Crown Castle
3530 Toringdon Way Suite 300
Charlotte NC 28277

Tel (704) 405-6600

November 14, 2014

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

RE: **Metro PCS-Exempt Modification - Crown Site BU: 876364**
Metro PCS Site ID: CTHA520A
Located at: 201 Main Street, Cromwell, CT 06416

Dear Ms. Bachman:

This letter and exhibits are submitted on behalf of Metro PCS. Metro PCS is making modifications to certain existing sites in its Connecticut system in order to implement their 700MHz technology. Please accept this letter and exhibits as notification, pursuant to § 16-50j-73 of the Regulations of Connecticut State Agencies ("R.C.S.A."), of construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In compliance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Mr. Jonathan Sistare, Town Manager for the Town of Cromwell and S & S Partners Inc., Property Owner.

Metro PCS plans to modify the existing wireless communications facility owned by Crown Castle and located at **201 Main Street, Cromwell, CT 06416**. Attached are a compound plan and elevation depicting the planned changes (Exhibit-1), and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration (Exhibit-2). Also included is a power density table report reflecting the modification to T-Mobile's operations at the site (Exhibit-3).

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes ("C.G.S.") § 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in the 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 tower. T-Mobile's replacement antennas will be located at the same elevation on the existing tower.

2. There will be no proposed modifications to the ground and no extension of boundaries.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative General Power Density table report for T-Mobile's modified facility is included as Exhibit-3.

5. A Structural Modification Report confirming that the tower and foundation can support T-Mobile's proposed modifications is included as Exhibit-2.

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

Sincerely,

Jerry Feathers
Real Estate Specialist

Enclosure

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

cc: Mr. Jonathan Sistare, Town Manager
Office of the Town Manager
Nathaniel White Building
41 West Street
Cromwell, CT 06416

cc: S & S Partners Inc.
P.O. Box 734
Old Lyme, CT 06371

metroPCS

SITE NAME: CROWN CROMWELL MONOPOLE

SITE ID NUMBER: CTHA520A

SITE ADDRESS: 201 MAIN ST.
CROMWELL, CT 06480

PROJECT SUMMARY

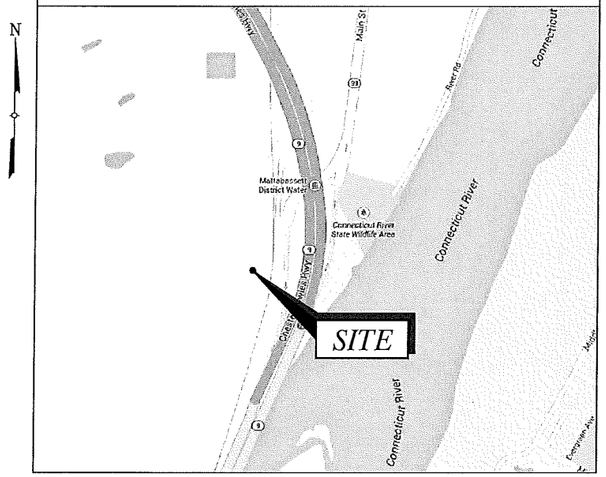
SITE ID NUMBER:	CTHA520A
SITE NAME:	CROWN CROMWELL MONOPOLE
CROWN BU#:	876364
SITE ADDRESS:	201 MAIN ST. CROMWELL, CT 06480
COUNTY:	MIDDLESEX
PROPERTY OWNER:	CROWN CASTLE USA
APPLICANT:	metroPCS WIRELESS, INC. 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
ENGINEER:	TECTONIC ENGINEERING AND SURVEYING CONSULTANTS, P.C. 1279 ROUTE 300 NEWBURGH, NY 12550
CONTACT: PHONE:	JAMES QUICKSELL (845) 567-6656 EXT. 2835
SITE ACQUISITION:	CROWN CASTLE 1200 MACARTHUR BLVD SUITE 200 MAHWAH, NJ 07430
CONTACT: PHONE:	PETE TISI (201) 491-6009
PARCEL INFO:	51/47/36//
LATITUDE: (NAD 83)	41.583364° N
LONGITUDE: (NAD 83)	72.649761° W

SITE DIRECTIONS

HEAD NORTHEAST ON GRIFFIN RD S TOWARD W NEWBERRY RD. TAKE THE SECOND RIGHT ONTO DAY HILL RD. MERGE ONTO I-91 S VIA THE RAMP TO HARTFORD. MERGE ONTO I-91 S. TAKE THE EXIT 22S ON THE LEFT ONTO CT-9 TOWARD MIDDLETOWN/OLD SAYBROOK. TAKE EXIT 19 FOR CT-372/WEST ST TOWARD CROMWELL. TURN LEFT ONTO CT-372E/WEST ST. TURN RIGHT ONTO CT-99S. TAKE THE CONNECTICUT 9 S RAMP. DESTINATION WILL BE ON THE RIGHT.

LOCATION MAP

SCALE: NTS



SHEET INDEX

SHEET NO	DESCRIPTION	REV NO
T-1	TITLE SHEET	1
A-1	SITE PLAN	1
A-2	EQUIPMENT LAYOUT PLANS & DETAILS	1
A-3	ELEVATION & DETAIL	1
A-3A	ELEVATIONS & DETAILS	1
A-4	ANTENNA LAYOUT PLANS & DETAILS	1
A-5	EQUIPMENT PLATFORM PLAN & DETAILS	1
A-6	DETAILS	1
A-7	GROUNDING DIAGRAM & DETAILS	1
A-8	ONE-LINE POWER DIAGRAM & DETAILS	1
A-9	GROUNDING & UTILITY PLAN & DETAILS	1
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A-11	ELECTRICAL & GROUNDING NOTES	1
A-12	STRUCTURAL & EARTHWORK NOTES	1
A-13	CONCRETE NOTES	1

THIS SET OF PLANS SHALL NOT BE UTILIZED AS CONSTRUCTION DOCUMENTS UNTIL ALL ITEMS HAVE BEEN ADDRESSED AND EACH OF THE DRAWINGS HAS BEEN REVISED AND ISSUED "FOR CONSTRUCTION".

CALL TOLL FREE FOR CONNECTICUT
CALL TWO FULL WORKING DAYS IN ADVANCE TO LOCATE BURIED UTILITY PIPES AND CABLES

CONFIGURATION
5A
REFER TO LATEST T-MOBILE RF DATA SHEET FOR FINAL RF DESIGN & BOM.

0 1 2 3
ORIGINAL SIZE IN INCHES

TECTONIC
• PLANNING • ENGINEERING • CONSTRUCTION MANAGEMENT • SURVEYING
TECTONIC Engineering and Surveying Consultants, P.C.
1279 ROUTE 300
NEWBURGH, NY 12550
Phone: (845) 567-6656
Fax: (845) 567-8703

metroPCS
metroPCS WIRELESS, INC.
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

CROWN CASTLE

APPROVALS

LANDLORD _____
RF _____
CONSTRUCTION _____
OPERATIONS _____
SITE ACQ. _____

PROJECT NUMBER	DESIGNED BY
7061.CTHA520A	JQ

REV	DATE	REVISION	DRAWN BY
0	11/07/14	FOR COMMENT	MP
1	11/12/14	FOR CONSTRUCTION	MP

ISSUED BY | DATE

STATE OF CONNECTICUT
ANTONIO A. GUALTIERI
No. 25406
LICENSED PROFESSIONAL ENGINEER

SITE INFORMATION

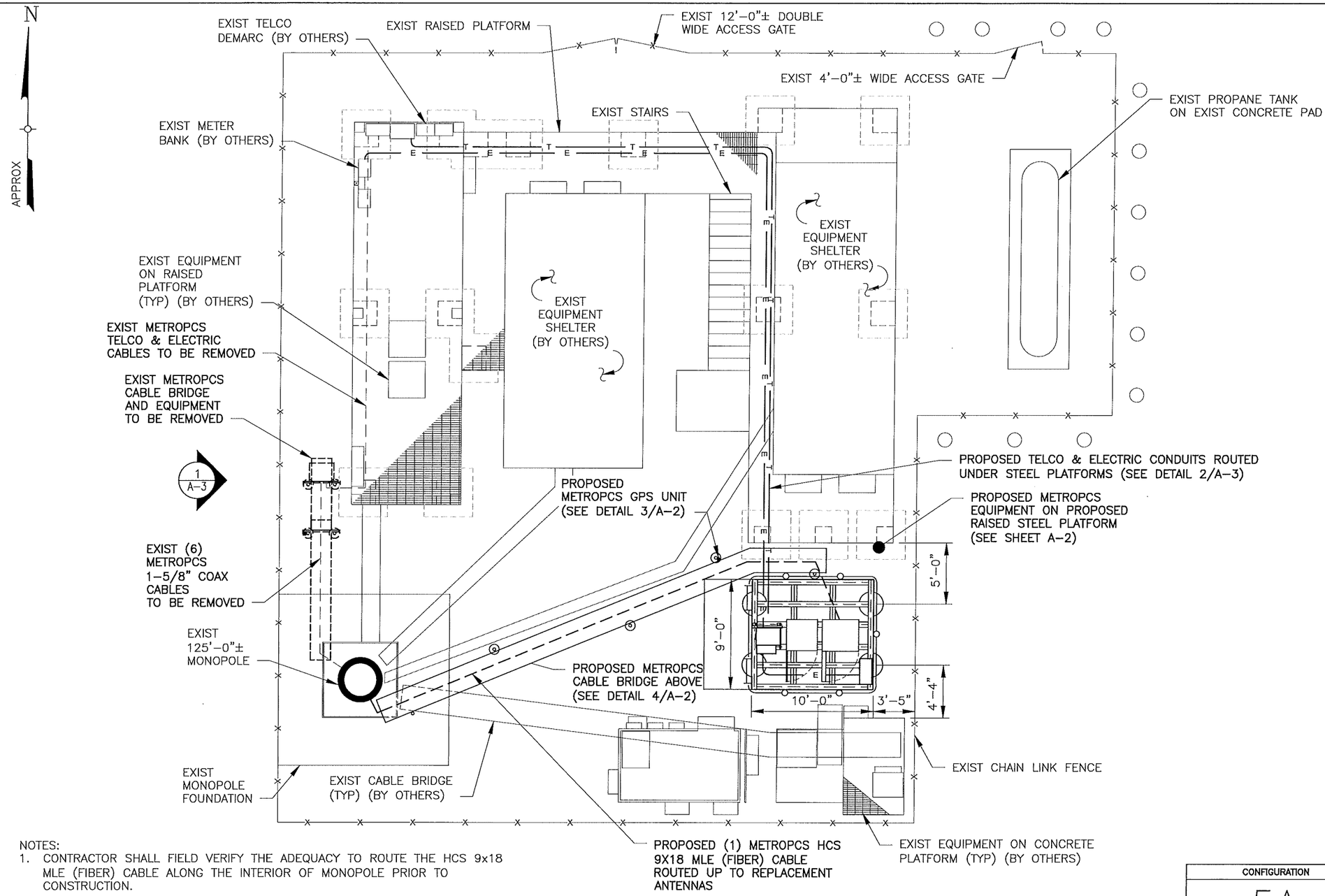
CTHA520A
CROWN CROMWELL MONOPOLE
201 MAIN ST
CROMWELL, CT 06480

SHEET TITLE

TITLE SHEET

SHEET NUMBER

T-1



NOTES:
1. CONTRACTOR SHALL FIELD VERIFY THE ADEQUACY TO ROUTE THE HCS 9x18 MLE (FIBER) CABLE ALONG THE INTERIOR OF MONOPOLE PRIOR TO CONSTRUCTION.
2. CONTRACTOR TO MATCH ANTENNA AZIMUTHS AND DOWNTILTS TO EXISTING CONDITION AND NOTIFY RF ENGINEER OF ANY DISCREPANCY.
3. LOCK & TAG BREAKERS FOR ALL EQUIPMENT BEING TURNED OFF (WHEN APPLICABLE).
4. CONTRACTOR TO RE-VERIFY CABLE LENGTHS PRIOR TO CONSTRUCTION.
5. SEE RFDS FOR FINAL EQUIPMENT CONFIGURATION.

1 A-1 SITE PLAN
SCALE: 1/8" = 1'-0'

CONFIGURATION
5A
REFER TO LATEST T-MOBILE RF DATA SHEET FOR FINAL RF DESIGN & BOM.

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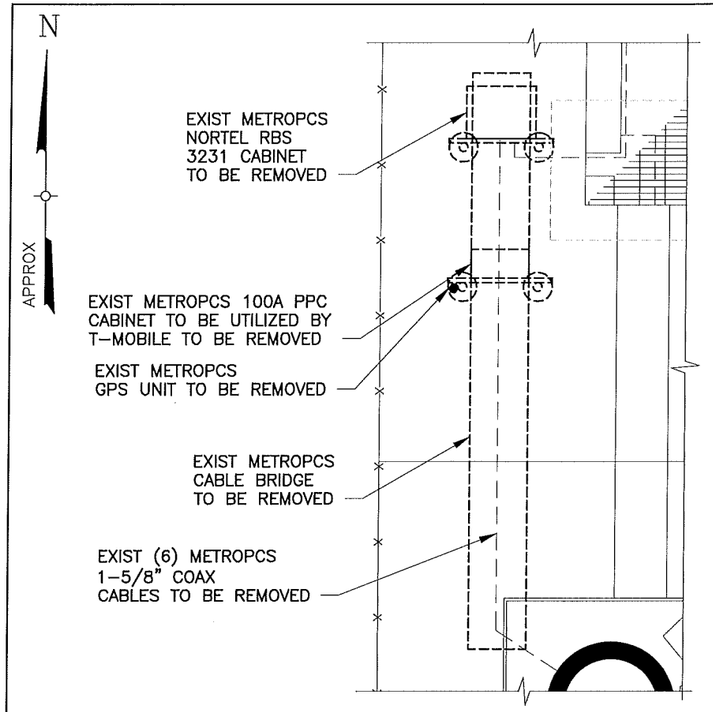
CROMWELL, CT 06480

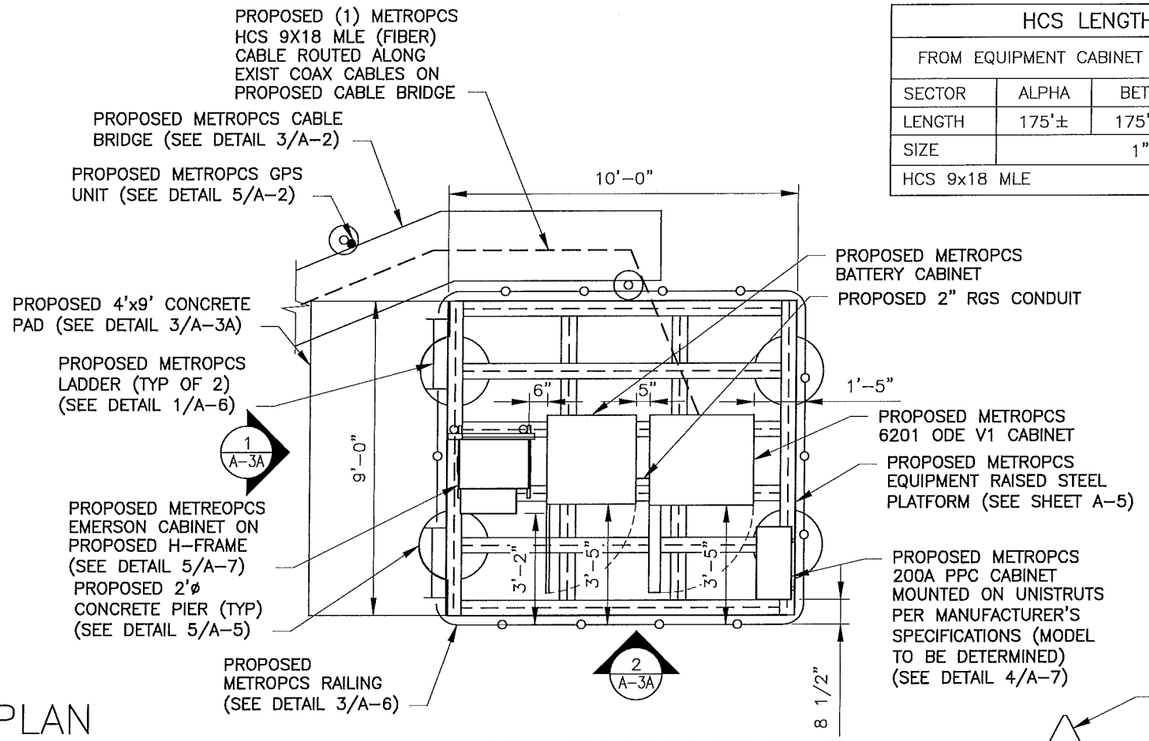
SHEET TITLE
SITE PLAN

SHEET NUMBER
A-1



1 A-2 EXIST EQUIPMENT PLAN

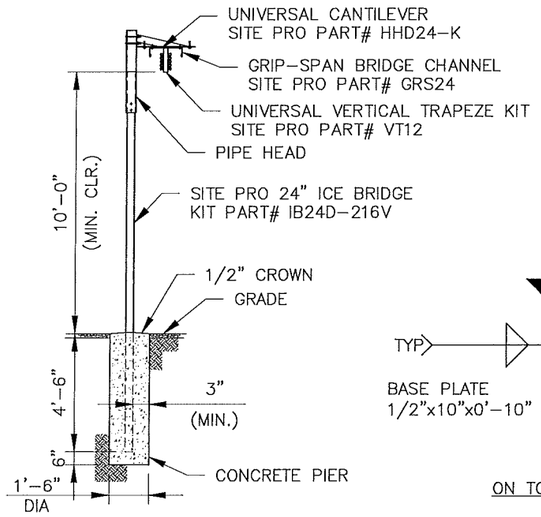
SCALE: 1/4" = 1'-0'



2 A-2 PROPOSED EQUIPMENT PLAN

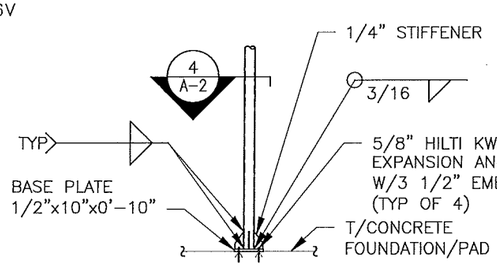
SCALE: 1/4" = 1'-0'

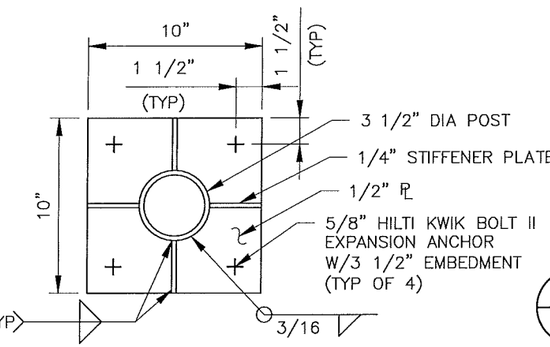
HCS LENGTH			
FROM EQUIPMENT CABINET TO ANTENNA			
SECTOR	ALPHA	BETA	GAMMA
LENGTH	175'±	175'±	175'±
SIZE	1"		
HCS 9x18 MLE			



3 A-2 CABLE BRIDGE DETAILS

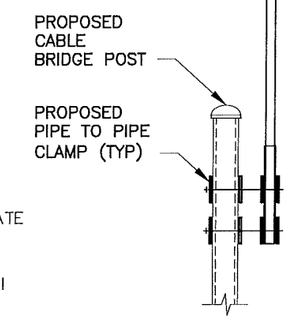
SCALE: N.T.S.





4 A-2 SECTION

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



5 A-2 GPS UNIT DETAIL

SCALE: 3/4" = 1'-0"

CONFIGURATION
5A
REFER TO LATEST T-MOBILE RF DATA SHEET FOR FINAL RF DESIGN & BOM.

0 1 2 3

ORIGINAL SIZE IN INCHES

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metroPCS
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BLOOMFIELD, CT 06002

CROWN CASTLE

APPROVALS

LANDLORD
RF
CONSTRUCTION
OPERATIONS
SITE ACQ.

PROJECT NUMBER	DESIGNED BY
7061.CTHA520A	JQ

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SITE INFORMATION

CTHA520A
CROWN CROMWELL MONOPOLE
201 MAIN ST
CROMWELL, CT 06480

SHEET TITLE

EQUIPMENT LAYOUT
PLANS & DETAILS

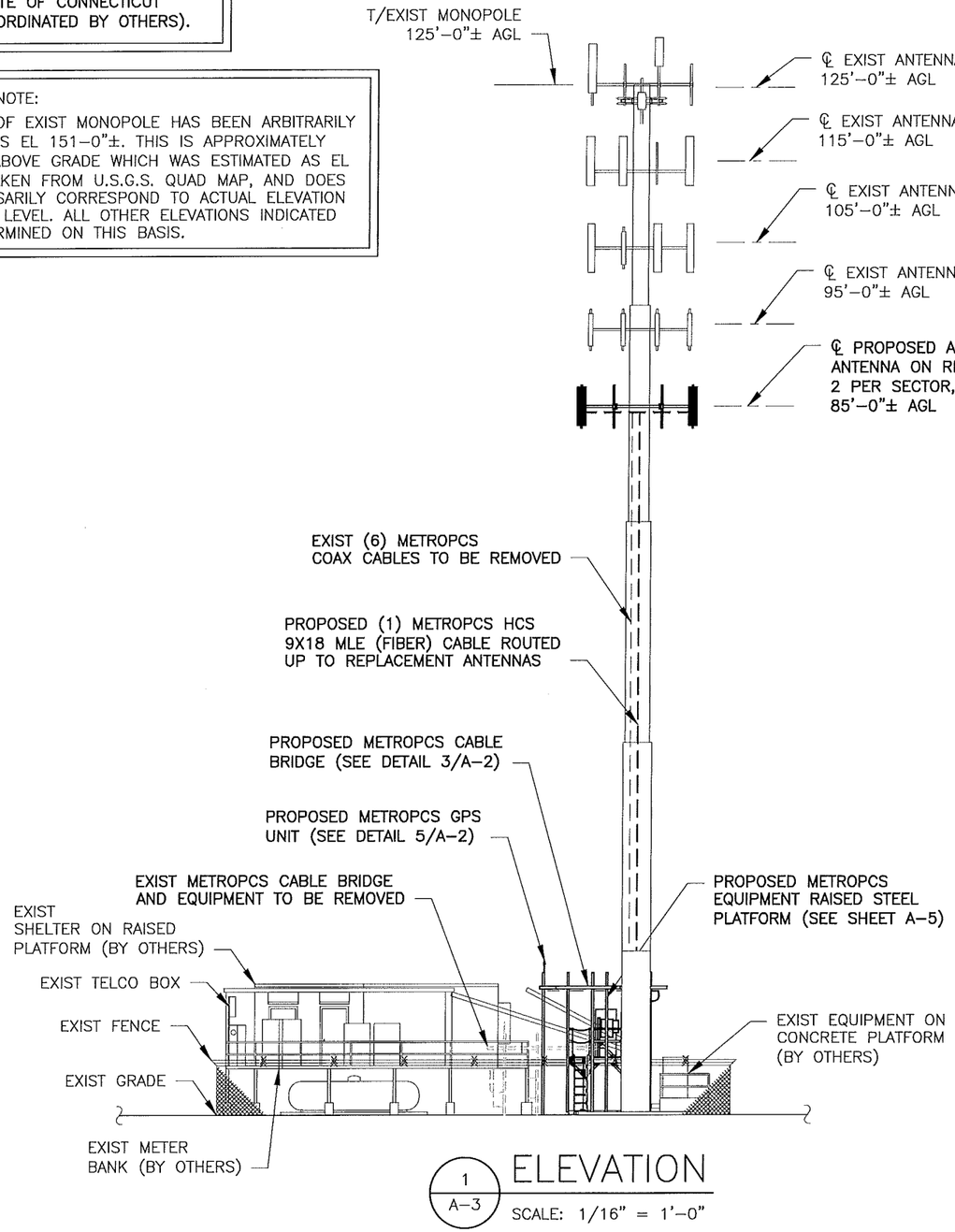
SHEET NUMBER

A-2

THE PROPOSED MOUNTS & EXISTING MONOPOLE SHALL BE STRUCTURALLY ANALYZED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT (TO BE COORDINATED BY OTHERS).

ELEVATION NOTE:

ELEVATION OF EXIST MONOPOLE HAS BEEN ARBITRARILY ASSIGNED AS EL 151'-0"±. THIS IS APPROXIMATELY 125'-0"± ABOVE GRADE WHICH WAS ESTIMATED AS EL 26'-0"± TAKEN FROM U.S.G.S. QUAD MAP, AND DOES NOT NECESSARILY CORRESPOND TO ACTUAL ELEVATION ABOVE SEA LEVEL. ALL OTHER ELEVATIONS INDICATED WERE DETERMINED ON THIS BASIS.

