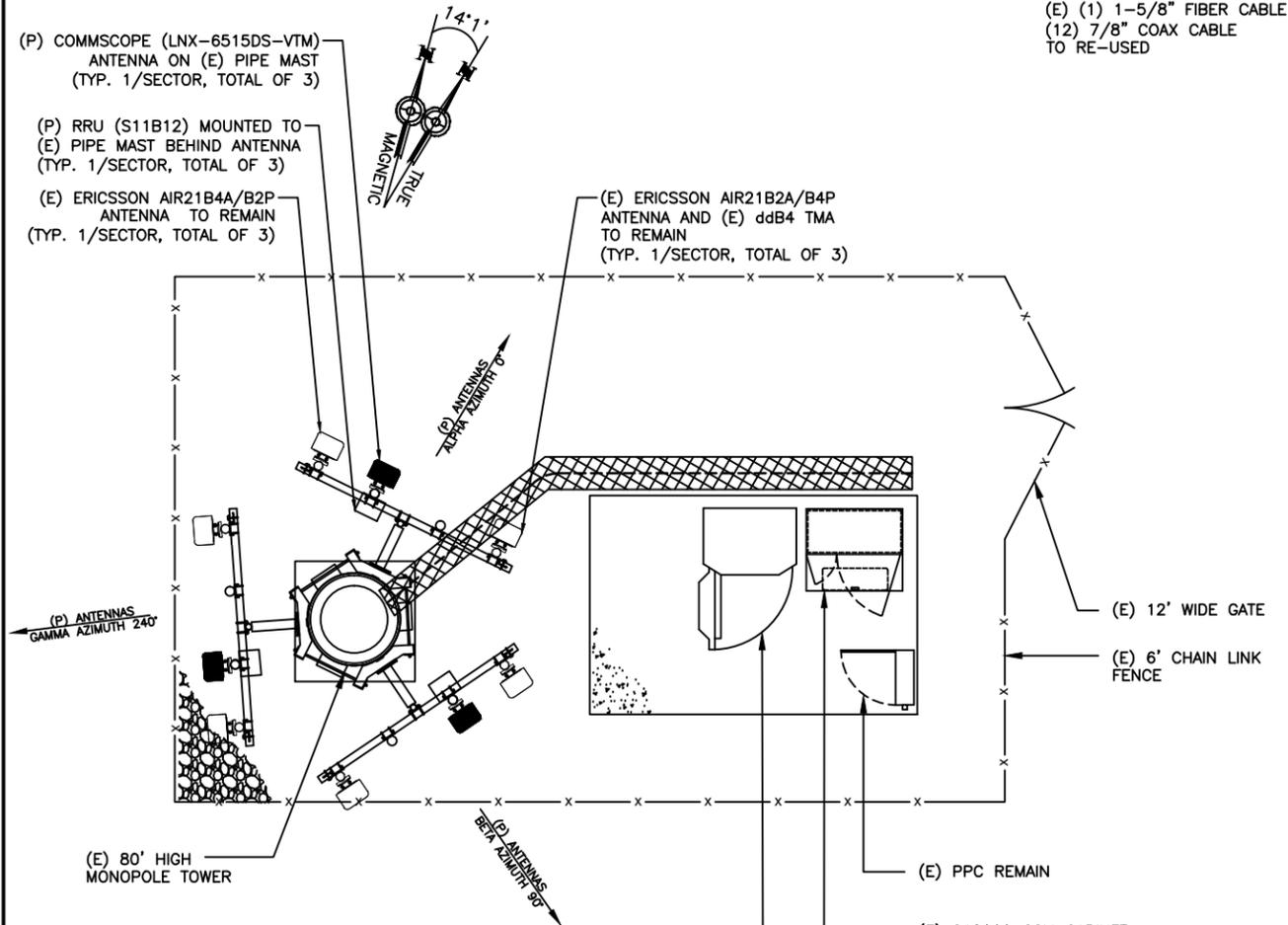
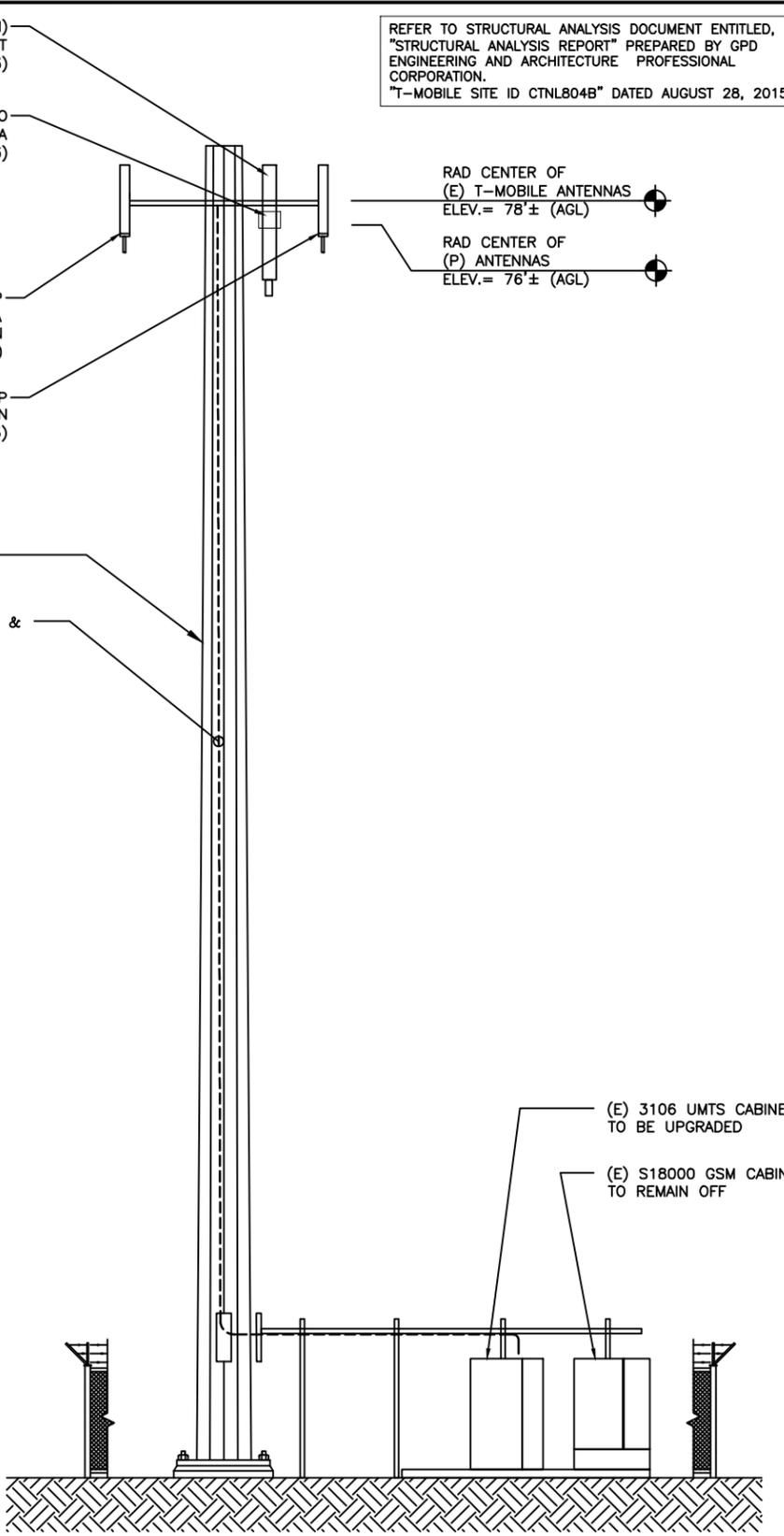
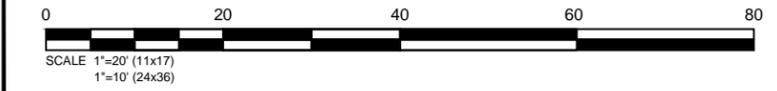


