Filed by:
G. Scott Shepherd, Sr. Property Specialist - SBA Communications
134 Flanders Rd., Suite 125, Westborough, MA 01581
508.251.0720 x 3807 - GShepherd@sbasite.com

March 1, 2022

Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Tower Share Application
11 Francis J. Clarke Circle, Bethel, CT 06801
Latitude: 41.360522
Longitude: -73.424474
Site# NJJER01165A - Dish

Dear Ms. Bachman:

This letter and attachments are submitted on behalf of Dish Wireless LLC. Dish Wireless LLC plans to install antennas and related equipment to the tower site located at 11 Francis J. Clarke Circle, Bethel, Connecticut.

Dish Wireless LLC proposes to install three (3) 600/1900/2100 MHz antennas and six (6) RRUs, at the 147-foot level of the existing 155-foot monopole tower, one (1) Fiber cables will also be installed. Dish Wireless LLC equipment cabinets will be placed within 7' x 5' lease area. Included are plans by B + T Group, dated Oct., 26, 2021 Exhibit 10. Also included is a structural analysis prepared by TES, dated Oct. 14, 2021, confirming that the existing tower is structurally capable of supporting the proposed equipment. Attached as Exhibit 8. This facility was approved by the Town of Bethel Planning and Zoning Commission on April 16, 1999. Please see attached Exhibit 6.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies 16-50aa, of Dish Wireless LLC intent to share a telecommunications facility pursuant to R.C.S.A. 16-50j-88. In accordance with R.C.S.A., a copy of this letter is being sent to Matt Knickerbocker, First Selectman for the Town of Bethel, Christopher Baldwin, Building Official, as well as, property owner Estate of Costa Stergue c/o Peter E. Fahan. Separate notice is not being sent to the tower owner as it belongs to SBA.

The planned modifications of the facility fall squarely within those activities explicitly provided for in R.C.S.A. 16-50j-89.

1. The proposed modification will not result in an increase in the height of the existing structure. The top of the tower is 150-feet; Dish Wireless LLC proposed antennas will be located at a center line height of 147-feet.

2. The proposed modifications will not result in the increase of the site boundary as depicted on the attached site plan.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed local and state criteria. The incremental effect of the proposed changes will be negligent.

The operation of the proposed antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard. As indicated in the attached power density calculations, the combined site operations will result in a total power density of 7.4291% as evidenced by Exhibit 7.

Connecticut General Statutes 16-50aa indicates that the Council must approve the shared use of a telecommunications facility provided it finds the shared use is technically, legally, environmentally, and economically feasible and meets public safety concerns. As demonstrated in this letter, Dish Wireless LLC respectfully indicates that the shared use of this facility satisfies these criteria.

A. Technical Feasibility. The existing monopole has been deemed structurally capable of supporting Dish Wireless LLC proposed loading. The structural analysis is included as Exhibit 8.

B. Legal Feasibility. As referenced above, C.G.S. 16-50aa has been authorized to issue orders approving the shared use of an existing tower such as this support tower in Bethel. Under the authority granted to the Council, an order of the Council approving the requested shared use would permit Dish Wireless LLC to obtain a building permit for the proposed installation. Further, a Letter of Authorization is included as Exhibit 2, authorizing Dish Wireless LLC to file this application for shared use.

C. Environmental Feasibility. The proposed shared use of this facility would have a minimal environmental impact. The installation of Dish Wireless LLC equipment at the 147-foot level of the existing 155-foot tower would have an insignificant visual impact on the area around the tower. Dish Wireless LLC ground equipment would be installed within the existing facility compound. Dish Wireless LLC shared use would therefore not cause any significant alteration in the physical or environmental characteristics of the existing site. Additionally, as evidenced by Exhibit 7, the proposed antennas would not increase radio frequency emissions to a level at or above the Federal Communications Commission safety standard.

D. Economic Feasibility. Dish Wireless LLC will be entering into an agreement with the owner of this facility to mutually agreeable terms. As previously mentioned, the Letter of Authorization has been provided by the owner to assist Dish Wireless LLC with this tower sharing application.

E. Public Safety Concerns. As discussed above, the tower is structurally capable of supporting Dish Wireless LLC proposed loading.

Dish Wireless LLC is not aware of any public safety concerns relative to the proposed sharing of the existing guyed tower. Dish Wireless LLC intentions of providing new and improved wireless service through the shared use of this facility is expected to enhance the safety and welfare of local residents and individuals traveling through Westbrook.

Sincerely,

Scott Shepherd
Site Development Specialist II
SBA COMMUNICATIONS CORPORATION
134 Flanders Rd., Suite 125
Westborough, MA 01581
508.251.0720 x3807 + T
508.366.2610 + F
508.868.6000 + C
GShepherd@sbasite.com

Attachments:

cc: Matt Knickerbocker, First Selectman / with attachments
Municipal Center, 1 Scholl St., Bethel, CT 06801
Christopher Baldwin, Building Official / with attachments 5
Municipal Center, 1 Scholl St., Bethel, CT 06801
Estate of Costa Stergue c/o Mary S. Padovano / with attachments
28 Park Lane Rd, New Milford, CT 06776

EXHIBIT LIST

Exhibit 1	Copy of Check	X
Exhibit 2	Letter of Intent to Allow Shared Use of the Existing SBA Telecommunications Site	X
Exhibit 3	Notification Receipts	X
Exhibit 4	Property Card	x
Exhibit 5	Property Map	x
Exhibit 6	Original Zoning Approval	Town of Bethel P&Z Comm. 4/16/99
Exhibit 7	EME Report	Pinnacle Telecom Group 02/25/2022
Exhibit 8	Structural Analysis	TES 10/14/21
Exhibit 9	Mount Analysis	B + T Group 7/22/21
Exhibit 10	Construction Drawings	B + T Group 10/26/21

EXHIBIT 1

Copy of check

EXHIBIT 2
Letter of Intent

March 1, 2022

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

RE: Notice of Intent to Allow Shared Use of the Existing SBA Telecommunications Site
Location: 11 Francis J. Clarke Circle, Bethel, CT 06801
Dish Wireless Site No: NJJER01165A
SBA Site No: CT00248-S

Dear Ms. Bachman:

Please let the following serve as Evidence of Intent to allow Dish's shared use of the existing SBA telecommunications site at 11 Francis J. Clarke Circle, Bethel, CT.

SBA Towers, LLC ("Owner") and Dish Wireless ("Tenant") are entering into a Site Lease Agreement. Tenant will be provided ground space within the existing site compound for its base station equipment and space at the height of 147' for antennas and associated equipment.

Thank you,

Rick Woods
Site Development Manager
SBA COMMUNICATIONS CORPORATION
134 Flanders Road, Suite 125
Westboro, MA 01581

508.251.0720 x3800 + T
508.366.2610 + F
508.614.0389 + C
rwoods@sbasite.com

EXHIBIT 3

Fedex Labels

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

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FedEx® Tracking

776123200220

ADD NICKNAME

Delivered
Friday, March 4, 2022 at 10:00 am

DELIVERED

Signed for by: L.LISA

GET STATUS UPDATES

OBTAIN PROOF OF DELIVERY

FROM	TO
WESTBOROUGH, MA US	BETHEL, CT US

MANAGE DELIVERY

Travel History

TIME ZONE
Local Scan Time

Friday, March 4, 2022		
10:00 AM	BETHEL, CT	Delivered
8:42 AM	DANBURY, CT	On FedEx vehicle for delivery
7:15 AM	DANBURY, CT	Shipment arriving On-Time
6:56 AM	DANBURY, CT	At local FedEx facility
3:47 AM	NEWARK, NJ	Departed FedEx hub
12:33 AM	NEWARK, NJ	Arrived at FedEx hub
Thursday, March 3, 2022		
7:01 PM	WATERTOWN, CT	Left FedEx origin facility
4:44 PM	WATERTOWN, CT	Shipment arriving On-Time

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FedEx® Tracking

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ADD NICKNAME

Delivered
Friday, March 4, 2022 at 10:00 am

DELIVERED

Signed for by: L.LISA

GET STATUS UPDATES

OBTAIN PROOF OF DELIVERY

FROM	TO
WESTBOROUGH, MA US	BETHEL, CT US

MANAGE DELIVERY

Travel History

TIME ZONE
Local Scan Time

Friday, March 4, 2022		
10:00 AM	BETHEL, CT	Delivered
8:41 AM	DANBURY, CT	On FedEx vehicle for delivery
7:21 AM	DANBURY, CT	Shipment arriving On-Time
6:59 AM	DANBURY, CT	At local FedEx facility
3:47 AM	NEWARK, NJ	Departed FedEx hub
12:33 AM	NEWARK, NJ	Arrived at FedEx hub
Thursday, March 3, 2022		
7:01 PM	WATERTOWN, CT	Left FedEx origin facility
4:44 PM	WATERTOWN, CT	Shipment arriving On-Time

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ON TIME

Scheduled delivery:
Friday, March 4, 2022 before 4:30 pm
Estimated between: 11:25 am - 3:25 pm

IN TRANSIT

On FedEx vehicle for delivery

DANBURY, CT

GET STATUS UPDATES

FROM

Elizabeth Jamieson

134 Flanders Rd,
Suite 125
WESTBOROUGH, MA US 01581
860-605-7808

TO

c/o Padovano, Mary S., Admin Stergue,Estate of

28 Park Lane Road
New Milford, CT US 06776
860-354-4444

MANAGE DELIVERY

Travel History

TIME ZONE
Local Scan Time

Friday, March 4, 2022		
7:58 AM	DANBURY, CT	On FedEx vehicle for delivery
7:21 AM	DANBURY, CT	Shipment arriving On-Time
6:59 AM	DANBURY, CT	At local FedEx facility
3:47 AM	NEWARK, NJ	Departed FedEx hub
12:33 AM	NEWARK, NJ	Arrived at FedEx hub

EXHIBIT 4

Property Card

Bethel, CT : Assessor Database

Property Search:

Parcel ID:	Alternate ID:	Owner 1 Name:	Street Number:	Street Name:
			11	FRANCIS J CLARKE CIRCLE

Search Reset

Property Detail:

Parcel ID:	Alternate ID/Map Block Lot:	Card:	Card:	Street Name:	Street Number:	Zoning:	LUC:	Acres:
09 23 150-05	R05677	1	1	FRANCIS J CLARKE CIRCLE	11	IP	WAREHOUSES	5.80

Owner Information:

Owner 1 Name:	STERGUE COSTA ESTATE OF
Owner 2 Name:	% PADOVANO MARY S ADMINISTRATOR
Street 1:	28 PARK LANE ROAD
Street 2:	
City:	NEW MILFORD
State:	CT
Zip:	06776
Volume:	1105
Page:	225
Deed Date:	0000-00-00

Building Information:

Building Number:	1
Units:	7
Structure Type:	MFG/PROCESSING
Grade:	C
Identical Units:	1
Year Built:	1992

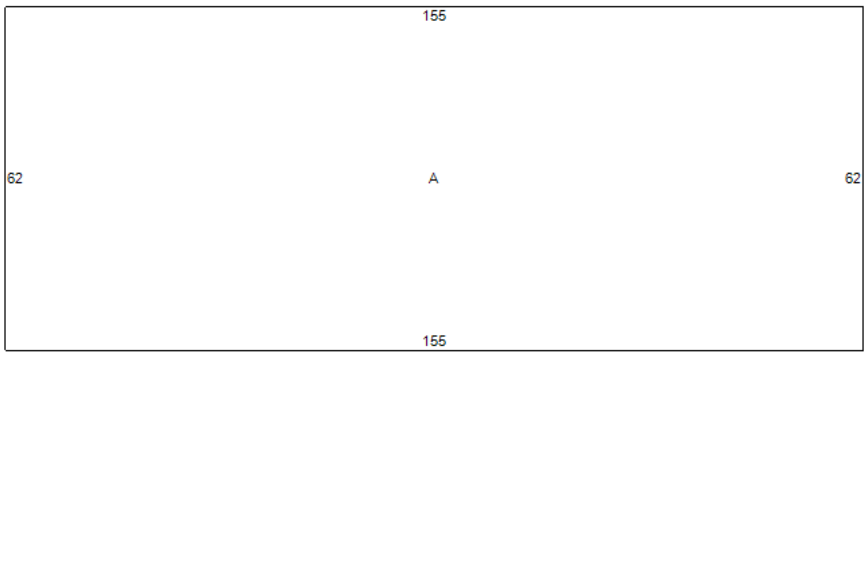
Valuation:

Appraised Land:	$392,800.00
Appraised Land PA490:	$0.00
Appraised Bldg:	$1,184,000.00
Appraised Total:	$1,576,800.00
Total Assessment:	$1,103,760.00

Property Images:

Picture:

Sketch:



Out-Buildings:

Code:	Description:	Units:	Year Built:	Size1:	Size2:	Area:	Grade:	Condition:
PA1	PAVING ASPHALT PARKING	1	1992	0	0	20000	C	NORMAL (C

Building Interior/Exterior Information:

Floor From:	Floor To:	Area:	Use Type:	Exterior Walls:	Contruction Type:	Heating:	A/C:	Plumbing:
01	01	9610	LIGHT MANUFACTURING	FRAME	WOOD FRAME/JOIST/BEAM	UNIT HEATERS	NONE	BELOW NORMAL
02	02	7378	LIGHT MANUFACTURING	FRAME	WOOD FRAME/JOIST/BEAM	UNIT HEATERS	NONE	BELOW NORMAL
02	02	2232	MULTI-USE OFFICE	FRAME	WOOD FRAME/JOIST/BEAM	HOT AIR	CENTRAL	NORMAL

Wed. January 5, 2022 : 03:12 PM : 0.08s : 10mb

EXHIBIT 5

Property Map

11 Francis

Email Map Link

Copy ar aste the following string into an email to link to the current map view:

60m
200ft

Close

Print Map

Tighe&Bond

lat:41.3596, long:-73.4226

Google Maps 11 Francis J Clarke Cir

Imagery ©2022 Maxar Technologies, USDA Farm Service Agency, Map data ©2022 100 ft

EXHIBIT 6

Zoning Approval

SITE ID # CT00248 SITE NAME No Bethel

JOB COST #_____

ZONING/PERMITTING COMPLETION FORM

Zoning Classification for Site: Industrial

Special Relief (setback, height variance, special use permit, wetlands permit etc.):
Special Permit - Site Plan (& Reinstatement of Site Plan)

* Date of Zoning Decision: 4/15/02, 11/15/00 & 4/16/99

Summary of zoning conditions **(Include details of any conditions relative to time restrictions, expiration dates, renewal obligations, monetary obligations, performance obligation, inspection fees).**

Conformance with Plans

Submitted by: S Becker Title: RCM-IC

Territory Manager Approval:_____

* Attach a copy of the Zoning decision and forward to the Regional Compliance Manager as soon as possible, after the decision.

PLANNING & ZONING COMMISSION

Bethel Municipal Center
1 School Street, Bethel, Connecticut 06801 *(203) 794-8519

April 15, 2002

RTP
FINAL

Attorney Susan A. Hays
One State St
P.O. Box 231277
Hartford Ct 06123-1277

RE: SBA Telecommunications Tower
11 Francis J. Clarke Circle

Dear Ms. Hays,

At the April 9, 2002 meeting of the Planning & Zoning Commission it was voted to **APPROVE** your request for reinstatement of the terms and conditions of the original the Site Plan for the proposed SBA, Inc. telecommunications facility and antennas for Sprint and Nextel at 11 Francis J. Clarke Circle with the following stipulations:

1. Except as modified by this approval, improvements shall be constructed as shown on drawings prepared by Gesick & Associates, P.C., Robert J. Grabarek, P.E. (CT Lic # 13441), as follows:

   a) "SBA, Inc., #4276 Bethel (Costa Property II), 11 Francis J. Clarke Circle, Bethel, Connecticut," Sheet T-1, last revised 1/22/99;
   b) "Comprehensive Site Plan," Sheet C-1, last revised 1/22/99 (Note: the northerly setback is shown correctly at 212.5 feet, but the arrow is shown only to the 25-foot rear setback line and should be extended to the property line.);
   c) "Site Plan and Elevations," Sheet C-2, last revised 1/22/99 (added Sprint);
   d) "Site Details," Sheet C-3, last revised 4/6/99;
   e) "General Notes and Erosion Control Narrative," Sheet C-4, dated 6/20/98.

2. Applicant shall furnish the Economic Development Commission of the Town of Bethel with a copy of the plans, and shall furnish proof of transmittal to the Planning and Zoning Commission prior to the issuance of any zoning and building permits for the project.

3. Any changes in the approved plan shall require the approval of the Planning and Zoning Commission.

4. It is the applicant's responsibility to secure any and all permits and approvals required by the Connecticut Siting Council.

5. Pursuant to Sec. 118-22 of the Zoning Regulations, "The approval of any site plan shall be void and shall be of no effect unless construction of the proposed buildings or structures is commenced within one (1) year of the effective date of said approval and is substantially completed within (5) years of the effective date of said approval."

Reasons: The reinstated plan is in substantial compliance with Sec. 118-47.3, "Telecommunications towers and antennas," of the Zoning Regulations of the Town of Bethel and was previously approved by the Commission on 11/14/00, and further by Settlement Agreement dated 8/24/00-9/22/00. In granting the reinstatement of the Site Plan for this application, the Commission makes no decision regarding the property owner's right to apply for additional buildings or structures on the site, in accordance with Bethel zoning regulations in effect at the time of the application.

Sincerely,

Michael Mannion/mc

Michael J. Mannion
Chairman

MJM: cpc

PLANNING & ZONING COMMISSION
Bethel Municipal Center
1 School Street, Bethel, Connecticut 06801 *(203) 794-8519

November 15, 2000

Esther McNany
SBA, Inc./ Nextel Communications/Sprint PCS
125 Shaw Street
New London, CT 06320

RE: SBA, Inc. – 11 Francis J. Clarke Circle

Dear Ms. McNany,

At the November 14, 2000 meeting of the Planning & Zoning Commission it was voted to approve your revised site plan application for 11 Francis Clarke Circle on maps dated 2/17/98 last revised 11/5/00 with the following stipulations:

1) The resolution granting the original approval, dated 4/16/99, including all stipulations must be adhered to.
2) Any further changes in the site plan must be submitted to this Commission.

I have attached a copy of the legal notice for your review. Please be advised that work is not to commence until bonds are submitted and maps are signed and filed

Sincerely,

Denis J. Riordan

Denis J. Riordan BC
Chairman

SITE # 4276
FILE TYPE Construction
SECTION Permits

PLANNING & ZONING COMMISSION
Bethel Municipal Center
1 School Street, Bethel, Connecticut 06801 *(203) 794-8519

April 16, 1999

Esther McNany
SBA, Inc/Nextel Communications/Sprint PCS
125 Shaw Street
New London, CT 06320

RE: SBA, Inc./Nextel Communications/Sprint PCS

Dear Ms. McNany:

At the April 13, 1999 meeting of the Planning & Zoning Commission it was voted to **APPROVE** your application for a special permit and site plan, 11 Francis J. Clarke Industrial Park, on maps dated C-1 dated 2/17/98 last revised 1/22/99, C-2 dated 2/17/98 last revised 1/22/99, C-3 dated 6/20/98 last revised 4/16/99, and C-4 dated 6/20/98 with the following stipulations:

1. Applicant will submit the approved site plan to the Economic Development Commission for their review prior to applying for a building permit.
2. Any changes to the plan or in the field will require a resubmission the Commission before making any changes.
3. Reason for approval is that it meets the Planning & Zoning regulations.

Work is to commence within (1) one year and completed in (5) five years.

If you have any questions please call. I have also attached a copy of the legal notice for you review.

Sincerely,

Denis J. Riordan
Chairman

DJR: cpc

SITE ID # CT00248 SITE NAME N Bethel

JOB COST # '

ZONING/PERMITTING COMPLETION FORM

Zoning Classification for Site: Industrial

Special Relief (setback, height variance, special use permit, wetlands permit etc.):
Inland Wetlands Permit

* Date of Zoning Decision: 10/98

Summary of zoning conditions **(Include details of any conditions relative to time restrictions, expiration dates, renewal obligations, monetary obligations, performance obligation, inspection fees).**

none

Submitted by: S Becker Title: RCM - IC

Territory Manager Approval: _____

* Attach a copy of the Zoning decision and forward to the Regional Compliance Manager as soon as possible, after the decision.

INLAND WETLANDS COMMISSION

Bethel Municipal Center, 1 School Street
Bethel, Connecticut 06801 * (203) 794-8519

TO: DENIS RIORDAN, CHAIRMAN PLANNING & ZONING COMMISSION

FROM: E. JOYCE DIXON, CHAIRMAN INLAND WETLANDS COMMISSION

RE: SBA, INC., TELECOMMUNICATIONS FACILITY

DATE: OCTOBER 30, 1998

At the October 28, 1998 meeting of the Inland Wetlands Commission it was voted to approve and issue a permit to SBA, Inc. because the impervious area is less than two (2) acres.

EJD:cpc

CONSERVATION COMMISSION

Town Hall, P.O. Box 95, Bethel, Connecticut 06801 • (203) 794-8517

PERMIT

Name of Applicant: Costa Stergue

Address: 8 Dorothey Road, West Redding, Conn. 06896

Location of Property: Lot 5, Clarke Industrial Park

Adjacent Property Owners:

Proposed Activity: Industrial Building

Public Hearing Held On: None

Application Approved Date: January 11, 1988

In Accordance with plan prepared, signed, sealed, Dated: Costa Stergue Map dated 8/11/87 revised by Dudley Ashwood, P.E. 10473

Reason for Approval: Plan meets requirements for soil and erosion control measures. No wetlands. Drainage runoff not increased.

Conditions of Approval: Soil and erosion control notes shall be revised as to standard verbiage. If any changes are made in the plans or in the field a resubmission must be made to the Conservation Commission.

The permit is issued by the Conservation Commission in accordance with the Bethel Inland Wetlands and Water Courses Regulations and is subject to all applicable Sections of Enforcement within that Regulation. Note: Section 115-16 (D) It is also subject to compliance by the applicant with all other regulations, codes and ordinaces and requirements of the Town of Bethel, Connecticut necessary to undertake the proposed activity.

Issued this 11th day of January 1988 at Bethel, Connecticut.

CONSERVATION COMMISSION

E. Joyce Dixon

Joyce Dixon
Chairman

EXHIBIT 7

EME Report

Pinnacle Telecom Group

Professional and Technical Services

Telecom Consulting

Antenna Site FCC RF Compliance Assessment and Report for Municipal Submission

Prepared for:	Dish Wireless, LLC
Site ID:	NJJER01165A
Site Address:	11 Francis J. Clarke Circle Bethel, CT
Latitude:	N 41.36052222
Longitude:	W 73.42447433
Structure type:	Monopole
Report date:	February 25, 2022
Compliance Conclusion:	Dish Wireless, LLC will be in compliance with the rules and regulations as described in OET Bulletin 65, following the implementation of the proposed mitigation as detailed in the report.

14 Ridgedale Avenue - Suite 260 • Cedar Knolls, NJ 07927 • 973-451-1630

Contents

Introduction and Summary 3

Antenna and Transmission Data 5

Compliance Analysis 11

Compliance Conclusion 18

Certification

Appendix A. Documents Used to Prepare the Analysis

Appendix B. Background on the FCC MPE Limit

Appendix C. Proposed Signage

Appendix D. Summary of Expert Qualifications

Introduction and Summary

At the request of Dish Wireless, LLC ("Dish"), Pinnacle Telecom Group has performed an independent expert assessment of radiofrequency (RF) levels and related FCC compliance for proposed wireless base station antenna operations on an existing monopole located at 11 Francis J. Clarke Circle in Bethel, CT. Dish refers to the antenna site by the code "NJJER01165A", and its proposed operation involves directional panel antennas and transmission in the 600 MHz 2000 MHz and 2100 MHz frequency bands licensed to it by the FCC.

The FCC requires all wireless antenna operators to perform an assessment of potential human exposure to radiofrequency (RF) fields emanating from all the transmitting antennas at a site whenever antenna operations are added or modified, and to ensure compliance with the Maximum Permissible Exposure (MPE) limit in the FCC's regulations. In this case, the compliance assessment needs to take into account the RF effects of other existing antenna operations at the site by AT&T, T-Mobile, and Verizon Wireless. Note that FCC regulations require any future antenna collocators to assess and assure continuing compliance based on the cumulative effects of all then-proposed and then-existing antennas at the site.

This report describes a mathematical analysis of RF levels resulting around the site in areas of unrestricted public access, that is, at street level around the site. The compliance analysis employs a standard FCC formula for calculating the effects of the antennas in a very conservative manner, in order to overstate the RF levels and to ensure "safe-side" conclusions regarding compliance with the FCC limit for safe continuous exposure of the general public.

The results of a compliance assessment can be described in layman's terms by expressing the calculated RF levels as simple percentages of the FCC MPE limit. If the normalized reference for that limit is 100 percent, then calculated RF levels higher than 100 percent indicate the MPE limit is exceeded and there is a need to mitigate the potential exposure. On the other hand, calculated RF levels consistently below 100 percent serve as a clear and sufficient demonstration of

compliance with the MPE limit. We can (and will) also describe the overall worst-case result via the “plain-English” equivalent “times-below-the-limit” factor.

The result of the RF compliance assessment in this case is as follows:

- At street level, the conservatively calculated maximum RF level from the combination of proposed and existing antenna operations at the site is 7.4291 percent of the FCC general population MPE limit – well below the 100-percent reference for compliance. In other words, the worst-case calculated RF level – intentionally and significantly overstated by the calculations – is still more than 13 times below the FCC limit for safe, continuous exposure of the general public.
- A supplemental analysis of the RF levels at the same height as the Dish antennas indicate that the FCC MPE limit is potentially exceeded. Therefore, it is recommended that two Caution signs be installed six feet below the antennas. In addition, NOC Information signs are to be installed at the base of the monopole.
- The results of the calculations, along with the proposed mitigation, combine to satisfy the FCC requirements and associated guidelines on RF compliance at street level around the site and on the subject roof. Moreover, because of the significant conservatism incorporated in the analysis, RF levels actually caused by the antennas will be lower than these calculations indicate.

The remainder of this report provides the following:

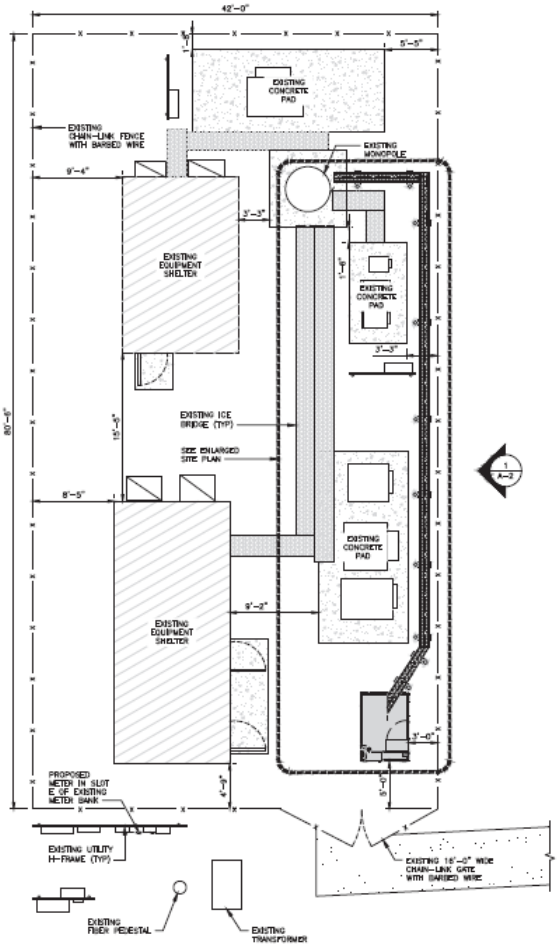
- relevant technical data on the proposed Dish antenna operations at the site, as well as on the other existing antenna operations;
- a description of the applicable FCC mathematical model for calculating RF levels, and application of the relevant technical data to that model;
- analysis of the results of the calculations against the FCC MPE limit, and the compliance conclusion for the site.

In addition, four Appendices are included. Appendix A provides information on the documents used to prepare the analysis. Appendix B provides background on the FCC MPE limit. Appendix C details the proposed mitigation to satisfy the FCC requirements and associated guidelines on RF compliance. Appendix D provides a summary of the qualifications of the expert certifying FCC compliance for this site.

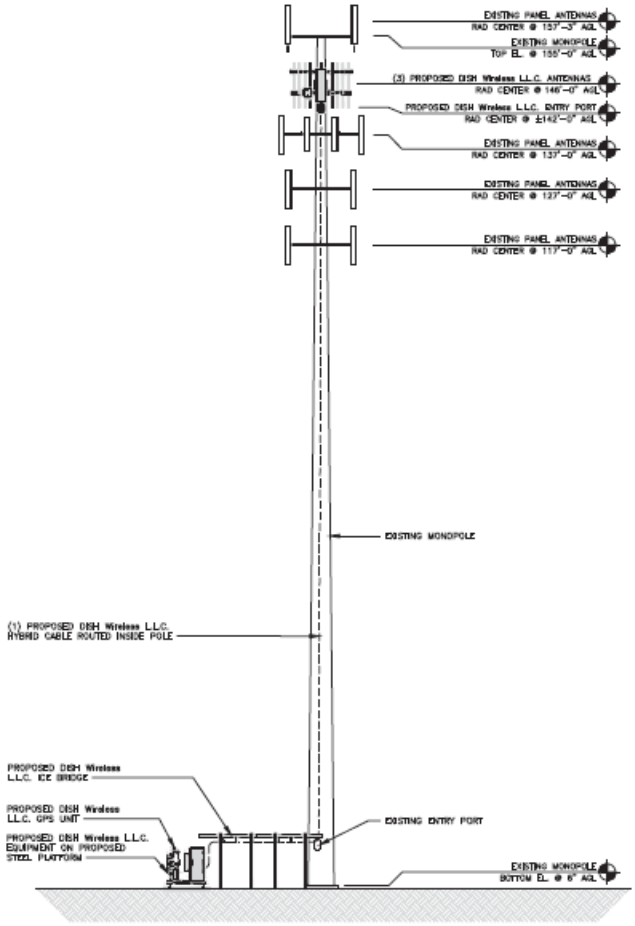
Antenna and Transmission Data

The plan and elevation views that follow, extracted from the site drawings, illustrate the mounting positions of the Dish antennas at the site.

Plan View:



Elevation View:



The table that follows summarizes the relevant data for the proposed Dish antenna operations. Note that the “Z” height references the centerline of the antenna.

Ant. ID	Carrier	Antenna Manufacturer	Antenna Model	Type	Freq (MHz)	Ant. Dim. (ft.)	Total Input Power (watts)	Total ERP (watts)	Z AGL (ft)	Ant. Gain (dBd)	B/W	Azimuth	EDT	MDT
❶	Dish	Commscope	FFVV-65B-R2	Panel	600	6	120	2110	146	12.46	64	60	2	0
❶	Dish	Commscope	FFVV-65B-R2	Panel	2000	6	160	7396	146	16.66	67	60	2	0
❶	Dish	Commscope	FFVV-65B-R2	Panel	2100	6	160	7396	146	16.66	67	60	2	0
❷	Dish	Commscope	FFVV-65B-R2	Panel	600	6	120	2110	146	12.46	64	160	2	0
❷	Dish	Commscope	FFVV-65B-R2	Panel	2000	6	160	7396	146	16.66	67	160	2	0
❷	Dish	Commscope	FFVV-65B-R2	Panel	2100	6	160	7396	146	16.66	67	160	2	0
❸	Dish	Commscope	FFVV-65B-R2	Panel	600	6	120	2110	146	12.46	64	320	2	0
❸	Dish	Commscope	FFVV-65B-R2	Panel	2000	6	160	7396	146	16.66	67	320	2	0
❸	Dish	Commscope	FFVV-65B-R2	Panel	2100	6	160	7396	146	16.66	67	320	2	0

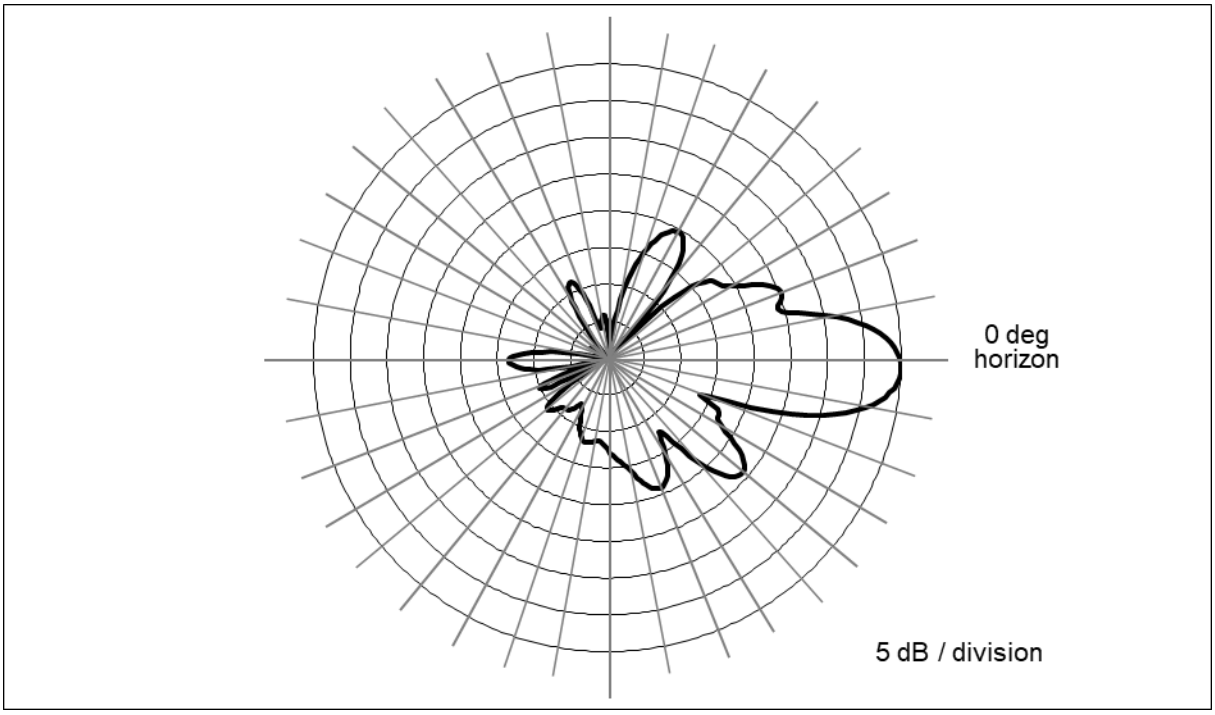
The area below the antennas, at street level, is of interest in terms of potential "uncontrolled" exposure of the general public, so the antenna's vertical-plane emission characteristic is used in the calculations, as it is a key determinant of the relative amount of RF emissions in the "downward" direction.

By way of illustration, Figure 1 that follows shows the vertical-plane radiation pattern of the proposed antenna model in the 600 MHz frequency band. In this type of antenna radiation pattern diagram, the antenna is effectively pointed at the three o'clock position (the horizon) and the relative strength of the pattern at different angles is described using decibel units.

Note that the use of a decibel scale to describe the relative pattern at different angles actually serves to significantly understate the actual focusing effects of the antenna. Where the antenna pattern reads 20 dB the relative RF energy emitted at the corresponding downward angle is 1/100th of the maximum that occurs in the main beam (at 0 degrees); at 30 dB, the energy is only 1/1000th of the maximum.

Finally, note that the automatic pattern-scaling feature of our internal software may skew side-by-side visual comparisons of different antenna models, or even different parties' depictions of the same antenna model.

Figure 1. Commscope FFVV-65B-R2 – 600 MHz Vertical-plane Pattern



As noted at the outset, there are other existing wireless antenna operations to include in the compliance assessment. For each of the wireless operators, we will conservatively assume operation with maximum channel capacity and at maximum transmitter power per channel to be used by each wireless operator in each of their respective FCC-licensed frequency bands.

The table that follows summarizes the relevant data for the collocated antenna operations.

Carrier	*Antenna Manufacturer*	*Antenna Model*	*Type*	*Freq (MHz)*	*Total ERP (watts)*	*Ant. Gain (dBd)*	*Azimuth*
AT&T	Generic	Generic	Panel	700	4945	11.26	N/A
AT&T	Generic	Generic	Panel	850	2400	11.76	N/A
AT&T	Generic	Generic	Panel	1900	5756	15.56	N/A
AT&T	Generic	Generic	Panel	2100	5890	15.66	N/A
AT&T	Generic	Generic	Panel	2300	4131	16.16	N/A
T-Mobile	Generic	Generic	Panel	600	3163	12.96	N/A
T-Mobile	Generic	Generic	Panel	700	867	13.36	N/A
T-Mobile	Generic	Generic	Panel	1900	4123	15.36	N/A
T-Mobile	Generic	Generic	Panel	1900	1452	15.60	N/A
T-Mobile	Generic	Generic	Panel	2100	4626	15.86	N/A
T-Mobile	Generic	Generic	Panel	1900	1419	15.50	N/A
T-Mobile	Generic	Generic	Panel	2500	12804	22.35	N/A
Verizon Wireless	Generic	Generic	Panel	746	2400	11.76	N/A
Verizon Wireless	Generic	Generic	Panel	869	5166	12.36	N/A
Verizon Wireless	Generic	Generic	Panel	1900	5372	15.26	N/A
Verizon Wireless	Generic	Generic	Panel	2100	5625	15.46	N/A

Compliance Analysis

FCC Office of Engineering and Technology Bulletin 65 ("OET Bulletin 65") provides guidelines for mathematical models to calculate the RF levels at various points around transmitting antennas. Different models apply in different areas around antennas, with one model applying to street level around a site, and another applying to the rooftop near the antennas. We will address each area of interest in turn in the subsections that follow.

Street Level Analysis

At street-level around an antenna site (in what is called the "far field" of the antennas), the RF levels are directly proportional to the total antenna input power and the relative antenna gain in the downward direction of interest – and the levels are otherwise inversely proportional to the square of the straight-line distance to the antenna.

Conservative calculations also assume the potential RF exposure is enhanced by reflection of the RF energy from the intervening ground. Our calculations will assume a 100% "perfect", mirror-like reflection, which is the absolute worst-case scenario.

The formula for street-level compliance assessment for any given wireless antenna operation is as follows:

$$MPE\% = (100 * Chans * TxPower * 10^{(Gmax-Vdisc/10)} * 4) / (MPE * 4\pi * R^2)$$

where

MPE%	=	RF level, expressed as a percentage of the MPE limit applicable to continuous exposure of the general public
100	=	factor to convert the raw result to a percentage
Chans	=	maximum number of RF channels per sector
TxPower	=	maximum transmitter power per channel, in milliwatts

$10^{(Gmax-Vdisc/10)}$	=	numeric equivalent of the relative antenna gain in the downward direction of interest; data on the antenna vertical-plane pattern is taken from manufacturer specifications
4	=	factor to account for a 100-percent-efficient energy reflection from the ground, and the squared relationship between RF field strength and power density ($2^2 = 4$)
MPE	=	FCC general population MPE limit
R	=	straight-line distance from the RF source to the point of interest, centimeters

The MPE% calculations are performed out to a distance of 500 feet from the facility to points 6.5 feet (approximately two meters, the FCC-recommended standing height) off the ground, as illustrated in Figure 2, below.

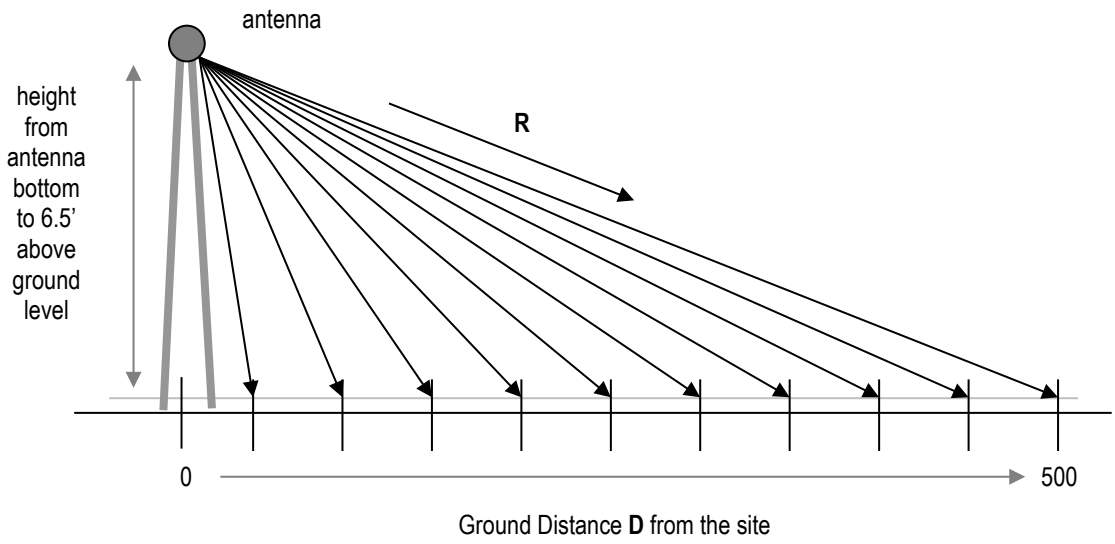


Figure 2. Street-level MPE% Calculation Geometry

It is popularly understood that the farther away one is from an antenna, the lower the RF level – which is generally but not universally correct. The results of MPE% calculations fairly close to the site will reflect the variations in the vertical-plane antenna pattern as well as the variation in straight-line distance to the antenna.

Therefore, RF levels may actually increase slightly with increasing distance within the range of zero to 500 feet from the site. As the distance approaches 500 feet

and beyond, though, the antenna pattern factor becomes less significant, the RF levels become primarily distance-controlled and, as a result, the RF levels generally decrease with increasing distance. In any case, the RF levels more than 500 feet from a wireless antenna site are well understood to be sufficiently low to be comfortably in compliance.

According to the FCC, when directional antennas (such as panels) are used, compliance assessments are based on the RF effect of a single (facing) antenna sector, as the effects of directional antennas pointed away from the point(s) of interest are considered insignificant. If the different parameters apply in the different sectors, compliance is based on the worst-case parameters.

Street level FCC compliance for a collocated antenna site is assessed in the following manner. At each distance point along the ground, an MPE% calculation is made for each antenna operation (including each frequency band), and the sum of the individual MPE% contributions at each point is compared to 100 percent, the normalized reference for compliance with the MPE limit. We refer to the sum of the individual MPE% contributions as “total MPE%”, and any calculated total MPE% result exceeding 100 percent is, by definition, higher than the FCC limit and represents non-compliance and a need to mitigate the potential exposure. If all results are consistently below 100 percent, on the other hand, that set of results serves as a clear and sufficient demonstration of compliance with the MPE limit.

Note that the following conservative methodology and assumptions are incorporated into the MPE% calculations on a general basis:

1. The antennas are assumed to be operating continuously at maximum power and maximum channel capacity.
2. The power-attenuation effects of shadowing or other obstructions to the line-of-sight path from the antenna to the point of interest are ignored.
3. The calculations intentionally minimize the distance factor (R) by assuming a 6’6” human and performing the calculations from the bottom (rather than the centerline) of each operator’s lowest-mounted antenna, as applicable.
4. The calculations also conservatively take into account, when applicable,

the different technical characteristics and related RF effects of the use of multiple antennas for transmission in the same frequency band.

5. The RF exposure at ground level is assumed to be 100-percent enhanced (increased) via a “perfect” field reflection from the intervening ground.

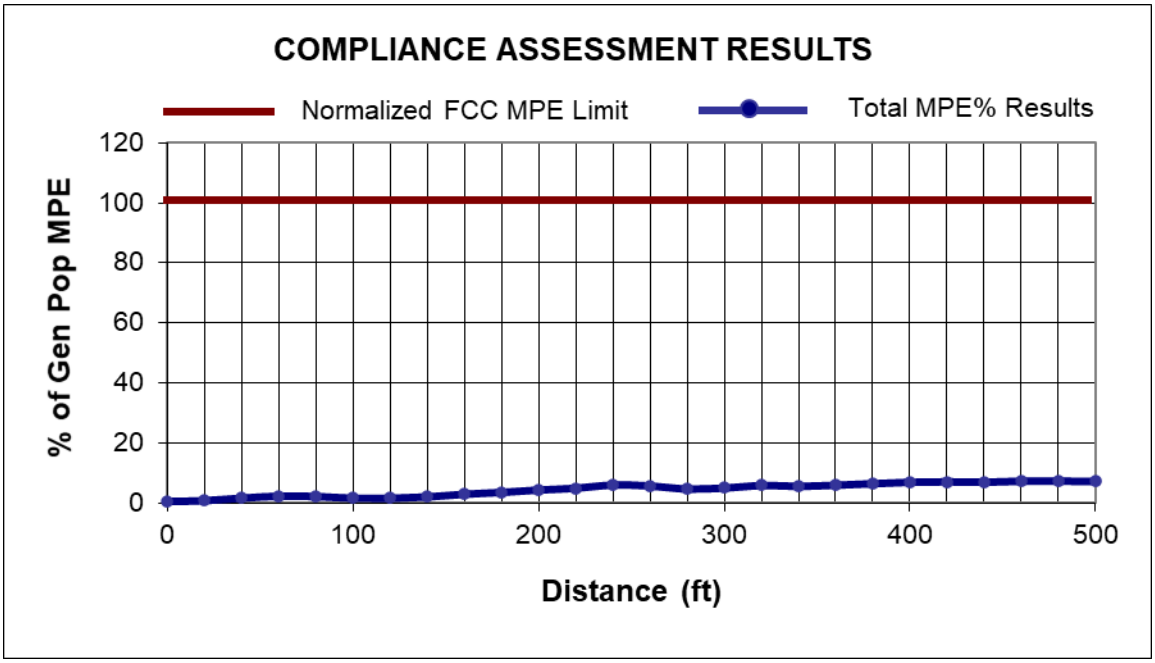
The net result of these assumptions is to intentionally and significantly overstate the calculated RF levels relative to the levels that will actually result from the antenna operations – and the purpose of this conservatism is to allow very “safe-side” conclusions about compliance.

The table that follows provides the results of the MPE% calculations for each antenna operation, with the overall worst-case calculated result highlighted in bold in the last column. Note that the transmission parameters for each Dish antenna sector are identical, and the calculations reflect the worst-case result for any/all sectors.

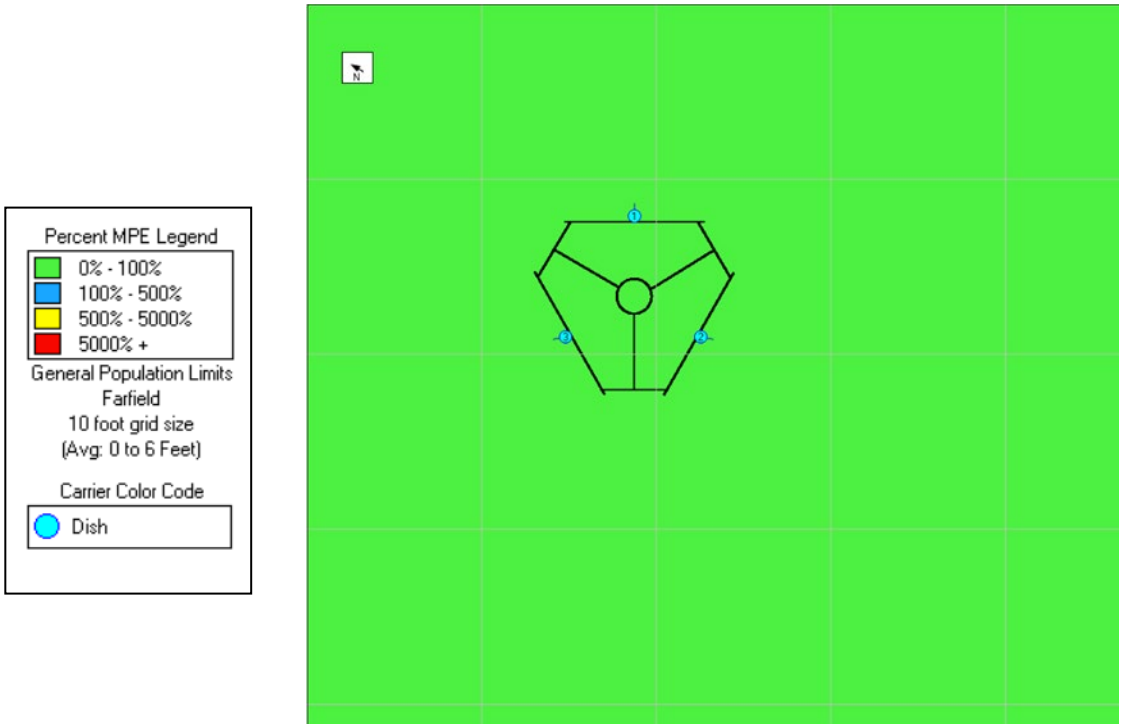
Ground Distance (ft)	Dish 600 MHz MPE%	Dish 2000 MHz MPE%	Dish 2100 MHz MPE%	AT&T MPE%	T-Mobile MPE%	Verizon Wireless MPE%	Total MPE%
0	0.0261	0.0012	0.0002	0.0829	0.1846	0.4412	0.7362
20	0.0440	0.0012	0.0014	0.0911	0.2632	0.6126	1.0135
40	0.0890	0.0074	0.0189	0.1854	0.3568	1.1750	1.8325
60	0.0985	0.0256	0.0087	0.2984	0.6237	1.4321	2.4870
80	0.0373	0.0097	0.0768	0.4426	0.5862	1.2402	2.3928
100	0.0207	0.0948	0.0036	0.4007	0.4664	0.8539	1.8401
120	0.0829	0.1294	0.2065	0.5369	0.3377	0.4921	1.7855
140	0.1535	0.1075	0.1881	0.7711	0.3148	0.7088	2.2438
160	0.1643	0.1493	0.1828	0.8193	0.3834	1.4236	3.1227
180	0.1152	0.0697	0.1506	0.8399	0.4258	2.1171	3.7183
200	0.0588	0.0062	0.0158	0.9273	0.5657	2.9285	4.5023
220	0.0265	0.0139	0.0337	0.8838	0.7039	3.4331	5.0949
240	0.0190	0.0021	0.0245	0.7061	1.1255	4.2622	6.1394
260	0.0165	0.0466	0.0189	0.4418	1.3860	3.9361	5.8459
280	0.0129	0.0449	0.0764	0.2591	1.4224	3.0130	4.8287
300	0.0095	0.0184	0.0713	0.2124	1.6315	3.1958	5.1389
320	0.0065	0.0079	0.0409	0.1947	1.4687	4.2584	5.9771
340	0.0058	0.0498	0.0138	0.1909	1.1773	4.2700	5.7076
360	0.0103	0.0664	0.0400	0.1988	1.4541	4.3102	6.0798
380	0.0200	0.0576	0.0654	0.2323	1.7904	4.4318	6.5975
400	0.0360	0.0326	0.0667	0.3152	2.0080	4.6013	7.0598
420	0.0330	0.0298	0.0610	0.4654	2.0689	4.5474	7.2055
440	0.0545	0.0097	0.0415	0.4268	2.0552	4.4665	7.0542
460	0.0830	0.0027	0.0187	0.6232	2.0094	4.6739	7.4109
480	**0.1189**	**0.0026**	**0.0060**	**0.8506**	**1.8517**	**4.5993**	**7.4291**
500	0.1102	0.0024	0.0055	0.7874	1.8099	4.5570	7.2724

As indicated, the maximum calculated overall RF level is 7.4291 percent of the FCC MPE limit – well below the 100-percent reference for compliance.

A graph of the overall calculation results, shown below, perhaps provides a clearer *visual* illustration of the relative compliance of the calculated RF levels. The line representing the overall calculation results shows an obviously clear, consistent margin to the FCC MPE limit.



The graphic output for the areas at street level surrounding the site is reproduced on the next page.

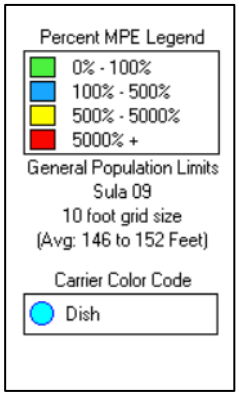


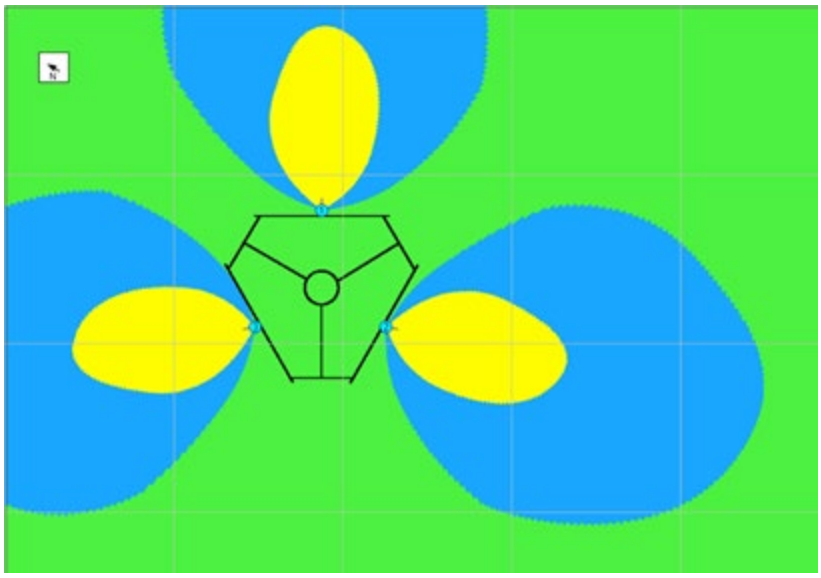
Near-field Analysis

The compliance analysis for the same height as the antennas is performed using the RoofMaster program by Waterford Consultants.

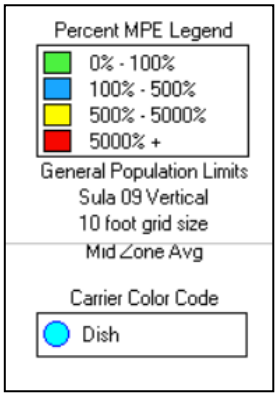
RF levels in the near field of an antenna depend on the power input to the antenna, the antenna's length and horizontal beamwidth, the mounting height of the antenna above nearby roof, and one's position and distance from the antenna. RF levels in front of a directional antenna are higher than they are to the sides or rear, and in any given horizontal direction are inversely proportional to the straight-line distance to the antenna.

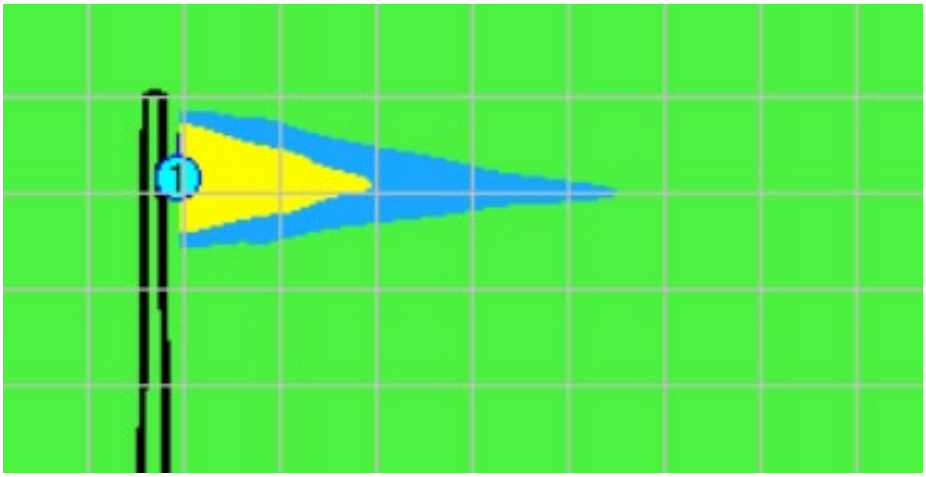
The RoofMaster graphic outputs for the same height as the Dish antennas are reproduced on the next page.





RoofMaster – Same Height as the Antennas – Alpha / Beta / Gamma sectors





RoofMaster – Same Height as the Antennas – Alpha / Beta / Gamma sectors

Compliance Conclusion

According to the FCC, the MPE limit has been constructed in such a manner that continuous human exposure to RF fields up to and including 100 percent of the MPE limit is acceptable and safe.

The conservative analysis in this case shows that the maximum calculated RF level from the proposed modifications to the existing antenna operations at the site is 7.4291 percent of the FCC general population MPE limit. At the same height as the antennas, the analysis shows that the calculated RF levels potentially exceed the FCC MPE limit. Per Dish guidelines, and consistent with FCC guidance on compliance, it is recommended that two Caution signs be six feet below the antennas. In addition, NOC Information signs be installed at the base of the monopole.

The results of the calculations, along with the described RF mitigation, combine to satisfy the FCC's RF compliance requirements and associated guidelines on compliance.

Moreover, because of the extremely conservative calculation methodology and operational assumptions we applied in the analysis, RF levels actually caused by the antennas will be significantly lower than the calculation results here indicate.

Certification

It is the policy of Pinnacle Telecom Group that all FCC RF compliance assessments are reviewed, approved, and signed by the firm's Chief Technical Officer who certifies as follows:

1. I have read and fully understand the FCC regulations concerning RF safety and the control of human exposure to RF fields (47 CFR 1.1301 *et seq*).
2. To the best of my knowledge, the statements and information disclosed in this report are true, complete and accurate.
3. The analysis of site RF compliance provided herein is consistent with the applicable FCC regulations, additional guidelines issued by the FCC, and industry practice.
4. The results of the analysis indicate that the subject antenna operations will be in compliance with the FCC regulations concerning the control of potential human exposure to the RF emissions from antennas.

2/25/22

Daniel J. Collins
Chief Technical Officer
Pinnacle Telecom Group, LLC

Date

Appendix A. Documents Used to Prepare the Analysis

RFDS: RFDS-NJJER01165A-Final-20211115-v.0_20211116094901

CD: NJJER01165A_FinalStampedCDs_20211103145656

Appendix B. Background on the FCC MPE Limit

As directed by the Telecommunications Act of 1996, the FCC has established limits for maximum continuous human exposure to RF fields.

The FCC maximum permissible exposure (MPE) limits represent the consensus of federal agencies and independent experts responsible for RF safety matters. Those agencies include the National Council on Radiation Protection and Measurements (NCRP), the Occupational Safety and Health Administration (OSHA), the National Institute for Occupational Safety and Health (NIOSH), the American National Standards Institute (ANSI), the Environmental Protection Agency (EPA), and the Food and Drug Administration (FDA). In formulating its guidelines, the FCC also considered input from the public and technical community – notably the Institute of Electrical and Electronics Engineers (IEEE).

The FCC's RF exposure guidelines are incorporated in Section 1.301 *et seq* of its Rules and Regulations (47 CFR 1.1301-1.1310). Those guidelines specify MPE limits for both occupational and general population exposure.