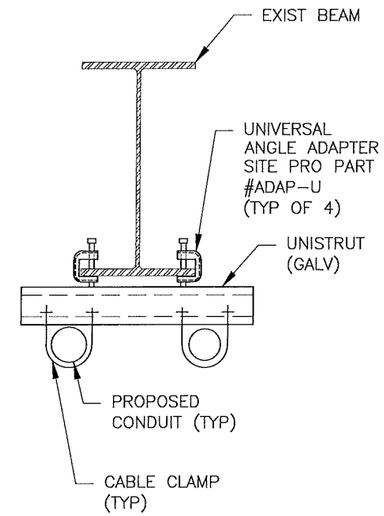


1 A-3 ELEVATION

SCALE: 1/16" = 1'-0"

EXIST ANTENNA SCHEDULE				
SECTOR	MAKE	QUANTITY	MODEL#	SIZE
ALPHA	RFS	1	APXV18-206517S	53.1x6.9x3.15
BETA	RFS	1	APXV18-206517S	53.1x6.9x3.15
GAMMA	RFS	1	APXV18-206517S	53.1x6.9x3.15

PROPOSED ANTENNA SCHEDULE				
SECTOR	MAKE	QUANTITY	MODEL#	SIZE
ALPHA	ERICSSON	1	AIR21 B2A/B4P	12x8x56
	ERICSSON	1	AIR21 B4A/B2P	12x8x56
BETA	ERICSSON	1	AIR21 B2A/B4P	12x8x56
	ERICSSON	1	AIR21 B4A/B2P	12x8x56
GAMMA	ERICSSON	1	AIR21 B2A/B4P	12x8x56
	ERICSSON	1	AIR21 B4A/B2P	12x8x56



2 A-3 DETAIL

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

CONFIGURATION

5A

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0 1 2 3

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CROWN CASTLE

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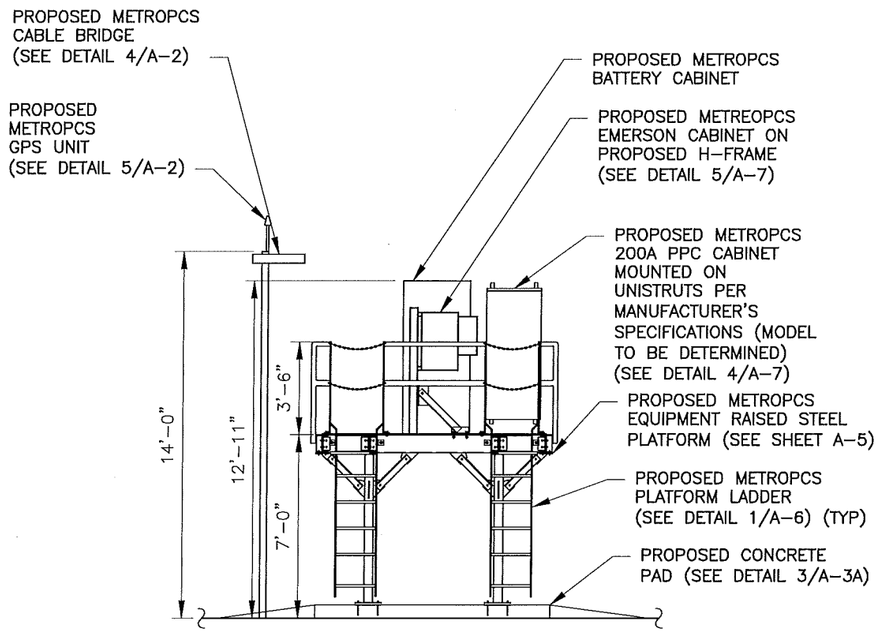
CROMWELL, CT 06480

SHEET TITLE

ELEVATION & DETAIL

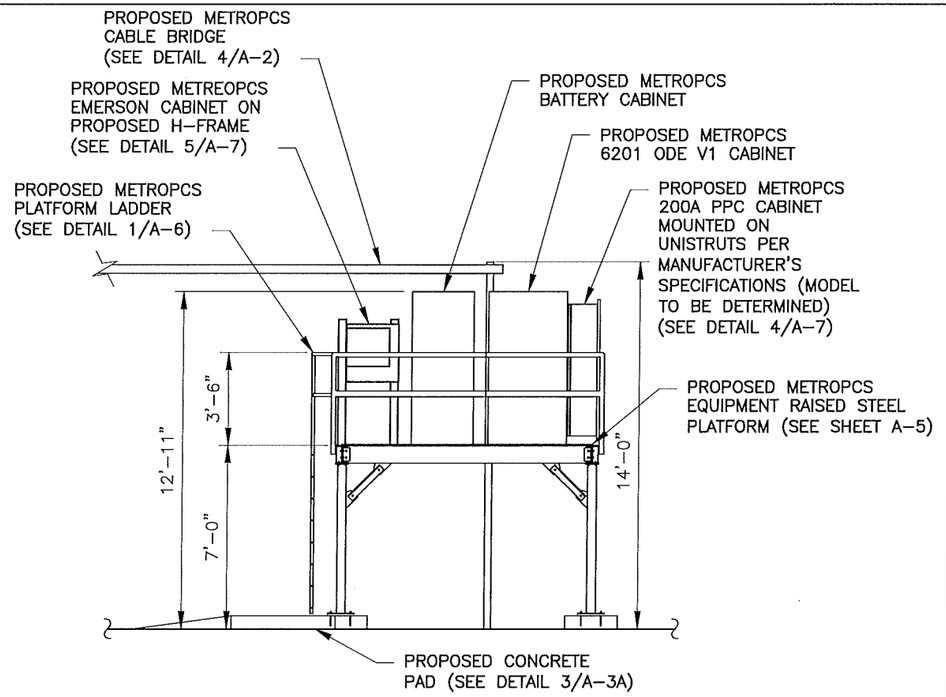
SHEET NUMBER

A-3



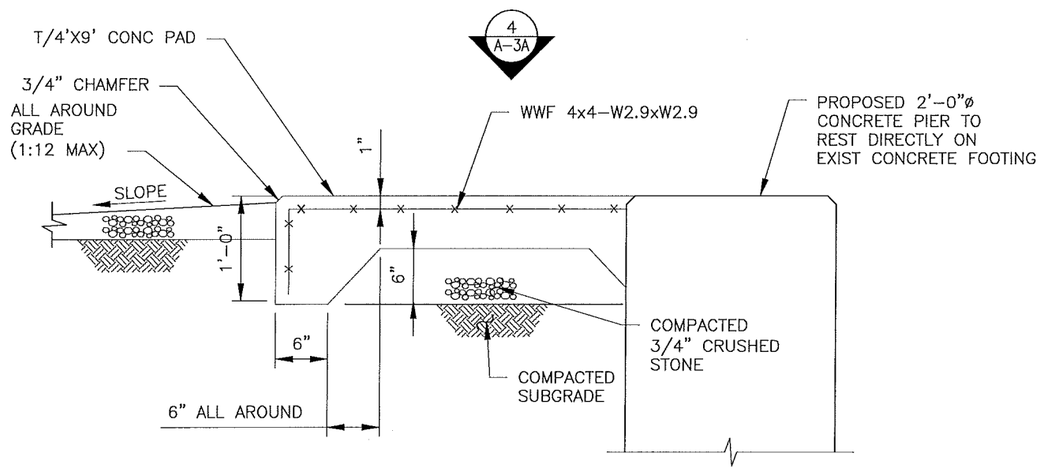
1 A-3A PROP. EQUIPMENT ELEVATION

SCALE: 3/16" = 1'-0"



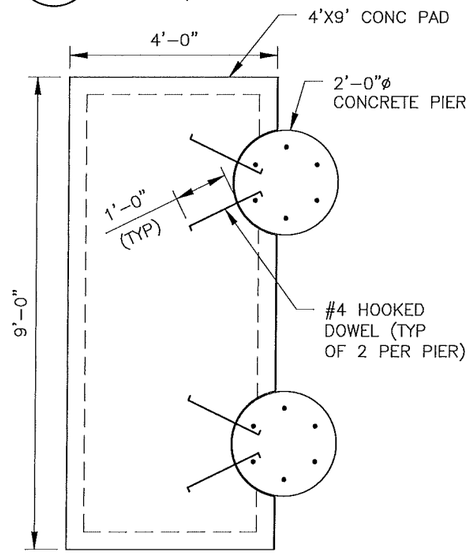
2 A-3A PROP. EQUIPMENT ELEVATION

SCALE: 3/16" = 1'-0"



3 A-3A CONCRETE PAD SECTION

SCALE: 3/4" = 1'-0"



4 A-3A CONCRETE PAD PLAN

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

CONFIGURATION

5A

REFER TO LATEST T-MOBILE RF DATA SHEET FOR FINAL RF DESIGN & BOM.

0 1 2 3

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CROWN CASTLE

APPROVALS

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RF _____
CONSTRUCTION _____
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CROWN CROMWELL MONOPOLE
201 MAIN ST
CROMWELL, CT 06480

SHEET TITLE

ELEVATIONS & DETAILS

SHEET NUMBER

A-3A

N

APPROX

EXIST METROPCS ANTENNA TO BE REPLACED (TYP OF 1 PER SECTOR, TOTAL OF 3)

ALPHA SECTOR AZ = 30°

GAMMA SECTOR AZ = 270°

EXIST METROPCS MOUNT TO BE REPLACED (TYP PER SECTOR)

EXIST 125'-0"± MONOPOLE

BETA SECTOR AZ = 150°

THE PROPOSED MOUNTS & EXISTING MONOPOLE SHALL BE STRUCTURALLY ANALYZED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT (TO BE COORDINATED BY OTHERS).

1/A-4 EXIST ANTENNA PLAN

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

REPLACEMENT METROPCS ALPHA SECTOR AIR21 B2A/B4P ANTENNA (SEE DETAIL 3/A-4)

PROPOSED METROPCS GAMMA SECTOR AIR21 B4A/B2P ANTENNA (SEE DETAIL 3/A-4)

ALPHA SECTOR AZ = 30°

PROPOSED FIBER/DC JUMPERS FROM CABLE DIVIDER TO PROPOSED ANTENNAS

REPLACEMENT ANTENNA MOUNT (SITE PRO P/N: RMV12-363)

PROPOSED METROPCS ALPHA SECTOR AIR21 B4A/B2P ANTENNA (SEE DETAIL 3/A-4)

GAMMA SECTOR AZ = 270°

PROPOSED CABLE DIVIDER

EXIST 125'-0"± MONOPOLE

REPLACEMENT METROPCS BETA SECTOR AIR21 B2A/B4P ANTENNA (SEE DETAIL 3/A-4)

BETA SECTOR AZ = 150°

REPLACEMENT METROPCS GAMMA SECTOR AIR21 B2A/B4P ANTENNA (SEE DETAIL 3/A-4)

PROPOSED METROPCS BETA SECTOR AIR21 B4A/B2P ANTENNA (SEE DETAIL 3/A-4)

2/A-4 PROPOSED ANTENNA PLAN

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

PROPOSED HSS 2.375x0.154" MOUNTING PIPE (5'-3" LONG)

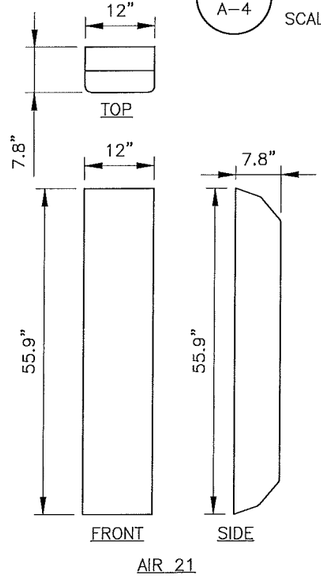
PROPOSED MOUNTING BRACKET

PROPOSED AIR21 ANTENNA (SEE DETAIL 4/A-4)

PROPOSED METROPCS FIBER AND POWER JUMPER CABLES

3/A-4 ANTENNA DETAIL

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



AIR 21

4/A-4 DETAIL

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

CONFIGURATION

5A

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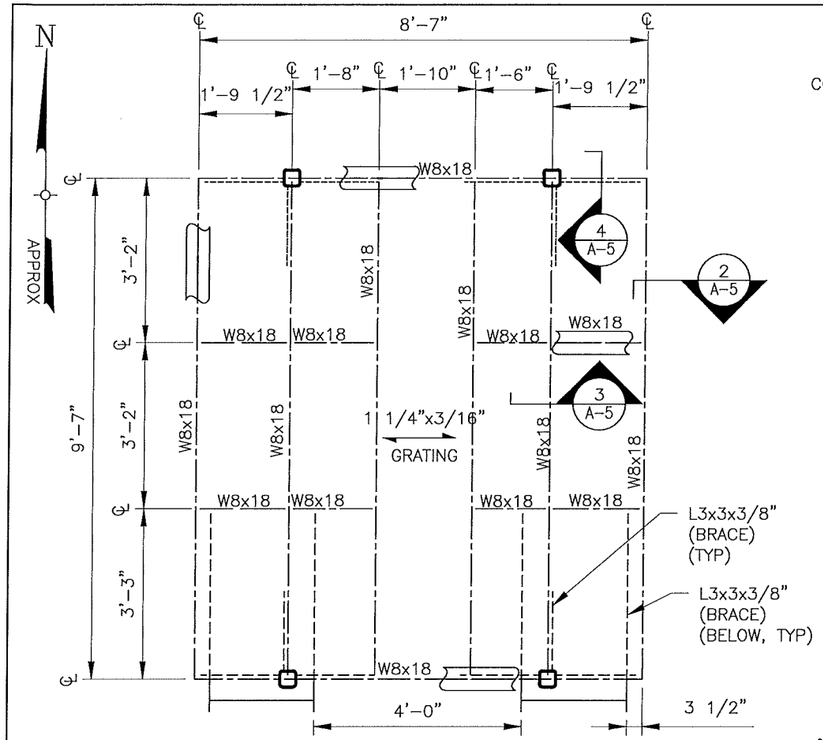
ANTENNA LAYOUT PLANS & DETAILS

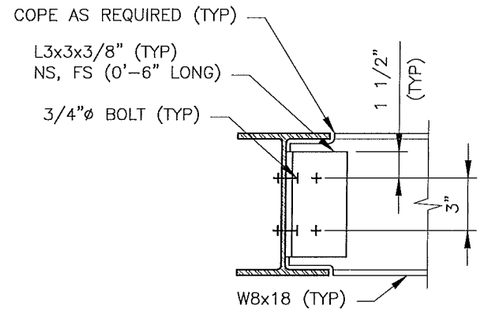
SHEET NUMBER

A-4



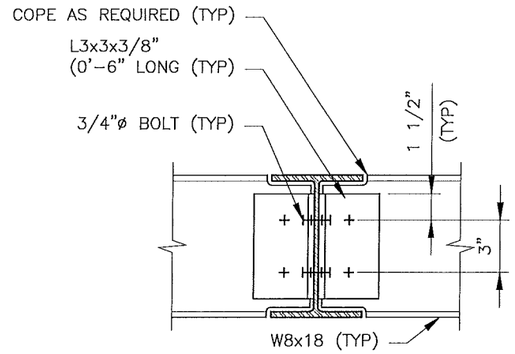
1 A-5 EQUIPMENT PLATFORM PLAN

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



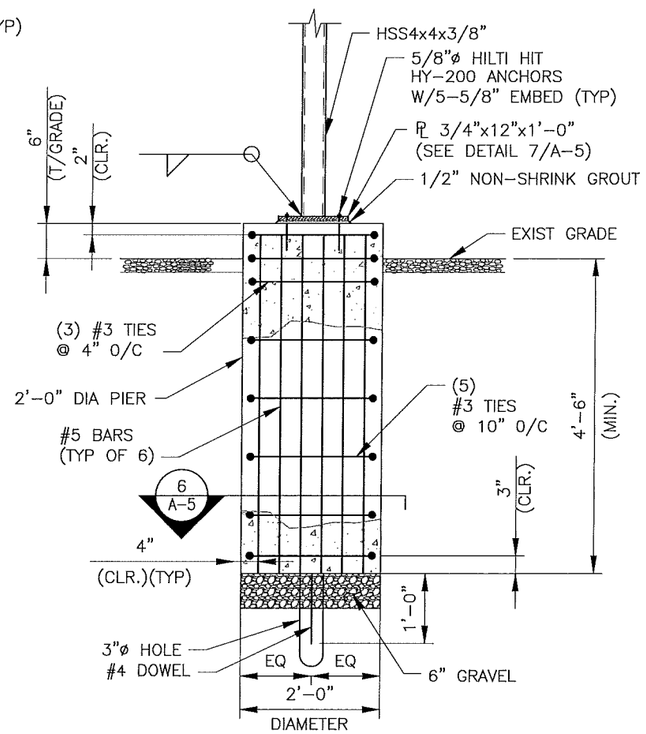
2 A-5 DETAIL

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



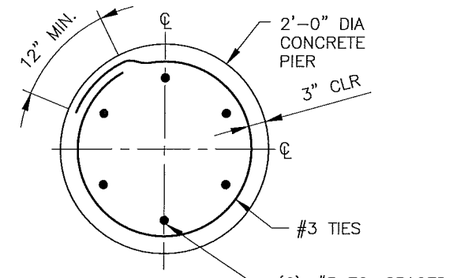
3 A-5 DETAIL

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



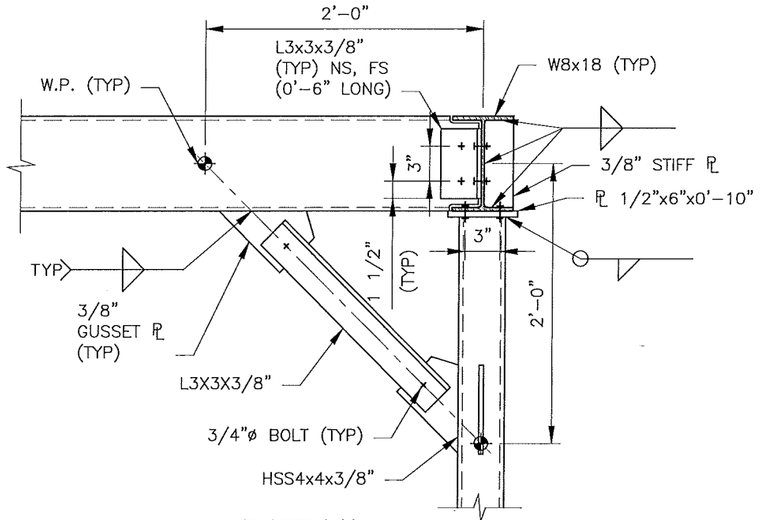
5 A-5 DETAIL

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



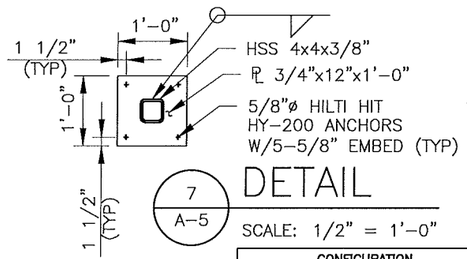
6 A-5 DETAIL

SCALE: 3/4" = 1'-0"



4 A-5 DETAIL

SCALE: 1" = 1'-0"



7 A-5 DETAIL

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

CONFIGURATION
5A
REFER TO LATEST T-MOBILE RF DATA SHEET FOR FINAL RF DESIGN & BOM.

0 1 2 3

ORIGINAL SIZE IN INCHES

TECTONIC

- PLANNING
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- CONSTRUCTION MANAGEMENT
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TECTONIC Engineering and Surveying Consultants, P.C.

1279 ROUTE 300
NEWBURGH, NY 12550
Phone: (845) 567-6656
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metroPCS

metroPCS WIRELESS, INC.
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

CROWN CASTLE

APPROVALS

LANDLORD _____
RF _____
CONSTRUCTION _____
OPERATIONS _____
SITE ACQ. _____

PROJECT NUMBER	DESIGNED BY
7061.CTHA520A	JQ

REV	DATE	REVISION	DRAWN BY
0	11/07/14	FOR COMMENT	MP
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ISSUED BY | DATE

STATE OF CONNECTICUT
ANTONIO A. GUALTIERI
No. 25406
LICENSED PROFESSIONAL ENGINEER

SITE INFORMATION

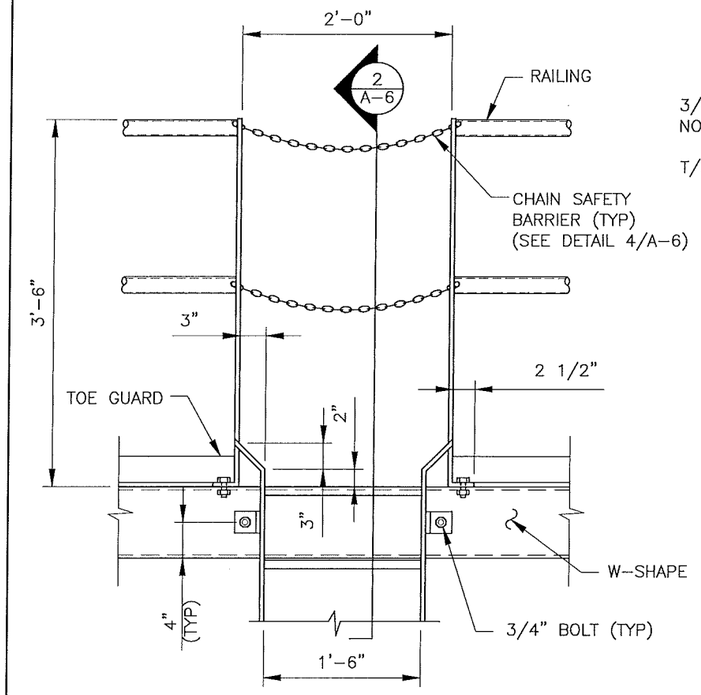
CTHA520A
CROWN CROMWELL MONOPOLE
201 MAIN ST
CROMWELL, CT 06480

SHEET TITLE

EQUIPMENT PLATFORM PLAN & DETAILS

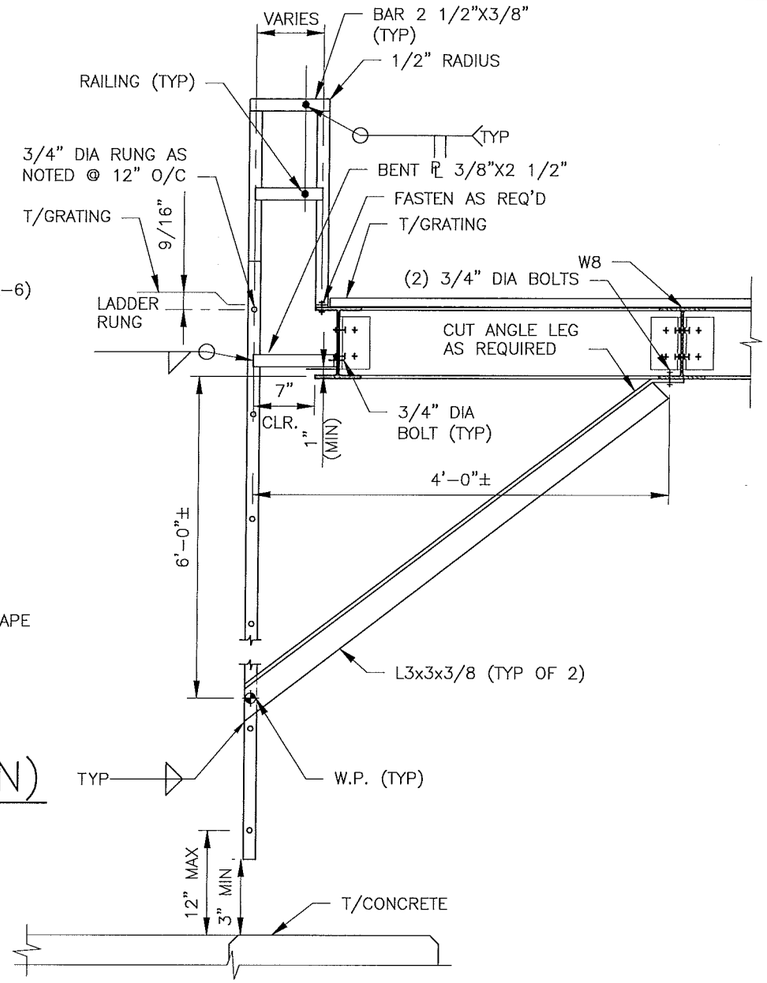
SHEET NUMBER

A-5



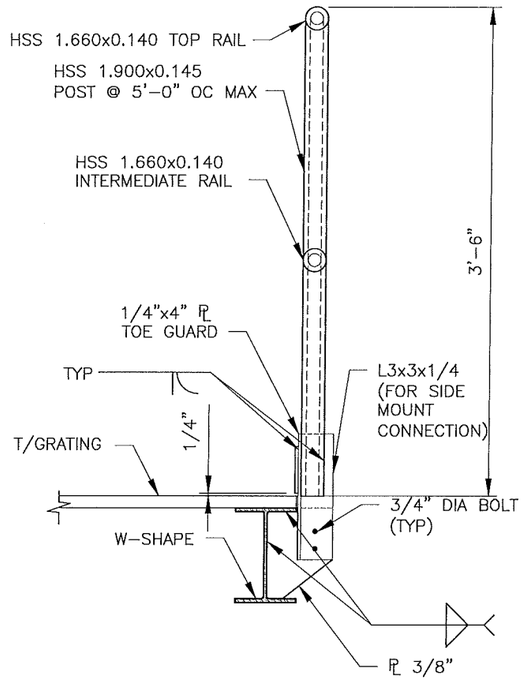
1 A-6 LADDER DETAIL (ELEVATION)

SCALE: 3/4" = 1'-0"



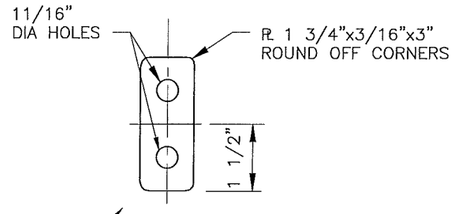
2 A-6 LADDER SECTION

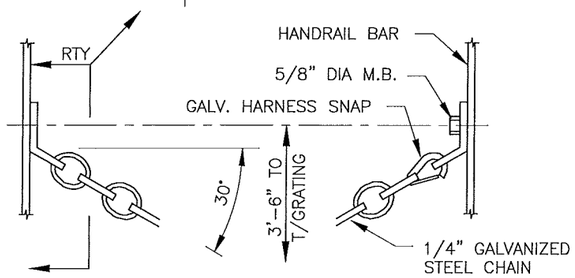
SCALE: 3/4" = 1'-0"



3 A-6 RAILING POST DETAIL

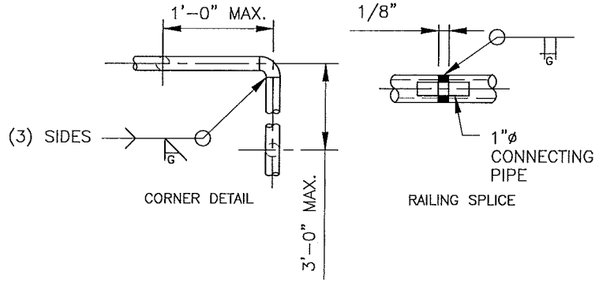
SCALE: 1" = 1'-0"





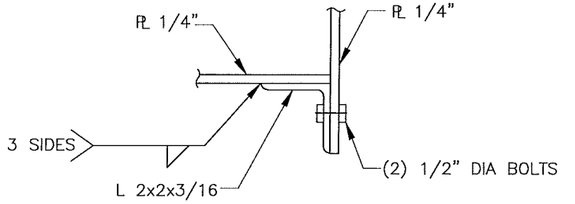
4 A-6 STEEL CHAIN SAFETY BARRIER

SCALE: N.T.S.



5 A-6 RAILING POST DETAIL

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



TOE GUARD SPLICE DETAIL @ CORNER

6 A-6

SCALE: 3" = 1'-0"

CONFIGURATION
5A
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BLOOMFIELD, CT 06002

CROWN CASTLE

APPROVALS

LANDLORD	
RF	
CONSTRUCTION	
OPERATIONS	
SITE ACQ.	

