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

April 6, 2020

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

RE: **Notice of Exempt Modification for AT&T - 829046**
56 Norfield Road, Weston, CT 06883
Latitude: 41° 12′ 8.40″ / Longitude: -73° 22′ 46.60″

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 160-foot mount on the existing 190-foot Monopole Tower, located at 56 Norfield Road, Weston, CT. The tower is owned by Crown Castle and the property is owned by the Town of Weston. AT&T now intends to remove and replace three (3) antennas on their existing configuration. The new antennas will be installed at the 160-foot mount level of the tower.

The facility was approved by the Planning & Zoning Commission of the Town of Weston on July 26, 1999. No conditions of approval were applied that would impact this exempt modification application.

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.C.S.A. § 16-50j-73, a copy of this letter is being sent to Chris Spaulding, First Selectman for the Town of Weston, as the municipality and the property owner, James Pjura, Town of Weston Zoning Enforcement Officer, 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, AT&T 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
Network Real Estate Specialist
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
(201) 236-9224
AnneMarie.Zsamba@crowncastle.com

Attachments
cc:

Chris Spaulding, First Selectman *(via email only to cspaulding@westonct.gov)*
Weston Town Hall
56 Norfield Road
Weston, CT 06883

James Pjura, Zoning Enforcement Officer *(via email only to jpjura@westonct.gov)*
Weston Town Hall Annex
24 School Road
Weston, CT 06883

Crown Castle, Tower Owner

From: Zsamba, Anne Marie
To: jpjura@westonct.gov
Subject: AT&T Exempt Modification Notice - 56 Norfield Road
Date: Monday, April 6, 2020 9:48:00 AM
Attachments: AT&T-ExemptModification-829046-56 NORFIELD ROAD WESTON-notice.pdf

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Good morning Mr. Pjura,

Attached please find AT&T's exempt modification application that is being submitted to the Connecticut Siting Council, today April 6, 2020.

In light of the present circumstances with Covid-19, The Council has advised that electronic notification of this filing is acceptable. If you could kindly confirm receipt. Thank you.

Best,
Anne Marie Zsamba

ANNE MARIE ZSAMBA
Network Real Estate Specialist
T: (201) 236-9224
M: (518) 350-3639
F: (724) 416-6112

CROWN CASTLE
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
CrownCastle.com

From: Zsamba, Anne Marie
To: "cspaulding@westonct.gov"
Subject: AT&T Exempt Modification Notice - 56 Norfield Road
Date: Monday, April 6, 2020 9:47:00 AM
Attachments: AT&T-ExemptModification-829046-56 NORFIELD ROAD WESTON-notice.pdf

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Good morning Mr. Spaulding,

Attached please find AT&T's exempt modification application that is being submitted to the Connecticut Siting Council, today April 6, 2020.

In light of the present circumstances with Covid-19, The Council has advised that electronic notification of this filing is acceptable. If you could kindly confirm receipt. Thank you.

Best,
Anne Marie Zsamba

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Network Real Estate Specialist
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F: (724) 416-6112

CROWN CASTLE
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
CrownCastle.com

Exhibit A

Original Facility Approval

VOL 278 PG 0706

8.3.99
Cau

009564

TOWN of WESTON, CONNECTICUT

Incorporated 1787

Planning & Zoning Commission

8-24 Report

Town of Weston
Omnipoint Communications
Monopole Tower

At a regularly scheduled meeting of the Planning & Zoning Commission held on July 26, 1999, the Commission unanimously approved the plan presented by the First Selectman George Guidera and Town Administrator Roy Hill to service six communication companies plus the Town of Weston antennas for public safety and radio emergency equipment on a monopole tower, in accordance with letter dated July 1, 1999 and the standard lease agreement dated May 24, 1999, which will be modified to include maintenance of the building.

RECEIVED FOR RECORD Aug 23 19 99
at 10:14A M. ATTEST [illegible]

56 Norfield Road, P.O. Box 1007, Weston CT 06883 Tel. (203) 222-2618 FAX (203) 222-8871

8-24 REPORT: TOWN OF WESTON OMNIPOINT COMMUNICATION MONOPOLE TOWER

First Selectman George Guidera presented an 8-24 Report for a communication monopole tower. Roy Hill, Town Administrator was also present. Mr. Guidera stated that the Town has been working on this project for almost 4 years to replace the existing emergency services radio tower located at the rear of the Town Hall complex. The existing tower is 20 plus years old and in need of replacement. There is noticeable deterioration of the cement base and several companies have described the tower as having lasted its useful life expectancy. The Town determined that the emergency services radio tower needed to be replaced and upgrading the need for better cellular phone service in Weston. The recommendation of the Communications Tower and Antenna Advisory Committee, it was decided to replace the existing emergency services radio tower with a 190 foot monopole tower in essentially the same as the current tower.

The Omnipoint Communications, Inc. will build this 190 foot monopole tower for the Town of Weston and pay $72,000. rent per year. After construction the tower will be leased back to Omnipoint Communications. Besides the antennas for all radio's of the Weston Fire, EMS, Highway, and Police Departments, it will also have 6 cellular/PCS (personal communications services) carriers on board. In the agreement with Omnipoint, the Town of Weston has the top of the tower allocated for the emergency services radios as appropriate by radio frequency.

An equipment building will also have to built next to the monopole tower to house the radio equipment for the police, fire and EMS, along with equipment for the six cellular/PCS carriers. The proposed building is a white brick, single story structure, approximately 77' by 23' in size.

Due to the placement of the existing underground utilities the most effective location for the new antenna is where the Police/Fire/EMS Fitness Center currently is. It is proposed that the fitness center be moved from its current location on the northeast corner of the of the firehouse to the northwest corner of the firehouse. This proposed tower will eliminate the tower planned at Timber Mill.

Mark Finely of Omnipoint introduced his staff and went over the tower in detail. He also stated that this 8-24 report if only for the tower at Town Hall and showed the coverage this tower would have for the Town.

8-24 REPORT: TOWER CONTINUED:

Questions from the Commission:

1. Will the tower need guy wires? The tower does not need quy wires.
The architect from Omnipoint stated it is extremely safe and has to sustain winds of 100 miles per hour and is designed to crumple down into itself.
2. Address land use issues such as the parking at Town Hall and the possible loss of parking spaces for the utility building. Also the increased traffic for maintenance of the tower.
3. Questioned the use of the land on the other side of the Fire House for the location of the tower. The Town Engineer explained that this area contains a new drainage system and could not withstand the weight of a tower.
4. Omnipoint will install the utility building and the Town will pay for the equipment.
5. Questioned the construction details of the tower and concerned about icing on the platforms. Omnipoint stated that they had not had this problem.

The Commission requested that the utility building be staked for this site walk on July 17.

PUBLIC HEARING CONT: 2 LOT RESUB. 35 SALEM ROAD MITCHELL (BARR)

Mel Barr was present, representing the owner R. Mitchell. The Commissioners walked the site and expressed concern about saving the trees and also a better site line for the driveway as the vegetation is on Town land and needs to be removed. Also discussed possible conditions for the approval including horses on Salem Road during construction, and an updated letter from the Fire Marshal.

Don Saltzman moved that the Commission close the public hearing. Seconded by Michael Widland. Vote in favor (7-0).

PUBLIC HEARING CONT: OLIVE PHILLIPS CALVIN ROAD 4 LOT SUB. (ROMANO)

Peter Romano of Richard Bennett Associates was present for the applicant. Mr. Romano and the Commission discussed the site walk and that the parcel they saw with the foundation is not a lot that is included in the subdivision. Also a discussion followed about the access to this lot which is off the subdivision road "Quail Road". The question arose as to why this lot is not part of the subdivision. Mr. Romano stated that they received a site specific approval from Conservation for this lot. Michael Widland was concerned about two curb cuts onto Georgetown Road and a discussion about the site lines and safety of the access to Georgetown Road. The Chairman requested that the applicant incorporate the adjacent 2 acre lot into the subdivision. Peter Romano agreed to submit a new map and also walk this thru with the Conservation officer as it was included in the subdivision when it was approved by Conservation.

8-24 REPORT CONT: TOWN OF WESTON OMNIPOINT COMMUNICATIONS MONOPOLE TOWER

First Selectman George Guidera, Town Administrator Roy Hill and members of Omnipoint Communications were present. The Commissioners walked the site and had the following concerns:

Don Saltzman looked at other potential locations and feels that the proposed location is the best location. Also concerned about ice buildup on 6 platforms and asked if there was a way to heat the platforms? The Omnipoint representative stated they have no technology for this and to his knowledge they have never had a problem. He felt the ground space around the tower is enough are to catch any ice. A discussion then followed regarding insurance and if the Town is covered. George Guidera stated that the Town has its own insurance and feels the Town is adequately protected. Mr. Saltzman was also concerned about having it in writing that the towers will be at Town Hall and possibly at the Landfill and not at Timbermill. A discussion followed regarding the 6 carriers on one pole.

Michael Widland clarified that the Commission is only dealing with this tower at Town Hall. Marguerite Terzian is concerned about service trucks regarding safety in the Town Hall parking lot and had considered some other location. Ms. Terzian then read the following letter from the Fire Chief, dated 7/20/99:

"I was chairman of the original tower fact-finding committee comprised of representatives from the police department, communications center, fire department, EMS, and the town engineer. When Selectman Guidera appointed a Town Tower Committee I forwarded our findings and became a member of that committee. Many hours have been spent examining in detail all feasible options for a tower location. The area behind the Communications Center is best for a number of short and long term reasons. The further away the tower is from the Communications Center, the greater the potential for problems. The Town Hall building will help screen the tower. When the Communications center expands it will have room to do so back toward the school. Locating the tower and radio building to the west side of the firehouse will make future expansion of Norfield Station impossible. At a minimum I anticipate the need for an aerial ladder truck which will require an additional bay. Parking for volunteers responding during the week is becoming very scarce. Taking space from Station 1's west side will only compound a growing problem. When a firefighter dormitory is added it will have to be at ground level, With no room on the west side the only option would be to build north into the school playing fields. It's highly unlikely the Board of Ed would approve. Marguerite, I cannot emphasize too strongly that the tower will help save lives and property by providing the emergency services the required antenna height for uninterrupted communications. It will also give residents access to emergency services while on the roads, in the woods, or at their homes when conventional telephones are

8-24 REPORT TOWER CONTINUED:

unavailable or out of service. The increasing portability of cellular phones will make 24 hour a day, anywhere in Weston emergency help a reality, particularly for the elderly, infirm and handicapped. Finally, we anticipate mobile computer data exchange in our emergency vehicles for transferring vital statistics to and from the field. We have been working on this very important project for years and are available to you for help and to answer any questions". Ms. Terzian stated that this letter convinced me that the other side of the Fire House was important to the Fire Department.

Town Engineer John Conte showed a map and went over in detail the drainage implications on the other side of the Fire House.

Don Saltzman suggested Omnipoint coordinate their installation with the trench wiring for the Technology Plan for Town Hall.

Michael Widland asked if the lease been amended? The Town Administrator stated it covers at least four and Mr. Widland wants to make sure there are six carriers.

There was a discussion regarding the block house and maintenance and that it is part of Omnipoint's responsibility. The Commission expressed concern about traffic involved for the maintenance and the Town Hall parking and to consider proper signage for same. It was noted by the Town Engineer that there will no loss of parking spaces for the construction of the block house.

Don Saltzman moved that the Commission approve the plan presented by the First Selectman George Guidera and Town Administrator Roy Hill to service six communication companies plus the Town of Weston antennas for public safety and radio emergency equipment on a monopole tower, in accordance with letter dated July l, l999 and the standard lease agreement dated May 24, 1999, which will be modified to include maintenance of the building. Seconded by Michael Widland. Vote in favor (6-0). Paul Schultz absent.

PUBLIC HEARING CONT: OLIVE PHILLIPS CALVIN ROAD 4 LOT SUB. (ROMANO)

This application was withdrawn.

PUBLIC HEARING CONT: SPECIAL PERMIT APARTMENT 7 NIMROD FARM (MATTERA)

This application was withdrawn

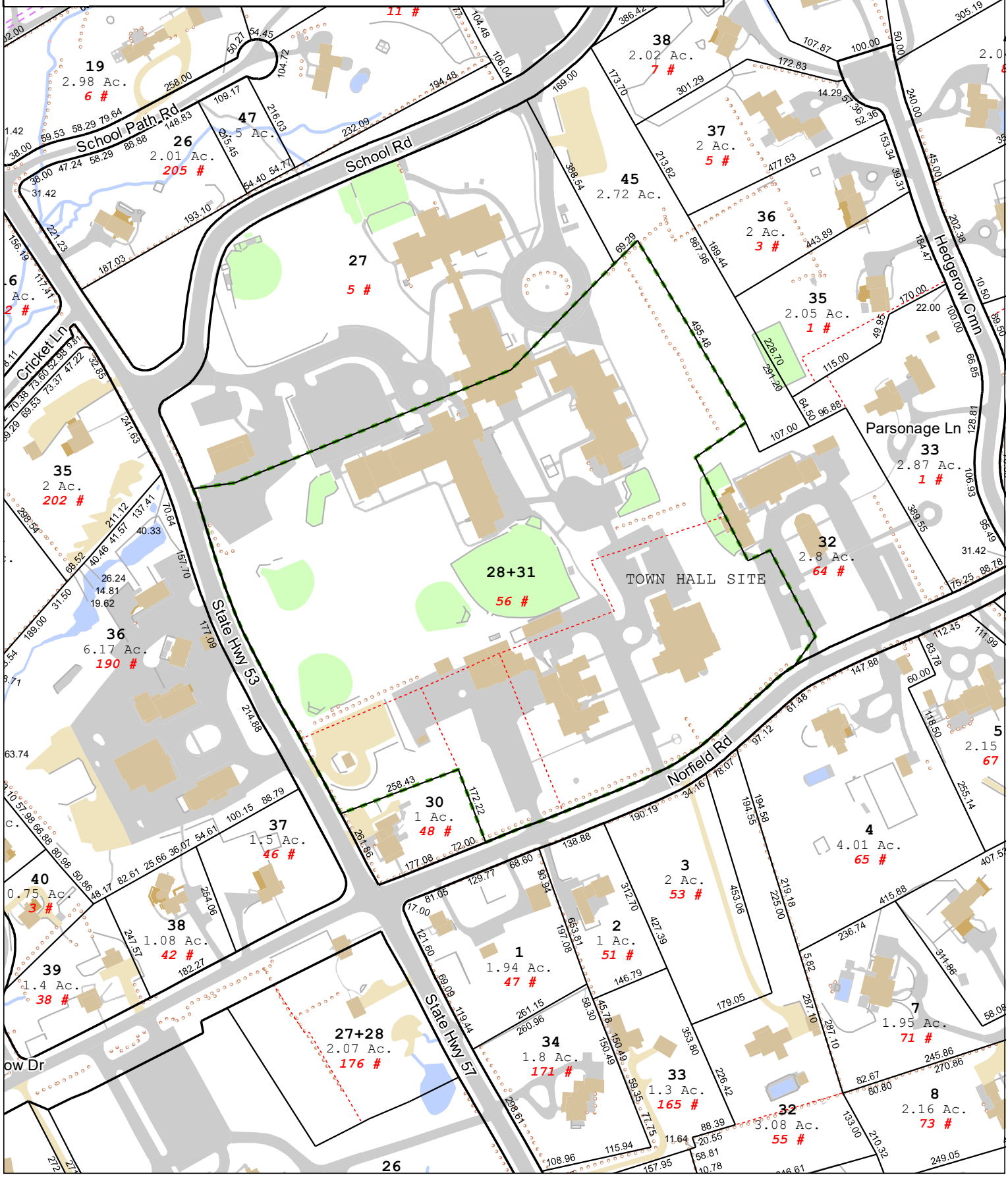
Exhibit B

Property Card

Town of Weston, Connecticut - Parcel Map

Parcel: 22-6-28+31

Address: 56 NORFIELD ROAD



Approximate Scale:

0 50 100 150 200 Feet

Disclaimer: This map is for informational purposes only.
All information is subject to verification by any user.
The Town of Weston and its mapping contractors
assume no legal responsibility for the information contained herein.

Map Produced
February 2020

The Assessor's office is responsible for the maintenance of records on the ownership of properties. Assessments are computed at 70% of the estimated market value of real property at the time of the last revaluation which was 2018.

Town of Weston, CT

Information on the Property Records for the Municipality of Weston was last updated on 4/4/2020.

Parcel Information

Location:	56 NORFIELD ROAD	Property Use:	Public Use	Primary Use:	Governmental Building
Unique ID:	E00116	Map Block Lot:	22 6 28+31	Acres:	0.00
490 Acres:	0.00	Zone:	C	Volume / Page:	42/ 272
Developers Map / Lot:	569A,569B,3471	Census:			

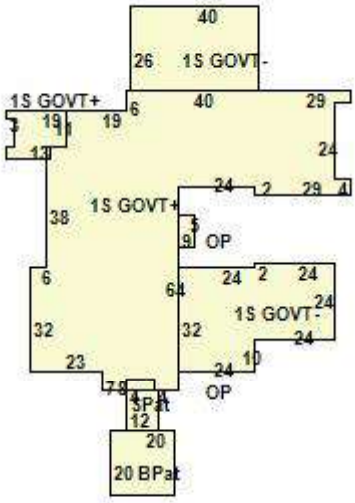
Value Information

	Appraised Value	Assessed Value
Land	0	0
Buildings	4,401,064	3,080,740
Detached Outbuildings	280,222	196,160
Total	4,681,286	3,276,900

Owner's Information

Owner's Data
TOWN OF WESTON TOWN HALL & FIRE STATION 56 NORFIELD RRD WESTON CT 06883

Building 1



Category:	Public Use	Use:	Governmental Building	GLA:	7,858
Stories:	1.00	Construction:	Wood Frame	Year Built:	1956

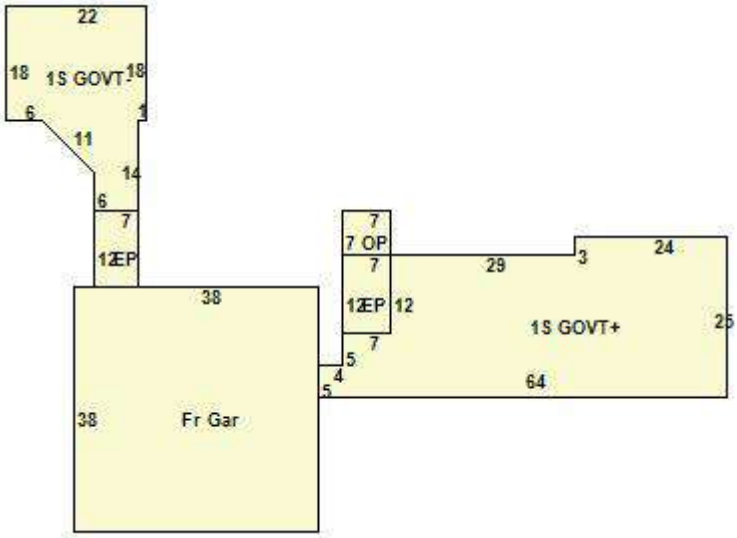
Heating:	Hot Water	Fuel:	Natural Gas	Cooling Percent:	100
Siding:	Wood Frame/Wood Frame	Roof Material:	Slate	Beds/Units:	1

Special Features

Attached Components

Type:	Year Built:	Area:
Brick Patio	1956	400
Stone Patio	1956	120
Open Porch	1956	45
Open Porch	1956	32

Building 2



Category:	Public Use	Use:	Governmental Building	GLA:	1,854
Stories:	1.00	Construction:	Wood Frame	Year Built:	1956
Heating:	Forced Hot Air	Fuel:	Natural Gas	Cooling Percent:	100
Siding:	Wood Frame/Wood Frame	Roof Material:	Slate	Beds/Units:	1

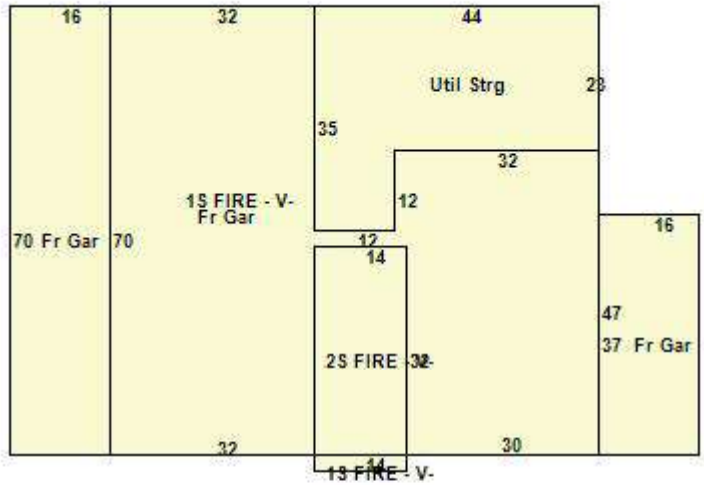
Special Features

Attached Components

Type:	Year Built:	Area:

Type:	Year Built:	Area:
Frame Garage	1956	1,444
Enclosed Porch	1956	84
Enclosed Porch	1956	84
Open Porch	1956	49

Building 3



Category:	Public Use	Use:	Fire Station - Volunteer	GLA:	4,654
Stories:	2.00	Construction:	Wood Frame	Year Built:	1956

Heating:	Hot Water	Fuel:	Natural Gas	Cooling Percent:	100
Siding:	Wood Frame/Wood Frame	Roof Material:	Asphalt	Beds/Units:	1

Special Features

Attached Components

Type:	Year Built:	Area:
Frame Garage	1956	1,120
Frame Garage	1956	3,716
Frame Garage	1956	592
Utility Storage	1956	1,156

Detached Outbuildings

Type:	Year Built:	Length:	Width:	Area:
Studio Office	2008	32.00	24.00	768
Average Work Shop	2008	20.00	12.00	240
Lights in W/PL	2008	0.00	0.00	7
Gazebo	2008	0.00	0.00	100
Paving	2008	25,600.00	0.00	25,600
Paving	2008	9,600.00	0.00	9,600
Light Poles 2	2008	0.00	0.00	1

Owner History - Sales

Owner Name	Volume	Page	Sale Date	Deed Type	Valid Sale	Sale Price
TOWN OF WESTON	42	272	12/21/1948	Warranty Deed	No	$23,500

Building Permits

Permit Number	Permit Type	Date Opened	Date Closed	Permit Status	Reason
8325	Building	11/07/2019		Permit Issued	VERIZON REMOVE & REPLACE ANTENNAS. RADIOS, OPV BOX & CABLE
8105	Building	06/12/2018		Reval	AT&T ATENNAS
7970		09/28/2017		Closed	SPRINT ADDING 3 ANTENNAS 3 RRHS 1 HYBRID CABLE TO EXSISTING EQUIPMENT ON TOWER
7857		01/12/2017		Closed	SEE PERMIT
7832		10/27/2016		Closed	SEE PERMIT
7790		07/12/2016		Closed	INTERIOR RENOVATIONS TO LIBRARY
7702		12/17/2015		Closed	AT&T REMOVE AND REPLCE ANTENNAS
7502		01/13/2015		Closed	SEE PERMIT
7429		08/20/2014		Closed	ANTENNAS
7346		03/19/2014		Closed	SEE PERMIT
7291		11/05/2013		Closed	ELECTRICAL
6512		11/05/2008		Closed	FOOD PANTRY
6490		09/19/2008		Closed	REPLACE ROOF
5362		10/06/2003		Closed	CELL TOWER

Information Published With Permission From The Assessor

Exhibit C

Construction Drawings

AT&T

AT&T SITE NUMBER:	**CTL02099**	**BUSINESS UNIT #:**	**829046**
AT&T SITE NAME:	**WESTON DT**	**SITE ADDRESS:**	**56 NORFIELD ROAD WESTON, CT 06883**
AT&T FA CODE:	**10035306**		
AT&T PACE NUMBER:	**MRCTB045272, MRCTB045221 MRCTB045313, MRCTB045222**	**COUNTY:**	**FAIRFIELD**
		TOWER HEIGHT:	**190'-0"**
SITE TYPE:	**MONOPOLE**		

PROJECT: AT&T 5C, 6C, 4TX4RX, 5G NR

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	WESTON/RT-57/NORFIELD R
SITE ADDRESS:	56 NORFIELD ROAD WESTON, CT 06883
COUNTY:	FAIRFIELD
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41.2021861
LONGITUDE:	-73.3794989
LAT/LONG TYPE:	NAD83
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
TOWER OWNER:	CROWN CASTLE 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	AT&T MOBILITY ONE AT&T WAY BEDMINSTER, NJ 07921
CROWN CASTLE USA INC. APPLICATION ID:	509322

PROJECT TEAM

A&E FIRM:	B+T GROUP 1717 SOUTH BOULDER, SUITE 300 TULSA, OK 74119 MIKE OAKES (918) 217-8574
CROWN CASTLE USA INC. DISTRICT CONTACTS:	3200 HORIZON DRIVE, SUITE 150 KING OF PRUSSIA, PA 19406

DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1	SITE PLAN
C-2	EQUIPMENT PLAN
C-3	TOWER ELEVATIONS
C-4	ANTENNA ORIENTATION
C-5	ANTENNA SCHEDULE
C-6	ANTENNA AND RRH SPECS.
C-7	ANTENNA AND RRH DETAIL
C-8	PLUMBING DIAGRAM
G-1	GROUNDING DETAILS
G-2	GROUNDING DETAILS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 11x17. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

PROJECT DESCRIPTION

THE PURPOSE OF THIS PROJECT IS TO PROPOSE AN ANTENNA MODIFICATION ON AN EXISTING WIRELESS SITE.

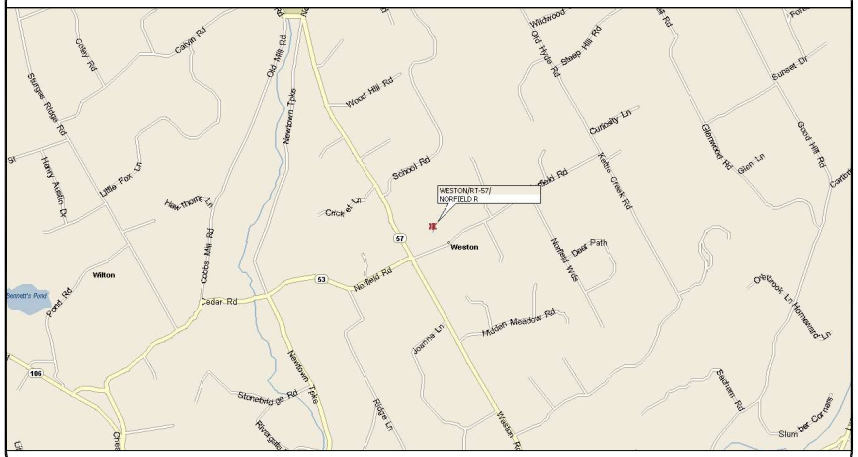
TOWER SCOPE OF WORK
- REMOVE (3) POWERWAVE 7770 ANTENNAS
- REMOVE (6) POWERWAVE LGP 21401 TMAS
- REMOVE (6) POWERWAVE LGP 21901 DIPLEXERS
- REMOVE (3) ERICSSON RRUS-11 B12 RRHS
- RELOCATE (3) KATHREIN 80010965 ANTENNAS
- RELOCATE (3) CCI OPA-65R-LCUU-H6 ANTENNAS
- RELOCATE (3) ERICSSON 4478 B14 RRHS
- RELOCATE (3) ERICCSON RRUS-32 B30 RRHS
- RELOCATE (3) ERICSSON RRUS-32 B2 RRHS
- INSTALL (3) CCI DMP65R-BU6DA ANTENNAS
- INSTALL (3) ERICSSON 4449 B5/B12 RRHS
- INSTALL (3) ERICSSON RRUS-32 B66A RRHS
- INSTALL (1) RAYCAP DC6-48-60-18-8C SURGE SUPPRESSOR
- INSTALL (2) ROSENBERGER LEONI WR-VG86ST-BRD DC CABLES

GROUND SCOPE OF WORK
- INSTALL (6) KAELUS DBCT108F1V92-1 DIPLEXERS
- INSTALL (1) BB6630+tDLe
- INSTALL (3) ERICSSON RRUS-E2 B29 RRHS

DESIGN PACKAGE BASED ON THE RFDS
REVISION: PRELIMINARY
DATE: 12/3/19

DESIGN PACKAGE BASED ON THE APPLICATION
ID: 509322
REVISION: 0

LOCATION MAP



NO SCALE

APPLICABLE CODES/REFERENCE DOCUMENTS

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:

CODE TYPE	CODE
BUILDING	2018 CT SBC (AMENDED 2015 IBC)
MECHANICAL	2018 CT SBC (AMENDED 2015 IBC)
ELECTRICAL	2018 CT SBC (AMENDED 2017 NEC)

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS: BLACK & VEATCH FEBRUARY 28, 2020

MOUNT ANALYSIS: B+T GROUP MARCH 5, 2020

NOTE:
PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN NOC AT (800) 788-7011 & CROWN CONSTRUCTION MANAGER

CALL CONNECTICUT ONE CALL
(800) 922-4455
CALL 3 WORKING DAYS BEFORE YOU DIG!

AT&T
ONE AT&T WAY
BEDMINSTER, NJ 07921

CROWN CASTLE
3200 HORIZON DRIVE, SUITE 150
KING OF PRUSSIA, PA 19406

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

AT&T SITE NUMBER:
CTL02099

BU #: **829046**
WESTON/RT-57/NORFIELD R

56 NORFIELD ROAD
WESTON, CT 06883

EXISTING 190'-0"
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	3/10/20	STH	CONSTRUCTION	RMC
1	4/3/20	GEH	CONSTRUCTION	RMC

STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER
4/3/20

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

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

SHEET NUMBER: T-1
REVISION: 1

136353_829046_Weston RT-57 Norfield.dwg – Sheet:T-1 – User: ghoyes – Apr 03, 2020 – 8:45am

SITE WORK GENERAL NOTES:

1. THE SUBCONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
2. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE SUBCONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES, SUBCONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION.
3. ALL SITE WORK TO COMPLY WITH QAS-STD-10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE USA INC. TOWER SITE" AND LATEST VERSION OF TIA 1019 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
4. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS.
5. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
6. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, OWNER AND/OR LOCAL UTILITIES.
7. THE SUBCONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE.
8. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE BTS EQUIPMENT AND TOWER AREAS.
9. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
10. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
11. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE PROJECT SPECIFICATIONS.
12. SUBCONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
13. NOTICE TO PROCEED– NO WORK TO COMMENCE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED AND THE ISSUANCE OF A PURCHASE ORDER.
14. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN STANDARD CED-STD-10253 INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH THE ANSI/TIA-322 (LATEST EDITION).

STRUCTURAL STEEL NOTES:

1. ALL STEEL WORK SHALL BE PAINTED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND IN ACCORDANCE WITH ASTM A36 UNLESS OTHERWISE NOTED.
2. BOLTED CONNECTIONS SHALL BE ASTM A325 BEARING TYPE (3/4"ø) CONNECTIONS AND SHALL HAVE MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE.
3. NON-STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE 5/8"ø ASTM A307 BOLTS UNLESS NOTED OTHERWISE.
4. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS.

CONCRETE AND REINFORCING STEEL NOTES:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST-IN-PLACE CONCRETE.
2. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS, UNLESS NOTED OTHERWISE. SLAB FOUNDATION DESIGN ASSUMING ALLOWABLE SOIL BEARING PRESSURE OF 2000 PSF.
3. REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60, DEFORMED UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE. SPLICES SHALL BE CLASS "B" AND ALL HOOKS SHALL BE STANDARD, UNO.
4. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:

   CONCRETE CAST AGAINST EARTH.....3 IN.
   CONCRETE EXPOSED TO EARTH OR WEATHER:
   #6 AND LARGER.....2 IN.
   #5 AND SMALLER & WWF.....1 1/2 IN.
   CONCRETE NOT EXPOSED TO EARTH OR WEATHER OR NOT CAST AGAINST THE GROUND:
   SLAB AND WALLS.....3/4 IN.
   BEAMS AND COLUMNS.....1 1/2 IN.
5. A CHAMFER 3/4" SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE. IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

MASONRY NOTES:

1. HOLLOW CONCRETE MASONRY UNITS SHALL MEET A.S.T.M. SPECIFICATION C90, GRADE N. TYPE 1. THE SPECIFIED DESIGN COMPRESSIVE STRENGTH OF CONCRETE MASONRY (F'm) SHALL BE 1500 PSI.
2. MORTAR SHALL MEET THE PROPERTY SPECIFICATION OF A.S.T.M. C270 TYP. "S" MORTAR AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2000 PSI.
3. GROUT SHALL MEET A.S.T.M. SPECIFICATION C475 AND HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 2000 PSI.
4. CONCRETE MASONRY SHALL BE LAID IN RUNNING (COMMON) BOND.
5. WALL SHALL RECEIVE TEMPORARY BRACING. TEMPORARY BRACING SHALL NOT BE REMOVED UNTIL GROUT IS FULLY CURED.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:

CONTRACTOR–	
SUBCONTRACTOR–	GENERAL CONTRACTOR (CONSTRUCTION)
CARRIER–	AT&T
TOWER OWNER–	CROWN CASTLE USA INC.
OEM–	ORIGINAL EQUIPMENT MANUFACTURER

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR AND CROWN CASTLE USA INC.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4. DRAWINGS PROVIDED HERE ARE NOT TO SCALE AND ARE INTENDED TO SHOW OUTLINE ONLY.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CONTRACTOR AND CROWN CASTLE USA INC. PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWINGS.
10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

ABBREVIATIONS AND SYMBOLS:

ABBREVIATIONS:

AGL	ABOVE GRADE LEVEL
BTS	BASE TRANSCEIVER STATION
EXISTING	EXISTING
MIN.	MINIMUM
REF	REFERENCE
RF	RADIO FREQUENCY
T.B.D.	TO BE DETERMINED
T.B.R.	TO BE RESOLVED
TYP	TYPICAL
REQ	REQUIRED
EGR	EQUIPMENT GROUND RING
AWG	AMERICAN WIRE GAUGE
MGB	MASTER GROUND BAR
EG	EQUIPMENT GROUND
BCW	BARE COPPER WIRE
SIAD	SMART INTEGRATED ACCESS DEVICE
GEN	GENERATOR
IGR	INTERIOR GROUND RING (HALO)
RBS	RADIO BASE STATION

SYMBOLS:

SG	SOLID GROUND BUS BAR
SN	SOLID NEUTRAL BUS BAR
	SUPPLEMENTAL GROUND CONDUCTOR
	2-POLE THERMAL-MAGNETIC CIRCUIT BREAKER
	SINGLE-POLE THERMAL-MAGNETIC CIRCUIT BREAKER
	CHEMICAL GROUND ROD
	TEST WELL
	DISCONNECT SWITCH
M	METER
	EXOTHERMIC WELD (CADWELD) (UNLESS OTHERWISE NOTED)
	MECHANICAL CONNECTION
	GROUNDING WIRE

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. SUBCONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC. HILTI EPOXY ANCHORS ARE REQUIRED BY CROWN CASTLE USA INC.
4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
5. CABLES SHALL NOT BE ROUTED THROUGH LADDER-STYLE CABLE TRAY RUNGS.
6. EACH END OF EVERY POWER, POWER PHASE CONDUCTOR (I.E., HOTS), GROUNDING AND T1 CONDUCTOR AND CABLE SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.
7. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH PLASTIC TAPE PER COLOR SCHEDULE. ALL EQUIPMENT SHALL BE LABELED WITH THEIR VOLTAGE RATING, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (I.E. PANEL BOARD AND CIRCUIT ID'S).
8. PANEL BOARDS (ID NUMBERS) AND INTERNAL CIRCUIT BREAKERS (CIRCUIT ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
9. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
10. POWER, CONTROL AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE CONDUCTOR (#14 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90° C (WET & DRY) OPERATION LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED UNLESS OTHERWISE SPECIFIED.
11. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE CONDUCTOR (#6 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN-2 GREEN INSULATION CLASS B STRANDED COPPER CABLE RATED FOR 90° C (WET AND DRY) OPERATION LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED UNLESS OTHERWISE SPECIFIED.
12. POWER AND CONTROL WIRING, NOT IN TUBING OR CONDUIT, SHALL BE MULTI-CONDUCTOR, TYPE TC CABLE (#14 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90° C (WET AND DRY) OPERATION WITH OUTER JACKET LISTED OR LABELED FOR THE LOCATION USED UNLESS OTHERWISE SPECIFIED.
13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP-STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION AT NO LESS THAN 75° C (90° C IF AVAILABLE).
14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
15. ELECTRICAL METALLIC TUBING (EMT) OR RIGID NONMETALLIC CONDUIT (I.E. RIGID PVC SCHEDULE 40 OR RIGID PVC SCHEDULE 80 FOR LOCATIONS SUBJECT TO PHYSICAL DAMAGE) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
16. ELECTRICAL METALLIC TUBING (EMT), ELECTRICAL NONMETALLIC TUBING (ENT) OR RIGID NONMETALLIC CONDUIT (RIGID PVC, SCHEDULE 40) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
18. LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
21. WIREWAYS SHALL BE EPOXY-COATED (GRAY) AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS; SHALL BE PANDUIT TYPE E (OR EQUAL); AND RATED NEMA 1 (OR BETTER).
22. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE. MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHIN ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
23. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY-COATED SHEET STEEL; SHALL MEET OR EXCEED UL 50 AND RATED NEMA 1 (OR BETTER) INDOORS OR NEMA 3R (OR BETTER) OUTDOORS.
24. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY-COATED OR NON-CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1; AND RATED NEMA 1 (OR BETTER) INDOORS OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
25. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2; AND RATED NEMA 1 (OR BETTER) INDOORS OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
26. THE SUBCONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CONTRACTOR BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
27. THE SUBCONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
28. INSTALL PLASTIC LABEL ON THE METER CENTER TO SHOW "AT&T".
29. ALL CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

GREENFIELD GROUNDING NOTES:

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE SUBCONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
5. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
6. EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 AWG SOLID TINNED COPPER FOR OUTDOOR BTS.
7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.
8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 AWG SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
14. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
15. APPROVED ANTIOXIDANT COATINGS (I.E. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
17. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
18. BOND ALL METALLIC OBJECTS WITHIN 6 FT. OF MAIN GROUND WIRES WITH 1-#2 AWG TIN-PLATED COPPER GROUND CONDUCTOR.
19. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS, WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 TINNED SOLID IN 3/4" LIQUID TIGHT CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD-WELD TERMINATION POINT. THE EXPOSED END OF THE LIQUID TIGHT CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).

NEC INSULATOR COLOR CODE

DESCRIPTION	PHASE/CODE LETTER	WIRE COLOR
240/120 1Ø	LEG 1	BLACK
	LEG 2	RED
AC NEUTRAL	N	WHITE
GROUND (EGC)	G	GREEN
VDC POS	+	*RED-POLARITY MARK AT TERMINATION
VDC NEG	–	*BLACK-POLARITY MARK AT TERMINATION
240V OR 208V, 3Ø	PHASE A	BLACK
	PHASE B	RED(ORG. IF HI LEG)
	PHASE C	BLUE
480V, 3Ø	PHASE A	BROWN
	PHASE B	ORANGE OR PURPLE
	PHASE C	YELLOW

* SEE NEC 210.5(C)(1) AND (2)

AT&T
ONE AT&T WAY
BEDMINSTER, NJ 07921

CROWN CASTLE
3200 HORIZON DRIVE, SUITE 150
KING OF PRUSSIA, PA 19406

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

AT&T SITE NUMBER:
CTL02099

BU #: **829046**
WESTON/RT-57/NORFIELD R

56 NORFIELD ROAD
WESTON, CT 06883

EXISTING 190'-0"
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	3/10/20	STH	CONSTRUCTION	RMC
1	4/3/20	GEH	CONSTRUCTION	RMC

STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER
4/3/20

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

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

SHEET NUMBER: T-2
REVISION: 1

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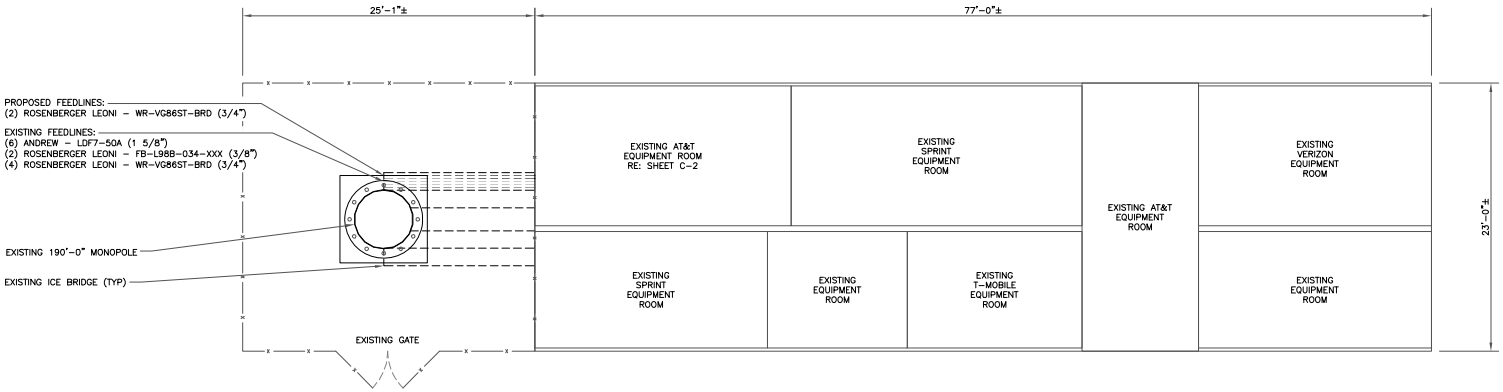

1 SITE PLAN

SCALE: 4' 2' 0 4' 3/16"=1'-0" (FULL SIZE) 3/32"=1'-0" (11x17)

N

AT&T

ONE AT&T WAY
BEDMINSTER, NJ 07921

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STATE OF CONNECTICUT
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4/3/20

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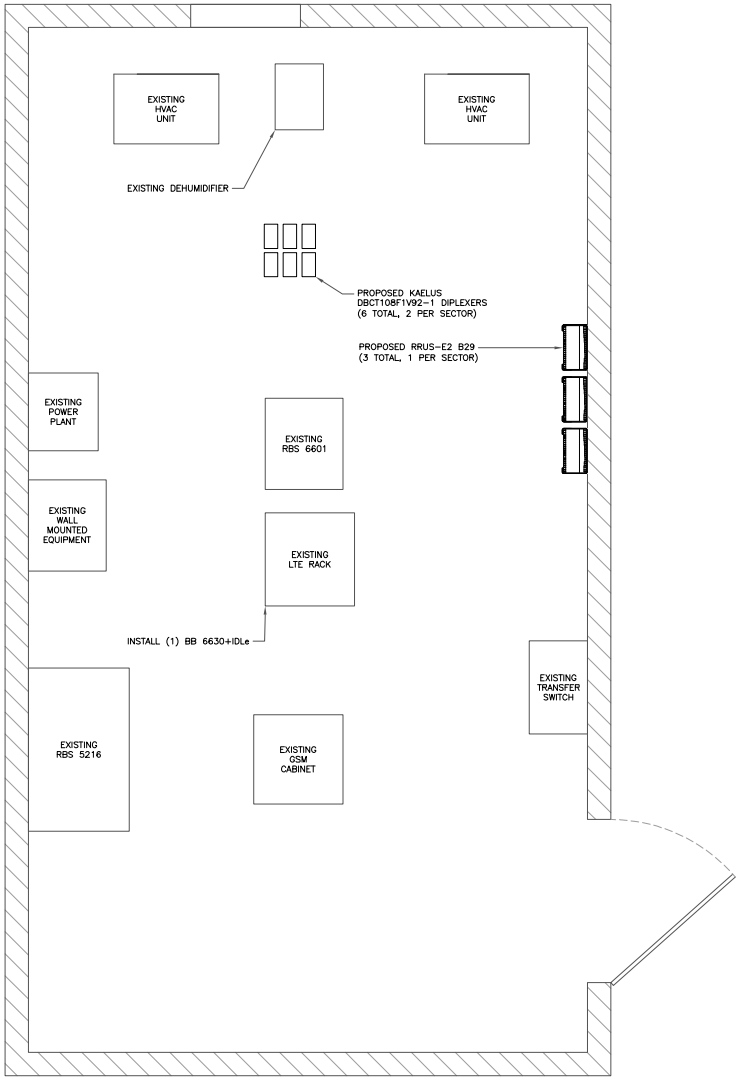
SHEET NUMBER: C-1

REVISION: 1

136353_829046_Weston Rt-57 Norfield.dwg – Sheet:C-1 – User: ghayes – Apr 03, 2020 – 8:45am



1 EXISTING EQUIPMENT PLAN

SCALE: 1' 6" 0 1' 3/4"=1'-0" (FULL SIZE) 3/8"=1'-0" (11x17)

N

AT&T

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56 NORFIELD ROAD
WESTON, CT 06883

EXISTING 190'-0"
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	3/10/20	STH	CONSTRUCTION	RMC
1	4/3/20	GEH	CONSTRUCTION	RMC

STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER

4/3/20

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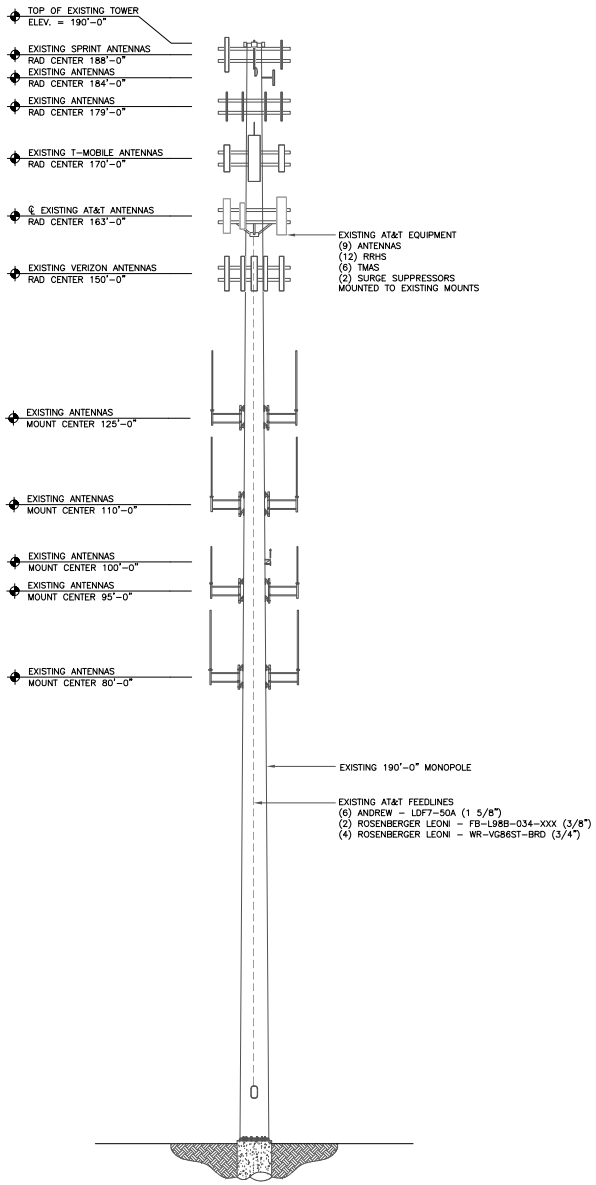
SHEET NUMBER: C-2

REVISION: 1

136353_829046_Weston Rt-57 Norfield.dwg – Sheet:C-2 – User: ghayes – Apr 03, 2020 – 8:45am

AT&T EQUIPMENT

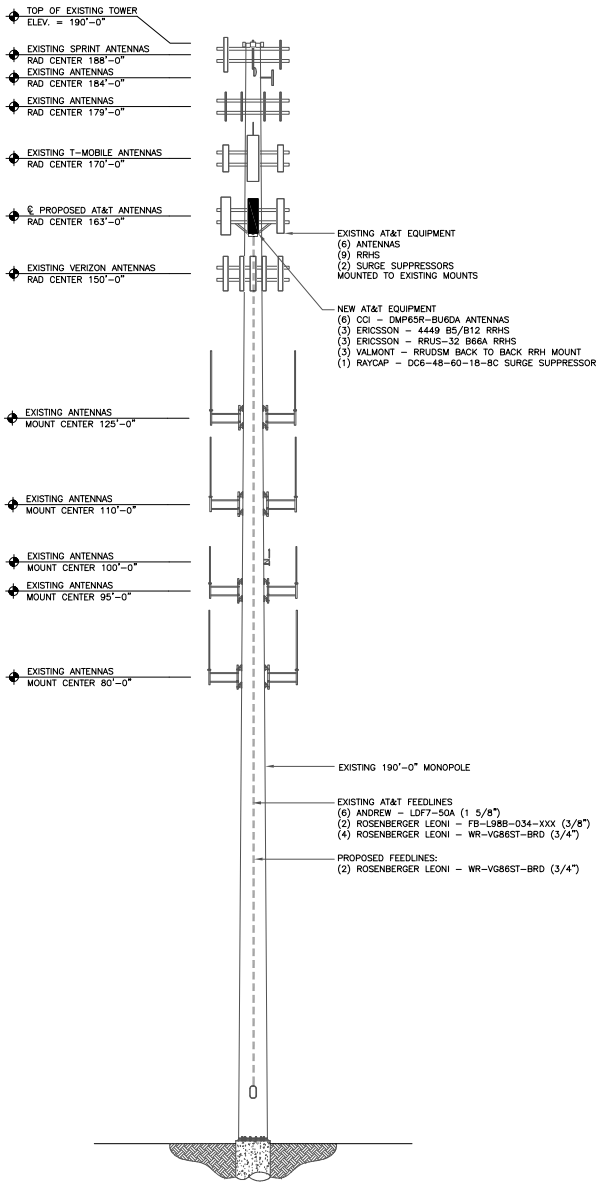
ANTENNA CL: 163'-0"
MOUNT CL: 162'-0"



1 EXISTING ELEVATION
SCALE: NOT TO SCALE

AT&T EQUIPMENT

ANTENNA CL: 163'-0"
MOUNT CL: 162'-0"



2 FINAL ELEVATION
SCALE: NOT TO SCALE

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AT&T SITE NUMBER:
CTL02099

BU #: **829046**
WESTON/RT-57/NORFIELD R

56 NORFIELD ROAD
WESTON, CT 06883

EXISTING 190'-0"
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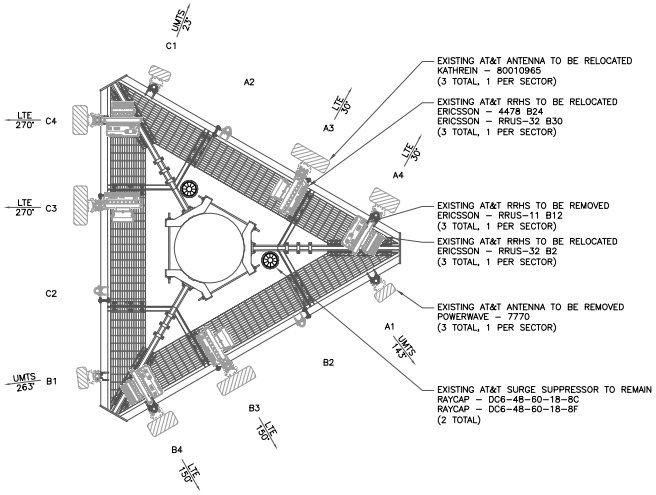
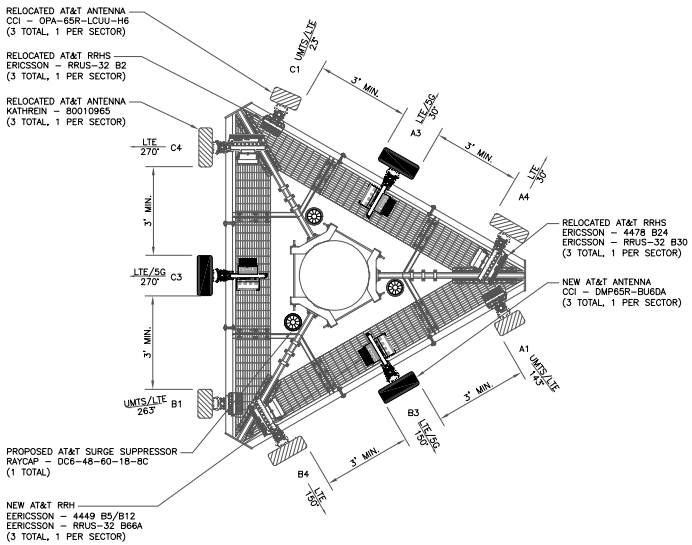
SHEET NUMBER: C-3
REVISION: 1

136353_829046_Weston Rt-57 Norfield.dwg – Sheet:C-3 – User: ghayes – Apr 03, 2020 – 8:45am



1 EXISTING ANTENNA LAYOUT
SCALE: NOT TO SCALE

N



2 FINAL ANTENNA LAYOUT
SCALE: NOT TO SCALE

N

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SHEET NUMBER: C-4
REVISION: 1

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FINAL ANTENNA AND COAXIAL CABLE SCHEDULE

POS.	TECH	STATUS	AZIMUTH	ANTENNA TYPE	ANTENNA RAD CENTER	MECHANICAL DOWNTILT	ELECTRICAL DOWNTILT	MAIN COAX SIZE	MAIN COAX LENGTH	COAX QTY	TMA QTY AND MODEL	RAYCAP	DC (WR-VG86ST-BRD) FIBER CABLES (FB-L98B-034-XXXXXXX)	RRHs QTY	DIPLEXER ON TOWER	DIPLEXER ON GROUND	RET CABLE
ALPHA SECTOR																	
A1	UMTS/LTE	EXISTING	23°	CCI OPS-65R-LCUU-H6	163'-0"	0°	7°/3°/3°/3°	1 5/8"	195'-0"	2	–	DC6-48-60-18-8F	(1) FIBER (2) DC LINES	(1) RRUS-32 B2 (1) RRUS-E2-B29 (SHELTER)	–	(2) DBCT108F1V92-1	Y
A2	–	–	–	–	–	–	–	–	–	–	–			–	–	–	–
A3	LTE/5G	NEW	30°	CCI DMP65R-BU6DA	163'-0"	0°	2°/2°/3°/2°	–	–	–	–			(1) 4449 B5/B12 (1) RRUS-32 B66A	–	–	Y
A4	LTE	EXISTING	30°	KATHREIN 80010965	163'-0"	0°	2°/3°	–	–	–	–			(1) 4478 B14 (1) RRUS-32 B30	–	–	Y
BETA SECTOR																	
B1	UMTS/LTE	EXISTING	143°	CCI OPS-65R-LCUU-H6	163'-0"	0°	7°/3°/4°/4°	1 5/8"	195'-0"	2	–	DC6-48-60-18-8C	(1) FIBER (2) DC LINES	(1) RRUS-32 B2 (1) RRUS-E2-B29 (SHELTER)	–	(2) DBCT108F1V92-1	Y
B2	–	–	–	–	–	–	–	–	–	–	–			–	–	–	–
B3	LTE/5G	NEW	150°	CCI DMP65R-BU6DA	163'-0"	0°	3°/3°/4°/3°	–	–	–	–			(1) 4449 B5/B12 (1) RRUS-32 B66A	–	–	Y
B4	LTE	EXISTING	150°	KATHREIN 80010965	163'-0"	0°	3°/3°	–	–	–	–			(1) 4478 B14 (1) RRUS-32 B30	–	–	Y
GAMMA SECTOR																	
C1	UMTS/LTE	EXISTING	263°	CCI OPS-65R-LCUU-H6	163'-0"	0°	6°/3°/3°/3°	1 5/8"	195'-0"	2	–	DC6-48-60-18-8C	(2) DC LINES	(1) RRUS-32 B2 (1) RRUS-E2-B29 (SHELTER)	–	(2) DBCT108F1V92-1	Y
C2	–	–	–	–	–	–	–	–	–	–	–			–	–	–	–
C3	LTE/5G	NEW	270°	CCI DMP65R-BU6DA	163'-0"	0°	2°/2°/3°/2°	–	–	–	–			(1) 4449 B5/B12 (1) RRUS-32 B66A	–	–	Y
C4	LTE	EXISTING	270°	KATHREIN 80010965	163'-0"	0°	2°/3°	–	–	–	–			(1) 4478 B14 (1) RRUS-32 B30	–	–	Y

NOTE: BOLD DENOTES NEW EQUIPMENT

1 FINAL ANTENNA AND COAXIAL CABLE SCHEDULE
SCALE: NOT TO SCALE

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BU #: **829046**
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WESTON, CT 06883

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SHEET NUMBER: C-5
REVISION: 1

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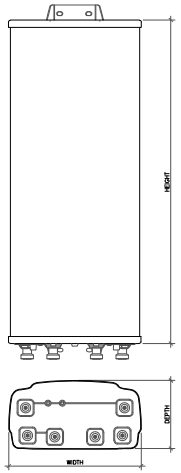
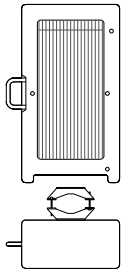


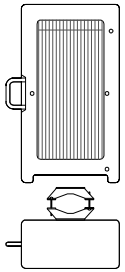
ANTENNA DIMENSIONS (INCHES)				
MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
DMP65R-BU6D	71.2"	20.7"	7.7"	79.4 lbs

1 ANTENNA DETAIL
SCALE: NOT TO SCALE



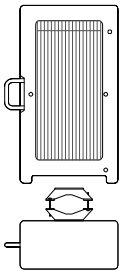
EERICSSON – 4449 B5/B12
WEIGHT (FULLY EQUIPPED): 71.0 LBS
SIZE (HxWxD): 17.9x13.19x9.44 IN.

2 RRH DETAIL
SCALE: NOT TO SCALE



EERICSSON – RRUS-32 B66A
WEIGHT (FULLY EQUIPPED): 55.12 LBS
SIZE (HxWxD): 27.6x12.45x7.41 IN.

3 RRH DETAIL
SCALE: NOT TO SCALE



EERICSSON – RRUS-E2 B29
WEIGHT (FULLY EQUIPPED): 50.7 LBS
SIZE (HxWxD): 19.69x16.96x7.16 IN.

4 RRH DETAIL
SCALE: NOT TO SCALE

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SHEET NUMBER: C-6
REVISION: 1

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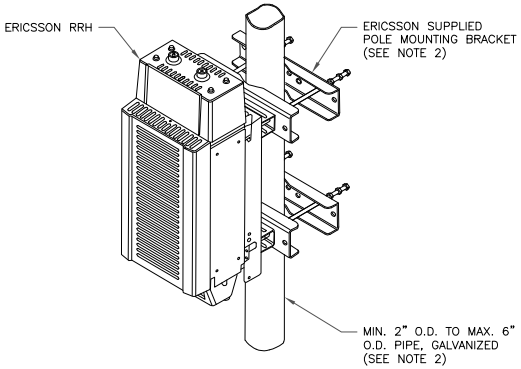
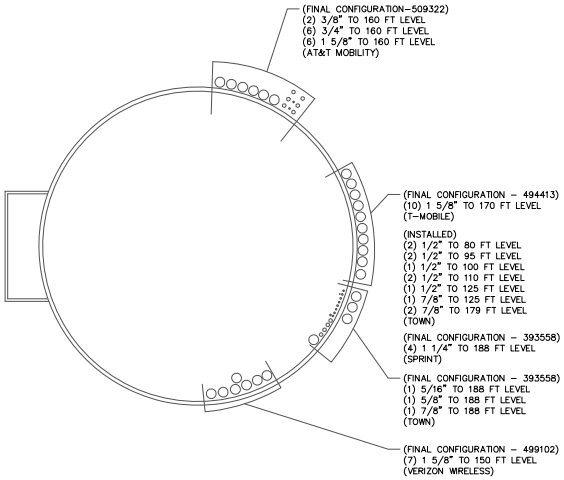
NOTES:

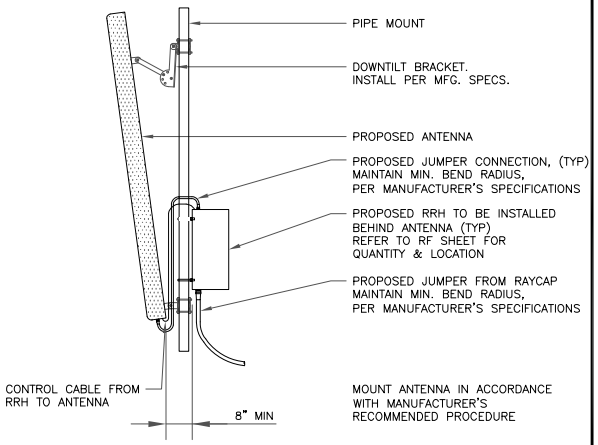
1. ERICSSON VIA AT&T SUPPLIES RRH, RRH POLE–MOUNTING BRACKET. SUBCONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ERICSSON RRH POLE–MOUNTING BRACKET. ERICSSON INSTALLS RRH AND MAKES CABLE TERMINATIONS.
2. FOR POLE DIAMETERS FROM 6" TO 15", ERICSSON CAN SUPPLY A PAIR OF POLE MOUNTING METAL BANDS WITH BOLTING WELDMENT.
3. NO PAINTING OF THE RRH OR SOLAR SHIELD IS ALLOWED



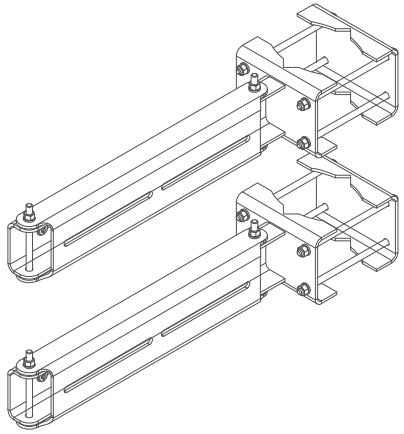
1 RRH MOUNTING DETAIL
SCALE: NOT TO SCALE



2 BASE LEVEL DRAWING
SCALE: NOT TO SCALE



3 ANTENNA MOUNTING DETAIL
SCALE: NOT TO SCALE



4 VALMONT – RRUDSM
SCALE: NOT TO SCALE

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SHEET NUMBER: C-7
REVISION: 1

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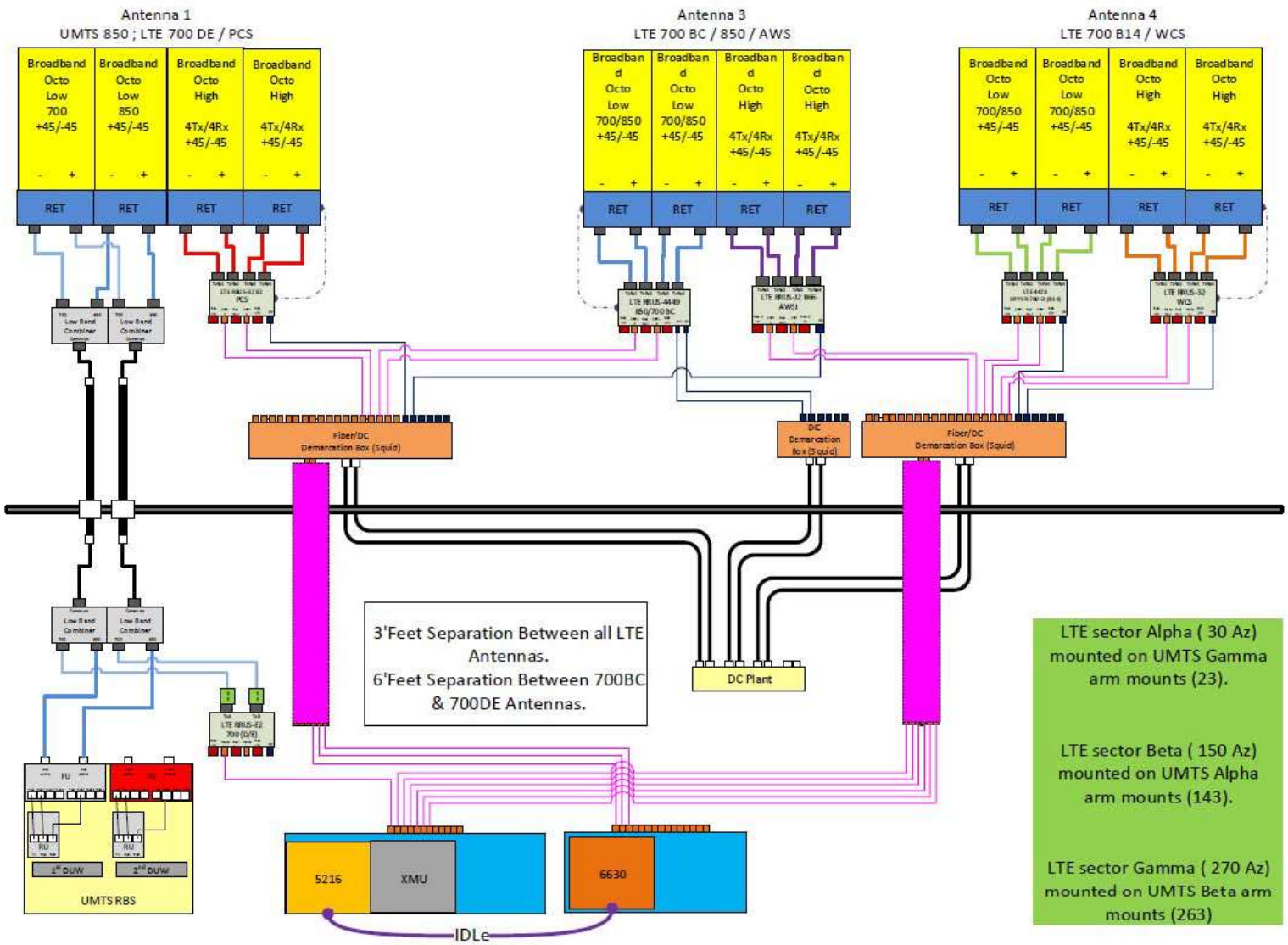

1 PLUMBING DIAGRAM
SCALE: NOT TO SCALE

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SHEET NUMBER: C-8
REVISION: 1

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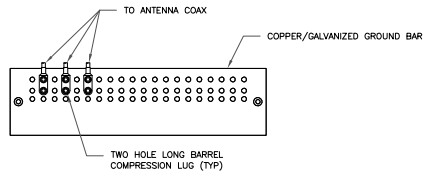
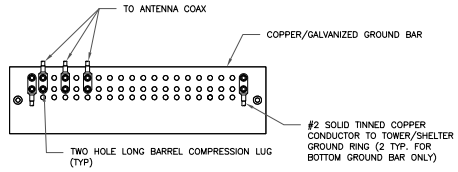


NOTES:

1. DOUBLING UP "OR STACKING" OF CONNECTIONS IS NOT PERMITTED.
2. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
3. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL.

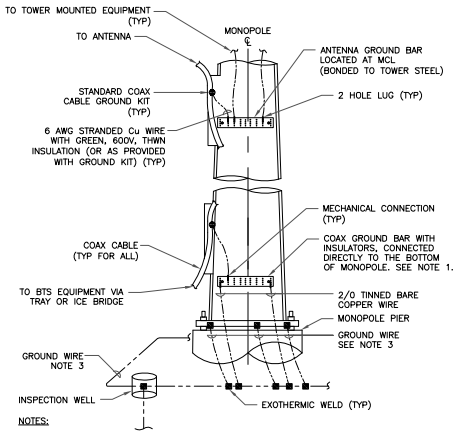
1 ANTENNA GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
2. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL (TOWER ONLY).
3. GROUND BAR SHALL BE ISOLATED FROM BUILDING OR SHELTER.

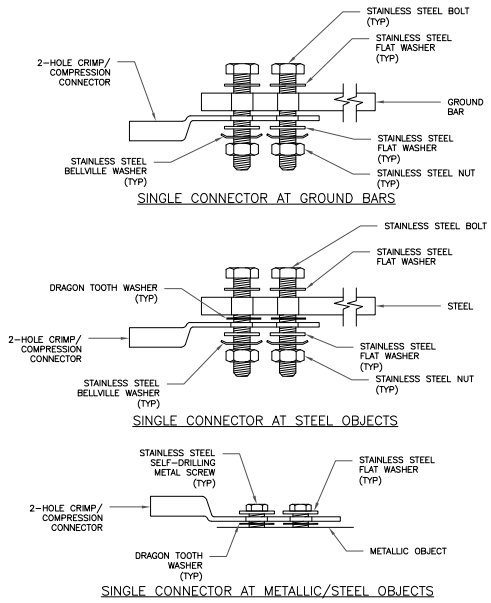
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATIONS AND CONNECTION ORIENTATION. COAXIAL CABLES EXCEEDING 200 FEET ON THE TOWER SHALL HAVE GROUND KITS AT THE MIDPOINT. PROVIDE AS REQUIRED.
2. ONLY MECHANICAL CONNECTIONS ARE ALLOWED TO BE MADE TO CROWN CASTLE USA INC. TOWERS. ALL MECHANICAL CONNECTIONS SHALL BE TREATED WITH AN ANTI-OXIDANT COATING.
3. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF THE RECOGNIZED EDITION OF ANSI/TIA 222 AND NFPA 780.

4 TYPICAL ANTENNA CABLE GROUNDING
SCALE: NOT TO SCALE



5 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE

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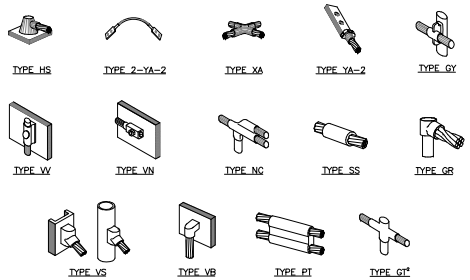
SHEET NUMBER: G-1
REVISION: 1

136353_829046_Weston Rt-57 Norfield.dwg – SheetG-1 – User: ghayes – Apr 03, 2020 – 8:45am

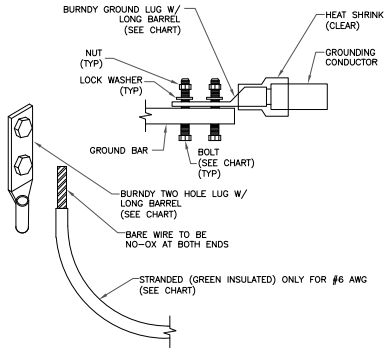


NOTE:

1. ERICO EXOTHERMIC "MOLD TYPES" SHOWN HERE ARE EXAMPLES. CONSULT WITH CONSTRUCTION MANAGER FOR SPECIFIC MOLDS TO BE USED FOR THIS PROJECT.
2. MOLD TYPE ONLY TO BE USED BELOW GRADE WHEN CONNECTING GROUND RING TO GROUND ROD.

1 CADWELD GROUNDING CONNECTIONS
SCALE: NOT TO SCALE

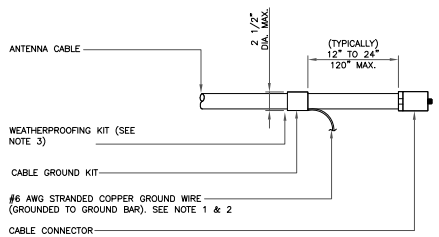
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" – 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" – 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" – 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" – 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" – 16 NC S 2 BOLT



NOTES:

1. ALL GROUNDING LUGS ARE TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. ALL HARDWARE BOLTS, NUTS, LOCK WASHERS SHALL BE STAINLESS STEEL. ALL HARDWARE ARE TO BE AS FOLLOWS: BOLT, FLAT WASHER,GROUND BAR, GROUND LUG, FLAT WASHER AND NUT.

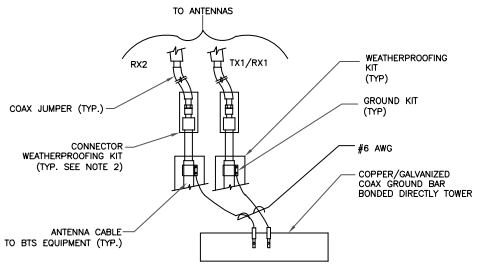
2 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE USED.

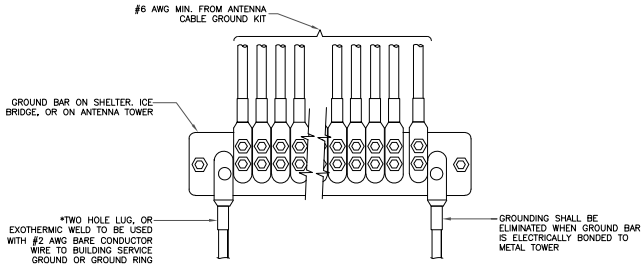
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



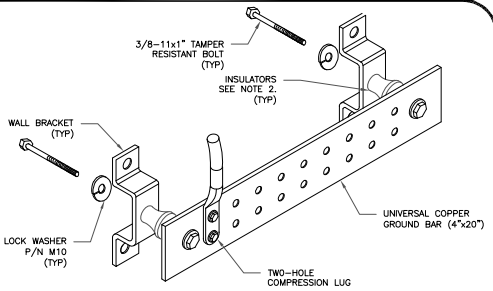
NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
2. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT. COLD SHRINK SHALL NOT BE USED.

4 GROUND CABLE CONNECTION
SCALE: NOT TO SCALE



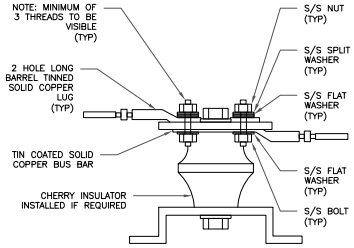
5 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE



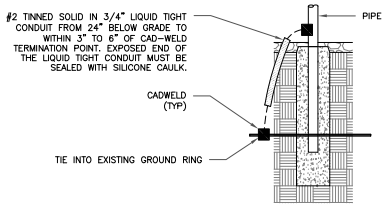
NOTES:

1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE USA INC. TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.
2. OMIT INSULATOR WHEN MOUNTING TO TOWER STEEL OR PLATFORM STEEL USE INSULATORS WHEN ATTACHING TO BUILDING OR SHELTERS.

6 GROUND BAR DETAIL
SCALE: NOT TO SCALE



7 LUG DETAIL
SCALE: NOT TO SCALE



8 TRANSITIONING GROUND DETAIL
SCALE: NOT TO SCALE

AT&T
ONE AT&T WAY
BEDMINSTER, NJ 07921

CROWN CASTLE
3200 HORIZON DRIVE, SUITE 150
KING OF PRUSSIA, PA 19406

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

AT&T SITE NUMBER:
CTL02099

BU #: **829046**
WESTON/RT-57/NORFIELD R

56 NORFIELD ROAD
WESTON, CT 06883

EXISTING 190'-0"
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	3/10/20	STH	CONSTRUCTION	RMC
1	4/3/20	GEH	CONSTRUCTION	RMC

4/3/20

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

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

SHEET NUMBER: G-2
REVISION: 1

136353_829046_Weston Rt-57 Norfield.dwg – SheetG-2 – User: ghayes – Apr 03, 2020 – 8:45am

Exhibit D

Structural Analysis Report

Date: **February 28, 2020**

Cheryl Schultz
Crown Castle
6325 Ardrey Kell RddSuite 600
Charlotte, NC 28277

Black & Veatch Corp.
6800 W. 115th St., Suite 2292
Overland Park, KS 66211
(913) 458-6909

Subject:	**Structural Analysis Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CTL02099
Crown Castle Designation:	**Crown Castle BU Number:**	829046
	Crown Castle Site Name:	Weston/ Rt-57/ Norfield R
	Crown Castle JDE Job Number:	596319
	Crown Castle Work Order Number:	1832008
	Crown Castle Order Number:	509322 Rev. 0
Engineering Firm Designation:	**Black & Veatch Corp. Project Number:**	1832008
Site Data:	**56 Norfield Rd. (Town Hall), Weston, Fairfield County, CT**	
	Latitude *41° 12' 8.4"*, Longitude *-73° 22' 46.6"*	
	190 Foot - Monopole Tower	

Dear Cheryl Schultz,

Black & Veatch Corp. is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower.

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

LC7: Proposed Equipment Configuration **Sufficient Capacity - 83.9%**

This analysis utilizes an ultimate 3-second gust wind speed of 120 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 – Analysis Criteria.

Structural analysis prepared by: Phutthiphong Suwantha / Keerati Pongrungsap

Respectfully submitted by:

Joshua J. Riley, P.E.
Professional Engineer

STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED
PROFESSIONAL ENGINEER
02/28/2020

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1) INTRODUCTION

This tower is a 190 ft Monopole tower designed by Pirod, Inc. and mapped by Tower Engineering Professionals, Inc.

The tower has been modified multiple times in the past to accommodate additional loading.

The tower has been modified per reinforcement drawings prepared by Tower Engineering Professionals and Sabre Tower & Poles, in January of 2012. Reinforcement consists of addition of reinforcement plates at elevation 0.83-ft to 51-ft and 57.5-ft to 112.5-ft and additional of (8) anchor rods. Refer to Post Modification Inspection Report by Sabre Tower & Poles in November of 2012. This modification has been considered effective in this analysis.

