Darien, CT
Rev. 0: 10/28/16	Prepared by: T.J.L Checked by: C.F.C. Job No. 16162.04

Development of Wind & Ice Load on Antennas

Proposed Antenna Data:

Antenna Model =	SBNHH-1D65A		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 55.5$	in	(User Input)
Antenna Width =	$W_{ant} := 11.9$	in	(User Input)
Antenna Thickness =	$T_{ant} := 7.1$	in	(User Input)
Antenna Weight =	$WT_{ant} := 34$	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 =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.6$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 13.8$	sf	
Total Antenna Wind Force =	$F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 961$	lbs	**BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 5.1$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 15.2$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 97$	lbs	**BLC 4**

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 102$	lbs	**BLC 2**

Gravity Load (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 4689$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1214$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 39$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 118$	lbs	**BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Andrew ATSBT-TOP-FM-4G		
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 =	$Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 4$	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 =	$V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 52$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 2$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 5$	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 =	$D_{coax} := 1.55$	in	(User Input)
Coax Cable Length =	$L_{coax} := 15$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 0.66$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 18$		(User Input)
No. of Coax Projecting Outside Face of PCS Mast =	$NP_{coax} := 4$		(User Input)

Wind Load (NESC Extreme)

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

Total Coax Wind Force (Above NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} \cdot m = 33$ plf **BLC 5**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot Ir)}{12} = 0.6$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := p \cdot Cd_{coax} \cdot AICE_{coax} = 3$ plf **BLC 4**

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 12$ plf **BLC 2**

Gravity Load (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[(D_{coax} + 2 \cdot Ir)^2 - D_{coax}^2\right] = 3.2$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 23$ plf **BLC 3**

CENTEK engineering, INC.
Consulting Engineers
63-2 North Branford Road
Branford, CT 06405
Ph. 203-488-0580 / Fax. 203-488-8587

Subject: **Analysis of NESC Heavy Wind and NESC Extreme Wind for Obtaining Reactions Applied to Utility Pole**
Tabulated Load Cases
Location: **Darien, CT**
Date:10/28/16 Prepared by: T.J.L. Checked by: C.F.C. Job No. 16162.04

Load Case	Description
1	Self Weight (Mast)
2	Weight of Appurtenances
3	Weight of Ice Only
4	NESC Heavy Wind
5	NESC Extreme Wind

Footnotes:

CENTEK engineering, INC.
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Branford, CT 06405
Ph. 203-488-0580 / Fax. 203-488-8587

Subject: **Analysis of NESC Heavy Wind and NESC Extreme Wind for Obtaining Reactions Applied to Utility Pole Load Combinations Table**

Location: **Darien, CT**

Date: 10/28/16 Prepared by: T.J.L. Checked by: C.F.C. Job No. 16162.04

Load Combination	Description	Envelope Soultion	Wind Factor	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	NESC Heavy Wind		1		1	1.5	2	1.5	3	1.5	4	2.5		
2	NESC Extreme Wind		1		1	1	2	1	5	1				

Footnotes:
(1) BLC = Basic Load Case

Global

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Increase Nailing Capacity for Wind?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automaticly Iterate Stiffness for Walls?	No
Maximum Iteration Number 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-97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-02
Masonry Code	ACI 530-05: ASD
Aluminum Code	AA ADM1-05: ASD - Building

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, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct Z	.035
Ct X	.035
T Z (sec)	Not Entered
T X (sec)	Not Entered
R Z	8.5
R X	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Seismic Detailing Code	ASCE 7-05
Om Z	1
Om X	1
Rho Z	1
Rho X	1

Footing Overturning Safety Factor	1.5
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	0
Footing Concrete f'c (ksi)	3
Footing Concrete Ec (ksi)	4000
Lamda	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 Design Parameters

	Label	Shape	Leng...	Lbyy[ft]	Lbzz[ft]	Lcomp ...	Lcomp ...	Kyy	Kzz	Cm...	Cm...	Cb	y s...	z s...	Functi...
1	M1	Existing Mast	17.5												Lateral

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Existing Mast	PIPE_4.0X	Beam	Pipe	A53 Gr. B	Typical	4.14	9.12	9.12	18.2

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design R...
1	M1	BOTMA...	TOPMA...			Existing Mast	Beam	Pipe	A53 Gr. B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From ...
1	BOTMAST	0	0	0	0	
2	BOTCONNECTION	0	1	0	0	
3	TOPCONNECTION	0	9	0	0	
4	TOPMAST	0	17.5	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]	Footing
1	BOTCONNECTION	Reaction	Reaction	Reaction		Fixed		
2	TOPCONNECTION	Reaction	Reaction	Reaction		Fixed		

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.102	15
2	M1	Y	-.006	15

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.118	15
2	M1	Y	-.005	15

Member Point Loads (BLC 4 : NESC Heavy Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.097	15
2	M1	X	.004	15

Member Point Loads (BLC 5 : NESC Extreme Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.961	15
2	M1	X	.03	15

Joint Loads and Enforced Displacements

Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*s^2*ft)]
No Data to Print ...			

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.012	-.012	0	15

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

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.003	-.003	0	0
2	M1	Y	-.023	-.023	0	15

Member Distributed Loads (BLC 4 : NESC Heavy Wind)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.002	.002	0	0
2	M1	X	.003	.003	0	15

Member Distributed Loads (BLC 5 : NESC Extreme Wind)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.021	.021	0	0
2	M1	X	.033	.033	0	15

Basic Load Cases

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

Load Combinations

	Description	Sol...	PDelta	SR..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact...
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

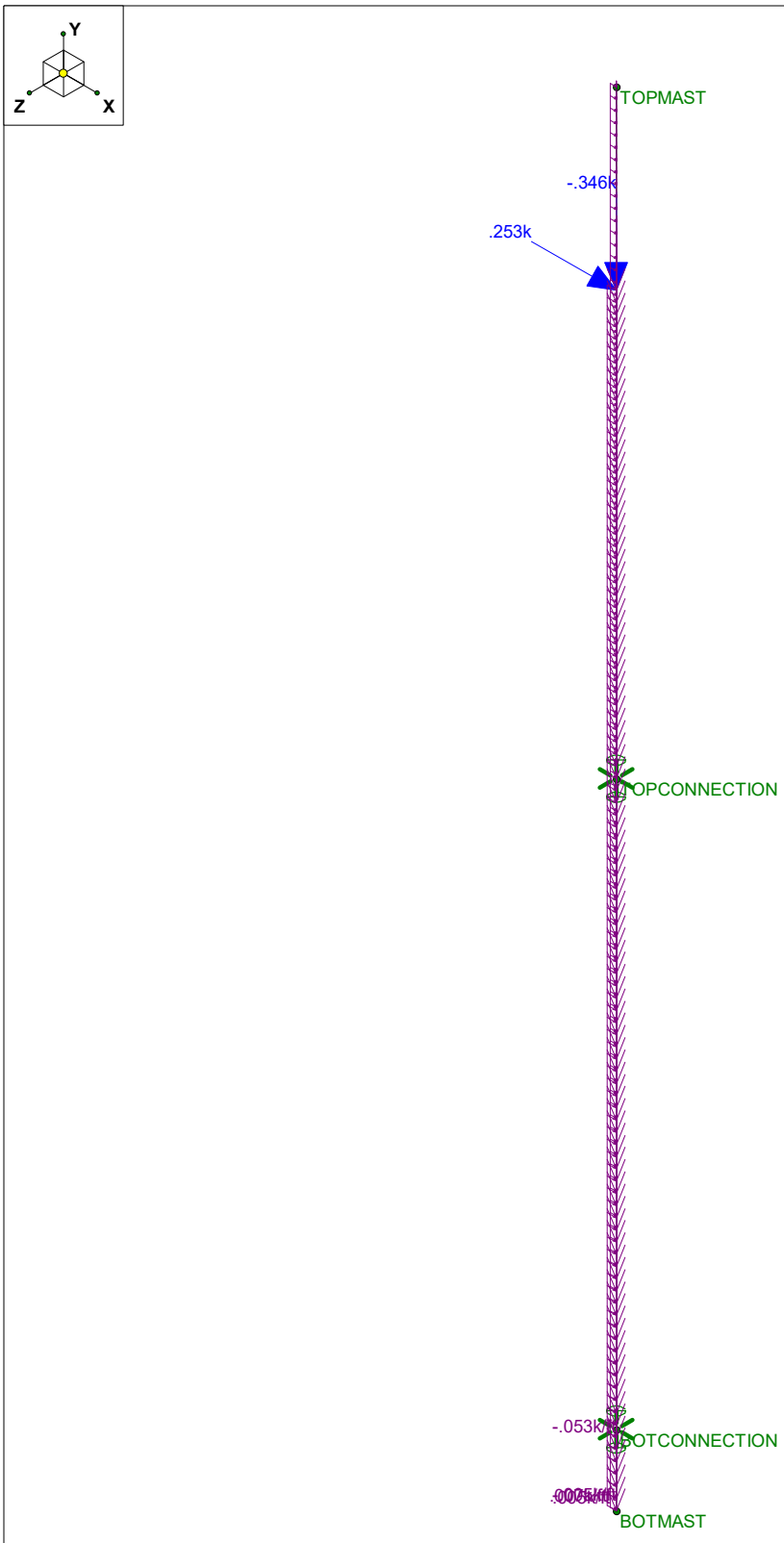
	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	BOTCONNE...	max	.639	2	.391	1	0	1	0	1	NC	NC	0	1
2		min	.166	1	.13	2	0	1	0	1	NC	NC	0	1
3	TOPCONNE...	max	-.618	1	1.192	1	0	1	0	1	NC	NC	0	1
4		min	-2.492	2	.404	2	0	1	0	1	NC	NC	0	1
5	Totals:	max	-.452	1	1.583	1	0	1						
6		min	-1.853	2	.535	2	0	1						

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	BOTCONNECTION	.166	.391	0	0	NC	0
2	1	TOPCONNECTION	-.618	1.192	0	0	NC	0
3	1	Totals:	-.452	1.583	0			
4	1	COG (ft):	X: 0	Y: 9.496	Z: 0			

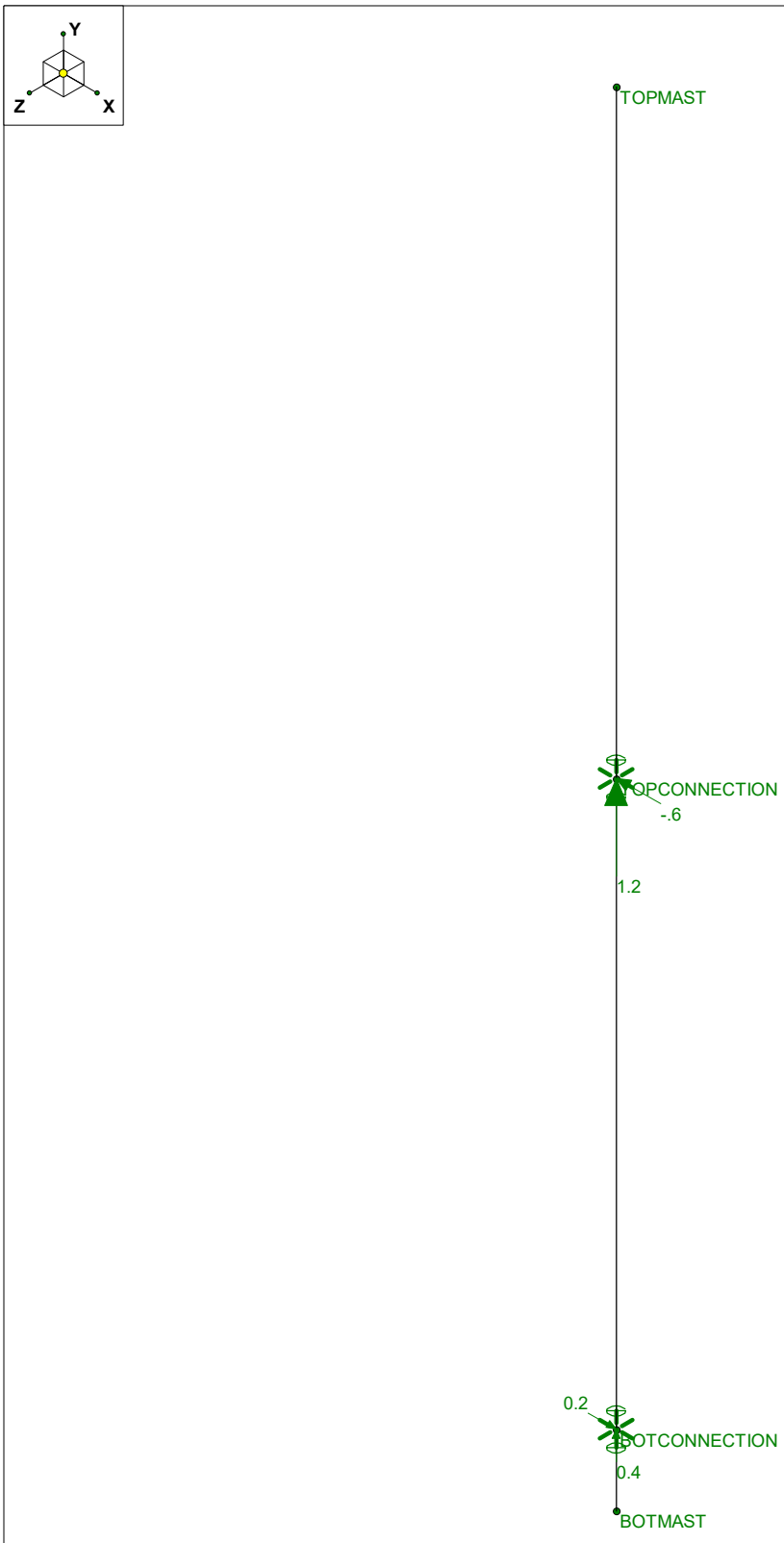
Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	BOTCONNECTION	.639	.13	0	0	NC	0
2	2	TOPCONNECTION	-2.492	.404	0	0	NC	0
3	2	Totals:	-1.853	.535	0			
4	2	COG (ft):	X: 0	Y: 9.592	Z: 0			