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ANTONIO A. GUALTIERI
No. 25406
LICENSED
PROFESSIONAL ENGINEER

SITE INFORMATION

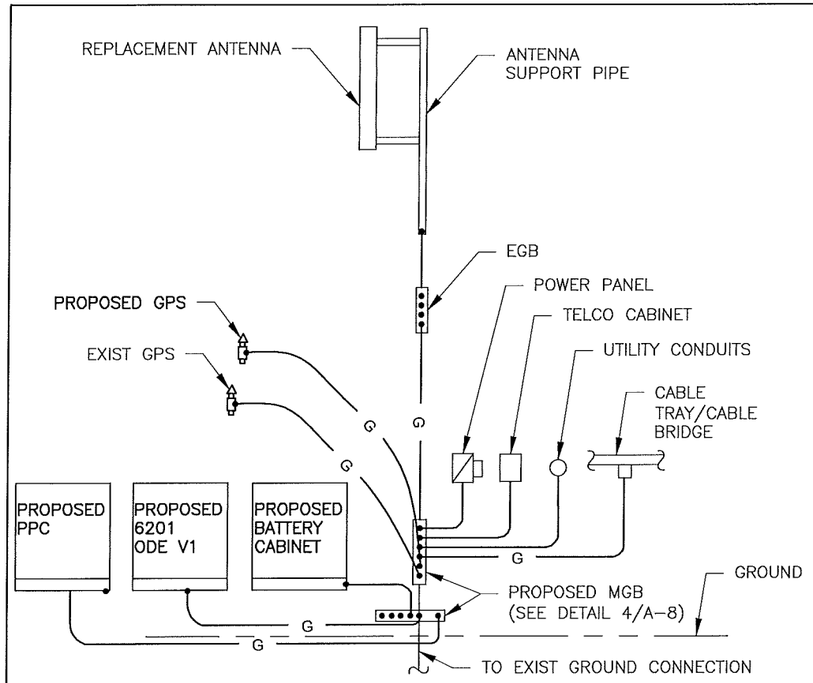
CTHA520A
CROWN CROMWELL MONOPOLE
201 MAIN ST
CROMWELL, CT 06480

SHEET TITLE

DETAILS

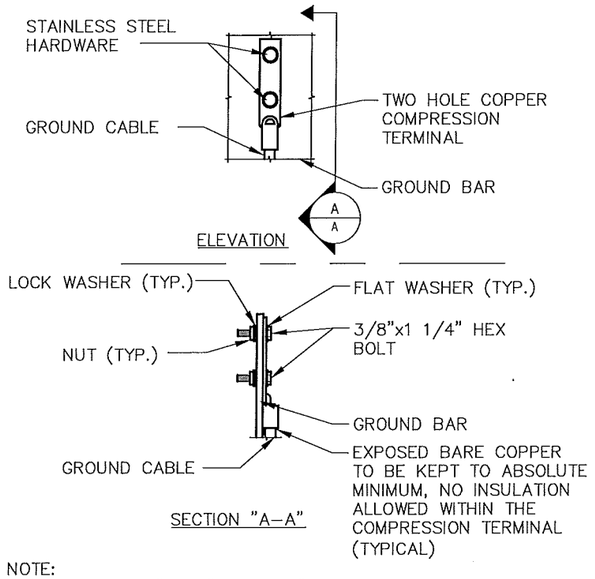
SHEET NUMBER

A-6



1 A-7 GROUNDING RISER DIAGRAM

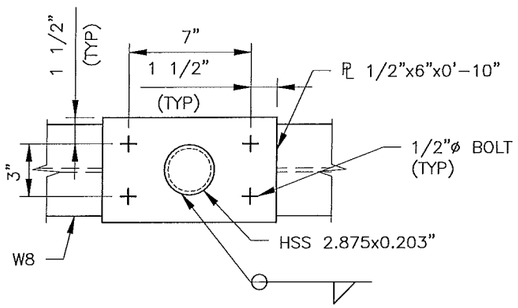
SCALE: NTS



NOTE:
1. "DOUBLING UP" OR "STACKING" OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB AND MGB.
4. ALL GROUND LUGS MUST NE HEAT SHRUNK AT WIRE/LUG CONNECTION.

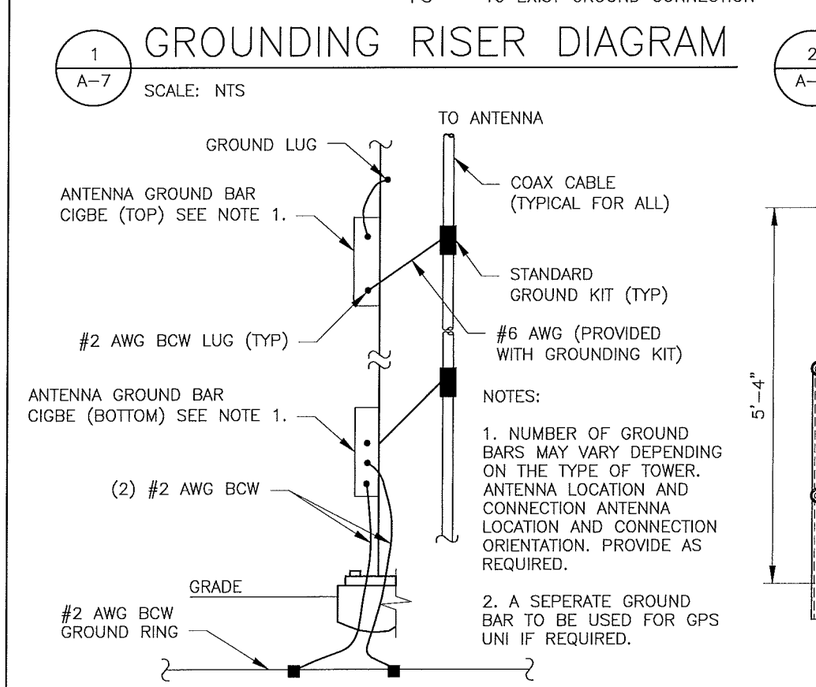
2 A-7 GROUNDING BAR CONN. DETAIL

SCALE: NTS



6 A-7 SECTION

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



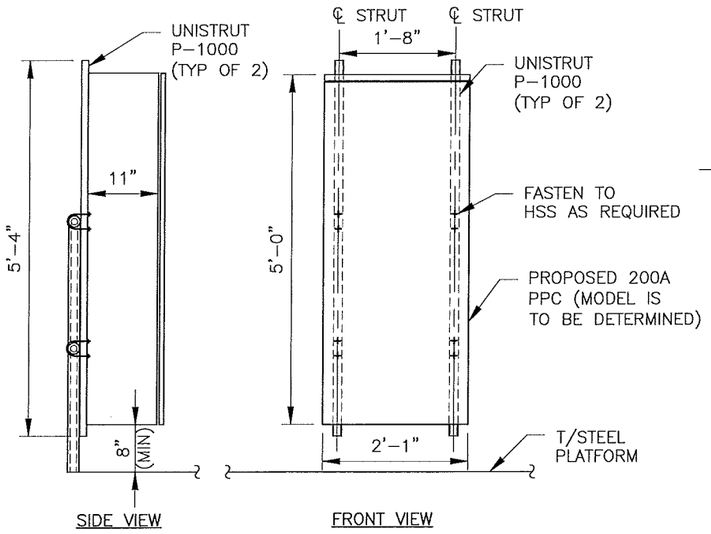
NOTES:

1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER. ANTENNA LOCATION AND CONNECTION ANTENNA LOCATION AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.

2. A SEPERATE GROUND BAR TO BE USED FOR GPS UNI IF REQUIRED.

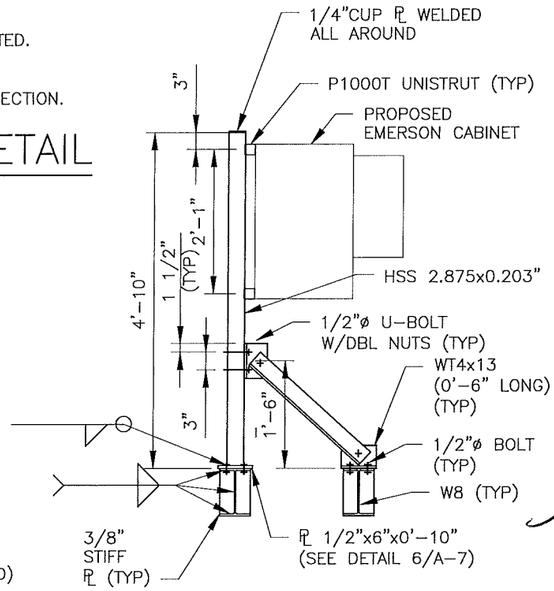
3 A-7 ANTENNA CABLE GROUNDING

SCALE: NTS



4 A-7 PPC CABINET DETAIL

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



5 A-7 H-FRAME DETAIL

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

CONFIGURATION
5A
REFER TO LATEST T-MOBILE RF DATA SHEET FOR FINAL RF DESIGN & BOM.

0 1 2 3

ORIGINAL SIZE IN INCHES

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BLOOMFIELD, CT 06002

CROWN CASTLE

APPROVALS

LANDLORD _____
RF _____
CONSTRUCTION _____
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ANTONIO A. GUALTIERI
No. 25406
LICENSED PROFESSIONAL ENGINEER

SITE INFORMATION

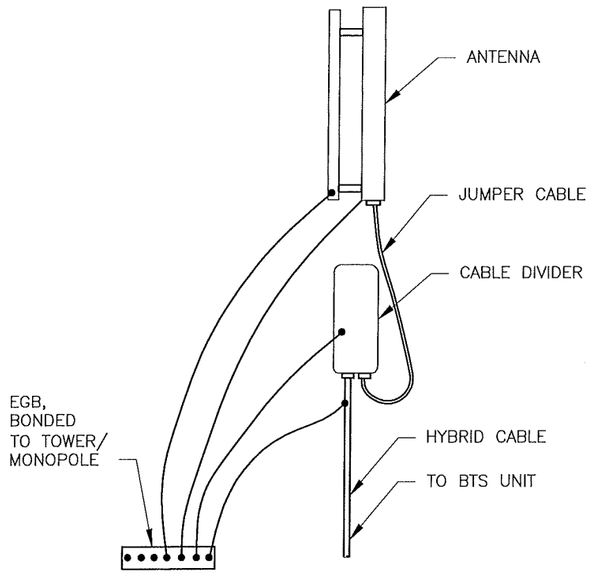
CTHA520A
CROWN CROMWELL MONOPOLE
201 MAIN ST
CROMWELL, CT 06480

SHEET TITLE

GROUNDING DIAGRAM & DETAILS

SHEET NUMBER

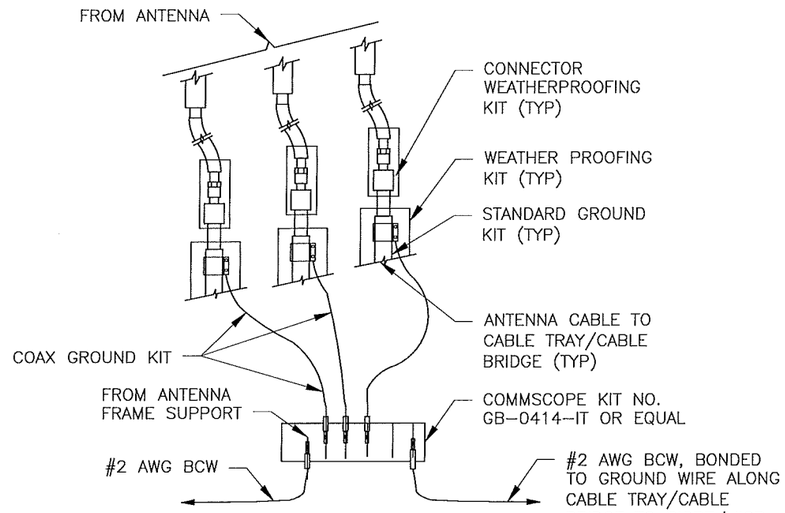
A-7



HYBRID CABLE CONNECTION AND GROUNDING DETAIL

1 / A-8

SCALE: NTS

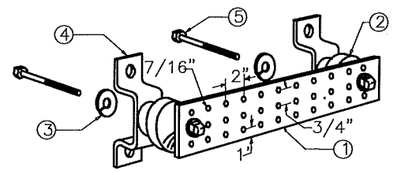


NOTE:
DO NOT INSTALL CABLE GROUND KIT AT A BEND
AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE.

GROUND WIRE TO GROUND BAR CONNECTION DETAIL

2 / A-8

SCALE: NTS



LEGEND

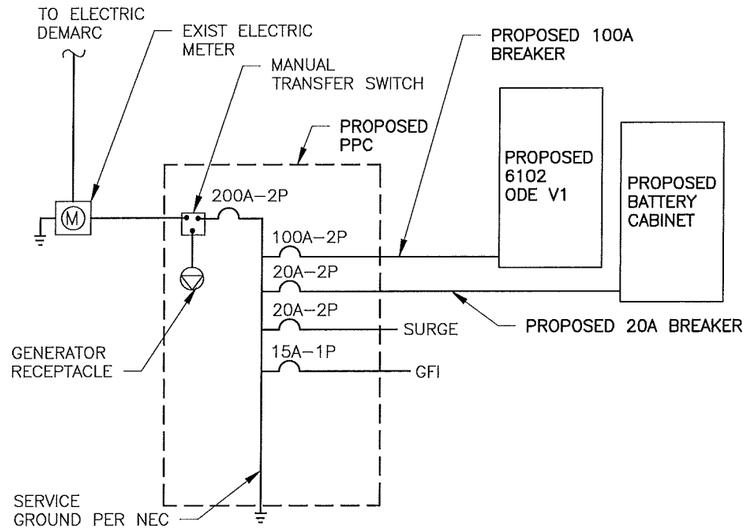
1- COPPER TINNED GROUND BAR, 1/4"X 4"X 20", OR OTHER LENGTH AS REQUIRED
2- INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4 OR EQUAL,
3- 5/8" LOCKWASHERS OR EQUAL
4- WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-6056 OR EQUAL
5- 5/8-11 X 1" H.H.C.S.BOLTS

NOTE:
ALL BOLTS, NUTS, WASHERS AND LOCK WASHERS SHALL BE 18-8 STAINLESS STEEL.

GROUNDING BAR DETAIL

3 / A-8

SCALE: NTS



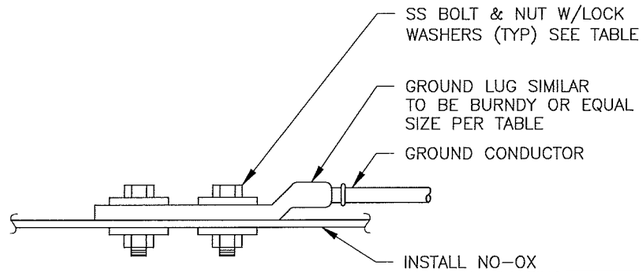
NOTE:
1. ONE LINE DIAGRAM IS GENERIC. ELECTRICAL DESIGN TO BE APPROVED & PERFORMED BY OTHERS.
2. EXIST ELECTRIC SERVICE MAY NEED TO BE UPGRADED IF REQUIRED. TO BE DESIGNED BY OTHERS.

ONE-LINE POWER DIAGRAM

4 / A-8

SCALE: NTS

TABLE		
WIRE SIZE	LUG #	BOLT DIA
#2	YA2CL-2TC14	1/4"
#2/0	YA25-2LN	1/2"



LUG GROUND CONNECTION

5 / A-8

SCALE: N.T.S.

CONFIGURATION
5A
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35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

CROWN CASTLE

APPROVALS

LANDLORD _____
RF _____
CONSTRUCTION _____
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SITE ACQ. _____

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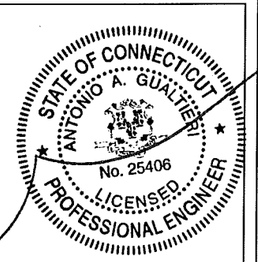


SITE INFORMATION

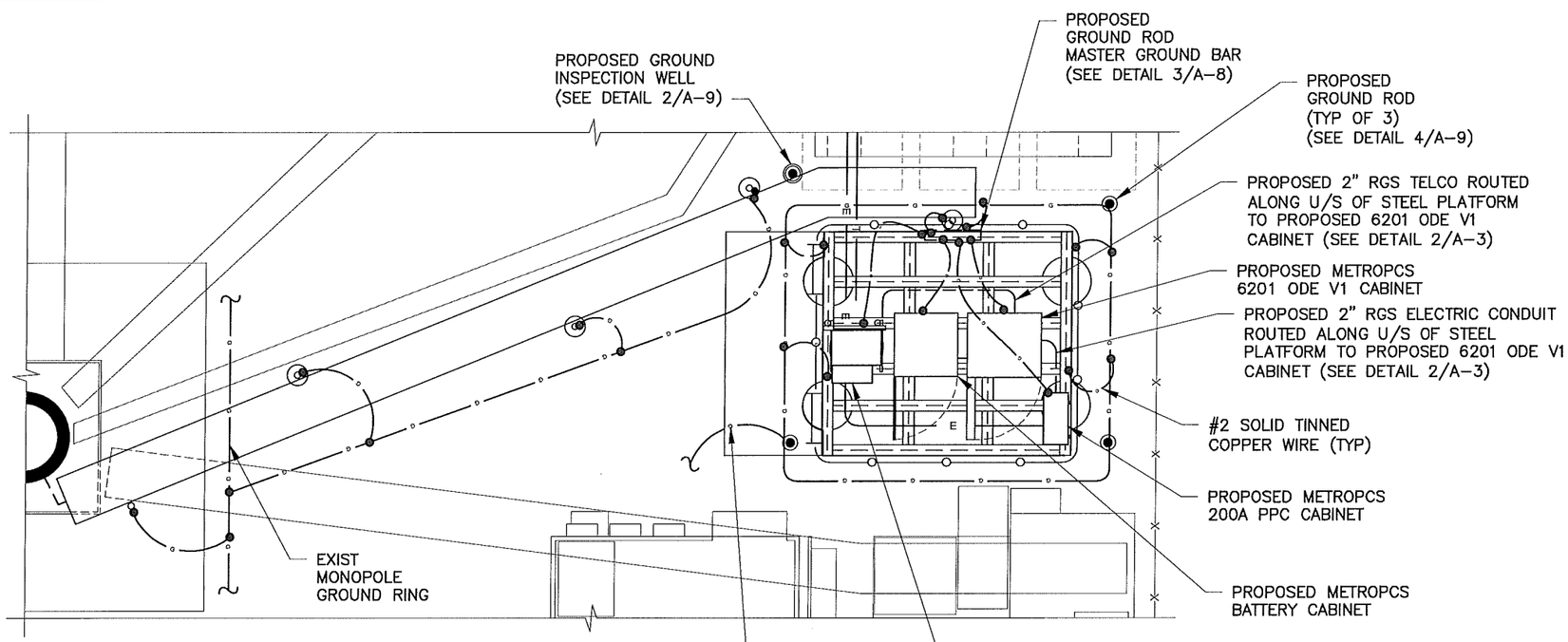
CTHA520A
CROWN CROMWELL MONOPOLE
201 MAIN ST
CROMWELL, CT 06480

SHEET TITLE

ONE-LINE POWER
DIAGRAM & DETAILS

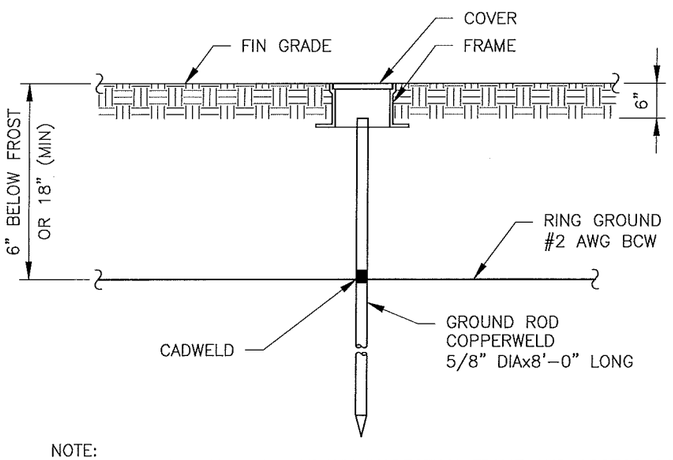
SHEET NUMBER

A-8



1 / A-9 GROUNDING & UTILITY PLAN

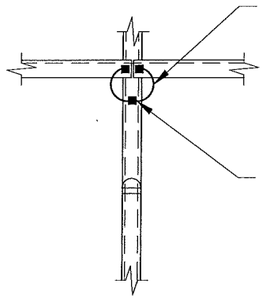
SCALE: NTS



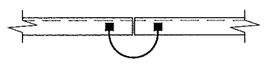
NOTE:
USE CAMPBELL FOUNDRY COMPANY INSPECTION FRAME AND ACCESS COVER MODEL #4153, OR EQUAL

2 / A-9 GROUND ROD INSPECTION

SCALE: N.T.S.



BONDING @ POST

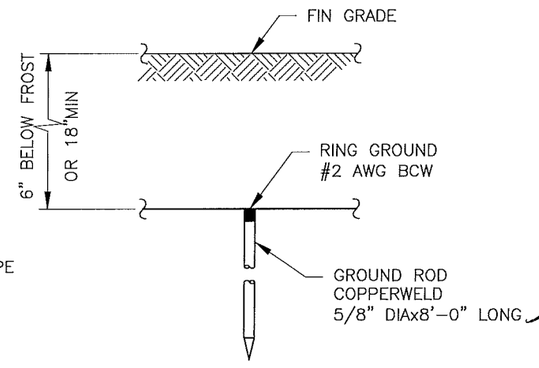


BONDING @ SPLICE

NOTE: 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.

3 / A-9 COAX BRIDGE BONDING DETAIL

SCALE: N.T.S.



4 / A-9 GROUND ROD DETAIL

SCALE: N.T.S.

CONFIGURATION
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CROWN CASTLE

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CROMWELL, CT 06480

SHEET TITLE

GROUNDING & UTILITY PLAN & DETAILS

SHEET NUMBER

A-9

GENERAL NOTES

1. CONTRACTOR SHALL NOT COMMENCE ANY WORK UNTIL HE OBTAINS, AT HIS OWN EXPENSE, ALL INSURANCE REQUIRED BY METROPCS, THE PROPERTY OWNER AND/OR PROPERTY MANAGEMENT COMPANY.
2. THIS SET OF PLANS HAS BEEN PREPARED FOR THE PURPOSES OF MUNICIPAL AND AGENCY REVIEW AND APPROVAL. THIS SET OF PLANS SHALL NOT BE UTILIZED AS CONSTRUCTION DOCUMENTS UNTIL ALL CONDITIONS OF APPROVAL HAVE BEEN SATISFIED AND EACH OF THE DRAWINGS HAVE BEEN REVISED TO INDICATE "ISSUED FOR PERMIT"
3. THIS PLAN IS SUBJECT TO ALL EASEMENTS AND RESTRICTIONS OF RECORD.
4. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE CODES, ORDINANCES, LAWS AND REGULATIONS OF ALL MUNICIPALITIES, UTILITIES OR OTHER PUBLIC AUTHORITIES.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS THAT MAY BE REQUIRED BY ANY FEDERAL, STATE, COUNTY OR MUNICIPAL AUTHORITIES.
6. THE CONTRACTOR SHALL NOTIFY THE CONSTRUCTION MANAGER, IN WRITING, OF ANY CONFLICTS, ERRORS OR OMISSIONS PRIOR TO THE SUBMISSION OF BIDS OR PERFORMANCE OF WORK. MINOR OMISSIONS OR ERRORS IN THE BID DOCUMENTS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THIS PROJECT IN ACCORDANCE WITH THE OVERALL INTENT OF THESE DRAWINGS.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING SITE IMPROVEMENTS PRIOR TO COMMENCING CONSTRUCTION. THE CONTRACTOR SHALL REPAIR ANY DAMAGE CAUSED AS A RESULT OF CONSTRUCTION OF THIS FACILITY.
8. THE SCOPE OF WORK FOR THIS PROJECT SHALL INCLUDE PROVIDING ALL MATERIALS, EQUIPMENT AND LABOR REQUIRED TO COMPLETE THIS PROJECT. ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
9. THE CONTRACTOR SHALL VISIT THE PROJECT SITE PRIOR TO SUBMITTING A BID TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
10. POWER TO THE FACILITY IS MONITORED BY AN EXISTING METER.
11. ALL STRUCTURAL ELEMENTS SHALL BE HOT DIP GALVANIZED STEEL.
12. CONTRACTOR SHALL MAKE A UTILITY "ONE CALL" TO LOCATE ALL UTILITIES PRIOR TO EXCAVATING.
13. IF ANY PIPING EXISTS BENEATH THE SITE AREA, CONTRACTOR MUST LOCATE IT AND CONTACT OWNER'S REPRESENTATIVE.
14. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ALL CONSTRUCTION MEANS AND METHODS. THE CONTRACTOR IS ALSO RESPONSIBLE FOR ALL JOB SITE SAFETY.
15. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES AND EXISTING CONDITIONS AT THE SITE PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA AND SUBMIT TO THE ENGINEER ANY DISCREPANCIES FROM THE DRAWINGS.
16. THE CONTRACTOR IS TO REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. THE CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUB-CONTRACTORS AND RELATED PARTIES. THE SUB-CONTRACTOR SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
17. DETAILS ARE INTENDED TO SHOW END RESULT OF DESIGN. MINOR MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK.
18. ALL MATERIAL PROVIDED BY METROPCS IS TO BE REVIEWED BY THE CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS PRIOR TO INSTALLATION. ANY DEFICIENCIES TO PROVIDE MATERIALS SHALL BE BROUGHT TO THE CONSTRUCTION MANAGER'S ATTENTION IMMEDIATELY.
19. THE MATERIALS INSTALLED SHALL MEET REQUIREMENTS OF CONTRACTORS DOCUMENTS. NO SUBSTITUTIONS ARE ALLOWED.
20. INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR CONFORMING MATERIALS OR CONDITIONS SHALL BE REPORTED TO THE ENGINEER PRIOR TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER APPROVAL.