KEY PLAN
SCALE: N.T.S.



SITE PLAN
SCALE: 1" = 20'-0"



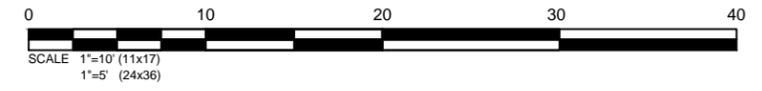
GENERAL SITE NOTES:

1. SITE INFORMATION WAS OBTAINED FROM A FIELD INVESTIGATION PERFORMED BY ATLANTIS GROUP, INC. CONTRACTOR TO FIELD VERIFY DIMENSIONS AS NECESSARY BEFORE CONSTRUCTION.
2. THE PROPOSED DEVELOPMENT DOES NOT INCLUDE SIGNS OF ADVERTISING.
3. THE PROPOSED DEVELOPMENT IS UNMANNED AND THEREFORE DOES NOT REQUIRE A MEANS OF WATER SUPPLY OR SEWAGE DISPOSAL.
4. NO LANDSCAPING WORK IS PROPOSED IN CONJUNCTION WITH THIS DEVELOPMENT OTHER THAN THAT WHICH IS SHOWN.
5. THE PROPOSED DEVELOPMENT DOES NOT INCLUDE OUTDOOR STORAGE OR ANY SOLID WASTE RECEPTACLES.
6. UTILITIES SHOWN ON PLAN ARE TAKEN FROM OWNERS RECORDS AND FIELD LOCATION OF VISIBLE SURFACE FEATURES. THE EXISTENCE, EXTENT AND EXACT HORIZONTAL AND VERTICAL LOCATIONS OF UTILITIES HAS NOT BEEN VERIFIED. ANY CONTRACTOR PERFORMING WORK ON THIS SITE MUST CONTACT CALL BEFORE YOU DIG THREE WORKING DAYS PRIOR TO COMMENCING WORK.
7. ALL OBSOLETE OR UNUSED FACILITIES SHALL BE REMOVED WITHIN 12 MONTHS OF CESSATION OF OPERATIONS.