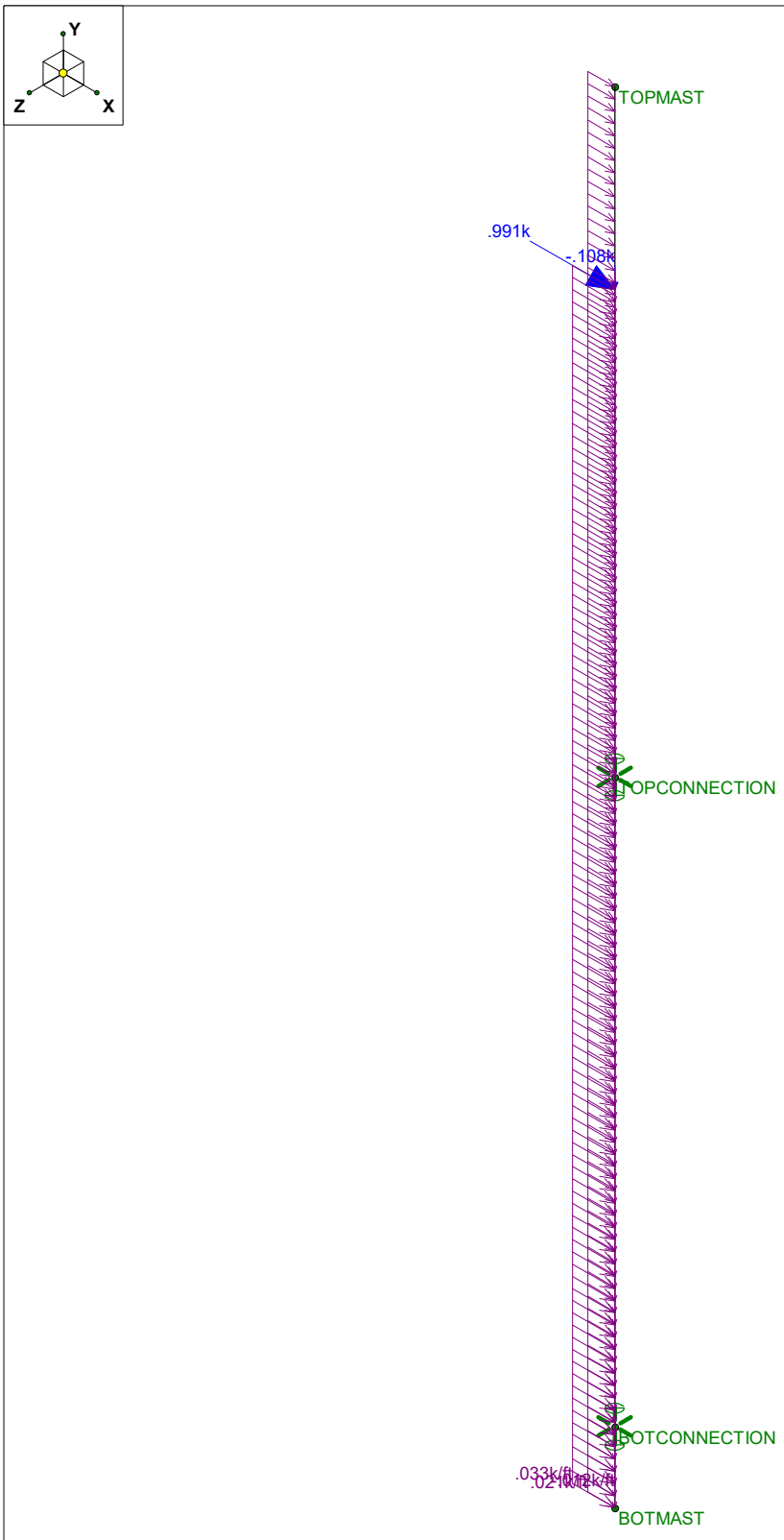
Loads: LC 1, NESC Heavy Wind

CENTEK Engineering, Inc.		
tjl, cfc	Structure # 1068 - Mast	Nov 8, 2016 at 1:31 PM
16162.04 /T-Mobile CT112...	LC #1 Loads	NESC.r3d



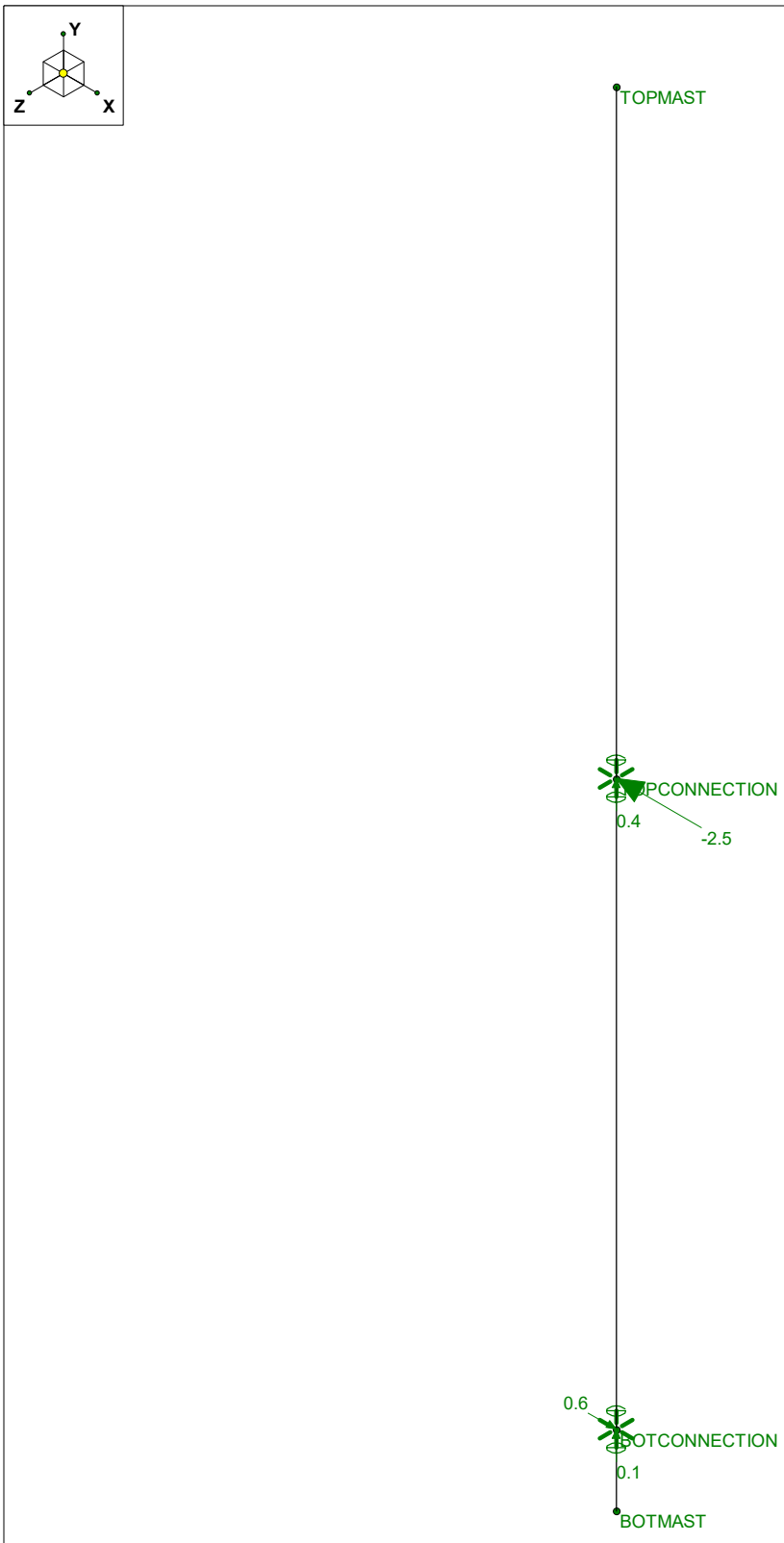
Results for LC 1, NESC Heavy Wind
Z-direction Reaction Units are k and k-ft

CENTEK Engineering, Inc.		
tjl, cfc	Structure # 1068 - Mast	Nov 8, 2016 at 1:32 PM
16162.04 /T-Mobile CT112...	LC #1 Reactions	NESC.r3d



Loads: LC 2, NESC Extreme Wind

CENTEK Engineering, Inc.		
tjl, cfc	Structure # 1068 - Mast	Nov 8, 2016 at 1:31 PM
16162.04 /T-Mobile CT112...	LC #2 Loads	NESC.r3d



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

CENTEK Engineering, Inc.		
tjl, cfc	Structure # 1068 - Mast	Nov 8, 2016 at 1:33 PM
16162.04 /T-Mobile CT112...	LC #2 Reactions	NESC.r3d

CENTEK engineering
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Subject:	Coax Cable on Pole #1068
Location:	Darien, CT
Rev. 0: 10/28/16	Prepared by: T.J.L Checked by: C.F.C. Job No. 16162.04

Coax Cable on Pole

Distance Between Coax Cable Attach Points =

Coaxial Cable Span = $Coax_{Span} := \begin{pmatrix} 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \end{pmatrix} \cdot ft$ *(User Input)*

Diameter of Coax Cable = $D_{coax} := 1.55 \cdot in$ *(User Input)*

Weight of Coax Cable = $W_{coax} := 0.66 \cdot plf$ *(User Input)*

Number of Coax Cables = $N_{coax} := 18$ *(User Input)*

Number of Projected Coax Cables = $NP_{coax} := 3$ *(User Input)*

Extreme Wind Pressure = $qz := 34.9 \cdot psf$ *(User Input)*

Heavy Wind Pressure = $p := 4 \cdot psf$ *(User Input)*

Radial Ice Thickness = $Ir := 0.5 \cdot in$ *(User Input)*

Radial Ice Density = $Id := 56 \cdot pcf$ *(User Input)*

Shape Factor = $Cd_{coax} := 1.6$ *(User Input)*

Overload Factor for NESC Heavy Wind Load = $OF_{HW} := 2.5$ *(User Input)*

Overload Factor for NESC Extreme Wind Load = $OF_{EW} := 1.0$ *(User Input)*

Overload Factor for NESC Heavy Vertical Load = $OF_{HV} := 1.5$ *(User Input)*

Overload Factor for NESC Extreme Vertical Load = $OF_{EV} := 1.0$ *(User Input)*

Wind Area with Ice = $A_{ice} := \left(NP_{coax} \cdot D_{coax} + 2 \cdot Ir\right) = 5.65 \cdot in$

Wind Area without Ice = $A := \left(NP_{coax} \cdot D_{coax}\right) = 4.65 \cdot in$

Ice Area per Liner Ft = $Ai_{coax} := \frac{\pi}{4} \cdot \left[\left(D_{coax} + 2 \cdot Ir\right)^2 - D_{coax}^2\right] = 0.022\,ft^2$

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax} \cdot Id \cdot N_{coax} = 22.541 \cdot plf$

Heavy Vertical Load =

$$Heavy_{Vert} := \overrightarrow{\left[\left(N_{coax} \cdot W_{coax} + W_{ice}\right) \cdot Coax_{Span} \cdot OF_{HV}\right]}$$

Heavy Transverse Load =

$$Heavy_{Trans} := \overrightarrow{\left(p \cdot A_{ice} \cdot Cd_{coax} \cdot Coax_{Span} \cdot OF_{HW}\right)}$$

$Heavy_{Vert}$ =

	0
0	516
1	516
2	516
3	516
4	516
5	516
6	516
7	516
8	516
9	516

lb

$Heavy_{Trans}$ =

	0
0	75
1	75
2	75
3	75
4	75
5	75
6	75
7	75
8	75
9	75

lb

Extreme Vertical Load =

$$Extreme_{Vert} := \overrightarrow{\left[\left(N_{coax} \cdot W_{coax}\right) \cdot Coax_{Span} \cdot OF_{EV}\right]}$$

Extreme Transverse Load =

$$Extreme_{Trans} := \overrightarrow{\left[\left(qz \cdot A \cdot Cd_{coax}\right) \cdot Coax_{Span} \cdot OF_{EW}\right]}$$

$Extreme_{Vert}$ =

	0
0	119
1	119
2	119
3	119
4	119
5	119
6	119
7	119
8	119
9	119

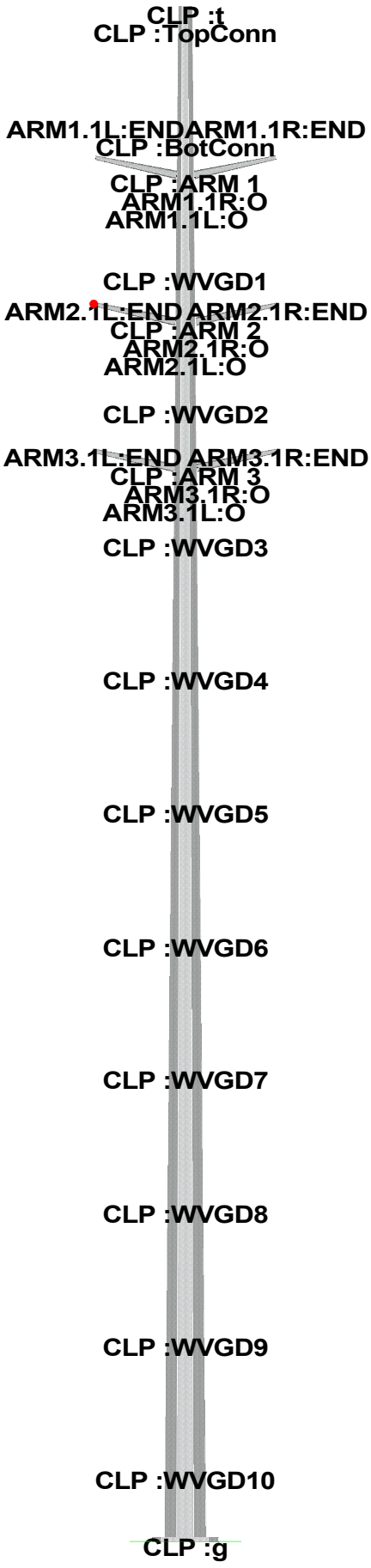
lb

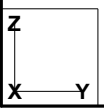
$Extreme_{Trans}$ =

	0
0	216
1	216
2	216
3	216
4	216
5	216
6	216
7	216
8	216
9	216

lb

Centek Engineering Inc, Project: "CLP Pole 1068"
PLS-POLE Version 12.50, 12:23:10 PM Friday, October 28, 2016
Undeformed geometry displayed





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Project Notes: Structure # 1068/ T-Mobile CT11290C
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Date run : 1:36:25 PM Tuesday, November 08, 2016
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\1616200.wi\04_ct11290a\04_structural\backup documentation\calcs\rev (0) - revised\pls pole\cl&p pole # 1068.lca

*** Analysis Results:

Maximum element usage is 88.21% for Base Plate "CLP " in load case "EXTREME"
Maximum insulator usage is 12.02% for Clamp "C20" 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		-0.08	-16.42	-45.83	16.42	1478.54	-4.50	1478.55	-0.01	0.00
EXTREME CLP :g		-0.03	-24.56	-25.20	24.56	1954.18	-1.40	1954.18	-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		0.18	79.99	-3.14	80.05	0.01	-5.91	0.00
EXTREME CLP :t		0.06	102.47	-5.10	102.60	0.00	-7.68	0.00

Tubes Summary:

Pole Label	Tube Num.	Weight (lbs)	Load Case	Maximum Usage %	Resultant Moment (ft-k)
CLP	1	1854	EXTREME	73.78	287.83
CLP	2	3496	EXTREME	83.53	961.86
CLP	3	4553	EXTREME	79.55	1594.00
CLP	4	2253	EXTREME	87.41	1954.18

*** 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	87.41	EXTREME	22	14259.4

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
ARM1.1R	20.99	NESC HEAVY	1	184.2
ARM1.1L	19.32	NESC HEAVY	1	184.2
ARM2.1R	9.30	NESC HEAVY	1	652.8
ARM2.1L	8.27	NESC HEAVY	1	652.8
ARM3.1R	43.80	NESC HEAVY	1	65.6
ARM3.1L	31.57	NESC HEAVY	1	65.6

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC HEAVY	70.53	CLP	Steel Pole
EXTREME	88.21	CLP	Base Plate

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Steel Pole Usage %	Segment Label	Segment Number
NESC HEAVY	70.53	CLP	15
EXTREME	87.41	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 Moment (ft-k)	Bending Stress (ksi)	Bolt Moment Sum (ft-k)	# Bolts Acting On Bend Line	Max Bolt Load For Bend Line (kips)	Minimum Plate Thickness (in)	Usage %
NESC HEAVY	CLP	5	10.196	43.725	1478.543	-4.503	37.979	40.674	2	79.570	2.285	69.05
EXTREME	CLP	5	10.196	23.097	1954.181	-1.398	48.513	51.956	2	101.596	2.583	88.21

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Tubular Davit Usage %	Segment Label	Segment Number
NESC HEAVY	43.80	ARM3.1R	1
EXTREME	21.68	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
C9	Clamp	1.74	NESC HEAVY	0.0
C10	Clamp	1.74	NESC HEAVY	0.0
C11	Clamp	1.74	NESC HEAVY	0.0
C12	Clamp	5.53	NESC HEAVY	0.0
C13	Clamp	1.74	NESC HEAVY	0.0
C14	Clamp	1.74	NESC HEAVY	0.0
C15	Clamp	1.74	NESC HEAVY	0.0
C16	Clamp	1.74	NESC HEAVY	0.0
C17	Clamp	1.74	NESC HEAVY	0.0
C18	Clamp	1.74	NESC HEAVY	0.0
C20	Clamp	12.02	EXTREME	0.0
C21	Clamp	2.17	EXTREME	0.0