The tower was later modified per reinforcement drawings prepared by Paul J. Ford and Company, in April of 2013. Reinforcement consisted of addition of jump plates at elevation 20-ft, 40-ft, 60-ft and 80-ft, reinforcing plates at 80.25-ft to 87.25-ft and additional of (4) transition stiffeners. Refer to Modification Inspection Report by Tower Engineering Professionals in November of 2014. This modification has been considered effective in this analysis.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	120 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
162.0	163.0	3	cci antennas	DMP65R-BU6D w/ Mount Pipe	6 2 6	1-5/8 3/8 3/4
		3	cci antennas	OPA-65R-LCUU-H6 w/ Mount Pipe		
		3	kathrein	80010965 w/ Mount Pipe		
		3	ericsson	RRUS 32 B2		
		3	ericsson	RRUS 32 B30		
		3	ericsson	RRUS 32 B66A		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 4478 B14		
		6	kaelus	DBCT108F1V92-1		
		2	raycap	DC6-48-60-18-8C		
		1	raycap	DC6-48-60-18-8F		
	162.0	1	site pro 1	HRK-14 Handrail Kit [NA 510-1]		
		3	site pro 1	PRK-SFS-L Reinforcement Kit		
		1	cci tower mounts (v2.1)	Platform Mount [LP 403-1]		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
188.0	193.0	1	rfs celwave	PD201-7	4 1 1 1	1-1/4 5/16 5/8 7/8
	190.0	3	alcatel lucent	TD-RRH8x20-25		
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe		
		3	rfs celwave	APXVTM14-ALU-I20 w/ Mount Pipe		
	188.0	1	cci tower mounts (v2.1)	Platform Mount [LP 403-1]		
	187.0	1	radiowaves	SP2-5.8		
185.0	188.0	3	alcatel lucent	1900MHz RRH	-	-
		3	alcatel lucent	800MHZ RRH		
	185.0	1	cci tower mounts (v2.1)	Side Arm Mount [SO 102-3]		
184.0	184.0	1	cci tower mounts (v2.1)	Side Arm Mount [SO 701-1]	-	-
179.0	185.0	2	rfs celwave	458-2D	2	7/8
	179.0	1	cci tower mounts (v2.1)	Platform Mount [LP 403-1]		
		2	cci tower mounts (v2.1)	Side Arm Mount [SO 301-1]		
170.0	170.0	1	cci tower mounts (v2.1)	Platform Mount [LP 405-1]	10	1-5/8
		3	ericsson	AIR 32 B2A/B66AA w/ Mount Pipe		
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe		
		3	ericsson	KRY 112 144/1		
		3	ericsson	RADIO 4449 B12/B71		
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		
150.0	153.0	2	antel	LPA-80080/6CF w/ Mount Pipe	7	1-5/8
		4	decibel	DB846F65ZAXY w/ Mount Pipe		
		6	quintel technology	QS6656-5D w/ Mount Pipe		
		1	rfs celwave	DB-C1-12C-24AB-0Z		
		3	samsung telecommunications	RFV01U-D1A		
		3	samsung telecommunications	RFV01U-D2A		
	150.0	1	cci tower mounts (v2.1)	Platform Mount [LP 403-1]		
125.0	130.0	1	rfs celwave	PD128-1	1 1	1/2 7/8
		1	rfs celwave	PD201-1		
	125.0	2	cci tower mounts (v2.1)	Side Arm Mount [SO 901-1]		
110.0	115.0	2	rfs celwave	PD128-1	2	1/2

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
	110.0	2	cci tower mounts (v2.1)	Side Arm Mount [SO 901-1]		
100.0	101.0	1	gps	GPS_A	1	1/2
	100.0	1	cci tower mounts (v2.1)	Side Arm Mount [SO 901-1]		
95.0	100.0	2	rfs celwave	PD128-1	2	1/2
	95.0	2	cci tower mounts (v2.1)	Side Arm Mount [SO 901-1]		
80.0	85.0	1	decibel	DB222	2	1/2
		1	rfs celwave	PD128-1		
	80.0	2	cci tower mounts (v2.1)	Side Arm Mount [SO 901-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Arcnet architects, Inc.	3529916	CCISITES
4-POST-MODIFICATION INSPECTION	Sabre Tower & Poles	3673725	CCISITES
4-POST-MODIFICATION INSPECTION	Tower Engineering Professionals, Inc.	5392198	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Pirod, Inc.	3755295	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Pirod, Inc. / Tower Engineering Professionals, Inc. (mapped)	7340070	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Sabre Tower & Poles	3667108	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Paul J. Ford and Company	3801440	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.5.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

tnxTower was used to determine the loads on the modified structure. Additional calculations were performed to determine the stresses in the pole and in the reinforcing elements. These calculations are presented in Appendix C.

3.2) Assumptions

1) Tower and structures were built and maintained in accordance with the manufacturer's specifications.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
3) Flange plate design methodology of the manufacturer have been reviewed and found to be an acceptable means of designing to resist the full capacity of the bolts and shaft.
4) The wind loading Exposure Category and Topographic Category for this site have been analyzed and determined by the tower owner. Black & Veatch does not assume any responsibility for their accuracy.
5) This analysis was performed under the assumption that all information provided to Black & Veatch is current and correct. This is to include site data, appurtenance loading (including antenna size and weight), tower/foundation details, and geotechnical data. The loading on the structure is based on CAD level drawings and carrier orders provided by the owner. If any of this information is not current and correct, this report should be considered obsolete and further analysis will be required.

This analysis may be affected if any assumptions are not valid or have been made in error. Black & Veatch Corp. should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary) (Monopole Tower)

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
190 - 185	Pole	TP30x30x0.375	Pole	1.3%	Pass
185 - 180	Pole	TP30x30x0.375	Pole	3.5%	Pass
180 - 175	Pole	TP36x36x0.375	Pole	4.9%	Pass
175 - 170	Pole	TP36x36x0.375	Pole	7.3%	Pass
170 - 165	Pole	TP36x36x0.375	Pole	11.3%	Pass
165 - 160	Pole	TP36x36x0.375	Pole	16.6%	Pass
160 - 155	Pole	TP42x42x0.375	Pole	16.9%	Pass
155 - 150	Pole	TP42x42x0.375	Pole	21.4%	Pass
150 - 145	Pole	TP42x42x0.375	Pole	27.7%	Pass
145 - 140	Pole	TP42x42x0.375	Pole	33.5%	Pass
140 - 135	Pole	TP48x48x0.375	Pole	30.7%	Pass
135 - 130	Pole	TP48x48x0.375	Pole	35.4%	Pass
130 - 125	Pole	TP48x48x0.375	Pole	40.1%	Pass
125 - 120	Pole	TP48x48x0.375	Pole	45.0%	Pass
120 - 115	Pole	TP54x54x0.375	Pole	40.1%	Pass
115 - 112.67	Pole	TP54x54x0.375	Pole	42.0%	Pass
112.67 - 112.42	Pole + Reinf.	TP54x54x0.4875	Pole	32.3%	Pass
112.42 - 107.42	Pole + Reinf.	TP54x54x0.4875	Pole	35.5%	Pass
107.42 - 103.33	Pole + Reinf.	TP54x54x0.4875	Pole	38.1%	Pass
103.33 - 103.08	Pole + Reinf.	TP54x54x0.4875	Pole	38.3%	Pass
103.08 - 100	Pole + Reinf.	TP54x54x0.4875	Pole	40.3%	Pass

100 - 95	Pole + Reinf.	TP60x60x0.475	Pole	36.8%	Pass
95 - 90	Pole + Reinf.	TP60x60x0.475	Pole	39.8%	Pass
90 - 89.5	Pole + Reinf.	TP60x60x0.475	Pole	40.1%	Pass
89.5 - 89.25	Pole + Reinf.	TP60x60x0.5563	Pole	34.7%	Pass
89.25 - 85.5	Pole + Reinf.	TP60x60x0.5563	Pole	36.7%	Pass
85.5 - 85.25	Pole + Reinf.	TP60x60x0.6375	Pole	32.4%	Pass
85.25 - 84	Pole + Reinf.	TP60x60x0.6375	Pole	33.0%	Pass
84 - 83.75	Pole + Reinf.	TP60x60x0.525	Pole	39.6%	Pass
83.75 - 82.5	Pole + Reinf.	TP60x60x0.525	Pole	40.3%	Pass
82.5 - 82.25	Pole + Reinf.	TP60x60x0.45	Pole	47.3%	Pass
82.25 - 80	Pole + Reinf.	TP60x60x0.45	Pole	48.9%	Pass
80 - 75	Pole + Reinf.	TP60x60x0.575	Reinf. 3 Compression	40.3%	Pass
75 - 70	Pole + Reinf.	TP60x60x0.575	Reinf. 3 Compression	43.1%	Pass
70 - 65	Pole + Reinf.	TP60x60x0.575	Reinf. 3 Compression	46.0%	Pass
65 - 60	Pole + Reinf.	TP60x60x0.575	Reinf. 3 Compression	48.9%	Pass
60 - 58.5	Pole + Reinf.	TP60x60x0.7	Reinf. 3 Compression	41.1%	Pass
58.5 - 58.25	Pole	TP60x60x0.625	Pole	45.0%	Pass
58.25 - 53.25	Pole	TP60x60x0.625	Pole	47.7%	Pass
53.25 - 48.25	Pole	TP60x60x0.625	Pole	50.4%	Pass
48.25 - 48	Pole + Reinf.	TP60x60x0.775	Pole	41.2%	Pass
48 - 43	Pole + Reinf.	TP60x60x0.775	Pole	43.5%	Pass
43 - 40	Pole + Reinf.	TP60x60x0.775	Pole	44.9%	Pass
40 - 35	Pole + Reinf.	TP60x60x0.775	Pole	47.3%	Pass
35 - 32.08	Pole + Reinf.	TP60x60x0.775	Pole	48.7%	Pass
32.08 - 31.83	Pole + Reinf.	TP60x60x0.9625	Pole	39.3%	Pass
31.83 - 28.75	Pole + Reinf.	TP60x60x0.9625	Pole	40.6%	Pass
28.75 - 28.5	Pole + Reinf.	TP60x60x0.8125	Pole	47.7%	Pass
28.5 - 23.5	Pole + Reinf.	TP60x60x0.8125	Pole	50.1%	Pass
23.5 - 18.5	Pole + Reinf.	TP60x60x0.95	Pole	44.6%	Pass
18.5 - 13.5	Pole + Reinf.	TP60x60x0.95	Pole	46.7%	Pass
13.5 - 8.5	Pole + Reinf.	TP60x60x0.95	Pole	48.9%	Pass
8.5 - 3.5	Pole + Reinf.	TP60x60x0.95	Pole	51.1%	Pass
3.5 - 0	Pole + Reinf.	TP60x60x0.95	Pole	52.6%	Pass
				Summary	
			Pole	52.6%	Pass
			Reinforcement	48.9%	Pass
			Overall	52.6%	Pass

Table 5 - Tower Component Stresses vs. Capacity (Monopole Tower) – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1, 2	Flange Bolts	180	3.0	Pass
	Flange Plates		3.5	Pass
1, 2	Flange Bolts	160	15.3	Pass
	Flange Plates		16.6	Pass
1, 2	Flange Bolts	140	33.5	Pass
	Flange Plates		33.5	Pass
1, 2	Flange Bolts	120	46.5	Pass
	Flange Plates		46.5	Pass
1, 2	Flange Bolts	100	46.0	Pass
	Flange Plates		46.0	Pass
1	Flange Bolts	80	32.5	Pass
	Flange Plate		41.6	Pass
	Stiffener Plates		51.2	Pass
	Jump Plates		66.7	Pass
1	Flange Bolts	60	36.2	Pass
	Flange Plates		46.6	Pass
	Stiffener Plates		50.6	Pass
	Jump Plates		71.4	Pass
1	Flange Bolts	40	39.2	Pass
	Flange Plates		50.8	Pass
	Stiffener Plates		49.4	Pass
	Jump Plates		67.7	Pass
1	Flange Bolts	20	42.1	Pass
	Flange Plates		55.4	Pass
	Stiffener Plates		53.9	Pass
	Jump Plates		83.9	Pass
1	Anchor Rods (Original)	0	36.7	Pass
	Anchor Rods (Existing Modification)		41.1	Pass
	Base Plate		17.5	Pass
	Stiffener Plates		49.3	Pass
1, 3	Base Foundation (Compared w/ Design Loads)	0	77.8	Pass

Structure Rating (max from all components) =	83.9%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity. Rating per TIA-222-H Section 15.5.
2) Base/Flange plates is/are assumed to have the same capacity as their respective splice bolts or shaft.
3) Foundation capacity determined by comparing analysis reactions to original design reactions.

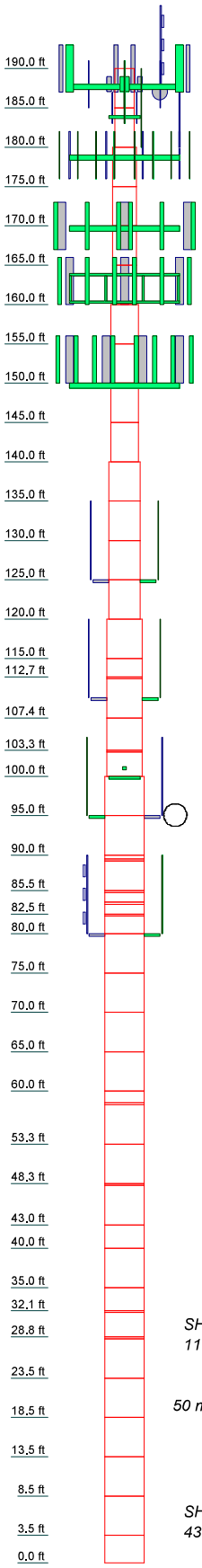
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	Size	Length (ft)	Grade	Weight (K)
1	P60x0.375	5.00	A53-B-42	0.6
2	P60x0.375	5.00		0.6
3	P60x0.375	5.00		0.7
4	P60x0.375	5.00		0.7
5	P60x0.375	5.00		0.7
6	P60x0.375	5.00		0.7
7	P60x0.375	5.00		0.8
8	P60x0.375	5.00		0.8
9	P60x0.375	5.00		0.8
10	P60x0.375	5.00		0.8
11	P60x0.375	5.00		1.0
12	P60x0.375	5.00		1.0
13	P60x0.375	5.00		1.0
14	P60x0.375	5.00		1.0
15	P60x0.375	5.00		1.1
16	P60x0.375	2.33		0.5
18	P60x0.375	5.00		1.4
19	P60x0.375	4.09		1.1
20	P60x0.375	3.02		0.9
22	P60x0.375	5.00		1.5
23	P60x0.375	5.00		1.5
24	P60x0.375	0.25		0.2
26	P60x0.375	1.70		1.3
27	P60x0.375	0.25		0.1
32	P60x0.375	0.25		0.0
33	P60x0.375	5.00		1.8
34	P60x0.375	5.00		1.8
35	P60x0.375	5.00		1.8
36	P60x0.375	5.00		1.8
37	P60x0.375	0.25		0.1
38	P60x0.375	0.25		0.0
39	P60x0.375	5.00		2.0
40	P60x0.375	5.00		2.0
41	P60x0.375	0.25		0.1
42	P60x0.375	5.00		2.4
43	P60x0.375	3.00		1.4
44	P60x0.375	5.00		2.4
45	P60x0.375	2.92		1.4
46	P60x0.375	0.25		0.1
47	P60x0.375	0.25		0.1
48	P60x0.375	0.25		0.1
49	P60x0.375	5.00		2.5
50	P60x0.375	5.00		2.9
51	P60x0.375	5.00		2.9
52	P60x0.375	5.00		2.9
53	P60x0.375	5.00		2.9
54	P60x0.375	3.50		2.0
				60.7



MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 ksi			

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 120 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft

ALL REACTIONS ARE FACTORED

AXIAL 164 K

SHEAR 11 K

MOMENT 1454 kip-ft

TORQUE 1 kip-ft
50 mph WIND - 1.5000 in ICE

AXIAL 107 K

SHEAR 43 K

MOMENT 5069 kip-ft

TORQUE 2 kip-ft
REACTIONS - 120 mph WIND

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Phone: (913) 458-6909
FAX:

Job: ***Weston/ Rt-57/ Norfield R (BU# 829046)***			
Project: ***400087 (829046.1832008)***			
Client: Crown Castle	Drawn by: Keerati Pongrungsap	App'd:	
Code: TIA-222-H	Date: 02/28/20	Scale: NTS	
Path:		Dwg No. E-1	

Tower Input Data

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

1) Tower is located in Fairfield County, Connecticut.
2) Tower base elevation above sea level: 322.00 ft.
3) Basic wind speed of 120 mph.
4) Risk Category II.
5) Exposure Category B.
6) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
7) Topographic Category: 1.
8) Crest Height: 0.00 ft.
9) Nominal ice thickness of 1.5000 in.
10) Ice thickness is considered to increase with height.
11) Ice density of 56 pcf.
12) A wind speed of 50 mph is used in combination with ice.
13) Temperature drop of 50 °F.
14) Deflections calculated using a wind speed of 60 mph.
15) A non-linear (P-delta) analysis was used.
16) Pressures are calculated at each section.
17) Stress ratio used in pole design is 1.05.
18) Tower analysis based on target reliabilities in accordance with Annex S.
19) Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
20) 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-H Bracing Resist. Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-H 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	Ignore KL/ry For 60 Deg. Angle Legs	Pole Without Linear Attachments
		Pole With Shroud Or No Appurtenances
		Outside and Inside Corner Radii Are Known

Pole Section Geometry

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L1	190.00-185.00	5.00	P30x0.375	A53-B-42 (42 ksi)	
L2	185.00-180.00	5.00	P30x0.375	A53-B-42 (42 ksi)	
L3	180.00-175.00	5.00	P36x0.375	A53-B-42 (42 ksi)	
L4	175.00-170.00	5.00	P36x0.375	A53-B-42 (42 ksi)	
L5	170.00-165.00	5.00	P36x0.375	A53-B-42 (42 ksi)	
L6	165.00-160.00	5.00	P36x0.375	A53-B-42 (42 ksi)	
L7	160.00-155.00	5.00	P42x0.375	A53-B-42 (42 ksi)	
L8	155.00-150.00	5.00	P42x0.375	A53-B-42 (42 ksi)	
L9	150.00-145.00	5.00	P42x0.375	A53-B-42 (42 ksi)	
L10	145.00-140.00	5.00	P42x0.375	A53-B-42 (42 ksi)	
L11	140.00-135.00	5.00	P48x0.375	A53-B-42 (42 ksi)	
L12	135.00-130.00	5.00	P48x0.375	A53-B-42 (42 ksi)	
L13	130.00-125.00	5.00	P48x0.375	A53-B-42 (42 ksi)	
L14	125.00-120.00	5.00	P48x0.375	A53-B-42 (42 ksi)	
L15	120.00-115.00	5.00	P54x0.375	A53-B-42 (42 ksi)	
L16	115.00-112.67	2.33	P54x0.375	A53-B-42 (42 ksi)	
L17	112.67-112.42	0.25	P54x0.4875	A53-B-42 (42 ksi)	
L18	112.42-107.42	5.00	P54x0.4875	A53-B-42 (42 ksi)	
L19	107.42-103.33	4.09	P54x0.4875	A53-B-42 (42 ksi)	
L20	103.33-103.08	0.25	P54x0.4875	A53-B-42 (42 ksi)	
L21	103.08-100.00	3.08	P54x0.4875	A53-B-42 (42 ksi)	
L22	100.00-95.00	5.00	P60x0.475	A53-B-42 (42 ksi)	
L23	95.00-90.00	5.00	P60x0.475	A53-B-42 (42 ksi)	
L24	90.00-89.50	0.50	P60x0.475	A53-B-42 (42 ksi)	
L25	89.50-89.25	0.25	P60x0.55625	A53-B-42 (42 ksi)	
L26	89.25-85.50	3.75	P60x0.55625	A53-B-42 (42 ksi)	
L27	85.50-85.25	0.25	P60x0.6375	A53-B-42 (42 ksi)	
L28	85.25-84.00	1.25	P60x0.6375	A53-B-42 (42 ksi)	
L29	84.00-83.75	0.25	P60x0.525	A53-B-42 (42 ksi)	
L30	83.75-82.50	1.25	P60x0.525	A53-B-42 (42 ksi)	
L31	82.50-82.25	0.25	P60x0.45	A53-B-42 (42 ksi)	
L32	82.25-80.00	2.25	P60x0.45	A53-B-42 (42 ksi)	
L33	80.00-75.00	5.00	P60x0.575	A53-B-42 (42 ksi)	

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L34	75.00-70.00	5.00	P60x0.575	A53-B-42 (42 ksi)	
L35	70.00-65.00	5.00	P60x0.575	A53-B-42 (42 ksi)	
L36	65.00-60.00	5.00	P60x0.575	A53-B-42 (42 ksi)	
L37	60.00-58.50	1.50	P60x0.7	A53-B-42 (42 ksi)	
L38	58.50-58.25	0.25	P60x0.625	A53-B-42 (42 ksi)	
L39	58.25-53.25	5.00	P60x0.625	A53-B-42 (42 ksi)	
L40	53.25-48.25	5.00	P60x0.625	A53-B-42 (42 ksi)	
L41	48.25-48.00	0.25	P60x0.775	A53-B-42 (42 ksi)	
L42	48.00-43.00	5.00	P60x0.775	A53-B-42 (42 ksi)	
L43	43.00-40.00	3.00	P60x0.775	A53-B-42 (42 ksi)	
L44	40.00-35.00	5.00	P60x0.775	A53-B-42 (42 ksi)	
L45	35.00-32.08	2.92	P60x0.775	A53-B-42 (42 ksi)	
L46	32.08-31.83	0.25	P60x0.9625	A53-B-42 (42 ksi)	
L47	31.83-28.75	3.08	P60x0.9625	A53-B-42 (42 ksi)	
L48	28.75-28.50	0.25	P60x0.8125	A53-B-42 (42 ksi)	
L49	28.50-23.50	5.00	P60x0.8125	A53-B-42 (42 ksi)	
L50	23.50-18.50	5.00	P60x0.95	A53-B-42 (42 ksi)	
L51	18.50-13.50	5.00	P60x0.95	A53-B-42 (42 ksi)	
L52	13.50-8.50	5.00	P60x0.95	A53-B-42 (42 ksi)	
L53	8.50-3.50	5.00	P60x0.95	A53-B-42 (42 ksi)	
L54	3.50-0.00	3.50	P60x0.95	A53-B-42 (42 ksi)	

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 190.00-185.00				1	1	1			
L2 185.00-180.00				1	1	1			
L3 180.00-175.00				1	1	1			
L4 175.00-170.00				1	1	1			
L5 170.00-165.00				1	1	1			
L6 165.00-160.00				1	1	1			
L7 160.00-155.00				1	1	1			
L8 155.00-150.00				1	1	1			
L9 150.00-145.00				1	1	1			
L10 145.00-				1	1	1			

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
140.00									
L11 140.00-135.00				1	1	1			
L12 135.00-130.00				1	1	1			
L13 130.00-125.00				1	1	1			
L14 125.00-120.00				1	1	1			
L15 120.00-115.00				1	1	1			
L16 115.00-112.67				1	1	1			
L17 112.67-112.42				1	1	0.990478			
L18 112.42-107.42				1	1	0.990478			
L19 107.42-103.33				1	1	0.990478			
L20 103.33-103.08				1	1	0.990478			
L21 103.08-100.00				1	1	0.990478			
L22 100.00-95.00				1	1	0.993442			
L23 95.00-90.00				1	1	0.993442			
L24 90.00-89.50				1	1	0.993442			
L25 89.50-89.25				1	1	0.979451			
L26 89.25-85.50				1	1	0.979451			
L27 85.50-85.25				1	1	0.96934			
L28 85.25-84.00				1	1	0.96934			
L29 84.00-83.75				1	1	0.991333			
L30 83.75-82.50				1	1	0.991333			
L31 82.50-82.25				1	1	0.99474			
L32 82.25-80.00				1	1	0.99474			
L33 80.00-75.00				1	1	0.996424			
L34 75.00-70.00				1	1	0.996424			
L35 70.00-65.00				1	1	0.996424			
L36 65.00-60.00				1	1	0.996424			
L37 60.00-58.50				1	1	0.997508			
L38 58.50-58.25				1	1	1			
L39 58.25-53.25				1	1	1			
L40 53.25-48.25				1	1	1			
L41 48.25-48.00				1	1	0.977534			
L42 48.00-43.00				1	1	0.977534			
L43 43.00-40.00				1	1	0.977534			

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
L44 40.00-35.00				1	1	0.977534			
L45 35.00-32.08				1	1	0.977534			
L46 32.08-31.83				1	1	0.96816			
L47 31.83-28.75				1	1	0.96816			
L48 28.75-28.50				1	1	0.98265			
L49 28.50-23.50				1	1	0.98265			
L50 23.50-18.50				1	1	0.973014			
L51 18.50-13.50				1	1	0.973014			
L52 13.50-8.50				1	1	0.973014			
L53 8.50-3.50				1	1	0.973014			
L54 3.50-0.00				1	1	0.973014			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
Safety Line 3/8	C	No	Surface Ar (CaAa)	190.00 - 10.00	1	1	0.492 0.500	0.3750		0.22
Climbing Rungs	C	No	Surface Ar (CaAa)	190.00 - 10.00	1	1	0.500 0.500	0.8000		7.90
188										
(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	B	No	Surface Ar (CaAa)	188.00 - 6.00	3	3	0.000 0.099	1.5400		1.22
170										
(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	B	No	Surface Ar (CaAa)	170.00 - 8.00	10	10	-0.412 0.000	1.9800		0.82
160										
(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	A	No	Surface Ar (CaAa)	162.00 - 11.00	8	3	0.401 0.450	0.7950		0.58
LDF7-50A(1-5/8)	A	No	Surface Ar (CaAa)	162.00 - 11.00	6	6	0.155 0.400	1.9800		0.82
***										
***MOD 2012 ***										
8.5" x 1.25" Flat Plate	A	No	Surface Af (CaAa)	35.83 - 0.83	1	1	0.000 0.000	8.5000	19.5000	0.00
8.5" x 1.25" Flat Plate	B	No	Surface Af (CaAa)	35.83 - 0.83	1	1	0.000 0.000	8.5000	19.5000	0.00
8.5" x 1.25" Flat Plate	C	No	Surface Af (CaAa)	35.83 - 0.83	1	1	0.000 0.000	8.5000	19.5000	0.00
*										
6.5" x 1.25" Flat Plate	A	No	Surface Af (CaAa)	51.00 - 26.00	1	1	0.000 0.000	6.5000	15.5000	0.00
6.5" x 1.25" Flat Plate	B	No	Surface Af (CaAa)	51.00 - 26.00	1	1	0.000 0.000	6.5000	15.5000	0.00
6.5" x 1.25" Flat Plate	C	No	Surface Af (CaAa)	51.00 - 26.00	1	1	0.000 0.000	6.5000	15.5000	0.00

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
*										
4.5" x 1" Flat Plate	A	No	Surface Af (CaAa)	87.00 - 57.00	1	1	0.000 0.000	4.5000	11.0000	0.00
4.5" x 1" Flat Plate	B	No	Surface Af (CaAa)	87.00 - 57.00	1	1	0.000 0.000	4.5000	11.0000	0.00
4.5" x 1" Flat Plate	C	No	Surface Af (CaAa)	87.00 - 57.00	1	1	0.000 0.000	4.5000	11.0000	0.00
*										
6" x 1" Flat Plate	A	No	Surface Af (CaAa)	105.33 - 82.00	1	1	0.000 0.000	6.0000	14.0000	0.00
6" x 1" Flat Plate	B	No	Surface Af (CaAa)	105.33 - 82.00	1	1	0.000 0.000	6.0000	14.0000	0.00
6" x 1" Flat Plate	C	No	Surface Af (CaAa)	105.33 - 82.00	1	1	0.000 0.000	6.0000	14.0000	0.00
*										
6" x 1" Flat Plate	A	No	Surface Af (CaAa)	114.67 - 101.33	1	1	0.000 0.000	6.0000	14.0000	0.00
6" x 1" Flat Plate	B	No	Surface Af (CaAa)	114.67 - 101.33	1	1	0.000 0.000	6.0000	14.0000	0.00
6" x 1" Flat Plate	C	No	Surface Af (CaAa)	114.67 - 101.33	1	1	0.000 0.000	6.0000	14.0000	0.00
MOD 2013										
4.5" x 1" Flat Plate	A	No	Surface Af (CaAa)	91.00 - 81.00	1	1	0.000 0.000	4.5000	11.0000	0.00
4.5" x 1" Flat Plate	B	No	Surface Af (CaAa)	91.00 - 81.00	1	1	0.000 0.000	4.5000	11.0000	0.00
4.5" x 1" Flat Plate	C	No	Surface Af (CaAa)	91.00 - 81.00	1	1	0.000 0.000	4.5000	11.0000	0.00
**********										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
TYPE I(1-1/4)	C	No	No	Inside Pole	188.00 - 0.00	1	No Ice	0.00	0.63
							1/2" Ice	0.00	0.63
							1" Ice	0.00	0.63
							2" Ice	0.00	0.63
ATCB-B01(5/16)	C	No	No	Inside Pole	188.00 - 0.00	1	No Ice	0.00	0.07
							1/2" Ice	0.00	0.07
							1" Ice	0.00	0.07
							2" Ice	0.00	0.07
LDF4.5-50(5/8)	C	No	No	Inside Pole	188.00 - 0.00	1	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
							2" Ice	0.00	0.15
LDF5-50A(7/8)	C	No	No	Inside Pole	188.00 - 0.00	1	No Ice	0.00	0.33
							1/2" Ice	0.00	0.33
							1" Ice	0.00	0.33
							2" Ice	0.00	0.33
179									
LDF5-50A(7/8)	C	No	No	Inside Pole	179.00 - 0.00	2	No Ice	0.00	0.33
							1/2" Ice	0.00	0.33
							1" Ice	0.00	0.33
							2" Ice	0.00	0.33
150									
HB158-1-13U6-S6F18(1-5/8)	C	No	No	Inside Pole	150.00 - 0.00	1	No Ice	0.00	1.90
							1/2" Ice	0.00	1.90
							1" Ice	0.00	1.90
							2" Ice	0.00	1.90
LDF7-50A(1-5/8)	C	No	No	Inside Pole	150.00 - 0.00	6	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
							2" Ice	0.00	0.82
125									
LDF4-50A(1/2)	B	No	No	Inside Pole	125.00 - 0.00	1	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
							2" Ice	0.00	0.15
LDF5-50A(7/8)	B	No	No	Inside Pole	125.00 - 0.00	1	No Ice	0.00	0.33
							1/2" Ice	0.00	0.33
							1" Ice	0.00	0.33
							2" Ice	0.00	0.33
110									
LDF4-50A(1/2)	B	No	No	Inside Pole	110.00 - 0.00	2	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
							2" Ice	0.00	0.15
100									
LDF4-50A(1/2)	B	No	No	Inside Pole	100.00 - 0.00	1	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
							2" Ice	0.00	0.15
95									
LDF4-50A(1/2)	B	No	No	Inside Pole	95.00 - 0.00	2	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
							2" Ice	0.00	0.15
80									
LDF4-50A(1/2)	B	No	No	Inside Pole	80.00 - 0.00	2	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
							2" Ice	0.00	0.15
*** **********									

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	190.00-185.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	1.386	0.000	0.01
		C	0.000	0.000	0.588	0.000	0.04
L2	185.00-180.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	2.310	0.000	0.02
		C	0.000	0.000	0.588	0.000	0.05
L3	180.00-175.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	2.310	0.000	0.02
		C	0.000	0.000	0.588	0.000	0.05
L4	175.00-170.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	2.310	0.000	0.02
		C	0.000	0.000	0.588	0.000	0.05
L5	170.00-165.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	12.210	0.000	0.06
		C	0.000	0.000	0.588	0.000	0.05
L6	165.00-160.00	A	0.000	0.000	2.853	0.000	0.02
		B	0.000	0.000	12.210	0.000	0.06
		C	0.000	0.000	0.588	0.000	0.05
L7	160.00-155.00	A	0.000	0.000	7.132	0.000	0.05
		B	0.000	0.000	12.210	0.000	0.06
		C	0.000	0.000	0.588	0.000	0.05
L8	155.00-150.00	A	0.000	0.000	7.132	0.000	0.05
		B	0.000	0.000	12.210	0.000	0.06
		C	0.000	0.000	0.588	0.000	0.05
L9	150.00-145.00	A	0.000	0.000	7.132	0.000	0.05
		B	0.000	0.000	12.210	0.000	0.06

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
		C	0.000	0.000	0.588	0.000	0.08
L10	145.00-140.00	A	0.000	0.000	7.132	0.000	0.05
		B	0.000	0.000	12.210	0.000	0.06
		C	0.000	0.000	0.588	0.000	0.08
L11	140.00-135.00	A	0.000	0.000	7.132	0.000	0.05
		B	0.000	0.000	12.210	0.000	0.06
		C	0.000	0.000	0.588	0.000	0.08
L12	135.00-130.00	A	0.000	0.000	7.132	0.000	0.05
		B	0.000	0.000	12.210	0.000	0.06
		C	0.000	0.000	0.588	0.000	0.08
L13	130.00-125.00	A	0.000	0.000	7.132	0.000	0.05
		B	0.000	0.000	12.210	0.000	0.06
		C	0.000	0.000	0.588	0.000	0.08
L14	125.00-120.00	A	0.000	0.000	7.132	0.000	0.05
		B	0.000	0.000	12.210	0.000	0.06
		C	0.000	0.000	0.588	0.000	0.08
L15	120.00-115.00	A	0.000	0.000	7.132	0.000	0.05
		B	0.000	0.000	12.210	0.000	0.06
		C	0.000	0.000	0.588	0.000	0.08
L16	115.00-112.67	A	0.000	0.000	5.320	0.000	0.02
		B	0.000	0.000	7.686	0.000	0.03
		C	0.000	0.000	2.270	0.000	0.04
L17	112.67-112.42	A	0.000	0.000	0.607	0.000	0.00
		B	0.000	0.000	0.861	0.000	0.00
		C	0.000	0.000	0.279	0.000	0.00
L18	112.42-107.42	A	0.000	0.000	12.133	0.000	0.05
		B	0.000	0.000	17.210	0.000	0.06
		C	0.000	0.000	5.588	0.000	0.08
L19	107.42-103.33	A	0.000	0.000	11.927	0.000	0.04
		B	0.000	0.000	16.081	0.000	0.05
		C	0.000	0.000	6.574	0.000	0.07
L20	103.33-103.08	A	0.000	0.000	0.857	0.000	0.00
		B	0.000	0.000	1.111	0.000	0.00
		C	0.000	0.000	0.529	0.000	0.00
L21	103.08-100.00	A	0.000	0.000	9.221	0.000	0.03
		B	0.000	0.000	12.348	0.000	0.04
		C	0.000	0.000	5.189	0.000	0.05
L22	100.00-95.00	A	0.000	0.000	12.133	0.000	0.05
		B	0.000	0.000	17.210	0.000	0.06
		C	0.000	0.000	5.588	0.000	0.08
L23	95.00-90.00	A	0.000	0.000	12.883	0.000	0.05
		B	0.000	0.000	17.960	0.000	0.07
		C	0.000	0.000	6.338	0.000	0.08
L24	90.00-89.50	A	0.000	0.000	1.588	0.000	0.00
		B	0.000	0.000	2.096	0.000	0.01
		C	0.000	0.000	0.934	0.000	0.01
L25	89.50-89.25	A	0.000	0.000	0.794	0.000	0.00
		B	0.000	0.000	1.048	0.000	0.00
		C	0.000	0.000	0.467	0.000	0.00
L26	89.25-85.50	A	0.000	0.000	13.037	0.000	0.04
		B	0.000	0.000	16.845	0.000	0.05
		C	0.000	0.000	8.128	0.000	0.06
L27	85.50-85.25	A	0.000	0.000	0.982	0.000	0.00
		B	0.000	0.000	1.236	0.000	0.00
		C	0.000	0.000	0.654	0.000	0.00
L28	85.25-84.00	A	0.000	0.000	4.908	0.000	0.01
		B	0.000	0.000	6.178	0.000	0.02
		C	0.000	0.000	3.272	0.000	0.02
L29	84.00-83.75	A	0.000	0.000	0.982	0.000	0.00
		B	0.000	0.000	1.236	0.000	0.00
		C	0.000	0.000	0.654	0.000	0.00
L30	83.75-82.50	A	0.000	0.000	4.908	0.000	0.01
		B	0.000	0.000	6.178	0.000	0.02
		C	0.000	0.000	3.272	0.000	0.02
L31	82.50-82.25	A	0.000	0.000	0.982	0.000	0.00
		B	0.000	0.000	1.236	0.000	0.00
		C	0.000	0.000	0.654	0.000	0.00
L32	82.25-80.00	A	0.000	0.000	6.085	0.000	0.02
		B	0.000	0.000	8.370	0.000	0.03

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
		C	0.000	0.000	3.139	0.000	0.04
L33	80.00-75.00	A	0.000	0.000	10.883	0.000	0.05
		B	0.000	0.000	15.960	0.000	0.07
		C	0.000	0.000	4.338	0.000	0.08
L34	75.00-70.00	A	0.000	0.000	10.883	0.000	0.05
		B	0.000	0.000	15.960	0.000	0.07
		C	0.000	0.000	4.338	0.000	0.08
L35	70.00-65.00	A	0.000	0.000	10.883	0.000	0.05
		B	0.000	0.000	15.960	0.000	0.07
		C	0.000	0.000	4.338	0.000	0.08
L36	65.00-60.00	A	0.000	0.000	10.883	0.000	0.05
		B	0.000	0.000	15.960	0.000	0.07
		C	0.000	0.000	4.338	0.000	0.08
L37	60.00-58.50	A	0.000	0.000	3.265	0.000	0.01
		B	0.000	0.000	4.788	0.000	0.02
		C	0.000	0.000	1.301	0.000	0.03
L38	58.50-58.25	A	0.000	0.000	0.544	0.000	0.00
		B	0.000	0.000	0.798	0.000	0.00
		C	0.000	0.000	0.217	0.000	0.00
L39	58.25-53.25	A	0.000	0.000	8.070	0.000	0.05
		B	0.000	0.000	13.148	0.000	0.07
		C	0.000	0.000	1.525	0.000	0.08
L40	53.25-48.25	A	0.000	0.000	10.112	0.000	0.05
		B	0.000	0.000	15.189	0.000	0.07
		C	0.000	0.000	3.567	0.000	0.08
L41	48.25-48.00	A	0.000	0.000	0.627	0.000	0.00
		B	0.000	0.000	0.881	0.000	0.00
		C	0.000	0.000	0.300	0.000	0.00
L42	48.00-43.00	A	0.000	0.000	12.549	0.000	0.05
		B	0.000	0.000	17.627	0.000	0.07
		C	0.000	0.000	6.004	0.000	0.08
L43	43.00-40.00	A	0.000	0.000	7.530	0.000	0.03
		B	0.000	0.000	10.576	0.000	0.04
		C	0.000	0.000	3.603	0.000	0.05
L44	40.00-35.00	A	0.000	0.000	13.729	0.000	0.05
		B	0.000	0.000	18.807	0.000	0.07
		C	0.000	0.000	7.184	0.000	0.08
L45	35.00-32.08	A	0.000	0.000	11.465	0.000	0.03
		B	0.000	0.000	14.431	0.000	0.04
		C	0.000	0.000	7.643	0.000	0.05
L46	32.08-31.83	A	0.000	0.000	0.982	0.000	0.00
		B	0.000	0.000	1.236	0.000	0.00
		C	0.000	0.000	0.654	0.000	0.00
L47	31.83-28.75	A	0.000	0.000	12.094	0.000	0.03
		B	0.000	0.000	15.221	0.000	0.04
		C	0.000	0.000	8.062	0.000	0.05
L48	28.75-28.50	A	0.000	0.000	0.982	0.000	0.00
		B	0.000	0.000	1.236	0.000	0.00
		C	0.000	0.000	0.654	0.000	0.00
L49	28.50-23.50	A	0.000	0.000	16.924	0.000	0.05
		B	0.000	0.000	22.002	0.000	0.07
		C	0.000	0.000	10.379	0.000	0.08
L50	23.50-18.50	A	0.000	0.000	14.216	0.000	0.05
		B	0.000	0.000	19.293	0.000	0.07
		C	0.000	0.000	7.671	0.000	0.08
L51	18.50-13.50	A	0.000	0.000	14.216	0.000	0.05
		B	0.000	0.000	19.293	0.000	0.07
		C	0.000	0.000	7.671	0.000	0.08
L52	13.50-8.50	A	0.000	0.000	10.650	0.000	0.02
		B	0.000	0.000	19.293	0.000	0.07
		C	0.000	0.000	7.495	0.000	0.07
L53	8.50-3.50	A	0.000	0.000	7.083	0.000	0.00
		B	0.000	0.000	9.228	0.000	0.02
		C	0.000	0.000	7.083	0.000	0.04
L54	3.50-0.00	A	0.000	0.000	3.778	0.000	0.00
		B	0.000	0.000	3.778	0.000	0.01
		C	0.000	0.000	3.778	0.000	0.03

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	190.00-185.00	A	1.517	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	2.870	0.000	0.04
		C		0.000	0.000	3.621	0.000	0.08
L2	185.00-180.00	A	1.513	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	4.779	0.000	0.07
		C		0.000	0.000	3.613	0.000	0.09
L3	180.00-175.00	A	1.509	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	4.773	0.000	0.07
		C		0.000	0.000	3.605	0.000	0.09
L4	175.00-170.00	A	1.504	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	4.768	0.000	0.07
		C		0.000	0.000	3.596	0.000	0.09
L5	170.00-165.00	A	1.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	19.012	0.000	0.26
		C		0.000	0.000	3.587	0.000	0.09
L6	165.00-160.00	A	1.495	0.000	0.000	5.062	0.000	0.07
		B		0.000	0.000	19.001	0.000	0.26
		C		0.000	0.000	3.578	0.000	0.09
L7	160.00-155.00	A	1.491	0.000	0.000	12.642	0.000	0.18
		B		0.000	0.000	18.989	0.000	0.26
		C		0.000	0.000	3.569	0.000	0.09
L8	155.00-150.00	A	1.486	0.000	0.000	12.630	0.000	0.18
		B		0.000	0.000	18.977	0.000	0.26
		C		0.000	0.000	3.559	0.000	0.09
L9	150.00-145.00	A	1.481	0.000	0.000	12.618	0.000	0.18
		B		0.000	0.000	18.965	0.000	0.26
		C		0.000	0.000	3.549	0.000	0.12
L10	145.00-140.00	A	1.476	0.000	0.000	12.605	0.000	0.18
		B		0.000	0.000	18.952	0.000	0.25
		C		0.000	0.000	3.539	0.000	0.12
L11	140.00-135.00	A	1.471	0.000	0.000	12.592	0.000	0.18
		B		0.000	0.000	18.939	0.000	0.25
		C		0.000	0.000	3.529	0.000	0.12
L12	135.00-130.00	A	1.465	0.000	0.000	12.578	0.000	0.18
		B		0.000	0.000	18.925	0.000	0.25
		C		0.000	0.000	3.518	0.000	0.12
L13	130.00-125.00	A	1.460	0.000	0.000	12.564	0.000	0.18
		B		0.000	0.000	18.911	0.000	0.25
		C		0.000	0.000	3.507	0.000	0.12
L14	125.00-120.00	A	1.454	0.000	0.000	12.550	0.000	0.18
		B		0.000	0.000	18.897	0.000	0.25
		C		0.000	0.000	3.495	0.000	0.12
L15	120.00-115.00	A	1.448	0.000	0.000	12.535	0.000	0.18
		B		0.000	0.000	18.882	0.000	0.25
		C		0.000	0.000	3.483	0.000	0.12
L16	115.00-112.67	A	1.443	0.000	0.000	8.176	0.000	0.11
		B		0.000	0.000	11.134	0.000	0.14
		C		0.000	0.000	3.959	0.000	0.08
L17	112.67-112.42	A	1.441	0.000	0.000	0.919	0.000	0.01
		B		0.000	0.000	1.236	0.000	0.02
		C		0.000	0.000	0.467	0.000	0.01
L18	112.42-107.42	A	1.438	0.000	0.000	18.370	0.000	0.23
		B		0.000	0.000	24.717	0.000	0.31
		C		0.000	0.000	9.323	0.000	0.17
L19	107.42-103.33	A	1.432	0.000	0.000	17.589	0.000	0.21
		B		0.000	0.000	22.780	0.000	0.27
		C		0.000	0.000	10.191	0.000	0.16
L20	103.33-103.08	A	1.429	0.000	0.000	1.239	0.000	0.01
		B		0.000	0.000	1.556	0.000	0.02
		C		0.000	0.000	0.786	0.000	0.01
L21	103.08-100.00	A	1.427	0.000	0.000	13.693	0.000	0.16
		B		0.000	0.000	17.603	0.000	0.21
		C		0.000	0.000	8.124	0.000	0.13
L22	100.00-95.00	A	1.421	0.000	0.000	18.889	0.000	0.23
		B		0.000	0.000	25.236	0.000	0.30
		C		0.000	0.000	9.850	0.000	0.17

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L23	95.00-90.00	A	1.413	0.000	0.000	19.773	0.000	0.24
		B		0.000	0.000	26.120	0.000	0.31
		C		0.000	0.000	10.738	0.000	0.18
L24	90.00-89.50	A	1.409	0.000	0.000	2.340	0.000	0.03
		B		0.000	0.000	2.974	0.000	0.03
		C		0.000	0.000	1.436	0.000	0.02
L25	89.50-89.25	A	1.409	0.000	0.000	1.170	0.000	0.01
		B		0.000	0.000	1.487	0.000	0.02
		C		0.000	0.000	0.718	0.000	0.01
L26	89.25-85.50	A	1.405	0.000	0.000	19.083	0.000	0.22
		B		0.000	0.000	23.843	0.000	0.27
		C		0.000	0.000	12.310	0.000	0.18
L27	85.50-85.25	A	1.402	0.000	0.000	1.426	0.000	0.02
		B		0.000	0.000	1.743	0.000	0.02
		C		0.000	0.000	0.975	0.000	0.01
L28	85.25-84.00	A	1.401	0.000	0.000	7.129	0.000	0.08
		B		0.000	0.000	8.716	0.000	0.10
		C		0.000	0.000	4.872	0.000	0.06
L29	84.00-83.75	A	1.400	0.000	0.000	1.425	0.000	0.02
		B		0.000	0.000	1.743	0.000	0.02
		C		0.000	0.000	0.974	0.000	0.01
L30	83.75-82.50	A	1.398	0.000	0.000	7.126	0.000	0.08
		B		0.000	0.000	8.712	0.000	0.10
		C		0.000	0.000	4.869	0.000	0.06
L31	82.50-82.25	A	1.397	0.000	0.000	1.425	0.000	0.02
		B		0.000	0.000	1.742	0.000	0.02
		C		0.000	0.000	0.973	0.000	0.01
L32	82.25-80.00	A	1.395	0.000	0.000	9.352	0.000	0.11
		B		0.000	0.000	12.208	0.000	0.15
		C		0.000	0.000	5.291	0.000	0.09
L33	80.00-75.00	A	1.389	0.000	0.000	17.526	0.000	0.22
		B		0.000	0.000	23.873	0.000	0.29
		C		0.000	0.000	8.503	0.000	0.16
L34	75.00-70.00	A	1.379	0.000	0.000	17.494	0.000	0.22
		B		0.000	0.000	23.840	0.000	0.29
		C		0.000	0.000	8.476	0.000	0.16
L35	70.00-65.00	A	1.370	0.000	0.000	17.459	0.000	0.22
		B		0.000	0.000	23.806	0.000	0.29
		C		0.000	0.000	8.446	0.000	0.16
L36	65.00-60.00	A	1.359	0.000	0.000	17.422	0.000	0.21
		B		0.000	0.000	23.769	0.000	0.29
		C		0.000	0.000	8.415	0.000	0.16
L37	60.00-58.50	A	1.352	0.000	0.000	5.219	0.000	0.06
		B		0.000	0.000	7.123	0.000	0.09
		C		0.000	0.000	2.518	0.000	0.05
L38	58.50-58.25	A	1.350	0.000	0.000	0.870	0.000	0.01
		B		0.000	0.000	1.187	0.000	0.01
		C		0.000	0.000	0.419	0.000	0.01
L39	58.25-53.25	A	1.344	0.000	0.000	13.548	0.000	0.18
		B		0.000	0.000	19.895	0.000	0.25
		C		0.000	0.000	4.548	0.000	0.13
L40	53.25-48.25	A	1.331	0.000	0.000	15.955	0.000	0.20
		B		0.000	0.000	22.301	0.000	0.27
		C		0.000	0.000	6.961	0.000	0.14
L41	48.25-48.00	A	1.324	0.000	0.000	0.948	0.000	0.01
		B		0.000	0.000	1.266	0.000	0.01
		C		0.000	0.000	0.499	0.000	0.01
L42	48.00-43.00	A	1.317	0.000	0.000	18.940	0.000	0.22
		B		0.000	0.000	25.287	0.000	0.29
		C		0.000	0.000	9.954	0.000	0.17
L43	43.00-40.00	A	1.305	0.000	0.000	11.339	0.000	0.13
		B		0.000	0.000	15.147	0.000	0.17
		C		0.000	0.000	5.951	0.000	0.10
L44	40.00-35.00	A	1.291	0.000	0.000	20.247	0.000	0.23
		B		0.000	0.000	26.594	0.000	0.30
		C		0.000	0.000	11.274	0.000	0.17
L45	35.00-32.08	A	1.277	0.000	0.000	15.863	0.000	0.16
		B		0.000	0.000	19.569	0.000	0.20
		C		0.000	0.000	10.626	0.000	0.13

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
L46	32.08-31.83	A	1.271	0.000	0.000	1.357	0.000	0.01
		B		0.000	0.000	1.674	0.000	0.02
		C		0.000	0.000	0.909	0.000	0.01
L47	31.83-28.75	A	1.264	0.000	0.000	16.696	0.000	0.17
		B		0.000	0.000	20.606	0.000	0.21
		C		0.000	0.000	11.177	0.000	0.14
L48	28.75-28.50	A	1.257	0.000	0.000	1.354	0.000	0.01
		B		0.000	0.000	1.671	0.000	0.02
		C		0.000	0.000	0.906	0.000	0.01
L49	28.50-23.50	A	1.245	0.000	0.000	23.687	0.000	0.24
		B		0.000	0.000	30.034	0.000	0.31
		C		0.000	0.000	14.737	0.000	0.19
L50	23.50-18.50	A	1.219	0.000	0.000	20.264	0.000	0.21
		B		0.000	0.000	26.611	0.000	0.28
		C		0.000	0.000	11.327	0.000	0.17
L51	18.50-13.50	A	1.186	0.000	0.000	20.150	0.000	0.21
		B		0.000	0.000	26.497	0.000	0.28
		C		0.000	0.000	11.229	0.000	0.16
L52	13.50-8.50	A	1.142	0.000	0.000	14.111	0.000	0.13
		B		0.000	0.000	26.344	0.000	0.27
		C		0.000	0.000	10.236	0.000	0.14
L53	8.50-3.50	A	1.075	0.000	0.000	8.158	0.000	0.05
		B		0.000	0.000	11.646	0.000	0.10
		C		0.000	0.000	8.158	0.000	0.09
L54	3.50-0.00	A	0.951	0.000	0.000	4.285	0.000	0.02
		B		0.000	0.000	4.285	0.000	0.03
		C		0.000	0.000	4.285	0.000	0.05

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	190.00-185.00	1.2843	-0.4636	-0.2648	0.3813
L2	185.00-180.00	2.4497	-0.9941	0.7579	-0.1049
L3	180.00-175.00	2.5446	-1.0320	0.8070	-0.1087
L4	175.00-170.00	2.5446	-1.0320	0.8090	-0.1100
L5	170.00-165.00	6.3740	-7.6015	3.7732	-4.6669
L6	165.00-160.00	4.7564	-8.7240	2.6340	-5.6593
L7	160.00-155.00	3.2246	-10.9997	1.5403	-7.4617
L8	155.00-150.00	3.2246	-10.9997	1.5426	-7.4640
L9	150.00-145.00	3.2246	-10.9997	1.5450	-7.4663
L10	145.00-140.00	3.2246	-10.9997	1.5474	-7.4688
L11	140.00-135.00	3.4931	-11.9121	1.6858	-8.1331
L12	135.00-130.00	3.4931	-11.9121	1.6885	-8.1356
L13	130.00-125.00	3.4931	-11.9121	1.6914	-8.1382
L14	125.00-120.00	3.4931	-11.9121	1.6944	-8.1409
L15	120.00-115.00	3.7375	-12.7427	1.8231	-8.7518
L16	115.00-112.67	2.6998	-9.2046	1.5183	-7.2807
L17	112.67-112.42	2.5799	-8.7959	1.4774	-7.0817
L18	112.42-107.42	2.5799	-8.7959	1.4788	-7.0825
L19	107.42-103.33	2.2401	-7.6375	1.3432	-6.4233
L20	103.33-103.08	1.6202	-5.5239	1.2231	-5.8447
L21	103.08-100.00	2.1944	-7.4816	1.3161	-6.2855
L22	100.00-95.00	2.7710	-9.4456	1.5637	-7.4613
L23	95.00-90.00	2.6515	-9.0383	1.5239	-7.2577
L24	90.00-89.50	2.2614	-7.7087	1.3741	-6.5377
L25	89.50-89.25	2.2614	-7.7087	1.3743	-6.5378
L26	89.25-85.50	1.7138	-5.8422	1.3017	-6.1873
L27	85.50-85.25	1.5740	-5.3655	1.2022	-5.7098
L28	85.25-84.00	1.5740	-5.3655	1.2026	-5.7101
L29	84.00-83.75	1.5740	-5.3655	1.2030	-5.7103
L30	83.75-82.50	1.5740	-5.3655	1.2035	-5.7106
L31	82.50-82.25	1.5740	-5.3655	1.2039	-5.7109
L32	82.25-80.00	2.5575	-8.7181	1.4834	-7.0332

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L33	80.00-75.00	2.9960	-10.2127	1.6425	-7.7752
L34	75.00-70.00	2.9960	-10.2127	1.6470	-7.7786
L35	70.00-65.00	2.9960	-10.2127	1.6517	-7.7823
L36	65.00-60.00	2.9960	-10.2127	1.6569	-7.7863
L37	60.00-58.50	2.9960	-10.2127	1.6604	-7.7890
L38	58.50-58.25	2.9960	-10.2127	1.6614	-7.7898
L39	58.25-53.25	3.6657	-12.4958	1.9029	-8.9086
L40	53.25-48.25	3.1539	-10.7510	1.7494	-8.1646
L41	48.25-48.00	2.7033	-9.2149	1.5870	-7.3939
L42	48.00-43.00	2.7033	-9.2149	1.5904	-7.3961
L43	43.00-40.00	2.7033	-9.2149	1.5959	-7.3997
L44	40.00-35.00	2.5284	-8.6188	1.5347	-7.0931
L45	35.00-32.08	1.5740	-5.3655	1.2685	-5.8419
L46	32.08-31.83	1.5740	-5.3655	1.2706	-5.8429
L47	31.83-28.75	1.5740	-5.3655	1.2730	-5.8441
L48	28.75-28.50	1.5740	-5.3655	1.2755	-5.8454
L49	28.50-23.50	2.1515	-7.3341	1.4019	-6.4053
L50	23.50-18.50	2.4627	-8.3948	1.5535	-7.0523
L51	18.50-13.50	2.4627	-8.3948	1.5678	-7.0598
L52	13.50-8.50	3.5701	-7.1266	2.7711	-6.0559
L53	8.50-3.50	1.3070	-1.0297	1.3898	-1.0133
L54	3.50-0.00	0.0000	0.0000	0.0000	0.0000

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

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	1	Safety Line 3/8	185.00 - 190.00	1.0000	1.0000
L1	2	Climbing Rungs	185.00 - 190.00	1.0000	1.0000
L1	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	185.00 - 188.00	1.0000	1.0000
L2	1	Safety Line 3/8	180.00 - 185.00	1.0000	1.0000
L2	2	Climbing Rungs	180.00 - 185.00	1.0000	1.0000
L2	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	180.00 - 185.00	1.0000	1.0000
L3	1	Safety Line 3/8	175.00 - 180.00	1.0000	1.0000
L3	2	Climbing Rungs	175.00 - 180.00	1.0000	1.0000
L3	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	175.00 - 180.00	1.0000	1.0000
L4	1	Safety Line 3/8	170.00 - 175.00	1.0000	1.0000
L4	2	Climbing Rungs	170.00 - 175.00	1.0000	1.0000
L4	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	170.00 - 175.00	1.0000	1.0000
L5	1	Safety Line 3/8	165.00 - 170.00	1.0000	1.0000
L5	2	Climbing Rungs	165.00 - 170.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L5	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	165.00 - 170.00	1.0000	1.0000
L5	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	165.00 - 170.00	1.0000	1.0000
L6	1	Safety Line 3/8	160.00 - 165.00	1.0000	1.0000
L6	2	Climbing Rungs	160.00 - 165.00	1.0000	1.0000
L6	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	160.00 - 165.00	1.0000	1.0000
L6	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	160.00 - 165.00	1.0000	1.0000
L6	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	160.00 - 162.00	1.0000	1.0000
L6	15	LDF7-50A(1-5/8)	160.00 - 162.00	1.0000	1.0000
L7	1	Safety Line 3/8	155.00 - 160.00	1.0000	1.0000
L7	2	Climbing Rungs	155.00 - 160.00	1.0000	1.0000
L7	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	155.00 - 160.00	1.0000	1.0000
L7	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	155.00 - 160.00	1.0000	1.0000
L7	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	155.00 - 160.00	1.0000	1.0000
L7	15	LDF7-50A(1-5/8)	155.00 - 160.00	1.0000	1.0000
L8	1	Safety Line 3/8	150.00 - 155.00	1.0000	1.0000
L8	2	Climbing Rungs	150.00 - 155.00	1.0000	1.0000
L8	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	150.00 - 155.00	1.0000	1.0000
L8	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	150.00 - 155.00	1.0000	1.0000
L8	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	150.00 - 155.00	1.0000	1.0000
L8	15	LDF7-50A(1-5/8)	150.00 - 155.00	1.0000	1.0000
L9	1	Safety Line 3/8	145.00 - 150.00	1.0000	1.0000
L9	2	Climbing Rungs	145.00 - 150.00	1.0000	1.0000
L9	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	145.00 - 150.00	1.0000	1.0000
L9	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid	145.00 - 150.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
		9Power/18Fiber RL 2(1-5/8)			
L9	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	145.00 - 150.00	1.0000	1.0000
L9	15	LDF7-50A(1-5/8)	145.00 - 150.00	1.0000	1.0000
L10	1	Safety Line 3/8	140.00 - 145.00	1.0000	1.0000
L10	2	Climbing Rungs	140.00 - 145.00	1.0000	1.0000
L10	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	140.00 - 145.00	1.0000	1.0000
L10	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	140.00 - 145.00	1.0000	1.0000
L10	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	140.00 - 145.00	1.0000	1.0000
L10	15	LDF7-50A(1-5/8)	140.00 - 145.00	1.0000	1.0000
L11	1	Safety Line 3/8	135.00 - 140.00	1.0000	1.0000
L11	2	Climbing Rungs	135.00 - 140.00	1.0000	1.0000
L11	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	135.00 - 140.00	1.0000	1.0000
L11	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	135.00 - 140.00	1.0000	1.0000
L11	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	135.00 - 140.00	1.0000	1.0000
L11	15	LDF7-50A(1-5/8)	135.00 - 140.00	1.0000	1.0000
L12	1	Safety Line 3/8	130.00 - 135.00	1.0000	1.0000
L12	2	Climbing Rungs	130.00 - 135.00	1.0000	1.0000
L12	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	130.00 - 135.00	1.0000	1.0000
L12	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	130.00 - 135.00	1.0000	1.0000
L12	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	130.00 - 135.00	1.0000	1.0000
L12	15	LDF7-50A(1-5/8)	130.00 - 135.00	1.0000	1.0000
L13	1	Safety Line 3/8	125.00 - 130.00	1.0000	1.0000
L13	2	Climbing Rungs	125.00 - 130.00	1.0000	1.0000
L13	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	125.00 - 130.00	1.0000	1.0000
L13	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-	125.00 - 130.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
		5/8)			
L13	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	125.00 - 130.00	1.0000	1.0000
L13	15	LDF7-50A(1-5/8)	125.00 - 130.00	1.0000	1.0000
L14	1	Safety Line 3/8	120.00 - 125.00	1.0000	1.0000
L14	2	Climbing Rungs	120.00 - 125.00	1.0000	1.0000
L14	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	120.00 - 125.00	1.0000	1.0000
L14	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	120.00 - 125.00	1.0000	1.0000
L14	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	120.00 - 125.00	1.0000	1.0000
L14	15	LDF7-50A(1-5/8)	120.00 - 125.00	1.0000	1.0000
L15	1	Safety Line 3/8	115.00 - 120.00	1.0000	1.0000
L15	2	Climbing Rungs	115.00 - 120.00	1.0000	1.0000
L15	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	115.00 - 120.00	1.0000	1.0000
L15	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	115.00 - 120.00	1.0000	1.0000
L15	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	115.00 - 120.00	1.0000	1.0000
L15	15	LDF7-50A(1-5/8)	115.00 - 120.00	1.0000	1.0000
L16	1	Safety Line 3/8	112.67 - 115.00	1.0000	1.0000
L16	2	Climbing Rungs	112.67 - 115.00	1.0000	1.0000
L16	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	112.67 - 115.00	1.0000	1.0000
L16	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	112.67 - 115.00	1.0000	1.0000
L16	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	112.67 - 115.00	1.0000	1.0000
L16	15	LDF7-50A(1-5/8)	112.67 - 115.00	1.0000	1.0000
L16	51	6" x 1" Flat Plate	112.67 - 114.67	1.0000	1.0000
L16	52	6" x 1" Flat Plate	112.67 - 114.67	1.0000	1.0000
L16	53	6" x 1" Flat Plate	112.67 - 114.67	1.0000	1.0000
L17	1	Safety Line 3/8	112.42 - 112.67	1.0000	1.0000
L17	2	Climbing Rungs	112.42 - 112.67	1.0000	1.0000
L17	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE	112.42 - 112.67	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
		I(1-1/4)			
L17	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	112.42 - 112.67	1.0000	1.0000
L17	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	112.42 - 112.67	1.0000	1.0000
L17	15	LDF7-50A(1-5/8)	112.42 - 112.67	1.0000	1.0000
L17	51	6" x 1" Flat Plate	112.42 - 112.67	1.0000	1.0000
L17	52	6" x 1" Flat Plate	112.42 - 112.67	1.0000	1.0000
L17	53	6" x 1" Flat Plate	112.42 - 112.67	1.0000	1.0000
L18	1	Safety Line 3/8	107.42 - 112.42	1.0000	1.0000
L18	2	Climbing Rungs	107.42 - 112.42	1.0000	1.0000
L18	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	107.42 - 112.42	1.0000	1.0000
L18	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	107.42 - 112.42	1.0000	1.0000
L18	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	107.42 - 112.42	1.0000	1.0000
L18	15	LDF7-50A(1-5/8)	107.42 - 112.42	1.0000	1.0000
L18	51	6" x 1" Flat Plate	107.42 - 112.42	1.0000	1.0000
L18	52	6" x 1" Flat Plate	107.42 - 112.42	1.0000	1.0000
L18	53	6" x 1" Flat Plate	107.42 - 112.42	1.0000	1.0000
L19	1	Safety Line 3/8	103.33 - 107.42	1.0000	1.0000
L19	2	Climbing Rungs	103.33 - 107.42	1.0000	1.0000
L19	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	103.33 - 107.42	1.0000	1.0000
L19	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	103.33 - 107.42	1.0000	1.0000
L19	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	103.33 - 107.42	1.0000	1.0000
L19	15	LDF7-50A(1-5/8)	103.33 - 107.42	1.0000	1.0000
L19	47	6" x 1" Flat Plate	103.33 - 105.33	1.0000	1.0000
L19	48	6" x 1" Flat Plate	103.33 - 105.33	1.0000	1.0000
L19	49	6" x 1" Flat Plate	103.33 - 105.33	1.0000	1.0000
L19	51	6" x 1" Flat Plate	103.33 - 107.42	1.0000	1.0000
L19	52	6" x 1" Flat Plate	103.33 - 107.42	1.0000	1.0000
L19	53	6" x 1" Flat Plate	103.33 - 107.42	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L20	1	Safety Line 3/8	103.08 - 103.33	1.0000	1.0000
L20	2	Climbing Rungs	103.08 - 103.33	1.0000	1.0000
L20	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	103.08 - 103.33	1.0000	1.0000
L20	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	103.08 - 103.33	1.0000	1.0000
L20	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	103.08 - 103.33	1.0000	1.0000
L20	15	LDF7-50A(1-5/8)	103.08 - 103.33	1.0000	1.0000
L20	47	6" x 1" Flat Plate	103.08 - 103.33	1.0000	1.0000
L20	48	6" x 1" Flat Plate	103.08 - 103.33	1.0000	1.0000
L20	49	6" x 1" Flat Plate	103.08 - 103.33	1.0000	1.0000
L20	51	6" x 1" Flat Plate	103.08 - 103.33	1.0000	1.0000
L20	52	6" x 1" Flat Plate	103.08 - 103.33	1.0000	1.0000
L20	53	6" x 1" Flat Plate	103.08 - 103.33	1.0000	1.0000
L21	1	Safety Line 3/8	100.00 - 103.08	1.0000	1.0000
L21	2	Climbing Rungs	100.00 - 103.08	1.0000	1.0000
L21	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	100.00 - 103.08	1.0000	1.0000
L21	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	100.00 - 103.08	1.0000	1.0000
L21	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	100.00 - 103.08	1.0000	1.0000
L21	15	LDF7-50A(1-5/8)	100.00 - 103.08	1.0000	1.0000
L21	47	6" x 1" Flat Plate	100.00 - 103.08	1.0000	1.0000
L21	48	6" x 1" Flat Plate	100.00 - 103.08	1.0000	1.0000
L21	49	6" x 1" Flat Plate	100.00 - 103.08	1.0000	1.0000
L21	51	6" x 1" Flat Plate	101.33 - 103.08	1.0000	1.0000
L21	52	6" x 1" Flat Plate	101.33 - 103.08	1.0000	1.0000
L21	53	6" x 1" Flat Plate	101.33 - 103.08	1.0000	1.0000
L22	1	Safety Line 3/8	95.00 - 100.00	1.0000	1.0000
L22	2	Climbing Rungs	95.00 - 100.00	1.0000	1.0000
L22	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	95.00 - 100.00	1.0000	1.0000
L22	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-	95.00 - 100.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
		5/8)			
L22	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	95.00 - 100.00	1.0000	1.0000
L22	15	LDF7-50A(1-5/8)	95.00 - 100.00	1.0000	1.0000
L22	47	6" x 1" Flat Plate	95.00 - 100.00	1.0000	1.0000
L22	48	6" x 1" Flat Plate	95.00 - 100.00	1.0000	1.0000
L22	49	6" x 1" Flat Plate	95.00 - 100.00	1.0000	1.0000
L23	1	Safety Line 3/8	90.00 - 95.00	1.0000	1.0000
L23	2	Climbing Rungs	90.00 - 95.00	1.0000	1.0000
L23	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	90.00 - 95.00	1.0000	1.0000
L23	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	90.00 - 95.00	1.0000	1.0000
L23	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	90.00 - 95.00	1.0000	1.0000
L23	15	LDF7-50A(1-5/8)	90.00 - 95.00	1.0000	1.0000
L23	47	6" x 1" Flat Plate	90.00 - 95.00	1.0000	1.0000
L23	48	6" x 1" Flat Plate	90.00 - 95.00	1.0000	1.0000
L23	49	6" x 1" Flat Plate	90.00 - 95.00	1.0000	1.0000
L23	55	4.5" x 1" Flat Plate	90.00 - 91.00	1.0000	1.0000
L23	56	4.5" x 1" Flat Plate	90.00 - 91.00	1.0000	1.0000
L23	57	4.5" x 1" Flat Plate	90.00 - 91.00	1.0000	1.0000
L24	1	Safety Line 3/8	89.50 - 90.00	1.0000	1.0000
L24	2	Climbing Rungs	89.50 - 90.00	1.0000	1.0000
L24	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	89.50 - 90.00	1.0000	1.0000
L24	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	89.50 - 90.00	1.0000	1.0000
L24	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	89.50 - 90.00	1.0000	1.0000
L24	15	LDF7-50A(1-5/8)	89.50 - 90.00	1.0000	1.0000
L24	47	6" x 1" Flat Plate	89.50 - 90.00	1.0000	1.0000
L24	48	6" x 1" Flat Plate	89.50 - 90.00	1.0000	1.0000
L24	49	6" x 1" Flat Plate	89.50 - 90.00	1.0000	1.0000
L24	55	4.5" x 1" Flat Plate	89.50 - 90.00	1.0000	1.0000
L24	56	4.5" x 1" Flat Plate	89.50 - 90.00	1.0000	1.0000
L24	57	4.5" x 1" Flat Plate	89.50 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			90.00		
L25	1	Safety Line 3/8	89.25 - 89.50	1.0000	1.0000
L25	2	Climbing Rungs	89.25 - 89.50	1.0000	1.0000
L25	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	89.25 - 89.50	1.0000	1.0000
L25	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	89.25 - 89.50	1.0000	1.0000
L25	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	89.25 - 89.50	1.0000	1.0000
L25	15	LDF7-50A(1-5/8)	89.25 - 89.50	1.0000	1.0000
L25	47	6" x 1" Flat Plate	89.25 - 89.50	1.0000	1.0000
L25	48	6" x 1" Flat Plate	89.25 - 89.50	1.0000	1.0000
L25	49	6" x 1" Flat Plate	89.25 - 89.50	1.0000	1.0000
L25	55	4.5" x 1" Flat Plate	89.25 - 89.50	1.0000	1.0000
L25	56	4.5" x 1" Flat Plate	89.25 - 89.50	1.0000	1.0000
L25	57	4.5" x 1" Flat Plate	89.25 - 89.50	1.0000	1.0000
L26	1	Safety Line 3/8	85.50 - 89.25	1.0000	1.0000
L26	2	Climbing Rungs	85.50 - 89.25	1.0000	1.0000
L26	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	85.50 - 89.25	1.0000	1.0000
L26	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	85.50 - 89.25	1.0000	1.0000
L26	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	85.50 - 89.25	1.0000	1.0000
L26	15	LDF7-50A(1-5/8)	85.50 - 89.25	1.0000	1.0000
L26	43	4.5" x 1" Flat Plate	85.50 - 87.00	1.0000	1.0000
L26	44	4.5" x 1" Flat Plate	85.50 - 87.00	1.0000	1.0000
L26	45	4.5" x 1" Flat Plate	85.50 - 87.00	1.0000	1.0000
L26	47	6" x 1" Flat Plate	85.50 - 89.25	1.0000	1.0000
L26	48	6" x 1" Flat Plate	85.50 - 89.25	1.0000	1.0000
L26	49	6" x 1" Flat Plate	85.50 - 89.25	1.0000	1.0000
L26	55	4.5" x 1" Flat Plate	85.50 - 89.25	1.0000	1.0000
L26	56	4.5" x 1" Flat Plate	85.50 - 89.25	1.0000	1.0000
L26	57	4.5" x 1" Flat Plate	85.50 - 89.25	1.0000	1.0000
L27	1	Safety Line 3/8	85.25 - 85.50	1.0000	1.0000
L27	2	Climbing Rungs	85.25 - 85.50	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L27	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	85.25 - 85.50	1.0000	1.0000
L27	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	85.25 - 85.50	1.0000	1.0000
L27	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	85.25 - 85.50	1.0000	1.0000
L27	15	LDF7-50A(1-5/8)	85.25 - 85.50	1.0000	1.0000
L27	43	4.5" x 1" Flat Plate	85.25 - 85.50	1.0000	1.0000
L27	44	4.5" x 1" Flat Plate	85.25 - 85.50	1.0000	1.0000
L27	45	4.5" x 1" Flat Plate	85.25 - 85.50	1.0000	1.0000
L27	47	6" x 1" Flat Plate	85.25 - 85.50	1.0000	1.0000
L27	48	6" x 1" Flat Plate	85.25 - 85.50	1.0000	1.0000
L27	49	6" x 1" Flat Plate	85.25 - 85.50	1.0000	1.0000
L27	55	4.5" x 1" Flat Plate	85.25 - 85.50	1.0000	1.0000
L27	56	4.5" x 1" Flat Plate	85.25 - 85.50	1.0000	1.0000
L27	57	4.5" x 1" Flat Plate	85.25 - 85.50	1.0000	1.0000
L28	1	Safety Line 3/8	84.00 - 85.25	1.0000	1.0000
L28	2	Climbing Rungs	84.00 - 85.25	1.0000	1.0000
L28	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	84.00 - 85.25	1.0000	1.0000
L28	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	84.00 - 85.25	1.0000	1.0000
L28	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	84.00 - 85.25	1.0000	1.0000
L28	15	LDF7-50A(1-5/8)	84.00 - 85.25	1.0000	1.0000
L28	43	4.5" x 1" Flat Plate	84.00 - 85.25	1.0000	1.0000
L28	44	4.5" x 1" Flat Plate	84.00 - 85.25	1.0000	1.0000
L28	45	4.5" x 1" Flat Plate	84.00 - 85.25	1.0000	1.0000
L28	47	6" x 1" Flat Plate	84.00 - 85.25	1.0000	1.0000
L28	48	6" x 1" Flat Plate	84.00 - 85.25	1.0000	1.0000
L28	49	6" x 1" Flat Plate	84.00 - 85.25	1.0000	1.0000
L28	55	4.5" x 1" Flat Plate	84.00 - 85.25	1.0000	1.0000
L28	56	4.5" x 1" Flat Plate	84.00 - 85.25	1.0000	1.0000
L28	57	4.5" x 1" Flat Plate	84.00 - 85.25	1.0000	1.0000
L29	1	Safety Line 3/8	83.75 - 84.00	1.0000	1.0000
L29	2	Climbing Rungs	83.75 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			84.00		
L29	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	83.75 - 84.00	1.0000	1.0000
L29	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	83.75 - 84.00	1.0000	1.0000
L29	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	83.75 - 84.00	1.0000	1.0000
L29	15	LDF7-50A(1-5/8)	83.75 - 84.00	1.0000	1.0000
L29	43	4.5" x 1" Flat Plate	83.75 - 84.00	1.0000	1.0000
L29	44	4.5" x 1" Flat Plate	83.75 - 84.00	1.0000	1.0000
L29	45	4.5" x 1" Flat Plate	83.75 - 84.00	1.0000	1.0000
L29	47	6" x 1" Flat Plate	83.75 - 84.00	1.0000	1.0000
L29	48	6" x 1" Flat Plate	83.75 - 84.00	1.0000	1.0000
L29	49	6" x 1" Flat Plate	83.75 - 84.00	1.0000	1.0000
L29	55	4.5" x 1" Flat Plate	83.75 - 84.00	1.0000	1.0000
L29	56	4.5" x 1" Flat Plate	83.75 - 84.00	1.0000	1.0000
L29	57	4.5" x 1" Flat Plate	83.75 - 84.00	1.0000	1.0000
L30	1	Safety Line 3/8	82.50 - 83.75	1.0000	1.0000
L30	2	Climbing Rungs	82.50 - 83.75	1.0000	1.0000
L30	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	82.50 - 83.75	1.0000	1.0000
L30	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	82.50 - 83.75	1.0000	1.0000
L30	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	82.50 - 83.75	1.0000	1.0000
L30	15	LDF7-50A(1-5/8)	82.50 - 83.75	1.0000	1.0000
L30	43	4.5" x 1" Flat Plate	82.50 - 83.75	1.0000	1.0000
L30	44	4.5" x 1" Flat Plate	82.50 - 83.75	1.0000	1.0000
L30	45	4.5" x 1" Flat Plate	82.50 - 83.75	1.0000	1.0000
L30	47	6" x 1" Flat Plate	82.50 - 83.75	1.0000	1.0000
L30	48	6" x 1" Flat Plate	82.50 - 83.75	1.0000	1.0000
L30	49	6" x 1" Flat Plate	82.50 - 83.75	1.0000	1.0000
L30	55	4.5" x 1" Flat Plate	82.50 - 83.75	1.0000	1.0000
L30	56	4.5" x 1" Flat Plate	82.50 - 83.75	1.0000	1.0000
L30	57	4.5" x 1" Flat Plate	82.50 - 83.75	1.0000	1.0000
L31	1	Safety Line 3/8	82.25 - 82.50	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L31	2	Climbing Rungs	82.25 - 82.50	1.0000	1.0000
L31	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	82.25 - 82.50	1.0000	1.0000
L31	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	82.25 - 82.50	1.0000	1.0000
L31	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	82.25 - 82.50	1.0000	1.0000
L31	15	LDF7-50A(1-5/8)	82.25 - 82.50	1.0000	1.0000
L31	43	4.5" x 1" Flat Plate	82.25 - 82.50	1.0000	1.0000
L31	44	4.5" x 1" Flat Plate	82.25 - 82.50	1.0000	1.0000
L31	45	4.5" x 1" Flat Plate	82.25 - 82.50	1.0000	1.0000
L31	47	6" x 1" Flat Plate	82.25 - 82.50	1.0000	1.0000
L31	48	6" x 1" Flat Plate	82.25 - 82.50	1.0000	1.0000
L31	49	6" x 1" Flat Plate	82.25 - 82.50	1.0000	1.0000
L31	55	4.5" x 1" Flat Plate	82.25 - 82.50	1.0000	1.0000
L31	56	4.5" x 1" Flat Plate	82.25 - 82.50	1.0000	1.0000
L31	57	4.5" x 1" Flat Plate	82.25 - 82.50	1.0000	1.0000
L32	1	Safety Line 3/8	80.00 - 82.25	1.0000	1.0000
L32	2	Climbing Rungs	80.00 - 82.25	1.0000	1.0000
L32	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	80.00 - 82.25	1.0000	1.0000
L32	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	80.00 - 82.25	1.0000	1.0000
L32	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	80.00 - 82.25	1.0000	1.0000
L32	15	LDF7-50A(1-5/8)	80.00 - 82.25	1.0000	1.0000
L32	43	4.5" x 1" Flat Plate	80.00 - 82.25	1.0000	1.0000
L32	44	4.5" x 1" Flat Plate	80.00 - 82.25	1.0000	1.0000
L32	45	4.5" x 1" Flat Plate	80.00 - 82.25	1.0000	1.0000
L32	47	6" x 1" Flat Plate	82.00 - 82.25	1.0000	1.0000
L32	48	6" x 1" Flat Plate	82.00 - 82.25	1.0000	1.0000
L32	49	6" x 1" Flat Plate	82.00 - 82.25	1.0000	1.0000
L32	55	4.5" x 1" Flat Plate	81.00 - 82.25	1.0000	1.0000
L32	56	4.5" x 1" Flat Plate	81.00 - 82.25	1.0000	1.0000
L32	57	4.5" x 1" Flat Plate	81.00 - 82.25	1.0000	1.0000
L33	1	Safety Line 3/8	75.00 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			80.00		
L33	2	Climbing Rungs	75.00 - 80.00	1.0000	1.0000
L33	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	75.00 - 80.00	1.0000	1.0000
L33	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	75.00 - 80.00	1.0000	1.0000
L33	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	75.00 - 80.00	1.0000	1.0000
L33	15	LDF7-50A(1-5/8)	75.00 - 80.00	1.0000	1.0000
L33	43	4.5" x 1" Flat Plate	75.00 - 80.00	1.0000	1.0000
L33	44	4.5" x 1" Flat Plate	75.00 - 80.00	1.0000	1.0000
L33	45	4.5" x 1" Flat Plate	75.00 - 80.00	1.0000	1.0000
L34	1	Safety Line 3/8	70.00 - 75.00	1.0000	1.0000
L34	2	Climbing Rungs	70.00 - 75.00	1.0000	1.0000
L34	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	70.00 - 75.00	1.0000	1.0000
L34	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	70.00 - 75.00	1.0000	1.0000
L34	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	70.00 - 75.00	1.0000	1.0000
L34	15	LDF7-50A(1-5/8)	70.00 - 75.00	1.0000	1.0000
L34	43	4.5" x 1" Flat Plate	70.00 - 75.00	1.0000	1.0000
L34	44	4.5" x 1" Flat Plate	70.00 - 75.00	1.0000	1.0000
L34	45	4.5" x 1" Flat Plate	70.00 - 75.00	1.0000	1.0000
L35	1	Safety Line 3/8	65.00 - 70.00	1.0000	1.0000
L35	2	Climbing Rungs	65.00 - 70.00	1.0000	1.0000
L35	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	65.00 - 70.00	1.0000	1.0000
L35	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	65.00 - 70.00	1.0000	1.0000
L35	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	65.00 - 70.00	1.0000	1.0000
L35	15	LDF7-50A(1-5/8)	65.00 - 70.00	1.0000	1.0000
L35	43	4.5" x 1" Flat Plate	65.00 - 70.00	1.0000	1.0000
L35	44	4.5" x 1" Flat Plate	65.00 - 70.00	1.0000	1.0000
L35	45	4.5" x 1" Flat Plate	65.00 - 70.00	1.0000	1.0000
L36	1	Safety Line 3/8	60.00 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			65.00		
L36	2	Climbing Rungs	60.00 - 65.00	1.0000	1.0000
L36	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	60.00 - 65.00	1.0000	1.0000
L36	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	60.00 - 65.00	1.0000	1.0000
L36	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	60.00 - 65.00	1.0000	1.0000
L36	15	LDF7-50A(1-5/8)	60.00 - 65.00	1.0000	1.0000
L36	43	4.5" x 1" Flat Plate	60.00 - 65.00	1.0000	1.0000
L36	44	4.5" x 1" Flat Plate	60.00 - 65.00	1.0000	1.0000
L36	45	4.5" x 1" Flat Plate	60.00 - 65.00	1.0000	1.0000
L37	1	Safety Line 3/8	58.50 - 60.00	1.0000	1.0000
L37	2	Climbing Rungs	58.50 - 60.00	1.0000	1.0000
L37	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	58.50 - 60.00	1.0000	1.0000
L37	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	58.50 - 60.00	1.0000	1.0000
L37	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	58.50 - 60.00	1.0000	1.0000
L37	15	LDF7-50A(1-5/8)	58.50 - 60.00	1.0000	1.0000
L37	43	4.5" x 1" Flat Plate	58.50 - 60.00	1.0000	1.0000
L37	44	4.5" x 1" Flat Plate	58.50 - 60.00	1.0000	1.0000
L37	45	4.5" x 1" Flat Plate	58.50 - 60.00	1.0000	1.0000
L38	1	Safety Line 3/8	58.25 - 58.50	1.0000	1.0000
L38	2	Climbing Rungs	58.25 - 58.50	1.0000	1.0000
L38	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	58.25 - 58.50	1.0000	1.0000
L38	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	58.25 - 58.50	1.0000	1.0000
L38	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	58.25 - 58.50	1.0000	1.0000
L38	15	LDF7-50A(1-5/8)	58.25 - 58.50	1.0000	1.0000
L38	43	4.5" x 1" Flat Plate	58.25 - 58.50	1.0000	1.0000
L38	44	4.5" x 1" Flat Plate	58.25 - 58.50	1.0000	1.0000
L38	45	4.5" x 1" Flat Plate	58.25 - 58.50	1.0000	1.0000
L39	1	Safety Line 3/8	53.25 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			58.25		
L39	2	Climbing Rungs	53.25 - 58.25	1.0000	1.0000
L39	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	53.25 - 58.25	1.0000	1.0000
L39	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	53.25 - 58.25	1.0000	1.0000
L39	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	53.25 - 58.25	1.0000	1.0000
L39	15	LDF7-50A(1-5/8)	53.25 - 58.25	1.0000	1.0000
L39	43	4.5" x 1" Flat Plate	57.00 - 58.25	1.0000	1.0000
L39	44	4.5" x 1" Flat Plate	57.00 - 58.25	1.0000	1.0000
L39	45	4.5" x 1" Flat Plate	57.00 - 58.25	1.0000	1.0000
L40	1	Safety Line 3/8	48.25 - 53.25	1.0000	1.0000
L40	2	Climbing Rungs	48.25 - 53.25	1.0000	1.0000
L40	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	48.25 - 53.25	1.0000	1.0000
L40	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	48.25 - 53.25	1.0000	1.0000
L40	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	48.25 - 53.25	1.0000	1.0000
L40	15	LDF7-50A(1-5/8)	48.25 - 53.25	1.0000	1.0000
L40	39	6.5" x 1.25" Flat Plate	48.25 - 51.00	1.0000	1.0000
L40	40	6.5" x 1.25" Flat Plate	48.25 - 51.00	1.0000	1.0000
L40	41	6.5" x 1.25" Flat Plate	48.25 - 51.00	1.0000	1.0000
L41	1	Safety Line 3/8	48.00 - 48.25	1.0000	1.0000
L41	2	Climbing Rungs	48.00 - 48.25	1.0000	1.0000
L41	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	48.00 - 48.25	1.0000	1.0000
L41	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	48.00 - 48.25	1.0000	1.0000
L41	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	48.00 - 48.25	1.0000	1.0000
L41	15	LDF7-50A(1-5/8)	48.00 - 48.25	1.0000	1.0000
L41	39	6.5" x 1.25" Flat Plate	48.00 - 48.25	1.0000	1.0000
L41	40	6.5" x 1.25" Flat Plate	48.00 - 48.25	1.0000	1.0000
L41	41	6.5" x 1.25" Flat Plate	48.00 - 48.25	1.0000	1.0000
L42	1	Safety Line 3/8	43.00 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			48.00		
L42	2	Climbing Rungs	43.00 - 48.00	1.0000	1.0000
L42	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	43.00 - 48.00	1.0000	1.0000
L42	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	43.00 - 48.00	1.0000	1.0000
L42	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	43.00 - 48.00	1.0000	1.0000
L42	15	LDF7-50A(1-5/8)	43.00 - 48.00	1.0000	1.0000
L42	39	6.5" x 1.25" Flat Plate	43.00 - 48.00	1.0000	1.0000
L42	40	6.5" x 1.25" Flat Plate	43.00 - 48.00	1.0000	1.0000
L42	41	6.5" x 1.25" Flat Plate	43.00 - 48.00	1.0000	1.0000
L43	1	Safety Line 3/8	40.00 - 43.00	1.0000	1.0000
L43	2	Climbing Rungs	40.00 - 43.00	1.0000	1.0000
L43	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	40.00 - 43.00	1.0000	1.0000
L43	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	40.00 - 43.00	1.0000	1.0000
L43	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	40.00 - 43.00	1.0000	1.0000
L43	15	LDF7-50A(1-5/8)	40.00 - 43.00	1.0000	1.0000
L43	39	6.5" x 1.25" Flat Plate	40.00 - 43.00	1.0000	1.0000
L43	40	6.5" x 1.25" Flat Plate	40.00 - 43.00	1.0000	1.0000
L43	41	6.5" x 1.25" Flat Plate	40.00 - 43.00	1.0000	1.0000
L44	1	Safety Line 3/8	35.00 - 40.00	1.0000	1.0000
L44	2	Climbing Rungs	35.00 - 40.00	1.0000	1.0000
L44	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	35.00 - 40.00	1.0000	1.0000
L44	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	35.00 - 40.00	1.0000	1.0000
L44	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	35.00 - 40.00	1.0000	1.0000
L44	15	LDF7-50A(1-5/8)	35.00 - 40.00	1.0000	1.0000
L44	35	8.5" x 1.25" Flat Plate	35.00 - 35.83	1.0000	1.0000
L44	36	8.5" x 1.25" Flat Plate	35.00 - 35.83	1.0000	1.0000
L44	37	8.5" x 1.25" Flat Plate	35.00 - 35.83	1.0000	1.0000
L44	39	6.5" x 1.25" Flat Plate	35.00 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			40.00		
L44	40	6.5" x 1.25" Flat Plate	35.00 - 40.00	1.0000	1.0000
L44	41	6.5" x 1.25" Flat Plate	35.00 - 40.00	1.0000	1.0000
L45	1	Safety Line 3/8	32.08 - 35.00	1.0000	1.0000
L45	2	Climbing Rungs	32.08 - 35.00	1.0000	1.0000
L45	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	32.08 - 35.00	1.0000	1.0000
L45	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	32.08 - 35.00	1.0000	1.0000
L45	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	32.08 - 35.00	1.0000	1.0000
L45	15	LDF7-50A(1-5/8)	32.08 - 35.00	1.0000	1.0000
L45	35	8.5" x 1.25" Flat Plate	32.08 - 35.00	1.0000	1.0000
L45	36	8.5" x 1.25" Flat Plate	32.08 - 35.00	1.0000	1.0000
L45	37	8.5" x 1.25" Flat Plate	32.08 - 35.00	1.0000	1.0000
L45	39	6.5" x 1.25" Flat Plate	32.08 - 35.00	1.0000	1.0000
L45	40	6.5" x 1.25" Flat Plate	32.08 - 35.00	1.0000	1.0000
L45	41	6.5" x 1.25" Flat Plate	32.08 - 35.00	1.0000	1.0000
L46	1	Safety Line 3/8	31.83 - 32.08	1.0000	1.0000
L46	2	Climbing Rungs	31.83 - 32.08	1.0000	1.0000
L46	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	31.83 - 32.08	1.0000	1.0000
L46	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	31.83 - 32.08	1.0000	1.0000
L46	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	31.83 - 32.08	1.0000	1.0000
L46	15	LDF7-50A(1-5/8)	31.83 - 32.08	1.0000	1.0000
L46	35	8.5" x 1.25" Flat Plate	31.83 - 32.08	1.0000	1.0000
L46	36	8.5" x 1.25" Flat Plate	31.83 - 32.08	1.0000	1.0000
L46	37	8.5" x 1.25" Flat Plate	31.83 - 32.08	1.0000	1.0000
L46	39	6.5" x 1.25" Flat Plate	31.83 - 32.08	1.0000	1.0000
L46	40	6.5" x 1.25" Flat Plate	31.83 - 32.08	1.0000	1.0000
L46	41	6.5" x 1.25" Flat Plate	31.83 - 32.08	1.0000	1.0000
L47	1	Safety Line 3/8	28.75 - 31.83	1.0000	1.0000
L47	2	Climbing Rungs	28.75 - 31.83	1.0000	1.0000
L47	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE	28.75 - 31.83	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
		I(1-1/4)			
L47	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	28.75 - 31.83	1.0000	1.0000
L47	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	28.75 - 31.83	1.0000	1.0000
L47	15	LDF7-50A(1-5/8)	28.75 - 31.83	1.0000	1.0000
L47	35	8.5" x 1.25" Flat Plate	28.75 - 31.83	1.0000	1.0000
L47	36	8.5" x 1.25" Flat Plate	28.75 - 31.83	1.0000	1.0000
L47	37	8.5" x 1.25" Flat Plate	28.75 - 31.83	1.0000	1.0000
L47	39	6.5" x 1.25" Flat Plate	28.75 - 31.83	1.0000	1.0000
L47	40	6.5" x 1.25" Flat Plate	28.75 - 31.83	1.0000	1.0000
L47	41	6.5" x 1.25" Flat Plate	28.75 - 31.83	1.0000	1.0000
L48	1	Safety Line 3/8	28.50 - 28.75	1.0000	1.0000
L48	2	Climbing Rungs	28.50 - 28.75	1.0000	1.0000
L48	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	28.50 - 28.75	1.0000	1.0000
L48	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	28.50 - 28.75	1.0000	1.0000
L48	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	28.50 - 28.75	1.0000	1.0000
L48	15	LDF7-50A(1-5/8)	28.50 - 28.75	1.0000	1.0000
L48	35	8.5" x 1.25" Flat Plate	28.50 - 28.75	1.0000	1.0000
L48	36	8.5" x 1.25" Flat Plate	28.50 - 28.75	1.0000	1.0000
L48	37	8.5" x 1.25" Flat Plate	28.50 - 28.75	1.0000	1.0000
L48	39	6.5" x 1.25" Flat Plate	28.50 - 28.75	1.0000	1.0000
L48	40	6.5" x 1.25" Flat Plate	28.50 - 28.75	1.0000	1.0000
L48	41	6.5" x 1.25" Flat Plate	28.50 - 28.75	1.0000	1.0000
L49	1	Safety Line 3/8	23.50 - 28.50	1.0000	1.0000
L49	2	Climbing Rungs	23.50 - 28.50	1.0000	1.0000
L49	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	23.50 - 28.50	1.0000	1.0000
L49	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	23.50 - 28.50	1.0000	1.0000
L49	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	23.50 - 28.50	1.0000	1.0000
L49	15	LDF7-50A(1-5/8)	23.50 - 28.50	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L49	35	8.5" x 1.25" Flat Plate	23.50 - 28.50	1.0000	1.0000
L49	36	8.5" x 1.25" Flat Plate	23.50 - 28.50	1.0000	1.0000
L49	37	8.5" x 1.25" Flat Plate	23.50 - 28.50	1.0000	1.0000
L49	39	6.5" x 1.25" Flat Plate	26.00 - 28.50	1.0000	1.0000
L49	40	6.5" x 1.25" Flat Plate	26.00 - 28.50	1.0000	1.0000
L49	41	6.5" x 1.25" Flat Plate	26.00 - 28.50	1.0000	1.0000
L50	1	Safety Line 3/8	18.50 - 23.50	1.0000	1.0000
L50	2	Climbing Rungs	18.50 - 23.50	1.0000	1.0000
L50	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	18.50 - 23.50	1.0000	1.0000
L50	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	18.50 - 23.50	1.0000	1.0000
L50	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	18.50 - 23.50	1.0000	1.0000
L50	15	LDF7-50A(1-5/8)	18.50 - 23.50	1.0000	1.0000
L50	35	8.5" x 1.25" Flat Plate	18.50 - 23.50	1.0000	1.0000
L50	36	8.5" x 1.25" Flat Plate	18.50 - 23.50	1.0000	1.0000
L50	37	8.5" x 1.25" Flat Plate	18.50 - 23.50	1.0000	1.0000
L51	1	Safety Line 3/8	13.50 - 18.50	1.0000	1.0000
L51	2	Climbing Rungs	13.50 - 18.50	1.0000	1.0000
L51	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	13.50 - 18.50	1.0000	1.0000
L51	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	13.50 - 18.50	1.0000	1.0000
L51	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	13.50 - 18.50	1.0000	1.0000
L51	15	LDF7-50A(1-5/8)	13.50 - 18.50	1.0000	1.0000
L51	35	8.5" x 1.25" Flat Plate	13.50 - 18.50	1.0000	1.0000
L51	36	8.5" x 1.25" Flat Plate	13.50 - 18.50	1.0000	1.0000
L51	37	8.5" x 1.25" Flat Plate	13.50 - 18.50	1.0000	1.0000
L52	1	Safety Line 3/8	10.00 - 13.50	1.0000	1.0000
L52	2	Climbing Rungs	10.00 - 13.50	1.0000	1.0000
L52	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	8.50 - 13.50	1.0000	1.0000
L52	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-	8.50 - 13.50	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
		5/8)			
L52	14	(6) WR-VG86ST-BRD(3/4) + (2) FB-L98B-034-XXX(3/8)	11.00 - 13.50	1.0000	1.0000
L52	15	LDF7-50A(1-5/8)	11.00 - 13.50	1.0000	1.0000
L52	35	8.5" x 1.25" Flat Plate	8.50 - 13.50	1.0000	1.0000
L52	36	8.5" x 1.25" Flat Plate	8.50 - 13.50	1.0000	1.0000
L52	37	8.5" x 1.25" Flat Plate	8.50 - 13.50	1.0000	1.0000
L53	4	(1) HB114-21U3M12-XXXF(1-1/4) + (2) TYPE I(1-1/4)	6.00 - 8.50	1.0000	1.0000
L53	12	(6) LDF7-50A(1-5/8) + (3) HCS 6X12 4AWG(1-5/8) + (1) MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	8.00 - 8.50	1.0000	1.0000
L53	35	8.5" x 1.25" Flat Plate	3.50 - 8.50	1.0000	1.0000
L53	36	8.5" x 1.25" Flat Plate	3.50 - 8.50	1.0000	1.0000
L53	37	8.5" x 1.25" Flat Plate	3.50 - 8.50	1.0000	1.0000
L54	35	8.5" x 1.25" Flat Plate	0.83 - 3.50	1.0000	1.0000
L54	36	8.5" x 1.25" Flat Plate	0.83 - 3.50	1.0000	1.0000
L54	37	8.5" x 1.25" Flat Plate	0.83 - 3.50	1.0000	1.0000