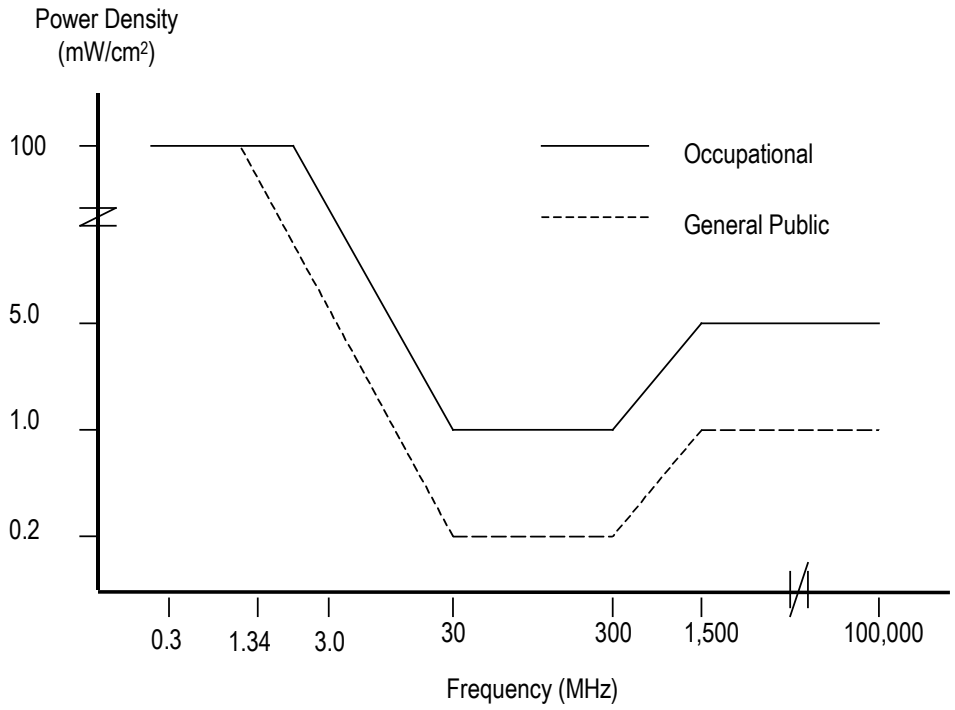
The specified continuous exposure MPE limits are based on known variation of human body susceptibility in different frequency ranges, and a Specific Absorption Rate (SAR) of 4 watts per kilogram, which is universally considered to accurately represent human capacity to dissipate incident RF energy (in the form of heat). The occupational MPE guidelines incorporate a safety factor of 10 or greater with respect to RF levels known to represent a health hazard, and an additional safety factor of five is applied to the MPE limits for general population exposure. Thus, the general population MPE limit has a built-in safety factor of more than 50. The limits were constructed to appropriately protect humans of both sexes and all ages and sizes and under all conditions – and continuous exposure at levels equal to or below the applicable MPE limits is considered to result in no adverse health effects or even health risk.

The reason for *two* tiers of MPE limits is based on an understanding and assumption that members of the general public are unlikely to have had appropriate RF safety training and may not be aware of the exposures they receive; occupational exposure in controlled environments, on the other hand, is assumed to involve individuals who have had such training, are aware of the exposures, and know how to maintain a safe personal work environment.

The FCC's RF exposure limits are expressed in two equivalent forms, using alternative units of field strength (expressed in volts per meter, or V/m), and power density (expressed in milliwatts per square centimeter, or mW/cm^2). The table on the next page lists the FCC limits for both occupational and general population exposures, using the mW/cm^2 reference, for the different radio frequency ranges.

Frequency Range (F) (MHz)	Occupational Exposure (mW/cm^2)	General Public Exposure (mW/cm^2)
0.3 - 1.34	100	100
1.34 - 3.0	100	$180 / F^2$
3.0 - 30	$900 / F^2$	$180 / F^2$
30 - 300	1.0	0.2
300 - 1,500	F / 300	F / 1500
1,500 - 100,000	5.0	1.0

The diagram below provides a graphical illustration of both the FCC's occupational and general population MPE limits.



Because the FCC's RF exposure limits are frequency-shaped, the exact MPE limits applicable to the instant situation depend on the frequency range used by the systems of interest.

The most appropriate method of determining RF compliance is to calculate the RF power density attributable to a particular system and compare that to the MPE limit applicable to the operating frequency in question. The result is usually expressed as a percentage of the MPE limit.

For potential exposure from multiple systems, the respective percentages of the MPE limits are added, and the total percentage compared to 100 (percent of the limit). If the result is less than 100, the total exposure is in compliance; if it is more than 100, exposure mitigation measures are necessary to achieve compliance.

Note that the FCC "categorically excludes" all "non-building-mounted" wireless antenna operations whose mounting heights are more than 10 meters (32.8 feet) from the routine requirement to demonstrate compliance with the MPE limit, because such operations "are deemed, individually and cumulatively, to have no significant effect on the human environment". The categorical exclusion also applies to *all* point-to-point antenna operations, regardless of the type of structure they're mounted on. Note that the FCC considers any facility qualifying for the categorical exclusion to be automatically in compliance.

In addition, FCC Rules and Regulations Section 1.1307(b)(3) describes a provision known in the industry as "the 5% rule". It describes that when a specific location – like a spot on a rooftop – is subject to an overall exposure level exceeding the applicable MPE limit, operators with antennas whose MPE% contributions at the point of interest are less than 5% are exempted from the obligation otherwise shared by all operators to bring the site into compliance, and those antennas are automatically deemed by the FCC to satisfy the rooftop compliance requirement.

FCC References on RF Compliance

47 CFR, FCC Rules and Regulations, Part 1 (Practice and Procedure), Section 1.1310 (Radiofrequency radiation exposure limits).

FCC Second Memorandum Opinion and Order and Notice of Proposed Rulemaking (FCC 97-303), *In the Matter of Procedures for Reviewing Requests for Relief From State and Local Regulations Pursuant to Section 332(c)(7)(B)(v) of the Communications Act of 1934 (WT Docket 97-192), Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation (ET Docket 93-62), and Petition for Rulemaking of the Cellular Telecommunications Industry Association Concerning Amendment of the Commission's Rules to Preempt State and Local Regulation of Commercial Mobile Radio Service Transmitting Facilities*, released August 25, 1997.

FCC First Memorandum Opinion and Order, ET Docket 93-62, *In the Matter of Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation*, released December 24, 1996.

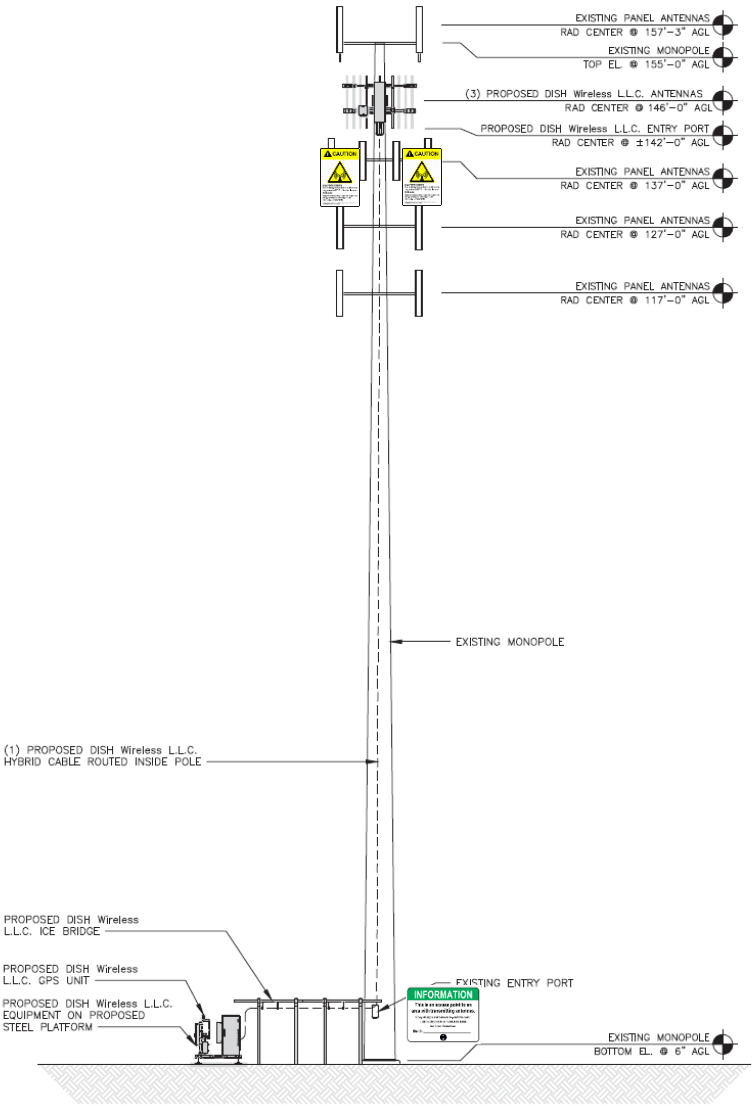
FCC Report and Order, ET Docket 93-62, *In the Matter of Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation*, released August 1, 1996.

FCC Report and Order, Notice of Proposed Rulemaking, Memorandum Opinion and Order (FCC 19-126), *Proposed Changes in the Commission's Rules Regarding Human Exposure to Radiofrequency Electromagnetic Fields; Reassessment of Federal Communications Commission Radiofrequency Exposure Limits and Policies,* released December 4, 2019.

FCC Office of Engineering and Technology (OET) Bulletin 65, “Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields”, Edition 97-01, August 1997.

FCC Office of Engineering and Technology (OET) Bulletin 56, “Questions and Answers About Biological Effects and Potential Hazards of RF Radiation”, edition 4, August 1999.

Appendix C. Proposed Signage



NOC Information Sign		Caution Sign	
Guidelines Sign		Warning Sign	
Notice Sign			

Appendix D. Summary of Expert Qualifications

Daniel J. Collins, Chief Technical Officer, Pinnacle Telecom Group, LLC

Synopsis:	• 40+ years of experience in all aspects of wireless system engineering, related regulation, and RF exposure • Has performed or led RF exposure compliance assessments on more than 20,000 antenna sites since the latest FCC regulations went into effect in 1997 • Has provided testimony as an RF compliance expert more than 1,500 times since 1997 • Have been accepted as an FCC compliance expert in New York, New Jersey, Connecticut, Pennsylvania and more than 40 other states, as well as by the FCC
Education:	• B.E.E., City College of New York (Sch. Of Eng.), 1971 • M.B.A., 1982, Fairleigh Dickinson University, 1982 • Bronx High School of Science, 1966
Current Responsibilities:	• Leads all PTG staff work involving RF safety and FCC compliance, microwave and satellite system engineering, and consulting on wireless technology and regulation
Prior Experience:	• Edwards & Kelcey, VP – RF Engineering and Chief Information Technology Officer, 1996-99 • Bellcore (a Bell Labs offshoot after AT&T's 1984 divestiture), Executive Director – Regulation and Public Policy, 1983-96 • AT&T (Corp. HQ), Division Manager – RF Engineering, and Director – Radio Spectrum Management, 1977-83 • AT&T Long Lines, Group Supervisor – Microwave Radio System Design, 1972-77
Specific RF Safety / Compliance Experience:	• Involved in RF exposure matters since 1972 • Have had lead corporate responsibility for RF safety and compliance at AT&T, Bellcore, Edwards & Kelcey, and PTG • While at AT&T, helped develop the mathematical models for calculating RF exposure levels • Have been relied on for compliance by all major wireless carriers, as well as by the federal government, several state and local governments, equipment manufacturers, system integrators, and other consulting / engineering firms
Other Background:	• Author, *Microwave System Engineering* (AT&T, 1974) • Co-author and executive editor, *A Guide to New Technologies and Services* (Bellcore, 1993) • National Spectrum Management Association (NSMA) – former three-term President and Chairman of the Board of Directors; was founding member, twice-elected Vice President, long-time member of the Board, and was named an NSMA Fellow in 1991 • Have published more than 35 articles in industry magazines

EXHIBIT 8

Structural Analysis

Tower Engineering Solutions
Phone (972) 483-0607, Fax (972) 975-9615
1320 Greenway Drive, Suite 600, Irving, Texas 75038

Structural Analysis Report

Existing 155 ft SUMMIT Monopole
Customer Name: SBA Communications Corp
Customer Site Number: CT00248-S
Customer Site Name: North Bethel
Carrier Name: Dish Wireless (App#: 163826, V#1)
Carrier Site ID / Name: NJJER01165A / 0
Site Location: 11 Francis J. Clarke Circle
Bethel, Connecticut
Fairfield County
Latitude: 41.360522
Longitude: -73.424474

Analysis Result:

Max Structural Usage: 69.4% [Pass]
Max Foundation Usage: 73.5% [Pass]

Report Prepared By: Mukunda Pokharel

Introduction

The purpose of this report is to summarize the analysis results on the 155 ft SUMMIT Monopole to support the proposed antennas and transmission lines in addition to those currently installed. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

Sources of Information

Tower Drawings	Tower Drawings prepared by Summit Manufacturing LLC., Job # 4071 Dated 10/22/1998
Foundation Drawing	Foundation Design prepared by Paul J. Ford and Company, Job # 29200-1210 Dated 08/17/2000
Geotechnical Report	Geotechnical Report prepared by Jaworski Geotech Inc., Project # C98342G Dated 08/06/1998
Modification Drawings	N/A

Analysis Criteria

The rigorous analysis was performed in accordance with the requirements and stipulations of the TIA-222-G-2**.** In accordance with this standard, the structure was analyzed using **TESPoles,** a proprietary analysis software. The program considers the structure as an elastic 3-D model with second-order effects and temperature effects incorporated in the analysis. The analysis was performed using multiple wind directions.

Wind Speed Used in the Analysis:	Ultimate Design Wind Speed Vult = 120 mph (3-Sec. Gust)/ Nominal Design Wind Speed V_{asd} = 93 mph (3-Sec. Gust)
Wind Speed with Ice:	50 mph (3-Sec. Gust) with 3/4" radial ice concurrent
Operational Wind Speed:	60 mph + 0" Radial ice
Standard/Codes:	TIA-222-G-2 / 2015 IBC / 2018 Connecticut State Building Code
Exposure Category:	B
Structure Class:	II
Topographic Category:	1
Crest Height:	0 ft
Seismic Parameters:	S_S = 0.215, S_1 = 0.066

This structural analysis is based upon the tower being classified as a Structure Class II; however, if a different classification is required subsequent to the date hereof, the tower classification will be changed to meet such requirement and a new structural analysis will be run.

Existing Antennas, Mounts and Transmission Lines

The table below summarizes the antennas, mounts and transmission lines that were considered in the analysis as existing on the tower.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
1	157.0	3	RFS APX16DWV-16DWVS-E-A20 - Panel	Modified Low Profile Platform w/ HRK, Collar Mounts, (1) T-arm kit, & (1) kicker kit.	(2) 1.99" Hybrid - 6x24	T-Mobile Sprint
2		3	RFS APXVAALL24_43-U-NA20 - Panel			
3		3	Ericsson AIR6449 B41 - Panel			
4		4	RFS ACU-A20-N RET			
5		3	Ericsson 4424 B25 RRU			
6		3	Ericsson 4415 B66A RRU			
7		3	Ericsson 4449 B71 + B85 RRU			
8	137.0	6	JMA - MX06FIT665-02 - Panel	Low Profile Platform	(6) 1 5/8" (1) 12x24 - 1 5/8" Hybrid	Verizon
9		3	Samsung - 64T64R - Panel			
10		3	Samsung - B5/B13 RRH-BR04C			
11		3	Samsung - B2/B66A RRH-BR049			
12		1	Commscope - RCMDC-6627-PF-48			
13		2	Antel - LPA-80080/4CF - Panel			
14		2	Antel - LPA-80080-6CF – Panel			
15		2	Antel - LPA-80063/6CF_5 - Panel			
16	127.0	3	RRU 11	Low Profile Platform	(9) 1 1/4" (1) 1/2" Fiber (2) 3/4" DC	AT&T
17		3	Powerwave - P65-16-XLH-RR - Panel			
18		3	Ericsson - RRUS 12 - RRU			
19		6	Kathrein - 860 10025 - RET			
20		1	Raycap - DC6-48-60-18-8F - SP			
21		3	Powerwave - 7770 - Panel			
22		6	Powerwave - LGP21401 - TMA			
23	117.0	3	Ericsson - Air 21 B4A/B2P - Panel	(3) T-Arms (Valmont P/N RMV12-3xx)	(12) 1 5/8"[1] (1) 1 5/8" Hybrid[2]	T-Mobile
24		3	Ericsson - Air 21 B2A/B4P - Panel			

Note: AT&T loading includes FirstNET equipment

1. The (12) 1 5/8” Coax and are considered double stacked running outside of the pole shaft
2. The (1) 1 5/8” Hybrid is considered running outside of the pole shaft

Proposed Carrier's Final Configuration of Antennas, Mounts and Transmission Lines

Information pertaining to the proposed carrier's final configuration of antennas and transmission lines was provided by SBA Communications Corp. The proposed antennas and lines are listed below.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
8	147.0	3	Commscope FFVV-65B-R2 - Panel	Platform w/ HRK (Commscope MC-PK8-DSH)	(1) 1.75" Hybrid	Dish Wireless
9		3	Fujitsu TA08025-B605 - RRU			
10		3	Fujitsu TA08025-B604 - RRU			
11		1	Raycap RDIDC-9181-PF-48 - OVP			

The proposed transmission line can be installed inside or outside of the pole shafts. If installed outside, the line shall be strapped tightly to the face of the pole shafts. See the attached coax layout for the line placement considered in the analysis.

Analysis Results

The results of the structural analysis, performed for the wind and ice loading and antenna equipment as defined above, are summarized as the following:

	Pole shafts	Anchor Bolts	Base Plate
Max. Usage:	**69.4%**	**49.7%**	**60.4%**
Pass/Fail	**Pass**	**Pass**	**Pass**

Foundations

	Moment (Kip-Ft)	Shear (Kips)	Axial (Kips)
Analysis Reactions	3270.2	27.4	46.7

The foundation has been investigated using the supplied documents and soils report and was found adequate. Therefore, no modification to the foundation will be required.

Operational Condition (Rigidity):

Operational characteristics of the tower are found to be within the limits prescribed by TIA-222 for the installed antennas. The maximum twist/sway at the elevation of the proposed equipment is 1.8181 degrees under the operational wind speed as specified in the Analysis Criteria.

Conclusions

Based on the analysis results, the existing structure and its foundation were found to be adequate to safely support the existing and proposed equipment and meet the minimum requirements per the TIA-222 Standard under the design basic wind speed as specified in the Analysis Criteria.

Standard Conditions

1. This analysis was performed based on the information supplied to **(TES) Tower Engineering Solutions, LLC.** Verification of the information provided was not included in the Scope of Work for **TES**. The accuracy of the analysis is dependent on the accuracy of the information provided.

2. The structural analysis was performance based upon the evidence available at the time of this report. All information provided by the client is considered to be accurate.

3. The analyses will be performed based on the codes as specified by the client or based on the best knowledge of the engineering staff of **TES**. In the absence of information to the contrary, all work will be performed in accordance with the latest relevant revision of ANSI/TIA-222. If wind speed and/or ice loads are different from the minimum values recommended by the ANSI/TIA-222 standard or other codes, **TES** should be notified in writing and the applicable minimum values provided by the client.

4. The configuration of the existing mounts, antennas, coax and other appurtenances were supplied by the customer for the current structural analysis. **TES** has not visited the tower site to verify the adequacy of the information provided. If there is any discrepancy found in the report regarding the existing conditions, **TES** should be notified immediately to evaluate the effect of the discrepancy on the analysis results.

5. The client will assume responsibility for rework associated with the differences in initially provided information, including tower and foundation information, existing and/or proposed equipment and transmission lines.

6. If a feasibility analysis was performed, final acceptance of changed conditions shall be based upon a rigorous structural analysis.

Usage Diagram - Max Ratio 69.38% at 123.3ft

Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021
Site Name:	North Bethel	**Exposure:**	B	
Height:	155.00 (ft)	**Gh:**	1.1	
Base Elev:	0.000 (ft)			Page: 1

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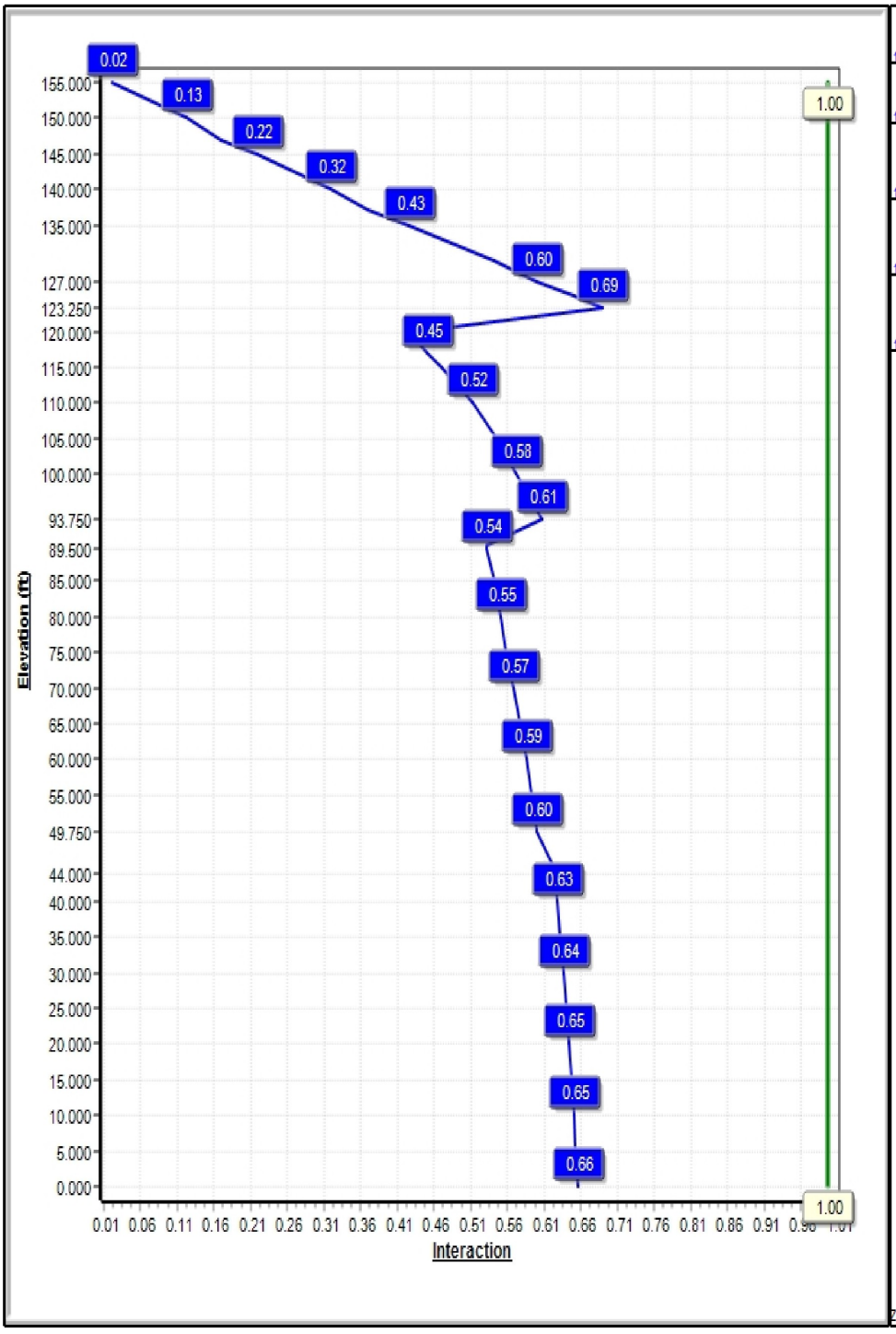
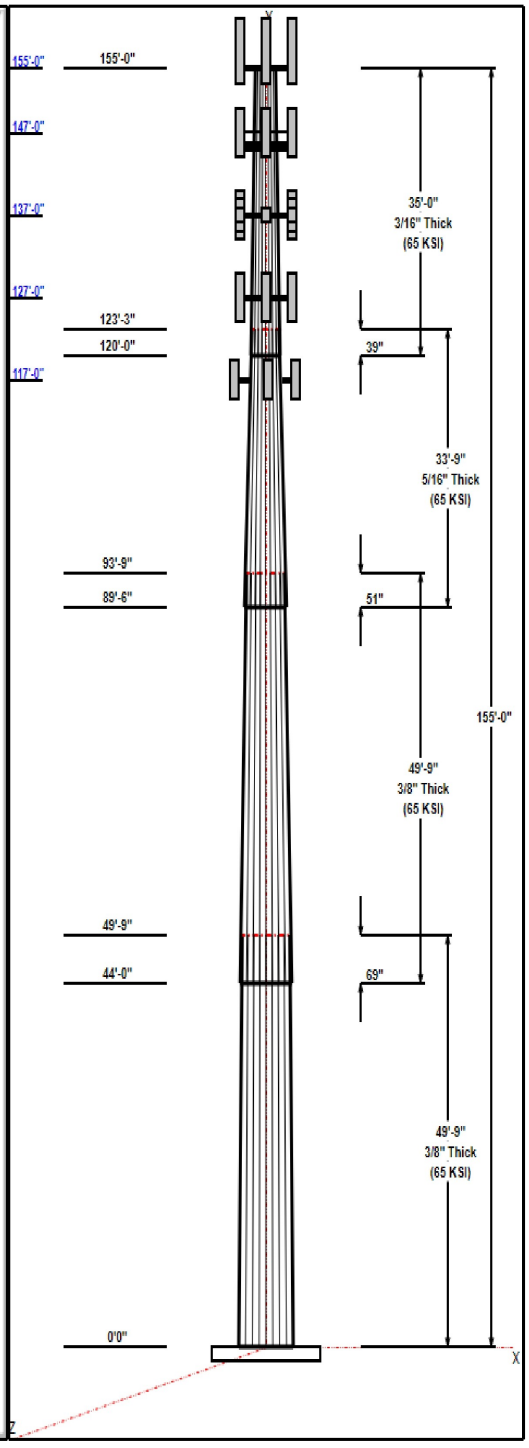
Dead Load Factor:	1.20	**Iterations:**	25
Wind Load Factor:	1.60		

Load Case : 1.2D + 1.6W 93 mph Wind





Structure: CT00248-S-SBA

Type: Tapered
Site Name: North Bethel
Height: 155.00 (ft)
Base Elev: 0.00 (ft)

Base Shape: 18 Sided
Taper: 0.27148

10/14/2021

Tower Engineering Solutions

Shaft Properties

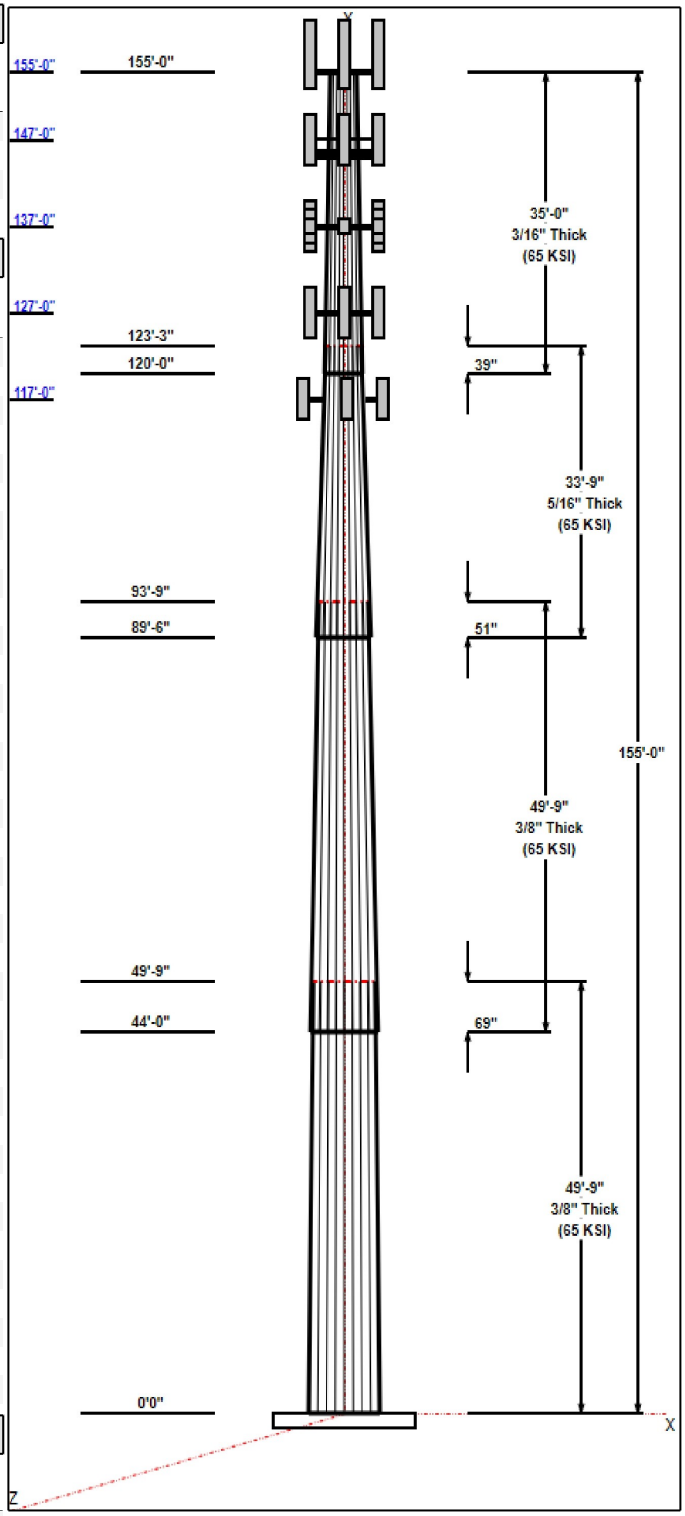
Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	49.75	43.32	56.83	0.375		0.27148	65
2	49.75	32.13	45.63	0.375	Slip	0.27148	65
3	33.75	24.74	33.91	0.313	Slip	0.27148	65
4	35.00	16.50	26.00	0.188	Slip	0.27148	65

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
155.00	157.00	4	ACU-A20-N	T-Mobile Sprint
155.00	155.00	1	Low Profile Platform	T-Mobile Sprint
155.00	157.00	3	RFS	T-Mobile Sprint
155.00	157.00	3	RFS	T-Mobile Sprint
155.00	157.00	3	Ericsson AIR6449 B41	T-Mobile Sprint
155.00	157.00	3	Ericsson 4424 B25 RRU	T-Mobile Sprint
155.00	157.00	3	Ericsson 4415 B66A RRU	T-Mobile Sprint
155.00	157.00	3	Ericsson 4449 B71 + B85	T-Mobile Sprint
155.00	155.00	1	(3) T-Arm Kit	T-Mobile Sprint
155.00	155.00	1	MS-H1242 (Heavy Collar	T-Mobile Sprint
155.00	155.00	1	MS-KI22-5 (Kickers w/o	T-Mobile Sprint
155.00	155.00	1	6' Lightning rod	-
147.00	147.00	3	FFVV-65C-R3-V1	Dish Wireless
147.00	147.00	1	MC-PK8-DSH	Dish Wireless
147.00	147.00	3	TA08025-B604	Dish Wireless
147.00	147.00	3	TA08025-B605	Dish Wireless
147.00	147.00	1	RDIDC-9181-PF-48	Dish Wireless
137.00	137.00	2	LPA-80080/4CF ___	Verizon
137.00	137.00	2	LPA-80080-6CF-EDIN	Verizon
137.00	137.00	2	LPA-80063/6CF	Verizon
137.00	137.00	1	Low Profile Platform	Verizon
137.00	137.00	6	JMA - MX06FIT665-02	Verizon
137.00	137.00	3	Samsung - 64T64R	Verizon
137.00	137.00	3	Samsung - B5/B13	Verizon
137.00	137.00	3	Samsung - B2/B66A	Verizon
137.00	137.00	1	Commscope -	Verizon
127.00	127.00	3	RRU 11	AT&T
127.00	127.00	3	P65-16-XLH-RR	AT&T
127.00	127.00	3	RRUS 12	AT&T
127.00	127.00	6	860 10025	AT&T
127.00	127.00	1	DC6-48-60-18-8F	AT&T
127.00	127.00	3	7770	AT&T
127.00	127.00	6	LGP21401	AT&T
127.00	127.00	1	Low Profile Platform	AT&T
117.00	117.00	3	T-Arms	T-Mobile
117.00	117.00	3	Air 21 B4A/B2P	T-Mobile
117.00	117.00	3	Ericsson - Air 21 B2A/B4P	T-Mobile

Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	155.00	Inside	1.99" Hybrid - 6x24	T-Mobile Sprint
0.00	147.00	Outside	1.75" Hybrid	Dish Wireless
0.00	137.00	Inside	1 5/8" Coax	Verizon
0.00	137.00	Inside	12x24 - 1 5/8" Hybrid	Verizon
0.00	127.00	Inside	1 1/4" Coax	AT&T



0.00	127.00	Inside	1/2" Fiber	AT&T
0.00	127.00	Inside	3/4" DC	AT&T
0.00	117.00	Outside	1 5/8" Coax	T-Mobile
0.00	117.00	Outside	1 5/8" Hybrid	T-Mobile

Anchor Bolts

Qty	Specifications	Grade (ksi)	Arrangement
20	2.25" 18J	75.0	Cluster

Base Plate

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
2.7500	64.0	50.0	Clipped

Reactions

Load Case	Moment (FT-Kips)	Shear (Kips)	Axial (Kips)
1.2D + 1.6W 93 mph Wind	3270.2	27.4	46.7
0.9D + 1.6W 93 mph Wind	3225.7	27.4	35.0
1.2D + 1.0Di + 1.0Wi 50 mph Wind	1012.4	8.4	78.4
1.2D + 1.0E	342.8	2.6	46.8
0.9D + 1.0E	337.6	2.6	35.1
1.0D + 1.0W 60 mph Wind	844.4	7.1	39.0

Structure: CT00248-S-SBA - Coax Line Placement

Type: Monopole
Site Name: North Bethel
Height: 155.00 (ft)

10/14/2021

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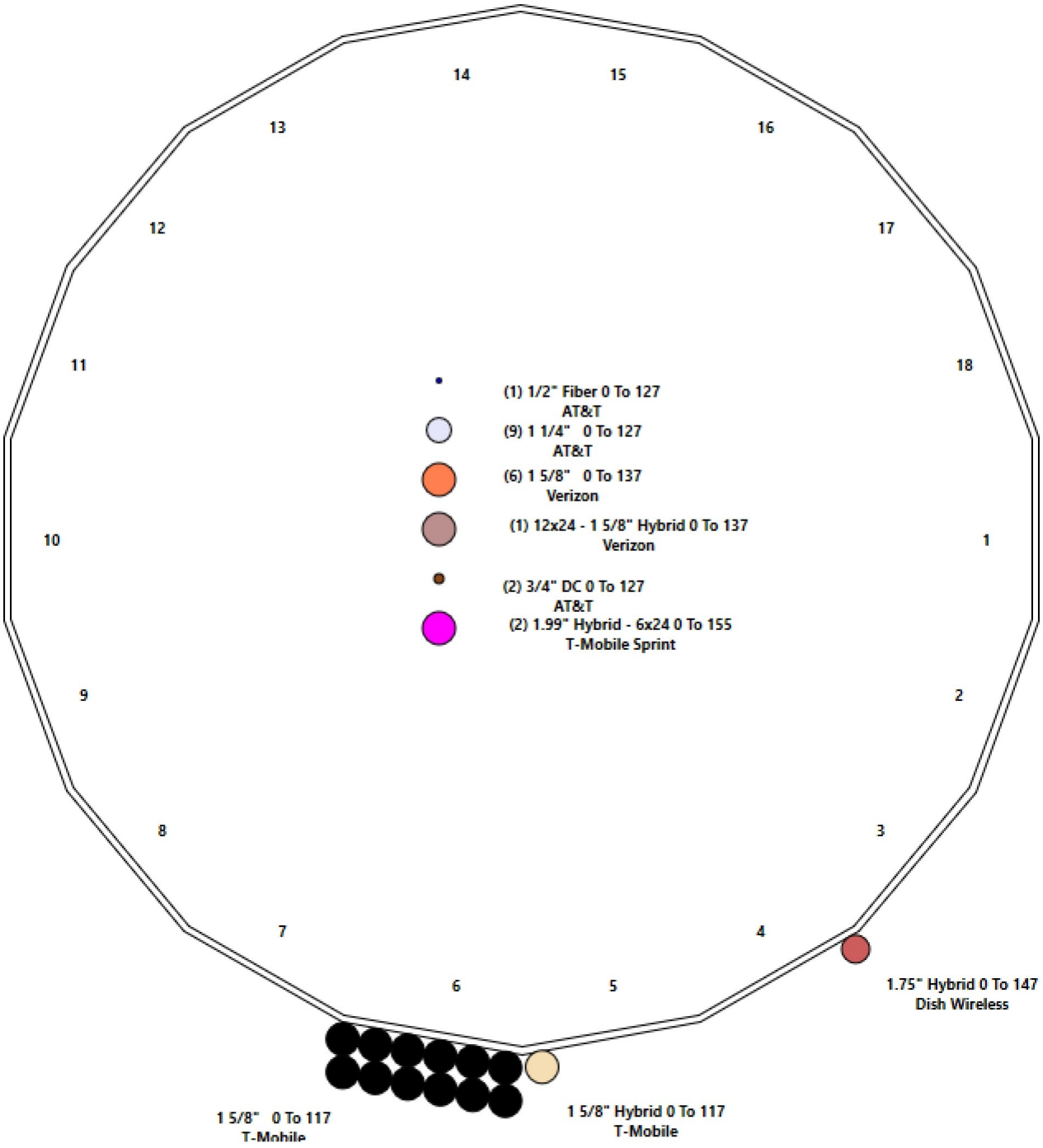

Shaft Properties

Structure:	CT00248-S-SBA		**Code:**	EIA/TIA-222-G	10/14/2021
Site Name:	North Bethel		**Exposure:**	B	
Height:	155.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 5

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Sec. No.	Shape	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Overlap (in)	Weight (lb)
1	18	49.750	0.3750	65		0.00	10,014
2	18	49.750	0.3750	65	Slip	69.00	7,759
3	18	33.750	0.3125	65	Slip	51.00	3,305
4	18	35.000	0.1875	65	Slip	39.00	1,493
					Total Shaft Weight:		**22,571**

	Bottom						Top						
Sec. No.	**Dia (in)**	**Elev (ft)**	**Area (sqin)**	**Ix (in^4)**	**W/t Ratio**	**D/t Ratio**	**Dia (in)**	**Elev (ft)**	**Area (sqin)**	**Ix (in^4)**	**W/t Ratio**	**D/t Ratio**	**Taper**
1	56.83	0.00	67.19	27057.20	25.31	151.55	43.32	49.75	51.12	11913.1	18.96	115.5	0.271484
2	45.63	44.00	53.87	13941.55	20.05	121.69	32.13	93.75	37.79	4814.44	13.70	85.68	0.271484
3	33.91	89.50	33.32	4751.23	17.72	108.50	24.74	123.25	24.23	1827.58	12.55	79.18	0.271484
4	26.00	120.0	15.36	1293.40	23.04	138.68	16.50	155.00	9.71	326.37	14.11	88.00	0.271484

Load Summary

Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 6	

Tower Engineering Solutions

Discrete Appurtenances

				No Ice			Ice				
No.	Elev (ft)	Description	Qty	Weight (lb)	CaAa (sf)	CaAa Factor	Weight (lb)	CaAa (sf)	CaAa Factor	Hor. Ecc. (ft)	Vert Ecc (ft)
1	155.00	ACU-A20-N	4	1.00	0.14	0.50	5.31	0.438	0.50	0.00	2.00
2	155.00	Low Profile Platform	1	1500.00	28.00	1.00	2813.21	50.552	1.00	0.00	0.00
3	155.00	RFS APX16DWV-16DWVS-E-A20	3	40.70	6.46	0.62	178.24	7.578	0.62	0.00	2.00
4	155.00	RFS APXVAALL24_43-U-NA20	3	122.80	20.24	0.70	542.28	22.147	0.70	0.00	2.00
5	155.00	Ericsson AIR6449 B41	3	103.00	5.65	0.71	240.57	6.604	0.71	0.00	2.00
6	155.00	Ericsson 4424 B25 RRU	3	88.00	2.05	0.67	174.74	2.648	0.67	0.00	2.00
7	155.00	Ericsson 4415 B66A RRU	3	46.30	1.86	0.67	107.33	2.427	0.67	0.00	2.00
8	155.00	Ericsson 4449 B71 + B85 RRU	3	73.20	1.97	0.67	131.13	2.541	0.67	0.00	2.00
9	155.00	(3) T-Arm Kit	1	500.00	16.50	1.00	1095.32	32.679	1.00	0.00	0.00
10	155.00	MS-H1242 (Heavy Collar Mount)	1	150.60	2.50	1.00	361.55	5.126	1.00	0.00	0.00
11	155.00	MS-KI22-5 (Kickers w/o Collar)	1	146.00	5.33	1.00	350.51	10.930	1.00	0.00	0.00
12	155.00	6' Lightning rod	1	6.50	0.38	1.00	42.92	1.471	1.00	0.00	0.00
13	147.00	FFVV-65C-R3-V1	3	71.00	12.27	0.73	351.42	13.745	0.73	0.00	0.00
14	147.00	MC-PK8-DSH	1	1727.00	37.59	1.00	3411.43	84.729	1.00	0.00	0.00
15	147.00	TA08025-B604	3	63.90	1.96	0.67	114.43	2.520	0.67	0.00	0.00
16	147.00	TA08025-B605	3	75.00	1.96	0.67	127.20	2.520	0.67	0.00	0.00
17	147.00	RDIDC-9181-PF-48	1	21.90	2.01	1.00	75.04	2.577	1.00	0.00	0.00
18	137.00	LPA-80080/4CF ___	2	12.00	2.61	0.93	217.55	7.254	0.93	0.00	0.00
19	137.00	LPA-80080-6CF-EDIN	2	21.00	4.33	0.93	187.91	5.693	0.93	0.00	0.00
20	137.00	LPA-80063/6CF	2	27.00	9.60	0.94	312.08	10.940	0.94	0.00	0.00
21	137.00	Low Profile Platform	1	1200.00	28.00	1.00	2237.68	51.244	1.00	0.00	0.00
22	137.00	JMA - MX06FIT665-02	6	45.00	9.55	0.80	269.43	10.899	0.80	0.00	0.00
23	137.00	Samsung - 64T64R	3	95.60	4.79	0.66	199.39	4.726	0.66	0.00	0.00
24	137.00	Samsung - B5/B13 RRH-BR04C	3	70.30	1.87	0.67	138.87	2.438	0.67	0.00	0.00
25	137.00	Samsung - B2/B66A RRH-BR049	3	84.40	1.87	0.67	160.10	2.438	0.67	0.00	0.00
26	137.00	Commscope - RCMDC-6627-PF-48	1	32.00	4.06	1.00	144.90	4.875	1.00	0.00	0.00
27	127.00	RRU 11	3	55.00	4.42	0.68	143.47	5.895	0.69	0.00	0.00
28	127.00	P65-16-XLH-RR	3	53.00	8.16	0.75	215.33	10.916	0.75	0.00	0.00
29	127.00	RRUS 12	3	60.00	2.70	0.67	125.91	3.349	0.69	0.00	0.00
30	127.00	860 10025	6	1.20	0.18	0.70	7.10	0.553	0.72	0.00	0.00
31	127.00	DC6-48-60-18-8F	1	31.80	1.47	1.00	92.60	2.158	1.00	0.00	0.00
32	127.00	7770	3	35.00	5.50	0.75	167.44	6.546	0.75	0.00	0.00
33	127.00	LGP21401	6	14.10	1.29	0.64	38.69	2.112	0.66	0.00	0.00
34	127.00	Low Profile Platform	1	1500.00	25.00	1.00	2787.31	44.739	1.00	0.00	0.00
35	117.00	T-Arms	3	350.00	8.00	0.75	588.33	14.810	0.75	0.00	0.00
36	117.00	Air 21 B4A/B2P	3	90.40	6.09	0.86	254.36	7.159	0.86	0.00	0.00
37	117.00	Ericsson - Air 21 B2A/B4P	3	91.50	6.09	0.86	255.46	7.159	0.86	0.00	0.00
		Totals:	**96**	**12,308.90**			**29,408.09**				

Linear Appurtenances

Bottom Elev. (ft)	Top Elev. (ft)	Description	Exposed Width	Exposed
0.00	155.00	(2) 1.99" Hybrid - 6x24	0.00	Inside
0.00	147.00	(1) 1.75" Hybrid	1.75	Outside
0.00	137.00	(6) 1 5/8" Coax	0.00	Inside
0.00	137.00	(1) 12x24 - 1 5/8" Hybrid	0.00	Inside

Discrete Appurtenances

No.	Elev (ft)	Description	Qty	No Ice Weight (lb)	No Ice CaAa (sf)	No Ice CaAa Factor	Ice Weight (lb)	Ice CaAa (sf)	Ice CaAa Factor	Hor. Ecc. (ft)	Vert Ecc (ft)
0.00	127.00	(9) 1 1/4" Coax			0.00	Inside					
0.00	127.00	(1) 1/2" Fiber			0.00	Inside					
0.00	127.00	(2) 3/4" DC			0.00	Inside					
0.00	117.00	(12) 1 5/8" Coax			3.96	Outside					
0.00	117.00	(1) 1 5/8" Hybrid			0.00	Outside					

Shaft Section Properties

Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 8	

Tower Engineering Solutions

Increment Length: **5 (ft)**

Elev (ft)	Description	Thick (in)	Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fpy (ksi)	S (in^3)	Weight (lb)
0.00		0.3750	56.830	67.193	27057.2	25.31	151.55	71.6	937.7	0.0
5.00		0.3750	55.473	65.578	25152.0	24.67	147.93	72.4	893.1	1129.5
10.00		0.3750	54.115	63.962	23338.5	24.03	144.31	73.1	849.4	1102.0
15.00		0.3750	52.758	62.346	21614.3	23.40	140.69	73.9	806.9	1074.5
20.00		0.3750	51.400	60.731	19977.1	22.76	137.07	74.6	765.5	1047.0
25.00		0.3750	50.043	59.115	18424.8	22.12	133.45	75.4	725.2	1019.5
30.00		0.3750	48.685	57.499	16955.1	21.48	129.83	76.1	685.9	992.0
35.00		0.3750	47.328	55.884	15565.7	20.84	126.21	76.9	647.8	964.5
40.00		0.3750	45.971	54.268	14254.3	20.21	122.59	77.6	610.7	937.1
44.00	Bot - Section 2	0.3750	44.885	52.976	13259.9	19.69	119.69	78.2	581.9	729.9
45.00		0.3750	44.613	52.653	13018.7	19.57	118.97	78.4	574.8	362.5
49.75	Top - Section 1	0.3750	44.074	52.010	12548.2	19.31	117.53	0.0	0.0	1691.7
50.00		0.3750	44.006	51.930	12489.8	19.28	117.35	78.7	559.0	44.2
55.00		0.3750	42.648	50.314	11360.0	18.64	113.73	79.5	524.6	869.8
60.00		0.3750	41.291	48.698	10300.4	18.00	110.11	80.2	491.3	842.3
65.00		0.3750	39.934	47.083	9308.9	17.37	106.49	81.0	459.1	814.8
70.00		0.3750	38.576	45.467	8383.1	16.73	102.87	81.7	428.0	787.3
75.00		0.3750	37.219	43.852	7520.8	16.09	99.25	82.5	398.0	759.8
80.00		0.3750	35.861	42.236	6719.8	15.45	95.63	82.5	369.1	732.3
85.00		0.3750	34.504	40.620	5977.8	14.81	92.01	82.5	341.2	704.9
89.50	Bot - Section 3	0.3750	33.282	39.166	5358.6	14.24	88.75	82.5	317.1	610.9
90.00		0.3750	33.146	39.005	5292.5	14.18	88.39	82.5	314.5	123.1
93.75	Top - Section 2	0.3125	32.753	32.176	4278.3	17.07	104.81	0.0	0.0	907.0
95.00		0.3125	32.414	31.840	4145.5	16.88	103.72	81.5	251.9	136.1
100.00		0.3125	31.057	30.493	3641.5	16.11	99.38	82.4	230.9	530.3
105.00		0.3125	29.699	29.147	3180.1	15.35	95.04	82.5	210.9	507.4
110.00		0.3125	28.342	27.801	2759.5	14.58	90.69	82.5	191.8	484.4
115.00		0.3125	26.984	26.454	2377.7	13.82	86.35	82.5	173.5	461.5
117.00		0.3125	26.441	25.916	2235.4	13.51	84.61	82.5	166.5	178.2
120.00	Bot - Section 4	0.3125	25.627	25.108	2032.8	13.05	82.01	82.5	156.2	260.4
123.25	Top - Section 3	0.1875	25.120	14.837	1165.3	22.21	133.97	0.0	0.0	439.8
125.00		0.1875	24.645	14.554	1099.9	21.77	131.44	75.8	87.9	87.5
127.00		0.1875	24.102	14.231	1028.3	21.25	128.54	76.4	84.0	98.0
130.00		0.1875	23.287	13.747	926.7	20.49	124.20	77.3	78.4	142.8
135.00		0.1875	21.930	12.939	772.8	19.21	116.96	78.8	69.4	227.0
137.00		0.1875	21.387	12.616	716.3	18.70	114.06	79.4	66.0	87.0
140.00		0.1875	20.572	12.131	636.9	17.94	109.72	80.3	61.0	126.3
145.00		0.1875	19.215	11.323	517.9	16.66	102.48	81.8	53.1	199.5
147.00		0.1875	18.672	11.000	474.9	16.15	99.58	82.4	50.1	76.0
150.00		0.1875	17.857	10.515	414.8	15.38	95.24	82.5	45.8	109.8
155.00		0.1875	16.500	9.708	326.4	14.11	88.00	82.5	39.0	172.0
										22570.6

Wind Loading - Shaft

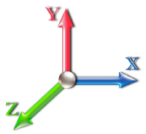
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 9	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 93 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 25

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.70	14.724	16.20	374.18	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.70	14.724	16.20	365.24	0.650	0.000	5.00	23.757	15.44	400.2	0.0	1355.4
10.00		1.00	0.70	14.724	16.20	356.30	0.655 *	0.000	5.00	23.183	15.19	393.6	0.0	1322.4
15.00		1.00	0.70	14.724	16.20	347.36	0.660 *	0.000	5.00	22.609	14.93	386.8	0.0	1289.4
20.00		1.00	0.70	14.724	16.20	338.43	0.666 *	0.000	5.00	22.034	14.67	380.0	0.0	1256.4
25.00		1.00	0.70	14.724	16.20	329.49	0.671 *	0.000	5.00	21.460	14.40	373.3	0.0	1223.4
30.00		1.00	0.70	14.736	16.21	320.69	0.677 *	0.000	5.00	20.886	14.14	366.8	0.0	1190.4
35.00		1.00	0.73	15.400	16.94	318.69	0.683 *	0.000	5.00	20.311	13.88	376.2	0.0	1157.5
40.00		1.00	0.76	15.999	17.60	315.51	0.690 *	0.000	5.00	19.737	13.62	383.5	0.0	1124.5
44.00	Bot - Section 2	1.00	0.78	16.441	18.08	312.28	0.696 *	0.000	4.00	15.376	10.71	309.8	0.0	875.8
45.00		1.00	0.79	16.546	18.20	311.39	0.700 *	0.000	1.00	3.850	2.70	78.5	0.0	435.0
49.75	Top - Section 1	1.00	0.81	17.028	18.73	306.75	0.704 *	0.000	4.75	17.974	12.66	379.4	0.0	2030.0
50.00		1.00	0.81	17.052	18.76	311.81	0.704 *	0.000	0.25	0.932	0.66	19.7	0.0	53.1
55.00		1.00	0.83	17.523	19.28	306.33	0.708 *	0.000	5.00	18.331	12.98	400.3	0.0	1043.7
60.00		1.00	0.85	17.964	19.76	300.29	0.716 *	0.000	5.00	17.757	12.72	402.1	0.0	1010.8
65.00		1.00	0.87	18.380	20.22	293.76	0.725 *	0.000	5.00	17.183	12.46	403.0	0.0	977.8
70.00		1.00	0.89	18.773	20.65	286.79	0.734 *	0.000	5.00	16.609	12.20	403.0	0.0	944.8
75.00		1.00	0.91	19.147	21.06	279.44	0.744 *	0.000	5.00	16.034	11.93	402.2	0.0	911.8
80.00		1.00	0.93	19.503	21.45	271.74	0.755 *	0.000	5.00	15.460	11.67	400.7	0.0	878.8
85.00		1.00	0.94	19.844	21.83	263.73	0.767 *	0.000	5.00	14.886	11.41	398.6	0.0	845.8
89.50	Bot - Section 3	1.00	0.96	20.138	22.15	256.28	0.779 *	0.000	4.50	12.906	10.05	356.1	0.0	733.0
90.00		1.00	0.96	20.170	22.19	255.43	0.785 *	0.000	0.50	1.432	1.12	39.9	0.0	147.7
93.75	Top - Section 2	1.00	0.97	20.407	22.45	249.04	0.791 *	0.000	3.75	10.555	8.35	299.9	0.0	1088.4
95.00		1.00	0.97	20.484	22.53	251.73	0.792 *	0.000	1.25	3.446	2.73	98.4	0.0	163.4
100.00		1.00	0.99	20.787	22.87	242.96	0.801 *	0.000	5.00	13.427	10.75	393.2	0.0	636.3
105.00		1.00	1.00	21.079	23.19	233.97	0.816 *	0.000	5.00	12.853	10.49	389.1	0.0	608.8
110.00		1.00	1.02	21.361	23.50	224.76	0.833 *	0.000	5.00	12.278	10.23	384.4	0.0	581.3
115.00		1.00	1.03	21.634	23.80	215.36	1.200 *	0.000	5.00	11.704	14.04	534.8	0.0	553.9
117.00	Appurtenance(s)	1.00	1.03	21.741	23.91	211.55	1.200 *	0.000	2.00	4.521	5.42	207.6	0.0	213.8
120.00	Bot - Section 4	1.00	1.04	21.898	24.09	205.77	0.650	0.000	3.00	6.609	4.30	165.6	0.0	312.5
123.25	Top - Section 3	1.00	1.05	22.066	24.27	199.45	0.650	0.000	3.25	7.030	4.57	177.5	0.0	527.8
125.00		1.00	1.05	22.155	24.37	199.04	0.650	0.000	1.75	3.685	2.39	93.4	0.0	105.0
127.00	Appurtenance(s)	1.00	1.06	22.256	24.48	195.10	0.650	0.000	2.00	4.125	2.68	105.0	0.0	117.5
130.00		1.00	1.07	22.405	24.65	189.14	0.650	0.000	3.00	6.015	3.91	154.2	0.0	171.4
135.00		1.00	1.08	22.648	24.91	179.07	0.650	0.000	5.00	9.565	6.22	247.8	0.0	272.4
137.00	Appurtenance(s)	1.00	1.08	22.743	25.02	175.01	0.650	0.000	2.00	3.665	2.38	95.4	0.0	104.3
140.00		1.00	1.09	22.884	25.17	168.86	0.650	0.000	3.00	5.326	3.46	139.4	0.0	151.6
145.00		1.00	1.10	23.115	25.43	158.51	0.650	0.000	5.00	8.417	5.47	222.6	0.0	239.4
147.00	Appurtenance(s)	1.00	1.10	23.206	25.53	154.34	0.650	0.000	2.00	3.206	2.08	85.1	0.0	91.2
150.00		1.00	1.11	23.340	25.67	148.03	0.650	0.000	3.00	4.637	3.01	123.8	0.0	131.8
155.00	Appurtenance(s)	1.00	1.12	23.560	25.92	137.42	0.650	0.000	5.00	7.268	4.72	195.9	0.0	206.4
								Totals:	**155.00**			**11,166.6**		**27,084.8**

* Cf Adjusted by Linear Load Ra Effect

Discrete Appurtenance Forces

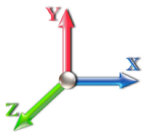
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 10	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 93 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 25

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	155.00	Ericsson 4424 B25 RRU	3	23.646	26.011	0.60	0.90	3.71	316.80	0.000	2.000	154.34	0.00	308.67
2	155.00	ACU-A20-N	4	23.646	26.011	0.45	0.90	0.25	4.80	0.000	2.000	10.49	0.00	20.98
3	155.00	Low Profile Platform	1	23.560	25.916	1.00	1.00	28.00	1800.00	0.000	0.000	1161.02	0.00	0.00
4	155.00	RFS	3	23.646	26.011	0.56	0.90	10.81	146.52	0.000	2.000	450.05	0.00	900.10
5	155.00	RFS	3	23.646	26.011	0.63	0.90	38.25	442.08	0.000	2.000	1592.00	0.00	3184.01
6	155.00	Ericsson AIR6449 B41	3	23.646	26.011	0.64	0.90	10.83	370.80	0.000	2.000	450.76	0.00	901.51
7	155.00	6' Lightning rod	1	23.560	25.916	1.00	1.00	0.38	7.80	0.000	0.000	15.76	0.00	0.00
8	155.00	Ericsson 4449 B71 + B85	3	23.646	26.011	0.60	0.90	3.56	263.52	0.000	2.000	148.31	0.00	296.62
9	155.00	(3) T-Arm Kit	1	23.560	25.916	0.75	0.75	12.38	600.00	0.000	0.000	513.13	0.00	0.00
10	155.00	MS-H1242 (Heavy Collar	1	23.560	25.916	1.00	1.00	2.50	180.72	0.000	0.000	103.66	0.00	0.00
11	155.00	MS-KI22-5 (Kickers w/o	1	23.560	25.916	1.00	1.00	5.33	175.20	0.000	0.000	221.01	0.00	0.00
12	155.00	Ericsson 4415 B66A RRU	3	23.646	26.011	0.60	0.90	3.36	166.68	0.000	2.000	140.03	0.00	280.06
13	147.00	MC-PK8-DSH	1	23.206	25.526	1.00	1.00	37.59	2072.40	0.000	0.000	1535.25	0.00	0.00
14	147.00	FFVV-65C-R3-V1	3	23.206	25.526	0.55	0.75	20.15	255.60	0.000	0.000	823.11	0.00	0.00
15	147.00	RDIDC-9181-PF-48	1	23.206	25.526	0.75	0.75	1.51	26.28	0.000	0.000	61.57	0.00	0.00
16	147.00	TA08025-B604	3	23.206	25.526	0.50	0.75	2.95	230.04	0.000	0.000	120.68	0.00	0.00
17	147.00	TA08025-B605	3	23.206	25.526	0.50	0.75	2.95	270.00	0.000	0.000	120.68	0.00	0.00
18	137.00	Low Profile Platform	1	22.743	25.017	1.00	1.00	28.00	1440.00	0.000	0.000	1120.78	0.00	0.00
19	137.00	LPA-80063/6CF	2	22.743	25.017	0.75	0.80	14.44	64.80	0.000	0.000	577.94	0.00	0.00
20	137.00	LPA-80080/4CF ___	2	22.743	25.017	0.74	0.80	3.88	28.80	0.000	0.000	155.46	0.00	0.00
21	137.00	Commscope -	1	22.743	25.017	1.00	1.00	4.06	38.40	0.000	0.000	162.51	0.00	0.00
22	137.00	Samsung - B2/B66A	3	22.743	25.017	0.54	0.80	3.01	303.84	0.000	0.000	120.36	0.00	0.00
23	137.00	Samsung - B5/B13	3	22.743	25.017	0.54	0.80	3.01	253.08	0.000	0.000	120.36	0.00	0.00
24	137.00	Samsung - 64T64R	3	22.743	25.017	0.53	0.80	7.59	344.16	0.000	0.000	303.71	0.00	0.00
25	137.00	JMA - MX06FIT665-02	6	22.743	25.017	0.64	0.80	36.67	324.00	0.000	0.000	1467.91	0.00	0.00
26	137.00	LPA-80080-6CF-EDIN	2	22.743	25.017	0.74	0.80	6.44	50.40	0.000	0.000	257.90	0.00	0.00
27	127.00	7770	3	22.256	24.482	0.60	0.80	9.90	126.00	0.000	0.000	387.79	0.00	0.00
28	127.00	LGP21401	6	22.256	24.482	0.51	0.80	3.96	101.52	0.000	0.000	155.23	0.00	0.00
29	127.00	Low Profile Platform	1	22.256	24.482	1.00	1.00	25.00	1800.00	0.000	0.000	979.26	0.00	0.00
30	127.00	DC6-48-60-18-8F	1	22.256	24.482	0.80	0.80	1.18	38.16	0.000	0.000	46.06	0.00	0.00
31	127.00	RRUS 12	3	22.256	24.482	0.54	0.80	4.34	216.00	0.000	0.000	170.06	0.00	0.00
32	127.00	RRU 11	3	22.256	24.482	0.54	0.80	7.21	198.00	0.000	0.000	282.55	0.00	0.00
33	127.00	P65-16-XLH-RR	3	22.256	24.482	0.60	0.80	14.69	190.80	0.000	0.000	575.34	0.00	0.00
34	127.00	860 10025	6	22.256	24.482	0.56	0.80	0.60	8.64	0.000	0.000	23.69	0.00	0.00
35	117.00	Ericsson - Air 21 B2A/B4P	3	21.741	23.915	0.69	0.80	12.57	329.40	0.000	0.000	480.96	0.00	0.00
36	117.00	T-Arms	3	21.741	23.915	0.56	0.75	13.50	1260.00	0.000	0.000	516.55	0.00	0.00
37	117.00	Air 21 B4A/B2P	3	21.741	23.915	0.69	0.80	12.57	325.44	0.000	0.000	480.96	0.00	0.00
							Totals:		**14,770.68**			**16,007.22**		