*** Weight of structure (lbs):

Weight of Tubular Davit Arms:	1805.4
Weight of Steel Poles:	14259.4
Total:	16064.8

*** End of Report

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

Project Name : 16162.04 - Darien, CT
Project Notes: Structure # 1068/ T-Mobile CT11290C
Project File : J:\Jobs\1616200.WI\04_CT11290A\04_Structural\Backup Documentation\Calcs\Rev (0) - Revised\PLS Pole\CLP Pole 1068.pol
Date run     : 1:36:24 PM Tuesday, November 08, 2016
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 48-05


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

Steel Pole Properties:

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

Label	Length (ft)	Length (ft)				Coef. (in/ft)		Override (ksi)	Override (lbs/ft^3)		Base	Type	Tip (ft)	Trans. Load (kips)	Long. Load (kips)
CLP 1068	1068	115.00	0	Yes	8F	13.26	37.4	0	1.3	4 tubes	0	0		Calculated	0.000	0.0000	0.0000

Steel Tubes Properties:

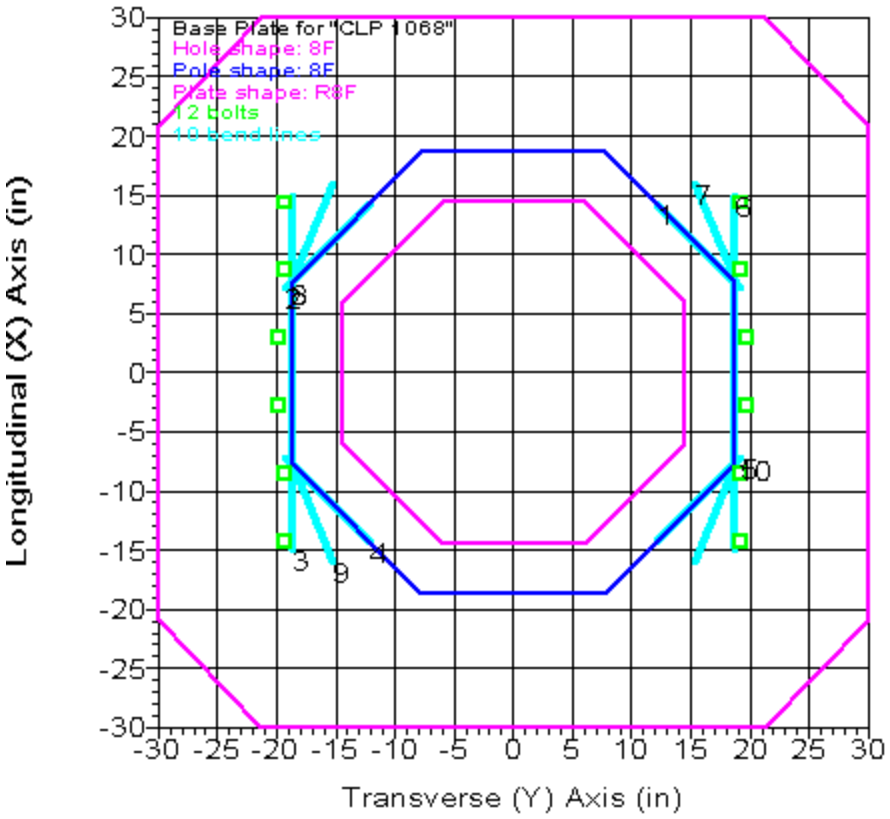
Pole Property	Tube No.	Length (ft)	Thickness (in)	Lap Length (ft)	Lap Factor	Lap Gap (in)	Yield Stress (ksi)	Moment Cap. Override (ft-k)	Tube Weight (lbs)	Center of Gravity (ft)	Calculated Taper (in/ft)	Tube Top Diameter (in)	Tube Bot. Diameter (in)	1.5x Lap Length (ft)	Diam. Actual Overlap (ft)
CLP 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:

Pole Property	Plate Diam. (in)	Plate Shape	Plate Thick. (in)	Plate Weight (lbs)	Bend Line Length Override (in)	Hole Diam. (in)	Hole Shape	Steel Density (lbs/ft^3)	Steel Yield Stress (ksi)	Bolt Diam. (in)	Bolt Pattern Diam. (in)	Num. Of Bolts	Bolt Cage X Inertia (in^4)	Bolt Cage Y Inertia (in^4)
CLP 1068	60.000	R8F	2.750	2103	0.000	29.000	8F	490.00	55.000	2.250	44.000	12	18099.29	4583.85

Base Plate Bolt Coordinates for Property "CLP 1068":

Bolt X Coord.	Bolt Y Coord.	Bolt Angle (deg)
0.1304	0.9005	0
0.3913	0.8776	0
0.6522	0.8776	0



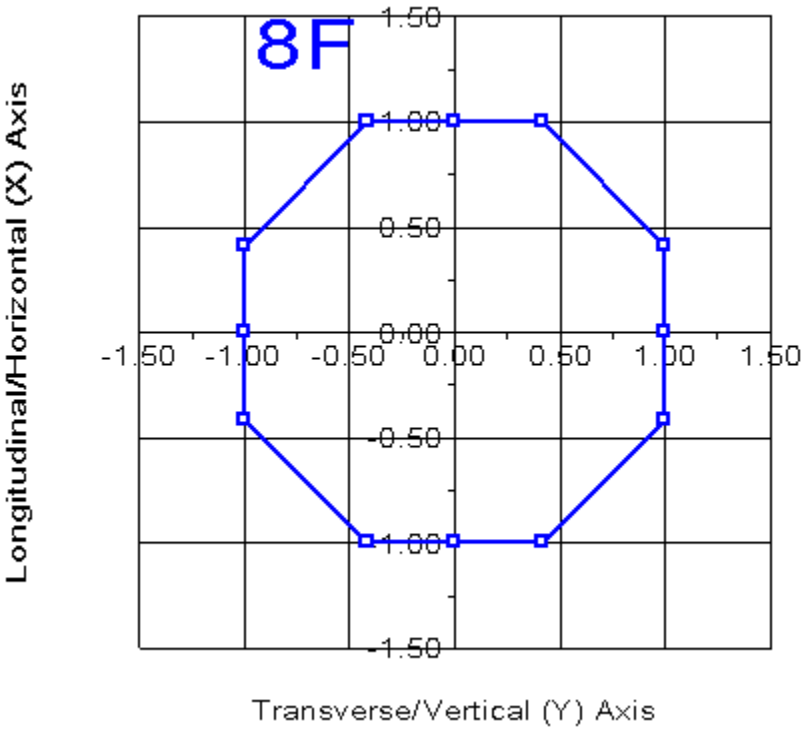
Steel Pole Connectivity:

Pole Label	Tip Joint	Base Joint	X of Base (ft)	Y of Base (ft)	Z of Base (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 15 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	95.00
CLP :WVGD2	0.00	85.00

CLP :WVGD3	0.00	75.00
CLP :WVGD4	0.00	65.00
CLP :WVGD5	0.00	55.00
CLP :WVGD6	0.00	45.00
CLP :WVGD7	0.00	35.00
CLP :WVGD8	0.00	25.00
CLP :WVGD9	0.00	15.00
CLP :WVGD10	0.00	5.00
CLP :TopConn	0.00	114.00
CLP :BotConn	0.00	105.00



Pole Steel Properties:

Warning: Capacities and usages printed in splices are listed for the inner tube except at the splice top which uses the outer tube. ??

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Outer Diam. (in)	Area (in^2)	T-Moment Inertia (in^4)	L-Moment Inertia (in^4)	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	1.00	13.49	10.97	254.13	254.13	0.00	18.2	50.00	50.00	157.00	157.00
CLP	CLP :TopConn	CLP :TopConn Ori	1.00	13.49	10.97	254.13	254.13	0.00	18.2	50.00	50.00	157.00	157.00
CLP	CLP :BotConn	CLP :BotConn End	10.00	15.52	12.65	390.27	390.27	0.00	21.6	50.00	50.00	209.49	209.49
CLP	CLP :BotConn	CLP :BotConn Ori	10.00	15.52	12.65	390.27	390.27	0.00	21.6	50.00	50.00	209.49	209.49

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 :WVGD1	CLP :WVGD1 End	20.00	17.79	14.53	590.55	590.55	0.00	25.3	50.00	50.00	276.68	276.68
CLP	CLP :WVGD1	CLP :WVGD1 Ori	20.00	17.79	14.53	590.55	590.55	0.00	25.3	50.00	50.00	276.68	276.68
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 :WVGD2	CLP :WVGD2 End	30.00	20.05	16.40	849.76	849.76	0.00	29.1	50.00	50.00	353.21	353.21
CLP	CLP :WVGD2	CLP :WVGD2 Ori	30.00	20.05	16.40	849.76	849.76	0.00	29.1	50.00	50.00	353.21	353.21
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 :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 :WVGD3	CLP :WVGD3 End	40.00	21.81	22.26	1359.94	1359.94	0.00	24.8	65.00	65.00	675.48	675.48
CLP	CLP :WVGD3	CLP :WVGD3 Ori	40.00	21.81	22.26	1359.94	1359.94	0.00	24.8	65.00	65.00	675.48	675.48
CLP	CLP :WVGD4	CLP :WVGD4 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 :WVGD4	CLP :WVGD4 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 :WVGD5	CLP :WVGD5 End	60.00	26.33	26.95	2411.62	2411.62	0.00	30.8	65.00	65.00	992.08	992.08
CLP	CLP :WVGD5	CLP :WVGD5 Ori	60.00	26.33	26.95	2411.62	2411.62	0.00	30.8	65.00	65.00	992.08	992.08
CLP	CLP :WVGD6	CLP :WVGD6 End	70.00	28.60	29.29	3096.68	3096.68	0.00	33.8	65.00	63.66	1148.92	1148.92
CLP	CLP :WVGD6	CLP :WVGD6 Ori	70.00	28.60	29.29	3096.68	3096.68	0.00	33.8	65.00	63.66	1148.92	1148.92
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 :3	SpliceB 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 :3	SpliceB 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 :WVGD7	CLP :WVGD7 End	80.00	30.23	37.10	4371.91	4371.91	0.00	29.3	65.00	65.00	1566.56	1566.56
CLP	CLP :WVGD7	CLP :WVGD7 Ori	80.00	30.23	37.10	4371.91	4371.91	0.00	29.3	65.00	65.00	1566.56	1566.56
CLP	CLP :WVGD8	CLP :WVGD8 End	90.00	32.50	39.91	5442.54	5442.54	0.00	31.8	65.00	65.00	1814.44	1814.44
CLP	CLP :WVGD8	CLP :WVGD8 Ori	90.00	32.50	39.91	5442.54	5442.54	0.00	31.8	65.00	65.00	1814.44	1814.44
CLP	#CLP :4	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 :4	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 :WVGD9	CLP :WVGD9 End	100.00	34.01	41.79	6247.76	6247.76	0.00	33.4	65.00	63.95	1958.07	1958.07
CLP	CLP :WVGD9	CLP :WVGD9 Ori	100.00	34.01	41.79	6247.76	6247.76	0.00	33.4	65.00	63.95	1958.07	1958.07
CLP	#CLP :5	SpliceB 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 :5	SpliceB 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 :WVGD10	CLP :WVGD10 End	110.00	36.27	44.60	7594.89	7594.89	0.00	35.9	65.00	61.83	2157.85	2157.85
CLP	CLP :WVGD10	CLP :WVGD10 Ori	110.00	36.27	44.60	7594.90	7594.90	0.00	35.9	65.00	61.83	2157.85	2157.85
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 Property Label	Stock Number	Steel Shape	Thickness or Depth (in)	Base Diameter or Depth (in)	Tip Diameter (in)	Taper (in/ft)	Drag Coef.	Modulus of Elasticity (ksi)	Geometry Check Type	Strength Vertical Capacity (lbs)	Tension Capacity (lbs)	Compres. Capacity (lbs)	Long. Capacity (lbs)	Yield Stress (ksi)	Weight Steel Density Override (lbs/ft^3)
ARM 1		8T	0.25	10	5	0	1.3	29000	1 point Calculated	0	0	0	0	65	0
ARM 2		8T	0.3125	18	9	0	1.3	29000	1 point Calculated	0	0	0	0	65	0
ARM 3		8T	0.1875	6.875	3.5	0	1.3	29000	1 point Calculated	0	0	0	0	65	0

Intermediate Joints for Davit Property "ARM 1":

Joint	Horz.	Vert.

Label	Horz. Offset (ft)	Vert. Offset (ft)
END	9	-0.5

Intermediate Joints for Davit Property "ARM 2":

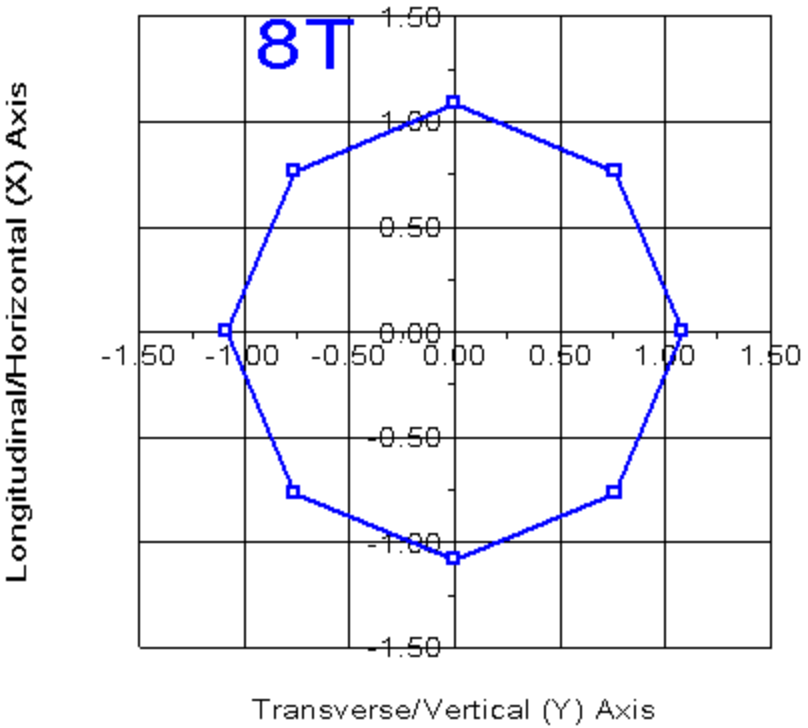
Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
END	14	-1.17

Intermediate Joints for Davit Property "ARM 3":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
END	6.083	-1.25

Tubular Davit Arm Connectivity:

Davit Label	Attach Label	Davit Property Set	Azimuth (deg)
ARM1.1R CLP	:ARM 1	ARM 1	0
ARM1.1L CLP	:ARM 1	ARM 1	180
ARM2.1R CLP	:ARM 2	ARM 2	0
ARM2.1L CLP	:ARM 2	ARM 2	180
ARM3.1R CLP	:ARM 3	ARM 3	0
ARM3.1L CLP	:ARM 3	ARM 3	180



Tubular Davit Arm Steel Properties:

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Outer Diam. (in)	Area (in^2)	V-Moment Inertia (in^4)	H-Moment Inertia (in^4)	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	10.00	8.08	101.53	101.53	0.00	12.4	65.00	65.00	101.62	101.62
ARM1.1R	ARM1.1R:END	End	9.01	5.00	3.94	11.76	11.76	0.00	4.1	65.00	65.00	23.55	23.55
ARM1.1L	ARM1.1L:O	Origin	0.00	10.00	8.08	101.53	101.53	0.00	12.4	65.00	65.00	101.62	101.62
ARM1.1L	ARM1.1L:END	End	9.01	5.00	3.94	11.76	11.76	0.00	4.1	65.00	65.00	23.55	23.55
ARM2.1R	ARM2.1R:O	Origin	0.00	18.00	18.32	757.46	757.46	0.00	19.7	65.00	65.00	421.18	421.18
ARM2.1R	ARM2.1R:END	End	14.05	9.00	9.00	89.84	89.84	0.00	7.8	65.00	65.00	99.91	99.91
ARM2.1L	ARM2.1L:O	Origin	0.00	18.00	18.32	757.46	757.46	0.00	19.7	65.00	65.00	421.18	421.18
ARM2.1L	ARM2.1L:END	End	14.05	9.00	9.00	89.84	89.84	0.00	7.8	65.00	65.00	99.91	99.91
ARM3.1R	ARM3.1R:O	Origin	0.00	6.88	4.16	24.58	24.58	0.00	11.0	65.00	65.00	35.78	35.78
ARM3.1R	ARM3.1R:END	End	6.21	3.50	2.06	2.99	2.99	0.00	3.6	65.00	65.00	8.56	8.56
ARM3.1L	ARM3.1L:O	Origin	0.00	6.88	4.16	24.58	24.58	0.00	11.0	65.00	65.00	35.78	35.78
ARM3.1L	ARM3.1L:END	End	6.21	3.50	2.06	2.99	2.99	0.00	3.6	65.00	65.00	8.56	8.56

*** 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
C9	CLP :WVGD1	CLAMP	No Limit
C10	CLP :WVGD2	CLAMP	No Limit
C11	CLP :WVGD3	CLAMP	No Limit
C12	CLP :WVGD4	CLAMP	No Limit
C13	CLP :WVGD5	CLAMP	No Limit
C14	CLP :WVGD6	CLAMP	No Limit
C15	CLP :WVGD7	CLAMP	No Limit
C16	CLP :WVGD8	CLAMP	No Limit
C17	CLP :WVGD9	CLAMP	No Limit
C18	CLP :WVGD10	CLAMP	No Limit
C20	CLP :TopConn	CLAMP	No Limit
C21	CLP :BotConn	CLAMP	No Limit

*** Loads Data

Loads from file: j:\jobs\1616200.wi\04_ct11290a\04_structural\backup documentation\calcs\rev (0) - revised\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 Description	Dead Load	Wind Area	SF for Steel Poles and Towers	SF for Wood Poles	SF for Conc. Poles	SF for Conc. Ult.	SF for First Crack	SF for Guys Zero Tens.	SF for Non Tubular Cables	SF for Braces and Tubular Arms	SF For Insuls.	Point Found.	Loads	Wind/Ice Model	Trans. Wind Pressure (psf)	Longit. Wind Pressure (psf)	Ice Thick. (in)	Ice Density (lbs/ft^3)	Temperature (deg F)	Pole Deflection Factor	Pole Deflection Limit % or (ft)	Check
NESC HEAVY	1.5000	2.5000	1.00000	0.6500	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	20 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	1.0000	20 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 :WVGD4	826	901	0	OPGW-012
CLP :WVGD1	516	75	0	Coax Cable
CLP :WVGD2	516	75	0	Coax Cable
CLP :WVGD3	516	75	0	Coax Cable
CLP :WVGD4	516	75	0	Coax Cable
CLP :WVGD5	516	75	0	Coax Cable
CLP :WVGD6	516	75	0	Coax Cable
CLP :WVGD7	516	75	0	Coax Cable
CLP :WVGD8	516	75	0	Coax Cable

CLP :WVGD9	516	75	0	Coax Cable
CLP :WVGD10	516	75	0	Coax Cable
CLP :TopConn	1192	618	0	Mast Top Connection
CLP :BotConn	391	-166	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
ARM1.1L:END	1021	1830	0	BITTERN
ARM1.1R:END	1021	1830	0	BITTERN
ARM2.1L:END	1021	1830	0	BITTERN
ARM2.1R:END	1021	1830	0	BITTERN
ARM3.1L:END	1021	1830	0	BITTERN
ARM3.1R:END	1021	1830	0	BITTERN
CLP :WVGD4	244	828	0	OPGW-012
CLP :WVGD1	119	216	0	Coax Cable
CLP :WVGD2	119	216	0	Coax Cable
CLP :WVGD3	119	216	0	Coax Cable
CLP :WVGD4	119	216	0	Coax Cable
CLP :WVGD5	119	216	0	Coax Cable
CLP :WVGD6	119	216	0	Coax Cable
CLP :WVGD7	119	216	0	Coax Cable
CLP :WVGD8	119	216	0	Coax Cable
CLP :WVGD9	119	216	0	Coax Cable
CLP :WVGD10	119	216	0	Coax Cable
CLP :TopConn	404	2492	0	Mast Top Connection
CLP :BotConn	130	-639	0	Mast Bottom Connection

Detailed Pole Loading Data for Load Case "EXTREME":

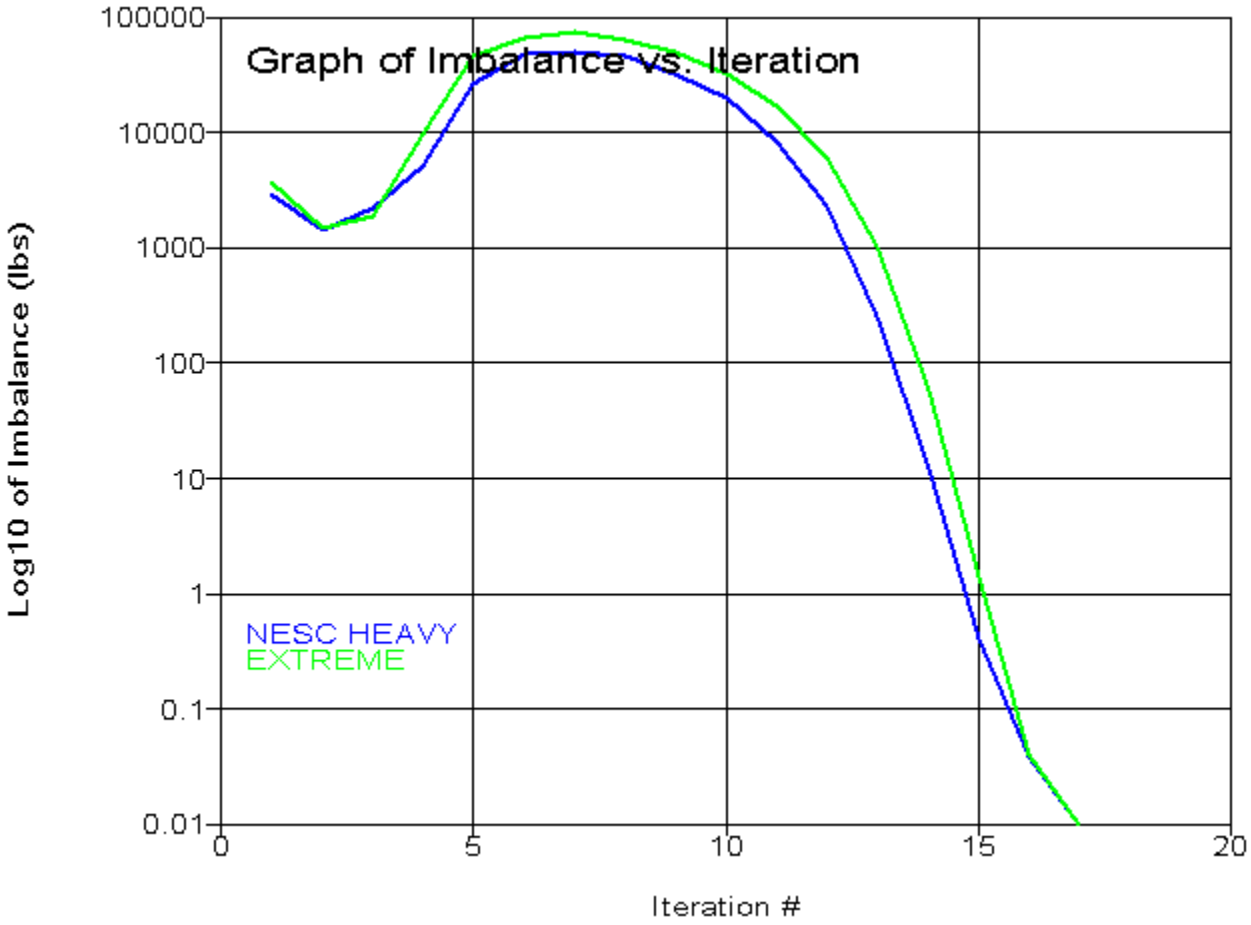
Notes: Does not include loads from equipment, arms, guys, braces, etc. or user input loads.
Wind load is calculated for the undeformed shape of a pole.

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 Load (lbs)	Pole Ice Wind Load (lbs)	Tran. Wind Load (lbs)	Long. Wind Load (lbs)
CLP	CLP :t	CLP :TopConn	115.00	114.00	114.50	13.376	1.13e+006	1.000	31.88	0.00	37.00	35.53	0.00	0.00	35.53	0.00
CLP	CLP :TopConn	CLP :BotConn	114.00	105.00	109.50	14.507	1.23e+006	1.000	31.88	0.00	361.71	346.83	0.00	0.00	346.83	0.00
CLP	CLP :BotConn	CLP :ARM 1	105.00	102.33	103.66	15.827	1.34e+006	1.000	31.88	0.00	117.24	112.25	0.00	0.00	112.25	0.00
CLP	CLP :ARM 1	CLP :WVGD1	102.33	95.00	98.67	16.958	1.43e+006	1.000	31.88	0.00	345.23	330.19	0.00	0.00	330.19	0.00
CLP	CLP :WVGD1	CLP :ARM 2	95.00	91.33	93.17	18.202	1.54e+006	1.000	31.88	0.00	185.72	177.45	0.00	0.00	177.45	0.00
CLP	CLP :ARM 2	CLP :WVGD2	91.33	85.00	88.17	19.333	1.63e+006	1.000	31.88	0.00	340.51	325.08	0.00	0.00	325.08	0.00
CLP	CLP :WVGD2	CLP :ARM 3	85.00	80.33	82.67	20.577	1.74e+006	1.000	31.88	0.00	267.59	255.27	0.00	0.00	255.27	0.00
CLP	CLP :ARM 3		80.33	79.83	80.08	21.161	1.79e+006	1.000	31.88	0.00	29.30	27.94	0.00	0.00	27.94	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 :WVGD3	77.00	75.00	76.00	21.584	1.82e+006	1.000	31.88	0.00	149.97	114.67	0.00	0.00	114.67	0.00
CLP	CLP :WVGD3	CLP :WVGD4	75.00	65.00	70.00	22.942	1.94e+006	1.000	31.88	0.00	797.38	609.42	0.00	0.00	609.42	0.00
CLP	CLP :WVGD4	CLP :WVGD5	65.00	55.00	60.00	25.204	2.13e+006	1.000	31.88	0.00	877.08	669.51	0.00	0.00	669.51	0.00
CLP	CLP :WVGD5	CLP :WVGD6	55.00	45.00	50.00	27.465	2.32e+006	1.000	31.88	0.00	956.78	729.60	0.00	0.00	729.60	0.00
CLP	CLP :WVGD6		45.00	44.00	44.50	28.709	2.43e+006	1.000	31.88	0.00	100.06	76.26	0.00	0.00	76.26	0.00
CLP			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 :WVGD7	40.00	35.00	37.50	29.668	2.51e+006	1.000	31.88	0.00	619.40	394.05	0.00	0.00	394.05	0.00
CLP	CLP :WVGD7	CLP :WVGD8	35.00	25.00	30.00	31.364	2.65e+006	1.000	31.88	0.00	1310.36	833.16	0.00	0.00	833.16	0.00

CLP	CLP :WVGD8		25.00	15.08	20.04	33.617	2.84e+006	1.000	31.88	0.00	1393.94	885.59	0.00	0.00	885.59	0.00
CLP		CLP :WVGD9	15.08	15.00	15.04	34.373	2.91e+006	1.000	31.88	0.00	23.86	7.58	0.00	0.00	7.58	0.00
CLP	CLP :WVGD9		15.00	10.00	12.50	34.573	2.92e+006	1.000	31.88	0.00	1461.88	459.20	0.00	0.00	459.20	0.00
CLP		CLP :WVGD10	10.00	5.00	7.50	35.704	3.02e+006	1.000	31.88	0.00	747.02	474.22	0.00	0.00	474.22	0.00
CLP	CLP :WVGD10	CLP :g	5.00	0.00	2.50	36.835	3.11e+006	1.000	31.88	0.00	770.83	489.24	0.00	0.00	489.24	0.00

*** Analysis Results:

Maximum element usage is 88.21% for Base Plate "CLP " in load case "EXTREME"
Maximum insulator usage is 12.02% for Clamp "C20" 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	0.01524	6.666	-0.2615	-5.9077	0.0124	0.0003	0.01524	6.666	114.7
CLP :TopConn	0.01502	6.563	-0.2562	-5.9077	0.0124	0.0003	0.01502	6.563	113.7

CLP :BotConn	0.01308	5.64	-0.2087	-5.8351	0.0123	0.0003	0.01308	5.64	104.8
CLP :ARM 1	0.0125	5.369	-0.1949	-5.7967	0.0123	0.0003	0.0125	5.369	102.1
CLP :WVGD1	0.01096	4.639	-0.1583	-5.6045	0.0120	0.0002	0.01096	4.639	94.84
CLP :ARM 2	0.0102	4.285	-0.1411	-5.4714	0.0117	0.0002	0.0102	4.285	91.19
CLP :WVGD2	0.008927	3.696	-0.1134	-5.1662	0.0113	0.0002	0.008927	3.696	84.89
CLP :ARM 3	0.008029	3.286	-0.0952	-4.8971	0.0108	0.0002	0.008029	3.286	80.23
CLP :WVGD3	0.007051	2.845	-0.07676	-4.5748	0.0103	0.0001	0.007051	2.845	74.92
CLP :WVGD4	0.005352	2.1	-0.04859	-3.9255	0.0091	0.0001	0.005352	2.1	64.95
CLP :WVGD5	0.003864	1.472	-0.0285	-3.2349	0.0078	0.0001	0.003864	1.472	54.97
CLP :WVGD6	0.002611	0.9654	-0.0153	-2.5401	0.0064	0.0000	0.002611	0.9654	44.98
CLP :WVGD7	0.001605	0.5774	-0.007416	-1.9141	0.0051	0.0000	0.001605	0.5774	34.99
CLP :WVGD8	0.0008336	0.2917	-0.00303	-1.3397	0.0037	0.0000	0.0008336	0.2917	25
CLP :WVGD9	0.0003047	0.1037	-0.0009541	-0.7985	0.0023	0.0000	0.0003047	0.1037	15
CLP :WVGD10	3.484e-005	0.01147	-0.0001772	-0.2567	0.0008	0.0000	3.484e-005	0.01147	5
ARM1.1R:O	0.01249	5.366	-0.2628	-5.7967	0.0123	0.0003	0.01249	6.038	102.1
ARM1.1R:END	0.01235	5.368	-1.224	-6.2716	0.0123	0.0002	0.01235	15.04	101.6
ARM1.1L:O	0.01252	5.373	-0.1271	-5.7967	0.0123	0.0003	0.01252	4.701	102.2
ARM1.1L:END	0.01286	5.462	0.7339	-5.3613	0.0123	0.0003	0.01286	-4.21	103.6
ARM2.1R:O	0.01018	4.281	-0.215	-5.4714	0.0117	0.0002	0.01018	5.057	91.11
ARM2.1R:END	0.01008	4.329	-1.585	-5.6532	0.0117	0.0002	0.01008	19.1	90.91
ARM2.1L:O	0.01022	4.288	-0.06711	-5.4714	0.0117	0.0002	0.01022	3.513	91.26
ARM2.1L:END	0.01079	4.459	1.236	-5.3106	0.0118	0.0003	0.01079	-10.32	93.74
ARM3.1R:O	0.008013	3.283	-0.1703	-4.8971	0.0108	0.0002	0.008013	4.162	80.16
ARM3.1R:END	0.008118	3.375	-0.7658	-5.8893	0.0108	0.0002	0.008118	10.34	80.81
ARM3.1L:O	0.008046	3.289	-0.02014	-4.8971	0.0108	0.0002	0.008046	2.41	80.31
ARM3.1L:END	0.008396	3.404	0.4454	-4.1924	0.0109	0.0003	0.008396	-3.559	82.03