Discrete Tower Loads

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
188									
Platform Mount [LP 403-1]	C	None		0.0000	188.00	No Ice	18.94	18.94	1.50
						1/2" Ice	23.31	23.31	1.90
						1" Ice	27.74	27.74	2.37
						2" Ice	36.77	36.77	3.53
6'x2" Mount Pipe	A	From Face	4.00 0.00 0.00	0.0000	188.00	No Ice	1.43	1.43	0.02
						1/2" Ice	1.92	1.92	0.03
						1" Ice	2.29	2.29	0.05
						2" Ice	3.06	3.06	0.09
6'x2" Mount Pipe	B	From Face	4.00 0.00 0.00	0.0000	188.00	No Ice	1.43	1.43	0.02
						1/2" Ice	1.92	1.92	0.03
						1" Ice	2.29	2.29	0.05
						2" Ice	3.06	3.06	0.09
6'x2" Mount Pipe	C	From Face	4.00 0.00 0.00	0.0000	188.00	No Ice	1.43	1.43	0.02
						1/2" Ice	1.92	1.92	0.03
						1" Ice	2.29	2.29	0.05
						2" Ice	3.06	3.06	0.09
APXVTM14-ALU-I20 w/ Mount Pipe	A	From Face	4.00 -7.00 2.00	0.0000	188.00	No Ice	4.09	2.86	0.08
						1/2" Ice	4.48	3.23	0.13
						1" Ice	4.88	3.61	0.19
						2" Ice	5.71	4.40	0.33
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Face	4.00 -7.00 2.00	0.0000	188.00	No Ice	4.09	2.86	0.08
						1/2" Ice	4.48	3.23	0.13
						Ice	4.88	3.61	0.19

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
						1" Ice	5.71	4.40	0.33
						2" Ice			
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Face	4.00	0.0000	188.00	No Ice	4.09	2.86	0.08
			-7.00			1/2"	4.48	3.23	0.13
			2.00			Ice	4.88	3.61	0.19
						1" Ice	5.71	4.40	0.33
						2" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	A	From Face	4.00	0.0000	188.00	No Ice	4.60	4.01	0.10
			7.00			1/2"	5.05	4.45	0.16
			2.00			Ice	5.50	4.89	0.23
						1" Ice	6.44	5.82	0.42
						2" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	B	From Face	4.00	0.0000	188.00	No Ice	4.60	4.01	0.10
			7.00			1/2"	5.05	4.45	0.16
			2.00			Ice	5.50	4.89	0.23
						1" Ice	6.44	5.82	0.42
						2" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	C	From Face	4.00	0.0000	188.00	No Ice	4.60	4.01	0.10
			7.00			1/2"	5.05	4.45	0.16
			2.00			Ice	5.50	4.89	0.23
						1" Ice	6.44	5.82	0.42
						2" Ice			
PD201-7	B	From Face	4.00	0.0000	188.00	No Ice	1.02	1.02	0.00
			0.00			1/2"	1.81	1.81	0.01
			5.00			Ice	2.62	2.62	0.03
						1" Ice	3.76	3.76	0.07
						2" Ice			
TD-RRH8x20-25	A	From Face	4.00	0.0000	188.00	No Ice	4.05	1.53	0.07
			0.00			1/2"	4.30	1.71	0.10
			2.00			Ice	4.56	1.90	0.13
						1" Ice	5.10	2.30	0.20
						2" Ice			
TD-RRH8x20-25	B	From Face	4.00	0.0000	188.00	No Ice	4.05	1.53	0.07
			0.00			1/2"	4.30	1.71	0.10
			2.00			Ice	4.56	1.90	0.13
						1" Ice	5.10	2.30	0.20
						2" Ice			
TD-RRH8x20-25	C	From Face	4.00	0.0000	188.00	No Ice	4.05	1.53	0.07
			0.00			1/2"	4.30	1.71	0.10
			2.00			Ice	4.56	1.90	0.13
						1" Ice	5.10	2.30	0.20
						2" Ice			
185									
Side Arm Mount [SO 102-3]	C	None		0.0000	185.00	No Ice	3.60	3.60	0.07
						1/2"	4.18	4.18	0.11
						Ice	4.75	4.75	0.14
						1" Ice	5.90	5.90	0.20
						2" Ice			
4'x2" Mount Pipe	A	From Face	0.50	0.0000	185.00	No Ice	0.87	0.87	0.01
			0.00			1/2"	1.11	1.11	0.02
			0.00			Ice	1.36	1.36	0.03
						1" Ice	1.90	1.90	0.06
						2" Ice			
4'x2" Mount Pipe	B	From Face	0.50	0.0000	185.00	No Ice	0.87	0.87	0.01
			0.00			1/2"	1.11	1.11	0.02
			0.00			Ice	1.36	1.36	0.03
						1" Ice	1.90	1.90	0.06
						2" Ice			
4'x2" Mount Pipe	C	From Face	0.50	0.0000	185.00	No Ice	0.87	0.87	0.01
			0.00			1/2"	1.11	1.11	0.02
			0.00			Ice	1.36	1.36	0.03
						1" Ice	1.90	1.90	0.06
						2" Ice			
800MHZ RRH	A	From Face	1.00	0.0000	185.00	No Ice	2.13	1.77	0.05
			0.00			1/2"	2.32	1.95	0.07

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
			3.00			Ice	2.51	2.13	0.10
						1" Ice	2.92	2.51	0.16
						2" Ice			
800MHZ RRH	B	From Face	1.00	0.0000	185.00	No Ice	2.13	1.77	0.05
			0.00			1/2"	2.32	1.95	0.07
			3.00			Ice	2.51	2.13	0.10
						1" Ice	2.92	2.51	0.16
						2" Ice			
800MHZ RRH	C	From Face	1.00	0.0000	185.00	No Ice	2.13	1.77	0.05
			0.00			1/2"	2.32	1.95	0.07
			3.00			Ice	2.51	2.13	0.10
						1" Ice	2.92	2.51	0.16
						2" Ice			
1900MHz RRH	A	From Face	1.00	0.0000	185.00	No Ice	2.49	3.26	0.04
			0.00			1/2"	2.70	3.48	0.08
			3.00			Ice	2.91	3.72	0.11
						1" Ice	3.35	4.21	0.19
						2" Ice			
1900MHz RRH	B	From Face	1.00	0.0000	185.00	No Ice	2.49	3.26	0.04
			0.00			1/2"	2.70	3.48	0.08
			3.00			Ice	2.91	3.72	0.11
						1" Ice	3.35	4.21	0.19
						2" Ice			
1900MHz RRH	C	From Face	1.00	0.0000	185.00	No Ice	2.49	3.26	0.04
			0.00			1/2"	2.70	3.48	0.08
			3.00			Ice	2.91	3.72	0.11
						1" Ice	3.35	4.21	0.19
						2" Ice			
184									
Side Arm Mount [SO 701-1]	C	From Face	1.50	0.0000	184.00	No Ice	0.85	1.67	0.07
			0.00			1/2"	1.14	2.34	0.08
			0.00			Ice	1.43	3.01	0.09
						1" Ice	2.01	4.35	0.12
						2" Ice			
4'x2" Mount Pipe	C	From Face	3.00	0.0000	184.00	No Ice	0.87	0.87	0.01
			0.00			1/2"	1.11	1.11	0.02
			0.00			Ice	1.36	1.36	0.03
						1" Ice	1.90	1.90	0.06
						2" Ice			
179									
Platform Mount [LP 403-1]	C	None		0.0000	179.00	No Ice	18.94	18.94	1.50
						1/2"	23.31	23.31	1.90
						Ice	27.74	27.74	2.37
						1" Ice	36.77	36.77	3.53
						2" Ice			
Side Arm Mount [SO 301-1]	A	From Leg	4.00	0.0000	179.00	No Ice	0.46	0.91	0.02
			7.00			1/2"	0.65	1.30	0.03
			0.00			Ice	0.87	1.71	0.05
						1" Ice	1.41	2.62	0.09
						2" Ice			
Side Arm Mount [SO 301-1]	B	From Leg	4.00	0.0000	179.00	No Ice	0.46	0.91	0.02
			7.00			1/2"	0.65	1.30	0.03
			0.00			Ice	0.87	1.71	0.05
						1" Ice	1.41	2.62	0.09
						2" Ice			
6'x2" Mount Pipe	A	From Leg	4.00	0.0000	179.00	No Ice	1.43	1.43	0.02
			-7.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice			
6'x2" Mount Pipe	B	From Leg	4.00	0.0000	179.00	No Ice	1.43	1.43	0.02
			-7.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice			

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
6'x2" Mount Pipe	C	From Leg	4.00	0.0000	179.00	No Ice	1.43	1.43	0.02
			-7.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice			
6'x2" Mount Pipe	A	From Leg	4.00	0.0000	179.00	No Ice	1.43	1.43	0.02
			-2.33			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice			
6'x2" Mount Pipe	B	From Leg	4.00	0.0000	179.00	No Ice	1.43	1.43	0.02
			-2.33			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice			
6'x2" Mount Pipe	C	From Leg	4.00	0.0000	179.00	No Ice	1.43	1.43	0.02
			-2.33			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice			
6'x2" Mount Pipe	A	From Leg	4.00	0.0000	179.00	No Ice	1.43	1.43	0.02
			2.33			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice			
6'x2" Mount Pipe	B	From Leg	4.00	0.0000	179.00	No Ice	1.43	1.43	0.02
			2.33			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice			
6'x2" Mount Pipe	C	From Leg	4.00	0.0000	179.00	No Ice	1.43	1.43	0.02
			2.33			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice			
6'x2" Mount Pipe	A	From Leg	4.00	0.0000	179.00	No Ice	1.43	1.43	0.02
			7.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice			
6'x2" Mount Pipe	B	From Leg	4.00	0.0000	179.00	No Ice	1.43	1.43	0.02
			7.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice			
6'x2" Mount Pipe	C	From Leg	4.00	0.0000	179.00	No Ice	1.43	1.43	0.02
			7.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice			
458-2D	A	From Leg	5.00	0.0000	179.00	No Ice	3.67	3.67	0.02
			7.00			1/2"	5.03	5.03	0.05
			6.00			Ice	6.41	6.41	0.08
						1" Ice	9.10	9.10	0.18
						2" Ice			
458-2D	B	From Leg	5.00	0.0000	179.00	No Ice	3.67	3.67	0.02
			7.00			1/2"	5.03	5.03	0.05
			6.00			Ice	6.41	6.41	0.08
						1" Ice	9.10	9.10	0.18
						2" Ice			
170									
Platform Mount [LP 405-1]	C	None		0.0000	170.00	No Ice	20.88	20.88	1.80
						1/2"	28.89	28.89	2.28
						Ice	37.04	37.04	2.87
						1" Ice	53.73	53.73	4.39

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
						2" Ice			
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	170.00	No Ice	14.69	6.87	0.19
						1/2" Ice	15.46	7.55	0.31
						1" Ice	16.23	8.25	0.46
						2" Ice	17.82	9.67	0.79
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	170.00	No Ice	14.69	6.87	0.19
						1/2" Ice	15.46	7.55	0.31
						1" Ice	16.23	8.25	0.46
						2" Ice	17.82	9.67	0.79
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	170.00	No Ice	14.69	6.87	0.19
						1/2" Ice	15.46	7.55	0.31
						1" Ice	16.23	8.25	0.46
						2" Ice	17.82	9.67	0.79
AIR 32 B2A/B66AA w/ Mount Pipe	A	From Leg	4.00 8.00 0.00	0.0000	170.00	No Ice	6.75	6.07	0.15
						1/2" Ice	7.20	6.87	0.21
						1" Ice	7.65	7.58	0.28
						2" Ice	8.57	9.06	0.44
AIR 32 B2A/B66AA w/ Mount Pipe	B	From Leg	4.00 8.00 0.00	0.0000	170.00	No Ice	6.75	6.07	0.15
						1/2" Ice	7.20	6.87	0.21
						1" Ice	7.65	7.58	0.28
						2" Ice	8.57	9.06	0.44
AIR 32 B2A/B66AA w/ Mount Pipe	C	From Leg	4.00 8.00 0.00	0.0000	170.00	No Ice	6.75	6.07	0.15
						1/2" Ice	7.20	6.87	0.21
						1" Ice	7.65	7.58	0.28
						2" Ice	8.57	9.06	0.44
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00 -8.00 0.00	0.0000	170.00	No Ice	6.33	5.64	0.11
						1/2" Ice	6.78	6.43	0.17
						1" Ice	7.21	7.13	0.23
						2" Ice	8.12	8.59	0.38
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00 -8.00 0.00	0.0000	170.00	No Ice	6.33	5.64	0.11
						1/2" Ice	6.78	6.43	0.17
						1" Ice	7.21	7.13	0.23
						2" Ice	8.12	8.59	0.38
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.00 -8.00 0.00	0.0000	170.00	No Ice	6.33	5.64	0.11
						1/2" Ice	6.78	6.43	0.17
						1" Ice	7.21	7.13	0.23
						2" Ice	8.12	8.59	0.38
RADIO 4449 B12/B71	A	From Leg	4.00 0.00 0.00	0.0000	170.00	No Ice	1.65	1.30	0.08
						1/2" Ice	1.81	1.44	0.09
						1" Ice	1.98	1.60	0.11
						2" Ice	2.34	1.92	0.16
RADIO 4449 B12/B71	B	From Leg	4.00 0.00 0.00	0.0000	170.00	No Ice	1.65	1.30	0.08
						1/2" Ice	1.81	1.44	0.09
						1" Ice	1.98	1.60	0.11
						2" Ice	2.34	1.92	0.16
RADIO 4449 B12/B71	C	From Leg	4.00 0.00 0.00	0.0000	170.00	No Ice	1.65	1.30	0.08
						1/2" Ice	1.81	1.44	0.09
						1" Ice	1.98	1.60	0.11
						2" Ice	2.34	1.92	0.16
KRY 112 144/1	A	From Leg	4.00 0.00 0.00	0.0000	170.00	No Ice	0.35	0.17	0.01
						1/2" Ice	0.43	0.23	0.01
						1" Ice	0.51	0.30	0.02
						2" Ice	0.70	0.46	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
						2" Ice			
KRY 112 144/1	B	From Leg	4.00	0.0000	170.00	No Ice	0.35	0.17	0.01
			0.00			1/2"	0.43	0.23	0.01
			0.00			Ice	0.51	0.30	0.02
						1" Ice	0.70	0.46	0.03
						2" Ice			
KRY 112 144/1	C	From Leg	4.00	0.0000	170.00	No Ice	0.35	0.17	0.01
			0.00			1/2"	0.43	0.23	0.01
			0.00			Ice	0.51	0.30	0.02
						1" Ice	0.70	0.46	0.03
						2" Ice			
160									
Platform Mount [LP 403-1]	C	None		0.0000	162.00	No Ice	18.94	18.94	1.50
						1/2"	23.31	23.31	1.90
						Ice	27.74	27.74	2.37
						1" Ice	36.77	36.77	3.53
						2" Ice			
HRK-14 Handrail Kit [NA 510-1]	C	None		0.0000	162.00	No Ice	6.36	6.36	0.26
						1/2"	8.52	8.52	0.34
						Ice	10.62	10.62	0.46
						1" Ice	14.64	14.64	0.77
						2" Ice			
PRK-SFS-L Reinforcement Kit	A	From Leg	0.00	0.0000	162.00	No Ice	1.97	0.06	0.08
			0.00			1/2"	2.54	0.10	0.96
			0.00			Ice	3.13	0.14	0.13
						1" Ice	4.35	0.26	0.22
						2" Ice			
PRK-SFS-L Reinforcement Kit	B	From Leg	0.00	0.0000	162.00	No Ice	1.97	0.06	0.08
			0.00			1/2"	2.54	0.10	0.96
			0.00			Ice	3.13	0.14	0.13
						1" Ice	4.35	0.26	0.22
						2" Ice			
PRK-SFS-L Reinforcement Kit	C	From Leg	0.00	0.0000	162.00	No Ice	1.97	0.06	0.08
			0.00			1/2"	2.54	0.10	0.96
			0.00			Ice	3.13	0.14	0.13
						1" Ice	4.35	0.26	0.22
						2" Ice			
(2) L1-1/2"x2-1/2"x1/4"x1'-2"	A	From Leg	0.00	0.0000	162.00	No Ice	0.00	0.00	0.00
			0.00			1/2"	0.00	0.00	0.00
			0.00			Ice	0.00	0.00	0.00
						1" Ice	0.00	0.00	0.00
						2" Ice			
(2) L1-1/2"x2-1/2"x1/4"x1'-2"	B	From Leg	0.00	0.0000	162.00	No Ice	0.00	0.00	0.00
			0.00			1/2"	0.00	0.00	0.00
			0.00			Ice	0.00	0.00	0.00
						1" Ice	0.00	0.00	0.00
						2" Ice			
(2) L1-1/2"x2-1/2"x1/4"x1'-2"	C	From Leg	0.00	0.0000	162.00	No Ice	0.00	0.00	0.00
			0.00			1/2"	0.00	0.00	0.00
			0.00			Ice	0.00	0.00	0.00
						1" Ice	0.00	0.00	0.00
						2" Ice			
DMP65R-BU6D w/ Mount Pipe	A	From Leg	4.00	0.0000	162.00	No Ice	11.96	5.97	0.11
			-7.00			1/2"	12.70	6.63	0.20
			1.00			Ice	13.46	7.30	0.30
						1" Ice	15.02	8.69	0.53
						2" Ice			
DMP65R-BU6D w/ Mount Pipe	B	From Leg	4.00	0.0000	162.00	No Ice	11.96	5.97	0.11
			-7.00			1/2"	12.70	6.63	0.20
			1.00			Ice	13.46	7.30	0.30
						1" Ice	15.02	8.69	0.53
						2" Ice			
DMP65R-BU6D w/ Mount Pipe	C	From Leg	4.00	0.0000	162.00	No Ice	11.96	5.97	0.11
			-7.00			1/2"	12.70	6.63	0.20
			1.00			Ice	13.46	7.30	0.30

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
						1" Ice	15.02	8.69	0.53
						2" Ice			
80010965 w/ Mount Pipe	A	From Leg	4.00	0.0000	162.00	No Ice	12.26	5.79	0.14
			0.00			1/2"	13.03	6.47	0.23
			1.00			Ice	13.80	7.17	0.33
						1" Ice	15.41	8.60	0.57
						2" Ice			
80010965 w/ Mount Pipe	B	From Leg	4.00	0.0000	162.00	No Ice	12.26	5.79	0.14
			0.00			1/2"	13.03	6.47	0.23
			1.00			Ice	13.80	7.17	0.33
						1" Ice	15.41	8.60	0.57
						2" Ice			
80010965 w/ Mount Pipe	C	From Leg	4.00	0.0000	162.00	No Ice	12.26	5.79	0.14
			0.00			1/2"	13.03	6.47	0.23
			1.00			Ice	13.80	7.17	0.33
						1" Ice	15.41	8.60	0.57
						2" Ice			
OPA-65R-LCUU-H6 w/ Mount Pipe	A	From Leg	4.00	0.0000	162.00	No Ice	9.19	6.21	0.11
			7.00			1/2"	9.94	6.93	0.18
			1.00			Ice	10.71	7.66	0.26
						1" Ice	12.30	9.17	0.45
						2" Ice			
OPA-65R-LCUU-H6 w/ Mount Pipe	B	From Leg	4.00	0.0000	162.00	No Ice	9.19	6.21	0.11
			7.00			1/2"	9.94	6.93	0.18
			1.00			Ice	10.71	7.66	0.26
						1" Ice	12.30	9.17	0.45
						2" Ice			
OPA-65R-LCUU-H6 w/ Mount Pipe	C	From Leg	4.00	0.0000	162.00	No Ice	9.19	6.21	0.11
			7.00			1/2"	9.94	6.93	0.18
			1.00			Ice	10.71	7.66	0.26
						1" Ice	12.30	9.17	0.45
						2" Ice			
RRUS 32 B30	A	From Leg	4.00	0.0000	162.00	No Ice	2.69	1.57	0.06
			0.00			1/2"	2.91	1.76	0.08
			1.00			Ice	3.14	1.95	0.10
						1" Ice	3.61	2.35	0.16
						2" Ice			
RRUS 32 B30	B	From Leg	4.00	0.0000	162.00	No Ice	2.69	1.57	0.06
			0.00			1/2"	2.91	1.76	0.08
			1.00			Ice	3.14	1.95	0.10
						1" Ice	3.61	2.35	0.16
						2" Ice			
RRUS 32 B30	C	From Leg	4.00	0.0000	162.00	No Ice	2.69	1.57	0.06
			0.00			1/2"	2.91	1.76	0.08
			1.00			Ice	3.14	1.95	0.10
						1" Ice	3.61	2.35	0.16
						2" Ice			
RRUS 32 B2	A	From Leg	4.00	0.0000	162.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			1.00			Ice	3.18	2.05	0.10
						1" Ice	3.66	2.46	0.16
						2" Ice			
RRUS 32 B2	B	From Leg	4.00	0.0000	162.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			1.00			Ice	3.18	2.05	0.10
						1" Ice	3.66	2.46	0.16
						2" Ice			
RRUS 32 B2	C	From Leg	4.00	0.0000	162.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			1.00			Ice	3.18	2.05	0.10
						1" Ice	3.66	2.46	0.16
						2" Ice			
RRUS 4478 B14	A	From Leg	4.00	0.0000	162.00	No Ice	1.84	1.06	0.06
			0.00			1/2"	2.01	1.20	0.08
			1.00			Ice	2.19	1.34	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
						1" Ice	2.57	1.66	0.14
						2" Ice			
RRUS 4478 B14	B	From Leg	4.00	0.0000	162.00	No Ice	1.84	1.06	0.06
			0.00			1/2"	2.01	1.20	0.08
			1.00			Ice	2.19	1.34	0.09
						1" Ice	2.57	1.66	0.14
						2" Ice			
RRUS 4478 B14	C	From Leg	4.00	0.0000	162.00	No Ice	1.84	1.06	0.06
			0.00			1/2"	2.01	1.20	0.08
			1.00			Ice	2.19	1.34	0.09
						1" Ice	2.57	1.66	0.14
						2" Ice			
DC6-48-60-18-8C	A	From Leg	1.00	0.0000	162.00	No Ice	1.14	1.14	0.03
			0.00			1/2"	1.79	1.79	0.05
			1.00			Ice	2.00	2.00	0.07
						1" Ice	2.45	2.45	0.13
						2" Ice			
DC6-48-60-18-8C	B	From Leg	4.00	0.0000	162.00	No Ice	1.14	1.14	0.03
			0.00			1/2"	1.79	1.79	0.05
			1.00			Ice	2.00	2.00	0.07
						1" Ice	2.45	2.45	0.13
						2" Ice			
DC6-48-60-18-8F	C	From Leg	1.00	0.0000	162.00	No Ice	0.92	0.92	0.02
			0.00			1/2"	1.46	1.46	0.04
			1.00			Ice	1.64	1.64	0.06
						1" Ice	2.04	2.04	0.11
						2" Ice			
RRUS 4449 B5/B12	A	From Leg	4.00	0.0000	162.00	No Ice	1.97	1.41	0.07
			0.00			1/2"	2.14	1.56	0.09
			1.00			Ice	2.33	1.73	0.11
						1" Ice	2.72	2.07	0.16
						2" Ice			
RRUS 4449 B5/B12	B	From Leg	4.00	0.0000	162.00	No Ice	1.97	1.41	0.07
			0.00			1/2"	2.14	1.56	0.09
			1.00			Ice	2.33	1.73	0.11
						1" Ice	2.72	2.07	0.16
						2" Ice			
RRUS 4449 B5/B12	C	From Leg	4.00	0.0000	162.00	No Ice	1.97	1.41	0.07
			0.00			1/2"	2.14	1.56	0.09
			1.00			Ice	2.33	1.73	0.11
						1" Ice	2.72	2.07	0.16
						2" Ice			
RRUS 32 B66A	A	From Leg	4.00	0.0000	162.00	No Ice	2.86	1.78	0.06
			0.00			1/2"	3.09	1.97	0.08
			1.00			Ice	3.32	2.17	0.10
						1" Ice	3.81	2.59	0.16
						2" Ice			
RRUS 32 B66A	B	From Leg	4.00	0.0000	162.00	No Ice	2.86	1.78	0.06
			0.00			1/2"	3.09	1.97	0.08
			1.00			Ice	3.32	2.17	0.10
						1" Ice	3.81	2.59	0.16
						2" Ice			
RRUS 32 B66A	C	From Leg	4.00	0.0000	162.00	No Ice	2.86	1.78	0.06
			0.00			1/2"	3.09	1.97	0.08
			1.00			Ice	3.32	2.17	0.10
						1" Ice	3.81	2.59	0.16
						2" Ice			
(2) DBCT108F1V92-1	A	From Leg	4.00	0.0000	162.00	No Ice	0.64	0.32	0.01
			0.00			1/2"	0.74	0.40	0.02
			1.00			Ice	0.85	0.49	0.03
						1" Ice	1.09	0.69	0.05
						2" Ice			
(2) DBCT108F1V92-1	B	From Leg	4.00	0.0000	162.00	No Ice	0.64	0.32	0.01
			0.00			1/2"	0.74	0.40	0.02
			1.00			Ice	0.85	0.49	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
						1" Ice	1.09	0.69	0.05
						2" Ice			
(2) DBCT108F1V92-1	C	From Leg	4.00	0.0000	162.00	No Ice	0.64	0.32	0.01
			0.00			1/2"	0.74	0.40	0.02
			1.00			Ice	0.85	0.49	0.03
						1" Ice	1.09	0.69	0.05
						2" Ice			
150									
Platform Mount [LP 403-1]	C	None		0.0000	150.00	No Ice	18.94	18.94	1.50
						1/2"	23.31	23.31	1.90
						Ice	27.74	27.74	2.37
						1" Ice	36.77	36.77	3.53
						2" Ice			
QS6656-5D w/ Mount Pipe	A	From Leg	4.00	0.0000	150.00	No Ice	4.04	4.18	0.11
			-7.00			1/2"	4.42	4.57	0.18
			3.00			Ice	4.82	4.97	0.26
						1" Ice	5.63	5.79	0.46
						2" Ice			
QS6656-5D w/ Mount Pipe	A	From Leg	4.00	0.0000	150.00	No Ice	4.04	4.18	0.11
			2.33			1/2"	4.42	4.57	0.18
			3.00			Ice	4.82	4.97	0.26
						1" Ice	5.63	5.79	0.46
						2" Ice			
QS6656-5D w/ Mount Pipe	B	From Leg	4.00	0.0000	150.00	No Ice	4.04	4.18	0.11
			-7.00			1/2"	4.42	4.57	0.18
			3.00			Ice	4.82	4.97	0.26
						1" Ice	5.63	5.79	0.46
						2" Ice			
QS6656-5D w/ Mount Pipe	B	From Leg	4.00	0.0000	150.00	No Ice	4.04	4.18	0.11
			-2.33			1/2"	4.42	4.57	0.18
			3.00			Ice	4.82	4.97	0.26
						1" Ice	5.63	5.79	0.46
						2" Ice			
QS6656-5D w/ Mount Pipe	C	From Leg	4.00	0.0000	150.00	No Ice	4.04	4.18	0.11
			-7.00			1/2"	4.42	4.57	0.18
			3.00			Ice	4.82	4.97	0.26
						1" Ice	5.63	5.79	0.46
						2" Ice			
QS6656-5D w/ Mount Pipe	C	From Leg	4.00	0.0000	150.00	No Ice	4.04	4.18	0.11
			-2.33			1/2"	4.42	4.57	0.18
			3.00			Ice	4.82	4.97	0.26
						1" Ice	5.63	5.79	0.46
						2" Ice			
DB846F65ZAXY w/ Mount Pipe	A	From Leg	4.00	0.0000	150.00	No Ice	7.27	7.82	0.05
			-2.33			1/2"	7.83	9.01	0.11
			3.00			Ice	8.35	9.91	0.19
						1" Ice	9.40	11.73	0.37
						2" Ice			
DB846F65ZAXY w/ Mount Pipe	A	From Leg	4.00	0.0000	150.00	No Ice	7.27	7.82	0.05
			7.00			1/2"	7.83	9.01	0.11
			3.00			Ice	8.35	9.91	0.19
						1" Ice	9.40	11.73	0.37
						2" Ice			
DB846F65ZAXY w/ Mount Pipe	B	From Leg	4.00	0.0000	150.00	No Ice	7.27	7.82	0.05
			2.33			1/2"	7.83	9.01	0.11
			3.00			Ice	8.35	9.91	0.19
						1" Ice	9.40	11.73	0.37
						2" Ice			
DB846F65ZAXY w/ Mount Pipe	B	From Leg	4.00	0.0000	150.00	No Ice	7.27	7.82	0.05
			7.00			1/2"	7.83	9.01	0.11
			3.00			Ice	8.35	9.91	0.19
						1" Ice	9.40	11.73	0.37
						2" Ice			
LPA-80080/6CF w/ Mount Pipe	C	From Leg	4.00	0.0000	150.00	No Ice	4.56	10.26	0.05
			2.33			1/2"	5.11	11.43	0.11

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
			3.00			Ice	5.61	12.31	0.19
						1" Ice	6.65	14.13	0.36
						2" Ice			
LPA-80080/6CF w/ Mount Pipe	C	From Leg	4.00	0.0000	150.00	No Ice	4.56	10.26	0.05
			7.00			1/2"	5.11	11.43	0.11
			3.00			Ice	5.61	12.31	0.19
						1" Ice	6.65	14.13	0.36
						2" Ice			
DB-C1-12C-24AB-0Z	A	From Leg	4.00	0.0000	150.00	No Ice	4.06	3.10	0.03
			0.00			1/2"	4.32	3.34	0.07
			3.00			Ice	4.58	3.58	0.11
						1" Ice	5.14	4.09	0.20
						2" Ice			
RFV01U-D2A	A	From Leg	4.00	0.0000	150.00	No Ice	1.88	1.01	0.07
			0.00			1/2"	2.05	1.14	0.09
			3.00			Ice	2.22	1.28	0.11
						1" Ice	2.60	1.59	0.15
						2" Ice			
RFV01U-D2A	B	From Leg	4.00	0.0000	150.00	No Ice	1.88	1.01	0.07
			0.00			1/2"	2.05	1.14	0.09
			3.00			Ice	2.22	1.28	0.11
						1" Ice	2.60	1.59	0.15
						2" Ice			
RFV01U-D2A	C	From Leg	4.00	0.0000	150.00	No Ice	1.88	1.01	0.07
			0.00			1/2"	2.05	1.14	0.09
			3.00			Ice	2.22	1.28	0.11
						1" Ice	2.60	1.59	0.15
						2" Ice			
RFV01U-D1A	A	From Leg	4.00	0.0000	150.00	No Ice	1.88	1.25	0.08
			0.00			1/2"	2.05	1.39	0.10
			3.00			Ice	2.22	1.54	0.12
						1" Ice	2.60	1.86	0.18
						2" Ice			
RFV01U-D1A	B	From Leg	4.00	0.0000	150.00	No Ice	1.88	1.25	0.08
			0.00			1/2"	2.05	1.39	0.10
			3.00			Ice	2.22	1.54	0.12
						1" Ice	2.60	1.86	0.18
						2" Ice			
RFV01U-D1A	C	From Leg	4.00	0.0000	150.00	No Ice	1.88	1.25	0.08
			0.00			1/2"	2.05	1.39	0.10
			3.00			Ice	2.22	1.54	0.12
						1" Ice	2.60	1.86	0.18
						2" Ice			
125									
Side Arm Mount [SO 901-1]	A	From Face	1.50	0.0000	125.00	No Ice	0.33	0.62	0.11
			0.00			1/2"	0.46	0.78	0.11
			0.00			Ice	0.62	0.97	0.12
						1" Ice	1.01	1.43	0.15
						2" Ice			
Side Arm Mount [SO 901-1]	B	From Leg	1.50	0.0000	125.00	No Ice	0.33	0.62	0.11
			0.00			1/2"	0.46	0.78	0.11
			0.00			Ice	0.62	0.97	0.12
						1" Ice	1.01	1.43	0.15
						2" Ice			
PD128-1	A	From Face	3.00	0.0000	125.00	No Ice	1.28	1.28	0.01
			0.00			1/2"	2.27	2.27	0.02
			5.00			Ice	3.28	3.28	0.04
						1" Ice	5.13	5.13	0.09
						2" Ice			
PD201-1	B	From Leg	3.00	0.0000	125.00	No Ice	1.18	1.18	0.00
			0.00			1/2"	2.09	2.09	0.01
			5.00			Ice	3.02	3.02	0.03
						1" Ice	4.58	4.58	0.08
						2" Ice			
110									

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
Side Arm Mount [SO 901-1]	A	From Face	1.50 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.33 0.46 0.62 1.01	0.62 0.78 0.97 1.43	0.11 0.11 0.12 0.15
Side Arm Mount [SO 901-1]	B	From Leg	1.50 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.33 0.46 0.62 1.01	0.62 0.78 0.97 1.43	0.11 0.11 0.12 0.15
PD128-1	A	From Face	3.00 0.00 5.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.28 2.27 3.28 5.13	1.28 2.27 3.28 5.13	0.01 0.02 0.04 0.09
PD128-1	B	From Leg	3.00 0.00 5.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.28 2.27 3.28 5.13	1.28 2.27 3.28 5.13	0.01 0.02 0.04 0.09
100									
Side Arm Mount [SO 901-1]	C	From Face	1.50 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.33 0.46 0.62 1.01	0.62 0.78 0.97 1.43	0.11 0.11 0.12 0.15
GPS_A	C	From Face	3.00 0.00 1.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.26 0.32 0.39 0.56	0.26 0.32 0.39 0.56	0.00 0.00 0.01 0.02
95									
Side Arm Mount [SO 901-1]	B	From Face	1.50 0.00 0.00	0.0000	95.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.33 0.46 0.62 1.01	0.62 0.78 0.97 1.43	0.11 0.11 0.12 0.15
Side Arm Mount [SO 901-1]	C	From Leg	1.50 0.00 0.00	0.0000	95.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.33 0.46 0.62 1.01	0.62 0.78 0.97 1.43	0.11 0.11 0.12 0.15
PD128-1	B	From Face	3.00 0.00 5.00	0.0000	95.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.28 2.27 3.28 5.13	1.28 2.27 3.28 5.13	0.01 0.02 0.04 0.09
PD128-1	C	From Leg	3.00 0.00 5.00	0.0000	95.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.28 2.27 3.28 5.13	1.28 2.27 3.28 5.13	0.01 0.02 0.04 0.09
80									
Side Arm Mount [SO 901-1]	A	From Face	1.50 0.00 0.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.33 0.46 0.62 1.01	0.62 0.78 0.97 1.43	0.11 0.11 0.12 0.15
Side Arm Mount [SO 901-1]	B	From Leg	1.50 0.00 0.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.33 0.46 0.62 1.01	0.62 0.78 0.97 1.43	0.11 0.11 0.12 0.15
DB222	A	From Face	3.00 0.00	0.0000	80.00	No Ice 1/2"	1.60 2.88	1.60 2.88	0.02 0.02

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
			5.00			Ice	4.16	4.16	0.03
						1" Ice	6.72	6.72	0.04
						2" Ice			
PD128-1	B	From Leg	3.00	0.0000	80.00	No Ice	1.28	1.28	0.01
			0.00			1/2"	2.27	2.27	0.02
			5.00			Ice	3.28	3.28	0.04
						1" Ice	5.13	5.13	0.09
						2" Ice			
***									
MOD 2013									
Jump Plate 120" x 4.5" x 1"	A	From Face	0.00	0.0000	80.00	No Ice	7.50	2.21	0.21
			0.00			1/2"	9.24	3.09	0.25
			0.00			Ice	11.01	3.99	0.28
						1" Ice	14.64	5.81	0.36
						2" Ice			
Jump Plate 120" x 4.5" x 1"	B	From Face	0.00	0.0000	80.00	No Ice	7.50	2.21	0.21
			0.00			1/2"	9.24	3.09	0.25
			0.00			Ice	11.01	3.99	0.28
						1" Ice	14.64	5.81	0.36
						2" Ice			
Jump Plate 120" x 4.5" x 1"	C	From Face	0.00	0.0000	80.00	No Ice	7.50	2.21	0.21
			0.00			1/2"	9.24	3.09	0.25
			0.00			Ice	11.01	3.99	0.28
						1" Ice	14.64	5.81	0.36
						2" Ice			
***									
Jump Plate 120" x 6.5" x 1.25"	A	From Face	0.00	0.0000	60.00	No Ice	9.65	3.08	0.41
			0.00			1/2"	11.23	3.97	0.47
			0.00			Ice	12.83	4.87	0.51
						1" Ice	16.11	6.71	0.59
						2" Ice			
Jump Plate 120" x 6.5" x 1.25"	B	From Face	0.00	0.0000	60.00	No Ice	9.65	3.08	0.41
			0.00			1/2"	11.23	3.97	0.47
			0.00			Ice	12.83	4.87	0.51
						1" Ice	16.11	6.71	0.59
						2" Ice			
Jump Plate 120" x 6.5" x 1.25"	C	From Face	0.00	0.0000	60.00	No Ice	9.65	3.08	0.41
			0.00			1/2"	11.23	3.97	0.47
			0.00			Ice	12.83	4.87	0.51
						1" Ice	16.11	6.71	0.59
						2" Ice			
***									
(2) Jump Plate 120" x 6" x 1"	A	From Face	0.00	0.0000	40.00	No Ice	9.17	2.42	0.30
			0.00			1/2"	10.78	3.30	0.35
			0.00			Ice	12.43	4.19	0.38
						1" Ice	15.79	6.03	0.47
						2" Ice			
(2) Jump Plate 120" x 6" x 1"	B	From Face	0.00	0.0000	40.00	No Ice	9.17	2.42	0.30
			0.00			1/2"	10.78	3.30	0.35
			0.00			Ice	12.43	4.19	0.38
						1" Ice	15.79	6.03	0.47
						2" Ice			
(2) Jump Plate 120" x 6" x 1"	C	From Face	0.00	0.0000	40.00	No Ice	9.17	2.42	0.30
			0.00			1/2"	10.78	3.30	0.35
			0.00			Ice	12.43	4.19	0.38
						1" Ice	15.79	6.03	0.47
						2" Ice			
***									
(2) Jump Plate 120" x 6.5" x 1.25"	A	From Face	0.00	0.0000	20.00	No Ice	9.65	3.08	0.41
			0.00			1/2"	11.23	3.97	0.47
			0.00			Ice	12.83	4.87	0.51
						1" Ice	16.11	6.71	0.59
						2" Ice			
(2) Jump Plate 120" x 6.5" x 1.25"	B	From Face	0.00	0.0000	20.00	No Ice	9.65	3.08	0.41
			0.00			1/2"	11.23	3.97	0.47

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	12.83	4.87	0.51
						1" Ice	16.11	6.71	0.59
						2" Ice			
(2) Jump Plate 120" x 6.5" x 1.25"	C	From Face	0.00	0.0000	20.00	No Ice	9.65	3.08	0.41
			0.00			1/2"	11.23	3.97	0.47
			0.00			Ice	12.83	4.87	0.51
						1" Ice	16.11	6.71	0.59
						2" Ice			
***									
***									

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
SP2-5.8	B	Paraboloid w/Radome	From Face	4.00	-45.0000		188.00	2.00	No Ice	3.14	0.02
				0.00					1/2" Ice	3.41	0.04
				-1.00					1" Ice	3.68	0.06
									2" Ice	4.21	0.09
***											

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 190.00-185.00	187.50	1.183	39	12.500	A	0.000	12.500	12.500	100.00	0.000	0.000
					B	0.000	12.500		100.00	1.386	0.000
					C	0.000	12.500		100.00	0.588	0.000
L2 185.00-180.00	182.50	1.174	39	12.500	A	0.000	12.500	12.500	100.00	0.000	0.000
					B	0.000	12.500		100.00	2.310	0.000
					C	0.000	12.500		100.00	0.588	0.000
L3 180.00-175.00	177.50	1.164	38	15.000	A	0.000	15.000	15.000	100.00	0.000	0.000
					B	0.000	15.000		100.00	2.310	0.000
					C	0.000	15.000		100.00	0.588	0.000
L4 175.00-170.00	172.50	1.155	38	15.000	A	0.000	15.000	15.000	100.00	0.000	0.000
					B	0.000	15.000		100.00	2.310	0.000
					C	0.000	15.000		100.00	0.588	0.000
L5 170.00-165.00	167.50	1.145	38	15.000	A	0.000	15.000	15.000	100.00	0.000	0.000
					B	0.000	15.000		100.00	12.210	0.000
					C	0.000	15.000		100.00	0.588	0.000
L6 165.00-160.00	162.50	1.135	37	15.000	A	0.000	15.000	15.000	100.00	2.853	0.000
					B	0.000	15.000		100.00	12.210	0.000
					C	0.000	15.000		100.00	0.588	0.000
L7 160.00-155.00	157.50	1.125	37	17.500	A	0.000	17.500	17.500	100.00	7.132	0.000
					B	0.000	17.500		100.00	12.210	0.000
					C	0.000	17.500		100.00	0.588	0.000
L8 155.00-150.00	152.50	1.115	37	17.500	A	0.000	17.500	17.500	100.00	7.132	0.000
					B	0.000	17.500		100.00	12.210	0.000
					C	0.000	17.500		100.00	0.588	0.000

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
L9 150.00-145.00	147.50	1.104	36	17.500	A	0.000	17.500	17.500	100.00	7.132	0.000
					B	0.000	17.500		100.00	12.210	0.000
					C	0.000	17.500		100.00	0.588	0.000
L10 145.00-140.00	142.50	1.093	36	17.500	A	0.000	17.500	17.500	100.00	7.132	0.000
					B	0.000	17.500		100.00	12.210	0.000
					C	0.000	17.500		100.00	0.588	0.000
L11 140.00-135.00	137.50	1.082	36	20.000	A	0.000	20.000	20.000	100.00	7.132	0.000
					B	0.000	20.000		100.00	12.210	0.000
					C	0.000	20.000		100.00	0.588	0.000
L12 135.00-130.00	132.50	1.071	35	20.000	A	0.000	20.000	20.000	100.00	7.132	0.000
					B	0.000	20.000		100.00	12.210	0.000
					C	0.000	20.000		100.00	0.588	0.000
L13 130.00-125.00	127.50	1.059	35	20.000	A	0.000	20.000	20.000	100.00	7.132	0.000
					B	0.000	20.000		100.00	12.210	0.000
					C	0.000	20.000		100.00	0.588	0.000
L14 125.00-120.00	122.50	1.047	34	20.000	A	0.000	20.000	20.000	100.00	7.132	0.000
					B	0.000	20.000		100.00	12.210	0.000
					C	0.000	20.000		100.00	0.588	0.000
L15 120.00-115.00	117.50	1.035	34	22.500	A	0.000	22.500	22.500	100.00	7.132	0.000
					B	0.000	22.500		100.00	12.210	0.000
					C	0.000	22.500		100.00	0.588	0.000
L16 115.00-112.67	113.84	1.026	34	10.485	A	0.000	10.485	10.485	100.00	5.320	0.000
					B	0.000	10.485		100.00	7.686	0.000
					C	0.000	10.485		100.00	2.270	0.000
L17 112.67-112.42	112.55	1.022	34	1.125	A	0.000	1.125	1.125	100.00	0.607	0.000
					B	0.000	1.125		100.00	0.861	0.000
					C	0.000	1.125		100.00	0.279	0.000
L18 112.42-107.42	109.92	1.015	33	22.500	A	0.000	22.500	22.500	100.00	12.133	0.000
					B	0.000	22.500		100.00	17.210	0.000
					C	0.000	22.500		100.00	5.588	0.000
L19 107.42-103.33	105.38	1.003	33	18.405	A	0.000	18.405	18.405	100.00	11.927	0.000
					B	0.000	18.405		100.00	16.081	0.000
					C	0.000	18.405		100.00	6.574	0.000
L20 103.33-103.08	103.21	0.997	33	1.125	A	0.000	1.125	1.125	100.00	0.857	0.000
					B	0.000	1.125		100.00	1.111	0.000
					C	0.000	1.125		100.00	0.529	0.000
L21 103.08-100.00	101.54	0.993	33	13.860	A	0.000	13.860	13.860	100.00	9.221	0.000
					B	0.000	13.860		100.00	12.348	0.000
					C	0.000	13.860		100.00	5.189	0.000
L22 100.00-95.00	97.50	0.981	32	25.000	A	0.000	25.000	25.000	100.00	12.133	0.000
					B	0.000	25.000		100.00	17.210	0.000
					C	0.000	25.000		100.00	5.588	0.000
L23 95.00-90.00	92.50	0.966	32	25.000	A	0.000	25.000	25.000	100.00	12.883	0.000
					B	0.000	25.000		100.00	17.960	0.000
					C	0.000	25.000		100.00	6.338	0.000
L24 90.00-89.50	89.75	0.958	32	2.500	A	0.000	2.500	2.500	100.00	1.588	0.000
					B	0.000	2.500		100.00	2.096	0.000
					C	0.000	2.500		100.00	0.934	0.000
L25 89.50-89.25	89.38	0.957	31	1.250	A	0.000	1.250	1.250	100.00	0.794	0.000
					B	0.000	1.250		100.00	1.048	0.000
					C	0.000	1.250		100.00	0.467	0.000
L26 89.25-85.50	87.38	0.951	31	18.750	A	0.000	18.750	18.750	100.00	13.037	0.000
					B	0.000	18.750		100.00	16.845	0.000
					C	0.000	18.750		100.00	8.128	0.000
L27 85.50-85.25	85.38	0.945	31	1.250	A	0.000	1.250	1.250	100.00	0.982	0.000
					B	0.000	1.250		100.00	1.236	0.000
					C	0.000	1.250		100.00	0.654	0.000
L28 85.25-84.00	84.63	0.942	31	6.250	A	0.000	6.250	6.250	100.00	4.908	0.000
					B	0.000	6.250		100.00	6.178	0.000
					C	0.000	6.250		100.00	3.272	0.000
L29 84.00-83.75	83.88	0.94	31	1.250	A	0.000	1.250	1.250	100.00	0.982	0.000
					B	0.000	1.250		100.00	1.236	0.000
					C	0.000	1.250		100.00	0.654	0.000
L30 83.75-82.50	83.13	0.937	31	6.250	A	0.000	6.250	6.250	100.00	4.908	0.000
					B	0.000	6.250		100.00	6.178	0.000
					C	0.000	6.250		100.00	3.272	0.000
L31 82.50-82.25	82.38	0.935	31	1.250	A	0.000	1.250	1.250	100.00	0.982	0.000
					B	0.000	1.250		100.00	1.236	0.000

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
					C	0.000	1.250		100.00	0.654	0.000
L32 82.25-80.00	81.13	0.931	31	11.250	A	0.000	11.250	11.250	100.00	6.085	0.000
					B	0.000	11.250		100.00	8.370	0.000
					C	0.000	11.250		100.00	3.139	0.000
L33 80.00-75.00	77.50	0.919	30	25.000	A	0.000	25.000	25.000	100.00	10.883	0.000
					B	0.000	25.000		100.00	15.960	0.000
					C	0.000	25.000		100.00	4.338	0.000
L34 75.00-70.00	72.50	0.901	30	25.000	A	0.000	25.000	25.000	100.00	10.883	0.000
					B	0.000	25.000		100.00	15.960	0.000
					C	0.000	25.000		100.00	4.338	0.000
L35 70.00-65.00	67.50	0.883	29	25.000	A	0.000	25.000	25.000	100.00	10.883	0.000
					B	0.000	25.000		100.00	15.960	0.000
					C	0.000	25.000		100.00	4.338	0.000
L36 65.00-60.00	62.50	0.864	28	25.000	A	0.000	25.000	25.000	100.00	10.883	0.000
					B	0.000	25.000		100.00	15.960	0.000
					C	0.000	25.000		100.00	4.338	0.000
L37 60.00-58.50	59.25	0.851	28	7.500	A	0.000	7.500	7.500	100.00	3.265	0.000
					B	0.000	7.500		100.00	4.788	0.000
					C	0.000	7.500		100.00	1.301	0.000
L38 58.50-58.25	58.38	0.847	28	1.250	A	0.000	1.250	1.250	100.00	0.544	0.000
					B	0.000	1.250		100.00	0.798	0.000
					C	0.000	1.250		100.00	0.217	0.000
L39 58.25-53.25	55.75	0.836	28	25.000	A	0.000	25.000	25.000	100.00	8.070	0.000
					B	0.000	25.000		100.00	13.148	0.000
					C	0.000	25.000		100.00	1.525	0.000
L40 53.25-48.25	50.75	0.814	27	25.000	A	0.000	25.000	25.000	100.00	10.112	0.000
					B	0.000	25.000		100.00	15.189	0.000
					C	0.000	25.000		100.00	3.567	0.000
L41 48.25-48.00	48.13	0.802	26	1.250	A	0.000	1.250	1.250	100.00	0.627	0.000
					B	0.000	1.250		100.00	0.881	0.000
					C	0.000	1.250		100.00	0.300	0.000
L42 48.00-43.00	45.50	0.789	26	25.000	A	0.000	25.000	25.000	100.00	12.549	0.000
					B	0.000	25.000		100.00	17.627	0.000
					C	0.000	25.000		100.00	6.004	0.000
L43 43.00-40.00	41.50	0.769	25	15.000	A	0.000	15.000	15.000	100.00	7.530	0.000
					B	0.000	15.000		100.00	10.576	0.000
					C	0.000	15.000		100.00	3.603	0.000
L44 40.00-35.00	37.50	0.747	25	25.000	A	0.000	25.000	25.000	100.00	13.729	0.000
					B	0.000	25.000		100.00	18.807	0.000
					C	0.000	25.000		100.00	7.184	0.000
L45 35.00-32.08	33.54	0.723	24	14.600	A	0.000	14.600	14.600	100.00	11.465	0.000
					B	0.000	14.600		100.00	14.431	0.000
					C	0.000	14.600		100.00	7.643	0.000
L46 32.08-31.83	31.96	0.713	23	1.250	A	0.000	1.250	1.250	100.00	0.982	0.000
					B	0.000	1.250		100.00	1.236	0.000
					C	0.000	1.250		100.00	0.654	0.000
L47 31.83-28.75	30.29	0.703	23	15.400	A	0.000	15.400	15.400	100.00	12.094	0.000
					B	0.000	15.400		100.00	15.221	0.000
					C	0.000	15.400		100.00	8.062	0.000
L48 28.75-28.50	28.63	0.7	23	1.250	A	0.000	1.250	1.250	100.00	0.982	0.000
					B	0.000	1.250		100.00	1.236	0.000
					C	0.000	1.250		100.00	0.654	0.000
L49 28.50-23.50	26.00	0.7	23	25.000	A	0.000	25.000	25.000	100.00	16.924	0.000
					B	0.000	25.000		100.00	22.002	0.000
					C	0.000	25.000		100.00	10.379	0.000
L50 23.50-18.50	21.00	0.7	23	25.000	A	0.000	25.000	25.000	100.00	14.216	0.000
					B	0.000	25.000		100.00	19.293	0.000
					C	0.000	25.000		100.00	7.671	0.000
L51 18.50-13.50	16.00	0.7	23	25.000	A	0.000	25.000	25.000	100.00	14.216	0.000
					B	0.000	25.000		100.00	19.293	0.000
					C	0.000	25.000		100.00	7.671	0.000
L52 13.50-8.50	11.00	0.7	23	25.000	A	0.000	25.000	25.000	100.00	10.650	0.000
					B	0.000	25.000		100.00	19.293	0.000
					C	0.000	25.000		100.00	7.495	0.000
L53 8.50-3.50	6.00	0.7	23	25.000	A	0.000	25.000	25.000	100.00	7.083	0.000
					B	0.000	25.000		100.00	9.228	0.000
					C	0.000	25.000		100.00	7.083	0.000
L54 3.50-0.00	1.75	0.7	23	17.500	A	0.000	17.500	17.500	100.00	3.778	0.000

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
					B	0.000	17.500		100.00	3.778	0.000
					C	0.000	17.500		100.00	3.778	0.000

Tower Pressure - With Ice

G_H = 1.100

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
L1 190.00-185.00	187.50	1.183	7	1.5169	13.764	A	0.000	13.764	13.764	100.00	0.000	0.000
						B	0.000	13.764		100.00	2.870	0.000
						C	0.000	13.764		100.00	3.621	0.000
L2 185.00-180.00	182.50	1.174	7	1.5128	13.761	A	0.000	13.761	13.761	100.00	0.000	0.000
						B	0.000	13.761		100.00	4.779	0.000
						C	0.000	13.761		100.00	3.613	0.000
L3 180.00-175.00	177.50	1.164	7	1.5086	16.257	A	0.000	16.257	16.257	100.00	0.000	0.000
						B	0.000	16.257		100.00	4.773	0.000
						C	0.000	16.257		100.00	3.605	0.000
L4 175.00-170.00	172.50	1.155	7	1.5043	16.254	A	0.000	16.254	16.254	100.00	0.000	0.000
						B	0.000	16.254		100.00	4.768	0.000
						C	0.000	16.254		100.00	3.596	0.000
L5 170.00-165.00	167.50	1.145	7	1.4999	16.250	A	0.000	16.250	16.250	100.00	0.000	0.000
						B	0.000	16.250		100.00	19.012	0.000
						C	0.000	16.250		100.00	3.587	0.000
L6 165.00-160.00	162.50	1.135	6	1.4954	16.246	A	0.000	16.246	16.246	100.00	5.062	0.000
						B	0.000	16.246		100.00	19.001	0.000
						C	0.000	16.246		100.00	3.578	0.000
L7 160.00-155.00	157.50	1.125	6	1.4907	18.742	A	0.000	18.742	18.742	100.00	12.642	0.000
						B	0.000	18.742		100.00	18.989	0.000
						C	0.000	18.742		100.00	3.569	0.000
L8 155.00-150.00	152.50	1.115	6	1.4859	18.738	A	0.000	18.738	18.738	100.00	12.630	0.000
						B	0.000	18.738		100.00	18.977	0.000
						C	0.000	18.738		100.00	3.559	0.000
L9 150.00-145.00	147.50	1.104	6	1.4809	18.734	A	0.000	18.734	18.734	100.00	12.618	0.000
						B	0.000	18.734		100.00	18.965	0.000
						C	0.000	18.734		100.00	3.549	0.000
L10 145.00-140.00	142.50	1.093	6	1.4758	18.730	A	0.000	18.730	18.730	100.00	12.605	0.000
						B	0.000	18.730		100.00	18.952	0.000
						C	0.000	18.730		100.00	3.539	0.000
L11 140.00-135.00	137.50	1.082	6	1.4706	21.225	A	0.000	21.225	21.225	100.00	12.592	0.000
						B	0.000	21.225		100.00	18.939	0.000
						C	0.000	21.225		100.00	3.529	0.000
L12 135.00-130.00	132.50	1.071	6	1.4651	21.221	A	0.000	21.221	21.221	100.00	12.578	0.000
						B	0.000	21.221		100.00	18.925	0.000
						C	0.000	21.221		100.00	3.518	0.000
L13 130.00-125.00	127.50	1.059	6	1.4595	21.216	A	0.000	21.216	21.216	100.00	12.564	0.000
						B	0.000	21.216		100.00	18.911	0.000
						C	0.000	21.216		100.00	3.507	0.000
L14 125.00-120.00	122.50	1.047	6	1.4537	21.211	A	0.000	21.211	21.211	100.00	12.550	0.000
						B	0.000	21.211		100.00	18.897	0.000
						C	0.000	21.211		100.00	3.495	0.000
L15 120.00-115.00	117.50	1.035	6	1.4476	23.706	A	0.000	23.706	23.706	100.00	12.535	0.000
						B	0.000	23.706		100.00	18.882	0.000
						C	0.000	23.706		100.00	3.483	0.000
L16 115.00-112.67	113.84	1.026	6	1.4431	11.045	A	0.000	11.045	11.045	100.00	8.176	0.000
						B	0.000	11.045		100.00	11.134	0.000
						C	0.000	11.045		100.00	3.959	0.000
L17 112.67-112.42	112.55	1.022	6	1.4414	1.185	A	0.000	1.185	1.185	100.00	0.919	0.000
						B	0.000	1.185		100.00	1.236	0.000
						C	0.000	1.185		100.00	0.467	0.000
L18 112.42-107.42	109.92	1.015	6	1.4380	23.698	A	0.000	23.698	23.698	100.00	18.370	0.000
						B	0.000	23.698		100.00	24.717	0.000
						C	0.000	23.698		100.00	9.323	0.000

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
L19 107.42-	105.38	1.003	6	1.4320	19.381	A	0.000	19.381	19.381	100.00	17.589	0.000
103.33						B	0.000	19.381		100.00	22.780	0.000
						C	0.000	19.381		100.00	10.191	0.000
L20 103.33-	103.21	0.997	6	1.4290	1.185	A	0.000	1.185	1.185	100.00	1.239	0.000
103.08						B	0.000	1.185		100.00	1.556	0.000
						C	0.000	1.185		100.00	0.786	0.000
L21 103.08-	101.54	0.993	6	1.4267	14.592	A	0.000	14.592	14.592	100.00	13.693	0.000
100.00						B	0.000	14.592		100.00	17.603	0.000
						C	0.000	14.592		100.00	8.124	0.000
L22 100.00-	97.50	0.981	6	1.4209	26.184	A	0.000	26.184	26.184	100.00	18.889	0.000
95.00						B	0.000	26.184		100.00	25.236	0.000
						C	0.000	26.184		100.00	9.850	0.000
L23 95.00-	92.50	0.966	6	1.4134	26.178	A	0.000	26.178	26.178	100.00	19.773	0.000
90.00						B	0.000	26.178		100.00	26.120	0.000
						C	0.000	26.178		100.00	10.738	0.000
L24 90.00-	89.75	0.958	5	1.4092	2.617	A	0.000	2.617	2.617	100.00	2.340	0.000
89.50						B	0.000	2.617		100.00	2.974	0.000
						C	0.000	2.617		100.00	1.436	0.000
L25 89.50-	89.38	0.957	5	1.4086	1.309	A	0.000	1.309	1.309	100.00	1.170	0.000
89.25						B	0.000	1.309		100.00	1.487	0.000
						C	0.000	1.309		100.00	0.718	0.000
L26 89.25-	87.38	0.951	5	1.4054	19.628	A	0.000	19.628	19.628	100.00	19.083	0.000
85.50						B	0.000	19.628		100.00	23.843	0.000
						C	0.000	19.628		100.00	12.310	0.000
L27 85.50-	85.38	0.945	5	1.4021	1.308	A	0.000	1.308	1.308	100.00	1.426	0.000
85.25						B	0.000	1.308		100.00	1.743	0.000
						C	0.000	1.308		100.00	0.975	0.000
L28 85.25-	84.63	0.942	5	1.4009	6.542	A	0.000	6.542	6.542	100.00	7.129	0.000
84.00						B	0.000	6.542		100.00	8.716	0.000
						C	0.000	6.542		100.00	4.872	0.000
L29 84.00-	83.88	0.94	5	1.3997	1.308	A	0.000	1.308	1.308	100.00	1.425	0.000
83.75						B	0.000	1.308		100.00	1.743	0.000
						C	0.000	1.308		100.00	0.974	0.000
L30 83.75-	83.13	0.937	5	1.3984	6.541	A	0.000	6.541	6.541	100.00	7.126	0.000
82.50						B	0.000	6.541		100.00	8.712	0.000
						C	0.000	6.541		100.00	4.869	0.000
L31 82.50-	82.38	0.935	5	1.3971	1.308	A	0.000	1.308	1.308	100.00	1.425	0.000
82.25						B	0.000	1.308		100.00	1.742	0.000
						C	0.000	1.308		100.00	0.973	0.000
L32 82.25-	81.13	0.931	5	1.3950	11.773	A	0.000	11.773	11.773	100.00	9.352	0.000
80.00						B	0.000	11.773		100.00	12.208	0.000
						C	0.000	11.773		100.00	5.291	0.000
L33 80.00-	77.50	0.919	5	1.3886	26.157	A	0.000	26.157	26.157	100.00	17.526	0.000
75.00						B	0.000	26.157		100.00	23.873	0.000
						C	0.000	26.157		100.00	8.503	0.000
L34 75.00-	72.50	0.901	5	1.3794	26.150	A	0.000	26.150	26.150	100.00	17.494	0.000
70.00						B	0.000	26.150		100.00	23.840	0.000
						C	0.000	26.150		100.00	8.476	0.000
L35 70.00-	67.50	0.883	5	1.3696	26.141	A	0.000	26.141	26.141	100.00	17.459	0.000
65.00						B	0.000	26.141		100.00	23.806	0.000
						C	0.000	26.141		100.00	8.446	0.000
L36 65.00-	62.50	0.864	5	1.3591	26.133	A	0.000	26.133	26.133	100.00	17.422	0.000
60.00						B	0.000	26.133		100.00	23.769	0.000
						C	0.000	26.133		100.00	8.415	0.000
L37 60.00-	59.25	0.851	5	1.3518	7.838	A	0.000	7.838	7.838	100.00	5.219	0.000
58.50						B	0.000	7.838		100.00	7.123	0.000
						C	0.000	7.838		100.00	2.518	0.000
L38 58.50-	58.38	0.847	5	1.3498	1.306	A	0.000	1.306	1.306	100.00	0.870	0.000
58.25						B	0.000	1.306		100.00	1.187	0.000
						C	0.000	1.306		100.00	0.419	0.000
L39 58.25-	55.75	0.836	5	1.3436	26.120	A	0.000	26.120	26.120	100.00	13.548	0.000
53.25						B	0.000	26.120		100.00	19.895	0.000
						C	0.000	26.120		100.00	4.548	0.000
L40 53.25-	50.75	0.814	5	1.3311	26.109	A	0.000	26.109	26.109	100.00	15.955	0.000
48.25						B	0.000	26.109		100.00	22.301	0.000
						C	0.000	26.109		100.00	6.961	0.000
L41 48.25-	48.13	0.802	5	1.3240	1.305	A	0.000	1.305	1.305	100.00	0.948	0.000
48.00						B	0.000	1.305		100.00	1.266	0.000

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
						C	0.000	1.305		100.00	0.499	0.000
L42 48.00-43.00	45.50	0.789	5	1.3166	26.097	A	0.000	26.097	26.097	100.00	18.940	0.000
						B	0.000	26.097		100.00	25.287	0.000
						C	0.000	26.097		100.00	9.954	0.000
L43 43.00-40.00	41.50	0.769	4	1.3046	15.652	A	0.000	15.652	15.652	100.00	11.339	0.000
						B	0.000	15.652		100.00	15.147	0.000
						C	0.000	15.652		100.00	5.951	0.000
L44 40.00-35.00	37.50	0.747	4	1.2914	26.076	A	0.000	26.076	26.076	100.00	20.247	0.000
						B	0.000	26.076		100.00	26.594	0.000
						C	0.000	26.076		100.00	11.274	0.000
L45 35.00-32.08	33.54	0.723	4	1.2771	15.222	A	0.000	15.222	15.222	100.00	15.863	0.000
						B	0.000	15.222		100.00	19.569	0.000
						C	0.000	15.222		100.00	10.626	0.000
L46 32.08-31.83	31.96	0.713	4	1.2709	1.303	A	0.000	1.303	1.303	100.00	1.357	0.000
						B	0.000	1.303		100.00	1.674	0.000
						C	0.000	1.303		100.00	0.909	0.000
L47 31.83-28.75	30.29	0.703	4	1.2641	16.049	A	0.000	16.049	16.049	100.00	16.696	0.000
						B	0.000	16.049		100.00	20.606	0.000
						C	0.000	16.049		100.00	11.177	0.000
L48 28.75-28.50	28.63	0.7	4	1.2570	1.302	A	0.000	1.302	1.302	100.00	1.354	0.000
						B	0.000	1.302		100.00	1.671	0.000
						C	0.000	1.302		100.00	0.906	0.000
L49 28.50-23.50	26.00	0.7	4	1.2450	26.037	A	0.000	26.037	26.037	100.00	23.687	0.000
						B	0.000	26.037		100.00	30.034	0.000
						C	0.000	26.037		100.00	14.737	0.000
L50 23.50-18.50	21.00	0.7	4	1.2187	26.016	A	0.000	26.016	26.016	100.00	20.264	0.000
						B	0.000	26.016		100.00	26.611	0.000
						C	0.000	26.016		100.00	11.327	0.000
L51 18.50-13.50	16.00	0.7	4	1.1860	25.988	A	0.000	25.988	25.988	100.00	20.150	0.000
						B	0.000	25.988		100.00	26.497	0.000
						C	0.000	25.988		100.00	11.229	0.000
L52 13.50-8.50	11.00	0.7	4	1.1423	25.952	A	0.000	25.952	25.952	100.00	14.111	0.000
						B	0.000	25.952		100.00	26.344	0.000
						C	0.000	25.952		100.00	10.236	0.000
L53 8.50-3.50	6.00	0.7	4	1.0752	25.896	A	0.000	25.896	25.896	100.00	8.158	0.000
						B	0.000	25.896		100.00	11.646	0.000
						C	0.000	25.896		100.00	8.158	0.000
L54 3.50-0.00	1.75	0.7	4	0.9505	18.054	A	0.000	18.054	18.054	100.00	4.285	0.000
						B	0.000	18.054		100.00	4.285	0.000
						C	0.000	18.054		100.00	4.285	0.000