SITE LEGEND

---	SITE PROPERTY LINE
---	STREET OR ROAD
-x-x-x-	CHAIN LINK FENCE
—o—o—	OPAQUE WOODEN FENCE
—o—o—	BOARD ON BOARD FENCE
	DECIDUOUS TREES/SHRUBS
	EVERGREEN TREES/SHRUBS
	TREE LINE
	UTILITY POLE
(E)	EXISTING
(N)	NEW
(P)	PROPOSED
(F)	FUTURE
	PROP. LTE ANTENNA
	PROP. UMTS/GSM ANTENNA
	EX. GSM ANTENNA
	EX. UMTS ANTENNA

ELEVATION VIEW
SCALE: 1" = 10'-0"



REFER TO STRUCTURAL ANALYSIS DOCUMENT ENTITLED, "STRUCTURAL ANALYSIS REPORT" PREPARED BY GPD ENGINEERING AND ARCHITECTURE PROFESSIONAL CORPORATION. "T-MOBILE SITE ID CTNL804B" DATED AUGUST 28, 2015.

T-Mobile
T-MOBILE NORTHEAST, LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860) 692-7100
FAX: (860) 692-7159

ATLANTIS GROUP
1340 Centre Street, Suite 212
Newton Center, MA 02459
Office: 617-965-0789
Fax: 617-213-5056

SUBMITTALS

DATE	DESCRIPTION	REVISION
08/14/15	ISSUED FOR REVIEW	A
09/03/15	FINAL CD	0

DEPT.	DATE	APP'D	REVISIONS
RFE			
RF MAN.			
ZONING			
OPS			
CONSTR.			
SITE AC.			

PROJECT NO: CTNL804B
DRAWN BY: MS
CHECKED BY: SM



THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF T-MOBILE. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED.

SITE NAME
CTNL804B
SITE NAME
AMTRAK_OLDLYME5
SITE ADDRESS
**387 SHORE ROAD
OLD LYME, CT 06376**

SHEET TITLE
**SITE PLAN
AND
ELEVATION**
SHEET NUMBER

A-1



T-Mobile Towers
 12920 SE 38th Street
 Bellevue, WA 98006
 (425) 383-3978



GPD Engineering and Architecture
 Professional Corporation

Chris Scheks
 520 South Main Street, Suite 2531
 Akron, OH 44311
 (614) 588-8973
 cschecks@gpdgroup.com

REVIEWED

By JACKIE DONAHUE at 10:09 am, Aug 28, 2015

GPD# 2015791.16

August 28, 2015

STRUCTURAL ANALYSIS REPORT

T-MOBILE DESIGNATION: Site Number: CTNL804B
 Site Name: AMTRAK_OldLyme5
 T-Mobile Project: Network Modification

ANALYSIS CRITERIA: Codes: TIA/EIA-222-F, 2003 IBC & 2005 CTBC
 104-mph fastest-mile (equivalent 120mph 3 second gust) with 0" ice
 38-mph fastest-mile (equivalent 50mph 3 second gust) with 0.75" ice

SITE DATA: 387 Shore Road, Old Lyme, CT 06371, New London County
 Latitude 41° 17' 47.36" N, Longitude 72° 15' 34.89" W
 80' Sabre Monopole

Mr. John Warzecha,

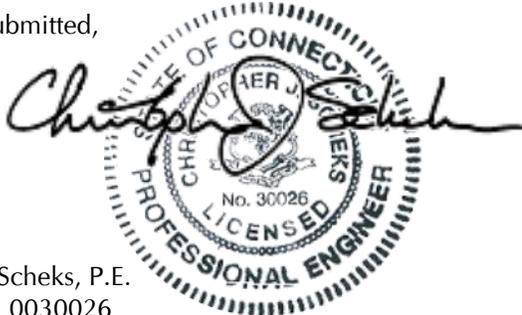
GPD is pleased to submit this Structural Analysis Report to determine the structural integrity of the aforementioned tower. The purpose of the analysis is to determine the suitability of the tower with the existing and proposed loading configuration detailed in the analysis report.

Analysis Results

Tower Stress Level with Proposed Equipment:	51.9%	Pass
Foundation Ratio with Proposed Equipment:	48.6%	Pass

We at GPD appreciate the opportunity of providing our continuing professional services to you and T-Mobile Towers. If you have any questions or need further assistance on this or any other projects please do not hesitate to call.

Respectfully submitted,



Christopher J. Scheks, P.E.
 Connecticut #: 0030026

SUMMARY & RESULTS

The purpose of this analysis was to verify whether the existing structure is capable of carrying the proposed loading configuration as specified by T-Mobile Towers. This report was commissioned by Mr. John Warzecha of T-Mobile Towers.

The proposed coax shall be installed inside the monopole in order for the results of this analysis to be valid. Please see Appendix C for feedline plan.

TOWER SUMMARY AND RESULTS

Member	Capacity	Results
Monopole	47.6%	Pass
Anchor Rods	31.2%	Pass
Base Plate	34.4%	Pass
Flange Plates	29.0%	Pass
Flange Bolts	51.9%	Pass
Foundation	48.6%	Pass

ANALYSIS METHOD

tnxTower (Version 6.1.4.1), a commercially available software program, was used to create a three-dimensional model of the tower and calculate primary member stresses for various dead, live, wind, and ice load cases. Selected output from the analysis is included in Appendix B. The following table details the information provided to complete this structural analysis. This analysis is solely based on this information and is being completed without the benefit of a detailed site visit.