Total Applied Force Summary

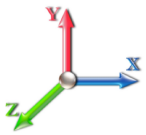
Structure:	CT00248-S-SBA		**Code:**	EIA/TIA-222-G	10/14/2021
Site Name:	North Bethel		**Exposure:**	B	
Height:	155.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 11

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 93 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 25

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		400.18	1546.83	0.00	0.00
10.00		393.58	1513.85	0.00	0.00
15.00		386.81	1480.86	0.00	0.00
20.00		380.03	1447.88	0.00	0.00
25.00		373.26	1414.89	0.00	0.00
30.00		366.80	1381.91	0.00	0.00
35.00		376.23	1348.92	0.00	0.00
40.00		383.51	1315.94	0.00	0.00
44.00		309.83	1029.00	0.00	0.00
45.00		78.49	473.25	0.00	0.00
49.75		379.43	2211.92	0.00	0.00
50.00		19.68	62.63	0.00	0.00
55.00		400.31	1235.20	0.00	0.00
60.00		402.13	1202.22	0.00	0.00
65.00		402.98	1169.23	0.00	0.00
70.00		402.97	1136.25	0.00	0.00
75.00		402.18	1103.26	0.00	0.00
80.00		400.70	1070.28	0.00	0.00
85.00		398.57	1037.29	0.00	0.00
89.50		356.12	905.36	0.00	0.00
90.00		39.91	166.84	0.00	0.00
93.75		299.85	1232.01	0.00	0.00
95.00		98.35	211.24	0.00	0.00
100.00		393.24	827.78	0.00	0.00
105.00		389.06	800.29	0.00	0.00
110.00		384.45	772.80	0.00	0.00
115.00		643.47	745.32	0.00	0.00
117.00	(9) attachments	1729.75	2205.27	0.00	0.00
120.00		165.57	378.51	0.00	0.00
123.25		177.45	599.27	0.00	0.00
125.00		93.39	143.51	0.00	0.00
127.00	(26) attachments	2725.01	2840.66	0.00	0.00
130.00		154.17	212.88	0.00	0.00
135.00		247.83	341.60	0.00	0.00
137.00	(23) attachments	4382.30	2979.50	0.00	0.00
140.00		139.43	166.66	0.00	0.00
145.00		222.57	264.58	0.00	0.00
147.00	(11) attachments	2746.38	2955.53	0.00	0.00
150.00		123.80	139.70	0.00	0.00
155.00	(27) attachments	5156.45	4694.56	0.00	5891.95
	Totals:	**27,326.21**	**46,765.49**	**0.00**	**5,891.95**

Linear Appurtenance Segment Forces (Factored)

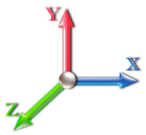
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 12	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 93 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 25

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.100	0.000	14.724	0.00	11.95
5.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.100	0.000	14.724	0.00	74.88
5.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.100	0.000	14.724	0.00	6.60
10.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.103	1.008	14.724	0.00	11.95
10.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.103	1.008	14.724	0.00	74.88
10.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.103	1.008	14.724	0.00	6.60
15.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.105	1.016	14.724	0.00	11.95
15.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.105	1.016	14.724	0.00	74.88
15.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.105	1.016	14.724	0.00	6.60
20.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.108	1.024	14.724	0.00	11.95
20.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.108	1.024	14.724	0.00	74.88
20.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.108	1.024	14.724	0.00	6.60
25.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.111	1.033	14.724	0.00	11.95
25.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.111	1.033	14.724	0.00	74.88
25.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.111	1.033	14.724	0.00	6.60
30.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.114	1.042	14.736	0.00	11.95
30.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.114	1.042	14.736	0.00	74.88
30.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.114	1.042	14.736	0.00	6.60
35.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.117	1.051	15.400	0.00	11.95
35.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.117	1.051	15.400	0.00	74.88
35.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.117	1.051	15.400	0.00	6.60
40.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.121	1.062	15.999	0.00	11.95
40.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.121	1.062	15.999	0.00	74.88
40.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.121	1.062	15.999	0.00	6.60
44.00	1.75" Hybrid	Yes	4.00	0.000	1.75	0.58	0.00	0.124	1.071	16.441	0.00	9.56
44.00	1 5/8" Coax	Yes	4.00	0.000	3.96	1.32	0.00	0.124	1.071	16.441	0.00	59.90
44.00	1 5/8" Hybrid	Yes	4.00	0.000	0.00	0.00	0.00	0.124	1.071	16.441	0.00	5.28
45.00	1.75" Hybrid	Yes	1.00	0.000	1.75	0.15	0.00	0.126	1.077	16.546	0.00	2.39
45.00	1 5/8" Coax	Yes	1.00	0.000	3.96	0.33	0.00	0.126	1.077	16.546	0.00	14.98
45.00	1 5/8" Hybrid	Yes	1.00	0.000	0.00	0.00	0.00	0.126	1.077	16.546	0.00	1.32
49.75	1.75" Hybrid	Yes	4.75	0.000	1.75	0.69	0.00	0.128	1.084	17.028	0.00	11.35
49.75	1 5/8" Coax	Yes	4.75	0.000	3.96	1.57	0.00	0.128	1.084	17.028	0.00	71.14
49.75	1 5/8" Hybrid	Yes	4.75	0.000	0.00	0.00	0.00	0.128	1.084	17.028	0.00	6.27
50.00	1.75" Hybrid	Yes	0.25	0.000	1.75	0.04	0.00	0.128	1.083	17.052	0.00	0.60
50.00	1 5/8" Coax	Yes	0.25	0.000	3.96	0.08	0.00	0.128	1.083	17.052	0.00	3.74
50.00	1 5/8" Hybrid	Yes	0.25	0.000	0.00	0.00	0.00	0.128	1.083	17.052	0.00	0.33
55.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.130	1.089	17.523	0.00	11.95
55.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.130	1.089	17.523	0.00	74.88
55.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.130	1.089	17.523	0.00	6.60
60.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.134	1.102	17.964	0.00	11.95
60.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.134	1.102	17.964	0.00	74.88
60.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.134	1.102	17.964	0.00	6.60
65.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.138	1.115	18.380	0.00	11.95
65.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.138	1.115	18.380	0.00	74.88
65.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.138	1.115	18.380	0.00	6.60
70.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.143	1.130	18.773	0.00	11.95
70.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.143	1.130	18.773	0.00	74.88

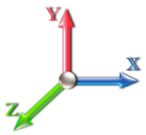
Linear Appurtenance Segment Forces (Factored)

Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 13	

Load Case: 1.2D + 1.6W 93 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 25

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
70.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.143	1.130	18.773	0.00	6.60
75.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.148	1.145	19.147	0.00	11.95
75.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.148	1.145	19.147	0.00	74.88
75.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.148	1.145	19.147	0.00	6.60
80.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.154	1.162	19.503	0.00	11.95
80.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.154	1.162	19.503	0.00	74.88
80.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.154	1.162	19.503	0.00	6.60
85.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.160	1.179	19.844	0.00	11.95
85.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.160	1.179	19.844	0.00	74.88
85.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.160	1.179	19.844	0.00	6.60
89.50	1.75" Hybrid	Yes	4.50	0.000	1.75	0.66	0.00	0.166	1.198	20.138	0.00	10.75
89.50	1 5/8" Coax	Yes	4.50	0.000	3.96	1.48	0.00	0.166	1.198	20.138	0.00	67.39
89.50	1 5/8" Hybrid	Yes	4.50	0.000	0.00	0.00	0.00	0.166	1.198	20.138	0.00	5.94
90.00	1.75" Hybrid	Yes	0.50	0.000	1.75	0.07	0.00	0.169	1.208	20.170	0.00	1.19
90.00	1 5/8" Coax	Yes	0.50	0.000	3.96	0.17	0.00	0.169	1.208	20.170	0.00	7.49
90.00	1 5/8" Hybrid	Yes	0.50	0.000	0.00	0.00	0.00	0.169	1.208	20.170	0.00	0.66
93.75	1.75" Hybrid	Yes	3.75	0.000	1.75	0.55	0.00	0.172	1.217	20.407	0.00	8.96
93.75	1 5/8" Coax	Yes	3.75	0.000	3.96	1.24	0.00	0.172	1.217	20.407	0.00	56.16
93.75	1 5/8" Hybrid	Yes	3.75	0.000	0.00	0.00	0.00	0.172	1.217	20.407	0.00	4.95
95.00	1.75" Hybrid	Yes	1.25	0.000	1.75	0.18	0.00	0.173	1.218	20.484	0.00	2.99
95.00	1 5/8" Coax	Yes	1.25	0.000	3.96	0.41	0.00	0.173	1.218	20.484	0.00	18.72
95.00	1 5/8" Hybrid	Yes	1.25	0.000	0.00	0.00	0.00	0.173	1.218	20.484	0.00	1.65
100.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.177	1.232	20.787	0.00	11.95
100.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.177	1.232	20.787	0.00	74.88
100.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.177	1.232	20.787	0.00	6.60
105.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.185	1.255	21.079	0.00	11.95
105.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.185	1.255	21.079	0.00	74.88
105.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.185	1.255	21.079	0.00	6.60
110.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.194	1.281	21.361	0.00	11.95
110.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.194	1.281	21.361	0.00	74.88
110.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.194	1.281	21.361	0.00	6.60
115.00	1.75" Hybrid	Yes	5.00	1.200	1.75	0.73	0.87	0.203	0.000	21.634	33.32	11.95
115.00	1 5/8" Coax	Yes	5.00	1.200	3.96	1.65	1.98	0.203	0.000	21.634	75.39	74.88
115.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.203	0.000	21.634	0.00	6.60
117.00	1.75" Hybrid	Yes	2.00	1.200	1.75	0.29	0.35	0.211	0.000	21.741	13.39	4.78
117.00	1 5/8" Coax	Yes	2.00	1.200	3.96	0.66	0.79	0.211	0.000	21.741	30.30	29.95
117.00	1 5/8" Hybrid	Yes	2.00	0.000	0.00	0.00	0.00	0.211	0.000	21.741	0.00	2.64
120.00	1.75" Hybrid	Yes	3.00	0.000	1.75	0.44	0.00	0.066	0.000	21.898	0.00	7.17
123.25	1.75" Hybrid	Yes	3.25	0.000	1.75	0.47	0.00	0.068	0.000	22.066	0.00	7.76
125.00	1.75" Hybrid	Yes	1.75	0.000	1.75	0.26	0.00	0.069	0.000	22.155	0.00	4.18
127.00	1.75" Hybrid	Yes	2.00	0.000	1.75	0.29	0.00	0.071	0.000	22.256	0.00	4.78
130.00	1.75" Hybrid	Yes	3.00	0.000	1.75	0.44	0.00	0.073	0.000	22.405	0.00	7.17
135.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.076	0.000	22.648	0.00	11.95
137.00	1.75" Hybrid	Yes	2.00	0.000	1.75	0.29	0.00	0.080	0.000	22.743	0.00	4.78
140.00	1.75" Hybrid	Yes	3.00	0.000	1.75	0.44	0.00	0.082	0.000	22.884	0.00	7.17
145.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.087	0.000	23.115	0.00	11.95
147.00	1.75" Hybrid	Yes	2.00	0.000	1.75	0.29	0.00	0.091	0.000	23.206	0.00	4.78

Linear Appurtenance Segment Forces (Factored)

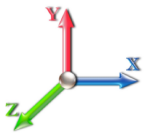
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 14	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 93 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 25

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
										Totals:	**152.4**	**2,257.8**

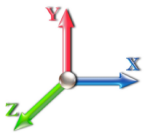
Calculated Forces

Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 15	

Load Case: 1.2D + 1.6W 93 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 25

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-46.72	-27.40	0.00	-3270.2	0.00	3270.20	4331.76	2165.88	10060.7	5037.85	0.00	0.000	0.000	0.660
5.00	-45.10	-27.13	0.00	-3133.2	0.00	3133.22	4271.91	2135.96	9681.61	4848.00	0.09	-0.168	0.000	0.657
10.00	-43.50	-26.86	0.00	-2997.5	0.00	2997.59	4209.88	2104.94	9304.37	4659.10	0.36	-0.342	0.000	0.654
15.00	-41.94	-26.60	0.00	-2863.2	0.00	2863.28	4145.67	2072.83	8929.41	4471.34	0.81	-0.520	0.000	0.651
20.00	-40.41	-26.33	0.00	-2730.3	0.00	2730.30	4079.27	2039.64	8557.10	4284.91	1.46	-0.704	0.000	0.647
25.00	-38.91	-26.07	0.00	-2598.6	0.00	2598.64	4010.69	2005.34	8187.79	4099.98	2.30	-0.894	0.000	0.644
30.00	-37.45	-25.81	0.00	-2468.2	0.00	2468.29	3939.93	1969.96	7821.85	3916.74	3.34	-1.090	0.000	0.640
35.00	-36.02	-25.54	0.00	-2339.2	0.00	2339.24	3866.98	1933.49	7459.66	3735.38	4.59	-1.291	0.000	0.636
40.00	-34.63	-25.23	0.00	-2211.5	0.00	2211.56	3791.85	1895.92	7101.59	3556.07	6.05	-1.499	0.000	0.631
44.00	-33.56	-24.96	0.00	-2110.6	0.00	2110.63	3730.17	1865.09	6818.34	3414.24	7.38	-1.672	0.000	0.627
45.00	-33.03	-24.94	0.00	-2085.6	0.00	2085.67	3714.54	1857.27	6747.99	3379.01	7.74	-1.717	0.000	0.626
49.75	-30.79	-24.55	0.00	-1967.2	0.00	1967.20	3683.20	1841.60	6608.77	3309.30	9.55	-1.927	0.000	0.603
50.00	-30.68	-24.59	0.00	-1961.0	0.00	1961.06	3679.23	1839.62	6591.31	3300.56	9.65	-1.939	0.000	0.603
55.00	-29.36	-24.26	0.00	-1838.1	0.00	1838.11	3598.76	1799.38	6244.86	3127.07	11.80	-2.155	0.000	0.596
60.00	-28.09	-23.92	0.00	-1716.8	0.00	1716.81	3516.10	1758.05	5903.79	2956.28	14.18	-2.378	0.000	0.589
65.00	-26.84	-23.58	0.00	-1597.2	0.00	1597.21	3431.27	1715.63	5568.46	2788.37	16.79	-2.607	0.000	0.581
70.00	-25.63	-23.23	0.00	-1479.3	0.00	1479.33	3344.24	1672.12	5239.26	2623.52	19.64	-2.842	0.000	0.572
75.00	-24.45	-22.87	0.00	-1363.2	0.00	1363.20	3255.04	1627.52	4916.54	2461.92	22.75	-3.083	0.000	0.561
80.00	-23.30	-22.51	0.00	-1248.8	0.00	1248.84	3137.93	1568.96	4563.27	2285.03	26.11	-3.330	0.000	0.554
85.00	-22.20	-22.15	0.00	-1136.2	0.00	1136.27	3017.89	1508.95	4219.09	2112.68	29.73	-3.582	0.000	0.545
89.50	-21.27	-21.78	0.00	-1036.6	0.00	1036.60	2909.87	1454.93	3920.86	1963.34	33.22	-3.815	0.000	0.536
90.00	-21.06	-21.77	0.00	-1025.7	0.00	1025.71	2897.86	1448.93	3888.39	1947.09	33.62	-3.842	0.000	0.534
93.75	-19.81	-21.43	0.00	-944.07	0.00	944.07	2354.99	1177.49	3133.69	1569.17	36.71	-4.041	0.000	0.610
95.00	-19.53	-21.39	0.00	-917.27	0.00	917.27	2336.81	1168.40	3076.66	1540.62	37.78	-4.110	0.000	0.604
100.00	-18.63	-21.03	0.00	-810.35	0.00	810.35	2262.72	1131.36	2851.92	1428.08	42.24	-4.406	0.000	0.576
105.00	-17.75	-20.67	0.00	-705.21	0.00	705.21	2165.47	1082.73	2607.63	1305.76	47.01	-4.702	0.000	0.549
110.00	-16.92	-20.31	0.00	-601.87	0.00	601.87	2065.44	1032.72	2371.09	1187.31	52.09	-4.995	0.000	0.515
115.00	-16.16	-19.65	0.00	-500.35	0.00	500.35	1965.41	982.71	2145.79	1074.49	57.47	-5.279	0.000	0.474
117.00	-14.08	-17.76	0.00	-461.04	0.00	461.04	1925.40	962.70	2058.82	1030.94	59.70	-5.394	0.000	0.455
120.00	-13.67	-17.60	0.00	-407.76	0.00	407.76	1865.39	932.69	1931.73	967.30	63.14	-5.560	0.000	0.429
123.25	-13.05	-17.39	0.00	-350.56	0.00	350.56	1005.19	502.59	1030.12	515.83	66.98	-5.732	0.000	0.694
125.00	-12.88	-17.32	0.00	-320.12	0.00	320.12	992.91	496.46	998.01	499.75	69.10	-5.823	0.000	0.655
127.00	-10.29	-14.35	0.00	-285.49	0.00	285.49	978.56	489.28	961.59	481.51	71.57	-5.980	0.000	0.604
130.00	-10.03	-14.22	0.00	-242.45	0.00	242.45	956.38	478.19	907.53	454.44	75.39	-6.199	0.000	0.545
135.00	-9.66	-13.97	0.00	-171.36	0.00	171.36	917.66	458.83	819.21	410.21	82.05	-6.517	0.000	0.429
137.00	-7.18	-9.29	0.00	-143.42	0.00	143.42	901.57	450.78	784.57	392.87	84.80	-6.633	0.000	0.373
140.00	-7.00	-9.16	0.00	-115.54	0.00	115.54	876.76	438.38	733.42	367.25	89.01	-6.787	0.000	0.323
145.00	-6.75	-8.92	0.00	-69.76	0.00	69.76	833.68	416.84	650.52	325.74	96.22	-6.994	0.000	0.223
147.00	-4.14	-5.84	0.00	-51.92	0.00	51.92	815.84	407.92	618.25	309.58	99.16	-7.061	0.000	0.173
150.00	-4.01	-5.70	0.00	-34.41	0.00	34.41	781.24	390.62	565.69	283.26	103.61	-7.138	0.000	0.127
155.00	0.00	-5.16	0.00	-5.89	0.00	5.89	721.23	360.61	481.69	241.20	111.11	-7.207	0.000	0.025

Wind Loading - Shaft

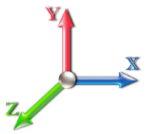
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 16	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 93 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 25

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.70	14.724	16.20	374.18	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.70	14.724	16.20	365.24	0.650	0.000	5.00	23.757	15.44	400.2	0.0	1016.5
10.00		1.00	0.70	14.724	16.20	356.30	0.655 *	0.000	5.00	23.183	15.19	393.6	0.0	991.8
15.00		1.00	0.70	14.724	16.20	347.36	0.660 *	0.000	5.00	22.609	14.93	386.8	0.0	967.0
20.00		1.00	0.70	14.724	16.20	338.43	0.666 *	0.000	5.00	22.034	14.67	380.0	0.0	942.3
25.00		1.00	0.70	14.724	16.20	329.49	0.671 *	0.000	5.00	21.460	14.40	373.3	0.0	917.6
30.00		1.00	0.70	14.736	16.21	320.69	0.677 *	0.000	5.00	20.886	14.14	366.8	0.0	892.8
35.00		1.00	0.73	15.400	16.94	318.69	0.683 *	0.000	5.00	20.311	13.88	376.2	0.0	868.1
40.00		1.00	0.76	15.999	17.60	315.51	0.690 *	0.000	5.00	19.737	13.62	383.5	0.0	843.4
44.00	Bot - Section 2	1.00	0.78	16.441	18.08	312.28	0.696 *	0.000	4.00	15.376	10.71	309.8	0.0	656.9
45.00		1.00	0.79	16.546	18.20	311.39	0.700 *	0.000	1.00	3.850	2.70	78.5	0.0	326.2
49.75	Top - Section 1	1.00	0.81	17.028	18.73	306.75	0.704 *	0.000	4.75	17.974	12.66	379.4	0.0	1522.5
50.00		1.00	0.81	17.052	18.76	311.81	0.704 *	0.000	0.25	0.932	0.66	19.7	0.0	39.8
55.00		1.00	0.83	17.523	19.28	306.33	0.708 *	0.000	5.00	18.331	12.98	400.3	0.0	782.8
60.00		1.00	0.85	17.964	19.76	300.29	0.716 *	0.000	5.00	17.757	12.72	402.1	0.0	758.1
65.00		1.00	0.87	18.380	20.22	293.76	0.725 *	0.000	5.00	17.183	12.46	403.0	0.0	733.3
70.00		1.00	0.89	18.773	20.65	286.79	0.734 *	0.000	5.00	16.609	12.20	403.0	0.0	708.6
75.00		1.00	0.91	19.147	21.06	279.44	0.744 *	0.000	5.00	16.034	11.93	402.2	0.0	683.8
80.00		1.00	0.93	19.503	21.45	271.74	0.755 *	0.000	5.00	15.460	11.67	400.7	0.0	659.1
85.00		1.00	0.94	19.844	21.83	263.73	0.767 *	0.000	5.00	14.886	11.41	398.6	0.0	634.4
89.50	Bot - Section 3	1.00	0.96	20.138	22.15	256.28	0.779 *	0.000	4.50	12.906	10.05	356.1	0.0	549.8
90.00		1.00	0.96	20.170	22.19	255.43	0.785 *	0.000	0.50	1.432	1.12	39.9	0.0	110.8
93.75	Top - Section 2	1.00	0.97	20.407	22.45	249.04	0.791 *	0.000	3.75	10.555	8.35	299.9	0.0	816.3
95.00		1.00	0.97	20.484	22.53	251.73	0.792 *	0.000	1.25	3.446	2.73	98.4	0.0	122.5
100.00		1.00	0.99	20.787	22.87	242.96	0.801 *	0.000	5.00	13.427	10.75	393.2	0.0	477.2
105.00		1.00	1.00	21.079	23.19	233.97	0.816 *	0.000	5.00	12.853	10.49	389.1	0.0	456.6
110.00		1.00	1.02	21.361	23.50	224.76	0.833 *	0.000	5.00	12.278	10.23	384.4	0.0	436.0
115.00		1.00	1.03	21.634	23.80	215.36	1.200 *	0.000	5.00	11.704	14.04	534.8	0.0	415.4
117.00	Appurtenance(s)	1.00	1.03	21.741	23.91	211.55	1.200 *	0.000	2.00	4.521	5.42	207.6	0.0	160.4
120.00	Bot - Section 4	1.00	1.04	21.898	24.09	205.77	0.650	0.000	3.00	6.609	4.30	165.6	0.0	234.4
123.25	Top - Section 3	1.00	1.05	22.066	24.27	199.45	0.650	0.000	3.25	7.030	4.57	177.5	0.0	395.8
125.00		1.00	1.05	22.155	24.37	199.04	0.650	0.000	1.75	3.685	2.39	93.4	0.0	78.8
127.00	Appurtenance(s)	1.00	1.06	22.256	24.48	195.10	0.650	0.000	2.00	4.125	2.68	105.0	0.0	88.2
130.00		1.00	1.07	22.405	24.65	189.14	0.650	0.000	3.00	6.015	3.91	154.2	0.0	128.5
135.00		1.00	1.08	22.648	24.91	179.07	0.650	0.000	5.00	9.565	6.22	247.8	0.0	204.3
137.00	Appurtenance(s)	1.00	1.08	22.743	25.02	175.01	0.650	0.000	2.00	3.665	2.38	95.4	0.0	78.3
140.00		1.00	1.09	22.884	25.17	168.86	0.650	0.000	3.00	5.326	3.46	139.4	0.0	113.7
145.00		1.00	1.10	23.115	25.43	158.51	0.650	0.000	5.00	8.417	5.47	222.6	0.0	179.6
147.00	Appurtenance(s)	1.00	1.10	23.206	25.53	154.34	0.650	0.000	2.00	3.206	2.08	85.1	0.0	68.4
150.00		1.00	1.11	23.340	25.67	148.03	0.650	0.000	3.00	4.637	3.01	123.8	0.0	98.8
155.00	Appurtenance(s)	1.00	1.12	23.560	25.92	137.42	0.650	0.000	5.00	7.268	4.72	195.9	0.0	154.8
								Totals:	**155.00**			**11,166.6**		**20,313.6**

* Cf Adjusted by Linear Load Ra Effect

Discrete Appurtenance Forces

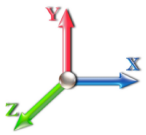
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 17	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 93 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 25

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	155.00	Ericsson 4424 B25 RRU	3	23.646	26.011	0.60	0.90	3.71	237.60	0.000	2.000	154.34	0.00	308.67
2	155.00	ACU-A20-N	4	23.646	26.011	0.45	0.90	0.25	3.60	0.000	2.000	10.49	0.00	20.98
3	155.00	Low Profile Platform	1	23.560	25.916	1.00	1.00	28.00	1350.00	0.000	0.000	1161.02	0.00	0.00
4	155.00	RFS	3	23.646	26.011	0.56	0.90	10.81	109.89	0.000	2.000	450.05	0.00	900.10
5	155.00	RFS	3	23.646	26.011	0.63	0.90	38.25	331.56	0.000	2.000	1592.00	0.00	3184.01
6	155.00	Ericsson AIR6449 B41	3	23.646	26.011	0.64	0.90	10.83	278.10	0.000	2.000	450.76	0.00	901.51
7	155.00	6' Lightning rod	1	23.560	25.916	1.00	1.00	0.38	5.85	0.000	0.000	15.76	0.00	0.00
8	155.00	Ericsson 4449 B71 + B85	3	23.646	26.011	0.60	0.90	3.56	197.64	0.000	2.000	148.31	0.00	296.62
9	155.00	(3) T-Arm Kit	1	23.560	25.916	0.75	0.75	12.38	450.00	0.000	0.000	513.13	0.00	0.00
10	155.00	MS-H1242 (Heavy Collar	1	23.560	25.916	1.00	1.00	2.50	135.54	0.000	0.000	103.66	0.00	0.00
11	155.00	MS-KI22-5 (Kickers w/o	1	23.560	25.916	1.00	1.00	5.33	131.40	0.000	0.000	221.01	0.00	0.00
12	155.00	Ericsson 4415 B66A RRU	3	23.646	26.011	0.60	0.90	3.36	125.01	0.000	2.000	140.03	0.00	280.06
13	147.00	MC-PK8-DSH	1	23.206	25.526	1.00	1.00	37.59	1554.30	0.000	0.000	1535.25	0.00	0.00
14	147.00	FFVV-65C-R3-V1	3	23.206	25.526	0.55	0.75	20.15	191.70	0.000	0.000	823.11	0.00	0.00
15	147.00	RDIDC-9181-PF-48	1	23.206	25.526	0.75	0.75	1.51	19.71	0.000	0.000	61.57	0.00	0.00
16	147.00	TA08025-B604	3	23.206	25.526	0.50	0.75	2.95	172.53	0.000	0.000	120.68	0.00	0.00
17	147.00	TA08025-B605	3	23.206	25.526	0.50	0.75	2.95	202.50	0.000	0.000	120.68	0.00	0.00
18	137.00	Low Profile Platform	1	22.743	25.017	1.00	1.00	28.00	1080.00	0.000	0.000	1120.78	0.00	0.00
19	137.00	LPA-80063/6CF	2	22.743	25.017	0.75	0.80	14.44	48.60	0.000	0.000	577.94	0.00	0.00
20	137.00	LPA-80080/4CF ___	2	22.743	25.017	0.74	0.80	3.88	21.60	0.000	0.000	155.46	0.00	0.00
21	137.00	Commscope -	1	22.743	25.017	1.00	1.00	4.06	28.80	0.000	0.000	162.51	0.00	0.00
22	137.00	Samsung - B2/B66A	3	22.743	25.017	0.54	0.80	3.01	227.88	0.000	0.000	120.36	0.00	0.00
23	137.00	Samsung - B5/B13	3	22.743	25.017	0.54	0.80	3.01	189.81	0.000	0.000	120.36	0.00	0.00
24	137.00	Samsung - 64T64R	3	22.743	25.017	0.53	0.80	7.59	258.12	0.000	0.000	303.71	0.00	0.00
25	137.00	JMA - MX06FIT665-02	6	22.743	25.017	0.64	0.80	36.67	243.00	0.000	0.000	1467.91	0.00	0.00
26	137.00	LPA-80080-6CF-EDIN	2	22.743	25.017	0.74	0.80	6.44	37.80	0.000	0.000	257.90	0.00	0.00
27	127.00	7770	3	22.256	24.482	0.60	0.80	9.90	94.50	0.000	0.000	387.79	0.00	0.00
28	127.00	LGP21401	6	22.256	24.482	0.51	0.80	3.96	76.14	0.000	0.000	155.23	0.00	0.00
29	127.00	Low Profile Platform	1	22.256	24.482	1.00	1.00	25.00	1350.00	0.000	0.000	979.26	0.00	0.00
30	127.00	DC6-48-60-18-8F	1	22.256	24.482	0.80	0.80	1.18	28.62	0.000	0.000	46.06	0.00	0.00
31	127.00	RRUS 12	3	22.256	24.482	0.54	0.80	4.34	162.00	0.000	0.000	170.06	0.00	0.00
32	127.00	RRU 11	3	22.256	24.482	0.54	0.80	7.21	148.50	0.000	0.000	282.55	0.00	0.00
33	127.00	P65-16-XLH-RR	3	22.256	24.482	0.60	0.80	14.69	143.10	0.000	0.000	575.34	0.00	0.00
34	127.00	860 10025	6	22.256	24.482	0.56	0.80	0.60	6.48	0.000	0.000	23.69	0.00	0.00
35	117.00	Ericsson - Air 21 B2A/B4P	3	21.741	23.915	0.69	0.80	12.57	247.05	0.000	0.000	480.96	0.00	0.00
36	117.00	T-Arms	3	21.741	23.915	0.56	0.75	13.50	945.00	0.000	0.000	516.55	0.00	0.00
37	117.00	Air 21 B4A/B2P	3	21.741	23.915	0.69	0.80	12.57	244.08	0.000	0.000	480.96	0.00	0.00
							Totals:		**11,078.01**			**16,007.22**		

Total Applied Force Summary

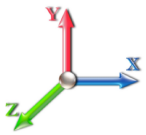
Structure:	CT00248-S-SBA		**Code:**	EIA/TIA-222-G	10/14/2021
Site Name:	North Bethel		**Exposure:**	B	
Height:	155.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 18

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 93 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 25

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		400.18	1160.12	0.00	0.00
10.00		393.58	1135.39	0.00	0.00
15.00		386.81	1110.65	0.00	0.00
20.00		380.03	1085.91	0.00	0.00
25.00		373.26	1061.17	0.00	0.00
30.00		366.80	1036.43	0.00	0.00
35.00		376.23	1011.69	0.00	0.00
40.00		383.51	986.95	0.00	0.00
44.00		309.83	771.75	0.00	0.00
45.00		78.49	354.94	0.00	0.00
49.75		379.43	1658.94	0.00	0.00
50.00		19.68	46.97	0.00	0.00
55.00		400.31	926.40	0.00	0.00
60.00		402.13	901.66	0.00	0.00
65.00		402.98	876.93	0.00	0.00
70.00		402.97	852.19	0.00	0.00
75.00		402.18	827.45	0.00	0.00
80.00		400.70	802.71	0.00	0.00
85.00		398.57	777.97	0.00	0.00
89.50		356.12	679.02	0.00	0.00
90.00		39.91	125.13	0.00	0.00
93.75		299.85	924.01	0.00	0.00
95.00		98.35	158.43	0.00	0.00
100.00		393.24	620.83	0.00	0.00
105.00		389.06	600.22	0.00	0.00
110.00		384.45	579.60	0.00	0.00
115.00		643.47	558.99	0.00	0.00
117.00	(9) attachments	1729.75	1653.95	0.00	0.00
120.00		165.57	283.88	0.00	0.00
123.25		177.45	449.45	0.00	0.00
125.00		93.39	107.63	0.00	0.00
127.00	(26) attachments	2725.01	2130.49	0.00	0.00
130.00		154.17	159.66	0.00	0.00
135.00		247.83	256.20	0.00	0.00
137.00	(23) attachments	4382.30	2234.63	0.00	0.00
140.00		139.43	125.00	0.00	0.00
145.00		222.57	198.43	0.00	0.00
147.00	(11) attachments	2746.38	2216.65	0.00	0.00
150.00		123.80	104.78	0.00	0.00
155.00	(27) attachments	5156.45	3520.92	0.00	5891.95
	Totals:	**27,326.21**	**35,074.12**	**0.00**	**5,891.95**

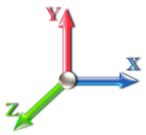
Linear Appurtenance Segment Forces (Factored)

Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 19	

Load Case: 0.9D + 1.6W 93 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 25

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.100	0.000	14.724	0.00	8.96
5.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.100	0.000	14.724	0.00	56.16
5.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.100	0.000	14.724	0.00	4.95
10.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.103	1.008	14.724	0.00	8.96
10.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.103	1.008	14.724	0.00	56.16
10.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.103	1.008	14.724	0.00	4.95
15.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.105	1.016	14.724	0.00	8.96
15.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.105	1.016	14.724	0.00	56.16
15.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.105	1.016	14.724	0.00	4.95
20.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.108	1.024	14.724	0.00	8.96
20.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.108	1.024	14.724	0.00	56.16
20.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.108	1.024	14.724	0.00	4.95
25.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.111	1.033	14.724	0.00	8.96
25.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.111	1.033	14.724	0.00	56.16
25.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.111	1.033	14.724	0.00	4.95
30.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.114	1.042	14.736	0.00	8.96
30.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.114	1.042	14.736	0.00	56.16
30.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.114	1.042	14.736	0.00	4.95
35.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.117	1.051	15.400	0.00	8.96
35.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.117	1.051	15.400	0.00	56.16
35.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.117	1.051	15.400	0.00	4.95
40.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.121	1.062	15.999	0.00	8.96
40.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.121	1.062	15.999	0.00	56.16
40.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.121	1.062	15.999	0.00	4.95
44.00	1.75" Hybrid	Yes	4.00	0.000	1.75	0.58	0.00	0.124	1.071	16.441	0.00	7.17
44.00	1 5/8" Coax	Yes	4.00	0.000	3.96	1.32	0.00	0.124	1.071	16.441	0.00	44.93
44.00	1 5/8" Hybrid	Yes	4.00	0.000	0.00	0.00	0.00	0.124	1.071	16.441	0.00	3.96
45.00	1.75" Hybrid	Yes	1.00	0.000	1.75	0.15	0.00	0.126	1.077	16.546	0.00	1.79
45.00	1 5/8" Coax	Yes	1.00	0.000	3.96	0.33	0.00	0.126	1.077	16.546	0.00	11.23
45.00	1 5/8" Hybrid	Yes	1.00	0.000	0.00	0.00	0.00	0.126	1.077	16.546	0.00	0.99
49.75	1.75" Hybrid	Yes	4.75	0.000	1.75	0.69	0.00	0.128	1.084	17.028	0.00	8.51
49.75	1 5/8" Coax	Yes	4.75	0.000	3.96	1.57	0.00	0.128	1.084	17.028	0.00	53.35
49.75	1 5/8" Hybrid	Yes	4.75	0.000	0.00	0.00	0.00	0.128	1.084	17.028	0.00	4.70
50.00	1.75" Hybrid	Yes	0.25	0.000	1.75	0.04	0.00	0.128	1.083	17.052	0.00	0.45
50.00	1 5/8" Coax	Yes	0.25	0.000	3.96	0.08	0.00	0.128	1.083	17.052	0.00	2.81
50.00	1 5/8" Hybrid	Yes	0.25	0.000	0.00	0.00	0.00	0.128	1.083	17.052	0.00	0.25
55.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.130	1.089	17.523	0.00	8.96
55.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.130	1.089	17.523	0.00	56.16
55.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.130	1.089	17.523	0.00	4.95
60.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.134	1.102	17.964	0.00	8.96
60.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.134	1.102	17.964	0.00	56.16
60.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.134	1.102	17.964	0.00	4.95
65.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.138	1.115	18.380	0.00	8.96
65.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.138	1.115	18.380	0.00	56.16
65.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.138	1.115	18.380	0.00	4.95
70.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.143	1.130	18.773	0.00	8.96
70.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.143	1.130	18.773	0.00	56.16

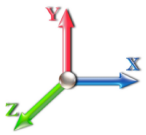
Linear Appurtenance Segment Forces (Factored)

Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 20	

Load Case: 0.9D + 1.6W 93 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 25

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
70.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.143	1.130	18.773	0.00	4.95
75.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.148	1.145	19.147	0.00	8.96
75.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.148	1.145	19.147	0.00	56.16
75.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.148	1.145	19.147	0.00	4.95
80.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.154	1.162	19.503	0.00	8.96
80.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.154	1.162	19.503	0.00	56.16
80.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.154	1.162	19.503	0.00	4.95
85.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.160	1.179	19.844	0.00	8.96
85.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.160	1.179	19.844	0.00	56.16
85.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.160	1.179	19.844	0.00	4.95
89.50	1.75" Hybrid	Yes	4.50	0.000	1.75	0.66	0.00	0.166	1.198	20.138	0.00	8.06
89.50	1 5/8" Coax	Yes	4.50	0.000	3.96	1.48	0.00	0.166	1.198	20.138	0.00	50.54
89.50	1 5/8" Hybrid	Yes	4.50	0.000	0.00	0.00	0.00	0.166	1.198	20.138	0.00	4.46
90.00	1.75" Hybrid	Yes	0.50	0.000	1.75	0.07	0.00	0.169	1.208	20.170	0.00	0.90
90.00	1 5/8" Coax	Yes	0.50	0.000	3.96	0.17	0.00	0.169	1.208	20.170	0.00	5.62
90.00	1 5/8" Hybrid	Yes	0.50	0.000	0.00	0.00	0.00	0.169	1.208	20.170	0.00	0.50
93.75	1.75" Hybrid	Yes	3.75	0.000	1.75	0.55	0.00	0.172	1.217	20.407	0.00	6.72
93.75	1 5/8" Coax	Yes	3.75	0.000	3.96	1.24	0.00	0.172	1.217	20.407	0.00	42.12
93.75	1 5/8" Hybrid	Yes	3.75	0.000	0.00	0.00	0.00	0.172	1.217	20.407	0.00	3.71
95.00	1.75" Hybrid	Yes	1.25	0.000	1.75	0.18	0.00	0.173	1.218	20.484	0.00	2.24
95.00	1 5/8" Coax	Yes	1.25	0.000	3.96	0.41	0.00	0.173	1.218	20.484	0.00	14.04
95.00	1 5/8" Hybrid	Yes	1.25	0.000	0.00	0.00	0.00	0.173	1.218	20.484	0.00	1.24
100.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.177	1.232	20.787	0.00	8.96
100.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.177	1.232	20.787	0.00	56.16
100.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.177	1.232	20.787	0.00	4.95
105.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.185	1.255	21.079	0.00	8.96
105.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.185	1.255	21.079	0.00	56.16
105.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.185	1.255	21.079	0.00	4.95
110.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.194	1.281	21.361	0.00	8.96
110.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.194	1.281	21.361	0.00	56.16
110.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.194	1.281	21.361	0.00	4.95
115.00	1.75" Hybrid	Yes	5.00	1.200	1.75	0.73	0.87	0.203	0.000	21.634	33.32	8.96
115.00	1 5/8" Coax	Yes	5.00	1.200	3.96	1.65	1.98	0.203	0.000	21.634	75.39	56.16
115.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.203	0.000	21.634	0.00	4.95
117.00	1.75" Hybrid	Yes	2.00	1.200	1.75	0.29	0.35	0.211	0.000	21.741	13.39	3.58
117.00	1 5/8" Coax	Yes	2.00	1.200	3.96	0.66	0.79	0.211	0.000	21.741	30.30	22.46
117.00	1 5/8" Hybrid	Yes	2.00	0.000	0.00	0.00	0.00	0.211	0.000	21.741	0.00	1.98
120.00	1.75" Hybrid	Yes	3.00	0.000	1.75	0.44	0.00	0.066	0.000	21.898	0.00	5.38
123.25	1.75" Hybrid	Yes	3.25	0.000	1.75	0.47	0.00	0.068	0.000	22.066	0.00	5.82
125.00	1.75" Hybrid	Yes	1.75	0.000	1.75	0.26	0.00	0.069	0.000	22.155	0.00	3.14
127.00	1.75" Hybrid	Yes	2.00	0.000	1.75	0.29	0.00	0.071	0.000	22.256	0.00	3.58
130.00	1.75" Hybrid	Yes	3.00	0.000	1.75	0.44	0.00	0.073	0.000	22.405	0.00	5.38
135.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.076	0.000	22.648	0.00	8.96
137.00	1.75" Hybrid	Yes	2.00	0.000	1.75	0.29	0.00	0.080	0.000	22.743	0.00	3.58
140.00	1.75" Hybrid	Yes	3.00	0.000	1.75	0.44	0.00	0.082	0.000	22.884	0.00	5.38
145.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.087	0.000	23.115	0.00	8.96
147.00	1.75" Hybrid	Yes	2.00	0.000	1.75	0.29	0.00	0.091	0.000	23.206	0.00	3.58

Linear Appurtenance Segment Forces (Factored)

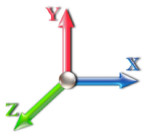
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 21	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 93 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 25

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
										Totals:	**152.4**	**1,693.4**

Calculated Forces

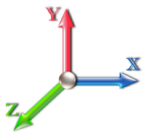
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 22	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 93 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 25

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-35.03	-27.38	0.00	-3225.7	0.00	3225.71	4331.76	2165.88	10060.7	5037.85	0.00	0.000	0.000	0.649
5.00	-33.79	-27.08	0.00	-3088.8	0.00	3088.82	4271.91	2135.96	9681.61	4848.00	0.09	-0.166	0.000	0.645
10.00	-32.58	-26.78	0.00	-2953.4	0.00	2953.44	4209.88	2104.94	9304.37	4659.10	0.35	-0.337	0.000	0.642
15.00	-31.39	-26.48	0.00	-2819.5	0.00	2819.57	4145.67	2072.83	8929.41	4471.34	0.80	-0.513	0.000	0.638
20.00	-30.22	-26.18	0.00	-2687.1	0.00	2687.18	4079.27	2039.64	8557.10	4284.91	1.44	-0.694	0.000	0.635
25.00	-29.08	-25.89	0.00	-2556.2	0.00	2556.26	4010.69	2005.34	8187.79	4099.98	2.26	-0.881	0.000	0.631
30.00	-27.97	-25.60	0.00	-2426.8	0.00	2426.80	3939.93	1969.96	7821.85	3916.74	3.29	-1.073	0.000	0.627
35.00	-26.87	-25.30	0.00	-2298.7	0.00	2298.78	3866.98	1933.49	7459.66	3735.38	4.52	-1.271	0.000	0.623
40.00	-25.81	-24.98	0.00	-2172.2	0.00	2172.27	3791.85	1895.92	7101.59	3556.07	5.96	-1.476	0.000	0.618
44.00	-25.01	-24.69	0.00	-2072.3	0.00	2072.36	3730.17	1865.09	6818.34	3414.24	7.27	-1.645	0.000	0.614
45.00	-24.60	-24.66	0.00	-2047.6	0.00	2047.67	3714.54	1857.27	6747.99	3379.01	7.62	-1.689	0.000	0.613
49.75	-22.91	-24.27	0.00	-1930.5	0.00	1930.54	3683.20	1841.60	6608.77	3309.30	9.40	-1.896	0.000	0.590
50.00	-22.81	-24.30	0.00	-1924.4	0.00	1924.47	3679.23	1839.62	6591.31	3300.56	9.50	-1.907	0.000	0.589
55.00	-21.81	-23.95	0.00	-1802.9	0.00	1802.99	3598.76	1799.38	6244.86	3127.07	11.62	-2.119	0.000	0.583
60.00	-20.83	-23.59	0.00	-1683.2	0.00	1683.27	3516.10	1758.05	5903.79	2956.28	13.95	-2.338	0.000	0.575
65.00	-19.88	-23.23	0.00	-1565.3	0.00	1565.32	3431.27	1715.63	5568.46	2788.37	16.52	-2.562	0.000	0.567
70.00	-18.96	-22.86	0.00	-1449.1	0.00	1449.19	3344.24	1672.12	5239.26	2623.52	19.33	-2.792	0.000	0.558
75.00	-18.06	-22.49	0.00	-1334.8	0.00	1334.87	3255.04	1627.52	4916.54	2461.92	22.38	-3.029	0.000	0.548
80.00	-17.18	-22.12	0.00	-1222.4	0.00	1222.40	3137.93	1568.96	4563.27	2285.03	25.68	-3.270	0.000	0.541
85.00	-16.34	-21.75	0.00	-1111.7	0.00	1111.78	3017.89	1508.95	4219.09	2112.68	29.23	-3.518	0.000	0.532
89.50	-15.64	-21.38	0.00	-1013.9	0.00	1013.92	2909.87	1454.93	3920.86	1963.34	32.66	-3.745	0.000	0.522
90.00	-15.48	-21.37	0.00	-1003.2	0.00	1003.23	2897.86	1448.93	3888.39	1947.09	33.05	-3.772	0.000	0.521
93.75	-14.53	-21.04	0.00	-923.10	0.00	923.10	2354.99	1177.49	3133.69	1569.17	36.09	-3.966	0.000	0.595
95.00	-14.31	-20.97	0.00	-896.81	0.00	896.81	2336.81	1168.40	3076.66	1540.62	37.14	-4.033	0.000	0.589
100.00	-13.61	-20.61	0.00	-791.94	0.00	791.94	2262.72	1131.36	2851.92	1428.08	41.51	-4.323	0.000	0.561
105.00	-12.95	-20.24	0.00	-688.91	0.00	688.91	2165.47	1082.73	2607.63	1305.76	46.19	-4.612	0.000	0.534
110.00	-12.30	-19.87	0.00	-587.74	0.00	587.74	2065.44	1032.72	2371.09	1187.31	51.17	-4.898	0.000	0.501
115.00	-11.74	-19.21	0.00	-488.41	0.00	488.41	1965.41	982.71	2145.79	1074.49	56.45	-5.175	0.000	0.461
117.00	-10.21	-17.37	0.00	-449.98	0.00	449.98	1925.40	962.70	2058.82	1030.94	58.64	-5.287	0.000	0.442
120.00	-9.89	-17.20	0.00	-397.88	0.00	397.88	1865.39	932.69	1931.73	967.30	62.01	-5.449	0.000	0.417
123.25	-9.42	-17.00	0.00	-341.97	0.00	341.97	1005.19	502.59	1030.12	515.83	65.77	-5.618	0.000	0.673
125.00	-9.29	-16.92	0.00	-312.22	0.00	312.22	992.91	496.46	998.01	499.75	67.85	-5.707	0.000	0.635
127.00	-7.40	-14.02	0.00	-278.38	0.00	278.38	978.56	489.28	961.59	481.51	70.27	-5.859	0.000	0.587
130.00	-7.19	-13.88	0.00	-236.32	0.00	236.32	956.38	478.19	907.53	454.44	74.01	-6.073	0.000	0.528
135.00	-6.91	-13.63	0.00	-166.91	0.00	166.91	917.66	458.83	819.21	410.21	80.54	-6.383	0.000	0.415
137.00	-5.16	-9.04	0.00	-139.64	0.00	139.64	901.57	450.78	784.57	392.87	83.23	-6.495	0.000	0.362
140.00	-5.03	-8.90	0.00	-112.53	0.00	112.53	876.76	438.38	733.42	367.25	87.35	-6.646	0.000	0.313
145.00	-4.84	-8.67	0.00	-68.01	0.00	68.01	833.68	416.84	650.52	325.74	94.41	-6.847	0.000	0.215
147.00	-2.96	-5.68	0.00	-50.68	0.00	50.68	815.84	407.92	618.25	309.58	97.29	-6.912	0.000	0.168
150.00	-2.86	-5.55	0.00	-33.64	0.00	33.64	781.24	390.62	565.69	283.26	101.65	-6.988	0.000	0.123
155.00	0.00	-5.16	0.00	-5.89	0.00	5.89	721.23	360.61	481.69	241.20	108.99	-7.056	0.000	0.025

Wind Loading - Shaft

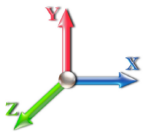
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 23	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 24

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.70	4.256	4.68	0.00	1.200	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.70	4.256	4.68	0.00	1.200	1.242	5.00	24.792	29.75	139.3	441.3	1796.7
10.00		1.00	0.70	4.256	4.68	0.00	1.209 *	1.331	5.00	24.292	29.38	137.5	462.4	1784.8
15.00		1.00	0.70	4.256	4.68	0.00	1.219 *	1.386	5.00	23.764	28.96	135.6	470.2	1759.6
20.00		1.00	0.70	4.256	4.68	0.00	1.229 *	1.427	5.00	23.223	28.53	133.6	472.1	1728.5
25.00		1.00	0.70	4.256	4.68	0.00	1.239 *	1.459	5.00	22.676	28.10	131.5	470.7	1694.1
30.00		1.00	0.70	4.260	4.69	0.00	1.250 *	1.486	5.00	22.124	27.66	129.6	466.9	1657.4
35.00		1.00	0.73	4.451	4.90	0.00	1.262 *	1.509	5.00	21.569	27.21	133.2	461.6	1619.0
40.00		1.00	0.76	4.625	5.09	0.00	1.274 *	1.529	5.00	21.011	26.77	136.2	454.9	1579.4
44.00	Bot - Section 2	1.00	0.78	4.752	5.23	0.00	1.286 *	1.544	4.00	16.405	21.09	110.3	359.1	1235.0
45.00		1.00	0.79	4.783	5.26	0.00	1.292 *	1.547	1.00	4.108	5.31	27.9	90.9	525.9
49.75	Top - Section 1	1.00	0.81	4.922	5.41	0.00	1.300 *	1.563	4.75	19.211	24.98	135.3	424.4	2454.4
50.00		1.00	0.81	4.929	5.42	0.00	1.300 *	1.564	0.25	0.997	1.30	7.0	22.3	75.4
55.00		1.00	0.83	5.065	5.57	0.00	1.307 *	1.579	5.00	19.647	25.68	143.1	437.3	1481.0
60.00		1.00	0.85	5.193	5.71	0.00	1.322 *	1.592	5.00	19.084	25.24	144.1	427.7	1438.4
65.00		1.00	0.87	5.313	5.84	0.00	1.338 *	1.605	5.00	18.520	24.79	144.9	417.6	1395.4
70.00		1.00	0.89	5.426	5.97	0.00	1.356 *	1.617	5.00	17.956	24.34	145.3	407.1	1351.9
75.00		1.00	0.91	5.534	6.09	0.00	1.374 *	1.628	5.00	17.391	23.90	145.5	396.2	1307.9
80.00		1.00	0.93	5.637	6.20	0.00	1.394 *	1.639	5.00	16.826	23.46	145.4	384.9	1263.7
85.00		1.00	0.94	5.736	6.31	0.00	1.415 *	1.649	5.00	16.260	23.01	145.2	373.3	1219.1
89.50	Bot - Section 3	1.00	0.96	5.821	6.40	0.00	1.437 *	1.657	4.50	14.149	20.34	130.2	326.4	1059.4
90.00		1.00	0.96	5.830	6.41	0.00	1.449 *	1.658	0.50	1.570	2.28	14.6	36.8	184.5
93.75	Top - Section 2	1.00	0.97	5.899	6.49	0.00	1.460 *	1.665	3.75	11.596	16.93	109.9	269.2	1357.6
95.00		1.00	0.97	5.921	6.51	0.00	1.461 *	1.667	1.25	3.794	5.54	36.1	89.0	252.3
100.00		1.00	0.99	6.008	6.61	0.00	1.478 *	1.676	5.00	14.824	21.91	144.8	343.5	979.8
105.00		1.00	1.00	6.093	6.70	0.00	1.506 *	1.684	5.00	14.256	21.48	143.9	330.9	939.8
110.00		1.00	1.02	6.174	6.79	0.00	1.538 *	1.692	5.00	13.688	21.05	142.9	318.2	899.5
115.00		1.00	1.03	6.253	6.88	0.00	1.200 *	1.699	5.00	13.120	15.74	108.3	305.2	859.1
117.00	Appurtenance(s)	1.00	1.03	6.284	6.91	0.00	1.200 *	1.702	2.00	5.088	6.11	42.2	120.0	333.8
120.00	Bot - Section 4	1.00	1.04	6.330	6.96	0.00	1.200	1.707	3.00	7.462	8.95	62.3	175.2	487.8
123.25	Top - Section 3	1.00	1.05	6.378	7.02	0.00	1.200	1.711	3.25	7.956	9.55	67.0	186.8	714.6
125.00		1.00	1.05	6.404	7.04	0.00	1.200	1.714	1.75	4.184	5.02	35.4	99.0	204.0
127.00	Appurtenance(s)	1.00	1.06	6.433	7.08	0.00	1.200	1.716	2.00	4.697	5.64	39.9	111.0	228.5
130.00		1.00	1.07	6.476	7.12	0.00	1.200	1.720	3.00	6.875	8.25	58.8	161.6	333.0
135.00		1.00	1.08	6.546	7.20	0.00	1.200	1.727	5.00	11.005	13.21	95.1	255.7	528.1
137.00	Appurtenance(s)	1.00	1.08	6.574	7.23	0.00	1.200	1.729	2.00	4.242	5.09	36.8	100.1	204.4
140.00		1.00	1.09	6.615	7.28	0.00	1.200	1.733	3.00	6.192	7.43	54.1	145.2	296.8
145.00		1.00	1.10	6.681	7.35	0.00	1.200	1.739	5.00	9.866	11.84	87.0	228.1	467.5
147.00	Appurtenance(s)	1.00	1.10	6.708	7.38	0.00	1.200	1.742	2.00	3.786	4.54	33.5	89.0	180.2
150.00		1.00	1.11	6.746	7.42	0.00	1.200	1.745	3.00	5.509	6.61	49.1	128.5	260.2
155.00	Appurtenance(s)	1.00	1.12	6.810	7.49	0.00	1.200	1.751	5.00	8.727	10.47	78.5	200.0	406.4
								Totals:	**155.00**			**3,940.9**		**38,544.8**

* Cf Adjusted by Linear Load Ra Effect

Discrete Appurtenance Forces

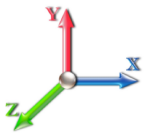
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 24	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 24

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	155.00	Ericsson 4424 B25 RRU	3	6.835	7.518	0.60	0.90	4.79	577.03	0.000	2.000	36.01	0.00	72.03
2	155.00	ACU-A20-N	4	6.835	7.518	0.45	0.90	0.79	16.84	0.000	2.000	5.92	0.00	11.85
3	155.00	Low Profile Platform	1	6.810	7.491	1.00	1.00	50.55	2813.21	0.000	0.000	378.68	0.00	0.00
4	155.00	RFS	3	6.835	7.518	0.56	0.90	12.69	559.14	0.000	2.000	95.38	0.00	190.75
5	155.00	RFS	3	6.835	7.518	0.63	0.90	41.86	1700.52	0.000	2.000	314.70	0.00	629.40
6	155.00	Ericsson AIR6449 B41	3	6.835	7.518	0.64	0.90	12.66	688.41	0.000	2.000	95.18	0.00	190.35
7	155.00	6' Lightning rod	1	6.810	7.491	1.00	1.00	1.47	38.92	0.000	0.000	11.02	0.00	0.00
8	155.00	Ericsson 4449 B71 + B85	3	6.835	7.518	0.60	0.90	4.60	262.12	0.000	2.000	34.56	0.00	69.13
9	155.00	(3) T-Arm Kit	1	6.810	7.491	0.75	0.75	24.51	1045.32	0.000	0.000	183.60	0.00	0.00
10	155.00	MS-H1242 (Heavy Collar	1	6.810	7.491	1.00	1.00	5.13	325.37	0.000	0.000	38.40	0.00	0.00
11	155.00	MS-KI22-5 (Kickers w/o	1	6.810	7.491	1.00	1.00	10.93	315.71	0.000	0.000	81.87	0.00	0.00
12	155.00	Ericsson 4415 B66A RRU	3	6.835	7.518	0.60	0.90	4.39	349.76	0.000	2.000	33.00	0.00	66.01
13	147.00	MC-PK8-DSH	1	6.708	7.378	1.00	1.00	84.73	3383.83	0.000	0.000	625.16	0.00	0.00
14	147.00	FFVV-65C-R3-V1	3	6.708	7.378	0.55	0.75	22.58	1096.86	0.000	0.000	166.57	0.00	0.00
15	147.00	RDIDC-9181-PF-48	1	6.708	7.378	0.75	0.75	1.93	66.72	0.000	0.000	14.26	0.00	0.00
16	147.00	TA08025-B604	3	6.708	7.378	0.50	0.75	3.80	345.32	0.000	0.000	28.03	0.00	0.00
17	147.00	TA08025-B605	3	6.708	7.378	0.50	0.75	3.80	388.80	0.000	0.000	28.03	0.00	0.00
18	137.00	Low Profile Platform	1	6.574	7.231	1.00	1.00	51.24	2177.68	0.000	0.000	370.56	0.00	0.00
19	137.00	LPA-80063/6CF	2	6.574	7.231	0.75	0.80	16.45	634.96	0.000	0.000	118.98	0.00	0.00
20	137.00	LPA-80080/4CF ___	2	6.574	7.231	0.74	0.80	10.79	439.91	0.000	0.000	78.05	0.00	0.00
21	137.00	Commscope -	1	6.574	7.231	1.00	1.00	4.87	126.10	0.000	0.000	35.25	0.00	0.00
22	137.00	Samsung - B2/B66A	3	6.574	7.231	0.54	0.80	3.92	530.94	0.000	0.000	28.34	0.00	0.00
23	137.00	Samsung - B5/B13	3	6.574	7.231	0.54	0.80	3.92	458.80	0.000	0.000	28.34	0.00	0.00
24	137.00	Samsung - 64T64R	3	6.574	7.231	0.53	0.80	7.49	655.53	0.000	0.000	54.13	0.00	0.00
25	137.00	JMA - MX06FIT665-02	6	6.574	7.231	0.64	0.80	41.85	1670.57	0.000	0.000	302.66	0.00	0.00
26	137.00	LPA-80080-6CF-EDIN	2	6.574	7.231	0.74	0.80	8.47	287.61	0.000	0.000	61.26	0.00	0.00
27	127.00	7770	3	6.433	7.076	0.60	0.80	11.78	523.33	0.000	0.000	83.39	0.00	0.00
28	127.00	LGP21401	6	6.433	7.076	0.53	0.80	6.69	206.45	0.000	0.000	47.34	0.00	0.00
29	127.00	Low Profile Platform	1	6.433	7.076	1.00	1.00	44.74	2787.31	0.000	0.000	316.59	0.00	0.00
30	127.00	DC6-48-60-18-8F	1	6.433	7.076	0.80	0.80	1.73	81.26	0.000	0.000	12.22	0.00	0.00
31	127.00	RRUS 12	3	6.433	7.076	0.55	0.80	5.55	366.63	0.000	0.000	39.24	0.00	0.00
32	127.00	RRU 11	3	6.433	7.076	0.55	0.80	9.76	386.32	0.000	0.000	69.08	0.00	0.00
33	127.00	P65-16-XLH-RR	3	6.433	7.076	0.60	0.80	19.65	536.18	0.000	0.000	139.05	0.00	0.00
34	127.00	860 10025	6	6.433	7.076	0.58	0.80	1.91	34.42	0.000	0.000	13.51	0.00	0.00
35	117.00	Ericsson - Air 21 B2A/B4P	3	6.284	6.913	0.69	0.80	14.78	821.28	0.000	0.000	102.13	0.00	0.00
36	117.00	T-Arms	3	6.284	6.913	0.56	0.75	24.99	1765.00	0.000	0.000	172.75	0.00	0.00
37	117.00	Air 21 B4A/B2P	3	6.284	6.913	0.69	0.80	14.78	817.32	0.000	0.000	102.13	0.00	0.00
							Totals:		**29,281.47**			**4,345.40**		