Tower Pressure - Service

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 190.00-185.00	187.50	1.183	9	12.500	A	0.000	12.500	12.500	100.00	0.000	0.000
					B	0.000	12.500		100.00	1.386	0.000
					C	0.000	12.500		100.00	0.588	0.000
L2 185.00-180.00	182.50	1.174	9	12.500	A	0.000	12.500	12.500	100.00	0.000	0.000
					B	0.000	12.500		100.00	2.310	0.000
					C	0.000	12.500		100.00	0.588	0.000
L3 180.00-175.00	177.50	1.164	9	15.000	A	0.000	15.000	15.000	100.00	0.000	0.000
					B	0.000	15.000		100.00	2.310	0.000
					C	0.000	15.000		100.00	0.588	0.000
L4 175.00-170.00	172.50	1.155	9	15.000	A	0.000	15.000	15.000	100.00	0.000	0.000
					B	0.000	15.000		100.00	2.310	0.000
					C	0.000	15.000		100.00	0.588	0.000
L5 170.00-165.00	167.50	1.145	9	15.000	A	0.000	15.000	15.000	100.00	0.000	0.000
					B	0.000	15.000		100.00	12.210	0.000

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
					C	0.000	15.000		100.00	0.588	0.000
L6 165.00-	162.50	1.135	9	15.000	A	0.000	15.000	15.000	100.00	2.853	0.000
160.00					B	0.000	15.000		100.00	12.210	0.000
					C	0.000	15.000		100.00	0.588	0.000
L7 160.00-	157.50	1.125	9	17.500	A	0.000	17.500	17.500	100.00	7.132	0.000
155.00					B	0.000	17.500		100.00	12.210	0.000
					C	0.000	17.500		100.00	0.588	0.000
L8 155.00-	152.50	1.115	9	17.500	A	0.000	17.500	17.500	100.00	7.132	0.000
150.00					B	0.000	17.500		100.00	12.210	0.000
					C	0.000	17.500		100.00	0.588	0.000
L9 150.00-	147.50	1.104	9	17.500	A	0.000	17.500	17.500	100.00	7.132	0.000
145.00					B	0.000	17.500		100.00	12.210	0.000
					C	0.000	17.500		100.00	0.588	0.000
L10 145.00-	142.50	1.093	8	17.500	A	0.000	17.500	17.500	100.00	7.132	0.000
140.00					B	0.000	17.500		100.00	12.210	0.000
					C	0.000	17.500		100.00	0.588	0.000
L11 140.00-	137.50	1.082	8	20.000	A	0.000	20.000	20.000	100.00	7.132	0.000
135.00					B	0.000	20.000		100.00	12.210	0.000
					C	0.000	20.000		100.00	0.588	0.000
L12 135.00-	132.50	1.071	8	20.000	A	0.000	20.000	20.000	100.00	7.132	0.000
130.00					B	0.000	20.000		100.00	12.210	0.000
					C	0.000	20.000		100.00	0.588	0.000
L13 130.00-	127.50	1.059	8	20.000	A	0.000	20.000	20.000	100.00	7.132	0.000
125.00					B	0.000	20.000		100.00	12.210	0.000
					C	0.000	20.000		100.00	0.588	0.000
L14 125.00-	122.50	1.047	8	20.000	A	0.000	20.000	20.000	100.00	7.132	0.000
120.00					B	0.000	20.000		100.00	12.210	0.000
					C	0.000	20.000		100.00	0.588	0.000
L15 120.00-	117.50	1.035	8	22.500	A	0.000	22.500	22.500	100.00	7.132	0.000
115.00					B	0.000	22.500		100.00	12.210	0.000
					C	0.000	22.500		100.00	0.588	0.000
L16 115.00-	113.84	1.026	8	10.485	A	0.000	10.485	10.485	100.00	5.320	0.000
112.67					B	0.000	10.485		100.00	7.686	0.000
					C	0.000	10.485		100.00	2.270	0.000
L17 112.67-	112.55	1.022	8	1.125	A	0.000	1.125	1.125	100.00	0.607	0.000
112.42					B	0.000	1.125		100.00	0.861	0.000
					C	0.000	1.125		100.00	0.279	0.000
L18 112.42-	109.92	1.015	8	22.500	A	0.000	22.500	22.500	100.00	12.133	0.000
107.42					B	0.000	22.500		100.00	17.210	0.000
					C	0.000	22.500		100.00	5.588	0.000
L19 107.42-	105.38	1.003	8	18.405	A	0.000	18.405	18.405	100.00	11.927	0.000
103.33					B	0.000	18.405		100.00	16.081	0.000
					C	0.000	18.405		100.00	6.574	0.000
L20 103.33-	103.21	0.997	8	1.125	A	0.000	1.125	1.125	100.00	0.857	0.000
103.08					B	0.000	1.125		100.00	1.111	0.000
					C	0.000	1.125		100.00	0.529	0.000
L21 103.08-	101.54	0.993	8	13.860	A	0.000	13.860	13.860	100.00	9.221	0.000
100.00					B	0.000	13.860		100.00	12.348	0.000
					C	0.000	13.860		100.00	5.189	0.000
L22 100.00-	97.50	0.981	8	25.000	A	0.000	25.000	25.000	100.00	12.133	0.000
95.00					B	0.000	25.000		100.00	17.210	0.000
					C	0.000	25.000		100.00	5.588	0.000
L23 95.00-	92.50	0.966	7	25.000	A	0.000	25.000	25.000	100.00	12.883	0.000
90.00					B	0.000	25.000		100.00	17.960	0.000
					C	0.000	25.000		100.00	6.338	0.000
L24 90.00-	89.75	0.958	7	2.500	A	0.000	2.500	2.500	100.00	1.588	0.000
89.50					B	0.000	2.500		100.00	2.096	0.000
					C	0.000	2.500		100.00	0.934	0.000
L25 89.50-	89.38	0.957	7	1.250	A	0.000	1.250	1.250	100.00	0.794	0.000
89.25					B	0.000	1.250		100.00	1.048	0.000
					C	0.000	1.250		100.00	0.467	0.000
L26 89.25-	87.38	0.951	7	18.750	A	0.000	18.750	18.750	100.00	13.037	0.000
85.50					B	0.000	18.750		100.00	16.845	0.000
					C	0.000	18.750		100.00	8.128	0.000
L27 85.50-	85.38	0.945	7	1.250	A	0.000	1.250	1.250	100.00	0.982	0.000
85.25					B	0.000	1.250		100.00	1.236	0.000
					C	0.000	1.250		100.00	0.654	0.000
L28 85.25-	84.63	0.942	7	6.250	A	0.000	6.250	6.250	100.00	4.908	0.000

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
84.00					B	0.000	6.250		100.00	6.178	0.000
					C	0.000	6.250		100.00	3.272	0.000
L29 84.00-	83.88	0.94	7	1.250	A	0.000	1.250	1.250	100.00	0.982	0.000
83.75					B	0.000	1.250		100.00	1.236	0.000
					C	0.000	1.250		100.00	0.654	0.000
L30 83.75-	83.13	0.937	7	6.250	A	0.000	6.250	6.250	100.00	4.908	0.000
82.50					B	0.000	6.250		100.00	6.178	0.000
					C	0.000	6.250		100.00	3.272	0.000
L31 82.50-	82.38	0.935	7	1.250	A	0.000	1.250	1.250	100.00	0.982	0.000
82.25					B	0.000	1.250		100.00	1.236	0.000
					C	0.000	1.250		100.00	0.654	0.000
L32 82.25-	81.13	0.931	7	11.250	A	0.000	11.250	11.250	100.00	6.085	0.000
80.00					B	0.000	11.250		100.00	8.370	0.000
					C	0.000	11.250		100.00	3.139	0.000
L33 80.00-	77.50	0.919	7	25.000	A	0.000	25.000	25.000	100.00	10.883	0.000
75.00					B	0.000	25.000		100.00	15.960	0.000
					C	0.000	25.000		100.00	4.338	0.000
L34 75.00-	72.50	0.901	7	25.000	A	0.000	25.000	25.000	100.00	10.883	0.000
70.00					B	0.000	25.000		100.00	15.960	0.000
					C	0.000	25.000		100.00	4.338	0.000
L35 70.00-	67.50	0.883	7	25.000	A	0.000	25.000	25.000	100.00	10.883	0.000
65.00					B	0.000	25.000		100.00	15.960	0.000
					C	0.000	25.000		100.00	4.338	0.000
L36 65.00-	62.50	0.864	7	25.000	A	0.000	25.000	25.000	100.00	10.883	0.000
60.00					B	0.000	25.000		100.00	15.960	0.000
					C	0.000	25.000		100.00	4.338	0.000
L37 60.00-	59.25	0.851	7	7.500	A	0.000	7.500	7.500	100.00	3.265	0.000
58.50					B	0.000	7.500		100.00	4.788	0.000
					C	0.000	7.500		100.00	1.301	0.000
L38 58.50-	58.38	0.847	7	1.250	A	0.000	1.250	1.250	100.00	0.544	0.000
58.25					B	0.000	1.250		100.00	0.798	0.000
					C	0.000	1.250		100.00	0.217	0.000
L39 58.25-	55.75	0.836	6	25.000	A	0.000	25.000	25.000	100.00	8.070	0.000
53.25					B	0.000	25.000		100.00	13.148	0.000
					C	0.000	25.000		100.00	1.525	0.000
L40 53.25-	50.75	0.814	6	25.000	A	0.000	25.000	25.000	100.00	10.112	0.000
48.25					B	0.000	25.000		100.00	15.189	0.000
					C	0.000	25.000		100.00	3.567	0.000
L41 48.25-	48.13	0.802	6	1.250	A	0.000	1.250	1.250	100.00	0.627	0.000
48.00					B	0.000	1.250		100.00	0.881	0.000
					C	0.000	1.250		100.00	0.300	0.000
L42 48.00-	45.50	0.789	6	25.000	A	0.000	25.000	25.000	100.00	12.549	0.000
43.00					B	0.000	25.000		100.00	17.627	0.000
					C	0.000	25.000		100.00	6.004	0.000
L43 43.00-	41.50	0.769	6	15.000	A	0.000	15.000	15.000	100.00	7.530	0.000
40.00					B	0.000	15.000		100.00	10.576	0.000
					C	0.000	15.000		100.00	3.603	0.000
L44 40.00-	37.50	0.747	6	25.000	A	0.000	25.000	25.000	100.00	13.729	0.000
35.00					B	0.000	25.000		100.00	18.807	0.000
					C	0.000	25.000		100.00	7.184	0.000
L45 35.00-	33.54	0.723	6	14.600	A	0.000	14.600	14.600	100.00	11.465	0.000
32.08					B	0.000	14.600		100.00	14.431	0.000
					C	0.000	14.600		100.00	7.643	0.000
L46 32.08-	31.96	0.713	6	1.250	A	0.000	1.250	1.250	100.00	0.982	0.000
31.83					B	0.000	1.250		100.00	1.236	0.000
					C	0.000	1.250		100.00	0.654	0.000
L47 31.83-	30.29	0.703	5	15.400	A	0.000	15.400	15.400	100.00	12.094	0.000
28.75					B	0.000	15.400		100.00	15.221	0.000
					C	0.000	15.400		100.00	8.062	0.000
L48 28.75-	28.63	0.7	5	1.250	A	0.000	1.250	1.250	100.00	0.982	0.000
28.50					B	0.000	1.250		100.00	1.236	0.000
					C	0.000	1.250		100.00	0.654	0.000
L49 28.50-	26.00	0.7	5	25.000	A	0.000	25.000	25.000	100.00	16.924	0.000
23.50					B	0.000	25.000		100.00	22.002	0.000
					C	0.000	25.000		100.00	10.379	0.000
L50 23.50-	21.00	0.7	5	25.000	A	0.000	25.000	25.000	100.00	14.216	0.000
18.50					B	0.000	25.000		100.00	19.293	0.000
					C	0.000	25.000		100.00	7.671	0.000

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
L51 18.50-13.50	16.00	0.7	5	25.000	A	0.000	25.000	25.000	100.00	14.216	0.000
					B	0.000	25.000		100.00	19.293	0.000
					C	0.000	25.000		100.00	7.671	0.000
L52 13.50-8.50	11.00	0.7	5	25.000	A	0.000	25.000	25.000	100.00	10.650	0.000
					B	0.000	25.000		100.00	19.293	0.000
					C	0.000	25.000		100.00	7.495	0.000
L53 8.50-3.50	6.00	0.7	5	25.000	A	0.000	25.000	25.000	100.00	7.083	0.000
					B	0.000	25.000		100.00	9.228	0.000
					C	0.000	25.000		100.00	7.083	0.000
L54 3.50-0.00	1.75	0.7	5	17.500	A	0.000	17.500	17.500	100.00	3.778	0.000
					B	0.000	17.500		100.00	3.778	0.000
					C	0.000	17.500		100.00	3.778	0.000

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service

Comb. No.	Description
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	190 - 185	Pole	Max Tension	39	0.00	0.00	-0.00
			Max. Compression	26	-7.18	-0.64	0.26
			Max. Mx	8	-3.44	-10.87	-0.01
			Max. My	14	-3.44	-0.13	-10.83
			Max. Vy	20	-2.78	10.60	-0.02
			Max. Vx	14	2.83	-0.13	-10.83
			Max. Torque	12			0.77
L2	185 - 180	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-9.74	-0.73	-0.35
			Max. Mx	8	-4.73	-31.28	-0.37
			Max. My	14	-4.72	-0.16	-31.74
			Max. Vy	20	-3.99	31.04	-0.41
			Max. Vx	14	4.01	-0.16	-31.74
			Max. Torque	12			0.77
L3	180 - 175	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-15.68	-2.72	-1.06
			Max. Mx	8	-7.77	-61.90	-0.60
			Max. My	14	-7.76	-0.54	-62.27
			Max. Vy	20	-6.25	60.79	-0.74
			Max. Vx	14	6.26	-0.54	-62.27
			Max. Torque	14			2.40
L4	175 - 170	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-17.05	-2.83	-1.13
			Max. Mx	8	-8.69	-94.11	-0.68
			Max. My	14	-8.68	-0.54	-94.67
			Max. Vy	20	-6.66	93.03	-0.93
			Max. Vx	14	6.67	-0.54	-94.67
			Max. Torque	14			2.40
L5	170 - 165	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-27.30	-3.22	-1.04
			Max. Mx	8	-13.62	-146.02	-0.72
			Max. My	14	-13.61	-0.61	-146.68
			Max. Vy	20	-10.58	144.82	-1.08
			Max. Vx	14	10.60	-0.61	-146.68
			Max. Torque	14			2.40
L6	165 - 160	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-39.91	-3.81	-1.02
			Max. Mx	8	-19.34	-213.78	-0.79
			Max. My	14	-19.33	-0.77	-214.50
			Max. Vy	20	-16.01	212.30	-1.25
			Max. Vx	14	16.04	-0.77	-214.50
			Max. Torque	14			2.52
L7	160 - 155	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.86	-3.96	-0.73
			Max. Mx	8	-20.53	-294.96	-0.80
			Max. My	14	-20.51	-0.77	-295.80
			Max. Vy	20	-16.49	293.52	-1.35
			Max. Vx	14	16.50	-0.77	-295.80
			Max. Torque	14			2.52
L8	155 - 150	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-43.82	-4.11	-0.45
			Max. Mx	8	-21.71	-378.54	-0.80
			Max. My	14	-21.69	-0.78	-379.39
			Max. Vy	20	-16.97	377.14	-1.45
			Max. Vx	14	16.95	-0.78	-379.39
			Max. Torque	14			2.52
L9	150 - 145	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-54.13	-4.75	0.76
			Max. Mx	8	-26.37	-489.72	-1.73

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	14	-26.34	-2.32	-491.52
			Max. Vy	20	-20.88	487.66	-0.17
			Max. Vx	14	21.04	-2.32	-491.52
			Max. Torque	14			2.52
L10	145 - 140	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-56.12	-4.90	1.05
			Max. Mx	8	-27.61	-595.15	-2.46
			Max. My	14	-27.58	-3.05	-597.76
			Max. Vy	20	-21.32	593.12	0.46
			Max. Vx	14	21.47	-3.05	-597.76
			Max. Torque	16			2.02
L11	140 - 135	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-58.30	-5.07	1.37
			Max. Mx	8	-28.99	-702.92	-3.19
			Max. My	14	-28.96	-3.78	-706.29
			Max. Vy	20	-21.82	700.93	1.09
			Max. Vx	14	21.96	-3.78	-706.29
			Max. Torque	16			2.02
L12	135 - 130	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-60.48	-5.23	1.70
			Max. Mx	8	-30.37	-813.12	-3.91
			Max. My	14	-30.35	-4.51	-817.24
			Max. Vy	20	-22.30	811.17	1.72
			Max. Vx	14	22.44	-4.51	-817.24
			Max. Torque	16			2.02
L13	130 - 125	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-62.66	-5.39	2.02
			Max. Mx	8	-31.76	-925.69	-4.64
			Max. My	14	-31.73	-5.24	-930.54
			Max. Vy	20	-22.76	923.77	2.35
			Max. Vx	14	22.90	-5.24	-930.54
			Max. Torque	16			2.02
L14	125 - 120	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-65.28	-5.48	2.38
			Max. Mx	8	-33.43	-1041.65	-5.30
			Max. My	14	-33.40	-5.89	-1047.29
			Max. Vy	20	-23.35	1039.84	2.95
			Max. Vx	14	23.50	-5.89	-1047.29
			Max. Torque	16			2.02
L15	120 - 115	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-67.65	-5.66	2.73
			Max. Mx	8	-34.96	-1159.58	-5.97
			Max. My	14	-34.93	-6.57	-1165.99
			Max. Vy	20	-23.85	1157.79	3.54
			Max. Vx	14	24.01	-6.57	-1165.99
			Max. Torque	16			2.00
L16	115 - 112.67	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-68.82	-5.74	2.90
			Max. Mx	8	-35.68	-1215.40	-6.28
			Max. My	14	-35.65	-6.89	-1222.16
			Max. Vy	20	-24.09	1213.63	3.81
			Max. Vx	14	24.24	-6.89	-1222.16
			Max. Torque	16			2.00
L17	112.67 - 112.42	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-68.96	-5.75	2.92
			Max. Mx	8	-35.78	-1221.42	-6.32
			Max. My	14	-35.75	-6.93	-1228.23
			Max. Vy	20	-24.12	1219.65	3.84
			Max. Vx	14	24.29	-6.93	-1228.23
			Max. Torque	16			2.00
L18	112.42 - 107.42	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-72.31	-5.89	3.25
			Max. Mx	8	-37.95	-1344.06	-6.97
			Max. My	14	-37.90	-7.59	-1352.99
			Max. Vy	20	-24.77	1342.32	4.41
			Max. Vx	14	25.45	-7.59	-1352.99
			Max. Torque	16			2.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L19	107.42 - 103.33	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-74.74	-6.01	3.52
			Max. Mx	8	-39.51	-1446.19	-7.48
			Max. My	14	-39.45	-8.11	-1458.74
			Max. Vy	20	-25.20	1444.48	4.85
			Max. Vx	14	26.29	-8.11	-1458.74
			Max. Torque	16			2.00
L20	103.33 - 103.08	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-74.90	-6.02	3.54
			Max. Mx	8	-39.61	-1452.49	-7.51
			Max. My	14	-39.55	-8.14	-1465.31
			Max. Vy	20	-25.25	1450.78	4.88
			Max. Vx	14	26.34	-8.14	-1465.31
			Max. Torque	16			2.00
L21	103.08 - 100	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-76.73	-6.10	3.74
			Max. Mx	8	-40.78	-1530.69	-7.90
			Max. My	14	-40.72	-8.53	-1547.36
			Max. Vy	20	-25.57	1529.01	5.21
			Max. Vx	14	26.96	-8.53	-1547.36
			Max. Torque	16			2.00
L22	100 - 95	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-79.99	-6.26	3.44
			Max. Mx	8	-42.96	-1659.98	-9.00
			Max. My	14	-42.89	-9.17	-1684.07
			Max. Vy	20	-26.14	1658.32	5.29
			Max. Vx	14	27.53	-9.17	-1684.07
			Max. Torque	16			2.07
L23	95 - 90	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-83.54	-6.42	3.80
			Max. Mx	8	-45.28	-1793.01	-9.67
			Max. My	14	-45.21	-9.86	-1825.45
			Max. Vy	20	-26.80	1791.38	5.88
			Max. Vx	14	28.73	-9.86	-1825.45
			Max. Torque	16			2.07
L24	90 - 89.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-83.86	-6.43	3.83
			Max. Mx	8	-45.49	-1806.42	-9.73
			Max. My	14	-45.42	-9.93	-1839.83
			Max. Vy	20	-26.85	1804.78	5.94
			Max. Vx	14	28.83	-9.93	-1839.83
			Max. Torque	16			2.07
L25	89.5 - 89.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-84.03	-6.44	3.85
			Max. Mx	8	-45.61	-1813.13	-9.77
			Max. My	14	-45.53	-9.96	-1847.04
			Max. Vy	20	-26.87	1811.50	5.97
			Max. Vx	14	28.89	-9.96	-1847.04
			Max. Torque	16			2.07
L26	89.25 - 85.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-86.68	-6.56	4.12
			Max. Mx	8	-47.34	-1915.32	-10.27
			Max. My	14	-47.27	-10.47	-1956.89
			Max. Vy	20	-27.66	1913.71	6.41
			Max. Vx	14	29.72	-10.47	-1956.89
			Max. Torque	16			2.07
L27	85.5 - 85.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-86.88	-6.57	4.14
			Max. Mx	8	-47.48	-1922.24	-10.30
			Max. My	14	-47.40	-10.51	-1964.32
			Max. Vy	20	-27.71	1920.63	6.44
			Max. Vx	14	29.77	-10.51	-1964.32
			Max. Torque	16			2.07
L28	85.25 - 84	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-87.85	-6.60	4.23
			Max. Mx	8	-48.12	-1957.02	-10.47
			Max. My	14	-48.04	-10.68	-2001.70

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	20	-27.97	1955.41	6.59
			Max. Vx	14	30.06	-10.68	-2001.70
			Max. Torque	16			2.07
L29	84 - 83.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-88.03	-6.61	4.25
			Max. Mx	8	-48.23	-1964.01	-10.50
			Max. My	14	-48.16	-10.71	-2009.22
			Max. Vy	20	-28.02	1962.41	6.62
			Max. Vx	14	30.11	-10.71	-2009.22
			Max. Torque	16			2.07
L30	83.75 - 82.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-88.90	-6.65	4.34
			Max. Mx	8	-48.79	-1999.18	-10.67
			Max. My	14	-48.71	-10.89	-2047.02
			Max. Vy	20	-28.28	1997.59	6.77
			Max. Vx	14	30.40	-10.89	-2047.02
			Max. Torque	16			2.07
L31	82.5 - 82.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-89.07	-6.66	4.36
			Max. Mx	8	-48.89	-2006.25	-10.70
			Max. My	14	-48.81	-10.92	-2054.62
			Max. Vy	20	-28.33	2004.66	6.79
			Max. Vx	14	30.45	-10.92	-2054.62
			Max. Torque	16			2.07
L32	82.25 - 80	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-90.43	-6.73	4.52
			Max. Mx	8	-49.78	-2070.21	-11.00
			Max. My	14	-49.69	-11.23	-2123.61
			Max. Vy	20	-28.56	2068.63	7.06
			Max. Vx	14	30.90	-11.23	-2123.61
			Max. Torque	16			2.07
L33	80 - 75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-95.32	-7.04	4.79
			Max. Mx	8	-53.24	-2217.27	-11.61
			Max. My	14	-53.16	-11.84	-2282.48
			Max. Vy	20	-29.58	2215.79	7.63
			Max. Vx	14	31.94	-11.84	-2282.48
			Max. Torque	16			2.07
L34	75 - 70	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-98.73	-7.19	5.15
			Max. Mx	8	-55.69	-2366.28	-12.23
			Max. My	14	-55.61	-12.48	-2443.28
			Max. Vy	20	-30.05	2364.82	8.18
			Max. Vx	14	32.41	-12.48	-2443.28
			Max. Torque	16			2.01
L35	70 - 65	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-102.13	-7.34	5.50
			Max. Mx	8	-58.14	-2517.59	-12.86
			Max. My	14	-58.07	-13.12	-2606.39
			Max. Vy	20	-30.51	2516.15	8.73
			Max. Vx	14	32.86	-13.12	-2606.39
			Max. Torque	16			2.01
L36	65 - 60	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-105.52	-7.49	5.85
			Max. Mx	8	-60.59	-2671.10	-13.48
			Max. My	14	-60.53	-13.76	-2771.69
			Max. Vy	20	-30.94	2669.69	9.28
			Max. Vx	14	33.29	-13.76	-2771.69
			Max. Torque	16			2.01
L37	60 - 58.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-108.54	-7.54	5.96
			Max. Mx	8	-62.93	-2718.31	-13.66
			Max. My	14	-62.87	-13.95	-2822.45
			Max. Vy	20	-31.56	2716.91	9.44
			Max. Vx	14	33.92	-13.95	-2822.45
			Max. Torque	16			2.01
L38	58.5 - 58.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-108.72	-7.55	5.97
			Max. Mx	8	-63.07	-2726.20	-13.70

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	14	-63.01	-13.98	-2830.93
			Max. Vy	20	-31.58	2724.80	9.47
			Max. Vx	14	33.93	-13.98	-2830.93
			Max. Torque	16			2.01
L39	58.25 - 53.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-112.20	-7.70	6.32
			Max. Mx	8	-65.72	-2885.03	-14.32
			Max. My	14	-65.66	-14.62	-3001.56
			Max. Vy	20	-31.99	2883.66	10.02
			Max. Vx	14	34.35	-14.62	-3001.56
			Max. Torque	16			2.01
L40	53.25 - 48.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-115.73	-7.85	6.67
			Max. Mx	8	-68.38	-3045.84	-14.94
			Max. My	14	-68.33	-15.26	-3174.15
			Max. Vy	20	-32.37	3044.49	10.57
			Max. Vx	14	34.73	-15.26	-3174.15
			Max. Torque	16			2.01
L41	48.25 - 48	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-115.94	-7.86	6.69
			Max. Mx	8	-68.54	-3053.93	-14.97
			Max. My	14	-68.49	-15.29	-3182.83
			Max. Vy	20	-32.38	3052.58	10.60
			Max. Vx	14	34.76	-15.29	-3182.83
			Max. Torque	16			2.01
L42	48 - 43	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-120.03	-8.01	7.03
			Max. Mx	8	-71.69	-3216.74	-15.59
			Max. My	14	-71.63	-15.93	-3358.61
			Max. Vy	20	-32.77	3215.43	11.14
			Max. Vx	14	35.58	-15.93	-3358.61
			Max. Torque	16			2.01
L43	43 - 40	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-122.48	-8.09	7.23
			Max. Mx	8	-73.58	-3315.33	-15.96
			Max. My	14	-73.53	-16.31	-3465.99
			Max. Vy	20	-32.99	3314.03	11.47
			Max. Vx	14	36.05	-16.31	-3465.99
			Max. Torque	16			2.01
L44	40 - 35	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-129.38	-8.24	7.57
			Max. Mx	8	-78.86	-3484.99	-16.58
			Max. My	14	-78.81	-16.94	-3651.96
			Max. Vy	20	-34.12	3483.72	12.02
			Max. Vx	14	37.59	-16.94	-3651.96
			Max. Torque	16			2.01
L45	35 - 32.08	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-131.86	-8.33	7.77
			Max. Mx	8	-80.70	-3585.18	-16.93
			Max. My	14	-80.65	-17.31	-3762.32
			Max. Vy	20	-34.55	3583.93	12.33
			Max. Vx	14	38.05	-17.31	-3762.32
			Max. Torque	16			2.01
L46	32.08 - 31.83	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-132.10	-8.33	7.78
			Max. Mx	8	-80.90	-3593.81	-16.97
			Max. My	14	-80.85	-17.34	-3771.83
			Max. Vy	20	-34.57	3592.56	12.36
			Max. Vx	14	38.07	-17.34	-3771.83
			Max. Torque	16			2.01
L47	31.83 - 28.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-135.10	-8.42	7.99
			Max. Mx	8	-83.24	-3700.92	-17.34
			Max. My	14	-83.19	-17.73	-3889.78
			Max. Vy	20	-35.01	3699.68	12.70

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	14	38.55	-17.73	-3889.78
			Max. Torque	16			2.01
L48	28.75 - 28.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-135.32	-8.43	8.01
			Max. Mx	8	-83.41	-3709.67	-17.37
			Max. My	14	-83.36	-17.76	-3899.42
			Max. Vy	20	-35.04	3708.44	12.72
			Max. Vx	14	38.58	-17.76	-3899.42
			Max. Torque	16			2.01
L49	28.5 - 23.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-139.61	-8.57	8.33
			Max. Mx	8	-86.72	-3885.56	-17.99
			Max. My	14	-86.68	-18.39	-4094.03
			Max. Vy	20	-35.35	3884.35	13.27
			Max. Vx	14	39.29	-18.39	-4094.03
			Max. Torque	16			2.01
L50	23.5 - 18.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-147.91	-8.71	8.66
			Max. Mx	8	-93.44	-4064.11	-18.60
			Max. My	14	-93.41	-19.02	-4293.29
			Max. Vy	20	-36.43	4062.93	13.81
			Max. Vx	14	40.77	-19.02	-4293.29
			Max. Torque	16			2.01
L51	18.5 - 13.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-152.55	-8.85	8.97
			Max. Mx	8	-97.23	-4246.82	-19.20
			Max. My	14	-97.20	-19.64	-4498.67
			Max. Vy	20	-36.70	4245.67	14.35
			Max. Vx	14	41.43	-19.64	-4498.67
			Max. Torque	16			2.01
L52	13.5 - 8.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-157.05	-9.17	9.23
			Max. Mx	8	-100.98	-4430.91	-19.81
			Max. My	14	-100.96	-20.33	-4707.33
			Max. Vy	20	-36.96	4429.66	14.89
			Max. Vx	14	42.08	-20.33	-4707.33
			Max. Torque	16			2.01
L53	8.5 - 3.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-161.20	-9.26	9.29
			Max. Mx	8	-104.61	-4616.17	-20.43
			Max. My	14	-104.60	-20.95	-4919.18
			Max. Vy	20	-37.19	4614.93	15.40
			Max. Vx	14	42.70	-20.95	-4919.18
			Max. Torque	16			2.01
L54	3.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-164.01	-9.26	9.29
			Max. Mx	8	-107.14	-4746.51	-20.88
			Max. My	14	-107.14	-21.36	-5069.32
			Max. Vy	20	-37.35	4745.33	15.74
			Max. Vx	14	43.12	-21.36	-5069.32
			Max. Torque	16			2.01

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	164.01	-0.00	0.00
	Max. H_x	20	107.15	37.33	0.10
	Max. H_z	2	107.15	0.12	37.33
	Max. M_x	2	4753.88	0.12	37.33
	Max. M_z	8	4746.51	-37.32	-0.13
	Max. Torsion	16	2.01	18.48	-32.29
	Min. Vert	19	80.36	32.12	-18.58
	Min. H_x	8	107.15	-37.32	-0.13

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. H_z	14	107.15	-0.12	-43.10
	Min. M_x	14	-5069.32	-0.12	-43.10
	Min. M_z	20	-4745.33	37.33	0.10
	Min. Torsion	4	-1.86	-18.47	32.27

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	89.29	0.00	0.00	-0.31	-1.82	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	107.15	-0.12	-37.33	-4753.88	17.31	1.49
0.9 Dead+1.0 Wind 0 deg - No Ice	80.36	-0.12	-37.33	-4715.09	17.74	1.48
1.2 Dead+1.0 Wind 30 deg - No Ice	107.15	18.47	-32.27	-4107.24	-2349.86	1.86
0.9 Dead+1.0 Wind 30 deg - No Ice	80.36	18.47	-32.27	-4073.72	-2330.15	1.85
1.2 Dead+1.0 Wind 60 deg - No Ice	107.15	37.06	-21.43	-2514.08	-4351.26	1.77
0.9 Dead+1.0 Wind 60 deg - No Ice	80.36	37.06	-21.43	-2494.02	-4316.11	1.76
1.2 Dead+1.0 Wind 90 deg - No Ice	107.15	37.32	0.13	20.88	-4746.51	1.21
0.9 Dead+1.0 Wind 90 deg - No Ice	80.36	37.32	0.13	20.79	-4707.31	1.21
1.2 Dead+1.0 Wind 120 deg - No Ice	107.15	32.20	18.77	2394.22	-4100.62	0.32
0.9 Dead+1.0 Wind 120 deg - No Ice	80.36	32.20	18.77	2374.81	-4066.65	0.32
1.2 Dead+1.0 Wind 150 deg - No Ice	107.15	18.77	32.57	4152.56	-2395.95	-0.77
0.9 Dead+1.0 Wind 150 deg - No Ice	80.36	18.77	32.57	4118.83	-2375.86	-0.77
1.2 Dead+1.0 Wind 180 deg - No Ice	107.15	0.12	43.10	5069.32	-21.36	-1.61
0.9 Dead+1.0 Wind 180 deg - No Ice	80.36	0.12	43.10	5029.11	-20.60	-1.60
1.2 Dead+1.0 Wind 210 deg - No Ice	107.15	-18.48	32.29	4111.57	2347.58	-2.01
0.9 Dead+1.0 Wind 210 deg - No Ice	80.36	-18.48	32.29	4078.18	2329.04	-2.00
1.2 Dead+1.0 Wind 240 deg - No Ice	107.15	-32.12	18.58	2363.08	4084.34	-1.85
0.9 Dead+1.0 Wind 240 deg - No Ice	80.36	-32.12	18.58	2343.94	4051.65	-1.84
1.2 Dead+1.0 Wind 270 deg - No Ice	107.15	-37.33	-0.10	-15.74	4745.33	-1.30
0.9 Dead+1.0 Wind 270 deg - No Ice	80.36	-37.33	-0.10	-15.52	4707.29	-1.30
1.2 Dead+1.0 Wind 300 deg - No Ice	107.15	-37.18	-21.61	-2543.47	4365.01	-0.43
0.9 Dead+1.0 Wind 300 deg - No Ice	80.36	-37.18	-21.61	-2523.17	4330.90	-0.43
1.2 Dead+1.0 Wind 330 deg - No Ice	107.15	-18.75	-32.53	-4145.57	2388.11	0.60
0.9 Dead+1.0 Wind 330 deg - No Ice	80.36	-18.75	-32.53	-4111.74	2369.23	0.59
1.2 Dead+1.0 Ice+1.0 Temp	164.01	0.00	-0.00	-9.29	-9.26	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	164.01	-0.02	-11.26	-1451.40	-6.61	0.71
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	164.01	5.60	-9.74	-1256.71	-726.68	0.76
1.2 Dead+1.0 Wind 60	164.01	9.78	-5.65	-729.82	-1257.23	0.61

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
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	164.01	11.22	0.02	-6.22	-1446.94	0.30
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	164.01	9.73	5.64	714.06	-1256.10	-0.09
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	164.01	5.63	9.76	1241.29	-731.74	-0.48
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	164.01	0.02	11.34	1437.86	-12.60	-0.73
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	164.01	-5.60	9.74	1238.56	707.86	-0.78
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	164.01	-9.72	5.62	709.40	1235.49	-0.63
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	164.01	-11.23	-0.01	-11.75	1428.37	-0.33
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	164.01	-9.80	-5.68	-734.08	1240.66	0.06
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	164.01	-5.63	-9.75	-1258.84	711.66	0.44
Dead+Wind 0 deg - Service	89.29	-0.03	-8.79	-1113.72	2.69	0.35
Dead+Wind 30 deg - Service	89.29	4.35	-7.60	-962.26	-551.77	0.44
Dead+Wind 60 deg - Service	89.29	8.73	-5.04	-589.17	-1020.70	0.42
Dead+Wind 90 deg - Service	89.29	8.79	0.03	4.67	-1113.14	0.28
Dead+Wind 120 deg - Service	89.29	7.58	4.42	560.57	-961.85	0.07
Dead+Wind 150 deg - Service	89.29	4.42	7.67	972.43	-562.57	-0.18
Dead+Wind 180 deg - Service	89.29	0.03	10.15	1187.33	-6.37	-0.38
Dead+Wind 210 deg - Service	89.29	-4.35	7.60	962.83	548.51	-0.47
Dead+Wind 240 deg - Service	89.29	-7.56	4.37	553.28	955.31	-0.43
Dead+Wind 270 deg - Service	89.29	-8.79	-0.02	-3.91	1110.14	-0.31
Dead+Wind 300 deg - Service	89.29	-8.75	-5.09	-596.06	1021.19	-0.10
Dead+Wind 330 deg - Service	89.29	-4.42	-7.66	-971.24	558.00	0.14

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-89.29	0.00	0.00	89.29	0.00	0.000%
2	-0.12	-107.15	-37.33	0.12	107.15	37.33	0.000%
3	-0.12	-80.36	-37.33	0.12	80.36	37.33	0.000%
4	18.47	-107.15	-32.27	-18.47	107.15	32.27	0.000%
5	18.47	-80.36	-32.27	-18.47	80.36	32.27	0.000%
6	37.06	-107.15	-21.43	-37.06	107.15	21.43	0.000%
7	37.06	-80.36	-21.43	-37.06	80.36	21.43	0.000%
8	37.32	-107.15	0.13	-37.32	107.15	-0.13	0.000%
9	37.32	-80.36	0.13	-37.32	80.36	-0.13	0.000%
10	32.20	-107.15	18.77	-32.20	107.15	-18.77	0.000%
11	32.20	-80.36	18.77	-32.20	80.36	-18.77	0.000%
12	18.77	-107.15	32.57	-18.77	107.15	-32.57	0.000%
13	18.77	-80.36	32.57	-18.77	80.36	-32.57	0.000%
14	0.12	-107.15	43.10	-0.12	107.15	-43.10	0.000%
15	0.12	-80.36	43.10	-0.12	80.36	-43.10	0.000%
16	-18.48	-107.15	32.29	18.48	107.15	-32.29	0.000%
17	-18.48	-80.36	32.29	18.48	80.36	-32.29	0.000%
18	-32.12	-107.15	18.58	32.12	107.15	-18.58	0.000%
19	-32.12	-80.36	18.58	32.12	80.36	-18.58	0.000%
20	-37.33	-107.15	-0.10	37.33	107.15	0.10	0.000%
21	-37.33	-80.36	-0.10	37.33	80.36	0.10	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
22	-37.18	-107.15	-21.61	37.18	107.15	21.61	0.000%
23	-37.18	-80.36	-21.61	37.18	80.36	21.61	0.000%
24	-18.75	-107.15	-32.53	18.75	107.15	32.53	0.000%
25	-18.75	-80.36	-32.53	18.75	80.36	32.53	0.000%
26	0.00	-164.01	0.00	-0.00	164.01	0.00	0.000%
27	-0.02	-164.01	-11.26	0.02	164.01	11.26	0.000%
28	5.60	-164.01	-9.74	-5.60	164.01	9.74	0.000%
29	9.78	-164.01	-5.65	-9.78	164.01	5.65	0.000%
30	11.22	-164.01	0.02	-11.22	164.01	-0.02	0.000%
31	9.73	-164.01	5.64	-9.73	164.01	-5.64	0.000%
32	5.63	-164.01	9.76	-5.63	164.01	-9.76	0.000%
33	0.02	-164.01	11.34	-0.02	164.01	-11.34	0.000%
34	-5.60	-164.01	9.74	5.60	164.01	-9.74	0.000%
35	-9.72	-164.01	5.62	9.72	164.01	-5.62	0.000%
36	-11.23	-164.01	-0.01	11.23	164.01	0.01	0.000%
37	-9.80	-164.01	-5.68	9.80	164.01	5.68	0.000%
38	-5.63	-164.01	-9.75	5.63	164.01	9.75	0.000%
39	-0.03	-89.29	-8.79	0.03	89.29	8.79	0.000%
40	4.35	-89.29	-7.60	-4.35	89.29	7.60	0.000%
41	8.73	-89.29	-5.04	-8.73	89.29	5.04	0.000%
42	8.79	-89.29	0.03	-8.79	89.29	-0.03	0.000%
43	7.58	-89.29	4.42	-7.58	89.29	-4.42	0.000%
44	4.42	-89.29	7.67	-4.42	89.29	-7.67	0.000%
45	0.03	-89.29	10.15	-0.03	89.29	-10.15	0.000%
46	-4.35	-89.29	7.60	4.35	89.29	-7.60	0.000%
47	-7.56	-89.29	4.37	7.56	89.29	-4.37	0.000%
48	-8.79	-89.29	-0.02	8.79	89.29	0.02	0.000%
49	-8.75	-89.29	-5.09	8.75	89.29	5.09	0.000%
50	-4.42	-89.29	-7.66	4.42	89.29	7.66	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00014321
3	Yes	5	0.00000001	0.00006390
4	Yes	6	0.00000001	0.00006537
5	Yes	5	0.00000001	0.00084467
6	Yes	6	0.00000001	0.00006623
7	Yes	5	0.00000001	0.00084857
8	Yes	5	0.00000001	0.00014896
9	Yes	5	0.00000001	0.00006754
10	Yes	6	0.00000001	0.00006447
11	Yes	5	0.00000001	0.00083206
12	Yes	6	0.00000001	0.00006638
13	Yes	5	0.00000001	0.00085624
14	Yes	5	0.00000001	0.00017374
15	Yes	5	0.00000001	0.00008068
16	Yes	6	0.00000001	0.00006040
17	Yes	5	0.00000001	0.00077868
18	Yes	6	0.00000001	0.00006518
19	Yes	5	0.00000001	0.00084294
20	Yes	5	0.00000001	0.00013475
21	Yes	5	0.00000001	0.00005904
22	Yes	6	0.00000001	0.00006910
23	Yes	5	0.00000001	0.00088629
24	Yes	6	0.00000001	0.00006401
25	Yes	5	0.00000001	0.00082559
26	Yes	4	0.00000001	0.00041621
27	Yes	6	0.00000001	0.00023454
28	Yes	6	0.00000001	0.00024640
29	Yes	6	0.00000001	0.00024643
30	Yes	6	0.00000001	0.00023472
31	Yes	6	0.00000001	0.00024496

32	Yes	6	0.00000001	0.00024444
33	Yes	6	0.00000001	0.00023189
34	Yes	6	0.00000001	0.00024007
35	Yes	6	0.00000001	0.00023977
36	Yes	6	0.00000001	0.00022982
37	Yes	6	0.00000001	0.00024273
38	Yes	6	0.00000001	0.00024368
39	Yes	4	0.00000001	0.00054436
40	Yes	4	0.00000001	0.00099285
41	Yes	4	0.00000001	0.00097393
42	Yes	4	0.00000001	0.00053979
43	Yes	4	0.00000001	0.00095874
44	Yes	4	0.00000001	0.00098676
45	Yes	4	0.00000001	0.00056889
46	Yes	4	0.00000001	0.00090431
47	Yes	4	0.00000001	0.00098433
48	Yes	4	0.00000001	0.00053730
49	Yes	5	0.00000001	0.00003361
50	Yes	4	0.00000001	0.00094206

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	190 - 185	13.152	45	0.5619	0.0016
L2	185 - 180	12.563	45	0.5615	0.0016
L3	180 - 175	11.976	45	0.5596	0.0015
L4	175 - 170	11.391	45	0.5572	0.0014
L5	170 - 165	10.810	45	0.5532	0.0012
L6	165 - 160	10.233	45	0.5471	0.0011
L7	160 - 155	9.665	45	0.5382	0.0010
L8	155 - 150	9.105	45	0.5302	0.0009
L9	150 - 145	8.556	45	0.5196	0.0008
L10	145 - 140	8.018	45	0.5058	0.0007
L11	140 - 135	7.497	45	0.4887	0.0006
L12	135 - 130	6.993	45	0.4751	0.0006
L13	130 - 125	6.503	45	0.4592	0.0005
L14	125 - 120	6.032	45	0.4409	0.0005
L15	120 - 115	5.581	45	0.4202	0.0004
L16	115 - 112.67	5.149	45	0.4040	0.0004
L17	112.67 - 112.42	4.954	45	0.3959	0.0004
L18	112.42 - 107.42	4.933	45	0.3952	0.0004
L19	107.42 - 103.33	4.527	45	0.3806	0.0003
L20	103.33 - 103.08	4.206	45	0.3676	0.0003
L21	103.08 - 100	4.187	45	0.3667	0.0003
L22	100 - 95	3.954	45	0.3562	0.0003
L23	95 - 90	3.588	45	0.3425	0.0003
L24	90 - 89.5	3.237	45	0.3277	0.0003
L25	89.5 - 89.25	3.203	45	0.3262	0.0003
L26	89.25 - 85.5	3.185	45	0.3255	0.0003
L27	85.5 - 85.25	2.934	45	0.3152	0.0002
L28	85.25 - 84	2.917	45	0.3145	0.0002
L29	84 - 83.75	2.835	45	0.3114	0.0002
L30	83.75 - 82.5	2.819	45	0.3106	0.0002
L31	82.5 - 82.25	2.738	45	0.3067	0.0002
L32	82.25 - 80	2.722	45	0.3058	0.0002
L33	80 - 75	2.580	45	0.2974	0.0002
L34	75 - 70	2.277	45	0.2820	0.0002
L35	70 - 65	1.990	45	0.2654	0.0002
L36	65 - 60	1.721	45	0.2477	0.0002
L37	60 - 58.5	1.472	45	0.2288	0.0001
L38	58.5 - 58.25	1.401	45	0.2239	0.0001
L39	58.25 - 53.25	1.389	45	0.2230	0.0001
L40	53.25 - 48.25	1.165	45	0.2041	0.0001
L41	48.25 - 48	0.962	45	0.1841	0.0001
L42	48 - 43	0.952	45	0.1833	0.0001
L43	43 - 40	0.769	45	0.1661	0.0001

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L44	40 - 35	0.668	45	0.1553	0.0001
L45	35 - 32.08	0.515	45	0.1366	0.0001
L46	32.08 - 31.83	0.435	45	0.1252	0.0001
L47	31.83 - 28.75	0.429	45	0.1244	0.0001
L48	28.75 - 28.5	0.352	45	0.1143	0.0001
L49	28.5 - 23.5	0.346	45	0.1133	0.0001
L50	23.5 - 18.5	0.238	45	0.0932	0.0000
L51	18.5 - 13.5	0.149	45	0.0750	0.0000
L52	13.5 - 8.5	0.081	45	0.0560	0.0000
L53	8.5 - 3.5	0.032	45	0.0360	0.0000
L54	3.5 - 0	0.006	45	0.0152	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
188.00	Platform Mount [LP 403-1]	45	12.916	0.5619	0.0017	257514
187.00	SP2-5.8	45	12.799	0.5618	0.0017	257514
185.00	Side Arm Mount [SO 102-3]	45	12.563	0.5615	0.0017	257514
184.00	Side Arm Mount [SO 701-1]	45	12.446	0.5612	0.0017	213932
179.00	Platform Mount [LP 403-1]	45	11.859	0.5591	0.0016	119466
170.00	Platform Mount [LP 405-1]	45	10.810	0.5532	0.0013	57379
162.00	Platform Mount [LP 403-1]	45	9.891	0.5418	0.0011	34433
150.00	Platform Mount [LP 403-1]	45	8.556	0.5196	0.0008	23446
125.00	Side Arm Mount [SO 901-1]	45	6.032	0.4409	0.0005	14600
110.00	Side Arm Mount [SO 901-1]	45	4.734	0.3883	0.0004	18929
100.00	Side Arm Mount [SO 901-1]	45	3.954	0.3562	0.0003	18738
95.00	Side Arm Mount [SO 901-1]	45	3.588	0.3425	0.0003	20112
80.00	Side Arm Mount [SO 901-1]	45	2.580	0.2974	0.0002	17354
60.00	Jump Plate 120" x 6.5" x 1.25"	45	1.472	0.2288	0.0002	15735
40.00	(2) Jump Plate 120" x 6" x 1"	45	0.668	0.1553	0.0001	15699
20.00	(2) Jump Plate 120" x 6.5" x 1.25"	45	0.174	0.0804	0.0000	15411

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	190 - 185	56.201	14	2.4005	0.0066
L2	185 - 180	53.688	14	2.3990	0.0066
L3	180 - 175	51.181	14	2.3908	0.0063
L4	175 - 170	48.682	14	2.3809	0.0058
L5	170 - 165	46.198	14	2.3641	0.0052
L6	165 - 160	43.735	14	2.3384	0.0046
L7	160 - 155	41.306	14	2.3006	0.0040
L8	155 - 150	38.914	14	2.2664	0.0036
L9	150 - 145	36.564	14	2.2212	0.0032
L10	145 - 140	34.268	14	2.1624	0.0029
L11	140 - 135	32.041	14	2.0895	0.0026
L12	135 - 130	29.884	14	2.0312	0.0024
L13	130 - 125	27.792	14	1.9631	0.0022
L14	125 - 120	25.776	14	1.8850	0.0020
L15	120 - 115	23.848	14	1.7965	0.0018
L16	115 - 112.67	22.003	14	1.7272	0.0016
L17	112.67 - 112.42	21.169	14	1.6924	0.0015
L18	112.42 - 107.42	21.080	14	1.6894	0.0015
L19	107.42 - 103.33	19.343	14	1.6269	0.0014
L20	103.33 - 103.08	17.974	14	1.5711	0.0013
L21	103.08 - 100	17.891	14	1.5676	0.0013

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L22	100 - 95	16.895	14	1.5226	0.0013
L23	95 - 90	15.331	14	1.4642	0.0012
L24	90 - 89.5	13.830	14	1.4007	0.0011
L25	89.5 - 89.25	13.684	14	1.3941	0.0011
L26	89.25 - 85.5	13.611	14	1.3912	0.0011
L27	85.5 - 85.25	12.536	14	1.3470	0.0010
L28	85.25 - 84	12.465	14	1.3444	0.0010
L29	84 - 83.75	12.115	14	1.3309	0.0010
L30	83.75 - 82.5	12.046	14	1.3276	0.0010
L31	82.5 - 82.25	11.700	14	1.3110	0.0010
L32	82.25 - 80	11.632	14	1.3071	0.0010
L33	80 - 75	11.024	14	1.2712	0.0009
L34	75 - 70	9.727	14	1.2051	0.0008
L35	70 - 65	8.502	14	1.1342	0.0008
L36	65 - 60	7.354	14	1.0584	0.0007
L37	60 - 58.5	6.287	14	0.9777	0.0006
L38	58.5 - 58.25	5.984	14	0.9569	0.0006
L39	58.25 - 53.25	5.934	14	0.9529	0.0006
L40	53.25 - 48.25	4.978	14	0.8722	0.0005
L41	48.25 - 48	4.109	14	0.7867	0.0005
L42	48 - 43	4.067	14	0.7831	0.0005
L43	43 - 40	3.286	14	0.7096	0.0004
L44	40 - 35	2.854	14	0.6635	0.0004
L45	35 - 32.08	2.201	14	0.5835	0.0003
L46	32.08 - 31.83	1.859	14	0.5348	0.0003
L47	31.83 - 28.75	1.831	14	0.5313	0.0003
L48	28.75 - 28.5	1.502	14	0.4882	0.0003
L49	28.5 - 23.5	1.477	14	0.4840	0.0003
L50	23.5 - 18.5	1.014	14	0.3981	0.0002
L51	18.5 - 13.5	0.638	14	0.3204	0.0002
L52	13.5 - 8.5	0.345	14	0.2390	0.0001
L53	8.5 - 3.5	0.139	14	0.1538	0.0001
L54	3.5 - 0	0.024	14	0.0647	0.0000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
188.00	Platform Mount [LP 403-1]	14	55.196	2.4005	0.0073	62120
187.00	SP2-5.8	14	54.693	2.4003	0.0072	62120
185.00	Side Arm Mount [SO 102-3]	14	53.688	2.3990	0.0072	62120
184.00	Side Arm Mount [SO 701-1]	14	53.186	2.3978	0.0071	51679
179.00	Platform Mount [LP 403-1]	14	50.680	2.3890	0.0068	29010
170.00	Platform Mount [LP 405-1]	14	46.198	2.3641	0.0057	13750
162.00	Platform Mount [LP 403-1]	14	42.273	2.3159	0.0047	8182
150.00	Platform Mount [LP 403-1]	14	36.564	2.2212	0.0035	5532
125.00	Side Arm Mount [SO 901-1]	14	25.776	1.8850	0.0021	3428
110.00	Side Arm Mount [SO 901-1]	14	20.231	1.6600	0.0016	4439
100.00	Side Arm Mount [SO 901-1]	14	16.895	1.5226	0.0014	4393
95.00	Side Arm Mount [SO 901-1]	14	15.331	1.4642	0.0013	4709
80.00	Side Arm Mount [SO 901-1]	14	11.024	1.2712	0.0010	4062
60.00	Jump Plate 120" x 6.5" x 1.25"	14	6.287	0.9777	0.0007	3682
40.00	(2) Jump Plate 120" x 6" x 1"	14	2.854	0.6635	0.0004	3673
20.00	(2) Jump Plate 120" x 6.5" x 1.25"	14	0.742	0.3435	0.0002	3607

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	190 - 185 (1)	P30x0.375	5.00	0.00	0.0	34.9011	-3.44	1311.06	0.003
L2	185 - 180 (2)	P30x0.375	5.00	0.00	0.0	34.9011	-4.72	1311.06	0.004
L3	180 - 175 (3)	P36x0.375	5.00	0.00	0.0	41.9697	-7.76	1490.10	0.005
L4	175 - 170 (4)	P36x0.375	5.00	0.00	0.0	41.9697	-8.69	1490.10	0.006
L5	170 - 165 (5)	P36x0.375	5.00	0.00	0.0	41.9697	-13.61	1490.10	0.009
L6	165 - 160 (6)	P36x0.375	5.00	0.00	0.0	41.9697	-19.33	1490.10	0.013
L7	160 - 155 (7)	P42x0.375	5.00	0.00	0.0	49.0383	-20.52	1668.87	0.012
L8	155 - 150 (8)	P42x0.375	5.00	0.00	0.0	49.0383	-21.70	1668.87	0.013
L9	150 - 145 (9)	P42x0.375	5.00	0.00	0.0	49.0383	-26.35	1668.87	0.016
L10	145 - 140 (10)	P42x0.375	5.00	0.00	0.0	49.0383	-27.59	1668.87	0.017
L11	140 - 135 (11)	P48x0.375	5.00	0.00	0.0	56.1069	-28.97	1847.49	0.016
L12	135 - 130 (12)	P48x0.375	5.00	0.00	0.0	56.1069	-30.36	1847.49	0.016
L13	130 - 125 (13)	P48x0.375	5.00	0.00	0.0	56.1069	-31.75	1847.49	0.017
L14	125 - 120 (14)	P48x0.375	5.00	0.00	0.0	56.1069	-33.41	1847.49	0.018
L15	120 - 115 (15)	P54x0.375	5.00	0.00	0.0	63.1755	-34.95	2026.00	0.017
L16	115 - 112.67 (16)	P54x0.375	2.33	0.00	0.0	63.1755	-35.66	2026.00	0.018
L17	112.67 - 112.42 (17)	P54x0.4875	0.25	0.00	0.0	81.9558	-35.76	2797.17	0.013
L18	112.42 - 107.42 (18)	P54x0.4875	5.00	0.00	0.0	81.9558	-37.93	2797.17	0.014
L19	107.42 - 103.33 (19)	P54x0.4875	4.09	0.00	0.0	81.9558	-39.49	2797.17	0.014
L20	103.33 - 103.08 (20)	P54x0.4875	0.25	0.00	0.0	81.9558	-39.59	2797.17	0.014
L21	103.08 - 100 (21)	P54x0.4875	3.08	0.00	0.0	81.9558	-40.77	2797.17	0.015
L22	100 - 95 (22)	P60x0.475	5.00	0.00	0.0	88.8266	-42.89	2934.04	0.015
L23	95 - 90 (23)	P60x0.475	5.00	0.00	0.0	88.8266	-45.21	2934.04	0.015
L24	90 - 89.5 (24)	P60x0.475	0.50	0.00	0.0	88.8266	-45.42	2934.04	0.015
L25	89.5 - 89.25 (25)	P60x0.55625	0.25	0.00	0.0	103.8790	-45.53	3570.37	0.013
L26	89.25 - 85.5 (26)	P60x0.55625	3.75	0.00	0.0	103.8790	-47.27	3570.37	0.013
L27	85.5 - 85.25 (27)	P60x0.6375	0.25	0.00	0.0	118.8890	-47.40	4245.55	0.011
L28	85.25 - 84 (28)	P60x0.6375	1.25	0.00	0.0	118.8890	-48.04	4245.55	0.011
L29	84 - 83.75 (29)	P60x0.525	0.25	0.00	0.0	98.0943	-48.16	3321.02	0.015
L30	83.75 - 82.5 (30)	P60x0.525	1.25	0.00	0.0	98.0943	-48.71	3321.02	0.015
L31	82.5 - 82.25 (31)	P60x0.45	0.25	0.00	0.0	84.1868	-48.81	2746.08	0.018

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L32	82.25 - 80 (32)	P60x0.45	2.25	0.00	0.0	84.1868	-49.69	2746.08	0.018
L33	80 - 75 (33)	P60x0.575	5.00	0.00	0.0	107.3460	-53.16	3722.74	0.014
L34	75 - 70 (34)	P60x0.575	5.00	0.00	0.0	107.3460	-55.61	3722.74	0.015
L35	70 - 65 (35)	P60x0.575	5.00	0.00	0.0	107.3460	-58.07	3722.74	0.016
L36	65 - 60 (36)	P60x0.575	5.00	0.00	0.0	107.3460	-60.53	3722.74	0.016
L37	60 - 58.5 (37)	P60x0.7	1.50	0.00	0.0	130.4080	-62.87	4791.24	0.013
L38	58.5 - 58.25 (38)	P60x0.625	0.25	0.00	0.0	116.5830	-63.01	4139.15	0.015
L39	58.25 - 53.25 (39)	P60x0.625	5.00	0.00	0.0	116.5830	-65.66	4139.15	0.016
L40	53.25 - 48.25 (40)	P60x0.625	5.00	0.00	0.0	116.5830	-68.33	4139.15	0.017
L41	48.25 - 48 (41)	P60x0.775	0.25	0.00	0.0	144.1970	-68.49	5450.65	0.013
L42	48 - 43 (42)	P60x0.775	5.00	0.00	0.0	144.1970	-71.63	5450.65	0.013
L43	43 - 40 (43)	P60x0.775	3.00	0.00	0.0	144.1970	-73.53	5450.65	0.013
L44	40 - 35 (44)	P60x0.775	5.00	0.00	0.0	144.1970	-78.81	5450.65	0.014
L45	35 - 32.08 (45)	P60x0.775	2.92	0.00	0.0	144.1970	-80.65	5450.65	0.015
L46	32.08 - 31.83 (46)	P60x0.9625	0.25	0.00	0.0	178.5170	-80.85	6747.93	0.012
L47	31.83 - 28.75 (47)	P60x0.9625	3.08	0.00	0.0	178.5170	-83.19	6747.93	0.012
L48	28.75 - 28.5 (48)	P60x0.8125	0.25	0.00	0.0	151.0790	-83.36	5710.78	0.015
L49	28.5 - 23.5 (49)	P60x0.8125	5.00	0.00	0.0	151.0790	-86.68	5710.78	0.015
L50	23.5 - 18.5 (50)	P60x0.95	5.00	0.00	0.0	176.2350	-93.41	6661.70	0.014
L51	18.5 - 13.5 (51)	P60x0.95	5.00	0.00	0.0	176.2350	-97.20	6661.70	0.015
L52	13.5 - 8.5 (52)	P60x0.95	5.00	0.00	0.0	176.2350	-100.96	6661.70	0.015
L53	8.5 - 3.5 (53)	P60x0.95	5.00	0.00	0.0	176.2350	-104.60	6661.70	0.016
L54	3.5 - 0 (54)	P60x0.95	3.50	0.00	0.0	176.2350	-107.14	6661.70	0.016

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	190 - 185 (1)	P30x0.375	10.90	947.86	0.011	0.00	947.86	0.000
L2	185 - 180 (2)	P30x0.375	31.75	947.86	0.033	0.00	947.86	0.000
L3	180 - 175 (3)	P36x0.375	62.42	1338.81	0.047	0.00	1338.81	0.000
L4	175 - 170 (4)	P36x0.375	94.75	1338.81	0.071	0.00	1338.81	0.000
L5	170 - 165 (5)	P36x0.375	146.82	1338.81	0.110	0.00	1338.81	0.000
L6	165 - 160 (6)	P36x0.375	214.89	1338.81	0.161	0.00	1338.81	0.000
L7	160 - 155 (7)	P42x0.375	296.47	1796.56	0.165	0.00	1796.56	0.000
L8	155 - 150 (8)	P42x0.375	380.42	1796.56	0.212	0.00	1796.56	0.000
L9	150 - 145 (9)	P42x0.375	493.77	1796.56	0.275	0.00	1796.56	0.000
L10	145 - 140 (10)	P42x0.375	600.87	1796.56	0.334	0.00	1796.56	0.000
L11	140 - 135 (11)	P48x0.375	710.29	2321.11	0.306	0.00	2321.11	0.000
L12	135 - 130 (12)	P48x0.375	822.12	2321.11	0.354	0.00	2321.11	0.000
L13	130 - 125 (13)	P48x0.375	936.30	2321.11	0.403	0.00	2321.11	0.000

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 $\frac{M_{uy}}{\phi M_{ny}}$
L14	125 - 120 (14)	P48x0.375	1053.86	2321.11	0.454	0.00	2321.11	0.000
L15	120 - 115 (15)	P54x0.375	1173.36	2912.46	0.403	0.00	2912.46	0.000
L16	115 - 112.67 (16)	P54x0.375	1229.92	2912.46	0.422	0.00	2912.46	0.000
L17	112.67 - 112.42 (17)	P54x0.4875	1236.02	3864.47	0.320	0.00	3864.47	0.000
L18	112.42 - 107.42 (18)	P54x0.4875	1360.20	3864.47	0.352	0.00	3864.47	0.000
L19	107.42 - 103.33 (19)	P54x0.4875	1463.58	3864.47	0.379	0.00	3864.47	0.000
L20	103.33 - 103.08 (20)	P54x0.4875	1469.96	3864.47	0.380	0.00	3864.47	0.000
L21	103.08 - 100 (21)	P54x0.4875	1549.09	3864.47	0.401	0.00	3864.47	0.000
L22	100 - 95 (22)	P60x0.475	1684.10	4598.57	0.366	0.00	4598.57	0.000
L23	95 - 90 (23)	P60x0.475	1825.47	4598.57	0.397	0.00	4598.57	0.000
L24	90 - 89.5 (24)	P60x0.475	1839.86	4598.57	0.400	0.00	4598.57	0.000
L25	89.5 - 89.25 (25)	P60x0.55625	1847.07	5456.53	0.339	0.00	5456.53	0.000
L26	89.25 - 85.5 (26)	P60x0.55625	1956.92	5456.53	0.359	0.00	5456.53	0.000
L27	85.5 - 85.25 (27)	P60x0.6375	1964.35	6334.56	0.310	0.00	6334.56	0.000
L28	85.25 - 84 (28)	P60x0.6375	2001.73	6334.56	0.316	0.00	6334.56	0.000
L29	84 - 83.75 (29)	P60x0.525	2009.25	5124.16	0.392	0.00	5124.16	0.000
L30	83.75 - 82.5 (30)	P60x0.525	2047.05	5124.16	0.399	0.00	5124.16	0.000
L31	82.5 - 82.25 (31)	P60x0.45	2054.65	4338.67	0.474	0.00	4338.67	0.000
L32	82.25 - 80 (32)	P60x0.45	2123.64	4338.67	0.489	0.00	4338.67	0.000
L33	80 - 75 (33)	P60x0.575	2282.51	5657.38	0.403	0.00	5657.38	0.000
L34	75 - 70 (34)	P60x0.575	2443.32	5657.38	0.432	0.00	5657.38	0.000
L35	70 - 65 (35)	P60x0.575	2606.43	5657.38	0.461	0.00	5657.38	0.000
L36	65 - 60 (36)	P60x0.575	2771.72	5657.38	0.490	0.00	5657.38	0.000
L37	60 - 58.5 (37)	P60x0.7	2822.48	7023.43	0.402	0.00	7023.43	0.000
L38	58.5 - 58.25 (38)	P60x0.625	2830.96	6198.18	0.457	0.00	6198.18	0.000
L39	58.25 - 53.25 (39)	P60x0.625	3001.59	6198.18	0.484	0.00	6198.18	0.000
L40	53.25 - 48.25 (40)	P60x0.625	3174.18	6198.18	0.512	0.00	6198.18	0.000
L41	48.25 - 48 (41)	P60x0.775	3182.87	7865.35	0.405	0.00	7865.35	0.000
L42	48 - 43 (42)	P60x0.775	3358.64	7865.35	0.427	0.00	7865.35	0.000
L43	43 - 40 (43)	P60x0.775	3466.03	7865.35	0.441	0.00	7865.35	0.000
L44	40 - 35 (44)	P60x0.775	3652.00	7865.35	0.464	0.00	7865.35	0.000
L45	35 - 32.08 (45)	P60x0.775	3762.36	7865.35	0.478	0.00	7865.35	0.000
L46	32.08 - 31.83 (46)	P60x0.9625	3771.87	10041.58	0.376	0.00	10041.58	0.000
L47	31.83 - 28.75 (47)	P60x0.9625	3889.82	10041.58	0.387	0.00	10041.58	0.000
L48	28.75 - 28.5 (48)	P60x0.8125	3899.46	8292.48	0.470	0.00	8292.48	0.000
L49	28.5 - 23.5 (49)	P60x0.8125	4094.07	8292.48	0.494	0.00	8292.48	0.000
L50	23.5 - 18.5 (50)	P60x0.95	4293.32	9893.33	0.434	0.00	9893.33	0.000
L51	18.5 - 13.5 (51)	P60x0.95	4498.72	9893.33	0.455	0.00	9893.33	0.000
L52	13.5 - 8.5 (52)	P60x0.95	4707.38	9893.33	0.476	0.00	9893.33	0.000
L53	8.5 - 3.5 (53)	P60x0.95	4919.23	9893.33	0.497	0.00	9893.33	0.000
L54	3.5 - 0 (54)	P60x0.95	5069.37	9893.33	0.512	0.00	9893.33	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	190 - 185 (1)	P30x0.375	2.80	395.78	0.007	0.33	994.73	0.000
L2	185 - 180 (2)	P30x0.375	4.01	395.78	0.010	0.71	994.73	0.001
L3	180 - 175 (3)	P36x0.375	6.25	454.19	0.014	1.83	1094.28	0.002
L4	175 - 170 (4)	P36x0.375	6.66	454.19	0.015	1.83	1094.28	0.002
L5	170 - 165 (5)	P36x0.375	10.62	454.19	0.023	1.83	1094.28	0.002
L6	165 - 160 (6)	P36x0.375	16.08	454.19	0.035	1.91	1094.28	0.002
L7	160 - 155 (7)	P42x0.375	16.56	421.13	0.039	1.91	1185.51	0.002
L8	155 - 150 (8)	P42x0.375	17.03	421.13	0.040	1.91	1185.51	0.002
L9	150 - 145 (9)	P42x0.375	21.21	421.13	0.050	0.89	1185.51	0.001
L10	145 - 140 (10)	P42x0.375	21.65	421.13	0.051	0.89	1185.51	0.001
L11	140 - 135 (11)	P48x0.375	22.13	394.81	0.056	0.89	1270.83	0.001
L12	135 - 130 (12)	P48x0.375	22.61	394.81	0.057	0.89	1270.83	0.001
L13	130 - 125 (13)	P48x0.375	23.07	394.81	0.058	0.89	1270.83	0.001
L14	125 - 120 (14)	P48x0.375	23.66	394.81	0.060	0.88	1270.83	0.001
L15	120 - 115 (15)	P54x0.375	24.16	406.96	0.059	0.88	1474.98	0.001
L16	115 - 112.67 (16)	P54x0.375	24.40	406.96	0.060	0.88	1474.98	0.001
L17	112.67 - 112.42 (17)	P54x0.4875	24.42	732.85	0.033	0.88	2650.55	0.000
L18	112.42 - 107.42 (18)	P54x0.4875	25.07	732.85	0.034	0.88	2650.55	0.000
L19	107.42 - 103.33 (19)	P54x0.4875	25.50	732.85	0.035	0.88	2650.55	0.000
L20	103.33 - 103.08 (20)	P54x0.4875	25.54	732.85	0.035	0.88	2650.55	0.000
L21	103.08 - 100 (21)	P54x0.4875	25.86	732.85	0.035	0.88	2650.55	0.000
L22	100 - 95 (22)	P60x0.475	27.53	710.49	0.039	1.67	2858.41	0.001
L23	95 - 90 (23)	P60x0.475	28.73	710.49	0.040	1.67	2858.41	0.001
L24	90 - 89.5 (24)	P60x0.475	28.83	710.49	0.041	1.67	2858.41	0.001
L25	89.5 - 89.25 (25)	P60x0.55625	28.89	1012.19	0.029	1.67	4066.63	0.000
L26	89.25 - 85.5 (26)	P60x0.55625	29.72	1012.19	0.029	1.67	4066.63	0.000
L27	85.5 - 85.25 (27)	P60x0.6375	29.77	1348.20	0.022	1.67	5511.49	0.000
L28	85.25 - 84 (28)	P60x0.6375	30.06	1348.20	0.022	1.67	5511.49	0.000
L29	84 - 83.75 (29)	P60x0.525	30.11	889.19	0.034	1.67	3574.31	0.000
L30	83.75 - 82.5 (30)	P60x0.525	30.40	889.19	0.034	1.67	3574.31	0.000
L31	82.5 - 82.25 (31)	P60x0.45	30.45	629.38	0.048	1.67	2533.13	0.001
L32	82.25 - 80 (32)	P60x0.45	30.90	629.38	0.049	1.67	2533.13	0.001
L33	80 - 75 (33)	P60x0.575	31.94	1090.24	0.029	1.61	4378.80	0.000
L34	75 - 70 (34)	P60x0.575	32.41	1090.24	0.030	1.61	4378.80	0.000
L35	70 - 65 (35)	P60x0.575	32.86	1090.24	0.030	1.61	4378.80	0.000
L36	65 - 60 (36)	P60x0.575	33.29	1090.24	0.031	1.61	4378.80	0.000
L37	60 - 58.5 (37)	P60x0.7	33.92	1478.82	0.023	1.61	6788.03	0.000
L38	58.5 - 58.25 (38)	P60x0.625	33.93	1314.11	0.026	1.61	5273.53	0.000
L39	58.25 - 53.25 (39)	P60x0.625	34.35	1314.11	0.026	1.61	5273.53	0.000
L40	53.25 - 48.25 (40)	P60x0.625	34.73	1314.11	0.026	1.61	5273.53	0.000
L41	48.25 - 48 (41)	P60x0.775	34.76	1635.20	0.021	1.61	8514.42	0.000
L42	48 - 43 (42)	P60x0.775	35.58	1635.20	0.022	1.61	8514.42	0.000
L43	43 - 40 (43)	P60x0.775	36.05	1635.20	0.022	1.61	8514.42	0.000
L44	40 - 35 (44)	P60x0.775	37.59	1635.20	0.023	1.61	8514.42	0.000
L45	35 - 32.08 (45)	P60x0.775	38.05	1635.20	0.023	1.61	8514.42	0.000
L46	32.08 - 31.83	P60x0.9625	38.07	2024.38	0.019	1.61	10507.50	0.000

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 $\frac{T_u}{\phi T_n}$
	(46)							
L47	31.83 - 28.75 (47)	P60x0.9625	38.55	2024.38	0.019	1.61	10507.50	0.000
L48	28.75 - 28.5 (48)	P60x0.8125	38.58	1713.23	0.023	1.61	8915.08	0.000
L49	28.5 - 23.5 (49)	P60x0.8125	39.29	1713.23	0.023	1.61	8915.08	0.000
L50	23.5 - 18.5 (50)	P60x0.95	40.77	1998.51	0.020	1.61	10375.42	0.000
L51	18.5 - 13.5 (51)	P60x0.95	41.43	1998.51	0.021	1.61	10375.42	0.000
L52	13.5 - 8.5 (52)	P60x0.95	42.08	1998.51	0.021	1.61	10375.42	0.000
L53	8.5 - 3.5 (53)	P60x0.95	42.70	1998.51	0.021	1.61	10375.42	0.000
L54	3.5 - 0 (54)	P60x0.95	43.12	1998.51	0.022	1.61	10375.42	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	190 - 185 (1)	0.003	0.011	0.000	0.007	0.000	0.014	1.050	4.8.2
L2	185 - 180 (2)	0.004	0.033	0.000	0.010	0.001	0.037	1.050	4.8.2
L3	180 - 175 (3)	0.005	0.047	0.000	0.014	0.002	0.052	1.050	4.8.2
L4	175 - 170 (4)	0.006	0.071	0.000	0.015	0.002	0.077	1.050	4.8.2
L5	170 - 165 (5)	0.009	0.110	0.000	0.023	0.002	0.119	1.050	4.8.2
L6	165 - 160 (6)	0.013	0.161	0.000	0.035	0.002	0.175	1.050	4.8.2
L7	160 - 155 (7)	0.012	0.165	0.000	0.039	0.002	0.179	1.050	4.8.2
L8	155 - 150 (8)	0.013	0.212	0.000	0.040	0.002	0.227	1.050	4.8.2
L9	150 - 145 (9)	0.016	0.275	0.000	0.050	0.001	0.293	1.050	4.8.2
L10	145 - 140 (10)	0.017	0.334	0.000	0.051	0.001	0.354	1.050	4.8.2
L11	140 - 135 (11)	0.016	0.306	0.000	0.056	0.001	0.325	1.050	4.8.2
L12	135 - 130 (12)	0.016	0.354	0.000	0.057	0.001	0.374	1.050	4.8.2
L13	130 - 125 (13)	0.017	0.403	0.000	0.058	0.001	0.424	1.050	4.8.2
L14	125 - 120 (14)	0.018	0.454	0.000	0.060	0.001	0.476	1.050	4.8.2
L15	120 - 115 (15)	0.017	0.403	0.000	0.059	0.001	0.424	1.050	4.8.2
L16	115 - 112.67 (16)	0.018	0.422	0.000	0.060	0.001	0.444	1.050	4.8.2
L17	112.67 - 112.42 (17)	0.013	0.320	0.000	0.033	0.000	0.334	1.050	4.8.2
L18	112.42 - 107.42 (18)	0.014	0.352	0.000	0.034	0.000	0.367	1.050	4.8.2
L19	107.42 - 103.33 (19)	0.014	0.379	0.000	0.035	0.000	0.394	1.050	4.8.2
L20	103.33 - 103.08 (20)	0.014	0.380	0.000	0.035	0.000	0.396	1.050	4.8.2
L21	103.08 - 100 (21)	0.015	0.401	0.000	0.035	0.000	0.417	1.050	4.8.2
L22	100 - 95 (22)	0.015	0.366	0.000	0.039	0.001	0.382	1.050	4.8.2
L23	95 - 90 (23)	0.015	0.397	0.000	0.040	0.001	0.414	1.050	4.8.2
L24	90 - 89.5 (24)	0.015	0.400	0.000	0.041	0.001	0.417	1.050	4.8.2
L25	89.5 - 89.25 (25)	0.013	0.339	0.000	0.029	0.000	0.352	1.050	4.8.2
L26	89.25 - 85.5 (26)	0.013	0.359	0.000	0.029	0.000	0.373	1.050	4.8.2
L27	85.5 - 85.25 (27)	0.011	0.310	0.000	0.022	0.000	0.322	1.050	4.8.2
L28	85.25 - 84 (28)	0.011	0.316	0.000	0.022	0.000	0.328	1.050	4.8.2
L29	84 - 83.75 (29)	0.015	0.392	0.000	0.034	0.000	0.408	1.050	4.8.2
L30	83.75 - 82.5 (30)	0.015	0.399	0.000	0.034	0.000	0.415	1.050	4.8.2
L31	82.5 - 82.25	0.018	0.474	0.000	0.048	0.001	0.494	1.050	4.8.2

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
	(31)								
L32	82.25 - 80 (32)	0.018	0.489	0.000	0.049	0.001	0.510	1.050	4.8.2
L33	80 - 75 (33)	0.014	0.403	0.000	0.029	0.000	0.419	1.050	4.8.2
L34	75 - 70 (34)	0.015	0.432	0.000	0.030	0.000	0.448	1.050	4.8.2
L35	70 - 65 (35)	0.016	0.461	0.000	0.030	0.000	0.477	1.050	4.8.2
L36	65 - 60 (36)	0.016	0.490	0.000	0.031	0.000	0.507	1.050	4.8.2
L37	60 - 58.5 (37)	0.013	0.402	0.000	0.023	0.000	0.416	1.050	4.8.2
L38	58.5 - 58.25 (38)	0.015	0.457	0.000	0.026	0.000	0.473	1.050	4.8.2
L39	58.25 - 53.25 (39)	0.016	0.484	0.000	0.026	0.000	0.501	1.050	4.8.2
L40	53.25 - 48.25 (40)	0.017	0.512	0.000	0.026	0.000	0.529	1.050	4.8.2
L41	48.25 - 48 (41)	0.013	0.405	0.000	0.021	0.000	0.418	1.050	4.8.2
L42	48 - 43 (42)	0.013	0.427	0.000	0.022	0.000	0.441	1.050	4.8.2
L43	43 - 40 (43)	0.013	0.441	0.000	0.022	0.000	0.455	1.050	4.8.2
L44	40 - 35 (44)	0.014	0.464	0.000	0.023	0.000	0.479	1.050	4.8.2
L45	35 - 32.08 (45)	0.015	0.478	0.000	0.023	0.000	0.494	1.050	4.8.2
L46	32.08 - 31.83 (46)	0.012	0.376	0.000	0.019	0.000	0.388	1.050	4.8.2
L47	31.83 - 28.75 (47)	0.012	0.387	0.000	0.019	0.000	0.400	1.050	4.8.2
L48	28.75 - 28.5 (48)	0.015	0.470	0.000	0.023	0.000	0.485	1.050	4.8.2
L49	28.5 - 23.5 (49)	0.015	0.494	0.000	0.023	0.000	0.509	1.050	4.8.2
L50	23.5 - 18.5 (50)	0.014	0.434	0.000	0.020	0.000	0.448	1.050	4.8.2
L51	18.5 - 13.5 (51)	0.015	0.455	0.000	0.021	0.000	0.470	1.050	4.8.2
L52	13.5 - 8.5 (52)	0.015	0.476	0.000	0.021	0.000	0.491	1.050	4.8.2
L53	8.5 - 3.5 (53)	0.016	0.497	0.000	0.021	0.000	0.513	1.050	4.8.2
L54	3.5 - 0 (54)	0.016	0.512	0.000	0.022	0.000	0.529	1.050	4.8.2