GENERAL NOTES

21. THE CONTRACTOR SHALL RECEIVE CLARIFICATION AND AUTHORIZATION IN WRITING TO PROCEED BEFORE STARTING WORK ON ANY ITEMS NOT CLEARLY DEFINED OR IDENTIFIED BY THE CONSTRUCTION DOCUMENTS.
22. THE CONTRACTOR SHALL NOTIFY THE CONSTRUCTION MANAGER OF ALL PRODUCTS OR ITEMS NOTED AS "EXISTING" WHICH ARE NOT FOUND TO BE IN THE FIELD.
23. ERECTION SHALL BE DONE IN A WORKMANLIKE MANNER BY COMPETENT EXPERIENCED WORKMEN IN ACCORDANCE WITH APPLICABLE CODES AND THE BEST-ACCEPTED PRACTICE. ALL MEMBERS SHALL BE LAID PLUMB AND TRUE AS INDICATED ON THE DRAWINGS.
24. THE CONTRACTOR SHALL COORDINATE HIS WORK AND SCHEDULE HIS ACTIVITIES AND WORKING HOURS IN ACCORDANCE WITH THE REQUIREMENTS OF THE PROPERTY OWNER AND/OR PROPERTY MANAGEMENT COMPANY.
25. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING HIS WORK WITH THE WORK OF OTHERS AS IT MAY RELATE TO RADIO EQUIPMENT, ANTENNAS AND ANY OTHER PORTIONS OF THE WORK.
26. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY INDICATED OR WHERE LOCAL CODES OR REGULATIONS MAY TAKE PRECEDENCE.
27. THE CONTRACTOR SHALL REPAIR ALL EXISTING SURFACES DAMAGED DURING CONSTRUCTION SUCH THAT THEY MATCH AND BLEND WITH ADJACENT SURFACES.
28. THE CONTRACTOR SHALL KEEP CONTRACT AREA CLEAN, HAZARD FREE AND DISPOSE OF ALL DEBRIS AND RUBBISH. EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY OF THE OWNER SHALL BE REMOVED. LEAVE PREMISES IN CLEAN CONDITIONS AND FREE FROM PAINT SPOTS, DUST OR SMUDGES OF ANY NATURE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL ITEMS UNTIL COMPLETION OF CONSTRUCTION.
29. BEFORE FINAL ACCEPTANCE OF THE WORK, THE CONTRACTOR SHALL REMOVE ALL EQUIPMENT, TEMPORARY WORK, UNUSED AND USELESS MATERIALS, RUBBISH AND TEMPORARY STRUCTURES.
30. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE 2005 STATE OF CONNECTICUT BUILDING CODE AND SUBSEQUENT AMENDMENTS.
31. CONTRACTOR SHALL VISIT THE JOB SITE AND SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING THE PROPOSED WORK AND SHALL MAKE PROVISIONS AS TO THE COST THEREOF. CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.
32. PLANS ARE NOT TO BE SCALED. THESE PLANS ARE INTENDED TO BE A DIAGRAMMATIC OUTLINE ONLY UNLESS OTHERWISE NOTED. THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT AND APPURTENANCES, AND LABOR NECESSARY TO EFFECT ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
33. CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF THE WORK AREA, ADJACENT AREAS AND BUILDING OCCUPANTS THAT ARE LIKELY TO BE AFFECTED BY THE WORK UNDER THIS CONTRACT. WORK SHALL CONFORM TO ALL OSHA REQUIREMENTS.
34. CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK USING THE BEST CONSTRUCTION SKILLS AND ATTENTION. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER CONTRACT, UNLESS OTHERWISE NOTED.

CONFIGURATION

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- PLANNING
- ENGINEERING
- CONSTRUCTION MANAGEMENT
- SURVEYING

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CROWN CASTLE

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STATE OF CONNECTICUT
ANTONIO A. GUALTIERI
No. 25406
LICENSED PROFESSIONAL ENGINEER

SITE INFORMATION

CTHA520A
CROWN CROMWELL MONOPOLE
201 MAIN ST
CROMWELL, CT 06480

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

A-10

ELECTRICAL NOTES

1. CONTRACTOR SHALL PERFORM ALL VERIFICATION OBSERVATION TESTS, AND EXAMINATION WORK PRIOR TO THE ORDERING OF THE ELECTRICAL EQUIPMENT AND THE ACTUAL CONSTRUCTION. CONTRACTOR SHALL ISSUE A WRITTEN NOTICE OF ALL FINDINGS TO THE ENGINEER LISTING ALL MALFUNCTIONS, FAULTY EQUIPMENT AND DISCREPANCIES.
2. CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, INSURANCE, EQUIPMENT, INSTALLATION, CONSTRUCTION TOOLS, TRANSPORTATION, ETC., FOR A COMPLETE AND PROPERLY OPERATIVE SYSTEM ENERGIZED THROUGHOUT AND AS INDICATED ON DRAWINGS, AS SPECIFIED HEREIN AND/OR AS OTHERWISE REQUIRED.
3. ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND IN PERFECT CONDITION WHEN INSTALLED AND SHALL BE OF THE BEST GRADE AND OF THE SAME MANUFACTURER THROUGHOUT FOR EACH CLASS OR GROUP OF EQUIPMENT. MATERIALS SHALL BE LISTED AND APPROVED BY UNDERWRITER'S LABORATORIES (U.L.) AND SHALL BEAR THE INSPECTION LABEL "J" WHERE SUBJECT TO SUCH APPROVAL. MATERIALS SHALL MEET WITH APPROVAL OF ALL GOVERNING BODIES HAVING JURISDICTION. AND SHALL BE MANUFACTURED IN ACCORDANCE WITH APPLICABLE STANDARDS ESTABLISHED BY ANSI, NEMA AND NBFU.
4. CONTRACTOR TO COORDINATE WITH SITE OWNER FOR CONNECTION OF TEMPORARY AND PERMANENT POWER TO THE SITE. THE TEMPORARY POWER AND ALL HOOKUP COSTS TO BE PAID BY CONTRACTOR.
5. ALL ELECTRICAL EQUIPMENT SHALL BE LABELED WITH PERMANENT ENGRAVED PLASTIC LABELS.
6. ALL CIRCUIT BREAKERS, FUSES AND ELECTRICAL EQUIPMENT SHALL HAVE AN INTERRUPTING RATING NOT LESS THAN THE MAXIMUM SHORT CIRCUIT CURRENT TO WHICH THEY MAY BE SUBJECTED, AND A MINIMUM OF 10,000 A.I.C.
7. METER SOCKETS AMPERES, VOLTAGE AND NUMBER OF PHASES SHALL BE NOTED AND SHALL BE MANUFACTURED BY SQUARE "D" COMPANY, SANGAMO OR APPROVED EQUAL. METER SOCKET SHALL BE APPROVED BY UTILITY COMPANY PRIOR TO INSTALLATION.
8. WIRE AND CABLE CONDUCTORS SHALL BE COPPER #12 AWG MINIMUM WITH TYPE THHN INSULATION UNLESS SPECIFICALLY NOTED OTHERWISE.
9. ALL CONDUCTORS SHALL BE COPPER.
10. USE T-TAP CONNECTIONS ON ALL MULTI-CIRCUITS WITH COMMON NEUTRAL CONDUCTOR FOR LIGHTING FIXTURES.
11. EACH CONDUCTOR OF EVERY SYSTEM SHALL BE PERMANENTLY TAGGED IN EACH PANEL BOARD, PULLBOX, J-BOX, SWITCH BOX, ETC., IN COMPLIANCE WITH THE OCCUPATIONAL SAFETY AND HEALTH ACT (O.S.H.A.)
12. CONDUIT:
    - A. RIGID CONDUIT SHALL BE U.L. LABEL GALVANIZED ZINC COATED WITH ZINC INTERIOR AND SHALL BE USED WHEN INSTALLED IN OR UNDER CONCRETE SLABS, IN CONTACT WITH THE EARTH, UNDER PUBLIC ROADWAYS, IN MASONRY WALLS OR EXPOSED ON BUILDING EXTERIOR.
    - B. INTERMEDIATE METAL CONDUIT SHALL BE U.L. LABEL, FITTINGS SHALL BE THREADED ALUMINUM OR STEEL AND SHALL BE USED FOR ALL EXTERIOR RUNS. THREADLESS COUPLINGS AND CONNECTORS SHALL NOT BE USED.
    - C. ELECTRICAL METALLIC TUBING (EMT) SHALL HAVE U.L. LABEL, FITTINGS SHALL BE NO SET SCREW OR CRIMP TYPE FITTINGS SHALL BE USED. GLAND RING COMPRESSION TYPE. EMT SHALL BE USED ONLY FOR INTERIOR RUNS.
    - D. FLEXIBLE METALLIC CONDUIT SHALL HAVE U.L. LISTED LABEL AND MAY BE USED WHERE PERMITTED BY CODE. FITTINGS SHALL BE "JAKE" OR "SQUEEZE" TYPE, SEAL TIGHT FLEXIBLE CONDUIT. ALL CONDUIT IN EXCESS OF SIX FEET IN LENGTH SHALL HAVE FULL SIZE GROUND WIRE.
    - E. CONDUIT SHALL BE SIZED PER THE NEC AND AS SHOWN.
    - F. CONDUIT RUNS MAY BE SURFACE MOUNTED IN CEILINGS OR WALLS UNLESS INDICATED OTHERWISE. CONDUIT INDICATED SHALL RUN PARALLEL OR AT RIGHT ANGLES TO CEILING, FLOOR OR BEAMS. VERIFY EXACT ROUTING OF ALL EXPOSED CONDUIT WITH OWNER PRIOR TO INSTALLING.
    - G. ALL CONDUIT ONLY (C.O.) RUNS SHALL HAVE A PULL WIRE OR ROPE.
13. COVERPLATES SHALL BE BRUSHED STAINLESS STEEL FOR ALL SWITCHES, RECEPTACLES, TELEPHONE AND BLANKED OUTLETS, AND SHALL HAVE ENGRAVED LETTERING WHERE INDICATED WEATHERPROOF RECEPTACLES SHALL HAVE SIERRA #WPD-8 LIFT COVERPLATES.
14. REFER TO MANUFACTURERS MANUAL FOR RECOMMENDED FUSE AND WIRE SIZES.
15. ALL FINAL CONNECTIONS TO THE EQUIPMENT ARE TO BE OF FLEXIBLE WEATHERPROOF CONDUIT TO MEET APPLICABLE CODES.
16. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE GROUNDED AS REQUIRED BY ALL APPLICABLE CODES.
17. GROUNDING CONDUCTORS SHALL BE SOLID TINNED COPPER AND ANNEALED #2, UNLESS OTHERWISE NOTED.
18. UPON COMPLETION OF WORK, CONDUCT CONTINUITY, SHORT CIRCUIT, AND FALL OF POTENTIAL GROUNDING TESTS FOR APPROVAL. SUBMIT TEST REPORTS TO THE CONSTRUCTION MANAGER. CLEAN PREMISES OF ALL DEBRIS RESULTING FROM WORK AND LEAVE WORK IN A COMPLETE AND UNDAMAGED CONDITION.
19. PROVIDE CONSTRUCTION MANAGER WITH ONE SET OF COMPLETE ELECTRICAL "AS INSTALLED" DRAWINGS AT THE COMPLETION OF THE JOB, SHOWING ACTUAL DIMENSIONS, ROUTINGS, AND CIRCUITS.
20. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH GAINING APPROVALS AND PAYING ALL FEES ASSESSED BY UTILITY COMPANY FOR ELECTRICAL SERVICE.

GROUNDING NOTES

1. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE GROUNDED AS REQUIRED BY ALL APPLICABLE CODES.
2. ALL GROUNDING WORK SHALL BE IN ACCORDANCE WITH METROPCS STANDARD PRACTICE.
3. ALL BUS CONNECTORS SHALL BE TWO-HOLE, LONG-BARREL TYPE COMPRESSION LUGS, T&B OR EQUAL, UNLESS OTHERWISE NOTED ON DRAWINGS. ALL LUGS SHALL BE ATTACHED TO BUSSES USING BOLTS, NUTS, AND LOCK WASHERS. NO WASHERS ARE ALLOWED BETWEEN THE ITEMS BEING GROUNDED.
4. ALL CONNECTORS SHALL BE CRIMPED USING HYDRAULIC CRIMPING TOOLS, T&B #TBM 8 OR EQUIVALENT.
5. ALL CONNECTIONS SHALL BE MADE TO BARE METAL. ALL PAINTED SURFACES SHALL BE FILED TO ENSURE PROPER CONTACT. NO WASHERS ARE ALLOWED BETWEEN THE ITEMS BEING GROUNDED. ALL CONNECTIONS ARE TO HAVE A NON-OXIDIZING AGENT APPLIED PRIOR TO INSTALLATION.
6. ALL COPPER BUSSES SHALL BE CLEANED, POLISHED, AND A NON-OXIDIZING AGENT APPLIED. NO FINGERPRINTS OR DISCOLORED COPPER WILL BE PERMITTED.
7. ALL BENDS SHALL BE AS SHALLOW AS POSSIBLE, WITH NO TURN SHORTER THAN AN 8-INCH NOMINAL RADIUS.
8. GROUNDING CONDUCTORS SHALL BE SOLID TINNED COPPER AND ANNEALED #2. ALL GROUNDING CONDUCTORS SHALL RUN THROUGH PVC SLEEVES WHEREVER CONDUCTORS RUN THROUGH WALLS, FLOORS, OR CEILINGS. IF CONDUCTORS MUST RUN THROUGH EMT, BOTH ENDS OF CONDUIT SHALL BE GROUNDED. SEAL BOTH ENDS OF CONDUIT WITH SILICONE CAULK.
9. GROUNDING SYSTEM RESISTANCE SHALL NOT EXCEED 10 OHMS. IF THE RESISTANCE VALUE IS EXCEEDED, NOTIFY THE PROJECT MANAGER FOR FURTHER INSTRUCTION ON METHODS FOR REDUCING THE RESISTANCE VALUE.
10. ALL ROOF TOP ANTENNA MOUNTS SHALL BE GROUNDED WITH A #2 GROUND WIRE CONNECTED TO THE NEAREST GROUND BUS. ALL CONNECTIONS ARE TO BE CAD-WELDED IF POSSIBLE.
11. UPON COMPLETION OF WORK, CONDUCT CONTINUITY, SHORT CIRCUIT, AND FALL OF POTENTIAL GROUNDING TESTS FOR APPROVAL. SUBMIT TEST REPORTS TO THE PROJECT MANAGER.
12. GROUNDING CONNECTION TO TRAVEL IN A DOWNWARD DIRECTION.
13. ALL EXPOSED #2 WIRE MUST BE TINN NOT BTW.
14. TECTONIC TAKES NO RESPONSIBILITY OR LIABILITY FOR THE GROUNDING SYSTEM AS SHOWN ON THIS SITE. THIS IS A STANDARD GROUNDING SYSTEM.

CONFIGURATION
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CROWN CASTLE

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STATE OF CONNECTICUT
ANTONIO A. GUALTIERI
No. 25406
LICENSED
PROFESSIONAL ENGINEER

SITE INFORMATION

CTHA520A
CROWN CROMWELL MONOPOLE
201 MAIN ST
CROMWELL, CT 06480

SHEET TITLE

ELECTRICAL &
GROUNDING NOTES

SHEET NUMBER

A-11

STRUCTURAL NOTES

1. DESIGN AND CONSTRUCTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS, ALLOWABLE STRESS DESIGN AND PLASTIC DESIGN".
2. STRUCTURAL STEEL WIDE FLANGE SHAPES SHALL CONFORM TO ASTM A992, "STEEL FOR STRUCTURAL SHAPES FOR USE IN BUILDING FRAMING", GRADE 50, UNLESS OTHERWISE INDICATED. IF THE MEMBER SIZES INDICATED ARE NOT AVAILABLE IN THIS GRADE, ASTM A572 "HIGH-STRENGTH LOW-ALLOY COLUMBIUM-VANADIUM STRUCTURAL STEEL", GRADE 50, MAY BE SUBSTITUTED.
3. HOLLOW STRUCTURAL SECTIONS (HSS) SHALL CONFORM TO ASTM A500 "COLD-FORMED WELDED & SEAMLESS CARBON STEEL STRUCTURAL TUBING IN ROUNDS AND SHAPES", GRADE B.
4. MISCELLANEOUS STEEL, INCLUDING CHANNELS, ANGLES, PLATES, AND BARS SHALL CONFORM TO ASTM A36 "CARBON STRUCTURAL STEEL", UNLESS OTHERWISE INDICATED.
5. ANCHOR BOLTS SHALL CONFORM TO ASTM F1554 "ANCHOR BOLTS, STEEL, 36, 55, AND 105-KSI YIELD STRENGTH", GRADE 36.
6. STRUCTURAL CONNECTION BOLTS SHALL BE HIGH STRENGTH BOLTS CONFORMING TO ASTM A325 "STRUCTURAL BOLTS, STEEL, HEAT TREATED, 120/105 KSI MINIMUM TENSILE STRENGTH". BOLTS SHALL BE 3/4 INCH DIAMETER, TYPE X, UNLESS OTHERWISE NOTED.
7. MATCHING NUTS SHALL BE HEAVY HEX TYPE, CONFORMING TO ASTM A563 "CARBON AND ALLOY STEEL NUTS".
   WASHERS, WHERE REQUIRED, SHALL CONFORM TO ASTM F436 "HARDENED STEEL WASHERS".
8. FIELD CONNECTIONS SHALL BE BOLTED UNLESS OTHERWISE INDICATED. ALL BOLTED CONNECTIONS SHALL BE MADE WITH NOT LESS THAN TWO (2) HIGH STRENGTH BOLTS, OR EQUIVALENT WELD.
9. STRUCTURAL CONNECTIONS SHALL BE SNUG TIGHT IN ACCORDANCE WITH THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS", UNLESS OTHERWISE NOTED.
10. BOLTS IN SLIP-CRITICAL CONNECTIONS SHALL BE FULLY PRETENSIONED BY THE TURN-OF-NUT METHOD IN ACCORDANCE WITH THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS "SPECIFICATIONS FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS".
11. ANCHOR BOLTS SHALL BE TENSIONED BY THE TURN-OF-NUT METHOD AFTER GROUTING OF BASE PLATES.
12. CONTRACTOR SHALL COMPLY WITH AWS D1.1 "STRUCTURAL WELDING CODE - STEEL" FOR PROCEDURES, APPEARANCE AND QUALITY OF WELDS, AND FOR METHODS USED IN CORRECTING WELDING. ALL WELDERS AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES".
13. GRATING SHALL BE TYPE "W/B" GALVANIZED WELDED STEEL BAR GRATING AS MANUFACTURED BY IKG BORDEN, OR APPROVED EQUAL. BEARING BARS SHALL BE AS FOLLOWS:
    GRATING 1-1/4" x 3/16" SERRATED
    BAND ALL EDGES, AND ATTACH TO SUPPORTING MEMBERS AT 18" ON CENTER WITH MODEL GG GALVANIZED G-CLIPS AS MANUFACTURED BY GRATING FASTENERS INC.
14. EXPANSION ANCHORS SHALL BE HILTI KWIK BOLT III OR APPROVED EQUAL. INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. MINIMUM EMBEDMENT SHALL BE 4-3/4" UNLESS OTHERWISE NOTED.

STRUCTURAL NOTES

15. EPOXY ANCHOR ASSEMBLIES SHALL BE AS MANUFACTURED BY HILTI OR ENGINEER APPROVED EQUAL, AS FOLLOWS:

BASE MATERIAL	ANCHOR SYSTEM
CONCRETE OR GROUTED CMU	HIT HY-200
HOLLOW CMU	HIT HY-70

    INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS.
16. ALL INTERIOR STRUCTURAL STEEL SHALL BE SHOP PRIME COATED WITH A RUST-INHIBITIVE PRIMER EXCEPT AREAS TO BE FIREPROOFED NEED NOT BE PAINTED. SURFACE PREPARATION SHALL BE IN ACCORDANCE WITH THE PAINT MANUFACTURER'S RECOMMENDATIONS. AREAS WHICH MAY BE INACCESSIBLE AFTER INSTALLATION SHALL RECEIVE TWO (2) COATS OF PRIMER. SEE ARCHITECTURAL DRAWINGS FOR FINISH PAINT.
17. FIELD CONNECTIONS AND DAMAGED OR ABRADED AREAS OF SHOP PRIME COAT SHALL BE TOUCH-UP PAINTED WITH COMPATIBLE FIELD PRIMER.
18. ALL EXTERIOR STEEL SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS OTHERWISE NOTED.
19. ALL EXTERIOR BOLTS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS OTHERWISE NOTED.
20. DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY COLD GALVANIZING IN ACCORDANCE WITH ASTM A780 "REPAIR OF DAMAGED AND UNCOATED AREAS OF HOT-DIP GALVANIZED COATINGS".
21. ALL STEEL WORK SHALL BE SUBJECT TO SPECIAL INSPECTIONS DURING CONSTRUCTION.
22. THE NOTES CONTAINED HEREIN ARE NOT PROJECT SPECIFIC. THE CONTRACTOR SHALL UTILIZE ALL NOTES WHICH SOLELY PERTAIN TO THE WORK DEPICTED ON THESE DRAWINGS.

EARTHWORK NOTES

1. ALL EXCAVATIONS SHALL BE DEWATERED BY SUMPING, PUMPING, ETC. IN A MANNER WHICH WILL NOT LOOSEN FOUNDATION SUBGRADE MATERIAL. SURFACE WATER SHALL BE DIVERTED AWAY FROM EXCAVATIONS BY MEANS OF BERMS, DIVERSION DITCHES, OR OTHER SUITABLE METHODS.
2. CONFINED EXCAVATIONS FOR FOUNDATIONS, UTILITIES, ETC. SHALL BE LIMITED TO 4 FEET IN DEPTH UNLESS SHORING AND BRACING IS USED. TRENCH EXCAVATION GEOMETRY AND/OR BRACING SHALL CONFORM WITH OSHA REQUIREMENTS.
3. BACKFILL SHALL BE PLACED IN MAXIMUM LOOSE LIFT THICKNESSES OF 8 INCHES AND COMPACTED WITH SUITABLE COMPACTION EQUIPMENT. ALL FILL IN CONFINED AREAS WHERE ONLY HAND TAMPING IS FEASIBLE, FILL SHALL BE PLACED IN MAXIMUM 4 INCH LOOSE LIFTS AND COMPACTED TO THE AFOREMENTIONED CRITERIA. 95% OF MAXIMUM DRY DENSITY PER ASTM D1557.
4. ALL FILL SHALL BE CLEAN AND FREE OF LARGE ROCKS, NO ORGANIC MATTER SHALL BE PERMITTED.
5. TEMPORARY EROSION CONTROL STRUCTURES SHALL BE INSTALLED AS REQUIRED BEFORE SITE IS DISTURBED.
6. ALL AREAS DISTURBED BY ON-SITE GRADING THAT WILL NOT BE CONSTRUCTED UPON, SHALL BE ESTABLISHED WITH PERMANENT VEGETATION.

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STRUCTURAL & EARTHWORK NOTES

SHEET NUMBER

A-12

CONCRETE NOTES

1. DESIGN AND CONSTRUCTION OF ALL CONCRETE SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" ACI 318.
2. ULTIMATE COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS SHALL BE 3000 PSI. IF IT IS NOT SPECIFIED IN THE DRAWING.
3. CEMENT SHALL BE PORTLAND CEMENT CONFORMING TO ASTM C150 – TYPE I OR II.
4. REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO ASTM A615, GRADE 60, "DEFORMED AND PLAIN BILLET STEEL BARS FOR CONCRETE REINFORCEMENT".
5. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185, "WELDED STEEL WIRE FABRIC PLAIN FOR CONCRETE REINFORCEMENT".
6. CONCRETE WORK AND MATERIALS SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS", ACI 301.
7. SUBMIT CONCRETE MIX DESIGN TO THE DESIGN ENGINEER FOR APPROVAL NOT LESS THAN 3 DAYS PRIOR TO CONSTRUCTION. MIX DESIGN SHALL BE APPROVED BY THE ENGINEER PRIOR TO PLACEMENT OF CONCRETE.
8. READY MIX CONCRETE SHALL COMPLY WITH ACI 304 AND ASTM C94 WITH A MAXIMUM WATER–CEMENT RATIO OF 0.50. TIME BETWEEN INTRODUCTION OF WATER AND THE PLACEMENT OF CONCRETE SHALL NOT EXCEED 1–1/2 HOURS.
9. CONCRETE AGGREGATES SHALL BE NORMAL WEIGHT, CONFORMING TO ASTM C33. MAXIMUM SIZE OF COARSE AGGREGATE SHALL BE 3/4".
10. CHLORIDE–CONTAINING ADMIXTURES SHALL NOT BE USED.
11. CONCRETE SLUMP SHALL NOT EXCEED 5 INCHES UNLESS SPECIFICALLY AUTHORIZED BY THE ENGINEER. SLUMP SHALL BE DETERMINED IN ACCORDANCE WITH ASTM C143.
12. PROVIDE AIR ENTRAINMENT IN EXTERIOR EXPOSED CONCRETE TO OBTAIN TOTAL AIR CONTENT OF 5% ± 1% IN ACCORDANCE WITH ACI 301.
13. FOR CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH, CONCRETE COVER FOR REINFORCING SHALL BE: 3" FOR ALL BARS
    FOR CONCRETE EXPOSED TO EARTH OR WEATHER, MINIMUM COVER SHALL BE:
    2" FOR #6 AND LARGER BARS
    1–1/2" FOR #5 AND SMALLER BARS OR WIRE FABRIC
14. LAP SPLICES FOR REINFORCING SHALL BE IN ACCORDANCE WITH ACI 318.12 AND STANDARD HOOKS SHALL CONFORM TO ACI 318.7.
15. WELDING OF REINFORCING STEEL OR THE APPLICATION OF HEAT TO FACILITATE BENDING IS SPECIFICALLY PROHIBITED.
16. ALL REINFORCING, ANCHOR BOLTS, DOWELS, EMBEDDED STEEL, INSERTS AND ALL OTHER EMBEDDED ITEMS AND FORMED DETAILS SHALL BE IN PLACE BEFORE START OF CONCRETE PLACEMENT.
17. PROVIDE A 3/4" CHAMFER AT ALL EXPOSED EDGES OF CONCRETE, UNLESS OTHERWISE NOTED.
18. PROVIDE NOT LESS THAN 48 HOURS NOTICE TO THE FIELD REPRESENTATIVE PRIOR TO PLACEMENT OF CONCRETE.
19. WHEN AMBIENT TEMPERATURE IS BELOW 50 DEGREES F, CONCRETE MATERIALS AND PLACEMENT SHALL CONFORM TO THE RECOMMENDATIONS OF ACI 306R "COLD WEATHER CONCRETING".
20. WHEN AMBIENT TEMPERATURE IS ABOVE 90 DEGREES F, CONCRETE MATERIALS AND PLACEMENT SHALL CONFORM TO THE RECOMMENDATIONS OF ACI 305R "HOT WEATHER CONCRETING".
21. REMOVE ALL LOOSE MATERIAL AND DEBRIS FROM COMPACTED SUBGRADE SURFACE PRIOR TO PLACING CONCRETE. CONCRETE SHALL NOT BE PLACED ON FROZEN SUBGRADE.
22. CONCRETE SHALL BE SUFFICIENTLY CONSOLIDATED BY VIBRATION TO REMOVE AIR VOIDS. VIBRATION SHALL BE IN ACCORDANCE WITH ACI 309 "STANDARD PRACTICE FOR CONSOLIDATION OF CONCRETE".