Total Applied Force Summary

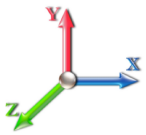
Structure:	CT00248-S-SBA		**Code:**	EIA/TIA-222-G	10/14/2021
Site Name:	North Bethel		**Exposure:**	B	
Height:	155.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 25

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 24

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		139.28	2171.85	0.00	0.00
10.00		137.55	2173.69	0.00	0.00
15.00		135.60	2157.15	0.00	0.00
20.00		133.59	2132.52	0.00	0.00
25.00		131.54	2103.21	0.00	0.00
30.00		129.59	2070.82	0.00	0.00
35.00		133.25	2036.20	0.00	0.00
40.00		136.17	1999.90	0.00	0.00
44.00		110.25	1573.28	0.00	0.00
45.00		27.93	610.57	0.00	0.00
49.75		135.26	2859.12	0.00	0.00
50.00		7.02	96.67	0.00	0.00
55.00		143.09	1909.62	0.00	0.00
60.00		144.14	1869.32	0.00	0.00
65.00		144.86	1828.37	0.00	0.00
70.00		145.30	1786.83	0.00	0.00
75.00		145.49	1744.79	0.00	0.00
80.00		145.45	1702.30	0.00	0.00
85.00		145.20	1659.39	0.00	0.00
89.50		130.21	1456.93	0.00	0.00
90.00		14.59	228.67	0.00	0.00
93.75		109.87	1689.81	0.00	0.00
95.00		36.11	363.17	0.00	0.00
100.00		144.79	1424.61	0.00	0.00
105.00		143.93	1385.94	0.00	0.00
110.00		142.94	1347.01	0.00	0.00
115.00		151.32	1307.84	0.00	0.00
117.00	(9) attachments	436.54	3917.14	0.00	0.00
120.00		62.35	572.16	0.00	0.00
123.25		66.99	806.15	0.00	0.00
125.00		35.37	253.29	0.00	0.00
127.00	(26) attachments	760.31	5206.79	0.00	0.00
130.00		58.77	393.12	0.00	0.00
135.00		95.09	628.58	0.00	0.00
137.00	(23) attachments	1114.39	7226.75	0.00	0.00
140.00		54.07	330.71	0.00	0.00
145.00		87.02	524.27	0.00	0.00
147.00	(11) attachments	895.57	5484.41	0.00	0.00
150.00		49.06	268.16	0.00	0.00
155.00	(27) attachments	1386.78	9111.95	0.00	1229.51
	Totals:	**8,346.64**	**78,413.07**	**0.00**	**1,229.51**

Linear Appurtenance Segment Forces (Factored)

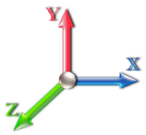
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 26	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 24

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1.75" Hybrid	Yes	5.00	0.000	1.75	1.76	0.00	0.100	0.000	4.256	0.00	31.10
5.00	1 5/8" Coax	Yes	5.00	0.000	3.96	2.69	0.00	0.100	0.000	4.256	0.00	218.70
5.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.100	0.000	4.256	0.00	27.35
10.00	1.75" Hybrid	Yes	5.00	0.000	1.75	1.84	0.00	0.103	1.008	4.256	0.00	33.11
10.00	1 5/8" Coax	Yes	5.00	0.000	3.96	2.76	0.00	0.103	1.008	4.256	0.00	228.34
10.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.103	1.008	4.256	0.00	29.45
15.00	1.75" Hybrid	Yes	5.00	0.000	1.75	1.88	0.00	0.105	1.016	4.256	0.00	34.40
15.00	1 5/8" Coax	Yes	5.00	0.000	3.96	2.81	0.00	0.105	1.016	4.256	0.00	234.34
15.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.105	1.016	4.256	0.00	30.79
20.00	1.75" Hybrid	Yes	5.00	0.000	1.75	1.92	0.00	0.108	1.024	4.256	0.00	35.37
20.00	1 5/8" Coax	Yes	5.00	0.000	3.96	2.84	0.00	0.108	1.024	4.256	0.00	238.78
20.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.108	1.024	4.256	0.00	31.80
25.00	1.75" Hybrid	Yes	5.00	0.000	1.75	1.94	0.00	0.111	1.033	4.256	0.00	36.15
25.00	1 5/8" Coax	Yes	5.00	0.000	3.96	2.87	0.00	0.111	1.033	4.256	0.00	242.32
25.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.111	1.033	4.256	0.00	32.62
30.00	1.75" Hybrid	Yes	5.00	0.000	1.75	1.97	0.00	0.114	1.042	4.260	0.00	36.82
30.00	1 5/8" Coax	Yes	5.00	0.000	3.96	2.89	0.00	0.114	1.042	4.260	0.00	245.28
30.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.114	1.042	4.260	0.00	33.31
35.00	1.75" Hybrid	Yes	5.00	0.000	1.75	1.99	0.00	0.117	1.051	4.451	0.00	37.40
35.00	1 5/8" Coax	Yes	5.00	0.000	3.96	2.91	0.00	0.117	1.051	4.451	0.00	247.84
35.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.117	1.051	4.451	0.00	33.91
40.00	1.75" Hybrid	Yes	5.00	0.000	1.75	2.00	0.00	0.121	1.062	4.625	0.00	37.91
40.00	1 5/8" Coax	Yes	5.00	0.000	3.96	2.92	0.00	0.121	1.062	4.625	0.00	250.09
40.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.121	1.062	4.625	0.00	34.45
44.00	1.75" Hybrid	Yes	4.00	0.000	1.75	1.61	0.00	0.124	1.071	4.752	0.00	30.63
44.00	1 5/8" Coax	Yes	4.00	0.000	3.96	2.35	0.00	0.124	1.071	4.752	0.00	201.37
44.00	1 5/8" Hybrid	Yes	4.00	0.000	0.00	0.00	0.00	0.124	1.071	4.752	0.00	27.87
45.00	1.75" Hybrid	Yes	1.00	0.000	1.75	0.40	0.00	0.126	1.077	4.783	0.00	7.68
45.00	1 5/8" Coax	Yes	1.00	0.000	3.96	0.59	0.00	0.126	1.077	4.783	0.00	50.42
45.00	1 5/8" Hybrid	Yes	1.00	0.000	0.00	0.00	0.00	0.126	1.077	4.783	0.00	6.99
49.75	1.75" Hybrid	Yes	4.75	0.000	1.75	1.93	0.00	0.128	1.084	4.922	0.00	36.84
49.75	1 5/8" Coax	Yes	4.75	0.000	3.96	2.80	0.00	0.128	1.084	4.922	0.00	241.15
49.75	1 5/8" Hybrid	Yes	4.75	0.000	0.00	0.00	0.00	0.128	1.084	4.922	0.00	33.58
50.00	1.75" Hybrid	Yes	0.25	0.000	1.75	0.10	0.00	0.128	1.083	4.929	0.00	1.94
50.00	1 5/8" Coax	Yes	0.25	0.000	3.96	0.15	0.00	0.128	1.083	4.929	0.00	12.70
50.00	1 5/8" Hybrid	Yes	0.25	0.000	0.00	0.00	0.00	0.128	1.083	4.929	0.00	1.77
55.00	1.75" Hybrid	Yes	5.00	0.000	1.75	2.04	0.00	0.130	1.089	5.065	0.00	39.19
55.00	1 5/8" Coax	Yes	5.00	0.000	3.96	2.97	0.00	0.130	1.089	5.065	0.00	255.60
55.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.130	1.089	5.065	0.00	35.77
60.00	1.75" Hybrid	Yes	5.00	0.000	1.75	2.06	0.00	0.134	1.102	5.193	0.00	39.55
60.00	1 5/8" Coax	Yes	5.00	0.000	3.96	2.98	0.00	0.134	1.102	5.193	0.00	257.14
60.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.134	1.102	5.193	0.00	36.14
65.00	1.75" Hybrid	Yes	5.00	0.000	1.75	2.07	0.00	0.138	1.115	5.313	0.00	39.89
65.00	1 5/8" Coax	Yes	5.00	0.000	3.96	2.99	0.00	0.138	1.115	5.313	0.00	258.57
65.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.138	1.115	5.313	0.00	36.49
70.00	1.75" Hybrid	Yes	5.00	0.000	1.75	2.08	0.00	0.143	1.130	5.426	0.00	40.20
70.00	1 5/8" Coax	Yes	5.00	0.000	3.96	3.00	0.00	0.143	1.130	5.426	0.00	259.91

Linear Appurtenance Segment Forces (Factored)

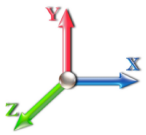
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 27	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 24

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
70.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.143	1.130	5.426	0.00	36.82
75.00	1.75" Hybrid	Yes	5.00	0.000	1.75	2.09	0.00	0.148	1.145	5.534	0.00	40.50
75.00	1 5/8" Coax	Yes	5.00	0.000	3.96	3.01	0.00	0.148	1.145	5.534	0.00	261.17
75.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.148	1.145	5.534	0.00	37.13
80.00	1.75" Hybrid	Yes	5.00	0.000	1.75	2.09	0.00	0.154	1.162	5.637	0.00	40.78
80.00	1 5/8" Coax	Yes	5.00	0.000	3.96	3.02	0.00	0.154	1.162	5.637	0.00	262.35
80.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.154	1.162	5.637	0.00	37.42
85.00	1.75" Hybrid	Yes	5.00	0.000	1.75	2.10	0.00	0.160	1.179	5.736	0.00	41.05
85.00	1 5/8" Coax	Yes	5.00	0.000	3.96	3.02	0.00	0.160	1.179	5.736	0.00	263.47
85.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.160	1.179	5.736	0.00	37.70
89.50	1.75" Hybrid	Yes	4.50	0.000	1.75	1.90	0.00	0.166	1.198	5.821	0.00	37.15
89.50	1 5/8" Coax	Yes	4.50	0.000	3.96	2.73	0.00	0.166	1.198	5.821	0.00	237.99
89.50	1 5/8" Hybrid	Yes	4.50	0.000	0.00	0.00	0.00	0.166	1.198	5.821	0.00	34.15
90.00	1.75" Hybrid	Yes	0.50	0.000	1.75	0.21	0.00	0.169	1.208	5.830	0.00	4.13
90.00	1 5/8" Coax	Yes	0.50	0.000	3.96	0.30	0.00	0.169	1.208	5.830	0.00	26.45
90.00	1 5/8" Hybrid	Yes	0.50	0.000	0.00	0.00	0.00	0.169	1.208	5.830	0.00	3.80
93.75	1.75" Hybrid	Yes	3.75	0.000	1.75	1.59	0.00	0.172	1.217	5.899	0.00	31.12
93.75	1 5/8" Coax	Yes	3.75	0.000	3.96	2.28	0.00	0.172	1.217	5.899	0.00	198.98
93.75	1 5/8" Hybrid	Yes	3.75	0.000	0.00	0.00	0.00	0.172	1.217	5.899	0.00	28.62
95.00	1.75" Hybrid	Yes	1.25	0.000	1.75	0.53	0.00	0.173	1.218	5.921	0.00	10.39
95.00	1 5/8" Coax	Yes	1.25	0.000	3.96	0.76	0.00	0.173	1.218	5.921	0.00	66.39
95.00	1 5/8" Hybrid	Yes	1.25	0.000	0.00	0.00	0.00	0.173	1.218	5.921	0.00	9.55
100.00	1.75" Hybrid	Yes	5.00	0.000	1.75	2.13	0.00	0.177	1.232	6.008	0.00	41.79
100.00	1 5/8" Coax	Yes	5.00	0.000	3.96	3.05	0.00	0.177	1.232	6.008	0.00	266.52
100.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.177	1.232	6.008	0.00	38.46
105.00	1.75" Hybrid	Yes	5.00	0.000	1.75	2.13	0.00	0.185	1.255	6.093	0.00	42.01
105.00	1 5/8" Coax	Yes	5.00	0.000	3.96	3.05	0.00	0.185	1.255	6.093	0.00	267.44
105.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.185	1.255	6.093	0.00	38.69
110.00	1.75" Hybrid	Yes	5.00	0.000	1.75	2.14	0.00	0.194	1.281	6.174	0.00	42.22
110.00	1 5/8" Coax	Yes	5.00	0.000	3.96	3.06	0.00	0.194	1.281	6.174	0.00	268.33
110.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.194	1.281	6.174	0.00	38.92
115.00	1.75" Hybrid	Yes	5.00	1.200	1.75	2.15	2.57	0.203	0.000	6.253	17.71	42.43
115.00	1 5/8" Coax	Yes	5.00	1.200	3.96	3.07	3.68	0.203	0.000	6.253	25.31	269.18
115.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.203	0.000	6.253	0.00	39.13
117.00	1.75" Hybrid	Yes	2.00	1.200	1.75	0.86	1.03	0.211	0.000	6.284	7.13	17.01
117.00	1 5/8" Coax	Yes	2.00	1.200	3.96	1.23	1.47	0.211	0.000	6.284	10.18	107.81
117.00	1 5/8" Hybrid	Yes	2.00	0.000	0.00	0.00	0.00	0.211	0.000	6.284	0.00	15.69
120.00	1.75" Hybrid	Yes	3.00	0.000	1.75	1.29	0.00	0.066	0.000	6.330	0.00	25.58
123.25	1.75" Hybrid	Yes	3.25	0.000	1.75	1.40	0.00	0.068	0.000	6.378	0.00	27.79
125.00	1.75" Hybrid	Yes	1.75	0.000	1.75	0.76	0.00	0.069	0.000	6.404	0.00	14.99
127.00	1.75" Hybrid	Yes	2.00	0.000	1.75	0.86	0.00	0.071	0.000	6.433	0.00	17.16
130.00	1.75" Hybrid	Yes	3.00	0.000	1.75	1.30	0.00	0.073	0.000	6.476	0.00	25.81
135.00	1.75" Hybrid	Yes	5.00	0.000	1.75	2.17	0.00	0.076	0.000	6.546	0.00	43.19
137.00	1.75" Hybrid	Yes	2.00	0.000	1.75	0.87	0.00	0.080	0.000	6.574	0.00	17.31
140.00	1.75" Hybrid	Yes	3.00	0.000	1.75	1.30	0.00	0.082	0.000	6.615	0.00	26.02
145.00	1.75" Hybrid	Yes	5.00	0.000	1.75	2.18	0.00	0.087	0.000	6.681	0.00	43.54
147.00	1.75" Hybrid	Yes	2.00	0.000	1.75	0.87	0.00	0.091	0.000	6.708	0.00	17.44

Linear Appurtenance Segment Forces (Factored)

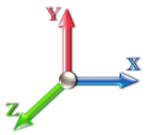
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 28	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 24

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
										Totals:	**60.3**	**7,934.6**

Calculated Forces

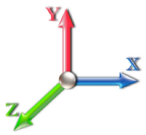
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 29	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 24

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-78.41	-8.38	0.00	-1012.3	0.00	1012.39	4331.76	2165.88	10060.7	5037.85	0.00	0.000	0.000	0.219
5.00	-76.23	-8.31	0.00	-970.48	0.00	970.48	4271.91	2135.96	9681.61	4848.00	0.03	-0.052	0.000	0.218
10.00	-74.05	-8.24	0.00	-928.92	0.00	928.92	4209.88	2104.94	9304.37	4659.10	0.11	-0.106	0.000	0.217
15.00	-71.88	-8.17	0.00	-887.71	0.00	887.71	4145.67	2072.83	8929.41	4471.34	0.25	-0.161	0.000	0.216
20.00	-69.74	-8.10	0.00	-846.85	0.00	846.85	4079.27	2039.64	8557.10	4284.91	0.45	-0.218	0.000	0.215
25.00	-67.63	-8.03	0.00	-806.34	0.00	806.34	4010.69	2005.34	8187.79	4099.98	0.71	-0.277	0.000	0.214
30.00	-65.55	-7.96	0.00	-766.18	0.00	766.18	3939.93	1969.96	7821.85	3916.74	1.03	-0.338	0.000	0.212
35.00	-63.51	-7.89	0.00	-726.37	0.00	726.37	3866.98	1933.49	7459.66	3735.38	1.42	-0.400	0.000	0.211
40.00	-61.50	-7.80	0.00	-686.94	0.00	686.94	3791.85	1895.92	7101.59	3556.07	1.88	-0.465	0.000	0.209
44.00	-59.93	-7.71	0.00	-655.75	0.00	655.75	3730.17	1865.09	6818.34	3414.24	2.29	-0.519	0.000	0.208
45.00	-59.31	-7.72	0.00	-648.04	0.00	648.04	3714.54	1857.27	6747.99	3379.01	2.40	-0.533	0.000	0.208
49.75	-56.45	-7.59	0.00	-611.39	0.00	611.39	3683.20	1841.60	6608.77	3309.30	2.96	-0.598	0.000	0.200
50.00	-56.35	-7.61	0.00	-609.49	0.00	609.49	3679.23	1839.62	6591.31	3300.56	2.99	-0.602	0.000	0.200
55.00	-54.43	-7.52	0.00	-571.42	0.00	571.42	3598.76	1799.38	6244.86	3127.07	3.66	-0.669	0.000	0.198
60.00	-52.55	-7.41	0.00	-533.84	0.00	533.84	3516.10	1758.05	5903.79	2956.28	4.40	-0.738	0.000	0.196
65.00	-50.72	-7.31	0.00	-496.78	0.00	496.78	3431.27	1715.63	5568.46	2788.37	5.21	-0.809	0.000	0.193
70.00	-48.92	-7.20	0.00	-460.24	0.00	460.24	3344.24	1672.12	5239.26	2623.52	6.10	-0.882	0.000	0.190
75.00	-47.17	-7.09	0.00	-424.25	0.00	424.25	3255.04	1627.52	4916.54	2461.92	7.06	-0.957	0.000	0.187
80.00	-45.46	-6.97	0.00	-388.81	0.00	388.81	3137.93	1568.96	4563.27	2285.03	8.10	-1.034	0.000	0.185
85.00	-43.80	-6.86	0.00	-353.94	0.00	353.94	3017.89	1508.95	4219.09	2112.68	9.23	-1.113	0.000	0.182
89.50	-42.34	-6.73	0.00	-323.09	0.00	323.09	2909.87	1454.93	3920.86	1963.34	10.31	-1.185	0.000	0.179
90.00	-42.11	-6.73	0.00	-319.73	0.00	319.73	2897.86	1448.93	3888.39	1947.09	10.44	-1.194	0.000	0.179
93.75	-40.42	-6.62	0.00	-294.48	0.00	294.48	2354.99	1177.49	3133.69	1569.17	11.40	-1.256	0.000	0.205
95.00	-40.05	-6.61	0.00	-286.21	0.00	286.21	2336.81	1168.40	3076.66	1540.62	11.73	-1.277	0.000	0.203
100.00	-38.62	-6.50	0.00	-253.15	0.00	253.15	2262.72	1131.36	2851.92	1428.08	13.12	-1.370	0.000	0.194
105.00	-37.22	-6.38	0.00	-220.66	0.00	220.66	2165.47	1082.73	2607.63	1305.76	14.61	-1.462	0.000	0.186
110.00	-35.87	-6.26	0.00	-188.77	0.00	188.77	2065.44	1032.72	2371.09	1187.31	16.19	-1.554	0.000	0.176
115.00	-34.56	-6.11	0.00	-157.48	0.00	157.48	1965.41	982.71	2145.79	1074.49	17.86	-1.643	0.000	0.164
117.00	-30.65	-5.58	0.00	-145.27	0.00	145.27	1925.40	962.70	2058.82	1030.94	18.56	-1.679	0.000	0.157
120.00	-30.08	-5.53	0.00	-128.53	0.00	128.53	1865.39	932.69	1931.73	967.30	19.63	-1.732	0.000	0.149
123.25	-29.27	-5.46	0.00	-110.56	0.00	110.56	1005.19	502.59	1030.12	515.83	20.83	-1.786	0.000	0.244
125.00	-29.02	-5.44	0.00	-101.00	0.00	101.00	992.91	496.46	998.01	499.75	21.49	-1.815	0.000	0.231
127.00	-23.83	-4.53	0.00	-90.13	0.00	90.13	978.56	489.28	961.59	481.51	22.26	-1.864	0.000	0.212
130.00	-23.43	-4.50	0.00	-76.53	0.00	76.53	956.38	478.19	907.53	454.44	23.45	-1.934	0.000	0.193
135.00	-22.80	-4.41	0.00	-54.05	0.00	54.05	917.66	458.83	819.21	410.21	25.54	-2.034	0.000	0.157
137.00	-15.62	-3.05	0.00	-45.24	0.00	45.24	901.57	450.78	784.57	392.87	26.40	-2.070	0.000	0.133
140.00	-15.29	-3.00	0.00	-36.10	0.00	36.10	876.76	438.38	733.42	367.25	27.71	-2.119	0.000	0.116
145.00	-14.76	-2.90	0.00	-21.13	0.00	21.13	833.68	416.84	650.52	325.74	29.97	-2.183	0.000	0.083
147.00	-9.32	-1.80	0.00	-15.33	0.00	15.33	815.84	407.92	618.25	309.58	30.89	-2.203	0.000	0.061
150.00	-9.05	-1.74	0.00	-9.94	0.00	9.94	781.24	390.62	565.69	283.26	32.28	-2.225	0.000	0.047
155.00	0.00	-1.39	0.00	-1.23	0.00	1.23	721.23	360.61	481.69	241.20	34.62	-2.245	0.000	0.005

Seismic Segment Forces (Factored)

Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 30	

Tower Engineering Solutions

Load Case:	1.2D + 1.0E					**Iterations**	23
Gust Response Factor	1.10			**Sds**	0.23	**Ss**	0.21
Dead Load Factor	1.20	**Seismic Load Factor**	1.00	**Sd1**	0.11	**S1**	0.07
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.32	**SA**	0.03	**Seismic Importance Factor**	1.00

Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	0.00	
5.00		1129.4	0.00	0.03	0.02	27.74	
10.00		1101.9	0.01	0.05	0.03	38.39	
15.00		1074.5	0.02	0.06	0.04	42.77	
20.00		1047.0	0.03	0.07	0.04	44.34	
25.00		1019.5	0.05	0.07	0.04	44.66	
30.00		992.03	0.07	0.07	0.04	44.54	
35.00		964.55	0.10	0.07	0.04	44.33	
40.00		937.06	0.13	0.07	0.03	44.10	
44.00	Bot - Section 2	729.86	0.15	0.07	0.03	34.93	
45.00		362.47	0.16	0.07	0.03	17.41	
49.75	Top - Section 1	1691.6	0.19	0.06	0.02	81.99	
50.00		44.21	0.20	0.06	0.02	2.14	
55.00		869.78	0.24	0.06	0.02	41.48	
60.00		842.29	0.28	0.05	0.01	37.70	
65.00		814.81	0.33	0.04	0.01	31.40	
70.00		787.32	0.39	0.02	0.01	21.99	
75.00		759.83	0.44	0.00	0.01	9.62	
80.00		732.34	0.50	-0.02	0.01	-4.29	
85.00		704.86	0.57	-0.04	0.01	-17.22	
89.50	Bot - Section 3	610.87	0.63	-0.06	0.02	-23.41	
90.00		123.08	0.64	-0.07	0.02	-4.88	
93.75	Top - Section 2	907.01	0.69	-0.08	0.03	-43.02	
95.00		136.14	0.71	-0.09	0.03	-6.71	
100.00		530.26	0.79	-0.11	0.05	-27.94	
105.00		507.35	0.87	-0.12	0.08	-25.37	
110.00		484.45	0.95	-0.12	0.11	-20.12	
115.00		461.54	1.04	-0.10	0.15	-12.69	
117.00	Appurtenance(s)	1773.9	1.08	-0.08	0.17	-36.09	
120.00	Bot - Section 4	260.43	1.13	-0.05	0.21	-2.08	
123.25	Top - Section 3	439.82	1.20	0.00	0.25	3.34	
125.00		87.51	1.23	0.03	0.28	1.48	
127.00	Appurtenance(s)	2330.5	1.27	0.08	0.31	66.34	
130.00		142.80	1.33	0.16	0.36	6.77	
135.00		227.01	1.43	0.35	0.47	18.95	
137.00	Appurtenance(s)	2459.8	1.48	0.44	0.52	244.75	
140.00		126.31	1.54	0.61	0.59	15.82	
145.00		199.52	1.65	0.96	0.75	34.52	
147.00	Appurtenance(s)	2454.5	1.70	1.12	0.81	475.59	
150.00		109.82	1.77	1.41	0.93	24.90	
155.00	Appurtenance(s)	3901.1	1.89	1.98	1.14	1118.35	
	Totals:	**34,879.5**				**2,396.5**	**Total Wind:** **27,326.2**

Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

Calculated Forces

Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 31	

Tower Engineering Solutions

Load Case: 1.2D + 1.0E

Iterations 23

Gust Response Factor	1.10			**Sds**	0.23			**Ss**	0.21
Dead Load Factor	1.20	**Seismic Load Factor**	1.00	**Sd1**	0.11			**S1**	0.07
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.32	**SA**	0.03	**Seismic Importance Factor**			1.00

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-46.77	-2.63	0.00	-342.77	0.00	342.77	4331.76	2165.88	10060.7	5037.85		0.00	0.00	0.079
5.00	-45.22	-2.61	0.00	-329.64	0.00	329.64	4271.91	2135.96	9681.61	4848.00		0.01	-0.02	0.079
10.00	-43.70	-2.59	0.00	-316.57	0.00	316.57	4209.88	2104.94	9304.37	4659.10		0.04	-0.04	0.078
15.00	-42.22	-2.56	0.00	-303.63	0.00	303.63	4145.67	2072.83	8929.41	4471.34		0.09	-0.05	0.078
20.00	-40.77	-2.53	0.00	-290.84	0.00	290.84	4079.27	2039.64	8557.10	4284.91		0.15	-0.07	0.078
25.00	-39.36	-2.49	0.00	-278.21	0.00	278.21	4010.69	2005.34	8187.79	4099.98		0.24	-0.09	0.078
30.00	-37.97	-2.46	0.00	-265.74	0.00	265.74	3939.93	1969.96	7821.85	3916.74		0.35	-0.12	0.077
35.00	-36.62	-2.43	0.00	-253.43	0.00	253.43	3866.98	1933.49	7459.66	3735.38		0.49	-0.14	0.077
40.00	-35.31	-2.39	0.00	-241.29	0.00	241.29	3791.85	1895.92	7101.59	3556.07		0.64	-0.16	0.077
44.00	-34.28	-2.36	0.00	-231.72	0.00	231.72	3730.17	1865.09	6818.34	3414.24		0.78	-0.18	0.077
45.00	-33.80	-2.35	0.00	-229.35	0.00	229.35	3714.54	1857.27	6747.99	3379.01		0.82	-0.18	0.077
49.75	-31.59	-2.27	0.00	-218.18	0.00	218.18	3683.20	1841.60	6608.77	3309.30		1.02	-0.21	0.075
50.00	-31.53	-2.27	0.00	-217.62	0.00	217.62	3679.23	1839.62	6591.31	3300.56		1.03	-0.21	0.075
55.00	-30.29	-2.24	0.00	-206.25	0.00	206.25	3598.76	1799.38	6244.86	3127.07		1.26	-0.23	0.074
60.00	-29.09	-2.21	0.00	-195.04	0.00	195.04	3516.10	1758.05	5903.79	2956.28		1.52	-0.26	0.074
65.00	-27.92	-2.19	0.00	-183.99	0.00	183.99	3431.27	1715.63	5568.46	2788.37		1.80	-0.28	0.074
70.00	-26.78	-2.17	0.00	-173.06	0.00	173.06	3344.24	1672.12	5239.26	2623.52		2.11	-0.31	0.074
75.00	-25.68	-2.17	0.00	-162.20	0.00	162.20	3255.04	1627.52	4916.54	2461.92		2.45	-0.34	0.074
80.00	-24.61	-2.18	0.00	-151.35	0.00	151.35	3137.93	1568.96	4563.27	2285.03		2.82	-0.37	0.074
85.00	-23.57	-2.18	0.00	-140.47	0.00	140.47	3017.89	1508.95	4219.09	2112.68		3.23	-0.40	0.074
89.50	-22.66	-2.18	0.00	-130.66	0.00	130.66	2909.87	1454.93	3920.86	1963.34		3.62	-0.43	0.074
90.00	-22.50	-2.19	0.00	-129.57	0.00	129.57	2897.86	1448.93	3888.39	1947.09		3.66	-0.43	0.074
93.75	-21.26	-2.18	0.00	-121.37	0.00	121.37	2354.99	1177.49	3133.69	1569.17		4.01	-0.46	0.086
95.00	-21.05	-2.19	0.00	-118.65	0.00	118.65	2336.81	1168.40	3076.66	1540.62		4.13	-0.47	0.086
100.00	-20.22	-2.20	0.00	-107.70	0.00	107.70	2262.72	1131.36	2851.92	1428.08		4.64	-0.51	0.084
105.00	-19.42	-2.20	0.00	-96.72	0.00	96.72	2165.47	1082.73	2607.63	1305.76		5.20	-0.55	0.083
110.00	-18.65	-2.21	0.00	-85.71	0.00	85.71	2065.44	1032.72	2371.09	1187.31		5.79	-0.59	0.081
115.00	-17.90	-2.21	0.00	-74.67	0.00	74.67	1965.41	982.71	2145.79	1074.49		6.42	-0.63	0.079
117.00	-15.69	-2.19	0.00	-70.25	0.00	70.25	1925.40	962.70	2058.82	1030.94		6.69	-0.65	0.076
120.00	-15.31	-2.19	0.00	-63.68	0.00	63.68	1865.39	932.69	1931.73	967.30		7.11	-0.67	0.074
123.25	-14.71	-2.19	0.00	-56.55	0.00	56.55	1005.19	502.59	1030.12	515.83		7.57	-0.70	0.124
125.00	-14.57	-2.19	0.00	-52.72	0.00	52.72	992.91	496.46	998.01	499.75		7.83	-0.71	0.120
127.00	-11.73	-2.09	0.00	-48.34	0.00	48.34	978.56	489.28	961.59	481.51		8.13	-0.74	0.112
130.00	-11.51	-2.09	0.00	-42.05	0.00	42.05	956.38	478.19	907.53	454.44		8.61	-0.78	0.105
135.00	-11.17	-2.08	0.00	-31.58	0.00	31.58	917.66	458.83	819.21	410.21		9.46	-0.83	0.089
137.00	-8.19	-1.79	0.00	-27.42	0.00	27.42	901.57	450.78	784.57	392.87		9.81	-0.85	0.079
140.00	-8.03	-1.78	0.00	-22.04	0.00	22.04	876.76	438.38	733.42	367.25		10.36	-0.88	0.069
145.00	-7.76	-1.75	0.00	-13.14	0.00	13.14	833.68	416.84	650.52	325.74		11.31	-0.92	0.050
147.00	-4.81	-1.22	0.00	-9.65	0.00	9.65	815.84	407.92	618.25	309.58		11.70	-0.94	0.037
150.00	-4.68	-1.20	0.00	-5.98	0.00	5.98	781.24	390.62	565.69	283.26		12.29	-0.95	0.027
155.00	0.00	-1.12	0.00	0.00	0.00	0.00	721.23	360.61	481.69	241.20		13.29	-0.96	0.000

Seismic Segment Forces (Factored)

Structure:	CT00248-S-SBA		**Code:**	EIA/TIA-222-G	10/14/2021
Site Name:	North Bethel		**Exposure:**	B	
Height:	155.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 32

Tower Engineering Solutions

Load Case:	0.9D + 1.0E							**Iterations**	23
Gust Response Factor	1.10				**Sds**	0.23		**Ss**	0.21
Dead Load Factor	0.90	**Seismic Load Factor**	1.00		**Sd1**	0.11		**S1**	0.07
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.32		**SA**	0.03	**Seismic Importance Factor**		1.00

Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	0.00	
5.00		1129.4	0.00	0.03	0.02	27.74	
10.00		1101.9	0.01	0.05	0.03	38.39	
15.00		1074.5	0.02	0.06	0.04	42.77	
20.00		1047.0	0.03	0.07	0.04	44.34	
25.00		1019.5	0.05	0.07	0.04	44.66	
30.00		992.03	0.07	0.07	0.04	44.54	
35.00		964.55	0.10	0.07	0.04	44.33	
40.00		937.06	0.13	0.07	0.03	44.10	
44.00	Bot - Section 2	729.86	0.15	0.07	0.03	34.93	
45.00		362.47	0.16	0.07	0.03	17.41	
49.75	Top - Section 1	1691.6	0.19	0.06	0.02	81.99	
50.00		44.21	0.20	0.06	0.02	2.14	
55.00		869.78	0.24	0.06	0.02	41.48	
60.00		842.29	0.28	0.05	0.01	37.70	
65.00		814.81	0.33	0.04	0.01	31.40	
70.00		787.32	0.39	0.02	0.01	21.99	
75.00		759.83	0.44	0.00	0.01	9.62	
80.00		732.34	0.50	-0.02	0.01	-4.29	
85.00		704.86	0.57	-0.04	0.01	-17.22	
89.50	Bot - Section 3	610.87	0.63	-0.06	0.02	-23.41	
90.00		123.08	0.64	-0.07	0.02	-4.88	
93.75	Top - Section 2	907.01	0.69	-0.08	0.03	-43.02	
95.00		136.14	0.71	-0.09	0.03	-6.71	
100.00		530.26	0.79	-0.11	0.05	-27.94	
105.00		507.35	0.87	-0.12	0.08	-25.37	
110.00		484.45	0.95	-0.12	0.11	-20.12	
115.00		461.54	1.04	-0.10	0.15	-12.69	
117.00	Appurtenance(s)	1773.9	1.08	-0.08	0.17	-36.09	
120.00	Bot - Section 4	260.43	1.13	-0.05	0.21	-2.08	
123.25	Top - Section 3	439.82	1.20	0.00	0.25	3.34	
125.00		87.51	1.23	0.03	0.28	1.48	
127.00	Appurtenance(s)	2330.5	1.27	0.08	0.31	66.34	
130.00		142.80	1.33	0.16	0.36	6.77	
135.00		227.01	1.43	0.35	0.47	18.95	
137.00	Appurtenance(s)	2459.8	1.48	0.44	0.52	244.75	
140.00		126.31	1.54	0.61	0.59	15.82	
145.00		199.52	1.65	0.96	0.75	34.52	
147.00	Appurtenance(s)	2454.5	1.70	1.12	0.81	475.59	
150.00		109.82	1.77	1.41	0.93	24.90	
155.00	Appurtenance(s)	3901.1	1.89	1.98	1.14	1118.35	
	Totals:	**34,879.5**				**2,396.5**	**Total Wind:** **27,326.2**

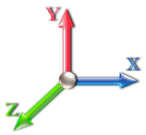
Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

Calculated Forces

Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 33	

Tower Engineering Solutions

Load Case: 0.9D + 1.0E



Gust Response Factor	1.10			**Sds**	0.23			**Iterations**	23
Dead Load Factor	0.90	**Seismic Load Factor**	1.00	**Sd1**	0.11			**Ss**	0.21
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.32	**SA**	0.03			**S1**	0.07
								Seismic Importance Factor	1.00

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-35.07	-2.63	0.00	-337.63	0.00	337.63	4331.76	2165.88	10060.7	5037.85		0.00	0.00	0.075
5.00	-33.91	-2.61	0.00	-324.51	0.00	324.51	4271.91	2135.96	9681.61	4848.00		0.01	-0.02	0.075
10.00	-32.78	-2.58	0.00	-311.47	0.00	311.47	4209.88	2104.94	9304.37	4659.10		0.04	-0.04	0.075
15.00	-31.67	-2.55	0.00	-298.57	0.00	298.57	4145.67	2072.83	8929.41	4471.34		0.08	-0.05	0.074
20.00	-30.58	-2.51	0.00	-285.84	0.00	285.84	4079.27	2039.64	8557.10	4284.91		0.15	-0.07	0.074
25.00	-29.52	-2.48	0.00	-273.29	0.00	273.29	4010.69	2005.34	8187.79	4099.98		0.24	-0.09	0.074
30.00	-28.48	-2.44	0.00	-260.91	0.00	260.91	3939.93	1969.96	7821.85	3916.74		0.35	-0.11	0.074
35.00	-27.47	-2.40	0.00	-248.72	0.00	248.72	3866.98	1933.49	7459.66	3735.38		0.48	-0.14	0.074
40.00	-26.48	-2.37	0.00	-236.70	0.00	236.70	3791.85	1895.92	7101.59	3556.07		0.63	-0.16	0.074
44.00	-25.71	-2.33	0.00	-227.24	0.00	227.24	3730.17	1865.09	6818.34	3414.24		0.77	-0.18	0.073
45.00	-25.35	-2.32	0.00	-224.90	0.00	224.90	3714.54	1857.27	6747.99	3379.01		0.81	-0.18	0.073
49.75	-23.69	-2.24	0.00	-213.88	0.00	213.88	3683.20	1841.60	6608.77	3309.30		1.00	-0.20	0.071
50.00	-23.64	-2.24	0.00	-213.32	0.00	213.32	3679.23	1839.62	6591.31	3300.56		1.01	-0.20	0.071
55.00	-22.72	-2.21	0.00	-202.11	0.00	202.11	3598.76	1799.38	6244.86	3127.07		1.24	-0.23	0.071
60.00	-21.82	-2.17	0.00	-191.07	0.00	191.07	3516.10	1758.05	5903.79	2956.28		1.49	-0.25	0.071
65.00	-20.94	-2.15	0.00	-180.20	0.00	180.20	3431.27	1715.63	5568.46	2788.37		1.77	-0.28	0.071
70.00	-20.08	-2.13	0.00	-169.46	0.00	169.46	3344.24	1672.12	5239.26	2623.52		2.07	-0.31	0.071
75.00	-19.26	-2.13	0.00	-158.80	0.00	158.80	3255.04	1627.52	4916.54	2461.92		2.41	-0.33	0.070
80.00	-18.45	-2.13	0.00	-148.16	0.00	148.16	3137.93	1568.96	4563.27	2285.03		2.77	-0.36	0.071
85.00	-17.67	-2.14	0.00	-137.50	0.00	137.50	3017.89	1508.95	4219.09	2112.68		3.17	-0.39	0.071
89.50	-16.99	-2.14	0.00	-127.89	0.00	127.89	2909.87	1454.93	3920.86	1963.34		3.55	-0.42	0.071
90.00	-16.87	-2.14	0.00	-126.83	0.00	126.83	2897.86	1448.93	3888.39	1947.09		3.60	-0.42	0.071
93.75	-15.94	-2.14	0.00	-118.80	0.00	118.80	2354.99	1177.49	3133.69	1569.17		3.94	-0.45	0.082
95.00	-15.78	-2.14	0.00	-116.13	0.00	116.13	2336.81	1168.40	3076.66	1540.62		4.06	-0.46	0.082
100.00	-15.16	-2.15	0.00	-105.42	0.00	105.42	2262.72	1131.36	2851.92	1428.08		4.56	-0.50	0.081
105.00	-14.56	-2.15	0.00	-94.69	0.00	94.69	2165.47	1082.73	2607.63	1305.76		5.10	-0.53	0.079
110.00	-13.98	-2.16	0.00	-83.93	0.00	83.93	2065.44	1032.72	2371.09	1187.31		5.68	-0.57	0.077
115.00	-13.42	-2.16	0.00	-73.15	0.00	73.15	1965.41	982.71	2145.79	1074.49		6.30	-0.62	0.075
117.00	-11.76	-2.14	0.00	-68.84	0.00	68.84	1925.40	962.70	2058.82	1030.94		6.57	-0.63	0.073
120.00	-11.48	-2.15	0.00	-62.41	0.00	62.41	1865.39	932.69	1931.73	967.30		6.97	-0.66	0.071
123.25	-11.03	-2.14	0.00	-55.44	0.00	55.44	1005.19	502.59	1030.12	515.83		7.43	-0.68	0.118
125.00	-10.92	-2.14	0.00	-51.69	0.00	51.69	992.91	496.46	998.01	499.75		7.68	-0.70	0.114
127.00	-8.79	-2.05	0.00	-47.41	0.00	47.41	978.56	489.28	961.59	481.51		7.98	-0.72	0.107
130.00	-8.63	-2.05	0.00	-41.25	0.00	41.25	956.38	478.19	907.53	454.44		8.45	-0.76	0.100
135.00	-8.37	-2.03	0.00	-30.99	0.00	30.99	917.66	458.83	819.21	410.21		9.28	-0.82	0.085
137.00	-6.14	-1.76	0.00	-26.92	0.00	26.92	901.57	450.78	784.57	392.87		9.62	-0.84	0.075
140.00	-6.01	-1.75	0.00	-21.64	0.00	21.64	876.76	438.38	733.42	367.25		10.16	-0.87	0.066
145.00	-5.82	-1.71	0.00	-12.91	0.00	12.91	833.68	416.84	650.52	325.74		11.09	-0.91	0.047
147.00	-3.61	-1.20	0.00	-9.48	0.00	9.48	815.84	407.92	618.25	309.58		11.47	-0.92	0.035
150.00	-3.50	-1.18	0.00	-5.88	0.00	5.88	781.24	390.62	565.69	283.26		12.05	-0.93	0.025
155.00	0.00	-1.12	0.00	0.00	0.00	0.00	721.23	360.61	481.69	241.20		13.04	-0.94	0.000

Wind Loading - Shaft

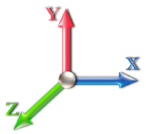
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 34	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 24

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.70	6.129	6.74	241.40	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.70	6.129	6.74	235.64	0.650	0.000	5.00	23.757	15.44	104.1	0.0	1129.5
10.00		1.00	0.70	6.129	6.74	229.87	0.655 *	0.000	5.00	23.183	15.19	102.4	0.0	1102.0
15.00		1.00	0.70	6.129	6.74	224.11	0.660 *	0.000	5.00	22.609	14.93	100.6	0.0	1074.5
20.00		1.00	0.70	6.129	6.74	218.34	0.666 *	0.000	5.00	22.034	14.67	98.9	0.0	1047.0
25.00		1.00	0.70	6.129	6.74	212.57	0.671 *	0.000	5.00	21.460	14.40	97.1	0.0	1019.5
30.00		1.00	0.70	6.134	6.75	206.90	0.677 *	0.000	5.00	20.886	14.14	95.4	0.0	992.0
35.00		1.00	0.73	6.410	7.05	205.60	0.683 *	0.000	5.00	20.311	13.88	97.9	0.0	964.5
40.00		1.00	0.76	6.659	7.33	203.55	0.690 *	0.000	5.00	19.737	13.62	99.8	0.0	937.1
44.00	Bot - Section 2	1.00	0.78	6.843	7.53	201.47	0.696 *	0.000	4.00	15.376	10.71	80.6	0.0	729.9
45.00		1.00	0.79	6.887	7.58	200.90	0.700 *	0.000	1.00	3.850	2.70	20.4	0.0	362.5
49.75	Top - Section 1	1.00	0.81	7.088	7.80	197.91	0.704 *	0.000	4.75	17.974	12.66	98.7	0.0	1691.7
50.00		1.00	0.81	7.098	7.81	201.17	0.704 *	0.000	0.25	0.932	0.66	5.1	0.0	44.2
55.00		1.00	0.83	7.294	8.02	197.63	0.708 *	0.000	5.00	18.331	12.98	104.1	0.0	869.8
60.00		1.00	0.85	7.477	8.22	193.74	0.716 *	0.000	5.00	17.757	12.72	104.6	0.0	842.3
65.00		1.00	0.87	7.650	8.42	189.52	0.725 *	0.000	5.00	17.183	12.46	104.8	0.0	814.8
70.00		1.00	0.89	7.814	8.60	185.03	0.734 *	0.000	5.00	16.609	12.20	104.8	0.0	787.3
75.00		1.00	0.91	7.969	8.77	180.29	0.744 *	0.000	5.00	16.034	11.93	104.6	0.0	759.8
80.00		1.00	0.93	8.118	8.93	175.32	0.755 *	0.000	5.00	15.460	11.67	104.2	0.0	732.3
85.00		1.00	0.94	8.260	9.09	170.15	0.767 *	0.000	5.00	14.886	11.41	103.7	0.0	704.9
89.50	Bot - Section 3	1.00	0.96	8.382	9.22	165.34	0.779 *	0.000	4.50	12.906	10.05	92.6	0.0	610.9
90.00		1.00	0.96	8.396	9.24	164.80	0.785 *	0.000	0.50	1.432	1.12	10.4	0.0	123.1
93.75	Top - Section 2	1.00	0.97	8.494	9.34	160.67	0.791 *	0.000	3.75	10.555	8.35	78.0	0.0	907.0
95.00		1.00	0.97	8.526	9.38	162.40	0.792 *	0.000	1.25	3.446	2.73	25.6	0.0	136.1
100.00		1.00	0.99	8.652	9.52	156.75	0.801 *	0.000	5.00	13.427	10.75	102.3	0.0	530.3
105.00		1.00	1.00	8.774	9.65	150.95	0.816 *	0.000	5.00	12.853	10.49	101.2	0.0	507.4
110.00		1.00	1.02	8.891	9.78	145.01	0.833 *	0.000	5.00	12.278	10.23	100.0	0.0	484.4
115.00		1.00	1.03	9.005	9.91	138.94	1.200 *	0.000	5.00	11.704	14.04	139.1	0.0	461.5
117.00	Appurtenance(s)	1.00	1.03	9.049	9.95	136.48	1.200 *	0.000	2.00	4.521	5.42	54.0	0.0	178.2
120.00	Bot - Section 4	1.00	1.04	9.115	10.03	132.76	0.650	0.000	3.00	6.609	4.30	43.1	0.0	260.4
123.25	Top - Section 3	1.00	1.05	9.185	10.10	128.68	0.650	0.000	3.25	7.030	4.57	46.2	0.0	439.8
125.00		1.00	1.05	9.222	10.14	128.41	0.650	0.000	1.75	3.685	2.39	24.3	0.0	87.5
127.00	Appurtenance(s)	1.00	1.06	9.264	10.19	125.87	0.650	0.000	2.00	4.125	2.68	27.3	0.0	98.0
130.00		1.00	1.07	9.326	10.26	122.02	0.650	0.000	3.00	6.015	3.91	40.1	0.0	142.8
135.00		1.00	1.08	9.427	10.37	115.53	0.650	0.000	5.00	9.565	6.22	64.5	0.0	227.0
137.00	Appurtenance(s)	1.00	1.08	9.466	10.41	112.91	0.650	0.000	2.00	3.665	2.38	24.8	0.0	87.0
140.00		1.00	1.09	9.525	10.48	108.94	0.650	0.000	3.00	5.326	3.46	36.3	0.0	126.3
145.00		1.00	1.10	9.621	10.58	102.27	0.650	0.000	5.00	8.417	5.47	57.9	0.0	199.5
147.00	Appurtenance(s)	1.00	1.10	9.659	10.62	99.57	0.650	0.000	2.00	3.206	2.08	22.1	0.0	76.0
150.00		1.00	1.11	9.715	10.69	95.50	0.650	0.000	3.00	4.637	3.01	32.2	0.0	109.8
155.00	Appurtenance(s)	1.00	1.12	9.806	10.79	88.66	0.650	0.000	5.00	7.268	4.72	51.0	0.0	172.0
								Totals:	**155.00**			**2,904.9**		**22,570.6**

* Cf Adjusted by Linear Load Ra Effect

Discrete Appurtenance Forces

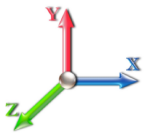
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 35	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 24

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	155.00	Ericsson 4424 B25 RRU	3	9.842	10.827	0.60	0.90	3.71	264.00	0.000	2.000	40.15	0.00	80.30
2	155.00	ACU-A20-N	4	9.842	10.827	0.45	0.90	0.25	4.00	0.000	2.000	2.73	0.00	5.46
3	155.00	Low Profile Platform	1	9.806	10.787	1.00	1.00	28.00	1500.00	0.000	0.000	302.03	0.00	0.00
4	155.00	RFS	3	9.842	10.827	0.56	0.90	10.81	122.10	0.000	2.000	117.08	0.00	234.16
5	155.00	RFS	3	9.842	10.827	0.63	0.90	38.25	368.40	0.000	2.000	414.15	0.00	828.31
6	155.00	Ericsson AIR6449 B41	3	9.842	10.827	0.64	0.90	10.83	309.00	0.000	2.000	117.26	0.00	234.53
7	155.00	6' Lightning rod	1	9.806	10.787	1.00	1.00	0.38	6.50	0.000	0.000	4.10	0.00	0.00
8	155.00	Ericsson 4449 B71 + B85	3	9.842	10.827	0.60	0.90	3.56	219.60	0.000	2.000	38.58	0.00	77.17
9	155.00	(3) T-Arm Kit	1	9.806	10.787	0.75	0.75	12.38	500.00	0.000	0.000	133.49	0.00	0.00
10	155.00	MS-H1242 (Heavy Collar	1	9.806	10.787	1.00	1.00	2.50	150.60	0.000	0.000	26.97	0.00	0.00
11	155.00	MS-KI22-5 (Kickers w/o	1	9.806	10.787	1.00	1.00	5.33	146.00	0.000	0.000	57.49	0.00	0.00
12	155.00	Ericsson 4415 B66A RRU	3	9.842	10.827	0.60	0.90	3.36	138.90	0.000	2.000	36.43	0.00	72.86
13	147.00	MC-PK8-DSH	1	9.659	10.625	1.00	1.00	37.59	1727.00	0.000	0.000	399.39	0.00	0.00
14	147.00	FFVV-65C-R3-V1	3	9.659	10.625	0.55	0.75	20.15	213.00	0.000	0.000	214.13	0.00	0.00
15	147.00	RDIDC-9181-PF-48	1	9.659	10.625	0.75	0.75	1.51	21.90	0.000	0.000	16.02	0.00	0.00
16	147.00	TA08025-B604	3	9.659	10.625	0.50	0.75	2.95	191.70	0.000	0.000	31.39	0.00	0.00
17	147.00	TA08025-B605	3	9.659	10.625	0.50	0.75	2.95	225.00	0.000	0.000	31.39	0.00	0.00
18	137.00	Low Profile Platform	1	9.466	10.413	1.00	1.00	28.00	1200.00	0.000	0.000	291.57	0.00	0.00
19	137.00	LPA-80063/6CF	2	9.466	10.413	0.75	0.80	14.44	54.00	0.000	0.000	150.35	0.00	0.00
20	137.00	LPA-80080/4CF ___	2	9.466	10.413	0.74	0.80	3.88	24.00	0.000	0.000	40.44	0.00	0.00
21	137.00	Commscope -	1	9.466	10.413	1.00	1.00	4.06	32.00	0.000	0.000	42.28	0.00	0.00
22	137.00	Samsung - B2/B66A	3	9.466	10.413	0.54	0.80	3.01	253.20	0.000	0.000	31.31	0.00	0.00
23	137.00	Samsung - B5/B13	3	9.466	10.413	0.54	0.80	3.01	210.90	0.000	0.000	31.31	0.00	0.00
24	137.00	Samsung - 64T64R	3	9.466	10.413	0.53	0.80	7.59	286.80	0.000	0.000	79.01	0.00	0.00
25	137.00	JMA - MX06FIT665-02	6	9.466	10.413	0.64	0.80	36.67	270.00	0.000	0.000	381.87	0.00	0.00
26	137.00	LPA-80080-6CF-EDIN	2	9.466	10.413	0.74	0.80	6.44	42.00	0.000	0.000	67.09	0.00	0.00
27	127.00	7770	3	9.264	10.190	0.60	0.80	9.90	105.00	0.000	0.000	100.88	0.00	0.00
28	127.00	LGP21401	6	9.264	10.190	0.51	0.80	3.96	84.60	0.000	0.000	40.38	0.00	0.00
29	127.00	Low Profile Platform	1	9.264	10.190	1.00	1.00	25.00	1500.00	0.000	0.000	254.75	0.00	0.00
30	127.00	DC6-48-60-18-8F	1	9.264	10.190	0.80	0.80	1.18	31.80	0.000	0.000	11.98	0.00	0.00
31	127.00	RRUS 12	3	9.264	10.190	0.54	0.80	4.34	180.00	0.000	0.000	44.24	0.00	0.00
32	127.00	RRU 11	3	9.264	10.190	0.54	0.80	7.21	165.00	0.000	0.000	73.51	0.00	0.00
33	127.00	P65-16-XLH-RR	3	9.264	10.190	0.60	0.80	14.69	159.00	0.000	0.000	149.67	0.00	0.00
34	127.00	860 10025	6	9.264	10.190	0.56	0.80	0.60	7.20	0.000	0.000	6.16	0.00	0.00
35	117.00	Ericsson - Air 21 B2A/B4P	3	9.049	9.954	0.69	0.80	12.57	274.50	0.000	0.000	125.12	0.00	0.00
36	117.00	T-Arms	3	9.049	9.954	0.56	0.75	13.50	1050.00	0.000	0.000	134.38	0.00	0.00
37	117.00	Air 21 B4A/B2P	3	9.049	9.954	0.69	0.80	12.57	271.20	0.000	0.000	125.12	0.00	0.00
							Totals:		**12,308.90**			**4,164.21**		

Total Applied Force Summary

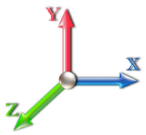
Structure:	CT00248-S-SBA		**Code:**	EIA/TIA-222-G	10/14/2021
Site Name:	North Bethel		**Exposure:**	B	
Height:	155.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 36

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 24

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		104.10	1289.03	0.00	0.00
10.00		102.39	1261.54	0.00	0.00
15.00		100.63	1234.05	0.00	0.00
20.00		98.86	1206.56	0.00	0.00
25.00		97.10	1179.08	0.00	0.00
30.00		95.42	1151.59	0.00	0.00
35.00		97.88	1124.10	0.00	0.00
40.00		99.77	1096.61	0.00	0.00
44.00		80.60	857.50	0.00	0.00
45.00		20.42	394.38	0.00	0.00
49.75		98.71	1843.27	0.00	0.00
50.00		5.12	52.19	0.00	0.00
55.00		104.14	1029.34	0.00	0.00
60.00		104.61	1001.85	0.00	0.00
65.00		104.83	974.36	0.00	0.00
70.00		104.83	946.87	0.00	0.00
75.00		104.63	919.39	0.00	0.00
80.00		104.24	891.90	0.00	0.00
85.00		103.69	864.41	0.00	0.00
89.50		92.64	754.47	0.00	0.00
90.00		10.38	139.03	0.00	0.00
93.75		78.01	1026.68	0.00	0.00
95.00		25.59	176.03	0.00	0.00
100.00		102.30	689.82	0.00	0.00
105.00		101.21	666.91	0.00	0.00
110.00		100.01	644.00	0.00	0.00
115.00		167.40	621.10	0.00	0.00
117.00	(9) attachments	449.99	1837.72	0.00	0.00
120.00		43.07	315.43	0.00	0.00
123.25		46.16	499.39	0.00	0.00
125.00		24.29	119.59	0.00	0.00
127.00	(26) attachments	708.90	2367.21	0.00	0.00
130.00		40.11	177.40	0.00	0.00
135.00		64.47	284.67	0.00	0.00
137.00	(23) attachments	1140.04	2482.92	0.00	0.00
140.00		36.27	138.88	0.00	0.00
145.00		57.90	220.48	0.00	0.00
147.00	(11) attachments	714.46	2462.94	0.00	0.00
150.00		32.21	116.42	0.00	0.00
155.00	(27) attachments	1341.43	3912.14	0.00	1532.77
	Totals:	**7,108.79**	**38,971.24**	**0.00**	**1,532.77**

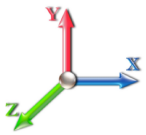
Linear Appurtenance Segment Forces (Factored)

Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 37	

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 24

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.100	0.000	6.129	0.00	9.96
5.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.100	0.000	6.129	0.00	62.40
5.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.100	0.000	6.129	0.00	5.50
10.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.103	1.008	6.129	0.00	9.96
10.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.103	1.008	6.129	0.00	62.40
10.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.103	1.008	6.129	0.00	5.50
15.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.105	1.016	6.129	0.00	9.96
15.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.105	1.016	6.129	0.00	62.40
15.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.105	1.016	6.129	0.00	5.50
20.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.108	1.024	6.129	0.00	9.96
20.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.108	1.024	6.129	0.00	62.40
20.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.108	1.024	6.129	0.00	5.50
25.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.111	1.033	6.129	0.00	9.96
25.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.111	1.033	6.129	0.00	62.40
25.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.111	1.033	6.129	0.00	5.50
30.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.114	1.042	6.134	0.00	9.96
30.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.114	1.042	6.134	0.00	62.40
30.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.114	1.042	6.134	0.00	5.50
35.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.117	1.051	6.410	0.00	9.96
35.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.117	1.051	6.410	0.00	62.40
35.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.117	1.051	6.410	0.00	5.50
40.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.121	1.062	6.659	0.00	9.96
40.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.121	1.062	6.659	0.00	62.40
40.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.121	1.062	6.659	0.00	5.50
44.00	1.75" Hybrid	Yes	4.00	0.000	1.75	0.58	0.00	0.124	1.071	6.843	0.00	7.96
44.00	1 5/8" Coax	Yes	4.00	0.000	3.96	1.32	0.00	0.124	1.071	6.843	0.00	49.92
44.00	1 5/8" Hybrid	Yes	4.00	0.000	0.00	0.00	0.00	0.124	1.071	6.843	0.00	4.40
45.00	1.75" Hybrid	Yes	1.00	0.000	1.75	0.15	0.00	0.126	1.077	6.887	0.00	1.99
45.00	1 5/8" Coax	Yes	1.00	0.000	3.96	0.33	0.00	0.126	1.077	6.887	0.00	12.48
45.00	1 5/8" Hybrid	Yes	1.00	0.000	0.00	0.00	0.00	0.126	1.077	6.887	0.00	1.10
49.75	1.75" Hybrid	Yes	4.75	0.000	1.75	0.69	0.00	0.128	1.084	7.088	0.00	9.46
49.75	1 5/8" Coax	Yes	4.75	0.000	3.96	1.57	0.00	0.128	1.084	7.088	0.00	59.28
49.75	1 5/8" Hybrid	Yes	4.75	0.000	0.00	0.00	0.00	0.128	1.084	7.088	0.00	5.23
50.00	1.75" Hybrid	Yes	0.25	0.000	1.75	0.04	0.00	0.128	1.083	7.098	0.00	0.50
50.00	1 5/8" Coax	Yes	0.25	0.000	3.96	0.08	0.00	0.128	1.083	7.098	0.00	3.12
50.00	1 5/8" Hybrid	Yes	0.25	0.000	0.00	0.00	0.00	0.128	1.083	7.098	0.00	0.28
55.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.130	1.089	7.294	0.00	9.96
55.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.130	1.089	7.294	0.00	62.40
55.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.130	1.089	7.294	0.00	5.50
60.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.134	1.102	7.477	0.00	9.96
60.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.134	1.102	7.477	0.00	62.40
60.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.134	1.102	7.477	0.00	5.50
65.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.138	1.115	7.650	0.00	9.96
65.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.138	1.115	7.650	0.00	62.40
65.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.138	1.115	7.650	0.00	5.50
70.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.143	1.130	7.814	0.00	9.96
70.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.143	1.130	7.814	0.00	62.40

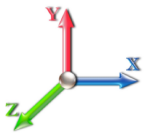
Linear Appurtenance Segment Forces (Factored)

Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 38	

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 24

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
70.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.143	1.130	7.814	0.00	5.50
75.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.148	1.145	7.969	0.00	9.96
75.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.148	1.145	7.969	0.00	62.40
75.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.148	1.145	7.969	0.00	5.50
80.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.154	1.162	8.118	0.00	9.96
80.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.154	1.162	8.118	0.00	62.40
80.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.154	1.162	8.118	0.00	5.50
85.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.160	1.179	8.260	0.00	9.96
85.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.160	1.179	8.260	0.00	62.40
85.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.160	1.179	8.260	0.00	5.50
89.50	1.75" Hybrid	Yes	4.50	0.000	1.75	0.66	0.00	0.166	1.198	8.382	0.00	8.96
89.50	1 5/8" Coax	Yes	4.50	0.000	3.96	1.48	0.00	0.166	1.198	8.382	0.00	56.16
89.50	1 5/8" Hybrid	Yes	4.50	0.000	0.00	0.00	0.00	0.166	1.198	8.382	0.00	4.95
90.00	1.75" Hybrid	Yes	0.50	0.000	1.75	0.07	0.00	0.169	1.208	8.396	0.00	1.00
90.00	1 5/8" Coax	Yes	0.50	0.000	3.96	0.17	0.00	0.169	1.208	8.396	0.00	6.24
90.00	1 5/8" Hybrid	Yes	0.50	0.000	0.00	0.00	0.00	0.169	1.208	8.396	0.00	0.55
93.75	1.75" Hybrid	Yes	3.75	0.000	1.75	0.55	0.00	0.172	1.217	8.494	0.00	7.47
93.75	1 5/8" Coax	Yes	3.75	0.000	3.96	1.24	0.00	0.172	1.217	8.494	0.00	46.80
93.75	1 5/8" Hybrid	Yes	3.75	0.000	0.00	0.00	0.00	0.172	1.217	8.494	0.00	4.13
95.00	1.75" Hybrid	Yes	1.25	0.000	1.75	0.18	0.00	0.173	1.218	8.526	0.00	2.49
95.00	1 5/8" Coax	Yes	1.25	0.000	3.96	0.41	0.00	0.173	1.218	8.526	0.00	15.60
95.00	1 5/8" Hybrid	Yes	1.25	0.000	0.00	0.00	0.00	0.173	1.218	8.526	0.00	1.38
100.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.177	1.232	8.652	0.00	9.96
100.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.177	1.232	8.652	0.00	62.40
100.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.177	1.232	8.652	0.00	5.50
105.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.185	1.255	8.774	0.00	9.96
105.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.185	1.255	8.774	0.00	62.40
105.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.185	1.255	8.774	0.00	5.50
110.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.194	1.281	8.891	0.00	9.96
110.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.194	1.281	8.891	0.00	62.40
110.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.194	1.281	8.891	0.00	5.50
115.00	1.75" Hybrid	Yes	5.00	1.200	1.75	0.73	0.87	0.203	0.000	9.005	8.67	9.96
115.00	1 5/8" Coax	Yes	5.00	1.200	3.96	1.65	1.98	0.203	0.000	9.005	19.61	62.40
115.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.203	0.000	9.005	0.00	5.50
117.00	1.75" Hybrid	Yes	2.00	1.200	1.75	0.29	0.35	0.211	0.000	9.049	3.48	3.98
117.00	1 5/8" Coax	Yes	2.00	1.200	3.96	0.66	0.79	0.211	0.000	9.049	7.88	24.96
117.00	1 5/8" Hybrid	Yes	2.00	0.000	0.00	0.00	0.00	0.211	0.000	9.049	0.00	2.20
120.00	1.75" Hybrid	Yes	3.00	0.000	1.75	0.44	0.00	0.066	0.000	9.115	0.00	5.97
123.25	1.75" Hybrid	Yes	3.25	0.000	1.75	0.47	0.00	0.068	0.000	9.185	0.00	6.47
125.00	1.75" Hybrid	Yes	1.75	0.000	1.75	0.26	0.00	0.069	0.000	9.222	0.00	3.48
127.00	1.75" Hybrid	Yes	2.00	0.000	1.75	0.29	0.00	0.071	0.000	9.264	0.00	3.98
130.00	1.75" Hybrid	Yes	3.00	0.000	1.75	0.44	0.00	0.073	0.000	9.326	0.00	5.97
135.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.076	0.000	9.427	0.00	9.96
137.00	1.75" Hybrid	Yes	2.00	0.000	1.75	0.29	0.00	0.080	0.000	9.466	0.00	3.98
140.00	1.75" Hybrid	Yes	3.00	0.000	1.75	0.44	0.00	0.082	0.000	9.525	0.00	5.97
145.00	1.75" Hybrid	Yes	5.00	0.000	1.75	0.73	0.00	0.087	0.000	9.621	0.00	9.96
147.00	1.75" Hybrid	Yes	2.00	0.000	1.75	0.29	0.00	0.091	0.000	9.659	0.00	3.98

Linear Appurtenance Segment Forces (Factored)

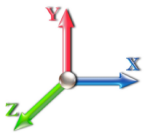
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 39	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 24

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
										Totals:	**39.6**	**1,881.5**

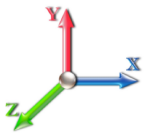
Calculated Forces

Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	10/14/2021	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 40	

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 24

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-38.97	-7.12	0.00	-844.37	0.00	844.37	4331.76	2165.88	10060.7	5037.85	0.00	0.000	0.000	0.177
5.00	-37.67	-7.05	0.00	-808.75	0.00	808.75	4271.91	2135.96	9681.61	4848.00	0.02	-0.043	0.000	0.176
10.00	-36.41	-6.97	0.00	-773.51	0.00	773.51	4209.88	2104.94	9304.37	4659.10	0.09	-0.088	0.000	0.175
15.00	-35.17	-6.90	0.00	-738.65	0.00	738.65	4145.67	2072.83	8929.41	4471.34	0.21	-0.134	0.000	0.174
20.00	-33.96	-6.83	0.00	-704.16	0.00	704.16	4079.27	2039.64	8557.10	4284.91	0.38	-0.182	0.000	0.173
25.00	-32.77	-6.75	0.00	-670.03	0.00	670.03	4010.69	2005.34	8187.79	4099.98	0.59	-0.231	0.000	0.172
30.00	-31.61	-6.68	0.00	-636.27	0.00	636.27	3939.93	1969.96	7821.85	3916.74	0.86	-0.281	0.000	0.170
35.00	-30.48	-6.60	0.00	-602.87	0.00	602.87	3866.98	1933.49	7459.66	3735.38	1.18	-0.333	0.000	0.169
40.00	-29.38	-6.52	0.00	-569.85	0.00	569.85	3791.85	1895.92	7101.59	3556.07	1.56	-0.387	0.000	0.168
44.00	-28.52	-6.45	0.00	-543.77	0.00	543.77	3730.17	1865.09	6818.34	3414.24	1.90	-0.431	0.000	0.167
45.00	-28.12	-6.44	0.00	-537.32	0.00	537.32	3714.54	1857.27	6747.99	3379.01	2.00	-0.443	0.000	0.167
49.75	-26.28	-6.34	0.00	-506.72	0.00	506.72	3683.20	1841.60	6608.77	3309.30	2.46	-0.497	0.000	0.160
50.00	-26.22	-6.35	0.00	-505.13	0.00	505.13	3679.23	1839.62	6591.31	3300.56	2.49	-0.500	0.000	0.160
55.00	-25.19	-6.26	0.00	-473.38	0.00	473.38	3598.76	1799.38	6244.86	3127.07	3.04	-0.556	0.000	0.158
60.00	-24.18	-6.17	0.00	-442.08	0.00	442.08	3516.10	1758.05	5903.79	2956.28	3.66	-0.613	0.000	0.156
65.00	-23.20	-6.08	0.00	-411.23	0.00	411.23	3431.27	1715.63	5568.46	2788.37	4.33	-0.672	0.000	0.154
70.00	-22.25	-5.99	0.00	-380.83	0.00	380.83	3344.24	1672.12	5239.26	2623.52	5.07	-0.732	0.000	0.152
75.00	-21.33	-5.89	0.00	-350.90	0.00	350.90	3255.04	1627.52	4916.54	2461.92	5.87	-0.795	0.000	0.149
80.00	-20.43	-5.80	0.00	-321.44	0.00	321.44	3137.93	1568.96	4563.27	2285.03	6.73	-0.858	0.000	0.147
85.00	-19.56	-5.70	0.00	-292.44	0.00	292.44	3017.89	1508.95	4219.09	2112.68	7.67	-0.923	0.000	0.145
89.50	-18.80	-5.61	0.00	-266.78	0.00	266.78	2909.87	1454.93	3920.86	1963.34	8.57	-0.983	0.000	0.142
90.00	-18.66	-5.61	0.00	-263.98	0.00	263.98	2897.86	1448.93	3888.39	1947.09	8.67	-0.990	0.000	0.142
93.75	-17.63	-5.52	0.00	-242.96	0.00	242.96	2354.99	1177.49	3133.69	1569.17	9.47	-1.041	0.000	0.162
95.00	-17.45	-5.51	0.00	-236.06	0.00	236.06	2336.81	1168.40	3076.66	1540.62	9.74	-1.059	0.000	0.161
100.00	-16.76	-5.41	0.00	-208.53	0.00	208.53	2262.72	1131.36	2851.92	1428.08	10.89	-1.135	0.000	0.153
105.00	-16.09	-5.32	0.00	-181.47	0.00	181.47	2165.47	1082.73	2607.63	1305.76	12.12	-1.211	0.000	0.146
110.00	-15.44	-5.22	0.00	-154.88	0.00	154.88	2065.44	1032.72	2371.09	1187.31	13.43	-1.286	0.000	0.138
115.00	-14.82	-5.06	0.00	-128.75	0.00	128.75	1965.41	982.71	2145.79	1074.49	14.82	-1.360	0.000	0.127
117.00	-12.99	-4.57	0.00	-118.64	0.00	118.64	1925.40	962.70	2058.82	1030.94	15.40	-1.389	0.000	0.122
120.00	-12.67	-4.53	0.00	-104.93	0.00	104.93	1865.39	932.69	1931.73	967.30	16.28	-1.432	0.000	0.115
123.25	-12.17	-4.48	0.00	-90.21	0.00	90.21	1005.19	502.59	1030.12	515.83	17.27	-1.476	0.000	0.187
125.00	-12.05	-4.46	0.00	-82.38	0.00	82.38	992.91	496.46	998.01	499.75	17.82	-1.500	0.000	0.177
127.00	-9.70	-3.69	0.00	-73.46	0.00	73.46	978.56	489.28	961.59	481.51	18.46	-1.540	0.000	0.163
130.00	-9.52	-3.66	0.00	-62.38	0.00	62.38	956.38	478.19	907.53	454.44	19.44	-1.596	0.000	0.147
135.00	-9.23	-3.60	0.00	-44.08	0.00	44.08	917.66	458.83	819.21	410.21	21.16	-1.678	0.000	0.118
137.00	-6.78	-2.39	0.00	-36.88	0.00	36.88	901.57	450.78	784.57	392.87	21.87	-1.708	0.000	0.101
140.00	-6.64	-2.35	0.00	-29.72	0.00	29.72	876.76	438.38	733.42	367.25	22.96	-1.748	0.000	0.089
145.00	-6.42	-2.29	0.00	-17.96	0.00	17.96	833.68	416.84	650.52	325.74	24.82	-1.801	0.000	0.063
147.00	-3.98	-1.50	0.00	-13.37	0.00	13.37	815.84	407.92	618.25	309.58	25.58	-1.818	0.000	0.048
150.00	-3.87	-1.47	0.00	-8.87	0.00	8.87	781.24	390.62	565.69	283.26	26.72	-1.838	0.000	0.036
155.00	0.00	-1.34	0.00	-1.53	0.00	1.53	721.23	360.61	481.69	241.20	28.66	-1.856	0.000	0.006

Reactions

Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)
1.2D + 1.6W 93 mph Wind	27.4	0.00	46.72	0.00	0.00	3270.20
0.9D + 1.6W 93 mph Wind	27.4	0.00	35.03	0.00	0.00	3225.71
1.2D + 1.0Di + 1.0Wi 50 mph Wind	8.4	0.00	78.41	0.00	0.00	1012.39
1.2D + 1.0E	2.6	0.00	46.77	0.00	0.00	342.77
0.9D + 1.0E	2.6	0.00	35.07	0.00	0.00	337.63
1.0D + 1.0W 60 mph Wind	7.1	0.00	38.97	0.00	0.00	844.37

Max Stresses

Load Case	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Elev (ft)	Stress Ratio
1.2D + 1.6W 93 mph Wind	-13.05	-17.39	0.00	-350.56	0.00	-350.56	1005.19	502.59	1030.12	515.83	123.25	0.694
0.9D + 1.6W 93 mph Wind	-9.42	-17.00	0.00	-341.97	0.00	-341.97	1005.19	502.59	1030.12	515.83	123.25	0.673
1.2D + 1.0Di + 1.0Wi 50 mph Wind	-29.27	-5.46	0.00	-110.56	0.00	-110.56	1005.19	502.59	1030.12	515.83	123.25	0.244
1.2D + 1.0E	-14.71	-2.19	0.00	-56.55	0.00	-56.55	1005.19	502.59	1030.12	515.83	123.25	0.124
0.9D + 1.0E	-11.03	-2.14	0.00	-55.44	0.00	-55.44	1005.19	502.59	1030.12	515.83	123.25	0.118
1.0D + 1.0W 60 mph Wind	-12.17	-4.48	0.00	-90.21	0.00	-90.21	1005.19	502.59	1030.12	515.83	123.25	0.187

Base Plate Summary

Structure:	CT00248-S-SB		**Code:**	EIA/TIA-222-G	10/14/2021
Site Name:	North Bethel		**Exposure:**	B	
Height:	155.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 42

Tower Engineering Solutions

Reactions	
Original Design	
Moment (kip-ft):	3850.00
Axial (kip):	38.70
Shear (kip):	32.40
Analysis (1.2D + 1.6W)	
Moment (kip-ft):	3270.20
Axial (kip):	46.72
Shear (kip):	27.40

Base Plate	
Yield (ksi):	50.00
Width (in):	64.00
Style:	Clipped
Polygon Sides:	0.00
Clip Length (in):	15.00
Effective Len (in):	8.82
Moment (kip-in):	453.69
Allow Stress (ksi):	67.50
Applied Stress (ksi):	40.50
Stress Ratio:	0.60

Anchor Bolts	
Bolt Circle:	64.00
Number Bolts:	20.00
Bolt Type:	2.25" 18J
Bolt Diameter (in):	2.25
Yield (ksi):	75.00
Ultimate (ksi):	100.00
Arrangement:	Clustered
Cluster Dist (in):	6.00
Start Angle (deg):	45.00
Compression	
Force (kip):	126.55
Allowable (kip):	260.00
Ratio:	0.50
Tension	
Force (kip):	118.71
Allowable (kip):	260.00
Ratio:	0.47

Monopole Mat Foundation Design

			Date: 10/14/2021
Customer Name:	Dish Wireless	**EIA/TIA Standard:**	EIA-222-G
Site Name:		**Structure Height (Ft.):**	155
Site Number:	CT00248-S-SBA	**Engineer Name:**	J. Tibbetts
Engr. Number:	117426	**Engineer Login ID:**	

Foundation Info Obtained from: Drawings/Calculations

Structure Type: Monopole

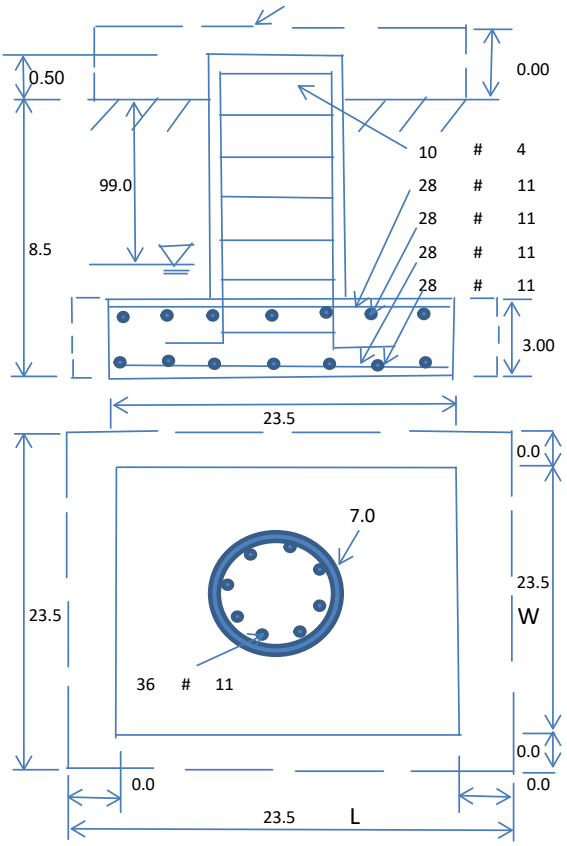
Analysis or Design? Analysis

Base Reactions (Factored):

Axial Load (Kips):	46.7	Shear Force (Kips):	27.4
Uplift Force (Kips):	0.0	Moment (Kips-ft):	3270.2
Allowable overstress %:	5.0%		

Foundation Geometries:

		Mods required -Yes/No ?:	No
Diameter of Pier (ft.):	7.0	Depth of Base BG (ft.):	8.5
Pier Height A. G. (ft.):	0.50	Thickness of Pad (ft):	3.00
Length of Pad (ft.):	23.5	Width of Pad (ft.):	23.5
Final Length of pad (ft)	23.5	Final width of pad (ft):	23.5



Material Properties and Reabr Info:

Concrete Strength (psi):	3000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)	60	Tie steel yield (ksi):	60	
Vertical Rebar Size #:	11	Tie / Stirrup Size #:	4	
Qty. of Vertical Rebars:	36	Tie Spacing (in):	12.0	
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	11	
Concrete Cover (in.):	4	Unit Weight of Concrete:	150.0	pcf

Rebar at the bottom of the concrete pad:

Qty. of Rebar in Pad (L):	28	Qty. of Rebar in Pad (W):	28

Rebar at the top of the concrete pad:

Qty. of Rebar in Pad (L):	28	Qty. of Rebar in Pad (W):	28
Apply 1.35 factor for e/w Per G:	1.35		

Soil Design Parameters:

Soil Unit Weight (pcf):	100.0	Soil Buoyant Weight:	50.0	Pcf		
Water Table B.G.S. (ft):	99.0	Unit Weight of Water:	62.4	pcf	Angle from Top of Pad:	30
Ultimate Bearing Pressure (psf):	5000	Ultimate Skin Friction:	0	Psf	Angle from Bottm of Pad:	25
Consider Friction for O.T.M. (Y/N):	No	Consider Friction for bearing (Y/N):	No		Angle from Bottm of Pad:	25
Consider soil hor. resist. for OTM.:	Yes	Reduction factor on the maximum soil bearing pressure:			1.00	

Foundation Analysis and Design: Uplift Strength Reduction Factor: 0.75 — Compression Strength Reduction Factor: 0.75

Total Dry Soil Volume (cu. Ft.):	2825.71	Total Dry Soil Weight (Kips):	282.57
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	282.57	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	1887.66	Total Dry Concrete Weight (Kips):	283.15
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00
Total Effective Concrete Weight (Kips):	283.15	Total Vertical Load on Base (Kips):	612.42

Check Soil Capacities:

					Load/ Capacity Ratio	
Calculated Maxium Net Soil Pressure under the base (psf):	2758	<	Allowable Factored Soil Bearing (psf):	3750	0.74	OK!
Allowable Foundation Overturning Resistance (kips-ft.):	6531.2	>	Design Factored Momont (kips-ft):	3251	0.50	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	2.01	OK!				

Check the capacities of Reinforceing Concrete:

Strength reduction factor (Flexure and axial tension):	0.90		Strength reduction factor (Shear):	0.75		
Strength reduction factor (Axial compresion):	0.65		Wind Load Factor on Concrete Design:	1.00		
					Load/ Capacity Ratio	
(1) Concrete Pier:						
Vertical Steel Rebar Area (sq. in./each):	1.56		Tie / Stirrup Area (sq. in./each):	0.20		
Calculated Moment Capacity (Mn,Kips-Ft):	8832.5	>	Design Factored Moment (Mu, Kips-F	3434.6	0.39	OK!
Calculated Shear Capacity (Kips):	589.7	>	Design Factored Shear (Kips):	27.4	0.05	OK!
Calculated Tension Capacity (Tn, Kips):	3032.6	>	Design Factored Tension (Tu Kips):	0.0	0.00	OK!
Calculated Compression Capacity (Pn, Kips):	7273.9	>	Design Factored Axial Load (Pu Kips):	46.7	0.01	OK!
Moment & Axial Strength Combination:	0.39	OK!	Check Tie Spacing (Design/Required):		1	OK!
Pier Reinforcement Ratio:	0.010		Reinforcement Ratio is satisfied per ACI			
(2).Concrete Pad:						
One-Way Design Shear Capacity (L-Direction, Kips):	725.5	>	One-Way Factored Shear (L-D. Kips):	218.6	0.30	OK!
One-Way Design Shear Capacity (W-Direction, Kips):	725.5	>	One-Way Factored Shear (W-D., Kips)	218.6	0.30	OK!
One-Way Design Shear Capacity (Corner-Corner. Kips):	648.8	>	One-Way Factored Shear (C-C, Kips):	205.8	0.32	OK!
Lower Steel Pad Reinforcement Ratio (L-Direct.):	0.0049	OK!	Lower Steel Pad Reinf. Ratio (W-Direc	0.0049		
Lower Steel Pad Moment Capacity (L-Direction. Kips-ft):	5796.6	>	Moment at Bottom (L-Dir. K-Ft):	1141.0	0.20	OK!
Lower Steel Pad Moment Capacity (W-Direction. Kips-ft):	5796.6	>	Moment at Bottom (W-Dir. K-Ft):	1141.0	0.20	OK!
Lower Steel Pad Moment Capacity (Corner-Corner,K-ft):	8062.5	>	Moment at Bottom (C-C Dir. K-Ft):	1613.7	0.20	OK!
Upper Steel Pad Reinforcement Ratio (L-Direct.):	0.0049	OK!	Upper Steel Reinf. Ratio (W-Dir.):	0.0049		
Upper Steel Pad Moment Capacity (L-Direc. Kips-ft):	5796.6	>	Moment at the top (L-Dir K-Ft):	477.7	0.08	OK!
Upper Steel Pad Moment Capacity (W-Direc. Kips-ft):	5796.6	>	Moment at the top (W-Dir K-Ft):	477.7	0.08	OK!
Upper Steel Pad Moment Capacity (Corner-Corner. K-ft):	8062.5	>	Moment at the top (C-C Dir. K-Ft):	449.4	0.06	OK!
(3).Check Punching Shear Capacity due to Moment in the Pier:						
Moment transferred by punching shear:	1308.1	k-ft.	Max. factored shear stress v_{u_CD}:		3.3	Psi
Max. factored shear stress v_{u_AB}:	9.7	Psi	Factored shear Strength ϕv_n:		164.3	Psi
Max. factored shear stress v_u:	9.7	Psi	Check Usage of Punching Shear Capacity:		0.06	OK!

EXHIBIT 9

Antenna Mount Analysis

July 22, 2021

Sherri Knapik
SBA Network Services, LLC
134 Flanders Road, Suite 125
Westborough, MA 01581
(508) 251-0720 x 3805

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

Subject:	**Appurtenance Mount Analysis Report**	
Carrier Designation:	***Dish Wireless* Co-Locate**	
	Site Number:	NJJER01165A
	Site Name:	N/A
SBA Network Services Designation:	**Site Number:**	CT00248-S
	Site Name:	North Bethel
	Application Number:	163826, v1
Engineering Firm Designation:	**B+T Group Project Number:**	153441.003.01
Site Data:	**11 Francis J. Clarke Circle, Bethel, CT, 06801, Fairfield County** **Latitude *41.36052*°, Longitude *-73.42447*°** **Monopole** **8 ft. Platform Mount**	

Dear Ms. Knapik,

B+T Group is pleased to submit this **"Appurtenance Mount Analysis Report"** to determine the structural integrity of the antenna mount on the above-mentioned structure.

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 for the mount under the following load case to be:

Proposed Equipment Note: See Table 1 for the final loading configuration	**Sufficient Capacity** **(Passing at 66.9%)**

This analysis has been performed in accordance with the 2018 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 120 mph converted to a nominal 3-second gust wind speed of 93 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category C and Risk Category II were used in this analysis.

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

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

Mount structural analysis prepared by: Isaac Fulton

Respectfully submitted by: B&T Engineering, Inc.
COA: PEC.0001564 Expires: 02/10/2022

Chad E. Tuttle, P.E.

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER
7/22/21

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1) INTRODUCTION

The appurtenance mount consists of Commscope platform mount, Part# MC-PK8-DSH at 147 ft., attached to monopole at 11 Francis J. Clarke Circle, Bethel, CT, 06801, Fairfield County. The proposed antenna loading information was obtained from SBA Network Services, LLC. All information provided to B+T Group was assumed accurate and complete.

2) ANALYSIS CRITERIA

The structural analysis was performed for this mount in accordance with the ANSI/TIA-222-G-2-2005 Structural Standard for Antenna Supporting Structures and Antennas - Addendum 2 using a 3-second gust wind speed of 93 mph with no ice and 50 mph with 0.75 inch escalated ice thickness. Exposure Category B & Topographic Category 1 and Risk Category II were used in this analysis. In addition, the platform mount has been analyzed for various live loading conditions consisting of a 250-lb man live load applied individually at the midpoint and cantilevered ends of horizontal members as well as a 500-pound man live load applied individually at mount pipe locations using a 3-second gust of 30 mph. The mount was analyzed under 30º increments in the wind direction. The analyzed loading is detailed in Table 1.

Table 1 – Proposed Equipment Information

Loading	RAD Center Elev. (ft.)	Position	Qty.	Description	Note
Proposed	147	1	3	JMA Wireless MX08FRO665-21	1
			3	Fujitsu TA08025-B605	2
			3	Fujitsu TA08025-B604	
		-	1	Raycap RDIDC-9181-PF-48	3

Note:
(1) Proposed Antenna to be installed on the Mount Pipe.
(2) Proposed Equipment to be installed directly behind the Antenna.
(3) Proposed Equipment to be installed on the mount.

Table 2 – Documents Provided

Documents	Remarks	Reference	Source
SBA Application	Proposed Loading Mount Info	Date: 06/29/2021	SBA Network Services, LLC
RFDS	Proposed Loading	Date: 06/04/2021	

3) ANALYSIS PROCEDURE

3.1) Analysis Method

RISA-3D (Version 19.0.4), a commercially available analysis software package, was used to create a three-dimensional model of the mount and calculate member stresses and deflections for various loading cases. Selected output from the analysis is included in Appendix A.

Manufacturer's drawing were used to create the model.

3.2) Assumptions

1. The mount was built in accordance with the 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 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.
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 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

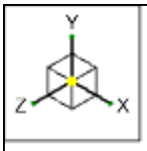
Notes	Component	Elevation (ft.)	% Capacity	Pass / Fail
-	Main Horizontals	147	13.2	Pass
-	Support Rails	147	62.6	Pass
-	Support Tubes	147	66.9	Pass
-	Support Channels	147	41.1	Pass
-	Support Angels	147	39.3	Pass
-	Mount Pipes	147	49.8	Pass
-	Connection Plates	147	25.3	Pass
-	Connection Angles	147	32.0	Pass
-	Connection Check	147	22.5	Pass

5) RECOMMENDATIONS

The Commscope platform mount, Part# MC-PK8-DSH has sufficient capacity to carry the proposed loads and is in compliance with the ANSI/TIA-222-H standard for the proposed loading. (Refer to the RISA output for the specific members).

APPENDIX A

(RISA-3D Output)



Envelope Only Solution

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MP		Jul 21, 2021
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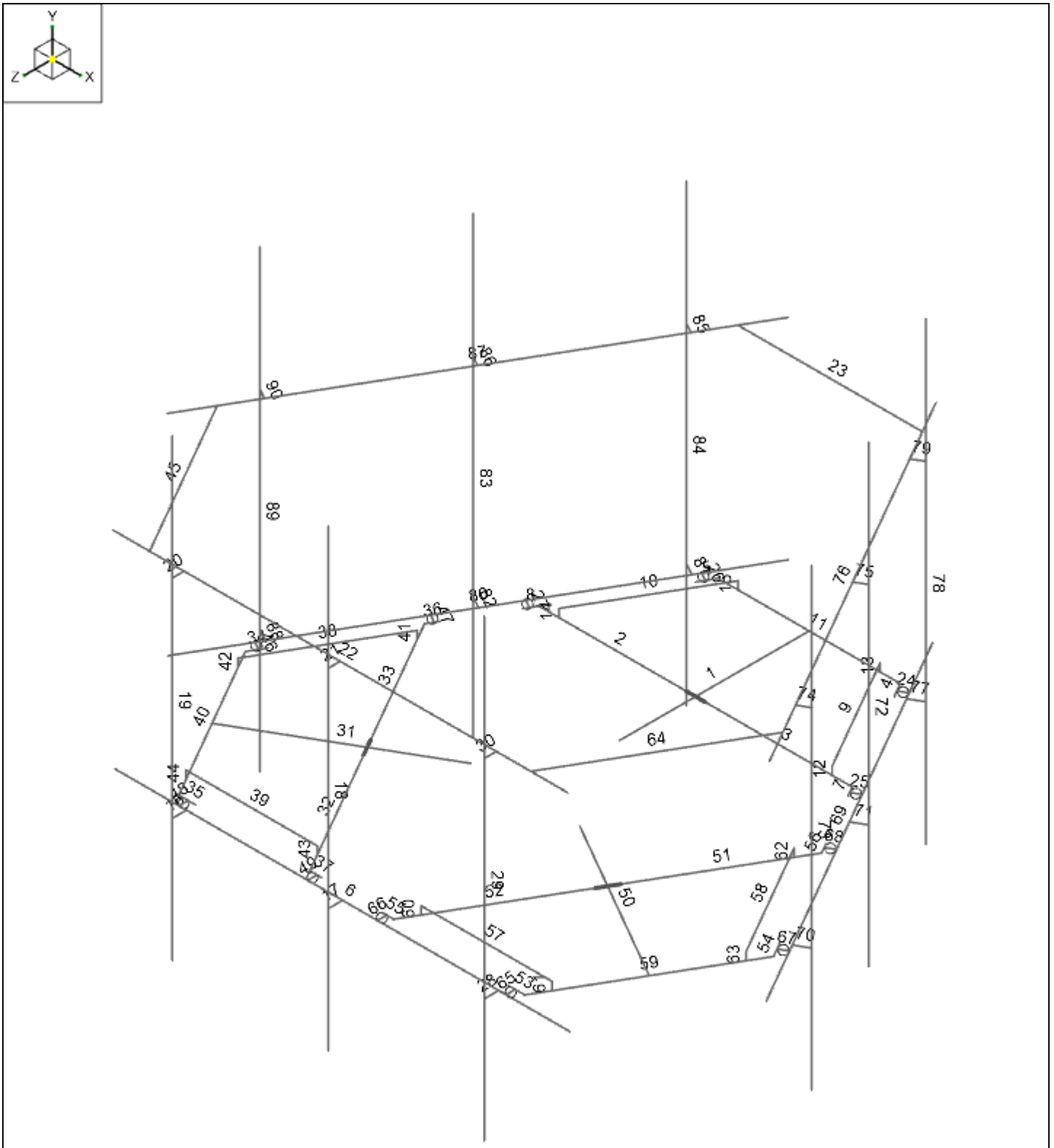

Envelope Only Solution

B+T Group	CT00248-S - North Bethel	SK-2
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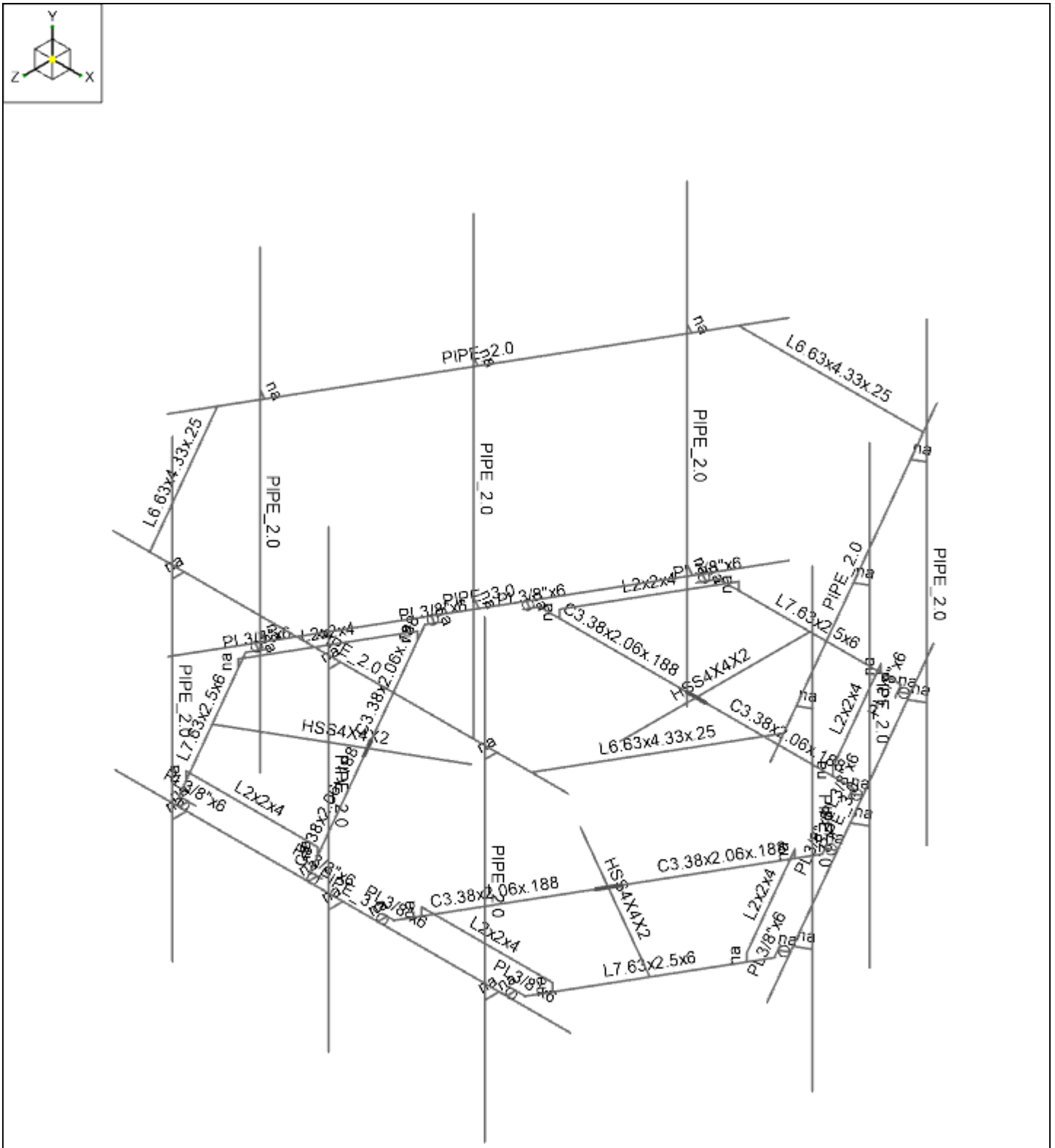

Envelope Only Solution

B+T Group	CT00248-S - North Bethel	SK-3
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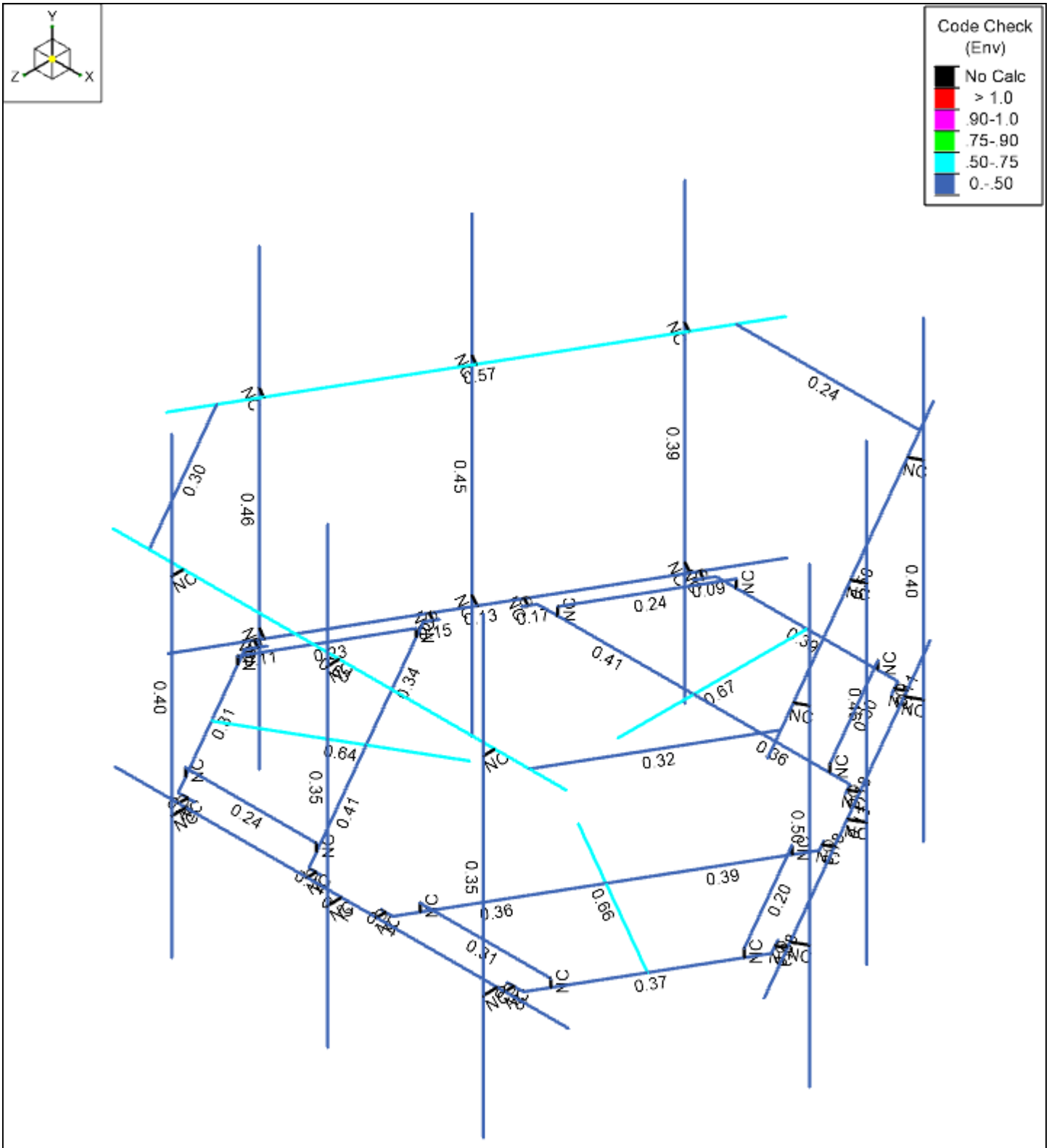

Member Code Checks Displayed (Enveloped)
Envelope Only Solution

B+T Group	CT00248-S - North Bethel	SK-4
MP		Jul 21, 2021
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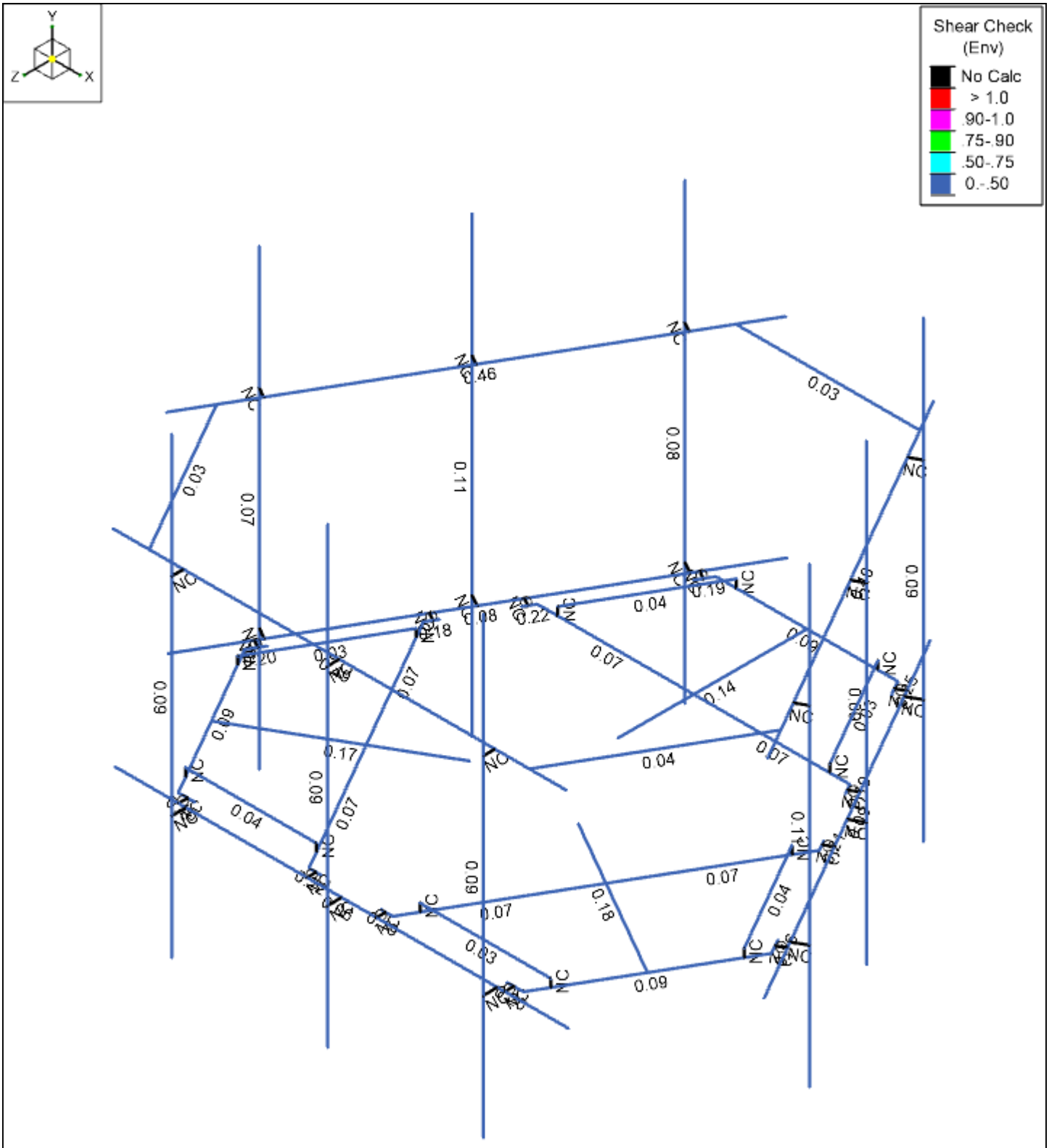


Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

B+T Group	CT00248-S - North Bethel	SK-5
MP		Jul 21, 2021
153441.003.01		153441_003_01_North Bethel_CT....

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [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-H2	PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical	1.02	0.627	0.627	1.25
3	SF-H1	HSS4X4X2	Beam	Tube	A500 Gr.B Rect	Typical	1.77	4.4	4.4	6.91
4	SF-H2	C3.38x2.06x.188	Beam	Channel	A36 Gr.36	Typical	1.339	0.562	2.4	0.015
5	SF-H3	L2x2x4	Beam	Single Angle	A36 Gr.36	Typical	0.944	0.346	0.346	0.021
6	SF-H4	L7.63x2.5x6	Beam	Single Angle	A36 Gr.36	Typical	3.658	1.307	22.092	0.163
7	MF-P1	PIPE_2.0	Column	Pipe	A53 Gr.B	Typical	1.02	0.627	0.627	1.25
8	MF-CP1	PL3/8"x6	Beam	RECT	A36 Gr.36	Typical	2.25	0.026	6.75	0.101
9	MF-H3	L6.63x4.33x.25	Beam	Single Angle	A36 Gr.36	Typical	2.678	4.383	12.502	0.054

Member Primary Data

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
1	1	1	2		SF-H1	Beam	Tube	A500 Gr.B Rect	Typical
2	2	5	3	180	SF-H2	Beam	Channel	A36 Gr.36	Typical
3	3	3	4	180	SF-H2	Beam	Channel	A36 Gr.36	Typical
4	4	7	8		MF-CP1	Beam	RECT	A36 Gr.36	Typical
5	5	6	9		MF-CP1	Beam	RECT	A36 Gr.36	Typical
6	6	14	15		MF-H1	Beam	Pipe	A53 Gr.B	Typical
7	7	16	4		MF-CP1	Beam	RECT	A36 Gr.36	Typical
8	8	5	19		MF-CP1	Beam	RECT	A36 Gr.36	Typical
9	9	25	24		SF-H3	Beam	Single Angle	A36 Gr.36	Typical
10	10	23	22		SF-H3	Beam	Single Angle	A36 Gr.36	Typical
11	11	6	7		SF-H4	Beam	Single Angle	A36 Gr.36	Typical
12	12	28	24		RIGID	None	None	RIGID	Typical
13	13	29	25		RIGID	None	None	RIGID	Typical
14	14	27	23		RIGID	None	None	RIGID	Typical
15	15	26	22		RIGID	None	None	RIGID	Typical
16	16	32	30		RIGID	None	None	RIGID	Typical
17	17	33	31		RIGID	None	None	RIGID	Typical
18	18	37	35		MF-P1	Column	Pipe	A53 Gr.B	Typical
19	19	36	34		MF-P1	Column	Pipe	A53 Gr.B	Typical
20	20	38	40		RIGID	None	None	RIGID	Typical
21	21	39	41		RIGID	None	None	RIGID	Typical
22	22	42	43		MF-H2	Beam	Pipe	A53 Gr.B	Typical
23	23	44	45	180	MF-H3	Beam	Single Angle	A36 Gr.36	Typical
24	24	11	10		RIGID	None	None	RIGID	Typical
25	25	18	17		RIGID	None	None	RIGID	Typical
26	26	13	12		RIGID	None	None	RIGID	Typical
27	27	21	20		RIGID	None	None	RIGID	Typical
28	28	47	46		RIGID	None	None	RIGID	Typical
29	29	49	48		MF-P1	Column	Pipe	A53 Gr.B	Typical
30	30	50	51		RIGID	None	None	RIGID	Typical
31	31	53	54		SF-H1	Beam	Tube	A500 Gr.B Rect	Typical
32	32	57	55	180	SF-H2	Beam	Channel	A36 Gr.36	Typical
33	33	55	56	180	SF-H2	Beam	Channel	A36 Gr.36	Typical
34	34	59	60		MF-CP1	Beam	RECT	A36 Gr.36	Typical
35	35	58	61		MF-CP1	Beam	RECT	A36 Gr.36	Typical
36	36	66	56		MF-CP1	Beam	RECT	A36 Gr.36	Typical
37	37	57	69		MF-CP1	Beam	RECT	A36 Gr.36	Typical
38	38	75	74		SF-H3	Beam	Single Angle	A36 Gr.36	Typical
39	39	73	72		SF-H3	Beam	Single Angle	A36 Gr.36	Typical
40	40	58	59		SF-H4	Beam	Single Angle	A36 Gr.36	Typical
41	41	78	74		RIGID	None	None	RIGID	Typical
42	42	79	75		RIGID	None	None	RIGID	Typical
43	43	77	73		RIGID	None	None	RIGID	Typical
44	44	76	72		RIGID	None	None	RIGID	Typical
45	45	80	81	180	MF-H3	Beam	Single Angle	A36 Gr.36	Typical
46	46	63	62		RIGID	None	None	RIGID	Typical

Member Primary Data (Continued)

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
47	47	68	67		RIGID	None	None	RIGID	Typical
48	48	65	64		RIGID	None	None	RIGID	Typical
49	49	71	70		RIGID	None	None	RIGID	Typical
50	50	82	83		SF-H1	Beam	Tube	A500 Gr.B Rect	Typical
51	51	86	84	180	SF-H2	Beam	Channel	A36 Gr.36	Typical
52	52	84	85	180	SF-H2	Beam	Channel	A36 Gr.36	Typical
53	53	88	89		MF-CP1	Beam	RECT	A36 Gr.36	Typical
54	54	87	90		MF-CP1	Beam	RECT	A36 Gr.36	Typical
55	55	95	85		MF-CP1	Beam	RECT	A36 Gr.36	Typical
56	56	86	98		MF-CP1	Beam	RECT	A36 Gr.36	Typical
57	57	104	103		SF-H3	Beam	Single Angle	A36 Gr.36	Typical
58	58	102	101		SF-H3	Beam	Single Angle	A36 Gr.36	Typical
59	59	87	88		SF-H4	Beam	Single Angle	A36 Gr.36	Typical
60	60	107	103		RIGID	None	None	RIGID	Typical
61	61	108	104		RIGID	None	None	RIGID	Typical
62	62	106	102		RIGID	None	None	RIGID	Typical
63	63	105	101		RIGID	None	None	RIGID	Typical
64	64	109	110	180	MF-H3	Beam	Single Angle	A36 Gr.36	Typical
65	65	92	91		RIGID	None	None	RIGID	Typical
66	66	97	96		RIGID	None	None	RIGID	Typical
67	67	94	93		RIGID	None	None	RIGID	Typical
68	68	100	99		RIGID	None	None	RIGID	Typical
69	69	111	112		MF-H1	Beam	Pipe	A53 Gr.B	Typical
70	70	115	113		RIGID	None	None	RIGID	Typical
71	71	116	114		RIGID	None	None	RIGID	Typical
72	72	120	118		MF-P1	Column	Pipe	A53 Gr.B	Typical
73	73	119	117		MF-P1	Column	Pipe	A53 Gr.B	Typical
74	74	121	123		RIGID	None	None	RIGID	Typical
75	75	122	124		RIGID	None	None	RIGID	Typical
76	76	125	126		MF-H2	Beam	Pipe	A53 Gr.B	Typical
77	77	128	127		RIGID	None	None	RIGID	Typical
78	78	130	129		MF-P1	Column	Pipe	A53 Gr.B	Typical
79	79	131	132		RIGID	None	None	RIGID	Typical
80	80	133	134		MF-H1	Beam	Pipe	A53 Gr.B	Typical
81	81	137	135		RIGID	None	None	RIGID	Typical
82	82	138	136		RIGID	None	None	RIGID	Typical
83	83	142	140		MF-P1	Column	Pipe	A53 Gr.B	Typical
84	84	141	139		MF-P1	Column	Pipe	A53 Gr.B	Typical
85	85	143	145		RIGID	None	None	RIGID	Typical
86	86	144	146		RIGID	None	None	RIGID	Typical
87	87	147	148		MF-H2	Beam	Pipe	A53 Gr.B	Typical
88	88	150	149		RIGID	None	None	RIGID	Typical
89	89	152	151		MF-P1	Column	Pipe	A53 Gr.B	Typical
90	90	153	154		RIGID	None	None	RIGID	Typical

Basic Load Cases

	BLC Description	Category	Y Gravity	Nodal	Point	Distributed	Area(Member)
1	Dead	DL	-1		20		3
2	0 Wind - No Ice	WLZ			20	48	
3	90 Wind - No Ice	WLX			20	48	
4	0 Wind - Ice	WLZ			20	48	
5	90 Wind - Ice	WLX			20	48	
6	0 Wind - Service	WLZ			20	48	
7	90 Wind - Service	WLX			20	48	
8	Ice	OL1			20	48	3
9	Live Load a	LL		3			
10	Live Load b	LL		3			
11	Live Load c	LL		3			

Basic Load Cases (Continued)

	BLC Description	Category	Y Gravity	Nodal	Point	Distributed	Area(Member)
12	Live Load d	LL					
13	Maint LL 1	LL			1		
14	Maint LL 2	LL			1		
15	Maint LL 3	LL			1		
16	Maint LL 4	LL			1		
17	Maint LL 5	LL			1		
18	Maint LL 6	LL			1		
19	Maint LL 7	LL			1		
20	Maint LL 8	LL			1		
21	Maint LL 9	LL			1		
22	Maint LL 10	LL			1		
23	Maint LL 11	LL			1		
24	Maint LL 12	LL			1		
25	Maint LL 13	LL			1		
26	Maint LL 14	LL			1		
27	Maint LL 15	LL			1		
28	BLC 1 Transient Area Loads	None				9	
29	BLC 8 Transient Area Loads	None				9	

Load Combinations

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	1.4 Dead	Yes	Y	1	1.4						
2	0.9 D + 1.6 - 0 W	Yes	Y	1	0.9	2	1.6				
3	0.9 D + 1.6 - 30 W	Yes	Y	1	0.9	2	1.386	3	0.8		
4	0.9 D + 1.6 - 60 W	Yes	Y	1	0.9	3	1.386	2	0.8		
5	0.9 D + 1.6 - 90 W	Yes	Y	1	0.9	3	1.6				
6	0.9 D + 1.6 - 120 W	Yes	Y	1	0.9	3	1.386	2	-0.8		
7	0.9 D + 1.6 - 150 W	Yes	Y	1	0.9	2	-1.386	3	0.8		
8	0.9 D + 1.6 - 180 W	Yes	Y	1	0.9	2	-1.6				
9	0.9 D + 1.6 - 210 W	Yes	Y	1	0.9	2	-1.386	3	-0.8		
10	0.9 D + 1.6 - 240 W	Yes	Y	1	0.9	3	-1.386	2	-0.8		
11	0.9 D + 1.6 - 270 W	Yes	Y	1	0.9	3	-1.6				
12	0.9 D + 1.6 - 300 W	Yes	Y	1	0.9	3	-1.386	2	0.8		
13	0.9 D + 1.6 - 330 W	Yes	Y	1	0.9	2	1.386	3	-0.8		
14	1.2 D + 1.6 - 0 W	Yes	Y	1	1.2	2	1.6				
15	1.2 D + 1.6 - 30 W	Yes	Y	1	1.2	2	1.386	3	0.8		
16	1.2 D + 1.6 - 60 W	Yes	Y	1	1.2	3	1.386	2	0.8		
17	1.2 D + 1.6 - 90 W	Yes	Y	1	1.2	3	1.6				
18	1.2 D + 1.6 - 120 W	Yes	Y	1	1.2	3	1.386	2	-0.8		
19	1.2 D + 1.6 - 150 W	Yes	Y	1	1.2	2	-1.386	3	0.8		
20	1.2 D + 1.6 - 180 W	Yes	Y	1	1.2	2	-1.6				
21	1.2 D + 1.6 - 210 W	Yes	Y	1	1.2	2	-1.386	3	-0.8		
22	1.2 D + 1.6 - 240 W	Yes	Y	1	1.2	3	-1.386	2	-0.8		
23	1.2 D + 1.6 - 270 W	Yes	Y	1	1.2	3	-1.6				
24	1.2 D + 1.6 - 300 W	Yes	Y	1	1.2	3	-1.386	2	0.8		
25	1.2 D + 1.6 - 330 W	Yes	Y	1	1.2	2	1.386	3	-0.8		
26	0.9 D + 1.6 - 0 W/Ice	Yes	Y	1	0.9	4	1.6			8	1
27	0.9 D + 1.6 - 30 W/Ice	Yes	Y	1	0.9	4	1.386	5	0.8	8	1
28	0.9 D + 1.6 - 60 W/Ice	Yes	Y	1	0.9	5	1.386	4	0.8	8	1
29	0.9 D + 1.6 - 90 W/Ice	Yes	Y	1	0.9	5	1.6			8	1
30	0.9 D + 1.6 - 120 W/Ice	Yes	Y	1	0.9	5	1.386	4	-0.8	8	1
31	0.9 D + 1.6 - 150 W/Ice	Yes	Y	1	0.9	4	-1.386	5	0.8	8	1
32	0.9 D + 1.6 - 180 W/Ice	Yes	Y	1	0.9	4	-1.6			8	1
33	0.9 D + 1.6 - 210 W/Ice	Yes	Y	1	0.9	4	-1.386	5	-0.8	8	1
34	0.9 D + 1.6 - 240 W/Ice	Yes	Y	1	0.9	5	-1.386	4	-0.8	8	1
35	0.9 D + 1.6 - 270 W/Ice	Yes	Y	1	0.9	5	-1.6			8	1
36	0.9 D + 1.6 - 300 W/Ice	Yes	Y	1	0.9	5	-1.386	4	0.8	8	1
37	0.9 D + 1.6 - 330 W/Ice	Yes	Y	1	0.9	4	1.386	5	-0.8	8	1

Load Combinations (Continued)