Section Capacity Table

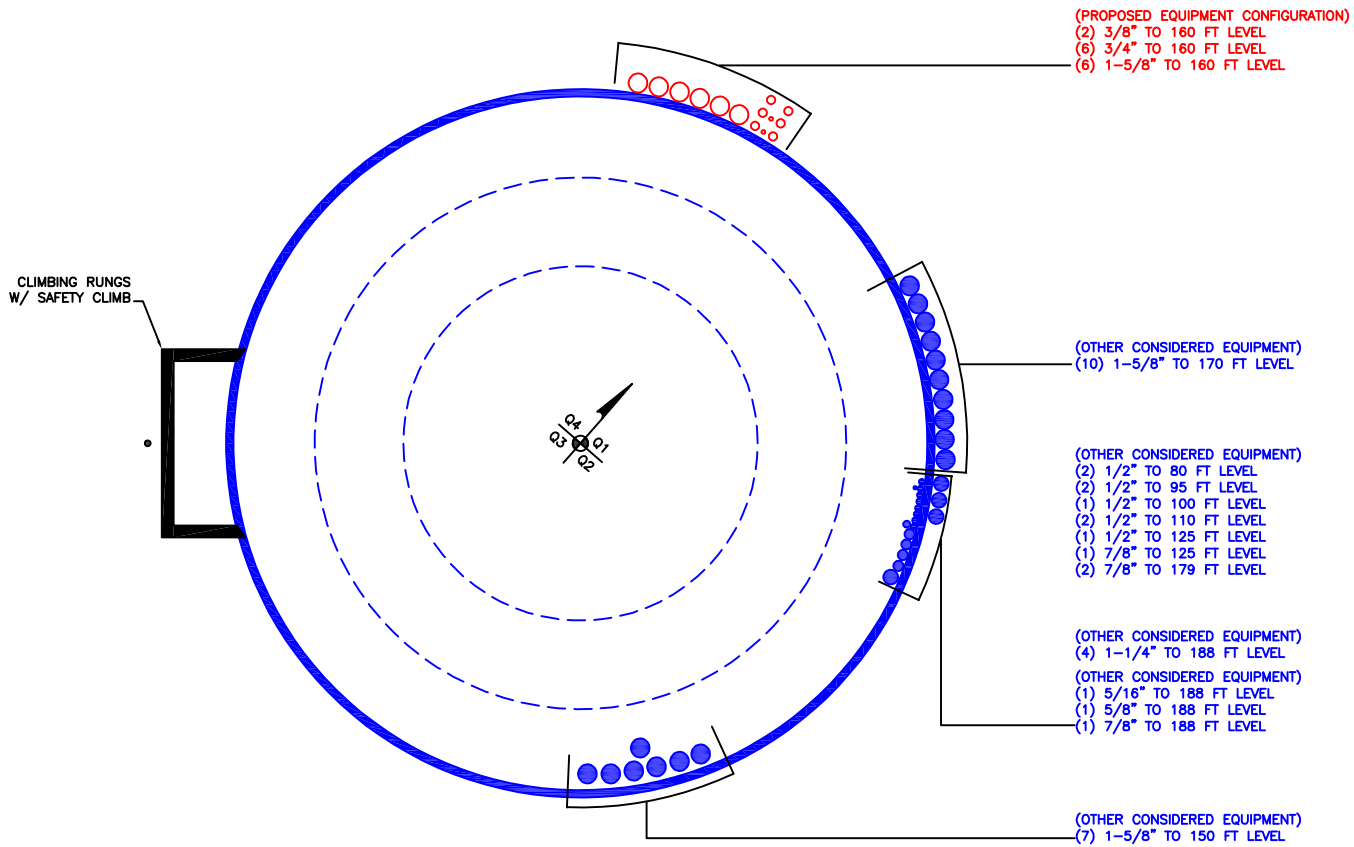
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	190 - 185	Pole	P30x0.375	1	-3.44	1376.61	1.4	Pass
L2	185 - 180	Pole	P30x0.375	2	-4.72	1376.61	3.5	Pass
L3	180 - 175	Pole	P36x0.375	3	-7.76	1564.60	5.0	Pass
L4	175 - 170	Pole	P36x0.375	4	-8.69	1564.60	7.3	Pass
L5	170 - 165	Pole	P36x0.375	5	-13.61	1564.60	11.4	Pass
L6	165 - 160	Pole	P36x0.375	6	-19.33	1564.60	16.7	Pass
L7	160 - 155	Pole	P42x0.375	7	-20.52	1752.31	17.0	Pass
L8	155 - 150	Pole	P42x0.375	8	-21.70	1752.31	21.6	Pass
L9	150 - 145	Pole	P42x0.375	9	-26.35	1752.31	27.9	Pass
L10	145 - 140	Pole	P42x0.375	10	-27.59	1752.31	33.7	Pass
L11	140 - 135	Pole	P48x0.375	11	-28.97	1939.86	30.9	Pass
L12	135 - 130	Pole	P48x0.375	12	-30.36	1939.86	35.6	Pass
L13	130 - 125	Pole	P48x0.375	13	-31.75	1939.86	40.4	Pass
L14	125 - 120	Pole	P48x0.375	14	-33.41	1939.86	45.3	Pass
L15	120 - 115	Pole	P54x0.375	15	-34.95	2127.30	40.4	Pass
L16	115 - 112.67	Pole	P54x0.375	16	-35.66	2127.30	42.2	Pass
L17	112.67 - 112.42	Pole	P54x0.4875	17	-35.76	2937.03	31.8	Pass
L18	112.42 - 107.42	Pole	P54x0.4875	18	-37.93	2937.03	34.9	Pass
L19	107.42 - 103.33	Pole	P54x0.4875	19	-39.49	2937.03	37.5	Pass
L20	103.33 - 103.08	Pole	P54x0.4875	20	-39.59	2937.03	37.7	Pass
L21	103.08 - 100	Pole	P54x0.4875	21	-40.77	2937.03	39.7	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$øP_{allow}$ K	% Capacity	Pass Fail
L22	100 - 95	Pole	P60x0.475	22	-42.89	3080.74	36.4	Pass
L23	95 - 90	Pole	P60x0.475	23	-45.21	3080.74	39.4	Pass
L24	90 - 89.5	Pole	P60x0.475	24	-45.42	3080.74	39.7	Pass
L25	89.5 - 89.25	Pole	P60x0.55625	25	-45.53	3748.89	33.5	Pass
L26	89.25 - 85.5	Pole	P60x0.55625	26	-47.27	3748.89	35.5	Pass
L27	85.5 - 85.25	Pole	P60x0.6375	27	-47.40	4457.83	30.6	Pass
L28	85.25 - 84	Pole	P60x0.6375	28	-48.04	4457.83	31.2	Pass
L29	84 - 83.75	Pole	P60x0.525	29	-48.16	3487.07	38.8	Pass
L30	83.75 - 82.5	Pole	P60x0.525	30	-48.71	3487.07	39.6	Pass
L31	82.5 - 82.25	Pole	P60x0.45	31	-48.81	2883.38	47.0	Pass
L32	82.25 - 80	Pole	P60x0.45	32	-49.69	2883.38	48.6	Pass
L33	80 - 75	Pole	P60x0.575	33	-53.16	3908.88	39.9	Pass
L34	75 - 70	Pole	P60x0.575	34	-55.61	3908.88	42.6	Pass
L35	70 - 65	Pole	P60x0.575	35	-58.07	3908.88	45.5	Pass
L36	65 - 60	Pole	P60x0.575	36	-60.53	3908.88	48.3	Pass
L37	60 - 58.5	Pole	P60x0.7	37	-62.87	5030.80	39.6	Pass
L38	58.5 - 58.25	Pole	P60x0.625	38	-63.01	4346.11	45.0	Pass
L39	58.25 - 53.25	Pole	P60x0.625	39	-65.66	4346.11	47.7	Pass
L40	53.25 - 48.25	Pole	P60x0.625	40	-68.33	4346.11	50.4	Pass
L41	48.25 - 48	Pole	P60x0.775	41	-68.49	5723.18	39.8	Pass
L42	48 - 43	Pole	P60x0.775	42	-71.63	5723.18	42.0	Pass
L43	43 - 40	Pole	P60x0.775	43	-73.53	5723.18	43.3	Pass
L44	40 - 35	Pole	P60x0.775	44	-78.81	5723.18	45.6	Pass
L45	35 - 32.08	Pole	P60x0.775	45	-80.65	5723.18	47.0	Pass
L46	32.08 - 31.83	Pole	P60x0.9625	46	-80.85	7085.33	36.9	Pass
L47	31.83 - 28.75	Pole	P60x0.9625	47	-83.19	7085.33	38.1	Pass
L48	28.75 - 28.5	Pole	P60x0.8125	48	-83.36	5996.32	46.2	Pass
L49	28.5 - 23.5	Pole	P60x0.8125	49	-86.68	5996.32	48.5	Pass
L50	23.5 - 18.5	Pole	P60x0.95	50	-93.41	6994.78	42.7	Pass
L51	18.5 - 13.5	Pole	P60x0.95	51	-97.20	6994.78	44.7	Pass
L52	13.5 - 8.5	Pole	P60x0.95	52	-100.96	6994.78	46.8	Pass
L53	8.5 - 3.5	Pole	P60x0.95	53	-104.60	6994.78	48.9	Pass
L54	3.5 - 0	Pole	P60x0.95	54	-107.14	6994.78	50.4	Pass
							Summary	
						Pole (L40)	50.4	Pass
						RATING =	**50.4**	**Pass**

***NOTE: Above stress ratios for reinforced sections are approximate. More exact calculations are presented in Appendix C.**

APPENDIX B

BASE LEVEL DRAWING


(PROPOSED EQUIPMENT CONFIGURATION)
(2) 3/8" TO 160 FT LEVEL
(6) 3/4" TO 160 FT LEVEL
(6) 1-5/8" TO 160 FT LEVEL
CLIMBING RUNGS
W/ SAFETY CLIMB
Q1
Q2
Q3
Q4
(OTHER CONSIDERED EQUIPMENT)
(10) 1-5/8" TO 170 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(2) 1/2" TO 80 FT LEVEL
(2) 1/2" TO 95 FT LEVEL
(1) 1/2" TO 100 FT LEVEL
(2) 1/2" TO 110 FT LEVEL
(1) 1/2" TO 125 FT LEVEL
(1) 7/8" TO 125 FT LEVEL
(2) 7/8" TO 179 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(4) 1-1/4" TO 188 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 5/16" TO 188 FT LEVEL
(1) 5/8" TO 188 FT LEVEL
(1) 7/8" TO 188 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(7) 1-5/8" TO 150 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

CCIpole

per TIA-222- H

Site BU: 829046

Work Order: 1832008

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Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	190	10		0	30	30	0.375		A53-B-42
2	180	20		0	36.00	36	0.375		A53-B-42
3	160	20		0	42.00	42	0.375		A53-B-42
4	140	20		0	48.00	48	0.375		A53-B-42
5	120	20		0	54.00	54	0.375		A53-B-42
6	100	20		0	60.00	60	0.375		A53-B-42
7	80	20		0	60.00	60	0.5		A53-B-42
8	60	20		0	60.00	60	0.625		A53-B-42
9	40	20		0	60.00	60	0.625		A53-B-42
10	20	20		0	60.00	60	0.75		A53-B-42

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	0	32.08	plate	MS-850 (1.1875")	3	0	120	240															
2	28.75	48.25	plate	MS-650 (1.1875")	3	24	144	264															
3	58.5	85.5	plate	MS-450 (1.1875")	3	0	120	240															
4	84	103.33	plate	MS-600 (1.1875")	3	21	141	261															
5	103.33	112.67	plate	MS-600 (1.1875")	3				0	120	240												
6	82.5	89.5	plate	MS-450 (1.1875")	3							90	210	330									
7																							
8																							
9																							
10																							

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	Bottom Termination Length (in)	Top Termination Length (in)	L_u (in)	Net Area (in^2)	Bolt Hole Size (in)	Reinforcement Material
1	8.5	1.25	10.625	0.625	45.000	45.000	17.250	9.063	1.1875	A572-65
2	6.5	1.25	8.125	0.625	33.000	33.000	19.250	6.563	1.1875	A572-65
3	4.5	1	4.5	0.5	18.000	18.000	20.625	3.250	1.1875	A572-65
4	6	1	6	0.5	24.000	24.000	16.375	4.750	1.1875	A572-65
5	6	1	6	0.5	24.000	24.000	16.375	4.750	1.1875	A572-65
6	4.5	1	4.5	0.5	18.000	18.000	20.625	3.250	1.1875	A572-65

TNX Geometry Input

Increment (ft): 5

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	190 - 185	5		0	30.000	30.000	0.375	A53-B-42	1.000
2	185 - 180	5	0	0	30.000	30.000	0.375	A53-B-42	1.000
3	180 - 175	5		0	36.000	36.000	0.375	A53-B-42	1.000
4	175 - 170	5		0	36.000	36.000	0.375	A53-B-42	1.000
5	170 - 165	5		0	36.000	36.000	0.375	A53-B-42	1.000
6	165 - 160	5	0	0	36.000	36.000	0.375	A53-B-42	1.000
7	160 - 155	5		0	42.000	42.000	0.375	A53-B-42	1.000
8	155 - 150	5		0	42.000	42.000	0.375	A53-B-42	1.000
9	150 - 145	5		0	42.000	42.000	0.375	A53-B-42	1.000
10	145 - 140	5	0	0	42.000	42.000	0.375	A53-B-42	1.000
11	140 - 135	5		0	48.000	48.000	0.375	A53-B-42	1.000
12	135 - 130	5		0	48.000	48.000	0.375	A53-B-42	1.000
13	130 - 125	5		0	48.000	48.000	0.375	A53-B-42	1.000
14	125 - 120	5	0	0	48.000	48.000	0.375	A53-B-42	1.000
15	120 - 115	5		0	54.000	54.000	0.375	A53-B-42	1.000
16	115 - 112.67	2.33		0	54.000	54.000	0.375	A53-B-42	1.000
17	112.67 - 112.42	0.25		0	54.000	54.000	0.4875	A53-B-42	0.990
18	112.42 - 107.42	5		0	54.000	54.000	0.4875	A53-B-42	0.990
19	107.42 - 103.33	4.09		0	54.000	54.000	0.4875	A53-B-42	0.990
20	103.33 - 103.08	0.25		0	54.000	54.000	0.4875	A53-B-42	0.990
21	103.08 - 100	3.08	0	0	54.000	54.000	0.4875	A53-B-42	0.990
22	100 - 95	5		0	60.000	60.000	0.475	A53-B-42	0.993
23	95 - 90	5		0	60.000	60.000	0.475	A53-B-42	0.993
24	90 - 89.5	0.5		0	60.000	60.000	0.475	A53-B-42	0.993
25	89.5 - 89.25	0.25		0	60.000	60.000	0.55625	A53-B-42	0.979
26	89.25 - 85.5	3.75		0	60.000	60.000	0.55625	A53-B-42	0.979
27	85.5 - 85.25	0.25		0	60.000	60.000	0.6375	A53-B-42	0.969
28	85.25 - 84	1.25		0	60.000	60.000	0.6375	A53-B-42	0.969
29	84 - 83.75	0.25		0	60.000	60.000	0.525	A53-B-42	0.991
30	83.75 - 82.5	1.25		0	60.000	60.000	0.525	A53-B-42	0.991
31	82.5 - 82.25	0.25		0	60.000	60.000	0.45	A53-B-42	0.995
32	82.25 - 80	2.25	0	0	60.000	60.000	0.45	A53-B-42	0.995
33	80 - 75	5		0	60.000	60.000	0.575	A53-B-42	0.996
34	75 - 70	5		0	60.000	60.000	0.575	A53-B-42	0.996
35	70 - 65	5		0	60.000	60.000	0.575	A53-B-42	0.996
36	65 - 60	5	0	0	60.000	60.000	0.575	A53-B-42	0.996
37	60 - 58.5	1.5		0	60.000	60.000	0.7	A53-B-42	0.998
38	58.5 - 58.25	0.25		0	60.000	60.000	0.625	A53-B-42	1.000
39	58.25 - 53.25	5		0	60.000	60.000	0.625	A53-B-42	1.000
40	53.25 - 48.25	5		0	60.000	60.000	0.625	A53-B-42	1.000
41	48.25 - 48	0.25		0	60.000	60.000	0.775	A53-B-42	0.978
42	48 - 43	5		0	60.000	60.000	0.775	A53-B-42	0.978
43	43 - 40	3	0	0	60.000	60.000	0.775	A53-B-42	0.978
44	40 - 35	5		0	60.000	60.000	0.775	A53-B-42	0.978
45	35 - 32.08	2.92		0	60.000	60.000	0.775	A53-B-42	0.978
46	32.08 - 31.83	0.25		0	60.000	60.000	0.9625	A53-B-42	0.968
47	31.83 - 28.75	3.08		0	60.000	60.000	0.9625	A53-B-42	0.968
48	28.75 - 28.5	0.25		0	60.000	60.000	0.8125	A53-B-42	0.983
49	28.5 - 23.5	5	0	0	60.000	60.000	0.8125	A53-B-42	0.983
50	23.5 - 18.5	5		0	60.000	60.000	0.95	A53-B-42	0.973
51	18.5 - 13.5	5		0	60.000	60.000	0.95	A53-B-42	0.973
52	13.5 - 8.5	5		0	60.000	60.000	0.95	A53-B-42	0.973
53	8.5 - 3.5	5		0	60.000	60.000	0.95	A53-B-42	0.973
54	3.5 - 0	3.5		0	60.000	60.000	0.95	A53-B-42	0.973

TNX Section Forces

Increment (ft): 5

	Section Height (ft)	TNX Output		
		P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	190 - 185	3.44	10.90	2.77
2	185 - 180	4.72	31.75	4.01
3	180 - 175	7.76	62.42	6.25
4	175 - 170	8.69	94.75	6.66
5	170 - 165	13.61	146.82	10.62
6	165 - 160	19.33	214.89	16.08
7	160 - 155	20.52	296.47	16.56
8	155 - 150	21.70	380.42	17.03
9	150 - 145	26.35	493.77	21.21
10	145 - 140	27.59	600.87	21.65
11	140 - 135	28.97	710.29	22.13
12	135 - 130	30.36	822.12	22.61
13	130 - 125	31.75	936.30	23.07
14	125 - 120	33.41	1053.86	23.66
15	120 - 115	34.95	1173.36	24.16
16	115 - 112.67	35.66	1229.92	24.40
17	112.67 - 112.42	35.76	1236.02	24.42
18	112.42 - 107.42	37.93	1360.20	25.07
19	107.42 - 103.33	39.49	1463.58	25.50
20	103.33 - 103.08	39.59	1469.96	25.54
21	103.08 - 100	40.77	1549.09	25.86
22	100 - 95	42.89	1684.10	27.53
23	95 - 90	45.21	1825.47	28.73
24	90 - 89.5	45.42	1839.86	28.83
25	89.5 - 89.25	45.53	1847.07	28.89
26	89.25 - 85.5	47.27	1956.92	29.72
27	85.5 - 85.25	47.40	1964.35	29.78
28	85.25 - 84	48.04	2001.73	30.06
29	84 - 83.75	48.16	2009.25	30.11
30	83.75 - 82.5	48.71	2047.05	30.40
31	82.5 - 82.25	48.81	2054.65	30.45
32	82.25 - 80	49.69	2123.64	30.90
33	80 - 75	53.16	2282.51	31.94
34	75 - 70	55.61	2443.31	32.41
35	70 - 65	58.07	2606.42	32.86
36	65 - 60	60.53	2771.73	33.29
37	60 - 58.5	62.87	2822.48	33.92
38	58.5 - 58.25	63.01	2830.96	33.93
39	58.25 - 53.25	65.66	3001.59	34.35
40	53.25 - 48.25	68.33	3174.19	34.73
41	48.25 - 48	68.49	3182.87	34.76
42	48 - 43	71.63	3358.64	35.58
43	43 - 40	73.53	3466.03	36.05
44	40 - 35	78.81	3652.00	37.59
45	35 - 32.08	80.65	3762.36	38.05
46	32.08 - 31.83	80.85	3771.87	38.07
47	31.83 - 28.75	83.19	3889.82	38.55
48	28.75 - 28.5	83.36	3899.46	38.58
49	28.5 - 23.5	86.68	4094.07	39.29
50	23.5 - 18.5	93.41	4293.33	40.77
51	18.5 - 13.5	97.20	4498.72	41.43
52	13.5 - 8.5	100.96	4707.37	42.08
53	8.5 - 3.5	104.60	4919.23	42.70
54	3.5 - 0	107.14	5069.36	43.12

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
190 - 185	Pole	TP30x30x0.375	Pole	1.3%	Pass
185 - 180	Pole	TP30x30x0.375	Pole	3.5%	Pass
180 - 175	Pole	TP36x36x0.375	Pole	4.9%	Pass
175 - 170	Pole	TP36x36x0.375	Pole	7.3%	Pass
170 - 165	Pole	TP36x36x0.375	Pole	11.3%	Pass
165 - 160	Pole	TP36x36x0.375	Pole	16.6%	Pass
160 - 155	Pole	TP42x42x0.375	Pole	16.9%	Pass
155 - 150	Pole	TP42x42x0.375	Pole	21.4%	Pass
150 - 145	Pole	TP42x42x0.375	Pole	27.7%	Pass
145 - 140	Pole	TP42x42x0.375	Pole	33.5%	Pass
140 - 135	Pole	TP48x48x0.375	Pole	30.7%	Pass
135 - 130	Pole	TP48x48x0.375	Pole	35.4%	Pass
130 - 125	Pole	TP48x48x0.375	Pole	40.1%	Pass
125 - 120	Pole	TP48x48x0.375	Pole	45.0%	Pass
120 - 115	Pole	TP54x54x0.375	Pole	40.1%	Pass
115 - 112.67	Pole	TP54x54x0.375	Pole	42.0%	Pass
112.67 - 112.42	Pole + Reinf.	TP54x54x0.4875	Pole	32.3%	Pass
112.42 - 107.42	Pole + Reinf.	TP54x54x0.4875	Pole	35.5%	Pass
107.42 - 103.33	Pole + Reinf.	TP54x54x0.4875	Pole	38.1%	Pass
103.33 - 103.08	Pole + Reinf.	TP54x54x0.4875	Pole	38.3%	Pass
103.08 - 100	Pole + Reinf.	TP54x54x0.4875	Pole	40.3%	Pass
100 - 95	Pole + Reinf.	TP60x60x0.475	Pole	36.8%	Pass
95 - 90	Pole + Reinf.	TP60x60x0.475	Pole	39.8%	Pass
90 - 89.5	Pole + Reinf.	TP60x60x0.475	Pole	40.1%	Pass
89.5 - 89.25	Pole + Reinf.	TP60x60x0.5563	Pole	34.7%	Pass
89.25 - 85.5	Pole + Reinf.	TP60x60x0.5563	Pole	36.7%	Pass
85.5 - 85.25	Pole + Reinf.	TP60x60x0.6375	Pole	32.4%	Pass
85.25 - 84	Pole + Reinf.	TP60x60x0.6375	Pole	33.0%	Pass
84 - 83.75	Pole + Reinf.	TP60x60x0.525	Pole	39.6%	Pass
83.75 - 82.5	Pole + Reinf.	TP60x60x0.525	Pole	40.3%	Pass
82.5 - 82.25	Pole + Reinf.	TP60x60x0.45	Pole	47.3%	Pass
82.25 - 80	Pole + Reinf.	TP60x60x0.45	Pole	48.9%	Pass
80 - 75	Pole + Reinf.	TP60x60x0.575	Reinf. 3 Compression	40.3%	Pass
75 - 70	Pole + Reinf.	TP60x60x0.575	Reinf. 3 Compression	43.1%	Pass
70 - 65	Pole + Reinf.	TP60x60x0.575	Reinf. 3 Compression	46.0%	Pass
65 - 60	Pole + Reinf.	TP60x60x0.575	Reinf. 3 Compression	48.9%	Pass
60 - 58.5	Pole + Reinf.	TP60x60x0.7	Reinf. 3 Compression	41.1%	Pass
58.5 - 58.25	Pole	TP60x60x0.625	Pole	45.0%	Pass
58.25 - 53.25	Pole	TP60x60x0.625	Pole	47.7%	Pass
53.25 - 48.25	Pole	TP60x60x0.625	Pole	50.4%	Pass
48.25 - 48	Pole + Reinf.	TP60x60x0.775	Pole	41.2%	Pass
48 - 43	Pole + Reinf.	TP60x60x0.775	Pole	43.5%	Pass
43 - 40	Pole + Reinf.	TP60x60x0.775	Pole	44.9%	Pass
40 - 35	Pole + Reinf.	TP60x60x0.775	Pole	47.3%	Pass
35 - 32.08	Pole + Reinf.	TP60x60x0.775	Pole	48.7%	Pass
32.08 - 31.83	Pole + Reinf.	TP60x60x0.9625	Pole	39.3%	Pass
31.83 - 28.75	Pole + Reinf.	TP60x60x0.9625	Pole	40.6%	Pass
28.75 - 28.5	Pole + Reinf.	TP60x60x0.8125	Pole	47.7%	Pass
28.5 - 23.5	Pole + Reinf.	TP60x60x0.8125	Pole	50.1%	Pass
23.5 - 18.5	Pole + Reinf.	TP60x60x0.95	Pole	44.6%	Pass
18.5 - 13.5	Pole + Reinf.	TP60x60x0.95	Pole	46.7%	Pass
13.5 - 8.5	Pole + Reinf.	TP60x60x0.95	Pole	48.9%	Pass
8.5 - 3.5	Pole + Reinf.	TP60x60x0.95	Pole	51.1%	Pass
3.5 - 0	Pole + Reinf.	TP60x60x0.95	Pole	52.6%	Pass
				Summary	
			Pole	52.6%	Pass
			Reinforcement	48.9%	Pass
			Overall	52.6%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity*						
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3	R4	R5	R6
190 - 185	3829	n/a	3829	34.90	n/a	34.90	1.3%						
185 - 180	3829	n/a	3829	34.90	n/a	34.90	3.5%						
180 - 175	6659	n/a	6659	41.97	n/a	41.97	4.9%						
175 - 170	6659	n/a	6659	41.97	n/a	41.97	7.3%						
170 - 165	6659	n/a	6659	41.97	n/a	41.97	11.3%						
165 - 160	6659	n/a	6659	41.97	n/a	41.97	16.6%						
160 - 155	10622	n/a	10622	49.04	n/a	49.04	16.9%						
155 - 150	10622	n/a	10622	49.04	n/a	49.04	21.4%						
150 - 145	10622	n/a	10622	49.04	n/a	49.04	27.7%						
145 - 140	10622	n/a	10622	49.04	n/a	49.04	33.5%						
140 - 135	15908	n/a	15908	56.11	n/a	56.11	30.7%						
135 - 130	15908	n/a	15908	56.11	n/a	56.11	35.4%						
130 - 125	15908	n/a	15908	56.11	n/a	56.11	40.1%						
125 - 120	15908	n/a	15908	56.11	n/a	56.11	45.0%						
120 - 115	22710	n/a	22710	63.18	n/a	63.18	40.1%						
115 - 112.67	22710	n/a	22710	63.18	n/a	63.18	42.0%						
112.67 - 112.42	22710	6834	29544	63.18	18.00	81.18	32.3%					28.9%	
112.42 - 107.42	22710	6834	29544	63.18	18.00	81.18	35.5%					31.7%	
107.42 - 103.33	22710	6834	29544	63.18	18.00	81.18	38.1%					34.1%	
103.33 - 103.08	22710	6834	29544	63.18	18.00	81.18	38.3%				34.2%		
103.08 - 100	22710	6834	29544	63.18	18.00	81.18	40.3%				36.1%		
100 - 95	31217	8400	39617	70.24	18.00	88.24	36.8%				32.5%		
95 - 90	31217	8400	39617	70.24	18.00	88.24	39.8%				35.2%		
90 - 89.5	31217	8400	39617	70.24	18.00	88.24	40.1%				35.5%		
89.5 - 89.25	31217	14691	45908	70.24	31.50	101.74	34.7%				30.7%		33.9%
89.25 - 85.5	31217	14691	45908	70.24	31.50	101.74	36.7%				32.5%		35.9%
85.5 - 85.25	31217	20982	52199	70.24	45.00	115.24	32.4%			31.7%	28.7%		31.7%
85.25 - 84	31217	20982	52199	70.24	45.00	115.24	33.0%			32.3%	29.2%		32.3%
84 - 83.75	31217	12582	43799	70.24	27.00	97.24	39.6%			38.7%			38.7%
83.75 - 82.5	31217	12582	43799	70.24	27.00	97.24	40.3%			39.4%			39.4%
82.5 - 82.25	31217	6291	37508	70.24	13.50	83.74	47.3%			46.2%			
82.25 - 80	31217	6291	37508	70.24	13.50	83.74	48.9%			47.8%			
80 - 75	41363	6291	47654	93.46	13.50	106.96	40.2%			40.3%			
75 - 70	41363	6291	47654	93.46	13.50	106.96	43.0%			43.1%			
70 - 65	41363	6291	47654	93.46	13.50	106.96	45.8%			46.0%			
65 - 60	41363	6291	47654	93.46	13.50	106.96	48.7%			48.9%			
60 - 58.5	51381	6291	57672	116.58	13.50	130.08	39.9%			41.1%			
58.5 - 58.25	51381	n/a	51381	116.58	n/a	116.58	45.0%						
58.25 - 53.25	51381	n/a	51381	116.58	n/a	116.58	47.7%						
53.25 - 48.25	51381	n/a	51381	116.58	n/a	116.58	50.4%						
48.25 - 48	51381	11475	62856	116.58	24.38	140.96	41.2%		37.8%				
48 - 43	51381	11475	62856	116.58	24.38	140.96	43.5%		39.9%				
43 - 40	51381	11475	62856	116.58	24.38	140.96	44.9%		41.1%				
40 - 35	51381	11475	62856	116.58	24.38	140.96	47.3%		43.4%				
35 - 32.08	51381	11475	62856	116.58	24.38	140.96	48.7%		44.7%				
32.08 - 31.83	51381	26521	77901	116.58	56.25	172.83	39.3%	35.6%	36.1%				
31.83 - 28.75	51381	26521	77901	116.58	56.25	172.83	40.6%	35.5%	37.2%				
28.75 - 28.5	51381	15046	66426	116.58	31.88	148.46	47.7%	41.8%					
28.5 - 23.5	51381	15046	66426	116.58	31.88	148.46	50.1%	43.8%					
23.5 - 18.5	61271	15046	76317	139.60	31.88	171.48	44.6%	40.0%					
18.5 - 13.5	61271	15046	76317	139.60	31.88	171.48	46.7%	41.9%					
13.5 - 8.5	61271	15046	76317	139.60	31.88	171.48	48.9%	43.8%					
8.5 - 3.5	61271	15046	76317	139.60	31.88	171.48	51.1%	45.8%					
3.5 - 0	61271	15046	76317	139.60	31.88	171.48	52.6%	48.8%					

Note: Section capacity checked in 5 degree increments.
Rating per TIA-222-H Section 15.5.

Monopole Flange Plate Connection

Elevation = 180 ft.

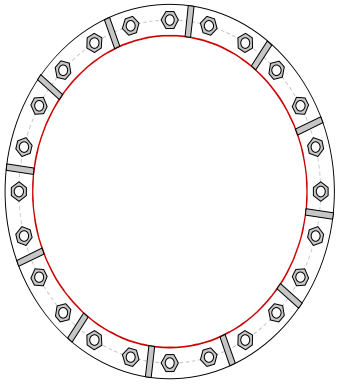
BU #	829046
Site Name	/eston/ Rt-57/ Norfield
Order #	509322 Rev. 0

TIA-222 Revision	H

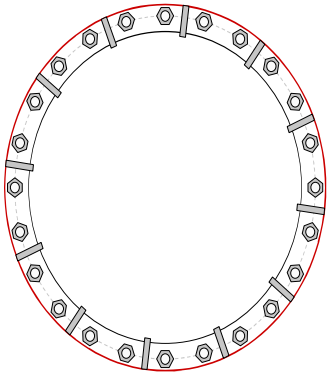
Applied Loads	
Moment (kip-ft)	31.75
Axial Force (kips)	4.72
Shear Force (kips)	4.01

**TIA-222-H Section 15.5 Applied*

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

(24) 1" ø bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 33" BC

Top Plate Data

36" OD x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

30" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

(12) 5"H x 3"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Bottom Stiffener Data

(12) 5"H x 3"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Top Pole Data

30" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

36" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	1.73	
Allowable (kips)	54.54	
Stress Rating:	**3.0%**	Pass

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Pirod OK**
Tension Side Stress Rating:	**Pirod OK**

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Pirod OK**
Tension Side Stress Rating:	**Pirod OK**

Top Stiffener Capacity

Horizontal Weld:	**Pirod OK**
Vertical Weld:	**Pirod OK**
Plate Flexure+Shear:	**Pirod OK**
Plate Tension+Shear:	**Pirod OK**
Plate Compression:	**Pirod OK**

Bottom Stiffener Capacity

Horizontal Weld:	**Pirod OK**
Vertical Weld:	**Pirod OK**
Plate Flexure+Shear:	**Pirod OK**
Plate Tension+Shear:	**Pirod OK**
Plate Compression:	**Pirod OK**

Top Pole Capacity

Punching Shear:	**Pirod OK**

Bottom Pole Capacity

Punching Shear:	**Pirod OK**

Monopole Flange Plate Connection

Elevation = 160 ft.

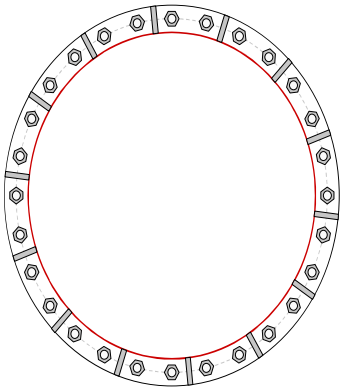
BU #	829046
Site Name	/eston/ Rt-57/ Norfield
Order #	509322 Rev. 0

TIA-222 Revision	H

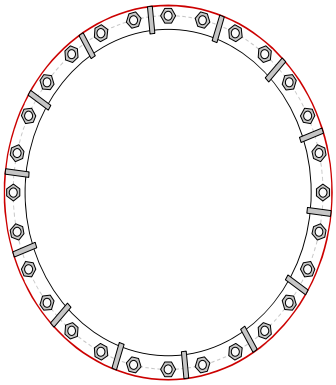
Applied Loads	
Moment (kip-ft)	214.89
Axial Force (kips)	19.33
Shear Force (kips)	16.08

**TIA-222-H Section 15.5 Applied*

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

(28) 1" ø bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 39" BC

Top Plate Data

42" OD x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

36" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

(14) 5"H x 3"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Bottom Stiffener Data

(14) 5"H x 3"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Top Pole Data

36" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

42" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	8.75	
Allowable (kips)	54.53	
Stress Rating:	**15.3%**	Pass

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Pirod OK**
Tension Side Stress Rating:	**Pirod OK**

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Pirod OK**
Tension Side Stress Rating:	**Pirod OK**

Top Stiffener Capacity

Horizontal Weld:	**Pirod OK**
Vertical Weld:	**Pirod OK**
Plate Flexure+Shear:	**Pirod OK**
Plate Tension+Shear:	**Pirod OK**
Plate Compression:	**Pirod OK**

Bottom Stiffener Capacity

Horizontal Weld:	**Pirod OK**
Vertical Weld:	**Pirod OK**
Plate Flexure+Shear:	**Pirod OK**
Plate Tension+Shear:	**Pirod OK**
Plate Compression:	**Pirod OK**

Top Pole Capacity

Punching Shear:	**Pirod OK**

Bottom Pole Capacity

Punching Shear:	**Pirod OK**

Monopole Flange Plate Connection

Elevation = 140 ft.

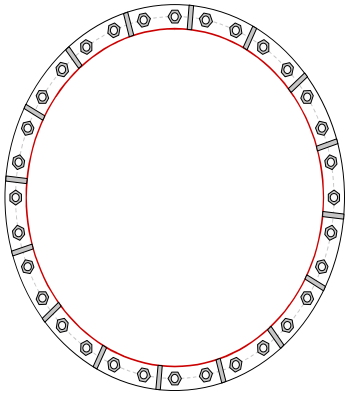
BU #	829046
Site Name	/eston/ Rt-57/ Norfield
Order #	509322 Rev. 0

TIA-222 Revision	H

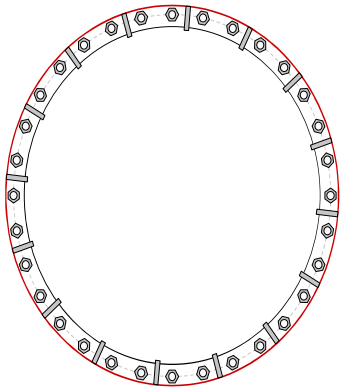
Applied Loads	
Moment (kip-ft)	600.87
Axial Force (kips)	27.59
Shear Force (kips)	21.65

**TIA-222-H Section 15.5 Applied*

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

(32) 1" ø bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 45" BC

Top Plate Data

48" OD x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

42" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

(16) 5"H x 3"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Bottom Stiffener Data

(16) 5"H x 3"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Top Pole Data

42" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

48" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	19.16	
Allowable (kips)	54.53	
Stress Rating:	**33.5%**	Pass

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Pirod OK**
Tension Side Stress Rating:	**Pirod OK**

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Pirod OK**
Tension Side Stress Rating:	**Pirod OK**

Top Stiffener Capacity

Horizontal Weld:	**Pirod OK**
Vertical Weld:	**Pirod OK**
Plate Flexure+Shear:	**Pirod OK**
Plate Tension+Shear:	**Pirod OK**
Plate Compression:	**Pirod OK**

Bottom Stiffener Capacity

Horizontal Weld:	**Pirod OK**
Vertical Weld:	**Pirod OK**
Plate Flexure+Shear:	**Pirod OK**
Plate Tension+Shear:	**Pirod OK**
Plate Compression:	**Pirod OK**

Top Pole Capacity

Punching Shear:	**Pirod OK**

Bottom Pole Capacity

Punching Shear:	**Pirod OK**

Monopole Flange Plate Connection

Elevation = 120 ft.

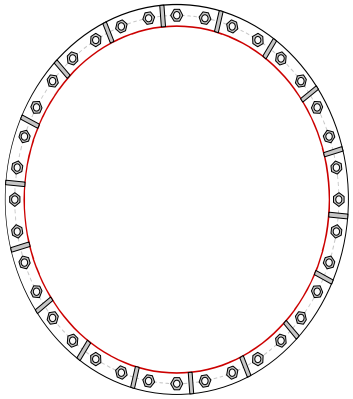
BU #	829046
Site Name	/eston/ Rt-57/ Norfield
Order #	509322 Rev. 0

TIA-222 Revision	H

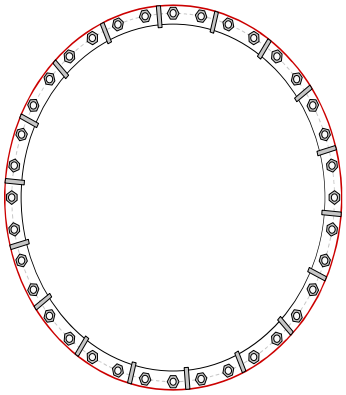
Applied Loads	
Moment (kip-ft)	1053.86
Axial Force (kips)	33.41
Shear Force (kips)	23.66

**TIA-222-H Section 15.5 Applied*

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

(36) 1" ø bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 51" BC

Top Plate Data

54" OD x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

48" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

(18) 5"H x 3"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Bottom Stiffener Data

(18) 5"H x 3"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Top Pole Data

48" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

54" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	26.62	
Allowable (kips)	54.53	
Stress Rating:	**46.5%**	Pass

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Pirod OK**
Tension Side Stress Rating:	**Pirod OK**

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Pirod OK**
Tension Side Stress Rating:	**Pirod OK**

Top Stiffener Capacity

Horizontal Weld:	**Pirod OK**
Vertical Weld:	**Pirod OK**
Plate Flexure+Shear:	**Pirod OK**
Plate Tension+Shear:	**Pirod OK**
Plate Compression:	**Pirod OK**

Bottom Stiffener Capacity

Horizontal Weld:	**Pirod OK**
Vertical Weld:	**Pirod OK**
Plate Flexure+Shear:	**Pirod OK**
Plate Tension+Shear:	**Pirod OK**
Plate Compression:	**Pirod OK**

Top Pole Capacity

Punching Shear:	**Pirod OK**

Bottom Pole Capacity

Punching Shear:	**Pirod OK**

Monopole Flange Plate Connection

Elevation = 100 ft.

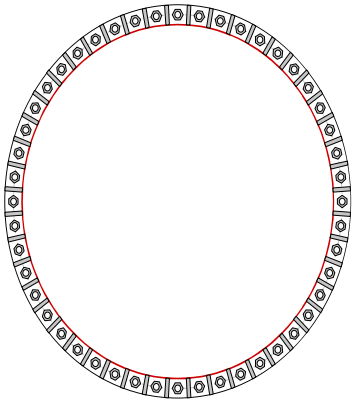
BU #	829046
Site Name	/eston/ Rt-57/ Norfield
Order #	509322 Rev. 0

TIA-222 Revision	H

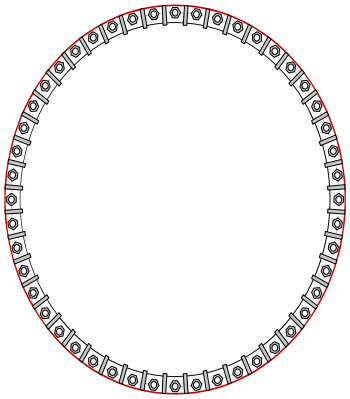
Applied Loads	
Moment (kip-ft)	1549.09
Axial Force (kips)	40.77
Shear Force (kips)	25.86

**TIA-222-H Section 15.5 Applied*

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

(48) 1" ø bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 57" BC

Top Plate Data

60" OD x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

54" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

(48) 5"H x 3"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Bottom Stiffener Data

(48) 5"H x 3"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Top Pole Data

54" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

60" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	26.32	
Allowable (kips)	54.53	
Stress Rating:	**46.0%**	Pass

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Pirod OK**
Tension Side Stress Rating:	**Pirod OK**

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Pirod OK**
Tension Side Stress Rating:	**Pirod OK**

Top Stiffener Capacity

Horizontal Weld:	**Pirod OK**
Vertical Weld:	**Pirod OK**
Plate Flexure+Shear:	**Pirod OK**
Plate Tension+Shear:	**Pirod OK**
Plate Compression:	**Pirod OK**

Bottom Stiffener Capacity

Horizontal Weld:	**Pirod OK**
Vertical Weld:	**Pirod OK**
Plate Flexure+Shear:	**Pirod OK**
Plate Tension+Shear:	**Pirod OK**
Plate Compression:	**Pirod OK**

Top Pole Capacity

Punching Shear:	**Pirod OK**

Bottom Pole Capacity

Punching Shear:	**Pirod OK**

Monopole Flange Plate Connection

Elevation = 80 ft.

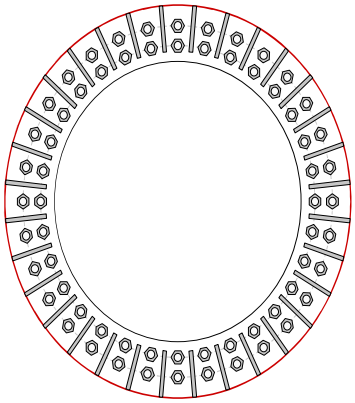
BU #	829046
Site Name	/eston/ Rt-57/ Norfield
Order #	509322 Rev. 0

TIA-222 Revision	H

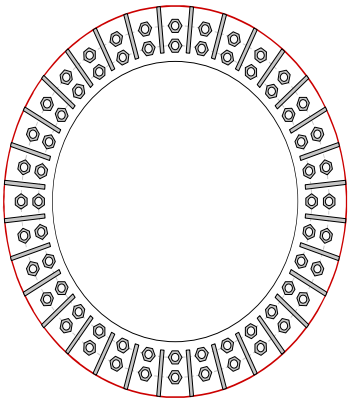
Applied Loads	
Moment (kip-ft)	1691.02
Axial Force (kips)	49.69
Shear Force (kips)	30.90

**TIA-222-H Section 15.5 Applied*

Top Plate - Internal



Bottom Plate - Internal



Connection Properties

Bolt Data

GROUP 1: (32) 1-1/4" ø bolts (A325 N; Fy=81 ksi, Fu=105 ksi) on 53" BC
GROUP 2: (32) 1-1/4" ø bolts (A325 N; Fy=81 ksi, Fu=105 ksi) on 47" BC

Top Plate Data

42.25" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

42.25" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

(32) 10"H x 7"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Bottom Stiffener Data

(32) 10"H x 7"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Top Pole Data

60" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

60" x 0.5" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	26.01	
Allowable (kips)	76.30	
Stress Rating:	**32.5%**	Pass

Top Plate Capacity

Max Stress (ksi):	14.14	(Roark's Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	**41.6%**	Pass
Tension Side Stress Rating:	**N/A**	

Bottom Plate Capacity

Max Stress (ksi):	14.14	(Roark's Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	**41.6%**	Pass
Tension Side Stress Rating:	**N/A**	

Top Stiffener Capacity

Horizontal Weld:	**29.6%**	Pass
Vertical Weld:	**25.9%**	Pass
Plate Flexure+Shear:	**20.6%**	Pass
Plate Tension+Shear:	**24.7%**	Pass
Plate Compression:	**51.2%**	Pass

Bottom Stiffener Capacity

Horizontal Weld:	**26.1%**	Pass
Vertical Weld:	**22.8%**	Pass
Plate Flexure+Shear:	**17.6%**	Pass
Plate Tension+Shear:	**21.4%**	Pass
Plate Compression:	**45.1%**	Pass

Top Pole Capacity

Punching Shear:	**16.7%**	Pass

Bottom Pole Capacity

Punching Shear:	**11.0%**	Pass

1. PARAMETERS

Analysis
Design

Flange Elevation: 80'- 0"

1.1 tnxTower Reactions

Apply TIA-222-H Section 15.5? No / Yes

Moment: $M := 2123.64kip \cdot ft$

Axial Load: $P := 49.69kip$

Shear Load: $V := 30.90kip$

1.2 Shaft Properties at the Flange

Upper Shaft Diameter: $D_{shaft1} := 60in$

Upper Shaft Thickness: (inches) $t_1 := 0.375$

Lower Shaft Diameter: $D_{shaft2} := 60in$

Lower Shaft Thickness: (inches) $t_2 := 0.500$

Shaft Grade: $Fy_{shaft} := 42ksi$ $Fu_{shaft} := 63ksi$

1.3 Proposed Bridge Stiffeners Properties

Number of Proposed Bridge Stiffeners: $N_{new} := 3$

Thickness of Proposed Bridge Stiffeners: $t_{new} := 1in$

Width of Proposed Bridge Stiffeners: $w_{new} := 4.5in$

Diameter to the centroid of Proposed Bridge Stiffeners: $BC_{new} := 61in$

Gross Area of One Proposed Bridge Stiffener: $A_{g_new} := w_{new} \cdot t_{new} = 4.5 \cdot in^2$

Radius of Gyration about x-axis: $r_x := \frac{t_{new}}{\sqrt{12}} = 0.289 \cdot in$

Moment of Inertia of Proposed Bridge Stiffeners: $I_{new} := \frac{N_{new} \cdot BC_{new}^2 \cdot A_{g_new}}{8} = 6279.188 \cdot in^4$

1.5 Flange Bolt Properties

Number of Flange Bolts: $N_b := 64$

Diameter of Flange Bolts: 1-1/4"

Bolt Circle of Flange Bolts: $BC_{bolts} := 50in$

Gross Area of One Flange Bolt: $A_{g_bolts} := \frac{\pi}{4} \cdot D_{bolts}^2 = 1.227 \cdot in^2$

Moment of Inertia of Flange Bolts: $I_{bolts} := \frac{N_b \cdot BC_{bolts}^2 \cdot A_{g_bolts}}{8} = 24543.693 \cdot in^4$

1.6 Division of Forces

Total Gross Area: $A_{g_total} := N_{new} \cdot A_{g_new} + N_b \cdot A_{g_bolts} = 92.04 \cdot in^2$

Total Moment of Inertia: $I_{total} := I_{new} + I_{bolts} = 30822.88 \cdot in^4$

1.8 Reactions to Proposed Bridge Stiffeners

Moment Reaction to Proposed Bridge Stiffeners: $M_{new} := M \cdot \left(\frac{I_{new}}{I_{total}}\right) = 432.625 \cdot kip \cdot ft$

Axial Reaction to Proposed Bridge Stiffeners: $P_{new} := 0kip$

Shear Reaction to Proposed Bridge Stiffeners: $V_{new} := 0kip$

1.9 Reactions to Flange Bolts

(It is assumed that all shear and axial loads are taken by the flange bolts)

Moment Reaction to Flange Bolts: $M_{bolts} := M \cdot \left(\frac{I_{bolts}}{I_{total}}\right) = 1691.015 \cdot kip \cdot ft$

Axial Reaction to Flange Bolts: $P_{bolts} := P = 49.69 \cdot kip$

Shear Reaction to Flange Bolts: $V_{bolts} := V = 30.9 \cdot kip$

Check Flange Connection in CCIplate with these Reactions

2. Determine Maximum Forces on Bridge Stiffener

2.1 Division of Forces For New Bridge Stiffener Design

Number of Flange Bolts: $N_{bolts} := \begin{cases} 0 & \text{if } AorD = \text{"Design"} \\ N_b & \text{if } AorD = \text{"Analysis"} \end{cases} = 64$

Moment of Inertia of Flange Bolts: $I_{bolts} := \frac{N_{bolts} \cdot BC_{bolts}^2 \cdot A_{g_bolts}}{8} = 24543.6926 \cdot in^4$

Total Gross Area: $A_{g_total} := N_{new} \cdot A_{g_new} + N_{bolts} \cdot A_{g_bolts} = 92.04 \cdot in^2$

Total Moment of Inertia: $I_{total} := I_{new} + I_{bolts} = 30822.88 \cdot in^4$

2.2 Reactions to Proposed Bridge Stiffeners

Moment Reaction to Proposed Bridge Stiffeners: $M_{new} := M \cdot \left(\frac{I_{new}}{I_{total}}\right) = 432.625 \cdot kip \cdot ft$

Axial Reaction to Proposed Bridge Stiffeners: $P_{new} := 0kip$

Shear Reaction to Proposed Bridge Stiffeners: $V_{new} := 0kip$

2.3 Maximum Axial Forces in Single Proposed Bridge Stiffener

Outer Radius of Bolt Circle: $C := \frac{BC_{new}}{2} = 30.5 \cdot in$

Critical Compression Bending Stress: $P_{comp} := \frac{M_{new} \cdot C}{I_{new}} \cdot A_{g_new} + \frac{P_{new}}{N_{new}} = 113.475 \cdot kip$

Critical Tension Bending Stress: $P_{tens} := \frac{M_{new} \cdot C}{I_{new}} \cdot A_{g_new} - \frac{P_{new}}{N_{new}} = 113.475 \cdot kip$

3. Bridge Stiffener Calculations

3.1 Available Compression Strength [AISC 15th Edition E3-1]

Resistance Factor: $\phi_c := 0.9$

Unbraced Length: $L_u := 20.625in$

Effective Length Factor: $K := 1.0$

Strength of Bridge Stiffener: $F_y := 65ksi$ $F_u := 80ksi$

Effective Length of Member: $L_c := K \cdot L_u = 20.625 \cdot in$ [AISC 15th Edition E3-2]

Elastic Buckling Stress:
[AISC 15th Ed., Eq.E3-4]

$$F_e := \frac{\pi^2 \cdot 29000ksi}{\left(\frac{L_c}{r_x}\right)^2} = 56.07 \cdot ksi$$

Determination of Crticial Stress:
[AISC 15th Ed., Eqs. E3-2 and E3-3]

$$F_{cr} := \begin{cases} \left(0.658^{\frac{F_y}{F_e}} \cdot F_y\right) & \text{if } 4.71 \cdot \sqrt{\frac{E}{F_y}} \geq \frac{L_c}{r_x} \\ \left(0.877 \cdot F_e\right) & \text{otherwise} \end{cases}$$

$$F_{cr} = 40.012 \cdot ksi$$

Allowable Compressive Strength:
[AISC 15th Ed., Eqs. J4-6 and E3-1]

$$\phi P_n := \begin{cases} \left(\phi_c \cdot F_y \cdot A_{g_new}\right) & \text{if } \frac{L_c}{r_x} \leq 25 \\ \left(\phi_c \cdot F_{cr} \cdot A_{g_new}\right) & \text{otherwise} \end{cases}$$

$$\phi P_n = 162.048 \cdot kip$$

Check Compressive Strength:

$$Check_{comp} := \begin{cases} \text{"OK"} & \text{if } Capacity_{comp} \leq 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{comp} = \text{"OK"}$

$Capacity_{comp} = 66.691 \cdot \%$

3.2 Available Tension Strength

Gross Section Yield [AISC 15th Edition Ch. D2]

Available Tension Yield Strength: $\phi P_{ty} := 0.9 \cdot F_y \cdot A_{g_new} = 263.25 \cdot kip$

Net Section Fracture

Bolt Hole Diameter: $BH := 1.1875in$

Thickness: $T := t_{new} = 1 \cdot in$

Net Area: $A_{net} := A_{g_new} - \left(BH + \frac{1}{16}in\right) \cdot T = 3.25 \cdot in^2$

Net Area Limitation: $A_e := A_{net} = 3.25 \cdot in^2$

Available Fractile Strength: $\phi P_{tr} := 0.75 \cdot F_u \cdot A_e = 195 \cdot kip$

Tension Check

Controlling Mode of Failure:

$$Check_{mode} := \begin{cases} \text{"Fracture Controls"} & \text{if } \frac{P_{tens}}{\phi P_{tr}} > \frac{P_{tens}}{\phi P_{ty}} \\ \text{"Yield Controls"} & \text{otherwise} \end{cases}$$

$Check_{mode} = \text{"Fracture Controls"}$

$$\phi P_{nt} := \begin{cases} \phi P_{tr} & \text{if } Check_{mode} = \text{"Fracture Controls"} \\ \phi P_{ty} & \text{otherwise} \end{cases}$$

Controlling Tension Mode Check:

$$Check_{tension} := \begin{cases} \text{"OK"} & \text{if } Capacity_{tension} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{tension} = \text{"OK"}$

$Capacity_{tension} = 55.421 \cdot \%$

4. Bolt Checks

4.1 Evaluate Bolts for Controlling Capacity of the Plate or Controlling Axial Demand

Controlling Capacity Ratio:

$$Capacity_{max} := \begin{cases} \max\left(\frac{P_{comp}}{\phi P_n}, \frac{P_{tens}}{\phi P_{ty}}, \frac{P_{tens}}{\phi P_{tr}}\right) & \text{if } S15Allowable = \text{"No"} \\ \max\left(\frac{P_{comp}}{\phi P_n}, \frac{P_{tens}}{\phi P_{ty}}, \frac{P_{tens}}{\phi P_{tr}}\right) \cdot \left(\frac{1}{1.05}\right) & \text{if } S15Allowable = \text{"Yes"} \end{cases} = 66.691 \cdot \%$$

Controlling Capacity/Demand: $P_{max} = 113.475 \cdot kip$

4.2 Blind Bolt Properties

[ENG-STD-10183]

AJAX - Standard Sleeve
AJAX - Hi Shear Sleeve
NextGen2
FORGBolt
Design
Default

Number of Bolts in the Eccentric Bolt Group: $N_{be} := 8$

Number of Bolts in Shear-Only Group: $N_{bs} := 7$

Intermediate Bolt Spacing: $L_b := 3in$

Eccentricity: $ecc := \frac{BC_{new} - D_{shaft1}}{2} = 0.5 \cdot in$

Bolt Diameter: $D_b := 20mm$

Bolt Hole Diameter: $D_h := 1.1875in$

Sleeve Diameter: $D_s := 1.14173in$

Washer Diameter: $D_w := 42mm = 1.654 \cdot in$

Ultimate Strength: $Fu_{bolt} := 120ksi$

Gross Area: $A_{gb} := \frac{\pi}{4} \cdot D_b^2 = 0.487 \cdot in^2$

Allowable Shear: $\phi R_{nv} = 43.837 \cdot kip$

4.3 Shear-Only Connection

Bolt Shear Capacity:

$$\phi R_{nv2} := \begin{cases} \phi R_{nv} & \text{if } N_{bs} \cdot 3in \le 38in \\ (\phi R_{nv} \cdot 0.833) & \text{if } N_{bs} \cdot 3in > 38in \end{cases}$$

[AISC 15th Edition Table J3.2 Note (b)]

$$\phi R_{nv2} = 43.837 \cdot kip$$

$$V_{max2} := \frac{P_{max}}{N_{bs}} = 16.211 \cdot kip$$

$$Check_{shear} := \begin{cases} \text{"OK"} & \text{if } Capacity_{shear} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$$Check_{shear} = \text{"OK"}$$

4.4 Eccentric Connection

Bolt Shear Capacity:

$$\phi R_{nv1} := \begin{cases} \phi R_{nv} & \text{if } N_{be} \cdot L_b \le 38in \\ (\phi R_{nv} \cdot 0.833) & \text{if } N_{be} \cdot L_b > 38in \end{cases}$$

[AISC 15th Edition Table J3.2 Note (b)]

$$\phi R_{nv1} = 43.837 \cdot kip$$

Applied Bolt Shear:

$$V_{max} := \frac{P_{max}}{N_{be}} = 14.184 \cdot kip$$

$$Check_{ecc1} := \begin{cases} \text{"OK"} & \text{if } Capacity_{shear.eccentric} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$$Check_{ecc1} = \text{"OK"}$$

Tension Check Due to Eccentricity

(Conservatively assuming the neutral axis of the bolt group is at the center of gravity.)

Number of Bolts Above Neutral Axis: $n' := \text{floor}\left(\frac{N_{be}}{2}\right) = 4$

Moment Arm Between Resultant Tensile and Resultant Compressive Force: $d_m := L_b \cdot \text{ceil}\left(\frac{N_{be}}{2}\right) = 12 \cdot \text{in}$

Tension Force due to Eccentric Load: $r_{ut} := \frac{P_{max} \cdot ecc}{n' \cdot d_m} = 1.182 \cdot \text{kip}$ [AISC 15th Edition Eq. 7-14a]

Design Tensile Strength: $\phi R_{nt} = 34.227 \cdot \text{kip}$

Eccentric Load Check: $Check_{ecc2} := \begin{cases} \text{"OK"} & \text{if } Capacity_{tension.eccentric} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$

$Check_{ecc2} = \text{"OK"}$

Combined Shear and Tension Check: [TIA-222-H Section 4.9.6.4]

$Check_{ecc3} := \begin{cases} \text{"OK"} & \text{if } \left(Capacity_{interaction}\right) \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$

$Check_{ecc3} = \text{"OK"}$

5. Pole/ Shaft Checks

5.1 Shaft Bearing

[AISC 15th Ed., Eqs. J3-6a and J3-6c]

Minimum Thickness to Bear On: $t := \min(t_1, t_2) \cdot in = 0.375 \cdot in$

Clear Distance from Edge of Hole to Edge of Adjacent Hole: $L_c := L_b - D_h = 1.812 \cdot in$

Bearing By Tear-out: $Rn_{shaft1} := 1.2 \cdot L_c \cdot t \cdot Fu_{shaft} = 51.384 \cdot kip$

Bearing By Hole Deformation: $Rn_{shaft2} := 2.4 \cdot D_s \cdot t \cdot Fu_{shaft} = 64.736 \cdot kip$

Bearing Capacity: $\phi Rn_{shaft} := 0.75 \cdot \min(Rn_{shaft1}, Rn_{shaft2}) = 38.538 \cdot kip$

$$Check_{bearing} := \begin{cases} \text{"OK"} & \text{if } Capacity_{shaft.bearing} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{bearing} = \text{"OK"}$

6. Weld Connection to Filler Plates

6.1 Weld Sizing

Thickness of Filler Plate: 1"

Interpolation per AISC SCM Table 8-4:

13th Edition
14th Edition
15th Edition

Length of Filler Plate: $L_{be} := N_{be} \cdot L_b = 24 \cdot in$

Weld Material Grade:
- ○ E70XX
- ◉ E80XX

Electrode Strength Coefficient: $C_1 = 1.03$

Coefficient for Eccentrically Loaded Weld Groups: $C = 3.716$

Weld Reduction Factor: $\phi_w := 0.75$

Minimum Weld Size for Eccentrically Loaded Weld: $D_{min} := \frac{P_{max}}{\phi_w \cdot C \cdot C_1 \cdot L_{be} \cdot \frac{kip}{in^2}} = 1.647 \cdot in$ *(In sixteenths of an inch)*

$D_{min1} := ceil\left(\frac{D_{min}}{in}\right) \cdot in = 2 \cdot in$ *(In sixteenths of an inch)*

Minimum Fillet Size per Material Thickness (In sixteenths of an inch): $D_{min2} = 5 \cdot in$ [AISC 15th Edition Table J2.3]

Design Weld Size (In sixteenths of an inch): $D := max(D_{min1}, D_{min2}) = 5 \cdot in$

6.2 Weld Capacity

Weld Capacity: $\phi R_n := \phi_w \cdot C \cdot C_1 \cdot L_{be} \cdot D \cdot \frac{kip}{in^2} = 344.496 \cdot kip$

Check Weld Does Not Control: $Check_{weld} := \begin{cases} \text{"OK"} & \text{if } Capacity_{weld} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$

$Check_{weld} = \text{"OK"}$

Weld Size Used: $D = \frac{5}{16} \cdot in$

Monopole Flange Plate Connection

Elevation = 60 ft.

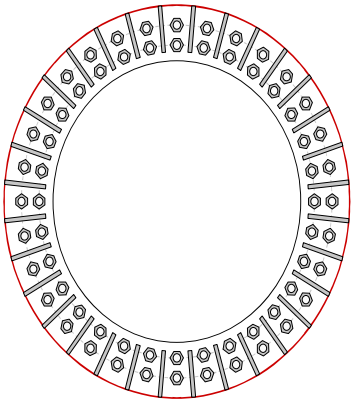
BU #	829046
Site Name	/eston/ Rt-57/ Norfield
Order #	509322 Rev. 0

TIA-222 Revision	H

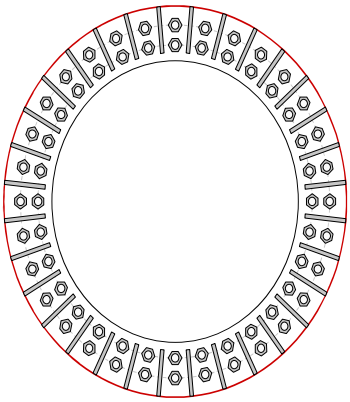
Applied Loads	
Moment (kip-ft)	1891.03
Axial Force (kips)	60.53
Shear Force (kips)	33.29

**TIA-222-H Section 15.5 Applied*

Top Plate - Internal



Bottom Plate - Internal



Connection Properties

Bolt Data

GROUP 1: (32) 1-1/4" ø bolts (A325 N; Fy=81 ksi, Fu=105 ksi) on 53" BC
GROUP 2: (32) 1-1/4" ø bolts (A325 N; Fy=81 ksi, Fu=105 ksi) on 47" BC

Top Plate Data

42.25" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

42.25" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

(32) 10"H x 7"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Bottom Stiffener Data

(32) 10"H x 7"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Top Pole Data

60" x 0.5" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

60" x 0.625" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	29.01	
Allowable (kips)	76.30	
Stress Rating:	**36.2%**	Pass

Top Plate Capacity

Max Stress (ksi):	15.86	(Roark's Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	**46.6%**	Pass
Tension Side Stress Rating:	**N/A**	

Bottom Plate Capacity

Max Stress (ksi):	15.86	(Roark's Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	**46.6%**	Pass
Tension Side Stress Rating:	**N/A**	

Top Stiffener Capacity

Horizontal Weld:	**29.3%**	Pass
Vertical Weld:	**25.6%**	Pass
Plate Flexure+Shear:	**20.3%**	Pass
Plate Tension+Shear:	**24.4%**	Pass
Plate Compression:	**50.6%**	Pass

Bottom Stiffener Capacity

Horizontal Weld:	**26.2%**	Pass
Vertical Weld:	**22.9%**	Pass
Plate Flexure+Shear:	**17.7%**	Pass
Plate Tension+Shear:	**21.5%**	Pass
Plate Compression:	**45.3%**	Pass

Top Pole Capacity

Punching Shear:	**12.4%**	Pass

Bottom Pole Capacity

Punching Shear:	**8.9%**	Pass

1. PARAMETERS

Analysis
Design

Flange Elevation: 60'- 0"

1.1 tnxTower Reactions

Apply TIA-222-H Section 15.5? No / Yes

Moment: $M := 2771.73kip \cdot ft$

Axial Load: $P := 60.53kip$

Shear Load: $V := 33.29kip$

1.2 Shaft Properties at the Flange

Upper Shaft Diameter: $D_{shaft1} := 60in$

Upper Shaft Thickness: (inches) $t_1 := 0.500$

Lower Shaft Diameter: $D_{shaft2} := 60in$

Lower Shaft Thickness: (inches) $t_2 := 0.625$

Shaft Grade: $Fy_{shaft} := 42ksi$ $Fu_{shaft} := 63ksi$

1.3 Proposed Bridge Stiffeners Properties

Number of Proposed Bridge Stiffeners: $N_{new} := 3$

Thickness of Proposed Bridge Stiffeners: $t_{new} := 1.25in$

Width of Proposed Bridge Stiffeners: $w_{new} := 6.5in$

Diameter to the centroid of Proposed Bridge Stiffeners: $BC_{new} := 61.25in$

Gross Area of One Proposed Bridge Stiffener: $A_{g_new} := w_{new} \cdot t_{new} = 8.125 \cdot in^2$

Radius of Gyration about x-axis: $r_x := \frac{t_{new}}{\sqrt{12}} = 0.361 \cdot in$

Moment of Inertia of Proposed Bridge Stiffeners: $I_{new} := \frac{N_{new} \cdot BC_{new}^2 \cdot A_{g_new}}{8} = 11430.542 \cdot in^4$

1.5 Flange Bolt Properties

Number of Flange Bolts: $N_b := 64$

Diameter of Flange Bolts: 1-1/4"

Bolt Circle of Flange Bolts: $BC_{bolts} := 50in$

Gross Area of One Flange Bolt: $A_{g_bolts} := \frac{\pi}{4} \cdot D_{bolts}^2 = 1.227 \cdot in^2$

Moment of Inertia of Flange Bolts: $I_{bolts} := \frac{N_b \cdot BC_{bolts}^2 \cdot A_{g_bolts}}{8} = 24543.693 \cdot in^4$

1.6 Division of Forces

Total Gross Area: $A_{g_total} := N_{new} \cdot A_{g_new} + N_b \cdot A_{g_bolts} = 102.915 \cdot in^2$

Total Moment of Inertia: $I_{total} := I_{new} + I_{bolts} = 35974.235 \cdot in^4$

1.8 Reactions to Proposed Bridge Stiffeners

Moment Reaction to Proposed Bridge Stiffeners: $M_{new} := M \cdot \left(\frac{I_{new}}{I_{total}}\right) = 880.696 \cdot kip \cdot ft$

Axial Reaction to Proposed Bridge Stiffeners: $P_{new} := 0kip$

Shear Reaction to Proposed Bridge Stiffeners: $V_{new} := 0kip$

1.9 Reactions to Flange Bolts

(It is assumed that all shear and axial loads are taken by the flange bolts)

Moment Reaction to Flange Bolts: $M_{bolts} := M \cdot \left(\frac{I_{bolts}}{I_{total}}\right) = 1891.034 \cdot kip \cdot ft$

Axial Reaction to Flange Bolts: $P_{bolts} := P = 60.53 \cdot kip$

Shear Reaction to Flange Bolts: $V_{bolts} := V = 33.29 \cdot kip$

Check Flange Connection in CCIplate with these Reactions

2. Determine Maximum Forces on Bridge Stiffener

2.1 Division of Forces For New Bridge Stiffener Design

Number of Flange Bolts: $N_{bolts} := \begin{cases} 0 & \text{if } AorD = \text{"Design"} \\ N_b & \text{if } AorD = \text{"Analysis"} \end{cases} = 64$

Moment of Inertia of Flange Bolts: $I_{bolts} := \frac{N_{bolts} \cdot BC_{bolts}^2 \cdot A_{g_bolts}}{8} = 24543.6926 \cdot in^4$

Total Gross Area: $A_{g_total} := N_{new} \cdot A_{g_new} + N_{bolts} \cdot A_{g_bolts} = 102.915 \cdot in^2$

Total Moment of Inertia: $I_{total} := I_{new} + I_{bolts} = 35974.235 \cdot in^4$

2.2 Reactions to Proposed Bridge Stiffeners

Moment Reaction to Proposed Bridge Stiffeners: $M_{new} := M \cdot \left(\frac{I_{new}}{I_{total}}\right) = 880.696 \cdot kip \cdot ft$

Axial Reaction to Proposed Bridge Stiffeners: $P_{new} := 0kip$

Shear Reaction to Proposed Bridge Stiffeners: $V_{new} := 0kip$

2.3 Maximum Axial Forces in Single Proposed Bridge Stiffener

Outer Radius of Bolt Circle: $C := \frac{BC_{new}}{2} = 30.625 \cdot in$

Critical Compression Bending Stress: $P_{comp} := \frac{M_{new} \cdot C}{I_{new}} \cdot A_{g_new} + \frac{P_{new}}{N_{new}} = 230.059 \cdot kip$

Critical Tension Bending Stress: $P_{tens} := \frac{M_{new} \cdot C}{I_{new}} \cdot A_{g_new} - \frac{P_{new}}{N_{new}} = 230.059 \cdot kip$

3. Bridge Stiffener Calculations

3.1 Available Compression Strength [AISC 15th Edition E3-1]

Resistance Factor: $\phi_c := 0.9$

Unbraced Length: $L_u := 19.25in$

Effective Length Factor: $K := 1.0$

Strength of Bridge Stiffener: $F_y := 65ksi$ $F_u := 80ksi$

Effective Length of Member: $L_c := K \cdot L_u = 19.25 \cdot in$ [AISC 15th Edition E3-2]

Elastic Buckling Stress:
[AISC 15th Ed., Eq.E3-4]

$$F_e := \frac{\pi^2 \cdot 29000ksi}{\left(\frac{L_c}{r_x}\right)^2} = 100.572 \cdot ksi$$

Determination of Crticial Stress:
[AISC 15th Ed., Eqs. E3-2 and E3-3]

$$F_{cr} := \begin{cases} \left(0.658^{\frac{F_y}{F_e}} \cdot F_y\right) & \text{if } 4.71 \cdot \sqrt{\frac{E}{F_y}} \geq \frac{L_c}{r_x} \\ \left(0.877 \cdot F_e\right) & \text{otherwise} \end{cases}$$

$$F_{cr} = 49.594 \cdot ksi$$

Allowable Compressive Strength:
[AISC 15th Ed., Eqs. J4-6 and E3-1]

$$\phi P_n := \begin{cases} \left(\phi_c \cdot F_y \cdot A_{g_new}\right) & \text{if } \frac{L_c}{r_x} \leq 25 \\ \left(\phi_c \cdot F_{cr} \cdot A_{g_new}\right) & \text{otherwise} \end{cases}$$

$$\phi P_n = 362.658 \cdot kip$$

Check Compressive Strength:

$$Check_{comp} := \begin{cases} \text{"OK"} & \text{if } Capacity_{comp} \leq 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{comp} = \text{"OK"}$

$Capacity_{comp} = 60.416 \cdot \%$

3.2 Available Tension Strength

Gross Section Yield [AISC 15th Edition Ch. D2]

Available Tension Yield Strength: $\phi P_{ty} := 0.9 \cdot F_y \cdot A_{g_new} = 475.313 \cdot kip$

Net Section Fracture

Bolt Hole Diameter: $BH := 1.1875in$

Thickness: $T := t_{new} = 1.25 \cdot in$

Net Area: $A_{net} := A_{g_new} - \left(BH + \frac{1}{16}in\right) \cdot T = 6.562 \cdot in^2$

Net Area Limitation: $A_e := A_{net} = 6.562 \cdot in^2$

Available Fractile Strength: $\phi P_{tr} := 0.75 \cdot F_u \cdot A_e = 393.75 \cdot kip$

Tension Check

Controlling Mode of Failure:

$$Check_{mode} := \begin{cases} \text{"Fracture Controls"} & \text{if } \frac{P_{tens}}{\phi P_{tr}} > \frac{P_{tens}}{\phi P_{ty}} \\ \text{"Yield Controls"} & \text{otherwise} \end{cases}$$

$Check_{mode} = \text{"Fracture Controls"}$

$$\phi P_{nt} := \begin{cases} \phi P_{tr} & \text{if } Check_{mode} = \text{"Fracture Controls"} \\ \phi P_{ty} & \text{otherwise} \end{cases}$$

Controlling Tension Mode Check:

$$Check_{tension} := \begin{cases} \text{"OK"} & \text{if } Capacity_{tension} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{tension} = \text{"OK"}$

$Capacity_{tension} = 55.646 \cdot \%$

4. Bolt Checks

4.1 Evaluate Bolts for Controlling Capacity of the Plate or Controlling Axial Demand

Controlling Capacity Ratio:

$$Capacity_{max} := \begin{cases} \max\left(\frac{P_{comp}}{\phi P_n}, \frac{P_{tens}}{\phi P_{ty}}, \frac{P_{tens}}{\phi P_{tr}}\right) & \text{if } S15Allowable = \text{"No"} \\ \max\left(\frac{P_{comp}}{\phi P_n}, \frac{P_{tens}}{\phi P_{ty}}, \frac{P_{tens}}{\phi P_{tr}}\right) \cdot \left(\frac{1}{1.05}\right) & \text{if } S15Allowable = \text{"Yes"} \end{cases} = 60.416 \cdot \%$$

Controlling Capacity/Demand: $P_{max} = 230.059 \cdot kip$

4.2 Blind Bolt Properties

[ENG-STD-10183]

AJAX - Standard Sleeve
AJAX - Hi Shear Sleeve
NextGen2
FORGBolt
Design
Default

Number of Bolts in the Eccentric Bolt Group: $N_{be} := 8$

Number of Bolts in Shear-Only Group: $N_{bs} := 7$

Intermediate Bolt Spacing: $L_b := 3in$

Eccentricity: $ecc := \frac{BC_{new} - D_{shaft1}}{2} = 0.625 \cdot in$

Bolt Diameter: $D_b := 20mm$

Bolt Hole Diameter: $D_h := 1.1875in$

Sleeve Diameter: $D_s := 1.14173in$

Washer Diameter: $D_w := 42mm = 1.654 \cdot in$

Ultimate Strength: $Fu_{bolt} := 120ksi$

Gross Area: $A_{gb} := \frac{\pi}{4} \cdot D_b^2 = 0.487 \cdot in^2$

Allowable Shear: $\phi R_{nv} = 43.837 \cdot kip$

4.3 Shear-Only Connection

Bolt Shear Capacity:

$$\phi R_{nv2} := \begin{cases} \phi R_{nv} & \text{if } N_{bs} \cdot 3in \le 38in \\ (\phi R_{nv} \cdot 0.833) & \text{if } N_{bs} \cdot 3in > 38in \end{cases}$$

[AISC 15th Edition Table J3.2 Note (b)]

$$\phi R_{nv2} = 43.837 \cdot kip$$

$$V_{max2} := \frac{P_{max}}{N_{bs}} = 32.866 \cdot kip$$

$$Check_{shear} := \begin{cases} \text{"OK"} & \text{if } Capacity_{shear} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$$Check_{shear} = \text{"OK"}$$

4.4 Eccentric Connection

Bolt Shear Capacity:

$$\phi R_{nv1} := \begin{cases} \phi R_{nv} & \text{if } N_{be} \cdot L_b \le 38in \\ (\phi R_{nv} \cdot 0.833) & \text{if } N_{be} \cdot L_b > 38in \end{cases}$$

[AISC 15th Edition Table J3.2 Note (b)]

$$\phi R_{nv1} = 43.837 \cdot kip$$

Applied Bolt Shear:

$$V_{max} := \frac{P_{max}}{N_{be}} = 28.757 \cdot kip$$

$$Check_{ecc1} := \begin{cases} \text{"OK"} & \text{if } Capacity_{shear.eccentric} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$$Check_{ecc1} = \text{"OK"}$$

Tension Check Due to Eccentricity

(Conservatively assuming the neutral axis of the bolt group is at the center of gravity.)

Number of Bolts Above Neutral Axis: $n' := \text{floor}\left(\frac{N_{be}}{2}\right) = 4$

Moment Arm Between Resultant Tensile and Resultant Compressive Force: $d_m := L_b \cdot \text{ceil}\left(\frac{N_{be}}{2}\right) = 12 \cdot \text{in}$

Tension Force due to Eccentric Load: $r_{ut} := \frac{P_{max} \cdot ecc}{n' \cdot d_m} = 2.996 \cdot \text{kip}$ [AISC 15th Edition Eq. 7-14a]

Design Tensile Strength: $\phi R_{nt} = 34.227 \cdot \text{kip}$

Eccentric Load Check: $Check_{ecc2} := \begin{cases} \text{"OK"} & \text{if } Capacity_{tension.eccentric} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$

$Check_{ecc2} = \text{"OK"}$

Combined Shear and Tension Check: [TIA-222-H Section 4.9.6.4]

$Check_{ecc3} := \begin{cases} \text{"OK"} & \text{if } \left(Capacity_{interaction}\right) \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$

$Check_{ecc3} = \text{"OK"}$

5. Pole/ Shaft Checks

5.1 Shaft Bearing

[AISC 15th Ed., Eqs. J3-6a and J3-6c]

Minimum Thickness to Bear On: $t := \min(t_1, t_2) \cdot in = 0.5 \cdot in$

Clear Distance from Edge of Hole to Edge of Adjacent Hole: $L_c := L_b - D_h = 1.812 \cdot in$

Bearing By Tear-out: $Rn_{shaft1} := 1.2 \cdot L_c \cdot t \cdot Fu_{shaft} = 68.512 \cdot kip$

Bearing By Hole Deformation: $Rn_{shaft2} := 2.4 \cdot D_s \cdot t \cdot Fu_{shaft} = 86.315 \cdot kip$

Bearing Capacity: $\phi Rn_{shaft} := 0.75 \cdot \min(Rn_{shaft1}, Rn_{shaft2}) = 51.384 \cdot kip$

$$Check_{bearing} := \begin{cases} \text{"OK"} & \text{if } Capacity_{shaft.bearing} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{bearing} = \text{"OK"}$

6. Weld Connection to Filler Plates

6.1 Weld Sizing

Thickness of Filler Plate: 1"

Interpolation per AISC SCM Table 8-4:

13th Edition
14th Edition
15th Edition

Length of Filler Plate: $L_{be} := N_{be} \cdot L_b = 24 \cdot in$

Weld Material Grade:
- ○ E70XX
- ◉ E80XX

Electrode Strength Coefficient: $C_1 = 1.03$

Coefficient for Eccentrically Loaded Weld Groups: $C = 3.717$

Weld Reduction Factor: $\phi_w := 0.75$

Minimum Weld Size for Eccentrically Loaded Weld: $D_{min} := \frac{P_{max}}{\phi_w \cdot C \cdot C_1 \cdot L_{be} \cdot \frac{kip}{in^2}} = 3.339 \cdot in$ *(In sixteenths of an inch)*

$D_{min1} := ceil\left(\frac{D_{min}}{in}\right) \cdot in = 4 \cdot in$ *(In sixteenths of an inch)*

Minimum Fillet Size per Material Thickness (In sixteenths of an inch): $D_{min2} = 5 \cdot in$ [AISC 15th Edition Table J2.3]

Design Weld Size (In sixteenths of an inch): $D := max(D_{min1}, D_{min2}) = 5 \cdot in$

6.2 Weld Capacity

Weld Capacity: $\phi R_n := \phi_w \cdot C \cdot C_1 \cdot L_{be} \cdot D \cdot \frac{kip}{in^2} = 344.545 \cdot kip$

Check Weld Does Not Control: $Check_{weld} := \begin{cases} \text{"OK"} & \text{if } Capacity_{weld} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$

$Check_{weld} = \text{"OK"}$

Weld Size Used: $D = \frac{5}{16} \cdot in$

Monopole Flange Plate Connection

Elevation = 40 ft.

