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

February 21, 2019

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

RE: **Notice of Exempt Modification for Crown Site BU: 876347**
AT&T Site ID: 10071100 – Manchester North
53 Slater Street, Manchester, CT 06040
Latitude: 41° 48′ 18.00″/ Longitude: -72° 32′ 1.00″

Dear Ms. Bachman:

AT&T currently maintains (6) antennas at the 145-foot level of the existing 155-foot monopole at 53 Slater Street in Manchester, Connecticut. The tower is owned by Crown Castle. The property is owned by 121 Connecticut Avenue Associates. AT&T intends to add (3) antennas, replace (3) remote radio heads, add (3) remote radio heads, add (1) hybrid and (2) DC power cables.

The facility was approved by the Town of Manchester Planning and Zoning Commission on August 17, 1998. This approval was given without conditions.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to the Honorable Jay Moran, Town of Manchester, Matthew R. Bordeaux, Senior Planner, as well as the property owner, and Crown Castle is the tower owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, Sprint respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Anne Marie Zsamba.

Sincerely,

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

Attachments:

Exhibit-A: Compound Plan and Elevation Depicting the Planned Changes
Exhibit-B: Structural Modification Report
Exhibit-C: General Power Density Table Report (RF Emissions Analysis Report)

cc: The Honorable Jay Moran, Mayor
Town of Manchester
41 Center Street
Manchester, CT 06040

Matthew Bordeaux, Senior Planner
Town of Manchester
41 Center Street
Manchester, CT 06040

121 Connecticut Avenue Associates
ATTN: Jean Burns
9 Lake Lane
Ellington, CT 06029

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Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

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

SHIP DATE: 21FEB19
ACTWGT: 1.50 LB
CAD: 104924194/INET4100

BILL SENDER

TO **MATTHEW BORDEAUX, SENIOR PLANNER**

TOWN OF MANCHESTER
41 CENTER STREET
MANCHESTER CT 06040
(201) 236-9224

REF: 1734.7680
INV:
PO:
DEPT:

565J2/0E3D/23AD

J191019010701uv

FedEx Express

FRI - 22 FEB 10:30A
PRIORITY OVERNIGHT

TRK# 0201 **7745 2641 3256**

EB QCWA

06040
BDL
CT-US

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VOL 2013 PG 259

TOWN OF MANCHESTER

PLANNING AND ZONING COMMISSION

CERTIFICATE OF APPROVAL OF SPECIAL EXCEPTION

Owner of record: Raglin Associates, c/o Sullivan Tile Dist.

Property Address: 53 Slater Street

Applicant: Sprint Spectrum LP

Regulation(s) cited: Article IV, Section 19.05

SPECIAL EXCEPTION GRANTED:

with modifications and the condition that a caveat addressing co-location requirements be submitted for staff review and filed on the land records by the applicant prior to any construction.

* ALL SITE WORK APPROVED BY THIS SPECIAL EXCEPTION MUST BE COMPLETED BY AUGUST 17, 2003 (5 yrs. From approval date). FAILURE TO COMPLETE ALL WORK WITHIN THE SPECIFIED TIME PERIOD WILL RESULT IN AUTOMATIC EXPIRATION OF THE APPROVAL.

* THIS CERTIFICATE MUST BE RECORDED IN THE LAND RECORDS IN THE OFFICE OF THE TOWN CLERK BEFORE THE SPECIAL EXCEPTION IS LAWFULLY EFFECTIVE.

CERTIFIED:

Frank Daversa

Secretary
Planning and Zoning Commission

*DATE ADOPTED: August 17, 1998

FILE NO. S-147

Received for Record on
SEP 11 1998 at 2:43 P.M.
Joseph V. Camposeo

Joseph V. Camposeo, Town Clerk

TOWN OF MANCHESTER
41 CENTER STREET - P.O. BOX 191
MANCHESTER, CT 06045-0191
(860) 647-3052 FAX: (860) 647-3144

ZONING PERMIT

CERTIFICATION OF ZONING COMPLIANCE REQUEST

PERMIT/APPLICATION NBR: 99 00000638 DATE APPLIED: 10/08/98
PERMIT TYPE: ZONE APP TYPE: DISH PREPARED BY: PAT21
DATE ISSUED: 11/03/98

PROPERTY ADDRESS:
3 SLATER STREET
TENANT:

LEGAL DESCRIPTION:

OWNER NAME/ADDRESS:
AGLIN ASSOCIATES
C/O SULLIVAN TILE DIST
5 RAILROAD AVE
EST HAVEN CT 06516

CONTRACTOR NAME/ADDRESS:

OTHER:
SPRINT PCS

VALUATION:
OCCUPANCY TYPE: COMMERCIAL BUIL Certificate of O-C-U-P-T: C
Dimensions of structure: 150' Plans for building: YES

DESCRIPTION OF OTHER BUILDINGS NOT SHOWN:
CONDITIONS: REMARKS:
ADDTNL APPROVAL: ADDTNL PERMITS:

MISCELLANEOUS INFO: SITE DEVELOPMENT AND COLORS OF TOWER AND EQUIPMENT CABINETS TO BE AS APPRVD BY PZC ON 8/17/98

THIS IS TO CERTIFY THAT THE ABOVE STATED INFORMATION IS A PERMITTED AND LAWFUL USE AS CONTROLLED BY THE ZONING REGULATIONS OF THE TOWN OF MANCHESTER, CONNECTICUT, UPON AUTHORIZED SIGNATURE OF THE ZONING ENFORCEMENT OFFICER.

Thomas R. O'Meara
APPROVAL SIGNATURE

11/3/98
DATE

ORIGINAL

53 SLATER STREET

Location	53 SLATER STREET	**Mblu**	56/ 5140/ 53/ /
Acct#	514000053	**Owner**	ONE HUNDRED TWENTY ONE CONN-
Assessment	$1,690,200	**Appraisal**	$2,414,500
PID	14616	**Building Count**	4

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2011	$1,689,400	$725,100	$2,414,500
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2011	$1,182,600	$507,600	$1,690,200

Owner of Record

Owner	ONE HUNDRED TWENTY ONE CONN-ECTICUT AVENUE ASSOCIATES LLC	**Sale Price**	$1,180,000
		Certificate	C
Address	9 LAKE LANE ELLINGTON, CT 06029	**Book & Page**	2683/ 224
		Sale Date	07/17/2003
		Instrument	33

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
ONE HUNDRED TWENTY ONE CONN-	$1,180,000	C	2683/ 224	33	07/17/2003
RAGLIN ASSOCIATES LLC	$0		2132/ 338		12/02/1999

Building Information

Building 1 : Section 1

Year Built: 1987
Living Area: 6333
Replacement Cost: $474,167
Replacement Cost Less Depreciation: $265,500

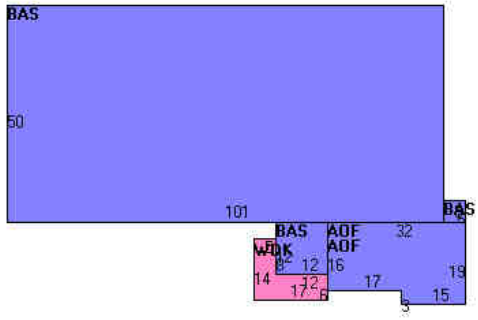
Building Attributes	
Field	**Description**
STYLE	Service Shop
MODEL	Ind/Comm

Building Photo

Grade	Average
Stories:	1
Occupancy	4
Exterior Wall 1	Pre-finsh Metl
Exterior Wall 2	Brick Veneer
Roof Structure	Gable/Hip
Roof Cover	Enam Mtl Shing
Interior Wall 1	Wall Brd/Wood
Interior Wall 2	Minim/Masonry
Interior Floor 1	Concr-Finished
Interior Floor 2	
Heating Fuel	Gas
Heating Type	Forced Air-Duc
AC Type	Partial
Bldg Use	Industrial 96
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	300
Heat/AC	Heat/AC Packag
Frame Type	Steel
Baths/Plumbing	Average
Ceiling/Wall	Ceil & Min Wl
Rooms/Prtns	Average
Wall Height	14
% Comn Wall	0

(http://images.vgsi.com/photos/ManchesterCTPhotos//\00\03\43/03.jpg)

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	5219	5219
AOF	Office, (Average)	1114	1114
WDK	Wood Deck	142	0
		6475	6333

Building 2 : Section 1

Year Built: 1987
Living Area: 24306
Replacement Cost: $1,082,175
Replacement Cost Less Depreciation: $606,000

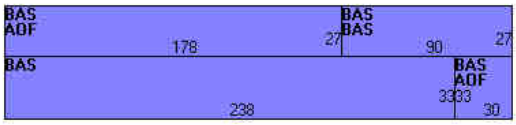
Building Photo

Building Attributes : Bldg 2 of 4	
Field	**Description**
STYLE	Pre-Eng Garage
MODEL	Ind/Comm
Grade	Average
Stories:	1
Occupancy	4
Exterior Wall 1	Pre-finsh Metl

Exterior Wall 2	Brick Veneer
Roof Structure	Gable/Hip
Roof Cover	Enam Mtl Shing
Interior Wall 1	Minim/Masonry
Interior Wall 2	
Interior Floor 1	Concr-Finished
Interior Floor 2	
Heating Fuel	Gas
Heating Type	Forced Air-Duc
AC Type	Partial
Bldg Use	Industrial 96
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	300
Heat/AC	Heat AC Split
Frame Type	Steel
Baths/Plumbing	Average
Ceiling/Wall	Susp Ceil & Wl
Rooms/Prtns	Average
Wall Height	22
% Comn Wall	0

(http://images.vgsi.com/photos/ManchesterCTPhotos//\00\03\43/04.jpg)

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	18510	18510
AOF	Office, (Average)	5796	5796
		24306	24306

Building 3 : Section 1

Year Built: 1987
Living Area: 10320
Replacement Cost: $433,337
Replacement Cost Less Depreciation: $242,700

Building Attributes : Bldg 3 of 4	
Field	**Description**
STYLE	Pre-Eng Garage
MODEL	Ind/Comm
Grade	Average
Stories:	1
Occupancy	12
Exterior Wall 1	Pre-finsh Metl
Exterior Wall 2	Brick Veneer

Building Photo

(http://images.vgsi.com/photos/ManchesterCTPhotos//\00\03\43/05.jpg)

Roof Structure	Gable/Hip
Roof Cover	Enam Mtl Shing
Interior Wall 1	Minim/Masonry
Interior Wall 2	
Interior Floor 1	Concr-Finished
Interior Floor 2	
Heating Fuel	Electric
Heating Type	Hot Air-no Duc
AC Type	None
Bldg Use	Industrial 96
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	300
Heat/AC	None
Frame Type	Steel
Baths/Plumbing	Average
Ceiling/Wall	Ceil & Min Wl
Rooms/Prtns	Average
Wall Height	18
% Comn Wall	0

Building Layout

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	10320	10320
		10320	10320

Building 4 : Section 1

Year Built: 2008
Living Area: 12000
Replacement Cost: $479,640
Replacement Cost Less Depreciation: $465,300

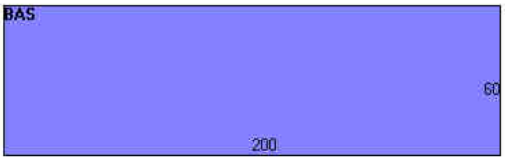
Building Attributes : Bldg 4 of 4	
Field	**Description**
STYLE	Pre-Eng Garage
MODEL	Ind/Comm
Grade	Average
Stories:	1
Occupancy	8
Exterior Wall 1	Pre-finsh Metl
Exterior Wall 2	Concr/Cinder
Roof Structure	Gable/Hip
Roof Cover	Enam Mtl Shing
Interior Wall 1	Minim/Masonry
Interior Wall 2	
Interior Floor 1	Concr-Finished
Interior Floor 2	
Heating Fuel	Gas

Building Photo

(http://images.vgsi.com/photos/ManchesterCTPhotos//\00\03\43/06.jpg)

Building Layout

Heating Type	Hot Air-no Duc
AC Type	None
Bldg Use	Industrial 96
Total Rooms	00
Total Bedrms	00
Total Baths	0
1st Floor Use:	
Heat/AC	None
Frame Type	Steel
Baths/Plumbing	Average
Ceiling/Wall	Ceil & Min Wl
Rooms/Prtns	Average
Wall Height	18
% Comn Wall	0



Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	12000	12000
		12000	12000

Extra Features

Extra Features				Legend
Code	**Description**	**Size**	**Value**	**Bldg #**
A/C	Partial AC	5796 S.F.	$6,500	2

Land

Land Use

Use Code	300
Description	Industrial 96
Zone	IND
Neighborhood	5000
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	4.96
Frontage	0
Depth	0
Assessed Value	$507,600
Appraised Value	$725,100

Outbuildings

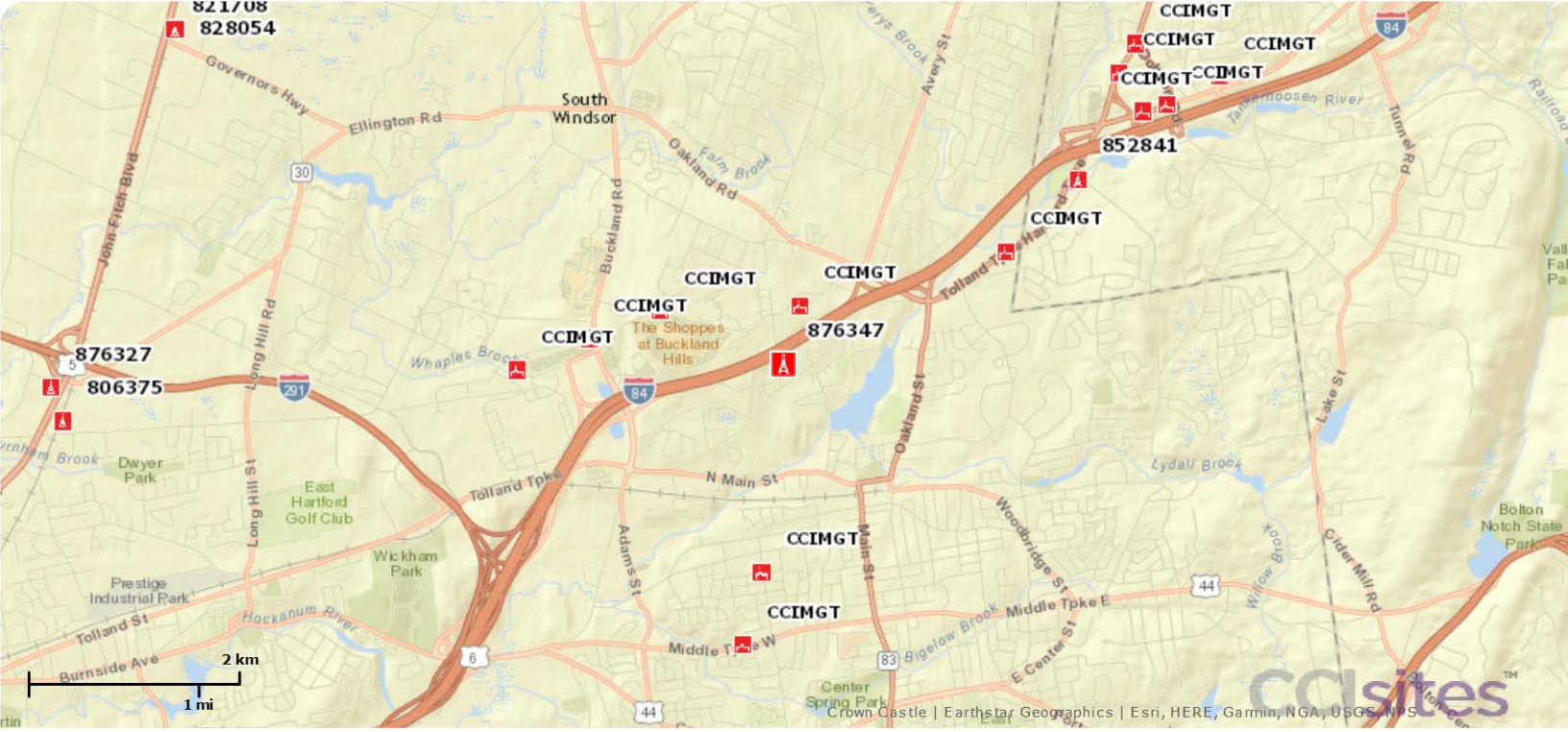
Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
PAV1	Paving Asphalt			13350 S.F.	$19,200	4
PAV1	Paving Asphalt			37000 S.F.	$17,800	1
FN3	Fence 6' Chain			300 L.F.	$2,000	1
PAV2	Paving Concrete			96 S.F.	$300	4
SHDT	Telephone Shed			319 S.F.	$31,600	1
FN4	Fence 8' Chain			54 L.F.	$900	1
SHDT	Telephone Shed			319 S.F.	$31,600	1

Valuation History

Appraisal

Valuation Year	Improvements	Land	Total
2010	$1,766,600	$760,300	$2,526,900
2005	$871,200	$540,700	$1,411,900
2000	$1,082,500	$540,700	$1,623,200

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2010	$1,236,700	$532,300	$1,769,000
2005	$609,900	$378,500	$988,400
2000	$757,800	$378,500	$1,136,300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876347
876327
806375
CCIMGT
CCIMGT
South Windsor
Ellington Rd
Governors Hwy
John Fitch Blvd
Buckland Rd
Oakland Rd
Farm Brook
Avery St
Tankerhoosen River
Tunnel Rd
Tolland Tpke
Long Hill Rd
Whaples Brook
The Shoppes at Buckland Hills
Oakland St
Lake St
Lydall Brook
Dwyer Park
East Hartford Golf Club
Tolland Tpke
N Main St
Long Hill St
Adams St
Main St
Woodbridge St
Bolton Notch State Park
Prestige Industrial Park
Wickham Park
Tolland St
Hockanum River
Middle Tpke W
Middle Tpke E
Bigelow Brook
Willow Brook
Cider Mill Rd
E Center St
Burnside Ave
Center Spring Park
2 km
1 mi
Crown Castle | Earthstar Geographics | Esri, HERE, Garmin, NGA, USGS, NPS

SHEET INDEX

NO.	DESCRIPTION
T1	TITLE PAGE
N1	GENERAL NOTES
C1	COMPOUND PLAN
C2	EQUIPMENT LAYOUT
C3	ELEVATION VIEW AND RF SCHEDULE
C4	ANTENNA ORIENTATION PLAN
C5	EQUIPMENT DETAILS
C6	RF PLUMBING DIAGRAM
C7	GROUNDING DETAILS

SCOPE OF WORK

(3) 800-10965 (SWAP IN POS. 4 ALL SECTORS)
(1) SQUID
(2) DC POWER
(3) B2/B66A 8843 (POS. 3)
(3) B5/B12 4449 (POS. 4)
(2) 6630
POWER PLANT SWAP
N/A
SOW NOTES:
BYPASS RXAIT

at&t

SITE NAME

BUCKLAND MALL

CROWN BU

876347

FA SITE NUMBER

10071100

SITE ADDRESS

53-73 SLATER STREET
MANCHESTER, CT 06040

STRUCTURE TYPE

MONOPOLE

PROJECT SITE INFORMATION

SITE NAME:	BUCKLAND MALL
CROWN BU:	876347
FA SITE #:	10071100
SITE ADDRESS:	53-73 SLATER STREET MANCHESTER, CT 06040
JURISDICTION:	CITY OF MANCHESTER
SITE COORDINATES: LATITUDE:	N 41° 48' 18.2" (41.805056°) (NAD 83)
LONGITUDE:	W 72° 32' 00.8" (-72.533556°) (NAD 83)
APPLICANT:	AT&T MOBILITY 575 MOROSGO DRIVE ATLANTA, GA 30324

STRUCTURAL ANALYSIS INFORMATION

TOWER ANALYSIS

*BASED ON THE STRUCTURAL ANALYSIS COMPLETED BY **MASER CONSULTING P.A.** DATED **08/04/17**. THE EXISTING TOWER IS CAPABLE OF SUPPORTING THE PROPOSED EQUIPMENT CONFIGURATION.*

ANTENNA MOUNTS

*BASED ON THE MOUNT ANALYSIS COMPLETED BY **INFINIGY** DATED **01/23/2019**. THE EXISTING ANTENNA MOUNT IS CAPABLE OF SUPPORTING THE PROPOSED EQUIPMENT CONFIGURATION WITH THE FOLLOWING MODIFICATIONS:*

- ***CONTRACTOR TO INSTALL (1) 8'-0" LONG 2.0 STD PIPES AS TIE BACKS BETWEEN POS #1 & #2 OF ONE SECTOR AND POS #2 & #3 OF THE ADJACENT SECTOR.***

PROJECT TEAM INFORMATION

CLIENT REPRESENTATIVE:	CROWN CASTLE 3 CORPORATE PARK DRIVE, SUITE 101 CLIFTON PARK, NY 12065
CLIENT REP. CONTACT:	ALLISON SQUIRES ALLISON.SQUIRES.CONTRACTOR@CROWNCASTLE.COM
ENGINEER:	INFINIGY SOLUTIONS 6865 DEERPATH ROAD SUITE 152 ELKRIDGE, MD 21075
ENGINEER CONTACT:	MATT BIRTH MBIRTH@INFINIGY.COM 443-567-8791

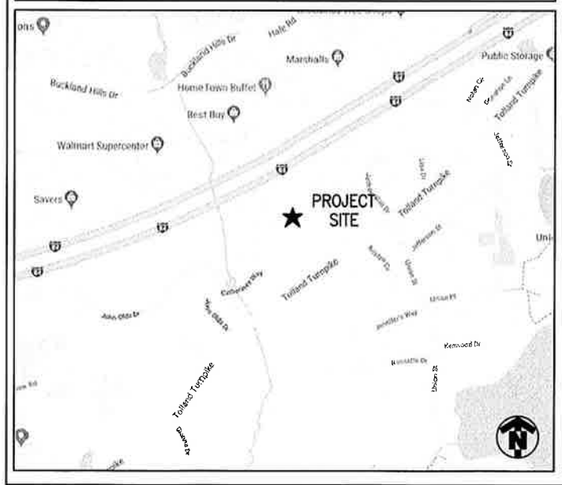
TOWER OWNER NOTIFICATION

ONCE THE CONTRACTOR HAS RECEIVED AND ACCEPTED THE NOTICE TO PROCEED, CONTRACTOR WILL CONTACT THE CROWN CASTLE CONSTRUCTION MANAGER OF RECORD (NOTED ON THE FIRST PAGE ON THIS CONSTRUCTION DRAWING) A MINIMUM OF 48 HOURS PRIOR TO WORK START. UPON ARRIVAL TO THE JOB SITE, CONTRACTOR CREW IS REQUIRED CALL 1-800-788-7011 TO NOTIFY THE CROWN CASTLE NOC WORK HAS BEGUN.

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

TO OBTAIN LOCATION OF PARTICIPANTS UNDERGROUND FACILITIES BEFORE YOU DIG IN CONNECTICUT, CONTACT CALL BEFORE YOU DIG
TOLL FREE: 1-800-922-4455 OR www.cbyd.com
CONNECTICUT STATUTE REQUIRES MIN OF 2 WORKING DAYS NOTICE BEFORE YOU EXCAVATE

LOCATION MAP



GENERAL NOTES

- HANDICAP ACCESS REQUIREMENTS ARE NOT REQUIRED.
- FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION.
- FACILITY HAS NO PLUMBING OR REFRIGERANTS.
- THIS FACILITY SHALL MEET OR EXCEED ALL FAA AND FCC REGULATORY REQUIREMENTS.
- ALL NEW MATERIAL SHALL BE FURNISHED AND INSTALLED BY CONTRACTOR UNLESS NOTED OTHERWISE. EQUIPMENT, ANTENNAS/RRH AND CABLES FURNISHED BY OWNER AND INSTALLED BY CONTRACTOR.
- THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON STORMWATER DRAINAGE.
- NO SANITARY SEWER, POTABLE WATER, OR TRASH DISPOSAL SERVICE IS REQUIRED
- NO COMMERCIAL SIGNAGE IS PROPOSED

CODE COMPLIANCE

ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT ADOPTED EDITIONS OF THE FOLLOWING CODES WITH ANY LOCAL AMENDMENTS BY THE LOCAL GOVERNING AUTHORITIES:

- INTERNATIONAL BUILDING CODE
- NATIONAL ELECTRICAL CODE
- NATIONAL FIRE PROTECTION ASSOCIATION 101
- NATIONAL FIRE PROTECTION ASSOCIATION 1
- LOCAL BUILDING CODES
- CITY/COUNTY ORDINANCES
- AMERICAN INSTITUTE OF STEEL CONSTRUCTION SPECIFICATIONS (AISC)
- UNDERWRITERS LABORATORIES APPROVED ELECTRICAL PRODUCTS.
- ANSI EIA/TIA 222 REV. G
- TIA 607
- INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS 81
- IEEE C2 (LATEST EDITION)
- TELCORDIA GR-1275
- ANSI T1.311

at&t

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STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER
FEB 04 2019

No.	Submittal / Revision	App'd	Date
0	ISSUED FOR CONSTRUCTION	MPB	02/04/19
A	ISSUED FOR CLIENT REVIEW	MPB	01/03/19

Drawn: RCD
Designed: MBL
Checked: AJD

Project Number: 499-002

Project Title:
BUCKLAND MALL
CROWN BU: 876347
FA # 10071100
53-73 SLATER STREET
MANCHESTER, CT 06040

Prepared For:
CROWN CASTLE

Drawing Title
TITLE PAGE

Drawing Number
T1

GENERAL NOTES

PART 1 – GENERAL REQUIREMENTS

1.1 THE WORK SHALL COMPLY WITH APPLICABLE NATIONAL CODES AND STANDARDS, LATEST EDITION, AND PORTIONS THEREOF, INCLUDED BUT NOT LIMITED TO THE FOLLOWING:
- A. GR-63-CORE NEBS REQUIREMENTS: PHYSICAL PROTECTION
- B. GR-78-CORE GENERIC REQUIREMENTS FOR THE PHYSICAL DESIGN AND MANUFACTURE OF TELECOMMUNICATIONS EQUIPMENT.
- C. NATIONAL FIRE PROTECTION ASSOCIATION CODES AND STANDARDS (NFPA) INCLUDING NFPA 70 (NATIONAL ELECTRICAL CODE – "NEC").
- D. AND NFPA 101 (LIFE SAFETY CODE).
- E. AMERICAN SOCIETY FOR TESTING OF MATERIALS (ASTM).
- F. INSTITUTE OF ELECTRONIC AND ELECTRICAL ENGINEERS (IEEE).

1.2 DEFINITIONS:
A: WORK: THE SUM OF TASKS AND RESPONSIBILITIES IDENTIFIED IN THE CONTRACT DOCUMENTS.
B: COMPANY: AT&T CORPORATION
C. ENGINEER: SYNONYMOUS WITH ARCHITECT & ENGINEER AND "A&E". THE DESIGN PROFESSIONAL HAVING PROFESSIONAL RESPONSIBILITY FOR DESIGN OF THE PROJECT.
D: CONTRACTOR: CONSTRUCTION CONTRACTOR; CONSTRUCTION VENDOR; INDIVIDUAL OR ENTITY WHO AFTER EXECUTION OF A CONTRACT IS BOUND TO ACCOMPLISH THE WORK.
E: THIRD PARTY VENDOR OR AGENCY: A VENDOR OR AGENCY ENGAGED SEPARATELY BY THE COMPANY, A&E, OR CONTRACTOR TO PROVIDE MATERIALS OR TO ACCOMPLISH SPECIFIC TASKS RELATED TO BUT NOT INCLUDED IN THE WORK.

1.3 POINT OF CONTACT: COMMUNICATION BETWEEN THE COMPANY AND THE CONTRACTOR SHALL FLOW THROUGH THE SINGLE COMPANY SITE DEVELOPMENT SPECIALIST OR OTHER PROJECT COORDINATOR APPOINTED TO MANAGE THE PROJECT FOR THE COMPANY.

1.4 ON-SITE SUPERVISION: THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL EMPLOY A COMPETENT SUPERINTENDENT WHO SHALL BE IN ATTENDANCE AT THE SITE AT ALL TIMES DURING PERFORMANCE OF THE WORK.

1.5 DRAWINGS, SPECIFICATIONS AND DETAILS REQUIRED AT JOBSITE: THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A FULL SET OF THE CONSTRUCTION DRAWINGS, STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES, AND THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AT THE JOBSITE FROM MOBILIZATION THROUGH CONSTRUCTION COMPLETION.
A. THE JOBSITE DRAWINGS, SPECIFICATIONS AND DETAILS SHALL BE CLEARLY MARKED DAILY IN PENCIL WITH ANY CHANGES IN CONSTRUCTION OVER WHAT IS DEPICTED IN THE DOCUMENTS. AT CONSTRUCTION COMPLETION, THIS JOBSITE MARKUP SET SHALL BE DELIVERED TO THE COMPANY OR COMPANY'S DESIGNATED REPRESENTATIVE TO BE FORWARDED TO THE COMPANY'S A&E VENDOR FOR PRODUCTION OF "AS-BUILT" DRAWINGS.

1.6 USE OF JOB SITE: THE CONTRACTOR SHALL CONFINE ALL CONSTRUCTION AND RELATED OPERATIONS INCLUDING STAGING AND STORAGE OF MATERIALS AND EQUIPMENT, PARKING, TEMPORARY FACILITIES, AND WASTE STORAGE TO THE LEASE PARCEL UNLESS OTHERWISE PERMITTED BY THE CONTRACT DOCUMENTS.

1.7 NOTICE TO PROCEED:
A. NO WORK SHALL COMMENCE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED.
B. UPON RECEIVING NOTICE TO PROCEED, CONTRACTOR SHALL FULLY PERFORM ALL WORK NECESSARY TO PROVIDE AT&T WITH AN OPERATIONAL WIRELESS FACILITY.

PART 2 – EXECUTION

2.1 TEMPORARY UTILITIES AND FACILITIES: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY UTILITIES AND FACILITIES NECESSARY EXCEPT AS OTHERWISE INDICATED IN THE CONSTRUCTION DOCUMENTS. TEMPORARY UTILITIES AND FACILITIES INCLUDE, POTABLE WATER, HEAT, HVAC, ELECTRICITY, SANITARY FACILITIES, WASTE DISPOSAL FACILITIES, AND TELEPHONE/COMMUNICATION SERVICES. PROVIDE TEMPORARY UTILITIES AND FACILITIES IN ACCORDANCE WITH OSHA AND THE AUTHORITY HAVING JURISDICTION. CONTRACTOR MAY UTILIZE THE COMPANY ELECTRICAL SERVICE IN THE COMPLETION OF THE WORK WHEN IT BECOMES AVAILABLE. USE OF THE LESSORS OR SITE OWNER'S UTILITIES OR FACILITIES IS EXPRESSLY FORBIDDEN EXCEPT AS OTHERWISE ALLOWED IN THE CONTRACT DOCUMENTS.

2.2 ACCESS TO WORK: THE CONTRACTOR SHALL PROVIDE ACCESS TO THE JOB SITE FOR AUTHORIZED COMPANY PERSONNEL AND AUTHORIZED REPRESENTATIVES OF THE ARCHITECT/ENGINEER DURING ALL PHASES OF THE WORK.

2.3 TESTING: REQUIREMENTS FOR TESTING BY THIS CONTRACTOR SHALL BE AS INDICATED HEREWITH, ON THE CONSTRUCTION DRAWINGS, AND IN THE INDIVIDUAL SECTIONS OF THESE SPECIFICATIONS. SHOULD COMPANY CHOOSE TO ENGAGE ANY THIRD-PARTY TO CONDUCT ADDITIONAL TESTING, THE CONTRACTOR SHALL COOPERATE WITH AND PROVIDE A WORK AREA FOR COMPANY'S TEST AGENCY.

2.4 COMPANY FURNISHED MATERIAL AND EQUIPMENT: ALL HANDLING, STORAGE AND INSTALLATION OF COMPANY FURNISHED MATERIAL AND EQUIPMENT SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS AND WITH THE MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
A. CONTRACTOR SHALL PROCURE ALL OTHER REQUIRED WORK RELATED MATERIALS NOT PROVIDED BY AT&T TO SUCCESSFULLY CONSTRUCT A WIRELESS FACILITY.

2.5 DIMENSIONS: VERIFY DIMENSIONS INDICATED ON DRAWINGS WITH FIELD DIMENSIONS BEFORE FABRICATION OR ORDERING OF MATERIALS. DO NOT SCALE DRAWINGS.

2.6 EXISTING CONDITIONS: NOTIFY THE COMPANY REPRESENTATIVE OF EXISTING CONDITIONS DIFFERING FROM THOSE INDICATED ON THE DRAWINGS. DO NOT REMOVE OR ALTER STRUCTURAL COMPONENTS WITHOUT PRIOR WRITTEN APPROVAL FROM THE ARCHITECT AND ENGINEER.

PART 3 – RECEIPT OF MATERIAL & EQUIPMENT

3.1 RECEIPT OF MATERIAL AND EQUIPMENT: CONTRACTOR IS RESPONSIBLE FOR AT&T PROVIDED MATERIAL AND EQUIPMENT AND UPON RECEIPT SHALL:
- A. ACCEPT DELIVERIES AS SHIPPED AND TAKE RECEIPT.
- B. VERIFY COMPLETENESS AND CONDITION OF ALL DELIVERIES.
- C. TAKE RESPONSIBILITY FOR EQUIPMENT AND PROVIDE INSURANCE PROTECTION AS REQUIRED IN AGREEMENT.
- D. RECORD ANY DEFECTS OR DAMAGES AND WITHIN TWENTY-FOUR HOURS AFTER RECEIPT, REPORT TO AT&T OR ITS DESIGNATED PROJECT REPRESENTATIVE OF SUCH.
- E. PROVIDE SECURE AND NECESSARY WEATHER PROTECTED WAREHOUSING.
- F. COORDINATE SAFE AND SECURE TRANSPORTATION OF MATERIAL AND EQUIPMENT, DELIVERING AND OFF-LOADING FROM CONTRACTOR'S WAREHOUSE TO SITE.