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
38	1.2 D + 1.0 - 0 W/Ice	Yes	Y	1	1.2	4	1			8	1
39	1.2 D + 1.0 - 30 W/Ice	Yes	Y	1	1.2	4	0.866	5	0.5	8	1
40	1.2 D + 1.0 - 60 W/Ice	Yes	Y	1	1.2	5	0.866	4	0.5	8	1
41	1.2 D + 1.0 - 90 W/Ice	Yes	Y	1	1.2	5	1			8	1
42	1.2 D + 1.0 - 120 W/Ice	Yes	Y	1	1.2	5	0.866	4	-0.5	8	1
43	1.2 D + 1.0 - 150 W/Ice	Yes	Y	1	1.2	4	-0.866	5	0.5	8	1
44	1.2 D + 1.0 - 180 W/Ice	Yes	Y	1	1.2	4	-1			8	1
45	1.2 D + 1.0 - 210 W/Ice	Yes	Y	1	1.2	4	-0.866	5	-0.5	8	1
46	1.2 D + 1.0 - 240 W/Ice	Yes	Y	1	1.2	5	-0.866	4	-0.5	8	1
47	1.2 D + 1.0 - 270 W/Ice	Yes	Y	1	1.2	5	-1			8	1
48	1.2 D + 1.0 - 300 W/Ice	Yes	Y	1	1.2	5	-0.866	4	0.5	8	1
49	1.2 D + 1.0 - 330 W/Ice	Yes	Y	1	1.2	4	0.866	5	-0.5	8	1
50	1.2 D + 1.5 LL a + Service - 0 W	Yes	Y	1	1.2	6	1			9	1.5
51	1.2 D + 1.5 LL a + Service - 30 W	Yes	Y	1	1.2	6	0.866	7	0.5	9	1.5
52	1.2 D + 1.5 LL a + Service - 60 W	Yes	Y	1	1.2	7	0.866	6	0.5	9	1.5
53	1.2 D + 1.5 LL a + Service - 90 W	Yes	Y	1	1.2	7	1			9	1.5
54	1.2 D + 1.5 LL a + Service - 120 W	Yes	Y	1	1.2	7	0.866	6	-0.5	9	1.5
55	1.2 D + 1.5 LL a + Service - 150 W	Yes	Y	1	1.2	6	-0.866	7	0.5	9	1.5
56	1.2 D + 1.5 LL a + Service - 180 W	Yes	Y	1	1.2	6	-1			9	1.5
57	1.2 D + 1.5 LL a + Service - 210 W	Yes	Y	1	1.2	6	-0.866	7	-0.5	9	1.5
58	1.2 D + 1.5 LL a + Service - 240 W	Yes	Y	1	1.2	7	-0.866	6	-0.5	9	1.5
59	1.2 D + 1.5 LL a + Service - 270 W	Yes	Y	1	1.2	7	-1			9	1.5
60	1.2 D + 1.5 LL a + Service - 300 W	Yes	Y	1	1.2	7	-0.866	6	0.5	9	1.5
61	1.2 D + 1.5 LL a + Service - 330 W	Yes	Y	1	1.2	6	0.866	7	-0.5	9	1.5
62	1.2 D + 1.5 LL b + Service - 0 W	Yes	Y	1	1.2	6	1			10	1.5
63	1.2 D + 1.5 LL b + Service - 30 W	Yes	Y	1	1.2	6	0.866	7	0.5	10	1.5
64	1.2 D + 1.5 LL b + Service - 60 W	Yes	Y	1	1.2	7	0.866	6	0.5	10	1.5
65	1.2 D + 1.5 LL b + Service - 90 W	Yes	Y	1	1.2	7	1			10	1.5
66	1.2 D + 1.5 LL b + Service - 120 W	Yes	Y	1	1.2	7	0.866	6	-0.5	10	1.5
67	1.2 D + 1.5 LL b + Service - 150 W	Yes	Y	1	1.2	6	-0.866	7	0.5	10	1.5
68	1.2 D + 1.5 LL b + Service - 180 W	Yes	Y	1	1.2	6	-1			10	1.5
69	1.2 D + 1.5 LL b + Service - 210 W	Yes	Y	1	1.2	6	-0.866	7	-0.5	10	1.5
70	1.2 D + 1.5 LL b + Service - 240 W	Yes	Y	1	1.2	7	-0.866	6	-0.5	10	1.5
71	1.2 D + 1.5 LL b + Service - 270 W	Yes	Y	1	1.2	7	-1			10	1.5
72	1.2 D + 1.5 LL b + Service - 300 W	Yes	Y	1	1.2	7	-0.866	6	0.5	10	1.5
73	1.2 D + 1.5 LL b + Service - 330 W	Yes	Y	1	1.2	6	0.866	7	-0.5	10	1.5
74	1.2 D + 1.5 LL c + Service - 0 W	Yes	Y	1	1.2	6	1			11	1.5
75	1.2 D + 1.5 LL c + Service - 30 W	Yes	Y	1	1.2	6	0.866	7	0.5	11	1.5
76	1.2 D + 1.5 LL c + Service - 60 W	Yes	Y	1	1.2	7	0.866	6	0.5	11	1.5
77	1.2 D + 1.5 LL c + Service - 90 W	Yes	Y	1	1.2	7	1			11	1.5
78	1.2 D + 1.5 LL c + Service - 120 W	Yes	Y	1	1.2	7	0.866	6	-0.5	11	1.5
79	1.2 D + 1.5 LL c + Service - 150 W	Yes	Y	1	1.2	6	-0.866	7	0.5	11	1.5
80	1.2 D + 1.5 LL c + Service - 180 W	Yes	Y	1	1.2	6	-1			11	1.5
81	1.2 D + 1.5 LL c + Service - 210 W	Yes	Y	1	1.2	6	-0.866	7	-0.5	11	1.5
82	1.2 D + 1.5 LL c + Service - 240 W	Yes	Y	1	1.2	7	-0.866	6	-0.5	11	1.5
83	1.2 D + 1.5 LL c + Service - 270 W	Yes	Y	1	1.2	7	-1			11	1.5
84	1.2 D + 1.5 LL c + Service - 300 W	Yes	Y	1	1.2	7	-0.866	6	0.5	11	1.5
85	1.2 D + 1.5 LL c + Service - 330 W	Yes	Y	1	1.2	6	0.866	7	-0.5	11	1.5
86	1.2 D + 1.5 LL d + Service - 0 W	Yes	Y	1	1.2	6	1			12	1.5
87	1.2 D + 1.5 LL d + Service - 30 W	Yes	Y	1	1.2	6	0.866	7	0.5	12	1.5
88	1.2 D + 1.5 LL d + Service - 60 W	Yes	Y	1	1.2	7	0.866	6	0.5	12	1.5
89	1.2 D + 1.5 LL d + Service - 90 W	Yes	Y	1	1.2	7	1			12	1.5
90	1.2 D + 1.5 LL d + Service - 120 W	Yes	Y	1	1.2	7	0.866	6	-0.5	12	1.5
91	1.2 D + 1.5 LL d + Service - 150 W	Yes	Y	1	1.2	6	-0.866	7	0.5	12	1.5
92	1.2 D + 1.5 LL d + Service - 180 W	Yes	Y	1	1.2	6	-1			12	1.5
93	1.2 D + 1.5 LL d + Service - 210 W	Yes	Y	1	1.2	6	-0.866	7	-0.5	12	1.5
94	1.2 D + 1.5 LL d + Service - 240 W	Yes	Y	1	1.2	7	-0.866	6	-0.5	12	1.5
95	1.2 D + 1.5 LL d + Service - 270 W	Yes	Y	1	1.2	7	-1			12	1.5

Load Combinations (Continued)

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
96	1.2 D + 1.5 LL d + Service - 300 W	Yes	Y	1	1.2	7	-0.866	6	0.5	12	1.5
97	1.2 D + 1.5 LL d + Service - 330 W	Yes	Y	1	1.2	6	0.866	7	-0.5	12	1.5
98	1.2 D + 1.5 LL Maint (1)	Yes	Y	1	1.2					13	1.5
99	1.2 D + 1.5 LL Maint (2)	Yes	Y	1	1.2					14	1.5
100	1.2 D + 1.5 LL Maint (3)	Yes	Y	1	1.2					15	1.5
101	1.2 D + 1.5 LL Maint (4)	Yes	Y	1	1.2					16	1.5
102	1.2 D + 1.5 LL Maint (5)	Yes	Y	1	1.2					17	1.5
103	1.2 D + 1.5 LL Maint (6)	Yes	Y	1	1.2					18	1.5
104	1.2 D + 1.5 LL Maint (7)	Yes	Y	1	1.2					19	1.5
105	1.2 D + 1.5 LL Maint (8)	Yes	Y	1	1.2					20	1.5
106	1.2 D + 1.5 LL Maint (9)	Yes	Y	1	1.2					21	1.5
107	1.2 D + 1.5 LL Maint (10)	Yes	Y	1	1.2					22	1.5
108	1.2 D + 1.5 LL Maint (11)	Yes	Y	1	1.2					23	1.5
109	1.2 D + 1.5 LL Maint (12)	Yes	Y	1	1.2					24	1.5
110	1.2 D + 1.5 LL Maint (13)	Yes	Y	1	1.2					25	1.5
111	1.2 D + 1.5 LL Maint (14)	Yes	Y	1	1.2					26	1.5
112	1.2 D + 1.5 LL Maint (15)	Yes	Y	1	1.2					27	1.5

Member Point Loads (BLC 1 : Dead)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	29	Y	-0.032	%15
2	29	Y	-0.032	%85
3	29	Y	-0.075	%20
4	29	Y	-0.064	%50
5	29	Y	0	0
6	89	Y	-0.032	%15
7	89	Y	-0.032	%85
8	89	Y	-0.075	%20
9	89	Y	-0.064	%50
10	89	Y	0	0
11	78	Y	-0.032	%15
12	78	Y	-0.032	%85
13	78	Y	-0.075	%20
14	78	Y	-0.064	%50
15	78	Y	0	0
16	31	Y	-0.022	%20
17	31	Y	0	0
18	31	Y	0	0
19	31	Y	0	0
20	31	Y	0	0

Member Point Loads (BLC 2 : 0 Wind - No Ice)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	29	Z	-0.18	%15
2	29	Z	-0.18	%85
3	29	Z	-0.057	%20
4	29	Z	-0.057	%50
5	29	Z	0	0
6	89	Z	-0.18	%15
7	89	Z	-0.18	%85
8	89	Z	-0.057	%20
9	89	Z	-0.057	%50
10	89	Z	0	0
11	78	Z	-0.18	%15
12	78	Z	-0.18	%85
13	78	Z	-0.057	%20
14	78	Z	-0.057	%50

Member Point Loads (BLC 2 : 0 Wind - No Ice) (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
15	78	Z	0	0
16	31	Z	-0.058	%20
17	31	Z	0	0
18	31	Z	0	0
19	31	Z	0	0
20	31	Z	0	0

Member Point Loads (BLC 3 : 90 Wind - No Ice)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	29	X	-0.072	%15
2	29	X	-0.072	%85
3	29	X	-0.034	%20
4	29	X	-0.03	%50
5	29	X	0	0
6	89	X	-0.072	%15
7	89	X	-0.072	%85
8	89	X	-0.034	%20
9	89	X	-0.03	%50
10	89	X	0	0
11	78	X	-0.072	%15
12	78	X	-0.072	%85
13	78	X	-0.034	%20
14	78	X	-0.03	%50
15	78	X	0	0
16	31	X	-0.033	%20
17	31	X	0	0
18	31	X	0	0
19	31	X	0	0
20	31	X	0	0

Member Point Loads (BLC 4 : 0 Wind - Ice)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	29	Z	-0.064	%15
2	29	Z	-0.064	%85
3	29	Z	-0.025	%20
4	29	Z	-0.025	%50
5	29	Z	0	0
6	89	Z	-0.064	%15
7	89	Z	-0.064	%85
8	89	Z	-0.025	%20
9	89	Z	-0.025	%50
10	89	Z	0	0
11	78	Z	-0.064	%15
12	78	Z	-0.064	%85
13	78	Z	-0.025	%20
14	78	Z	-0.025	%50
15	78	Z	0	0
16	31	Z	-0.025	%20
17	31	Z	0	0
18	31	Z	0	0
19	31	Z	0	0
20	31	Z	0	0

Member Point Loads (BLC 5 : 90 Wind - Ice)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	29	X	-0.031	%15
2	29	X	-0.031	%85

Member Point Loads (BLC 5 : 90 Wind - Ice) (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
3	29	X	-0.017	%20
4	29	X	-0.015	%50
5	29	X	0	0
6	89	X	-0.031	%15
7	89	X	-0.031	%85
8	89	X	-0.017	%20
9	89	X	-0.015	%50
10	89	X	0	0
11	78	X	-0.031	%15
12	78	X	-0.031	%85
13	78	X	-0.017	%20
14	78	X	-0.015	%50
15	78	X	0	0
16	31	X	-0.016	%20
17	31	X	0	0
18	31	X	0	0
19	31	X	0	0
20	31	X	0	0

Member Point Loads (BLC 6 : 0 Wind - Service)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	29	Z	-0.019	%15
2	29	Z	-0.019	%85
3	29	Z	-0.006	%20
4	29	Z	-0.006	%50
5	29	Z	0	0
6	89	Z	-0.019	%15
7	89	Z	-0.019	%85
8	89	Z	-0.006	%20
9	89	Z	-0.006	%50
10	89	Z	0	0
11	78	Z	-0.019	%15
12	78	Z	-0.019	%85
13	78	Z	-0.006	%20
14	78	Z	-0.006	%50
15	78	Z	0	0
16	31	Z	-0.006	%20
17	31	Z	0	0
18	31	Z	0	0
19	31	Z	0	0
20	31	Z	0	0

Member Point Loads (BLC 7 : 90 Wind - Service)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	29	X	-0.007	%15
2	29	X	-0.007	%85
3	29	X	-0.004	%20
4	29	X	-0.003	%50
5	29	X	0	0
6	89	X	-0.007	%15
7	89	X	-0.007	%85
8	89	X	-0.004	%20
9	89	X	-0.003	%50
10	89	X	0	0
11	78	X	-0.007	%15
12	78	X	-0.007	%85
13	78	X	-0.004	%20

Member Point Loads (BLC 7 : 90 Wind - Service) (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
14	78	X	-0.003	%50
15	78	X	0	0
16	31	X	-0.003	%20
17	31	X	0	0
18	31	X	0	0
19	31	X	0	0
20	31	X	0	0

Member Point Loads (BLC 8 : Ice)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	29	Y	-0.149	%15
2	29	Y	-0.149	%85
3	29	Y	-0.054	%20
4	29	Y	-0.052	%50
5	29	Y	0	0
6	89	Y	-0.149	%15
7	89	Y	-0.149	%85
8	89	Y	-0.054	%20
9	89	Y	-0.052	%50
10	89	Y	0	0
11	78	Y	-0.149	%15
12	78	Y	-0.149	%85
13	78	Y	-0.054	%20
14	78	Y	-0.052	%50
15	78	Y	0	0
16	31	Y	-0.054	%20
17	31	Y	0	0
18	31	Y	0	0
19	31	Y	0	0
20	31	Y	0	0

Member Point Loads (BLC 13 : Maint LL 1)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	6	Y	-0.25	%5

Member Point Loads (BLC 14 : Maint LL 2)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	22	Y	-0.25	%5

Member Point Loads (BLC 15 : Maint LL 3)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	80	Y	-0.25	%5

Member Point Loads (BLC 16 : Maint LL 4)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	87	Y	-0.25	%5

Member Point Loads (BLC 17 : Maint LL 5)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	69	Y	-0.25	%5

Member Point Loads (BLC 18 : Maint LL 6)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	76	Y	-0.25	%5

Member Point Loads (BLC 19 : Maint LL 7)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	6	Y	-0.25	%95

Member Point Loads (BLC 20 : Maint LL 8)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	22	Y	-0.25	%95

Member Point Loads (BLC 21 : Maint LL 9)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	80	Y	-0.25	%95

Member Point Loads (BLC 22 : Maint LL 10)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	87	Y	-0.25	%95

Member Point Loads (BLC 23 : Maint LL 11)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	69	Y	-0.25	%95

Member Point Loads (BLC 24 : Maint LL 12)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	76	Y	-0.25	%95

Member Point Loads (BLC 25 : Maint LL 13)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	31	Y	-0.25	%95

Member Point Loads (BLC 26 : Maint LL 14)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	1	Y	-0.25	%95

Member Point Loads (BLC 27 : Maint LL 15)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	50	Y	-0.25	%95

Member Distributed Loads (BLC 2 : 0 Wind - No Ice)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	1	Z	-0.014	-0.014	0	%100
2	2	Z	-0.012	-0.012	0	%100
3	3	Z	-0.012	-0.012	0	%100
4	4	Z	-0.017	-0.017	0	%100
5	5	Z	-0.017	-0.017	0	%100
6	6	Z	-0.01	-0.01	0	%100
7	7	Z	-0.017	-0.017	0	%100
8	8	Z	-0.017	-0.017	0	%100
9	9	Z	-0.008	-0.008	0	%100
10	10	Z	-0.008	-0.008	0	%100
11	11	Z	-0.024	-0.024	0	%100
12	18	Z	-0.007	-0.007	0	%100
13	19	Z	-0.007	-0.007	0	%100
14	22	Z	-0.007	-0.007	0	%100
15	23	Z	-0.021	-0.021	0	%100
16	29	Z	-0.007	-0.007	0	%100
17	31	Z	-0.014	-0.014	0	%100
18	32	Z	-0.012	-0.012	0	%100

Member Distributed Loads (BLC 2 : 0 Wind - No Ice) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
19	33	Z	-0.012	-0.012	0	%100
20	34	Z	-0.017	-0.017	0	%100
21	35	Z	-0.017	-0.017	0	%100
22	36	Z	-0.017	-0.017	0	%100
23	37	Z	-0.017	-0.017	0	%100
24	38	Z	-0.008	-0.008	0	%100
25	39	Z	-0.008	-0.008	0	%100
26	40	Z	-0.024	-0.024	0	%100
27	45	Z	-0.021	-0.021	0	%100
28	50	Z	-0.014	-0.014	0	%100
29	51	Z	-0.012	-0.012	0	%100
30	52	Z	-0.012	-0.012	0	%100
31	53	Z	-0.017	-0.017	0	%100
32	54	Z	-0.017	-0.017	0	%100
33	55	Z	-0.017	-0.017	0	%100
34	56	Z	-0.017	-0.017	0	%100
35	57	Z	-0.008	-0.008	0	%100
36	58	Z	-0.008	-0.008	0	%100
37	59	Z	-0.024	-0.024	0	%100
38	64	Z	-0.021	-0.021	0	%100
39	69	Z	-0.01	-0.01	0	%100
40	72	Z	-0.007	-0.007	0	%100
41	73	Z	-0.007	-0.007	0	%100
42	76	Z	-0.007	-0.007	0	%100
43	78	Z	-0.007	-0.007	0	%100
44	80	Z	-0.01	-0.01	0	%100
45	83	Z	-0.007	-0.007	0	%100
46	84	Z	-0.007	-0.007	0	%100
47	87	Z	-0.007	-0.007	0	%100
48	89	Z	-0.007	-0.007	0	%100

Member Distributed Loads (BLC 3 : 90 Wind - No Ice)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	1	X	-0.014	-0.014	0	%100
2	2	X	-0.012	-0.012	0	%100
3	3	X	-0.012	-0.012	0	%100
4	4	X	-0.017	-0.017	0	%100
5	5	X	-0.017	-0.017	0	%100
6	6	X	-0.01	-0.01	0	%100
7	7	X	-0.017	-0.017	0	%100
8	8	X	-0.017	-0.017	0	%100
9	9	X	-0.008	-0.008	0	%100
10	10	X	-0.008	-0.008	0	%100
11	11	X	-0.024	-0.024	0	%100
12	18	X	-0.007	-0.007	0	%100
13	19	X	-0.007	-0.007	0	%100
14	22	X	-0.007	-0.007	0	%100
15	23	X	-0.021	-0.021	0	%100
16	29	X	-0.007	-0.007	0	%100
17	31	X	-0.014	-0.014	0	%100
18	32	X	-0.012	-0.012	0	%100
19	33	X	-0.012	-0.012	0	%100
20	34	X	-0.017	-0.017	0	%100
21	35	X	-0.017	-0.017	0	%100
22	36	X	-0.017	-0.017	0	%100
23	37	X	-0.017	-0.017	0	%100
24	38	X	-0.008	-0.008	0	%100
25	39	X	-0.008	-0.008	0	%100

Member Distributed Loads (BLC 3 : 90 Wind - No Ice) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
26	40	X	-0.024	-0.024	0	%100
27	45	X	-0.021	-0.021	0	%100
28	50	X	-0.014	-0.014	0	%100
29	51	X	-0.012	-0.012	0	%100
30	52	X	-0.012	-0.012	0	%100
31	53	X	-0.017	-0.017	0	%100
32	54	X	-0.017	-0.017	0	%100
33	55	X	-0.017	-0.017	0	%100
34	56	X	-0.017	-0.017	0	%100
35	57	X	-0.008	-0.008	0	%100
36	58	X	-0.008	-0.008	0	%100
37	59	X	-0.024	-0.024	0	%100
38	64	X	-0.021	-0.021	0	%100
39	69	X	-0.01	-0.01	0	%100
40	72	X	-0.007	-0.007	0	%100
41	73	X	-0.007	-0.007	0	%100
42	76	X	-0.007	-0.007	0	%100
43	78	X	-0.007	-0.007	0	%100
44	80	X	-0.01	-0.01	0	%100
45	83	X	-0.007	-0.007	0	%100
46	84	X	-0.007	-0.007	0	%100
47	87	X	-0.007	-0.007	0	%100
48	89	X	-0.007	-0.007	0	%100

Member Distributed Loads (BLC 4 : 0 Wind - Ice)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	1	Z	-0.008	-0.008	0	%100
2	2	Z	-0.008	-0.008	0	%100
3	3	Z	-0.008	-0.008	0	%100
4	4	Z	-0.016	-0.016	0	%100
5	5	Z	-0.016	-0.016	0	%100
6	6	Z	-0.003	-0.003	0	%100
7	7	Z	-0.019	-0.019	0	%100
8	8	Z	-0.019	-0.019	0	%100
9	9	Z	-0.007	-0.007	0	%100
10	10	Z	-0.007	-0.007	0	%100
11	11	Z	-0.011	-0.011	0	%100
12	18	Z	-0.003	-0.003	0	%100
13	19	Z	-0.003	-0.003	0	%100
14	22	Z	-0.003	-0.003	0	%100
15	23	Z	-0.01	-0.01	0	%100
16	29	Z	-0.003	-0.003	0	%100
17	31	Z	-0.008	-0.008	0	%100
18	32	Z	-0.008	-0.008	0	%100
19	33	Z	-0.008	-0.008	0	%100
20	34	Z	-0.016	-0.016	0	%100
21	35	Z	-0.016	-0.016	0	%100
22	36	Z	-0.019	-0.019	0	%100
23	37	Z	-0.019	-0.019	0	%100
24	38	Z	-0.007	-0.007	0	%100
25	39	Z	-0.007	-0.007	0	%100
26	40	Z	-0.011	-0.011	0	%100
27	45	Z	-0.01	-0.01	0	%100
28	50	Z	-0.008	-0.008	0	%100
29	51	Z	-0.008	-0.008	0	%100
30	52	Z	-0.008	-0.008	0	%100
31	53	Z	-0.016	-0.016	0	%100
32	54	Z	-0.016	-0.016	0	%100

Member Distributed Loads (BLC 4 : 0 Wind - Ice) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
33	55	Z	-0.019	-0.019	0	%100
34	56	Z	-0.019	-0.019	0	%100
35	57	Z	-0.007	-0.007	0	%100
36	58	Z	-0.007	-0.007	0	%100
37	59	Z	-0.011	-0.011	0	%100
38	64	Z	-0.01	-0.01	0	%100
39	69	Z	-0.003	-0.003	0	%100
40	72	Z	-0.003	-0.003	0	%100
41	73	Z	-0.003	-0.003	0	%100
42	76	Z	-0.003	-0.003	0	%100
43	78	Z	-0.003	-0.003	0	%100
44	80	Z	-0.003	-0.003	0	%100
45	83	Z	-0.003	-0.003	0	%100
46	84	Z	-0.003	-0.003	0	%100
47	87	Z	-0.003	-0.003	0	%100
48	89	Z	-0.003	-0.003	0	%100

Member Distributed Loads (BLC 5 : 90 Wind - Ice)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	1	X	-0.008	-0.008	0	%100
2	2	X	-0.008	-0.008	0	%100
3	3	X	-0.008	-0.008	0	%100
4	4	X	-0.016	-0.016	0	%100
5	5	X	-0.016	-0.016	0	%100
6	6	X	-0.003	-0.003	0	%100
7	7	X	-0.019	-0.019	0	%100
8	8	X	-0.019	-0.019	0	%100
9	9	X	-0.007	-0.007	0	%100
10	10	X	-0.007	-0.007	0	%100
11	11	X	-0.011	-0.011	0	%100
12	18	X	-0.003	-0.003	0	%100
13	19	X	-0.003	-0.003	0	%100
14	22	X	-0.003	-0.003	0	%100
15	23	X	-0.01	-0.01	0	%100
16	29	X	-0.003	-0.003	0	%100
17	31	X	-0.008	-0.008	0	%100
18	32	X	-0.008	-0.008	0	%100
19	33	X	-0.008	-0.008	0	%100
20	34	X	-0.016	-0.016	0	%100
21	35	X	-0.016	-0.016	0	%100
22	36	X	-0.019	-0.019	0	%100
23	37	X	-0.019	-0.019	0	%100
24	38	X	-0.007	-0.007	0	%100
25	39	X	-0.007	-0.007	0	%100
26	40	X	-0.011	-0.011	0	%100
27	45	X	-0.01	-0.01	0	%100
28	50	X	-0.008	-0.008	0	%100
29	51	X	-0.008	-0.008	0	%100
30	52	X	-0.008	-0.008	0	%100
31	53	X	-0.016	-0.016	0	%100
32	54	X	-0.016	-0.016	0	%100
33	55	X	-0.019	-0.019	0	%100
34	56	X	-0.019	-0.019	0	%100
35	57	X	-0.007	-0.007	0	%100
36	58	X	-0.007	-0.007	0	%100
37	59	X	-0.011	-0.011	0	%100
38	64	X	-0.01	-0.01	0	%100
39	69	X	-0.003	-0.003	0	%100

Member Distributed Loads (BLC 5 : 90 Wind - Ice) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
40	72	X	-0.003	-0.003	0	%100
41	73	X	-0.003	-0.003	0	%100
42	76	X	-0.003	-0.003	0	%100
43	78	X	-0.003	-0.003	0	%100
44	80	X	-0.003	-0.003	0	%100
45	83	X	-0.003	-0.003	0	%100
46	84	X	-0.003	-0.003	0	%100
47	87	X	-0.003	-0.003	0	%100
48	89	X	-0.003	-0.003	0	%100

Member Distributed Loads (BLC 6 : 0 Wind - Service)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	1	Z	-0.002	-0.002	0	%100
2	2	Z	-0.001	-0.001	0	%100
3	3	Z	-0.001	-0.001	0	%100
4	4	Z	-0.002	-0.002	0	%100
5	5	Z	-0.002	-0.002	0	%100
6	6	Z	-0.0005	-0.0005	0	%100
7	7	Z	-0.002	-0.002	0	%100
8	8	Z	-0.002	-0.002	0	%100
9	9	Z	-0.0008	-0.0008	0	%100
10	10	Z	-0.0008	-0.0008	0	%100
11	11	Z	-0.003	-0.003	0	%100
12	18	Z	-0.0004	-0.0004	0	%100
13	19	Z	-0.0004	-0.0004	0	%100
14	22	Z	-0.0004	-0.0004	0	%100
15	23	Z	-0.002	-0.002	0	%100
16	29	Z	-0.0004	-0.0004	0	%100
17	31	Z	-0.002	-0.002	0	%100
18	32	Z	-0.001	-0.001	0	%100
19	33	Z	-0.001	-0.001	0	%100
20	34	Z	-0.002	-0.002	0	%100
21	35	Z	-0.002	-0.002	0	%100
22	36	Z	-0.002	-0.002	0	%100
23	37	Z	-0.002	-0.002	0	%100
24	38	Z	-0.0008	-0.0008	0	%100
25	39	Z	-0.0008	-0.0008	0	%100
26	40	Z	-0.003	-0.003	0	%100
27	45	Z	-0.002	-0.002	0	%100
28	50	Z	-0.002	-0.002	0	%100
29	51	Z	-0.001	-0.001	0	%100
30	52	Z	-0.001	-0.001	0	%100
31	53	Z	-0.002	-0.002	0	%100
32	54	Z	-0.002	-0.002	0	%100
33	55	Z	-0.002	-0.002	0	%100
34	56	Z	-0.002	-0.002	0	%100
35	57	Z	-0.0008	-0.0008	0	%100
36	58	Z	-0.0008	-0.0008	0	%100
37	59	Z	-0.003	-0.003	0	%100
38	64	Z	-0.002	-0.002	0	%100
39	69	Z	-0.0005	-0.0005	0	%100
40	72	Z	-0.0004	-0.0004	0	%100
41	73	Z	-0.0004	-0.0004	0	%100
42	76	Z	-0.0004	-0.0004	0	%100
43	78	Z	-0.0004	-0.0004	0	%100
44	80	Z	-0.0005	-0.0005	0	%100
45	83	Z	-0.0004	-0.0004	0	%100
46	84	Z	-0.0004	-0.0004	0	%100

Member Distributed Loads (BLC 6 : 0 Wind - Service) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
47	87	Z	-0.0004	-0.0004	0	%100
48	89	Z	-0.0004	-0.0004	0	%100

Member Distributed Loads (BLC 7 : 90 Wind - Service)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	1	X	-0.002	-0.002	0	%100
2	2	X	-0.001	-0.001	0	%100
3	3	X	-0.001	-0.001	0	%100
4	4	X	-0.002	-0.002	0	%100
5	5	X	-0.002	-0.002	0	%100
6	6	X	-0.0005	-0.0005	0	%100
7	7	X	-0.002	-0.002	0	%100
8	8	X	-0.002	-0.002	0	%100
9	9	X	-0.0008	-0.0008	0	%100
10	10	X	-0.0008	-0.0008	0	%100
11	11	X	-0.003	-0.003	0	%100
12	18	X	-0.0004	-0.0004	0	%100
13	19	X	-0.0004	-0.0004	0	%100
14	22	X	-0.0004	-0.0004	0	%100
15	23	X	-0.002	-0.002	0	%100
16	29	X	-0.0004	-0.0004	0	%100
17	31	X	-0.002	-0.002	0	%100
18	32	X	-0.001	-0.001	0	%100
19	33	X	-0.001	-0.001	0	%100
20	34	X	-0.002	-0.002	0	%100
21	35	X	-0.002	-0.002	0	%100
22	36	X	-0.002	-0.002	0	%100
23	37	X	-0.002	-0.002	0	%100
24	38	X	-0.0008	-0.0008	0	%100
25	39	X	-0.0008	-0.0008	0	%100
26	40	X	-0.003	-0.003	0	%100
27	45	X	-0.002	-0.002	0	%100
28	50	X	-0.002	-0.002	0	%100
29	51	X	-0.001	-0.001	0	%100
30	52	X	-0.001	-0.001	0	%100
31	53	X	-0.002	-0.002	0	%100
32	54	X	-0.002	-0.002	0	%100
33	55	X	-0.002	-0.002	0	%100
34	56	X	-0.002	-0.002	0	%100
35	57	X	-0.0008	-0.0008	0	%100
36	58	X	-0.0008	-0.0008	0	%100
37	59	X	-0.003	-0.003	0	%100
38	64	X	-0.002	-0.002	0	%100
39	69	X	-0.0005	-0.0005	0	%100
40	72	X	-0.0004	-0.0004	0	%100
41	73	X	-0.0004	-0.0004	0	%100
42	76	X	-0.0004	-0.0004	0	%100
43	78	X	-0.0004	-0.0004	0	%100
44	80	X	-0.0005	-0.0005	0	%100
45	83	X	-0.0004	-0.0004	0	%100
46	84	X	-0.0004	-0.0004	0	%100
47	87	X	-0.0004	-0.0004	0	%100
48	89	X	-0.0004	-0.0004	0	%100

Member Distributed Loads (BLC 8 : Ice)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	1	Y	-0.016	-0.016	0	%100
2	2	Y	-0.012	-0.012	0	%100
3	3	Y	-0.012	-0.012	0	%100
4	4	Y	-0.016	-0.016	0	%100
5	5	Y	-0.016	-0.016	0	%100
6	6	Y	-0.011	-0.011	0	%100
7	7	Y	-0.016	-0.016	0	%100
8	8	Y	-0.016	-0.016	0	%100
9	9	Y	-0.01	-0.01	0	%100
10	10	Y	-0.01	-0.01	0	%100
11	11	Y	-0.021	-0.021	0	%100
12	18	Y	-0.009	-0.009	0	%100
13	19	Y	-0.009	-0.009	0	%100
14	22	Y	-0.009	-0.009	0	%100
15	23	Y	-0.021	-0.021	0	%100
16	29	Y	-0.009	-0.009	0	%100
17	31	Y	-0.016	-0.016	0	%100
18	32	Y	-0.012	-0.012	0	%100
19	33	Y	-0.012	-0.012	0	%100
20	34	Y	-0.016	-0.016	0	%100
21	35	Y	-0.016	-0.016	0	%100
22	36	Y	-0.016	-0.016	0	%100
23	37	Y	-0.016	-0.016	0	%100
24	38	Y	-0.01	-0.01	0	%100
25	39	Y	-0.01	-0.01	0	%100
26	40	Y	-0.021	-0.021	0	%100
27	45	Y	-0.021	-0.021	0	%100
28	50	Y	-0.016	-0.016	0	%100
29	51	Y	-0.012	-0.012	0	%100
30	52	Y	-0.012	-0.012	0	%100
31	53	Y	-0.016	-0.016	0	%100
32	54	Y	-0.016	-0.016	0	%100
33	55	Y	-0.016	-0.016	0	%100
34	56	Y	-0.016	-0.016	0	%100
35	57	Y	-0.01	-0.01	0	%100
36	58	Y	-0.01	-0.01	0	%100
37	59	Y	-0.021	-0.021	0	%100
38	64	Y	-0.021	-0.021	0	%100
39	69	Y	-0.011	-0.011	0	%100
40	72	Y	-0.009	-0.009	0	%100
41	73	Y	-0.009	-0.009	0	%100
42	76	Y	-0.009	-0.009	0	%100
43	78	Y	-0.009	-0.009	0	%100
44	80	Y	-0.011	-0.011	0	%100
45	83	Y	-0.009	-0.009	0	%100
46	84	Y	-0.009	-0.009	0	%100
47	87	Y	-0.009	-0.009	0	%100
48	89	Y	-0.009	-0.009	0	%100

Member Distributed Loads (BLC 28 : BLC 1 Transient Area Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	9	Y	-0.015	-0.015	0	2.078
2	10	Y	-0.014	-0.02	0.231	1.27
3	10	Y	-0.02	-0.026	1.27	2.309
4	38	Y	-0.014	-0.02	0	2.078
5	39	Y	0.0006164	-0.016	0	1.155
6	39	Y	-0.016	-0.035	1.155	2.309
7	57	Y	-0.035	-0.016	0	1.155

Member Distributed Loads (BLC 28 : BLC 1 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
8	57	Y	-0.016	0.0006163	1.155	2.309
9	58	Y	-0.018	-0.016	0.231	2.309

Member Distributed Loads (BLC 29 : BLC 8 Transient Area Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	9	Y	-0.013	-0.013	0	2.078
2	10	Y	-0.012	-0.017	0.231	1.27
3	10	Y	-0.017	-0.021	1.27	2.309
4	38	Y	-0.01	-0.017	0	2.078
5	39	Y	0.0004931	-0.013	0	1.155
6	39	Y	-0.013	-0.028	1.155	2.309
7	57	Y	-0.028	-0.013	0	1.155
8	57	Y	-0.013	0.0004931	1.155	2.309
9	58	Y	-0.014	-0.013	0.231	2.309

Member Area Loads (BLC 1 : Dead)

	Node A	Node B	Node C	Node D	Direction	Load Direction	Magnitude [ksf]
1	23	22	25	24	Y	Two Way	-0.01
2	73	72	75	74	Y	Two Way	-0.01
3	102	101	104	103	Y	Two Way	-0.01

Member Area Loads (BLC 8 : Ice)

	Node A	Node B	Node C	Node D	Direction	Load Direction	Magnitude [ksf]
1	23	22	25	24	Y	Two Way	-0.008
2	73	72	75	74	Y	Two Way	-0.008
3	102	101	104	103	Y	Two Way	-0.008

Node Loads and Enforced Displacements (BLC 9 : Live Load a)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	30	L	Y	-0.5
2	113	L	Y	-0.5
3	135	L	Y	-0.5

Node Loads and Enforced Displacements (BLC 10 : Live Load b)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	31	L	Y	-0.5
2	114	L	Y	-0.5
3	136	L	Y	-0.5

Node Loads and Enforced Displacements (BLC 11 : Live Load c)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	46	L	Y	-0.5
2	127	L	Y	-0.5
3	149	L	Y	-0.5

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	1	max	1.571	5	2.19	26	1.302	2	5.064	14	1.553	11	0.445	24
2		min	-1.581	23	-0.787	8	-1.399	20	-2.611	8	-1.561	17	-0.321	6
3	53	max	1.234	4	2.194	42	1.989	14	1.046	13	1.995	3	1.472	12
4		min	-1.31	22	-0.464	12	-1.929	8	-2.175	19	-2.001	21	-4.081	30
5	82	max	1.196	17	2.108	46	2.008	14	1.145	3	1.985	7	3.827	34
6		min	-1.107	11	-0.491	4	-1.97	8	-2.545	33	-1.993	25	-1.521	4
7	Totals:	max	3.969	17	5.627	45	5.285	2						
8		min	-3.969	11	1.589	3	-5.285	20						

Envelope AISC 13TH (360-05): LRFD Member Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
1	1	HSS4X4X2	0.669	0	25	0.141	0	y	37	70.173	73.278	8.24	8.24	1.884	H1-1b
2	2	C3.38x2.06x.188	0.405	2.592	27	0.071	0.351	y	40	38.433	43.394	1.694	4.483	1.627	H1-1b
3	3	C3.38x2.06x.188	0.361	0	37	0.071	2.241	z	20	38.433	43.394	1.694	4.483	1.627	H1-1b
4	4	PL3/8"x6	0.115	0.164	19	0.253	0	y	14	68.856	72.9	0.57	9.113	2.146	H1-1b
5	5	PL3/8"x6	0.091	0	15	0.188	0	y	14	68.856	72.9	0.57	9.113	2.586	H1-1b
6	6	PIPE_3.0	0.123	3.333	21	0.063	4		17	46.291	65.205	5.749	5.749	1.703	H1-1b
7	7	PL3/8"x6	0.185	0.208	20	0.188	0.208	y	49	70.733	72.9	0.57	9.113	1.388	H1-1b
8	8	PL3/8"x6	0.174	0	25	0.216	0	y	39	70.733	72.9	0.57	9.113	3	H1-1b
9	9	L2x2x4	0.298	0	19	0.03	2.309	y	58	23.349	30.586	0.691	1.577	1.5	H2-1
10	10	L2x2x4	0.24	2.309	21	0.041	2.309	y	40	23.349	30.586	0.691	1.577	1.5	H2-1
11	11	L7.63x2.5x6	0.393	1.604	8	0.087	1.604	y	39	73.845	118.523	1.798	13.745	1.247	H2-1
12	18	PIPE_2.0	0.347	5.75	17	0.086	5.75		18	14.916	32.13	1.872	1.872	3	H1-1b
13	19	PIPE_2.0	0.404	2.167	21	0.092	5.75		21	14.916	32.13	1.872	1.872	3	H1-1b
14	22	PIPE_2.0	0.626	6.75	25	0.488	7.333		14	14.916	32.13	1.872	1.872	2.624	H3-6
15	23	L6.63x4.33x.25	0.242	3.25	18	0.031	3.25	z	24	49.975	86.751	2.311	6.976	1.5	H2-1
16	29	PIPE_2.0	0.352	2.167	19	0.088	5.75		20	14.916	32.13	1.872	1.872	3	H1-1b
17	31	HSS4X4X2	0.641	0	19	0.174	0	z	15	70.173	73.278	8.24	8.24	1.918	H1-1b
18	32	C3.38x2.06x.188	0.411	2.592	32	0.072	0.351	y	44	38.433	43.394	1.694	4.483	1.625	H1-1b
19	33	C3.38x2.06x.188	0.345	0	29	0.067	2.241	y	61	38.433	43.394	1.694	4.483	1.631	H1-1b
20	34	PL3/8"x6	0.112	0.164	22	0.203	0	y	18	68.856	72.9	0.57	9.113	1.414	H1-1b
21	35	PL3/8"x6	0.106	0	20	0.147	0	y	18	68.856	72.9	0.57	9.113	1.885	H1-1b
22	36	PL3/8"x6	0.154	0.208	25	0.183	0.208	y	41	70.733	72.9	0.57	9.113	1.759	H1-1b
23	37	PL3/8"x6	0.136	0	17	0.22	0	y	43	70.733	72.9	0.57	9.113	3	H1-1b
24	38	L2x2x4	0.228	0	23	0.03	2.309	y	50	23.349	30.586	0.691	1.577	1.5	H2-1
25	39	L2x2x4	0.241	2.309	25	0.042	2.309	y	44	23.349	30.586	0.691	1.577	1.5	H2-1
26	40	L7.63x2.5x6	0.31	1.604	13	0.087	1.604	y	44	73.845	118.523	1.798	13.788	1.257	H2-1
27	45	L6.63x4.33x.25	0.305	0	3	0.033	0	y	15	49.975	86.751	2.311	6.976	1.5	H2-1
28	50	HSS4X4X2	0.663	0	21	0.18	0	z	19	70.173	73.278	8.24	8.24	1.885	H1-1b
29	51	C3.38x2.06x.188	0.39	2.592	47	0.071	0.351	y	49	38.433	43.394	1.694	4.483	1.634	H1-1b
30	52	C3.38x2.06x.188	0.362	0	32	0.066	2.241	y	53	38.433	43.394	1.694	4.483	1.626	H1-1b
31	53	PL3/8"x6	0.155	0.164	14	0.204	0	y	22	68.856	72.9	0.57	9.113	2.19	H1-1b
32	54	PL3/8"x6	0.08	0	24	0.157	0	y	21	68.856	72.9	0.57	9.113	1.673	H1-1b
33	55	PL3/8"x6	0.14	0.208	16	0.189	0.208	y	45	70.733	72.9	0.57	9.113	1.377	H1-1b
34	56	PL3/8"x6	0.178	0	21	0.211	0	y	47	70.733	72.9	0.57	9.113	3	H1-1b
35	57	L2x2x4	0.305	0	15	0.03	0	y	55	23.349	30.586	0.691	1.577	1.5	H2-1
36	58	L2x2x4	0.196	2.309	17	0.041	0	y	49	23.349	30.586	0.691	1.577	1.5	H2-1
37	59	L7.63x2.5x6	0.374	1.604	3	0.085	1.604	y	48	73.845	118.523	1.798	14.004	1.306	H2-1
38	64	L6.63x4.33x.25	0.32	0	7	0.041	0	y	20	49.975	86.751	2.311	6.976	1.5	H2-1
39	69	PIPE_3.0	0.132	4	14	0.085	4		21	46.291	65.205	5.749	5.749	1.495	H1-1b
40	72	PIPE_2.0	0.455	5.75	21	0.094	5.75		21	14.916	32.13	1.872	1.872	3	H1-1b
41	73	PIPE_2.0	0.498	2.167	14	0.105	5.75		14	14.916	32.13	1.872	1.872	2.828	H1-1b
42	76	PIPE_2.0	0.499	1.25	25	0.4	1.25		25	14.916	32.13	1.872	1.872	2.238	H3-6
43	78	PIPE_2.0	0.401	5.75	21	0.085	5.75		14	14.916	32.13	1.872	1.872	3	H1-1b
44	80	PIPE_3.0	0.127	4	14	0.079	4		25	46.291	65.205	5.749	5.749	1.411	H1-1b
45	83	PIPE_2.0	0.451	5.75	25	0.112	5.75		14	14.916	32.13	1.872	1.872	3	H1-1b
46	84	PIPE_2.0	0.385	2.167	18	0.076	5.75		18	14.916	32.13	1.872	1.872	3	H1-1b
47	87	PIPE_2.0	0.573	6.75	21	0.458	7.333		21	14.916	32.13	1.872	1.872	2.522	H3-6
48	89	PIPE_2.0	0.46	5.75	14	0.073	5.75		15	14.916	32.13	1.872	1.872	3	H1-1b

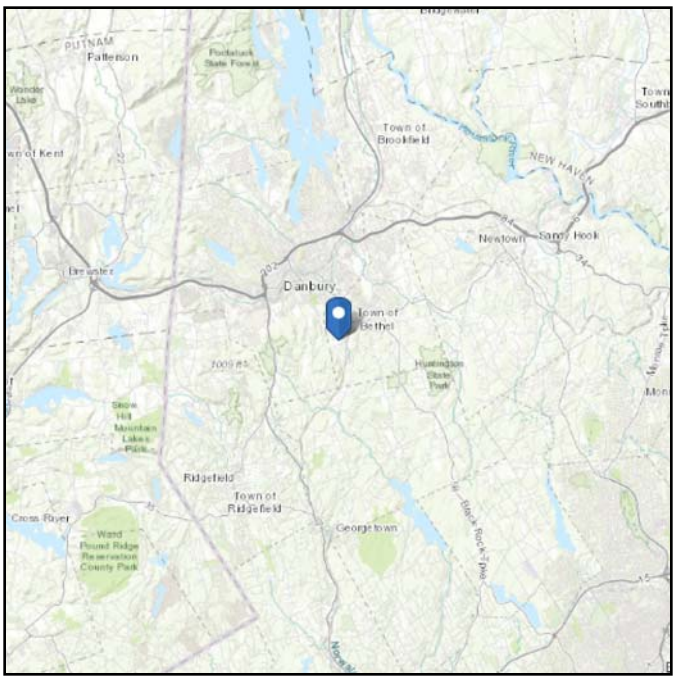
APPENDIX B

(Additional Calculations)

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-10	**Elevation:**	411.08 ft (NAVD 88)
Risk Category:	II	**Latitude:**	41.360522
Soil Class:	D - Stiff Soil	**Longitude:**	-73.424474



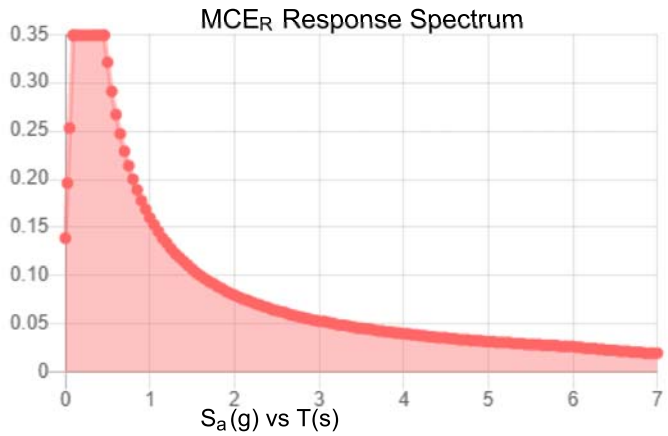
Seismic

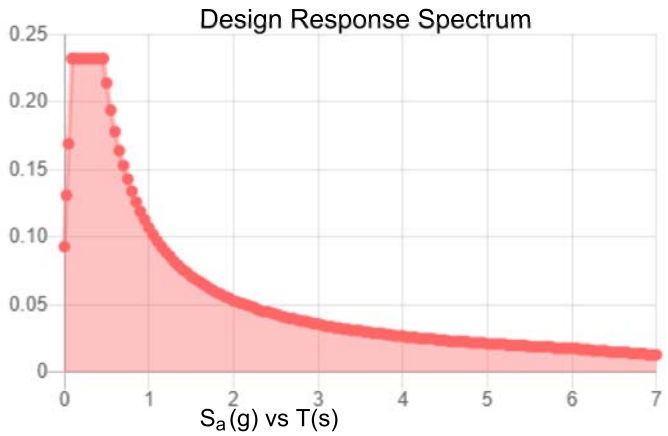
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.218	S_{DS} :	0.232
S_1 :	0.067	S_{D1} :	0.107
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.119
S_{MS} :	0.349	PGA_M :	0.186
S_{M1} :	0.16	F_{PGA} :	1.561
		I_e :	1

Seismic Design Category B





Data Accessed: Wed Jul 21 2021

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 Jul 21 2021

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.

PROJECT	**153441_003_01_North Bethel_CT**				**0**
SUBJECT	**Platform Mount Analysis**				
DATE	**07/21/21**	PAGE	1	OF	2

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

[REF: AISC 360-05]

Reactions at Bolted Connection

Tension	:	2.008	k
Vertical Shear	:	2.108	k
Horizontal Shear	:	1.196	k
Torsion	:	3.827	k.ft
Moment from Horizontal Forces	:	1.985	k.ft
Moment from Vertical Forces	:	1.145	k.ft

Bolt Parameters

Bolt Grade	:	A325	
Bolt Diameter	:	0.625	in
Nominal Bolt Area	:	0.307	in^2
Bolt spacing, Horizontal	:	6	in
Bolt spacing, Vertical	:	6	in
Bolt edge distance, plate height	:	1.5	in
Bolt edge distance, plate width	:	1.5	in
Total Number of Bolts	:	4	bolts

Summary of Forces

Shear Resultant Force	:	2.42	k
Force from Horz. Moment	:	3.60	k
Force from Vert. Moment	:	2.07	k
Shear Load / Bolt	:	0.61	k
Tension Load / Bolt	:	0.50	k
Resultant from Moments / Bolt	:	2.08	k

Bolt Checks

Nominal Tensile Stress, F_{nt}	:	90.00	ksi	[AISC Table J3.2]
Available Tensile Stress, ΦR_{nt}	:	20.72	k/bolt	[Eq. J3-1]
Unity Check, Bolt Tension	:	**12.44%**		**OKAY**
Nominal Shear Stress, F_{nv}	:	48.00	ksi	[AISC Table J3.2]
Available Shear Stress, ΦR_{nv}	:	11.05	k/bolt	[Eq. J3-1]
Unity Check, Bolt Shear	:	**10.02%**		**OKAY**
Unity Check, Combined	:	**22.46%**		**OKAY**
Available Bearing Strength, ΦR_n	:	34.66	k/bolt	
Unity Check, Bolt Bearing	:	**1.75%**		**OKAY**

PROJECT	**153441.003.01 - N/A**				**0**
SUBJECT	**Platform Mount Analysis**				
DATE	**07/21/21**	PAGE	2	OF	2

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

[REF: AISC 360-05]

Connecting Member Parameters

Plate Yield Strength, F_y	:	36.00	ksi	[AISC Table 2-5]
Plate Tensile Strength, F_u	:	58.00	ksi	[AISC Table 2-5]
Plate Height	:	9.00	in	
Plate Width	:	9.00	in	
Plate Thickness	:	0.50	in	
Edge Distance	:	1.06	in	
Gross Tension Area, A_{gt}	:	4.50	in^2	
Gross Shear Area, A_{gv}	:	0.75	in^2	
Net Area for tension, A_{nv}	:	4.16	in^2	
Net Area for shear, A_{nt}	:	3.00	in^2	

Plate Check

Available Tensile Yield	:	145.80	k	[Eq. J4-1]
Available Tensile Rupture	:	180.80	k	[Eq. J4-2]
Unity Check, Plate Tension	:	**1.77%**		**OKAY**
Available Shear Yield	:	16.20	k	[Eq. J4-3]
Available Shear Rupture	:	104.40	k	[Eq. J4-4]
Unity Check, Plate Shear	:	**14.96%**		**OKAY**
Available Block Shear, ΦRn	:	77.40	k	[Eq. J4-5]
Unity Check, Block Shear	:	**3.13%**		**OKAY**

EXHIBIT 10

Construction Drawings

dish wireless

DISH Wireless L.L.C. SITE ID:

NJJER01165A

DISH Wireless L.L.C. SITE ADDRESS:

11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

CONNECTICUT CODE COMPLIANCE

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 STATE BUILDING CODE/2015 IBC W/ CT AMENDMENTS
MECHANICAL	2018 CT STATE BUILDING CODE/2015 IMC W/ CT AMENDMENTS
ELECTRICAL	2018 CT STATE BUILDING CODE/2017 NEC W/ CT AMENDMENTS

SHEET INDEX

SHEET NO.	SHEET TITLE
T-1	TITLE SHEET
LS1	SITE SURVEY
A-1	OVERALL AND ENLARGED SITE PLAN
A-2	ELEVATION, ANTENNA LAYOUT AND SCHEDULE
A-3	EQUIPMENT PLATFORM AND H-FRAME DETAILS
A-4	EQUIPMENT DETAILS
A-5	EQUIPMENT DETAILS
A-6	EQUIPMENT DETAILS
E-1	ELECTRICAL/FIBER ROUTE PLAN AND NOTES
E-2	ELECTRICAL DETAILS
E-3	ELECTRICAL ONE-LINE, FAULT CALCS & PANEL SCHEDULE
G-1	GROUNDING PLANS AND NOTES
G-2	GROUNDING DETAILS
G-3	GROUNDING DETAILS
RF-1	RF CABLE COLOR CODE
GN-1	LEGEND AND ABBREVIATIONS
GN-2	GENERAL NOTES
GN-3	GENERAL NOTES
GN-4	GENERAL NOTES

SCOPE OF WORK

THIS IS NOT AN ALL INCLUSIVE LIST. CONTRACTOR SHALL UTILIZE SPECIFIED EQUIPMENT PART OR ENGINEER APPROVED EQUIVALENT. CONTRACTOR SHALL VERIFY ALL NEEDED EQUIPMENT TO PROVIDE A FUNCTIONAL SITE. THE PROJECT GENERALLY CONSISTS OF THE FOLLOWING:

TOWER SCOPE OF WORK:
- INSTALL (3) PROPOSED PANEL ANTENNAS (1 PER SECTOR)
- INSTALL (1) PROPOSED TOWER PLATFORM MOUNT
- INSTALL PROPOSED JUMPERS
- INSTALL (6) PROPOSED RRUs (2 PER SECTOR)
- INSTALL (1) PROPOSED OVER VOLTAGE PROTECTION DEVICE (OVP)
- INSTALL (1) PROPOSED HYBRID CABLE

GROUND SCOPE OF WORK:
- INSTALL (1) PROPOSED METAL PLATFORM
- INSTALL (1) PROPOSED ICE BRIDGE
- INSTALL (1) PROPOSED PPC CABINET
- INSTALL (1) PROPOSED EQUIPMENT CABINET
- INSTALL (1) PROPOSED POWER CONDUIT
- INSTALL (1) PROPOSED TELCO CONDUIT
- INSTALL (1) PROPOSED TELCO-FIBER BOX
- INSTALL (1) PROPOSED GPS UNIT
- INSTALL (1) PROPOSED FIBER NID (IF REQUIRED)

SITE PHOTO

UNDERGROUND SERVICE ALERT CBYD 811
UTILITY NOTIFICATION CENTER OF CONNECTICUT
(800) 922-4455
WWW.CBYD.COM

CALL 2 WORKING DAYS UTILITY NOTIFICATION PRIOR TO CONSTRUCTION

GENERAL NOTES

THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. A TECHNICIAN WILL VISIT THE SITE AS REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE. NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE IS PROPOSED.

11"x17" PLOT WILL BE HALF SCALE UNLESS OTHERWISE NOTED

CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, AND CONDITIONS ON THE JOB SITE, AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK.

SITE INFORMATION

PROPERTY OWNER:	ESTATE OF STERGUE COSTA MARY S PADOVANO, ADMIN
ADDRESS:	28 PARK LANE RD NEW MILFORD, CT 06776
TOWER TYPE:	MONOPOLE
TOWER CO SITE ID:	CT00248-S
TOWER APP NUMBER:	163826
COUNTY:	FAIRFIELD
LATITUDE (NAD 83):	41° 21' 36.32" N 41.38300361
LONGITUDE (NAD 83):	73° 25' 30.08" W -73.42216972
ZONING JURISDICTION:	FAIRFIELD COUNTY
ZONING DISTRICT:	IP
PARCEL NUMBER:	09 23 150-05
OCCUPANCY GROUP:	U
CONSTRUCTION TYPE:	II-B
POWER COMPANY:	T.B.D.
TELEPHONE COMPANY:	AT&T

PROJECT DIRECTORY

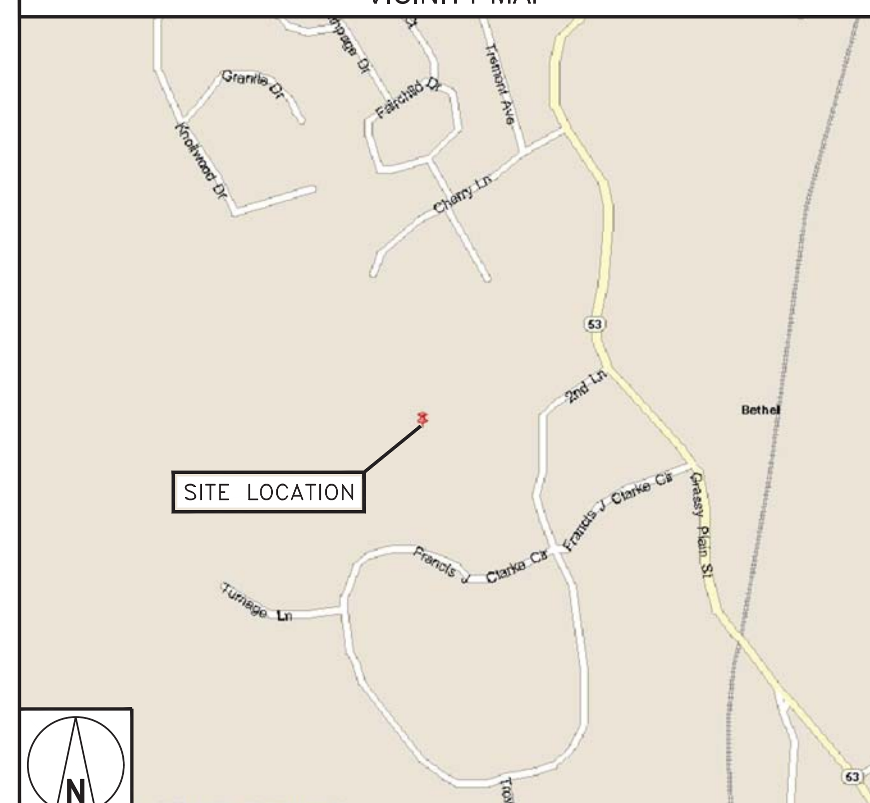
APPLICANT:	DISH Wireless L.L.C. 5701 SOUTH SANTA FE DRIVE LITTLETON, CO 80120
TOWER OWNER:	SBA COMMUNICATAIONS CORP. 8051 CONGRESS AVENUE BOCA RATON, FL 33487 (800) 487-7483
SITE DESIGNER:	B+T GROUP 1717 S. BOULDER AVE, SUITE 300 TULSA, OK 74119 (918) 587-4630
SITE ACQUISITION:	GREGG BAILEY GREGG.BAILEY@DISH.COM
CONSTRUCTION MANAGER:	MICHAEL NARDUCCI MICHAEL.NARDUCCI@DISH.COM
RF ENGINEER:	MURUGABIRAN JAYAPAL MURUGABIRAN.JAYAPAL@DISH.COM

DIRECTIONS

DIRECTIONS FROM 3 ADP BLVD, ROSELAND, NJ 07068:

HEAD NORTHEAST TOWARD ADP BLVD, TURN LEFT, TURN LEFT TOWARD ADP BLVD, TURN LEFT TOWARD ADP BLVD, TURN LEFT ONTO ADP BLVD, TURN RIGHT TOWARD CHOCTAW WAY, SLIGHT RIGHT TOWARD CHOCTAW WAY. USE THE LEFT LAND TO TURN RIGHT ONTO LIVINGSTON AVE. USE THE RIGHT LANE TO TAKE THE RAMP ONTO I-280 E, MERGE ONTO I-280 E. TAKE EXIT 12 TOWARD ORATON PKWY, KEEP LEFT, FOLLOW SIGNS FOR GARDEN STATE PARKWAY AND MERGE ONTO GARDEN STATE PKWY. KEEP RIGHT TO STAY ON GARDEN STATE PKWY. CONTINUE ONTO NJ-444 N/GARDEN STATE PKWY, CONTINUE ONTO GARDEN STATE PARKWAY CONNECTOR. TAKE EXIT 14-1 TO MERGE ONTO I-287 E/I-87E. KEEP LEFT AT THE FOR TO CONTINUE ON I-287 E, FOLLOW SIGNS FOR WHITE PLAINS/RYE. TAKEEXIT 9A TO MERGE ONTO I-684 N TOWARD BREWSTER. TAKE EXIT 9E TO MERGE ONTO I-84 E TOWARD DANBURY, TAKE EXIT 3 FOR US-7 S TOWARD NORWALK. CONTINUE ONTO US-7 S, TAKE EXIT 7 TOWARD DANBURY/AIRPORT, USE THE LEFT LANE TO TURN LEFT ONTO SUGAR HOLLOW RD. TURN LEFT ONTO MIRY BROOKE RD/WOOSER HEIGHTS. TURN RIGHT ONTO SOUTHERN BLVD, TURN RIGHT TO STAY ON SOUTHERN BLVD, SHARP RIGHT ONTO MOUNTAINVILLE RD. CONTINUE ONTO RESERVOIR ST, TURN RIGHT ONTO CT-53 S/GRASSY PLAIN ST. TURN RIGHT ONTO FRANCIS J CLARK CIR, TURN RIGHT AND THEN TURN LEFT – ARRIVING AT NJJER01165A

VICINITY MAP



NO SCALE

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SM	MAH	BLB

RFDS REV #: 3

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	8/2/21	ISSUED FOR REVIEW
0	10/26/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

153441.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

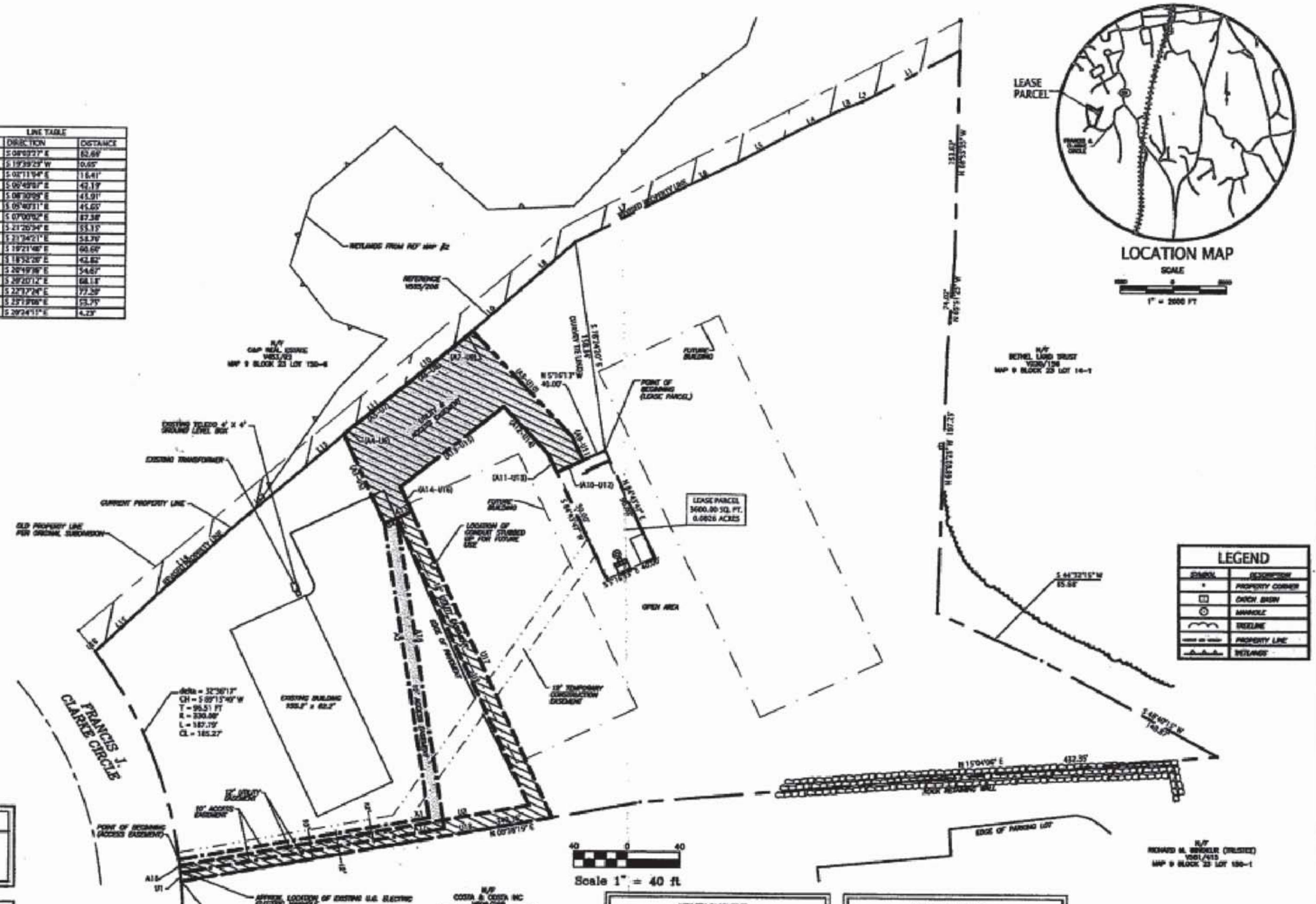
NJJER01165A
11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

SHEET TITLE

TITLE SHEET

SHEET NUMBER

T-1



ACCESS EASEMENT		
NUMBER	DIRECTION	DISTANCE
A1	N 08°57'31" E	190.24'
A2	N 78°54'02" W	224.75'
A3	S 85°17'40" W	74.03'
A4	N 20°49'36" W	9.17'
A5	N 18°52'20" W	42.82'
A6	N 19°21'46" W	60.60'
A7	N 21°34'21" W	11.21'
A8	N 68°22'13" E	109.79'
A9	N 84°43'47" E	19.10'
A10	S 05°16'13" E	22.00'
A11	S 84°43'47" W	15.54'
A12	S 68°22'13" W	48.79'
A13	S 18°38'27" E	98.01'
A14	N 85°17'40" E	20.54'
A15	S 04°42'20" E	12.00'
A16	S 78°54'02" E	237.38'
A17	S 09°57'31" W	200.47'
A18 CURVE DATA		
CHORD DIRECTION = N 76°27'18" W		
RADIUS = 330.00'		
DELTA ANGLE = 01°44'23"		
ARC LENGTH = 10.02'		

LINE TABLE		
NUMBER	DIRECTION	DISTANCE
L1	S 08°03'27" E	82.69'
L2	S 19°39'23" W	0.65'
L3	S 02°11'04" E	16.41'
L4	S 00°49'07" E	42.19'
L5	S 08°30'09" E	45.91'
L6	S 05°40'31" E	45.65'
L7	S 07°00'02" E	87.38'
L8	S 21°26'34" E	55.15'
L9	S 21°34'21" E	58.70'
L10	S 19°21'46" E	60.60'
L11	S 18°52'20" E	42.82'
L12	S 20°49'36" E	54.67'
L13	S 28°20'12" E	68.13'
L14	S 22°37'24" E	77.29'
L15	S 25°19'06" E	55.75'
L16	S 20°24'11" E	4.23'

UTILITY EASEMENT		
NUMBER	DIRECTION	DISTANCE
U2	N 09°38'19" E	265.33'
U3	S 85°17'40" W	238.20'
U4	S 04°42'20" E	10.39'
U5	S 85°17'40" W	74.03'
U6	N20°49'36"W	9.17'
U7	N18°52'20"W	42.82'
U8	N 19°21'46" W	60.60'
U9	N 21°34'21" W	11.21'
U10	N 68°22'13" E	109.79'
U11	N 84°43'47" E	19.10'
U12	S 05°16'13" E	22.00'
U13	S 84°43'47" W	15.54'
U14	S 68°22'13" W	48.79'
U15	S 18°38'27" E	98.01'
U16	N 85°17'40" E	20.54'
U17	N 85°17'40" E	253.65'
U18	S 09°38'19" W	281.80'
U1 CURVE DATA		
CHORD DIRECTION = N 75°28'55" W		
RADIUS = 330.00'		
DELTA ANGLE = 02°05'28"		
ARC LENGTH = 12.04'		

delta = 32°36'17"
CH = S 89°13'40" W
T = 96.51 FT
R = 330.00'
L = 187.79'
CL = 185.27'

Costa Stergue
7/20/05
Date

REFERENCE MAPS

"PROPERTY SURVEY OF 11 FRANCIS J. CLARKE CIRCLE BETHEL, CONNECTICUT"
PREPARED BY GESICK AND ASSOCIATES P.C.
DATED 11/1/1988 SCALE 1" = 80'

LEASE PARCEL INFORMATION

ADDRESS	11 FRANCIS J. CLARKE CIRCLE, BETHEL, CT.
CURRENT OWNER	COSTA STERGUE
DEED	VOL. 305/406
ASSESSORS ID	MAP 9, BLOCK 23, LOT 150-5
FLOOD ZONE	ZONE C
ZONE	IP (INDUSTRIAL PARK)
AREA OF LEASE PARCEL	3600.00 SQ FT, 0.0826 ACRES
AREA OF TOTAL PARCEL	[illegible] SQ FT, [illegible] ACRES

To the best of my knowledge and belief this map is substantially correct as noted hereon.