Joint Support Reactions for Load Case "NESC HEAVY":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Uplift 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	-0.08	0.0	-16.42	0.0	0.0	-45.83	0.0	0.0	48.68	0.0	1478.54	0.0	-4.5	0.0	0.0	-0.01	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 Pt.
CLP	CLP :t	Origin	0.00	79.99	0.18	-3.14	-0.00	-0.00	-0.0	-0.03	0.01	-0.00	-0.00	0.00	0.00	0.00	0.00	0.0	4
CLP	CLP :TopConn	End	1.00	78.75	0.18	-3.07	0.01	-0.00	-0.0	-0.03	0.01	-0.00	-0.00	0.00	0.00	0.00	0.01	0.0	2
CLP	CLP :TopConn	Origin	1.00	78.75	0.18	-3.07	0.01	-0.00	-0.0	-2.73	2.03	-0.00	-0.25	0.00	0.38	0.00	0.71	1.4	4
CLP	CLP :BotConn	End	10.00	67.68	0.16	-2.50	18.25	-0.03	-0.0	-2.73	2.03	-0.00	-0.22	4.36	0.13	0.00	4.58	9.2	2
CLP	CLP :BotConn	Origin	10.00	67.68	0.16	-2.50	18.25	-0.03	0.0	-3.49	2.03	-0.01	-0.28	4.36	0.13	0.00	4.64	9.3	2
CLP	CLP :ARM 1	End	12.67	64.43	0.15	-2.34	23.66	-0.04	0.0	-3.49	2.03	-0.01	-0.27	5.23	0.12	0.00	5.50	11.0	2
CLP	CLP :ARM 1	Origin	12.67	64.43	0.15	-2.34	25.40	-0.04	0.0	-8.59	6.01	-0.01	-0.65	5.61	0.36	0.00	6.30	12.6	2
CLP	CLP :WVGD1	End	20.00	55.67	0.13	-1.90	69.43	-0.11	0.0	-8.59	6.01	-0.01	-0.59	12.56	0.33	0.00	13.16	26.3	2
CLP	CLP :WVGD1	Origin	20.00	55.67	0.13	-1.90	69.43	-0.11	0.0	-9.51	6.25	-0.01	-0.65	12.56	0.34	0.00	13.22	26.4	2
CLP	CLP :ARM 2	End	23.67	51.42	0.12	-1.69	92.36	-0.15	0.0	-9.51	6.25	-0.01	-0.63	15.22	0.33	0.00	15.85	31.7	2
CLP	CLP :ARM 2	Origin	23.67	51.42	0.12	-1.69	96.84	-0.16	0.0	-16.10	10.31	-0.02	-1.06	15.96	0.54	0.00	17.04	34.1	2
CLP	CLP :WVGD2	End	30.00	44.35	0.11	-1.36	162.11	-0.27	0.0	-16.10	10.31	-0.02	-0.98	22.96	0.50	0.00	23.96	47.9	2
CLP	CLP :WVGD2	Origin	30.00	44.35	0.11	-1.36	162.11	-0.27	0.0	-17.11	10.51	-0.02	-1.04	22.96	0.51	0.00	24.02	48.0	2
CLP	CLP :ARM 3	End	34.67	39.43	0.10	-1.14	211.17	-0.36	0.0	-17.11	10.51	-0.02	-0.99	26.94	0.48	0.00	27.95	55.9	2
CLP	CLP :ARM 3	Origin	34.67	39.43	0.10	-1.14	215.66	-0.36	0.0	-21.81	14.30	-0.02	-1.26	27.52	0.66	0.00	28.80	57.6	2
CLP	SpliceT	End	35.17	38.92	0.10	-1.12	222.77	-0.37	0.0	-21.81	14.30	-0.02	-1.26	28.12	0.65	0.00	29.40	58.8	2
CLP	SpliceT	Origin	35.17	38.92	0.10	-1.12	222.77	-0.37	0.0	-22.14	14.33	-0.02	-1.27	28.12	0.65	0.00	29.41	58.8	2

CLP	SpliceB	End	38.00	36.09	0.09	-1.00	263.35	-0.44	0.0	-22.14	14.33	-0.02	-1.02	26.47	0.52	0.00	27.50	42.3	2
CLP	SpliceB	Origin	38.00	36.09	0.09	-1.00	263.35	-0.44	0.0	-22.57	14.36	-0.03	-1.04	26.47	0.52	0.00	27.52	42.3	2
CLP	CLP :WVGD3	End	40.00	34.14	0.08	-0.92	292.06	-0.49	0.0	-22.57	14.36	-0.03	-1.01	28.12	0.51	0.00	29.15	44.8	2
CLP	CLP :WVGD3	Origin	40.00	34.14	0.08	-0.92	292.06	-0.49	0.0	-23.88	14.53	-0.03	-1.07	28.12	0.52	0.00	29.21	44.9	2
CLP	CLP :WVGD4	End	50.00	25.20	0.06	-0.58	437.31	-0.79	0.0	-23.88	14.53	-0.03	-0.97	34.43	0.47	0.00	35.41	54.5	2
CLP	CLP :WVGD4	Origin	50.00	25.20	0.06	-0.58	437.31	-0.79	0.0	-26.58	15.64	-0.04	-1.08	34.43	0.50	0.00	35.52	54.6	2
CLP	CLP :WVGD5	End	60.00	17.66	0.05	-0.34	593.70	-1.14	0.0	-26.58	15.64	-0.04	-0.99	38.93	0.46	0.00	39.92	61.4	2
CLP	CLP :WVGD5	Origin	60.00	17.66	0.05	-0.34	593.70	-1.14	0.0	-28.65	15.77	-0.04	-1.06	38.93	0.46	0.00	40.00	62.4	2
CLP	CLP :WVGD6	End	70.00	11.58	0.03	-0.18	751.41	-1.57	0.0	-28.65	15.77	-0.04	-0.98	41.67	0.43	0.00	42.65	67.0	2
CLP	CLP :WVGD6	Origin	70.00	11.58	0.03	-0.18	751.41	-1.57	0.0	-30.07	15.87	-0.05	-1.03	41.67	0.43	0.00	42.70	69.8	2
CLP	SpliceT	End	71.00	11.06	0.03	-0.17	767.27	-1.62	0.0	-30.07	15.87	-0.05	-1.02	41.87	0.43	0.00	42.90	70.5	2
CLP	SpliceT	Origin	71.00	11.06	0.03	-0.17	767.27	-1.62	0.0	-30.85	15.89	-0.05	-1.04	41.87	0.43	0.00	42.93	70.5	2
CLP	SpliceB	End	75.00	9.09	0.02	-0.13	830.84	-1.82	0.0	-30.85	15.89	-0.05	-0.86	37.29	0.35	0.00	38.16	58.7	2
CLP	SpliceB	Origin	75.00	9.09	0.02	-0.13	830.84	-1.82	0.0	-32.06	15.93	-0.05	-0.90	37.29	0.35	0.00	38.20	58.8	2
CLP	CLP :WVGD7	End	80.00	6.93	0.02	-0.09	910.47	-2.08	0.0	-32.06	15.93	-0.05	-0.86	37.81	0.34	0.00	38.68	59.5	2
CLP	CLP :WVGD7	Origin	80.00	6.93	0.02	-0.09	910.47	-2.08	0.0	-34.14	16.06	-0.06	-0.92	37.81	0.34	0.00	38.74	59.6	2
CLP	CLP :WVGD8	End	90.00	3.50	0.01	-0.04	1071.11	-2.66	0.0	-34.14	16.06	-0.06	-0.86	38.41	0.32	0.00	39.27	60.4	2
CLP	CLP :WVGD8	Origin	90.00	3.50	0.01	-0.04	1071.11	-2.66	0.0	-36.84	16.21	-0.07	-0.92	38.41	0.32	0.00	39.34	60.5	2
CLP	SpliceT	End	99.92	1.26	0.00	-0.01	1231.82	-3.33	0.0	-36.84	16.21	-0.07	-0.86	38.57	0.30	0.00	39.44	62.3	2
CLP	SpliceT	Origin	99.92	1.26	0.00	-0.01	1231.82	-3.33	0.0	-37.98	16.22	-0.07	-0.89	38.57	0.30	0.00	39.46	62.4	2
CLP	CLP :WVGD9	End	100.00	1.24	0.00	-0.01	1233.16	-3.33	0.0	-37.98	16.22	-0.07	-0.91	40.32	0.31	0.00	41.23	64.5	2
CLP	CLP :WVGD9	Origin	100.00	1.24	0.00	-0.01	1233.16	-3.33	0.0	-39.65	16.32	-0.07	-0.95	40.32	0.31	0.00	41.27	64.5	2
CLP	SpliceB	End	105.00	0.55	0.00	-0.01	1314.77	-3.70	0.0	-39.65	16.32	-0.07	-0.92	40.22	0.30	0.00	41.14	65.4	2
CLP	SpliceB	Origin	105.00	0.55	0.00	-0.01	1314.77	-3.70	0.0	-41.38	16.34	-0.08	-0.96	40.22	0.30	0.00	41.18	65.5	2
CLP	CLP :WVGD10	End	110.00	0.14	0.00	-0.00	1396.44	-4.09	0.0	-41.38	16.34	-0.08	-0.93	40.06	0.29	0.00	40.99	66.3	2
CLP	CLP :WVGD10	Origin	110.00	0.14	0.00	-0.00	1396.44	-4.09	0.0	-43.11	16.42	-0.08	-0.97	40.06	0.29	0.00	41.03	66.4	2
CLP	CLP :g	End	115.00	0.00	0.00	0.00	1478.54	-4.50	0.0	-43.11	16.42	-0.08	-0.94	39.85	0.28	0.00	40.79	67.1	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	64.39	0.15	-3.15	-20.98	-0.01	0.0	1.81	2.33	0.00	0.22	13.42	0.00	0.00	13.64	21.0	1
ARM1.1R	ARM1.1R:END	End	9.01	64.42	0.15	-14.69	0.00	0.00	0.0	1.81	2.33	0.00	0.46	0.00	1.24	0.00	2.19	3.4	3
ARM1.1L	ARM1.1L:O	Origin	0.00	64.47	0.15	-1.52	-19.24	0.01	0.0	-2.03	2.13	-0.00	-0.25	12.30	0.00	0.00	12.56	19.3	1
ARM1.1L	ARM1.1L:END	End	9.01	65.55	0.15	8.81	-0.00	0.00	0.0	-2.03	2.13	-0.00	-0.52	0.00	1.13	0.00	2.03	3.1	3
ARM2.1R	ARM2.1R:O	Origin	0.00	51.37	0.12	-2.58	-38.55	-0.01	0.0	1.72	2.74	0.00	0.09	5.95	0.00	0.00	6.04	9.3	1
ARM2.1R	ARM2.1R:END	End	14.05	51.94	0.12	-19.02	0.00	0.00	0.0	1.72	2.74	0.00	0.19	0.00	0.63	0.00	1.11	1.7	3
ARM2.1L	ARM2.1L:O	Origin	0.00	51.46	0.12	-0.81	-34.08	0.01	0.0	-2.15	2.43	-0.00	-0.12	5.26	0.00	0.00	5.38	8.3	1
ARM2.1L	ARM2.1L:END	End	14.05	53.51	0.13	14.84	-0.00	0.00	0.0	-2.15	2.43	-0.00	-0.24	0.00	0.56	0.00	1.00	1.5	3
ARM3.1R	ARM3.1R:O	Origin	0.00	39.39	0.10	-2.04	-15.48	-0.00	0.0	1.43	2.49	0.00	0.34	28.13	0.00	0.00	28.47	43.8	1
ARM3.1R	ARM3.1R:END	End	6.21	40.50	0.10	-9.19	0.00	0.00	0.0	1.43	2.49	0.00	0.69	0.00	2.53	0.00	4.44	6.8	3
ARM3.1L	ARM3.1L:O	Origin	0.00	39.47	0.10	-0.24	-11.00	0.00	0.0	-2.26	1.77	-0.00	-0.54	19.98	0.00	0.00	20.52	31.6	1
ARM3.1L	ARM3.1L:END	End	6.21	40.85	0.10	5.34	-0.00	0.00	0.0	-2.26	1.77	-0.00	-1.10	0.00	1.80	0.00	3.31	5.1	3

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

Clamp Force Label	Input Holding Capacity	Factored Holding Capacity	Usage

	(kips)	(kips)	(kips)	%
C1	2.834	30.00	30.00	9.45
C2	2.834	30.00	30.00	9.45
C3	2.834	30.00	30.00	9.45
C4	2.834	30.00	30.00	9.45
C5	2.834	30.00	30.00	9.45
C6	2.834	30.00	30.00	9.45
C9	0.521	30.00	30.00	1.74
C10	0.521	30.00	30.00	1.74
C11	0.521	30.00	30.00	1.74
C12	1.659	30.00	30.00	5.53
C13	0.521	30.00	30.00	1.74
C14	0.521	30.00	30.00	1.74
C15	0.521	30.00	30.00	1.74
C16	0.521	30.00	30.00	1.74
C17	0.521	30.00	30.00	1.74
C18	0.521	30.00	30.00	1.74
C20	3.069	30.00	30.00	10.23
C21	0.425	30.00	30.00	1.42