PART 4 – GENERAL REQUIREMENTS FOR CONSTRUCTION

4.1 CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH. AT THE COMPLETION OF THE WORK, CONTRACTOR SHALL REMOVE FROM THE SITE ALL REMAINING RUBBISH, IMPLEMENTS, TEMPORARY FACILITIES, AND SURPLUS MATERIALS.

4.2 EQUIPMENT ROOMS SHALL AT ALL TIMES BE MAINTAINED "BROOM CLEAN" AND CLEAR OF DEBRIS.

4.3 CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO DISCOVER AND LOCATE ANY HAZARDOUS CONDITION.
A. IN THE EVENT CONTRACTOR ENCOUNTERS ANY HAZARDOUS CONDITION WHICH HAS NOT BEEN ABATED OR OTHERWISE MITIGATED, CONTRACTOR AND ALL OTHER PERSONS SHALL IMMEDIATELY STOP WORK IN THE AFFECTED AREA AND NOTIFY COMPANY IN WRITING. THE WORK IN THE AFFECTED AREA SHALL NOT BE RESUMED EXCEPT BY WRITTEN NOTIFICATION BY COMPANY.
B. CONTRACTOR AGREES TO USE CARE WHILE ON THE SITE AND SHALL NOT TAKE ANY ACTION THAT WILL OR MAY RESULT IN OR CAUSE THE HAZARDOUS CONDITION TO BE FURTHER RELEASED IN THE ENVIRONMENT, OR TO FURTHER EXPOSE INDIVIDUALS TO THE HAZARD.

4.4 CONTRACTOR'S ACTIVITIES SHALL BE RESTRICTED TO THE PROJECT LIMITS. SHOULD AREAS OUTSIDE THE PROJECT LIMITS BE AFFECTED BY CONTRACTOR'S ACTIVITIES, CONTRACTOR SHALL IMMEDIATELY RETURN THEM TO ORIGINAL CONDITION.

4.5 CONDUCT TESTING AS REQUIRED HEREIN.

PART 5 – TESTS AND INSPECTIONS

5.1 TESTS AND INSPECTIONS:
- A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION TESTS, INSPECTIONS AND PROJECT DOCUMENTATION.
- B. CONTRACTOR SHALL COORDINATE TEST AND INSPECTION SCHEDULES WITH COMPANY'S REPRESENTATIVE WHO MUST BE ON SITE TO WITNESS SUCH TESTS AND INSPECTIONS.
- C. WHEN THE USE OF A THIRD PARTY INDEPENDENT TESTING AGENCY IS REQUIRED, THE AGENCY THAT IS SELECTED MUST PERFORM SUCH WORK ON A REGULAR BASIS IN THE STATE WHERE THE PROJECT IS LOCATED AND HAVE A THOROUGH UNDERSTANDING OF LOCAL AVAILABLE MATERIALS, INCLUDING THE SOIL, ROCK, AND GROUNDWATER CONDITIONS.
- D. THE THIRD PARTY TESTING AGENCY IS TO BE FAMILIAR WITH THE APPLICABLE REQUIREMENTS FOR THE TESTS TO BE DONE, EQUIPMENT TO BE USED, AND ASSOCIATED HEALTH AND SAFETY ISSUES.
- E. SITE RESISTANCE TO EARTH TESTING PER EXHIBIT: CELL SITE GROUNDING SYSTEM DESIGN.
- F. ANTENNA AND COAX SWEEP TESTS PER EXHIBIT: ANTENNA TRANSMISSION LINE ACCEPTANCE STANDARDS.
- G. ALL OTHER TESTS REQUIRED BY COMPANY OR JURISDICTION.

PART 6 – TRENCHING AND BACKFILLING

6.1 TRENCHING AND BACKFILLING: THE CONTRACTOR SHALL PERFORM ALL EXCAVATION OF EVERY DESCRIPTION AND OF WHATEVER SUBSTANCES ENCOUNTERED, TO THE DEPTHS INDICATED ON THE CONSTRUCTION DRAWINGS OR AS OTHERWISE SPECIFIED.

A. PROTECTION OF EXISTING UTILITIES: THE CONTRACTOR SHALL CHECK WITH THE LOCAL UTILITIES AND THE RESPECTIVE UTILITY LOCATOR COMPANIES PRIOR TO STARTING EXCAVATION OPERATIONS IN EACH RESPECTIVE AREA TO ASCERTAIN THE LOCATIONS OF KNOWN UTILITY LINES. THE LOCATIONS, NUMBER AND TYPES OF EXISTING UTILITY LINES DETAILED ON THE CONSTRUCTION DRAWINGS ARE APPROXIMATE AND DO NOT REPRESENT EXACT INFORMATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ALL LINES DAMAGED DURING EXCAVATION AND ALL ASSOCIATED OPERATIONS. ALL UTILITY LINES UNCOVERED DURING THE EXCAVATION OPERATIONS, SHALL BE PROTECTED FROM DAMAGE DURING EXCAVATION AND ASSOCIATED OPERATIONS. ALL REPAIRS SHALL BE APPROVED BY THE UTILITY COMPANY.

B. HAND DIGGING: UNLESS APPROVED IN WRITING OTHERWISE, ALL DIGGING WITHIN AN EXISTING CELL SITE COMPOUND IS TO BE DONE BY HAND.

C. DURING EXCAVATION, MATERIAL SUITABLE FOR BACKFILLING SHALL BE STOCKPILED IN AN ORDERLY MANNER A SUFFICIENT DISTANCE FROM THE BANKS OF THE TRENCH TO AVOID OVERLOADING AND TO PREVENT SLIDES OR CAVE-INS. ALL EXCAVATED MATERIALS NOT REQUIRED OR SUITABLE FOR BACKFILL SHALL BE REMOVED AND DISPOSED OF AT THE CONTRACTOR'S EXPENSE.

D. GRADING SHALL BE DONE AS MAY BE NECESSARY TO PREVENT SURFACE WATER FROM FLOWING INTO TRENCHES OR OTHER EXCAVATIONS, AND ANY WATER ACCUMULATING THEREIN SHALL BE REMOVED BY PUMPING OR BY OTHER APPROVED METHOD.

E. SHEETING AND SHORING SHALL BE DONE AS NECESSARY FOR THE PROTECTION OF THE WORK AND FOR THE SAFETY OF PERSONNEL. UNLESS OTHERWISE INDICATED, EXCAVATION SHALL BE BY OPEN CUT, EXCEPT THAT SHORT SECTIONS OF A TRENCH MAY BE TUNNELED IF, THE CONDUIT CAN BE SAFELY AND PROPERLY INSTALLED AND BACKFILL CAN BE PROPERLY TAMPED IN SUCH TUNNEL SECTIONS. EARTH EXCAVATION SHALL COMPRISE ALL MATERIALS AND SHALL INCLUDE CLAY, SILT, SAND, MUCK, GRAVEL, HARDPAN, LOOSE SHALE, AND LOOSE STONE.

F. TRENCHES SHALL BE OF NECESSARY WIDTH FOR THE PROPER LAYING OF THE CONDUIT OR CABLE, AND THE BANKS SHALL BE AS NEARLY VERTICAL AS PRACTICABLE. THE BOTTOM OF THE TRENCHES SHALL BE ACCURATELY GRADED TO PROVIDE UNIFORM BEARING AND SUPPORT FOR EACH SECTION OF THE CONDUIT OR CABLE ON UNDISTURBED SOIL AT EVERY POINT ALONG ITS ENTIRE LENGTH. EXCEPT WHERE ROCK IS ENCOUNTERED, CARE SHALL BE TAKEN NOT TO EXCAVATE BELOW THE DEPTHS INDICATED. WHERE ROCK EXCAVATIONS ARE NECESSARY, THE ROCK SHALL BE EXCAVATED TO A MINIMUM OVER DEPTH OF 6 INCHES BELOW THE TRENCH DEPTHS INDICATED ON THE CONSTRUCTION DRAWINGS OR SPECIFIED. OVER DEPTHS IN THE ROCK EXCAVATION AND UNAUTHORIZED OVER DEPTHS SHALL BE THOROUGHLY BACK FILLED AND TAMPED TO THE APPROPRIATE GRADE. WHENEVER WET OR OTHERWISE UNSTABLE SOIL THAT IS INCAPABLE OF PROPERLY SUPPORTING THE CONDUIT OR CABLE IS ENCOUNTERED IN THE BOTTOM OF THE TRENCH, SUCH SOLID SHALL BE REMOVED TO A MINIMUM OVER DEPTH OF 6 INCHES AND THE TRENCH BACKFILLED TO THE PROPER GRADE WITH EARTH OF OTHER SUITABLE MATERIAL, AS HEREINAFTER SPECIFIED.

G. BACKFILLING OF TRENCHES. TRENCHES SHALL NOT BE BACKFILLED UNTIL ALL SPECIFIED TESTS HAVE BEEN PERFORMED AND ACCEPTED. WHERE COMPACTED BACKFILL IS NOT INDICATED THE TRENCHES SHALL BE CAREFULLY BACKFILLED WITH SELECT MATERIAL SUCH AS EXCAVATED SOILS THAT ARE FREE OF ROOTS, SOD, RUBBISH OR STONES, DEPOSITED IN 6 INCH LAYERS AND THOROUGHLY AND CAREFULLY RAMMED UNTIL THE CONDUIT OR CABLE HAS A COVER OF NOT LESS THAN 1 FOOT. THE REMAINDER OF THE BACKFILL MATERIAL SHALL BE GRANULAR IN NATURE AND SHALL NOT CONTAIN ROOTS, SOD, RUBBING, OR STONES OF 2-1/2 INCH MAXIMUM DIMENSION. BACKFILL SHALL BE CAREFULLY PLACED IN THE TRENCH AND IN 1 FOOT LAYERS AND EACH LAYER TAMPED. SETTLING THE BACKFILL WITH WATER WILL BE PERMITTED. THE SURFACE SHALL BE GRADED TO A REASONABLE UNIFORMITY AND THE MOUNDING OVER THE TRENCHES LEFT IN A UNIFORM AND NEAT CONDITION.

SYMBOL	DESCRIPTION
	CIRCUIT BREAKER
	NON-FUSIBLE DISCONNECT SWITCH
F	FUSIBLE DISCONNECT SWITCH
	SURFACE MOUNTED PANEL BOARD
T	TRANSFORMER
M	KILOWATT HOUR METER
JB	JUNCTION BOX
PB	PULL BOX TO NEC/TELCO STANDARDS
	UNDERGROUND UTILITIES
	EXOTHERMIC WELD CONNECTION
	MECHANICAL CONNECTION
OR	GROUND ROD
OR	GROUND ROD WITH INSPECTION SLEEVE
	GROUND BAR
	120AC DUPLEX RECEPTACLE
G	GROUND CONDUCTOR
	DC POWER AND FIBER OPTIC TRUNK CABLES
	DC POWER CABLES
# / #	REPRESENTS DETAIL NUMBER / REF. DRAWING NUMBER

ABBREVIATIONS

CIGBE	COAX ISOLATED GROUND BAR EXTERNAL
MIGB	MASTER ISOLATED GROUND BAR
SST	SELF SUPPORTING TOWER
GPS	GLOBAL POSITIONING SYSTEM
TYP.	TYPICAL
DWG	DRAWING
BCW	BARE COPPER WIRE
BFG	BELOW FINISH GRADE
PVC	POLYVINYL CHLORIDE
CAB	CABINET
C	CONDUIT
SS	STAINLESS STEEL
G	GROUND
AWG	AMERICAN WIRE GAUGE
RGS	RIGID GALVANIZED STEEL
AHJ	AUTHORITY HAVING JURISDICTION
TTLNA	TOWER TOP LOW NOISE AMPLIFIER
UNO	UNLESS NOTED OTHERWISE
EMT	ELECTRICAL METALLIC TUBING
AGL	ABOVE GROUND LEVEL

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A	ISSUED FOR CLIENT REVIEW	HAM	01/03/19

Drawn: RCD
Designed: MRL
Checked: AJD

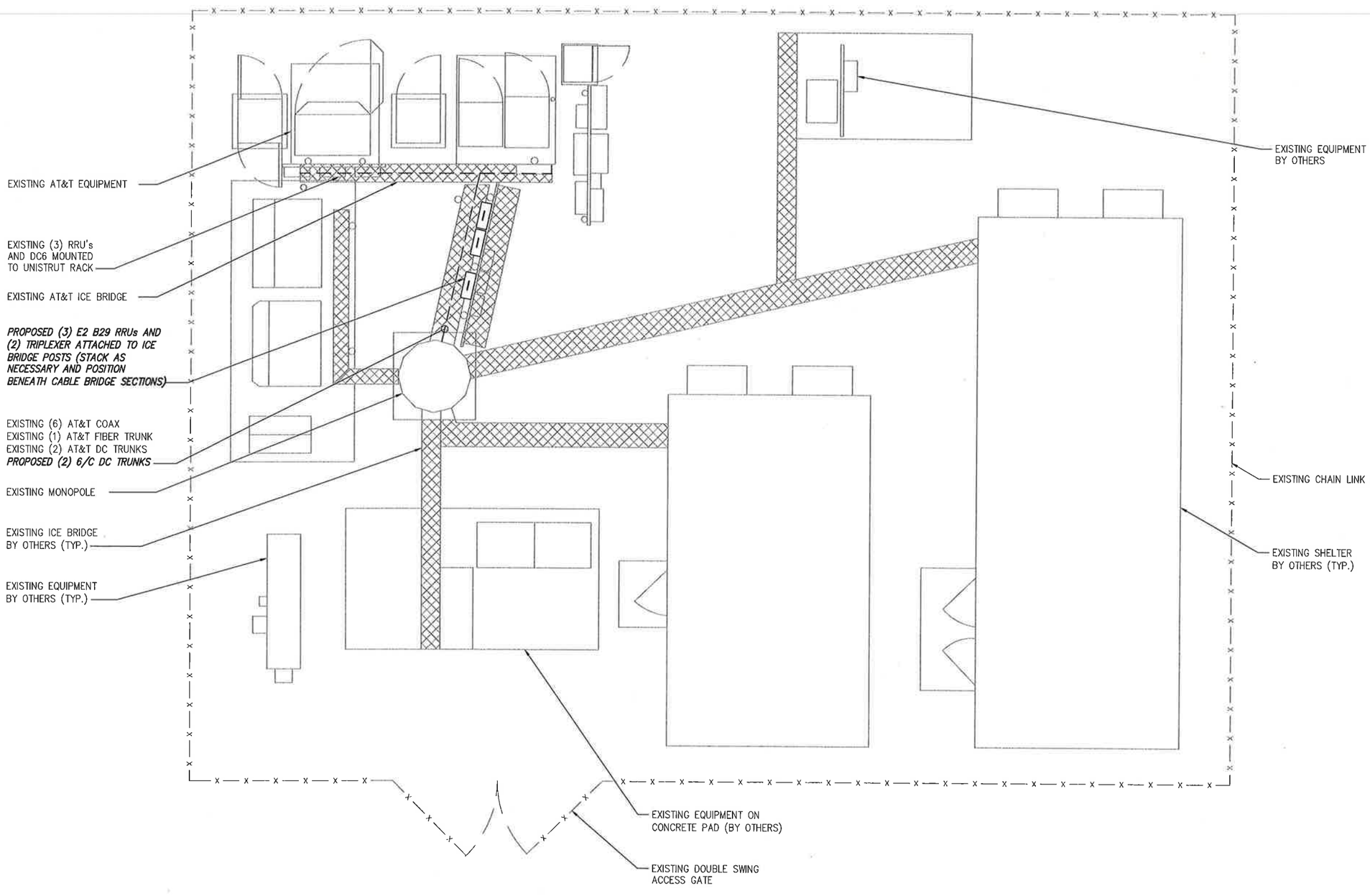
Project Number: 499-002

Project Title:
BUCKLAND MALL
CROWN BU: 876347
FA # 10071100
53-73 SLATER STREET
MANCHESTER, CT 06040

Prepared For:
CROWN CASTLE

Drawing Title
GENERAL NOTES

Drawing Number
N1



NORTH

1 / C1 COMPOUND PLAN
SCALE: AS NOTED

GRAPHIC SCALE:
4' 2' 0 2' 4'
SCALE (11x17): 1" = 4'-0"
SCALE (22x34): 1" = 2'-0"

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COMPOUND PLAN

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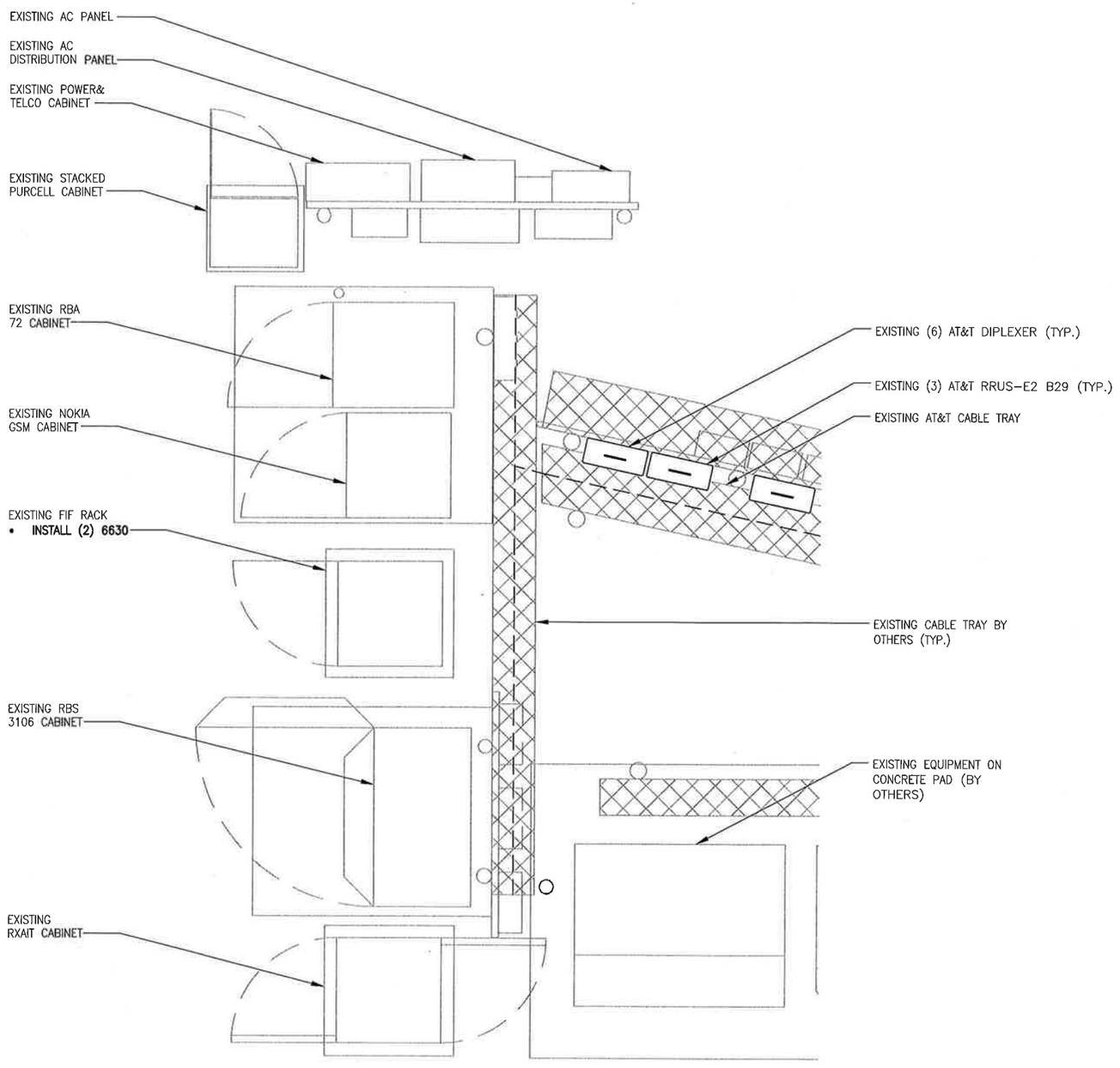

NORTH

1/C2 EQUIPMENT LAYOUT
SCALE: AS NOTED

GRAPHIC SCALE:
2' 1' 0 1' 2'
SCALE (11x17): 1" = 2'-0"
SCALE (22x34): 1" = 1'-0"

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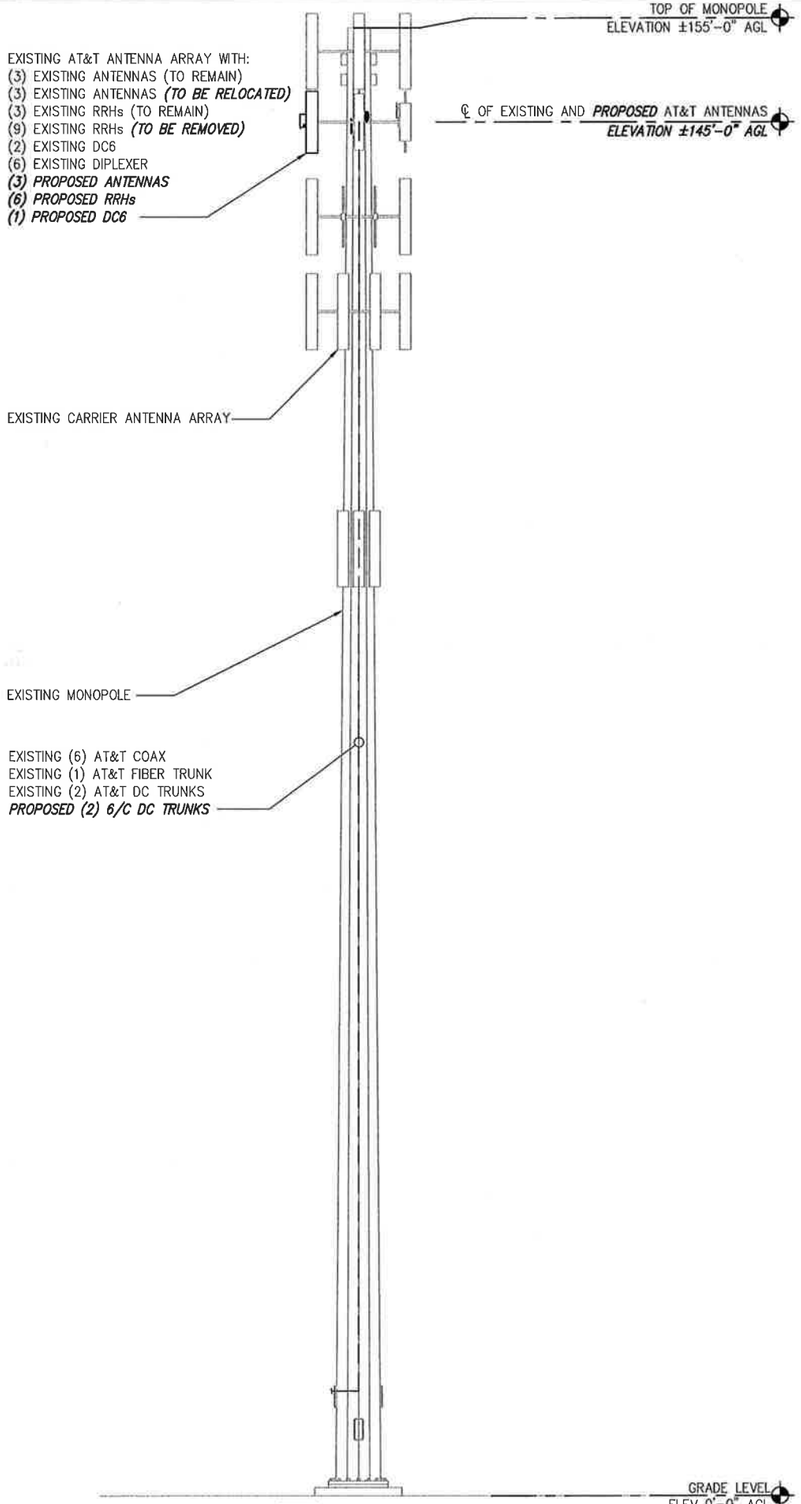
EQUIPMENT LAYOUT

Drawing Number
C2



1 C3 ELEVATION VIEW
SCALE: NOT TO SCALE

ANTENNA AND RRH SCHEDULE

SECTOR	ANTENNA POSITION	ANTENNA MAKE	ANTENNA MODEL	RAD CTR. FT. AGL	AZIMUTH	RRH/TMA QTY/MAKE/MODEL	FILTER/DIPLEXER QTY/MAKE/MODEL	E-TILT	M-TILT
A	#1	CCI	OPA65R-LCUU-H6	145'-0"	50°	(1) RRUS-E2 B29 (AT GROUND)	(2) TPX-070821	6° (UMTS 850) 3° (LTE 700)	0°
	#2	QUINTEL	QS66512-2	145'-0"	50°	**(1) B2/B66A 8843** (1) RRUS-32	–	7° (LTE 1900) 7° (LTE 1900) 3° (LTE WCS)	0°
	#3	**KATHREIN**	**800-10965**	**145'-0"**	**50°**	**(1) RRUS-B5/B12-4449**	–	8° (LTE 700) 8° (LTE 850) 7° (LTE AWS) 8° (5G 850)	0°
B	#4	CCI	OPA65R-LCUU-H6	145'-0"	170°	(1) RRUS-E2 B29 (AT GROUND)	(2) TPX-070821	8° (UMTS 850) 3° (LTE 700)	0°
	#5	QUINTEL	QS66512-2	145'-0"	170°	**(1) B2/B66A 8843** (1) RRUS-32	–	6° (LTE 1900) 6° (LTE 1900) 3° (LTE WCS)	0°
	#6	**KATHREIN**	**800-10965**	**145'-0"**	**170°**	**(1) RRUS-B5/B12-4449**	–	8° (LTE 700) 8° (LTE 850) 6° (LTE AWS) 8° (5G 850)	0°
C	#7	CCI	OPA65R-LCUU-H6	145'-0"	290°	(1) RRUS-E2 B29 (AT GROUND)	(2) TPX-070821	10° (UMTS 850) 3° (LTE 700)	0°
	#8	QUINTEL	QS66512-2	145'-0"	290°	**(1) B2/B66A 8843** (1) RRUS-32	–	7° (LTE 1900) 7° (LTE 1900) 2° (LTE WCS)	0°
	#9	**KATHREIN**	**800-10965**	**145'-0"**	**290°**	**(1) RRUS-B5/B12-4449**	–	8° (LTE 700) 8° (LTE 850) 7° (LTE AWS) 8° (5G 850)	0°

KEY:
EXISTING
PROPOSED

CABLE SCHEDULE

SYSTEM	TYPE	QTY	LENGTH
LTE	1-1/4"ø COAX	6	195'±
LTE	DC TRUNK	2	195'±
LTE	FIBER TRUNK	1	195'±
LTE	**6/C DC TRUNK**	**2**	**195'±**

SURGE PROTECTION DEVICE SCHEDULE

TYPE	LOCATION	QTY
DC6	SECTOR LEVEL	2
DC6	**SECTOR LEVEL**	**1**

RF DESIGN NOTE:
THIS ANTENNA AND CABLE SCHEDULE HAS BEEN CREATED USING THE FOLLOWING AT&T RFDS DATED: **10/02/18** REVISION: **1.00** ALL ANTENNA DESIGN, ZONING, STRUCTURAL ANALYSIS PERMITS AND COMPLIANCE SUBMISSIONS ARE COORDINATED WITH THE AFOREMENTIONED DOCUMENT.

2 C3 RF SCHEDULE
NOT TO SCALE

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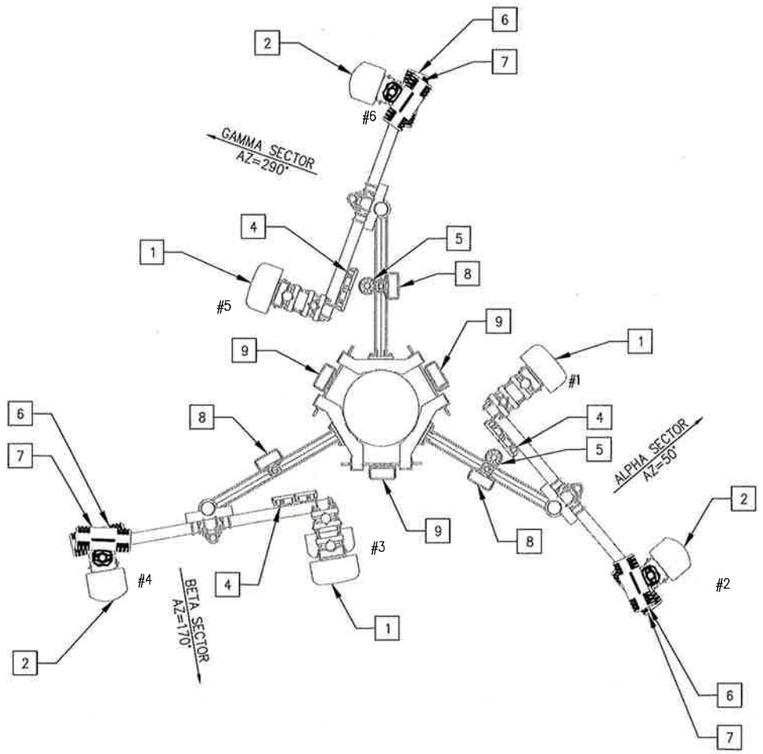
Drawing Title
ELEVATION AND RF SCHEDULE

Drawing Number
C3

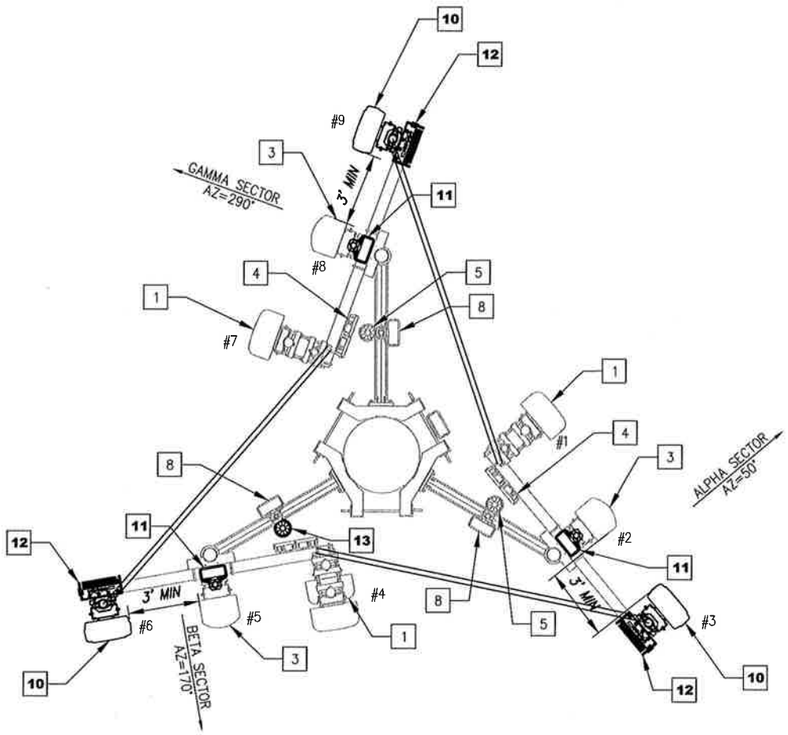
ORIENTATION PLAN KEY				
KEY	DESCRIPTION	TYPE	QTY	STATUS
1	OPA-65R-LCUU-H6	ANTENNA	3	REMAIN
2	QS66512-2	ANTENNA	3	TO BE RELOCATED
3	QS66512-2	ANTENNA	3	RELOCATED
4	TPX-070821	DIPLEXER	6	REMAIN
5	APTDC-BDFDM-DBW	DC6	3	REMAIN
6	RRUS-11	RRH	3	REMOVED
7	RRUS-11	RRH	3	REMOVED
8	RRUS-32	RRH	3	REMAIN
9	RRUS-32 B2	RRH	3	REMOVED
10	**800-10965**	**ANTENNA**	**3**	**PROPOSED**
11	**RRUS-B2/B66A 8843**	**RRH**	**3**	**PROPOSED**
12	**RRUS-B5/B12 4449**	**RRH**	**3**	**PROPOSED**
13	**DC6**	**DC/FIBER MGMT**	**1**	**PROPOSED**

NOTE:
1. *LAYOUT SHOWN BASED ON AVAILABLE INFORMATION FROM AUDIT PHOTOS. GC TO FIELD ADJUST LAYOUT AS NECESSARY FOR MINIMUM REQUIRED CLEARANCES OF EQUIPMENT.*
2. *NO EXISTING OR PROPOSED UNISTRUT TO EXCEED A SPAN OF 4' BETWEEN SUPPORTS. REMOVE AND REPLACE EXISTING UNISTRUT AS NECESSARY FOR MAX. 4' SPAN WHEN UTILIZED FOR MOUNTING RRHs AND SLACK BOXES.*
3. *SEE SHEETS C4 AND C5 FOR PROPOSED EQUIPMENT MOUNTING DETAILS.*
4. *8' PIPE TIEBACK BETWEEN POSITION 1 & 2*



NORTH

1 / C4 ANTENNA ORIENTATION PLAN (EXISTING)
NOT TO SCALE



NORTH

2 / C4 ANTENNA ORIENTATION PLAN (PROPOSED)
NOT TO SCALE

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http://www.infinigy.com

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER
FEB 04 2019

No.	Submittal / Revision	App'd	Date
0	ISSUED FOR CONSTRUCTION	MPB	02/04/19
A	ISSUED FOR CLIENT REVIEW	HAM	01/03/19

Drawn: RCD
Designed: MBL
Checked: AJD

Project Number: 499-002

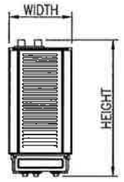
Project Title:
BUCKLAND MALL
CROWN BU: 876347
FA # 10071100
53-73 SLATER STREET
MANCHESTER, CT 06040

Prepared For:
CROWN CASTLE

Drawing Title
ANTENNA ORIENTATION PLAN

Drawing Number
C4

REMOTE RADIO HEAD (RRH)
aka
REMOTE RADIO UNIT (RRU)



SIZE AND WEIGHT TABLE

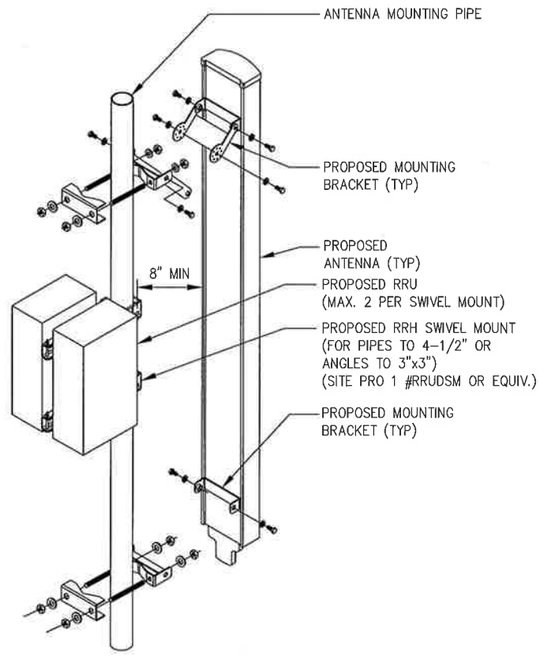
RRH MODEL	HEIGHT x WIDTH x DEPTH	WEIGHT
ERICSSON B5/B12 4449	14.96"x13.19"x10.43"	73.0 LBS
ERICSSON B2/B66A 8843	14.96"x13.19"x11.10"	75.00 LBS
–	–	–
–	–	–

CLEARANCE TABLE

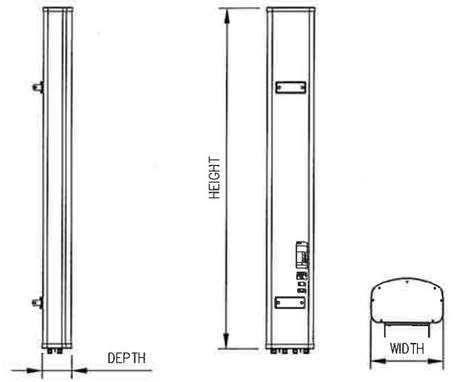
	CLEARANCE REQ'D
FRONT	36" FOR INSTALLATION ACCESS
REAR	2" (0" WITH SUPPLIED MOUNTING BRACKETS)
RIGHT	4" FOR AIR FLOW
LEFT	4" FOR AIR FLOW
TOP	12" FOR AIR FLOW
BOTTOM	12" FOR CONDUIT ROUTING

NOTES:
1. AT&T SUPPLIES RRH AND RRH MOUNTING BRACKET. SUBCONTRACTOR SHALL SUPPLY UNISTRUT AND INSTALL RRHs AND ALL MOUNTING HARDWARE INCLUDING ERICSSON RRH WALL MOUNTING BRACKET IF NECESSARY. ERICSSON MAKES CABLE TERMINATIONS.
2. DIMENSIONS AND WEIGHTS ARE FOR RRH WITHOUT MOUNTING BRACKET
3. RRH BANDS (E.G. 4478 B14) DENOTE OPERATING FREQUENCY ONLY AND DO NOT CONSTITUTE A CHANGE IN SIZE OR WEIGHT.