CONCRETE NOTES

23. THE TOP OF ALL CONCRETE SURFACES SHALL BE TRUE AND LEVEL WITH A SMOOTH FLOAT FINISH, UNLESS OTHERWISE NOTED. ALL DIMENSIONS SHALL BE WITHIN ± 1/8 INCH.
24. TESTING OF CONCRETE SHALL BE PERFORMED UNDER THE DIRECTION OF THE CONSTRUCTION MANAGER.
25. THROUGHOUT CONSTRUCTION, THE CONCRETE WORK SHALL BE ADEQUATELY PROTECTED AGAINST DAMAGE DUE TO EXCESSIVE LOADING, CONSTRUCTION EQUIPMENT, MATERIALS OR METHODS, ICE, RAIN, OR SNOW. PROTECT CONCRETE FROM EXCESSIVE HEAT AND FREEZING FOR NOT LESS THAN 14 DAYS.
26. DRYING OUT OF CONCRETE, ESPECIALLY DURING THE FIRST 24 HOURS, SHALL BE CAREFULLY GUARDED AGAINST. ALL SURFACES SHALL BE MOIST CURED OR PROTECTED USING A MEMBRANE CURING AGENT CONFORMING TO ASTM C309 APPLIED AS SOON AS FORMS ARE REMOVED. IF MEMBRANE CURING AGENT IS USED, EXERCISE CARE NOT TO DAMAGE SURFACE.
27. CONTRACTOR SHALL BRING TO THE IMMEDIATE ATTENTION OF THE CONSTRUCTION MANAGER ANY DEFECTS OR ERRORS IN THE WORK, PRIOR TO MAKING REPAIRS. CONTRACTOR SHALL OBTAIN PERMISSION FROM THE CONSTRUCTION MANAGER TO PATCH OR OTHERWISE REPAIR DEFECTS OTHER THAN MINOR HONEYCOMBING.
28. SET GROUT IN ACCORDANCE WITH MASTER BUILDERS TECHNOLOGIES OR APPROVED EQUAL, UNLESS SPECIFIED IN THE DRAWING.
29. JOINT FILLER SHALL BE PREFORMED RESILIENT BITUMINOUS EXPANSION JOINT FILLER CONFORMING TO ASTM D1751.
30. EXTERIOR WALKING SURFACES SHALL RECEIVE A BROOM FINISH.
31. GROUT SHALL BE NON METALLIC, NON SHRINK PREPACKAGED GROUT WITH A MINIMUM COMPRESSIVE STRENGTH OF 5000 PSI AT 28 DAYS. GROUT SHALL BE FIVE STAR GROUT AS MANUFACTURED BY FIVE STAR PRODUCTS, FAIRFIELD, CT OR APPROVED EQUAL.
32. CONCRETE ANCHORS SHALL BE HEADED STEEL STUDS MEETING THE REQUIREMENTS OF ASTM A108 "STEEL BARS, CARBON, COLD FINISHED, STANDARD QUALITY".

CONFIGURATION

5A

REFER TO LATEST T–MOBILE RF DATA SHEET FOR FINAL RF DESIGN & BOM.

0 1 2 3

ORIGINAL SIZE IN INCHES

TECTONIC
• PLANNING • ENGINEERING • CONSTRUCTION MANAGEMENT • SURVEYING
TECTONIC Engineering and Surveying Consultants, P.C.
1279 ROUTE 300
NEWBURGH, NY 12550
Phone: (845) 567–6656
Fax: (845) 567–8703

metroPCS
metroPCS WIRELESS, INC.
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

CROWN CASTLE

APPROVALS

LANDLORD _____
RF _____
CONSTRUCTION _____
OPERATIONS _____
SITE ACQ. _____

PROJECT NUMBER	DESIGNED BY
7061.CTHA520A	JQ

REV	DATE	REVISION	DRAWN BY
0	11/07/14	FOR COMMENT	MP
1	11/12/14	FOR CONSTRUCTION	MP

ISSUED BY _____ DATE _____

STATE OF CONNECTICUT
ANTONIO A. GUALTIERI
No. 25406
LICENSED PROFESSIONAL ENGINEER

SITE INFORMATION

CTHA520A
CROWN CROMWELL MONOPOLE
201 MAIN ST
CROMWELL, CT 06480

SHEET TITLE

CONCRETE NOTES

SHEET NUMBER

A–13

August 21, 2014

Andrew Bazinet
Crown Castle
3 Corporate Park Drive Suite 101
Clifton Park, NY 12065
(585) 899-3442

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630
btwo@btgrp.com

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Metro PCS* Co-Locate**	
	Carrier Site Number:	HFC0210A
	Carrier Site Name:	N/A
Crown Castle Designation:	**Crown Castle BU Number:**	876364
	Crown Castle Site Name:	Cromwell / First Line Emergenc
	Crown Castle JDE Job Number:	295284
	Crown Castle Work Order Number:	915224
	Crown Castle Application Number:	252176 Rev. 1
Engineering Firm Designation:	**B+T Group Project Number:**	84470.010.01
Site Data:	**201 Main St., Cromwell, Middlesex County, CT**	
	Latitude *41° 35' 0.11"*, Longitude *-72° 38' 59.14"*	
	125 Foot - Monopole Tower	

Dear Andrew Bazinet,

B+T Group is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 683239, in accordance with application 252176, revision 1.

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

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table 1 and Table 2 for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT Building Code with 2009 amendment based upon a wind speed of 85 mph fastest mile.

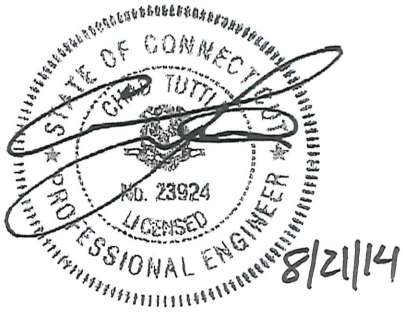
All equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *B+T Group* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:
B+T Engineering, Inc.

Jennifer Tillson
Project Engineer

Chad E. Tuttle, P.E.
President



tnxTower Report - version 6.1.4.1

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1) INTRODUCTION

This tower is a 125 ft Monopole tower designed by Engineered Endeavors, Inc. in February of 2002. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F. This tower has modified multiple times and those modifications are incorporated in this analysis.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
85.0	85.0	3	Ericsson	ERICSSON AIR 21 B2A B4P	1	1-3/16	--
		3	Ericsson	ERICSSON AIR 21 B4A B2P			
		1	--	T-Arm Mount [TA 601-3]			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
125.0	129.0	3	Argus Tech.	LLPX310R-V1	3 3 2 3	5/16 1/4 1/2 1-1/4	1
	127.0	3	RFS Celwave	APXVSPP18-C-A20			
	125.0	2	Dragonwave	HORIZON COMPACT			
		3	Samsung Telecomm.	WIMAX DAP HEAD			
		1	--	Platform Mount [LP 712-1]			
	124.0	1	Andrew	VHLP2-11			
		1	Andrew	VHLP2-18			
	127.0	3	Alcatel Lucent	TD-RRH8x20-25	1	1-1/4	2
		3	RFS Celwave	APXVTM14-C-120			
123.0	123.0	3	Alcatel Lucent	800MHZ 2X50W RRH W/FILTER	--	--	1
		3	Alcatel Lucent	PCS 1900MHz 4x45W-65MHz			
		1	--	Side Arm Mount [SO 102-3]			
115.0	117.0	6	Comm. Components Inc.	DTMABP7819VG12A	12 2 1	1-1/4 3/4 3/8	1
		3	Ericsson	RRUS-11			
		9	KMW Comm.	AM-X-CD-16-65-00T-RET			
		1	Raycap	DC6-48-60-18-8F			
	115.0	1	--	Platform Mount [LP 303-1]			
105.0	105.0	3	Alcatel Lucent	RRH2X40-AWS	1	1-5/8	2
		3	Andrew	HBX-6517DS-VTM			
		1	RFS Celwave	DB-T1-6Z-8AB-0Z			
		3	Andrew	LNX-6514DS-VTM			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
		3	Antel	BXA-171063-8BF-EDIN-2	12	1-5/8	1
		3	Antel	BXA-70063-6CF-EDIN-0			
		6	RFS Celwave	FD9R6004/2C-3L			
		1	--	Platform Mount [LP 712-1]			
95.0	95.0	**12**	**Decibel**	**DB844H65E-XY**	**12**	**1-5/8**	**3**
		1	**--**	**Platform Mount [LP 303-1]**			
85.0	85.0	**3**	**Kathrein**	**742 213**	**--**	**--**	**3**
		1	**--**	**Pipe Mount [PM 601-3]**			
		--	--	--	6	1-5/8	1

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
125	125	1	Generic	L.P.Platform	--	--
		6	Decibel	DB980H65		
		3	Decibel	DB980H90		
115	115	1	Generic	T-Arm	--	--
		6	Allgon	7250		
105	105	1	Generic	L.P.Platform	--	--
		12	Decibel	DB844		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	Metro PCS Co-Locate Rev # 1	252176	CCI Sites
Tower Manufacturer Drawings	EEI, Job No. 10554	2068958	CCI Sites
Tower Modification Drawings	Semaan Engineering Solutions, Job No. CT23XC558	2055765	CCI Sites
Post-Modification Inspection	VSI, Job No. 2007-004-138	2182292	CCI Sites
Tower Modification Drawings	B+T Group, Project No. 84890.001	3373019	CCI Sites
Post Modification Inspection	B+T Group, Project No. 84890.002	3394680	CCI Sites
Tower Modification Drawings	B+T Group, Project No. 84470.006.01	3669962	CCI Sites
Post-Modification Inspection	TEP, Project No. 131001.876364	4009982	CCI Sites
Foundation Drawings	EEI, Project No. 6464	1613909	CCI Sites
Base Plate Details	Crown, Project No. 320820	2608627	CCI Sites
Geotech Report	Dr. Clarence Welti, P.E., Date: 08/02/1999	1532312	CCI Sites
Antenna Configuration	Crown CAD Package	Date: 06/10/2014	CCI Sites

3.1) Analysis Method

tnxTower (version 6.1.4.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
5) Mount areas and weights are assumed based on photographs provided.
6) The existing base plate grout was not considered in this analysis.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	125 - 94.45	Pole	TP25.067x18.5x0.188	1	-7.661	769.746	96.1	Pass
L2	94.45 - 85.04	Pole	TP27.09x25.067x0.439	2	-8.480	1445.985	61.2	Pass
L3	85.04 - 73.5	Pole	TP29.158x25.873x0.475	3	-12.889	1743.737	75.9	Pass
L4	73.5 - 73	Pole	TP29.264x29.158x0.609	4	-13.018	2235.441	60.3	Pass
L5	73 - 60.5	Pole	TP31.921x29.264x0.367	5	-15.482	1908.243	88.0	Pass
L6	60.5 - 40.457	Pole	TP36.18x31.921x0.436	6	-19.353	2492.137	81.8	Pass
L7	40.457 - 30.5	Pole	TP37.787x34.6x0.485	7	-24.485	2983.507	80.2	Pass
L8	30.5 - 0	Pole	TP44.25x37.787x0.456	8	-33.922	3297.309	90.1	Pass
							Summary	
						Pole (L1)	96.1	Pass
						Rating =	96.1	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	84.0	Pass
1	Base Plate	Base	83.0	Pass
1	Base Foundation (Soil Interaction)	Base	80.9	Pass

Structure Rating (max from all components) =	**96.1%**

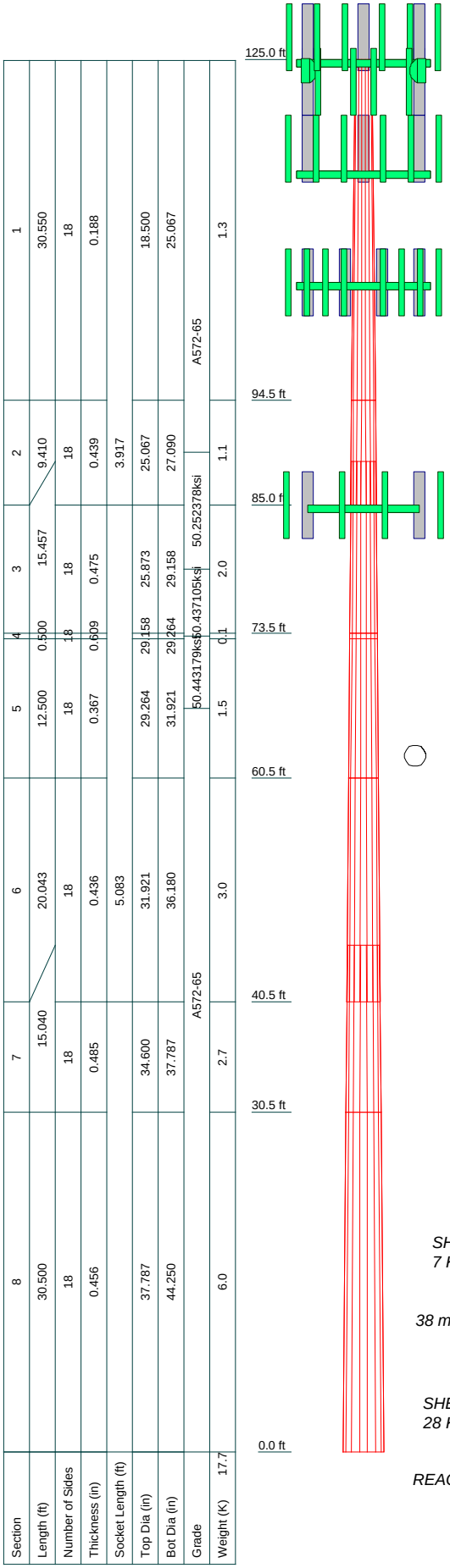
Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT



Section	1	2	3	4	5	6	7	8
Length (ft)	30.550	9.410	15.457	0.500	12.500	20.043	15.040	30.500
Number of Sides	18	18	18	18	18	18	18	18
Thickness (in)	0.188	0.439	0.475	0.609	0.367	0.436	0.485	0.456
Socket Length (ft)		3.917				5.083		
Top Dia (in)	18.500	25.067	25.873	29.158	29.264	31.921	34.600	37.787
Bot Dia (in)	25.067	27.090	29.158	29.264	31.921	36.180	37.787	44.250
Grade	A572-65	50.252378ksi	50.437105ksi	50.443179ksi	50.437105ksi	A572-65		
Weight (K)	1.3	1.1	2.0	0.1	1.5	3.0	2.7	6.0

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
APXVTM14-C-120 w/ Mount Pipe (R)	125	Platform Mount [LP 303-1] (E)	115
APXVTM14-C-120 w/ Mount Pipe (R)	125	(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	115
APXVTM14-C-120 w/ Mount Pipe (R)	125	(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	115
TD-RRH8x20-25 (R)	125	BXA-70063-6CF-EDIN-0 w/ Mount Pipe (E)	105
TD-RRH8x20-25 (R)	125	BXA-171063-8BF-EDIN-2 w/ Mount Pipe (E)	105
TD-RRH8x20-25 (R)	125	BXA-171063-8BF-EDIN-2 w/ Mount Pipe (E)	105
LLPX310R-V1 w/ Mount Pipe (E)	125	BXA-171063-8BF-EDIN-2 w/ Mount Pipe (E)	105
LLPX310R-V1 w/ Mount Pipe (E)	125	(2) FD9R6004/2C-3L (E)	105
LLPX310R-V1 w/ Mount Pipe (E)	125	(2) FD9R6004/2C-3L (E)	105
APXVSPP18-C-A20 w/ Mount Pipe (E)	125	(2) FD9R6004/2C-3L (E)	105
APXVSPP18-C-A20 w/ Mount Pipe (E)	125	LNX-6514DS-VTM w/ Mount Pipe (R)	105
APXVSPP18-C-A20 w/ Mount Pipe (E)	125	LNX-6514DS-VTM w/ Mount Pipe (R)	105
WIMAX DAP HEAD (E)	125	LNX-6514DS-VTM w/ Mount Pipe (R)	105
WIMAX DAP HEAD (E)	125	HBX-6517DS-VTM w/ Mount Pipe (R)	105
WIMAX DAP HEAD (E)	125	HBX-6517DS-VTM w/ Mount Pipe (R)	105
HORIZON COMPACT (E)	125	HBX-6517DS-VTM w/ Mount Pipe (R)	105
HORIZON COMPACT (E)	125	RRH2X40-AWS (R)	105
(2) 6' x 2" Mount Pipe (E)	125	RRH2X40-AWS (R)	105
(2) 6' x 2" Mount Pipe (E)	125	RRH2X40-AWS (R)	105
(2) 6' x 2" Mount Pipe (E)	125	DB-T1-6Z-8AB-0Z (R)	105
Platform Mount [LP 712-1] (E)	125	Platform Mount [LP 712-1] (E)	105
VHLP2-18 (E)	125	BXA-70063-6CF-EDIN-0 w/ Mount Pipe (E)	105
VHLP2-11 (E)	125	BXA-70063-6CF-EDIN-0 w/ Mount Pipe (E)	105
PCS 1900MHz 4x45W-65MHz w / Mount Pipe (E)	123	ERICSSON AIR 21 B2A B4P w/ Mount Pipe (P)	85
800MHZ 2X50W RRH W/FILTER w / Mount Pipe (E)	123	ERICSSON AIR 21 B4A B2P w/ Mount Pipe (P)	85
800MHZ 2X50W RRH W/FILTER w / Mount Pipe (E)	123	ERICSSON AIR 21 B4A B2P w/ Mount Pipe (P)	85
800MHZ 2X50W RRH W/FILTER w / Mount Pipe (E)	123	ERICSSON AIR 21 B4A B2P w/ Mount Pipe (P)	85
Side Arm Mount [SO 102-3] (E)	123	T-Arm Mount [TA 601-3] (P)	85
PCS 1900MHz 4x45W-65MHz w / Mount Pipe (E)	123	ERICSSON AIR 21 B2A B4P w/ Mount Pipe (P)	85
PCS 1900MHz 4x45W-65MHz w / Mount Pipe (E)	123	ERICSSON AIR 21 B2A B4P w/ Mount Pipe (P)	85
(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	115		
(2) DTMABP7819VG12A (E)	115		
(2) DTMABP7819VG12A (E)	115		
(2) DTMABP7819VG12A (E)	115		
RRUS-11 (E)	115		
RRUS-11 (E)	115		
RRUS-11 (E)	115		
DC6-48-60-18-8F (E)	115		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	50.437105ksi	50 ksi	65 ksi
50.252378ksi	50 ksi	65 ksi	50.443179ksi	50 ksi	65 ksi

TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 96.1%

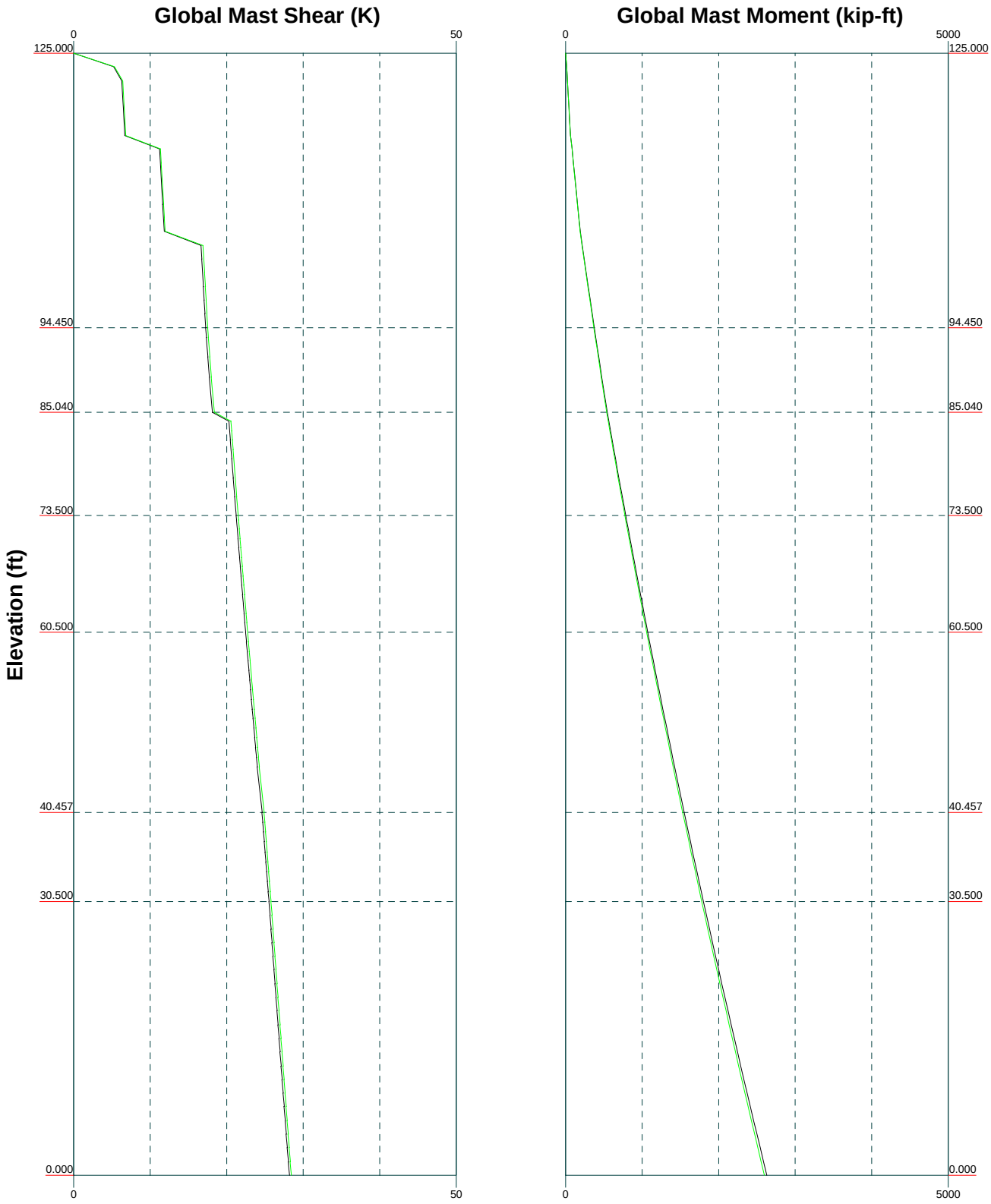
B+T Group
1717 South Boulder Ave, Suite 300
Tulsa, OK - 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job:	**84470.010.01 - Cromwell/First Line Emergencl, CT (BU# 87636**		
Project:			
Client: Crown Castle	Drawn by: JTillson	App'd:	
Code: TIA/EIA-222-F	Date: 08/21/14	Scale: NTS	
Path: S:\Projects\Crown Castle\84470_876364_Cromwell\Engineering\tnxTower\84470_010_01_Cromwell_First Line Emergenc_CT_ASIeri		Dwg No. E-1	

TIA/EIA-222-F - 85 mph/38 mph 0.750 in Ice

Maximum Values

Vx Vz Mx Mz



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1717 South Boulder Ave, Suite 300
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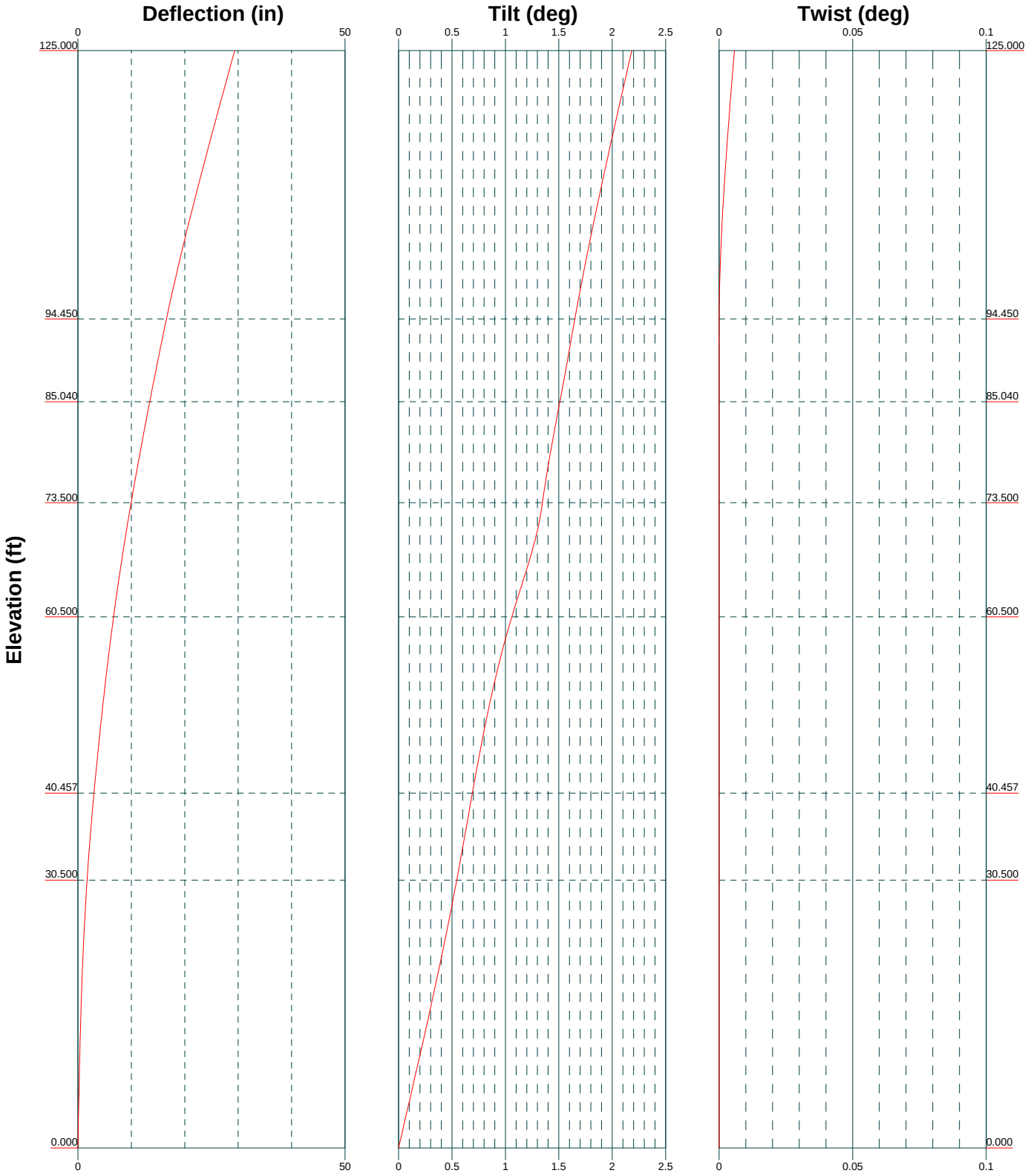
Job: 84470.010.01 - Cromwell/First Line Emergencl, CT (BU# 87636		
Project:		
Client: Crown Castle	Drawn by: JTillson	App'd:
Code: TIA/EIA-222-F	Date: 08/21/14	Scale: NTS
Path: S:\Projects\Crown Castle\84470_876364_Cromwell\Engineering\tnxTower\84470_010_01_Cromwell_First Line Emergenc_CT_ASIeri		Dwg No. E-4