*** Analysis Results for Load Case No. 2 "EXTREME" - Number of iterations in SAPS 17

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	0.004616	8.54	-0.4254	-7.6788	0.0037	0.0001	0.004616	8.54	114.6
CLP :TopConn	0.004551	8.406	-0.4164	-7.6788	0.0037	0.0001	0.004551	8.406	113.6
CLP :BotConn	0.003969	7.21	-0.3366	-7.5427	0.0037	0.0001	0.003969	7.21	104.7
CLP :ARM 1	0.003797	6.861	-0.3137	-7.4716	0.0037	0.0001	0.003797	6.861	102
CLP :WVGD1	0.003332	5.924	-0.2535	-7.1746	0.0036	0.0001	0.003332	5.924	94.75
CLP :ARM 2	0.003104	5.471	-0.2254	-6.9835	0.0035	0.0001	0.003104	5.471	91.1
CLP :WVGD2	0.002722	4.722	-0.1809	-6.5709	0.0034	0.0001	0.002722	4.722	84.82
CLP :ARM 3	0.002451	4.201	-0.1516	-6.2184	0.0033	0.0001	0.002451	4.201	80.18
CLP :WVGD3	0.002155	3.643	-0.1222	-5.8059	0.0031	0.0001	0.002155	3.643	74.88
CLP :WVGD4	0.00164	2.697	-0.07718	-4.9890	0.0028	0.0000	0.00164	2.697	64.92
CLP :WVGD5	0.001187	1.898	-0.04504	-4.1267	0.0024	0.0000	0.001187	1.898	54.95
CLP :WVGD6	0.0008035	1.25	-0.02388	-3.2582	0.0020	0.0000	0.0008035	1.25	44.98
CLP :WVGD7	0.0004951	0.7509	-0.0112	-2.4707	0.0016	0.0000	0.0004951	0.7509	34.99
CLP :WVGD8	0.0002576	0.3812	-0.004215	-1.7404	0.0011	0.0000	0.0002576	0.3812	25
CLP :WVGD9	9.436e-005	0.1362	-0.001057	-1.0441	0.0007	0.0000	9.436e-005	0.1362	15
CLP :WVGD10	1.081e-005	0.01515	-0.0001091	-0.3381	0.0002	0.0000	1.081e-005	0.01515	5
ARM1.1R:O	0.00379	6.856	-0.4011	-7.4716	0.0037	0.0001	0.00379	7.528	101.9
ARM1.1R:END	0.003727	6.843	-1.596	-7.6691	0.0037	0.0001	0.003727	16.51	101.2
ARM1.1L:O	0.003804	6.867	-0.2263	-7.4716	0.0037	0.0001	0.003804	6.195	102.1
ARM1.1L:END	0.003932	7.005	0.9237	-7.3175	0.0037	0.0001	0.003932	-2.667	103.8
ARM2.1R:O	0.003097	5.466	-0.3197	-6.9835	0.0035	0.0001	0.003097	6.241	91.01
ARM2.1R:END	0.003037	5.504	-2.045	-7.0679	0.0035	0.0001	0.003037	20.28	90.46
ARM2.1L:O	0.003111	5.477	-0.1311	-6.9835	0.0035	0.0001	0.003111	4.701	91.2
ARM2.1L:END	0.003317	5.721	1.552	-6.9216	0.0035	0.0001	0.003317	-9.054	94.05
ARM3.1R:O	0.002444	4.196	-0.2469	-6.2184	0.0033	0.0001	0.002444	5.075	80.08
ARM3.1R:END	0.002468	4.299	-0.9481	-6.7007	0.0033	0.0001	0.002468	11.26	80.63
ARM3.1L:O	0.002457	4.206	-0.05637	-6.2184	0.0033	0.0001	0.002457	3.327	80.27
ARM3.1L:END	0.002576	4.374	0.583	-6.0425	0.0033	0.0001	0.002576	-2.588	82.16

Joint Support Reactions for Load Case "EXTREME":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. 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	-0.03	0.0	-24.56	0.0	0.0	-25.20	0.0	0.0	35.19	0.0	1954.18	0.0	-1.4	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	102.47	0.06	-5.10	-0.00	-0.00	-0.0	-0.02	0.02	-0.00	-0.00	0.00	0.00	0.00	0.01	0.0	4
CLP	CLP :TopConn	End	1.00	100.87	0.05	-5.00	0.02	-0.00	-0.0	-0.02	0.02	-0.00	-0.00	0.01	0.00	0.00	0.01	0.0	2
CLP	CLP :TopConn	Origin	1.00	100.87	0.05	-5.00	0.02	-0.00	-0.0	-0.75	3.80	-0.00	-0.07	0.00	0.72	0.00	1.25	2.5	4
CLP	CLP :BotConn	End	10.00	86.52	0.05	-4.04	34.23	-0.01	-0.0	-0.75	3.80	-0.00	-0.06	8.17	0.24	0.00	8.24	16.5	2
CLP	CLP :BotConn	Origin	10.00	86.52	0.05	-4.04	34.23	-0.01	0.0	-1.21	3.44	-0.00	-0.10	8.17	0.22	0.00	8.27	16.5	2

CLP	CLP :ARM 1	End	12.67	82.33	0.05	-3.76	43.41	-0.01	0.0	-1.21	3.44	-0.00	-0.09	9.58	0.21	0.00	9.68	19.4	2
CLP	CLP :ARM 1	Origin	12.67	82.33	0.05	-3.76	45.33	-0.01	0.0	-3.36	7.62	-0.00	-0.26	10.01	0.46	0.00	10.29	20.6	2
CLP	CLP :WVGD1	End	20.00	71.09	0.04	-3.04	101.20	-0.03	0.0	-3.36	7.62	-0.00	-0.23	18.29	0.42	0.00	18.54	37.1	2
CLP	CLP :WVGD1	Origin	20.00	71.09	0.04	-3.04	101.20	-0.03	0.0	-3.75	8.12	-0.00	-0.26	18.29	0.44	0.00	18.56	37.1	2
CLP	CLP :ARM 2	End	23.67	65.66	0.04	-2.71	130.99	-0.04	0.0	-3.75	8.12	-0.00	-0.25	21.57	0.42	0.00	21.83	43.7	2
CLP	CLP :ARM 2	Origin	23.67	65.66	0.04	-2.71	135.78	-0.04	0.0	-6.92	12.41	-0.01	-0.45	22.36	0.65	0.00	22.84	45.7	2
CLP	CLP :WVGD2	End	30.00	56.67	0.03	-2.17	214.34	-0.08	0.0	-6.92	12.41	-0.01	-0.42	30.35	0.60	0.00	30.79	61.6	2
CLP	CLP :WVGD2	Origin	30.00	56.67	0.03	-2.17	214.34	-0.08	0.0	-7.40	12.91	-0.01	-0.45	30.35	0.62	0.00	30.82	61.6	2
CLP	CLP :ARM 3	End	34.67	50.42	0.03	-1.82	274.63	-0.11	0.0	-7.40	12.91	-0.01	-0.43	35.02	0.59	0.00	35.47	70.9	2
CLP	CLP :ARM 3	Origin	34.67	50.42	0.03	-1.82	279.42	-0.11	0.0	-9.35	16.92	-0.01	-0.54	35.63	0.78	0.00	36.20	72.4	2
CLP	SpliceT	End	35.17	49.77	0.03	-1.78	287.83	-0.11	0.0	-9.35	16.92	-0.01	-0.54	36.31	0.77	0.00	36.87	73.7	2
CLP	SpliceT	Origin	35.17	49.77	0.03	-1.78	287.83	-0.11	0.0	-9.59	17.01	-0.01	-0.55	36.31	0.78	0.00	36.89	73.8	2
CLP	SpliceB	End	38.00	46.17	0.03	-1.59	336.02	-0.13	0.0	-9.59	17.01	-0.01	-0.44	33.75	0.62	0.00	34.21	52.6	2
CLP	SpliceB	Origin	38.00	46.17	0.03	-1.59	336.02	-0.13	0.0	-9.91	17.14	-0.01	-0.45	33.75	0.63	0.00	34.23	52.7	2
CLP	CLP :WVGD3	End	40.00	43.71	0.03	-1.47	370.30	-0.14	0.0	-9.91	17.14	-0.01	-0.45	35.64	0.61	0.00	36.10	55.5	2
CLP	CLP :WVGD3	Origin	40.00	43.71	0.03	-1.47	370.30	-0.14	0.0	-10.62	17.69	-0.01	-0.48	35.64	0.63	0.00	36.13	55.6	2
CLP	CLP :WVGD4	End	50.00	32.36	0.02	-0.93	547.21	-0.23	0.0	-10.62	17.69	-0.01	-0.43	43.06	0.57	0.00	43.50	66.9	2
CLP	CLP :WVGD4	Origin	50.00	32.36	0.02	-0.93	547.21	-0.23	0.0	-11.99	19.30	-0.01	-0.49	43.06	0.62	0.00	43.56	67.0	2
CLP	CLP :WVGD5	End	60.00	22.77	0.01	-0.54	740.25	-0.34	0.0	-11.99	19.30	-0.01	-0.45	48.51	0.57	0.00	48.96	75.3	2
CLP	CLP :WVGD5	Origin	60.00	22.77	0.01	-0.54	740.25	-0.34	0.0	-13.31	20.10	-0.01	-0.49	48.51	0.59	0.00	49.01	75.4	2
CLP	CLP :WVGD6	End	70.00	15.00	0.01	-0.29	941.22	-0.47	0.0	-13.31	20.10	-0.01	-0.45	52.16	0.54	0.00	52.62	82.7	2
CLP	CLP :WVGD6	Origin	70.00	15.00	0.01	-0.29	941.22	-0.47	0.0	-14.12	20.64	-0.01	-0.48	52.16	0.56	0.00	52.65	82.7	2
CLP	SpliceT	End	71.00	14.33	0.01	-0.27	961.86	-0.49	0.0	-14.12	20.64	-0.01	-0.48	52.46	0.55	0.00	52.95	83.5	2
CLP	SpliceT	Origin	71.00	14.33	0.01	-0.27	961.86	-0.49	0.0	-14.68	20.80	-0.02	-0.50	52.46	0.56	0.00	52.96	83.5	2
CLP	SpliceB	End	75.00	11.80	0.01	-0.20	1045.07	-0.55	0.0	-14.68	20.80	-0.02	-0.41	46.88	0.46	0.00	47.29	72.8	2
CLP	SpliceB	Origin	75.00	11.80	0.01	-0.20	1045.07	-0.55	0.0	-15.56	21.10	-0.02	-0.44	46.88	0.47	0.00	47.32	72.8	2
CLP	CLP :WVGD7	End	80.00	9.01	0.01	-0.13	1150.56	-0.63	0.0	-15.56	21.10	-0.02	-0.42	47.75	0.45	0.00	48.18	74.1	2
CLP	CLP :WVGD7	Origin	80.00	9.01	0.01	-0.13	1150.56	-0.63	0.0	-16.84	21.82	-0.02	-0.45	47.75	0.47	0.00	48.21	74.2	2
CLP	CLP :WVGD8	End	90.00	4.57	0.00	-0.05	1368.73	-0.81	0.0	-16.84	21.82	-0.02	-0.42	49.04	0.43	0.00	49.47	76.1	2
CLP	CLP :WVGD8	Origin	90.00	4.57	0.00	-0.05	1368.73	-0.81	0.0	-18.58	22.72	-0.02	-0.47	49.04	0.45	0.00	49.52	76.2	2
CLP	SpliceT	End	99.92	1.65	0.00	-0.01	1594.00	-1.02	0.0	-18.58	22.72	-0.02	-0.44	49.87	0.42	0.00	50.31	79.5	2
CLP	SpliceT	Origin	99.92	1.65	0.00	-0.01	1594.00	-1.02	0.0	-19.44	23.06	-0.02	-0.46	49.87	0.43	0.00	50.33	79.6	2
CLP	CLP :WVGD9	End	100.00	1.63	0.00	-0.01	1595.92	-1.03	0.0	-19.44	23.06	-0.02	-0.47	52.13	0.44	0.00	52.60	82.3	2
CLP	CLP :WVGD9	Origin	100.00	1.63	0.00	-0.01	1595.92	-1.03	0.0	-20.37	23.46	-0.02	-0.49	52.13	0.44	0.00	52.63	82.3	2
CLP	SpliceB	End	105.00	0.72	0.00	-0.00	1713.22	-1.14	0.0	-20.37	23.46	-0.02	-0.47	52.37	0.43	0.00	52.84	84.0	2
CLP	SpliceB	Origin	105.00	0.72	0.00	-0.00	1713.22	-1.14	0.0	-21.62	23.81	-0.02	-0.50	52.37	0.44	0.00	52.87	84.1	2
CLP	CLP :WVGD10	End	110.00	0.18	0.00	-0.00	1832.27	-1.27	0.0	-21.62	23.81	-0.02	-0.48	52.51	0.42	0.00	53.00	85.7	2
CLP	CLP :WVGD10	Origin	110.00	0.18	0.00	-0.00	1832.27	-1.27	0.0	-22.64	24.38	-0.03	-0.51	52.51	0.43	0.00	53.03	85.8	2
CLP	CLP :g	End	115.00	0.00	0.00	0.00	1954.18	-1.40	0.0	-22.64	24.38	-0.03	-0.49	52.62	0.42	0.00	53.12	87.4	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	82.27	0.05	-4.81	-8.72	-0.00	0.0	1.91	0.97	0.00	0.24	5.58	0.00	0.00	5.82	8.9	1
ARM1.1R	ARM1.1R:END	End	9.01	82.11	0.04	-19.16	0.00	0.00	0.0	1.91	0.97	0.00	0.49	0.00	0.51	0.00	1.01	1.6	3
ARM1.1L	ARM1.1L:O	Origin	0.00	82.40	0.05	-2.72	-6.81	0.00	0.0	-2.00	0.76	-0.00	-0.25	4.36	0.00	0.00	4.60	7.1	1
ARM1.1L	ARM1.1L:END	End	9.01	84.07	0.05	11.08	-0.00	0.00	0.0	-2.00	0.76	-0.00	-0.51	0.00	0.40	0.00	0.86	1.3	3
ARM2.1R	ARM2.1R:O	Origin	0.00	65.59	0.04	-3.84	-17.89	-0.00	0.0	1.88	1.27	0.00	0.10	2.76	0.00	0.00	2.86	4.4	1
ARM2.1R	ARM2.1R:END	End	14.05	66.04	0.04	-24.53	0.00	0.00	0.0	1.88	1.27	0.00	0.21	0.00	0.29	0.00	0.55	0.8	3
ARM2.1L	ARM2.1L:O	Origin	0.00	65.73	0.04	-1.57	-13.12	0.00	0.0	-2.07	0.93	-0.00	-0.11	2.03	0.00	0.00	2.14	3.3	1
ARM2.1L	ARM2.1L:END	End	14.05	68.66	0.04	18.63	-0.00	0.00	0.0	-2.07	0.93	-0.00	-0.23	0.00	0.22	0.00	0.44	0.7	3

ARM3.1R	ARM3.1R:O	Origin	0.00	50.35	0.03	-2.96	-7.53	-0.00	0.0	1.73	1.21	0.00	0.42	13.67	0.00	0.00	14.09	21.7	1
ARM3.1R	ARM3.1R:END	End	6.21	51.59	0.03	-11.38	0.00	0.00	0.0	1.73	1.21	0.00	0.84	0.00	1.23	0.00	2.29	3.5	3
ARM3.1L	ARM3.1L:O	Origin	0.00	50.48	0.03	-0.68	-2.74	0.00	0.0	-2.06	0.44	-0.00	-0.50	4.99	0.00	0.00	5.48	8.4	1
ARM3.1L	ARM3.1L:END	End	6.21	52.49	0.03	7.00	-0.00	0.00	0.0	-2.06	0.44	-0.00	-1.00	0.00	0.45	0.00	1.27	2.0	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
C9	0.247	30.00	30.00	0.82
C10	0.247	30.00	30.00	0.82
C11	0.247	30.00	30.00	0.82
C12	1.105	30.00	30.00	3.68
C13	0.247	30.00	30.00	0.82
C14	0.247	30.00	30.00	0.82
C15	0.247	30.00	30.00	0.82
C16	0.247	30.00	30.00	0.82
C17	0.247	30.00	30.00	0.82
C18	0.247	30.00	30.00	0.82
C20	3.607	30.00	30.00	12.02
C21	0.652	30.00	30.00	2.17