1 / C5 RRH DETAIL
SCALE: NTS

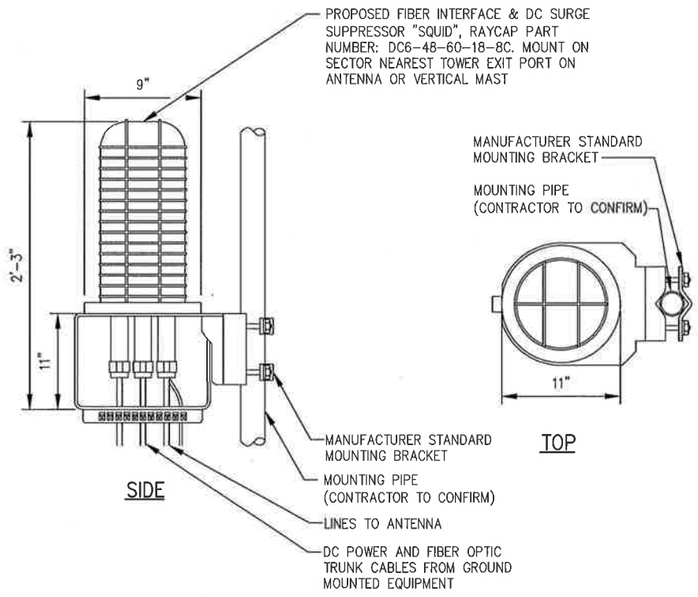


2 / C5 ANTENNA/RRU MOUNTING DETAIL
SCALE: NOT TO SCALE

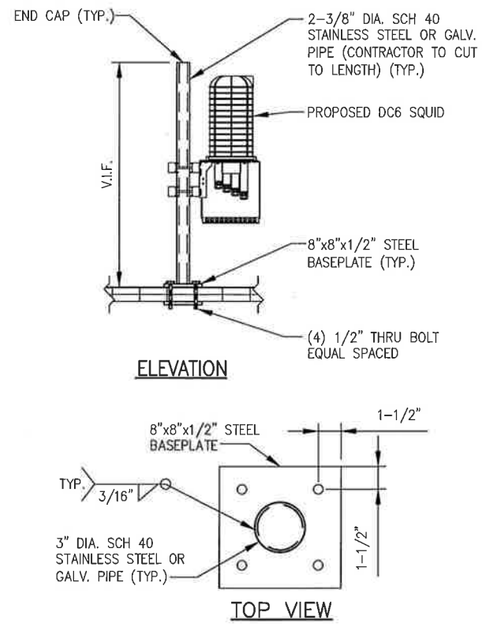


KATHREIN MODEL NO.:	800–10965
DIMENSIONS, HxWxD:	78.70"x20"x6.90"
WEIGHT:	97.60LBS

3 / C5 ANTENNA DETAIL
NOT TO SCALE



4 / C5 DC6 DETAIL
NOT TO SCALE



5 / C5 DC6 MOUNTING DETAIL
SCALE: NTS

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STATE OF CONNECTICUT
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Designed: MRL
Checked: AJO

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BUCKLAND MALL
CROWN BU: 876347
FA # 10071100
53-73 SLATER STREET
MANCHESTER, CT 06040

Prepared For: CROWN CASTLE

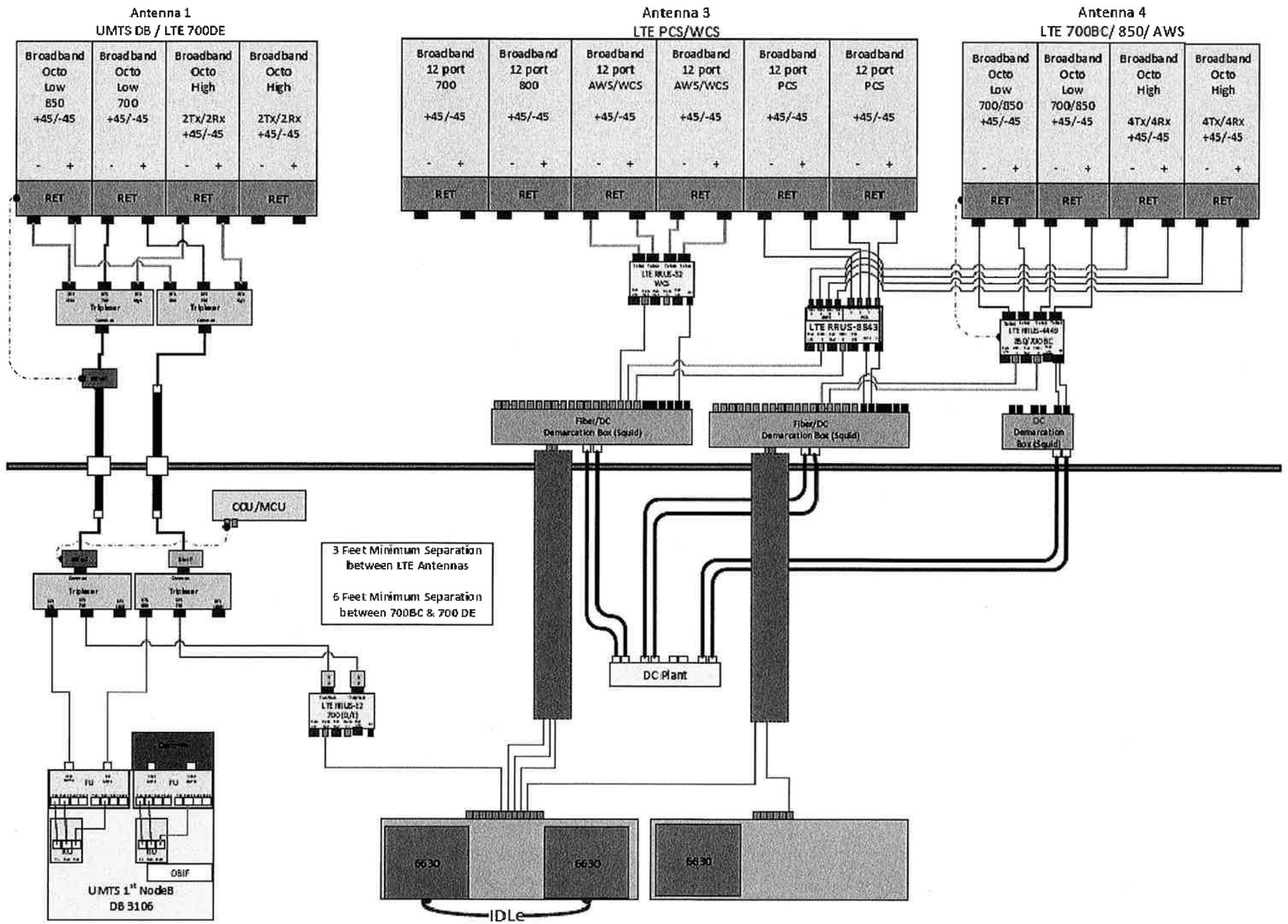
Drawing Title
EQUIPMENT DETAILS

Drawing Number
C5

Diagram - Sector A | Diagram File Name - FN_NR_CT5307_A-B-C_LTE8C_R1.0.vsd

Atoll Site Name - CTV5307 | Location Name - MANCHESTER NORTH | Market - CONNECTICUT | Market Cluster - NEW ENGLAND

Comments: Important Note: For detailed radio to antenna wiring refer to the latest field notice - Antenna_Radio Connection Drawings Playbook v6.0_Ericsson "



1 / C6 PLUMBING DIAGRAM (FINAL CONFIGURATION)
NOT TO SCALE

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STATE OF CONNECTICUT
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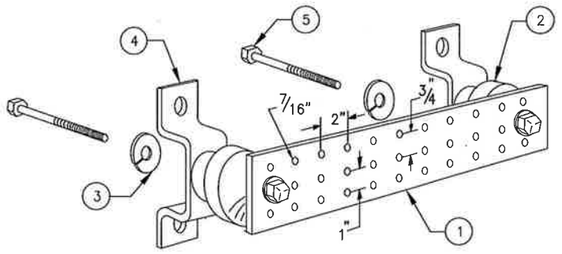
MANCHESTER, CT 06040

Prepared For: CROWN CASTLE

Drawing Title
RF PLUMBING DIAGRAM

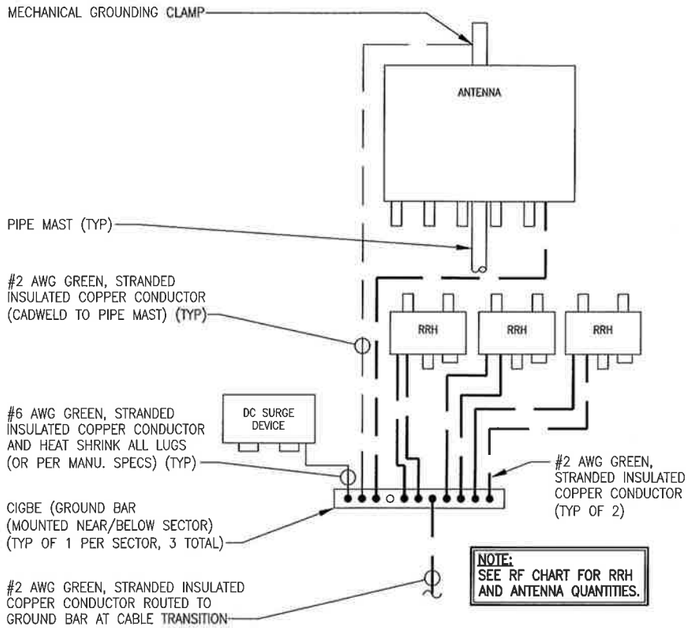
Drawing Number
C6



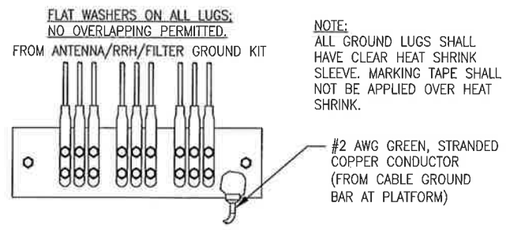
LEGEND

1 – SOLID TINNED COPPER GROUND BAR, 1/4"x 4"x 20" MIN., NEWTON INSTRUMENT CO. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION
2 – INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061–4
3 – 5/8" LOCKWASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015–8
4 – WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A–6056
5 – 5/8–11 X 1" H.H.C.S. BOLTS, NEWTON INSTRUMENT CO. CAT NO. 3012–1
6 – GROUND BAR SHALL BE SIZED TO ACCOMODATE ALL GROUNDING CONNECTIONS REQUIRED PLUS PROVIDE 50% SPARE CAPACITY
7 – GROUND BARS SHALL NEITHER BE FIELD FABRICATED NOR NEW HOLES DRILLED
8 – GROUND LUGS SHALL MATCH THE HOLE SPACING ON THE BAR
9 – HARDWARE DIAMETER SHALL BE MINIMUM 3/8"

1 / C6 GROUND BAR
NOT TO SCALE



2 / C7 CONNECTION OF SECTOR EQUIPMENT TO GROUNDING BAR DETAIL
SCALE: NTS



3 / C7 INSTALLATION OF GROUND WIRE TO GROUND BAR DETAIL
SCALE: NTS

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STATE OF CONNECTICUT
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53-73 SLATER STREET
MANCHESTER, CT 06040

Prepared For:
CROWN CASTLE

Drawing Title
GROUNDING DETAILS

Drawing Number
C7

PAUL J. FORD & COMPANY

Date: **August 06, 2018**

Charles Trask
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

Paul J. Ford and Company
250 East Broad st., Suite 600
Columbus, OH 43215
(614) 221-6679

Subject: **Structural Analysis Report**

Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11377C
	Carrier Site Name:	N/A
Crown Castle Designation:	**Crown Castle BU Number:**	876347
	Crown Castle Site Name:	BUCKLAND MALL
	Crown Castle JDE Job Number:	512593
	Crown Castle Work Order Number:	1601377
	Crown Castle Order Number:	446062 Rev. 0
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37518-2720.001.7805
Site Data:	**53 Slater Street, MANCHESTER, Hartford County, CT** **Latitude *41° 48' 18"*, Longitude *-72° 32' 1"*** **155 Foot - Monopole Tower**	

Dear Charles Trask,

Paul J. Ford and Company 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 1231155, in accordance with order 446062, revision 0.

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 I and Table II for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1 were used in this analysis.

We at *Paul J. Ford and Company* 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:

Gowtham

Gowtham Penumatsa
Structural Designer MCS

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED
PROFESSIONAL ENGINEER

8-7-18

tnxTower Report - version 8.0.2.1

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 155 ft Monopole tower designed by SUMMIT in February of 2002. The tower was originally designed for a wind speed of 80 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, “Structural Standard for Antenna Supporting Structures and Antennas”, with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1 were used in this analysis.

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
133.0	133.0	3	ericsson	ERICSSON AIR 21 B2A B4P	1	1-3/8	-
		3	ericsson	KRY 112 144/1			
		3	ericsson	RADIO 4449 B12/B71			
		3	rfs celwave	APXVAARR24_43-U-NA20			
		1	Commscope	MT-195-12 Handrail Kit			
		1	Commscope	MT-196-14 Low profile Platform			

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
155.0	155.0	3	alcatel lucent	TD-RRH8x20-25	5 2 3 3 2	1/2 5/8 1-1/4 5/16 2” Cond	1
		3	argus technologies	LPX310R w/ Mount Pipe			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
		3	samsung telecommunications	WIMAX DAP HEAD			
		1	tower mounts	Miscellaneous [NA 510-1]			
		1	tower mounts	Platform Mount [LP 1201-1]			
	151.0	1	andrew	VHLP1-23			
		1	andrew	VHLP2-11			
		1	andrew	VHLP2.5-18			
		3	dragonwave	HORIZON COMPACT			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
153.0	153.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	-	-	1
		3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
		1	tower mounts	Pipe Mount [PM 601-3]			
		1	tower mounts	Side Arm Mount [SO 104-3]			
145.0	147.0	3	ericsson	RRUS 11	-	-	1
	145.0	1	tower mounts	Pipe Mount [PM 601-3]			
143.0	145.0	3	cci antennas	OPA-65R-LCUU-H6 w/ Mount Pipe	2 1	3/4 3/8	2
		1	raycap	DC6-48-60-18-8F			
		6	cci antennas	TPX-070821			
		3	ericsson	RRUS 11			
		3	ericsson	RRUS 32			
		3	ericsson	RRUS 32 B2			
		3	kathrein	782 10253			
		3	quintel technology	QS66512-2 w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F	6 2 1	1-1/4 3/4 3/8	1
	143.0	1	tower mounts	T-Arm Mount [TA 702-3]			
133.0	133.0	3	ericsson	AIR -32 B2A/B66AA	1 7	1-1/4 1-5/8	1
		3	ericsson	KRC 118 057/1 w/ Mount Pipe	-	-	3
		3	ericsson	RRUS 11 B12			
		1	tower mounts	Platform Mount [LP 403-1]			
		1	tower mounts	Side Arm Mount [SO 201-3]			
113.0	113.0	3	alcatel lucent	RRH2X60-AWS	12 2	1-5/8 1-1/4	1
		3	alcatel lucent	RRH2x60-700			
		3	andrew	LNX-6512DS-T0M w/ Mount Pipe			
		3	antel	BXA-70063/6CFx2 w/ Mount Pipe			
		6	commscope	SBNHH-1D65B w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		1	tower mounts	Platform Mount [LP 1201-1]			
60.0	60.0	1	tower mounts	Side Arm Mount [SO 701-1]	-	-	1

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

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH, 1204605EG1, 06/12/2012	1533476	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	PJF, 329298-597, 09/11/1998	1615406	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PJF, A02-T0021, 02/18/2002	2068033	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.2.1), 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.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	155 - 115.5	Pole	TP29.31x22x0.25	1	-11.94	1507.55	59.4	Pass
L2	115.5 - 79.25	Pole	TP35.51x28.11x0.31	2	-22.07	2469.71	87.0	Pass
L3	79.25 - 43.75	Pole	TP41.46x34.06x0.38	3	-31.85	3485.55	92.4	Pass
L4	43.75 - 0	Pole	TP48.8x39.73x0.44	4	-49.30	4858.33	91.8	Pass
							Summary	
						Pole (L3)	92.4	Pass
						RATING =	**92.4**	**Pass**

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	93.2	Pass
1	Base Plate	0	75.5	Pass
1	Base Foundation Structural Steel	0	61.5	Pass
1	Base Foundation Soil Interaction	0	54.4	Pass

Structure Rating (max from all components) =	**93.2%**

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

4.1) Recommendations

The monopole and its foundation have sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

Tower is located in Hartford County, Connecticut.
ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
Basic wind speed of 97.0 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.00 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50.0 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60.0 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	155.00-115.50	39.50	3.75	18	22.00	29.31	0.25	1.00	A607-60 (60 ksi)
L2	115.50-79.25	40.00	4.50	18	28.11	35.51	0.31	1.25	A607-65 (65 ksi)
L3	79.25-43.75	40.00	5.25	18	34.06	41.46	0.38	1.50	A607-65

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L4	43.75-0.00	49.00		18	39.73	48.80	0.44	1.75	(65 ksi) A607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	22.30	17.26	1031.48	7.72	11.18	92.29	2064.32	8.63	3.43	13.728
	29.72	23.06	2459.70	10.32	14.89	165.21	4922.63	11.53	4.72	18.873
L2	29.20	27.58	2692.83	9.87	14.28	188.55	5389.20	13.79	4.40	14.074
	36.01	34.92	5466.10	12.50	18.04	302.98	10939.40	17.46	5.70	18.241
L3	35.37	40.09	5745.80	11.96	17.30	332.11	11499.17	20.05	5.33	14.224
	42.04	48.90	10425.54	14.58	21.06	495.05	20864.80	24.45	6.64	17.697
L4	41.27	54.57	10646.61	13.95	20.19	527.44	21307.22	27.29	6.22	14.225
	49.49	67.16	19844.89	17.17	24.79	800.51	39715.89	33.59	7.82	17.872

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 155.00-115.50				1	1	1			
L2 115.50-79.25				1	1	1			
L3 79.25-43.75				1	1	1			
L4 43.75-0.00				1	1	1			

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 plf
***										
***										

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 plf
**								
2" (Nominal) Conduit	C	No	CaAa (Out Of Face)	155.00 - 0.00	1	No Ice	0.00	0.72
						1/2" Ice	0.00	2.48
						1" Ice	0.00	4.84
2" (Nominal) Conduit	C	No	CaAa (Out Of Face)	155.00 - 0.00	1	No Ice	0.24	0.72
						1/2" Ice	0.34	2.48
						1" Ice	0.44	4.84
ATCB-B01-005(5/16)	C	No	CaAa (Out Of Face)	155.00 - 0.00	3	No Ice	0.00	0.07
						1/2" Ice	0.00	0.57
						1" Ice	0.00	1.68
FSJ4-50B(1/2)	C	No	CaAa (Out Of Face)	155.00 - 0.00	5	No Ice	0.00	0.14
						1/2" Ice	0.00	0.77
						1" Ice	0.00	2.01

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
9776(5/8)	C	No	Inside Pole	155.00 - 0.00	1	No Ice	0.00	0.28
						1/2" Ice	0.00	0.28
						1" Ice	0.00	0.28
HB058-M12-XXXF(5/8)	C	No	Inside Pole	155.00 - 0.00	1	No Ice	0.00	0.24
						1/2" Ice	0.00	0.24
						1" Ice	0.00	0.24
HB114-1-08U4-M5J(1-1/4)	C	No	Inside Pole	155.00 - 0.00	3	No Ice	0.00	1.08
						1/2" Ice	0.00	1.08
						1" Ice	0.00	1.08
**								
LDF6-50A(1-1/4)	C	No	Inside Pole	143.00 - 0.00	6	No Ice	0.00	0.60
						1/2" Ice	0.00	0.60
						1" Ice	0.00	0.60
FB-L98B-002-75000(3/8)	C	No	Inside Pole	143.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	C	No	Inside Pole	143.00 - 0.00	2	No Ice	0.00	0.58
						1/2" Ice	0.00	0.58
						1" Ice	0.00	0.58
FB-L98B-002-75000(3/8)	C	No	CaAa (Out Of Face)	143.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.60
						1" Ice	0.00	1.76
WR-VG86ST-BRD(3/4)	C	No	CaAa (Out Of Face)	143.00 - 0.00	1	No Ice	0.00	0.58
						1/2" Ice	0.00	1.38
						1" Ice	0.00	2.78
WR-VG86ST-BRD(3/4)	C	No	CaAa (Out Of Face)	143.00 - 0.00	1	No Ice	0.08	0.58
						1/2" Ice	0.18	1.38
						1" Ice	0.28	2.78
2" (Nominal) Conduit	C	No	Inside Pole	143.00 - 0.00	1	No Ice	0.00	0.72
						1/2" Ice	0.00	0.72
						1" Ice	0.00	0.72
**								
HB114-21U3M12-XXXF(1-1/4)	C	No	Inside Pole	133.00 - 0.00	1	No Ice	0.00	1.22
						1/2" Ice	0.00	1.22
						1" Ice	0.00	1.22
LCF158-50JA-A0(1-5/8)	C	No	Inside Pole	133.00 - 0.00	6	No Ice	0.00	0.80
						1/2" Ice	0.00	0.80
						1" Ice	0.00	0.80
HCS 6X12 6AWG(1-3/8)	C	No	Inside Pole	133.00 - 0.00	1	No Ice	0.00	1.70
						1/2" Ice	0.00	1.70
						1" Ice	0.00	1.70
HCS 6X12 4AWG(1-5/8)	C	No	Inside Pole	133.00 - 0.00	1	No Ice	0.00	2.40
						1/2" Ice	0.00	2.40
						1" Ice	0.00	2.40
**								
561(1-5/8)	C	No	Inside Pole	113.00 - 0.00	12	No Ice	0.00	1.35
						1/2" Ice	0.00	1.35
						1" Ice	0.00	1.35
HB158-1-08U8-S8J18(1-5/8)	C	No	Inside Pole	113.00 - 0.00	2	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
**								
***								
***								

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	155.00-115.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	11.568	0.61
L2	115.50-79.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	11.491	1.47

Tower Section	Tower Elevation ft	Face	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
L3	79.25-43.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	11.254	1.48
L4	43.75-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	13.869	1.83

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
L1	155.00-115.50	A	2.302	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	42.409	5.07
L2	115.50-79.25	A	2.228	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	44.865	5.87
L3	79.25-43.75	A	2.128	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	42.884	5.51
L4	43.75-0.00	A	1.921	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	51.102	6.32

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	155.00-115.50	-1.87	1.08	-2.93	1.69
L2	115.50-79.25	-2.12	1.22	-3.48	2.01
L3	79.25-43.75	-2.17	1.25	-3.61	2.09
L4	43.75-0.00	-2.21	1.28	-3.69	2.13

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

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight K
LPX310R w/ Mount Pipe	A	From Leg	4.00	0.000	155.00	No Ice	2.31	2.34	0.03

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
			0.00			1/2"	2.64	2.87	0.05
			0.00			Ice	2.97	3.41	0.08
						1" Ice			
LPX310R w/ Mount Pipe	B	From Leg	4.00	0.000	155.00	No Ice	2.31	2.34	0.03
			0.00			1/2"	2.64	2.87	0.05
			0.00			Ice	2.97	3.41	0.08
						1" Ice			
LPX310R w/ Mount Pipe	C	From Leg	4.00	0.000	155.00	No Ice	2.31	2.34	0.03
			0.00			1/2"	2.64	2.87	0.05
			0.00			Ice	2.97	3.41	0.08
						1" Ice			
HORIZON COMPACT	A	From Leg	4.00	0.000	155.00	No Ice	0.72	0.37	0.01
			0.00			1/2"	0.83	0.45	0.02
			-4.00			Ice	0.94	0.54	0.03
						1" Ice			
HORIZON COMPACT	B	From Leg	4.00	0.000	155.00	No Ice	0.72	0.37	0.01
			0.00			1/2"	0.83	0.45	0.02
			-4.00			Ice	0.94	0.54	0.03
						1" Ice			
HORIZON COMPACT	C	From Leg	4.00	0.000	155.00	No Ice	0.72	0.37	0.01
			0.00			1/2"	0.83	0.45	0.02
			-4.00			Ice	0.94	0.54	0.03
						1" Ice			
WIMAX DAP HEAD	A	From Leg	4.00	0.000	155.00	No Ice	1.55	0.68	0.03
			0.00			1/2"	1.70	0.80	0.04
			0.00			Ice	1.87	0.92	0.06
						1" Ice			
WIMAX DAP HEAD	B	From Leg	4.00	0.000	155.00	No Ice	1.55	0.68	0.03
			0.00			1/2"	1.70	0.80	0.04
			0.00			Ice	1.87	0.92	0.06
						1" Ice			
WIMAX DAP HEAD	C	From Leg	4.00	0.000	155.00	No Ice	1.55	0.68	0.03
			0.00			1/2"	1.70	0.80	0.04
			0.00			Ice	1.87	0.92	0.06
						1" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00	0.000	155.00	No Ice	8.26	6.95	0.08
			0.00			1/2"	8.82	8.13	0.15
			0.00			Ice	9.35	9.02	0.23
						1" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00	0.000	155.00	No Ice	8.26	6.95	0.08
			0.00			1/2"	8.82	8.13	0.15
			0.00			Ice	9.35	9.02	0.23
						1" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00	0.000	155.00	No Ice	8.26	6.95	0.08
			0.00			1/2"	8.82	8.13	0.15
			0.00			Ice	9.35	9.02	0.23
						1" Ice			
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00	0.000	155.00	No Ice	6.58	4.96	0.08
			0.00			1/2"	7.03	5.75	0.13
			0.00			Ice	7.47	6.47	0.19
						1" Ice			
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00	0.000	155.00	No Ice	6.58	4.96	0.08
			0.00			1/2"	7.03	5.75	0.13
			0.00			Ice	7.47	6.47	0.19
						1" Ice			
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00	0.000	155.00	No Ice	6.58	4.96	0.08
			0.00			1/2"	7.03	5.75	0.13
			0.00			Ice	7.47	6.47	0.19
						1" Ice			
TD-RRH8x20-25	A	From Leg	4.00	0.000	155.00	No Ice	4.05	1.53	0.07
			0.00			1/2"	4.30	1.71	0.10
			0.00			Ice	4.56	1.90	0.13
						1" Ice			
TD-RRH8x20-25	A	From Leg	4.00	0.000	155.00	No Ice	4.05	1.53	0.07
			0.00			1/2"	4.30	1.71	0.10

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
			0.00			Ice 1" Ice	4.56	1.90	0.13
TD-RRH8x20-25	B	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
8'x2 1/2" Pipe Mount	A	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice 1" Ice	2.30 3.13 3.62	2.30 3.13 3.62	0.04 0.06 0.08
8'x2 1/2" Pipe Mount	B	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice 1" Ice	2.30 3.13 3.62	2.30 3.13 3.62	0.04 0.06 0.08
8'x2 1/2" Pipe Mount	C	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice 1" Ice	2.30 3.13 3.62	2.30 3.13 3.62	0.04 0.06 0.08
Miscellaneous [NA 510-1]	C	None		0.000	155.00	No Ice 1/2" Ice 1" Ice	6.00 8.50 11.00	6.00 8.50 11.00	0.26 0.34 0.42
Platform Mount [LP 1201-1]	C	None		0.000	155.00	No Ice 1/2" Ice 1" Ice	23.10 26.80 30.50	23.10 26.80 30.50	2.10 2.50 2.90
***									
800MHz 2X50W RRH W/FILTER	A	From Leg	1.00 0.00 0.00	0.000	153.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
800MHz 2X50W RRH W/FILTER	B	From Leg	1.00 0.00 0.00	0.000	153.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
800MHz 2X50W RRH W/FILTER	C	From Leg	1.00 0.00 0.00	0.000	153.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
PCS 1900MHz 4x45W-65MHz	A	From Leg	1.00 0.00 0.00	0.000	153.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	0.06 0.08 0.11
PCS 1900MHz 4x45W-65MHz	B	From Leg	1.00 0.00 0.00	0.000	153.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	0.06 0.08 0.11
PCS 1900MHz 4x45W-65MHz	C	From Leg	1.00 0.00 0.00	0.000	153.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	0.06 0.08 0.11
Pipe Mount [PM 601-3]	C	None		0.000	153.00	No Ice 1/2" Ice 1" Ice	4.39 5.48 6.57	4.39 5.48 6.57	0.20 0.24 0.28
Side Arm Mount [SO 104-3]	C	None		0.000	153.00	No Ice 1/2" Ice 1" Ice	3.30 4.13 4.96	3.30 4.13 4.96	0.29 0.32 0.35
***									
RRUS 11	A	From Leg	1.00 0.00 2.00	0.000	145.00	No Ice 1/2" Ice 1" Ice	2.79 3.00 3.21	1.19 1.34 1.50	0.05 0.07 0.10
RRUS 11	B	From Leg	1.00	0.000	145.00	No Ice	2.79	1.19	0.05

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
			0.00			1/2" Ice	3.00	1.34	0.07
			2.00			1" Ice	3.21	1.50	0.10
RRUS 11	C	From Leg	1.00 0.00 2.00	0.000	145.00	No Ice 1/2" Ice 1" Ice	2.79 3.00 3.21	1.19 1.34 1.50	0.05 0.07 0.10
Pipe Mount [PM 601-3]	C	None		0.000	145.00	No Ice 1/2" Ice 1" Ice	4.39 5.48 6.57	4.39 5.48 6.57	0.20 0.24 0.28
***									
DC6-48-60-18-8F	A	From Leg	4.00 0.00 2.00	0.000	143.00	No Ice 1/2" Ice 1" Ice	0.92 1.46 1.64	0.92 1.46 1.64	0.02 0.04 0.06
QS66512-2 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.000	143.00	No Ice 1/2" Ice 1" Ice	3.83 9.29 9.91	6.22 9.66 10.62	0.14 0.21 0.30
QS66512-2 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.000	143.00	No Ice 1/2" Ice 1" Ice	3.83 9.29 9.91	6.22 9.66 10.62	0.14 0.21 0.30
QS66512-2 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.000	143.00	No Ice 1/2" Ice 1" Ice	3.83 9.29 9.91	6.22 9.66 10.62	0.14 0.21 0.30
OPA-65R-LCUU-H6 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.000	143.00	No Ice 1/2" Ice 1" Ice	9.90 10.47 11.01	7.18 8.36 9.26	0.10 0.18 0.26
OPA-65R-LCUU-H6 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.000	143.00	No Ice 1/2" Ice 1" Ice	9.90 10.47 11.01	7.18 8.36 9.26	0.10 0.18 0.26
OPA-65R-LCUU-H6 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.000	143.00	No Ice 1/2" Ice 1" Ice	9.90 10.47 11.01	7.18 8.36 9.26	0.10 0.18 0.26
(2) TPX-070821	A	From Leg	4.00 0.00 2.00	0.000	143.00	No Ice 1/2" Ice 1" Ice	0.47 0.56 0.66	0.10 0.15 0.20	0.01 0.01 0.02
(2) TPX-070821	B	From Leg	4.00 0.00 2.00	0.000	143.00	No Ice 1/2" Ice 1" Ice	0.47 0.56 0.66	0.10 0.15 0.20	0.01 0.01 0.02
(2) TPX-070821	C	From Leg	4.00 0.00 2.00	0.000	143.00	No Ice 1/2" Ice 1" Ice	0.47 0.56 0.66	0.10 0.15 0.20	0.01 0.01 0.02
782 10253	A	From Leg	4.00 0.00 2.00	0.000	143.00	No Ice 1/2" Ice 1" Ice	0.11 0.15 0.20	0.06 0.10 0.14	0.00 0.00 0.01
782 10253	B	From Leg	4.00 0.00 2.00	0.000	143.00	No Ice 1/2" Ice 1" Ice	0.11 0.15 0.20	0.06 0.10 0.14	0.00 0.00 0.01
782 10253	C	From Leg	4.00 0.00 2.00	0.000	143.00	No Ice 1/2" Ice 1" Ice	0.11 0.15 0.20	0.06 0.10 0.14	0.00 0.00 0.01
RRUS 11	A	From Leg	4.00	0.000	143.00	No Ice	2.79	1.19	0.05