Donald L. Gesick Jr. L.S. Reg. No. 18417

STATE OF CONNECTICUT DONALD L. GESICK No. 18417 LICENSED LAND SURVEYOR

NOTES

1. THIS SURVEY AND MAP HAS BEEN PREPARED IN ACCORDANCE WITH SECTIONS 20-300b-1 THRU 20-300b-20 OF THE REGULATIONS OF CONNECTICUT STATE AGENCIES – "MINIMUM STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT" AS ENDORSED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC. IT IS A DATA ACCUMULATION PLAN. BASED ON A DEPENDENT RESURVEY (BASED ON REF MAP #1) CONFORMING TO A-2 HORIZONTAL ACCURACY AND T-2 TOPOGRAPHIC ACCURACY AND INTENDED TO DEPICT AND NOTE THE POSITION OF A PROPOSED LEASE PARCEL WITH RESPECT TO EXISTING STRUCTURES ON PARCEL.
2. NORTH IS BASED ON THE CONNECTICUT COORDINATE SYSTEM (NAD 83)
3. ELEVATIONS BASED ON NGVD 1929.
4. BASE MAPPING PREPARED BY GESICK & ASSOCIATES PC FROM A FEB 2, 1988 FIELD SURVEY.
5. SUBJECT TO ALL RIGHTS, EASEMENTS, COVENANTS OR RESTRICTIONS OF RECORD
6. LEASE PARCEL LOCATED IN FLOOD ZONE C PER FIRM COMMUNITY 090001 0001B PANEL 10 OF 10 DATE FEB. 15, 1984
7. LEASE PARCEL LOCATED IN ZONE IP INDUSTRIAL PARK

REDUCED COPY NOT TO SCALE

PREVIOUS CL&P FILE [illegible]
PREVIOUS CL&P DRAWING [illegible]

UTILITY EASEMENT LEGAL DESCRIPTION

Beginning at a point which point is the Northwesterly corner of now or formerly Costa & Costa Inc., which point is on the northerly street line of Francis J. Clarke Circle. Thence the following courses & distances:

Along a curve to the left with a delta angle of 02°05'28", A chord direction of N 75°28'55" W, a radius of 330.00', and an arc length of 12.04' to a point; [remaining courses illegible] to a point and place of beginning.

Said utility easement area contains 15850.12 square feet or 0.3639 acres more or less.

ACCESS EASEMENT LEGAL DESCRIPTION

Beginning at a point which point is 17' ± northeasterly from SE corner of now or formerly Costa & Costa, Inc. which point is on the northerly street line of Francis J. Clarke Circle. Thence the following courses & distances:

[courses illegible] A curve to the left with a delta angle of 01°-44'-23", A chord of N76°-27'-18"W, a radius of 330.00', and a length of 10.02' to a point and place of beginning.

Said access easement area contains 13880.82 square feet or 0.3187 acres more or less.

LEASE PARCEL LEGAL DESCRIPTION

Commencing at a point on lot line of now or formerly Costa Stergue & C&P Real Estate. Thence S 78°24'30" E a distance of 128.84 feet to the point of beginning of said lease parcel. Thence the following courses & distances:

N84°-43'-47"E a distance of 90.00' to an iron pipe to be set; S05°-16'-13"E a distance of 40.00' to an iron pipe to be set; S84°-43'-47"W a distance of 90.00' to an iron pipe to be set; N05°-16'-13"W a distance of 40.00' to an iron pipe to be set; and place of beginning.

Said lease parcel area contains 3,600.00 square feet or 0.0826 acres more or less.

Gesick & Associates P.C.
SURVEYORS MAPPERS PLANNERS
19 Cedar Island Ave. Clinton, CT 06413
www.gesicksurveyors.com

SCALE: AS SHOWN

REVISIONS

Site Location:
SBA INC.
80 EASTERN BLVD.
GLASTONBURY, CONNECTICUT
(860) 659-9101
ONE TOWN CENTER RD, 3RD FL.
BOCA RATON, FL. 33486
(561) 995-7670
SBA Site Agent : Esther McNany (800) 659-0101

Site Location:
11 Francis J. Clarke Circle
Bethel, Connecticut
SBA Site : North Bethel
SBA Site # CT00248-S
(COSTA PROPERTY II)
G&A PROJ # 98-009A

Sheet title:
Map Showing Easement Area
To be Granted to The
Connecticut Light & Power Co.
Across the Property of
Costa Stergue
11 Francis J. Clarke Circle
Bethel, Connecticut

CL&P FILE # [illegible]
CL&P DWG. # [illegible]
Nov. 12, 2001
DRAWING NUMBER: S-3

SITE SURVEY | NO SCALE | 1

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5701 SOUTH SANTA FE DRIVE
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SBA

8051 CONGRESS AVENUE
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STATE OF CONNECTICUT CHAD [illegible] No. 23924 LICENSED PROFESSIONAL ENGINEER
10/26/2021

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PEC.0001564
Expires 2/10/22

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SM	MAH	BLB

RFDS REV #: 3

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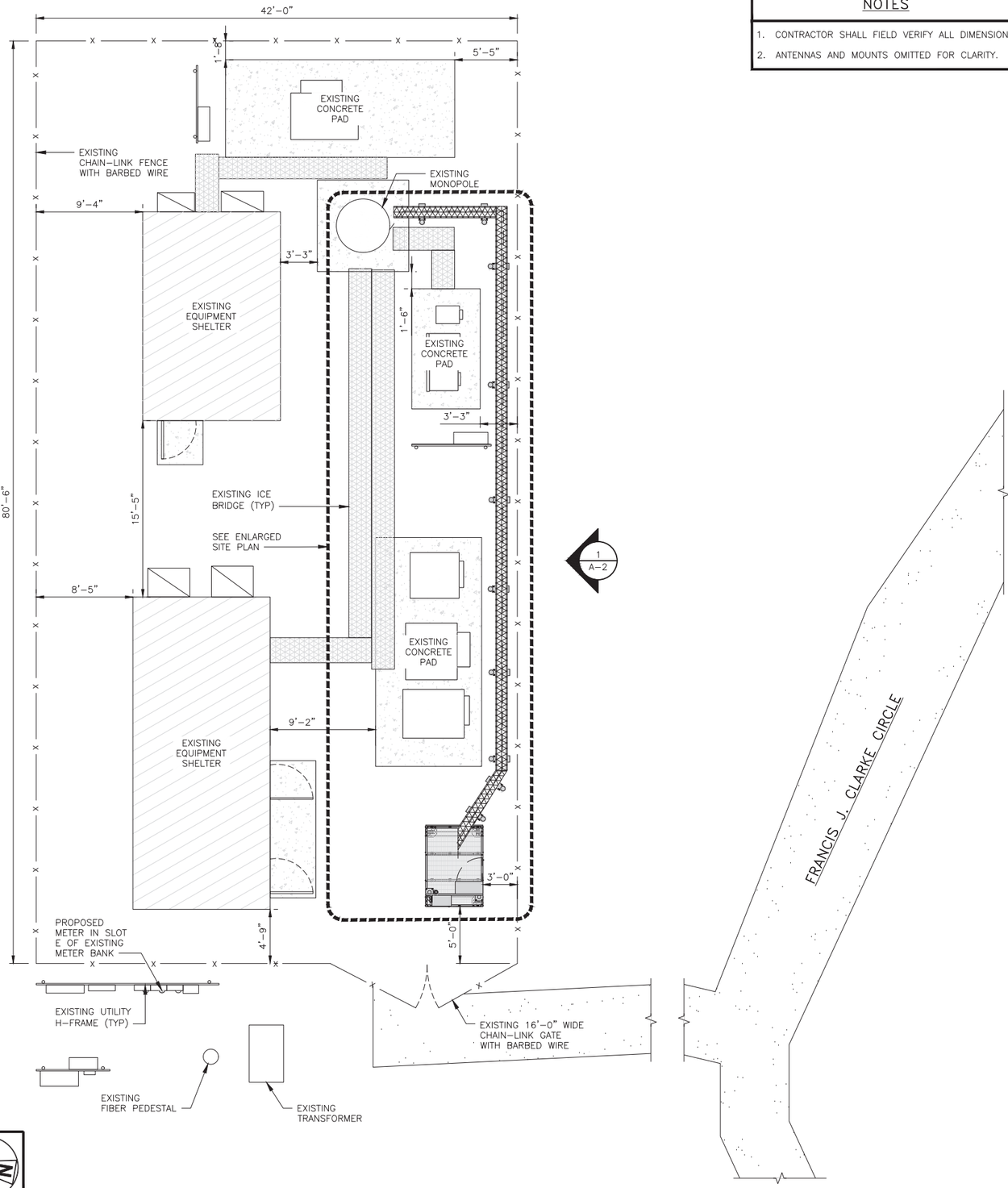
153441.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION
NJJER01165A
11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

SHEET TITLE
SITE SURVEY

SHEET NUMBER
LS1



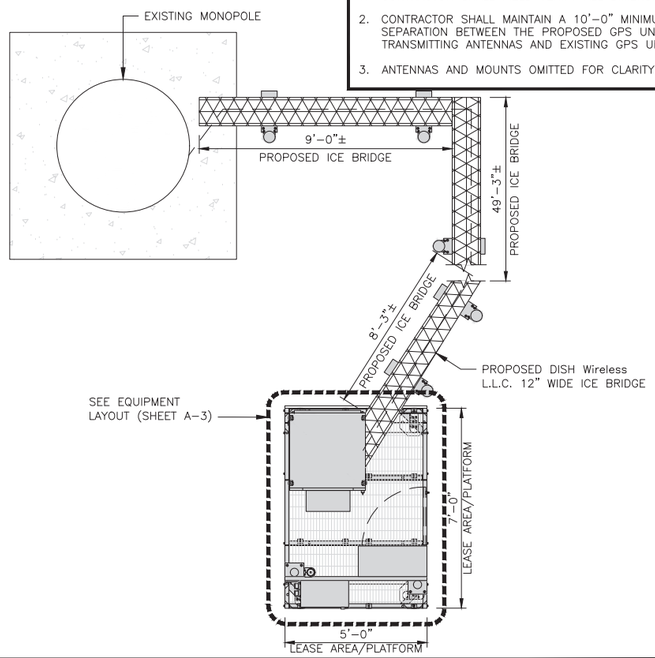
OVERALL SITE PLAN

6' 4' 2' 0 5' 10'
3/16"=1'-0"

1

NOTES

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.



ENLARGED SITE PLAN

12" 6" 0 1' 2' 3' 4' 5'
1/2"=1'-0"

2

NOTES

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. CONTRACTOR SHALL MAINTAIN A 10'-0" MINIMUM SEPARATION BETWEEN THE PROPOSED GPS UNIT, TRANSMITTING ANTENNAS AND EXISTING GPS UNITS.
3. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.

NOT USED

3

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DISH Wireless L.L.C.
PROJECT INFORMATION

NJJER01165A
11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

SHEET TITLE

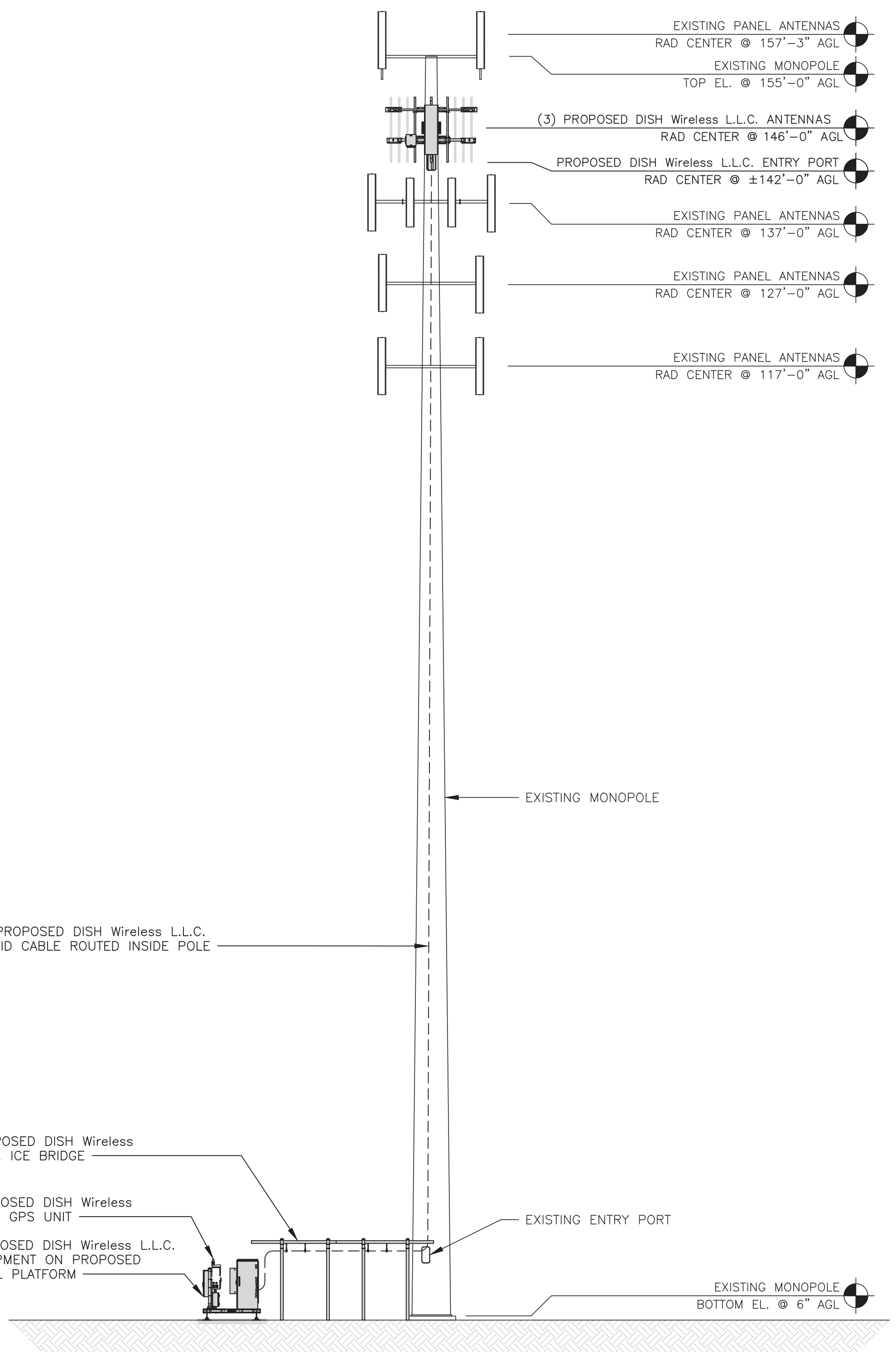
OVERALL AND ENLARGED SITE PLAN

SHEET NUMBER

A-1

NOTES

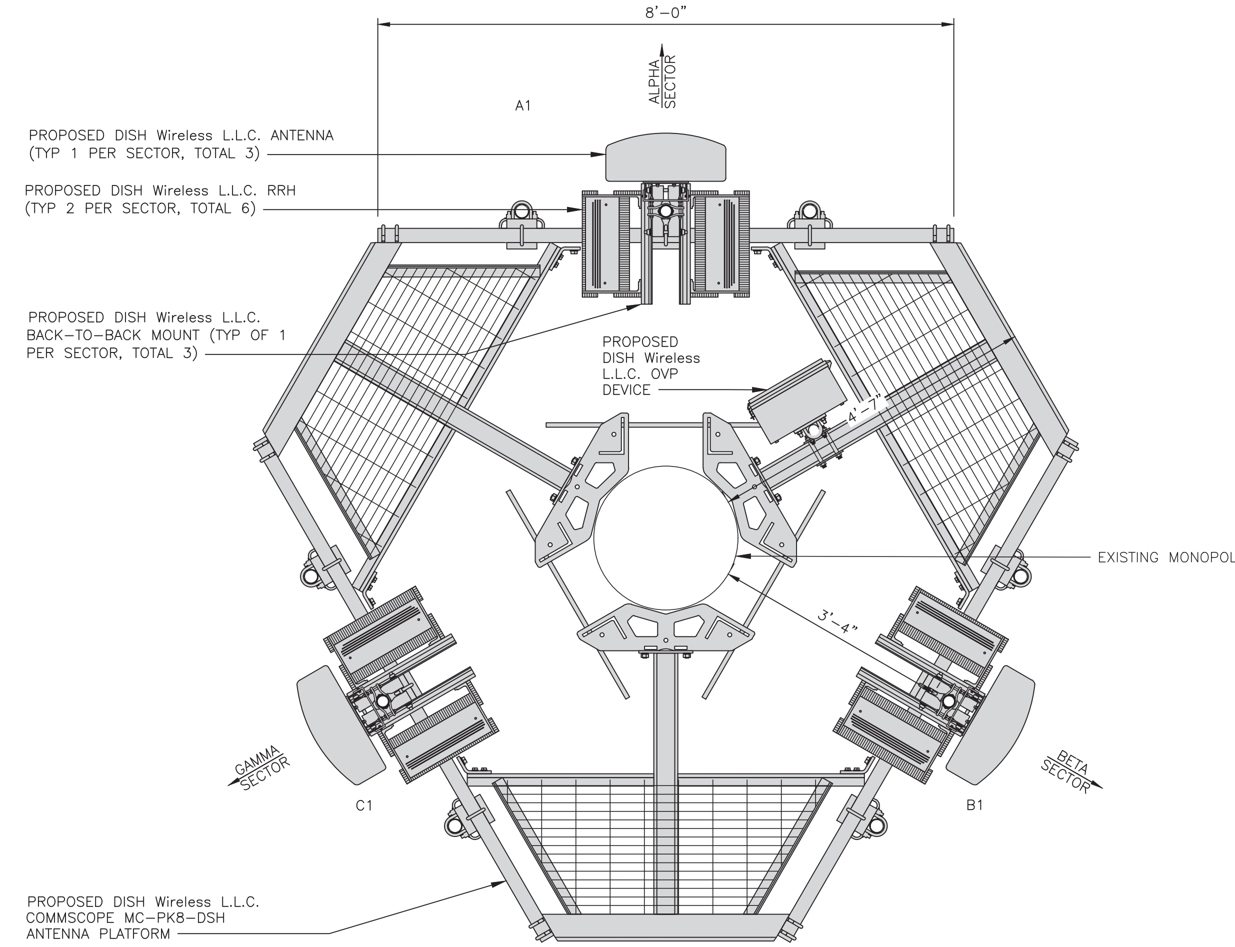
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. ANTENNA AND MW DISH SPECIFICATIONS REFER TO ANTENNA SCHEDULE AND TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS
3. EXISTING EQUIPMENT AND FENCE OMITTED FOR CLARITY.



PROPOSED SOUTH ELEVATION

12' 8' 4' 0 10' 20'
3/32"=1'–0"

1



*AZIMUTHS ARE TENTATIVE, NEED TO CONFIRM BEFORE THE CONSTRUCTION STARTS

N

ANTENNA LAYOUT

12" 6" 0 1' 2' 3'
3/4"=1'–0"

2

SECTOR	POSITION	ANTENNA: EXISTING OR PROPOSED	MANUFACTURER – MODEL NUMBER	TECHNOLOGY	SIZE (HxW)	AZIMUTH	RAD CENTER	TRANSMISSION CABLE: FEED LINE TYPE AND LENGTH
ALPHA	A1	PROPOSED	COMMSCOPE FFVV–65B–R2	5G	72.0" x 20.0"	0°	146'–0"	(1) HIGH–CAPACITY HYBRID CABLE (240' LONG)
BETA	B1	PROPOSED	COMMSCOPE FFVV–65B–R2	5G	72.0" x 20.0"	120°	146'–0"	
GAMMA	C1	PROPOSED	COMMSCOPE FFVV–65B–R2	5G	72.0" x 20.0"	240°	146'–0"	

SECTOR	POSITION	RRH: MANUFACTURER – MODEL NUMBER	TECHNOLOGY
ALPHA	A1	FUJITSU – TA08025–B605	5G
	A1	FUJITSU – TA08025–B604	5G
BETA	B1	FUJITSU – TA08025–B605	5G
	B1	FUJITSU – TA08025–B604	5G
GAMMA	C1	FUJITSU – TA08025–B605	5G
	C1	FUJITSU – TA08025–B604	5G

OVP: EXISTING OR PROPOSED	MANUFACTURER – MODEL NUMBER	SIZE (HxWxD)
PROPOSED	RAYCAP–RDIDC–9181–PF–48	16"x14"x8"

NOTES

1. CONTRACTOR TO REFER TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS.
2. ANTENNA AND RRH MODELS MAY CHANGE DUE TO EQUIPMENT AVAILABILITY. ALL EQUIPMENT CHANGES MUST BE APPROVED AND REMAIN IN COMPLIANCE WITH THE PROPOSED DESIGN AND STRUCTURAL ANALYSES.

ANTENNA SCHEDULE

NO SCALE

3

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DISH Wireless L.L.C. PROJECT INFORMATION

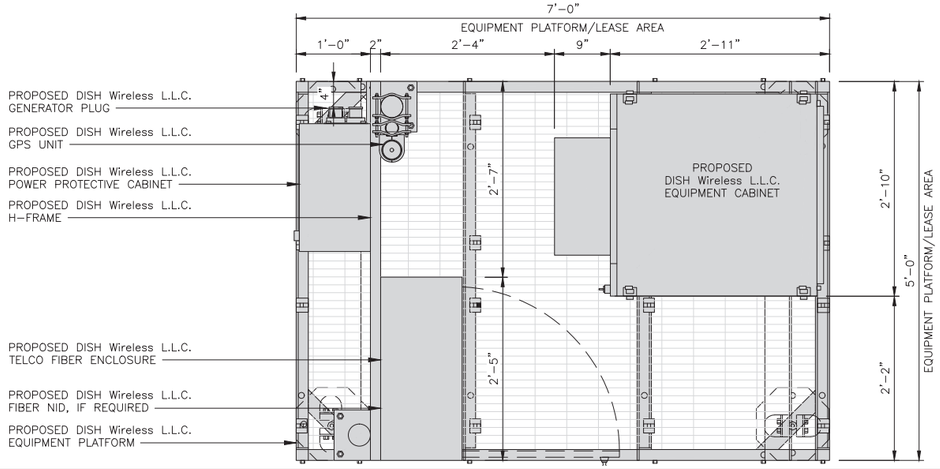
NJJER01165A
11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

SHEET TITLE

ELEVATION, ANTENNA LAYOUT AND SCHEDULE

SHEET NUMBER

A-2



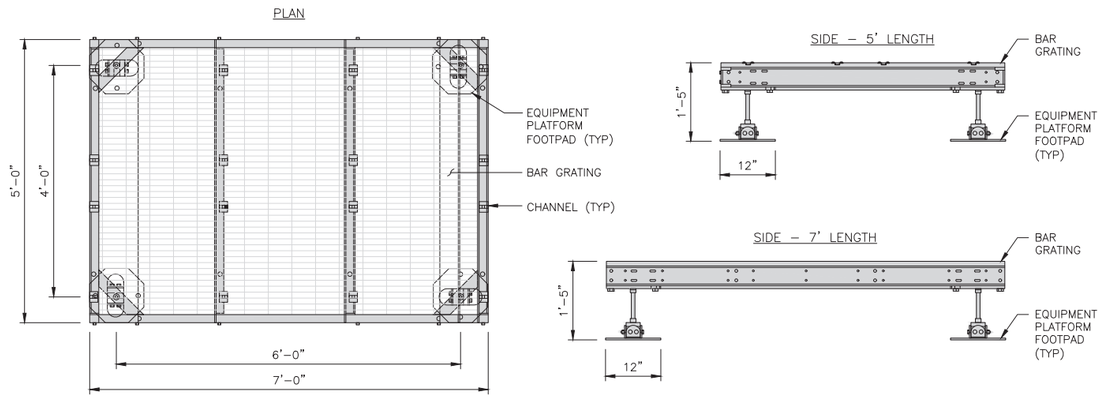
PLATFORM EQUIPMENT PLAN

12" 9" 6" 3" 0 1' 2'
1"=1'-0"

1

COMMSCOPE MTC4045LP 5X7 PLATFORM	
DIMENSIONS (HxWxD)	16"x84"x60"
TOTAL WEIGHT	423 LBS

NOTE:
GC TO PROVIDE EXTENDED THREAD FOR PLATFORM IF REQUIRED HEIGHT EXCEEDS 17"



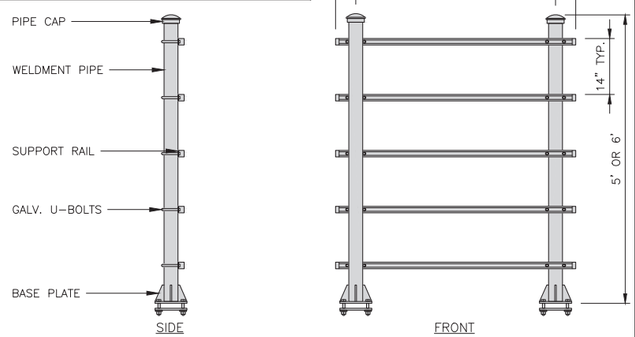
PLATFORM DETAIL

NO SCALE

2

COMMSCOPE MTC4045HFLD H-FRAME	
UNISTRUT/SUPPORT RAILS QTY	5
WEIGHT	59.74 lbs

NOTE:
OR DISH Wireless L.L.C. APPROVED EQUIVALENT



H-FRAME DETAIL

NO SCALE

3

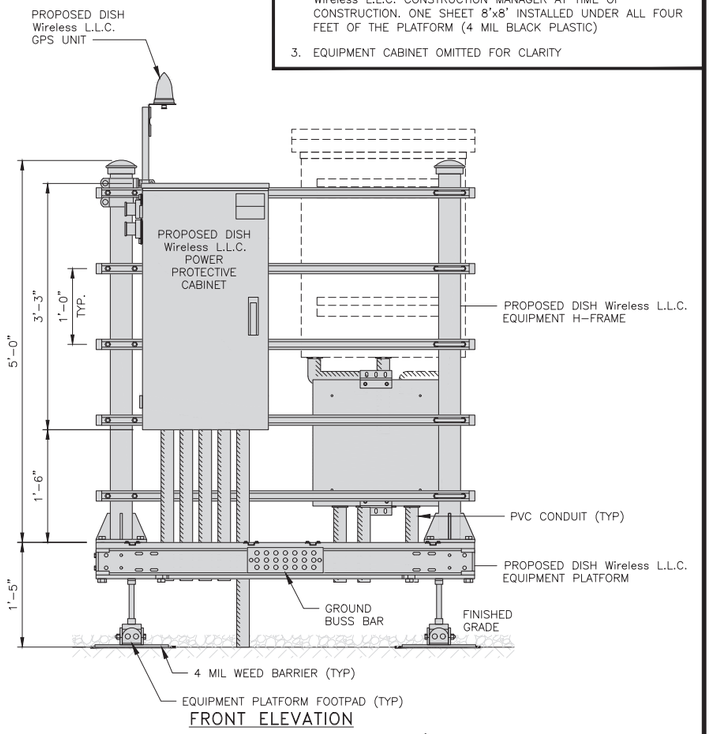
NOT USED

NO SCALE

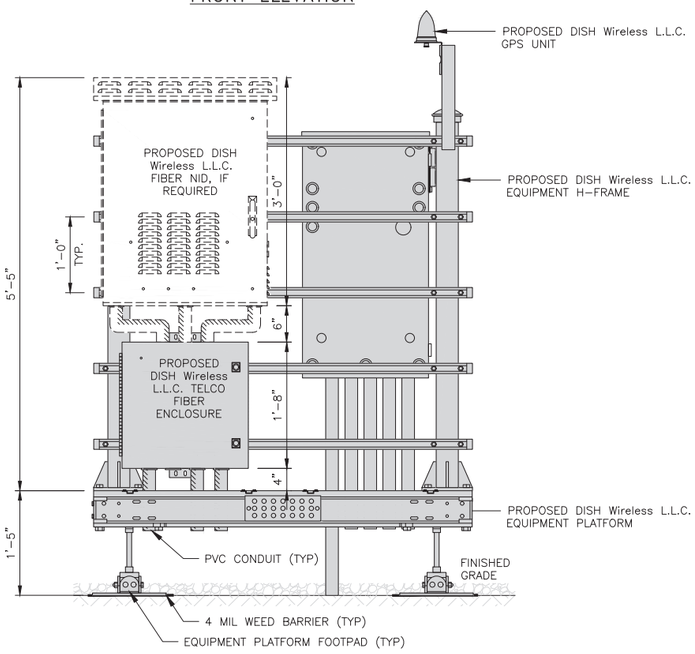
4

NOTES

1. CONTRACTOR TO BURY PLATFORM FEET WITH A MINIMUM OF 2" OF FILL PER EXISTING SITE SURFACE
2. WEED BARRIER FABRIC TO BE ADDED AT DISCRETION OF DISH Wireless L.L.C. CONSTRUCTION MANAGER AT TIME OF CONSTRUCTION. ONE SHEET 8'x8' INSTALLED UNDER ALL FOUR FEET OF THE PLATFORM (4 MIL BLACK PLASTIC)
3. EQUIPMENT CABINET OMITTED FOR CLARITY



FRONT ELEVATION



BACK ELEVATION

H-FRAME EQUIPMENT ELEVATION

12" 9" 6" 3" 0 1' 2'
1"=1'-0"

5

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STATE OF CONNECTICUT
No. 23024
LICENSED
PROFESSIONAL ENGINEER
10/26/2021

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

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SM	MAH	BLB

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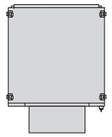
PROJECT INFORMATION
NJJER01165A
11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

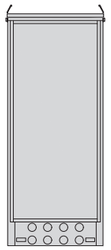
SHEET TITLE
EQUIPMENT PLATFORM AND H-FRAME DETAILS

SHEET NUMBER
A-3

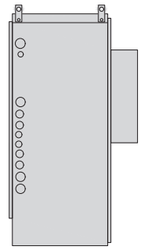
ENERSYS HVAC 2000005995	
DIMENSIONS (HxWxD)	73"x30"x32"
POWER SYSTEM	-48V ALPHA/600A
HVAC	600W
TOTAL WEIGHT (EMPTY)	371 lbs



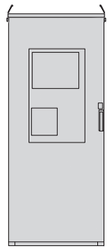
PLAN



BACK



SIDE

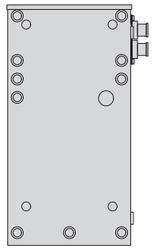


FRONT

CABINET DETAIL | NO SCALE | 1

RAYCAP PPC RDIAC-2465-P-240-MTS	
ENCLOSURE DIMENSIONS (HxWxD):	39"x22.855"x12.593
WEIGHT:	80 lbs
OPERATING AC VOLTAGE	240/120 1 PHASE 3W+G

TOP



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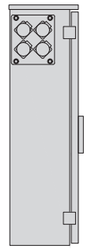

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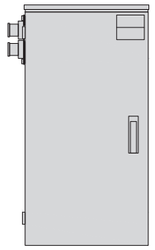

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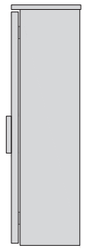


SIDE

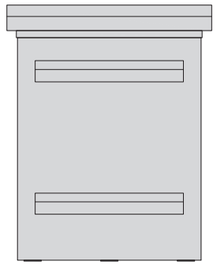
POWER PROTECTION CABINET (PPC) DETAIL | NO SCALE | 2

NOT USED | NO SCALE | 3

NOT USED | NO SCALE | 4

ZAYO 5RU (LEFT SWING DOOR) FIBER NID ENCLOSURE	
DIMENSIONS (HxWxD)	36.1"x29"x12.9"
WEIGHT	85 lbs

BOTTOM



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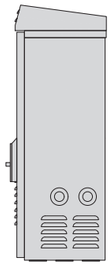
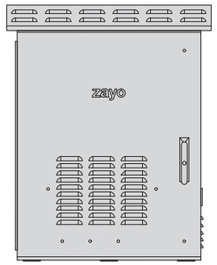


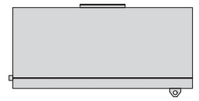
SIDE



FRONT

FIBER NID ENCLOSURE DETAIL | NO SCALE | 5

CHARLES CFIT-PF2020DSH1 FIBER TELCO ENCLOSURE	
ENCLOSURE DIMS (HxWxD)	20"x20"x9"
ENCLOSURE WEIGHT	20 lbs
MOUNTING	WALL
COMPLIANCE	TYPE 4



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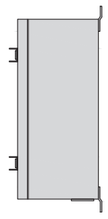
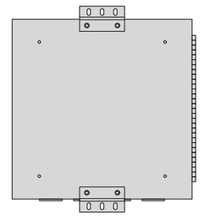


SIDE



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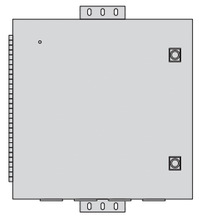
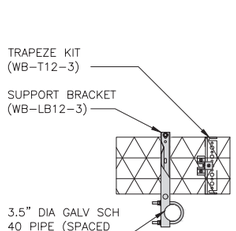


FRONT

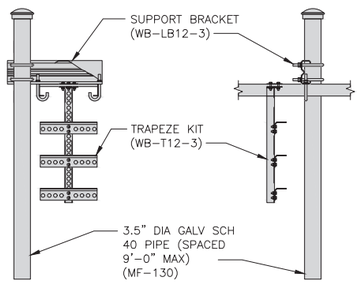
FIBER TELCO ENCLOSURE DETAIL | NO SCALE | 6

COMMSCOPE WB-K110-B WAVEGUIDE BRIDGE KIT	
DIMENSIONS (HxL)	160"x10'
WEIGHT/ VOLUME	325.0 LBS
CABLE RUN (QTY)	12

INCLUDED PRODUCTS:	WB-T12-3 TRAPEZE KIT, 3 RUNGS
	WB-LB12-3 SUPPORT BRACKET
	MF-130 DIRECT BURIAL PIPE COLUMN, 13'-4"

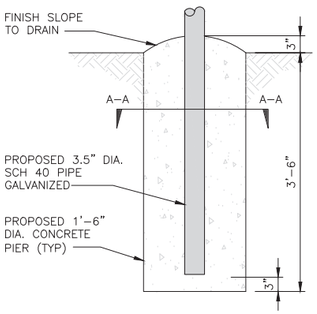


PLAN

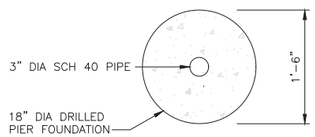


FRONT SIDE

ICE BRIDGE DETAIL | NO SCALE | 7

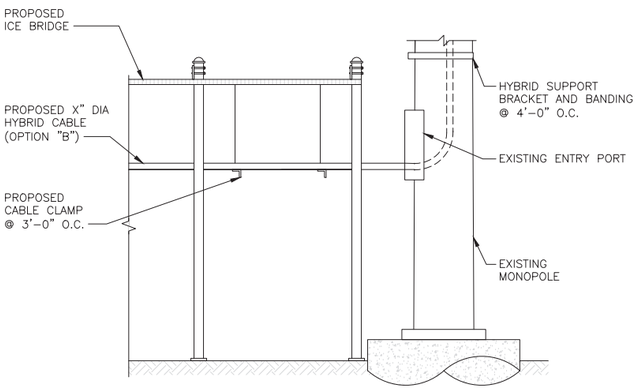


CONCRETE PIER



A-A SECTION

TYPICAL ICE BRIDGE CONCRETE PIER DETAIL | NO SCALE | 8



HYBRID CABLE RUN | NO SCALE | 9

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SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
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STATE OF CONNECTICUT
No. 23024
LICENSED
PROFESSIONAL ENGINEER
10/26/2021

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

DRAWN BY:	CHECKED BY:	APPROVED BY:
SM	MAH	BLB

RFDS REV #: 3

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	8/2/21	ISSUED FOR REVIEW
0	10/26/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

153441.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

NJJER01165A
11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

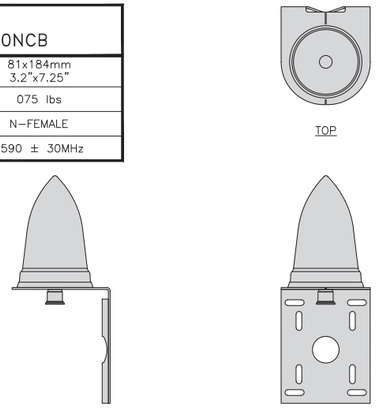
SHEET TITLE

EQUIPMENT DETAILS

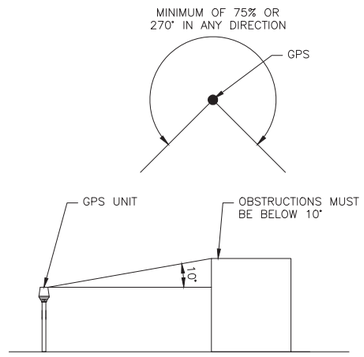
SHEET NUMBER

A-4

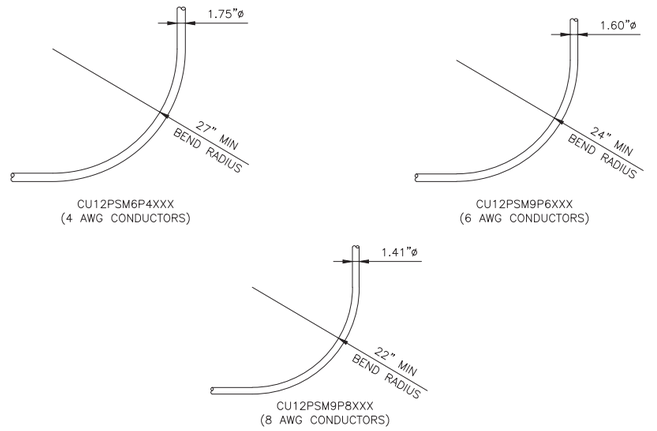
PCTEL GPSGL-TMG-SPI-40NCB	
DIMENSIONS (DIAxH) MM/INCH	81x184mm 3.2"x7.25"
WEIGHT W/ACCESSORIES	075 lbs
CONNECTOR	N-FEMALE
FREQUENCY RANGE	1590 ± 30MHz



GPS DETAIL | NO SCALE | 1



GPS MINIMUM SKY VIEW REQUIREMENTS | NO SCALE | 2



CABLES UNLIMITED HYBRID CABLE MINIMUM BEND RADIUSES | NO SCALE | 3

NOT USED | NO SCALE | 4

NOT USED | NO SCALE | 5

NOT USED | NO SCALE | 6

NOT USED | NO SCALE | 7

NOT USED | NO SCALE | 8

NOT USED | NO SCALE | 9

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DISH Wireless L.L.C.
PROJECT INFORMATION

NJJER01165A
11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

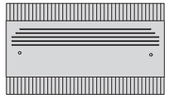
SHEET TITLE

EQUIPMENT DETAILS

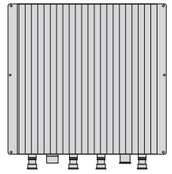
SHEET NUMBER

A-5

FUJITSU TRIPLE BAND TA08025-B605	
DIMENSIONS (HxWxD)	14.9"x15.7"x9"
WEIGHT	74.95 lbs
CONNECTOR TYPE	4.3-10 RF CONNECTOR
POWER SUPPLY	DC -58~-36V



PLAN



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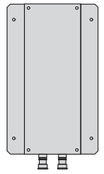
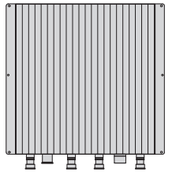


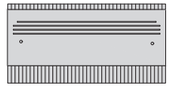
SIDE



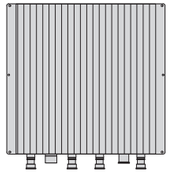
FRONT

RRH DETAIL | NO SCALE | 1

FUJITSU DUAL BAND TA08025-B604	
DIMENSIONS (HxWxD)	14.9"x15.7"x7.8"
WEIGHT	63.9 lbs
CONNECTOR TYPE	4.3-10 RF CONNECTOR
POWER SUPPLY	DC -58~-36V



PLAN



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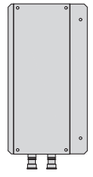

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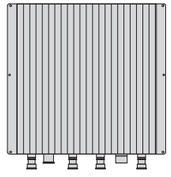
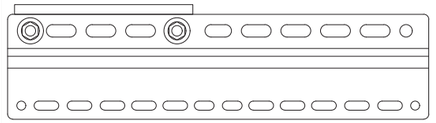


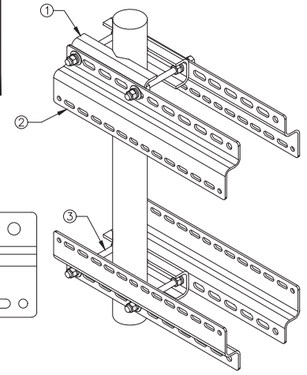
FRONT

RRH DETAIL | NO SCALE | 2

SABRE DOUBLE Z-BRACKET C10123155	
DIMENSIONS (HxWxD) (1 BRACKET)	5"x20"x1-13/16"
WEIGHT (FULL ASSEMBLY)	35.79 lbs
PACKAGE QUANTITY	4

#	DESCRIPTION
1	PLATE, CHANNEL BRACKET
2	RRH Z BRACKET, 3/16"
3	THREADED ROD ASSEMBLY 1/2"x12"



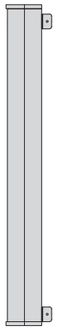


NOTE:
OR DISH Wireless L.L.C.
APPROVED EQUIVALENT

RRH MOUNT DETAIL | NO SCALE | 3

JMA MX08FRO665-21	
DIMENSIONS (HxWxD)	72"x20.0"x8.0"
RF PORTS, CONNECTOR TYPE	8 x 4.3-10 FEMALE
WEIGHT	64.5 lbs
WEIGHT WITH BRACKETS	82.5 lbs

PLAN



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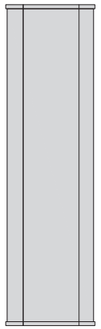


FRONT

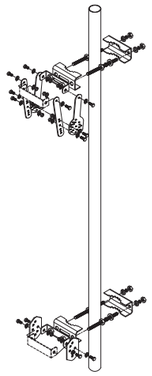
ANTENNA DETAIL | NO SCALE | 4

NOT USED | NO SCALE | 5

JMA ANTENNA MOUNT BRACKET #91900318	
TOTAL WEIGHT (WITH BRACKETS)	18 lbs (8.18 Kg)
POLE DIAMETER RANGE	2.5" TO 4.5"

NOTE:
KIT #91900318: TOP AND BOTTOM BRACKETS FOR 4-,6-, AND 8-FOOT ANTENNAS

ANTENNA BRACKET NOT PART OF KIT

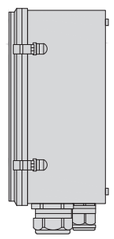


NOTE:
OR DISH Wireless L.L.C.
APPROVED EQUIVALENT

ANTENNA BRACKET DETAIL | NO SCALE | 6

RAYCAP RDIDC-9181-PF-48 DC SURGE PROTECTION (OVP)	
DIMENSIONS (HxWxD)	18.98"x14.39"x8.15"
WEIGHT	21.82 LBS

PLAN



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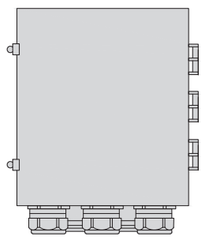

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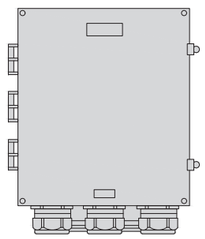
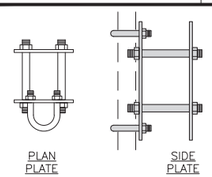


FRONT

SURGE SUPPRESSION DETAIL (OVP) | NO SCALE | 7

COMMSCOPE XP-2040 CROSSOVER PLATE	
DIMENSIONS (HxW)	10"x12"
WEIGHT	11 lbs

NOTE:
OR DISH Wireless L.L.C.
APPROVED EQUIVALENT

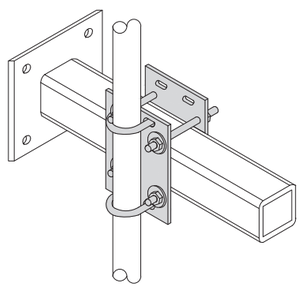


PLAN PLATE

SIDE PLATE

PLAN U-BOLT

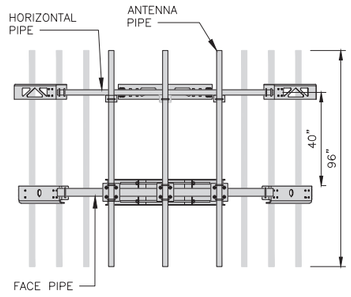
SIDE U-BOLT

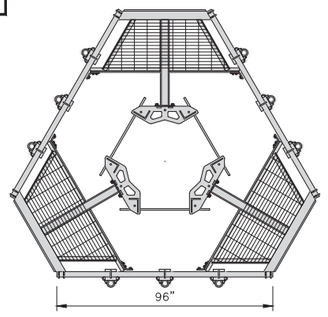


RRH/OVP MOUNT DETAIL | NO SCALE | 8

COMMSCOPE MC-PK8-DSH	
FACE WIDTH	96"
WEIGHT	1373.08 lbs
NOTE: 15" TO 38" O.D.	

NOTE:
OR DISH Wireless L.L.C.
APPROVED EQUIVALENT





ANTENNA PLATFORM DETAIL | NO SCALE | 9

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PEC.0001564
Expires 2/10/22

DRAWN BY:	CHECKED BY:	APPROVED BY:
SM	MAH	BLB

RFDS REV #: 3

CONSTRUCTION DOCUMENTS

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REV	DATE	DESCRIPTION
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0	10/26/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

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DISH Wireless L.L.C.
PROJECT INFORMATION

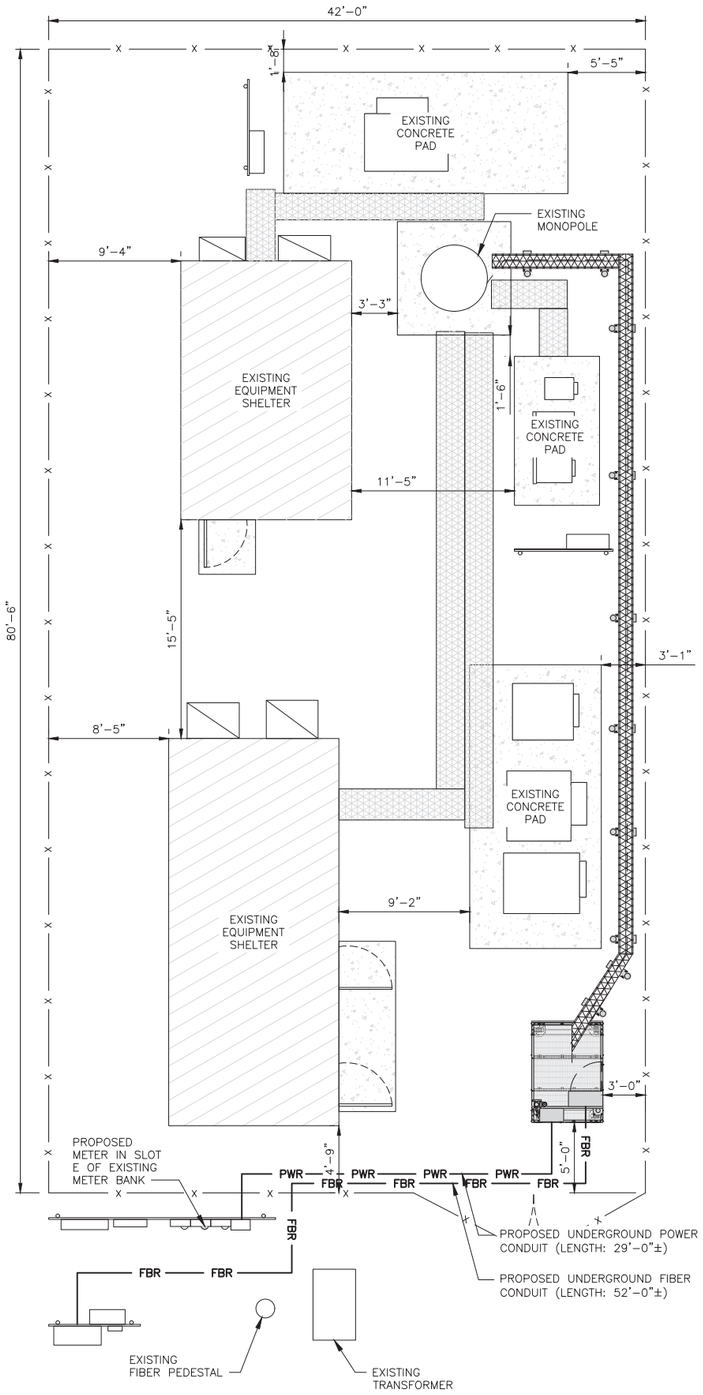
NJJER01165A
11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

SHEET TITLE

EQUIPMENT DETAILS

SHEET NUMBER

A-6



NOTES

1. CONTRACTOR SHALL FIELD VERIFY ALL PROPOSED UNDERGROUND UTILITY CONDUIT ROUTE.
2. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.

DC POWER WIRING SHALL BE COLOR CODED AT EACH END FOR IDENTIFYING +24V AND −48V CONDUCTORS. RED MARKINGS SHALL IDENTIFY +24V AND BLUE MARKINGS SHALL IDENTIFY −48V.

1. CONTRACTOR SHALL INSPECT THE EXISTING CONDITIONS PRIOR TO SUBMITTING A BID. ANY QUESTIONS ARISING DURING THE BID PERIOD IN REGARDS TO THE CONTRACTOR'S FUNCTIONS, THE SCOPE OF WORK, OR ANY OTHER ISSUE RELATED TO THIS PROJECT SHALL BE BROUGHT UP DURING THE BID PERIOD WITH THE PROJECT MANAGER FOR CLARIFICATION, NOT AFTER THE CONTRACT HAS BEEN AWARDED.
2. ALL ELECTRICAL WORK SHALL BE DONE IN ACCORDANCE WITH CURRENT NATIONAL ELECTRICAL CODES AND ALL STATE AND LOCAL CODES, LAWS, AND ORDINANCES. PROVIDE ALL COMPONENTS AND WIRING SIZES AS REQUIRED TO MEET NEC STANDARDS.
3. LOCATION OF EQUIPMENT, CONDUIT AND DEVICES SHOWN ON THE DRAWINGS ARE APPROXIMATE AND SHALL BE COORDINATED WITH FIELD CONDITIONS PRIOR TO CONSTRUCTION.
4. CONDUIT ROUGH-IN SHALL BE COORDINATED WITH THE MECHANICAL EQUIPMENT TO AVOID LOCATION CONFLICTS. VERIFY WITH THE MECHANICAL EQUIPMENT CONTRACTOR AND COMPLY AS REQUIRED.
5. CONTRACTOR SHALL PROVIDE ALL BREAKERS, CONDUITS AND CIRCUITS AS REQUIRED FOR A COMPLETE SYSTEM.
6. CONTRACTOR SHALL PROVIDE PULL BOXES AND JUNCTION BOXES AS REQUIRED BY THE NEC ARTICLE 314.
7. CONTRACTOR SHALL PROVIDE ALL STRAIN RELIEF AND CABLE SUPPORTS FOR ALL CABLE ASSEMBLIES. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
8. ALL DISCONNECTS AND CONTROLLING DEVICES SHALL BE PROVIDED WITH ENGRAVED PHENOLIC NAMEPLATES INDICATING EQUIPMENT CONTROLLED, BRANCH CIRCUITS INSTALLED ON, AND PANEL FIELD LOCATIONS FED FROM.
9. INSTALL AN EQUIPMENT GROUNDING CONDUCTOR IN ALL CONDUITS PER THE SPECIFICATIONS AND NEC 250. THE EQUIPMENT GROUNDING CONDUCTORS SHALL BE BONDED AT ALL JUNCTION BOXES, PULL BOXES, AND ALL DISCONNECT SWITCHES, AND EQUIPMENT CABINETS.
10. ALL NEW MATERIAL SHALL HAVE A U.L. LABEL.
11. PANEL SCHEDULE LOADING AND CIRCUIT ARRANGEMENTS REFLECT POST-CONSTRUCTION EQUIPMENT.
12. CONTRACTOR SHALL BE RESPONSIBLE FOR AS-BUILT PANEL SCHEDULE AND SITE DRAWINGS.
13. ALL TRENCHES IN COMPOUND TO BE HAND DUG

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SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

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RFDS REV #: 3

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	8/2/21	ISSUED FOR REVIEW
0	10/26/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

153441.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

NJJER01165A
11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

SHEET TITLE

ELECTRICAL/FIBER ROUTE PLAN AND NOTES

SHEET NUMBER

E-1

UTILITY ROUTE PLAN

6' 4' 2' 0 5' 10'
3/16"=1'-0"

1

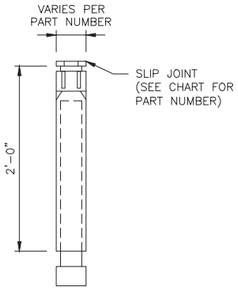
ELECTRICAL NOTES

NO SCALE

2

CARLON EXPANSION FITTINGS

COUPLING END PART#	MALE TERMINAL ADAPTER END PART#	SIZE	STD CTN QTY.	TRAVEL LENGTH
E945D	E945DX	1/2"	20	4"
E945E	E945EX	3/4"	15	4"
E945F	E945FX	1"	10	4"
E945G	E945GX	1 1/4"	5	4"
E945H	E945HX	1 1/2"	5	4"
E945J	E945JX	2"	15	8"
E945K	E945KX	2 1/2"	10	8"
E945L	E945LX	3"	10	8"
E945M	E945MX	3 1/2"	5	8"
E945N	E945NX	4"	5	8"
E945P	E945PX	5"	1	8"
E945R	E945RX	6"	1	8"

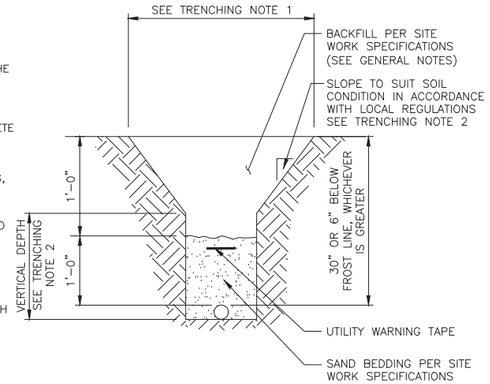


NOTE:
CONTRACTOR TO INSTALL EXPANSION FITTING SLIP JOINT AT METER CENTER CONDUIT TERMINATION, AS PER LOCAL UTILITY POLICY, ORDINANCE AND/OR SPECIFIED REQUIREMENT.