TIA/EIA-222-F - Service - 50 mph

Maximum Values



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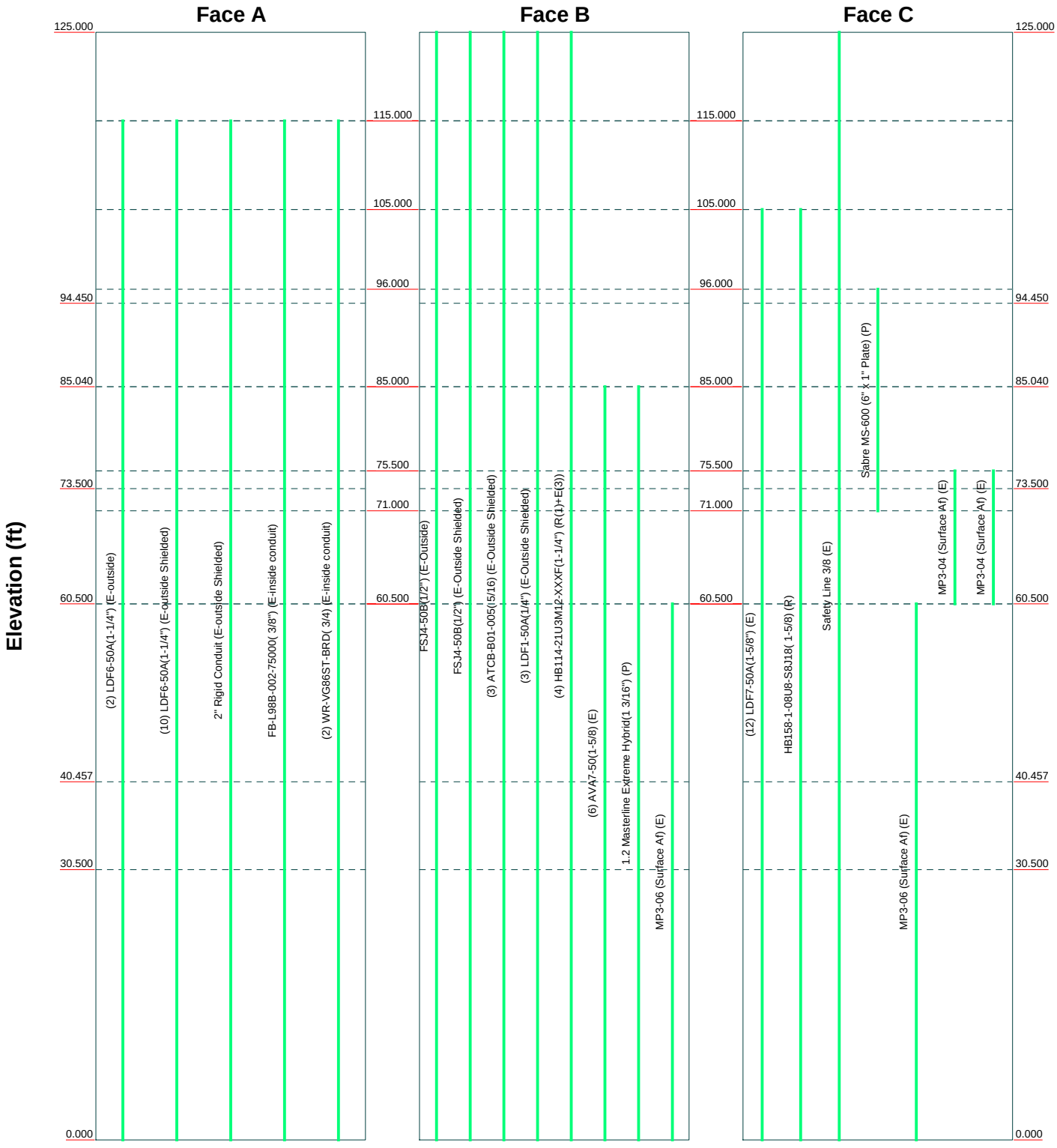
Project:		
Client: Crown Castle	Drawn by: JTillson	App'd:
Code: TIA/EIA-222-F	Date: 08/21/14	Scale: NTS
Path: S:\Projects\Crown Castle\84470_876364_Cromwell\Engineering\tnxTower\84470_010_01_Cromwell_First Line Emergenc_CT_ASIeri		Dwg No. E-5

Feed Line Distribution Chart

0' - 125'

Round | Flat | App In Face | App Out Face | Truss Leg



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Project:		
Client: Crown Castle	Drawn by: JTillson	App'd:
Code: TIA/EIA-222-F	Date: 08/21/14	Scale: NTS
Path: S:\Projects\Crown Castle\84470_876364_Cromwell\Engineering\tnxTower\84470_010_01_Cromwell_First Line Emergenc_CT_ASeri		Dwg No. E-7

Tower Input Data

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

Tower is located in Middlesex County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.750 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 50 mph.
TOWER RATING: 96.1%.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation* ft	*Section Length* ft	*Splice Length* ft	*Number of Sides*	*Top Diameter* in	*Bottom Diameter* in	*Wall Thickness* in	*Bend Radius* in	*Pole Grade*
L1	125.000-94.450	30.550	0.000	18	18.500	25.067	0.188	0.750	A572-65 (65 ksi)
L2	94.450-85.040	9.410	3.917	18	25.067	27.090	0.439	1.757	50.252378ksi (50 ksi)
L3	85.040-73.500	15.457	0.000	18	25.873	29.158	0.475	1.899	50.437105ksi (50 ksi)
L4	73.500-73.000	0.500	0.000	18	29.158	29.264	0.609	2.437	50.443179ksi

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L5	73.000-60.500	12.500	0.000	18	29.264	31.921	0.367	1.466	(50 ksi) A572-65 (65 ksi)
L6	60.500-40.457	20.043	5.083	18	31.921	36.180	0.436	1.743	A572-65 (65 ksi)
L7	40.457-30.500	15.040	0.000	18	34.600	37.787	0.485	1.939	A572-65 (65 ksi)
L8	30.500-0.000	30.500		18	37.787	44.250	0.456	1.825	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	18.785	10.898	461.730	6.501	9.398	49.131	924.069	5.450	2.926	15.605
	25.454	14.807	1157.924	8.832	12.734	90.931	2317.371	7.405	4.082	21.77
L2	25.454	34.331	2630.769	8.743	12.734	206.592	5265.000	17.169	3.639	8.285
	27.508	37.151	3333.705	9.461	13.762	242.245	6671.796	18.579	3.995	9.096
L3	27.117	38.276	3119.391	9.016	13.143	237.334	6242.888	19.142	3.718	7.83
	29.608	43.226	4493.011	10.182	14.812	303.332	8991.935	21.617	4.296	9.048
L4	29.608	55.204	5684.267	10.135	14.812	383.756	11376.014	27.607	4.060	6.664
	29.716	55.409	5747.975	10.172	14.866	386.648	11503.512	27.710	4.078	6.694
L5	29.716	33.616	3546.548	10.259	14.866	238.565	7097.762	16.811	4.505	12.293
	32.413	36.706	4617.275	11.202	16.216	284.742	9240.626	18.357	4.973	13.569
L6	32.413	43.541	5453.050	11.177	16.216	336.283	10913.275	21.775	4.851	11.134
	36.738	49.432	7979.124	12.689	18.379	434.133	15968.747	24.720	5.601	12.855
L7	36.227	52.486	7717.450	12.111	17.577	439.073	15445.054	26.248	5.236	10.803
	38.370	57.389	10088.726	13.242	19.196	525.572	20190.728	28.700	5.797	11.96
L8	38.370	54.065	9518.850	13.252	19.196	495.884	19050.225	27.038	5.847	12.815
	44.933	63.426	15368.309	15.547	22.479	683.674	30756.839	31.719	6.985	15.308

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 125.000-94.450				1	1	1		
L2 94.450-85.040				1	1	0.93228		
L3 85.040-73.500				1	1	0.947822		
L4 73.500-73.000				1	1	0.93408		
L5 73.000-60.500				1	1	0.976519		
L6 60.500-40.457				1	1	0.959022		
L7 40.457-30.500				1	1	0.966927		
L8 30.500-0.000				1	1	0.9761		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
$$$										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
FSJ4-50B(1/2") (E-Outside)	B	No	CaAa (Out Of Face)	125.000 - 0.000	1	No Ice	0.052	0.000
						1/2" Ice	0.152	0.001
						1" Ice	0.252	0.002
						2" Ice	0.452	0.006
						4" Ice	0.852	0.022
FSJ4-50B(1/2") (E-Outside Shielded)	B	No	CaAa (Out Of Face)	125.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.022
ATCB-B01-005(5/16) (E-Outside Shielded)	B	No	CaAa (Out Of Face)	125.000 - 0.000	3	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.021
LDF1-50A(1/4") (E-Outside Shielded)	B	No	CaAa (Out Of Face)	125.000 - 0.000	3	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.021
HB114-21U3M12-XXX F(1-1/4") (R(1)+E(3))	B	No	Inside Pole	125.000 - 0.000	4	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
$$$								
LDF6-50A(1-1/4") (E-outside)	A	No	CaAa (Out Of Face)	115.000 - 0.000	2	No Ice	0.155	0.001
						1/2" Ice	0.255	0.002
						1" Ice	0.355	0.004
						2" Ice	0.555	0.009
						4" Ice	0.955	0.028
LDF6-50A(1-1/4") (E-outside Shielded)	A	No	CaAa (Out Of Face)	115.000 - 0.000	10	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
						2" Ice	0.000	0.009
						4" Ice	0.000	0.028
2" Rigid Conduit (E-outside Shielded)	A	No	CaAa (Out Of Face)	115.000 - 0.000	1	No Ice	0.000	0.003
						1/2" Ice	0.000	0.004
						1" Ice	0.000	0.006
						2" Ice	0.000	0.013
						4" Ice	0.000	0.032
FB-L98B-002-75000(3/8") (E-inside conduit)	A	No	CaAa (Out Of Face)	115.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.022
WR-VG86ST-BRD(3/4)	A	No	CaAa (Out Of	115.000 - 0.000	2	No Ice	0.000	0.001

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
(E-inside conduit)			Face)			1/2" Ice	0.000	0.001
						1" Ice	0.000	0.003
						2" Ice	0.000	0.007
						4" Ice	0.000	0.024
$$$								
LDF7-50A(1-5/8")	C	No	Inside Pole	105.000 - 0.000	12	No Ice	0.000	0.001
(E)						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
HB158-1-08U8-S8J18(	C	No	Inside Pole	105.000 - 0.000	1	No Ice	0.000	0.001
1-5/8)						1/2" Ice	0.000	0.001
(R)						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
$$$								
$$$								
AVA7-50(1-5/8)	B	No	Inside Pole	85.000 - 0.000	6	No Ice	0.000	0.001
(E)						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
1.2 Masterline Extreme	B	No	Inside Pole	85.000 - 0.000	1	No Ice	0.000	0.001
Hybrid(1 3/16")						1/2" Ice	0.000	0.001
(P)						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
$$$								
Safety Line 3/8	C	No	CaAa (Out Of	125.000 - 0.000	1	No Ice	0.037	0.000
(E)			Face)			1/2" Ice	0.137	0.001
						1" Ice	0.238	0.001
						2" Ice	0.437	0.002
						4" Ice	0.838	0.004
$$$								
Sabre MS-600 (6" x 1"	C	No	CaAa (Out Of	96.000 - 71.000	1	No Ice	0.167	0.000
Plate)			Face)			1/2" Ice	0.250	0.000
(P)						1" Ice	0.333	0.000
						2" Ice	0.500	0.000
						4" Ice	0.833	0.000
$$$								
$$$								
MP3-06 (Surface Af)	C	No	CaAa (Out Of	60.500 - 0.000	1	No Ice	0.434	0.029
(E)			Face)			1/2" Ice	0.518	0.031
						1" Ice	0.601	0.034
						2" Ice	0.768	0.040
						4" Ice	1.101	0.057
MP3-06 (Surface Af)	B	No	CaAa (Out Of	60.500 - 0.000	1	No Ice	0.434	0.029
(E)			Face)			1/2" Ice	0.518	0.031
						1" Ice	0.601	0.034
						2" Ice	0.768	0.040
						4" Ice	1.101	0.057
$$$								
MP3-04 (Surface Af)	C	No	CaAa (Out Of	75.500 - 60.500	1	No Ice	0.268	0.014
(E)			Face)			1/2" Ice	0.352	0.016
						1" Ice	0.435	0.018
						2" Ice	0.602	0.022
						4" Ice	0.935	0.036
MP3-04 (Surface Af)	C	No	CaAa (Out Of	75.500 - 60.500	1	No Ice	0.268	0.014
(E)			Face)			1/2" Ice	0.352	0.016
						1" Ice	0.435	0.018
						2" Ice	0.602	0.022

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
						4" Ice	0.935	0.036
$$$								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	125.000-94.450	A	0.000	0.000	0.000	6.371	0.246
		B	0.000	0.000	0.000	1.589	0.170
		C	0.000	0.000	0.000	1.404	0.124
L2	94.450-85.040	A	0.000	0.000	0.000	2.917	0.113
		B	0.000	0.000	0.000	0.489	0.052
		C	0.000	0.000	0.000	1.921	0.107
L3	85.040-73.500	A	0.000	0.000	0.000	3.577	0.138
		B	0.000	0.000	0.000	0.600	0.123
		C	0.000	0.000	0.000	3.429	0.187
L4	73.500-73.000	A	0.000	0.000	0.000	0.155	0.006
		B	0.000	0.000	0.000	0.026	0.005
		C	0.000	0.000	0.000	0.370	0.020
L5	73.000-60.500	A	0.000	0.000	0.000	3.875	0.149
		B	0.000	0.000	0.000	0.650	0.134
		C	0.000	0.000	0.000	7.510	0.494
L6	60.500-40.457	A	0.000	0.000	0.000	6.213	0.240
		B	0.000	0.000	0.000	9.748	0.792
		C	0.000	0.000	0.000	9.457	0.805
L7	40.457-30.500	A	0.000	0.000	0.000	3.087	0.119
		B	0.000	0.000	0.000	4.842	0.394
		C	0.000	0.000	0.000	4.698	0.400
L8	30.500-0.000	A	0.000	0.000	0.000	9.455	0.365
		B	0.000	0.000	0.000	14.833	1.206
		C	0.000	0.000	0.000	14.391	1.225

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	125.000-94.450	A	0.866	0.000	0.000	0.000	13.487	1.056
		B		0.000	0.000	0.000	6.878	0.506
		C		0.000	0.000	0.000	6.917	0.152
L2	94.450-85.040	A	0.846	0.000	0.000	0.000	6.100	0.473
		B		0.000	0.000	0.000	2.081	0.152
		C		0.000	0.000	0.000	4.839	0.115
L3	85.040-73.500	A	0.833	0.000	0.000	0.000	7.481	0.580
		B		0.000	0.000	0.000	2.552	0.246
		C		0.000	0.000	0.000	7.571	0.209
L4	73.500-73.000	A	0.825	0.000	0.000	0.000	0.320	0.025
		B		0.000	0.000	0.000	0.109	0.010
		C		0.000	0.000	0.000	0.659	0.023
L5	73.000-60.500	A	0.816	0.000	0.000	0.000	7.955	0.607
		B		0.000	0.000	0.000	2.690	0.260
		C		0.000	0.000	0.000	13.223	0.575
L6	60.500-40.457	A	0.789	0.000	0.000	0.000	12.538	0.943
		B		0.000	0.000	0.000	15.545	1.063

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	0.000	15.254	0.900
L7	40.457-30.500	A	0.756	0.000	0.000	0.000	6.229	0.468
		B		0.000	0.000	0.000	7.722	0.528
		C		0.000	0.000	0.000	7.578	0.447
L8	30.500-0.000	A	0.750	0.000	0.000	0.000	18.605	1.367
		B		0.000	0.000	0.000	23.221	1.589
		C		0.000	0.000	0.000	22.778	1.362

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	125.000-94.450	0.005	-0.217	-0.003	-0.226
L2	94.450-85.040	-0.157	-0.216	-0.224	-0.247
L3	85.040-73.500	-0.252	-0.156	-0.333	-0.181
L4	73.500-73.000	-0.616	0.089	-0.734	0.098
L5	73.000-60.500	-0.517	0.017	-0.606	-0.001
L6	60.500-40.457	0.013	0.175	0.010	0.118
L7	40.457-30.500	0.013	0.179	0.011	0.122
L8	30.500-0.000	0.014	0.185	0.011	0.130

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXVTM14-C-120 w/ Mount Pipe (R)	A	From Leg	4.000 0.000 2.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.134 7.662 8.183 9.256 11.526	4.959 5.754 6.472 8.010 11.412	0.077 0.131 0.193 0.338 0.752
APXVTM14-C-120 w/ Mount Pipe (R)	B	From Leg	4.000 0.000 2.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.134 7.662 8.183 9.256 11.526	4.959 5.754 6.472 8.010 11.412	0.077 0.131 0.193 0.338 0.752
APXVTM14-C-120 w/ Mount Pipe (R)	C	From Leg	4.000 0.000 2.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.134 7.662 8.183 9.256 11.526	4.959 5.754 6.472 8.010 11.412	0.077 0.131 0.193 0.338 0.752
TD-RRH8x20-25 (R)	A	From Leg	4.000 0.000 2.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.720 5.014 5.316 5.948 7.314	1.703 1.920 2.145 2.622 3.680	0.070 0.097 0.128 0.201 0.397
TD-RRH8x20-25	B	From Leg	4.000	0.000	125.000	No Ice	4.720	1.703	0.070

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(R)			0.000			1/2" Ice	5.014	1.920	0.097
			2.000			1" Ice	5.316	2.145	0.128
						2" Ice	5.948	2.622	0.201
						4" Ice	7.314	3.680	0.397
TD-RRH8x20-25	C	From Leg	4.000	0.000	125.000	No Ice	4.720	1.703	0.070
(R)			0.000			1/2" Ice	5.014	1.920	0.097
			2.000			1" Ice	5.316	2.145	0.128
						2" Ice	5.948	2.622	0.201
						4" Ice	7.314	3.680	0.397
LLPX310R-V1 w/ Mount	A	From Leg	4.000	0.000	125.000	No Ice	5.065	2.983	0.045
Pipe			0.000			1/2" Ice	5.480	3.526	0.083
(E)			4.000			1" Ice	5.905	4.086	0.126
						2" Ice	6.788	5.313	0.232
						4" Ice	8.704	8.131	0.544
LLPX310R-V1 w/ Mount	B	From Leg	4.000	0.000	125.000	No Ice	5.065	2.983	0.045
Pipe			0.000			1/2" Ice	5.480	3.526	0.083
(E)			4.000			1" Ice	5.905	4.086	0.126
						2" Ice	6.788	5.313	0.232
						4" Ice	8.704	8.131	0.544
LLPX310R-V1 w/ Mount	C	From Leg	4.000	0.000	125.000	No Ice	5.065	2.983	0.045
Pipe			0.000			1/2" Ice	5.480	3.526	0.083
(E)			4.000			1" Ice	5.905	4.086	0.126
						2" Ice	6.788	5.313	0.232
						4" Ice	8.704	8.131	0.544
APXVSPP18-C-A20 w/	A	From Leg	4.000	0.000	125.000	No Ice	8.498	6.946	0.083
Mount Pipe			0.000			1/2" Ice	9.149	8.127	0.151
(E)			2.000			1" Ice	9.767	9.021	0.227
						2" Ice	11.031	10.844	0.406
						4" Ice	13.679	14.851	0.909
APXVSPP18-C-A20 w/	B	From Leg	4.000	0.000	125.000	No Ice	8.498	6.946	0.083
Mount Pipe			0.000			1/2" Ice	9.149	8.127	0.151
(E)			2.000			1" Ice	9.767	9.021	0.227
						2" Ice	11.031	10.844	0.406
						4" Ice	13.679	14.851	0.909
APXVSPP18-C-A20 w/	C	From Leg	4.000	0.000	125.000	No Ice	8.498	6.946	0.083
Mount Pipe			0.000			1/2" Ice	9.149	8.127	0.151
(E)			2.000			1" Ice	9.767	9.021	0.227
						2" Ice	11.031	10.844	0.406
						4" Ice	13.679	14.851	0.909
WIMAX DAP HEAD	A	From Leg	4.000	0.000	125.000	No Ice	1.804	0.778	0.033
(E)			0.000			1/2" Ice	1.988	0.918	0.045
			0.000			1" Ice	2.180	1.067	0.058
						2" Ice	2.589	1.391	0.094
						4" Ice	3.512	2.143	0.201
WIMAX DAP HEAD	B	From Leg	4.000	0.000	125.000	No Ice	1.804	0.778	0.033
(E)			0.000			1/2" Ice	1.988	0.918	0.045
			0.000			1" Ice	2.180	1.067	0.058
						2" Ice	2.589	1.391	0.094
						4" Ice	3.512	2.143	0.201
WIMAX DAP HEAD	C	From Leg	4.000	0.000	125.000	No Ice	1.804	0.778	0.033
(E)			0.000			1/2" Ice	1.988	0.918	0.045
			0.000			1" Ice	2.180	1.067	0.058
						2" Ice	2.589	1.391	0.094
						4" Ice	3.512	2.143	0.201
HORIZON COMPACT	B	From Leg	4.000	0.000	125.000	No Ice	0.841	0.429	0.012
(E)			0.000			1/2" Ice	0.966	0.525	0.018
			0.000			1" Ice	1.099	0.629	0.026

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	1.392	0.863	0.048
						4" Ice	2.082	1.435	0.122
HORIZON COMPACT	C	From Leg	4.000	0.000	125.000	No Ice	0.841	0.429	0.012
(E)			0.000			1/2" Ice	0.966	0.525	0.018
			0.000			1" Ice	1.099	0.629	0.026
						2" Ice	1.392	0.863	0.048
						4" Ice	2.082	1.435	0.122
(2) 6' x 2" Mount Pipe	A	From Leg	4.000	0.000	125.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
(2) 6' x 2" Mount Pipe	B	From Leg	4.000	0.000	125.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
(2) 6' x 2" Mount Pipe	C	From Leg	4.000	0.000	125.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
Platform Mount [LP 712-1]	C	None		0.000	125.000	No Ice	24.530	24.530	1.335
(E)						1/2" Ice	29.940	29.940	1.646
						1" Ice	35.350	35.350	1.956
						2" Ice	46.170	46.170	2.577
						4" Ice	67.810	67.810	3.820
$$$									
PCS 1900MHz 4x45W-65MHz w / Mount Pipe	A	From Leg	1.000	0.000	123.000	No Ice	2.905	3.218	0.071
			0.000			1/2" Ice	3.206	3.647	0.101
(E)			0.000			1" Ice	3.519	4.094	0.138
						2" Ice	4.187	5.064	0.225
						4" Ice	5.703	7.343	0.480
PCS 1900MHz 4x45W-65MHz w / Mount Pipe	B	From Leg	1.000	0.000	123.000	No Ice	2.905	3.218	0.071
			0.000			1/2" Ice	3.206	3.647	0.101
(E)			0.000			1" Ice	3.519	4.094	0.138
						2" Ice	4.187	5.064	0.225
						4" Ice	5.703	7.343	0.480
PCS 1900MHz 4x45W-65MHz w / Mount Pipe	C	From Leg	1.000	0.000	123.000	No Ice	2.905	3.218	0.071
			0.000			1/2" Ice	3.206	3.647	0.101
(E)			0.000			1" Ice	3.519	4.094	0.138
						2" Ice	4.187	5.064	0.225
						4" Ice	5.703	7.343	0.480
800MHZ 2X50W RRH W/FILTER w / Mount Pipe	A	From Leg	1.000	0.000	123.000	No Ice	2.586	2.731	0.073
			0.000			1/2" Ice	2.861	3.102	0.101
(E)			0.000			1" Ice	3.149	3.490	0.135
						2" Ice	3.780	4.371	0.216
						4" Ice	5.207	6.396	0.453
800MHZ 2X50W RRH W/FILTER w / Mount Pipe	B	From Leg	1.000	0.000	123.000	No Ice	2.586	2.731	0.073
			0.000			1/2" Ice	2.861	3.102	0.101
(E)			0.000			1" Ice	3.149	3.490	0.135
						2" Ice	3.780	4.371	0.216
						4" Ice	5.207	6.396	0.453
800MHZ 2X50W RRH W/FILTER w / Mount Pipe	C	From Leg	1.000	0.000	123.000	No Ice	2.586	2.731	0.073
			0.000			1/2" Ice	2.861	3.102	0.101
(E)			0.000			1" Ice	3.149	3.490	0.135
						2" Ice	3.780	4.371	0.216

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice	5.207	6.396	0.453
Side Arm Mount [SO 102-3]	C	None		0.000	123.000	No Ice	3.000	3.000	0.081
(E)						1/2" Ice	3.480	3.480	0.111
						1" Ice	3.960	3.960	0.141
						2" Ice	4.920	4.920	0.201
						4" Ice	6.840	6.840	0.321
$$$									
(3)	A	From Leg	4.000	0.000	115.000	No Ice	8.498	6.304	0.074
AM-X-CD-16-65-00T-RET			0.000			1/2" Ice	9.149	7.479	0.139
w/ Mount Pipe			2.000			1" Ice	9.767	8.368	0.212
(E)						2" Ice	11.031	10.179	0.385
						4" Ice	13.679	14.024	0.874
(3)	B	From Leg	4.000	0.000	115.000	No Ice	8.498	6.304	0.074
AM-X-CD-16-65-00T-RET			0.000			1/2" Ice	9.149	7.479	0.139
w/ Mount Pipe			2.000			1" Ice	9.767	8.368	0.212
(E)						2" Ice	11.031	10.179	0.385
						4" Ice	13.679	14.024	0.874
(3)	C	From Leg	4.000	0.000	115.000	No Ice	8.498	6.304	0.074
AM-X-CD-16-65-00T-RET			0.000			1/2" Ice	9.149	7.479	0.139
w/ Mount Pipe			2.000			1" Ice	9.767	8.368	0.212
(E)						2" Ice	11.031	10.179	0.385
						4" Ice	13.679	14.024	0.874
(2) DTMABP7819VG12A	A	From Leg	4.000	0.000	115.000	No Ice	1.139	0.391	0.019
(E)			0.000			1/2" Ice	1.284	0.488	0.026
			2.000			1" Ice	1.437	0.595	0.036
						2" Ice	1.769	0.833	0.060
						4" Ice	2.538	1.414	0.140
(2) DTMABP7819VG12A	B	From Leg	4.000	0.000	115.000	No Ice	1.139	0.391	0.019
(E)			0.000			1/2" Ice	1.284	0.488	0.026
			2.000			1" Ice	1.437	0.595	0.036
						2" Ice	1.769	0.833	0.060
						4" Ice	2.538	1.414	0.140
(2) DTMABP7819VG12A	C	From Leg	4.000	0.000	115.000	No Ice	1.139	0.391	0.019
(E)			0.000			1/2" Ice	1.284	0.488	0.026
			2.000			1" Ice	1.437	0.595	0.036
						2" Ice	1.769	0.833	0.060
						4" Ice	2.538	1.414	0.140
RRUS-11	A	From Leg	4.000	0.000	115.000	No Ice	3.249	1.373	0.048
(E)			0.000			1/2" Ice	3.491	1.551	0.068
			2.000			1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150
						4" Ice	5.426	3.042	0.310
RRUS-11	B	From Leg	4.000	0.000	115.000	No Ice	3.249	1.373	0.048
(E)			0.000			1/2" Ice	3.491	1.551	0.068
			2.000			1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150
						4" Ice	5.426	3.042	0.310
RRUS-11	C	From Leg	4.000	0.000	115.000	No Ice	3.249	1.373	0.048
(E)			0.000			1/2" Ice	3.491	1.551	0.068
			2.000			1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150
						4" Ice	5.426	3.042	0.310
DC6-48-60-18-8F	A	From Leg	4.000	0.000	115.000	No Ice	1.467	1.467	0.019
(E)			0.000			1/2" Ice	1.667	1.667	0.037
			2.000			1" Ice	1.878	1.878	0.057
						2" Ice	2.333	2.333	0.105
						4" Ice	3.378	3.378	0.239