DOCUMENTS PROVIDED

Document	Remarks	Source
Structrual Analysis Worksheet	CTNL804B TMO L700, dated 8/24/2015	T-Mobile
Tower Design	Sabre Job #: 40204, dated 2/7/2011	T-Mobile
Foundation Design	Sabre Job #: 40204, dated 2/7/2011	T-Mobile
Geotechnical Report	Terracon Project #: J2105225, dated 11/11/2010	T-Mobile
Previous Structural Analysis	GPD Project #: 2014790.25 Rev 2, dated 3/19/2014	GPD

ASSUMPTIONS

This structural analysis is based on the theoretical capacity of the members and is not a condition assessment of the tower. This analysis is from information supplied, and therefore, its results are based on and are as accurate as that supplied data. GPD has made no independent determination, nor is it required to, of its accuracy. The following assumptions were made for this structural analysis.

1. The tower member sizes and shapes are considered accurate as supplied. The material grade is as per data supplied and/or as assumed and as stated in the materials section.
2. The antenna configuration is as supplied and/or as modeled in the analysis. It is assumed to be complete and accurate. All antennas, mounts, coax and waveguides are assumed to be properly installed and supported as per manufacturer requirements.
3. Some assumptions are made regarding antennas and mount sizes and their projected areas based on best interpretation of data supplied and of best knowledge of antenna type and industry practice.
4. All mounts, if applicable, are considered adequate to support the loading. No actual analysis of the mount(s) is performed. This analysis is limited to analyzing the tower only.
5. The soil parameters are as per data supplied or as assumed and stated in the calculations.
6. Foundations are properly designed and constructed to resist the original design loads indicated in the documents provided.
7. The tower and structures have been properly maintained in accordance with TIA Standards and/or with manufacturer's specifications.
8. All welds and connections are assumed to develop at least the member capacity unless determined otherwise and explicitly stated in this report.
9. Loading interpreted from photos is accurate to $\pm 5'$ AGL, antenna size accurate to ± 3.3 sf, and coax equal to the number of existing antennas without reserve.
10. The proposed loading is taken from the provided Structural Analysis Worksheet titled: CTNL804B TMO L700, dated 8/24/2015, and is assumed to be accurate.
11. Appurtenance azimuths have not been provided and have been assumed.
12. The proposed coax shall be installed inside the monopole in order for the results of this analysis to be valid.

If any of these assumptions are not valid or have been made in error, this analysis may be affected, and GPD should be allowed to review any new information to determine its effect on the structural integrity of the tower.

DISCLAIMER OF WARRANTIES

GPD has not performed a site visit to the tower to verify the member sizes or antenna/coax loading. If the existing conditions are not as represented on the tower elevation contained in this report, we should be contacted immediately to evaluate the significance of the discrepancy. This is not a condition assessment of the tower or foundation. This report does not replace a full tower inspection. The tower and foundations are assumed to have been properly fabricated, erected, maintained, in good condition, twist free, and plumb.

The engineering services rendered by GPD in connection with this Structural Analysis are limited to a computer analysis of the tower structure and theoretical capacity of its main structural members. All tower components have been assumed to only resist dead loads when no other loads are applied. No allowance was made for any damaged, bent, missing, loose, or rusted members (above and below ground). No allowance was made for loose bolts or cracked welds.

GPD does not analyze the fabrication of the structure (including welding). It is not possible to have all the very detailed information needed to perform a thorough analysis of every structural sub-component and connection of an existing tower. GPD provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc. The purpose of this report is to assess the feasibility of adding appurtenances usually accompanied by transmission lines to the structure.

It is the owner's responsibility to determine the amount of ice accumulation in excess of the specified code recommended amount, if any, that should be considered in the structural analysis.

The attached sketches are a schematic representation of the analyzed tower. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions, proper fit, and clearance in the field. Any mentions of structural modifications are reasonable estimates and should not be used as a precise construction document. Precise modification drawings are obtainable from GPD, but are beyond the scope of this report.

Towers are designed to carry gravity, wind, and ice loads. All members, legs, diagonals, struts, and redundant members provide structural stability to the tower with little redundancy. Absence or removal of a member can trigger catastrophic failure unless a substitute is provided before any removal. Legs carry axial loads and derive their strength from shorter unbraced lengths by the presence of redundant members and their connection to the diagonals with bolts or welds. If the bolts or welds are removed without providing any substitute to the frame, the leg is subjected to a higher unbraced length that immediately reduces its load carrying capacity. If a diagonal is also removed in addition to the connection, the unbraced length of the leg is greatly increased, jeopardizing its load carrying capacity. Failure of one leg can result in a tower collapse because there is no redundancy. Redundant members and diagonals are critical to the stability of the tower.

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

GPD makes no warranties, expressed and/or implied, in connection with this report and disclaims any liability arising from material, fabrication, and erection of this tower. GPD will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report. The maximum liability of GPD pursuant to this report will be limited to the total fee received for preparation of this report.

APPENDIX A

Tower Analysis Summary Form

Tower Analysis Summary Form

General Info

Site Name	AMTRAK_OldLyme5
Site Number	CTNL804B
Proposed Carrier	T-Mobile
Date of Analysis	August 28, 2015
Company Performing Analysis	GPD

The information contained in this summary report is not to be used independently from the PE stamped tower analysis.