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
			0.00			1/2"	3.00	1.34	0.07
			2.00			Ice	3.21	1.50	0.10
						1" Ice			
RRUS 11	B	From Leg	4.00	0.000	143.00	No Ice	2.79	1.19	0.05
			0.00			1/2"	3.00	1.34	0.07
			2.00			Ice	3.21	1.50	0.10
						1" Ice			
RRUS 11	C	From Leg	4.00	0.000	143.00	No Ice	2.79	1.19	0.05
			0.00			1/2"	3.00	1.34	0.07
			2.00			Ice	3.21	1.50	0.10
						1" Ice			
RRUS 32	A	From Leg	4.00	0.000	143.00	No Ice	2.86	1.78	0.06
			0.00			1/2"	3.08	1.97	0.08
			2.00			Ice	3.32	2.17	0.10
						1" Ice			
RRUS 32	B	From Leg	4.00	0.000	143.00	No Ice	2.86	1.78	0.06
			0.00			1/2"	3.08	1.97	0.08
			2.00			Ice	3.32	2.17	0.10
						1" Ice			
RRUS 32	C	From Leg	4.00	0.000	143.00	No Ice	2.86	1.78	0.06
			0.00			1/2"	3.08	1.97	0.08
			2.00			Ice	3.32	2.17	0.10
						1" Ice			
RRUS 32 B2	A	From Leg	4.00	0.000	143.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			2.00			Ice	3.18	2.05	0.10
						1" Ice			
RRUS 32 B2	B	From Leg	4.00	0.000	143.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			2.00			Ice	3.18	2.05	0.10
						1" Ice			
RRUS 32 B2	C	From Leg	4.00	0.000	143.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			2.00			Ice	3.18	2.05	0.10
						1" Ice			
DC6-48-60-18-8F	B	From Leg	4.00	0.000	143.00	No Ice	0.92	0.92	0.02
			0.00			1/2"	1.46	1.46	0.04
			2.00			Ice	1.64	1.64	0.06
						1" Ice			
T-Arm Mount [TA 702-3]	C	None		0.000	143.00	No Ice	5.64	5.64	0.34
						1/2"	6.55	6.55	0.43
						Ice	7.46	7.46	0.52
						1" Ice			
2.375" OD x 6' Mount Pipe	A	From Leg	4.00	0.000	143.00	No Ice	1.43	1.43	0.03
			0.00			1/2"	1.92	1.92	0.04
			0.00			Ice	2.29	2.29	0.05
						1" Ice			
2.375" OD x 6' Mount Pipe	B	From Leg	4.00	0.000	143.00	No Ice	1.43	1.43	0.03
			0.00			1/2"	1.92	1.92	0.04
			0.00			Ice	2.29	2.29	0.05
						1" Ice			
2.375" OD x 6' Mount Pipe	C	From Leg	4.00	0.000	143.00	No Ice	1.43	1.43	0.03
			0.00			1/2"	1.92	1.92	0.04
			0.00			Ice	2.29	2.29	0.05
						1" Ice			
*****									
*****									
ERICSSON AIR 21 B2A B4P	A	From Leg	4.00	0.000	133.00	No Ice	6.09	4.30	0.09
			0.00			1/2"	6.46	4.65	0.13
			0.00			Ice	6.84	5.00	0.18
						1" Ice			
ERICSSON AIR 21 B2A B4P	B	From Leg	4.00	0.000	133.00	No Ice	6.09	4.30	0.09
			0.00			1/2"	6.46	4.65	0.13
			0.00			Ice	6.84	5.00	0.18
						1" Ice			

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
ERICSSON AIR 21 B2A B4P	C	From Leg	4.00 0.00 0.00	0.000	133.00	No Ice 1/2" Ice 1" Ice	6.09 6.46 6.84	4.30 4.65 5.00	0.09 0.13 0.18
APXVAARR24_43-U-NA20	A	From Leg	4.00 0.00 0.00	0.000	133.00	No Ice 1/2" Ice 1" Ice	20.24 20.89 21.54	8.89 9.49 10.09	0.13 0.24 0.36
APXVAARR24_43-U-NA20	B	From Leg	4.00 0.00 0.00	0.000	133.00	No Ice 1/2" Ice 1" Ice	20.24 20.89 21.54	8.89 9.49 10.09	0.13 0.24 0.36
APXVAARR24_43-U-NA20	C	From Leg	4.00 0.00 0.00	0.000	133.00	No Ice 1/2" Ice 1" Ice	20.24 20.89 21.54	8.89 9.49 10.09	0.13 0.24 0.36
AIR -32 B2A/B66AA	A	From Leg	4.00 0.00 0.00	0.000	133.00	No Ice 1/2" Ice 1" Ice	6.51 6.89 7.27	4.71 5.07 5.43	0.13 0.18 0.23
AIR -32 B2A/B66AA	B	From Leg	4.00 0.00 0.00	0.000	133.00	No Ice 1/2" Ice 1" Ice	6.51 6.89 7.27	4.71 5.07 5.43	0.13 0.18 0.23
AIR -32 B2A/B66AA	C	From Leg	4.00 0.00 0.00	0.000	133.00	No Ice 1/2" Ice 1" Ice	6.51 6.89 7.27	4.71 5.07 5.43	0.13 0.18 0.23
KRY 112 144/1	A	From Leg	4.00 0.00 0.00	0.000	133.00	No Ice 1/2" Ice 1" Ice	0.35 0.43 0.51	0.17 0.23 0.30	0.01 0.01 0.02
KRY 112 144/1	B	From Leg	4.00 0.00 0.00	0.000	133.00	No Ice 1/2" Ice 1" Ice	0.35 0.43 0.51	0.17 0.23 0.30	0.01 0.01 0.02
KRY 112 144/1	C	From Leg	4.00 0.00 0.00	0.000	133.00	No Ice 1/2" Ice 1" Ice	0.35 0.43 0.51	0.17 0.23 0.30	0.01 0.01 0.02
RADIO 4449 B12/B71	A	From Leg	4.00 0.00 0.00	0.000	133.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	1.16 1.30 1.45	0.07 0.09 0.11
RADIO 4449 B12/B71	B	From Leg	4.00 0.00 0.00	0.000	133.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	1.16 1.30 1.45	0.07 0.09 0.11
RADIO 4449 B12/B71	C	From Leg	4.00 0.00 0.00	0.000	133.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	1.16 1.30 1.45	0.07 0.09 0.11
Platform Mount [LP 302-1]	C	From Leg	0.00 0.00 0.00	0.000	133.00	No Ice 1/2" Ice 1" Ice	33.03 44.60 56.17	33.03 44.60 56.17	1.71 2.19 2.68
***									
BXA-70063/6CFx2 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	7.81 8.36 8.87	5.40 6.55 7.41	0.04 0.10 0.17
BXA-70063/6CFx2 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	7.81 8.36 8.87	5.40 6.55 7.41	0.04 0.10 0.17

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
BXA-70063/6CFx2 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	7.81 8.36 8.87	5.40 6.55 7.41	0.04 0.10 0.17
LNX-6512DS-T0M w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	5.33 5.72 6.12	4.53 5.15 5.77	0.05 0.09 0.15
LNX-6512DS-T0M w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	5.33 5.72 6.12	4.53 5.15 5.77	0.05 0.09 0.15
LNX-6512DS-T0M w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	5.33 5.72 6.12	4.53 5.15 5.77	0.05 0.09 0.15
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	8.40 8.96 9.49	7.07 8.26 9.18	0.07 0.14 0.21
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	8.40 8.96 9.49	7.07 8.26 9.18	0.07 0.14 0.21
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	8.40 8.96 9.49	7.07 8.26 9.18	0.07 0.14 0.21
RRH2X60-AWS	A	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	1.88 2.06 2.24	1.24 1.39 1.54	0.04 0.06 0.08
RRH2X60-AWS	B	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	1.88 2.06 2.24	1.24 1.39 1.54	0.04 0.06 0.08
RRH2X60-AWS	C	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	1.88 2.06 2.24	1.24 1.39 1.54	0.04 0.06 0.08
RRH2x60-700	A	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
RRH2x60-700	B	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
RRH2x60-700	C	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
DB-T1-6Z-8AB-0Z	A	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	4.80 5.07 5.35	2.00 2.19 2.39	0.04 0.08 0.12
Platform Mount [LP 1201-1]	C	None		0.000	113.00	No Ice 1/2" Ice 1" Ice	23.10 26.80 30.50	23.10 26.80 30.50	2.10 2.50 2.90
***									
Side Arm Mount [SO 701-1]	C	None		0.000	60.00	No Ice 1/2" Ice 1" Ice	0.85 1.14 1.43	1.67 2.34 3.01	0.07 0.08 0.09

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
**								

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
VHLP1-23	A	Paraboloid w/o Radome	From Leg	4.00 0.00 -4.00	-64.000		155.00	1.27	No Ice 1/2" Ice 1" Ice	1.28 1.45 1.62	0.01 0.02 0.03
VHLP2.5-18	B	Paraboloid w/Shroud (HP)	From Leg	4.00 0.00 -4.00	21.000		155.00	2.92	No Ice 1/2" Ice 1" Ice	6.68 7.07 7.46	0.05 0.08 0.12
VHLP2-11	C	Paraboloid w/o Radome	From Leg	4.00 0.00 -4.00	13.000		155.00	2.17	No Ice 1/2" Ice 1" Ice	3.72 4.01 4.30	0.03 0.05 0.07

Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 155.00-115.50	134.46	1.347	31	85.620	A	0.000	85.620	85.620	100.00	0.000	0.000
					B	0.000	85.620		100.00	0.000	0.000
					C	0.000	85.620		100.00	0.000	11.568
L2 115.50-79.25	96.92	1.257	29	98.506	A	0.000	98.506	98.506	100.00	0.000	0.000
					B	0.000	98.506		100.00	0.000	0.000
					C	0.000	98.506		100.00	0.000	11.491
L3 79.25-43.75	61.26	1.142	26	114.498	A	0.000	114.498	114.498	100.00	0.000	0.000
					B	0.000	114.498		100.00	0.000	0.000
					C	0.000	114.498		100.00	0.000	11.254
L4 43.75-0.00	22.10	0.921	21	165.433	A	0.000	165.433	165.433	100.00	0.000	0.000
					B	0.000	165.433		100.00	0.000	0.000
					C	0.000	165.433		100.00	0.000	13.869

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 155.00-115.50	134.46	1.347	8	2.30	100.773	A	0.000	100.773	100.773	100.00	0.000	0.000
						B	0.000	100.773		100.00	0.000	0.000
						C	0.000	100.773		100.00	0.000	42.409
L2 115.50-	96.92	1.257	8	2.23	112.412	A	0.000	112.412	112.412	100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
79.25						B	0.000	112.412		100.00	0.000	0.000
						C	0.000	112.412		100.00	0.000	44.865
L3 79.25-43.75	61.26	1.142	7	2.13	127.677	A	0.000	127.677	127.677	100.00	0.000	0.000
						B	0.000	127.677		100.00	0.000	0.000
						C	0.000	127.677		100.00	0.000	42.884
L4 43.75-0.00	22.10	0.921	6	1.92	180.947	A	0.000	180.947	180.947	100.00	0.000	0.000
						B	0.000	180.947		100.00	0.000	0.000
						C	0.000	180.947		100.00	0.000	51.102

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 155.00-115.50	134.46	1.347	11	85.620	A	0.000	85.620	85.620	100.00	0.000	0.000
					B	0.000	85.620		100.00	0.000	0.000
					C	0.000	85.620		100.00	0.000	11.568
L2 115.50-79.25	96.92	1.257	10	98.506	A	0.000	98.506	98.506	100.00	0.000	0.000
					B	0.000	98.506		100.00	0.000	0.000
					C	0.000	98.506		100.00	0.000	11.491
L3 79.25-43.75	61.26	1.142	9	114.498	A	0.000	114.498	114.498	100.00	0.000	0.000
					B	0.000	114.498		100.00	0.000	0.000
					C	0.000	114.498		100.00	0.000	11.254
L4 43.75-0.00	22.10	0.921	7	165.433	A	0.000	165.433	165.433	100.00	0.000	0.000
					B	0.000	165.433		100.00	0.000	0.000
					C	0.000	165.433		100.00	0.000	13.869

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp

Comb. No.	Description
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	155 - 115.5	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-40.91	7	-4
			Max. Mx	8	-11.99	-507	-7
			Max. My	2	-11.95	4	512
			Max. Vy	8	21.02	-507	-7
			Max. Vx	2	-21.13	4	512
			Max. Torque	14			2
L2	115.5 - 79.25	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-65.98	14	-6
			Max. Mx	8	-22.12	-1486	-13
			Max. My	2	-22.08	6	1499
			Max. Vy	8	30.38	-1486	-13
			Max. Vx	2	-30.61	6	1499
			Max. Torque	25			2
L3	79.25 - 43.75	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-82.80	21	-10
			Max. Mx	8	-31.87	-2602	-20
			Max. My	2	-31.85	8	2623
			Max. Vy	8	33.76	-2602	-20
			Max. Vx	2	-33.99	8	2623
			Max. Torque	25			2
L4	43.75 - 0	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-109.53	31	-15
			Max. Mx	8	-49.30	-4348	-29
			Max. My	2	-49.30	11	4380
			Max. Vy	8	37.13	-4348	-29
			Max. Vx	2	-37.35	11	4380
			Max. Torque	25			3

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	109.53	-0.00	0.00
	Max. H_x	21	37.01	36.98	0.29
	Max. H_z	3	37.01	0.05	37.29
	Max. M_x	2	4380	0.05	37.29
	Max. M_z	8	4348	-37.07	-0.17
	Max. Torsion	25	3	18.65	32.29
	Min. Vert	15	37.01	-0.23	-37.18
	Min. H_x	9	37.01	-37.07	-0.17
	Min. H_z	14	49.35	-0.23	-37.18
	Min. M_x	14	-4365	-0.23	-37.18
	Min. M_z	20	-4337	36.97	0.29
	Min. Torsion	13	-3	-18.76	-32.18

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	41.12	0.00	-0.00	1	2	0
1.2 Dead+1.6 Wind 0 deg - No Ice	49.35	-0.05	-37.29	-4380	11	-3
0.9 Dead+1.6 Wind 0 deg - No Ice	37.01	-0.05	-37.29	-4308	11	-3
1.2 Dead+1.6 Wind 30 deg - No Ice	49.35	18.46	-32.17	-3774	-2161	-1
0.9 Dead+1.6 Wind 30 deg - No Ice	37.01	18.46	-32.17	-3712	-2126	-1
1.2 Dead+1.6 Wind 60 deg - No Ice	49.35	32.15	-18.39	-2148	-3772	0
0.9 Dead+1.6 Wind 60 deg - No Ice	37.01	32.15	-18.39	-2113	-3710	0
1.2 Dead+1.6 Wind 90 deg - No Ice	49.35	37.07	0.17	29	-4348	1
0.9 Dead+1.6 Wind 90 deg - No Ice	37.01	37.07	0.17	28	-4277	1
1.2 Dead+1.6 Wind 120 deg - No Ice	49.35	32.23	18.60	2184	-3786	3
0.9 Dead+1.6 Wind 120 deg - No Ice	37.01	32.23	18.60	2148	-3724	3
1.2 Dead+1.6 Wind 150 deg - No Ice	49.35	18.76	32.18	3777	-2209	3
0.9 Dead+1.6 Wind 150 deg - No Ice	37.01	18.76	32.18	3714	-2173	3
1.2 Dead+1.6 Wind 180 deg - No Ice	49.35	0.23	37.18	4365	-36	3
0.9 Dead+1.6 Wind 180 deg - No Ice	37.01	0.23	37.18	4293	-36	3
1.2 Dead+1.6 Wind 210 deg - No Ice	49.35	-18.27	32.17	3775	2134	2
0.9 Dead+1.6 Wind 210 deg - No Ice	37.01	-18.27	32.17	3713	2098	2
1.2 Dead+1.6 Wind 240 deg - No Ice	49.35	-31.92	18.47	2164	3740	0
0.9 Dead+1.6 Wind 240 deg - No Ice	37.01	-31.92	18.47	2128	3678	0
1.2 Dead+1.6 Wind 270 deg - No Ice	49.35	-36.97	-0.29	-46	4337	-1
0.9 Dead+1.6 Wind 270 deg - No Ice	37.01	-36.98	-0.29	-46	4265	-1
1.2 Dead+1.6 Wind 300 deg - No Ice	49.35	-32.07	-18.81	-2216	3764	-3
0.9 Dead+1.6 Wind 300 deg - No Ice	37.01	-32.07	-18.81	-2180	3701	-3
1.2 Dead+1.6 Wind 330 deg - No Ice	49.35	-18.65	-32.29	-3792	2195	-3

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
0.9 Dead+1.6 Wind 330 deg - No Ice	37.01	-18.65	-32.29	-3730	2159	-3
1.2 Dead+1.0 Ice+1.0 Temp	109.53	0.00	-0.00	15	31	0
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	109.53	-0.01	-12.84	-1654	33	-2
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	109.53	6.39	-11.10	-1426	-798	-1
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	109.53	11.10	-6.36	-809	-1412	0
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	109.53	12.80	0.04	23	-1633	1
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	109.53	11.11	6.41	849	-1415	2
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	109.53	6.45	11.10	1457	-811	2
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	109.53	0.05	12.82	1682	21	2
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	109.53	-6.34	11.09	1457	851	1
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	109.53	-11.04	6.39	844	1463	0
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	109.53	-12.77	-0.06	4	1689	-1
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	109.53	-11.07	-6.46	-826	1469	-2
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	109.53	-6.42	-11.12	-1431	867	-2
Dead+Wind 0 deg - Service	41.12	-0.01	-7.98	-930	4	-1
Dead+Wind 30 deg - Service	41.12	3.95	-6.88	-801	-457	0
Dead+Wind 60 deg - Service	41.12	6.88	-3.93	-456	-800	0
Dead+Wind 90 deg - Service	41.12	7.93	0.04	7	-922	0
Dead+Wind 120 deg - Service	41.12	6.90	3.98	464	-802	1
Dead+Wind 150 deg - Service	41.12	4.01	6.88	803	-468	1
Dead+Wind 180 deg - Service	41.12	0.05	7.96	928	-6	1
Dead+Wind 210 deg - Service	41.12	-3.91	6.88	802	455	0
Dead+Wind 240 deg - Service	41.12	-6.83	3.95	460	796	0
Dead+Wind 270 deg - Service	41.12	-7.91	-0.06	-9	923	0
Dead+Wind 300 deg - Service	41.12	-6.86	-4.02	-470	801	-1
Dead+Wind 330 deg - Service	41.12	-3.99	-6.91	-805	468	-1

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-41.12	0.00	-0.00	41.12	0.00	0.002%
2	-0.05	-49.35	-37.29	0.05	49.35	37.29	0.005%
3	-0.05	-37.01	-37.29	0.05	37.01	37.29	0.004%
4	18.46	-49.35	-32.17	-18.46	49.35	32.17	0.000%
5	18.46	-37.01	-32.17	-18.46	37.01	32.17	0.000%
6	32.15	-49.35	-18.39	-32.15	49.35	18.39	0.000%
7	32.15	-37.01	-18.39	-32.15	37.01	18.39	0.000%
8	37.07	-49.35	0.17	-37.07	49.35	-0.17	0.005%
9	37.07	-37.01	0.17	-37.07	37.01	-0.17	0.004%
10	32.23	-49.35	18.60	-32.23	49.35	-18.60	0.000%
11	32.23	-37.01	18.60	-32.23	37.01	-18.60	0.000%
12	18.76	-49.35	32.18	-18.76	49.35	-32.18	0.000%
13	18.76	-37.01	32.18	-18.76	37.01	-32.18	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
14	0.23	-49.35	37.19	-0.23	49.35	-37.18	0.005%
15	0.23	-37.01	37.19	-0.23	37.01	-37.18	0.008%
16	-18.27	-49.35	32.17	18.27	49.35	-32.17	0.000%
17	-18.27	-37.01	32.17	18.27	37.01	-32.17	0.000%
18	-31.92	-49.35	18.47	31.92	49.35	-18.47	0.000%
19	-31.92	-37.01	18.47	31.92	37.01	-18.47	0.000%
20	-36.98	-49.35	-0.29	36.97	49.35	0.29	0.005%
21	-36.98	-37.01	-0.29	36.98	37.01	0.29	0.004%
22	-32.07	-49.35	-18.81	32.07	49.35	18.81	0.000%
23	-32.07	-37.01	-18.81	32.07	37.01	18.81	0.000%
24	-18.65	-49.35	-32.29	18.65	49.35	32.29	0.000%
25	-18.65	-37.01	-32.29	18.65	37.01	32.29	0.000%
26	0.00	-109.53	0.00	-0.00	109.53	0.00	0.000%
27	-0.01	-109.53	-12.84	0.01	109.53	12.84	0.002%
28	6.39	-109.53	-11.10	-6.39	109.53	11.10	0.001%
29	11.10	-109.53	-6.36	-11.10	109.53	6.36	0.001%
30	12.80	-109.53	0.04	-12.80	109.53	-0.04	0.002%
31	11.11	-109.53	6.41	-11.11	109.53	-6.41	0.001%
32	6.45	-109.53	11.10	-6.45	109.53	-11.10	0.001%
33	0.05	-109.53	12.82	-0.05	109.53	-12.82	0.002%
34	-6.34	-109.53	11.10	6.34	109.53	-11.09	0.001%
35	-11.04	-109.53	6.39	11.04	109.53	-6.39	0.001%
36	-12.78	-109.53	-0.06	12.77	109.53	0.06	0.002%
37	-11.07	-109.53	-6.46	11.07	109.53	6.46	0.001%
38	-6.42	-109.53	-11.12	6.42	109.53	11.12	0.001%
39	-0.01	-41.12	-7.98	0.01	41.12	7.98	0.003%
40	3.95	-41.12	-6.88	-3.95	41.12	6.88	0.003%
41	6.88	-41.12	-3.93	-6.88	41.12	3.93	0.003%
42	7.93	-41.12	0.04	-7.93	41.12	-0.04	0.003%
43	6.90	-41.12	3.98	-6.90	41.12	-3.98	0.003%
44	4.01	-41.12	6.89	-4.01	41.12	-6.88	0.003%
45	0.05	-41.12	7.96	-0.05	41.12	-7.96	0.003%
46	-3.91	-41.12	6.88	3.91	41.12	-6.88	0.003%
47	-6.83	-41.12	3.95	6.83	41.12	-3.95	0.003%
48	-7.91	-41.12	-0.06	7.91	41.12	0.06	0.003%
49	-6.86	-41.12	-4.02	6.86	41.12	4.02	0.003%
50	-3.99	-41.12	-6.91	3.99	41.12	6.91	0.003%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000544
2	Yes	16	0.00005259	0.00013604
3	Yes	16	0.00003256	0.00010108
4	Yes	21	0.00000001	0.00009003
5	Yes	20	0.00000001	0.00012905
6	Yes	21	0.00000001	0.00008958
7	Yes	20	0.00000001	0.00012845
8	Yes	16	0.00005272	0.00013137
9	Yes	16	0.00003264	0.00009697
10	Yes	21	0.00000001	0.00009270
11	Yes	20	0.00000001	0.00013292
12	Yes	21	0.00000001	0.00009143
13	Yes	20	0.00000001	0.00013085
14	Yes	16	0.00005264	0.00007514
15	Yes	15	0.00007285	0.00012222
16	Yes	21	0.00000001	0.00008979
17	Yes	20	0.00000001	0.00012873
18	Yes	21	0.00000001	0.00008941
19	Yes	20	0.00000001	0.00012819
20	Yes	16	0.00005274	0.00011770
21	Yes	16	0.00003266	0.00008394
22	Yes	21	0.00000001	0.00009160
23	Yes	20	0.00000001	0.00013107

24	Yes	21	0.00000001	0.00009379
25	Yes	20	0.00000001	0.00013441
26	Yes	15	0.00000001	0.00001519
27	Yes	18	0.00013966	0.00012297
28	Yes	20	0.00003881	0.00010454
29	Yes	20	0.00003881	0.00010625
30	Yes	18	0.00013970	0.00011582
31	Yes	20	0.00003877	0.00011511
32	Yes	20	0.00003876	0.00010848
33	Yes	18	0.00013956	0.00012285
34	Yes	20	0.00003872	0.00012038
35	Yes	20	0.00003872	0.00011776
36	Yes	18	0.00013956	0.00011907
37	Yes	20	0.00003874	0.00011350
38	Yes	20	0.00003873	0.00012128
39	Yes	15	0.00009808	0.00004404
40	Yes	15	0.00009784	0.00010749
41	Yes	15	0.00009784	0.00010729
42	Yes	15	0.00009807	0.00004223
43	Yes	15	0.00009785	0.00011870
44	Yes	15	0.00009785	0.00010581
45	Yes	15	0.00009808	0.00004294
46	Yes	15	0.00009786	0.00011370
47	Yes	15	0.00009786	0.00010904
48	Yes	15	0.00009810	0.00004183
49	Yes	15	0.00009787	0.00010751
50	Yes	15	0.00009786	0.00012363

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	155 - 115.5	35.35	50	1.953	0.001
L2	119.25 - 79.25	21.32	50	1.711	0.002
L3	83.75 - 43.75	10.33	50	1.190	0.001
L4	49 - 0	3.48	50	0.659	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
155.00	LPX310R w/ Mount Pipe	50	35.35	1.953	0.001	32003
153.00	800MHz 2X50W RRH W/FILTER	50	34.53	1.943	0.002	32003
151.00	VHLP1-23	50	33.71	1.934	0.002	32003
145.00	RRUS 11	50	31.28	1.904	0.002	16001
143.00	DC6-48-60-18-8F	50	30.47	1.893	0.002	13334
133.00	ERICSSON AIR 21 B2A B4P	50	26.50	1.832	0.002	7272
113.00	BXA-70063/6CFx2 w/ Mount Pipe	50	19.12	1.637	0.002	4332
60.00	Side Arm Mount [SO 701-1]	50	5.19	0.820	0.001	3300

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	155 - 115.5	165.98	2	9.197	0.007
L2	119.25 - 79.25	100.24	2	8.060	0.011

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L3	83.75 - 43.75	48.60	2	5.608	0.006
L4	49 - 0	16.41	24	3.103	0.003

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
155.00	LPX310R w/ Mount Pipe	2	165.98	9.197	0.007	7143
153.00	800MHz 2X50W RRH W/FILTER	2	162.15	9.152	0.008	7143
151.00	VHLP1-23	2	158.33	9.108	0.008	7143
145.00	RRUS 11	2	146.90	8.968	0.009	3570
143.00	DC6-48-60-18-8F	2	143.12	8.918	0.009	2974
133.00	ERICSSON AIR 21 B2A B4P	2	124.50	8.629	0.010	1618
113.00	BXA-70063/6CFx2 w/ Mount Pipe	2	89.92	7.711	0.010	955
60.00	Side Arm Mount [SO 701-1]	24	24.42	3.864	0.004	707

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	155 - 115.5 (1)	TP29.31x22x0.25	39.50	0.00	0.0	22.51	-11.94	1507.55	0.008
L2	115.5 - 79.25 (2)	TP35.51x28.11x0.31	40.00	0.00	0.0	34.09	-22.07	2469.71	0.009
L3	79.25 - 43.75 (3)	TP41.46x34.06x0.38	40.00	0.00	0.0	47.74	-31.85	3485.55	0.009
L4	43.75 - 0 (4)	TP48.8x39.73x0.44	49.00	0.00	0.0	67.16	-49.30	4858.33	0.010

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	155 - 115.5 (1)	TP29.31x22x0.25	514	878	0.585	0	878	0.000
L2	115.5 - 79.25 (2)	TP35.51x28.11x0.31	1501	1743	0.861	0	1743	0.000
L3	79.25 - 43.75 (3)	TP41.46x34.06x0.38	2625	2871	0.914	0	2871	0.000
L4	43.75 - 0 (4)	TP48.8x39.73x0.44	4382	4826	0.908	0	4826	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	155 - 115.5 (1)	TP29.31x22x0.25	21.16	753.77	0.028	1	1761	0.001
L2	115.5 - 79.25 (2)	TP35.51x28.11x0.31	30.61	1234.85	0.025	2	3496	0.000
L3	79.25 - 43.75 (3)	TP41.46x34.06x0.38	33.99	1742.77	0.020	2	5756	0.000
L4	43.75 - 0 (4)	TP48.8x39.73x0.44	37.35	2429.16	0.015	3	9677	0.000

Pole Interaction Design Data

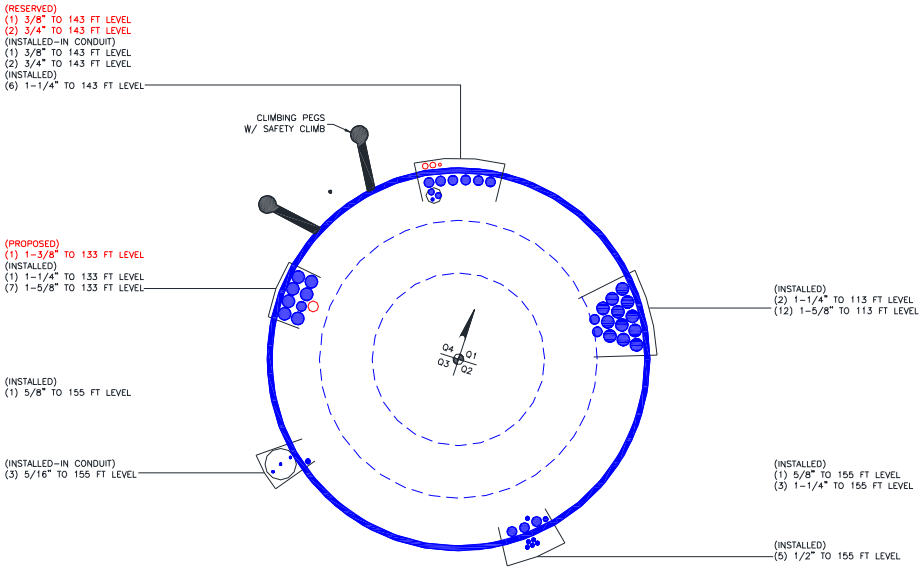
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	155 - 115.5 (1)	0.008	0.585	0.000	0.028	0.001	0.594 ✔	1.000	4.8.2 ✔
L2	115.5 - 79.25 (2)	0.009	0.861	0.000	0.025	0.000	0.870 ✔	1.000	4.8.2 ✔
L3	79.25 - 43.75 (3)	0.009	0.914	0.000	0.020	0.000	0.924 ✔	1.000	4.8.2 ✔
L4	43.75 - 0 (4)	0.010	0.908	0.000	0.015	0.000	0.918 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	155 - 115.5	Pole	TP29.31x22x0.25	1	-11.94	1507.55	59.4	Pass
L2	115.5 - 79.25	Pole	TP35.51x28.11x0.31	2	-22.07	2469.71	87.0	Pass
L3	79.25 - 43.75	Pole	TP41.46x34.06x0.38	3	-31.85	3485.55	92.4	Pass
L4	43.75 - 0	Pole	TP48.8x39.73x0.44	4	-49.30	4858.33	91.8	Pass
							Summary	
						Pole (L3)	92.4	Pass
						RATING =	**92.4**	**Pass**

APPENDIX B

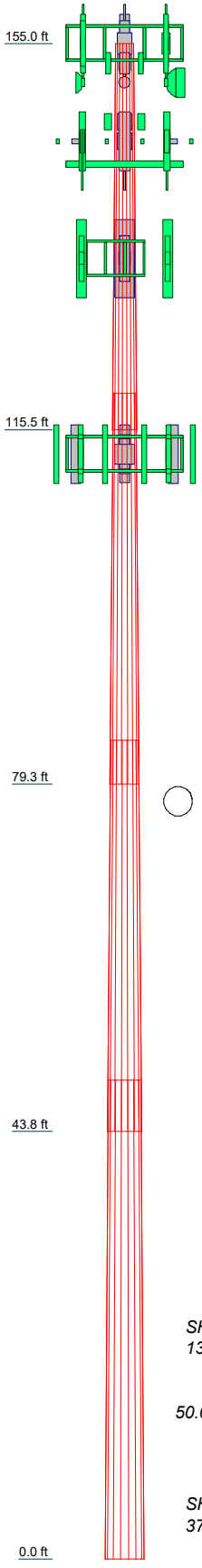
BASE LEVEL DRAWING


(RESERVED)
(1) 3/8" TO 143 FT LEVEL
(2) 3/4" TO 143 FT LEVEL
(INSTALLED-IN CONDUIT)
(1) 3/8" TO 143 FT LEVEL
(2) 3/4" TO 143 FT LEVEL
(INSTALLED)
(6) 1-1/4" TO 143 FT LEVEL
CLIMBING PEGS
W/ SAFETY CLIMB
(PROPOSED)
(1) 1-5/8" TO 133 FT LEVEL
(INSTALLED)
(1) 1-1/4" TO 133 FT LEVEL
(7) 1-5/8" TO 133 FT LEVEL
(INSTALLED)
(1) 5/8" TO 155 FT LEVEL
(INSTALLED-IN CONDUIT)
(3) 5/16" TO 155 FT LEVEL
(INSTALLED)
(2) 1-1/4" TO 113 FT LEVEL
(12) 1-5/8" TO 113 FT LEVEL
(INSTALLED)
(1) 5/8" TO 155 FT LEVEL
(3) 1-1/4" TO 155 FT LEVEL
(INSTALLED)
(5) 1/2" TO 155 FT LEVEL
Q4
Q1
Q3
Q2