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Platform Mount [LP 303-1]	C	None		0.000	115.000	No Ice	14.660	14.660	1.250
(E)						1/2" Ice	18.870	18.870	1.481
						1" Ice	23.080	23.080	1.713
						2" Ice	31.500	31.500	2.175
						4" Ice	48.340	48.340	3.101
$$$									
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	A	From Leg	4.000 0.000	0.000	105.000	No Ice 1/2" Ice	7.969 8.609	5.801 6.953	0.042 0.103
(E)			0.000			1" Ice	9.216	7.819	0.171
						2" Ice	10.459	9.601	0.335
						4" Ice	13.066	13.366	0.804
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	B	From Leg	4.000 0.000	0.000	105.000	No Ice 1/2" Ice	7.969 8.609	5.801 6.953	0.042 0.103
(E)			0.000			1" Ice	9.216	7.819	0.171
						2" Ice	10.459	9.601	0.335
						4" Ice	13.066	13.366	0.804
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	C	From Leg	4.000 0.000	0.000	105.000	No Ice 1/2" Ice	7.969 8.609	5.801 6.953	0.042 0.103
(E)			0.000			1" Ice	9.216	7.819	0.171
						2" Ice	10.459	9.601	0.335
						4" Ice	13.066	13.366	0.804
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	A	From Leg	4.000 0.000	0.000	105.000	No Ice 1/2" Ice	3.179 3.555	3.353 3.971	0.029 0.061
(E)			0.000			1" Ice	3.964	4.595	0.099
						2" Ice	4.853	5.893	0.193
						4" Ice	6.767	8.885	0.488
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	B	From Leg	4.000 0.000	0.000	105.000	No Ice 1/2" Ice	3.179 3.555	3.353 3.971	0.029 0.061
(E)			0.000			1" Ice	3.964	4.595	0.099
						2" Ice	4.853	5.893	0.193
						4" Ice	6.767	8.885	0.488
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	C	From Leg	4.000 0.000	0.000	105.000	No Ice 1/2" Ice	3.179 3.555	3.353 3.971	0.029 0.061
(E)			0.000			1" Ice	3.964	4.595	0.099
						2" Ice	4.853	5.893	0.193
						4" Ice	6.767	8.885	0.488
(2) FD9R6004/2C-3L	A	From Leg	4.000 0.000	0.000	105.000	No Ice 1/2" Ice	0.367 0.451	0.085 0.136	0.003 0.005
(E)			0.000			1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
						4" Ice	1.281	0.740	0.063
(2) FD9R6004/2C-3L	B	From Leg	4.000 0.000	0.000	105.000	No Ice 1/2" Ice	0.367 0.451	0.085 0.136	0.003 0.005
(E)			0.000			1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
						4" Ice	1.281	0.740	0.063
(2) FD9R6004/2C-3L	C	From Leg	4.000 0.000	0.000	105.000	No Ice 1/2" Ice	0.367 0.451	0.085 0.136	0.003 0.005
(E)			0.000			1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
						4" Ice	1.281	0.740	0.063
LNX-6514DS-VTM w/ Mount Pipe	A	From Leg	4.000 0.000	0.000	105.000	No Ice 1/2" Ice	8.568 9.220	7.004 8.185	0.059 0.127
(R)			0.000			1" Ice	9.838	9.081	0.204
						2" Ice	11.104	10.904	0.384
						4" Ice	13.754	14.926	0.890
LNX-6514DS-VTM w/	B	From Leg	4.000	0.000	105.000	No Ice	8.568	7.004	0.059

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Mount Pipe			0.000			1/2" Ice	9.220	8.185	0.127
(R)			0.000			1" Ice	9.838	9.081	0.204
						2" Ice	11.104	10.904	0.384
						4" Ice	13.754	14.926	0.890
LNX-6514DS-VTM w/	C	From Leg	4.000	0.000	105.000	No Ice	8.568	7.004	0.059
Mount Pipe			0.000			1/2" Ice	9.220	8.185	0.127
(R)			0.000			1" Ice	9.838	9.081	0.204
						2" Ice	11.104	10.904	0.384
						4" Ice	13.754	14.926	0.890
HBX-6517DS-VTM w/	A	From Leg	4.000	0.000	105.000	No Ice	5.541	5.021	0.045
Mount Pipe			0.000			1/2" Ice	6.112	6.223	0.092
(R)			0.000			1" Ice	6.654	7.167	0.146
						2" Ice	7.750	9.011	0.281
						4" Ice	10.109	12.898	0.692
HBX-6517DS-VTM w/	B	From Leg	4.000	0.000	105.000	No Ice	5.541	5.021	0.045
Mount Pipe			0.000			1/2" Ice	6.112	6.223	0.092
(R)			0.000			1" Ice	6.654	7.167	0.146
						2" Ice	7.750	9.011	0.281
						4" Ice	10.109	12.898	0.692
HBX-6517DS-VTM w/	C	From Leg	4.000	0.000	105.000	No Ice	5.541	5.021	0.045
Mount Pipe			0.000			1/2" Ice	6.112	6.223	0.092
(R)			0.000			1" Ice	6.654	7.167	0.146
						2" Ice	7.750	9.011	0.281
						4" Ice	10.109	12.898	0.692
RRH2X40-AWS	A	From Leg	4.000	0.000	105.000	No Ice	2.522	1.589	0.044
(R)			0.000			1/2" Ice	2.753	1.795	0.061
			0.000			1" Ice	2.993	2.010	0.082
						2" Ice	3.499	2.465	0.132
						4" Ice	4.615	3.479	0.275
RRH2X40-AWS	B	From Leg	4.000	0.000	105.000	No Ice	2.522	1.589	0.044
(R)			0.000			1/2" Ice	2.753	1.795	0.061
			0.000			1" Ice	2.993	2.010	0.082
						2" Ice	3.499	2.465	0.132
						4" Ice	4.615	3.479	0.275
RRH2X40-AWS	C	From Leg	4.000	0.000	105.000	No Ice	2.522	1.589	0.044
(R)			0.000			1/2" Ice	2.753	1.795	0.061
			0.000			1" Ice	2.993	2.010	0.082
						2" Ice	3.499	2.465	0.132
						4" Ice	4.615	3.479	0.275
DB-T1-6Z-8AB-0Z	A	From Leg	4.000	0.000	105.000	No Ice	5.600	2.333	0.044
(R)			0.000			1/2" Ice	5.915	2.558	0.080
			0.000			1" Ice	6.240	2.791	0.120
						2" Ice	6.914	3.284	0.213
						4" Ice	8.365	4.373	0.455
Platform Mount [LP 712-1]	C	None		0.000	105.000	No Ice	24.530	24.530	1.335
(E)						1/2" Ice	29.940	29.940	1.646
						1" Ice	35.350	35.350	1.956
						2" Ice	46.170	46.170	2.577
						4" Ice	67.810	67.810	3.820
$$$									
$$$									
ERICSSON AIR 21 B2A	A	From Leg	4.000	0.000	85.000	No Ice	6.825	5.642	0.112
B4P w/ Mount Pipe			0.000			1/2" Ice	7.347	6.480	0.169
(P)			0.000			1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B2A	B	From Leg	4.000	0.000	85.000	No Ice	6.825	5.642	0.112

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
B4P w/ Mount Pipe			0.000			1/2" Ice	7.347	6.480	0.169
(P)			0.000			1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B2A	C	From Leg	4.000	0.000	85.000	No Ice	6.825	5.642	0.112
B4P w/ Mount Pipe			0.000			1/2" Ice	7.347	6.480	0.169
(P)			0.000			1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B4A	A	From Leg	4.000	0.000	85.000	No Ice	6.825	5.642	0.112
B2P w/ Mount Pipe			0.000			1/2" Ice	7.347	6.480	0.169
(P)			0.000			1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B4A	B	From Leg	4.000	0.000	85.000	No Ice	6.825	5.642	0.112
B2P w/ Mount Pipe			0.000			1/2" Ice	7.347	6.480	0.169
(P)			0.000			1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B4A	C	From Leg	4.000	0.000	85.000	No Ice	6.825	5.642	0.112
B2P w/ Mount Pipe			0.000			1/2" Ice	7.347	6.480	0.169
(P)			0.000			1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
T-Arm Mount [TA 601-3]	C	None		0.000	85.000	No Ice	10.900	10.900	0.726
(P)						1/2" Ice	14.650	14.650	0.926
						1" Ice	18.400	18.400	1.125
						2" Ice	25.900	25.900	1.524
						4" Ice	40.900	40.900	2.322
$$$									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2-18	B	Paraboloid	From	4.000	62.000		125.000	2.175	No Ice	3.720	0.031
(E)		w/Shroud (HP)	Leg	0.000					1/2" Ice	4.010	0.050
				-1.000					1" Ice	4.300	0.070
									2" Ice	4.880	0.110
									4" Ice	6.040	0.200
VHLP2-11	C	Paraboloid	From	4.000	90.000		125.000	2.175	No Ice	3.720	0.027
(E)		w/Shroud (HP)	Leg	0.000					1/2" Ice	4.010	0.050
				-1.000					1" Ice	4.300	0.070
									2" Ice	4.880	0.110
									4" Ice	6.040	0.190
$$$											

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	125 - 94.45	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-16.869	-0.266	1.272
			Max. Mx	5	-7.702	-369.492	-3.225
			Max. My	2	-7.661	1.548	374.765
			Max. Vy	5	17.259	-369.492	-3.225
			Max. Vx	2	-17.522	1.548	374.765
			Max. Torque	5			-1.098
L2	94.45 - 85.04	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-18.069	-0.321	1.552
			Max. Mx	5	-8.519	-465.541	-3.828
			Max. My	2	-8.480	1.839	472.320

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	5	17.726	-465.541	-3.828
			Max. Vx	2	-17.989	1.839	472.320
			Max. Torque	12			-0.402
L3	85.04 - 73.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-24.801	-0.412	2.344
			Max. Mx	5	-12.925	-774.610	-5.562
			Max. My	2	-12.889	2.723	785.695
			Max. Vy	5	21.238	-774.610	-5.562
			Max. Vx	2	-21.504	2.723	785.695
			Max. Torque	9			-0.414
L4	73.5 - 73	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-24.962	-0.400	2.362
			Max. Mx	5	-13.053	-785.226	-5.626
			Max. My	2	-13.018	2.765	796.456
			Max. Vy	5	21.291	-785.226	-5.626
			Max. Vx	2	-21.557	2.765	796.456
			Max. Torque	9			-0.416
L5	73 - 60.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-28.260	-0.072	2.811
			Max. Mx	11	-15.511	1058.632	3.487
			Max. My	2	-15.482	3.819	1073.171
			Max. Vy	5	22.480	-1058.291	-7.205
			Max. Vx	8	22.744	-3.921	-1072.092
			Max. Torque	9			-0.461
L6	60.5 - 40.457	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-33.169	-0.241	2.995
			Max. Mx	11	-19.375	1406.005	3.813
			Max. My	2	-19.353	4.613	1424.249
			Max. Vy	5	24.006	-1405.798	-9.402
			Max. Vx	8	24.270	-4.950	-1423.906
			Max. Torque	9			-0.461
L7	40.457 - 30.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-39.574	-0.421	3.189
			Max. Mx	11	-24.501	1779.019	4.118
			Max. My	8	-24.485	-5.981	-1801.394
			Max. Vy	5	25.540	-1778.947	-11.623
			Max. Vx	8	25.803	-5.981	-1801.394
			Max. Torque	9			-0.442
L8	30.5 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-51.022	-0.806	3.556
			Max. Mx	5	-33.923	-2597.765	-16.165
			Max. My	8	-33.922	-8.041	-2628.987
			Max. Vy	5	28.206	-2597.765	-16.165
			Max. Vx	2	-28.461	6.980	2626.739
			Max. Torque	9			-0.433

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	15	51.022	0.011	7.208
	Max. H_x	11	33.941	28.177	0.045
	Max. H_z	2	33.941	0.051	28.439
	Max. M_x	2	2626.739	0.051	28.439
	Max. M_z	5	2597.765	-28.184	-0.117
	Max. Torsion	11	0.225	28.177	0.045

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. Vert	1	33.941	0.000	0.000
	Min. H_x	5	33.941	-28.184	-0.117
	Min. H_z	8	33.941	-0.066	-28.439
	Min. M_x	8	-2628.987	-0.066	-28.439
	Min. M_z	11	-2597.557	28.177	0.045
	Min. Torsion	9	-0.404	13.981	-24.641

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	33.941	0.000	0.000	1.128	0.380	0.000
Dead+Wind 0 deg - No Ice	33.941	-0.051	-28.439	-2626.739	6.980	0.019
Dead+Wind 30 deg - No Ice	33.941	14.022	-24.656	-2278.154	-1289.611	-0.090
Dead+Wind 60 deg - No Ice	33.941	24.350	-14.267	-1318.930	-2242.200	0.061
Dead+Wind 90 deg - No Ice	33.941	28.184	0.117	16.165	-2597.765	0.314
Dead+Wind 120 deg - No Ice	33.941	24.412	14.310	1326.751	-2250.149	0.163
Dead+Wind 150 deg - No Ice	33.941	14.106	24.657	2280.533	-1300.415	0.154
Dead+Wind 180 deg - No Ice	33.941	0.066	28.439	2628.987	-8.041	0.324
Dead+Wind 210 deg - No Ice	33.941	-13.981	24.641	2278.493	1285.187	0.404
Dead+Wind 240 deg - No Ice	33.941	-24.377	14.195	1311.938	2246.468	-0.131
Dead+Wind 270 deg - No Ice	33.941	-28.177	-0.045	-4.597	2597.557	-0.225
Dead+Wind 300 deg - No Ice	33.941	-24.370	-14.314	-1324.956	2245.451	0.292
Dead+Wind 330 deg - No Ice	33.941	-14.093	-24.663	-2279.064	1299.579	0.234
Dead+Ice+Temp	51.022	0.000	-0.000	-3.556	-0.806	0.000
Dead+Wind 0 deg+Ice+Temp	51.022	-0.011	-7.208	-684.658	0.688	-0.007
Dead+Wind 30 deg+Ice+Temp	51.022	3.561	-6.248	-594.213	-335.977	-0.039
Dead+Wind 60 deg+Ice+Temp	51.022	6.182	-3.614	-345.550	-583.206	-0.007
Dead+Wind 90 deg+Ice+Temp	51.022	7.154	0.026	-0.204	-675.279	0.054
Dead+Wind 120 deg+Ice+Temp	51.022	6.196	3.624	339.525	-585.037	0.027
Dead+Wind 150 deg+Ice+Temp	51.022	3.580	6.248	586.941	-338.458	0.036
Dead+Wind 180 deg+Ice+Temp	51.022	0.015	7.208	677.353	-2.757	0.084
Dead+Wind 210 deg+Ice+Temp	51.022	-3.552	6.245	586.466	333.136	0.109
Dead+Wind 240 deg+Ice+Temp	51.022	-6.188	3.598	336.124	582.359	-0.009
Dead+Wind 270 deg+Ice+Temp	51.022	-7.152	-0.010	-4.965	673.406	-0.033
Dead+Wind 300 deg+Ice+Temp	51.022	-6.187	-3.625	-346.934	582.130	0.076
Dead+Wind 330 deg+Ice+Temp	51.022	-3.577	-6.250	-594.426	336.439	0.053
Dead+Wind 0 deg - Service	33.941	-0.018	-9.840	-909.472	2.679	0.007
Dead+Wind 30 deg - Service	33.941	4.852	-8.531	-788.674	-446.605	-0.032
Dead+Wind 60 deg - Service	33.941	8.426	-4.937	-456.281	-776.674	0.021
Dead+Wind 90 deg - Service	33.941	9.752	0.040	6.341	-899.874	0.110
Dead+Wind 120 deg - Service	33.941	8.447	4.952	460.472	-779.439	0.058
Dead+Wind 150 deg - Service	33.941	4.881	8.532	790.978	-450.353	0.054
Dead+Wind 180 deg - Service	33.941	0.023	9.840	911.725	-2.527	0.113
Dead+Wind 210 deg - Service	33.941	-4.838	8.526	790.261	445.589	0.141
Dead+Wind 240 deg - Service	33.941	-8.435	4.912	455.331	778.671	-0.046
Dead+Wind 270 deg - Service	33.941	-9.750	-0.015	-0.856	900.322	-0.079
Dead+Wind 300 deg - Service	33.941	-8.432	-4.953	-458.374	778.326	0.103
Dead+Wind 330 deg - Service	33.941	-4.877	-8.534	-788.995	450.583	0.083

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-33.941	0.000	0.000	33.941	0.000	0.000%
2	-0.051	-33.941	-28.439	0.051	33.941	28.439	0.000%
3	14.022	-33.941	-24.656	-14.022	33.941	24.656	0.000%
4	24.350	-33.941	-14.267	-24.350	33.941	14.267	0.000%
5	28.184	-33.941	0.117	-28.184	33.941	-0.117	0.000%
6	24.412	-33.941	14.310	-24.412	33.941	-14.310	0.000%
7	14.106	-33.941	24.657	-14.106	33.941	-24.657	0.000%
8	0.066	-33.941	28.439	-0.066	33.941	-28.439	0.000%
9	-13.981	-33.941	24.641	13.981	33.941	-24.641	0.000%
10	-24.377	-33.941	14.195	24.377	33.941	-14.195	0.000%
11	-28.177	-33.941	-0.045	28.177	33.941	0.045	0.000%
12	-24.370	-33.941	-14.314	24.370	33.941	14.314	0.000%
13	-14.093	-33.941	-24.663	14.093	33.941	24.663	0.000%
14	0.000	-51.022	0.000	-0.000	51.022	0.000	0.000%
15	-0.011	-51.022	-7.208	0.011	51.022	7.208	0.000%
16	3.561	-51.022	-6.248	-3.561	51.022	6.248	0.000%
17	6.182	-51.022	-3.614	-6.182	51.022	3.614	0.000%
18	7.154	-51.022	0.026	-7.154	51.022	-0.026	0.000%
19	6.196	-51.022	3.624	-6.196	51.022	-3.624	0.000%
20	3.580	-51.022	6.248	-3.580	51.022	-6.248	0.000%
21	0.015	-51.022	7.208	-0.015	51.022	-7.208	0.000%
22	-3.552	-51.022	6.245	3.552	51.022	-6.245	0.000%
23	-6.188	-51.022	3.598	6.188	51.022	-3.598	0.000%
24	-7.152	-51.022	-0.010	7.152	51.022	0.010	0.000%
25	-6.187	-51.022	-3.625	6.187	51.022	3.625	0.000%
26	-3.577	-51.022	-6.250	3.577	51.022	6.250	0.000%
27	-0.018	-33.941	-9.840	0.018	33.941	9.840	0.000%
28	4.852	-33.941	-8.531	-4.852	33.941	8.531	0.000%
29	8.426	-33.941	-4.937	-8.426	33.941	4.937	0.000%
30	9.752	-33.941	0.040	-9.752	33.941	-0.040	0.000%
31	8.447	-33.941	4.952	-8.447	33.941	-4.952	0.000%
32	4.881	-33.941	8.532	-4.881	33.941	-8.532	0.000%
33	0.023	-33.941	9.840	-0.023	33.941	-9.840	0.000%
34	-4.838	-33.941	8.526	4.838	33.941	-8.526	0.000%
35	-8.435	-33.941	4.912	8.435	33.941	-4.912	0.000%
36	-9.750	-33.941	-0.015	9.750	33.941	0.015	0.000%
37	-8.432	-33.941	-4.953	8.432	33.941	4.953	0.000%
38	-4.877	-33.941	-8.534	4.877	33.941	8.534	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00041128
3	Yes	6	0.00000001	0.00005417
4	Yes	6	0.00000001	0.00005446
5	Yes	5	0.00000001	0.00004173
6	Yes	6	0.00000001	0.00005492
7	Yes	6	0.00000001	0.00005446
8	Yes	4	0.00000001	0.00030634
9	Yes	6	0.00000001	0.00005473
10	Yes	6	0.00000001	0.00005446
11	Yes	4	0.00000001	0.00029675
12	Yes	6	0.00000001	0.00005514
13	Yes	6	0.00000001	0.00005427

14	Yes	4	0.00000001	0.00004200
15	Yes	5	0.00000001	0.00052954
16	Yes	5	0.00000001	0.00068787
17	Yes	5	0.00000001	0.00068844
18	Yes	5	0.00000001	0.00052059
19	Yes	5	0.00000001	0.00067976
20	Yes	5	0.00000001	0.00067988
21	Yes	5	0.00000001	0.00052110
22	Yes	5	0.00000001	0.00067441
23	Yes	5	0.00000001	0.00067221
24	Yes	5	0.00000001	0.00051929
25	Yes	5	0.00000001	0.00069030
26	Yes	5	0.00000001	0.00068908
27	Yes	4	0.00000001	0.00015835
28	Yes	5	0.00000001	0.00013393
29	Yes	5	0.00000001	0.00013471
30	Yes	4	0.00000001	0.00020042
31	Yes	5	0.00000001	0.00013702
32	Yes	5	0.00000001	0.00013525
33	Yes	4	0.00000001	0.00017353
34	Yes	5	0.00000001	0.00013664
35	Yes	5	0.00000001	0.00013468
36	Yes	4	0.00000001	0.00016010
37	Yes	5	0.00000001	0.00013828
38	Yes	5	0.00000001	0.00013479

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	125 - 94.45	29.347	27	2.180	0.004
L2	94.45 - 85.04	16.576	33	1.651	0.001
L3	88.957 - 73.5	14.724	33	1.570	0.001
L4	73.5 - 73	9.959	33	1.348	0.001
L5	73 - 60.5	9.818	33	1.341	0.001
L6	60.5 - 40.457	6.675	33	1.058	0.000
L7	45.54 - 30.5	3.815	33	0.768	0.000
L8	30.5 - 0	1.705	33	0.543	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
125.000	APXVTM14-C-120 w/ Mount Pipe	27	29.347	2.180	0.004	11161
124.000	VHLP2-18	27	28.895	2.162	0.004	11161
123.000	PCS 1900MHz 4x45W-65MHz w / Mount Pipe	27	28.444	2.144	0.004	11161
115.000	(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe	27	24.866	1.998	0.003	5580
105.000	BXA-70063-6CF-EDIN-0 w/ Mount Pipe	27	20.601	1.822	0.001	2789
85.000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	33	13.442	1.512	0.001	5067

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	125 - 94.45	84.506	2	6.280	0.012
L2	94.45 - 85.04	47.772	8	4.759	0.003
L3	88.957 - 73.5	42.438	8	4.525	0.002
L4	73.5 - 73	28.707	8	3.887	0.002
L5	73 - 60.5	28.302	8	3.867	0.002
L6	60.5 - 40.457	19.245	8	3.052	0.001
L7	45.54 - 30.5	10.999	8	2.215	0.001
L8	30.5 - 0	4.917	8	1.566	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
125.000	APXVTM14-C-120 w/ Mount Pipe	2	84.506	6.280	0.012	3958
124.000	VHLP2-18	2	83.207	6.227	0.011	3958
123.000	PCS 1900MHz 4x45W-65MHz w / Mount Pipe	2	81.909	6.174	0.011	3958
115.000	(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe	2	71.624	5.754	0.007	1978
105.000	BXA-70063-6CF-EDIN-0 w/ Mount Pipe	2	59.359	5.249	0.003	987
85.000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	8	38.744	4.357	0.002	1780

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	125 - 94.45 (1)	TP25.067x18.5x0.188	30.550	0.000	0.0	39.000	14.807	-7.661	577.454	0.013
L2	94.45 - 85.04 (2)	TP27.09x25.067x0.439	9.410	0.000	0.0	30.151	35.977	-8.480	1084.760	0.008
L3	85.04 - 73.5 (3)	TP29.158x25.873x0.475	15.457	0.000	0.0	30.262	43.227	-12.889	1308.130	0.010
L4	73.5 - 73 (4)	TP29.264x29.158x0.609	0.500	0.000	0.0	30.266	55.409	-13.018	1677.000	0.008
L5	73 - 60.5 (5)	TP31.921x29.264x0.367	12.500	0.000	0.0	39.000	36.706	-15.482	1431.540	0.011
L6	60.5 - 40.457 (6)	TP36.18x31.921x0.436	20.043	0.000	0.0	39.000	47.938	-19.353	1869.570	0.010
L7	40.457 - 30.5 (7)	TP37.787x34.6x0.485	15.040	0.000	0.0	39.000	57.389	-24.485	2238.190	0.011
L8	30.5 - 0 (8)	TP44.25x37.787x0.456	30.500	0.000	0.0	39.000	63.426	-33.922	2473.600	0.014