Tower Info	Description	Date
Tower Type (G, SST, MP)	MP	
Tower Height (top of steel AGL)	80'	
Tower Manufacturer	Sabre	
Tower Model	n/a	
Tower Design	Sabre Job #: 40204	2/7/2011
Foundation Design	Sabre Job #: 40204	2/7/2011
Geotech Report	Terracon Project #: J2105225	11/11/2010
Tower Mapping	n/a	
Previous Structural Analysis	GPD Project #: 2014790.25 Rev 2	3/19/2014
Foundation Mapping	n/a	

Design Parameters

Design Code Used	TIA/EIA-222-F, 2003 IBC & 2005 CTBC
Location of Tower (County, State)	New London, CT
Basic Wind Speed (mph)	104 (fastest-mile)
Ice Thickness (in)	0.75
Structure Classification (I, II, III)	
Exposure Category (B, C, D)	
Topographic Category (1 to 5)	

Analysis Results (% Maximum Usage)

Existing/Reserved + Future + Proposed Condition	
Tower (%)	51.9%
Tower Base (%)	34.4%
Foundation (%)	48.6%
Foundation Adequate?	Yes

Steel Yield Strength (ksi)

Pole	65
Base Plate	50
Anchor Rods	75
Flange Plate	60
Flange Bolts	A325

Existing / Reserved Loading

Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Int./Ext.
T-Mobile	77	77	3	Panel	Ericsson	AIR 21		3	Unknown	12' T-Arms	12	Unknown	7/8"	Internal
T-Mobile	77	77	3	Panel	Ericsson	AIR 33				on the existing mounts	1	Hybrid	1-5/8"	Internal
T-Mobile	77	77	1	COVP	Raycap	DC4-48-60-8-20F				on the existing mounts				
T-Mobile	77	77	1	Dish	Unknown	2' HP Dish				on the existing mounts				

Proposed Loading

Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Int./Ext.
T-Mobile	77	78	6	Panel	Ericsson	AIR 21		3	Unknown	12' T-Arms	12	Unknown	7/8"	Internal
T-Mobile	77	76	3	Panel	Commscope	LNX-6515DS-VTM				on the existing mounts	1	Hybrid	1-5/8"	Internal
T-Mobile	77	78	3	TMA	Ericsson	KRY11271				on the existing mounts				
T-Mobile	77	78	3	RRUS	Ericsson	RRUS 11 B12				on the existing mounts				

Note: The proposed coax shall be installed inside the monopole in order for the results of this analysis to be valid. Please see Appendix C for feedline plan.

APPENDIX B

tnxTower Output File

tnxTower GPD 520 South Main Street, Suite 2531 Akron, OH 44311 Phone: (330) 572-2100 FAX: (330) 572-3709	Job CTNL804B AMTRAK _ OldLyme5	Page 1 of 4
	Project 2015791.16	Date 08:19:12 08/28/15
	Client T-Mobile Towers	Designed by tbeltz

Tower Input Data

There is a pole section.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

Tower is located in New London County, Connecticut.

Basic wind speed of 104 mph.

Nominal ice thickness of 0.7500 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 38 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 50 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.333.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _{AA}		Weight plf
						ft ² /ft	plf	
Step Pegs	C	No	CaAa (Out Of Face)	80.00 - 8.00	1	No Ice	0.08	2.72
						1/2" Ice	0.18	3.51
						1" Ice	0.28	4.92
						2" Ice	0.48	9.56
						4" Ice	0.88	26.18
Safety Line (3/8")	C	No	CaAa (Out Of Face)	80.00 - 8.00	1	No Ice	0.04	0.22
						1/2" Ice	0.14	0.75
						1" Ice	0.24	1.28
						2" Ice	0.44	2.34
						4" Ice	0.84	4.46
LDF5-50A (7/8 FOAM)	C	No	Inside Pole	77.00 - 8.00	12	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
						2" Ice	0.00	0.33
						4" Ice	0.00	0.33
1-5/8" Hybrid Cable	C	No	Inside Pole	77.00 - 8.00	1	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment °	Placement ft	C _{AA}		Weight lb
			Horz ft	Vert ft			Front ft ²	Side ft ²	
12' T-Arm - Round (GPD)	A	From Leg	2.00	0.0000	77.00	No Ice	4.70	2.33	333.00
			0.00			1/2" Ice	5.33	2.96	400.00

Job	CTNL804B AMTRAK _ OldLyme5	Page	2 of 4
Project	2015791.16	Date	08:19:12 08/28/15
Client	T-Mobile Towers	Designed by	tbeltz