APPENDIX C

ADDITIONAL CALCULATIONS

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	39.50	18	0.25	3.75	22.00	29.31	A607-60	2.7
2	40.00	18	0.31	4.50	28.11	35.51		4.3
3	40.00	18	0.38	5.25	34.06	41.46	A607-65	6.1
4	49.00	18	0.44		39.73	48.80		10.1



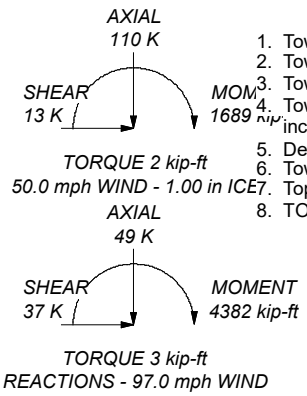
DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
LPX310R w/ Mount Pipe	155	RRUS 11	143
LPX310R w/ Mount Pipe	155	RRUS 32	143
LPX310R w/ Mount Pipe	155	RRUS 32	143
HORIZON COMPACT	155	RRUS 32	143
HORIZON COMPACT	155	RRUS 32 B2	143
HORIZON COMPACT	155	RRUS 32 B2	143
WIMAX DAP HEAD	155	RRUS 32 B2	143
WIMAX DAP HEAD	155	DC6-48-60-18-8F	143
WIMAX DAP HEAD	155	T-Arm Mount [TA 702-3]	143
APXVSPP18-C-A20 w/ Mount Pipe	155	2.375" OD x 6' Mount Pipe	143
APXVSPP18-C-A20 w/ Mount Pipe	155	2.375" OD x 6' Mount Pipe	143
APXVSPP18-C-A20 w/ Mount Pipe	155	2.375" OD x 6' Mount Pipe	143
APXVTM14-C-120 w/ Mount Pipe	155	DC6-48-60-18-8F	143
APXVTM14-C-120 w/ Mount Pipe	155	QS66512-2 w/ Mount Pipe	143
APXVTM14-C-120 w/ Mount Pipe	155	QS66512-2 w/ Mount Pipe	143
TD-RRH8x20-25	155	APXVAARR24_43-U-NA20	133
TD-RRH8x20-25	155	APXVAARR24_43-U-NA20	133
TD-RRH8x20-25	155	APXVAARR24_43-U-NA20	133
8'x2 1/2" Pipe Mount	155	AIR -32 B2A/B66AA	133
8'x2 1/2" Pipe Mount	155	AIR -32 B2A/B66AA	133
8'x2 1/2" Pipe Mount	155	AIR -32 B2A/B66AA	133
Miscellaneous [NA 510-1]	155	KRY 112 144/1	133
Platform Mount [LP 1201-1]	155	KRY 112 144/1	133
VHLP1-23	155	KRY 112 144/1	133
VHLP2.5-18	155	RADIO 4449 B12/B71	133
VHLP2-11	155	RADIO 4449 B12/B71	133
PCS 1900MHz 4x45W-65MHz	153	RADIO 4449 B12/B71	133
PCS 1900MHz 4x45W-65MHz	153	Platform Mount [LP 302-1]	133
PCS 1900MHz 4x45W-65MHz	153	ERICSSON AIR 21 B2A B4P	133
Pipe Mount [PM 601-3]	153	ERICSSON AIR 21 B2A B4P	133
Side Arm Mount [SO 104-3]	153	ERICSSON AIR 21 B2A B4P	133
800MHz 2X50W RRH W/FILTER	153	LNX-6512DS-T0M w/ Mount Pipe	113
800MHz 2X50W RRH W/FILTER	153	LNX-6512DS-T0M w/ Mount Pipe	113
800MHz 2X50W RRH W/FILTER	153	LNX-6512DS-T0M w/ Mount Pipe	113
Pipe Mount [PM 601-3]	145	(2) SBNHH-1D65B w/ Mount Pipe	113
RRUS 11	145	(2) SBNHH-1D65B w/ Mount Pipe	113
RRUS 11	145	(2) SBNHH-1D65B w/ Mount Pipe	113
RRUS 11	145	RRH2X60-AWS	113
QS66512-2 w/ Mount Pipe	143	RRH2X60-AWS	113
OPA-65R-LCUU-H6 w/ Mount Pipe	143	RRH2X60-AWS	113
OPA-65R-LCUU-H6 w/ Mount Pipe	143	RRH2x60-700	113
OPA-65R-LCUU-H6 w/ Mount Pipe	143	RRH2x60-700	113
(2) TPX-070821	143	RRH2x60-700	113
(2) TPX-070821	143	DB-T1-6Z-8AB-0Z	113
(2) TPX-070821	143	Platform Mount [LP 1201-1]	113
782 10253	143	BXA-70063/6CFx2 w/ Mount Pipe	113
782 10253	143	BXA-70063/6CFx2 w/ Mount Pipe	113
782 10253	143	BXA-70063/6CFx2 w/ Mount Pipe	113
RRUS 11	143	Side Arm Mount [SO 701-1]	60
RRUS 11	143		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi	A607-65	65 ksi	80 ksi

ALL REACTIONS ARE FACTORED



TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 97.0 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50.0 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60.0 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 92.4%

Paul J. Ford and Company
250 East Broad st., Suite 600
Columbus, OH 43215
Phone: (614) 221-6679
FAX:

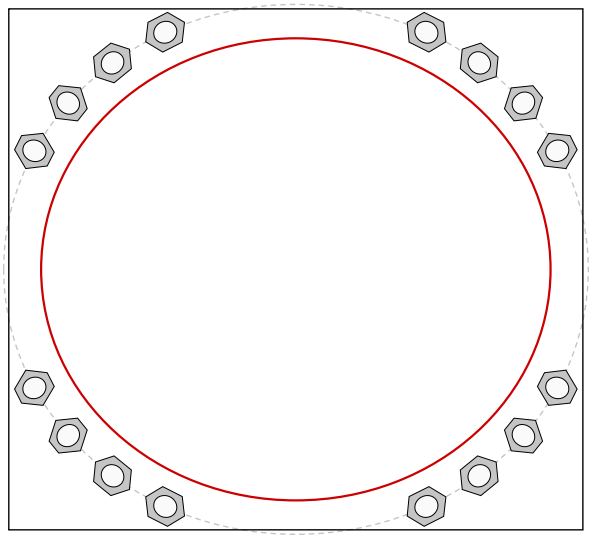
Job: 155 ft Monopole / Buckland Mall			
Project: PJF 37518-2720.001.7805 / BU 876347			
Client: Crown Castle	Drawn by: gpenumatsa		App'd:
Code: TIA-222-G	Date: 08/07/18		Scale: NTS
Path:			Dwg No. E-1

Monopole Base Plate Connection

Site Info	
BU #	876347
Site Name	Buckland Mall
Order #	

Analysis Considerations	
TIA-222 Revision	G
l_{ar} (in)	0
Eta Factor, η	0.5

Applied Loads	
Moment (kip-ft)	4382.00
Axial Force (kips)	49.00
Shear Force (kips)	37.00



Connection Properties

Anchor Rod Data

(16) 2-1/4" ø bolts (A615-75; Fy=75 ksi, Fu=100 ksi) on 56" BC

pos. (deg): 26.5, 38.8, 51.2, 63.5, 116.5, 128.8, 141.2, 153.5, 206.5, 2

Base Plate Data

55" OD x 3.25" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

Stiffener Data

N/A

Pole Data

48.8" x 0.4375" 18-sided pole (A607-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary		*(units of kips, kip-ft)*
Pu = 237.66	ϕPn = 260	**Stress Rating**
Vu = 2.31	ϕVn = n/a	**93.2%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary		
Max Stress (ksi):	33.97	
Allowable Stress (ksi):	45	
Stress Ratio:	**75.5%**	**Pass**

Pier and Pad Foundation

BU # :	876347
Site Name:	
App. Number:	

TIA-222 Revision:	G
Tower Type:	Monopole

Block Foundation?: ☐

Superstructure Analysis Reactions

Compression, P_{comp}:	49	kips
Base Shear, Vu_comp:	37	kips
Moment, M_u:	4382	ft-kips
Tower Height, **H**:	155	ft
BP Dist. Above Fdn, bp_{dist}:	3	in

Pier Properties

Pier Shape:	Circular	
Pier Diameter, **dpier**:	7.0	ft
Ext. Above Grade, **E**:	0.50	ft
Pier Rebar Size, **Sc**:	11	
Pier Rebar Quantity, **mc**:	32	
Pier Tie/Spiral Size, **St**:	5	
Pier Tie/Spiral Quantity, **mt**:	12	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties

Depth, **D**:	10.0	ft
Pad Width, **W**:	23.0	ft
Pad Thickness, **T**:	3.0	ft
Pad Rebar Size, **Sp**:	9	
Pad Rebar Quantity, **mp**:	34	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties

Rebar Grade, **Fy**:	60000	psi
Concrete Compressive Strength, **F'c**:	3000	psi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties

Total Soil Unit Weight, γ:	115	pcf
Ultimate Gross Bearing, Qult:	30.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	30	degrees
SPT Blow Count, N_{blows}:		
Base Friction, μ:		
Neglected Depth, **N**:	3.50	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	N/A	ft

<--Toggle between Gross and Net

Foundation Analysis Checks

	Capacity	Demand	Rating	Check
Lateral (Sliding) (kips)	361.20	37.00	**10.2%**	**Pass**
Bearing Pressure (ksf)	22.50	3.26	**14.5%**	**Pass**
*Overturning (kip*ft)*	8788.79	4779.75	**54.4%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	7571.00	4659.50	**61.5%**	**Pass**
Pier Compression (kip)	18370.97	100.95	**0.5%**	**Pass**
*Pad Flexure (kip*ft)*	4568.38	1801.61	**39.4%**	**Pass**
Pad Shear - 1-way (kips)	709.93	302.18	**42.6%**	**Pass**
Pad Shear - 2-way (ksi)	0.16	0.05	**28.7%**	**Pass**

Soil Rating:	**54.4%**
Structural Rating:	**61.5%**

Date: **January 23, 2019**

Charles McGuirt
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6607

Maser Consulting Connecticut
331 Newman Springs Road, Suite 203
Red Bank, NJ 07701
(732) 383-1950
CrownStructural@maserconsulting.com

Subject:	**Mount Analysis Report**	
Carrier Designation:	**AT&T Mobility Equipment Change Out**	
	Carrier Site Number:	10071100
	Carrier Site Name:	Manchester North
Crown Castle Designation:	**Crown Castle BU Number:**	876347
	Crown Castle Site Name:	Buckland Mall
	Crown Castle JDE Job Number:	546297
	Crown Castle PO Number:	1304660
	Crown Castle Order Number:	469372 Rev. 1
Engineering Firm Designation:	**Maser Consulting Connecticut Project Number:**	19922054A
Site Data:	**53 Slater Street, Manchester, CT 06040, Hartford County**	
	Latitude *41° 48' 18.00"*, Longitude *-72° 32' 1.00"*	
Structure Information:	**Tower Height & Type:**	**155 ft Monopole**
	Mount Elevation:	**143 ft**
	Mount Type:	**(3) 6' T-Arm Mounts**

Dear Mr. Charles McGuirt,

Maser Consulting Connecticut is pleased to submit this "**Mount Analysis Report**" to determine the structural integrity of AT&T Mobility's antenna mounting system with the proposed appurtenance and equipment addition on the above mentioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

The purpose of the analysis is to determine acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

6' T-Arm Mount (typical) **Sufficient**

This analysis has been performed in accordance with the 2018 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Vincent DiGirolamo

Respectfully submitted by:

Petros E. Tsoukalas, P.E.
Geographic Discipline Leader

TABLE OF CONTENTS

1) INTRODUCTION

This mount is a modified 6' T-Arm Mount mapped by Tower Engineering Professionals. This mount is installed at the 143 ft elevation, on 3 sectors, of the 155 ft Monopole**.**

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	125 mph Ultimate 3-sec Gust
Exposure Category:	C
Mean Base Elevation (AMSL):	195.5 ft
Topographic Factor (K_{zt}):	1.0
Ice Thickness:	2.0 in
Wind Speed with Ice:	50 mph
Live Loading Wind Speed:	30 mph
Man Live Load at Mid/End-Points:	250 lb
Man Live Load at Mount Pipes:	500 lb

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
143.0	145.0	3	CCI	OPA-65R-LCUU-H6	Modified T-Arm
		3	Kathrein	80010965	
		3	Quintel	QS66512-2	
		6	CCI	TPX-070821	
		3	Ericsson	RRUS 32	
		3	Ericsson	RRUS 4449 B5/12	
		3	Ericsson	RRUS 8843 B2/B66A	
		3	Ericsson	RRUS E2 B29	
		3	Kathrein	782 10253	
		3	Raycap	DC6-48-60-18-8F	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
Mount Mapping	Tower Engineering Professionals Job Number: 70024-50822, dated 06/21/16	-	Maser Consulting Connecticut
Mount Analysis	Maser Consulting Project Number: 17946001A dated 10/11/17	-	Maser Consulting Connecticut

3.1) Analysis Method

RISA-3D (version 17), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

Proprietary Excel sheets were used to calculate member loading for various load cases. Selected output from the analysis is included in Appendix B.

This analysis was performed in accordance with Crown Castle's ENG-SOW-10208 *Tower Mount Analysis* (Revision B). In addition, this analysis is in accordance with AT&T's Mount Technical Directive (Revision 11).

3.2) Assumptions

1) The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
2) The configuration of antennas, mounts, and other appurtenances are as specified in Table 1 and the referenced drawings.
3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
4) The connection from the tower to the mount is in good condition and has been analyzed and found sufficient assuming it will achieve its theoretical strength.
5) The connection from the mast pipe to the mount standoff is assumed adequately tightened and in good condition.
6) Due to site specific analysis parameters, it is assumed that wind forces will control over seismic forces and as such, seismic forces have not been considered in this analysis.
7) Equipment installations are only conducted when the wind speed is less than 30 mph.
8) Proposed antennas are assumed to have associated equipment installed on the same mount pipe unless explicitly stated otherwise in the 'Recommendations' section of this report.
9) Proposed loading is assumed to be installed in the location shown in Appendix A of this report. Any changes made to the proposed loading location will render this report invalid.
10) All equipment model numbers, quantities, and centerline elevations are as provided in the application (Crown Castle Order #: 469372 Rev. 1, originally submitted 11/28/18).
11) If applicable, steel grades have been assumed as follows:

HSS (Rectangular)	ASTM 500 (GR B-46)
Pipe	ASTM A53 (GR 35)
Bolts	ASTM A325

Discrepancies between in-field conditions and the assumptions listed above may render this analysis invalid unless explicitly approved by Maser Consulting, P.A. Crown Castle should be notified to determine the effect on the structural integrity of the antenna mounting system.

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (T-Arm)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1,2,4	Face Horizontal	M24	143.0	54.1	Pass
1,2,4	Stand-off Horizontal	M39		51.5	Pass
1,2,4	Mount Pipe	M16A		59.0	Pass
1,2,4	Tie Back	M58		43.1	Pass
1,3,4	Mount-to-Tower, Bolts	-		70.7	Pass

Structure Rating (max from all components) =	70.7%

Notes:
1) See additional documentation in "Appendix B – Software Input Calculations" for calculations supporting the % capacity consumed
2) See additional documentation in "Appendix C – Analysis Output" for calculations supporting the % capacity consumed
3) See additional documentation in "Appendix D – Additional Calculations" for calculations supporting the % capacity consumed
4) All sectors are typical

4.1) Recommendations

The mounts are **Sufficient** for the proposed loads and do not require modifications.

In order for the results of this analysis to be considered valid, the changes listed below shall be completed:

- 8'-0" long 2.0 STD pipes shall be installed as tie backs between positions 1 and 2 of one sector and positions 2 and 3 of the adjacent sector using Site Pro 1 Tie back Assembly (P/N PUCK).

5) DISCLAIMER OF WARRANTIES

The engineering services rendered by Maser Consulting, P.A. in connection with this structural analysis are limited to a computer analysis of the mounting frame structure and theoretical capacity of its main structural members. No allowance has been made for any damaged, bent, missing, loose, or rusted members or connections.

Maser Consulting, P.A. will accept no liability which may arise due to any existing deficiency in design, material, fabrication, erection, construction, or lack of maintenance. Maser Consulting, P.A. has not performed a site visit at the aforementioned facility to verify member sizes or equipment loading. Contractor should inspect the condition of the existing structure, mounting frames and connections and notify Maser Consulting, P.A. of any discrepancies or deficiencies before proceeding with installation.

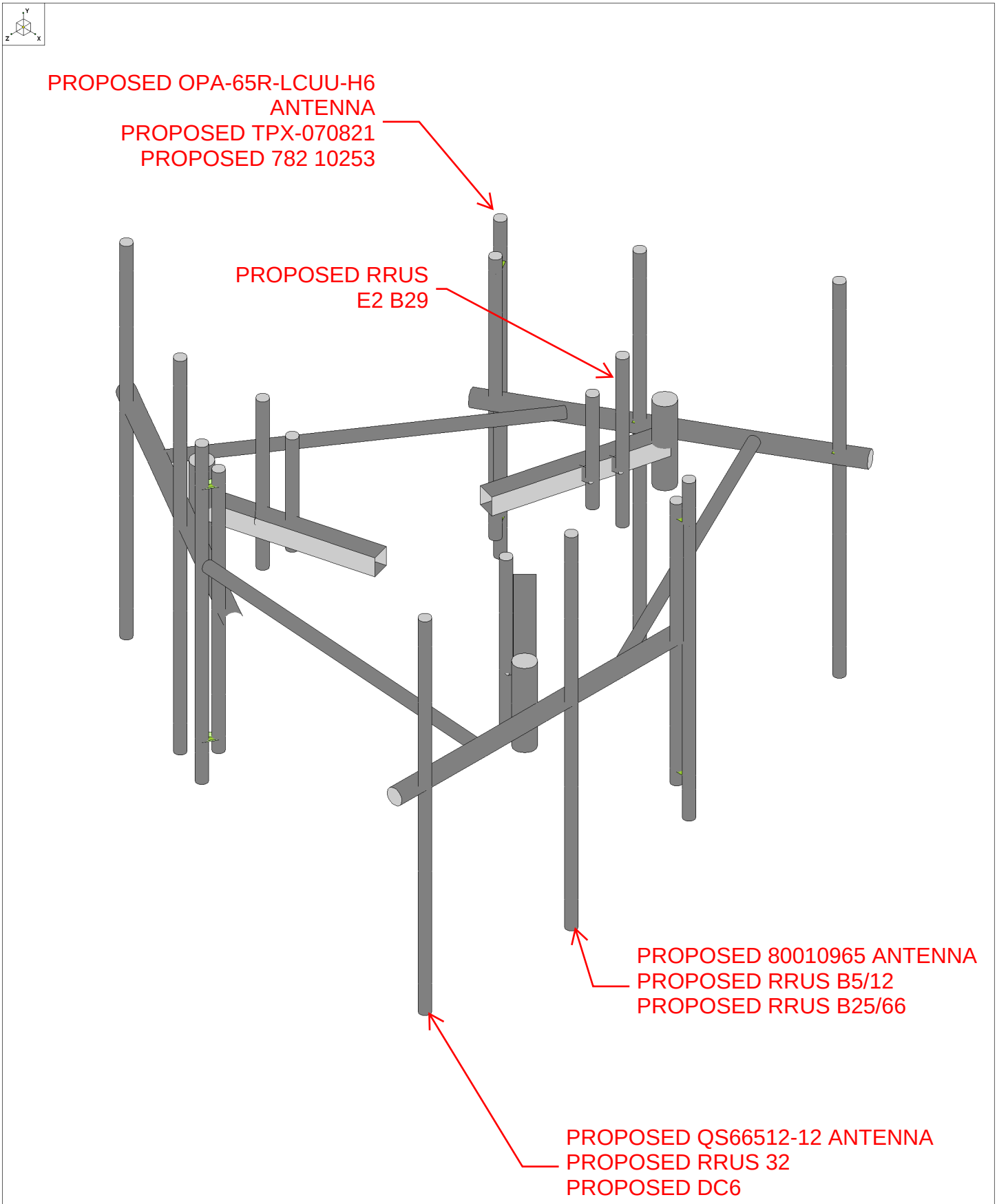
The attached sketch is a schematic representation of the analyzed mounting frames. The contractor shall be responsible for field verifying the existing conditions, proper fit, and clearances in the field. Any mention of structural modifications are reasonable estimates and should not be used as a construction document. Construction documents depicting the required modification are obtainable from Maser Consulting, P.A., but are beyond the scope of this report.

Miscellaneous items such as antenna mounts, etc., have not been designed or detailed as part of our work. We recommend that material of suitable size and strength be purchased from a reputable manufacturer.

Maser Consulting, P.A. makes no warranties, expressed and/or implied, in connection with this report and disclaims any liability arising from material, fabrication, and erection of the mounting frames. Maser Consulting, P.A. will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report.

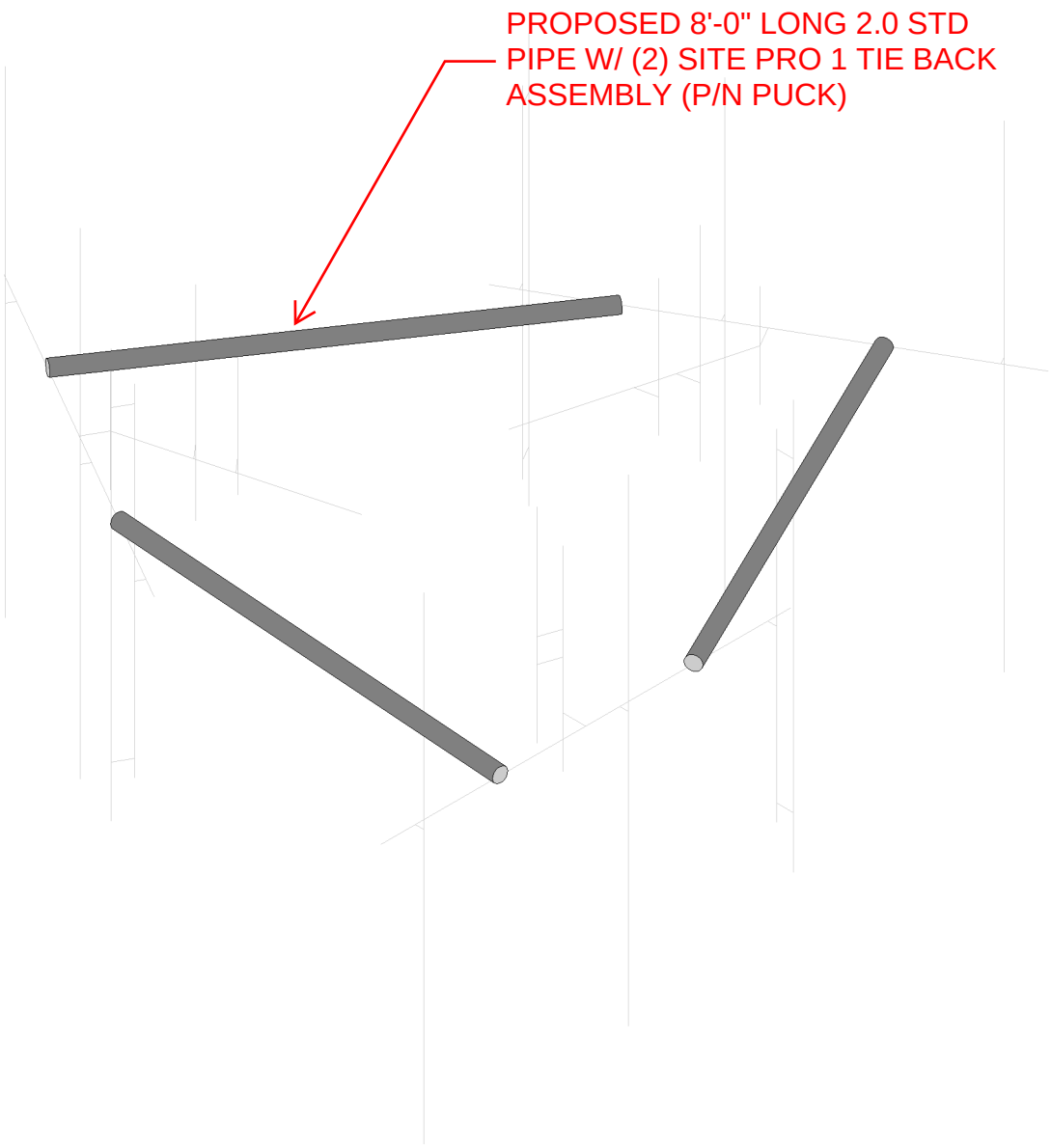
APPENDIX A

WIRE FRAME AND RENDERED MODELS



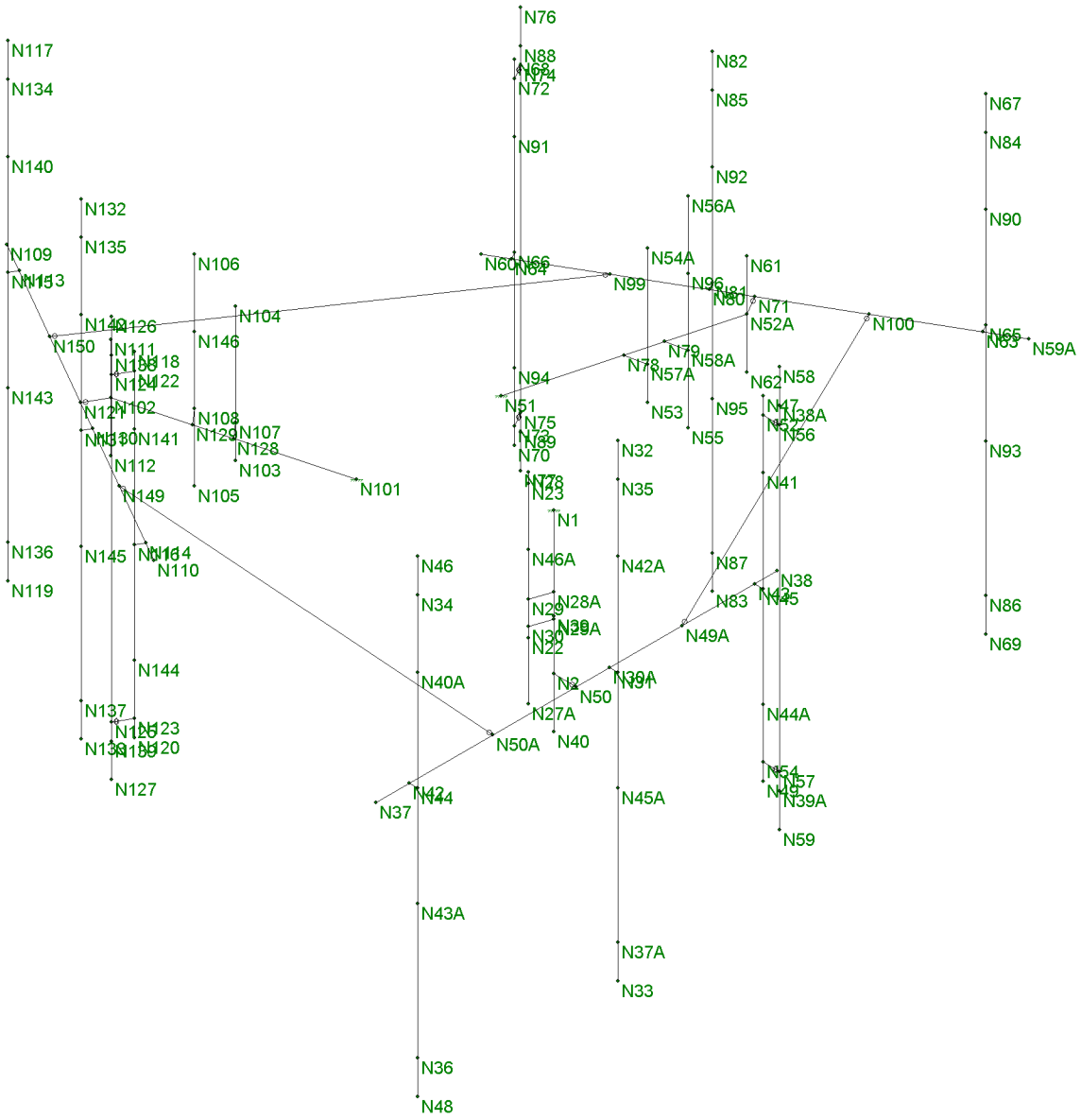
Envelope Only Solution

Maser Consulting P.A.		SK - 1
VRD	Mount Analysis	Jan 17, 2019 at 4:39 PM
19922054A	Rendered Model	Antenna Mount.r3d



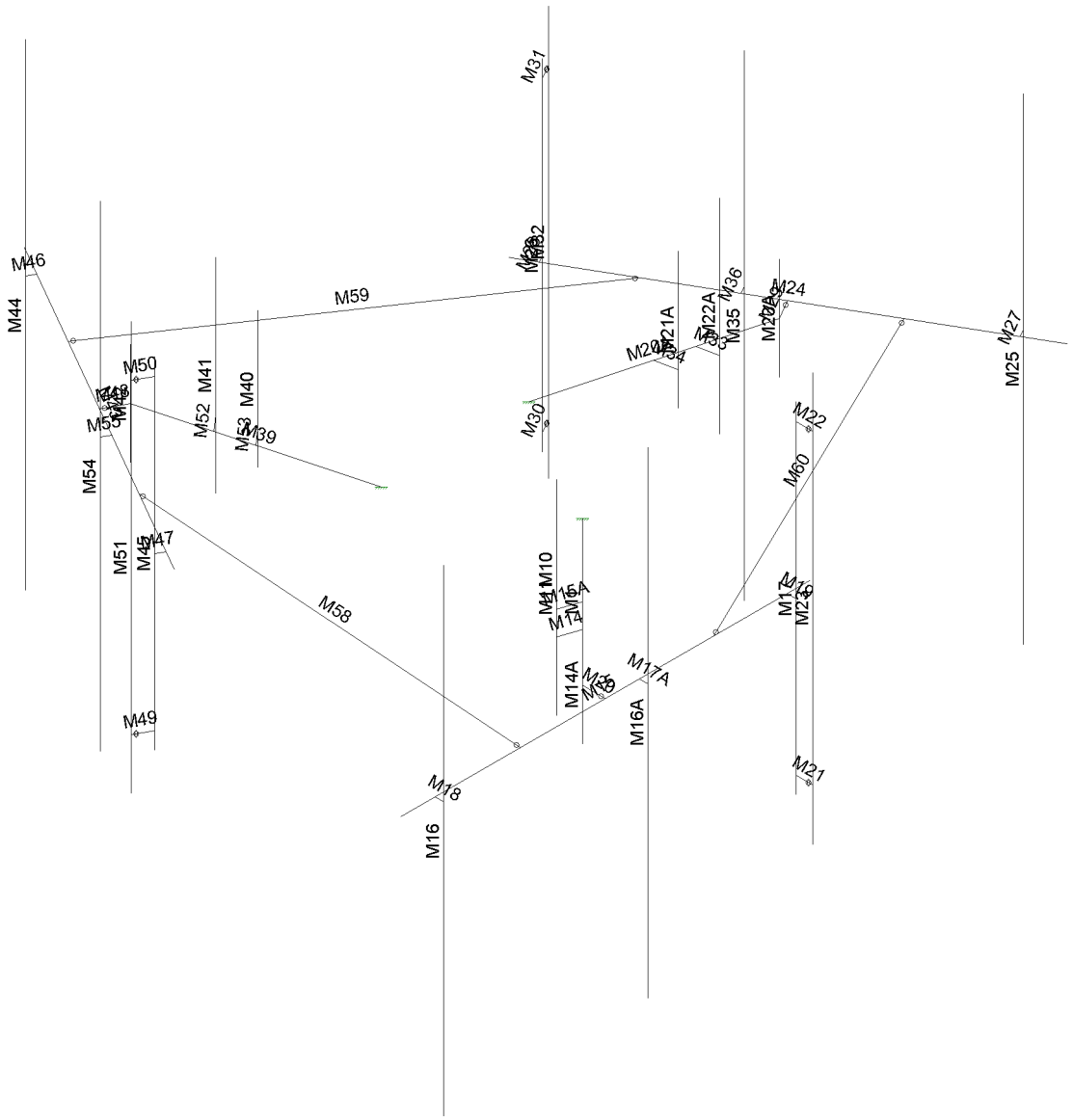
Envelope Only Solution

Maser Consulting P.A.		SK - 2
VRD	Mount Analysis	Jan 17, 2019 at 4:40 PM
19922054A	Modifications	Antenna Mount.r3d