*** 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	87.41	EXTREME	22	14259.4

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)	Bolt Mom. Sum (ft-k)	# Bolts Acting	Bolt Max Load (kips)	Min Plate Thickness (in)	Actual Thickness (in)	Usage %
CLP	NESC HEAVY	1	1.196	1.008	0.595	1.609	10.196	37.380	40.033	2	78.494	2.267	2.750	67.96
CLP	NESC HEAVY	2	0.595	-1.609	1.196	-1.008	10.196	34.499	36.947	2	-72.283	2.178	2.750	62.73
CLP	NESC HEAVY	3	-1.246	-1.558	1.246	-1.558	29.911	8.950	28.117	6	-73.708	1.109	2.750	16.27
CLP	NESC HEAVY	4	-1.196	-1.008	-0.595	-1.609	10.196	33.900	36.306	2	-71.206	2.159	2.750	61.64
CLP	NESC HEAVY	5	-0.595	1.609	-1.196	1.008	10.196	37.979	40.674	2	79.570	2.285	2.750	69.05
CLP	NESC HEAVY	6	1.246	1.558	-1.246	1.558	29.911	9.849	30.942	6	80.996	1.164	2.750	17.91
CLP	NESC HEAVY	7	1.335	1.273	0.620	1.569	9.282	26.625	25.957	2	78.494	1.913	2.750	48.41
CLP	NESC HEAVY	8	0.620	-1.569	1.335	-1.273	9.282	24.563	23.947	2	-72.283	1.838	2.750	44.66
CLP	NESC HEAVY	9	-1.335	-1.273	-0.620	-1.569	9.282	24.147	23.541	2	-71.206	1.822	2.750	43.90
CLP	NESC HEAVY	10	-0.620	1.569	-1.335	1.273	9.282	27.042	26.363	2	79.570	1.928	2.750	49.17
CLP	EXTREME	1	1.196	1.008	0.595	1.609	10.196	48.327	51.757	2	101.262	2.578	2.750	87.87
CLP	EXTREME	2	0.595	-1.609	1.196	-1.008	10.196	46.675	49.987	2	-97.746	2.533	2.750	84.86
CLP	EXTREME	3	-1.246	-1.558	1.246	-1.558	29.911	12.185	38.283	6	-100.175	1.294	2.750	22.16
CLP	EXTREME	4	-1.196	-1.008	-0.595	-1.609	10.196	46.489	49.788	2	-97.412	2.528	2.750	84.53
CLP	EXTREME	5	-0.595	1.609	-1.196	1.008	10.196	48.513	51.956	2	101.596	2.583	2.750	88.21
CLP	EXTREME	6	1.246	1.558	-1.246	1.558	29.911	12.660	39.775	6	104.024	1.319	2.750	23.02
CLP	EXTREME	7	1.335	1.273	0.620	1.569	9.282	34.418	33.554	2	101.262	2.175	2.750	62.58
CLP	EXTREME	8	0.620	-1.569	1.335	-1.273	9.282	33.238	32.404	2	-97.746	2.138	2.750	60.43
CLP	EXTREME	9	-1.335	-1.273	-0.620	-1.569	9.282	33.109	32.278	2	-97.412	2.134	2.750	60.20
CLP	EXTREME	10	-0.620	1.569	-1.335	1.273	9.282	34.547	33.680	2	101.596	2.180	2.750	62.81

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
ARM1.1R	20.99	NESC HEAVY	1	184.2
ARM1.1L	19.32	NESC HEAVY	1	184.2
ARM2.1R	9.30	NESC HEAVY	1	652.8
ARM2.1L	8.27	NESC HEAVY	1	652.8
ARM3.1R	43.80	NESC HEAVY	1	65.6
ARM3.1L	31.57	NESC HEAVY	1	65.6

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type

NESC HEAVY	70.53	CLP	Steel Pole
EXTREME	88.21	CLP	Base Plate

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Steel Pole Segment Usage %	Label	Number
NESC HEAVY	70.53	CLP	15
EXTREME	87.41	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 Moment (ft-k)	Bending Stress (ksi)	Bolt Moment Sum (ft-k)	# Bolts Acting On Bend Line	Max Bolt Load For Bend Line (kips)	Minimum Plate Thickness (in)	Usage %
NESC HEAVY	CLP	5	10.196	43.725	1478.543	-4.503	37.979	40.674	2	79.570	2.285	69.05
EXTREME	CLP	5	10.196	23.097	1954.181	-1.398	48.513	51.956	2	101.596	2.583	88.21

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Tubular Davit Segment Usage %	Label	Number
NESC HEAVY	43.80	ARM3.1R	1
EXTREME	21.68	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
C9	Clamp	1.74	NESC HEAVY	0.0
C10	Clamp	1.74	NESC HEAVY	0.0
C11	Clamp	1.74	NESC HEAVY	0.0
C12	Clamp	5.53	NESC HEAVY	0.0
C13	Clamp	1.74	NESC HEAVY	0.0
C14	Clamp	1.74	NESC HEAVY	0.0
C15	Clamp	1.74	NESC HEAVY	0.0
C16	Clamp	1.74	NESC HEAVY	0.0
C17	Clamp	1.74	NESC HEAVY	0.0
C18	Clamp	1.74	NESC HEAVY	0.0
C20	Clamp	12.02	EXTREME	0.0
C21	Clamp	2.17	EXTREME	0.0

Loads At Insulator Attachments For All Load Cases:

Load Case	Insulator Label	Insulator Type	Structure Attach	Structure Attach	Structure Attach	Structure Attach	Structure Attach

			Label	Load X (kips)	Load Y (kips)	Load Z (kips)	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	C9	Clamp	CLP :WVGD1	0.000	0.075	0.516	0.521
NESC HEAVY	C10	Clamp	CLP :WVGD2	0.000	0.075	0.516	0.521
NESC HEAVY	C11	Clamp	CLP :WVGD3	0.000	0.075	0.516	0.521
NESC HEAVY	C12	Clamp	CLP :WVGD4	0.000	0.976	1.342	1.659
NESC HEAVY	C13	Clamp	CLP :WVGD5	0.000	0.075	0.516	0.521
NESC HEAVY	C14	Clamp	CLP :WVGD6	0.000	0.075	0.516	0.521
NESC HEAVY	C15	Clamp	CLP :WVGD7	0.000	0.075	0.516	0.521
NESC HEAVY	C16	Clamp	CLP :WVGD8	0.000	0.075	0.516	0.521
NESC HEAVY	C17	Clamp	CLP :WVGD9	0.000	0.075	0.516	0.521
NESC HEAVY	C18	Clamp	CLP :WVGD10	0.000	0.075	0.516	0.521
NESC HEAVY	C20	Clamp	CLP :TopConn	0.000	1.652	2.587	3.069
NESC HEAVY	C21	Clamp	CLP :BotConn	0.000	-0.166	0.391	0.425
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	C9	Clamp	CLP :WVGD1	0.000	0.216	0.119	0.247
EXTREME	C10	Clamp	CLP :WVGD2	0.000	0.216	0.119	0.247
EXTREME	C11	Clamp	CLP :WVGD3	0.000	0.216	0.119	0.247
EXTREME	C12	Clamp	CLP :WVGD4	0.000	1.044	0.363	1.105
EXTREME	C13	Clamp	CLP :WVGD5	0.000	0.216	0.119	0.247
EXTREME	C14	Clamp	CLP :WVGD6	0.000	0.216	0.119	0.247
EXTREME	C15	Clamp	CLP :WVGD7	0.000	0.216	0.119	0.247
EXTREME	C16	Clamp	CLP :WVGD8	0.000	0.216	0.119	0.247
EXTREME	C17	Clamp	CLP :WVGD9	0.000	0.216	0.119	0.247
EXTREME	C18	Clamp	CLP :WVGD10	0.000	0.216	0.119	0.247
EXTREME	C20	Clamp	CLP :TopConn	0.000	3.464	1.005	3.607
EXTREME	C21	Clamp	CLP :BotConn	0.000	-0.639	0.130	0.652

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	13.247	0.000	22.638	1200.150	-0.000	-0.000
EXTREME	16.793	0.000	8.695	1503.112	-0.000	-0.000

*** Weight of structure (lbs):
Weight of Tubular Davit Arms: 1805.4
Weight of Steel Poles: 14259.4
Total: 16064.8

*** End of Report

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Branford, CT 06405 F: (203) 488-8587

Subject:	Anchor Bolt Analysis Pole #1068
Location:	Darien, CT
Rev. 0: 10/28/16	Prepared by: T.J.L. Checked by: C.F.C. Job No. 16162.04

Anchor Bolt Analysis:

Input Data:

Bolt Force:

Maximum Tensile Force = $T_{Max} := 102 \cdot kips$ (User Input from PLS-Pole)

Anchor Bolt Data:

Use ASTM A432 Grade 60

Number of Anchor Bolts = $N := 12$ (User Input)

Bolt "Column" Distance = $l := 3.0 \cdot in$ (User Input)

Bolt Ultimate Strength = $F_u := 90 \cdot ksi$ (User Input)

Bolt Yeild Strength= $F_y := 60 \cdot ksi$ (User Input)

Bolt Modulus = $E := 29000 \cdot ksi$ (User Input)

Diameter of Anchor Bolts = $D := 2.25 \cdot in$ (User Input)

Threads per Inch = $n := 4.5$ (User Input)

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 3.248 \cdot in^2$

Bolt Tension Check:

Allowable Tensile Force (Net Area) = $T_{ALL.Net} := 1.0 \cdot \left(A_n \cdot F_y\right) = 194.861 \cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Net}} = 52.35 \cdot \%$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL.Net}} \le 1.00, "OK", "Overstressed"\right)$

Condition1 = "OK"

RAN Template: 704Bu Outdoor	A&L Template: 1HP_704Bu

CT11290C_1.1_L700

Section 1 - Site Information

Site ID: CT11290C
Status: Draft
Version: 1.1
Project Type: L700
Approved: Not Approved
Approved By: Not Approved
Last Modified: 9/26/2016 5:54:01 AM
Last Modified By: GSM1900\AMurill9

Site Name: Darien/ Dtwn & Rt-1
Site Class: Utility Lattice Tower
Site Type: Structure Non Building
Solution Type:
Plan Year:
Market: CONNECTICUT
Vendor: Ericsson
Landlord: <undefined>

Latitude: 41.07757000
Longitude: -73.46758100
Address: 3 Mechanic Street
City, State: Darien, CT
Region: NORTHEAST

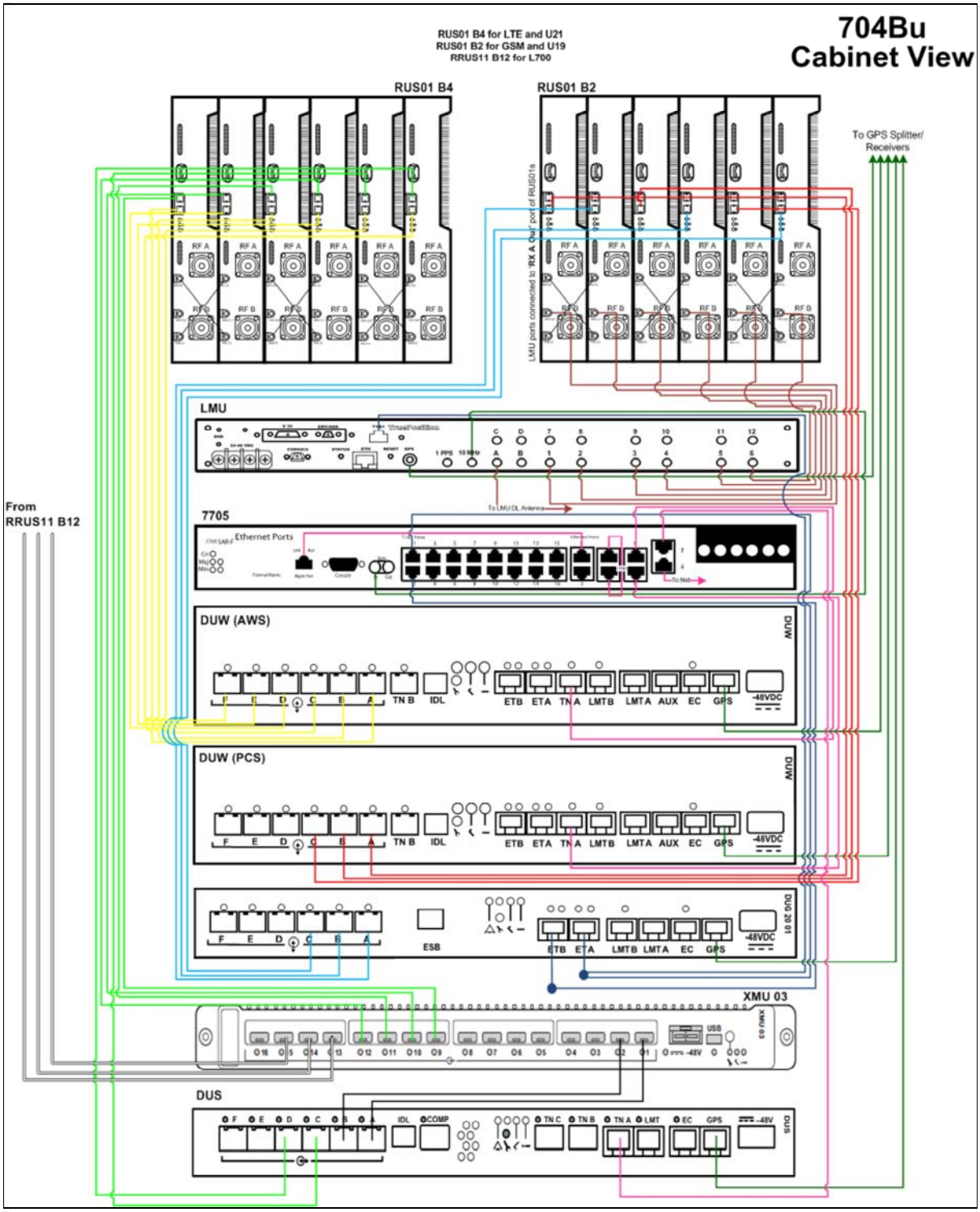
RAN Template: 704Bu Outdoor		AL Template: 1HP_704Bu		
Sector Count: 3	Antenna Count: 3	Coax Line Count: 18	TMA Count: 0	RRU Count: 3

Section 2 - Existing Template Images

— This section is intentionally blank. —

Section 3 - Proposed Template Images

704Bu.png



Notes:

Section 4 - Siteplan Images

— This section is intentionally blank. —

RAN Template: 704Bu Outdoor	A&L Template: 1HP_704Bu

CT11290C_1.1_L700

Section 5 - RAN Equipment

Existing RAN Equipment		
Template: 4B		
Enclosure	1	2
Enclosure Type	RBS 3106	RBS 6102
Baseband		DUL20, DUW30 (x2), DUG20
Radio		RUS01 B2 (x6), RUS01 B4 (x6)

Proposed RAN Equipment		
Template: 704Bu Outdoor		
Enclosure	1	2
Enclosure Type	RBS 6102	Ground Mount
Baseband	DUG20 (G1900), DUW30 (U1900), DUW30 (U2100), DUS41 (L2100, L700)	
Multiplexer	XMU (L2100, L700)	
Radio	RUS01 B2 (x3) (G1900), RUS01 B2 (x3) (U1900), RUS01 B4 (x6) (U2100, L2100)	RRUS11 B12 (x3) (L700)

RAN Scope of Work:

RAN Template: 704Bu Outdoor	A&L Template: 1HP_704Bu

CT11290C_1.1_L700

Section 6 - A&L Equipment

Existing Template: 4B
Proposed Template: 1HP_704Bu

Sector 1 (Existing) view from behind		
Coverage Type	A - Outdoor Macro	
Antenna	1	
Antenna Model	APX16DWV-16DWV-S-E-A20 (Quad)	
Azimuth	110	
M. Tilt	0	
Height	120	
Ports	P1	P2
Active Tech.	U1900 G1900	U2100 L2100
Dark Tech.		
Restricted Tech.		
Decomm. Tech.		
E. Tilt	3	4
Cables	1-1/4" Coax - 143 ft. 1-1/4" Coax - 143 ft.	1-1/4" Coax - 143 ft. 1-1/4" Coax - 143 ft.
TMAs		
Diplexers / Combiners		
Radio		
Sector Equipment		

Unconnected Equipment:

Scope of Work:

RAN Template: 704Bu Outdoor	A&L Template: 1HP_704Bu

CT11290C_1.1_L700

Sector 1 (Proposed) view from behind			
Coverage Type	A - Outdoor Macro		
Antenna	1		
Antenna Model	SBNHH-1D65A (Hex)		
Azimuth	110		
M. Tilt	0		
Height	120		
Ports	P1	P2	P3
Active Tech.	U1900 G1900	U2100 L2100	L700
Dark Tech.			
Restricted Tech.			
Decomm. Tech.			
E. Tilt	2	2	2
Cables	1-1/4" Coax - 143 ft. 1-1/4" Coax - 143 ft.	1-1/4" Coax - 143 ft. 1-1/4" Coax - 143 ft.	1-1/4" Coax - 143 ft. 1-1/4" Coax - 143 ft.
TMAs			
Diplexers / Combiners			
Radio			
Sector Equipment			Andrew Smart Bias T