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight
			Horz	Vert	Lateral					
				0.00						
							1" Ice	6.00	3.60	467.00
							2" Ice	6.67	4.87	533.00
							4" Ice	8.33	7.41	600.00
12' T-Arm - Round (GPD)	B	From Leg	2.00	0.0000	77.00	No Ice	4.70	2.33	333.00	
			0.00			1/2" Ice	5.33	2.96	400.00	
			0.00			1" Ice	6.00	3.60	467.00	
						2" Ice	6.67	4.87	533.00	
						4" Ice	8.33	7.41	600.00	
12' T-Arm - Round (GPD)	C	From Leg	2.00	0.0000	77.00	No Ice	4.70	2.33	333.00	
			0.00			1/2" Ice	5.33	2.96	400.00	
			0.00			1" Ice	6.00	3.60	467.00	
						2" Ice	6.67	4.87	533.00	
						4" Ice	8.33	7.41	600.00	
(2) AIR 21 w/ Mount Pipe	A	From Leg	4.00	0.0000	77.00	No Ice	6.85	5.78	112.90	
			0.00			1/2" Ice	7.41	6.70	170.69	
			1.00			1" Ice	7.94	7.50	235.28	
						2" Ice	9.05	9.14	388.12	
						4" Ice	11.38	12.65	819.05	
(2) AIR 21 w/ Mount Pipe	B	From Leg	4.00	0.0000	77.00	No Ice	6.85	5.78	112.90	
			0.00			1/2" Ice	7.41	6.70	170.69	
			1.00			1" Ice	7.94	7.50	235.28	
						2" Ice	9.05	9.14	388.12	
						4" Ice	11.38	12.65	819.05	
(2) AIR 21 w/ Mount Pipe	C	From Leg	4.00	0.0000	77.00	No Ice	6.85	5.78	112.90	
			0.00			1/2" Ice	7.41	6.70	170.69	
			1.00			1" Ice	7.94	7.50	235.28	
						2" Ice	9.05	9.14	388.12	
						4" Ice	11.38	12.65	819.05	
LNx-6515DS-VTM w/ Mount Pipe	A	From Leg	4.00	0.0000	77.00	No Ice	11.64	9.79	82.54	
			0.00			1/2" Ice	12.34	11.30	171.68	
			-1.00			1" Ice	13.04	12.80	270.74	
						2" Ice	14.48	15.12	502.93	
						4" Ice	17.71	19.94	1143.89	
LNx-6515DS-VTM w/ Mount Pipe	B	From Leg	4.00	0.0000	77.00	No Ice	11.64	9.79	82.54	
			0.00			1/2" Ice	12.34	11.30	171.68	
			-1.00			1" Ice	13.04	12.80	270.74	
						2" Ice	14.48	15.12	502.93	
						4" Ice	17.71	19.94	1143.89	
LNx-6515DS-VTM w/ Mount Pipe	C	From Leg	4.00	0.0000	77.00	No Ice	11.64	9.79	82.54	
			0.00			1/2" Ice	12.34	11.30	171.68	
			-1.00			1" Ice	13.04	12.80	270.74	
						2" Ice	14.48	15.12	502.93	
						4" Ice	17.71	19.94	1143.89	
KRY 112 71	A	From Leg	4.00	0.0000	77.00	No Ice	0.68	0.45	13.20	
			0.00			1/2" Ice	0.80	0.56	18.38	
			1.00			1" Ice	0.93	0.68	25.16	
						2" Ice	1.22	0.94	44.33	
						4" Ice	1.90	1.57	110.52	
KRY 112 71	B	From Leg	4.00	0.0000	77.00	No Ice	0.68	0.45	13.20	
			0.00			1/2" Ice	0.80	0.56	18.38	
			1.00			1" Ice	0.93	0.68	25.16	
						2" Ice	1.22	0.94	44.33	
						4" Ice	1.90	1.57	110.52	
KRY 112 71	C	From Leg	4.00	0.0000	77.00	No Ice	0.68	0.45	13.20	
			0.00			1/2" Ice	0.80	0.56	18.38	
			1.00			1" Ice	0.93	0.68	25.16	
						2" Ice	1.22	0.94	44.33	

tnxTower GPD 520 South Main Street, Suite 2531 Akron, OH 44311 Phone: (330) 572-2100 FAX: (330) 572-3709	Job	CTNL804B AMTRAK _ OldLyme5	Page	3 of 4
	Project	2015791.16	Date	08:19:12 08/28/15
	Client	T-Mobile Towers	Designed by	tbeltz

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight	
			Horz	Vert						
			ft	ft	°	ft	ft ²	ft ²	lb	
RRUS 11 B12	A	From Leg	4.00	0.00	0.0000	77.00	4" Ice	1.90	1.57	110.52
			0.00	1.00			No Ice	3.31	1.36	50.70
							1/2" Ice	3.55	1.54	71.57
							1" Ice	3.80	1.73	95.49
							2" Ice	4.33	2.13	153.24
RRUS 11 B12	B	From Leg	4.00	0.00	0.0000	77.00	4" Ice	5.50	3.04	313.85
			0.00	1.00			No Ice	3.31	1.36	50.70
							1/2" Ice	3.55	1.54	71.57
							1" Ice	3.80	1.73	95.49
							2" Ice	4.33	2.13	153.24
RRUS 11 B12	C	From Leg	4.00	0.00	0.0000	77.00	4" Ice	5.50	3.04	313.85
			0.00	1.00			No Ice	3.31	1.36	50.70
							1/2" Ice	3.55	1.54	71.57
							1" Ice	3.80	1.73	95.49
							2" Ice	4.33	2.13	153.24
		4" Ice	5.50	3.04	313.85					

Critical Deflections and Radius of Curvature - Service Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
77.00	12' T-Arm - Round (GPD)	35	4.128	0.4680	0.0001	34994

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L _a	KI/r	F _a	A	Actual P	Allow. P _a	Ratio P/P _a
	ft		ft	ft		ksi	in ²	lb	lb	
L1	80 - 55 (1)	TP25.42x20x0.1875	25.00	79.00	105.8	13.333	15.0165	-3226.59	200207.00	0.016
L2	55 - 43 (2)	TP28.03x25.42x0.1875	12.00	79.00	98.6	15.358	16.1167	-3766.74	247517.00	0.015
L3	43 - 1 (3)	TP36.77x26.8938x0.3125	45.50	79.00	73.2	23.791	36.1613	-9275.65	860301.00	0.011