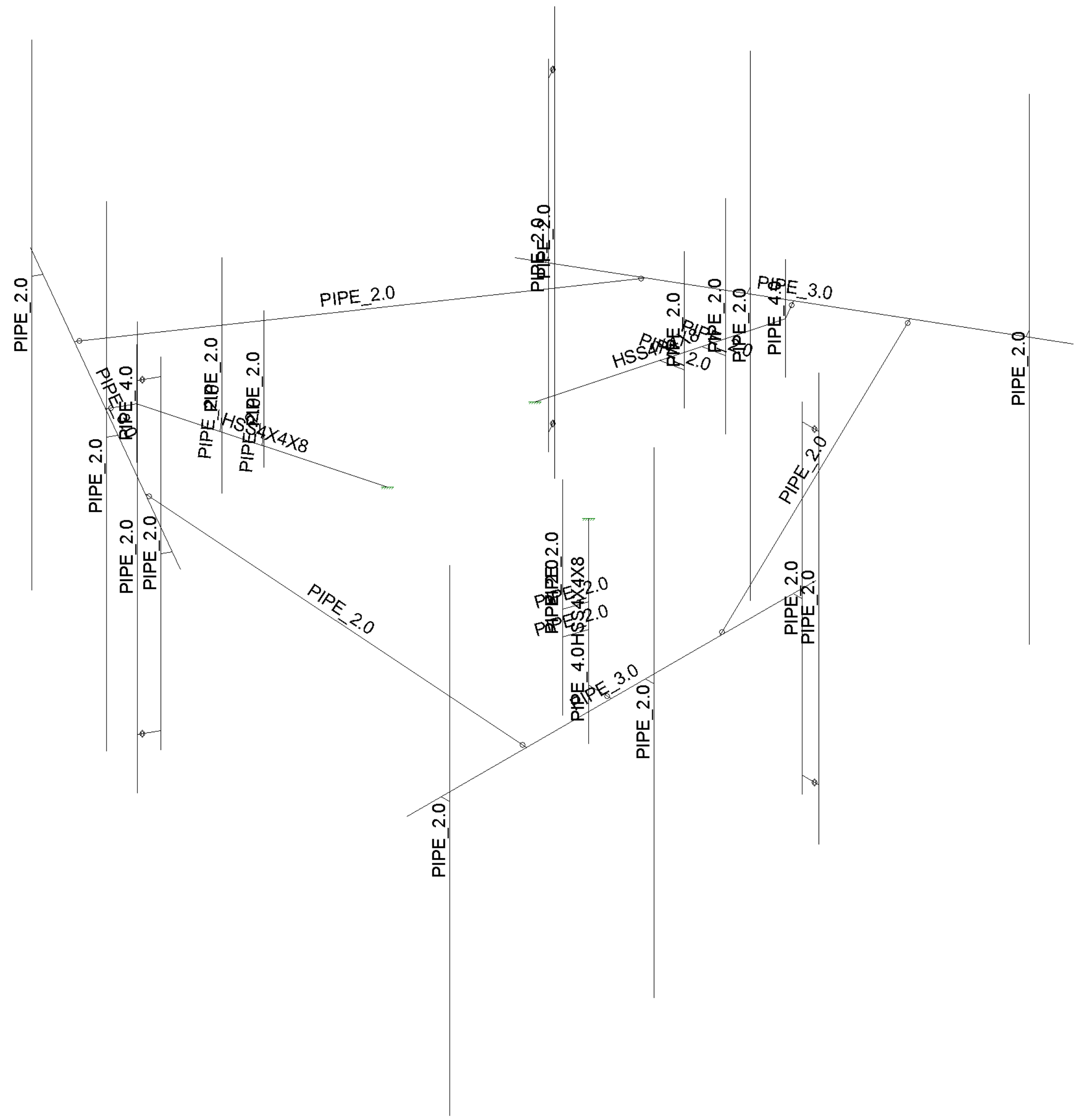
Envelope Only Solution

Maser Consulting P.A.		SK - 3
VRD	Mount Analysis	Jan 17, 2019 at 4:40 PM
19922054A	Joint Labels	Antenna Mount.r3d



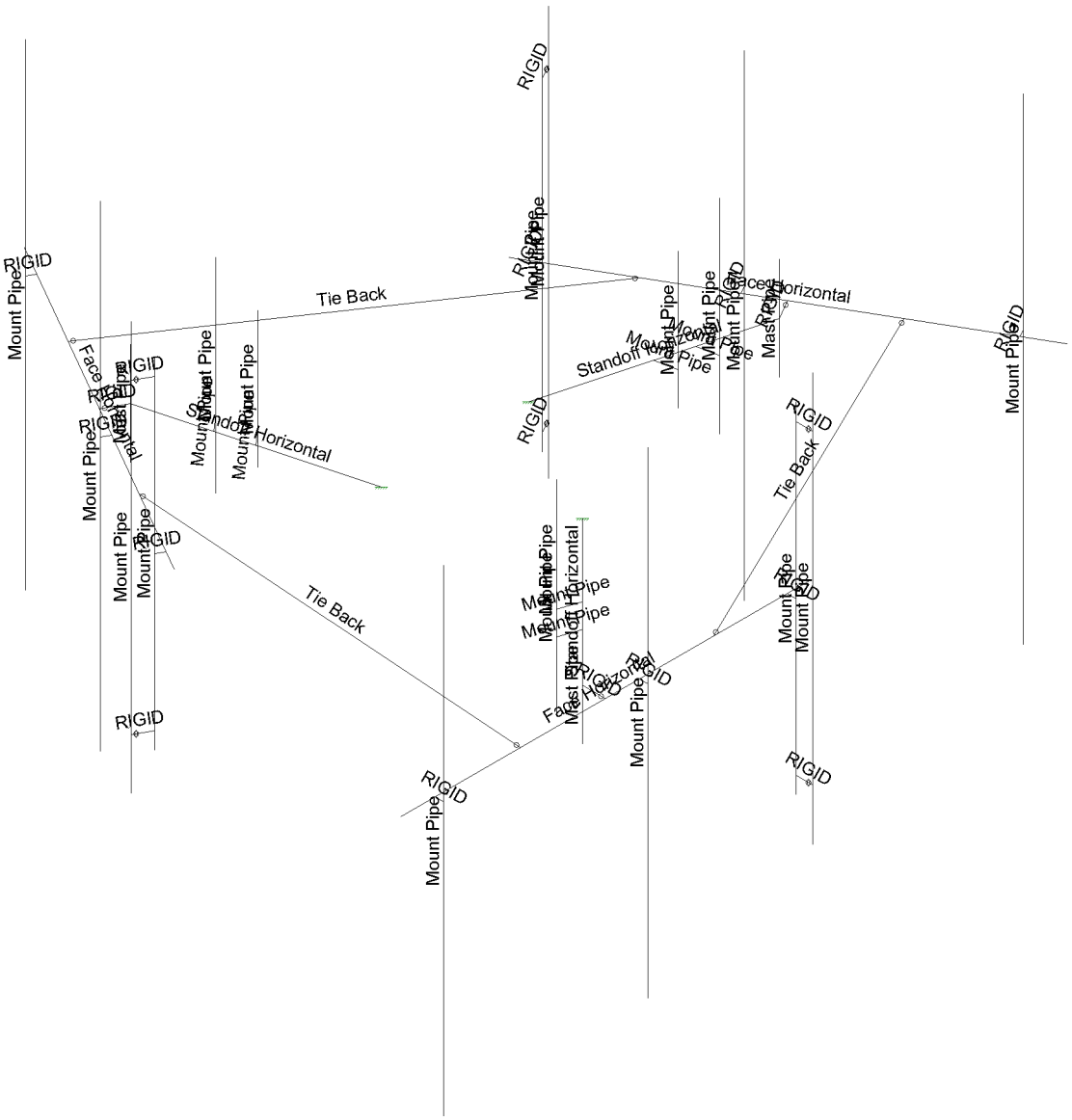
Envelope Only Solution

Maser Consulting P.A.		SK - 4
VRD	Mount Analysis	Jan 17, 2019 at 4:40 PM
19922054A	Member Labels	Antenna Mount.r3d



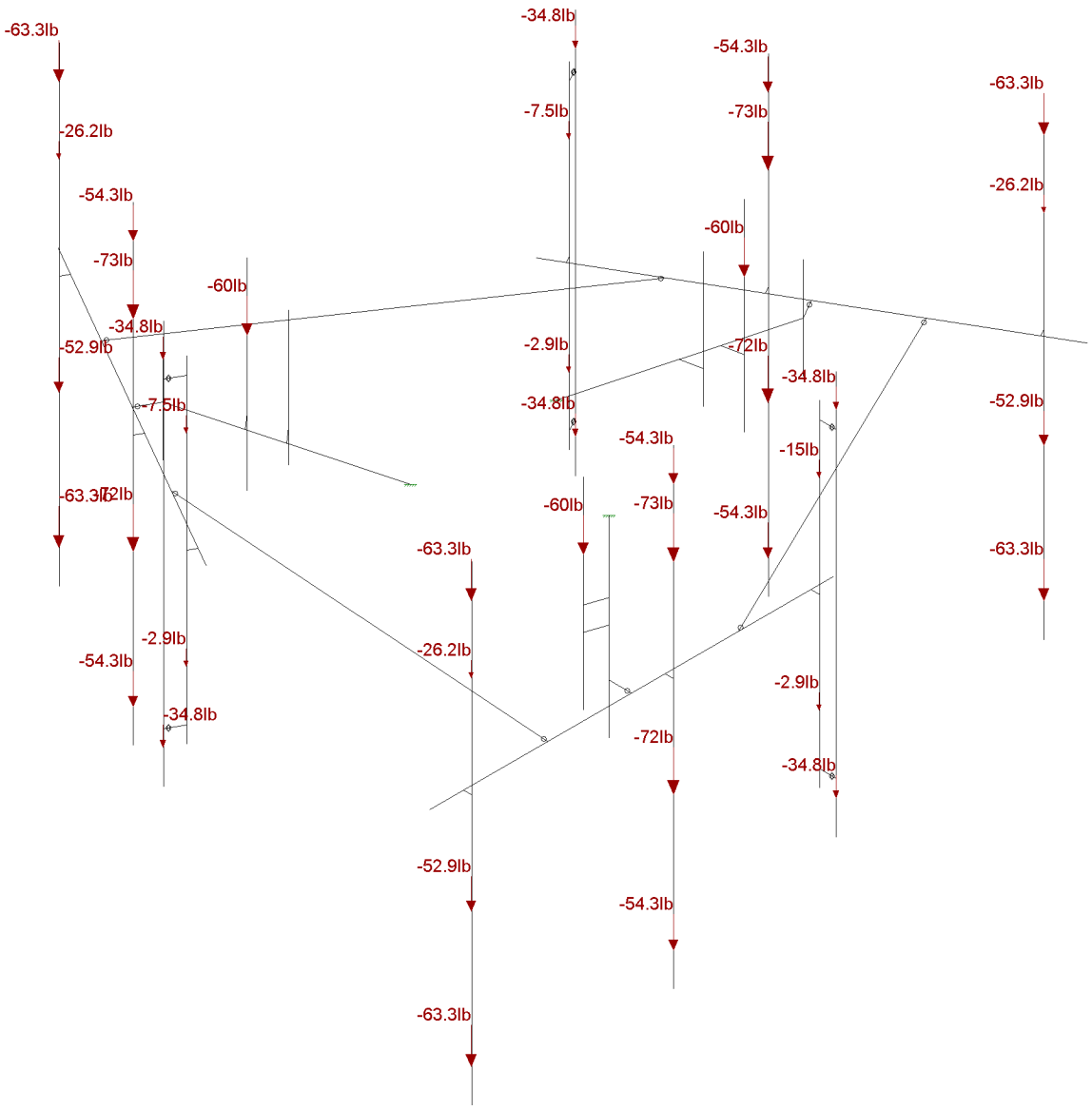
Envelope Only Solution

Maser Consulting P.A.		SK - 5
VRD	Mount Analysis	Jan 17, 2019 at 4:40 PM
19922054A	Member Shapes	Antenna Mount.r3d



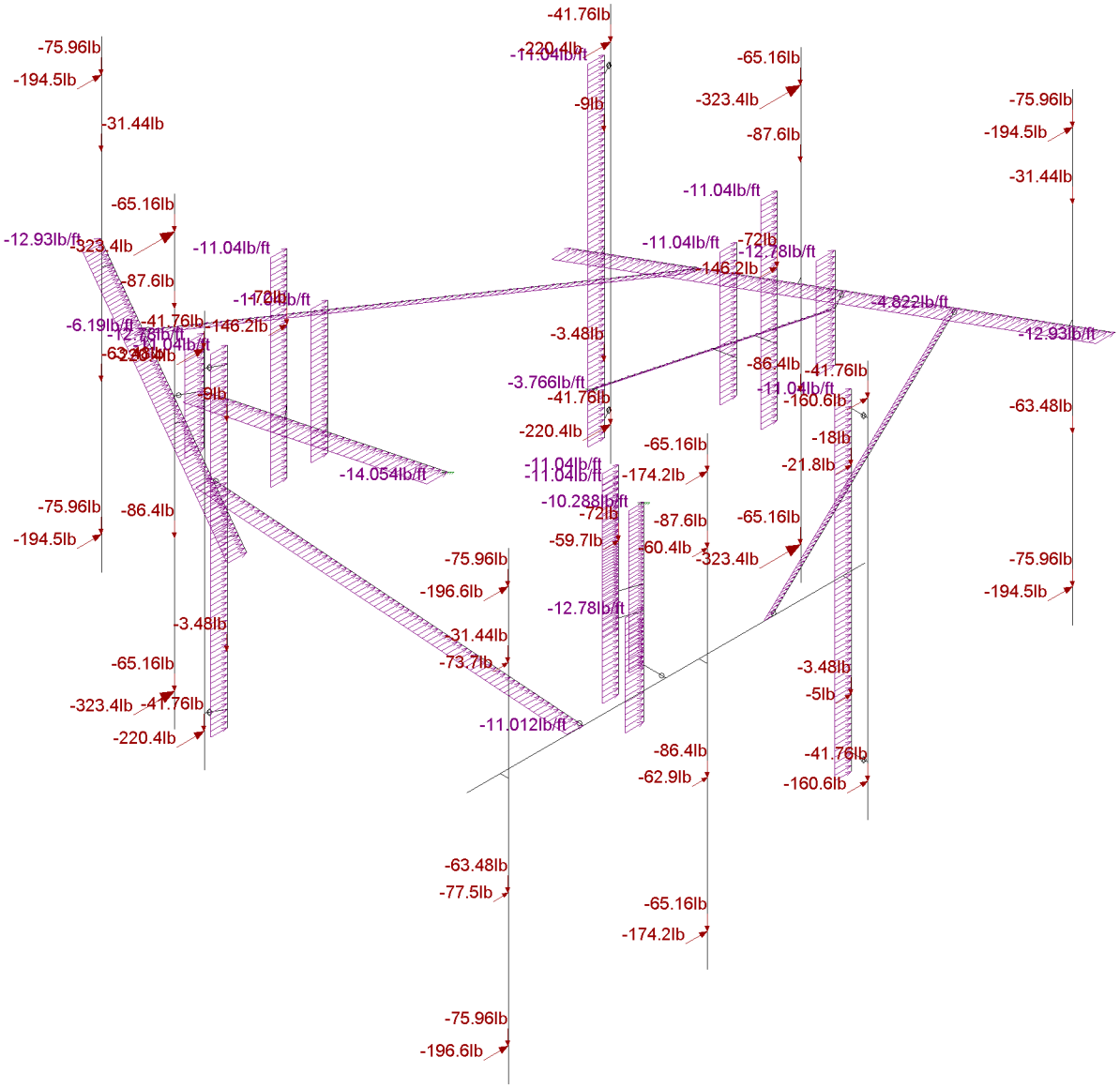
Envelope Only Solution

Maser Consulting P.A.		SK - 6
VRD	Mount Analysis	Jan 17, 2019 at 4:40 PM
19922054A	Section Sets	Antenna Mount.r3d



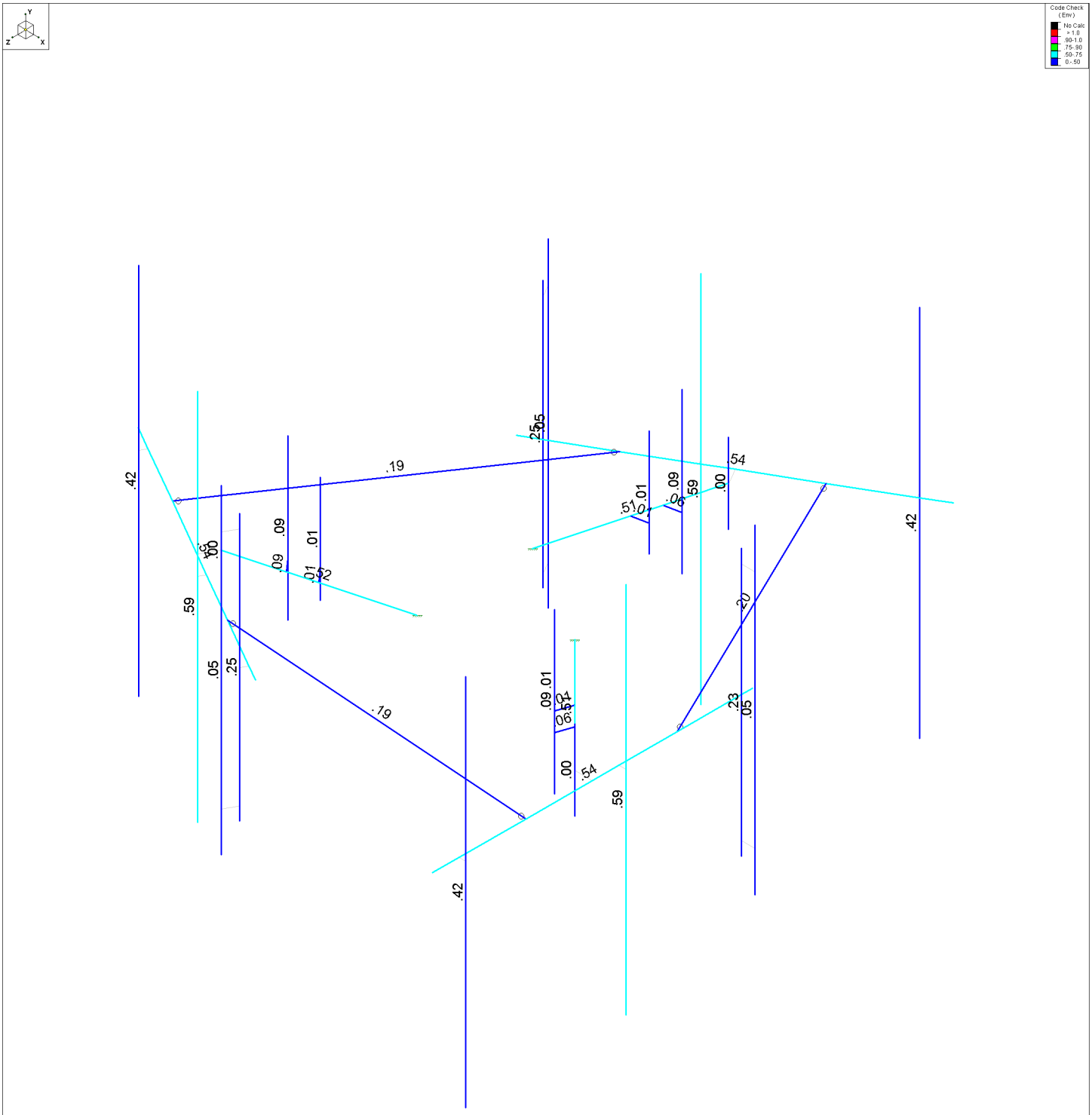
Loads: BLC 1, Dead
Envelope Only Solution

Maser Consulting P.A.		SK - 7
VRD	Mount Analysis	Jan 17, 2019 at 4:40 PM
19922054A	Dead Load	Antenna Mount.r3d



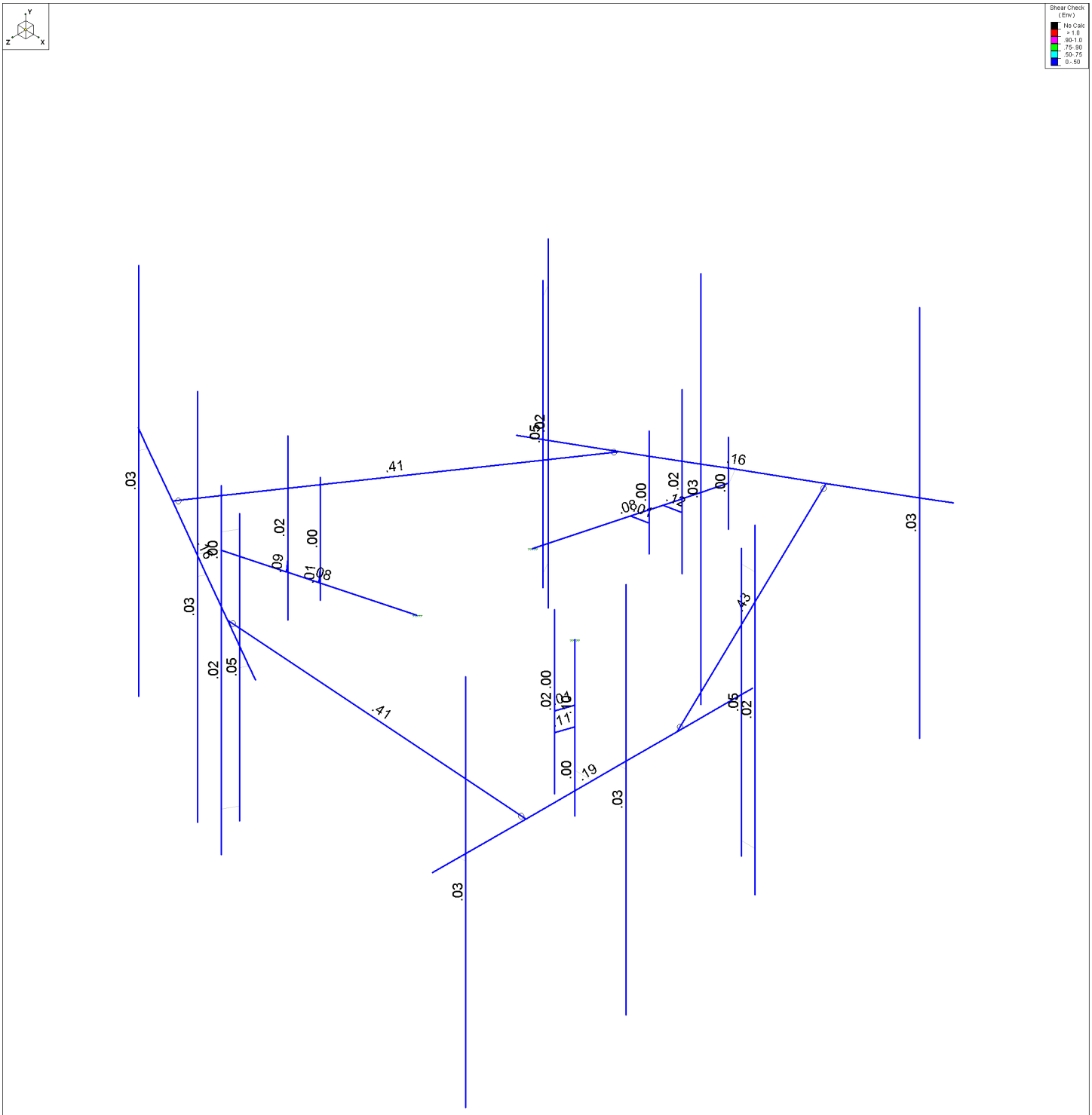
Loads: LC 11, 1.2D+1.0W10
Envelope Only Solution

Maser Consulting P.A.		SK - 8
VRD	Mount Analysis	Jan 17, 2019 at 4:41 PM
19922054A	Worst Case Loading	Antenna Mount.r3d



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Maser Consulting P.A.		SK - 9
VRD	Mount Analysis	Jan 17, 2019 at 4:41 PM
19922054A	Bending Check	Antenna Mount.r3d



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

Maser Consulting P.A.		SK - 10
VRD	Mount Analysis	Jan 17, 2019 at 4:41 PM
19922054A	Shear Check	Antenna Mount.r3d

APPENDIX B

SOFTWARE INPUT CALCULATIONS

Client:	Crown	Computed By:	VD
Site Name:	876347	Date:	1/17/2019
Project No.	19922054A	Verified By:	PET
Title:	Antenna Mount Analysis	Page:	1

Version 2.2

LOADING SUMMARY

Quantity	Manufacturer	Antenna/ Appurtenance	Status	Sector
3	CCI	OPA-65R-LCUU-H6	Proposed	Alpha, Beta, & Gamma
3	KATHREIN	80010965	Proposed	Alpha, Beta, & Gamma
3	QUINTEL	QS66512-2	Proposed	Alpha, Beta, & Gamma
6	CCI	TPX-070821	Proposed	Alpha, Beta, & Gamma
3	ERICSSON	RRUS 32	Proposed	Alpha, Beta, & Gamma
3	ERICSSON	RRUS B5/B12	Proposed	Alpha, Beta, & Gamma
3	ERICSSON	RRUS 8843 B2/B66A	Proposed	Alpha, Beta, & Gamma
3	ERICSSON	RRUS E2 B29	Proposed	Alpha, Beta, & Gamma
3	KATHREIN	782 10253	Proposed	Alpha, Beta, & Gamma
3	RAYCAP	DC6-48-60-18-8F	Existing/Proposed	Alpha, Beta, & Gamma

Client:	Crown	Computed By:	VD
Site Name:	876347	Date:	1/17/2019
Project No.	19922054A	Verified By:	PET
Title:	Antenna Mount Analysis	Page:	2

I. DESIGN INPUTS

Calculations for gravity and lateral loading on equipment and support mounts are determined as per the ANSI/TIA-222-H Code

				Reference	Equation
Wind Load Inputs Parameters					
Antenna Centerline	z	145	ft		
Ultimate Wind Speed	V_u	125	mph		
Normal Wind Speed with Ice (3 sec. Gust):	V_i	50	mph	Figure B9, p. 238	
Maintenace Wind Speed:	V_s	30	mph	Section 2.8.3	
Design Ice Thickness	t_i	2.0	in	Figure B9, p. 238	
Surface Roughness:		C		Section 2.6.5.1.1	
Exposure Category:		C		Section 2.6.5.1.2	
Risk Category:		II		Table 2-1	
Rooftop Wind Speed-Up Factor	K_s	1.0		Section 2.6.7	
Ground Elevation:		195.5	ft		
Ground Elevation Factor:	K_e	0.99295		Table 2-6	
Gust Effect Factor:	G_h	1.00		Section 2.6.9	
Wind Directionality Factor:	K_d	0.95		Table 2-2	
Topographic Category:		1		Section 2.6.6.2	
Shielding Factor	K_a	0.9		Section 16.6	
Wind Load Coefficients					
Importance Factors:					
Iced:	I_{ice}	1		Table 2-3	
Exposure Category Coefficients:					
3-s Gust-Speed Power Law Exponent:	α	9.5		Table 2-4	
Nominal Height of the Atmospheric Boundary Layer:	Z_g	900	ft	Table 2-4	
Min. Value for k_z:	Kz_{min}	1.03		Table 2-4	
Terrain Constant:	K_e	1.10		Table 2-4	
Velocity Pressure Exposure Coefficient:	K_z	1.369		Section 2.6.5.2	$=2.01\cdot(z/z_g)^{2/\alpha'}$
Topographic Category Coefficients:					
Topographic Constant:	K_t	N/A		Table 2-5	
Height Attenuation Factor:	f	N/A		Table 2-5	
Height Reduction Factor:	K_h	N/A		Section 2.6.6.2.1	$=e^{(f\cdot z/H)}$
Topographic Factor:	K_{zt}	1.00		Section 2.6.6.2	$=[1+(K_c\cdot K_t/K_h)]^2$
Ice Accumulation:					
Ice Velocity Pressure Exposure Coefficient:	K_{iz}	1.16			$=(z/33)^{0.10}$
Factored Ice Thickness:	t_{iz}	2.32	in	Section 2.6.10	$=t_i\cdot I\cdot K_{iz}\cdot(K_{zt})^{0.35}$
Ice Density:	ρ_i	56.00	pcf		
Design Wind Pressures:					
Velocity Pressure:	q_z	46.48	psf	Section 2.6.11.6	$=0.00256\cdot K_z\cdot K_{zt\cdot Ks\cdot Ke}\cdot K_d\cdot K_a\cdot V^2$
Velocity Pressure (With Ice):	q_{zi}	7.44	psf	Section 2.6.11.6	$=0.00256\cdot K_z\cdot K_{zt\cdot Ks\cdot Ke}\cdot K_d\cdot K_a\cdot V_i^2$
Velocity Pressure (Maintenance):	q_{zm}	2.68	psf	Section 2.6.11.6	$=0.00256\cdot K_z\cdot K_{zt\cdot Ks\cdot Ke}\cdot K_d\cdot K_a\cdot V_m^2$

II. CALCULATIONS

- ***Wind Load on Appurtenances***

Dimensions and Force Coefficients

Antenna/ Appurtenance	Non-Iced Condition								Iced Condition							
	Mounting Pipe			Equipment					Mounting Pipe			Equipment				
	Length (in)	Diameter (in)	Force Coefficient C_a	Height (in)	Width (in)	Depth (in)	Force Coefficient $C_{a\ Front}$	Force Coefficient $C_{a\ Side}$	Length (in)	Diameter (in)	Force Coefficient C_a	Height (in)	Width (in)	Depth (in)	Force Coefficient $C_{a\ Front}$	Force Coefficient $C_{a\ Side}$
OPA-65R-LCUU-H6	72.0	2.375	1.200	72.30	14.40	7.30	1.31	1.50	76.6	7.0	0.887	76.94	19.04	11.94	1.27	1.38
80010965	84.0	2.375	1.200	78.70	20.00	6.90	1.26	1.55	88.6	7.0	0.925	83.34	24.64	11.54	1.24	1.41
QS66512-2	84.0	2.375	1.200	72.00	12.00	9.60	1.36	1.42	88.6	7.0	0.925	76.64	16.64	14.24	1.29	1.33
TPX-070821	0.0	0.000	0.000	5.83	9.65	2.05	1.20	1.22	0.0	0.0	0.000	10.47	14.29	6.69	1.20	1.20
RRUS 32	0.0	0.000	0.000	27.20	12.00	7.00	1.20	1.26	0.0	0.0	0.000	31.84	16.64	11.64	1.20	1.21
RRUS B5/B12	0.0	0.000	0.000	14.96	13.19	10.43	1.20	1.20	0.0	0.0	0.000	19.60	17.83	15.07	1.20	1.20
RRUS 8843 B2/B66A	0.0	0.000	0.000	14.90	13.20	10.90	1.20	1.20	0.0	0.0	0.000	19.54	17.84	15.54	1.20	1.20
RRUS E2 B29	0.0	0.000	0.000	20.40	18.50	7.50	1.20	1.21	0.0	0.0	0.000	25.04	23.14	12.14	1.20	1.20
782 10253	0.0	0.000	0.000	4.30	3.00	1.70	1.20	1.20	0.0	0.0	0.000	8.94	7.64	6.34	1.20	1.20
DC6-48-60-18-8F	0.0	0.000	0.000	31.40	10.20	10.20	0.71	0.71	0.0	0.0	0.000	36.04	14.84	14.84	0.70	0.70

Antenna/ Appurtenance	# of Brackets	Non-Iced Condition			Iced Condition			Maintenance Condition		
		Wind Force (lbs.)		Gravity (lbs.)	Wind Force (lbs.)		Gravity (lbs.)	Wind Force (lbs.)		
		F_N	F_T		F_N	F_T		F_N	F_T	
OPA-65R-LCUU-H6	2	220.4	160.6	**34.8**	48.0	44.9	**167.7**	12.7	9.3	
80010965	2	323.4	174.2	**54.3**	66.8	49.8	**231.0**	18.6	10.0	
QS66512-2	2	194.5	196.6	**63.3**	45.2	52.3	**160.0**	11.2	11.3	
TPX-070821	1	21.8	0.0	**7.5**	9.3	0.0	**30.1**	1.3	0.0	(Shielded by OPA-65R-LCUU-H6 Antenna)
RRUS 32	1	0.0	77.5	**52.9**	0.0	23.2	**121.9**	0.0	4.5	(Shielded by QS66512-2 Antenna)
RRUS B5/B12	1	0.0	60.4	**73.0**	0.0	18.3	**88.5**	0.0	3.5	(Shielded by 80010965 Antenna)
RRUS 8843 B2/B66A	1	0.0	62.9	**72.0**	0.0	18.8	**89.7**	0.0	3.6	(Shielded by 80010965 Antenna)
RRUS E2 B29	1	146.2	59.7	**60.0**	35.9	18.8	**131.7**	8.4	3.4	
782 10253	1	5.0	0.0	**2.9**	4.2	0.0	**12.2**	0.3	0.0	(Shielded by OPA-65R-LCUU-H6 Antenna)
DC6-48-60-18-8F	1	0.0	73.7	**26.2**	0.0	19.3	**106.5**	0.0	4.2	(Shielded by QS66512-2 Antenna)

**** ALL CALCULATED LOADS ARE PER MOUNTING BRACKET. TO GET THE TOTAL EQUIPMENT LOAD, MULTIPLY THE INDIVIDUAL LOADS BY THE NUMBER OF BRACKETS***

- ***Wind Load on Framing Members***

Member Category	Member Shape	Length (in)	Member Surface	Non-Iced Condition			Iced Condition						Maintenance Condition
				Exposed Wind Height (in)	Force Coefficient C_a	Wind Load (plf)	Exposed Wind Height (in)	Depth (in)	Length (in)	Force Coefficient C_a	Wind Load (plf)	Ice Weight (plf)	Wind Load (plf)
Pipe	Pipe 2.0	84	Round	2.38	1.20	11.04	7.01	7.01	88.64	1.20	5.22	13.30	0.64
Pipe	Pipe 3.0	72	Round	3.50	1.10	14.93	8.14	8.14	76.64	1.10	5.55	16.49	0.86
Pipe	Pipe 4.0	18	Round	4.50	0.73	12.78	9.14	9.14	22.64	0.73	4.15	19.32	0.74
Square HSS	HSS 4x4x1/2	36	HSS	4.00	0.94	14.55	8.64	8.64	40.64	0.94	5.03	22.60	0.84

Client:	Crown	Computed By:	VD
Site Name:	876347	Date:	1/17/2019
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BASIC EQUATIONS