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	125 - 94.45 (1)	TP25.067x18.5x0.188	374.768	49.458	39.000	1.268	0.000	0.000	39.000	0.000
L2	94.45 - 85.04 (2)	TP27.09x25.067x0.439	472.323	24.962	30.151	0.828	0.000	0.000	30.151	0.000
L3	85.04 - 73.5 (3)	TP29.158x25.873x0.475	785.700	31.083	30.262	1.027	0.000	0.000	30.262	0.000
L4	73.5 - 73 (4)	TP29.264x29.158x0.609	796.461	24.719	30.266	0.817	0.000	0.000	30.266	0.000
L5	73 - 60.5 (5)	TP31.921x29.264x0.367	1073.175	45.227	39.000	1.160	0.000	0.000	39.000	0.000
L6	60.5 - 40.457 (6)	TP36.18x31.921x0.436	1424.258	41.876	39.000	1.074	0.000	0.000	39.000	0.000
L7	40.457 - 30.5 (7)	TP37.787x34.6x0.485	1801.400	41.130	39.000	1.055	0.000	0.000	39.000	0.000
L8	30.5 - 0 (8)	TP44.25x37.787x0.456	2629.000	46.145	39.000	1.183	0.000	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	125 - 94.45 (1)	TP25.067x18.5x0.188	17.522	1.183	26.000	0.091	0.099	0.006	26.000	0.000
L2	94.45 - 85.04 (2)	TP27.09x25.067x0.439	17.989	0.500	20.101	0.050	0.095	0.002	20.101	0.000
L3	85.04 - 73.5 (3)	TP29.158x25.873x0.475	21.504	0.497	20.175	0.049	0.070	0.001	20.175	0.000
L4	73.5 - 73 (4)	TP29.264x29.158x0.609	21.557	0.389	20.177	0.039	0.068	0.001	20.177	0.000
L5	73 - 60.5 (5)	TP31.921x29.264x0.367	22.744	0.620	26.000	0.048	0.016	0.000	26.000	0.000
L6	60.5 - 40.457 (6)	TP36.18x31.921x0.436	24.270	0.506	26.000	0.039	0.013	0.000	26.000	0.000
L7	40.457 - 30.5 (7)	TP37.787x34.6x0.485	25.803	0.450	26.000	0.035	0.328	0.004	26.000	0.000
L8	30.5 - 0 (8)	TP44.25x37.787x0.456	28.461	0.449	26.000	0.035	0.324	0.003	26.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	125 - 94.45 (1)	0.013	1.268	0.000	0.091	0.000	1.284 ✔	1.333	H1-3+VT ✔
L2	94.45 - 85.04 (2)	0.008	0.828	0.000	0.050	0.000	0.836 ✔	1.333	H1-3+VT ✔
L3	85.04 - 73.5 (3)	0.010	1.027	0.000	0.049	0.000	1.038 ✔	1.333	H1-3+VT ✔
L4	73.5 - 73 (4)	0.008	0.817	0.000	0.039	0.000	0.825 ✔	1.333	H1-3+VT ✔
L5	73 - 60.5 (5)	0.011	1.160	0.000	0.048	0.000	1.171	1.333	H1-3+VT ✔

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L6	60.5 - 40.457 (6)	0.010	1.074	0.000	0.039	0.000	1.084 ✔	1.333	H1-3+VT ✔
L7	40.457 - 30.5 (7)	0.011	1.055	0.000	0.035	0.000	1.066 ✔	1.333	H1-3+VT ✔
L8	30.5 - 0 (8)	0.014	1.183	0.000	0.035	0.000	1.197 ✔	1.333	H1-3+VT ✔

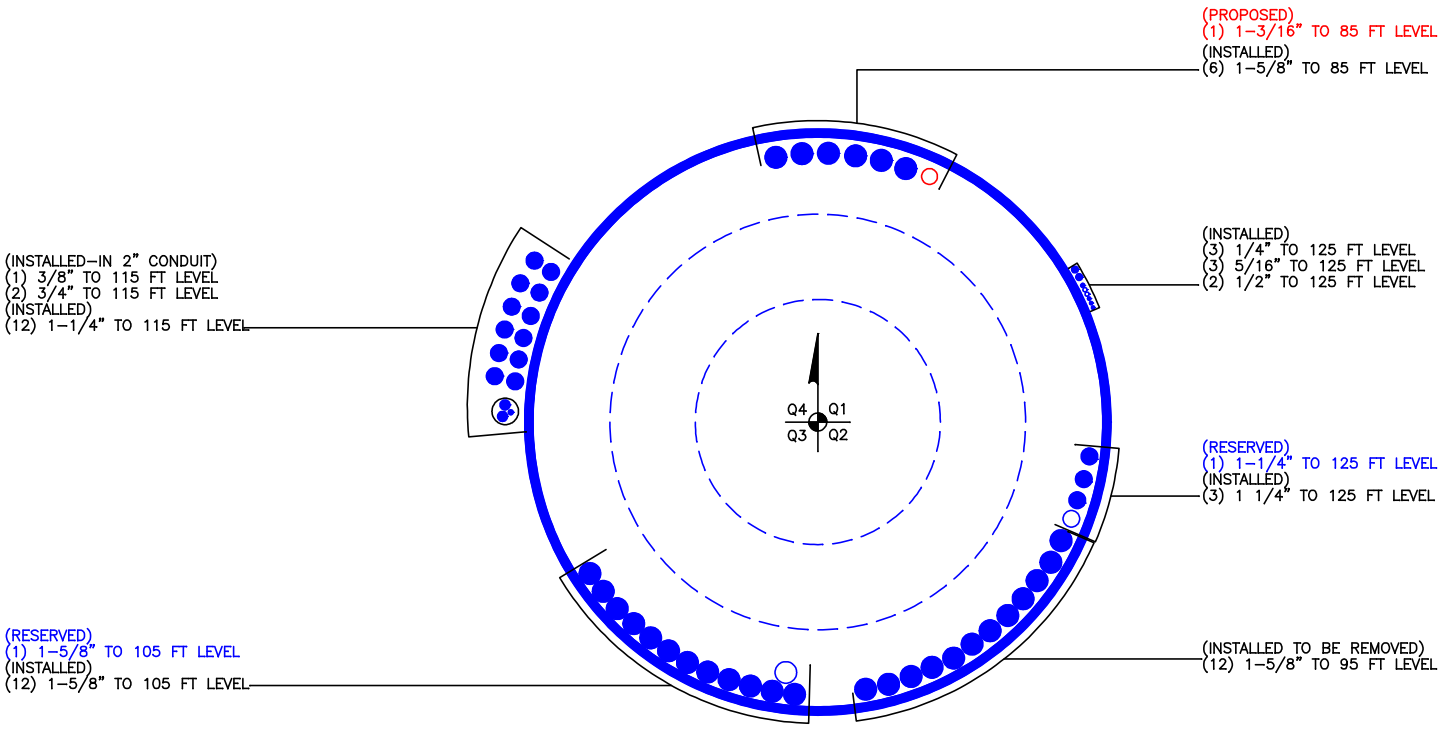
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	125 - 94.45	Pole	TP25.067x18.5x0.188	1	-7.661	769.746	**	**
L2	94.45 - 85.04	Pole	TP27.09x25.067x0.439	2	-8.480	1445.985	**	**
L3	85.04 - 73.5	Pole	TP29.158x25.873x0.475	3	-12.889	1743.737	**	**
L4	73.5 - 73	Pole	TP29.264x29.158x0.609	4	-13.018	2235.441	**	**
L5	73 - 60.5	Pole	TP31.921x29.264x0.367	5	-15.482	1908.243	**	**
L6	60.5 - 40.457	Pole	TP36.18x31.921x0.436	6	-19.353	2492.137	**	**
L7	40.457 - 30.5	Pole	TP37.787x34.6x0.485	7	-24.485	2983.507	**	**
L8	30.5 - 0	Pole	TP44.25x37.787x0.456	8	-33.922	3297.309	**	**
							Summary	
						Pole (L1)	96.1	Pass
						RATING =	**96.1**	**Pass**

**See additional calculations

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876364 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Reinforcement Capacity

AeroSolutions LLC
Optimizing Your Tower Infrastructure
5500 Flatirons Parkway, Suite 100
Boulder, CO 80301
720-304-6882

Dimensions and Properties														Compression				Axial				
																		ASD-9			LRFD	
Model	Weight (lb/ft)	Area (in^2)	Moment of Inertia (in^4)	Moment of Inertia (in^4)	Centroid from Mating Edge (in)	Centroid from Bolt Hole Center (in)	Web Thickness (in)	Width (in)	Flange Width (in)	Flange Thickness (in)	Hole Diameter (in)	Yield Stress (ksi)	Ultimate Stress (ksi)	Slender. Ratio Coefficient	Unbraced Length (in)	Slender. Ratio Coefficient	Unbraced Length (in)	Allowable Axial (kip)	Allowable Axial w/ increase (kip)	Governing Axial	Design Axial Strength (kip)	Governing Axial
Model	*Wt*	*A*	*Ix*	*Iy*	*Y*	*X*	*Tw*	*W*	*Wf*	*Tf*	*Dh*	*Fy*	*Fu*	*Kx*	*Lx*	*Ky*	*Ly*	*PAll*	*Pall.inc*	*Ptype.ASD*	*phiPn*	*Ptype.LRFD*
MP404	12.1	3.56	0.17	6.70	0.375	0	0.75	4.75	0	0	1.21875	100	110	0.80	14	1.00	14	143.1	190.8	Rupture	**214.6**	Rupture
MP406	20.7	6.09	0.79	12.07	0.625	0	1.25	4.875	0	0	1.21875	100	110	0.80	23	1.00	23	247.1	329.4	Rupture	**370.6**	Rupture
MS-600	20.4	6.00	0.50	18.00	0.5	0	1	6	0	0	1.21875	65	80	0.80	16.375	1.00	16.375	187.8	250.4	Compress.	283.1	Rupture

Rein1

Bottom	Top	Qty	Model	Position	T or T&C
0	30.5	3	MP406	F	T&C
30.5	60.5	3	MP406	F	T&C
60.5	73.5	3	MP404	F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Flats (Used for relative orientation only. Actual flat numbers may vary.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		1						1						1			
			1						1						1		
		1						1						1			

Rein2

Bottom	Top	Qty	Model	Position	T or T&C
73	87.45	3	MS-600	F	T&C
87.45	94.45	3	MS-600	F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1						1						1					
	1						1						1				

Rein3

Bottom	Top	Qty	Model	Position	T or T&C
0				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Reinforced Pole Stress
and Effective Thickness Check

AeroSolutions LLC
Optimizing Your Tower Infrastructure
5500 Flatirons Parkway, Suite 100
Boulder, CO 80301
720-304-6882

Section	Loads				Pole									
Section	Elevation (ft)	Moment (ft-kip)	Compression (kip)	Shear (kip)	Torsion (kip-ft)	Number of Sides	OD (in)	Thickness (in)	Yield Strength (ksi)	Flat Width (in)	Area (in^2)	Moment of Inertia (in^4)	Percent of Composite Moment of Inertia	Angle Offset to Pole Flat	Distance to Extreme Fiber (in)
1	125	7.0	2.4	4.6	0.0	18	18.5000	0.1875	65	2.93	10.9	461	100%	TRUE	9.38
2	94.45	374.8	7.7	17.5	0.1	18	25.0672	0.1875	65	4.09	14.8	1157	100%	TRUE	12.71
3	88.957	472.4	8.5	18.0	0.1	18	26.2480	0.1875	65	4.30	15.5	1329	44%	0	13.12
4	87.45	498.9	8.4	17.3	0.1	18	26.5719	0.4375	65	3.91	36.2	3126	64%	0	13.29
5	85.04	543.6	9.6	18.4	0.1	18	27.0900	0.4375	65	4.01	37.0	3315	65%	0	13.55
6	73.5	785.7	12.9	21.5	0.1	18	29.1578	0.2500	65	4.70	22.9	2419	54%	0	14.58
7	73	796.5	13.0	21.6	0.1	18	29.2641	0.2500	65	4.72	23.0	2446	43%	0	14.63
8	60.5	1073.2	15.5	22.7	0.0	18	31.9205	0.2500	65	5.19	25.1	3181	69%	10	16.19
9	45.54	1424.3	19.4	24.3	0.0	18	35.0998	0.2500	65	5.75	27.6	4239	58%	10	17.80
10	40.457	1549.1	21.6	24.9	0.0	18	36.1800	0.5625	65	5.39	63.5	10173	76%	10	18.33
11	30.5	1801.4	24.5	25.8	0.3	18	37.7869	0.3125	65	6.11	37.1	6587	65%	10	19.16
12	0	2629.0	33.9	28.5	0.3	18	44.2500	0.3125	65	7.25	43.6	10618	69%	10	22.44

Section	Pole (cont.)							Unreinforced Pole - Rev. F				
Section	Section Modulus (in^3)	Torsion Constant (in^4)	Polygonal Compact Criterion	Allowable Bending Stress (ksi)	Allowable Bending Moment Strength (ft-kip)	Allowable Axial Stress (ksi)	Allowable Shear Stress (ksi)	Bending Stress (ksi)	Axial Stress (ksi)	Shear Stress (ksi)	Torsion Shear Stress (ksi)	**Stress Ratio**
1	49	914	126	52.0	213.0	52.0	34.7	1.7	0.22	0.00	0.00	**0.037**
2	91	2293	176	52.0	394.2	52.0	34.7	49.4	0.52	0.00	0.01	**0.961**
3	101	2635	185	52.0	438.8	52.0	34.7	56.0	0.55	0.00	0.01	**1.087**
4	235	6203	72	52.0	1019.2	52.0	34.7	25.4	0.23	0.00	0.00	**0.494**
5	245	6579	74	52.0	1060.4	52.0	34.7	26.7	0.26	0.00	0.00	**0.518**
6	166	4795	152	52.0	718.8	52.0	34.7	56.8	0.56	0.00	0.00	**1.104**
7	167	4848	152	52.0	724.1	52.0	34.7	57.2	0.57	0.00	0.00	**1.111**
8	197	6305	167	52.0	851.4	52.0	34.7	65.5	0.62	0.00	0.00	**1.272**
9	238	8401	185	52.0	1031.6	52.0	34.7	71.8	0.70	0.00	0.00	**1.394**
10	555	20188	77	52.0	2405.0	52.0	34.7	33.5	0.34	0.00	0.00	**0.651**
11	344	13058	158	52.0	1489.4	52.0	34.7	62.9	0.66	0.00	0.01	**1.222**
12	473	21044	187	52.0	2049.7	52.0	34.7	66.7	0.78	0.00	0.00	**1.298**
												1.394

Section	Reinforced Pole					Rev. F	Reinforcement 1							
Section	Moment in Pole when Reinforced	Bending Stress (ksi)	Axial Stress (ksi)	Shear Stress (ksi)	Torsion Shear Stress (ksi)	**Reinforced Pole Stress Ratio**	Qty	**Model**	Position (F-Flat, C-Corner)	Gap Between Pole and Back of Rein. (in)	Tension only or Tension & Comp.	Total Moment of Inertia (in^4)	Axial Force (kip)	**Stress Ratio**
1	7.0	1.7	0.22	0.00	0.00	**0.037**								
2	374.8	49.4	0.52	0.00	0.00	**0.961**								
3	207.4	24.6	0.55	0.00	0.00	**0.483**								
4	320.6	16.4	0.23	0.00	0.00	**0.319**								
5	352.1	17.3	0.26	0.00	0.00	**0.337**								
6	423.0	30.6	0.56	0.00	0.00	**0.599**								
7	338.9	24.3	0.57	0.00	0.00	**0.479**	**3**	**MP404**	**F**	0	T&C	1214	83.6	**0.439**
8	739.4	45.1	0.62	0.00	0.00	**0.880**	**3**	**MP404**	**F**	0	T&C	1436	159.9	**0.838**
9	829.6	41.8	0.70	0.00	0.00	**0.818**	**3**	**MP406**	**F**	0	T&C	3039	256.3	**0.778**
10	1176.6	25.4	0.34	0.00	0.00	**0.496**	**3**	**MP406**	**F**	0	T&C	3221	156.0	**0.474**
11	1176.2	41.1	0.66	0.00	0.00	**0.802**	**3**	**MP406**	**F**	0	T&C	3502	251.1	**0.762**
12	1816.4	46.1	0.78	0.00	0.00	**0.901**	**3**	**MP406**	**F**	0	T&C	4750	280.4	**0.851**
						0.961								**0.851**

Section	Reinforcement 2								Composite							
Section	Qty	**Model**	Position (F-Flat, C-Corner)	Gap Between Pole and Back of Rein. (in)	Tension only or Tension & Comp.	Total Moment of Inertia (in^4)	Axial Force (kip)	**Stress Ratio**	Centroid Offset (in)	Area (in^2)	Moment of Inertia (in^4)	**Controlling Stress Ratio**	**Thickness (in)**	**Weight Multiplier**	**Derated Yield Stress (ksi)**	**% Error in Derated Yield Stress**
1									0.000	10.9	461	**0.037**	**0.1875**	**1.00**	**65.0**	**26.0%**
2									0.000	14.8	1157	**0.961**	**0.1875**	**1.00**	**65.0**	**0.3%**
3	**3**	**MS-600**	**F**	0	T&C	1698	153.1	**0.612**	0.000	33.5	3028	**0.612**	**0.4392**	**0.93**	**50.3**	**2.5%**
4	**3**	**MS-600**	**F**	0	T&C	1738	95.9	**0.383**	0.000	54.2	4864	**0.383**	**0.7004**	**0.94**	**50.3**	**8.5%**
5	**3**	**MS-600**	**F**	0	T&C	1803	107.4	**0.429**	0.000	55.0	5118	**0.429**	**0.6940**	**0.95**	**50.3**	**2.2%**
6	**3**	**MS-600**	**F**	0	T&C	2074	189.9	**0.759**	0.000	40.9	4493	**0.759**	**0.4748**	**0.95**	**50.4**	**2.4%**
7	**3**	**MS-600**	**F**	0	T&C	2089	151.0	**0.603**	0.000	51.7	5748	**0.603**	**0.6092**	**0.93**	**50.4**	**2.3%**
8									0.000	35.8	4617	**0.880**	**0.3665**	**0.98**	**65.0**	**0.3%**
9									0.000	45.9	7277	**0.818**	**0.4357**	**0.96**	**65.0**	**0.7%**
10									0.000	81.8	13394	**0.496**	**0.7511**	**0.97**	**65.0**	**0.3%**
11									0.000	55.4	10089	**0.802**	**0.4847**	**0.97**	**65.0**	**0.5%**
12									0.000	61.8	15368	**0.901**	**0.4563**	**0.98**	**65.0**	**0.5%**
								0.759				**0.961**				

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

TIA Rev F

Site Data

BU#:	*876364*
Site Name:	*CROMWELL - FIRST LINE*
App #:	*252176 Revision # 1*
Pole Manufacturer:	*Other*

Reactions		
Moment:	2205.1483	ft-kips
Axial:	33.9222	kips
Shear:	28.460976	kips

Anchor Rod Data		
Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	53	in

Plate Data		
Diam:	59	in
Thick:	1.75	in
Grade:	60	ksi
Single-Rod B-eff:	11.70	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.625	in
Fillet V. Weld:	0.375	in
Width:	7	in
Height:	22	in
Thick:	0.75	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	44.25	in
Thick:	0.3125	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

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

Anchor Rod Results

		Stiffened
Maximum Rod Tension:	163.6 Kips	Service, ASD
Allowable Tension:	195.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	83.9% **Pass**	

Base Plate Results

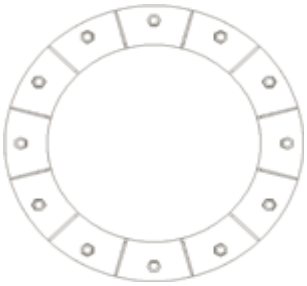
	Flexural Check	Stiffened
Base Plate Stress:	49.8 ksi	Service, ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	83.0% **Pass**	Y.L. Length: N/A, Roark

Stiffener Results

Horizontal Weld :	73.6% **Pass**
Vertical Weld:	39.2% **Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	15.5% **Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	64.1% **Pass**
Plate Comp. (AISC Bracket):	64.7% **Pass**

Pole Results

Pole Punching Shear Check:	12.2% **Pass**



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

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

Anchor Rod Information for TIA/EIA-222-F and TIA-222-G-2

Site Information	
ID:	876364
Name:	CROMWELL - FIRST LINE EMERGENC
App. #:	252176 Revision # 1

AeroSolutions LLC
Optimizing Your Tower Infrastructure

Base Reactions		
Moment:	2629	ft-kip
Axial:	34	kip
Shear:	28	kip
Base Plate Type:	Circular	

Design Information	
TIA Code:	F
ASIF:	1.333
Failure:	100%
eta Factor:	0.50

Original Anchor Rod Data

Quantity:	12	
Diameter:	2.25	in
Material:	#18J	
Bolt Circle:	53.0	in
Bolt Spacing:		in
Bolt Group Area:	47.71	in^2
Bolt Group MOIx:	16753	in^4

Reactions Seen by Original AR Group

Moment:	2205.1	kip-ft
Axial:	33.9	kip
Shear:	28.5	kip

Original AR Capacity Check

Tension Load:	163.6	kip
Allowable load:	194.8	kip
AR Capacity:	84.0%	Pass

First Added Anchor Rod Data

Quantity:	3	
Diameter:	1.75	in
Material:	A193 B7	
Bolt Circle:	59.8	in
Bolt Group Area:	7.22	in^2
Bolt Group MOIx:	3220	in^4

Reactions Seen by First Added AR Group

Moment:	423.9	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

First Added AR Capacity Check

Tension Load:	113.5	kip
Allowable load:	132.3	kip
AR Capacity:	85.8%	Pass

Second Added Anchor Rod Data

Quantity:		
Diameter:		in
Material:		
Bolt Circle:		in
Bolt Group Area:	0.00	in^2
Bolt Group MOIx:	0	in^4

Reactions Seen by Second Added AR Group

Moment:	0.0	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

Second Added AR Capacity Check

Tension Load:	0.0	kip
Allowable load:	0.0	kip
AR Capacity:	0.0%	

Third Added Anchor Rod Data

Quantity:		
Diameter:		in
Material:		
Bolt Circle:		in
Bolt Group Area:	0.00	in^2
Bolt Group MOIx:	0	in^4

Reactions Seen by Second Added AR Group

Moment:	0.0	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

Second Added AR Capacity Check

Tension Load:	0.0	kip
Allowable load:	0.0	kip
AR Capacity:	0.0%	

PROJECT	**876364 - CROMWELL / FIRST LINE EMERGENC, CT**				
SUBJECT	**Foundation Analysis**				
DATE	**08/21/14**	PAGE	1	OF	1

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74159
(918) 587-4630

Monopole Pad & Pier Foundation Analysis

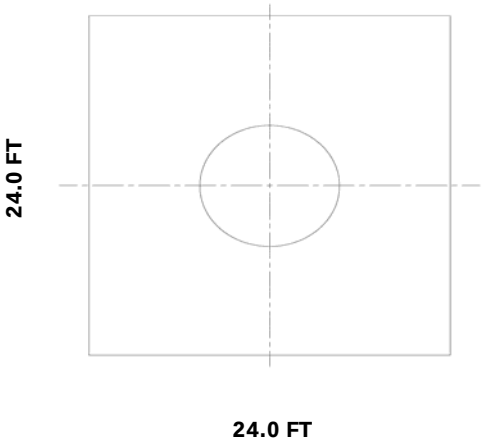
Rev. Type: F

Design Loads:

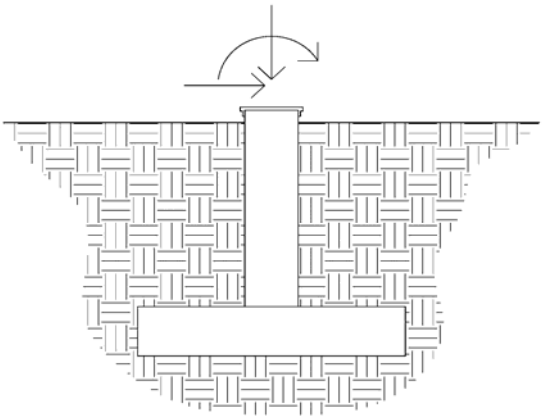
	Input unfactored loads	
Shear:	28.0	kips
Moment:	2,629.0	ft-kips
Tower Height:	125.0	ft
Tower Weight:	34.0	kips

Pad & Pier Dimensions / Properties:

Pole Diameter at Base:	44.25	in
Bearing Depth:	5.0	ft
Pad Width:	24.0	ft
Neglected Depth:	3.3	ft
Thickness:	3.0	ft
Pier Diameter:	14.0	ft
Pier Height Above Grade:	1.0	ft
BP Dist. Above Pier:	0.0	in
Clear Cover:	3.0	in
Pier Rebar Size:	8	
Pier Rebar Quanity:	24	
Pad Rebar Size:	8	
Pad Rebar Quanity:	30	
Pier Tie Size:	4	
Tie Quanity:	7	
Rebar Yield Strength:	60000	psi
Concrete Strength:	3000	psi
Concrete Unit Weight:	0.15	kcf



Elevation Overview



Soil Data:

	Allowable Values	
Soil Unit Weight:	0.125	kcf
Ult. Bearing Capacity:	8.000	ksf
Angle of Friction:	30.000	deg
Cohesion:	0.000	ksf
Passive Pressure:	0.000	ksf
Base Friction:	0.300	

Summary of Results

Req'd Pier Diam.	OK
Overturning	80.9%
Shear Capacity	38.7%
Bearing	43.8%
Pad Shear - 1-way	18.9%
Pad Shear - 2-way	6.7%
Pad Moment Capacity	13.8%
Pier Moment Capacity	50.1%

** Notes:

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

MetroPCS Existing Facility

Site ID: CTHA520A

Crown Cromwell Monopole
201 Main Street
Cromwell, CT 06416

September 24, 2014

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general public allowable limit:	**81.81 %**

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

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September 24, 2014

MetroPCS
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Emissions Analysis for Site: **CTHA520A – Crown Cromwell Monopole**

EBI Consulting was directed to analyze the proposed MetroPCS facility located at **201 Main Street, Cromwell, CT**, for the purpose of determining whether the emissions from the Proposed MetroPCS 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 both the PCS and 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 MetroPCS Wireless antenna facility located at **201 Main Street, Cromwell, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since MetroPCS 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 (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

4) 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.

5) For the following calculations the sample point was the top of a six 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.

6) The antennas used in this modeling are the **Ericsson AIR21 B4A/B2P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR21 B4A/B2P** has a maximum gain of **15.9 dBd** at its main lobe. 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.

7) The antenna mounting height centerline of the proposed antennas is **85 feet** above ground level (AGL).

8) 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.

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

MetroPCS Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	85	Height (AGL):	85	Height (AGL):	85
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	2	Channel Count	2	# PCS Channels:	2
Total TX Power:	120	Total TX Power:	120	# AWS Channels:	120
ERP (W):	1,906.06	ERP (W):	1,906.06	ERP (W):	1,906.06
Antenna A1 MPE%	2.69	Antenna B1 MPE%	2.69	Antenna C1 MPE%	2.69
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	85	Height (AGL):	85	Height (AGL):	85
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power:	120	Total TX Power:	120	Total TX Power:	120
ERP (W):	1,906.06	ERP (W):	1,906.06	ERP (W):	1,906.06
Antenna A2 MPE%	2.69	Antenna B2 MPE%	2.69	Antenna C2 MPE%	2.69

Site Composite MPE%	
Carrier	**MPE%**
MetroPCS	**16.14**
Sprint	9.26 %
Clearwire	1.22 %
Verizon Wireless	13.06 %
Nextel	8.43 %
AT&T	33.70 %
Site Total MPE %:	**81.81 %**

MetroPCS Sector 1 Total:	5.38 %
MetroPCS Sector 2 Total:	5.38 %
MetroPCS Sector 3 Total:	5.38 %
Site Total:	81.81 %

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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 MetroPCS 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:

MetroPCS Sector	Power Density Value (%)
Sector 1:	5.38 %
Sector 2:	5.38 %
Sector 3 :	5.38 %
MetroPCS Total:	16.14 %
Site Total:	81.81 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **81.81%** 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.

Scott Heffernan
RF Engineering Director

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