Pole Bending Design Data

Section No.	Elevation	Size	Actual M _x	Actual f _{bx}	Allow. F _{bx}	Ratio f _{bx} /F _{bx}	Actual M _y	Actual f _{by}	Allow. F _{by}	Ratio f _{by} /F _{by}
	ft		lb-ft	ksi	ksi		lb-ft	ksi	ksi	
L1	80 - 55 (1)	TP25.42x20x0.1875	143232.50	18.375	39.000	0.471	0.00	0.000	39.000	0.000
L2	55 - 43 (2)	TP28.03x25.42x0.1875	208588.33	23.219	39.000	0.595	0.00	0.000	39.000	0.000
L3	43 - 1 (3)	TP36.77x26.8938x0.3125	658614.17	24.312	39.000	0.623	0.00	0.000	39.000	0.000

tnxTower GPD 520 South Main Street, Suite 2531 Akron, OH 44311 Phone: (330) 572-2100 FAX: (330) 572-3709	Job CTNL804B AMTRAK _ OldLyme5	Page 4 of 4
	Project 2015791.16	Date 08:19:12 08/28/15
	Client T-Mobile Towers	Designed by tbeltz

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V lb	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T lb-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	80 - 55 (1)	TP25.42x20x0.1875	7350.02	0.489	26.000	0.038	0.00	0.000	26.000	0.000
L2	55 - 43 (2)	TP28.03x25.42x0.1875	8030.56	0.498	26.000	0.038	0.00	0.000	26.000	0.000
L3	43 - 1 (3)	TP36.77x26.8938x0.3125	11865.70	0.328	26.000	0.025	0.00	0.000	26.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio P	Ratio \hat{f}_{bx}	Ratio \hat{f}_{by}	Ratio \hat{f}_v	Ratio \hat{f}_{vt}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		P_a	F_{bx}	F_{by}	F_v	F_{vt}			
L1	80 - 55 (1)	0.016	0.471	0.000	0.038	0.000	0.488 ✓	1.333	H1-3+VT ✓
L2	55 - 43 (2)	0.015	0.595	0.000	0.038	0.000	0.611 ✓	1.333	H1-3+VT ✓
L3	43 - 1 (3)	0.011	0.623	0.000	0.025	0.000	0.634 ✓	1.333	H1-3+VT ✓

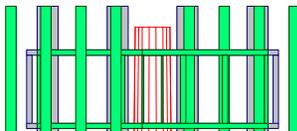
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF* P_{allow} lb	% Capacity	Pass Fail	
L1	80 - 55	Pole	TP25.42x20x0.1875	1	-3226.59	266875.92	36.6	Pass	
L2	55 - 43	Pole	TP28.03x25.42x0.1875	2	-3766.74	329940.15	45.8	Pass	
L3	43 - 1	Pole	TP36.77x26.8938x0.3125	3	-9275.65	1146781.19	47.6	Pass	
							Summary		
							Pole (L3)	47.6	Pass
							RATING =	47.6	Pass

APPENDIX C

Tower Elevation Drawing

80.0 ft



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
12' T-Arm - Round (GPD)	77	LNX-6515DS-VTM w/ Mount Pipe	77
12' T-Arm - Round (GPD)	77	KRY 112 71	77
12' T-Arm - Round (GPD)	77	KRY 112 71	77
(2) AIR 21 w/ Mount Pipe	77	KRY 112 71	77
(2) AIR 21 w/ Mount Pipe	77	RRUS 11 B12	77
(2) AIR 21 w/ Mount Pipe	77	RRUS 11 B12	77
LNX-6515DS-VTM w/ Mount Pipe	77	RRUS 11 B12	77
LNX-6515DS-VTM w/ Mount Pipe	77		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

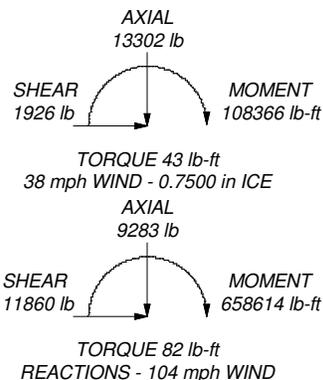
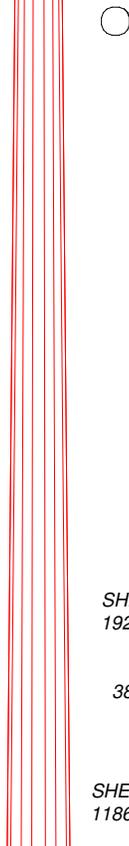
1. Tower is located in New London County, Connecticut.
2. Tower designed for a 104 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 47.6%

Section	1	2	3
Length (ft)	25.00	12.00	45.50
Number of Sides	18	18	18
Thickness (in)	0.1875	0.1875	0.3125
Socket Length (ft)		3.50	
Top Dia (in)	20.0000	25.4200	26.8938
Bot Dia (in)	25.4200	28.0300	36.7700
Grade		A572-65	
Weight (lb)	1140.3	644.9	4840.4