ANSI/TIA-222-H Reference

Force Coefficient: (Square) — Table 2-9

$$C_{f\_square}(h,w) := \begin{cases} 1.2 & \text{if } \frac{h}{w} \le 2.5 \\ \left[1.2 + \frac{0.2}{4.5}\cdot\left(\frac{h}{w} - 2.5\right)\right] & \text{if } \frac{h}{w} > 2.5 \wedge \frac{h}{w} \le 7 \\ \left[1.4 + \frac{0.6}{18}\cdot\left(\frac{h}{w} - 7\right)\right] & \text{if } \frac{h}{w} > 7 \wedge \frac{h}{w} \le 25 \\ 2.0 & \text{otherwise} \end{cases}$$

Force Coefficient: (Round) — Table 2-9

$$C_{f\_round}(h,w) := \begin{cases} 0.7 & \text{if } \frac{h}{w} \le 2.5 \\ \left[0.7 + \frac{0.1}{4.5}\cdot\left(\frac{h}{w} - 2.5\right)\right] & \text{if } \frac{h}{w} > 2.5 \wedge \frac{h}{w} \le 7 \\ \left[0.8 + \frac{0.4}{18}\cdot\left(\frac{h}{w} - 7\right)\right] & \text{if } \frac{h}{w} > 7 \wedge \frac{h}{w} \le 25 \\ 1.2 & \text{otherwise} \end{cases}$$

Terrain Exposure Constants: — Table 2-5

$$\alpha := \begin{cases} 7.0 & \text{if Exp} = \text{"B"} \\ 9.5 & \text{if Exp} = \text{"C"} \\ 11.5 & \text{if Exp} = \text{"D"} \end{cases} \quad Z_g := \begin{cases} 1200\text{ft} & \text{if Exp} = \text{"B"} \\ 900\text{ft} & \text{if Exp} = \text{"C"} \\ 700\text{ft} & \text{if Exp} = \text{"D"} \end{cases} \quad K_{zmin} := \begin{cases} 0.70 & \text{if Exp} = \text{"B"} \\ 0.85 & \text{if Exp} = \text{"C"} \\ 1.03 & \text{if Exp} = \text{"D"} \end{cases}$$

Client:	Crown	Computed By:	VD
Site Name:	876347	Date:	1/17/2019
Project No.	19922054A	Verified By:	PET
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BASIC EQUATIONS

ANSI/TIA-222-H Reference

Velocity Pressure Coefficient:

$$Kz(z) := \left| \begin{array}{l} K_z \leftarrow \max\left[2.01 \cdot \left(\frac{z}{Z_g} \right)^{\frac{2}{\alpha}}, K_{zmin} \right] \\ K_z \leftarrow \min\left(K_z, 2.01 \right) \end{array} \right.$$

Section 2.6.5.6

$$K_z := Kz(z)$$

$$Kzt(z) := K_{zt} \leftarrow \left| \begin{array}{l} 1.0 \quad \text{if Topo = "1"} \\ \text{otherwise} \\ \quad \left| \begin{array}{l} K_e \leftarrow \left| \begin{array}{l} 0.90 \quad \text{if Exp = "B"} \\ 1.00 \quad \text{if Exp = "C"} \\ 1.10 \quad \text{if Exp = "D"} \end{array} \right. \\ K_t \leftarrow \left| \begin{array}{l} 0.43 \quad \text{if Topo = "2"} \\ 0.53 \quad \text{if Topo = "3"} \\ 0.72 \quad \text{if Topo = "4"} \end{array} \right. \\ f \leftarrow \left| \begin{array}{l} 1.25 \quad \text{if Topo = "2"} \\ 2.00 \quad \text{if Topo = "3"} \\ 1.50 \quad \text{if Topo = "4"} \end{array} \right. \\ K_h \leftarrow e^{\left(\frac{f \cdot z}{CH} \right)} \\ \left(1 + \frac{K_e \cdot K_t}{K_h} \right)^2 \end{array} \right. \end{array} \right.$$

Table 2-4

$$K_{zt} := Kzt(z)$$

Velocity Pressure:

$$q_z := 0.00256 \cdot K_z \cdot K_{zt} \cdot K_s \cdot K_e \cdot K_d \cdot V^2 \cdot psf$$

Section 2.6.9.6

LOAD EQUATIONS

WIND LOAD

Area (Normal):	$AN_{area} = H_{ant} \cdot Want$
Area (Side):	$AT_{area} = H_{ant} \cdot Dant$
Force Coefficient (Normal):	$C_{fn} = C_{fsquare}(H_{ant}, Want)$
Force Coefficient (Side):	$C_{fs} = C_{fsquare}(H_{ant}, Dant)$
Pipe Area (Normal):	$AN_p = \max[(L_p - H_{ant}) * Dp, 0]$
Pipe Area (Side):	$AT_p = L_p \cdot Dp$
Force Coefficient (Normal):	$C_{fp} = C_{fround}(Lp, Dp)$
Normal Effective Projected Area:	$E_{pan} = (C_{fn} \cdot ANarea) + (Cfp \cdot ANp)$
Side Effective Projected Area:	$E_{pat} = (C_{fs} \cdot ATarea) + (Cfp \cdot ATp)$
Effective Projected Area:	$EPA = max(E_{pan}, Epat)$
Wind Force:	$F_{ant} = q_z \cdot Gh \cdot EPA$

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Joint Coordinates and Temperatures

	Label	X [in]	Y [in]	Z [in]	Temp [F]	Detach From Diap...
1	N1	15.	0	0.	0	
2	N2	40.455844	0	25.455844	0	
3	N22	26.572527	-6	16.143338	0	
4	N23	26.572527	18	16.143338	0	
5	N27A	30.815168	-12	20.385979	0	
6	N28	30.815168	24	20.385979	0	
7	N29	26.572527	0	16.143338	0	
8	N30	30.815168	0	20.385979	0	
9	N37	44.455844	0	61.455844	0	
10	N38	44.455844	0	-10.544156	0	
11	N39	40.455844	9	25.455844	0	
12	N40	40.455844	-9	25.455844	0	
13	N42	44.455844	0	55.455844	0	
14	N43	44.455844	0	-6.544156	0	
15	N44	45.955844	0	55.455844	0	
16	N45	45.955844	0	-6.544156	0	
17	N46	45.955844	36	55.455844	0	
18	N47	45.955844	30	-6.544156	0	
19	N48	45.955844	-48	55.455844	0	
20	N49	45.955844	-30	-6.544156	0	
21	N50	44.455844	0	25.455844	0	
22	N52	45.955844	27	-6.544156	0	
23	N54	45.955844	-27	-6.544156	0	
24	N56	48.955844	27	-6.544156	0	
25	N57	48.955844	-27	-6.544156	0	
26	N58	48.955844	36	-6.544156	0	
27	N59	48.955844	-36	-6.544156	0	
28	N28A	27.727922	0	12.727922	0	
29	N29A	31.970563	0	16.970563	0	
30	N30A	44.455844	0	19.455844	0	
31	N31	45.955844	0	19.455844	0	
32	N32	45.955844	36	19.455844	0	
33	N33	45.955844	-48	19.455844	0	
34	N34	45.955844	30	55.455844	0	
35	N35	45.955844	30	19.455844	0	
36	N36	45.955844	-42	55.455844	0	
37	N37A	45.955844	-42	19.455844	0	
38	N38A	48.955844	30	-6.544156	0	
39	N39A	48.955844	-30	-6.544156	0	
40	N40A	45.955844	18	55.455844	0	
41	N41	45.955844	18	-6.544156	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [in]	Y [in]	Z [in]	Temp [F]	Detach From Diap...
42	N42A	45.955844	18	19.455844	0	
43	N43A	45.955844	-18	55.455844	0	
44	N44A	45.955844	-18	-6.544156	0	
45	N45A	45.955844	-18	19.455844	0	
46	N46A	30.815168	12	20.385979	0	
47	N49A	44.455844	0	6.455844	0	
48	N50A	44.455844	0	40.455844	0	
49	N51	-7.5	0	-12.990381	0	
50	N52A	1.817486	0	-47.763711	0	
51	N53	0.694277	-6	-31.084153	0	
52	N54A	0.694277	18	-31.084153	0	
53	N55	2.247191	-12	-36.879708	0	
54	N56A	2.247191	24	-36.879708	0	
55	N57A	0.694277	0	-31.084153	0	
56	N58A	2.247191	0	-36.879708	0	
57	N59A	30.994401	0	-69.227812	0	
58	N60	-31.359429	0	-33.227812	0	
59	N61	1.817486	9	-47.763711	0	
60	N62	1.817486	-9	-47.763711	0	
61	N63	25.798248	0	-66.227812	0	
62	N64	-27.895327	0	-35.227812	0	
63	N65	25.048248	0	-67.526851	0	
64	N66	-28.645327	0	-36.526851	0	
65	N67	25.048248	36	-67.526851	0	
66	N68	-28.645327	30	-36.526851	0	
67	N69	25.048248	-48	-67.526851	0	
68	N70	-28.645327	-30	-36.526851	0	
69	N71	-0.182514	0	-51.227812	0	
70	N72	-28.645327	27	-36.526851	0	
71	N73	-28.645327	-27	-36.526851	0	
72	N74	-30.145327	27	-39.124927	0	
73	N75	-30.145327	-27	-39.124927	0	
74	N76	-30.145327	36	-39.124927	0	
75	N77	-30.145327	-36	-39.124927	0	
76	N78	-2.841257	0	-30.377046	0	
77	N79	-1.288343	0	-36.172601	0	
78	N80	-5.378666	0	-48.227812	0	
79	N81	-6.128666	0	-49.526851	0	
80	N82	-6.128666	36	-49.526851	0	
81	N83	-6.128666	-48	-49.526851	0	
82	N84	25.048248	30	-67.526851	0	
83	N85	-6.128666	30	-49.526851	0	
84	N86	25.048248	-42	-67.526851	0	
85	N87	-6.128666	-42	-49.526851	0	
86	N88	-30.145327	30	-39.124927	0	
87	N89	-30.145327	-30	-39.124927	0	
88	N90	25.048248	18	-67.526851	0	
89	N91	-28.645327	18	-36.526851	0	
90	N92	-6.128666	18	-49.526851	0	
91	N93	25.048248	-18	-67.526851	0	
92	N94	-28.645327	-18	-36.526851	0	
93	N95	-6.128666	-18	-49.526851	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [in]	Y [in]	Z [in]	Temp [F]	Detach From Diap...
94	N96	2.247191	12	-36.879708	0	
95	N99	-16.636997	0	-41.727812	0	
96	N100	12.807867	0	-58.727812	0	
97	N101	-7.5	0	12.990381	0	
98	N102	-42.27333	0	22.307866	0	
99	N103	-27.266805	-6	14.940815	0	
100	N104	-27.266805	18	14.940815	0	
101	N105	-33.062359	-12	16.493729	0	
102	N106	-33.062359	24	16.493729	0	
103	N107	-27.266805	0	14.940815	0	
104	N108	-33.062359	0	16.493729	0	
105	N109	-75.450245	0	7.771968	0	
106	N110	-13.096415	0	43.771968	0	
107	N111	-42.27333	9	22.307866	0	
108	N112	-42.27333	-9	22.307866	0	
109	N113	-70.254092	0	10.771968	0	
110	N114	-16.560517	0	41.771968	0	
111	N115	-71.004092	0	12.071006	0	
112	N116	-17.310517	0	43.071006	0	
113	N117	-71.004092	36	12.071006	0	
114	N118	-17.310517	30	43.071006	0	
115	N119	-71.004092	-48	12.071006	0	
116	N120	-17.310517	-30	43.071006	0	
117	N121	-44.27333	0	25.771968	0	
118	N122	-17.310517	27	43.071006	0	
119	N123	-17.310517	-27	43.071006	0	
120	N124	-18.810517	27	45.669082	0	
121	N125	-18.810517	-27	45.669082	0	
122	N126	-18.810517	36	45.669082	0	
123	N127	-18.810517	-36	45.669082	0	
124	N128	-24.886665	0	17.649124	0	
125	N129	-30.68222	0	19.202038	0	
126	N130	-39.077178	0	28.771968	0	
127	N131	-39.827178	0	30.071006	0	
128	N132	-39.827178	36	30.071006	0	
129	N133	-39.827178	-48	30.071006	0	
130	N134	-71.004092	30	12.071006	0	
131	N135	-39.827178	30	30.071006	0	
132	N136	-71.004092	-42	12.071006	0	
133	N137	-39.827178	-42	30.071006	0	
134	N138	-18.810517	30	45.669082	0	
135	N139	-18.810517	-30	45.669082	0	
136	N140	-71.004092	18	12.071006	0	
137	N141	-17.310517	18	43.071006	0	
138	N142	-39.827178	18	30.071006	0	
139	N143	-71.004092	-18	12.071006	0	
140	N144	-17.310517	-18	43.071006	0	
141	N145	-39.827178	-18	30.071006	0	
142	N146	-33.062359	12	16.493729	0	
143	N149	-27.818847	0	35.271968	0	
144	N150	-57.263711	0	18.271968	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N51	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N101	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N1	N2			Standoff Horiz...	Beam	Pipe	A500 Gr.42	Typical
2	M10	N23	N22			Mount Pipe	Column	Pipe	A53 Gr B	Typical
3	M11	N28	N27A			Mount Pipe	Column	Pipe	A53 Gr B	Typical
4	M14A	N39	N40			Mast Pipe	Column	Pipe	A53 Gr B	Typical
5	M15	N37	N38			Face Horizontal	Beam	RECT	A53 Gr B	Typical
6	M16	N46	N48			Mount Pipe	Column	Pipe	A53 Gr B	Typical
7	M17	N47	N49			Mount Pipe	Column	Pipe	A53 Gr B	Typical
8	M18	N44	N42			RIGID	None	None	RIGID	Typical
9	M19	N45	N43			RIGID	None	None	RIGID	Typical
10	M20	N50	N2			RIGID	None	None	RIGID	Typical
11	M21	N54	N57			RIGID	None	None	RIGID	Typical
12	M22	N52	N56			RIGID	None	None	RIGID	Typical
13	M23	N59	N58			Mount Pipe	Column	Pipe	A53 Gr B	Typical
14	M14	N29A	N30			Mount Pipe	Column	Pipe	A53 Gr B	Typical
15	M15A	N28A	N29			Mount Pipe	Column	Pipe	A53 Gr B	Typical
16	M16A	N32	N33			Mount Pipe	Column	Pipe	A53 Gr B	Typical
17	M17A	N31	N30A			RIGID	None	None	RIGID	Typical
18	M20A	N51	N52A			Standoff Horiz...	Beam	Pipe	A500 Gr.42	Typical
19	M21A	N54A	N53			Mount Pipe	Column	Pipe	A53 Gr B	Typical
20	M22A	N56A	N55			Mount Pipe	Column	Pipe	A53 Gr B	Typical
21	M23A	N61	N62			Mast Pipe	Column	Pipe	A53 Gr B	Typical
22	M24	N59A	N60			Face Horizontal	Beam	RECT	A53 Gr B	Typical
23	M25	N67	N69			Mount Pipe	Column	Pipe	A53 Gr B	Typical
24	M26	N68	N70			Mount Pipe	Column	Pipe	A53 Gr B	Typical
25	M27	N65	N63			RIGID	None	None	RIGID	Typical
26	M28	N66	N64			RIGID	None	None	RIGID	Typical
27	M29	N71	N52A			RIGID	None	None	RIGID	Typical
28	M30	N73	N75			RIGID	None	None	RIGID	Typical
29	M31	N72	N74			RIGID	None	None	RIGID	Typical
30	M32	N77	N76			Mount Pipe	Column	Pipe	A53 Gr B	Typical
31	M33	N79	N58A			Mount Pipe	Column	Pipe	A53 Gr B	Typical
32	M34	N78	N57A			Mount Pipe	Column	Pipe	A53 Gr B	Typical
33	M35	N82	N83			Mount Pipe	Column	Pipe	A53 Gr B	Typical
34	M36	N81	N80			RIGID	None	None	RIGID	Typical
35	M39	N101	N102			Standoff Horiz...	Beam	Pipe	A500 Gr.42	Typical
36	M40	N104	N103			Mount Pipe	Column	Pipe	A53 Gr B	Typical
37	M41	N106	N105			Mount Pipe	Column	Pipe	A53 Gr B	Typical
38	M42	N111	N112			Mast Pipe	Column	Pipe	A53 Gr B	Typical
39	M43	N109	N110			Face Horizontal	Beam	RECT	A53 Gr B	Typical
40	M44	N117	N119			Mount Pipe	Column	Pipe	A53 Gr B	Typical
41	M45	N118	N120			Mount Pipe	Column	Pipe	A53 Gr B	Typical
42	M46	N115	N113			RIGID	None	None	RIGID	Typical
43	M47	N116	N114			RIGID	None	None	RIGID	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
44	M48	N121	N102			RIGID	None	None	RIGID	Typical
45	M49	N123	N125			RIGID	None	None	RIGID	Typical
46	M50	N122	N124			RIGID	None	None	RIGID	Typical
47	M51	N127	N126			Mount Pipe	Column	Pipe	A53 Gr B	Typical
48	M52	N129	N108			Mount Pipe	Column	Pipe	A53 Gr B	Typical
49	M53	N128	N107			Mount Pipe	Column	Pipe	A53 Gr B	Typical
50	M54	N132	N133			Mount Pipe	Column	Pipe	A53 Gr B	Typical
51	M55	N131	N130			RIGID	None	None	RIGID	Typical
52	M58	N50A	N149			Tie Back	Column	Pipe	A53 Gr B	Typical
53	M59	N150	N99			Tie Back	Column	Pipe	A53 Gr B	Typical
54	M60	N100	N49A			Tie Back	Column	Pipe	A53 Gr B	Typical

Joint Loads and Enforced Displacements (BLC 1 : Dead)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N34	L	Y	0
2	N36	L	Y	0
3	N34	L	Y	-63.3
4	N36	L	Y	-63.3
5	N35	L	Y	-54.3
6	N37A	L	Y	-54.3
7	N38A	L	Y	-34.8
8	N39A	L	Y	-34.8
9	N40A	L	Y	-26.2
10	N43A	L	Y	-52.9
11	N42A	L	Y	-73
12	N45A	L	Y	-72
13	N41	L	Y	-15
14	N44A	L	Y	-2.9
15	N46A	L	Y	-60
16	N84	L	Y	-63.3
17	N86	L	Y	-63.3
18	N134	L	Y	-63.3
19	N136	L	Y	-63.3
20	N90	L	Y	-26.2
21	N140	L	Y	-26.2
22	N93	L	Y	-52.9
23	N143	L	Y	-52.9
24	N96	L	Y	-60
25	N146	L	Y	-60
26	N85	L	Y	-54.3
27	N87	L	Y	-54.3
28	N135	L	Y	-54.3
29	N137	L	Y	-54.3
30	N92	L	Y	-73
31	N142	L	Y	-73
32	N95	L	Y	-72
33	N145	L	Y	-72
34	N88	L	Y	-34.8
35	N89	L	Y	-34.8
36	N138	L	Y	-34.8

Joint Loads and Enforced Displacements (BLC 1 : Dead) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
37	N139	L	Y	-34.8
38	N94	L	Y	-2.9
39	N144	L	Y	-2.9
40	N91	L	Y	-7.5
41	N141	L	Y	-7.5

Joint Loads and Enforced Displacements (BLC 2 : Wx)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N34	L	X	194.5
2	N36	L	X	194.5
3	N35	L	X	323.4
4	N37A	L	X	323.4
5	N38A	L	X	220.4
6	N39A	L	X	220.4
7	N46A	L	X	146.2
8	N84	L	X	196.6
9	N86	L	X	196.6
10	N134	L	X	196.6
11	N136	L	X	196.6
12	N90	L	X	73.7
13	N140	L	X	73.7
14	N93	L	X	77.5
15	N143	L	X	77.5
16	N96	L	X	59.7
17	N146	L	X	59.7
18	N85	L	X	174.2
19	N87	L	X	174.2
20	N135	L	X	174.2
21	N137	L	X	174.2
22	N92	L	X	60.4
23	N142	L	X	60.4
24	N95	L	X	62.9
25	N145	L	X	62.9
26	N88	L	X	160.6
27	N89	L	X	160.6
28	N138	L	X	160.6
29	N139	L	X	160.6
30	N94	L	X	5
31	N144	L	X	5
32	N91	L	X	21.8
33	N141	L	X	21.8

Joint Loads and Enforced Displacements (BLC 3 : Wz)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N34	L	Z	196.6
2	N36	L	Z	196.6
3	N35	L	Z	174.2
4	N37A	L	Z	174.2
5	N38A	L	Z	160.6
6	N39A	L	Z	160.6
7	N40A	L	Z	73.7

Joint Loads and Enforced Displacements (BLC 3 : Wz) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
8	N43A	L	Z	77.5
9	N42A	L	Z	60.4
10	N45A	L	Z	62.9
11	N41	L	Z	21.8
12	N44A	L	Z	5
13	N46A	L	Z	59.7
14	N84	L	Z	194.5
15	N86	L	Z	194.5
16	N134	L	Z	194.5
17	N136	L	Z	194.5
18	N96	L	Z	146.2
19	N146	L	Z	146.2
20	N85	L	Z	323.4
21	N87	L	Z	323.4
22	N135	L	Z	323.4
23	N137	L	Z	323.4
24	N88	L	Z	220.4
25	N89	L	Z	220.4
26	N138	L	Z	220.4
27	N139	L	Z	220.4

Joint Loads and Enforced Displacements (BLC 4 : Ice Wx)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N34	L	X	45.2
2	N36	L	X	45.2
3	N35	L	X	66.8
4	N37A	L	X	66.8
5	N38A	L	X	48
6	N39A	L	X	48
7	N46A	L	X	35.9
8	N84	L	X	52.3
9	N86	L	X	52.3
10	N134	L	X	52.3
11	N136	L	X	52.3
12	N90	L	X	19.3
13	N140	L	X	19.3
14	N93	L	X	23.2
15	N143	L	X	23.2
16	N96	L	X	18.8
17	N146	L	X	18.8
18	N85	L	X	49.8
19	N87	L	X	49.8
20	N135	L	X	49.8
21	N137	L	X	49.8
22	N92	L	X	18.3
23	N142	L	X	18.3
24	N95	L	X	18.8
25	N145	L	X	18.8
26	N88	L	X	44.9
27	N89	L	X	44.9
28	N138	L	X	44.9

Joint Loads and Enforced Displacements (BLC 4 : Ice Wx) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
29	N139	L	X	44.9
30	N94	L	X	4.2
31	N144	L	X	4.2
32	N91	L	X	9.3
33	N141	L	X	9.3

Joint Loads and Enforced Displacements (BLC 5 : Ice Wz)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N34	L	Z	52.3
2	N36	L	Z	52.3
3	N35	L	Z	49.8
4	N37A	L	Z	49.8
5	N38A	L	Z	44.9
6	N39A	L	Z	44.9
7	N40A	L	Z	19.3
8	N43A	L	Z	23.2
9	N42A	L	Z	18.3
10	N45A	L	Z	18.8
11	N41	L	Z	9.3
12	N44A	L	Z	4.2
13	N46A	L	Z	18.8
14	N84	L	Z	45.2
15	N86	L	Z	45.2
16	N134	L	Z	45.2
17	N136	L	Z	45.2
18	N96	L	Z	35.9
19	N146	L	Z	35.9
20	N85	L	Z	66.8
21	N87	L	Z	66.8
22	N135	L	Z	66.8
23	N137	L	Z	66.8
24	N88	L	Z	48
25	N89	L	Z	48
26	N138	L	Z	48
27	N139	L	Z	48

Joint Loads and Enforced Displacements (BLC 6 : Ice weight)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N34	L	Y	-160
2	N36	L	Y	-160
3	N35	L	Y	-231
4	N37A	L	Y	-231
5	N38A	L	Y	-167.7
6	N39A	L	Y	-167.7
7	N40A	L	Y	-106.5
8	N43A	L	Y	-121.9
9	N42A	L	Y	-88.5
10	N45A	L	Y	-89.7
11	N41	L	Y	-60.2
12	N44A	L	Y	-12.2
13	N46A	L	Y	-131.7

Joint Loads and Enforced Displacements (BLC 6 : Ice weight) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
14	N84	L	Y	-160
15	N86	L	Y	-160
16	N134	L	Y	-160
17	N136	L	Y	-160
18	N90	L	Y	-106.5
19	N140	L	Y	-106.5
20	N93	L	Y	-121.9
21	N143	L	Y	-121.9
22	N96	L	Y	-131.7
23	N146	L	Y	-131.7
24	N85	L	Y	-231
25	N87	L	Y	-231
26	N135	L	Y	-231
27	N137	L	Y	-231
28	N92	L	Y	-88.5
29	N142	L	Y	-88.5
30	N95	L	Y	-89.7
31	N145	L	Y	-89.7
32	N88	L	Y	-167.7
33	N89	L	Y	-167.7
34	N138	L	Y	-167.7
35	N139	L	Y	-167.7
36	N94	L	Y	-12.2
37	N144	L	Y	-12.2
38	N91	L	Y	-30.1
39	N141	L	Y	-30.1

Joint Loads and Enforced Displacements (BLC 7 : Service X)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N34	L	X	11.2
2	N36	L	X	11.2
3	N35	L	X	18.6
4	N37A	L	X	18.6
5	N38A	L	X	12.7
6	N39A	L	X	12.7
7	N46A	L	X	8.4
8	N84	L	X	11.3
9	N86	L	X	11.3
10	N134	L	X	11.3
11	N136	L	X	11.3
12	N90	L	X	4.2
13	N140	L	X	4.2
14	N93	L	X	4.5
15	N143	L	X	4.5
16	N96	L	X	3.4
17	N146	L	X	3.4
18	N85	L	X	10
19	N87	L	X	10
20	N135	L	X	10
21	N137	L	X	10
22	N92	L	X	3.5

Joint Loads and Enforced Displacements (BLC 7 : Service X) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
23	N142	L	X	3.5
24	N95	L	X	3.6
25	N145	L	X	3.6
26	N88	L	X	9.3
27	N89	L	X	9.3
28	N138	L	X	9.3
29	N139	L	X	9.3
30	N94	L	X	.3
31	N144	L	X	.3
32	N91	L	X	1.3
33	N141	L	X	1.3

Joint Loads and Enforced Displacements (BLC 8 : Service Z)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N34	L	Z	11.3
2	N36	L	Z	11.3
3	N35	L	Z	10
4	N37A	L	Z	10
5	N38A	L	Z	9.3
6	N39A	L	Z	9.3
7	N40A	L	Z	4.2
8	N43A	L	Z	4.5
9	N42A	L	Z	3.5
10	N45A	L	Z	3.6
11	N41	L	Z	1.3
12	N44A	L	Z	.3
13	N46A	L	Z	3.4
14	N84	L	Z	11.2
15	N86	L	Z	11.2
16	N134	L	Z	11.2
17	N136	L	Z	11.2
18	N96	L	Z	8.4
19	N146	L	Z	8.4
20	N85	L	Z	18.6
21	N87	L	Z	18.6
22	N135	L	Z	18.6
23	N137	L	Z	18.6
24	N88	L	Z	12.7
25	N89	L	Z	12.7
26	N138	L	Z	12.7
27	N139	L	Z	12.7

Joint Loads and Enforced Displacements (BLC 9 : Service 1 Pipe)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N45	L	Y	-500

Joint Loads and Enforced Displacements (BLC 10 : Service 2 Pipe)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N31	L	Y	-500

Joint Loads and Enforced Displacements (BLC 11 : Service 3 Pipe)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N44	L	Y	-500

Joint Loads and Enforced Displacements (BLC 13 : Service 5 Middle)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N50	L	Y	-250

Joint Loads and Enforced Displacements (BLC 14 : Service 6 End)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N38	L	Y	-250

Member Distributed Loads (BLC 2 : Wx)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in,...	End Location[in,%]
1	M15	PX	14.93	14.93	0	0
2	M1	PX	14.55	14.55	0	0
3	M14A	PX	12.78	12.78	0	0
4	M10	PX	11.04	11.04	0	0
5	M11	PX	11.04	11.04	0	0
6	M20A	PX	14.55	14.55	0	0
7	M21A	PX	11.04	11.04	0	0
8	M22A	PX	11.04	11.04	0	0
9	M23A	PX	12.78	12.78	0	0
10	M24	PX	14.93	14.93	0	0
11	M39	PX	14.55	14.55	0	0
12	M40	PX	11.04	11.04	0	0
13	M41	PX	11.04	11.04	0	0
14	M42	PX	12.78	12.78	0	0
15	M43	PX	14.93	14.93	0	0
16	M58	PX	11.04	11.04	0	0
17	M59	PX	11.04	11.04	0	0
18	M60	PX	11.04	11.04	0	0

Member Distributed Loads (BLC 3 : Wz)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in,...	End Location[in,%]
1	M15	PZ	14.93	14.93	0	0
2	M1	PZ	14.55	14.55	0	0
3	M14A	PZ	12.78	12.78	0	0
4	M10	PZ	11.04	11.04	0	0
5	M11	PZ	11.04	11.04	0	0
6	M17	PZ	11.04	11.04	0	0
7	M20A	PZ	14.55	14.55	0	0
8	M21A	PZ	11.04	11.04	0	0
9	M22A	PZ	11.04	11.04	0	0
10	M23A	PZ	12.78	12.78	0	0
11	M24	PZ	14.93	14.93	0	0
12	M26	PZ	11.04	11.04	0	0
13	M39	PZ	14.55	14.55	0	0
14	M40	PZ	11.04	11.04	0	0
15	M41	PZ	11.04	11.04	0	0
16	M42	PZ	12.78	12.78	0	0

Member Distributed Loads (BLC 3 : Wz) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in,...	End Location[in,%]
17	M43	PZ	14.93	14.93	0	0
18	M45	PZ	11.04	11.04	0	0
19	M58	PZ	11.04	11.04	0	0
20	M59	PZ	11.04	11.04	0	0
21	M60	PZ	11.04	11.04	0	0

Member Distributed Loads (BLC 4 : Ice Wx)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in,...	End Location[in,%]
1	M15	PX	5.55	5.55	0	0
2	M1	PX	5.03	5.03	0	0
3	M14A	PX	4.15	4.15	0	0
4	M10	PX	5.22	5.22	0	0
5	M11	PX	5.22	5.22	0	0
6	M20A	PX	5.03	5.03	0	0
7	M21A	PX	5.22	5.22	0	0
8	M22A	PX	5.22	5.22	0	0
9	M23A	PX	4.15	4.15	0	0
10	M24	PX	5.55	5.55	0	0
11	M39	PX	5.03	5.03	0	0
12	M40	PX	5.22	5.22	0	0
13	M41	PX	5.22	5.22	0	0
14	M42	PX	4.15	4.15	0	0
15	M43	PX	5.55	5.55	0	0
16	M58	PX	5.22	5.22	0	0
17	M59	PX	5.22	5.22	0	0
18	M60	PX	5.22	5.22	0	0

Member Distributed Loads (BLC 5 : Ice Wz)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in,...	End Location[in,%]
1	M15	PZ	5.55	5.55	0	0
2	M1	PZ	5.03	5.03	0	0
3	M14A	PZ	4.15	4.15	0	0
4	M10	PZ	5.22	5.22	0	0
5	M11	PZ	5.22	5.22	0	0
6	M17	PZ	5.22	5.22	0	0
7	M20A	PZ	5.03	5.03	0	0
8	M21A	PZ	5.22	5.22	0	0
9	M22A	PZ	5.22	5.22	0	0
10	M23A	PZ	4.15	4.15	0	0
11	M24	PZ	5.55	5.55	0	0
12	M26	PZ	5.22	5.22	0	0
13	M39	PZ	5.03	5.03	0	0
14	M40	PZ	5.22	5.22	0	0
15	M41	PZ	5.22	5.22	0	0
16	M42	PZ	4.15	4.15	0	0
17	M43	PZ	5.55	5.55	0	0
18	M45	PZ	5.22	5.22	0	0
19	M58	PZ	5.22	5.22	0	0
20	M59	PZ	5.22	5.22	0	0
21	M60	PZ	5.22	5.22	0	0

Member Distributed Loads (BLC 6 : Ice weight)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in,...	End Location[in,%]
1	M15	Y	-16.49	-16.49	0	0
2	M1	Y	-22.6	-22.6	0	0
3	M14A	Y	-19.32	-19.32	0	0
4	M10	Y	-13.3	-13.3	0	0
5	M11	Y	-13.3	-13.3	0	0
6	M16	Y	-13.3	-13.3	0	0
7	M17	Y	-13.3	-13.3	0	0
8	M23	Y	-13.3	-13.3	0	0
9	M16A	Y	-13.3	-13.3	0	0
10	M20A	Y	-22.6	-22.6	0	0
11	M21A	Y	-13.3	-13.3	0	0
12	M22A	Y	-13.3	-13.3	0	0
13	M23A	Y	-19.32	-19.32	0	0
14	M24	Y	-16.49	-16.49	0	0
15	M25	Y	-13.3	-13.3	0	0
16	M26	Y	-13.3	-13.3	0	0
17	M32	Y	-13.3	-13.3	0	0
18	M35	Y	-13.3	-13.3	0	0
19	M39	Y	-22.6	-22.6	0	0
20	M40	Y	-13.3	-13.3	0	0
21	M41	Y	-13.3	-13.3	0	0
22	M42	Y	-19.32	-19.32	0	0
23	M43	Y	-16.49	-16.49	0	0
24	M44	Y	-13.3	-13.3	0	0
25	M45	Y	-13.3	-13.3	0	0
26	M51	Y	-13.3	-13.3	0	0
27	M54	Y	-13.3	-13.3	0	0
28	M58	Y	-13.3	-13.3	0	0
29	M59	Y	-13.3	-13.3	0	0
30	M60	Y	-13.3	-13.3	0	0