Unconnected Equipment:

Scope of Work:

RAN Template: 704Bu Outdoor	A&L Template: 1HP_704Bu

CT11290C_1.1_L700

Sector 2 (Existing) view from behind		
Coverage Type	A - Outdoor Macro	
Antenna	1	
Antenna Model	APX16DWV-16DWV-S-E-A20 (Quad)	
Azimuth	230	
M. Tilt	0	
Height	120	
Ports	P1	P2
Active Tech.	U1900 G1900	U2100 L2100
Dark Tech.		
Restricted Tech.		
Decomm. Tech.		
E. Tilt	2	8
Cables	1-1/4" Coax - 143 ft. 1-1/4" Coax - 143 ft.	1-1/4" Coax - 143 ft. 1-1/4" Coax - 143 ft.
TMAs		
Diplexers / Combiners		
Radio		
Sector Equipment		

Unconnected Equipment:

Scope of Work:

RAN Template: 704Bu Outdoor	A&L Template: 1HP_704Bu

CT11290C_1.1_L700

Sector 2 (Proposed) view from behind			
Coverage Type	A - Outdoor Macro		
Antenna	1		
Antenna Model	SBNHH-1D65A (Hex)		
Azimuth	230		
M. Tilt	0		
Height	120		
Ports	P1	P2	P3
Active Tech.	U1900 G1900	U2100 L2100	L700
Dark Tech.			
Restricted Tech.			
Decomm. Tech.			
E. Tilt	2	2	2
Cables	1-1/4" Coax - 143 ft. 1-1/4" Coax - 143 ft.	1-1/4" Coax - 143 ft. 1-1/4" Coax - 143 ft.	1-1/4" Coax - 143 ft. 1-1/4" Coax - 143 ft.
TMAs			
Diplexers / Combiners			
Radio			
Sector Equipment			Andrew Smart Bias T

Unconnected Equipment:

Scope of Work:

RAN Template: 704Bu Outdoor	A&L Template: 1HP_704Bu

CT11290C_1.1_L700

Sector 3 (Existing) view from behind		
Coverage Type	A - Outdoor Macro	
Antenna	1	
Antenna Model	APX16DWV-16DWV-S-E-A20 (Quad)	
Azimuth	350	
M. Tilt	0	
Height	120	
Ports	P1	P2
Active Tech.	U1900 G1900	U2100 L2100
Dark Tech.		
Restricted Tech.		
Decomm. Tech.		
E. Tilt	2	2
Cables	1-1/4" Coax - 143 ft. 1-1/4" Coax - 143 ft.	1-1/4" Coax - 143 ft. 1-1/4" Coax - 143 ft.
TMAs		
Diplexers / Combiners		
Radio		
Sector Equipment		

Unconnected Equipment:

Scope of Work:

RAN Template: 704Bu Outdoor	A&L Template: 1HP_704Bu

CT11290C_1.1_L700

Sector 3 (Proposed) view from behind			
Coverage Type	A - Outdoor Macro		
Antenna	1		
Antenna Model	SBNHH-1D65A (Hex)		
Azimuth	350		
M. Tilt	0		
Height	120		
Ports	P1	P2	P3
Active Tech.	U1900 G1900	U2100 L2100	L700
Dark Tech.			
Restricted Tech.			
Decomm. Tech.			
E. Tilt	2	2	2
Cables	1-1/4" Coax - 143 ft. 1-1/4" Coax - 143 ft.	1-1/4" Coax - 143 ft. 1-1/4" Coax - 143 ft.	1-1/4" Coax - 143 ft. 1-1/4" Coax - 143 ft.
TMAs			
Diplexers / Combiners			
Radio			
Sector Equipment			Andrew Smart Bias T

Unconnected Equipment:

Scope of Work:

Product Specifications

COMMSCOPE®

POWERED BY ANDREW

SBNHH-1D65A

Andrew® Tri-band Antenna, 698–896 and 2x 1695–2360 MHz, 65° horizontal beamwidth, internal RET. Both high bands share the same electrical tilt.

- Interleaved dipole technology providing for attractive, low wind load mechanical package

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2180	2300–2360
Gain, dBi	13.6	13.7	16.5	16.9	17.1	17.6
Beamwidth, Horizontal, degrees	66	61	70	65	62	61
Beamwidth, Vertical, degrees	17.6	15.9	7.1	6.6	6.2	5.5
Beam Tilt, degrees	0–18	0–18	0–10	0–10	0–10	0–10
USLS, dB	16	13	13	13	12	12
Front-to-Back Ratio at 180°, dB	25	27	28	28	27	29
CPR at Boresight, dB	20	16	20	23	17	20
CPR at Sector, dB	10	5	11	6	1	4
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	30	30	30	30
VSWR | Return Loss, dB	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350	350	350	300
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2180	2300–2360
Gain by all Beam Tilts, average, dBi	13.1	13.1	16.1	16.5	16.7	17.2
Gain by all Beam Tilts Tolerance, dB	±0.5	±0.5	±0.5	±0.3	±0.5	±0.4
	0 ° | 13.4	0 ° | 13.4	0 ° | 16.0	0 ° | 16.3	0 ° | 16.5	0 ° | 17.0
Gain by Beam Tilt, average, dBi	9 ° | 13.1	9 ° | 13.1	5 ° | 16.2	5 ° | 16.5	5 ° | 16.8	5 ° | 17.3
	18 ° | 12.7	18 ° | 12.7	10 ° | 16.1	10 ° | 16.5	10 ° | 16.6	10 ° | 16.9
Beamwidth, Horizontal Tolerance, degrees	±3.1	±5.4	±2.8	±4	±6.6	±4.6
Beamwidth, Vertical Tolerance, degrees	±1.8	±1.4	±0.3	±0.4	±0.5	±0.3
USLS, dB	15	14	15	15	15	14
Front-to-Back Total Power at 180° ± 30°, dB	22	21	26	26	24	25
CPR at Boresight, dB	22	16	22	25	21	22
CPR at Sector, dB	10	6	12	8	5	4

* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, download the whitepaper Time to Raise the Bar on BSAs.

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol® multiband with internal RET
Band	Multiband
Brand	DualPol® | Teletilt®
Operating Frequency Band	1695 – 2360 MHz | 698 – 896 MHz

Product Specifications

SBNHH-1D65A

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum | Low loss circuit board
Radome Material	Fiberglass, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	6
Wind Loading, maximum	445.0 N @ 150 km/h 100.0 lbf @ 150 km/h
Wind Speed, maximum	241.4 km/h | 150.0 mph

Dimensions

Depth	180.0 mm | 7.1 in
Length	1409.0 mm | 55.5 in
Width	301.0 mm | 11.9 in
Net Weight	15.2 kg | 33.5 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
Power Consumption, idle state, maximum	2.0 W
Power Consumption, normal conditions, maximum	13.0 W
Protocol	3GPP/AISG 2.0 (Multi-RET)
RET Interface	8-pin DIN Female | 8-pin DIN Male
RET Interface, quantity	1 female | 1 male
RET System	Teletilt®

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

Included Products

BSAMNT-1 — Wide Profile Antenna Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.

Product Specifications

COMMSCOPE®

POWERED BY ANDREW®

ATSBT-TOP-FM-4G

Teletilt® Top Smart Bias Tee

- Injects AISG power and control signals onto a coaxial cable line
- Reduces cable and site lease costs by eliminating the need for AISG home run cables
- AISG 1.1 and 2.0 compliant
- Operates at 10-30 Vdc
- Weatherproof AISG connectors
- Intuitive schematics simplify and ensure proper installation
- Enhanced lightning protection plus grounding stud for additional surge protection
- 7-16 DIN female connector (BTS)
- 7-16 DIN male connector (ANT)

General Specifications

Smart Bias Tee Type	10–30 V Top
Brand	Teletilt®
Operating Frequency Band	694 – 2690 MHz

Electrical Specifications

EU Certification	CE
Protocol	AISG 1.1 | AISG 2.0
Antenna Interface Signal	dc Blocked | RF
BTS Interface Signal	AISG data | dc | RF
Interface Protocol Signal	Data | dc
Voltage Range	10–30 Vdc
VSWR | Return Loss	1.17:1 | 22 dB, typical
Power Consumption, maximum	0.6 W
RF Power, maximum	250 W @ 1850 MHz 500 W @ 850 MHz
Impedance	50 ohm
Insertion Loss, typical	0.1 dB
3rd Order IMD	-158.0 dBc (relative to carrier)
3rd Order IMD Test Method	Two +43 dBm carriers
Electromagnetic Compatibility (EMC)	CFR 47 Part 15, Subpart B, Class B | EN 55022, Class B | ICES-003 Issue 4 CAN/CSA-CEI/IEC CISPR 22:02

Mechanical Specifications

Antenna Interface	7-16 DIN Male
BTS Interface	7-16 DIN Female
AISG Input Connector	8-pin DIN Female
Color	Silver
Grounding Lug Thread Size	M8
Material Type	Aluminum
Lightning Surge Capability	5 times @ -3 kA 5 times @ 3 kA

Product Specifications

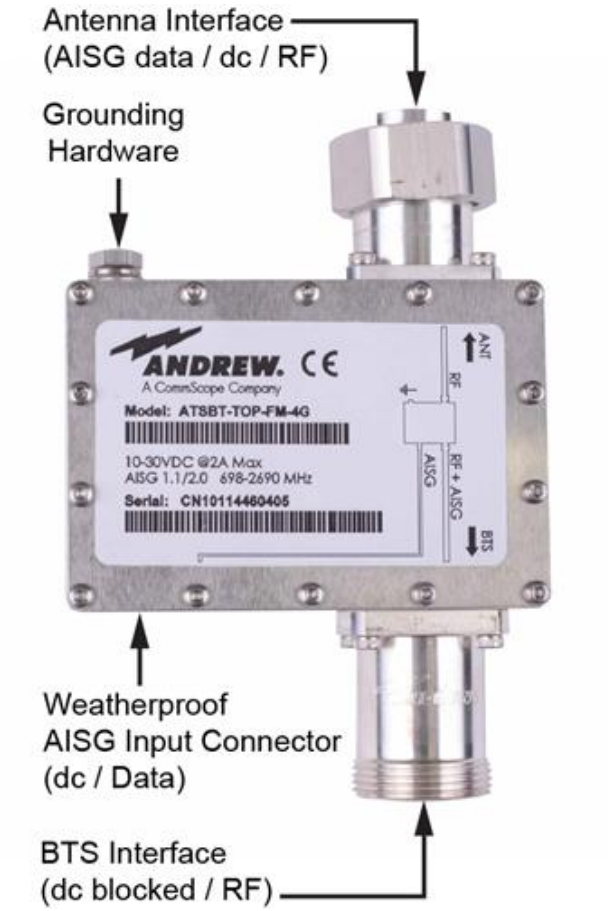
ATSBT-TOP-FM-4G

Lightning Surge Capability Test Method	IEC 61000-4-5, Level X
Lightning Surge Capability Waveform	1.2/50 voltage and 8/20 current combination waveform

Environmental Specifications

Ingress Protection Test Method	IEC 60529:2001, IP66
Operating Temperature	-40 °C to +70 °C (-40 °F to +158 °F)

Interface Port Drawing



Dimensions

Width	94.0 mm | 3.7 in
Depth	50.0 mm | 2.0 in
Height	143.00 mm | 5.63 in
Net Weight	0.8 kg | 1.8 lb

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption

Exhibit E

EBI Consulting
environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CT11290C

Darien/ Dtwn & Rt-1
3 Mechanic Street
Darien, CT 06820

November 5, 2016

EBI Project Number: 6216004977

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	1.79 %

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

EBI Consulting
environmental | engineering | due diligence

November 5, 2016

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

Emissions Analysis for Site: **CT11290C – Darien/ Dtwn & Rt-1**

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 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **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, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

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

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

3) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

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) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

6) Since all radios are ground mounted there are additional cabling losses accounted for. For each ground mounted RF path the following losses were calculated. 1.00 dB of additional cable loss for all ground mounted 700 MHz Channels, 1.74 dB of additional cable loss for all ground mounted 1900 MHz channels and 1.84 dB of additional cable loss for all ground mounted 2100 MHz channels. This is based on manufacturers Specifications for 143 feet of 1-1/4" coax cable on each path.

7) 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.

8) 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 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.

9) The antennas used in this modeling are the **Commscope SBNHH-1D65A** for 700 MHz, 1900 MHz (PCS) and 2100 MHz (AWS) channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Commscope SBNHH-1D65A** has a maximum gain of **14.7 dBd** at its main lobe at 1900 MHz and 2100 MHz and a maximum gain of **10.9 dBd** at its main lobe at 700 MHz. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, 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.

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

11) 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.

12) All calculations were done with respect to uncontrolled / general public threshold limits.

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Commscope SBNHH-1D65A	Make / Model:	Commscope SBNHH-1D65A	Make / Model:	Commscope SBNHH-1D65A
Gain:	14.7 dBd / 10.9 dBd	Gain:	14.7 dBd / 10.9 dBd	Gain:	14.7 dBd / 10.9 dBd
Height (AGL):	120	Height (AGL):	120	Height (AGL):	120
Frequency Bands	700 MHz / 1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	9	Channel Count	9	Channel Count	9
Total TX Power(W):	330	Total TX Power(W):	330	Total TX Power(W):	330
ERP (W):	6,143.08	ERP (W):	6,143.08	ERP (W):	6,143.08
Antenna A1 MPE%	1.79	Antenna B1 MPE%	1.79	Antenna C1 MPE%	1.79

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**1.79 %**
No Additional Carriers Listed per CSC active MPE database	NA
Site Total MPE %:	**1.79 %**

T-Mobile Sector A Total:	1.79 %
T-Mobile Sector B Total:	1.79 %
T-Mobile Sector C Total:	1.79 %
Site Total:	1.79 %

T-Mobile _per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile AWS - 2100 MHz LTE	2	1,159.18	120	6.41	AWS - 2100 MHz	1000	0.64%
T-Mobile AWS - 2100 MHz UMTS	2	579.59	120	3.21	AWS - 2100 MHz	1000	0.32%
T-Mobile PCS - 1950 MHz UMTS	2	593.09	120	3.28	PCS - 1950 MHz	1000	0.33%
T-Mobile PCS - 1950 MHz GSM	2	593.09	120	3.28	PCS - 1950 MHz	1000	0.33%
T-Mobile 700 MHz LTE	1	293.17	120	0.81	700 MHz	467	0.17%
						Total:	**1.79%**

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general public 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 public exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector A:	1.79 %
Sector B:	1.79 %
Sector C:	1.79 %
T-Mobile Per Sector Maximum:	1.79 %
Site Total:	1.79 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **1.79%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Exhibit F

EVERSOURCE ENERGY

56 Prospect Street,
Hartford, CT 06103

P.O. Box 270
Hartford, CT 06141-0270
(860) 665-5000

November 16, 2016

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

RE: T-Mobile Antenna Site, CT11290C, 3 Mechanic St., Darien CT, structure 1068.

Dear Mr. Richard:

Based on our reviews of the site drawings, the structural analysis provided by Centek Engineering and, and the foundation analyses performed by Centek Engineering, we have reviewed for acceptance this modification

Since there are no outstanding structural or site related issues to resolve at this time, please contact Hank O'Brien (860-665-6987) to complete the lease amendment issues

Sincerely,

Robert Gray
Transmission Line Engineering

ref: CT11290A-L700-CD 10-25-16.pdf
16162.04 - CT11290C Structural Analysis Rev0 16.10.31.pd