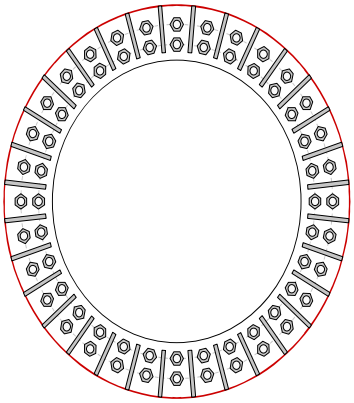
BU #	829046
Site Name	/eston/ Rt-57/ Norfield
Order #	509322 Rev. 0

TIA-222 Revision	H

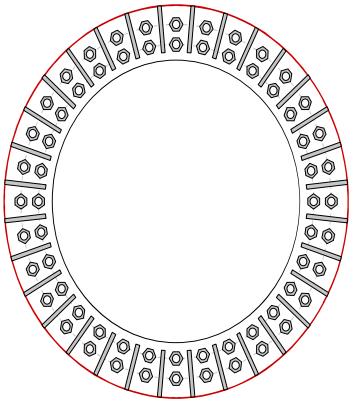
Applied Loads	
Moment (kip-ft)	2053.84
Axial Force (kips)	73.53
Shear Force (kips)	36.05

**TIA-222-H Section 15.5 Applied*

Top Plate - Internal



Bottom Plate - Internal



Connection Properties

Bolt Data

GROUP 1: (32) 1-1/4" ø bolts (A325 N; Fy=81 ksi, Fu=105 ksi) on 53" BC
GROUP 2: (32) 1-1/4" ø bolts (A325 N; Fy=81 ksi, Fu=105 ksi) on 47" BC

Top Plate Data

42.25" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

42.25" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

(32) 10"H x 7"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Bottom Stiffener Data

(32) 10"H x 7"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Top Pole Data

60" x 0.625" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

60" x 0.625" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	31.38	
Allowable (kips)	76.30	
Stress Rating:	**39.2%**	Pass

Top Plate Capacity

Max Stress (ksi):	17.29	(Roark's Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	**50.8%**	Pass
Tension Side Stress Rating:	**N/A**	

Bottom Plate Capacity

Max Stress (ksi):	17.29	(Roark's Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	**50.8%**	Pass
Tension Side Stress Rating:	**N/A**	

Top Stiffener Capacity

Horizontal Weld:	**28.6%**	Pass
Vertical Weld:	**25.0%**	Pass
Plate Flexure+Shear:	**19.7%**	Pass
Plate Tension+Shear:	**23.7%**	Pass
Plate Compression:	**49.4%**	Pass

Bottom Stiffener Capacity

Horizontal Weld:	**28.6%**	Pass
Vertical Weld:	**25.0%**	Pass
Plate Flexure+Shear:	**19.7%**	Pass
Plate Tension+Shear:	**23.7%**	Pass
Plate Compression:	**49.4%**	Pass

Top Pole Capacity

Punching Shear:	**9.7%**	Pass

Bottom Pole Capacity

Punching Shear:	**9.7%**	Pass

1. PARAMETERS

Analysis
Design

Flange Elevation: 40'- 0"

1.1 tnxTower Reactions

Apply TIA-222-H Section 15.5? No / Yes

Moment: $M := 3455.04kip \cdot ft$

Axial Load: $P := 73.53kip$

Shear Load: $V := 35.97kip$

1.2 Shaft Properties at the Flange

Upper Shaft Diameter: $D_{shaft1} := 60in$

Upper Shaft Thickness: (inches) $t_1 := 0.625$

Lower Shaft Diameter: $D_{shaft2} := 60in$

Lower Shaft Thickness: (inches) $t_2 := 0.625$

Shaft Grade: $Fy_{shaft} := 42ksi$ $Fu_{shaft} := 63ksi$

1.3 Proposed Bridge Stiffeners Properties

Number of Proposed Bridge Stiffeners: $N_{new} := 6$

Thickness of Proposed Bridge Stiffeners: $t_{new} := 1in$

Width of Proposed Bridge Stiffeners: $w_{new} := 6in$

Diameter to the centroid of Proposed Bridge Stiffeners: $BC_{new} := 61in$

Gross Area of One Proposed Bridge Stiffener: $A_{g_new} := w_{new} \cdot t_{new} = 6 \cdot in^2$

Radius of Gyration about x-axis: $r_x := \frac{t_{new}}{\sqrt{12}} = 0.289 \cdot in$

Moment of Inertia of Proposed Bridge Stiffeners: $I_{new} := \frac{N_{new} \cdot BC_{new}^2 \cdot A_{g_new}}{8} = 16744.5 \cdot in^4$

1.5 Flange Bolt Properties

Number of Flange Bolts: $N_b := 64$

Diameter of Flange Bolts: 1-1/4"

Bolt Circle of Flange Bolts: $BC_{bolts} := 50in$

Gross Area of One Flange Bolt: $A_{g_bolts} := \frac{\pi}{4} \cdot D_{bolts}^2 = 1.227 \cdot in^2$

Moment of Inertia of Flange Bolts: $I_{bolts} := \frac{N_b \cdot BC_{bolts}^2 \cdot A_{g_bolts}}{8} = 24543.693 \cdot in^4$

1.6 Division of Forces

Total Gross Area: $A_{g_total} := N_{new} \cdot A_{g_new} + N_b \cdot A_{g_bolts} = 114.54 \cdot in^2$

Total Moment of Inertia: $I_{total} := I_{new} + I_{bolts} = 41288.193 \cdot in^4$

1.8 Reactions to Proposed Bridge Stiffeners

Moment Reaction to Proposed Bridge Stiffeners: $M_{new} := M \cdot \left(\frac{I_{new}}{I_{total}}\right) = 1401.198 \cdot kip \cdot ft$

Axial Reaction to Proposed Bridge Stiffeners: $P_{new} := 0kip$

Shear Reaction to Proposed Bridge Stiffeners: $V_{new} := 0kip$

1.9 Reactions to Flange Bolts

(It is assumed that all shear and axial loads are taken by the flange bolts)

Moment Reaction to Flange Bolts: $M_{bolts} := M \cdot \left(\frac{I_{bolts}}{I_{total}}\right) = 2053.842 \cdot kip \cdot ft$

Axial Reaction to Flange Bolts: $P_{bolts} := P = 73.53 \cdot kip$

Shear Reaction to Flange Bolts: $V_{bolts} := V = 35.97 \cdot kip$

Check Flange Connection in CCIplate with these Reactions

2. Determine Maximum Forces on Bridge Stiffener

2.1 Division of Forces For New Bridge Stiffener Design

Number of Flange Bolts: $N_{bolts} := \begin{cases} 0 & \text{if } AorD = \text{"Design"} \\ N_b & \text{if } AorD = \text{"Analysis"} \end{cases} = 64$

Moment of Inertia of Flange Bolts: $I_{bolts} := \frac{N_{bolts} \cdot BC_{bolts}^2 \cdot A_{g_bolts}}{8} = 24543.6926 \cdot in^4$

Total Gross Area: $A_{g_total} := N_{new} \cdot A_{g_new} + N_{bolts} \cdot A_{g_bolts} = 114.54 \cdot in^2$

Total Moment of Inertia: $I_{total} := I_{new} + I_{bolts} = 41288.193 \cdot in^4$

2.2 Reactions to Proposed Bridge Stiffeners

Moment Reaction to Proposed Bridge Stiffeners: $M_{new} := M \cdot \left(\frac{I_{new}}{I_{total}}\right) = 1401.198 \cdot kip \cdot ft$

Axial Reaction to Proposed Bridge Stiffeners: $P_{new} := 0kip$

Shear Reaction to Proposed Bridge Stiffeners: $V_{new} := 0kip$

2.3 Maximum Axial Forces in Single Proposed Bridge Stiffener

Outer Radius of Bolt Circle: $C := \frac{BC_{new}}{2} = 30.5 \cdot in$

Critical Compression Bending Stress: $P_{comp} := \frac{M_{new} \cdot C}{I_{new}} \cdot A_{g_new} + \frac{P_{new}}{N_{new}} = 183.764 \cdot kip$

Critical Tension Bending Stress: $P_{tens} := \frac{M_{new} \cdot C}{I_{new}} \cdot A_{g_new} - \frac{P_{new}}{N_{new}} = 183.764 \cdot kip$

3. Bridge Stiffener Calculations

3.1 Available Compression Strength [AISC 15th Edition E3-1]

Resistance Factor: $\phi_c := 0.9$

Unbraced Length: $L_u := 16.375in$

Effective Length Factor: $K := 1.0$

Strength of Bridge Stiffener: $F_y := 65ksi$ $F_u := 80ksi$

Effective Length of Member: $L_c := K \cdot L_u = 16.375 \cdot in$ [AISC 15th Edition E3-2]

Elastic Buckling Stress:
[AISC 15th Ed., Eq.E3-4]

$$F_e := \frac{\pi^2 \cdot 29000ksi}{\left(\frac{L_c}{r_x}\right)^2} = 88.952 \cdot ksi$$

Determination of Crticial Stress:
[AISC 15th Ed., Eqs. E3-2 and E3-3]

$$F_{cr} := \begin{cases} \left(0.658^{\frac{F_y}{F_e}} \cdot F_y\right) & \text{if } 4.71 \cdot \sqrt{\frac{E}{F_y}} \geq \frac{L_c}{r_x} \\ \left(0.877 \cdot F_e\right) & \text{otherwise} \end{cases}$$

$$F_{cr} = 47.872 \cdot ksi$$

Allowable Compressive Strength:
[AISC 15th Ed., Eqs. J4-6 and E3-1]

$$\phi P_n := \begin{cases} \left(\phi_c \cdot F_y \cdot A_{g_new}\right) & \text{if } \frac{L_c}{r_x} \leq 25 \\ \left(\phi_c \cdot F_{cr} \cdot A_{g_new}\right) & \text{otherwise} \end{cases}$$

$$\phi P_n = 258.511 \cdot kip$$

Check Compressive Strength:

$$Check_{comp} := \begin{cases} \text{"OK"} & \text{if } Capacity_{comp} \leq 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{comp} = \text{"OK"}$

$Capacity_{comp} = 67.7 \cdot \%$

3.2 Available Tension Strength

Gross Section Yield [AISC 15th Edition Ch. D2]

Available Tension Yield Strength: $\phi P_{ty} := 0.9 \cdot F_y \cdot A_{g_new} = 351 \cdot kip$

Net Section Fracture

Bolt Hole Diameter: $BH := 1.1875in$

Thickness: $T := t_{new} = 1 \cdot in$

Net Area: $A_{net} := A_{g_new} - \left(BH + \frac{1}{16}in\right) \cdot T = 4.75 \cdot in^2$

Net Area Limitation: $A_e := A_{net} = 4.75 \cdot in^2$

Available Fractile Strength: $\phi P_{tr} := 0.75 \cdot F_u \cdot A_e = 285 \cdot kip$

Tension Check

Controlling Mode of Failure:

$$Check_{mode} := \begin{cases} \text{"Fracture Controls"} & \text{if } \frac{P_{tens}}{\phi P_{tr}} > \frac{P_{tens}}{\phi P_{ty}} \\ \text{"Yield Controls"} & \text{otherwise} \end{cases}$$

$Check_{mode} = \text{"Fracture Controls"}$

$$\phi P_{nt} := \begin{cases} \phi P_{tr} & \text{if } Check_{mode} = \text{"Fracture Controls"} \\ \phi P_{ty} & \text{otherwise} \end{cases}$$

Controlling Tension Mode Check:

$$Check_{tension} := \begin{cases} \text{"OK"} & \text{if } Capacity_{tension} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{tension} = \text{"OK"}$

$Capacity_{tension} = 61.408 \cdot \%$

4. Bolt Checks

4.1 Evaluate Bolts for Controlling Capacity of the Plate or Controlling Axial Demand

Controlling Capacity Ratio:

$$Capacity_{max} := \begin{cases} \max\left(\frac{P_{comp}}{\phi P_n}, \frac{P_{tens}}{\phi P_{ty}}, \frac{P_{tens}}{\phi P_{tr}}\right) & \text{if } S15Allowable = \text{"No"} \\ \max\left(\frac{P_{comp}}{\phi P_n}, \frac{P_{tens}}{\phi P_{ty}}, \frac{P_{tens}}{\phi P_{tr}}\right) \cdot \left(\frac{1}{1.05}\right) & \text{if } S15Allowable = \text{"Yes"} \end{cases} = 67.7 \cdot \%$$

Controlling Capacity/Demand: $P_{max} = 183.764 \cdot kip$

4.2 Blind Bolt Properties

[ENG-STD-10183]

AJAX - Standard Sleeve
AJAX - Hi Shear Sleeve
NextGen2
FORGBolt
Design
Default

Number of Bolts in the Eccentric Bolt Group: $N_{be} := 8$

Number of Bolts in Shear-Only Group: $N_{bs} := 7$

Intermediate Bolt Spacing: $L_b := 3in$

Eccentricity: $ecc := \frac{BC_{new} - D_{shaft1}}{2} = 0.5 \cdot in$

Bolt Diameter: $D_b := 20mm$

Bolt Hole Diameter: $D_h := 1.1875in$

Sleeve Diameter: $D_s := 1.14173in$

Washer Diameter: $D_w := 42mm = 1.654 \cdot in$

Ultimate Strength: $Fu_{bolt} := 120ksi$

Gross Area: $A_{gb} := \frac{\pi}{4} \cdot D_b^2 = 0.487 \cdot in^2$

Allowable Shear: $\phi R_{nv} = 43.837 \cdot kip$

4.3 Shear-Only Connection

Bolt Shear Capacity:

$$\phi R_{nv2} := \begin{cases} \phi R_{nv} & \text{if } N_{bs} \cdot 3in \le 38in \\ (\phi R_{nv} \cdot 0.833) & \text{if } N_{bs} \cdot 3in > 38in \end{cases}$$

[AISC 15th Edition Table J3.2 Note (b)]

$$\phi R_{nv2} = 43.837 \cdot kip$$

$$V_{max2} := \frac{P_{max}}{N_{bs}} = 26.252 \cdot kip$$

$$Check_{shear} := \begin{cases} \text{"OK"} & \text{if } Capacity_{shear} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$$Check_{shear} = \text{"OK"}$$

4.4 Eccentric Connection

Bolt Shear Capacity:

$$\phi R_{nv1} := \begin{cases} \phi R_{nv} & \text{if } N_{be} \cdot L_b \le 38in \\ (\phi R_{nv} \cdot 0.833) & \text{if } N_{be} \cdot L_b > 38in \end{cases}$$

[AISC 15th Edition Table J3.2 Note (b)]

$$\phi R_{nv1} = 43.837 \cdot kip$$

Applied Bolt Shear:

$$V_{max} := \frac{P_{max}}{N_{be}} = 22.97 \cdot kip$$

$$Check_{ecc1} := \begin{cases} \text{"OK"} & \text{if } Capacity_{shear.eccentric} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$$Check_{ecc1} = \text{"OK"}$$

Tension Check Due to Eccentricity

(Conservatively assuming the neutral axis of the bolt group is at the center of gravity.)

Number of Bolts Above Neutral Axis: $n' := \text{floor}\left(\frac{N_{be}}{2}\right) = 4$

Moment Arm Between Resultant Tensile and Resultant Compressive Force: $d_m := L_b \cdot \text{ceil}\left(\frac{N_{be}}{2}\right) = 12 \cdot \text{in}$

Tension Force due to Eccentric Load: $r_{ut} := \frac{P_{max} \cdot ecc}{n' \cdot d_m} = 1.914 \cdot \text{kip}$ [AISC 15th Edition Eq. 7-14a]

Design Tensile Strength: $\phi R_{nt} = 34.227 \cdot \text{kip}$

Eccentric Load Check:

$$Check_{ecc2} := \begin{cases} \text{"OK"} & \text{if } Capacity_{tension.eccentric} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{ecc2} = \text{"OK"}$

Combined Shear and Tension Check: [TIA-222-H Section 4.9.6.4]

$$Check_{ecc3} := \begin{cases} \text{"OK"} & \text{if } \left(Capacity_{interaction}\right) \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{ecc3} = \text{"OK"}$

5. Pole/ Shaft Checks

5.1 Shaft Bearing

[AISC 15th Ed., Eqs. J3-6a and J3-6c]

Minimum Thickness to Bear On: $t := \min(t_1, t_2) \cdot in = 0.625 \cdot in$

Clear Distance from Edge of Hole to Edge of Adjacent Hole: $L_c := L_b - D_h = 1.812 \cdot in$

Bearing By Tear-out: $Rn_{shaft1} := 1.2 \cdot L_c \cdot t \cdot Fu_{shaft} = 85.641 \cdot kip$

Bearing By Hole Deformation: $Rn_{shaft2} := 2.4 \cdot D_s \cdot t \cdot Fu_{shaft} = 107.893 \cdot kip$

Bearing Capacity: $\phi Rn_{shaft} := 0.75 \cdot \min(Rn_{shaft1}, Rn_{shaft2}) = 64.23 \cdot kip$

$$Check_{bearing} := \begin{cases} \text{"OK"} & \text{if } Capacity_{shaft.bearing} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{bearing} = \text{"OK"}$

6. Weld Connection to Filler Plates

6.1 Weld Sizing

Thickness of Filler Plate: 1"

Interpolation per AISC SCM Table 8-4:

13th Edition
14th Edition
15th Edition

Length of Filler Plate: $L_{be} := N_{be} \cdot L_b = 24 \cdot in$

Weld Material Grade:
- ○ E70XX
- ◉ E80XX

Electrode Strength Coefficient: $C_1 = 1.03$

Coefficient for Eccentrically Loaded Weld Groups: $C = 3.716$

Weld Reduction Factor: $\phi_w := 0.75$

Minimum Weld Size for Eccentrically Loaded Weld: $D_{min} := \frac{P_{max}}{\phi_w \cdot C \cdot C_1 \cdot L_{be} \cdot \frac{kip}{in^2}} = 2.667 \cdot in$ *(In sixteenths of an inch)*

$D_{min1} := ceil\left(\frac{D_{min}}{in}\right) \cdot in = 3 \cdot in$ *(In sixteenths of an inch)*

Minimum Fillet Size per Material Thickness (In sixteenths of an inch): $D_{min2} = 5 \cdot in$ [AISC 15th Edition Table J2.3]

Design Weld Size (In sixteenths of an inch): $D := max(D_{min1}, D_{min2}) = 5 \cdot in$

6.2 Weld Capacity

Weld Capacity: $\phi R_n := \phi_w \cdot C \cdot C_1 \cdot L_{be} \cdot D \cdot \frac{kip}{in^2} = 344.496 \cdot kip$

Check Weld Does Not Control: $Check_{weld} := \begin{cases} \text{"OK"} & \text{if } Capacity_{weld} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$

$Check_{weld} = \text{"OK"}$

Weld Size Used: $D = \frac{5}{16} \cdot in$

Monopole Flange Plate Connection

Elevation = 20 ft.

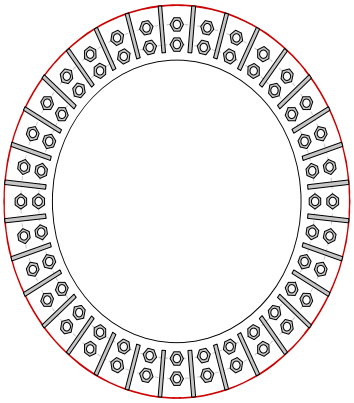
BU #	829046
Site Name	/eston/ Rt-57/ Norfield
Order #	509322 Rev. 0

TIA-222 Revision	H

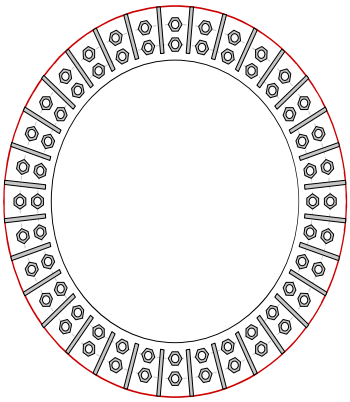
Applied Loads	
Moment (kip-ft)	2222.86
Axial Force (kips)	93.41
Shear Force (kips)	40.77

**TIA-222-H Section 15.5 Applied*

Top Plate - Internal



Bottom Plate - Internal



Connection Properties

Bolt Data

GROUP 1: (32) 1-1/4" ø bolts (A325 N; Fy=81 ksi, Fu=105 ksi) on 53" BC
GROUP 2: (32) 1-1/4" ø bolts (A325 N; Fy=81 ksi, Fu=105 ksi) on 47" BC

Top Plate Data

42.25" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

42.25" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

(32) 10"H x 7"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Bottom Stiffener Data

(32) 10"H x 7"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Top Pole Data

60" x 0.625" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

60" x 0.75" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	33.75	
Allowable (kips)	76.30	
Stress Rating:	**42.1%**	Pass

Top Plate Capacity

Max Stress (ksi):	18.83	(Roark's Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	**55.4%**	Pass
Tension Side Stress Rating:	**N/A**	

Bottom Plate Capacity

Max Stress (ksi):	18.83	(Roark's Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	**55.4%**	Pass
Tension Side Stress Rating:	**N/A**	

Top Stiffener Capacity

Horizontal Weld:	**31.2%**	Pass
Vertical Weld:	**27.2%**	Pass
Plate Flexure+Shear:	**22.0%**	Pass
Plate Tension+Shear:	**26.2%**	Pass
Plate Compression:	**53.9%**	Pass

Bottom Stiffener Capacity

Horizontal Weld:	**28.2%**	Pass
Vertical Weld:	**24.6%**	Pass
Plate Flexure+Shear:	**19.4%**	Pass
Plate Tension+Shear:	**23.3%**	Pass
Plate Compression:	**48.7%**	Pass

Top Pole Capacity

Punching Shear:	**10.5%**	Pass

Bottom Pole Capacity

Punching Shear:	**7.9%**	Pass

1. PARAMETERS

Analysis
Design

Flange Elevation: 20'- 0"

1.1 tnxTower Reactions

Apply TIA-222-H Section 15.5? No / Yes

Moment: $M := 4293.33kip \cdot ft$

Axial Load: $P := 93.41kip$

Shear Load: $V := 40.77kip$

1.2 Shaft Properties at the Flange

Upper Shaft Diameter: $D_{shaft1} := 60in$

Upper Shaft Thickness: (inches) $t_1 := 0.625$

Lower Shaft Diameter: $D_{shaft2} := 60in$

Lower Shaft Thickness: (inches) $t_2 := 0.75$

Shaft Grade: $Fy_{shaft} := 42ksi$ $Fu_{shaft} := 63ksi$

1.3 Proposed Bridge Stiffeners Properties

Number of Proposed Bridge Stiffeners: $N_{new} := 6$

Thickness of Proposed Bridge Stiffeners: $t_{new} := 1.25in$

Width of Proposed Bridge Stiffeners: $w_{new} := 6.5in$

Diameter to the centroid of Proposed Bridge Stiffeners: $BC_{new} := 61.25in$

Gross Area of One Proposed Bridge Stiffener: $A_{g_new} := w_{new} \cdot t_{new} = 8.125 \cdot in^2$

Radius of Gyration about x-axis: $r_x := \frac{t_{new}}{\sqrt{12}} = 0.361 \cdot in$

Moment of Inertia of Proposed Bridge Stiffeners: $I_{new} := \frac{N_{new} \cdot BC_{new}^2 \cdot A_{g_new}}{8} = 22861.084 \cdot in^4$

1.5 Flange Bolt Properties

Number of Flange Bolts: $N_b := 64$

Diameter of Flange Bolts: 1-1/4"

Bolt Circle of Flange Bolts: $BC_{bolts} := 50in$

Gross Area of One Flange Bolt: $A_{g_bolts} := \frac{\pi}{4} \cdot D_{bolts}^2 = 1.227 \cdot in^2$

Moment of Inertia of Flange Bolts: $I_{bolts} := \frac{N_b \cdot BC_{bolts}^2 \cdot A_{g_bolts}}{8} = 24543.693 \cdot in^4$

1.6 Division of Forces

Total Gross Area: $A_{g_total} := N_{new} \cdot A_{g_new} + N_b \cdot A_{g_bolts} = 127.29 \cdot in^2$

Total Moment of Inertia: $I_{total} := I_{new} + I_{bolts} = 47404.777 \cdot in^4$

1.8 Reactions to Proposed Bridge Stiffeners

Moment Reaction to Proposed Bridge Stiffeners: $M_{new} := M \cdot \left(\frac{I_{new}}{I_{total}}\right) = 2070.47 \cdot kip \cdot ft$

Axial Reaction to Proposed Bridge Stiffeners: $P_{new} := 0kip$

Shear Reaction to Proposed Bridge Stiffeners: $V_{new} := 0kip$

1.9 Reactions to Flange Bolts

(It is assumed that all shear and axial loads are taken by the flange bolts)

Moment Reaction to Flange Bolts: $M_{bolts} := M \cdot \left(\frac{I_{bolts}}{I_{total}}\right) = 2222.86 \cdot kip \cdot ft$

Axial Reaction to Flange Bolts: $P_{bolts} := P = 93.41 \cdot kip$

Shear Reaction to Flange Bolts: $V_{bolts} := V = 40.77 \cdot kip$

Check Flange Connection in CCIplate with these Reactions

2. Determine Maximum Forces on Bridge Stiffener

2.1 Division of Forces For New Bridge Stiffener Design

Number of Flange Bolts: $N_{bolts} := \begin{cases} 0 & \text{if } AorD = \text{"Design"} \\ N_b & \text{if } AorD = \text{"Analysis"} \end{cases} = 64$

Moment of Inertia of Flange Bolts: $I_{bolts} := \frac{N_{bolts} \cdot BC_{bolts}^2 \cdot A_{g_bolts}}{8} = 24543.6926 \cdot in^4$

Total Gross Area: $A_{g_total} := N_{new} \cdot A_{g_new} + N_{bolts} \cdot A_{g_bolts} = 127.29 \cdot in^2$

Total Moment of Inertia: $I_{total} := I_{new} + I_{bolts} = 47404.777 \cdot in^4$

2.2 Reactions to Proposed Bridge Stiffeners

Moment Reaction to Proposed Bridge Stiffeners: $M_{new} := M \cdot \left(\frac{I_{new}}{I_{total}}\right) = 2070.47 \cdot kip \cdot ft$

Axial Reaction to Proposed Bridge Stiffeners: $P_{new} := 0kip$

Shear Reaction to Proposed Bridge Stiffeners: $V_{new} := 0kip$

2.3 Maximum Axial Forces in Single Proposed Bridge Stiffener

Outer Radius of Bolt Circle: $C := \frac{BC_{new}}{2} = 30.625 \cdot in$

Critical Compression Bending Stress: $P_{comp} := \frac{M_{new} \cdot C}{I_{new}} \cdot A_{g_new} + \frac{P_{new}}{N_{new}} = 270.429 \cdot kip$

Critical Tension Bending Stress: $P_{tens} := \frac{M_{new} \cdot C}{I_{new}} \cdot A_{g_new} - \frac{P_{new}}{N_{new}} = 270.429 \cdot kip$

3. Bridge Stiffener Calculations

3.1 Available Compression Strength [AISC 15th Edition E3-1]

Resistance Factor: $\phi_c := 0.9$

Unbraced Length: $L_u := 19.25in$

Effective Length Factor: $K := 1.0$

Strength of Bridge Stiffener: $F_y := 65ksi$ $F_u := 80ksi$

Effective Length of Member: $L_c := K \cdot L_u = 19.25 \cdot in$ [AISC 15th Edition E3-2]

Elastic Buckling Stress:
[AISC 15th Ed., Eq.E3-4]

$$F_e := \frac{\pi^2 \cdot 29000ksi}{\left(\frac{L_c}{r_x}\right)^2} = 100.572 \cdot ksi$$

Determination of Crticial Stress:
[AISC 15th Ed., Eqs. E3-2 and E3-3]

$$F_{cr} := \begin{cases} \left(0.658^{\frac{F_y}{F_e}} \cdot F_y\right) & \text{if } 4.71 \cdot \sqrt{\frac{E}{F_y}} \geq \frac{L_c}{r_x} \\ \left(0.877 \cdot F_e\right) & \text{otherwise} \end{cases}$$

$$F_{cr} = 49.594 \cdot ksi$$

Allowable Compressive Strength:
[AISC 15th Ed., Eqs. J4-6 and E3-1]

$$\phi P_n := \begin{cases} \left(\phi_c \cdot F_y \cdot A_{g_new}\right) & \text{if } \frac{L_c}{r_x} \leq 25 \\ \left(\phi_c \cdot F_{cr} \cdot A_{g_new}\right) & \text{otherwise} \end{cases}$$

$$\phi P_n = 362.658 \cdot kip$$

Check Compressive Strength:

$$Check_{comp} := \begin{cases} \text{"OK"} & \text{if } Capacity_{comp} \leq 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{comp} = \text{"OK"}$

$Capacity_{comp} = 71.018 \cdot \%$

3.2 Available Tension Strength

Gross Section Yield [AISC 15th Edition Ch. D2]

Available Tension Yield Strength: $\phi P_{ty} := 0.9 \cdot F_y \cdot A_{g_new} = 475.313 \cdot kip$

Net Section Fracture

Bolt Hole Diameter: $BH := 1.1875in$

Thickness: $T := t_{new} = 1.25 \cdot in$

Net Area: $A_{net} := A_{g_new} - \left(BH + \frac{1}{16}in\right) \cdot T = 6.562 \cdot in^2$

Net Area Limitation: $A_e := A_{net} = 6.562 \cdot in^2$

Available Fractile Strength: $\phi P_{tr} := 0.75 \cdot F_u \cdot A_e = 393.75 \cdot kip$

Tension Check

Controlling Mode of Failure:

$$Check_{mode} := \begin{cases} \text{"Fracture Controls"} & \text{if } \frac{P_{tens}}{\phi P_{tr}} > \frac{P_{tens}}{\phi P_{ty}} \\ \text{"Yield Controls"} & \text{otherwise} \end{cases}$$

$Check_{mode} = \text{"Fracture Controls"}$

$$\phi P_{nt} := \begin{cases} \phi P_{tr} & \text{if } Check_{mode} = \text{"Fracture Controls"} \\ \phi P_{ty} & \text{otherwise} \end{cases}$$

Controlling Tension Mode Check:

$$Check_{tension} := \begin{cases} \text{"OK"} & \text{if } Capacity_{tension} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{tension} = \text{"OK"}$

$Capacity_{tension} = 65.41 \cdot \%$

4. Bolt Checks

4.1 Evaluate Bolts for Controlling Capacity of the Plate or Controlling Axial Demand

Controlling Capacity Ratio:

$$Capacity_{max} := \begin{cases} \max\left(\frac{P_{comp}}{\phi P_n}, \frac{P_{tens}}{\phi P_{ty}}, \frac{P_{tens}}{\phi P_{tr}}\right) & \text{if } S15Allowable = \text{"No"} \\ \max\left(\frac{P_{comp}}{\phi P_n}, \frac{P_{tens}}{\phi P_{ty}}, \frac{P_{tens}}{\phi P_{tr}}\right) \cdot \left(\frac{1}{1.05}\right) & \text{if } S15Allowable = \text{"Yes"} \end{cases} = 71.018 \cdot \%$$

Controlling Capacity/Demand: $P_{max} = 270.429 \cdot kip$

4.2 Blind Bolt Properties

[ENG-STD-10183]

AJAX - Standard Sleeve
AJAX - Hi Shear Sleeve
NextGen2
FORGBolt
Design
Default

Number of Bolts in the Eccentric Bolt Group: $N_{be} := 8$

Number of Bolts in Shear-Only Group: $N_{bs} := 7$

Intermediate Bolt Spacing: $L_b := 3in$

Eccentricity: $ecc := \frac{BC_{new} - D_{shaft1}}{2} = 0.625 \cdot in$

Bolt Diameter: $D_b := 20mm$

Bolt Hole Diameter: $D_h := 1.1875in$

Sleeve Diameter: $D_s := 1.14173in$

Washer Diameter: $D_w := 42mm = 1.654 \cdot in$

Ultimate Strength: $Fu_{bolt} := 120ksi$

Gross Area: $A_{gb} := \frac{\pi}{4} \cdot D_b^2 = 0.487 \cdot in^2$

Allowable Shear: $\phi R_{nv} = 43.837 \cdot kip$

4.3 Shear-Only Connection

Bolt Shear Capacity:

$$\phi R_{nv2} := \begin{cases} \phi R_{nv} & \text{if } N_{bs} \cdot 3in \le 38in \\ (\phi R_{nv} \cdot 0.833) & \text{if } N_{bs} \cdot 3in > 38in \end{cases}$$

[AISC 15th Edition Table J3.2 Note (b)]

$$\phi R_{nv2} = 43.837 \cdot kip$$

$$V_{max2} := \frac{P_{max}}{N_{bs}} = 38.633 \cdot kip$$

$$Check_{shear} := \begin{cases} \text{"OK"} & \text{if } Capacity_{shear} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$$Check_{shear} = \text{"OK"}$$

4.4 Eccentric Connection

Bolt Shear Capacity:

$$\phi R_{nv1} := \begin{cases} \phi R_{nv} & \text{if } N_{be} \cdot L_b \le 38in \\ (\phi R_{nv} \cdot 0.833) & \text{if } N_{be} \cdot L_b > 38in \end{cases}$$

[AISC 15th Edition Table J3.2 Note (b)]

$$\phi R_{nv1} = 43.837 \cdot kip$$

Applied Bolt Shear:

$$V_{max} := \frac{P_{max}}{N_{be}} = 33.804 \cdot kip$$

$$Check_{ecc1} := \begin{cases} \text{"OK"} & \text{if } Capacity_{shear.eccentric} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$$Check_{ecc1} = \text{"OK"}$$

Tension Check Due to Eccentricity

(Conservatively assuming the neutral axis of the bolt group is at the center of gravity.)

Number of Bolts Above Neutral Axis: $n' := \text{floor}\left(\frac{N_{be}}{2}\right) = 4$

Moment Arm Between Resultant Tensile and Resultant Compressive Force: $d_m := L_b \cdot \text{ceil}\left(\frac{N_{be}}{2}\right) = 12 \cdot \text{in}$

Tension Force due to Eccentric Load: $r_{ut} := \frac{P_{max} \cdot ecc}{n' \cdot d_m} = 3.521 \cdot \text{kip}$ [AISC 15th Edition Eq. 7-14a]

Design Tensile Strength: $\phi R_{nt} = 34.227 \cdot \text{kip}$

Eccentric Load Check:

$$\text{Check}_{ecc2} := \begin{cases} \text{"OK"} & \text{if } \text{Capacity}_{tension.eccentric} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$\text{Check}_{ecc2} = \text{"OK"}$

Combined Shear and Tension Check: [TIA-222-H Section 4.9.6.4]

$$\text{Check}_{ecc3} := \begin{cases} \text{"OK"} & \text{if } \left(\text{Capacity}_{interaction}\right) \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$\text{Check}_{ecc3} = \text{"OK"}$

5. Pole/ Shaft Checks

5.1 Shaft Bearing

[AISC 15th Ed., Eqs. J3-6a and J3-6c]

Minimum Thickness to Bear On: $t := \min(t_1, t_2) \cdot in = 0.625 \cdot in$

Clear Distance from Edge of Hole to Edge of Adjacent Hole: $L_c := L_b - D_h = 1.812 \cdot in$

Bearing By Tear-out: $Rn_{shaft1} := 1.2 \cdot L_c \cdot t \cdot Fu_{shaft} = 85.641 \cdot kip$

Bearing By Hole Deformation: $Rn_{shaft2} := 2.4 \cdot D_s \cdot t \cdot Fu_{shaft} = 107.893 \cdot kip$

Bearing Capacity: $\phi Rn_{shaft} := 0.75 \cdot \min(Rn_{shaft1}, Rn_{shaft2}) = 64.23 \cdot kip$

$$Check_{bearing} := \begin{cases} \text{"OK"} & \text{if } Capacity_{shaft.bearing} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{bearing} = \text{"OK"}$

6. Weld Connection to Filler Plates

6.1 Weld Sizing

Thickness of Filler Plate: 1"

Interpolation per AISC SCM Table 8-4:

13th Edition
14th Edition
15th Edition

Length of Filler Plate: $L_{be} := N_{be} \cdot L_b = 24 \cdot in$

Weld Material Grade:
- ○ E70XX
- ◉ E80XX

Electrode Strength Coefficient: $C_1 = 1.03$

Coefficient for Eccentrically Loaded Weld Groups: $C = 3.717$

Weld Reduction Factor: $\phi_w := 0.75$

Minimum Weld Size for Eccentrically Loaded Weld: $D_{min} := \frac{P_{max}}{\phi_w \cdot C \cdot C_1 \cdot L_{be} \cdot \frac{kip}{in^2}} = 3.924 \cdot in$ *(In sixteenths of an inch)*

$D_{min1} := ceil\left(\frac{D_{min}}{in}\right) \cdot in = 4 \cdot in$ *(In sixteenths of an inch)*

Minimum Fillet Size per Material Thickness (In sixteenths of an inch): $D_{min2} = 5 \cdot in$ [AISC 15th Edition Table J2.3]

Design Weld Size (In sixteenths of an inch): $D := max(D_{min1}, D_{min2}) = 5 \cdot in$

6.2 Weld Capacity

Weld Capacity: $\phi R_n := \phi_w \cdot C \cdot C_1 \cdot L_{be} \cdot D \cdot \frac{kip}{in^2} = 344.545 \cdot kip$

Check Weld Does Not Control: $Check_{weld} := \begin{cases} \text{"OK"} & \text{if } Capacity_{weld} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$

$Check_{weld} = \text{"OK"}$

Weld Size Used: $D = \frac{5}{16} \cdot in$

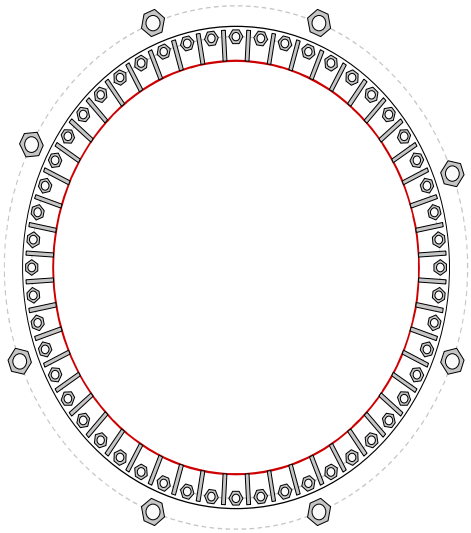
Monopole Base Plate Connection

Site Info	
BU #	829046
Site Name	eston/ Rt-57/ Norfield
Order #	509322 Rev. 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	1.25

Applied Loads	
Moment (kip-ft)	5069.36
Axial Force (kips)	107.14
Shear Force (kips)	43.12

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

GROUP 1: (52) 1-1/4" ø bolts (A687 N; Fy=105 ksi, Fu=125 ksi) on 67" BC
GROUP 2: (8) 2-1/4" ø bolts (F1554-105 N; Fy=105 ksi, Fu=125 ksi) on 76" BC
pos. (deg): 21, 69, 111, 152, 201, 249, 291, 339

Base Plate Data

70" OD x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Stiffener Data

(52) 8"H x 4.5"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Pole Data

60" x 0.75" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

GROUP 1:		
Pu_c = 44.71	ϕPn_c = 115.97	**Stress Rating**
Vu = 0.83	ϕVn = 52.19	**36.7%**
Mu = n/a	ϕMn = n/a	**Pass**

GROUP 2:		
Pu_c = 162.19	ϕPn_c = 375.74	**Stress Rating**
Vu = 0	ϕVn = 169.08	**41.1%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	3.97	(Shear)
Allowable Stress (ksi):	21.6	
Stress Rating:	**17.5%**	**Pass**

Stiffener Summary

Horizontal Weld:	**37.9%**	**Pass**
Vertical Weld:	**24.4%**	**Pass**
Plate Flexure+Shear:	**18.7%**	**Pass**
Plate Tension+Shear:	**32.4%**	**Pass**
Plate Compression:	**49.3%**	**Pass**

Pole Summary

Punching Shear:	**7.1%**	**Pass**

Anchor Rod Bracket Calculations:

Additional Anchor Rod Group:

$N_{new} := 8$ $D_{new} := 2.25 \cdot in$ $Fu_{rod} := 125ksi$

$BC_{new} := 76 \cdot in$ $A_{net_new} := 3.25 \cdot in^2$ $Fy_{rod} := 105ksi$

$A_{n_new} := N_{new} \cdot A_{net_new} = 26 \cdot in^2$

Anchor Rod Bracket Calculations

Analysis
Design

Comment = "Analyze the anchor rod brackets to resist the controlling anchor rod demand force"

Anchor Rod Demand Force: $P_{umax} := 162.19kip$

Bracket Loading:

$$P_u := \begin{cases} \phi P_n & \text{if } AorD = \text{"Design"} \\ P_{umax} & \text{if } AorD = \text{"Analysis"} \end{cases} = 162.19 \cdot kip$$

Tube Design (Square HSS)

Member Size: HSS 4"x4"x1/2"

Apply TIA-222-H Section 15.5? No / Yes

Member Properties (AISC 15th Ed., Table 1-12):

Outside Diameter: $OD_{HSS} := 4 \cdot in$

Area: $A_{HSS} := 6.02 \cdot in^2$ $A_{e_HSS} := 0.75 \cdot A_{HSS} = 4.51 \cdot in^2$

Thickness: $t_{HSS} := 0.465 \cdot in$

Yield Strength: $F_{y_HSS} := 50 \cdot ksi$ $F_{u_HSS} := 62 \cdot ksi$

Length: $L_{HSS} := 24 \cdot in$

Moment of Inertia: $I_{HSS} := 11.9 \cdot in^4$

Radius of Gyration: $r_{HSS} := 1.41 \cdot in$

Inside Dimension: $ID_{HSS} := OD_{HSS} - 2 \cdot t_{HSS} = 3.07 \cdot in$

Bearing Check
(AISC 15th Ed., Equation J7-1):

$\phi_b := 0.75$

$Pu_c = \phi_b \cdot R_n = \phi_b \cdot 1.8 \cdot F_{y_HSS} \cdot A_{pb}$

$$A_{pb} := \frac{P_u}{\phi_b \cdot 1.8 \cdot F_{y_HSS}} = 2.4 \cdot in^2$$

$$Check_{bear} := \begin{cases} \text{"OK"} & \text{if } A_{HSS} \geq A_{pb} \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{bear} = \text{"OK"}$

Compression Check
(AISC 15th Ed., Eqs. E3-1 to E3-4):

$\phi_c := 0.9$

$K := 1$

$\phi P_{u_comp} = \phi_c \cdot F_{cr} \cdot A_g$

$L_c := K \cdot L_{HSS} = 24 \cdot in$

$$F_e := \frac{\pi^2 \cdot 29000ksi}{\left(\frac{L_c}{r_{HSS}}\right)^2} = 987.9 \cdot ksi$$

$$\frac{L_c}{r_{HSS}} = 17.02 < 4.71 \cdot \sqrt{\frac{29000 \cdot ksi}{F_{y_HSS}}} = 113.43$$

$$\therefore \quad F_{cr} := 0.658^{\frac{F_{y_HSS}}{F_e}} \cdot F_{y_HSS} = 48.95 \cdot ksi$$

(AISC 15th Ed., Equation J4-6):

$$\phi P_{u_comp} := \begin{cases} \phi_c \cdot F_{y_HSS} \cdot A_{HSS} & \text{if } \frac{L_c}{r_{HSS}} \leq 25 \\ \phi_c \cdot F_{cr} \cdot A_{HSS} & \text{otherwise} \end{cases}$$

$\phi P_{u_comp} = 270.9 \cdot kip$

$$Check_{comp} := \begin{cases} \text{"OK"} & \text{if } Rating_{comp} < 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{comp} = \text{"OK"}$

Gusset Plate Design

Gusset Plate width: $w_{plate} := 6.25 \cdot in$

Gusset Plate thickness: $t_{plate} := 1.25in$

$L_{plate1} := 30in$

$L_{plate2} := 24in$

Gusset Plate Strength: $Fy_{plate} := 50ksi$

$Fu_{plate} := 65ksi$

Pole thickness: $t_{pole} := 0.75in$

Shear Check
(AISC 15th Ed., Eqs. J4-3 and J4-4):

$A_g := t_{plate} \cdot L_{plate2} = 30 \cdot in^2$

$A_{nv} := A_g = 30 \cdot in^2$

Shear Yielding

$\phi_v := 1$

$\phi V_{plate} := \phi_v \cdot 0.6 \cdot A_g \cdot Fy_{plate} = 900 \cdot kip$

$$Check_{shear} := \begin{cases} \text{"OK"} & \text{if } Rating_{sheary} < 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{shear} = \text{"OK"}$

Shear Rupture

$\phi_v := 0.75$

$\phi V_{plate} := \phi_v \cdot 0.6 \cdot A_{nv} \cdot Fu_{plate} = 877.5 \cdot kip$

$$Check_{shear} := \begin{cases} \text{"OK"} & \text{if } Rating_{shearr} < 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{shear} = \text{"OK"}$

Gusset Plate to Tower and Base Plate
Weld Design (Horizontal and Vertical

Weld):
(AISC 15th Ed., Part 8)

Gusset plate thickness: $t_{plate} = 1.25 \cdot in$

Tower Grade: $Fy_{pole} := 42ksi$ $Fu_{pole} := 63ksi$

Base Plate Grade: $Fy_{base} := 36ksi$ $Fu_{base} := 58ksi$

Gussett Plate Grade: $Fy_{plate} = 50 \cdot ksi$ $Fu_{plate} = 65 \cdot ksi$

Height of vertical weld from base plate: $H := L_{plate1} = 30 \cdot in$

$Notch_{horiz} := 0.75 \cdot in$

$Notch_{vert} := 0.75 \cdot in$

Gap between Base Plate and HSS: $Gap := 0in$

Vertical fillet weld size to pole:
(in sixteenths of an inch) $D_{vpole} := 5$

$$weldsize_{pole} := \frac{D_{vpole}}{16} = \frac{5}{16}$$

Electrode Strength: 70ksi
80ksi

$$Check := \begin{cases} \text{"OK"} & \text{if } Rating_{weld2} < 100\% \\ \text{"INSUFFICIENT"} & \text{otherwise} \end{cases}$$

$Check = \text{"OK"}$

Gusset Plate to HSS Weld Design
(AISC 15th Ed., Table 8-4)

Interpolation per AISC SCM Table 8-4:

13th Edition
14th Edition
15th Edition

Electrode Strength: 70ksi / 80ksi

Fillet Weld Size (in sixteenths of an inch): $D := 10$

Groove Weld: None / 45 PJP / 60 PJP / CJP

Groove Depth (inches): $GD := 0.625in$

Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS.

$$ecc_2 := OD_{HSS} - t_{HSS} - \frac{D_{new}}{2} = 2.41 \cdot in$$

Load not in plane with weld group:

$$k := 0$$

$$a := \frac{ecc_2}{L_{plate2}} = 0.1$$

$$C_1 = 1.03$$

$$Coeff_1 = 3.72$$

$$\phi_w := 0.75$$

$$D_{min1} := ceil\left(\frac{P_u \cdot in}{\phi_w \cdot Coeff_1 \, C_1 \cdot L_{plate2} \cdot kip}\right) = 3$$

$$minweldsize := \frac{D_{min1}}{16} = \frac{3}{16}$$

$$Check_{weld} := \begin{cases} \text{"OK"} & \text{if } D_1 \geq D_{min1} \wedge D_1 \geq Min_{weldsize} \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$$Check_{weld} = \text{"OK"}$$

$$\phi Rn_{weld1} := \phi_w \cdot Coeff_1 \, ksi \cdot in \cdot C_1 \cdot D_1 \cdot L_{plate2} = 1469.82 \cdot kip$$

$$Check_{weld1} := \begin{cases} \text{"OK"} & \text{if } Rating_{weld1} < 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$$Check_{weld1} = \text{"OK"}$$

Gusset Plate to Pole Punching Shear Check (max per unit length): (AISC 15th Ed., Section J4.2)

What is the bracket welded to?

Tower Only
Tower & Reinforcement
Reinforcement Only

Reinforcement Thickness: $t_{ref} := 0in$

Reinforcement Grade: $F_{y_ref} := 0ksi$

$F_{u_ref} := 0ksi$

Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS.

$\phi_{sy} := 1.0$

$\phi_{sr} := 0.75$

$$ecc_1 := w_{plate} + OD_{HSS} - t_{HSS} - \frac{D_{new}}{2} = 8.66 \cdot in$$

$$M_1 := P_u \cdot ecc_1 = 1404.57 \cdot kip \cdot in$$

$$S_1 := \frac{t_{plate} \cdot L_{plate1}^2}{6} = 187.5 \cdot in^3$$

$$f_v := \frac{M_1}{S_1} \cdot t_{plate} \cdot 1in = 9.36 \cdot kip$$

AISC 15th Ed., Equation J4-3:

$\phi F_{sy} := \phi_{sy} \cdot 0.6 \cdot Fy_{pole} \cdot 2 \cdot t_{pole} \cdot 1in$

$\phi F_{sy_ref} := \phi_{sy} \cdot 0.6 \cdot F_{y_ref} \cdot 2 \cdot t_{ref} \cdot 1in$

AISC 15th Ed., Equation J4-4:

$\phi F_{sr} := \phi_{sr} \cdot 0.6 \cdot Fu_{pole} \cdot 2 \cdot t_{pole} \cdot 1in$ $\phi F_{sr_ref} := \phi_{sr} \cdot 0.6 \cdot F_{u_ref} \cdot 2 \cdot t_{ref} \cdot 1in$

$\phi F_v = 37.8 \cdot kip$

$$Check_{PS1} := \begin{cases} \text{"OK"} & \text{if } Rating_{PS1} < 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{PS1} = \text{"OK"}$

Gusset Plate to HSS Punching Shear Check (max per unit length): (AISC 15th Ed., Section J4.2)

Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS.

$$ecc_2 := OD_{HSS} - t_{HSS} - \frac{D_{new}}{2} = 2.41 \cdot in$$

$$M_2 := P_u \cdot ecc_2 = 390.88 \cdot kip \cdot in$$

$$S_2 := \frac{t_{plate} \cdot L_{plate2}^2}{6} = 120 \cdot in^3$$

$$f_w := \frac{M_2}{S_2} \cdot t_{plate} \cdot 1in = 4.07 \cdot kip$$

AISC 15th Ed., Equation J4-3:

$\phi F_{sy} := \phi_{sy} \cdot 0.6 \cdot F_{y_HSS} \cdot 2 \cdot t_{HSS} \cdot 1in = 27.9 \cdot kip$

AISC 15th Ed., Equation J4-4:

$\phi F_{sr} := \phi_{sr} \cdot 0.6 \cdot F_{u_HSS} \cdot 2 \cdot t_{HSS} \cdot 1in = 25.95 \cdot kip$

$\phi F_w := \min(\phi F_{sy}, \phi F_{sr}) = 25.95 \cdot kip$

$$Check_{PS2} := \begin{cases} \text{"OK"} & \text{if } Rating_{PS2} < 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{PS2} = \text{"OK"}$

Embedment Depth Calculations

Projected Embedment Depth: $L_{em} := 6 \cdot ft$

Concrete Strength: $f'_c := 5000psi$

Are anchor rods installed in piers?: Yes / No

Yield Strength of Rebar: $f_y := 60ksi$

Transverse Reinforcement Index: $k_{tr} := 0$ Can be taken as 0 for design per ACI 318-14

Epoxy Factor:	$\psi_e := 1$
Rebar Size Factor:	$\psi_s := 1$
Casting Position Factor:	$\psi_t := 1$
Concrete Weight Factor:	$\lambda := 1 \cdot \sqrt{psi}$
Pier Diameter:	$D_{pier} := 7.5ft$
Cover	$c_c := 3in$
Rebar Size:	$d_s := 9$
Tie Size:	$Tie := 4$
Number of Vertical Rebar:	$n := 47$

$$d_b := \left|vlookup\left(d_s, d_{btable}, 2\right)\right| \cdot in = 1.13 \cdot in$$

The embedment depth shall be analyzed based on the design tension capacity of the anchor rods.

Design Load:

$$\phi P_{nt} := 0.75 \cdot Fu_{rod} \cdot A_{net_new} = 304.69 \cdot kip$$

Development Length (ACI 318-14 Chapter 25):

$$BC_{rebar} := D_{pier} - 2 \cdot c_c - \frac{Tie \cdot in}{4} - d_b = 81.87 \cdot in$$

$$S_{rebar} := \frac{\pi \cdot BC_{rebar}}{n} = 5.473 \cdot in$$

$$c_b := \min\left(c_c + \frac{Tie}{8} in + \frac{d_b}{2}, S_{rebar} \cdot 0.5\right) = 2.74 \cdot in$$

ACI 318-14, Equation 25.4.2.3a:

$$l_d := \left[\frac{3}{40} \cdot \frac{f_y}{\lambda \cdot \sqrt{f'_c}} \cdot \frac{\psi_t \cdot \psi_e \cdot \psi_s}{\min\left[\left(\frac{c_b + k_{tr}}{d_b}\right), 2.5\right]}\right] \cdot d_b = 29.59 \cdot in$$

Calculate Max Distance Between Rebar and New Anchor Rods:

$$A := \frac{1}{2} \cdot S_{rebar} = 2.736 \cdot in$$

$$B := \frac{BC_{rebar}}{2} - \frac{BC_{new}}{2} = 2.936 \cdot in$$

$$G := \sqrt{A^2 + B^2} = 4.013 \cdot in$$

$$l'_d := l_d + \frac{G}{1.5} + 3in = 2.94\,ft$$

Epoxy Development Length: Bond Strength:

Epoxy := Hilti Hit Re 500

$$S_b := \begin{cases} S_{bh} & \text{if } Epoxy = 0 \\ S_{bA} & \text{if } Epoxy = 1 \wedge \left(f'_c = 4000psi \vee f'_c > 4000 \cdot psi\right) \\ 0.94 S_{bA} & \text{if } Epoxy = 1 \wedge \left(f'_c = 3000psi \vee f'_c < 3000 \cdot psi\right) \\ E_{bond} & \text{if } Epoxy = 1 \wedge f'_c > 3000psi \wedge f'_c < 4000psi \end{cases} = 1073\,psi$$

$$\phi_{bond} := 0.65$$

$$L_{be} := \frac{\phi P_{nt}}{\pi \cdot D_{new} \cdot S_b \cdot \phi_{bond}} = 61.8 \cdot in$$

Required Embedment Length: Length of Breaker Tape: $L_{.BT} := 0 \cdot in$

$$L_{min} := \begin{cases} \max\left(L_{be} + L_{BT}, l'_d + 0.25 \cdot L_{be}\right) & \text{if } Piers = \text{"Yes"} \\ \left(L_{be} + L_{BT}\right) & \text{if } Piers = \text{"No"} \end{cases} = 5.15\,ft$$

$$Check := \begin{cases} \text{"OK"} & \text{if } L_{min} \le L_{em} \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

Check = "OK"

BLACK & VEATCH Building a world of difference.	Client:	Crown Castle	Design:	PSA
6800 W. 115th St., Suite 2292	Project:	400087 (829046.1832008)	Date:	2/28/2020
Overland Park, KS 66211	Site:	Weston/ Rt-57/ Norfield R	Verify:	KPP
Phone: (913) 458-6909	Title:	Foundation Design Reaction Comparison	Date:	2/28/2020
			Code:	TIA-222-H

Template Version 1.8

FOUNDATION ANALYSIS:

Original Tower Design Reactions:

Pad & Pier:

Shear:	52.8	Kip
Overturning Moment:	7052.7	Kip-ft

Note: Design reactions are multiplied by 1.35 for comparison as allowed by TIA-222-H Section 15.6.2.

TnxTower Reactions:

Drilled Caisson:

Shear:	43.1	Kip
Overturning Moment:	5069.4	Kip-ft

Stress Ratio:

Drilled Caisson:

Shear:	**77.8%**
Overturning Moment:	**68.5%**

Note: Ratings per TIA-222-H Section 15.5.

Conclusion:

When the calculated reactions are compared to the original design reactions, the existing foundation is considered to have been designed and constructed with adequate capacity to support the existing and proposed loads.

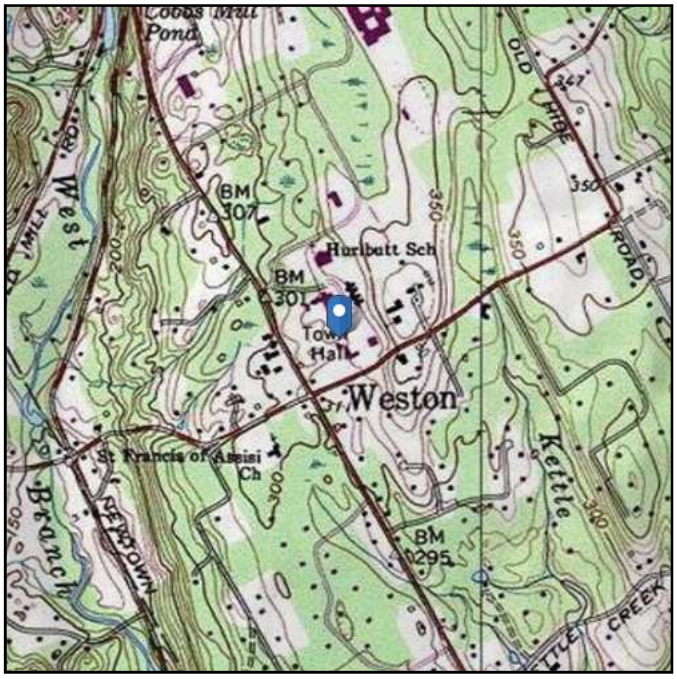
Controlling Foundation Stress Ratio: **77.8%**

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 321.79 ft (NAVD 88)
Latitude: 41.202333
Longitude: -73.379611



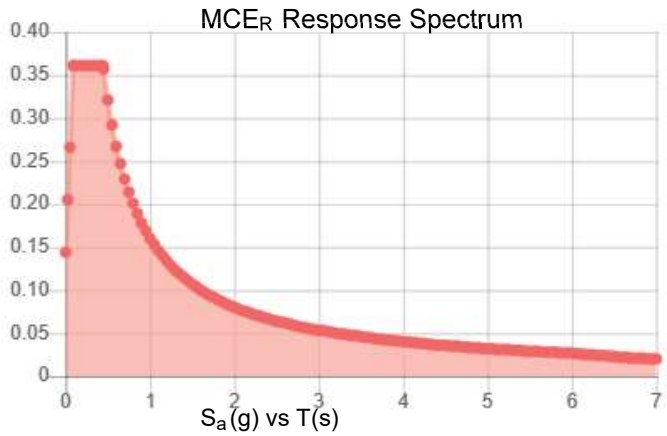
Seismic

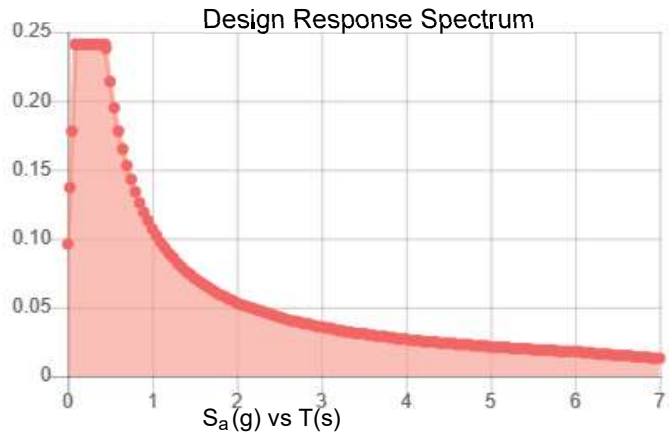
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.226	S_{DS} :	0.241
S_1 :	0.067	S_{D1} :	0.107
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.126
S_{MS} :	0.361	PGA_M :	0.195
S_{M1} :	0.16	F_{PGA} :	1.548
		I_e :	1

Seismic Design Category B





Data Accessed: Wed Feb 26 2020

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Wed Feb 26 2020

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.

The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE 7 standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE 7 Hazard Tool.

Exhibit E

Mount Analysis

Date: March 5, 2020

Kevin Morrow
Crown Castle
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Charlotte, NC 28277
(704) 405-6619

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

Subject:	**Mount Analysis Report**	
Carrier Designation:	**AT&T Mobility Equipment Change-Out**	
	Carrier Site Number:	CTL02099
	FA Number:	10035306
	Carrier Site Name:	N/A
Crown Castle Designation:	**Crown Castle BU Number:**	829046
	Crown Castle Site Name:	Weston/ Rt-57/ Norfield R
	Crown Castle JDE Job Number:	596319
	Crown Castle Order Number:	509322, Rev.0
Engineering Firm Designation:	**B+T Group Report Designation:**	136353.006.01
Site Data:	**56 Norfield Rd. (Town Hall), Weston, CT, Fairfield, 06883** **Latitude 41° 12' 8.40" Longitude -73° 22' 46.60"**	
Structure Information:	**Tower Height & Type:**	**190 ft. Monopole**
	Mount Elevation:	**160 ft.**
	Mount Type:	**13.67 ft. Platform Mount**

Dear Mr. Morrow,

B+T Group 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 abovementioned 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's stress level. Based on our analysis we have determined the stress level to be:

Platform Mount **Sufficient**

This analysis has been performed in accordance with the 2018 International Building Code based upon an ultimate 3-second gust wind speed of 117 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount structural analysis prepared by: Lokesh Narayanappa, E.I.T.

Respectfully submitted by: B&T Engineering, Inc.
COA: PEC.0001564 Expires: 02/10/2021

STATE OF CONNECTICUT
SCOTT S. VANCE
31627
LICENSED
PROFESSIONAL ENGINEER

3/5/20

Scott S. Vance, P.E.

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1) INTRODUCTION

This is a 13.67' Platform Mount, Mapped by B+T Group.

The mount was later reinforced per reinforcement drawings prepared by B+T Group, in March of 2018. Reinforcement consists of SitePro1 (Par# PRK-SFS-L and Part# HRK-14).

2) ANALYSIS CRITERIA

Building Code:	2018 IBC
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	117 mph
Exposure Category:	B
Topographic Factor at Base:	1
Topographic Factor at Mount:	1
Ice Thickness:	1 in
Wind Speed with Ice:	50 mph
Seismic S_s:	0.233
Seismic S_1:	0.056
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
160	163	3	CCI	DMP65R-BU6D	13.67 ft. Platform Mount
		3	CCI	OPA-65R-LCUU-H6	
		3	Kathrein	80010965	
		3	Ericsson	RRUS 32 B2	
		3	Ericsson	RRUS 32 B30	
		3	Ericsson	RRUS 32 B66A	
		3	Ericsson	RRUS 4449 B5/B12	
		3	Ericsson	RRUS 4478 B14	
		6	Kaelus	DBCT108F1V92-1	
		2	Raycap	DC6-48-60-18-8C	
		1	Raycap	DC6-48-60-18-8F	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
CCI Order	Existing Loading Proposed Loading	Date: 02/20/2020	Crown Castle
RFDS		Date: 12/03/2019	
Mapping Report	B+T Group	Date: 01/17/2018	On File
Mount Analysis Report		Date: 03/01/2018	

3.1) Analysis Method

RISA-3D (Version 17.0.4), 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.

A tool internally developed by B+T Group, was used to calculate wind loading on all appurtenances, dishes and mount members for various loading cases. Selected output from the analysis is included in Appendix B "Software Input Calculations and Analysis Output".

This analysis was performed in accordance with Crown Castle's ENG-SOW-10208 Tower Mount Analysis (Revision C). In addition, this analysis is in accordance with AT&T's *Mount Technical Directive – R14.1.*

3.2) Assumptions

1. The mount was properly fabricated and installed in accordance with its original design and manufacturer's specifications.
2. The mount has been maintained in accordance with the manufacturer's specifications and is free of damage.
3. The configuration of antennas, mounts, and other appurtenances are as specified in Table-1.
4. All mount components have been assumed to be in sufficient condition to carry their full design capacity for the analysis.
5. Mount areas and weights are determined from field measurements, standard material properties, and/or manufacturer product data.
   The following assumptions have been included in the analysis of the mount

Component	Section	Length	Note
RRU Pipe	2" Std. Pipe	4'-0"	-
Support Angles	LL2.5x1.5x4x0	2'-11"	-

6. Serviceability with respect to antenna twist, tilt, roll or lateral translation is not checked and is left to the carrier or tower owner to ensure conformance.
7. All prior structural modifications, if any are assumed to be correctly installed and fully effective.
8. 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.
9. The analysis will be required to be revised if the existing conditions in the field differ from those shown in the above-referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.
10. The following material grades were assumed (Unless Noted Otherwise):
    (a) Connection Bolts : ASTM A325
    (b) Steel Pipe : ASTM A53 (GR. 35)
    (c) HSS (Round) : ASTM 500 (GR. B-42)
    (d) HSS (Rectangular) : ASTM 500 (GR. B-46)
    (e) Channel : ASTM A36 (GR. 36)
    (f) Steel Solid Rod : ASTM A36 (GR. 36)
    (g) Steel Plate : ASTM A36 (GR. 36)
    (h) Steel Angle : ASTM A36 (GR. 36)
    (i) UNISTRUT : ASTM A570 (GR. 33)

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

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (Platform Mount)

Notes	Component	Critical Member	Centerline (ft.)	% Capacity	Pass / Fail
1,2	Main Horizontals	31	160	18.5	Pass
	Mount Pipes	61	160	50.1	Pass
	Support Tubes	39	160	38.6	Pass
	Support Angles	12	160	27.0	Pass
	Connection Plates	7	160	23.4	Pass
	Support Rails	42	160	33.1	Pass
	Connection Angles	46	160	91.5	Pass
	Reinforcement Angles	68	160	34.5	Pass

Structure Rating (max from all components) =	91.5%

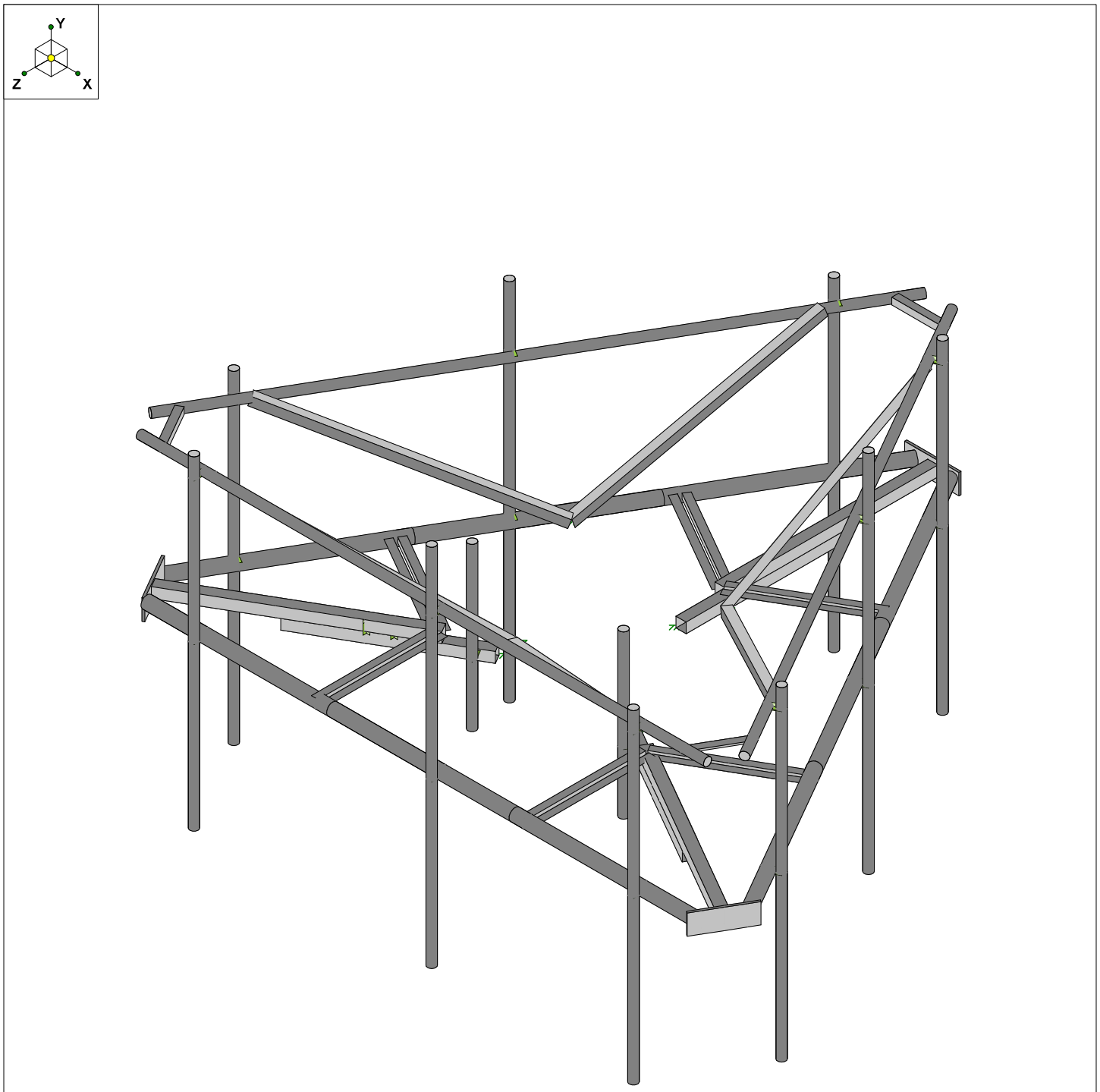
Notes:
1) See additional documentation in "Appendix B - Software Input Calculations and Analysis Output" for calculations supporting the % capacity consumed.
2) All sectors are typical

4.1) Recommendations

The mount has sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.