Member Distributed Loads (BLC 7 : Service X)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in,...	End Location[in,%]
1	M15	PX	.86	.86	0	0
2	M1	PX	.84	.84	0	0
3	M14A	PX	.74	.74	0	0
4	M10	PX	.64	.64	0	0
5	M11	PX	.64	.64	0	0
6	M20A	PX	.84	.84	0	0
7	M21A	PX	.64	.64	0	0
8	M22A	PX	.64	.64	0	0
9	M23A	PX	.74	.74	0	0
10	M24	PX	.86	.86	0	0
11	M39	PX	.84	.84	0	0
12	M40	PX	.64	.64	0	0
13	M41	PX	.64	.64	0	0
14	M42	PX	.74	.74	0	0
15	M43	PX	.86	.86	0	0
16	M58	X	.64	.64	0	0
17	M59	X	.64	.64	0	0
18	M60	X	.64	.64	0	0

Member Distributed Loads (BLC 8 : Service Z)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in,...	End Location[in,%]
1	M15	PZ	.86	.86	0	0
2	M1	PZ	.84	.84	0	0
3	M14A	PZ	.74	.74	0	0
4	M10	PZ	.64	.64	0	0
5	M11	PZ	.64	.64	0	0
6	M17	PZ	.64	.64	0	0
7	M20A	PZ	.84	.84	0	0
8	M21A	PZ	.64	.64	0	0
9	M22A	PZ	.64	.64	0	0
10	M23A	PZ	.74	.74	0	0
11	M24	PZ	.86	.86	0	0
12	M26	PZ	.64	.64	0	0
13	M39	PZ	.84	.84	0	0
14	M40	PZ	.64	.64	0	0
15	M41	PZ	.64	.64	0	0
16	M42	PZ	.74	.74	0	0
17	M43	PZ	.86	.86	0	0
18	M45	PZ	.64	.64	0	0
19	M58	Z	.64	.64	0	0
20	M59	Z	.64	.64	0	0
21	M60	Z	.64	.64	0	0

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Dead	DL		-1.05		41				
2	Wx	WL				33		18		
3	Wz	WL				27		21		
4	Ice Wx	WL				33		18		
5	Ice Wz	WL				27		21		
6	Ice weight	DL				39		30		
7	Service X	WL				33		18		
8	Service Z	WL				27		21		
9	Service 1 Pipe	OL1				1				
10	Service 2 Pipe	OL1				1				
11	Service 3 Pipe	OL1				1				
12	Service 4 Pipe	OL1								
13	Service 5 Middle	OL1				1				
14	Service 6 End	OL1				1				

Load Combinations

	Description	Sol..	PD..	SR..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact...
1	1.4D	Yes	Y		1	1.4																				
2	1.2D+1.0W1	Yes	Y		1	1.2	2	1	3																	
3	1.2D+1.0W2	Yes	Y		1	1.2	2	.866	3	.5																
4	1.2D+1.0W3	Yes	Y		1	1.2	2	.5	3	.866																
5	1.2D+1.0W4	Yes	Y		1	1.2	2		3	1																
6	1.2D+1.0W5	Yes	Y		1	1.2	2	-.5	3	.866																
7	1.2D+1.0W6	Yes	Y		1	1.2	2	-.866	3	.5																
8	1.2D+1.0W7	Yes	Y		1	1.2	2	-1	3																	

Load Combinations (Continued)

	Description	Sol..	PD..	SR..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact...
9	1.2D+1.0W8	Yes	Y		1	1.2	2	-.866	3	-.5																
10	1.2D+1.0W9	Yes	Y		1	1.2	2	-.5	3	-.866																
11	1.2D+1.0W10	Yes	Y		1	1.2	2		3	-1																
12	1.2D+1.0W11	Yes	Y		1	1.2	2	.5	3	-.866																
13	1.2D+1.0W12	Yes	Y		1	1.2	2	.866	3	-.5																
14	1.2D+1.0 Ice	Yes	Y		1	1.2	6	1																		
15	1.2D+1.0ICE...	Yes	Y		1	1.2	6	1	4	1	5															
16	1.2D+1.0ICE...	Yes	Y		1	1.2	6	1	4	.866	5	.5														
17	1.2D+1.0ICE...	Yes	Y		1	1.2	6	1	4	.5	5	.866														
18	1.2D+1.0ICE...	Yes	Y		1	1.2	6	1	4		5	1														
19	1.2D+1.0ICE...	Yes	Y		1	1.2	6	1	4	-.5	5	.866														
20	1.2D+1.0ICE...	Yes	Y		1	1.2	6	1	4	-.866	5	.5														
21	1.2D+1.0ICE...	Yes	Y		1	1.2	6	1	4	-1	5															
22	1.2D+1.0ICE...	Yes	Y		1	1.2	6	1	4	-.866	5	-.5														
23	1.2D+1.0ICE...	Yes	Y		1	1.2	6	1	4	-.5	5	-.866														
24	1.2D+1.0ICE...	Yes	Y		1	1.2	6	1	4		5	-1														
25	1.2D+1.0ICE...	Yes	Y		1	1.2	6	1	4	.5	5	-.866														
26	1.2D+1.0ICE...	Yes	Y		1	1.2	6	1	4	.866	5	-.5														
27	1.2D+1.5LM1...	Yes	Y		1	1.2	9	1.5	7	1	8															
28	1.2D+1.5LM1...	Yes	Y		1	1.2	9	1.5	7	.866	8	.5														
29	1.2D+1.5LM1...	Yes	Y		1	1.2	9	1.5	7	.5	8	.866														
30	1.2D+1.5LM1...	Yes	Y		1	1.2	9	1.5	7		8	1														
31	1.2D+1.5LM1...	Yes	Y		1	1.2	9	1.5	7	-.5	8	.866														
32	1.2D+1.5LM1...	Yes	Y		1	1.2	9	1.5	7	-.866	8	.5														
33	1.2D+1.5LM1...	Yes	Y		1	1.2	9	1.5	7	-1	8															
34	1.2D+1.5LM1...	Yes	Y		1	1.2	9	1.5	7	-.866	8	-.5														
35	1.2D+1.5LM1...	Yes	Y		1	1.2	9	1.5	7	-.5	8	-.866														
36	1.2D+1.5LM1...	Yes	Y		1	1.2	9	1.5	7		8	-1														
37	1.2D+1.5LM1...	Yes	Y		1	1.2	9	1.5	7	.5	8	-.866														
38	1.2D+1.5LM1...	Yes	Y		1	1.2	9	1.5	7	.866	8	-.5														
39																										
40	1.2D+1.5LM2...	Yes	Y		1	1.2	10	1.5	7	1	8															
41	1.2D+1.5LM2...	Yes	Y		1	1.2	10	1.5	7	.866	8	.5														
42	1.2D+1.5LM2...	Yes	Y		1	1.2	10	1.5	7	.5	8	.866														
43	1.2D+1.5LM2...	Yes	Y		1	1.2	10	1.5	7		8	1														
44	1.2D+1.5LM2...	Yes	Y		1	1.2	10	1.5	7	-.5	8	.866														
45	1.2D+1.5LM2...	Yes	Y		1	1.2	10	1.5	7	-.866	8	.5														
46	1.2D+1.5LM2...	Yes	Y		1	1.2	10	1.5	7	-1	8															
47	1.2D+1.5LM2...	Yes	Y		1	1.2	10	1.5	7	-.866	8	-.5														
48	1.2D+1.5LM2...	Yes	Y		1	1.2	10	1.5	7	-.5	8	-.866														
49	1.2D+1.5LM2...	Yes	Y		1	1.2	10	1.5	7		8	-1														
50	1.2D+1.5LM2...	Yes	Y		1	1.2	10	1.5	7	.5	8	-.866														
51	1.2D+1.5LM2...	Yes	Y		1	1.2	10	1.5	7	.866	8	-.5														
52																										
53	1.2D+1.5LV1	Yes	Y		1	1.2	13	1.5																		
54	1.2D+1.5LV2	Yes	Y		1	1.2	14	1.5																		
55			Y																							
56	1.2D+1.5LM3...	Yes	Y		1	1.2	11	1.5	7	1	8															
57	1.2D+1.5LM3...	Yes	Y		1	1.2	11	1.5	7	.866	8	.5														
58	1.2D+1.5LM3...	Yes	Y		1	1.2	11	1.5	7	.5	8	.866														
59	1.2D+1.5LM3...	Yes	Y		1	1.2	11	1.5	7		8	1														
60	1.2D+1.5LM3...	Yes	Y		1	1.2	11	1.5	7	-.5	8	.866														

Load Combinations (Continued)

	Description	Sol..	PD..	SR..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact...
61	1.2D+1.5LM3..	Yes	Y		1	1.2	11	1.5	7	-.866	8	.5														
62	1.2D+1.5LM3..	Yes	Y		1	1.2	11	1.5	7	-1	8															
63	1.2D+1.5LM3..	Yes	Y		1	1.2	11	1.5	7	-.866	8	-.5														
64	1.2D+1.5LM3..	Yes	Y		1	1.2	11	1.5	7	-.5	8	-.866														
65	1.2D+1.5LM3..	Yes	Y		1	1.2	11	1.5	7		8	-1														
66	1.2D+1.5LM3..	Yes	Y		1	1.2	11	1.5	7	.5	8	-.866														
67	1.2D+1.5LM3..	Yes	Y		1	1.2	11	1.5	7	.866	8	-.5														
68			Y																							
69	1.2D+1.5LM4..	Yes	Y		1	1.2	12	1.5	7	1	8															
70	1.2D+1.5LM4..	Yes	Y		1	1.2	12	1.5	7	.866	8	.5														
71	1.2D+1.5LM4..	Yes	Y		1	1.2	12	1.5	7	.5	8	.866														
72	1.2D+1.5LM4..	Yes	Y		1	1.2	12	1.5	7		8	1														
73	1.2D+1.5LM4..	Yes	Y		1	1.2	12	1.5	7	-.5	8	.866														
74	1.2D+1.5LM4..	Yes	Y		1	1.2	12	1.5	7	-.866	8	.5														
75	1.2D+1.5LM4..	Yes	Y		1	1.2	12	1.5	7	-1	8															
76	1.2D+1.5LM4..	Yes	Y		1	1.2	12	1.5	7	-.866	8	-.5														
77	1.2D+1.5LM4..	Yes	Y		1	1.2	12	1.5	7	-.5	8	-.866														
78	1.2D+1.5LM4..	Yes	Y		1	1.2	12	1.5	7		8	-1														
79	1.2D+1.5LM4..	Yes	Y		1	1.2	12	1.5	7	.5	8	-.866														
80	1.2D+1.5LM4..	Yes	Y		1	1.2	12	1.5	7	.866	8	-.5														

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

	Member	Shape	Code Check	Loc...	LC	Shear Check	Loc.....		LC	phi*Pn...	phi*Pn...	phi*M...	phi*M...	...	Eqn
1	M35	PIPE_2.0	.590	36....	11	.033	6.1...		11	17855...	32130	1871.6..	1871.6..	1...	H1-1b
2	M54	PIPE_2.0	.589	36....	5	.033	6.1...		5	17855...	32130	1871.6..	1871.6..	1...	H1-1b
3	M16A	PIPE_2.0	.588	36....	2	.033	6.1...		2	17855...	32130	1871.6..	1871.6..	1...	H1-1b
4	M24	PIPE_3.0	.541	36	21	.162	42		4	53775....	65205	5748.75	5748.75	1...	H1-1b
5	M15	PIPE_3.0	.539	36	25	.187	42		8	53775...	65205	5748.75	5748.75	1...	H1-1b
6	M43	PIPE_3.0	.538	36	17	.165	42		12	53775...	65205	5748.75	5748.75	1...	H1-1b
7	M39	HSS4X4...	.515	0	18	.078	24	y	22	21857...	227556	24255	24255	1...	H1-1b
8	M20A	HSS4X4...	.512	0	22	.078	24	y	26	21857...	227556	24255	24255	1...	H1-1b
9	M1	HSS4X4...	.512	0	26	.104	24	y	30	21857...	227556	24255	24255	1...	H1-1b
10	M16	PIPE_2.0	.422	36....	5	.028	36....		5	17855...	32130	1871.6..	1871.6..	1...	H1-1b
11	M44	PIPE_2.0	.421	36....	8	.028	36....		8	17855...	32130	1871.6..	1871.6..	1...	H1-1b
12	M25	PIPE_2.0	.419	36....	8	.028	36....		8	17855...	32130	1871.6..	1871.6..	1...	H1-1b
13	M45	PIPE_2.0	.253	30	10	.049	30		4	23808...	32130	1871.6..	1871.6..	1...	H1-1b
14	M26	PIPE_2.0	.253	30	6	.049	30		6	23808...	32130	1871.6..	1871.6..	1...	H1-1b
15	M17	PIPE_2.0	.231	30	5	.046	30		5	23808...	32130	1871.6..	1871.6..	1...	H1-1b
16	M60	PIPE_2.0	.200	38....	8	.431	72....		8	20751...	32130	1871.6..	1871.6..	1...	H3-6
17	M58	PIPE_2.0	.189	37....	12	.408	0		12	20751...	32130	1871.6..	1871.6..	1...	H3-6
18	M59	PIPE_2.0	.186	33....	4	.405	72....		4	20751...	32130	1871.6..	1871.6..	1...	H3-6
19	M22A	PIPE_2.0	.091	24	11	.017	24		11	28843...	32130	1871.6..	1871.6..	2...	H1-1b
20	M11	PIPE_2.0	.091	24	2	.017	24		2	28843...	32130	1871.6..	1871.6..	2...	H1-1b
21	M41	PIPE_2.0	.091	24	5	.017	24		5	28843...	32130	1871.6..	1871.6..	2...	H1-1b
22	M52	PIPE_2.0	.087	0	10	.090	0		6	32095...	32130	1871.6..	1871.6..	1...	H1-1b
23	M14	PIPE_2.0	.064	0	6	.113	0		2	32095...	32130	1871.6..	1871.6..	1...	H1-1b
24	M33	PIPE_2.0	.060	0	13	.116	0		11	32095...	32130	1871.6..	1871.6..	1...	H1-1b
25	M23	PIPE_2.0	.050	9	2	.023	63		8	20866...	32130	1871.6..	1871.6..	1	H1-1b
26	M32	PIPE_2.0	.048	9	11	.023	63		5	20866...	32130	1871.6..	1871.6..	1	H1-1b
27	M51	PIPE_2.0	.048	9	5	.023	63		5	20866...	32130	1871.6..	1871.6..	1	H1-1b

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

	Member	Shape	Code Check	Loc...	LC	Shear Check	Loc.....		LC	phi*Pn...	phi*Pn...	phi*M...	phi*M...	...	Eqn
28	M34	PIPE_2.0	.009	0	15	.009	0		11	32095...	32130	1871.6...	1871.6...	1...	H1-1b
29	M53	PIPE_2.0	.009	0	23	.009	0		7	32095...	32130	1871.6...	1871.6...	1...	H1-1b
30	M15A	PIPE_2.0	.009	0	19	.009	0		3	32095...	32130	1871.6...	1871.6...	1...	H1-1b
31	M21A	PIPE_2.0	.007	18	11	.002	18		11	30625...	32130	1871.6...	1871.6...	1...	H1-1b
32	M40	PIPE_2.0	.007	18	7	.002	18		7	30625...	32130	1871.6...	1871.6...	1...	H1-1b
33	M10	PIPE_2.0	.007	18	3	.002	18		3	30625...	32130	1871.6...	1871.6...	1...	H1-1b
34	M42	PIPE_4.0	.000	9	7	.000	9		7	92571...	93240	10631...	10631...	1...	H1-1b
35	M23A	PIPE_4.0	.000	9	11	.000	9		11	92571...	93240	10631...	10631...	1...	H1-1b
36	M14A	PIPE_4.0	.000	9	3	.000	9		3	92571...	93240	10631...	10631...	1...	H1-1b

APPENDIX D

ADDITIONAL CALCULATIONS

Mount to Monopole Ring Mount Kit Connection Check:

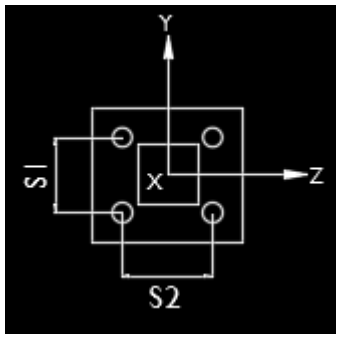
Applied Tension:	$Rx := 737 \cdot lbf$	From Risa 3D LRFD Loading
Applied Shear:	$Ry := 3403 lbf$	From Risa 3D LRFD Loading
Applied Shear:	$Rz := 2227 \cdot lbf$	From Risa 3D LRFD Loading
Applied Torque:	$Mx := 3060 \cdot lbf \cdot ft$	From Risa 3D LRFD Loading
Applied Moment:	$My := 6319 lbf \cdot ft$	From Risa 3D LRFD Loading
Applied Moment:	$Mz := 10553 \cdot lbf \cdot ft$	From Risa 3D LRFD Loading
Number of Bolts:	$n := 4$	Per Specifications
Bolts Vertical Spacing:	$S_1 := 7in$	Per Specifications
Bolts Horizontal Spacing:	$S_2 := 7in$	Per Specifications

Applied Tension at Bolt:

$$P_{a.t} := \frac{Rx}{n} + \frac{2My}{n \cdot S_2} + \frac{2Mz}{n \cdot S_1} = 14646\,lbf$$

Applied Shear at Bolt:

$$P_{a.v} := \frac{\sqrt{Ry^2 + Rz^2}}{n} + \frac{2Mx}{n\sqrt{S_1^{\,2} + S_2^{\,2}}} = 2871.4\,lbf$$



Bolt Type Used:	**A325N**	
Nominal Tensile Stress, Fnt:	$F_{n.t} := 90ksi$	AISC, Table J3-2, P. 16.1-104
Nominal Shear Stress, Fnv:	$F_{n.v} := 54ksi$	AISC, Table J3-2, P. 16.1-104
Nominal Bolt Diameter:	$d_b := \frac{5}{8}in$	Per Specifications
Gross Area of the Bolt:	$A_{b.g} := 0.307in^2$	AISC, Table 7-18, P. 7-83
Net Area of the Bolt:	$A_{b.n} := 0.226in^2$	AISC, Table 7-18, P. 7-83
Strength Reduction Factor, ϕ:	$\phi := 0.75$	

Applied Tensile Stress:

$$F_{a.t} := \frac{P_{a.t}}{A_{b.g}} = 47.7 \cdot ksi$$

Applied Shear Stress:

$$F_{a.v} := \frac{P_{a.v}}{A_{b.g}} = 9.4 \cdot ksi$$

Combined Tension And Shear Check

Nominal Tensile Stress, Fnt	$F_{n.t} = 90 \cdot ksi$
Nominal Shear Stress, Fnv	$F_{n.v} = 54 \cdot ksi$

Nominal Tensile Reduced Fntr

$$F_{n.t.r} := 1.3 \cdot F_{n.t} - \frac{F_{n.t}}{\phi \cdot F_{n.v}} \cdot \frac{P_{a.v}}{A_{b.g}} = 96.2 \cdot ksi$$

AISC Eq. J3-3a, P. 16.1-109

$$F_{n.t.r} := \begin{cases} F_{n.t.r} & \text{if } F_{n.t.r} \le F_{n.t} \\ F_{n.t} & \text{otherwise} \end{cases} = 90 \cdot ksi$$

Nominal Shear Reduced Fntv

$$F_{n.v.r} := 1.3 \cdot F_{n.v} - \frac{F_{n.v}}{\phi \cdot F_{n.t}} \cdot \frac{P_{a.t}}{A_{b.g}} = 32 \cdot ksi$$

AISC Eq. J3-3a, P. 16.1-109

$$F_{n.v.r} := \begin{cases} F_{n.v.r} & \text{if } F_{n.v.r} \le F_{n.v} \\ F_{n.v} & \text{otherwise} \end{cases} = 32 \cdot ksi$$

Avalaible Tensile Stress:

$$F_{n.t} := \begin{cases} F_{n.t} & \text{if } \frac{F_{a.t}}{F_{n.t}} \le 30\% \\ F_{n.t.r} & \text{otherwise} \end{cases} = 90 \cdot ksi$$

Bolt Nominal Tensile Strength

$$R_{n.t} := F_{n.t} \cdot A_{b.g} = 27.6 \cdot kip$$

Tension Check

$$Check := \begin{cases} \text{"OK"} & \text{if } \phi \cdot R_{n.t} \ge P_{a.t} \\ \text{"NOT GOOD"} & \text{otherwise} \end{cases}$$

Check = "OK"

Tension Ratio

$$Ratio_t := \frac{P_{a.t}}{\phi \cdot R_{n.t}} \qquad Ratio_t = 70.7 \cdot \%$$

Avalaible Shear Stress:

$$F_{n.v} := \begin{cases} F_{n.v} & \text{if } \frac{F_{a.v}}{F_{n.v}} \le 30\% \\ F_{n.v.r} & \text{otherwise} \end{cases} = 54 \cdot ksi$$

Bolt Nominal Shear Strength

$$R_{n.v} := F_{n.v} \cdot A_{b.g} = 16.6 \cdot kip$$

Shear Check

$$Check := \begin{cases} \text{"OK"} & \text{if } \phi \cdot R_{n.v} \ge P_{a.v} \\ \text{"NOT GOOD"} & \text{otherwise} \end{cases}$$

Check = "OK"

Shear Ratio

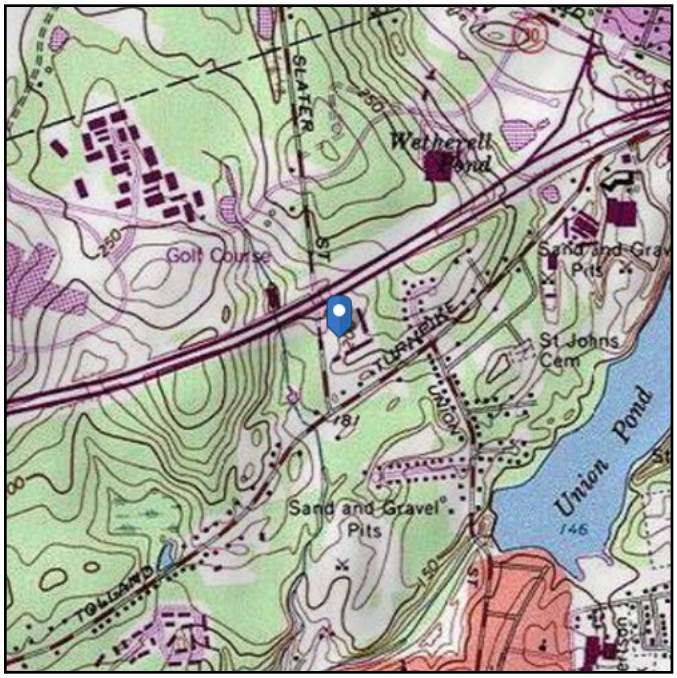
$$Ratio_v := \frac{P_{a.v}}{\phi \cdot R_{n.v}} = 23.1 \cdot \%$$

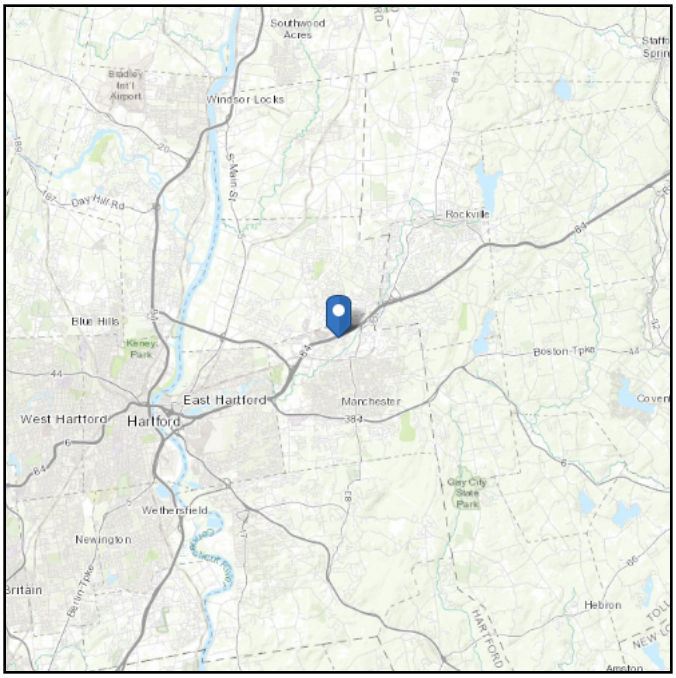
ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 195.5 ft (NAVD 88)
Latitude: 41.805
Longitude: -72.533611





Wind

Results:

Wind Speed:	123 Vmph
10-year MRI	77 Vmph
25-year MRI	87 Vmph
50-year MRI	93 Vmph
100-year MRI	101 Vmph

Data Source: ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014

Date Accessed: Thu Jan 10 2019

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Thu Jan 10 2019

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

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

RF EMISSIONS COMPLIANCE REPORT

Crown Castle on Behalf of AT&T Mobility, LLC

Site: BUCKLAND MALL
Crown Castle Site ID: 876347
App ID: 469372
53 Slater Street
MANCHESTER, CT
1/14/2019

Report Status:

AT&T Mobility, LLC Is Compliant

Prepared By:

Sitesafe, Inc.

8618 Westwood Center Drive, Suite 315 Vienna, VA 22182 Voice 703-276-1100
Fax 703-276-1169

Engineering Statement in Re:
Electromagnetic Energy Analysis
AT&T Mobility, LLC
MANCHESTER, CT

My signature on the cover of this document indicates:

That I am registered as a Professional Engineer in the jurisdiction indicated; and

That I have extensive professional experience in the wireless communications engineering industry; and

That I am an employee of Sitesafe, Inc. in Vienna, Virginia; and

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

That the technical information serving as the basis for this report was supplied by AT&T Mobility, LLC (See attached Site Summary and Carrier documents), and that AT&T Mobility, LLC's installations involve communications equipment, antennas and associated technical equipment at a location referred to as the "BUCKLAND MALL" ("the site"); and

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

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

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

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

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

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

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

licensees of AT&T Mobility, LLC's operating frequency as shown on the attached antenna worksheet; and

That when applying the uncontrolled environment standards, the predicted Maximum Power Density at two meters above ground level from the proposed AT&T Mobility, LLC operation is no more than 1.135% of the maximum in any accessible area on the ground and

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

That when applying the uncontrolled environment standards, the cumulative predicted energy density from the proposed operation is no more than 5.209% of the maximum in any accessible area up to two meters above the ground per OET-65; and

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

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

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

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

AT&T Mobility, LLC
BUCKLAND MALL
Site Summary

Carrier	Area Maximum Percentage MPE
AT&T Mobility, LLC (Proposed)	0.227 %
AT&T Mobility, LLC (Proposed)	0.367 %
AT&T Mobility, LLC (Proposed)	0.23 %
AT&T Mobility, LLC (Proposed)	0.311 %
Sprint	0.169 %
Sprint	0.136 %
Sprint	0.265 %
T-Mobile	0.394 %
T-Mobile	0.11 %
Clearwire	0.099 %
Metro PCS	0.206 %
Verizon Wireless	0.589 %
Verizon Wireless	0.341 %
Verizon Wireless	0.836 %
Verizon Wireless	0.928 %
Composite Site MPE:	5.209 %

AT&T Mobility, LLC (Proposed)
BUCKLAND MALL
Carrier Summary

Frequency:	869	MHz
Maximum Permissible Exposure (MPE):	579.33	µW/cm^2
Maximum power density at ground level:	1.31553	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.22708	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
CCI Antennas	OPA-65R-LCUU-H6	145	50	3021	0.877163	0.151409	1.27781	0.220566
CCI Antennas	OPA-65R-LCUU-H6	145	170	3021	0.877706	0.151503	1.277809	0.220565
CCI Antennas	OPA-65R-LCUU-H6	145	290	3021	0.876028	0.151213	1.277809	0.220565

AT&T Mobility, LLC (Proposed)
BUCKLAND MALL
Carrier Summary

Frequency:	2110	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	3.66955	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.36696	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Kathrein-Scala	800-10965	145	50	7114	1.439658	0.143966	3.49522	0.349522
Kathrein-Scala	800-10965	145	170	7114	1.475323	0.147532	3.495221	0.349522
Kathrein-Scala	800-10965	145	290	7114	1.475323	0.147532	3.495221	0.349522

AT&T Mobility, LLC (Proposed)
BUCKLAND MALL
Carrier Summary

Frequency:	1930	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	2.29721	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.22972	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Quintel	QS66512-2	145	50	4170	1.030998	0.1031	2.1581	0.21581
Quintel	QS66512-2	145	170	4170	1.027855	0.102785	2.1581	0.21581
Quintel	QS66512-2	145	290	4170	1.027855	0.102785	2.1581	0.21581

AT&T Mobility, LLC (Proposed)
BUCKLAND MALL
Carrier Summary

Frequency:	734	MHz
Maximum Permissible Exposure (MPE):	489.33	µW/cm^2
Maximum power density at ground level:	1.52298	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.31124	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Kathrein-Scala	800-10965	145	50	2959	1.077695	0.220237	1.410848	0.28832
Kathrein-Scala	800-10965	145	170	2959	1.082655	0.221251	1.410848	0.28832
Kathrein-Scala	800-10965	145	290	2959	1.077695	0.220237	1.410848	0.28832

Sprint
BUCKLAND MALL
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	1.69194	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.16919	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
RFS	APXVSPP18-C-A20	155	65	3804	0.785149	0.078515	1.411643	0.141164
RFS	APXVSPP18-C-A20	155	170	3804	0.785149	0.078515	1.411643	0.141164
RFS	APXVSPP18-C-A20	155	300	3804	0.785149	0.078515	1.411643	0.141164

Sprint
BUCKLAND MALL
Carrier Summary

Frequency:	862	MHz
Maximum Permissible Exposure (MPE):	574.67	µW/cm^2
Maximum power density at ground level:	0.77983	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.1357	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
RFS	APXVSPP18-C-A20	155	65	2168	0.644006	0.112066	0.658057	0.114511
RFS	APXVSPP18-C-A20	155	170	2168	0.644006	0.112066	0.658057	0.114511
RFS	APXVSPP18-C-A20	155	300	2168	0.641876	0.111695	0.658057	0.114511

Sprint
BUCKLAND MALL
Carrier Summary

Frequency:	2500	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	2.6535	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.26535	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
RFS	APXVTM14-C-I20	155	65	6168	0.937152	0.093715	1.753027	0.175303
RFS	APXVTM14-C-I20	155	170	6168	0.937152	0.093715	1.753027	0.175303
RFS	APXVTM14-C-I20	155	300	6168	0.936794	0.093679	1.753027	0.175303

T-Mobile
BUCKLAND MALL
Carrier Summary

Frequency:	2100	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	3.94108	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.39411	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Ericsson	AIR 32 B2A/B66AA	133	40	2313	2.737031	0.273703	2.737031	0.273703
Ericsson	AIR 32 B2A/B66AA	133	170	2313	2.737031	0.273703	2.737031	0.273703
Ericsson	AIR 32 B2A/B66AA	133	270	2313	2.737031	0.273703	2.737031	0.273703

T-Mobile
BUCKLAND MALL
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	1.10254	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.11025	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Ericsson	KRC 118 057/1	133	40	2109	0.507616	0.050762	0.914473	0.091447
Ericsson	KRC 118 057/1	133	170	2109	0.507315	0.050732	0.914473	0.091447
Ericsson	KRC 118 057/1	133	270	2109	0.507315	0.050732	0.914473	0.091447

Clearwire
BUCKLAND MALL
Carrier Summary

Frequency:	2500	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	0.98742	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.09874	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
ARGUS	LPX310R	155	45	1542	0.49996	0.049996	0.907465	0.090747
ARGUS	LPX310R	155	170	1542	0.49996	0.049996	0.907465	0.090747
ARGUS	LPX310R	155	280	1542	0.503797	0.05038	0.907465	0.090747

Metro PCS
BUCKLAND MALL
Carrier Summary

Frequency:	2100	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	2.05798	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.2058	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
RFS	APXV18-206517S-C-0	103	30	2912	0.709834	0.070983	1.851894	0.185189
RFS	APXV18-206517S-C-0	103	150	2912	0.709135	0.070914	1.851894	0.185189
RFS	APXV18-206517S-C-0	103	270	2912	0.709135	0.070914	1.851894	0.185189

Verizon Wireless
BUCKLAND MALL
Carrier Summary

Frequency:	2100	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	5.89341	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.58934	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
ANDREW	SBNHH-1D65B	113	30	5154	3.604646	0.360465	5.505698	0.55057
ANDREW	SBNHH-1D65B	113	145	5154	3.599389	0.359939	5.505698	0.55057
ANDREW	SBNHH-1D65B	113	270	5154	3.599389	0.359939	5.505698	0.55057

Verizon Wireless
BUCKLAND MALL
Carrier Summary

Frequency:	751	MHz
Maximum Permissible Exposure (MPE):	500.67	µW/cm^2
Maximum power density at ground level:	1.70934	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.34141	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Antel	BXA-70063-6CF	113	30	2010	1.354162	0.270472	1.60137	0.319848
Antel	BXA-70063-6CF	113	145	2010	1.354162	0.270472	1.60137	0.319848
Antel	BXA-70063-6CF	113	270	2010	1.357382	0.271115	1.60137	0.319848

Verizon Wireless
BUCKLAND MALL
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	8.35821	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.83582	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
ANDREW	SBNHH-1D65B	113	30	4583	6.327236	0.632724	8.213771	0.821377
ANDREW	SBNHH-1D65B	113	145	4583	6.419316	0.641932	8.213771	0.821377
ANDREW	SBNHH-1D65B	113	270	4583	6.419316	0.641932	8.213771	0.821377

Verizon Wireless
BUCKLAND MALL
Carrier Summary

Frequency:	850	MHz
Maximum Permissible Exposure (MPE):	566.67	µW/cm^2
Maximum power density at ground level:	5.25805	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.92789	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
ANDREW	LNX-6512DS-T4M	113	30	3421	5.090166	0.898264	5.228302	0.922641
ANDREW	LNX-6512DS-T4M	113	145	3421	5.093512	0.898855	5.228302	0.922641
ANDREW	LNX-6512DS-T4M	113	270	3421	5.093512	0.898855	5.228302	0.922641