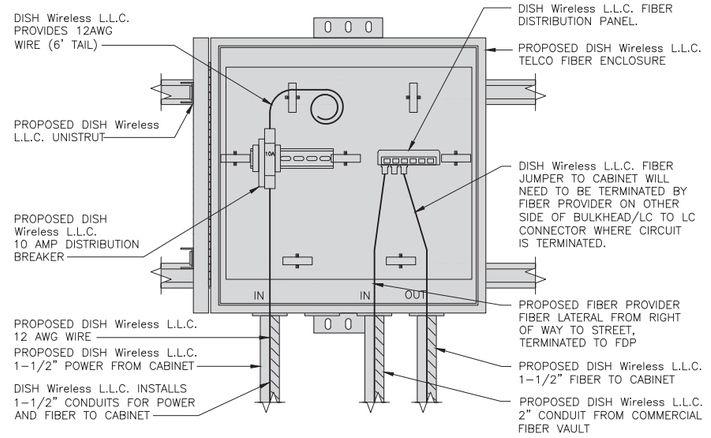
EXPANSION JOINT DETAIL | NO SCALE | 1

TRENCHING NOTES

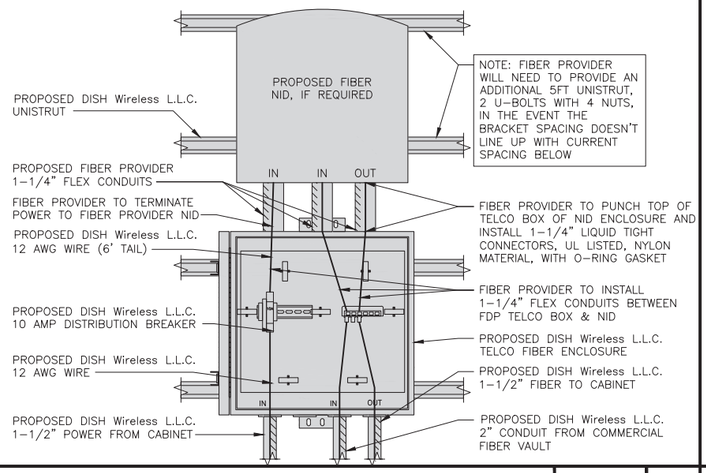
1. CONTRACTOR SHALL RESTORE THE TRENCH TO ITS ORIGINAL CONDITIONS BY EITHER SEEDING OR SODDING GRASS AREAS, OR REPLACING ASPHALT OR CONCRETE AREAS TO ITS ORIGINAL CROSS SECTION.
2. TRENCHING SAFETY; INCLUDING, BUT NOT LIMITED TO SOIL CLASSIFICATION, SLOPING, AND SHORING, SHALL BE GOVERNED BY THE CURRENT OSHA TRENCHING AND EXCAVATION SAFETY STANDARDS.
3. ALL CONDUITS SHALL BE INSTALLED IN COMPLIANCE WITH THE CURRENT NATIONAL ELECTRIC CODE (NEC) OR AS REQUIRED BY THE LOCAL JURISDICTION, WHICHEVER IS THE MOST STRINGENT.



TYPICAL UNDERGROUND TRENCH DETAIL | NO SCALE | 2



DARK TELCO BOX – INTERIOR WIRING LAYOUT | NO SCALE | 3



LIT TELCO BOX – INTERIOR WIRING LAYOUT (OPTIONAL) | NO SCALE | 4

NOT USED | NO SCALE | 5

NOT USED | NO SCALE | 6

NOT USED | NO SCALE | 7

NOT USED | NO SCALE | 8

NOT USED | NO SCALE | 9

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SUITE 300
TULSA, OK 74119
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PROJECT INFORMATION

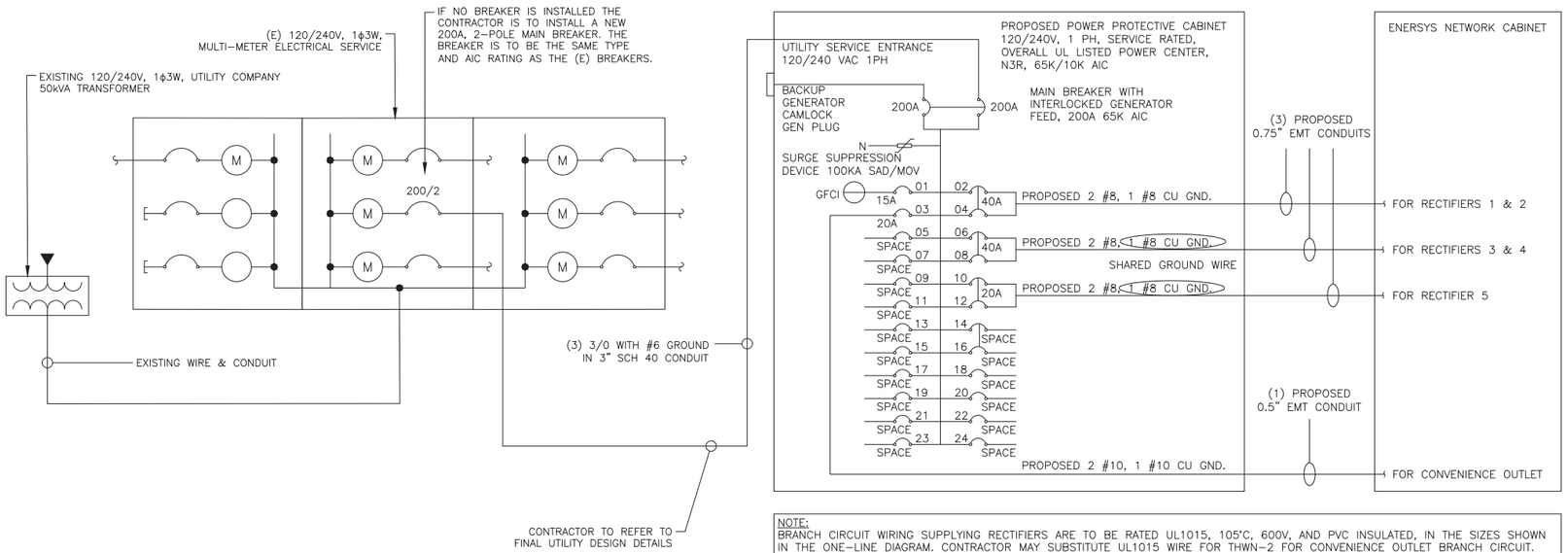
NJJER01165A
11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

SHEET TITLE

ELECTRICAL DETAILS

SHEET NUMBER

E-2



NOTE:
BRANCH CIRCUIT WIRING SUPPLYING RECTIFIERS ARE TO BE RATED UL1015, 105°C, 600V, AND PVC INSULATED, IN THE SIZES SHOWN IN THE ONE-LINE DIAGRAM. CONTRACTOR MAY SUBSTITUTE UL1015 WIRE FOR THWN-2 FOR CONVENIENCE OUTLET BRANCH CIRCUIT.

BREAKERS REQUIRED:
(2) 40A, 2P BREAKER - SQUARE D P/N:QO240
(1) 20A, 2P BREAKER - SQUARE D P/N:QO220
(1) 20A, 1P BREAKER - SQUARE D P/N:QO120

NOTES

CONDUIT SIZING: AT 40% FILL PER NEC CHAPTER 9, TABLE 4, ARTICLE 358.
0.5" CONDUIT - 0.122 SQ. IN AREA
0.75" CONDUIT - 0.213 SQ. IN AREA
2.0" CONDUIT - 1.316 SQ. IN AREA
3.0" CONDUIT - 2.907 SQ. IN AREA

CABINET CONVENIENCE OUTLET CONDUCTORS (1 CONDUIT): USING THWN-2, CU.

#10 - 0.0211 SQ. IN X 2 = 0.0422 SQ. IN
#10 - 0.0211 SQ. IN X 1 = 0.0211 SQ. IN <GROUND
TOTAL = 0.0633 SQ. IN

0.5" EMT CONDUIT IS ADEQUATE TO HANDLE THE TOTAL OF (3) WIRES, INCLUDING GROUND WIRE, AS INDICATED ABOVE.

RECTIFIER CONDUCTORS (3 CONDUITS): USING UL1015, CU.

#8 - 0.0552 SQ. IN X 2 = 0.1103 SQ. IN
#8 - 0.0131 SQ. IN X 1 = 0.0131 SQ. IN <BARE GROUND
TOTAL = 0.1234 SQ. IN

0.75" EMT CONDUIT IS ADEQUATE TO HANDLE THE TOTAL OF (3) WIRES, INCLUDING GROUND WIRE, AS INDICATED ABOVE.

PPC FEED CONDUCTORS (1 CONDUIT): USING THWN, CU.

3/0 - 0.2679 SQ. IN X 3 = 0.8037 SQ. IN
#6 - 0.0507 SQ. IN X 1 = 0.0507 SQ. IN <GROUND
TOTAL = 0.8544 SQ. IN

3.0" SCH 40 PVC CONDUIT IS ADEQUATE TO HANDLE THE TOTAL OF (4) WIRES, INCLUDING GROUND WIRE, AS INDICATED ABOVE.

PPC ONE-LINE DIAGRAM — NO SCALE — 1

PROPOSED ENERSYS PANEL SCHEDULE

LOAD SERVED	VOLT AMPS (WATTS) L1	VOLT AMPS (WATTS) L2	TRIP	CKT #	PHASE	CKT #	TRIP	VOLT AMPS (WATTS) L1	VOLT AMPS (WATTS) L2	LOAD SERVED
PPC GFCI OUTLET	180		15A	1	A	2	40A	3840		ENERSYS ALPHA CORDEX
ENERSYS GFCI OUTLET		180	20A	3	B	4			3840	RECTIFIERS 1 & 2
-SPACE-				5	A	6	40A	3840		ENERSYS ALPHA CORDEX
-SPACE-				7	B	8			3840	RECTIFIER 3 & 4
-SPACE-				9	A	10	20A	1920		ENERSYS ALPHA CORDEX
-SPACE-				11	B	12			1920	RECTIFIER 5
-SPACE-				13	A	14				-SPACE-
-SPACE-				15	B	16				-SPACE-
-SPACE-				17	A	18				-SPACE-
-SPACE-				19	B	20				-SPACE-
-SPACE-				21	A	22				-SPACE-
-SPACE-				23	B	24				-SPACE-
VOLTAGE AMPS	180	180						9500	9500	

200A MCB, 1φ, 24 SPACE, 120/240V	L1	L2	
MB RATING: 65,000 AIC	9680	9680	VOLTAGE AMPS
	81	81	AMPS
	81		MAX AMPS
	102		MAX 125%

PANEL SCHEDULE — NO SCALE — 2

NOT USED — NO SCALE — 3

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5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA
8051 CONGRESS AVENUE
BOCA RATON, FL 33487

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
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DISH Wireless L.L.C.
PROJECT INFORMATION

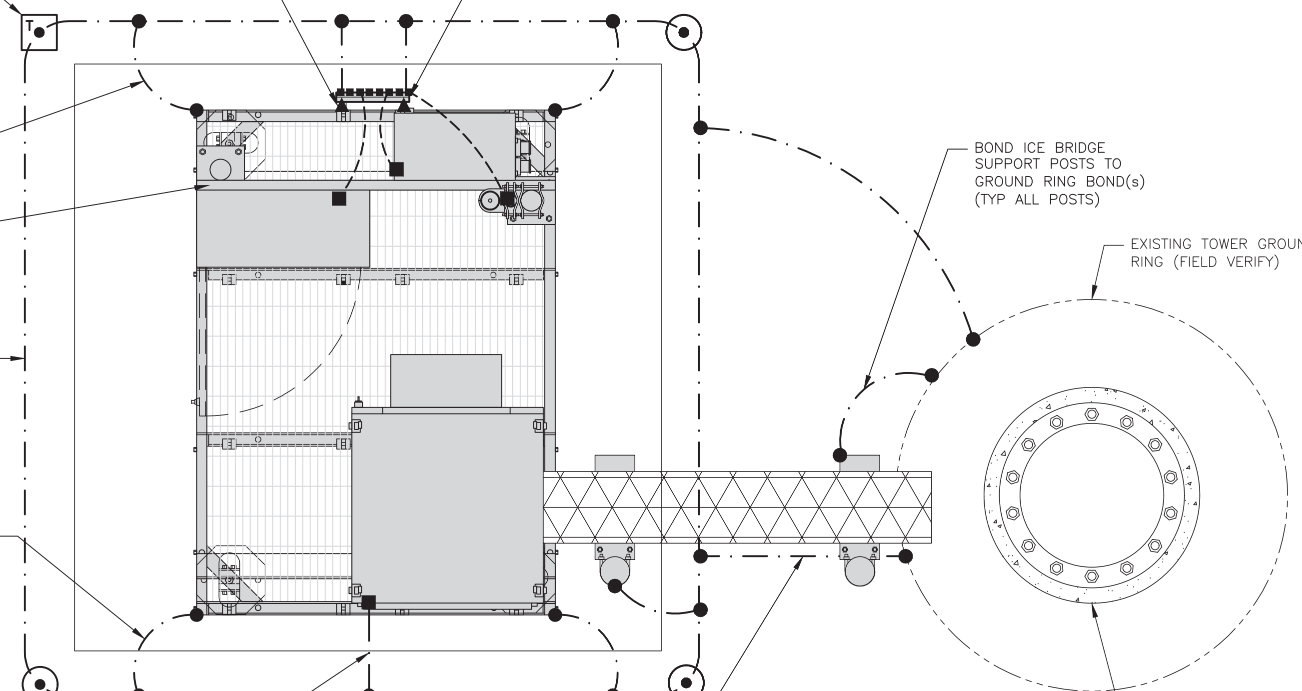
NJJER01165A
11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

SHEET TITLE

ELECTRICAL ONE-LINE, FAULT CALCS & PANEL SCHEDULE

SHEET NUMBER

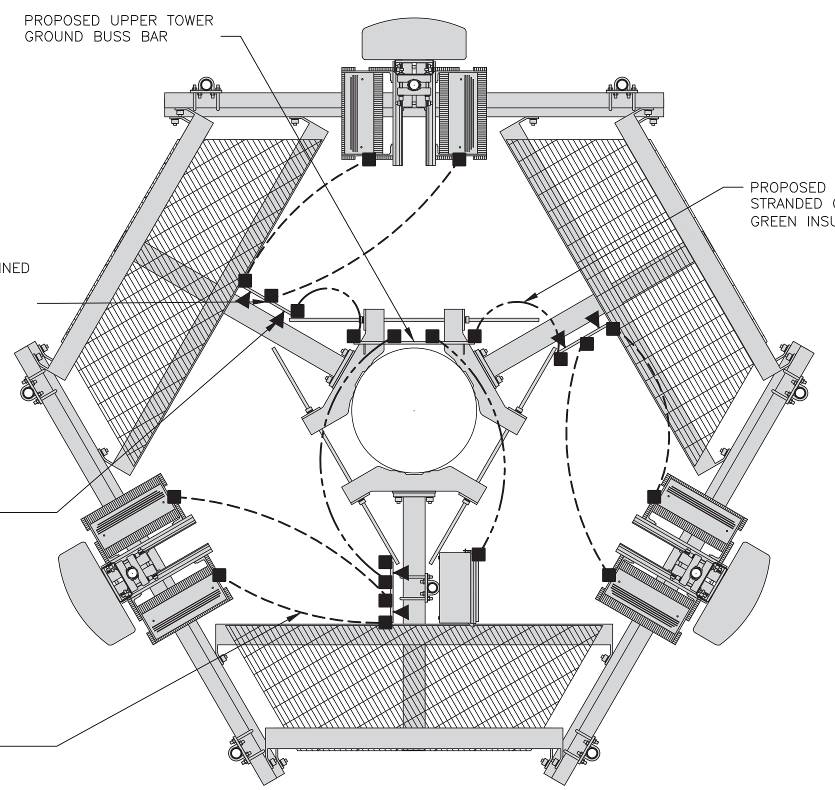
E-3



TYPICAL EQUIPMENT GROUNDING PLAN | NO SCALE | 1

NOTES

ANTENNAS AND OVP SHOWN ARE GENERIC AND NOT REFERENCING TO A SPECIFIC MANUFACTURER. THIS LAYOUT IS FOR REFERENCE PURPOSES ONLY



TYPICAL ANTENNA GROUNDING PLAN | NO SCALE | 2

GROUNDING LEGEND

- ● EXOTHERMIC CONNECTION
- ■ MECHANICAL CONNECTION
- GROUND BUS BAR
- ⊙ GROUND ROD
- TEST GROUND ROD WITH INSPECTION SLEEVE
- ------ #6 AWG STRANDED & INSULATED
- -·-·- #2 AWG SOLID COPPER TINNED
- ▲ BUSS BAR INSULATOR

1. GROUNDING IS SHOWN DIAGRAMMATICALLY ONLY.
2. CONTRACTOR SHALL GROUND ALL EQUIPMENT AS A COMPLETE SYSTEM. GROUNDING SHALL BE IN COMPLIANCE WITH NEC SECTION 250 AND DISH Wireless L.L.C. GROUNDING AND BONDING REQUIREMENTS AND MANUFACTURER'S SPECIFICATIONS.
3. ALL GROUND CONDUCTORS SHALL BE COPPER; NO ALUMINUM CONDUCTORS SHALL BE USED.

GROUNDING KEY NOTES

(A) EXTERIOR GROUND RING: #2 AWG SOLID COPPER, BURIED AT A DEPTH OF AT LEAST 30 INCHES BELOW GRADE, OR 6 INCHES BELOW THE FROST LINE AND APPROXIMATELY 24 INCHES FROM THE EXTERIOR WALL OR FOOTING.

(B) TOWER GROUND RING: THE GROUND RING SYSTEM SHALL BE INSTALLED AROUND AN ANTENNA TOWER'S LEGS, AND/OR GUY ANCHORS. WHERE SEPARATE SYSTEMS HAVE BEEN PROVIDED FOR THE TOWER AND THE BUILDING, AT LEAST TWO BONDS SHALL BE MADE BETWEEN THE TOWER RING GROUND SYSTEM AND THE BUILDING RING GROUND SYSTEM USING MINIMUM #2 AWG SOLID COPPER CONDUCTORS.

(C) INTERIOR GROUND RING: #2 AWG STRANDED GREEN INSULATED COPPER CONDUCTOR EXTENDED AROUND THE PERIMETER OF THE EQUIPMENT AREA. ALL NON-TELECOMMUNICATIONS RELATED METALLIC OBJECTS FOUND WITHIN A SITE SHALL BE GROUNDED TO THE INTERIOR GROUND RING WITH #6 AWG STRANDED GREEN INSULATED CONDUCTOR.

(D) BOND TO INTERIOR GROUND RING: #2 AWG SOLID TINNED COPPER WIRE PRIMARY BONDS SHALL BE PROVIDED AT LEAST AT FOUR POINTS ON THE INTERIOR GROUND RING, LOCATED AT THE CORNERS OF THE BUILDING.

(E) GROUND ROD: UL LISTED COPPER CLAD STEEL. MINIMUM 1/2" DIAMETER BY EIGHT FEET LONG. GROUND RODS SHALL BE INSTALLED WITH INSPECTION SLEEVES. GROUND RODS SHALL BE DRIVEN TO THE DEPTH OF GROUND RING CONDUCTOR.

(F) CELL REFERENCE GROUND BAR: POINT OF GROUND REFERENCE FOR ALL COMMUNICATIONS EQUIPMENT FRAMES. ALL BONDS ARE MADE WITH #2 AWG UNLESS NOTED OTHERWISE STRANDED GREEN INSULATED COPPER CONDUCTORS. BOND TO GROUND RING WITH (2) #2 SOLID TINNED COPPER CONDUCTORS.

(G) HATCH PLATE GROUND BAR: BOND TO THE INTERIOR GROUND RING WITH TWO #2 AWG STRANDED GREEN INSULATED COPPER CONDUCTORS. WHEN A HATCH-PLATE AND A CELL REFERENCE GROUND BAR ARE BOTH PRESENT, THE CRGB MUST BE CONNECTED TO THE HATCH-PLATE AND TO THE INTERIOR GROUND RING USING (2) TWO #2 AWG STRANDED GREEN INSULATED COPPER CONDUCTORS EACH.

(H) EXTERIOR CABLE ENTRY PORT GROUND BARS: LOCATED AT THE ENTRANCE TO THE CELL SITE BUILDING. BOND TO GROUND RING WITH A #2 AWG SOLID TINNED COPPER CONDUCTORS WITH AN EXOTHERMIC WELD AND INSPECTION SLEEVE.

(I) TELCO GROUND BAR: BOND TO BOTH CELL REFERENCE GROUND BAR OR EXTERIOR GROUND RING.

(J) FRAME BONDING: THE BONDING POINT FOR TELECOM EQUIPMENT FRAMES SHALL BE THE GROUND BUS THAT IS NOT ISOLATED FROM THE EQUIPMENTS METAL FRAMEWORK.

(K) INTERIOR UNIT BONDS: METAL FRAMES, CABINETS AND INDIVIDUAL METALLIC UNITS LOCATED WITH THE AREA OF THE INTERIOR GROUND RING REQUIRE A #6 AWG STRANDED GREEN INSULATED COPPER BOND TO THE INTERIOR GROUND RING.

(L) FENCE AND GATE GROUNDING: METAL FENCES WITHIN 7 FEET OF THE EXTERIOR GROUND RING OR OBJECTS BONDED TO THE EXTERIOR GROUND RING SHALL BE BONDED TO THE GROUND RING WITH A #2 AWG SOLID TINNED COPPER CONDUCTOR AT AN INTERVAL NOT EXCEEDING 25 FEET. BONDS SHALL BE MADE AT EACH GATE POST AND ACROSS GATE OPENINGS.

(M) EXTERIOR UNIT BONDS: METALLIC OBJECTS, EXTERNAL TO OR MOUNTED TO THE BUILDING, SHALL BE BONDED TO THE EXTERIOR GROUND RING. USING #2 TINNED SOLID COPPER WIRE

(N) ICE BRIDGE SUPPORTS: EACH ICE BRIDGE LEG SHALL BE BONDED TO THE GROUND RING WITH #2 AWG BARE TINNED COPPER CONDUCTOR. PROVIDE EXOTHERMIC WELDS AT BOTH THE ICE BRIDGE LEG AND BURIED GROUND RING.

(O) DURING ALL DC POWER SYSTEM CHANGES INCLUDING DC SYSTEM CHANGE OUTS, RECTIFIER REPLACEMENTS OR ADDITIONS, BREAKER DISTRIBUTION CHANGES, BATTERY ADDITIONS, BATTERY REPLACEMENTS AND INSTALLATIONS OR CHANGES TO DC CONVERTER SYSTEMS IT SHALL BE REQUIRED THAT SERVICE CONTRACTORS VERIFY ALL DC POWER SYSTEMS ARE EQUIPPED WITH A MASTER DC SYSTEM RETURN GROUND CONDUCTOR FROM THE DC POWER SYSTEM COMMON RETURN BUS DIRECTLY CONNECTED TO THE CELL SITE REFERENCE GROUND BAR

(P) TOWER TOP COLLECTOR BUSS BAR IS TO BE MECHANICALLY BONDED TO PROPOSED ANTENNA MOUNT COLLAR.

REFER TO DISH Wireless L.L.C. GROUNDING NOTES.

GROUNDING KEY NOTES | NO SCALE | 3

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5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA
8051 CONGRESS AVENUE
BOCA RATON, FL 33487

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1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
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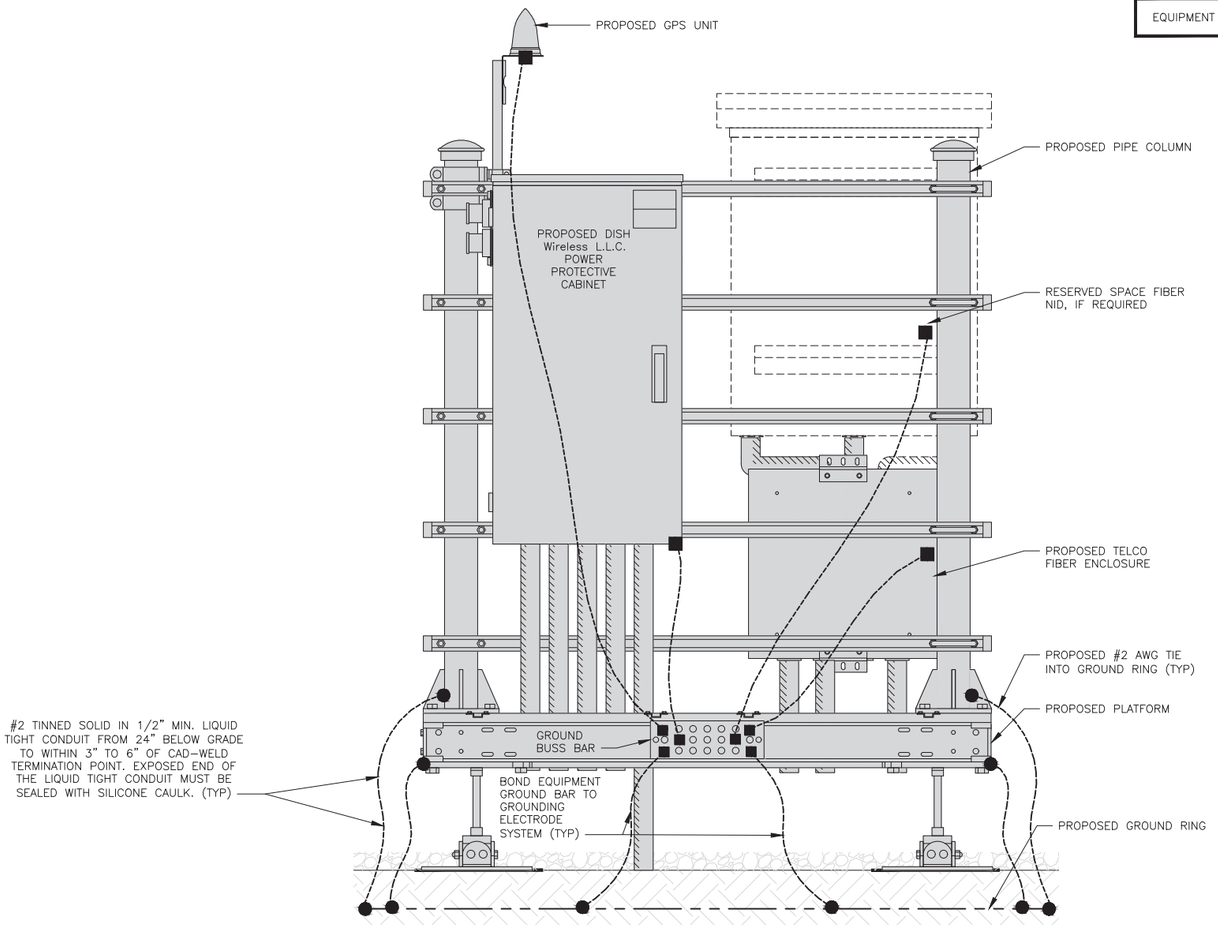
NJJER01165A
11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

SHEET TITLE
GROUNDING PLANS AND NOTES

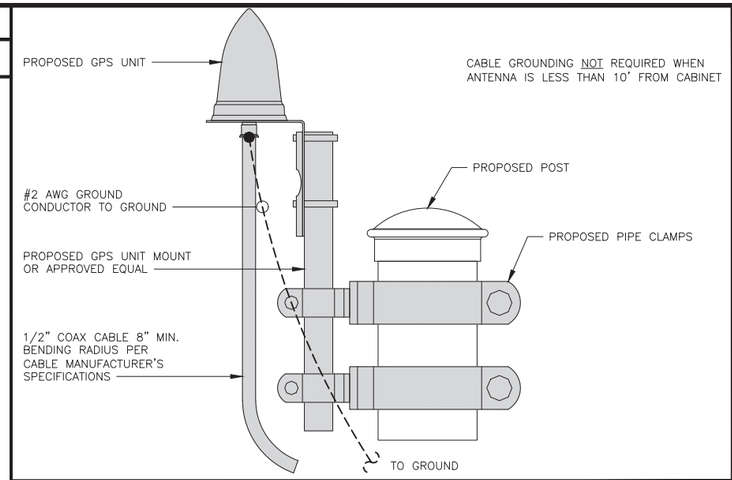
SHEET NUMBER
G-1

NOTES

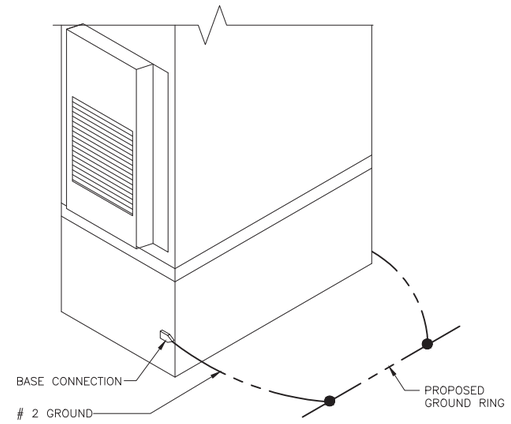
EQUIPMENT CABINET OMITTED FOR CLARITY



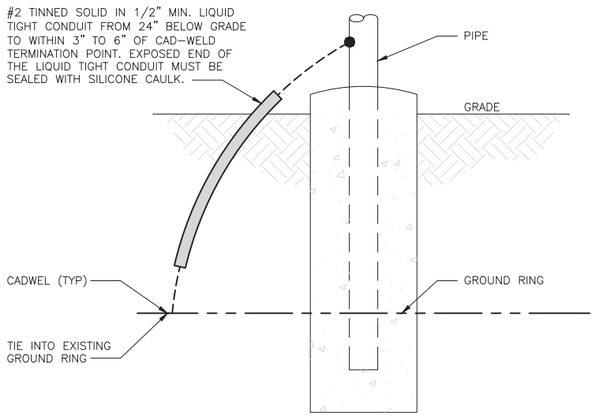
H-FRAME GROUNDING DETAIL | NO SCALE | 1



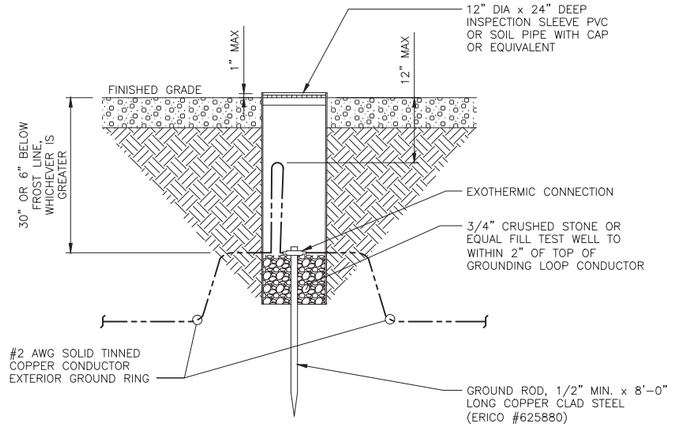
TYPICAL GPS UNIT GROUNDING | NO SCALE | 2



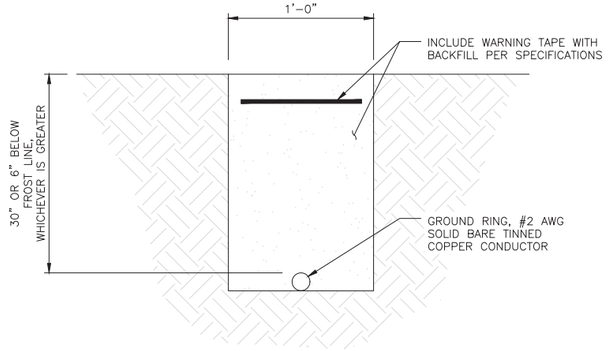
OUTDOOR CABINET GROUNDING | NO SCALE | 3



TRANSITIONING GROUND DETAIL | NO SCALE | 4



TYPICAL TEST GROUND ROD WITH INSPECTION SLEEVE | NO SCALE | 5



TYPICAL GROUND RING TRENCH | NO SCALE | 6

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BETHEL, CT 06801

SHEET TITLE

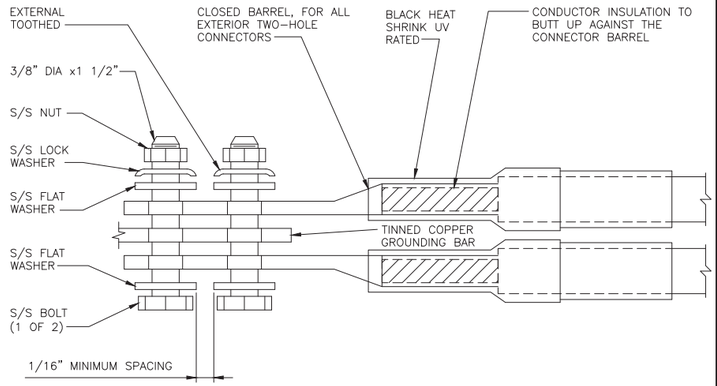
GROUNDING DETAILS

SHEET NUMBER

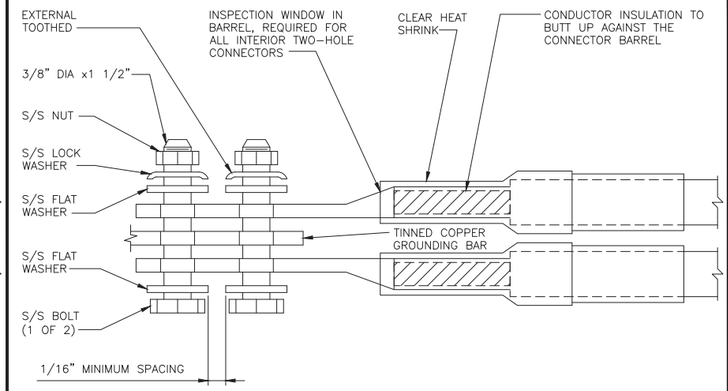
G-2

1. EXOTHERMIC WELD (2) TWO, #2 AWG BARE TINNED SOLID COPPER CONDUCTORS TO GROUND BAR, ROUTE CONDUCTORS TO BURIED GROUND RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
2. ALL EXTERIOR GROUNDING HARDWARE SHALL BE STAINLESS STEEL 3/8" DIAMETER OR LARGER. ALL HARDWARE 18-8 STAINLESS STEEL INCLUDING LOCK WASHERS, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
3. FOR GROUND BOND TO STEEL ONLY: COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
4. DO NOT INSTALL CABLE GROUNDING KIT AT A BEND AND ALWAYS DIRECT GROUND CONDUCTOR DOWN TO GROUNDING BUS.
5. NUT & WASHER SHALL BE PLACED ON THE FRONT SIDE OF THE GROUND BAR AND BOLTED ON THE BACK SIDE.
6. ALL GROUNDING PARTS AND EQUIPMENT TO BE SUPPLIED AND INSTALLED BY CONTRACTOR.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL GROUND BAR AS REQUIRED.
8. ENSURE THE WIRE INSULATION TERMINATION IS WITHIN 1/8" OF THE BARREL (NO SHINERS).

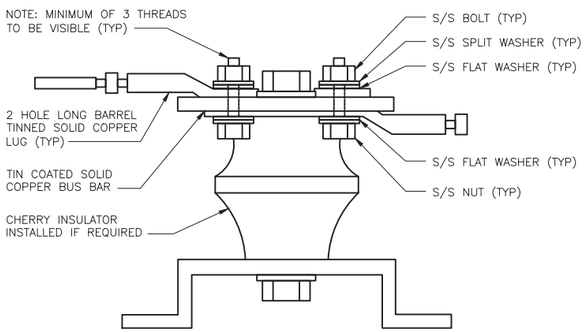
TYPICAL GROUNDING NOTES | NO SCALE | 1



TYPICAL EXTERIOR TWO HOLE LUG | NO SCALE | 2



TYPICAL INTERIOR TWO HOLE LUG | NO SCALE | 3



LUG DETAIL | NO SCALE | 4

NOT USED | NO SCALE | 5

NOT USED | NO SCALE | 6

NOT USED | NO SCALE | 7

NOT USED | NO SCALE | 8

NOT USED | NO SCALE | 9

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA

8051 CONGRESS AVENUE
BOCA RATON, FL 33487

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

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

DRAWN BY:	CHECKED BY:	APPROVED BY:
SM	MAH	BLB

RFDS REV #: 3

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	8/2/21	ISSUED FOR REVIEW
0	10/26/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

153441.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

NJJER01165A
11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

SHEET TITLE

GROUNDING DETAILS

SHEET NUMBER

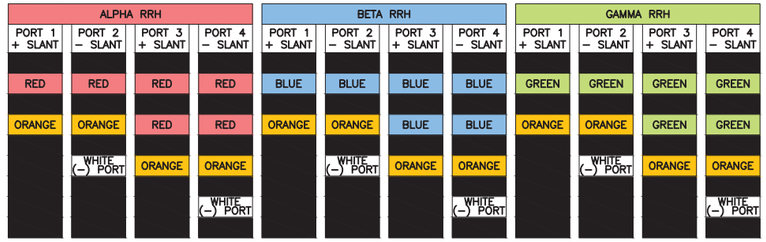
G-3

HYBRID/DISCREET CABLES

3/4" TAPE WIDTHS WITH 3/4" SPACING

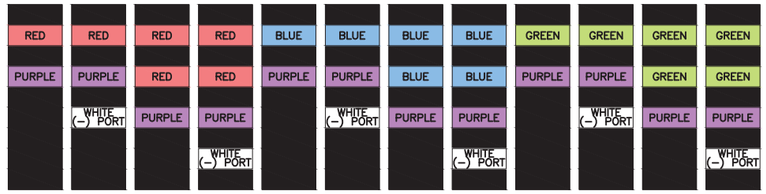
LOW–BAND RRH
(600 MHz N71 BASEBAND) +
(850 MHz N26 BAND) +
(700 MHz N29 BAND) – OPTIONAL PER MARKET

ADD FREQUENCY COLOR TO SECTOR BAND
(CBRS WILL USE YELLOW BAND)



MID–BAND RRH
(AWS BANDS N66+N70)

ADD FREQUENCY COLOR TO SECTOR BAND
(CBRS WILL USE YELLOW BANDS)



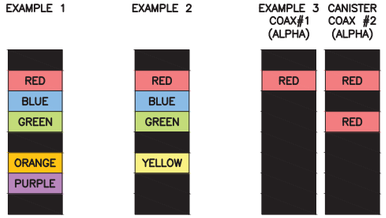
HYBRID/DISCREET CABLES

INCLUDE SECTOR BANDS BEING SUPPORTED ALONG WITH FREQUENCY BANDS.

EXAMPLE 1 – HYBRID, OR DISCREET, SUPPORTS ALL SECTORS, BOTH LOW–BANDS AND MID–BANDS.

EXAMPLE 2 – HYBRID, OR DISCREET, SUPPORTS CBRS ONLY, ALL SECTORS.

EXAMPLE 3 – MAIN COAX WITH GROUND MOUNTED RRHs.



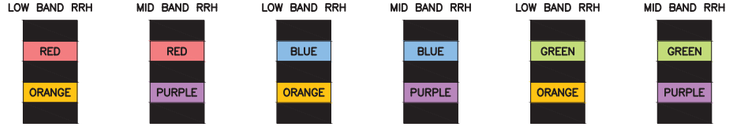
CONTRACTOR TO REFER TO FINAL CONSTRUCTION RFDS FOR ALL RD DETAILS. FINAL RFDS IS IN NEXSYSONE.

FIBER JUMPERS TO RRHs

LOW–BAND HHR FIBER CABLES HAVE SECTOR STRIPE ONLY.

POWER CABLES TO RRHs

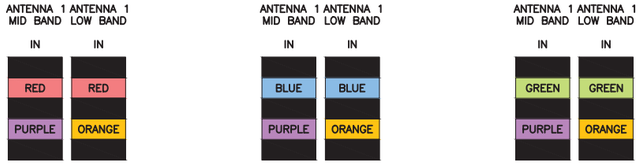
LOW–BAND RRH POWER CABLES HAVE SECTOR STRIPE ONLY



RET MOTORS AT ANTENNAS

RET CONTROL IS HANDLED BY THE MID–BAND RRH WHEN ONE SET OF RET PORTS EXIST ON ANTENNA.

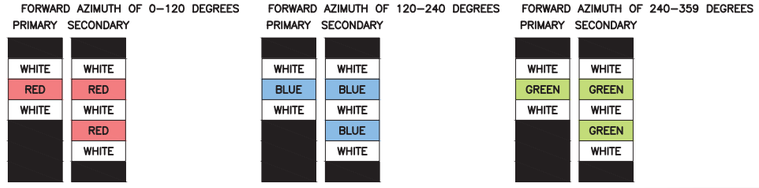
SEPARATE RET CABLES ARE USED WHEN ANTENNA PORTS PROVIDE INPUTS FOR BOTH LOW AND MID BANDS.



MICROWAVE RADIO LINKS

LINKS WILL HAVE A 1.5–2 INCH WHITE WRAP WITH THE AZIMUTH COLOR OVERLAPPING IN THE MIDDLE.
ADD ADDITIONAL SECTOR COLOR BANDS FOR EACH ADDITIONAL MW RADIO.

MICROWAVE CABLES WILL REQUIRE P–TOUCH LABELS INSIDE THE CABINET TO IDENTIFY THE LOCAL AND REMOTE SITE ID's.



RF CABLE COLOR CODES | NO SCALE | 1

LOW BANDS (N71+N26) OPTIONAL – (N29): ORANGE

AWS (N66+N70+H–BLOCK): PURPLE

CBRS TECH (3 GHz): YELLOW

NEGATIVE SLANT PORT ON ANT/RRH: WHITE

ALPHA SECTOR: RED

BETA SECTOR: BLUE

GAMMA SECTOR: GREEN

COLOR IDENTIFIER | NO SCALE | 2

NOT USED | NO SCALE | 3

NOT USED | NO SCALE | 4

dish wireless.

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BOCA RATON, FL 33487

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

STATE OF CONNECTICUT · No. 23024 · REGISTERED PROFESSIONAL ENGINEER
10/26/2021

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

DRAWN BY:	CHECKED BY:	APPROVED BY:
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DISH Wireless L.L.C.
PROJECT INFORMATION
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11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

SHEET TITLE
RF
CABLE COLOR CODES

SHEET NUMBER
RF-1

LEGEND

EXOTHERMIC CONNECTION

MECHANICAL CONNECTION

BUSS BAR INSULATOR

CHEMICAL ELECTROLYTIC GROUNDING SYSTEM

TEST CHEMICAL ELECTROLYTIC GROUNDING SYSTEM — T

EXOTHERMIC WITH INSPECTION SLEEVE

GROUNDING BAR

GROUND ROD

TEST GROUND ROD WITH INSPECTION SLEEVE — T

SINGLE POLE SWITCH

DUPLEX RECEPTACLE

DUPLEX GFCI RECEPTACLE — GFCI

FLUORESCENT LIGHTING FIXTURE (2) TWO LAMPS 48–T8 — F

SMOKE DETECTION (DC) — SD

EMERGENCY LIGHTING (DC)

SECURITY LIGHT W/PHOTOCELL LITHONIA ALXW LED–1–25A400/51K–SR4–120–PE–DDBTXD

CHAIN LINK FENCE — X X X X

WOOD/WROUGHT IRON FENCE

WALL STRUCTURE

LEASE AREA

PROPERTY LINE (PL)

SETBACKS

ICE BRIDGE

CABLE TRAY

WATER LINE — W W W W W

UNDERGROUND POWER — UGP UGP UGP UGP UGP

UNDERGROUND TELCO — UGT UGT UGT UGT UGT

OVERHEAD POWER — OHP OHP OHP OHP

OVERHEAD TELCO — OHT OHT OHT OHT

UNDERGROUND TELCO/POWER — UGT/P UGT/P UGT/P UGT/P

ABOVE GROUND POWER — AGP AGP AGP AGP AGP

ABOVE GROUND TELCO — AGT AGT AGT AGT AGT

ABOVE GROUND TELCO/POWER — AGT/P AGT/P AGT/P AGT/P

WORKPOINT — W.P.

SECTION REFERENCE — XX / X–X

DETAIL REFERENCE — XX / X–X

ABBREVIATIONS

AB	ANCHOR BOLT
ABV	ABOVE
AC	ALTERNATING CURRENT
ADDL	ADDITIONAL
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AGL	ABOVE GROUND LEVEL
AIC	AMPERAGE INTERRUPTION CAPACITY
ALUM	ALUMINUM
ALT	ALTERNATE
ANT	ANTENNA
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BATT	BATTERY
BLDG	BUILDING
BLK	BLOCK
BLKG	BLOCKING
BM	BEAM
BTC	BARE TINNED COPPER CONDUCTOR
BOF	BOTTOM OF FOOTING
CAB	CABINET
CANT	CANTILEVERED
CHG	CHARGING
CLG	CEILING
CLR	CLEAR
COL	COLUMN
COMM	COMMON
CONC	CONCRETE
CONSTR	CONSTRUCTION
DBL	DOUBLE
DC	DIRECT CURRENT
DEPT	DEPARTMENT
DF	DOUGLAS FIR
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DWG	DRAWING
DWL	DOWEL
EA	EACH
EC	ELECTRICAL CONDUCTOR
EL.	ELEVATION
ELEC	ELECTRICAL
EMT	ELECTRICAL METALLIC TUBING
ENG	ENGINEER
EQ	EQUAL
EXP	EXPANSION
EXT	EXTERIOR
EW	EACH WAY
FAB	FABRICATION
FF	FINISH FLOOR
FG	FINISH GRADE
FIF	FACILITY INTERFACE FRAME
FIN	FINISH(ED)
FLR	FLOOR
FDN	FOUNDATION
FOC	FACE OF CONCRETE
FOM	FACE OF MASONRY
FOS	FACE OF STUD
FOW	FACE OF WALL
FS	FINISH SURFACE
FT	FOOT
FTG	FOOTING
GA	GAUGE
GEN	GENERATOR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GLB	GLUE LAMINATED BEAM
GLV	GALVANIZED
GPS	GLOBAL POSITIONING SYSTEM
GND	GROUND
GSM	GLOBAL SYSTEM FOR MOBILE
HDG	HOT DIPPED GALVANIZED
HDR	HEADER
HGR	HANGER
HVAC	HEAT/VENTILATION/AIR CONDITIONING
HT	HEIGHT
IGR	INTERIOR GROUND RING
IN	INCH
INT	INTERIOR
LB(S)	POUND(S)
LF	LINEAR FEET
LTE	LONG TERM EVOLUTION
MAS	MASONRY
MAX	MAXIMUM
MB	MACHINE BOLT
MECH	MECHANICAL
MFR	MANUFACTURER
MGB	MASTER GROUND BAR
MIN	MINIMUM
MISC	MISCELLANEOUS
MTL	METAL
MTS	MANUAL TRANSFER SWITCH
MW	MICROWAVE
NEC	NATIONAL ELECTRIC CODE
NM	NEWTON METERS
NO.	NUMBER
#	NUMBER
NTS	NOT TO SCALE
OC	ON–CENTER
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
OPNG	OPENING
P/C	PRECAST CONCRETE
PCS	PERSONAL COMMUNICATION SERVICES
PCU	PRIMARY CONTROL UNIT
PRC	PRIMARY RADIO CABINET
PP	POLARIZING PRESERVING
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	PRESSURE TREATED
PWR	POWER CABINET
QTY	QUANTITY
RAD	RADIUS
RECT	RECTIFIER
REF	REFERENCE
REINF	REINFORCEMENT
REQ'D	REQUIRED
RET	REMOTE ELECTRIC TILT
RF	RADIO FREQUENCY
RMC	RIGID METALLIC CONDUIT
RRH	REMOTE RADIO HEAD
RRU	REMOTE RADIO UNIT
RWY	RACEWAY
SCH	SCHEDULE
SHT	SHEET
SIAD	SMART INTEGRATED ACCESS DEVICE
SIM	SIMILAR
SPEC	SPECIFICATION
SQ	SQUARE
SS	STAINLESS STEEL
STD	STANDARD
STL	STEEL
TEMP	TEMPORARY
THK	THICKNESS
TMA	TOWER MOUNTED AMPLIFIER
TN	TOE NAIL
TOA	TOP OF ANTENNA
TOC	TOP OF CURB
TOF	TOP OF FOUNDATION
TOP	TOP OF PLATE (PARAPET)
TOS	TOP OF STEEL
TOW	TOP OF WALL
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSION
TYP	TYPICAL
UG	UNDERGROUND
UL	UNDERWRITERS LABORATORY
UNO	UNLESS NOTED OTHERWISE
UMTS	UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM
UPS	UNITERRUPTIBLE POWER SYSTEM (DC POWER PLANT)
VIF	VERIFIED IN FIELD
W	WIDE
W/	WITH
WD	WOOD
WP	WEATHERPROOF
WT	WEIGHT

dish wireless

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA

8051 CONGRESS AVENUE
BOCA RATON, FL 33487

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

STATE OF CONNECTICUT — CHRISTOPHER No. 23024 HENRY — PROFESSIONAL ENGINEER

10/26/2021

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

DRAWN BY:	CHECKED BY:	APPROVED BY:
SM	MAH	BLB

RFDS REV #: 3

CONSTRUCTION DOCUMENTS

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A&E PROJECT NUMBER

153441.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

NJJER01165A
11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

SHEET TITLE

LEGEND AND ABBREVIATIONS

SHEET NUMBER

GN-1

SITE ACTIVITY REQUIREMENTS:

1. NOTICE TO PROCEED – NO WORK SHALL COMMENCE PRIOR TO CONTRACTOR RECEIVING A WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE DISH Wireless L.L.C. AND TOWER OWNER NOC & THE DISH Wireless L.L.C. AND TOWER OWNER CONSTRUCTION MANAGER.

2. "LOOK UP" – DISH Wireless L.L.C. AND TOWER OWNER SAFETY CLIMB REQUIREMENT:

THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR DISH Wireless L.L.C. AND DISH Wireless L.L.C. AND TOWER OWNER POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.

3. PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED. THIS INCLUDES, BUT IS NOT LIMITED TO, BUILDING, ELECTRICAL, MECHANICAL, FIRE, FLOOD ZONE, ENVIRONMENTAL, AND ZONING. AFTER ONSITE ACTIVITIES AND CONSTRUCTION ARE COMPLETED, ALL REQUIRED PERMITS SHALL BE SATISFIED AND CLOSED OUT ACCORDING TO LOCAL JURISDICTIONAL REQUIREMENTS.

4. 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 DISH Wireless L.L.C. AND TOWER OWNER STANDARDS, INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION, TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH ANSI/TIA–322 (LATEST EDITION).

5. ALL SITE WORK TO COMPLY WITH DISH Wireless L.L.C. AND TOWER OWNER INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON DISH Wireless L.L.C. AND TOWER OWNER TOWER SITE AND LATEST VERSION OF ANSI/TIA–1019–A–2012 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."

6. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY DISH Wireless L.L.C. AND TOWER OWNER PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.

7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR 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.

8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

9. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES INCLUDING PRIVATE LOCATES SERVICES PRIOR TO THE START OF CONSTRUCTION.

10. 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 CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR 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 E) CONSTRUCTION SAFETY PROCEDURES.

11. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND DISH PROJECT SPECIFICATIONS, LATEST APPROVED REVISION.

12. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.

13. 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 DISH Wireless L.L.C. AND TOWER OWNER, AND/OR LOCAL UTILITIES.

14. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE REQUIRED BY LOCAL JURISDICTION AND SIGNAGE REQUIRED ON INDIVIDUAL PIECES OF EQUIPMENT, ROOMS, AND SHELTERS.

15. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.

16. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.

17. 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 CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS.

18. CONTRACTOR 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.

19. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.

20. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS AND RADIOS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.

21. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

22. 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.

GENERAL NOTES:

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

CONTRACTOR:GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION

CARRIER:DISH Wireless L.L.C.

TOWER OWNER:TOWER OWNER

2. THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE ENGINEERS IN THIS OR SIMILAR LOCALITIES. IT IS ASSUMED THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR AND/OR WORKPEOPLE WHO HAVE A WORKING KNOWLEDGE OF THE APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR ELEMENT IS (OR CAN BE) EXPLICITLY SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR MISCELLANEOUS WORK NOT EXPLICITLY SHOWN.

3. THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS OR METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY FOR PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, FORMWORK, SHORING, ETC. SITE VISITS BY THE ENGINEER OR HIS REPRESENTATIVE WILL NOT INCLUDE INSPECTION OF THESE ITEMS AND IS FOR STRUCTURAL OBSERVATION OF THE FINISHED STRUCTURE ONLY.

4. NOTES AND DETAILS IN THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT, AND/OR AS PROVIDED FOR IN THE CONTRACT DOCUMENTS. WHERE DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL NOTES, AND SPECIFICATIONS, THE GREATER, MORE STRICT REQUIREMENTS, SHALL GOVERN. IF FURTHER CLARIFICATION IS REQUIRED CONTACT THE ENGINEER OF RECORD.

5. SUBSTANTIAL EFFORT HAS BEEN MADE TO PROVIDE ACCURATE DIMENSIONS AND MEASUREMENTS ON THE DRAWINGS TO ASSIST IN THE FABRICATION AND/OR PLACEMENT OF CONSTRUCTION ELEMENTS BUT IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE DIMENSIONS, MEASUREMENTS, AND/OR CLEARANCES SHOWN IN THE CONSTRUCTION DRAWINGS PRIOR TO FABRICATION OR CUTTING OF ANY NEW OR EXISTING CONSTRUCTION ELEMENTS. IF IT IS DETERMINED THAT THERE ARE DISCREPANCIES AND/OR CONFLICTS WITH THE CONSTRUCTION DRAWINGS THE ENGINEER OF RECORD IS TO BE NOTIFIED AS SOON AS POSSIBLE.

6. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR 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 CARRIER POC AND TOWER OWNER.

7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR 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.

8. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

9. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

10. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CARRIER AND TOWER OWNER PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.

11. CONTRACTOR IS TO PERFORM A SITE INVESTIGATION, BEFORE SUBMITTING BIDS, TO DETERMINE THE BEST ROUTING OF ALL CONDUITS FOR POWER, AND TELCO AND FOR GROUNDING CABLES AS SHOWN IN THE POWER, TELCO, AND GROUNDING PLAN DRAWINGS.

12. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF DISH Wireless L.L.C. AND TOWER OWNER

13. CONTRACTOR 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.

14. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

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5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA

8051 CONGRESS AVENUE
BOCA RATON, FL 33487

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

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

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DISH Wireless L.L.C.
PROJECT INFORMATION

NJJER01165A
11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-2

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

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. UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.

3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH (f'c) OF 3000 psi AT 28 DAYS, UNLESS NOTED OTHERWISE. NO MORE THAN 90 MINUTES SHALL ELAPSE FROM BATCH TIME TO TIME OF PLACEMENT UNLESS APPROVED BY THE ENGINEER OF RECORD. TEMPERATURE OF CONCRETE SHALL NOT EXCEED 90°f AT TIME OF PLACEMENT.

4. CONCRETE EXPOSED TO FREEZE-THAW CYCLES SHALL CONTAIN AIR ENTRAINING ADMIXTURES. AMOUNT OF AIR ENTRAINMENT TO BE BASED ON SIZE OF AGGREGATE AND F3 CLASS EXPOSURE (VERY SEVERE). CEMENT USED TO BE TYPE II PORTLAND CEMENT WITH A MAXIMUM WATER-TO-CEMENT RATIO (W/C) OF 0.45.

5. ALL STEEL REINFORCING SHALL CONFORM TO ASTM A615. ALL WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A185. ALL SPLICES SHALL BE CLASS "B" TENSION SPLICES, UNLESS NOTED OTHERWISE. ALL HOOKS SHALL BE STANDARD 90 DEGREE HOOKS, UNLESS NOTED OTHERWISE. YIELD STRENGTH (Fy) OF STANDARD DEFORMED BARS ARE AS FOLLOWS:

#4 BARS AND SMALLER 40 ksi

#5 BARS AND LARGER 60 ksi

6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:

- CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH 3"
- CONCRETE EXPOSED TO EARTH OR WEATHER:
- #6 BARS AND LARGER 2"
- #5 BARS AND SMALLER 1-1/2"
- CONCRETE NOT EXPOSED TO EARTH OR WEATHER:
- SLAB AND WALLS 3/4"
- BEAMS AND COLUMNS 1-1/2"

7. A TOOLED EDGE OR A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

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. CONTRACTOR 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.

4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.

4.1. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.

4.2. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 22,000 AIC MINIMUM. VERIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PRE THE GOVERNING JURISDICTION.

5. EACH END OF EVERY POWER PHASE CONDUCTOR, GROUNDING CONDUCTOR, AND TELCO CONDUCTOR OR 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.

6. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH LAMICOID TAGS SHOWING THEIR RATED VOLTAGE, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (i.e. PANEL BOARD AND CIRCUIT ID'S).

7. PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.

8. TIE WRAPS ARE NOT ALLOWED.

9. ALL POWER AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE COPPER CONDUCTOR (#14 OR LARGER) WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.

10. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE COPPER CONDUCTOR (#6 OR LARGER) WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.

11. POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI-CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS OTHERWISE SPECIFIED.

12. POWER AND CONTROL WIRING FOR USE IN CABLE TRAY SHALL BE MULTI-CONDUCTOR, TYPE TC CABLE (#14 OR LARGER), WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION 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 NOT 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), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.

16. ELECTRICAL METALLIC TUBING (EMT) OR METAL-CLAD CABLE (MC) 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 THE NEC.

21. WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS (WIREMOLD SPECMATE WIREWAY).

22. SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).

23. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES (i.e. POWDER-ACTUATED) 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 BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.

24. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY-COATED SHEET STEEL. SHALL MEET OR EXCEED UL 50 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND NEMA 3 (OR BETTER) FOR EXTERIOR LOCATIONS.

25. 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 BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.

26. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2 (NEWEST REVISION) AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.

27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR DISH Wireless L.L.C. AND TOWER OWNER BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.

28. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.

29. INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "DISH Wireless L.L.C.".

30. ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

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5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA

8051 CONGRESS AVENUE
BOCA RATON, FL 33487

B+T GRP

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

B&T ENGINEERING, INC.
PEC.0001564
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PROJECT INFORMATION

NJJER01165A
11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-3

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 CONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.

3. THE CONTRACTOR 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 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 STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 BARE 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 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 RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.

19. GROUND CONDUCTORS USED FOR THE FACILITY GROUNDING 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 CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (i.e., 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 BARE SOLID TINNED COPPER IN 3/4" NON-METALLIC, FLEXIBLE CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD-WELD TERMINATION POINT. THE EXPOSED END OF THE CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).

21. BUILDINGS WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY). DO NOT ATTACH GROUNDING TO FIRE SPRINKLER SYSTEM PIPES.

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5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA

8051 CONGRESS AVENUE
BOCA RATON, FL 33487

B+T GRP
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