APPENDIX A

WIRE FRAME AND RENDERED MODELS



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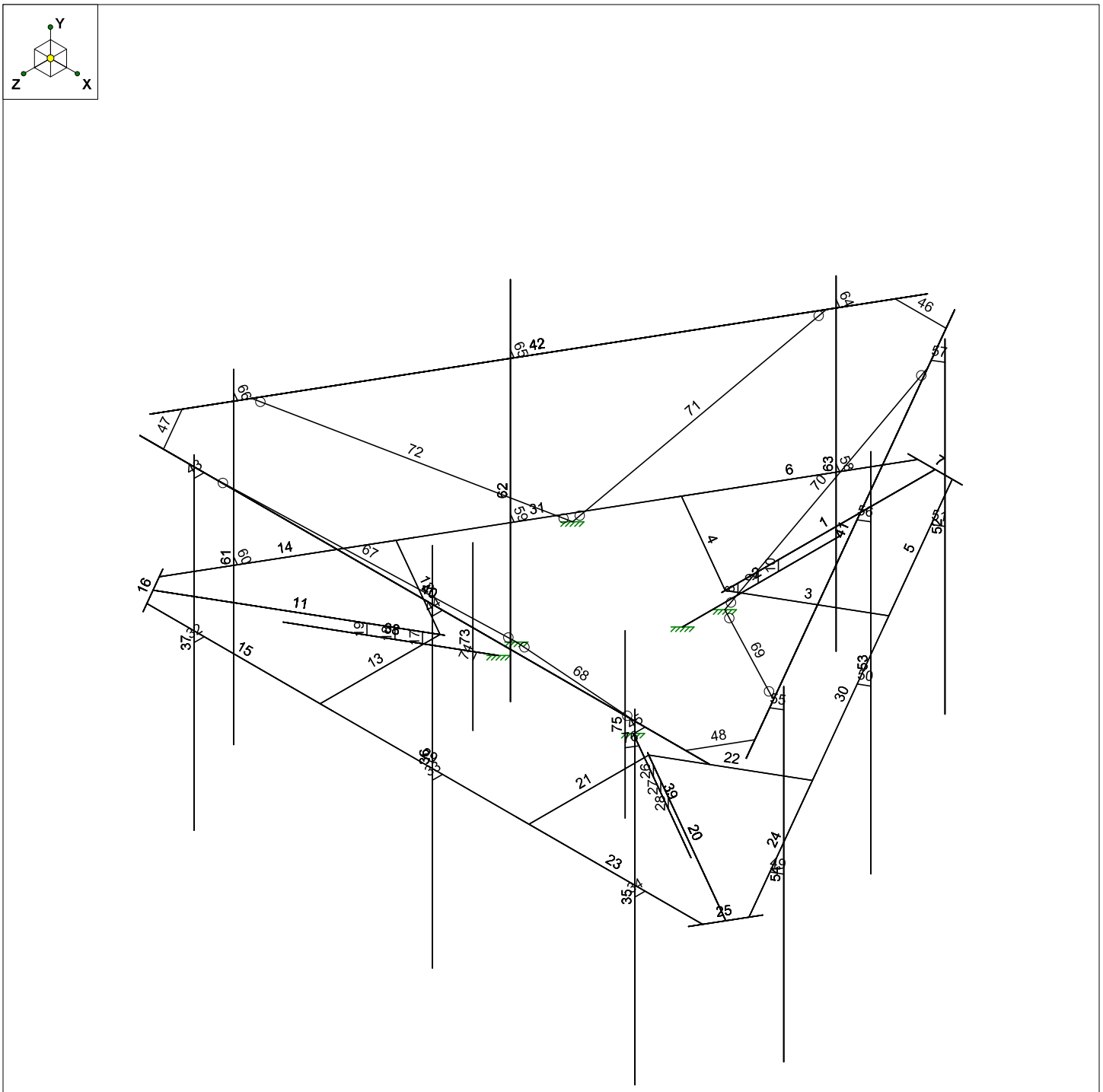

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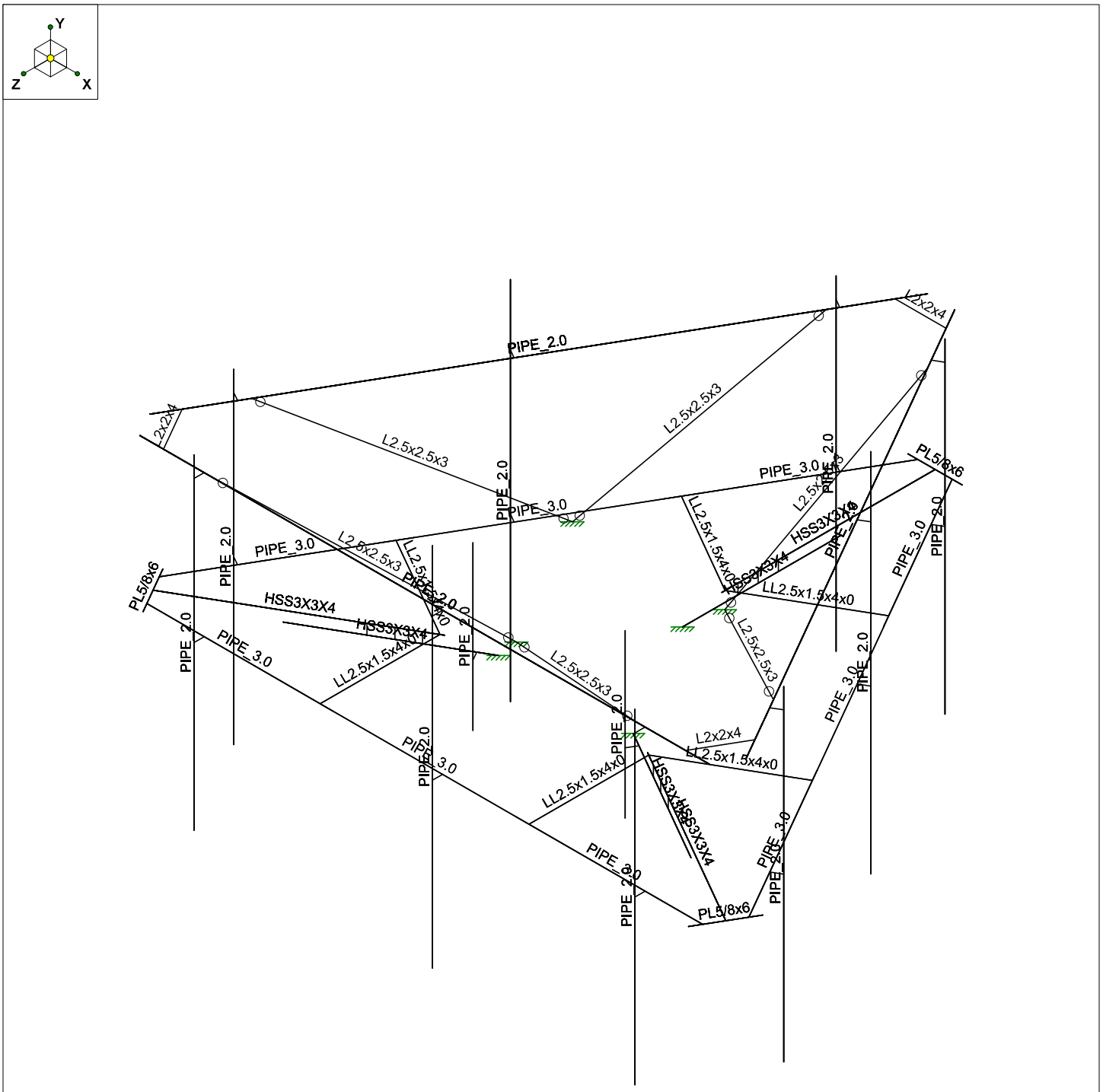

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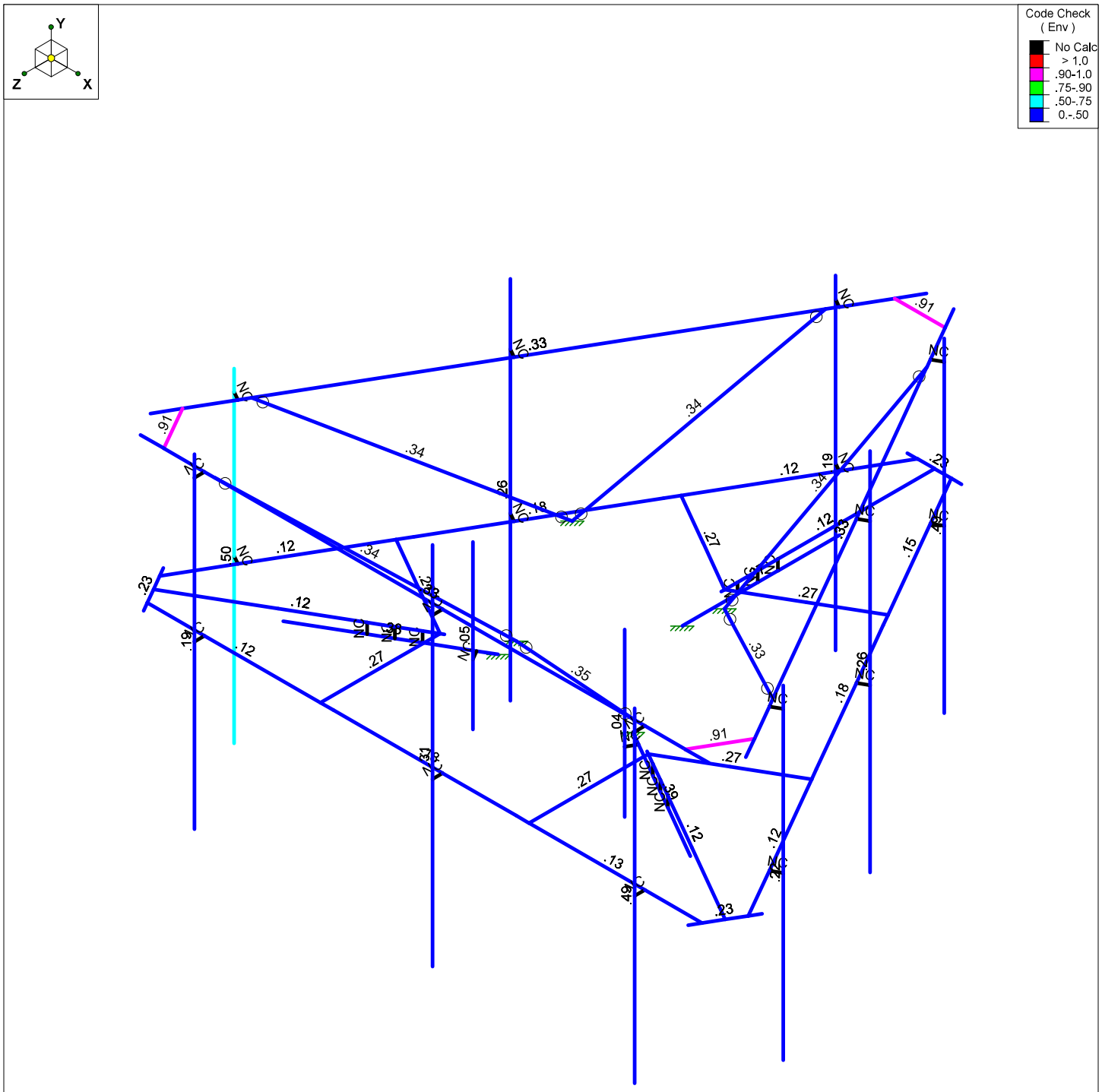

Member Code Checks Displayed (Enveloped)
Envelope Only Solution

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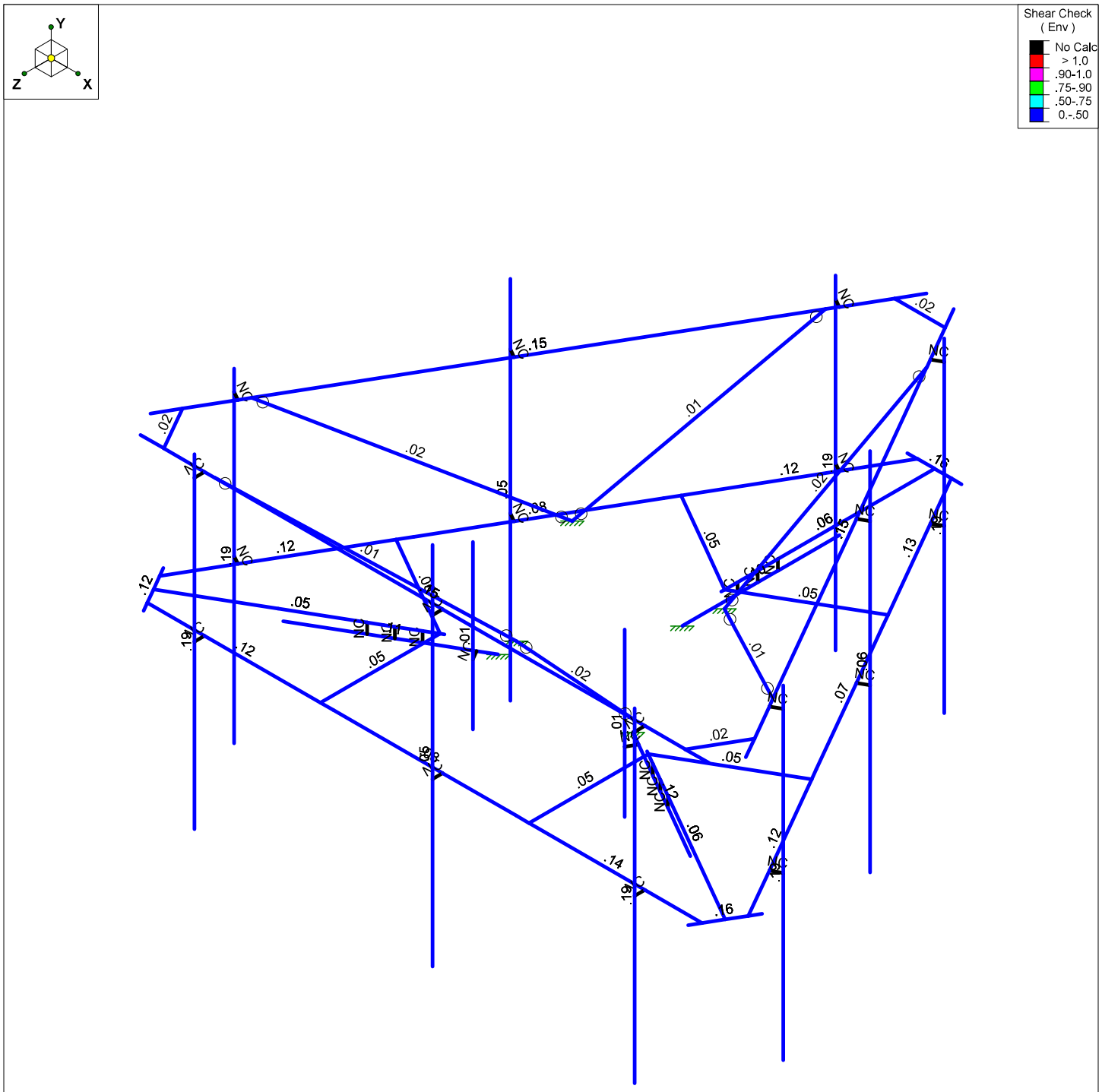

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Envelope Only Solution

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APPENDIX B

SOFTWARE INPUT CALCULATIONS AND ANALYSIS OUTPUT

PROJECT	**136353.006.01 - Weston/ Rt-57/ Norfi LHN**		
SUBJECT	**Platform Mount Mount Analysis**		
DATE	**03/05/20**	PAGE 1	OF 1

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Tulsa, OK 74119
(918) 587-4630

INPUT

[REF: ANSI/TIA-222-H]

Tower Type		:	Monopole									
Ground Elevation	z_s	:	322	ft	[ASCE7 Hazard Tool]							
Tower Height		:	190	ft								
Mount Elevation		:	160	ft								
Antenna Elevation		:	163	ft								
Crest Height		:	0	ft								
Risk Category		:	II		[Table 2-1]	Gust Factor	G_h	:	1.00		[Sec. 16.6]
Exposure Category		:	B		[Sec. 2.6.5.1.2]	Pressure Coefficient	K_z	:	1.14		[Sec. 2.6.5.2]
Topography Category		:	1		[Sec. 2.6.6.2]	Topography Factor	K_{zt}	:	1.00		[Sec. 2.6.6]
Wind Velocity	V	:	117	mph	[ASCE7 Hazard Tool]	Elevation Factor	K_e	:	0.99		[Sec. 2.6.8]
Ice wind Velocity	V_i	:	50	mph	[ASCE7 Hazard Tool]	Directionality Factor	K_d	:	0.95		[Sec. 16.6]
Service Velocity	V_s	:	30	mph	[ASCE7 Hazard Tool]	Shielding Factor	K_a	:	0.90		[Sec. 16.6]
Base Ice thickness	t_i	:	1	in	[ASCE7 Hazard Tool]	Design Ice Thickness	t_{iz}	:	1.17	in	[Sec. 2.6.10]
Seismic Design Cat.		:	B		[ASCE7 Hazard Tool]						
	S_S	:	0.233			Importance Factor	I_e	:	1		[Table 2-3]
	S_1	:	0.056			Response Coefficient	C_s	:	0.12		[Sec. 2.7.7.1]
	S_{DS}	:	0.248			Amplification	A_s	:	2.37		[Sec. 16.7]
	S_{D1}	:	0.09								

ANTENNAS

	Manufacturer	Model	Height (in)	Front Width (in)	Side Width (in)	Weight (lbs)	Shape	Quantity	Location (%)
Mount Pipe	**35**								
	CCI	DMP65R-BU6D	71.20	20.70	7.70	89.30	Flat	0.5	10
	CCI	DMP65R-BU6D	71.20	20.70	7.70	89.30	Flat	0.5	95
	Ericsson	RRUS 4449 B5/B12	17.90	9.44	13.19	71.00	Flat	1	30
	Ericsson	RRUS 32 B66A	27.60	7.41	12.45	55.12	Flat	1	30
	KAELUS	DBCT108F1V92-1	10.71	7.14	3.52	13.90	Flat	1	75
Mount Pipe	**36**								
	Kathrein	80010965	78.70	20.00	6.90	97.60	Flat	0.5	15
	Kathrein	80010965	78.70	20.00	6.90	97.60	Flat	0.5	65
	Ericsson	TME-RRUS 32 B30	27.20	7.00	12.10	53.00	Flat	1	30
	Ericsson	TME-RRUS 4478 B14	16.50	7.70	13.40	59.90	Flat	1	30
Mount Pipe	**37**								
	CCI	OPA-65R-LCUU-H6	72.00	14.40	7.40	80.00	Flat	0.5	10
	CCI	OPA-65R-LCUU-H6	72.00	14.40	7.40	80.00	Flat	0.5	70
	Ericsson	TME-RRUS 32 B2	27.20	7.00	12.05	52.90	Flat	1	30
	KAELUS	DBCT108F1V92-1	10.71	7.14	3.52	13.90	Flat	1	50
Mount Pipe	**61**								
	CCI	DMP65R-BU6D	71.20	20.70	7.70	89.30	Flat	0.5	10
	CCI	DMP65R-BU6D	71.20	20.70	7.70	89.30	Flat	0.5	95
	Ericsson	RRUS 4449 B5/B12	17.90	9.44	13.19	71.00	Flat	1	30
	Ericsson	RRUS 32 B66A	27.60	7.41	12.45	55.12	Flat	1	30
	KAELUS	DBCT108F1V92-1	10.71	7.14	3.52	13.90	Flat	1	75
	62								
	Kathrein	80010965	78.70	20.00	6.90	97.60	Flat	0.5	15
	Kathrein	80010965	78.70	20.00	6.90	97.60	Flat	0.5	65
	Ericsson	TME-RRUS 32 B30	27.20	7.00	12.10	53.00	Flat	1	30
	Ericsson	TME-RRUS 4478 B14	16.50	7.70	13.40	59.90	Flat	1	30
	63								
	CCI	OPA-65R-LCUU-H6	72.00	14.40	7.40	80.00	Flat	0.5	10
	CCI	OPA-65R-LCUU-H6	72.00	14.40	7.40	80.00	Flat	0.5	70
	Ericsson	TME-RRUS 32 B2	27.20	7.00	12.05	52.90	Flat	1	30
	KAELUS	DBCT108F1V92-1	10.71	7.14	3.52	13.90	Flat	1	50

PROJECT	**136353.006.01 - Weston/ Rt-57/ Norfi LHN**				
SUBJECT	**Platform Mount Mount Analysis**				
DATE	**03/05/20**	PAGE	2	OF	5

B+T Group
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Mount Pipe **52**

	CCI	DMP65R-BU6D	71.20	20.70	7.70	89.30	Flat	0.5	10
	CCI	DMP65R-BU6D	71.20	20.70	7.70	89.30	Flat	0.5	95
	Ericsson	RRUS 4449 B5/B12	17.90	9.44	13.19	71.00	Flat	1	30
	Ericsson	RRUS 32 B66A	27.60	7.41	12.45	55.12	Flat	1	30
	KAELUS	DBCT108F1V92-1	10.71	7.14	3.52	13.90	Flat	1	75

Mount Pipe **53**

	Kathrein	80010965	78.70	20.00	6.90	97.60	Flat	0.5	15
	Kathrein	80010965	78.70	20.00	6.90	97.60	Flat	0.5	65
	Ericsson	TME-RRUS 32 B30	27.20	7.00	12.10	53.00	Flat	1	30
	Ericsson	TME-RRUS 4478 B14	16.50	7.70	13.40	59.90	Flat	1	30

Mount Pipe **54**

	CCI	OPA-65R-LCUU-H6	72.00	14.40	7.40	80.00	Flat	0.5	10
	CCI	OPA-65R-LCUU-H6	72.00	14.40	7.40	80.00	Flat	0.5	70
	Ericsson	TME-RRUS 32 B2	27.20	7.00	12.05	52.90	Flat	1	30
	KAELUS	DBCT108F1V92-1	10.71	7.14	3.52	13.90	Flat	1	50

Mount Pipe **73**

	Raycap	TME-DC6-48-60-18-8C	31.41	10.24	10.24	26.20	Round	1	15

Mount Pipe **75**

	Raycap	TME-DC6-48-60-18-8C	31.41	10.24	10.24	26.20	Round	1	30
	Raycap	TME-DC6-48-60-18-8F	31.25	11.00	11.00	32.80	Round	1	60

Mount Pipe

Mount Pipe

Mount Pipe

Mount Pipe

PROJECT	**136353.006.01 - Weston/ Rt-57/ Norfi LHN**				
SUBJECT	**Platform Mount Mount Analysis**				
DATE	**03/05/20**	PAGE	1	OF	1

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

INPUT

[REF: ANSI/TIA-222-H]

	Member Number	Section Set	Wind Projection (in)	Length (in)	Perimeter (in)	Shape	D_c (in)
	1	F1-S1	3.00	63.00	12.00	Flat	4.24
	2	F1-S1	3.00	46.50	12.00	Flat	4.24
	3	F1-SA1	1.50	35.33	8.00	Flat	2.92
	4	F1-SA1	1.50	35.33	8.00	Flat	2.92
	5	MF-H1	3.50	55.00	11.00	Round	3.50
	6	MF-H1	3.50	55.00	11.00	Round	3.50
	7	F1-CP1	6.00	16.00	13.25	Flat	6.03
	11	F1-S1	3.00	63.00	12.00	Flat	4.24
	12	F1-SA1	1.50	35.33	8.00	Flat	2.92
	13	F1-SA1	1.50	35.33	8.00	Flat	2.92
	14	MF-H1	3.50	55.00	11.00	Round	3.50
	15	MF-H1	3.50	55.00	11.00	Round	3.50
	16	F1-CP1	6.00	16.00	13.25	Flat	6.03
	20	F1-S1	3.00	63.00	12.00	Flat	4.24
	21	F1-SA1	1.50	35.33	8.00	Flat	2.92
	22	F1-SA1	1.50	35.33	8.00	Flat	2.92
	23	MF-H1	3.50	55.00	11.00	Round	3.50
	24	MF-H1	3.50	55.00	11.00	Round	3.50
	25	F1-CP1	6.00	16.00	13.25	Flat	6.03
	29	MF-H1	3.50	54.04	11.00	Round	3.50
	30	MF-H1	3.50	54.04	11.00	Round	3.50
	31	MF-H1	3.50	54.04	11.00	Round	3.50
	35	MF-P1	2.38	96.00	7.46	Round	2.38
	36	MF-P1	2.38	108.00	7.46	Round	2.38
	37	MF-P1	2.38	96.00	7.46	Round	2.38
	38	F1-S1	3.00	46.50	12.00	Flat	4.24
	39	F1-S1	3.00	46.50	12.00	Flat	4.24
	40	Support Rail	2.38	168.00	7.46	Round	2.38
	41	Support Rail	2.38	168.00	7.46	Round	2.38
	42	Support Rail	2.38	168.00	7.46	Round	2.38
	46	F1-CA1	2.50	14.94	10.00	Flat	3.54
	47	F1-CA1	2.50	14.94	10.00	Flat	3.54
	48	F1-CA1	2.50	14.94	10.00	Flat	3.54
	52	MF-P1	2.38	96.00	7.46	Round	2.38
	53	MF-P1	2.38	108.00	7.46	Round	2.38
	54	MF-P1	2.38	96.00	7.46	Round	2.38
	61	MF-P1	2.38	96.00	7.46	Round	2.38
	62	MF-P1	2.38	108.00	7.46	Round	2.38
	63	MF-P1	2.38	96.00	7.46	Round	2.38
	67	F1-CA2	2.50	72.00	10.00	Flat	3.54
	68	F1-CA2	2.50	72.00	10.00	Flat	3.54
	69	F1-CA2	2.50	72.00	10.00	Flat	3.54
	70	F1-CA2	2.50	72.00	10.00	Flat	3.54
	71	F1-CA2	2.50	72.00	10.00	Flat	3.54
	72	F1-CA2	2.50	72.00	10.00	Flat	3.54
	73	MF-P1	2.38	48.00	7.46	Round	2.38
	75	MF-P1	2.38	48.00	7.46	Round	2.38

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Tulsa, OK 74159
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Tower Type		:	Monopole		
Ground Elevation	z_s	:	322	ft	[ASCE7 Hazard Tool]
Tower Height		:	190.00	ft	
Mount Elevation		:	160.00	ft	
Antenna Elevation		:	163.00	ft	
Crest Height		:	0	ft	
Risk Category		:	II		[Table 2-1]
Exposure Category		:	B		[Sec. 2.6.5.1.2]
Topography Category		:	1.00		[Sec. 2.6.6.2]
Wind Velocity	V	:	117	mph	[ASCE7 Hazard Tool]
Ice wind Velocity	V_i	:	50	mph	[ASCE7 Hazard Tool]
Service Velocity	V_s	:	30	mph	[ASCE7 Hazard Tool]
Base Ice thickness	t_i	:	1.00	in	[ASCE7 Hazard Tool]
Seismic Design Cat.		:	B		[ASCE7 Hazard Tool]
	S_S	:	0.23		
	S_1	:	0.06		
	S_{DS}	:	0.25		
	S_{D1}	:	0.09		

Gust Factor	G_h	:	1.00		[Sec. 16.6]
Pressure Coefficient	K_z	:	1.14		[Sec. 2.6.5.2]
Topography Factor	K_{zt}	:	1.00		[Sec. 2.6.6]
Elevation Factor	K_e	:	0.99		[Sec. 2.6.8]
Directionality Factor	K_d	:	0.95		[Sec. 16.6]
Shielding Factor	K_a	:	0.90		[Sec. 16.6]
Design Ice Thickness	t_{iz}	:	1.17	in	[Sec. 2.6.10]

Importance Factor	I_e	:	1		[Table 2-3]
Response Coefficient	C_s	:	0.124		[Sec. 2.7.7.1]
Amplification	A_s	:	2.368421		[Sec. 16.7]

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Manufacturer	Model	Qty	Aspect Ratio	C_a flat/round	EPA_N (ft^2)	EPA_T (ft^2)	$EPA_{N\text{-}Ice}$ (ft^2)	$EPA_{T\text{-}Ice}$ (ft^2)	$F_{A\ No\ Ice\ (N)}$	$F_{A\ No\ Ice\ (T)}$	$F_{A\ Ice\ (N)}$	$F_{A\ Ice\ (T)}$
CCI	DMP65R-BU6D	0.5	3.44	6.72	5.12	1.90	5.88	2.56	0.22	0.08	0.05	0.02
CCI	DMP65R-BU6D	0.5	3.44	1.24	5.12	1.90	5.88	2.56	0.22	0.08	0.05	0.02
Ericsson	RRUS 4449 B5/B12	1	1.90	1.20	1.17	1.64	1.66	2.18	0.05	0.07	0.01	0.01
Ericsson	RRUS 32 B66A	1	3.72	1.25	1.42	2.39	2.03	3.08	0.06	0.10	0.01	0.02
KAELUS	DBCT108F1V92-1	1	1.50	1.20	0.53	0.26	0.86	0.53	0.02	0.01	0.00	0.00
Kathrein	80010965	0.5	3.94	1.26	5.47	1.89	6.29	2.60	0.23	0.08	0.04	0.01
Kathrein	80010965	0.5	3.94	1.26	5.47	1.89	6.29	2.60	0.23	0.08	0.04	0.01
Ericsson	TME-RRUS 32 B30	1	3.89	1.26	1.32	2.29	1.92	2.96	0.06	0.10	0.01	0.02
Ericsson	TME-RRUS 4478 B14	1	2.14	1.20	0.88	1.54	1.31	2.06	0.04	0.06	0.01	0.01
CCI	OPA-65R-LCUU-H6	0.5	5.00	1.31	3.60	1.85	4.32	2.51	0.17	0.09	0.04	0.02
CCI	OPA-65R-LCUU-H6	0.5	5.00	1.31	3.60	1.85	4.32	2.51	0.17	0.09	0.04	0.02
Ericsson	TME-RRUS 32 B2	1	3.89	1.26	1.32	2.28	1.92	2.95	0.06	0.10	0.01	0.02
KAELUS	DBCT108F1V92-1	1	1.50	1.20	0.53	0.26	0.86	0.53	0.02	0.01	0.00	0.00
CCI	DMP65R-BU6D	0.5	3.44	1.24	5.12	1.90	5.88	2.56	0.22	0.08	0.05	0.02
CCI	DMP65R-BU6D	0.5	3.44	1.24	5.12	1.90	5.88	2.56	0.22	0.08	0.05	0.02
Ericsson	RRUS 4449 B5/B12	1	1.90	1.20	1.17	1.64	1.66	2.18	0.05	0.07	0.01	0.01
Ericsson	RRUS 32 B66A	1	3.72	1.25	1.42	2.39	2.03	3.08	0.06	0.10	0.01	0.02
KAELUS	DBCT108F1V92-1	1	1.50	1.20	0.53	0.26	0.86	0.53	0.02	0.01	0.00	0.00
Kathrein	80010965	0.5	3.94	1.26	5.47	1.89	6.29	2.60	0.23	0.08	0.04	0.01
Kathrein	80010965	0.5	3.94	1.26	5.47	1.89	6.29	2.60	0.23	0.08	0.04	0.01
Ericsson	TME-RRUS 32 B30	1	3.89	1.26	1.32	2.29	1.92	2.96	0.06	0.10	0.01	0.02
Ericsson	TME-RRUS 4478 B14	1	2.14	1.20	0.88	1.54	1.31	2.06	0.04	0.06	0.01	0.01
CCI	OPA-65R-LCUU-H6	0.5	5.00	1.31	3.60	1.85	4.32	2.51	0.17	0.09	0.04	0.02
CCI	OPA-65R-LCUU-H6	0.5	5.00	1.31	3.60	1.85	4.32	2.51	0.17	0.09	0.04	0.02
Ericsson	TME-RRUS 32 B2	1	3.89	1.26	1.32	2.28	1.92	2.95	0.06	0.10	0.01	0.02
KAELUS	DBCT108F1V92-1	1	1.50	1.20	0.53	0.26	0.86	0.53	0.02	0.01	0.00	0.00

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Manufacturer	Model	Qty	Aspect Ratio	C_a flat/round	EPA_N (ft^2)	EPA_T (ft^2)	$EPA_{N\text{-}Ice}$ (ft^2)	$EPA_{T\text{-}Ice}$ (ft^2)	$F_{A\ No\ Ice\ (N)}$	$F_{A\ No\ Ice\ (T)}$	$F_{A\ Ice\ (N)}$	$F_{A\ Ice\ (T)}$
CCI	DMP65R-BU6D	0.5	3.44	1.24	5.12	1.90	5.88	2.56	0.22	0.08	0.05	0.02
CCI	DMP65R-BU6D	0.5	3.44	1.24	5.12	1.90	5.88	2.56	0.22	0.08	0.05	0.02
Ericsson	RRUS 4449 B5/B12	1	1.90	1.20	1.17	1.64	1.66	2.18	0.05	0.07	0.01	0.01
Ericsson	RRUS 32 B66A	1	3.72	1.25	1.42	2.39	2.03	3.08	0.06	0.10	0.01	0.02
KAELUS	DBCT108F1V92-1	1	1.50	1.20	0.53	0.26	0.86	0.53	0.02	0.01	0.00	0.00
Kathrein	80010965	0.5	3.94	1.26	5.47	1.89	6.29	2.60	0.23	0.08	0.04	0.01
Kathrein	80010965	0.5	3.94	1.26	5.47	1.89	6.29	2.60	0.23	0.08	0.04	0.01
Ericsson	TME-RRUS 32 B30	1	3.89	1.26	1.32	2.29	1.92	2.96	0.06	0.10	0.01	0.02
Ericsson	TME-RRUS 4478 B14	1	2.14	1.20	0.88	1.54	1.31	2.06	0.04	0.06	0.01	0.01
CCI	OPA-65R-LCUU-H6	0.5	5.00	1.31	3.60	1.85	4.32	2.51	0.17	0.09	0.04	0.02
CCI	OPA-65R-LCUU-H6	0.5	5.00	1.31	3.60	1.85	4.32	2.51	0.17	0.09	0.04	0.02
Ericsson	TME-RRUS 32 B2	1	3.89	1.26	1.32	2.28	1.92	2.95	0.06	0.10	0.01	0.02
KAELUS	DBCT108F1V92-1	1	1.50	1.20	0.53	0.26	0.86	0.53	0.02	0.01	0.00	0.00
Raycap	TME-DC6-48-60-18-8C	1	3.07	0.51	2.23	2.23	2.95	2.95	0.02	0.04	0.01	0.01
Raycap	TME-DC6-48-60-18-8C	1	3.07	0.51	2.23	2.23	2.95	2.95	0.00	0.04	0.01	0.01
Raycap	TME-DC6-48-60-18-8F	1	2.84	0.51	2.39	2.39	3.11	3.11	0.00	0.04	0.01	0.01

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	MF-H1	PIPE_3.0	Beam	Pipe	A53 Gr.B	Typical	2.07	2.85	2.85	5.69
2	MF-P1	PIPE_2.0	Column	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25
3	F1-S1	HSS3X3X4	Beam	Tube	A500 Gr.B ...	Typical	2.44	3.02	3.02	5.08
4	F1-SA1	LL2.5x1.5x4x0	Beam	Double Angle (No Gap)	A36 Gr.36	Typical	1.89	.574	1.19	.042
5	F1-CP1	PL5/8x6	Beam	RECT	A36 Gr.36	Typical	3.75	.122	11.25	.456
6	Support Rail	PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25
7	F1-CA1	L2x2x4	Beam	Single Angle	A36 Gr.36	Typical	.944	.346	.346	.021
8	F1-CA2	L2.5x2.5x3	VBrace	Single Angle	A36 Gr.36	Typical	.901	.535	.535	.011

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(de...	Section/Shape	Type	Design List	Material	Design Rules
1	1	7	1			F1-S1	Beam	Tube	A500 Gr....	Typical
2	2	2	3			F1-S1	Beam	Tube	A500 Gr....	Typical
3	3	5	4			F1-SA1	Beam	Double Angle...	A36 Gr.36	Typical
4	4	6	5			F1-SA1	Beam	Double Angle...	A36 Gr.36	Typical
5	5	9	8			MF-H1	Beam	Pipe	A53 Gr.B	Typical
6	6	10	11			MF-H1	Beam	Pipe	A53 Gr.B	Typical
7	7	12	13			F1-CP1	Beam	RECT	A36 Gr.36	Typical
8	8	14	15			RIGID	None	None	RIGID	Typical
9	9	16	17			RIGID	None	None	RIGID	Typical
10	10	18	19			RIGID	None	None	RIGID	Typical
11	11	24	20			F1-S1	Beam	Tube	A500 Gr....	Typical
12	12	22	21			F1-SA1	Beam	Double Angle...	A36 Gr.36	Typical
13	13	23	22			F1-SA1	Beam	Double Angle...	A36 Gr.36	Typical
14	14	26	25			MF-H1	Beam	Pipe	A53 Gr.B	Typical
15	15	27	28			MF-H1	Beam	Pipe	A53 Gr.B	Typical
16	16	29	30			F1-CP1	Beam	RECT	A36 Gr.36	Typical
17	17	31	32			RIGID	None	None	RIGID	Typical
18	18	33	34			RIGID	None	None	RIGID	Typical
19	19	35	36			RIGID	None	None	RIGID	Typical
20	20	41	37			F1-S1	Beam	Tube	A500 Gr....	Typical
21	21	39	38			F1-SA1	Beam	Double Angle...	A36 Gr.36	Typical
22	22	40	39			F1-SA1	Beam	Double Angle...	A36 Gr.36	Typical
23	23	43	42			MF-H1	Beam	Pipe	A53 Gr.B	Typical
24	24	44	45			MF-H1	Beam	Pipe	A53 Gr.B	Typical
25	25	46	47			F1-CP1	Beam	RECT	A36 Gr.36	Typical
26	26	48	49			RIGID	None	None	RIGID	Typical
27	27	50	51			RIGID	None	None	RIGID	Typical
28	28	52	53			RIGID	None	None	RIGID	Typical
29	29	27	43			MF-H1	Beam	Pipe	A53 Gr.B	Typical
30	30	44	9			MF-H1	Beam	Pipe	A53 Gr.B	Typical
31	31	10	26			MF-H1	Beam	Pipe	A53 Gr.B	Typical
32	32	57	54			RIGID	None	None	RIGID	Typical
33	33	59	56			RIGID	None	None	RIGID	Typical
34	34	58	55			RIGID	None	None	RIGID	Typical
35	35	61	64			MF-P1	Column	Pipe	A53 Gr.B	Typical
36	36	62	65			MF-P1	Column	Pipe	A53 Gr.B	Typical
37	37	60	63			MF-P1	Column	Pipe	A53 Gr.B	Typical
38	38	67	68			F1-S1	Beam	Tube	A500 Gr....	Typical
39	39	69	70			F1-S1	Beam	Tube	A500 Gr....	Typical
40	40	71	72			Support Rail	Beam	Pipe	A53 Gr.B	Typical
41	41	73	74			Support Rail	Beam	Pipe	A53 Gr.B	Typical
42	42	75	76			Support Rail	Beam	Pipe	A53 Gr.B	Typical
43	43	80	77			RIGID	None	None	RIGID	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(de...	Section/Shape	Type	Design List	Material	Design Rules
44	44	82	79			RIGID	None	None	RIGID	Typical
45	45	81	78			RIGID	None	None	RIGID	Typical
46	46	83	84		180	F1-CA1	Beam	Single Angle	A36 Gr.36	Typical
47	47	85	86		180	F1-CA1	Beam	Single Angle	A36 Gr.36	Typical
48	48	87	88		180	F1-CA1	Beam	Single Angle	A36 Gr.36	Typical
49	49	92	89			RIGID	None	None	RIGID	Typical
50	50	94	91			RIGID	None	None	RIGID	Typical
51	51	93	90			RIGID	None	None	RIGID	Typical
52	52	96	99			MF-P1	Column	Pipe	A53 Gr.B	Typical
53	53	97	100			MF-P1	Column	Pipe	A53 Gr.B	Typical
54	54	95	98			MF-P1	Column	Pipe	A53 Gr.B	Typical
55	55	104	101			RIGID	None	None	RIGID	Typical
56	56	106	103			RIGID	None	None	RIGID	Typical
57	57	105	102			RIGID	None	None	RIGID	Typical
58	58	110	107			RIGID	None	None	RIGID	Typical
59	59	112	109			RIGID	None	None	RIGID	Typical
60	60	111	108			RIGID	None	None	RIGID	Typical
61	61	114	117			MF-P1	Column	Pipe	A53 Gr.B	Typical
62	62	115	118			MF-P1	Column	Pipe	A53 Gr.B	Typical
63	63	113	116			MF-P1	Column	Pipe	A53 Gr.B	Typical
64	64	122	119			RIGID	None	None	RIGID	Typical
65	65	124	121			RIGID	None	None	RIGID	Typical
66	66	123	120			RIGID	None	None	RIGID	Typical
67	67	127	128		90	F1-CA2	VBrace	Single Angle	A36 Gr.36	Typical
68	68	128	125		90	F1-CA2	VBrace	Single Angle	A36 Gr.36	Typical
69	69	130	146		90	F1-CA2	VBrace	Single Angle	A36 Gr.36	Typical
70	70	146	129		90	F1-CA2	VBrace	Single Angle	A36 Gr.36	Typical
71	71	133	147		90	F1-CA2	VBrace	Single Angle	A36 Gr.36	Typical
72	72	147	132		90	F1-CA2	VBrace	Single Angle	A36 Gr.36	Typical
73	73	138	139			MF-P1	Column	Pipe	A53 Gr.B	Typical
74	74	137	135			RIGID	None	None	RIGID	Typical
75	75	142	143			MF-P1	Column	Pipe	A53 Gr.B	Typical
76	76	141	136			RIGID	None	None	RIGID	Typical

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Dead	DL		-1			55		6	
2	0 Wind - No Ice	WLZ					55	47		
3	90 Wind - No Ice	WLX					55	47		
4	0 Wind - Ice	WLZ					55	47		
5	90 Wind - Ice	WLX					55	47		
6	0 Wind - Service	WLZ					55	47		
7	90 Wind - Service	WLX					55	47		
8	Ice	OL1					55	47	6	
9	0 Seismic	ELZ					55	47		
10	90 Seismic	ELX					55	47		
11	Live Load a	LL				3				
12	Live Load b	LL				3				
13	Live Load c	LL				3				
14	Live Load d	LL								
15	Maint LL 1	LL					1			
16	Maint LL 2	LL					1			
17	Maint LL 3	LL					1			
18	Maint LL 4	LL					1			
19	Maint LL 5	LL					1			

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
20	Maint LL 6	LL					1			
21	Maint LL 7	LL					1			
22	Maint LL 8	LL					1			
23	Maint LL 9	LL					1			
24	Maint LL 10	LL					1			
25	Maint LL 11	LL					1			
26	Maint LL 12	LL					1			
27	Maint LL 13	LL					1			
28	Maint LL 14	LL					1			
29	Maint LL 15	LL					1			
30	Maint LL 16	LL								
31	Maint LL 17	LL								
32	Maint LL 18	LL								
33	Maint LL 19	LL								
34	Maint LL 20	LL								
35	Maint LL 21	LL								
36	Maint LL 22	LL								
37	Maint LL 23	LL								
38	Maint LL 24	LL								
39	BLC 1 Transient Area...	None						102		
40	BLC 8 Transient Area...	None						102		

Load Combinations

	Description	Sol...	P...	S...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...
1	1.4 Dead	Yes	Y		1	1.4																		
2	1.2 D + 1.0 - 0 W	Yes	Y		1	1.2	2	1																
3	1.2 D + 1.0 - 30 W	Yes	Y		1	1.2	2	.866	3	.5														
4	1.2 D + 1.0 - 60 W	Yes	Y		1	1.2	3	.866	2	.5														
5	1.2 D + 1.0 - 90 W	Yes	Y		1	1.2	3	1																
6	1.2 D + 1.0 - 120 W	Yes	Y		1	1.2	3	.866	2	-.5														
7	1.2 D + 1.0 - 150 W	Yes	Y		1	1.2	2	-.866	3	.5														
8	1.2 D + 1.0 - 180 W	Yes	Y		1	1.2	2	-1																
9	1.2 D + 1.0 - 210 W	Yes	Y		1	1.2	2	-.866	3	-.5														
10	1.2 D + 1.0 - 240 W	Yes	Y		1	1.2	3	-.866	2	-.5														
11	1.2 D + 1.0 - 270 W	Yes	Y		1	1.2	3	-1																
12	1.2 D + 1.0 - 300 W	Yes	Y		1	1.2	3	-.866	2	.5														
13	1.2 D + 1.0 - 330 W	Yes	Y		1	1.2	2	.866	3	-.5														
14	1.2 D + 1.0 - 0 W/Ice	Yes	Y		1	1.2	4	1			8	1												
15	1.2 D + 1.0 - 30 W/Ice	Yes	Y		1	1.2	4	.866	5	.5	8	1												
16	1.2 D + 1.0 - 60 W/Ice	Yes	Y		1	1.2	5	.866	4	.5	8	1												
17	1.2 D + 1.0 - 90 W/Ice	Yes	Y		1	1.2	5	1			8	1												
18	1.2 D + 1.0 - 120 W/Ice	Yes	Y		1	1.2	5	.866	4	-.5	8	1												
19	1.2 D + 1.0 - 150 W/Ice	Yes	Y		1	1.2	4	-.866	5	.5	8	1												
20	1.2 D + 1.0 - 180 W/Ice	Yes	Y		1	1.2	4	-1			8	1												
21	1.2 D + 1.0 - 210 W/Ice	Yes	Y		1	1.2	4	-.866	5	-.5	8	1												
22	1.2 D + 1.0 - 240 W/Ice	Yes	Y		1	1.2	5	-.866	4	-.5	8	1												
23	1.2 D + 1.0 - 270 W/Ice	Yes	Y		1	1.2	5	-1			8	1												
24	1.2 D + 1.0 - 300 W/Ice	Yes	Y		1	1.2	5	-.866	4	.5	8	1												
25	1.2 D + 1.0 - 330 W/Ice	Yes	Y		1	1.2	4	.866	5	-.5	8	1												
26	1.2 D + 1.0 E - 0	Yes	Y		1	1.2	9	1																
27	1.2 D + 1.0 E - 30	Yes	Y		1	1.2	9	.866	10	.5														
28	1.2 D + 1.0 E - 60	Yes	Y		1	1.2	10	.866	9	.5														
29	1.2 D + 1.0 E - 90	Yes	Y		1	1.2	10	1																
30	1.2 D + 1.0 E - 120	Yes	Y		1	1.2	10	.866	9	-.5														
31	1.2 D + 1.0 E - 150	Yes	Y		1	1.2	9	-.866	10	.5														

Load Combinations (Continued)

	Description	Sol...	P...	S...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...
32	1.2 D + 1.0 E - 180	Yes	Y		1	1.2	9	-1																
33	1.2 D + 1.0 E - 210	Yes	Y		1	1.2	9	-.866	10	-.5														
34	1.2 D + 1.0 E - 240	Yes	Y		1	1.2	10	-.866	9	-.5														
35	1.2 D + 1.0 E - 270	Yes	Y		1	1.2	10	-1																
36	1.2 D + 1.0 E - 300	Yes	Y		1	1.2	10	-.866	9	.5														
37	1.2 D + 1.0 E - 330	Yes	Y		1	1.2	9	.866	10	-.5														
38	1.2 D + 1.5 LL a + Ser...	Yes	Y		1	1.2	6	1			11	1.5												
39	1.2 D + 1.5 LL a + Ser...	Yes	Y		1	1.2	6	.866	7	.5	11	1.5												
40	1.2 D + 1.5 LL a + Ser...	Yes	Y		1	1.2	7	.866	6	.5	11	1.5												
41	1.2 D + 1.5 LL a + Ser...	Yes	Y		1	1.2	7	1			11	1.5												
42	1.2 D + 1.5 LL a + Ser...	Yes	Y		1	1.2	7	.866	6	-.5	11	1.5												
43	1.2 D + 1.5 LL a + Ser...	Yes	Y		1	1.2	6	-.866	7	.5	11	1.5												
44	1.2 D + 1.5 LL a + Ser...	Yes	Y		1	1.2	6	-1			11	1.5												
45	1.2 D + 1.5 LL a + Ser...	Yes	Y		1	1.2	6	-.866	7	-.5	11	1.5												
46	1.2 D + 1.5 LL a + Ser...	Yes	Y		1	1.2	7	-.866	6	-.5	11	1.5												
47	1.2 D + 1.5 LL a + Ser...	Yes	Y		1	1.2	7	-1			11	1.5												
48	1.2 D + 1.5 LL a + Ser...	Yes	Y		1	1.2	7	-.866	6	.5	11	1.5												
49	1.2 D + 1.5 LL a + Ser...	Yes	Y		1	1.2	6	.866	7	-.5	11	1.5												
50	1.2 D + 1.5 LL b + Ser...	Yes	Y		1	1.2	6	1			12	1.5												
51	1.2 D + 1.5 LL b + Ser...	Yes	Y		1	1.2	6	.866	7	.5	12	1.5												
52	1.2 D + 1.5 LL b + Ser...	Yes	Y		1	1.2	7	.866	6	.5	12	1.5												
53	1.2 D + 1.5 LL b + Ser...	Yes	Y		1	1.2	7	1			12	1.5												
54	1.2 D + 1.5 LL b + Ser...	Yes	Y		1	1.2	7	.866	6	-.5	12	1.5												
55	1.2 D + 1.5 LL b + Ser...	Yes	Y		1	1.2	6	-.866	7	.5	12	1.5												
56	1.2 D + 1.5 LL b + Ser...	Yes	Y		1	1.2	6	-1			12	1.5												
57	1.2 D + 1.5 LL b + Ser...	Yes	Y		1	1.2	6	-.866	7	-.5	12	1.5												
58	1.2 D + 1.5 LL b + Ser...	Yes	Y		1	1.2	7	-.866	6	-.5	12	1.5												
59	1.2 D + 1.5 LL b + Ser...	Yes	Y		1	1.2	7	-1			12	1.5												
60	1.2 D + 1.5 LL b + Ser...	Yes	Y		1	1.2	7	-.866	6	.5	12	1.5												
61	1.2 D + 1.5 LL b + Ser...	Yes	Y		1	1.2	6	.866	7	-.5	12	1.5												
62	1.2 D + 1.5 LL c + Ser...	Yes	Y		1	1.2	6	1			13	1.5												
63	1.2 D + 1.5 LL c + Ser...	Yes	Y		1	1.2	6	.866	7	.5	13	1.5												
64	1.2 D + 1.5 LL c + Ser...	Yes	Y		1	1.2	7	.866	6	.5	13	1.5												
65	1.2 D + 1.5 LL c + Ser...	Yes	Y		1	1.2	7	1			13	1.5												
66	1.2 D + 1.5 LL c + Ser...	Yes	Y		1	1.2	7	.866	6	-.5	13	1.5												
67	1.2 D + 1.5 LL c + Ser...	Yes	Y		1	1.2	6	-.866	7	.5	13	1.5												
68	1.2 D + 1.5 LL c + Ser...	Yes	Y		1	1.2	6	-1			13	1.5												
69	1.2 D + 1.5 LL c + Ser...	Yes	Y		1	1.2	6	-.866	7	-.5	13	1.5												
70	1.2 D + 1.5 LL c + Ser...	Yes	Y		1	1.2	7	-.866	6	-.5	13	1.5												
71	1.2 D + 1.5 LL c + Ser...	Yes	Y		1	1.2	7	-1			13	1.5												
72	1.2 D + 1.5 LL c + Ser...	Yes	Y		1	1.2	7	-.866	6	.5	13	1.5												
73	1.2 D + 1.5 LL c + Ser...	Yes	Y		1	1.2	6	.866	7	-.5	13	1.5												
74	1.2 D + 1.5 LL d + Ser...	Yes	Y		1	1.2	6	1			14	1.5												
75	1.2 D + 1.5 LL d + Ser...	Yes	Y		1	1.2	6	.866	7	.5	14	1.5												
76	1.2 D + 1.5 LL d + Ser...	Yes	Y		1	1.2	7	.866	6	.5	14	1.5												
77	1.2 D + 1.5 LL d + Ser...	Yes	Y		1	1.2	7	1			14	1.5												
78	1.2 D + 1.5 LL d + Ser...	Yes	Y		1	1.2	7	.866	6	-.5	14	1.5												
79	1.2 D + 1.5 LL d + Ser...	Yes	Y		1	1.2	6	-.866	7	.5	14	1.5												
80	1.2 D + 1.5 LL d + Ser...	Yes	Y		1	1.2	6	-1			14	1.5												
81	1.2 D + 1.5 LL d + Ser...	Yes	Y		1	1.2	6	-.866	7	-.5	14	1.5												
82	1.2 D + 1.5 LL d + Ser...	Yes	Y		1	1.2	7	-.866	6	-.5	14	1.5												
83	1.2 D + 1.5 LL d + Ser...	Yes	Y		1	1.2	7	-1			14	1.5												
84	1.2 D + 1.5 LL d + Ser...	Yes	Y		1	1.2	7	-.866	6	.5	14	1.5												
85	1.2 D + 1.5 LL d + Ser...	Yes	Y		1	1.2	6	.866	7	-.5	14	1.5												
86	1.2 D + 1.5 LL Maint (1)	Yes	Y		1	1.2					15	1.5												
87	1.2 D + 1.5 LL Maint (2)	Yes	Y		1	1.2					16	1.5												
88	1.2 D + 1.5 LL Maint (3)	Yes	Y		1	1.2					17	1.5												

Load Combinations (Continued)

	Description	Sol...	P...	S...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...
89	1.2 D + 1.5 LL Maint (4)	Yes	Y		1	1.2					18	1.5												
90	1.2 D + 1.5 LL Maint (5)	Yes	Y		1	1.2					19	1.5												
91	1.2 D + 1.5 LL Maint (6)	Yes	Y		1	1.2					20	1.5												
92	1.2 D + 1.5 LL Maint (7)	Yes	Y		1	1.2					21	1.5												
93	1.2 D + 1.5 LL Maint (8)	Yes	Y		1	1.2					22	1.5												
94	1.2 D + 1.5 LL Maint (9)	Yes	Y		1	1.2					23	1.5												
95	1.2 D + 1.5 LL Maint (...	Yes	Y		1	1.2					24	1.5												
96	1.2 D + 1.5 LL Maint (...	Yes	Y		1	1.2					25	1.5												
97	1.2 D + 1.5 LL Maint (...	Yes	Y		1	1.2					26	1.5												
98	1.2 D + 1.5 LL Maint (...	Yes	Y		1	1.2					27	1.5												
99	1.2 D + 1.5 LL Maint (...	Yes	Y		1	1.2					28	1.5												
100	1.2 D + 1.5 LL Maint (...	Yes	Y		1	1.2					29	1.5												
101	1.2 D + 1.5 LL Maint (...	Yes	Y		1	1.2					30	1.5												
102	1.2 D + 1.5 LL Maint (...	Yes	Y		1	1.2					31	1.5												
103	1.2 D + 1.5 LL Maint (...	Yes	Y		1	1.2					32	1.5												
104	1.2 D + 1.5 LL Maint (...	Yes	Y		1	1.2					33	1.5												
105	1.2 D + 1.5 LL Maint (...	Yes	Y		1	1.2					34	1.5												
106	1.2 D + 1.5 LL Maint (...	Yes	Y		1	1.2					35	1.5												
107	1.2 D + 1.5 LL Maint (...	Yes	Y		1	1.2					36	1.5												
108	1.2 D + 1.5 LL Maint (...	Yes	Y		1	1.2					37	1.5												
109	1.2 D + 1.5 LL Maint (...	Yes	Y		1	1.2					38	1.5												

Member Point Loads (BLC 1 : Dead)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	35	Y	-.045	%10
2	35	Y	-.045	%95
3	35	Y	-.071	%30
4	35	Y	-.055	%30
5	35	Y	-.014	%75
6	36	Y	-.049	%15
7	36	Y	-.049	%65
8	36	Y	-.053	%30
9	36	Y	-.06	%30
10	36	Y	0	0
11	37	Y	-.04	%10
12	37	Y	-.04	%70
13	37	Y	-.053	%30
14	37	Y	-.014	%50
15	37	Y	0	0
16	61	Y	-.045	%10
17	61	Y	-.045	%95
18	61	Y	-.071	%30
19	61	Y	-.055	%30
20	61	Y	-.014	%75
21	62	Y	-.049	%15
22	62	Y	-.049	%65
23	62	Y	-.053	%30
24	62	Y	-.06	%30
25	62	Y	0	0
26	63	Y	-.04	%10
27	63	Y	-.04	%70
28	63	Y	-.053	%30
29	63	Y	-.014	%50
30	63	Y	0	0
31	52	Y	-.045	%10

Member Point Loads (BLC 1 : Dead) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
32	52	Y	-.045	%95
33	52	Y	-.071	%30
34	52	Y	-.055	%30
35	52	Y	-.014	%75
36	53	Y	-.049	%15
37	53	Y	-.049	%65
38	53	Y	-.053	%30
39	53	Y	-.06	%30
40	53	Y	0	0
41	54	Y	-.04	%10
42	54	Y	-.04	%70
43	54	Y	-.053	%30
44	54	Y	-.014	%50
45	54	Y	0	0
46	73	Y	-.026	%15
47	73	Y	0	0
48	73	Y	0	0
49	73	Y	0	0
50	73	Y	0	0
51	75	Y	-.026	%30
52	75	Y	-.033	%60
53	75	Y	0	0
54	75	Y	0	0
55	75	Y	0	0

Member Point Loads (BLC 2 : 0 Wind - No Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	35	Z	-.223	%10
2	35	Z	-.223	%95
3	35	Z	-.047	%30
4	35	Z	-.06	%30
5	35	Z	-.021	%75
6	36	Z	-.232	%15
7	36	Z	-.232	%65
8	36	Z	-.056	%30
9	36	Z	-.036	%30
10	36	Z	0	0
11	37	Z	-.172	%10
12	37	Z	-.172	%70
13	37	Z	-.056	%30
14	37	Z	-.021	%50
15	37	Z	0	0
16	61	Z	-.223	%10
17	61	Z	-.223	%95
18	61	Z	-.047	%30
19	61	Z	-.06	%30
20	61	Z	-.021	%75
21	62	Z	-.232	%15
22	62	Z	-.232	%65
23	62	Z	-.056	%30
24	62	Z	-.036	%30
25	62	Z	0	0
26	63	Z	-.172	%10
27	63	Z	-.172	%70
28	63	Z	-.056	%30
29	63	Z	-.021	%50

Member Point Loads (BLC 2 : 0 Wind - No Ice) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
30	63	Z	0	0
31	52	Z	-.223	%10
32	52	Z	-.223	%95
33	52	Z	-.047	%30
34	52	Z	-.06	%30
35	52	Z	-.021	%75
36	53	Z	-.232	%15
37	53	Z	-.232	%65
38	53	Z	-.056	%30
39	53	Z	-.036	%30
40	53	Z	0	0
41	54	Z	-.172	%10
42	54	Z	-.172	%70
43	54	Z	-.056	%30
44	54	Z	-.021	%50
45	54	Z	0	0
46	73	Z	-.038	%15
47	73	Z	0	0
48	73	Z	0	0
49	73	Z	0	0
50	73	Z	0	0
51	75	Z	-.038	%30
52	75	Z	-.041	%60
53	75	Z	0	0
54	75	Z	0	0
55	75	Z	0	0

Member Point Loads (BLC 3 : 90 Wind - No Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	35	X	-.084	%10
2	35	X	-.084	%95
3	35	X	-.066	%30
4	35	X	-.101	%30
5	35	X	-.011	%75
6	36	X	-.08	%15
7	36	X	-.08	%65
8	36	X	-.097	%30
9	36	X	-.062	%30
10	36	X	0	0
11	37	X	-.087	%10
12	37	X	-.087	%70
13	37	X	-.097	%30
14	37	X	-.011	%50
15	37	X	0	0
16	61	X	-.084	%10
17	61	X	-.084	%95
18	61	X	-.066	%30
19	61	X	-.101	%30
20	61	X	-.011	%75
21	62	X	-.08	%15
22	62	X	-.08	%65
23	62	X	-.097	%30
24	62	X	-.062	%30
25	62	X	0	0
26	63	X	-.087	%10
27	63	X	-.087	%70

Member Point Loads (BLC 3 : 90 Wind - No Ice) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
28	63	X	-.097	%30
29	63	X	-.011	%50
30	63	X	0	0
31	52	X	-.084	%10
32	52	X	-.084	%95
33	52	X	-.066	%30
34	52	X	-.101	%30
35	52	X	-.011	%75
36	53	X	-.08	%15
37	53	X	-.08	%65
38	53	X	-.097	%30
39	53	X	-.062	%30
40	53	X	0	0
41	54	X	-.087	%10
42	54	X	-.087	%70
43	54	X	-.097	%30
44	54	X	-.011	%50
45	54	X	0	0
46	73	X	-.038	%15
47	73	X	0	0
48	73	X	0	0
49	73	X	0	0
50	73	X	0	0
51	75	X	-.038	%30
52	75	X	-.041	%60
53	75	X	0	0
54	75	X	0	0
55	75	X	0	0

Member Point Loads (BLC 4 : 0 Wind - Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	35	Z	-.046	%10
2	35	Z	-.046	%95
3	35	Z	-.009	%30
4	35	Z	-.011	%30
5	35	Z	-.004	%75
6	36	Z	-.042	%15
7	36	Z	-.042	%65
8	36	Z	-.01	%30
9	36	Z	-.006	%30
10	36	Z	0	0
11	37	Z	-.037	%10
12	37	Z	-.037	%70
13	37	Z	-.01	%30
14	37	Z	-.004	%50
15	37	Z	0	0
16	61	Z	-.046	%10
17	61	Z	-.046	%95
18	61	Z	-.009	%30
19	61	Z	-.011	%30
20	61	Z	-.004	%75
21	62	Z	-.042	%15
22	62	Z	-.042	%65
23	62	Z	-.01	%30
24	62	Z	-.006	%30
25	62	Z	0	0

Member Point Loads (BLC 4 : 0 Wind - Ice) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
26	63	Z	-.037	%10
27	63	Z	-.037	%70
28	63	Z	-.01	%30
29	63	Z	-.004	%50
30	63	Z	0	0
31	52	Z	-.046	%10
32	52	Z	-.046	%95
33	52	Z	-.009	%30
34	52	Z	-.011	%30
35	52	Z	-.004	%75
36	53	Z	-.042	%15
37	53	Z	-.042	%65
38	53	Z	-.01	%30
39	53	Z	-.006	%30
40	53	Z	0	0
41	54	Z	-.037	%10
42	54	Z	-.037	%70
43	54	Z	-.01	%30
44	54	Z	-.004	%50
45	54	Z	0	0
46	73	Z	-.007	%15
47	73	Z	0	0
48	73	Z	0	0
49	73	Z	0	0
50	73	Z	0	0
51	75	Z	-.007	%30
52	75	Z	-.007	%60
53	75	Z	0	0
54	75	Z	0	0
55	75	Z	0	0

Member Point Loads (BLC 5 : 90 Wind - Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	35	X	-.02	%10
2	35	X	-.02	%95
3	35	X	-.012	%30
4	35	X	-.018	%30
5	35	X	-.002	%75
6	36	X	-.015	%15
7	36	X	-.015	%65
8	36	X	-.018	%30
9	36	X	-.011	%30
10	36	X	0	0
11	37	X	-.021	%10
12	37	X	-.021	%70
13	37	X	-.018	%30
14	37	X	-.002	%50
15	37	X	0	0
16	61	X	-.02	%10
17	61	X	-.02	%95
18	61	X	-.012	%30
19	61	X	-.018	%30
20	61	X	-.002	%75
21	62	X	-.015	%15
22	62	X	-.015	%65
23	62	X	-.018	%30

Member Point Loads (BLC 5 : 90 Wind - Ice) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
24	62	X	-.011	%30
25	62	X	0	0
26	63	X	-.021	%10
27	63	X	-.021	%70
28	63	X	-.018	%30
29	63	X	-.002	%50
30	63	X	0	0
31	52	X	-.02	%10
32	52	X	-.02	%95
33	52	X	-.012	%30
34	52	X	-.018	%30
35	52	X	-.002	%75
36	53	X	-.015	%15
37	53	X	-.015	%65
38	53	X	-.018	%30
39	53	X	-.011	%30
40	53	X	0	0
41	54	X	-.021	%10
42	54	X	-.021	%70
43	54	X	-.018	%30
44	54	X	-.002	%50
45	54	X	0	0
46	73	X	-.007	%15
47	73	X	0	0
48	73	X	0	0
49	73	X	0	0
50	73	X	0	0
51	75	X	-.007	%30
52	75	X	-.007	%60
53	75	X	0	0
54	75	X	0	0
55	75	X	0	0

Member Point Loads (BLC 6 : 0 Wind - Service)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	35	Z	-.015	%10
2	35	Z	-.015	%95
3	35	Z	-.003	%30
4	35	Z	-.004	%30
5	35	Z	-.001	%75
6	36	Z	-.015	%15
7	36	Z	-.015	%65
8	36	Z	-.004	%30
9	36	Z	-.002	%30
10	36	Z	0	0
11	37	Z	-.011	%10
12	37	Z	-.011	%70
13	37	Z	-.004	%30
14	37	Z	-.001	%50
15	37	Z	0	0
16	61	Z	-.015	%10
17	61	Z	-.015	%95
18	61	Z	-.003	%30
19	61	Z	-.004	%30
20	61	Z	-.001	%75
21	62	Z	-.015	%15

Member Point Loads (BLC 6 : 0 Wind - Service) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
22	62	Z	-.015	%65
23	62	Z	-.004	%30
24	62	Z	-.002	%30
25	62	Z	0	0
26	63	Z	-.011	%10
27	63	Z	-.011	%70
28	63	Z	-.004	%30
29	63	Z	-.001	%50
30	63	Z	0	0
31	52	Z	-.015	%10
32	52	Z	-.015	%95
33	52	Z	-.003	%30
34	52	Z	-.004	%30
35	52	Z	-.001	%75
36	53	Z	-.015	%15
37	53	Z	-.015	%65
38	53	Z	-.004	%30
39	53	Z	-.002	%30
40	53	Z	0	0
41	54	Z	-.011	%10
42	54	Z	-.011	%70
43	54	Z	-.004	%30
44	54	Z	-.001	%50
45	54	Z	0	0
46	73	Z	-.003	%15
47	73	Z	0	0
48	73	Z	0	0
49	73	Z	0	0
50	73	Z	0	0
51	75	Z	-.003	%30
52	75	Z	-.003	%60
53	75	Z	0	0
54	75	Z	0	0
55	75	Z	0	0

Member Point Loads (BLC 7 : 90 Wind - Service)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	35	X	-.005	%10
2	35	X	-.005	%95
3	35	X	-.004	%30
4	35	X	-.007	%30
5	35	X	-.0007	%75
6	36	X	-.005	%15
7	36	X	-.005	%65
8	36	X	-.006	%30
9	36	X	-.004	%30
10	36	X	0	0
11	37	X	-.006	%10
12	37	X	-.006	%70
13	37	X	-.006	%30
14	37	X	-.0007	%50
15	37	X	0	0
16	61	X	-.005	%10
17	61	X	-.005	%95
18	61	X	-.004	%30
19	61	X	-.007	%30

Member Point Loads (BLC 7 : 90 Wind - Service) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
20	61	X	-.0007	%75
21	62	X	-.005	%15
22	62	X	-.005	%65
23	62	X	-.006	%30
24	62	X	-.004	%30
25	62	X	0	0
26	63	X	-.006	%10
27	63	X	-.006	%70
28	63	X	-.006	%30
29	63	X	-.0007	%50
30	63	X	0	0
31	52	X	-.005	%10
32	52	X	-.005	%95
33	52	X	-.004	%30
34	52	X	-.007	%30
35	52	X	-.0007	%75
36	53	X	-.005	%15
37	53	X	-.005	%65
38	53	X	-.006	%30
39	53	X	-.004	%30
40	53	X	0	0
41	54	X	-.006	%10
42	54	X	-.006	%70
43	54	X	-.006	%30
44	54	X	-.0007	%50
45	54	X	0	0
46	73	X	-.003	%15
47	73	X	0	0
48	73	X	0	0
49	73	X	0	0
50	73	X	0	0
51	75	X	-.003	%30
52	75	X	-.003	%60
53	75	X	0	0
54	75	X	0	0
55	75	X	0	0

Member Point Loads (BLC 8 : Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	35	Y	-.122	%10
2	35	Y	-.122	%95
3	35	Y	-.037	%30
4	35	Y	-.052	%30
5	35	Y	-.012	%75
6	36	Y	-.105	%15
7	36	Y	-.105	%65
8	36	Y	-.049	%30
9	36	Y	-.033	%30
10	36	Y	0	0
11	37	Y	-.1	%10
12	37	Y	-.1	%70
13	37	Y	-.049	%30
14	37	Y	-.012	%50
15	37	Y	0	0
16	61	Y	-.122	%10
17	61	Y	-.122	%95

Member Point Loads (BLC 8 : Ice) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
18	61	Y	-.037	%30
19	61	Y	-.052	%30
20	61	Y	-.012	%75
21	62	Y	-.105	%15
22	62	Y	-.105	%65
23	62	Y	-.049	%30
24	62	Y	-.033	%30
25	62	Y	0	0
26	63	Y	-.1	%10
27	63	Y	-.1	%70
28	63	Y	-.049	%30
29	63	Y	-.012	%50
30	63	Y	0	0
31	52	Y	-.122	%10
32	52	Y	-.122	%95
33	52	Y	-.037	%30
34	52	Y	-.052	%30
35	52	Y	-.012	%75
36	53	Y	-.105	%15
37	53	Y	-.105	%65
38	53	Y	-.049	%30
39	53	Y	-.033	%30
40	53	Y	0	0
41	54	Y	-.1	%10
42	54	Y	-.1	%70
43	54	Y	-.049	%30
44	54	Y	-.012	%50
45	54	Y	0	0
46	73	Y	-.043	%15
47	73	Y	0	0
48	73	Y	0	0
49	73	Y	0	0
50	73	Y	0	0
51	75	Y	-.043	%30
52	75	Y	-.045	%60
53	75	Y	0	0
54	75	Y	0	0
55	75	Y	0	0

Member Point Loads (BLC 9 : 0 Seismic)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	35	Z	-.026	%10
2	35	Z	-.026	%95
3	35	Z	-.021	%30
4	35	Z	-.016	%30
5	35	Z	-.004	%75
6	36	Z	-.029	%15
7	36	Z	-.029	%65
8	36	Z	-.016	%30
9	36	Z	-.018	%30
10	36	Z	0	0
11	37	Z	-.024	%10
12	37	Z	-.024	%70
13	37	Z	-.015	%30
14	37	Z	-.004	%50
15	37	Z	0	0

Member Point Loads (BLC 9 : 0 Seismic) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
16	61	Z	-.026	%10
17	61	Z	-.026	%95
18	61	Z	-.021	%30
19	61	Z	-.016	%30
20	61	Z	-.004	%75
21	62	Z	-.029	%15
22	62	Z	-.029	%65
23	62	Z	-.016	%30
24	62	Z	-.018	%30
25	62	Z	0	0
26	63	Z	-.024	%10
27	63	Z	-.024	%70
28	63	Z	-.015	%30
29	63	Z	-.004	%50
30	63	Z	0	0
31	52	Z	-.026	%10
32	52	Z	-.026	%95
33	52	Z	-.021	%30
34	52	Z	-.016	%30
35	52	Z	-.004	%75
36	53	Z	-.029	%15
37	53	Z	-.029	%65
38	53	Z	-.016	%30
39	53	Z	-.018	%30
40	53	Z	0	0
41	54	Z	-.024	%10
42	54	Z	-.024	%70
43	54	Z	-.015	%30
44	54	Z	-.004	%50
45	54	Z	0	0
46	73	Z	-.008	%15
47	73	Z	0	0
48	73	Z	0	0
49	73	Z	0	0
50	73	Z	0	0
51	75	Z	-.008	%30
52	75	Z	-.01	%60
53	75	Z	0	0
54	75	Z	0	0
55	75	Z	0	0

Member Point Loads (BLC 10 : 90 Seismic)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	35	X	-.026	%10
2	35	X	-.026	%95
3	35	X	-.021	%30
4	35	X	-.016	%30
5	35	X	-.004	%75
6	36	X	-.029	%15
7	36	X	-.029	%65
8	36	X	-.016	%30
9	36	X	-.018	%30
10	36	X	0	0
11	37	X	-.024	%10
12	37	X	-.024	%70
13	37	X	-.015	%30

Member Point Loads (BLC 10 : 90 Seismic) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
14	37	X	-.004	%50
15	37	X	0	0
16	61	X	-.026	%10
17	61	X	-.026	%95
18	61	X	-.021	%30
19	61	X	-.016	%30
20	61	X	-.004	%75
21	62	X	-.029	%15
22	62	X	-.029	%65
23	62	X	-.016	%30
24	62	X	-.018	%30
25	62	X	0	0
26	63	X	-.024	%10
27	63	X	-.024	%70
28	63	X	-.015	%30
29	63	X	-.004	%50
30	63	X	0	0
31	52	X	-.026	%10
32	52	X	-.026	%95
33	52	X	-.021	%30
34	52	X	-.016	%30
35	52	X	-.004	%75
36	53	X	-.029	%15
37	53	X	-.029	%65
38	53	X	-.016	%30
39	53	X	-.018	%30
40	53	X	0	0
41	54	X	-.024	%10
42	54	X	-.024	%70
43	54	X	-.015	%30
44	54	X	-.004	%50
45	54	X	0	0
46	73	X	-.008	%15
47	73	X	0	0
48	73	X	0	0
49	73	X	0	0
50	73	X	0	0
51	75	X	-.008	%30
52	75	X	-.01	%60
53	75	X	0	0
54	75	X	0	0
55	75	X	0	0

Member Point Loads (BLC 15 : Maint LL 1)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	40	Y	-.25	%5

Member Point Loads (BLC 16 : Maint LL 2)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	42	Y	-.25	%5

Member Point Loads (BLC 17 : Maint LL 3)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	41	Y	-.25	%5

Member Point Loads (BLC 18 : Maint LL 4)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	15	Y	-.25	%95

Member Point Loads (BLC 19 : Maint LL 5)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	23	Y	-.25	%95

Member Point Loads (BLC 20 : Maint LL 6)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	40	Y	-.25	%95

Member Point Loads (BLC 21 : Maint LL 7)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	42	Y	-.25	%95

Member Point Loads (BLC 22 : Maint LL 8)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	14	Y	-.25	%95

Member Point Loads (BLC 23 : Maint LL 9)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	6	Y	-.25	%95

Member Point Loads (BLC 24 : Maint LL 10)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	41	Y	-.25	%95

Member Point Loads (BLC 25 : Maint LL 11)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	24	Y	-.25	%95

Member Point Loads (BLC 26 : Maint LL 12)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	5	Y	-.25	%95

Member Point Loads (BLC 27 : Maint LL 13)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	11	Y	-.25	%10

Member Point Loads (BLC 28 : Maint LL 14)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	1	Y	-.25	%10

Member Point Loads (BLC 29 : Maint LL 15)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	20	Y	-.25	%10

Member Distributed Loads (BLC 2 : 0 Wind - No Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	Z	-.016	-.016	0	0
2	2	Z	-.014	-.014	0	0

Member Distributed Loads (BLC 2 : 0 Wind - No Ice) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
3	3	Z	-.008	-.008	0	0
4	4	Z	-.008	-.008	0	0
5	5	Z	-.01	-.01	0	0
6	6	Z	-.01	-.01	0	0
7	7	Z	-.02	-.02	0	0
8	11	Z	-.016	-.016	0	0
9	12	Z	-.008	-.008	0	0
10	13	Z	-.008	-.008	0	0
11	14	Z	-.01	-.01	0	0
12	15	Z	-.01	-.01	0	0
13	16	Z	-.02	-.02	0	0
14	20	Z	-.016	-.016	0	0
15	21	Z	-.008	-.008	0	0
16	22	Z	-.008	-.008	0	0
17	23	Z	-.01	-.01	0	0
18	24	Z	-.01	-.01	0	0
19	25	Z	-.02	-.02	0	0
20	29	Z	-.01	-.01	0	0
21	30	Z	-.01	-.01	0	0
22	31	Z	-.01	-.01	0	0
23	35	Z	-.008	-.008	0	0
24	36	Z	-.008	-.008	0	0
25	37	Z	-.008	-.008	0	0
26	38	Z	-.014	-.014	0	0
27	39	Z	-.014	-.014	0	0
28	40	Z	-.008	-.008	0	0
29	41	Z	-.008	-.008	0	0
30	42	Z	-.008	-.008	0	0
31	46	Z	-.009	-.009	0	0
32	47	Z	-.009	-.009	0	0
33	48	Z	-.009	-.009	0	0
34	52	Z	-.008	-.008	0	0
35	53	Z	-.008	-.008	0	0
36	54	Z	-.008	-.008	0	0
37	61	Z	-.008	-.008	0	0
38	62	Z	-.008	-.008	0	0
39	63	Z	-.008	-.008	0	0
40	67	Z	-.014	-.014	0	0
41	68	Z	-.014	-.014	0	0
42	69	Z	-.014	-.014	0	0
43	70	Z	-.014	-.014	0	0
44	71	Z	-.014	-.014	0	0
45	72	Z	-.014	-.014	0	0
46	73	Z	-.007	-.007	0	0
47	75	Z	-.007	-.007	0	0

Member Distributed Loads (BLC 3 : 90 Wind - No Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	X	-.016	-.016	0	0
2	2	X	-.014	-.014	0	0
3	3	X	-.008	-.008	0	0
4	4	X	-.008	-.008	0	0
5	5	X	-.01	-.01	0	0
6	6	X	-.01	-.01	0	0
7	7	X	-.02	-.02	0	0
8	11	X	-.016	-.016	0	0

Member Distributed Loads (BLC 3 : 90 Wind - No Ice) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
9	12	X	-.008	-.008	0	0
10	13	X	-.008	-.008	0	0
11	14	X	-.01	-.01	0	0
12	15	X	-.01	-.01	0	0
13	16	X	-.02	-.02	0	0
14	20	X	-.016	-.016	0	0
15	21	X	-.008	-.008	0	0
16	22	X	-.008	-.008	0	0
17	23	X	-.01	-.01	0	0
18	24	X	-.01	-.01	0	0
19	25	X	-.02	-.02	0	0
20	29	X	-.01	-.01	0	0
21	30	X	-.01	-.01	0	0
22	31	X	-.01	-.01	0	0
23	35	X	-.008	-.008	0	0
24	36	X	-.008	-.008	0	0
25	37	X	-.008	-.008	0	0
26	38	X	-.014	-.014	0	0
27	39	X	-.014	-.014	0	0
28	40	X	-.008	-.008	0	0
29	41	X	-.008	-.008	0	0
30	42	X	-.008	-.008	0	0
31	46	X	-.009	-.009	0	0
32	47	X	-.009	-.009	0	0
33	48	X	-.009	-.009	0	0
34	52	X	-.008	-.008	0	0
35	53	X	-.008	-.008	0	0
36	54	X	-.008	-.008	0	0
37	61	X	-.008	-.008	0	0
38	62	X	-.008	-.008	0	0
39	63	X	-.008	-.008	0	0
40	67	X	-.014	-.014	0	0
41	68	X	-.014	-.014	0	0
42	69	X	-.014	-.014	0	0
43	70	X	-.014	-.014	0	0
44	71	X	-.014	-.014	0	0
45	72	X	-.014	-.014	0	0
46	73	X	-.007	-.007	0	0
47	75	X	-.007	-.007	0	0

Member Distributed Loads (BLC 4 : 0 Wind - Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	Z	-.005	-.005	0	0
2	2	Z	-.005	-.005	0	0
3	3	Z	-.004	-.004	0	0
4	4	Z	-.004	-.004	0	0
5	5	Z	-.002	-.002	0	0
6	6	Z	-.002	-.002	0	0
7	7	Z	-.006	-.006	0	0
8	11	Z	-.005	-.005	0	0
9	12	Z	-.004	-.004	0	0
10	13	Z	-.004	-.004	0	0
11	14	Z	-.002	-.002	0	0
12	15	Z	-.002	-.002	0	0
13	16	Z	-.006	-.006	0	0
14	20	Z	-.005	-.005	0	0

Member Distributed Loads (BLC 4 : 0 Wind - Ice) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
15	21	Z	-.004	-.004	0	0
16	22	Z	-.004	-.004	0	0
17	23	Z	-.002	-.002	0	0
18	24	Z	-.002	-.002	0	0
19	25	Z	-.006	-.006	0	0
20	29	Z	-.002	-.002	0	0
21	30	Z	-.002	-.002	0	0
22	31	Z	-.002	-.002	0	0
23	35	Z	-.002	-.002	0	0
24	36	Z	-.002	-.002	0	0
25	37	Z	-.002	-.002	0	0
26	38	Z	-.005	-.005	0	0
27	39	Z	-.005	-.005	0	0
28	40	Z	-.002	-.002	0	0
29	41	Z	-.002	-.002	0	0
30	42	Z	-.002	-.002	0	0
31	46	Z	-.004	-.004	0	0
32	47	Z	-.004	-.004	0	0
33	48	Z	-.004	-.004	0	0
34	52	Z	-.002	-.002	0	0
35	53	Z	-.002	-.002	0	0
36	54	Z	-.002	-.002	0	0
37	61	Z	-.002	-.002	0	0
38	62	Z	-.002	-.002	0	0
39	63	Z	-.002	-.002	0	0
40	67	Z	-.005	-.005	0	0
41	68	Z	-.005	-.005	0	0
42	69	Z	-.005	-.005	0	0
43	70	Z	-.005	-.005	0	0
44	71	Z	-.005	-.005	0	0
45	72	Z	-.005	-.005	0	0
46	73	Z	-.002	-.002	0	0
47	75	Z	-.002	-.002	0	0

Member Distributed Loads (BLC 5 : 90 Wind - Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	X	-.005	-.005	0	0
2	2	X	-.005	-.005	0	0
3	3	X	-.004	-.004	0	0
4	4	X	-.004	-.004	0	0
5	5	X	-.002	-.002	0	0
6	6	X	-.002	-.002	0	0
7	7	X	-.006	-.006	0	0
8	11	X	-.005	-.005	0	0
9	12	X	-.004	-.004	0	0
10	13	X	-.004	-.004	0	0
11	14	X	-.002	-.002	0	0
12	15	X	-.002	-.002	0	0
13	16	X	-.006	-.006	0	0
14	20	X	-.005	-.005	0	0
15	21	X	-.004	-.004	0	0
16	22	X	-.004	-.004	0	0
17	23	X	-.002	-.002	0	0
18	24	X	-.002	-.002	0	0
19	25	X	-.006	-.006	0	0
20	29	X	-.002	-.002	0	0

Member Distributed Loads (BLC 5 : 90 Wind - Ice) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
21	30	X	-.002	-.002	0	0
22	31	X	-.002	-.002	0	0
23	35	X	-.002	-.002	0	0
24	36	X	-.002	-.002	0	0
25	37	X	-.002	-.002	0	0
26	38	X	-.005	-.005	0	0
27	39	X	-.005	-.005	0	0
28	40	X	-.002	-.002	0	0
29	41	X	-.002	-.002	0	0
30	42	X	-.002	-.002	0	0
31	46	X	-.004	-.004	0	0
32	47	X	-.004	-.004	0	0
33	48	X	-.004	-.004	0	0
34	52	X	-.002	-.002	0	0
35	53	X	-.002	-.002	0	0
36	54	X	-.002	-.002	0	0
37	61	X	-.002	-.002	0	0
38	62	X	-.002	-.002	0	0
39	63	X	-.002	-.002	0	0
40	67	X	-.005	-.005	0	0
41	68	X	-.005	-.005	0	0
42	69	X	-.005	-.005	0	0
43	70	X	-.005	-.005	0	0
44	71	X	-.005	-.005	0	0
45	72	X	-.005	-.005	0	0
46	73	X	-.002	-.002	0	0
47	75	X	-.002	-.002	0	0

Member Distributed Loads (BLC 6 : 0 Wind - Service)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	Z	-.001	-.001	0	0
2	2	Z	-.0009	-.0009	0	0
3	3	Z	-.0005	-.0005	0	0
4	4	Z	-.0005	-.0005	0	0
5	5	Z	-.0004	-.0004	0	0
6	6	Z	-.0004	-.0004	0	0
7	7	Z	-.001	-.001	0	0
8	11	Z	-.001	-.001	0	0
9	12	Z	-.0005	-.0005	0	0
10	13	Z	-.0005	-.0005	0	0
11	14	Z	-.0004	-.0004	0	0
12	15	Z	-.0004	-.0004	0	0
13	16	Z	-.001	-.001	0	0
14	20	Z	-.001	-.001	0	0
15	21	Z	-.0005	-.0005	0	0
16	22	Z	-.0005	-.0005	0	0
17	23	Z	-.0004	-.0004	0	0
18	24	Z	-.0004	-.0004	0	0
19	25	Z	-.001	-.001	0	0
20	29	Z	-.0004	-.0004	0	0
21	30	Z	-.0004	-.0004	0	0
22	31	Z	-.0004	-.0004	0	0
23	35	Z	-.0003	-.0003	0	0
24	36	Z	-.0003	-.0003	0	0
25	37	Z	-.0003	-.0003	0	0
26	38	Z	-.0009	-.0009	0	0

Member Distributed Loads (BLC 6 : 0 Wind - Service) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
27	39	Z	-.0009	-.0009	0	0
28	40	Z	-.0003	-.0003	0	0
29	41	Z	-.0003	-.0003	0	0
30	42	Z	-.0003	-.0003	0	0
31	46	Z	-.0006	-.0006	0	0
32	47	Z	-.0006	-.0006	0	0
33	48	Z	-.0006	-.0006	0	0
34	52	Z	-.0003	-.0003	0	0
35	53	Z	-.0003	-.0003	0	0
36	54	Z	-.0003	-.0003	0	0
37	61	Z	-.0003	-.0003	0	0
38	62	Z	-.0003	-.0003	0	0
39	63	Z	-.0003	-.0003	0	0
40	67	Z	-.0009	-.0009	0	0
41	68	Z	-.0009	-.0009	0	0
42	69	Z	-.0009	-.0009	0	0
43	70	Z	-.0009	-.0009	0	0
44	71	Z	-.0009	-.0009	0	0
45	72	Z	-.0009	-.0009	0	0
46	73	Z	-.0003	-.0003	0	0
47	75	Z	-.0003	-.0003	0	0

Member Distributed Loads (BLC 7 : 90 Wind - Service)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	X	-.001	-.001	0	0
2	2	X	-.0009	-.0009	0	0
3	3	X	-.0005	-.0005	0	0
4	4	X	-.0005	-.0005	0	0
5	5	X	-.0004	-.0004	0	0
6	6	X	-.0004	-.0004	0	0
7	7	X	-.001	-.001	0	0
8	11	X	-.001	-.001	0	0
9	12	X	-.0005	-.0005	0	0
10	13	X	-.0005	-.0005	0	0
11	14	X	-.0004	-.0004	0	0
12	15	X	-.0004	-.0004	0	0
13	16	X	-.001	-.001	0	0
14	20	X	-.001	-.001	0	0
15	21	X	-.0005	-.0005	0	0
16	22	X	-.0005	-.0005	0	0
17	23	X	-.0004	-.0004	0	0
18	24	X	-.0004	-.0004	0	0
19	25	X	-.001	-.001	0	0
20	29	X	-.0004	-.0004	0	0
21	30	X	-.0004	-.0004	0	0
22	31	X	-.0004	-.0004	0	0
23	35	X	-.0003	-.0003	0	0
24	36	X	-.0003	-.0003	0	0
25	37	X	-.0003	-.0003	0	0
26	38	X	-.0009	-.0009	0	0
27	39	X	-.0009	-.0009	0	0
28	40	X	-.0003	-.0003	0	0
29	41	X	-.0003	-.0003	0	0
30	42	X	-.0003	-.0003	0	0
31	46	X	-.0006	-.0006	0	0
32	47	X	-.0006	-.0006	0	0

Member Distributed Loads (BLC 7 : 90 Wind - Service) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
33	48	X	-.0006	-.0006	0	0
34	52	X	-.0003	-.0003	0	0
35	53	X	-.0003	-.0003	0	0
36	54	X	-.0003	-.0003	0	0
37	61	X	-.0003	-.0003	0	0
38	62	X	-.0003	-.0003	0	0
39	63	X	-.0003	-.0003	0	0
40	67	X	-.0009	-.0009	0	0
41	68	X	-.0009	-.0009	0	0
42	69	X	-.0009	-.0009	0	0
43	70	X	-.0009	-.0009	0	0
44	71	X	-.0009	-.0009	0	0
45	72	X	-.0009	-.0009	0	0
46	73	X	-.0003	-.0003	0	0
47	75	X	-.0003	-.0003	0	0

Member Distributed Loads (BLC 8 : Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	Y	-.008	-.008	0	0
2	2	Y	-.008	-.008	0	0
3	3	Y	-.006	-.006	0	0
4	4	Y	-.006	-.006	0	0
5	5	Y	-.007	-.007	0	0
6	6	Y	-.007	-.007	0	0
7	7	Y	-.01	-.01	0	0
8	11	Y	-.008	-.008	0	0
9	12	Y	-.006	-.006	0	0
10	13	Y	-.006	-.006	0	0
11	14	Y	-.007	-.007	0	0
12	15	Y	-.007	-.007	0	0
13	16	Y	-.01	-.01	0	0
14	20	Y	-.008	-.008	0	0
15	21	Y	-.006	-.006	0	0
16	22	Y	-.006	-.006	0	0
17	23	Y	-.007	-.007	0	0
18	24	Y	-.007	-.007	0	0
19	25	Y	-.01	-.01	0	0
20	29	Y	-.007	-.007	0	0
21	30	Y	-.007	-.007	0	0
22	31	Y	-.007	-.007	0	0
23	35	Y	-.005	-.005	0	0
24	36	Y	-.005	-.005	0	0
25	37	Y	-.005	-.005	0	0
26	38	Y	-.008	-.008	0	0
27	39	Y	-.008	-.008	0	0
28	40	Y	-.005	-.005	0	0
29	41	Y	-.005	-.005	0	0
30	42	Y	-.005	-.005	0	0
31	46	Y	-.007	-.007	0	0
32	47	Y	-.007	-.007	0	0
33	48	Y	-.007	-.007	0	0
34	52	Y	-.005	-.005	0	0
35	53	Y	-.005	-.005	0	0
36	54	Y	-.005	-.005	0	0
37	61	Y	-.005	-.005	0	0
38	62	Y	-.005	-.005	0	0

Member Distributed Loads (BLC 8 : Ice) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
39	63	Y	-.005	-.005	0	0
40	67	Y	-.007	-.007	0	0
41	68	Y	-.007	-.007	0	0
42	69	Y	-.007	-.007	0	0
43	70	Y	-.007	-.007	0	0
44	71	Y	-.007	-.007	0	0
45	72	Y	-.007	-.007	0	0
46	73	Y	-.005	-.005	0	0
47	75	Y	-.005	-.005	0	0

Member Distributed Loads (BLC 9 : 0 Seismic)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	Z	-.004	-.004	0	0
2	2	Z	-.004	-.004	0	0
3	3	Z	-.0009	-.0009	0	0
4	4	Z	-.0009	-.0009	0	0
5	5	Z	-.002	-.002	0	0
6	6	Z	-.002	-.002	0	0
7	7	Z	-.003	-.003	0	0
8	11	Z	-.004	-.004	0	0
9	12	Z	-.0009	-.0009	0	0
10	13	Z	-.0009	-.0009	0	0
11	14	Z	-.002	-.002	0	0
12	15	Z	-.002	-.002	0	0
13	16	Z	-.003	-.003	0	0
14	20	Z	-.004	-.004	0	0
15	21	Z	-.0009	-.0009	0	0
16	22	Z	-.0009	-.0009	0	0
17	23	Z	-.002	-.002	0	0
18	24	Z	-.002	-.002	0	0
19	25	Z	-.003	-.003	0	0
20	29	Z	-.002	-.002	0	0
21	30	Z	-.002	-.002	0	0
22	31	Z	-.002	-.002	0	0
23	35	Z	-.001	-.001	0	0
24	36	Z	-.001	-.001	0	0
25	37	Z	-.001	-.001	0	0
26	38	Z	-.004	-.004	0	0
27	39	Z	-.004	-.004	0	0
28	40	Z	-.001	-.001	0	0
29	41	Z	-.001	-.001	0	0
30	42	Z	-.001	-.001	0	0
31	46	Z	-.001	-.001	0	0
32	47	Z	-.001	-.001	0	0
33	48	Z	-.001	-.001	0	0
34	52	Z	-.001	-.001	0	0
35	53	Z	-.001	-.001	0	0
36	54	Z	-.001	-.001	0	0
37	61	Z	-.001	-.001	0	0
38	62	Z	-.001	-.001	0	0
39	63	Z	-.001	-.001	0	0
40	67	Z	-.0009	-.0009	0	0
41	68	Z	-.0009	-.0009	0	0
42	69	Z	-.0009	-.0009	0	0
43	70	Z	-.0009	-.0009	0	0
44	71	Z	-.0009	-.0009	0	0

Member Distributed Loads (BLC 9 : 0 Seismic) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
45	72	Z	-.0009	-.0009	0	0
46	73	Z	-.001	-.001	0	0
47	75	Z	-.001	-.001	0	0

Member Distributed Loads (BLC 10 : 90 Seismic)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	X	-.004	-.004	0	0
2	2	X	-.004	-.004	0	0
3	3	X	-.0009	-.0009	0	0
4	4	X	-.0009	-.0009	0	0
5	5	X	-.002	-.002	0	0
6	6	X	-.002	-.002	0	0
7	7	X	-.003	-.003	0	0
8	11	X	-.004	-.004	0	0
9	12	X	-.0009	-.0009	0	0
10	13	X	-.0009	-.0009	0	0
11	14	X	-.002	-.002	0	0
12	15	X	-.002	-.002	0	0
13	16	X	-.003	-.003	0	0
14	20	X	-.004	-.004	0	0
15	21	X	-.0009	-.0009	0	0
16	22	X	-.0009	-.0009	0	0
17	23	X	-.002	-.002	0	0
18	24	X	-.002	-.002	0	0
19	25	X	-.003	-.003	0	0
20	29	X	-.002	-.002	0	0
21	30	X	-.002	-.002	0	0
22	31	X	-.002	-.002	0	0
23	35	X	-.001	-.001	0	0
24	36	X	-.001	-.001	0	0
25	37	X	-.001	-.001	0	0
26	38	X	-.004	-.004	0	0
27	39	X	-.004	-.004	0	0
28	40	X	-.001	-.001	0	0
29	41	X	-.001	-.001	0	0
30	42	X	-.001	-.001	0	0
31	46	X	-.001	-.001	0	0
32	47	X	-.001	-.001	0	0
33	48	X	-.001	-.001	0	0
34	52	X	-.001	-.001	0	0
35	53	X	-.001	-.001	0	0
36	54	X	-.001	-.001	0	0
37	61	X	-.001	-.001	0	0
38	62	X	-.001	-.001	0	0
39	63	X	-.001	-.001	0	0
40	67	X	-.0009	-.0009	0	0
41	68	X	-.0009	-.0009	0	0
42	69	X	-.0009	-.0009	0	0
43	70	X	-.0009	-.0009	0	0
44	71	X	-.0009	-.0009	0	0
45	72	X	-.0009	-.0009	0	0
46	73	X	-.001	-.001	0	0
47	75	X	-.001	-.001	0	0

Member Distributed Loads (BLC 39 : BLC 1 Transient Area Loads)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]

Member Distributed Loads (BLC 39 : BLC 1 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	11	Y	-.0005891	-.007	0	1.225
2	11	Y	-.007	-.01	1.225	2.45
3	11	Y	-.01	-.009	2.45	3.675
4	13	Y	-.003	-.007	0	.412
5	13	Y	-.007	-.012	.412	.824
6	13	Y	-.012	-.018	.824	1.237
7	13	Y	-.018	-.011	1.237	1.649
8	13	Y	-.011	-.0001866	1.649	2.061
9	15	Y	-.001	-.007	0	.917
10	15	Y	-.007	-.009	.917	1.833
11	15	Y	-.009	-.008	1.833	2.75
12	15	Y	-.008	-.005	2.75	3.667
13	15	Y	-.005	-.0009712	3.667	4.583
14	20	Y	-.0005891	-.007	0	1.225
15	20	Y	-.007	-.01	1.225	2.45
16	20	Y	-.01	-.009	2.45	3.675
17	21	Y	-.000187	-.011	.883	1.295
18	21	Y	-.011	-.018	1.295	1.708
19	21	Y	-.018	-.012	1.708	2.12
20	21	Y	-.012	-.007	2.12	2.532
21	21	Y	-.007	-.003	2.532	2.944
22	23	Y	-.001	-.007	0	.917
23	23	Y	-.007	-.009	.917	1.833
24	23	Y	-.009	-.008	1.833	2.75
25	23	Y	-.008	-.005	2.75	3.667
26	23	Y	-.005	-.0009773	3.667	4.583
27	29	Y	-.008	-.011	0	.901
28	29	Y	-.011	-.016	.901	1.801
29	29	Y	-.016	-.016	1.801	2.702
30	29	Y	-.016	-.011	2.702	3.603
31	29	Y	-.011	-.008	3.603	4.503
32	1	Y	-.0005891	-.007	0	1.225
33	1	Y	-.007	-.01	1.225	2.45
34	1	Y	-.01	-.009	2.45	3.675
35	3	Y	-.000187	-.011	.883	1.295
36	3	Y	-.011	-.018	1.295	1.708
37	3	Y	-.018	-.012	1.708	2.12
38	3	Y	-.012	-.007	2.12	2.532
39	3	Y	-.007	-.003	2.532	2.944
40	5	Y	-.001	-.007	0	.917
41	5	Y	-.007	-.009	.917	1.833
42	5	Y	-.009	-.008	1.833	2.75
43	5	Y	-.008	-.005	2.75	3.667
44	5	Y	-.005	-.0009773	3.667	4.583
45	22	Y	-.003	-.007	0	.412
46	22	Y	-.007	-.012	.412	.824
47	22	Y	-.012	-.018	.824	1.237
48	22	Y	-.018	-.011	1.237	1.649
49	22	Y	-.011	-.0001866	1.649	2.061
50	24	Y	-.001	-.007	0	.917
51	24	Y	-.007	-.009	.917	1.833
52	24	Y	-.009	-.008	1.833	2.75
53	24	Y	-.008	-.005	2.75	3.667
54	24	Y	-.005	-.0009712	3.667	4.583
55	30	Y	-.008	-.011	0	.901
56	30	Y	-.011	-.016	.901	1.801
57	30	Y	-.016	-.016	1.801	2.702

Member Distributed Loads (BLC 39 : BLC 1 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
58	30	Y	-.016	-.011	2.702	3.603
59	30	Y	-.011	-.008	3.603	4.503
60	4	Y	-.003	-.007	0	.412
61	4	Y	-.007	-.012	.412	.824
62	4	Y	-.012	-.018	.824	1.237
63	4	Y	-.018	-.011	1.237	1.649
64	4	Y	-.011	-.0001866	1.649	2.061
65	6	Y	-.001	-.007	0	.917
66	6	Y	-.007	-.009	.917	1.833
67	6	Y	-.009	-.008	1.833	2.75
68	6	Y	-.008	-.005	2.75	3.667
69	6	Y	-.005	-.0009712	3.667	4.583
70	12	Y	-.000187	-.011	.883	1.295
71	12	Y	-.011	-.018	1.295	1.708
72	12	Y	-.018	-.012	1.708	2.12
73	12	Y	-.012	-.007	2.12	2.532
74	12	Y	-.007	-.003	2.532	2.944
75	14	Y	-.001	-.007	0	.917
76	14	Y	-.007	-.009	.917	1.833
77	14	Y	-.009	-.008	1.833	2.75
78	14	Y	-.008	-.005	2.75	3.667
79	14	Y	-.005	-.0009773	3.667	4.583
80	31	Y	-.008	-.011	0	.901
81	31	Y	-.011	-.016	.901	1.801
82	31	Y	-.016	-.016	1.801	2.702
83	31	Y	-.016	-.011	2.702	3.603
84	31	Y	-.011	-.008	3.603	4.503
85	11	Y	-.004	-.006	0	.525
86	11	Y	-.006	-.005	.525	1.05
87	11	Y	-.005	-.003	1.05	1.575
88	11	Y	-.003	-.0008127	1.575	2.1
89	11	Y	-.0008127	-6.348e-5	2.1	2.625
90	16	Y	-.0007435	-.0007435	.073	1.261
91	20	Y	-.004	-.006	0	.525
92	20	Y	-.006	-.005	.525	1.05
93	20	Y	-.005	-.003	1.05	1.575
94	20	Y	-.003	-.0008126	1.575	2.1
95	20	Y	-.0008126	-6.341e-5	2.1	2.625
96	25	Y	-.0007442	-.0007442	.073	1.261
97	1	Y	-.004	-.006	0	.525
98	1	Y	-.006	-.005	.525	1.05
99	1	Y	-.005	-.003	1.05	1.575
100	1	Y	-.003	-.0008126	1.575	2.1
101	1	Y	-.0008126	-6.341e-5	2.1	2.625
102	7	Y	-.0007442	-.0007442	.073	1.261

Member Distributed Loads (BLC 40 : BLC 8 Transient Area Loads)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	11	Y	-.0003411	-.004	0	1.225
2	11	Y	-.004	-.006	1.225	2.45
3	11	Y	-.006	-.005	2.45	3.675
4	13	Y	-.002	-.004	0	.412
5	13	Y	-.004	-.006	.412	.824
6	13	Y	-.006	-.01	.824	1.237
7	13	Y	-.01	-.006	1.237	1.649
8	13	Y	-.006	-.0001041	1.649	2.061

Member Distributed Loads (BLC 40 : BLC 8 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
9	15	Y	-.0005837	-.004	0	.917
10	15	Y	-.004	-.005	.917	1.833
11	15	Y	-.005	-.004	1.833	2.75
12	15	Y	-.004	-.003	2.75	3.667
13	15	Y	-.003	-.0005417	3.667	4.583
14	20	Y	-.0003409	-.004	0	1.225
15	20	Y	-.004	-.006	1.225	2.45
16	20	Y	-.006	-.005	2.45	3.675
17	21	Y	-.0001043	-.006	.883	1.295
18	21	Y	-.006	-.01	1.295	1.708
19	21	Y	-.01	-.006	1.708	2.12
20	21	Y	-.006	-.004	2.12	2.532
21	21	Y	-.004	-.002	2.532	2.944
22	23	Y	-.0005857	-.004	0	.917
23	23	Y	-.004	-.005	.917	1.833
24	23	Y	-.005	-.004	1.833	2.75
25	23	Y	-.004	-.003	2.75	3.667
26	23	Y	-.003	-.0005451	3.667	4.583
27	29	Y	-.004	-.006	0	.901
28	29	Y	-.006	-.009	.901	1.801
29	29	Y	-.009	-.009	1.801	2.702
30	29	Y	-.009	-.006	2.702	3.603
31	29	Y	-.006	-.004	3.603	4.503
32	1	Y	-.0003535	-.004	0	1.225
33	1	Y	-.004	-.006	1.225	2.45
34	1	Y	-.006	-.005	2.45	3.675
35	3	Y	-.0001122	-.006	.883	1.295
36	3	Y	-.006	-.011	1.295	1.708
37	3	Y	-.011	-.007	1.708	2.12
38	3	Y	-.007	-.004	2.12	2.532
39	3	Y	-.004	-.002	2.532	2.944
40	5	Y	-.0006301	-.004	0	.917
41	5	Y	-.004	-.005	.917	1.833
42	5	Y	-.005	-.005	1.833	2.75
43	5	Y	-.005	-.003	2.75	3.667
44	5	Y	-.003	-.0005864	3.667	4.583
45	22	Y	-.002	-.004	0	.412
46	22	Y	-.004	-.007	.412	.824
47	22	Y	-.007	-.011	.824	1.237
48	22	Y	-.011	-.006	1.237	1.649
49	22	Y	-.006	-.000112	1.649	2.061
50	24	Y	-.000628	-.004	0	.917
51	24	Y	-.004	-.005	.917	1.833
52	24	Y	-.005	-.005	1.833	2.75
53	24	Y	-.005	-.003	2.75	3.667
54	24	Y	-.003	-.0005827	3.667	4.583
55	30	Y	-.005	-.007	0	.901
56	30	Y	-.007	-.009	.901	1.801
57	30	Y	-.009	-.009	1.801	2.702
58	30	Y	-.009	-.007	2.702	3.603
59	30	Y	-.007	-.005	3.603	4.503
60	4	Y	-.002	-.004	0	.412
61	4	Y	-.004	-.007	.412	.824
62	4	Y	-.007	-.011	.824	1.237
63	4	Y	-.011	-.006	1.237	1.649
64	4	Y	-.006	-.000112	1.649	2.061
65	6	Y	-.000628	-.004	0	.917

Member Distributed Loads (BLC 40 : BLC 8 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
66	6	Y	-.004	-.005	.917	1.833
67	6	Y	-.005	-.005	1.833	2.75
68	6	Y	-.005	-.003	2.75	3.667
69	6	Y	-.003	-.0005827	3.667	4.583
70	12	Y	-.0001122	-.006	.883	1.295
71	12	Y	-.006	-.011	1.295	1.708
72	12	Y	-.011	-.007	1.708	2.12
73	12	Y	-.007	-.004	2.12	2.532
74	12	Y	-.004	-.002	2.532	2.944
75	14	Y	-.0006301	-.004	0	.917
76	14	Y	-.004	-.005	.917	1.833
77	14	Y	-.005	-.005	1.833	2.75
78	14	Y	-.005	-.003	2.75	3.667
79	14	Y	-.003	-.0005864	3.667	4.583
80	31	Y	-.005	-.007	0	.901
81	31	Y	-.007	-.009	.901	1.801
82	31	Y	-.009	-.009	1.801	2.702
83	31	Y	-.009	-.007	2.702	3.603
84	31	Y	-.007	-.005	3.603	4.503
85	11	Y	-.003	-.003	0	.525
86	11	Y	-.003	-.003	.525	1.05
87	11	Y	-.003	-.002	1.05	1.575
88	11	Y	-.002	-.0004875	1.575	2.1
89	11	Y	-.0004875	-3.805e-5	2.1	2.625
90	16	Y	-.0004465	-.0004465	.073	1.261
91	20	Y	-.003	-.003	0	.525
92	20	Y	-.003	-.003	.525	1.05
93	20	Y	-.003	-.002	1.05	1.575
94	20	Y	-.002	-.0004875	1.575	2.1
95	20	Y	-.0004875	-3.805e-5	2.1	2.625
96	25	Y	-.0004465	-.0004465	.073	1.261
97	1	Y	-.003	-.003	0	.525
98	1	Y	-.003	-.003	.525	1.05
99	1	Y	-.003	-.002	1.05	1.575
100	1	Y	-.002	-.0004875	1.575	2.1
101	1	Y	-.0004875	-3.805e-5	2.1	2.625
102	7	Y	-.0004465	-.0004465	.073	1.261

Member Area Loads (BLC 1 : Dead)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[ksf]
1	28	143A	145	42	Y	Two Way	-.01
2	45	145	144	8	Y	Two Way	-.01
3	11	144	143A	25	Y	Two Way	-.01
4	28	143A	25		Y	Two Way	-.01
5	42	45	145		Y	Two Way	-.01
6	11	8	144		Y	Two Way	-.01

Member Area Loads (BLC 8 : Ice)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[ksf]
1	28	143A	145	42	Y	Two Way	-.006
2	45	145	144	8	Y	Two Way	-.006
3	11	144	143A	25	Y	Two Way	-.006
4	28	143A	25		Y	Two Way	-.006
5	42	45	145		Y	Two Way	-.006
6	11	8	144		Y	Two Way	-.006

Joint Loads and Enforced Displacements (BLC 11 : Live Load a)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*s^2*ft)]
1	54	L	Y	-.5
2	89	L	Y	-.5
3	107	L	Y	-.5

Joint Loads and Enforced Displacements (BLC 12 : Live Load b)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*s^2*ft)]
1	56	L	Y	-.5
2	91	L	Y	-.5
3	109	L	Y	-.5

Joint Loads and Enforced Displacements (BLC 13 : Live Load c)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*s^2*ft)]
1	55	L	Y	-.5
2	90	L	Y	-.5
3	108	L	Y	-.5

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	2	max	.715	5	1.374	14	.667	2	3.032	2	.636	11	.511	11
2		min	-.69	11	-.04	8	-2.953	8	-.893	8	-.685	5	-.441	5
3	67	max	.22	6	1.468	18	1.733	2	.527	13	.818	3	.694	12
4		min	-2.354	24	.078	12	-.61	8	-1.575	7	-.866	9	-2.606	6
5	69	max	2.332	16	1.553	22	1.917	2	.518	3	.857	7	2.534	10
6		min	-.244	10	.115	4	-.751	8	-1.714	9	-.907	13	-.675	4
7	128	max	.892	5	1.871	14	2.068	14	0	2	0	11	0	11
8		min	-.847	11	-.003	8	-.113	8	-.002	20	0	5	0	5
9	146	max	1.76	17	1.843	18	.606	2	.001	25	0	3	.002	24
10		min	-.019	11	.148	12	-1.504	8	0	7	0	9	0	6
11	147	max	.031	5	1.842	22	.591	2	.001	15	0	7	0	10
12		min	-1.81	23	.154	4	-1.412	8	0	9	0	13	-.002	16
13	Totals:	max	5.52	5	9.098	18	7.344	2						
14		min	-5.52	11	4.391	12	-7.344	8						

Envelope AISC 15th(360-16): LRFD Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	phi*P...	phi*P...	phi*M...	phi*M.....		Eqn
1	46	L2x2x4	.915	0	22	.021	0	y	95	28.278	30.586	.691	1.577	...	H2-1
2	48	L2x2x4	.912	0	17	.022	0	y	91	28.278	30.586	.691	1.577	...	H2-1
3	47	L2x2x4	.910	0	14	.021	0	y	92	28.278	30.586	.691	1.577	...	H2-1
4	61	PIPE_2.0	.501	4	8	.193	.5		15	14.916	32.13	1.872	1.872	...	H1-1b
5	35	PIPE_2.0	.493	4	8	.193	.5		19	14.916	32.13	1.872	1.872	...	H1-1b
6	52	PIPE_2.0	.493	4	8	.191	.5		23	14.916	32.13	1.872	1.872	...	H1-1b
7	39	HSS3X3X4	.386	0	9	.122	0	z	7	89.816	101.0...	8.556	8.556	...	H1-1b
8	38	HSS3X3X4	.380	0	7	.112	0	z	3	89.816	101.0...	8.556	8.556	...	H1-1b
9	2	HSS3X3X4	.368	0	13	.101	0	y	12	89.816	101.0...	8.556	8.556	...	H1-1b
10	68	L2.5x2.5x3	.345	2.937	15	.015	0	z	20	9.122	29.192	.873	1.531	...	H2-1
11	70	L2.5x2.5x3	.344	2.937	19	.015	6	z	24	9.122	29.192	.873	1.531	...	H2-1
12	72	L2.5x2.5x3	.340	2.937	23	.015	6	z	16	9.122	29.192	.873	1.531	...	H2-1
13	67	L2.5x2.5x3	.338	3.062	25	.014	6	z	20	9.122	29.192	.873	1.531	...	H2-1
14	71	L2.5x2.5x3	.337	3.062	21	.014	6	z	16	9.122	29.192	.873	1.531	...	H2-1
15	69	L2.5x2.5x3	.333	3.062	17	.014	0	z	24	9.122	29.192	.873	1.531	...	H2-1
16	42	PIPE_2.0	.331	.583	22	.154	1.75		20	5.019	32.13	1.872	1.872	...	H1-1b
17	40	PIPE_2.0	.329	.583	14	.154	1.75		22	5.019	32.13	1.872	1.872	...	H1-1b

Envelope AISC 15th(360-16): LRFD Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	phi*P...	phi*P...	phi*M...	phi*M.....		Eqn
18	41	PIPE_2.0	.329	.583	17	.155	1.75		15	5.019	32.13	1.872	1.872	...	H1-1b
19	36	PIPE_2.0	.310	4.969	8	.047	1.5		11	12.144	32.13	1.872	1.872	...	H1-1b
20	12	LL2.5x1.5x4x0	.270	0	19	.053	0	y	18	47.257	61.236	.992	4.809	...	H1-1b
21	3	LL2.5x1.5x4x0	.269	0	15	.054	0	y	14	47.257	61.236	.992	4.809	...	H1-1b
22	22	LL2.5x1.5x4x0	.268	2.944	21	.052	2.944	y	22	47.257	61.236	.992	4.809	...	H1-1b
23	4	LL2.5x1.5x4x0	.267	2.944	25	.053	2.944	y	14	47.257	61.236	.992	4.809	...	H1-1b
24	21	LL2.5x1.5x4x0	.267	0	23	.053	0	y	22	47.257	61.236	.992	4.809	...	H1-1b
25	13	LL2.5x1.5x4x0	.266	2.944	17	.052	2.944	y	18	47.257	61.236	.992	4.809	...	H1-1b
26	62	PIPE_2.0	.259	4.969	4	.052	1.5		7	12.144	32.13	1.872	1.872	...	H1-1b
27	53	PIPE_2.0	.258	4.969	12	.056	1.5		2	12.144	32.13	1.872	1.872	...	H1-1b
28	7	PL5/8x6	.234	.667	19	.162	.667	y	2	80.311	121.5	1.582	14.696	...	H1-1b
29	25	PL5/8x6	.234	.667	15	.165	.681	y	9	80.311	121.5	1.582	14.721	...	H1-1b
30	16	PL5/8x6	.230	.667	25	.116	.653	y	7	80.311	121.5	1.582	14.812	...	H1-1b
31	54	PIPE_2.0	.220	4	8	.190	.5		25	14.916	32.13	1.872	1.872	...	H1-1b
32	37	PIPE_2.0	.190	4	2	.191	.5		21	14.916	32.13	1.872	1.872	...	H1-1b
33	63	PIPE_2.0	.189	4	8	.190	.5		17	14.916	32.13	1.872	1.872	...	H1-1b
34	31	PIPE_3.0	.185	2.674	56	.080	4.503		2	58.497	65.205	5.749	5.749	...	H1-1b
35	30	PIPE_3.0	.184	2.674	51	.071	0		2	58.497	65.205	5.749	5.749	...	H1-1b
36	29	PIPE_3.0	.184	2.674	61	.076	4.503		7	58.497	65.205	5.749	5.749	...	H1-1b
37	5	PIPE_3.0	.149	3.151	8	.129	.334		13	58.27	65.205	5.749	5.749	...	H1-1b
38	23	PIPE_3.0	.126	3.199	2	.137	.334		9	58.27	65.205	5.749	5.749	...	H1-1b
39	14	PIPE_3.0	.121	3.199	9	.117	.334		17	58.27	65.205	5.749	5.749	...	H1-1b
40	6	PIPE_3.0	.121	3.151	8	.120	.334		15	58.27	65.205	5.749	5.749	...	H1-1b
41	1	HSS3X3X4	.120	5.141	14	.061	4.867	y	13	81.416	101.0...	8.556	8.556	...	H1-1b
42	20	HSS3X3X4	.120	5.141	21	.062	4.867	z	7	81.416	101.0...	8.556	8.556	...	H1-1b
43	15	PIPE_3.0	.119	3.199	14	.121	.334		19	58.27	65.205	5.749	5.749	...	H1-1b
44	11	HSS3X3X4	.119	5.141	18	.054	4.867	z	3	81.416	101.0...	8.556	8.556	...	H1-1b
45	24	PIPE_3.0	.117	3.199	19	.119	.334		23	58.27	65.205	5.749	5.749	...	H1-1b
46	73	PIPE_2.0	.052	2.5	6	.006	2.5		6	26.521	32.13	1.872	1.872	...	H1-1b
47	75	PIPE_2.0	.043	2.5	10	.010	2.5		10	26.521	32.13	1.872	1.872	...	H1-1b

Exhibit F

Power Density/RF Emissions Report

SITESAFE
RF COMPLIANCE EXPERTS

8618 Westwood Center Drive, Suite 315, Vienna, VA 22182
703.276.1100 • 703.276.1169 fax
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Crown Castle on behalf of AT&T Mobility, LLC Site BU – 829046 Application ID – ATT order 509322 Site Name – Weston/ Rt-57/ Norfield R Site Compliance Report

56 Norfield Road (Town Hall)
Weston, CT 06883

Latitude: N41-12-08.40
Longitude: W73-22-46.60
Structure Type: Monopole

Report generated date: March 25, 2020
Report by: Zyotty Thamsil
Customer Contact: Anne Marie Zsamba

AT&T Mobility, LLC will be compliant upon completion of the remediation identified in Section 3.2.

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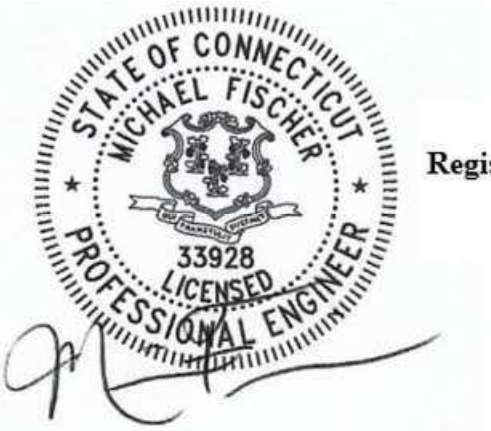

Michael Fischer, P.E.
Registered Professional Engineer (Electrical)
Connecticut License Number 33928
Expires January 31, 2021

Signed 25 March 2020

Crown Castle on behalf of AT&T Mobility, LLC
Weston/ Rt-57/ Norfield R - 829046
Radio Frequency (RF) Site Compliance Report

56 Norfield Road (Town Hall), Weston, CT 06883

8618 Westwood Center Drive • Suite 315 • Vienna, VA 22182
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1 Executive Summary

AT&T Mobility, LLC has contracted with Site Safe, LLC (Sitesafe) , an independent Radio Frequency (RF) regulatory and engineering consulting firm, to determine whether the proposed communications site, 829046 - Weston/ Rt-57/ Norfield R, located at 56 Norfield Rd. (Town Hall), Weston, CT, is in compliance with the Federal Communication Commission (FCC) Rules and Regulations for RF emissions.

This report contains a detailed summary of the RF environment at the site including:

- Diagram of the site
- Inventory of the make / model of all antennas
- Theoretical MPE based on modeling

This report addresses exposure to radio frequency electromagnetic fields in accordance with the FCC Rules and Regulations for all individuals, classified in two groups, "Occupational or Controlled" and "General Public or Uncontrolled." **AT&T Mobility, LLC will be compliant** with the FCC Rules and Regulations, as described in OET Bulletin 65, **upon implementation of the proposed remediation.** The corrective actions needed to make this site compliant are located in Section 3.2.

AT&T Mobility, LLC proposes to make modifications to an existing site. The proposed antennas are noted as "proposed" in the antenna table under Section 6.

This document and the conclusions herein are based on the information provided by AT&T Mobility, LLC.

If you have any questions regarding RF safety and regulatory compliance, please do not hesitate to contact Sitesafe's Customer Support Department at (703) 276-1100.

2 Regulatory Basis

2.1 FCC Rules and Regulations

In 1996, the Federal Communications Commission (FCC) adopted regulations for evaluating the effects of RF emissions in 47 CFR § 1.1307 and 1.1310. The guideline from the FCC Office of Engineering and Technology is Bulletin 65 ("OET Bulletin 65"), *Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields*, Edition 97-01, published August 1997. Since 1996, the FCC periodically reviews these rules and regulations as per their congressional mandate.

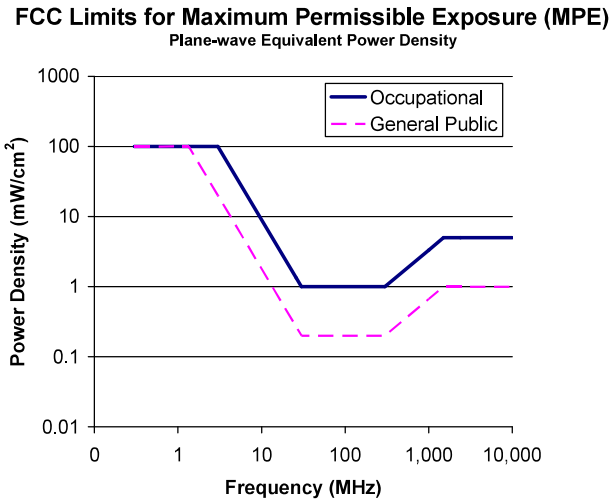
FCC regulations define two separate tiers of exposure limits: Occupational or "Controlled environment" and General Public or "Uncontrolled environment". The General Public limits are generally five times more conservative or restrictive than the Occupational limit. These limits apply to *accessible* areas where workers or the general public may be exposed to Radio Frequency (RF) electromagnetic fields.

Occupational or Controlled limits apply in situations in which persons are exposed as a consequence of their employment and where those persons exposed have been made fully aware of the potential for exposure and can exercise control over their exposure.

An area is considered a Controlled environment when access is limited to these aware personnel. Typical criteria are restricted access (i.e. locked or alarmed doors, barriers, etc.) to the areas where antennas are located coupled with proper RF warning signage. A site with Controlled environments is evaluated with Occupational limits.

All other areas are considered Uncontrolled environments. If a site has no access controls or no RF warning signage it is evaluated with General Public limits.

The theoretical modeling of the RF electromagnetic fields has been performed in accordance with OET Bulletin 65. The Maximum Permissible Exposure (MPE) limits utilized in this analysis are outlined in the following diagram:



Limits for Occupational/Controlled Exposure (MPE)

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

Limits for General Population/Uncontrolled Exposure (MPE)

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

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

2.2 OSHA Statement

The General Duty clause of the OSHA Act (Section 5) outlines the occupational safety and health responsibilities of the employer and employee. The General Duty clause in Section 5 states:

(a) Each employer –

(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;

(2) shall comply with occupational safety and health standards promulgated under this Act.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

OSHA has defined Radiofrequency and Microwave Radiation safety standards for workers who may enter hazardous RF areas. Regulation Standards 29 CFR § 1910.147 identify a generic lockout/tagout procedure aimed to control the unexpected energization or startup of machines when maintenance or service is being performed.

3 Site Compliance

3.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, Sitesafe has determined that:

AT&T Mobility, LLC will be compliant with the FCC Rules and Regulations, as described in OET Bulletin 65, **upon implementation of the proposed remediation.** The corrective actions needed to make this site compliant are located in Section 3.2.

The compliance determination is based on theoretical modeling, RF signage placement recommendations, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the proposed AT&T Mobility, LLC deployment plan could result in the site being rendered non-compliant.

3.2 Actions for Site Compliance

Based on common industry practice and our understanding of FCC and OSHA requirements, this section provides a statement of recommendations for site compliance. If required, RF alert signage recommendations have been proposed based on theoretical analysis of MPE levels. Where applicable, barriers can consist of locked doors, fencing, railing, rope, chain, paint striping or tape, combined with RF alert signage.

The site will be made compliant if the following changes are implemented:

Monopole Access Location

Ensure that a Warning sign is installed.
Ensure that a NOC Information sign is installed.
Ensure that the monopole access point or gate is locked/restricted.

4 Safety Plan and Procedures

The following items are general safety recommendations that should be administered on a site by site basis as needed by the carrier.

General Maintenance Work: Any maintenance personnel required to work immediately in front of antennas and / or in areas indicated as above 100% of the Occupational MPE limits should coordinate with the wireless operators to disable transmitters during their work activities.

Training and Qualification Verification: All personnel accessing areas indicated as exceeding the General Population MPE limits should have a basic understanding of EME awareness and RF Safety procedures when working around transmitting antennas. Awareness training increases a worker's understanding to potential RF exposure scenarios. Awareness can be achieved in a number of ways (e.g. videos, formal classroom lecture or internet-based courses).

Physical Access Control: Access restrictions to transmitting antennas locations is the primary element in a site safety plan. Examples of access restrictions are as follows:

- Locked door or gate
- Alarmed door
- Locked ladder access
- Restrictive Barrier at antenna (e.g. Chain link with posted RF Sign)

RF Signage: Everyone should obey all posted signs at all times. RF signs play an important role in properly warning a worker prior to entering into a potential RF Exposure area.

Assume all antennas are active: Due to the nature of telecommunications transmissions, an antenna transmits intermittently. Always assume an antenna is transmitting. Never stop in front of an antenna. If you have to pass by an antenna, move through as quickly and safely as possible thereby reducing any exposure to a minimum.

Maintain a 3-foot clearance from all antennas: There is a direct correlation between the strength of an EME field and the distance from the transmitting antenna. The farther away from an antenna, the lower the corresponding EME field is.

Site RF Emissions Diagram(s): Section 5 of this report contains RF Diagram(s) that outline various theoretical Maximum Permissible Exposure (MPE) areas at the site. The modeling is a worst-case scenario assuming a duty cycle of 100% for each transmitting antenna at full power. This analysis is based on one of two access control criteria: General Public criteria means the access to the site is uncontrolled and anyone can gain access. Occupational criteria means the access is restricted and only properly trained individuals can gain access to the antenna locations.

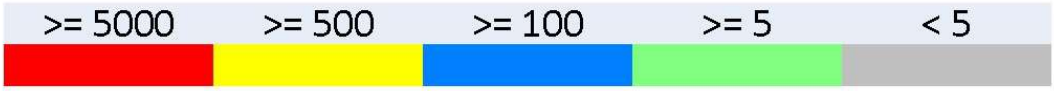
5 Analysis

5.1 RF Emissions Diagram

The RF diagram(s) below display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix B.

The key at the bottom of each diagram indicates if percentages displayed are referenced to FCC **General Public** Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

% of FCC Public Exposure Limit

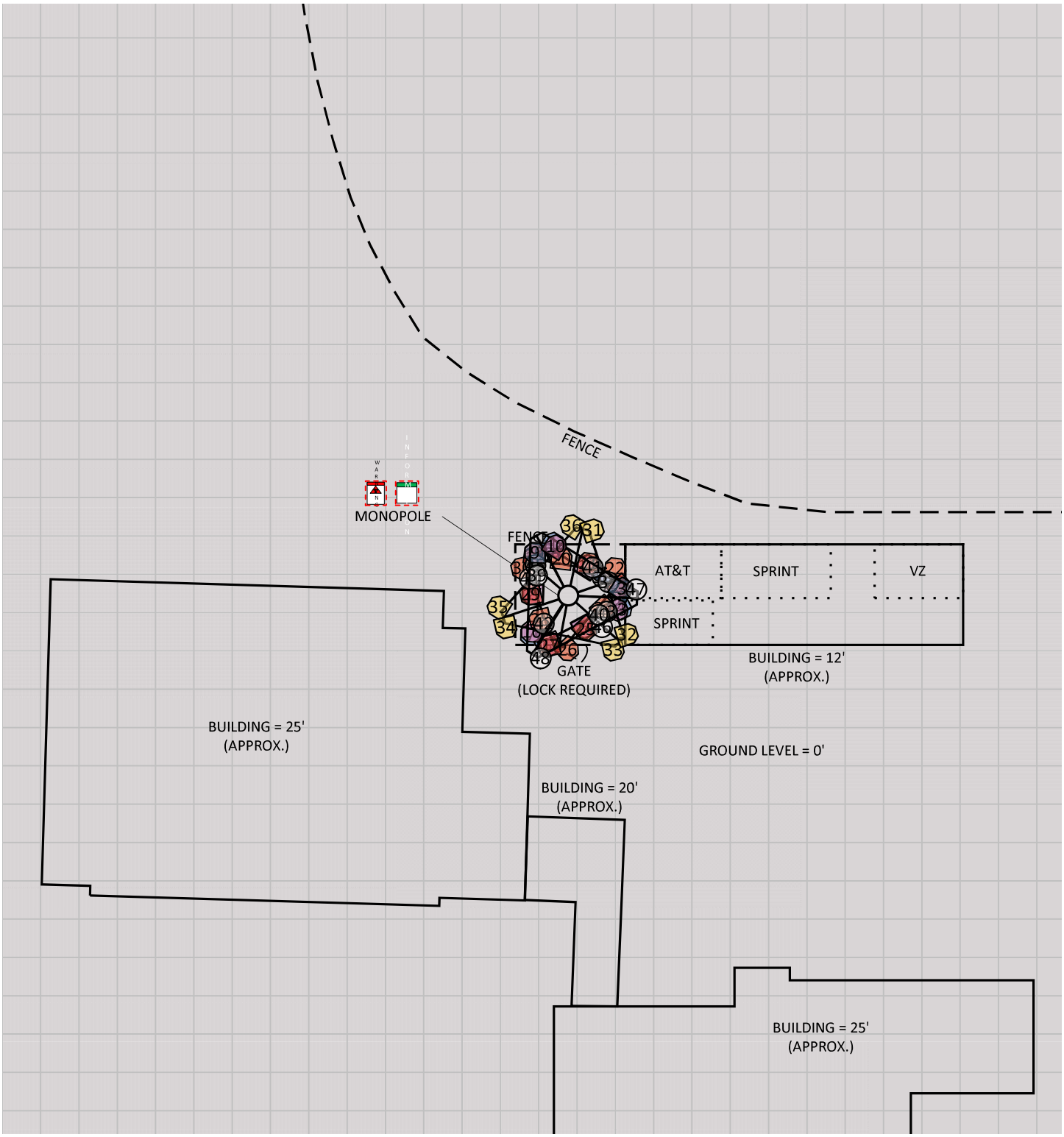


This table displays the maximum theoretical percentage of the FCC's General Public MPE limits:

	General Public Levels:	
Exposure Type:	**Maximum**	**Spatial Average**
Reference Level:	**Antenna**	**Ground**
AT&T Mobility, LLC:	15,257.4%	<1%
Composite:	15,273.8%	<1%

Note: On the diagrams shown below, each level is marked with a height. For all diagrams that are marked as *Spatial Average 0' – 6'*, the modeling program will spatially average the emissions within the area six feet above each set level. This provides an accurate spatial average of the percentage of the FCC's MPE limits within an accessible area.

RF Exposure Simulation For: Weston/ Rt-57/ Norfield R
Composite Diagram



% of FCC Public Exposure Limit
Spatial Average 0' - 6'

% of FCC Public Exposure Limit

>= 5000	>= 500	>= 100	>= 5	< 5

Carrier Identification

AT&T MOBILITY LLC · VERIZON WIRELESS · T-MOBILE · SPRINT · UNKNOWN CARRIER

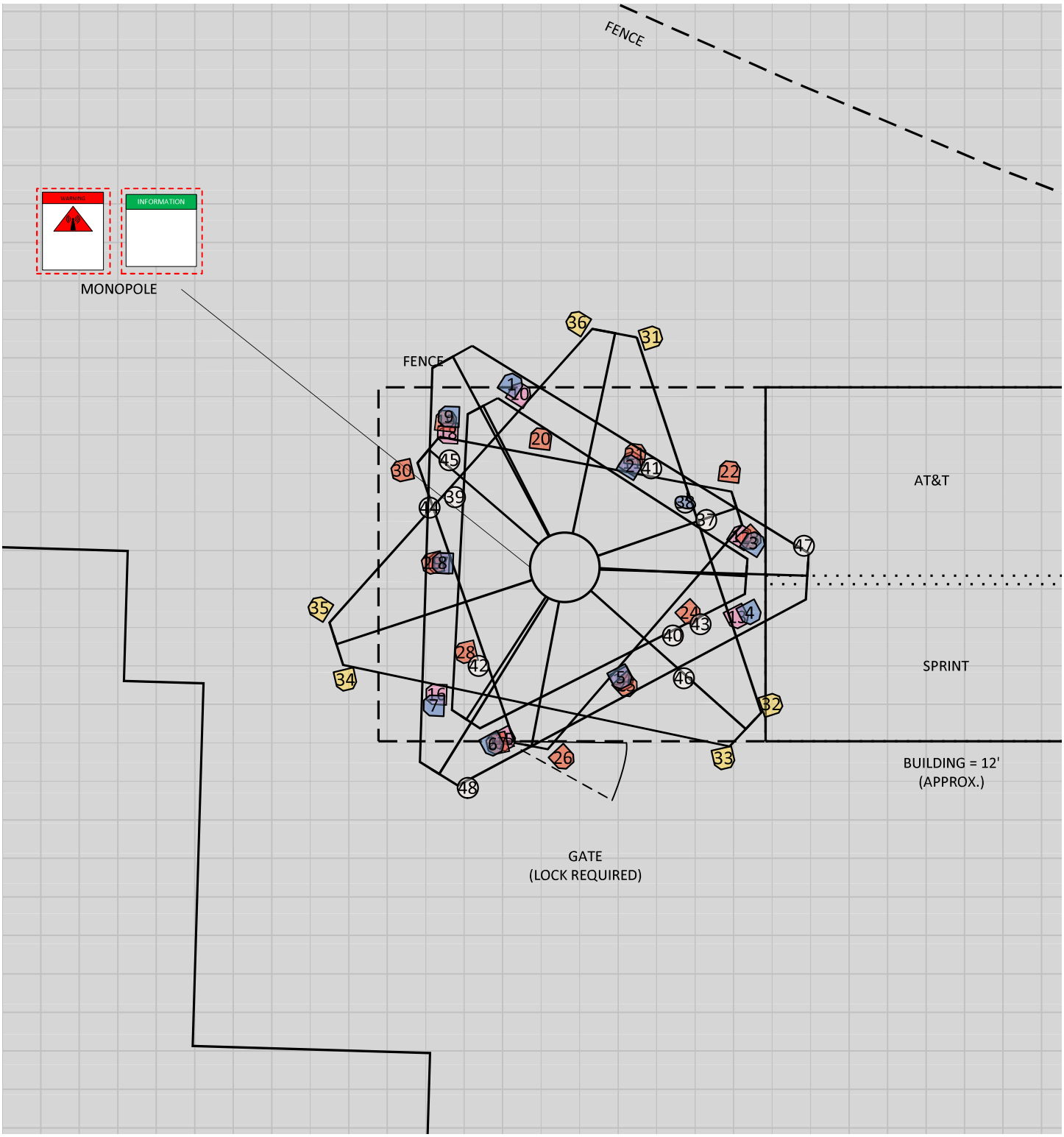
Barrier · **Proposed Barriers/ Signs**

(Feet)
0 17.1 34.2

www.sitesafe.com
Site Name:Weston/ Rt-57/ Norfield R
3/25/2020 1:42:39 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Weston/ Rt-57/ Norfield R
All Sector Detailed View



% of FCC Public Exposure Limit
Spatial Average 0' - 6'

% of FCC Public Exposure Limit

>= 5000	>= 500	>= 100	>= 5	< 5

Carrier Identification

AT&T MOBILITY LLC · VERIZON WIRELESS · T-MOBILE · SPRINT · UNKNOWN CARRIER

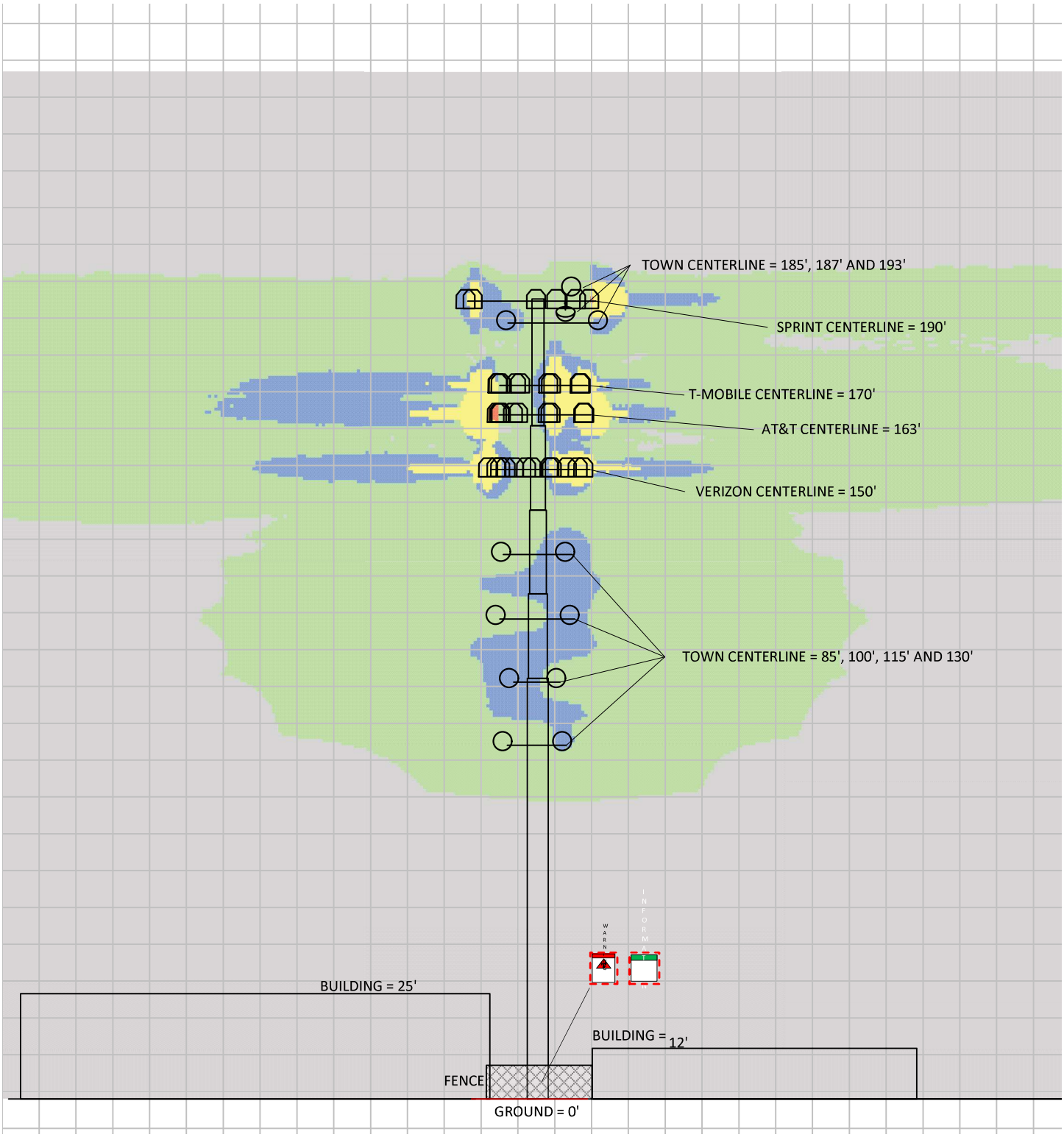
Barrier · **Proposed Barriers/ Signs**

(Feet)
0 4.7 9.4

www.sitesafe.com
Site Name:Weston/ Rt-57/ Norfield R
3/25/2020 1:43:14 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Weston/ Rt-57/ Norfield R
Elevation View



% of FCC Public Exposure Limit

% of FCC Public Exposure Limit

>= 5000	>= 500	>= 100	>= 5	< 5

Carrier Identification

AT&T MOBILITY LLC · VERIZON WIRELESS · T-MOBILE · SPRINT · UNKNOWN CARRIER

Barrier ——— **Proposed Barriers/ Signs** — — — —

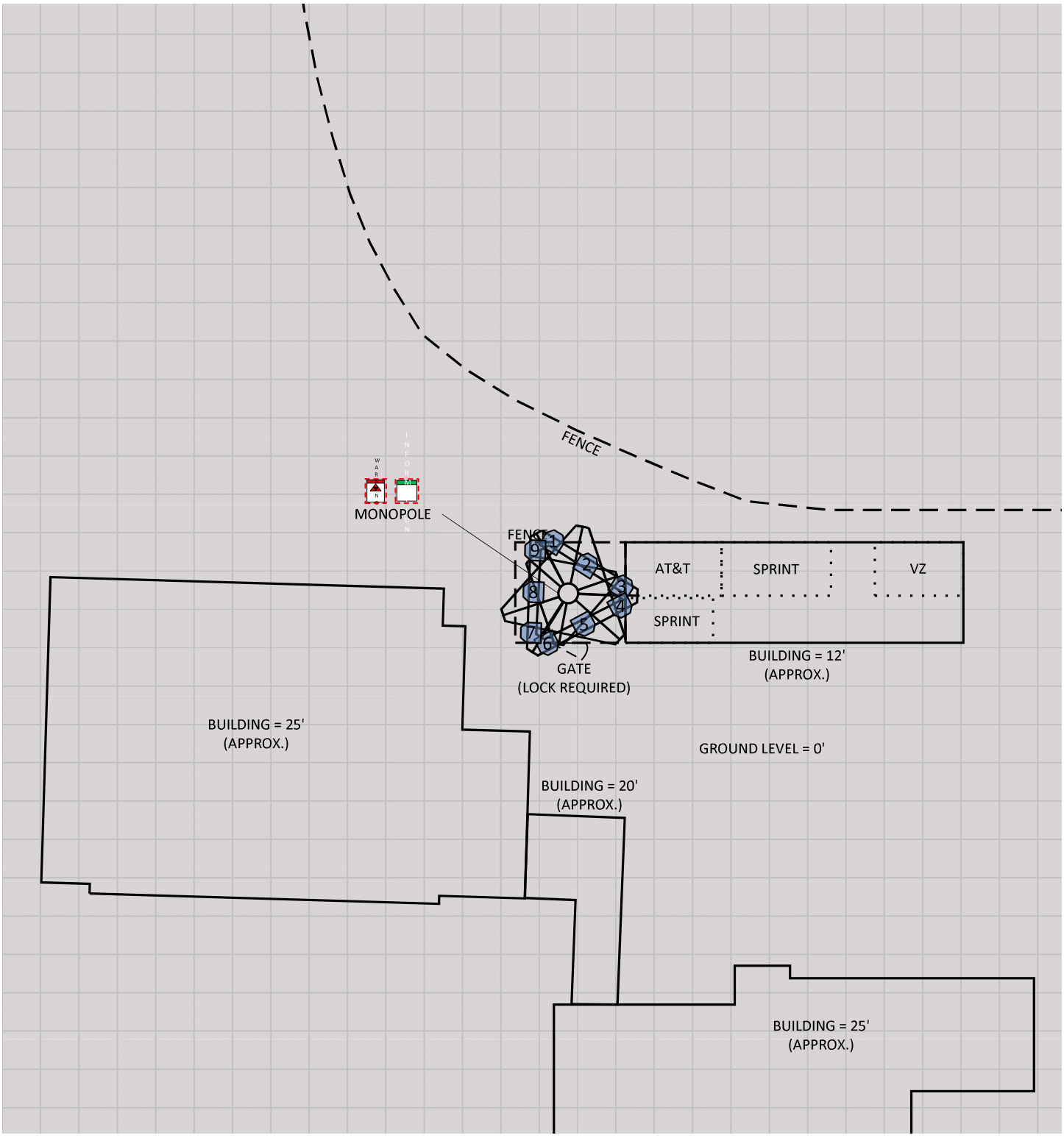
(Feet)

0 17.9 35.8

www.sitesafe.com
Site Name:Weston/ Rt-57/ Norfield R
3/25/2020 1:46:15 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Single Level (0)

RF Exposure Simulation For: Weston/ Rt-57/ Norfield R
AT&T Mobility, LLC Contribution



% of FCC Public Exposure Limit
Spatial Average 0' - 6'

% of FCC Public Exposure Limit

>= 5000	>= 500	>= 100	>= 5	< 5

Carrier Identification

AT&T MOBILITY LLC · VERIZON WIRELESS · T-MOBILE · SPRINT · UNKNOWN CARRIER

Barrier · **Proposed Barriers/ Signs**

(Feet)
0 17.1 34.2

www.sitesafe.com
Site Name:Weston/ Rt-57/ Norfield R
3/25/2020 1:44:28 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

6 Antenna Inventory

The Antenna Inventory shows all transmitting antennas at the site. This inventory was provided by the customer and was utilized by Sitesafe to perform theoretical modeling of RF emissions. The inventory coincides with the site diagrams in this report, identifying each antenna's location at 829046 - Weston/ Rt-57/ Norfield R. The antenna information collected includes the following information:

- Licensee or wireless operator name
- Frequency or frequency band
- Transmitter power – Transmitter Power Output ("TPO"), Effective Radiated Power ("ERP"), or Equivalent Isotropic Radiated Power ("EIRP")
- Antenna manufacturer make, model, and gain

For other carriers at this site, equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers and client provided data.

The following antenna inventory was provided by the customer and was utilized to create the site model diagrams:

Antenna Inventory																	
Ant #	Operator	Antenna Make and Model	Ant Type	Len (ft)	TX Freq (MHz)	Tech	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power BW (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z(ft) (AGL)	MDT	EDT
1	AT&T MOBILITY LLC (PROPOSED)	Cci DMP65R-BU6D	Panel	5.9	734	LTE	30	11.76	65.7	160	TPO	Watt	1	2399.5	163	0	0
1	AT&T MOBILITY LLC (PROPOSED)	Cci DMP65R-BU6D	Panel	5.9	788	LTE	30	11.76	65.7	160	TPO	Watt	1	2399.5	163	0	0
2	AT&T MOBILITY LLC	Kathrein-Scala 800-10965	Panel	6.6	1930	LTE	30	15.88	65.1	160	TPO	Watt	1	6196.1	163	0	0
2	AT&T MOBILITY LLC	Kathrein-Scala 800-10965	Panel	6.6	2110	LTE	30	16.48	65.2	160	TPO	Watt	1	7114.1	163	0	0
3	AT&T MOBILITY LLC	Cci OPA-65R-LCUU-H6	Panel	6	2345	LTE	30	15.06	63.7	100	TPO	Watt	1	3206.3	163	0	0
4	AT&T MOBILITY LLC (PROPOSED)	Cci DMP65R-BU6D	Panel	5.9	734	LTE	150	11.76	65.7	160	TPO	Watt	1	2399.5	163	0	0
4	AT&T MOBILITY LLC (PROPOSED)	Cci DMP65R-BU6D	Panel	5.9	788	LTE	150	11.76	65.7	160	TPO	Watt	1	2399.5	163	0	0
5	AT&T MOBILITY LLC	Kathrein-Scala 800-10965	Panel	6.6	1930	LTE	150	15.88	65.1	160	TPO	Watt	1	6196.1	163	0	0
5	AT&T MOBILITY LLC	Kathrein-Scala 800-10965	Panel	6.6	2110	LTE	150	16.48	65.2	160	TPO	Watt	1	7114.1	163	0	0
6	AT&T MOBILITY LLC	Cci OPA-65R-LCUU-H6	Panel	6	2345	LTE	150	15.06	63.7	100	TPO	Watt	1	3206.3	163	0	0
7	AT&T MOBILITY LLC (PROPOSED)	Cci DMP65R-BU6D	Panel	5.9	734	LTE	270	11.76	65.7	160	TPO	Watt	1	2399.5	163	0	0
7	AT&T MOBILITY LLC (PROPOSED)	Cci DMP65R-BU6D	Panel	5.9	788	LTE	270	11.76	65.7	160	TPO	Watt	1	2399.5	163	0	0
8	AT&T MOBILITY LLC	Kathrein-Scala 800-10965	Panel	6.6	1930	LTE	270	15.88	65.1	160	TPO	Watt	1	6196.1	163	0	0
8	AT&T MOBILITY LLC	Kathrein-Scala 800-10965	Panel	6.6	2110	LTE	270	16.48	65.2	160	TPO	Watt	1	7114.1	163	0	0
9	AT&T MOBILITY LLC	Cci OPA-65R-LCUU-H6	Panel	6	2345	LTE	270	15.06	63.7	100	TPO	Watt	1	3206.3	163	0	0
10	T-MOBILE	Ericsson AIR 21 B2A B4P	Panel	4.7	1900		30	15.37	65	160	TPO	Watt	1	5509.6	170	0	0
11	T-MOBILE	RFS APXVAARR24_43-U-NA20	Panel	8	600		30	13.2	62.76	120	TPO	Watt	1	2507.2	170	0	0

Antenna Inventory																	
Ant #	Operator	Antenna Make and Model	Ant Type	Len (ft)	TX Freq (MHz)	Tech	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power BW (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z(ft) (AGL)	MDT	EDT
11	T-MOBILE	RFS APXVAARR24_43-U-NA20	Panel	8	700		30	13.39	62	160	TPO	Watt	1	3492.4	170	0	0
12	T-MOBILE	Ericsson AIR 32 B2A B66AA	Panel	4.9	2100		30	15.86	61	160	TPO	Watt	1	6167.7	170	0	0
13	T-MOBILE	Ericsson AIR 21 B2A B4P	Panel	4.7	1900		150	15.37	65	160	TPO	Watt	1	5509.6	170	0	0
14	T-MOBILE	RFS APXVAARR24_43-U-NA20	Panel	8	600		150	13.2	62.76	120	TPO	Watt	1	2507.2	170	0	0
14	T-MOBILE	RFS APXVAARR24_43-U-NA20	Panel	8	700		150	13.39	62	160	TPO	Watt	1	3492.4	170	0	0
15	T-MOBILE	Ericsson AIR 32 B2A B66AA	Panel	4.9	2100		150	15.86	61	160	TPO	Watt	1	6167.7	170	0	0
16	T-MOBILE	Ericsson AIR 21 B2A B4P	Panel	4.7	1900		270	15.37	65	160	TPO	Watt	1	5509.6	170	0	0
17	T-MOBILE	RFS APXVAARR24_43-U-NA20	Panel	8	600		270	13.2	62.76	120	TPO	Watt	1	2507.2	170	0	0
17	T-MOBILE	RFS APXVAARR24_43-U-NA20	Panel	8	700		270	13.39	62	160	TPO	Watt	1	3492.4	170	0	0
18	T-MOBILE	Ericsson AIR 32 B2A B66AA	Panel	4.9	2100		270	15.86	61	160	TPO	Watt	1	6167.7	170	0	0
19	VERIZON WIRELESS	Quintel QS6656-5	Panel	6	751		5	11.26	70	160	TPO	Watt	1	2138.6	150	0	0
20	VERIZON WIRELESS	Andrew DB846F65ZAXY	Panel	6	850		5	14.51	65	80	TPO	Watt	1	2259.9	150	0	0
21	VERIZON WIRELESS	Quintel QS6656-5	Panel	6	1900		5	15.06	69	160	TPO	Watt	1	5130	150	0	0
21	VERIZON WIRELESS	Quintel QS6656-5	Panel	6	2100		5	15.56	65	160	TPO	Watt	1	5756	150	0	0
22	VERIZON WIRELESS	Andrew DB846F65ZAXY	Panel	6	850		5	14.51	65	160	TPO	Watt	1	4519.8	150	0	0
23	VERIZON WIRELESS	Quintel QS6656-5	Panel	6	751		135	11.26	70	160	TPO	Watt	1	2138.6	150	0	0
24	VERIZON WIRELESS	Quintel QS6656-5	Panel	6	1900		135	15.06	69	160	TPO	Watt	1	5130	150	0	0
24	VERIZON WIRELESS	Quintel QS6656-5	Panel	6	2100		135	15.56	65	160	TPO	Watt	1	5756	150	0	0
25	VERIZON WIRELESS	Andrew DB846F65ZAXY	Panel	6	850		135	14.51	65	80	TPO	Watt	1	2259.9	150	0	0
26	VERIZON WIRELESS	Andrew DB846F65ZAXY	Panel	6	850		135	14.51	65	160	TPO	Watt	1	4519.8	150	0	0
27	VERIZON WIRELESS	Quintel QS6656-5	Panel	6	751		255	11.26	70	160	TPO	Watt	1	2138.6	150	0	0
28	VERIZON WIRELESS	Quintel QS6656-5	Panel	6	1900		255	15.06	69	160	TPO	Watt	1	5130	150	0	0

Antenna Inventory																	
Ant #	Operator	Antenna Make and Model	Ant Type	Len (ft)	TX Freq (MHz)	Tech	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power BW (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z(ft) (AGL)	MDT	EDT
28	VERIZON WIRELESS	Quintel QS6656-5	Panel	6	2100		255	15.56	65	160	TPO	Watt	1	5756	150	0	0
29	VERIZON WIRELESS	Antel LPA-80080-6CF	Panel	5.9	850		255	14.01	80	80	TPO	Watt	1	2014.1	150	0	0
30	VERIZON WIRELESS	Antel LPA-80080-6CF	Panel	5.9	850		255	14.01	80	160	TPO	Watt	1	4028.3	150	0	0
31	SPRINT	RFS APXVTM14-C-I20	Panel	4.7	2500		70	15.86	68	160	TPO	Watt	1	6167.7	190	0	0
32	SPRINT	RFS APXVSPP18-C-A20	Panel	6	862		70	13.37	65	100	TPO	Watt	1	2172.7	190	0	0
32	SPRINT	RFS APXVSPP18-C-A20	Panel	6	1900		70	16.27	65	90	TPO	Watt	1	3812.8	190	0	0
33	SPRINT	RFS APXVTM14-C-I20	Panel	4.7	2500		165	15.86	68	160	TPO	Watt	1	6167.7	190	0	0
34	SPRINT	RFS APXVSPP18-C-A20	Panel	6	862		165	13.37	65	100	TPO	Watt	1	2172.7	190	0	0
34	SPRINT	RFS APXVSPP18-C-A20	Panel	6	1900		165	16.27	65	90	TPO	Watt	1	3812.8	190	0	0
35	SPRINT	RFS APXVTM14-C-I20	Panel	4.7	2500		300	15.86	68	160	TPO	Watt	1	6167.7	190	0	0
36	SPRINT	RFS APXVSPP18-C-A20	Panel	6	862		300	13.37	65	100	TPO	Watt	1	2172.7	190	0	0
36	SPRINT	RFS APXVSPP18-C-A20	Panel	6	1900		300	16.27	65	90	TPO	Watt	1	3812.8	190	0	0
37	TOWN	RFS PD201-7	Omni	8.3	450		0	5	360	60	ERP	Watt	1	60	193	0	0
38	TOWN	Radiowaves SP2-5.8	Aperture	2	5800		15	26.85	6	0.01	TPO	Watt	1	8.1	187	0	0
39	TOWN	Andrew DB222	Omni	10.6	150		300	3.01	360	20	ERP	Watt	1	20	85	0	0
40	TOWN	RFS PD128-1	Omni	9.75	33		120	0.01	360	100	ERP	Watt	1	100	85	0	0
41	TOWN	RFS PD128-1	Omni	9.75	33		40	0.01	360	100	ERP	Watt	1	100	100	0	0
42	TOWN	RFS PD128-1	Omni	9.75	33		220	0.01	360	100	ERP	Watt	1	100	100	0	0
43	TOWN	RFS PD128-1	Omni	9.75	33		110	0.01	360	100	ERP	Watt	1	100	115	0	0
44	TOWN	RFS PD128-1	Omni	9.75	33		290	0.01	360	100	ERP	Watt	1	100	115	0	0
45	TOWN	RFS PD128-1	Omni	9.75	33		310	0.01	360	100	ERP	Watt	1	100	130	0	0
46	TOWN	RFS PD128-1	Omni	9.75	33		130	0.01	360	100	ERP	Watt	1	100	130	0	0
47	TOWN	RFS 458-2D	Omni	4.1	460		270	8	360	100	ERP	Watt	1	100	185	0	0
48	TOWN	RFS 458-2D	Omni	4.1	460		180	8	360	100	ERP	Watt	1	100	185	0	0

Note: The Z reference indicates antenna height above the main site level unless otherwise indicated. ERP values provided by the client and used in the modeling may be greater than are currently deployed. For additional modeling information, refer to Appendix B. Proposed equipment is tagged as *(Proposed)* under *Operator* or *Antenna Make and Model*.

7 Engineer Certification

The professional engineer whose seal appears on the cover of this document hereby certifies and affirms:

That I am registered as a Professional Engineer in the jurisdiction indicated in the professional engineering stamp on the cover of this document; and

That I am an employee of Site Safe, LLC, in Vienna, Virginia, at which place the staff and I provide RF compliance services to clients in the wireless communications industry; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission (FCC) as well as the regulations of the Occupational Safety and Health Administration (OSHA), both in general and specifically as they apply to the FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields; and

That I have thoroughly reviewed this Site Compliance Report and believe it to be true and accurate to the best of my knowledge as assembled by and attested to by Zyotty Thamsil.

March 25, 2020

Appendix A – Statement of Limiting Conditions

Sitesafe will not be responsible for matters of a legal nature that affect the site or property.

Due to the complexity of some wireless sites, Sitesafe performed this analysis and created this report utilizing best industry practices and due diligence. Sitesafe cannot be held accountable or responsible for anomalies or discrepancies due to actual site conditions (i.e. mislabeling of antennas or equipment, inaccessible cable runs, inaccessible antennas or equipment, etc.) or information or data supplied by AT&T Mobility, LLC, the site manager, or their affiliates, subcontractors or assigns.

Sitesafe has provided computer generated model(s) in this Site Compliance Report to show approximate dimensions of the site, and the model is included to assist the reader of the compliance report to visualize the site area, and to provide supporting documentation for Sitesafe's recommendations.

Sitesafe may note in the Site Compliance Report any adverse physical conditions, such as needed repairs, observed during the survey of the subject property or that Sitesafe became aware of during the normal research involved in performing this survey. Sitesafe will not be responsible for any such conditions that do exist or for any engineering or testing that might be required to discover whether such conditions exist. Because Sitesafe is not an expert in the field of mechanical engineering or building maintenance, the Site Compliance Report must not be considered a structural or physical engineering report.

Sitesafe obtained information used in this Site Compliance Report from sources that Sitesafe considers reliable and believes them to be true and correct. Sitesafe does not assume any responsibility for the accuracy of such items that were furnished by other parties. When conflicts in information occur between data provided by a second party and physical data collected by Sitesafe, the physical data will be used.

Appendix B – Assumptions and Definitions

General Model Assumptions

In this site compliance report, it is assumed that all antennas are operating at **full power at all times**. Software modeling was performed for all transmitting antennas located on the site. Sitesafe has further assumed a 100% duty cycle and maximum radiated power.

The site has been modeled with these assumptions to show the maximum RF energy density. Sitesafe believes this to be a *worst-case* analysis, based on best available data. Areas modeled to predict emissions greater than 100% of the applicable MPE level may not actually occur but are shown as a *worst-case* prediction that could be realized real time. Sitesafe believes these areas to be safe for entry by occupationally trained personnel utilizing appropriate personal protective equipment (in most cases, a personal monitor).

Thus, at any time, if power density measurements were made, we believe the real-time measurements would indicate levels below those depicted in the RF emission diagram(s) in this report. By modeling in this way, Sitesafe has conservatively shown exclusion areas – areas that should not be entered without the use of a personal monitor, carriers reducing power, or performing real-time measurements to indicate real-time exposure levels.

Use of Generic Antennas

For the purposes of this report, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information about a carrier, their FCC license and/or antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use our industry specific knowledge of equipment, antenna models, and transmit power to model the site. If more specific information can be obtained for the unknown measurement criteria, Sitesafe recommends remodeling of the site utilizing the more complete and accurate data. Information about similar facilities is used when the service is identified and associated with a particular antenna. If no information is available regarding the transmitting service associated with an unidentified antenna, using the antenna manufacturer's published data regarding the antenna's physical characteristics makes more conservative assumptions.

Where the frequency is unknown, Sitesafe uses the closest frequency in the antenna's range that corresponds to the highest MPE, resulting in a conservative analysis.

Definitions

5% Rule – The rules adopted by the FCC specify that, in general, at multiple transmitter sites actions necessary to bring the area into compliance with the guidelines are the shared responsibility of all licensees whose transmitters produce field strengths or power density levels at the area in question in excess of 5% of the exposure limits. In other words, any wireless operator that contributes 5% or greater of the MPE limit in an area that is identified to be greater than 100% of the MPE limit is responsible for taking corrective actions to bring the site into compliance.

Compliance – The determination of whether a site complies with FCC standards with regards to Human Exposure to Radio Frequency Electromagnetic Fields from transmitting antennas.

Decibel (dB) – A unit for measuring power or strength of a signal.

Duty Cycle – The percent of pulse duration to the pulse period of a periodic pulse train. Also, may be a measure of the temporal transmission characteristic of an intermittently transmitting RF source such as a paging antenna by dividing average transmission duration by the average period for transmission. A duty cycle of 100% corresponds to continuous operation.

Effective (or Equivalent) Isotropic Radiated Power (EIRP) – The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna.

Effective Radiated Power (ERP) – The product of the power supplied to the antenna and the antenna gain in a given direction relative to a half-wave dipole antenna.

Gain (of an antenna) – The ratio, usually expressed in decibels, of the power required at the input of a loss-free reference antenna to the power supplied to the input of the given antenna to produce, in a given direction, the same field strength or the same power density at the same distance. When not specified otherwise, the gain refers to the direction of maximum radiation. Gain may be considered for a specified polarization. Gain may be referenced to an isotropic antenna (dBi) or a half-wave dipole (dBd) antenna.

General Population/Uncontrolled Environment – Defined by the FCC as an area where RF exposure may occur to persons who are *unaware* of the potential for exposure and who have no control over their exposure. General Population is also referenced as General Public.

Generic Antenna – For the purposes of this report, the use of "Generic" as an antenna model means the antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use its industry specific knowledge of antenna models to select a worst-case scenario antenna to model the site.

Isotropic Antenna – An antenna that is completely non-directional. In other words, an antenna that radiates energy equally in all directions.

Maximum Measurement – This measurement represents the single largest measurement recorded when performing a spatial average measurement.

Maximum Permissible Exposure (MPE) – The rms and peak electric and magnetic field strength, their squares, or the plane-wave equivalent power densities associated with these fields to which a person may be exposed without harmful effect and with acceptable safety factor.

Occupational/Controlled Environment – Defined by the FCC as an area where RF exposure may occur to persons who are **aware** of the potential for exposure as a condition of employment or specific activity and can exercise control over their exposure.

OET Bulletin 65 – Technical guideline developed by the FCC's Office of Engineering and Technology to determine the impact of RF exposure on humans. The guideline was published in August 1997.

OSHA (Occupational Safety and Health Administration) – Under the Occupational Safety and Health Act of 1970, employers are responsible for providing a safe and healthy workplace for their employees. OSHA's role is to promote the safety and health of America's working men and women by setting and enforcing standards; providing training, outreach and education; establishing partnerships; and encouraging continual process improvement in workplace safety and health. For more information, visit www.osha.gov.

Radio Frequency Exposure or Electromagnetic Fields – Electromagnetic waves that are propagated from antennas through space.

Spatial Average Measurement – A technique used to average a minimum of ten (10) measurements taken in a ten (10) second interval from zero (0) to six (6) feet. This measurement is intended to model the average energy a 6-foot tall human body will absorb while present in an electromagnetic field of energy.

Transmitter Power Output (TPO) – The radio frequency output power of a transmitter's final radio frequency stage as measured at the output terminal while connected to a load.

Appendix C – Rules & Regulations

Explanation of Applicable Rules and Regulations

The FCC has set forth guidelines in OET Bulletin 65 for human exposure to radio frequency electromagnetic fields. Specific regulations regarding this topic are listed in Part 1, Subpart I, of Title 47 in the Code of Federal Regulations. Currently, there are two different levels of MPE - General Public MPE and Occupational MPE. An individual classified as Occupational can be defined as an individual who has received appropriate RF training and meets the conditions outlined below. General Public is defined as anyone who does not meet the conditions of being Occupational. FCC and OSHA Rules and Regulations define compliance in terms of total exposure to total RF energy, regardless of location of or proximity to the sources of energy.

It is the responsibility of all licensees to ensure these guidelines are maintained at all times. It is the ongoing responsibility of all licensees composing the site to maintain ongoing compliance with the FCC Rules and Regulations. Individual licensees that contribute less than 5% MPE to any total area out of compliance are not responsible for corrective actions.

OSHA has adopted and enforces the FCC's exposure guidelines. A building owner or site manager can use this report as part of an overall RF Health and Safety Policy. It is important for building owners/site managers to identify areas in excess of the General Population MPE and ensure that only persons qualified as Occupational are granted access to those areas.

Occupational Environment Explained

The FCC definition of Occupational exposure limits apply to persons who:

- are exposed to RF energy as a consequence of their employment;
- have been made aware of the possibility of exposure; and
- can exercise control over their exposure.

OSHA guidelines go further to state that persons must complete RF Safety Awareness training and must be trained in the use of appropriate personal protective equipment.

In order to consider this site an Occupational Environment, the site must be controlled to prevent access by any individuals classified as the General Public. Compliance is also maintained when any non-occupational individuals (the General Public) are prevented from accessing areas indicated as Red or Yellow in the attached RF Emissions diagram. In addition, a person must be aware of the RF environment into which they are entering. This can be accomplished by an RF Safety Awareness class, and by appropriate written documentation such as this Site Compliance Report.

All AT&T Mobility, LLC employees who require access to this site must complete RF Safety Awareness training and must be trained in the use of appropriate personal protective equipment.

Appendix D – General Safety Recommendations

The following are *general recommendations* appropriate for any site with accessible areas in excess of 100% General Public MPE. These recommendations are not specific to this site. These are safety recommendations appropriate for typical site management, building management, and other tenant operations.

1. All individuals needing access to the main site (or the area indicated to be in excess of General Public MPE) should wear a personal protective monitor (PPM), successfully complete proper RF Safety Awareness training, and have and be trained in the use of appropriate personal protective equipment.

2. All individuals needing access to the main site should be instructed to read and obey all posted placards and signs.

3. The site should be routinely inspected and this or similar report updated with the addition of any antennas or upon any changes to the RF environment including:

- adding new antennas that may have been located on the site
- removing of any existing antennas
- changes in the radiating power or number of RF emitters

4. Post the appropriate **NOTICE**, **CAUTION,** or **WARNING** sign at the main site access point(s) and other locations as required. Note: Please refer to RF Exposure Diagrams in Section 5.1 to inform <u>everyone</u> who has access to this site that beyond posted signs there may be levels in excess of the limits prescribed by the FCC. In addition to RF Advisory Signage, a RF Guideline Signage is recommended to be posted at the main site access point(s). The signs below are examples of signs meeting FCC guidelines.

5. Ensure that the site door remains locked (or appropriately controlled) to deny access to the general public if deemed as policy by the building/site owner.

Keep a copy of this report available for all persons who must access the site. They should read this report and be aware of the potential hazards with regards to RF and MPE limits.

Additional Information

Additional RF information is available at the following sites:
https://www.fcc.gov/general/radio-frequency-safety-0
https://www.fcc.gov/engineering-technology/electromagnetic-compatibility-division/radio-frequency-safety/faq/rf-safety

OSHA has additional information available at:
https://www.osha.gov/SLTC/radiofrequencyradiation/index.html