55.0 ft

43.0 ft

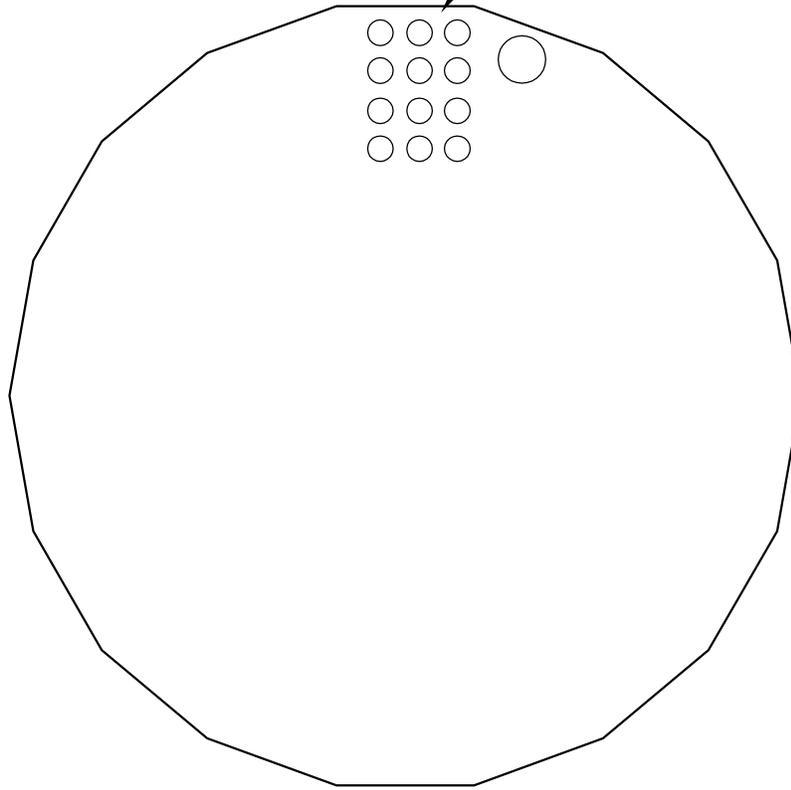
1.0 ft



GPD
 Consulting Engineers
 520 South Main Street, Suite 2531
 Akron, OH 44311
 Phone: (330) 572-2100
 FAX: (330) 572-3709

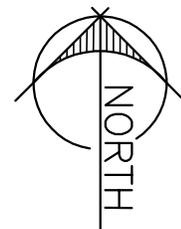
Job: **CTNL804B AMTRAK - OldLyme5**
 Project: **2015791.16**
 Client: T-Mobile Towers
 Code: TIA/EIA-222-F
 Path: \\AKRN05.apdco.com\TELECOM\MT\CTNL804B\02_2015791_16\m\CTNL804B.er
 Drawn by: **tbeltz**
 Date: **08/28/15**
 App'd:
 Scale: **NTS**
 Dwg No. **E-1**

7/8" Coax for (T-Mobile)
1-5/8" Hybrid Coax for (T-Mobile)



FEEDLINE PLAN

NOT TO SCALE



APPENDIX D

Flange Plate Analysis



Existing Flange Connection @ 55'
CTNL804B AMTRAK _ Old Lyme5
 2015791.16

O.T. Moment =	143.23	k*ft
Axial =	3.23	kips
Shear =	7.35	kips

Acceptable Stress Ratio	=	100.0%
-------------------------	---	--------

Flange Bolts		
# Bolts =	10	
Bolt Type =	A325	
F _t =	44	ksi
ASIF =	1.333	
Bolt Circle =	28.375	in
Bolt Diameter =	1	in
<i>Tension & Shear (ASD, Section J3.5)</i>		
F _v =	21	ksi
Nominal Area =	0.79	in ²
f _v =	0.94	ksi
Applied Shear =	0.74	kips
Allowable Shear =	21.99	kips
F _t ² - 4.39(f _v ²) ^{1/2} =	43.96	ksi
Allowable Bolt Stress =	58.60839	ksi
B =	46.03	kips
<i>Prying Action Check</i>		
N/A, top flange thickness > t _c		
Max Comp. on Bolt =	24.54	kips
Max Tension on Bolt =	23.89	kips
Shear Capacity =	3.3%	
Tensile Capacity =	51.9%	
Bolt Capacity =	51.9% OK	

Upper Flange Plate		
Location =	External	
Plate Strength (F _y) =	60	ksi
Plate Thickness =	1	in
Outer Diameter =	32.625	in
w _{calc} =	12.61	in
w _{max} =	18.77	in
w =	12.61	in
S =	2.10	in ³
f _b =	17.41	ksi
F _b =	60	ksi
UP Capacity =	29.0% OK	

Upper Stiffeners	
Configuration =	None

Pole Information		
Shaft Diam. (Upper) =	25.42	in
Thickness (Upper) =	0.1875	in
# of Sides (Upper) =	18	
F _y (Upper) =	65	ksi
Shaft Diam. (Lower) =	25.42	in
Thickness (Lower) =	0.1875	in
# of Sides (Lower) =	18	
F _y (Lower) =	65	ksi

Lower Flange Plate		
Location =	External	
Plate Strength (F _y) =	60	ksi
Plate Thickness =	1	in
Outer Diameter =	32.625	in
w _{calc} =	12.61	in
w _{max} =	18.77	in
w =	12.61	in
S =	2.10	in ³
f _b =	17.41	ksi
F _b =	60	ksi
LP Capacity =	29.0% OK	

Lower Stiffeners	
Configuration =	None

APPENDIX E

Anchor Rod & Base Plate Analysis



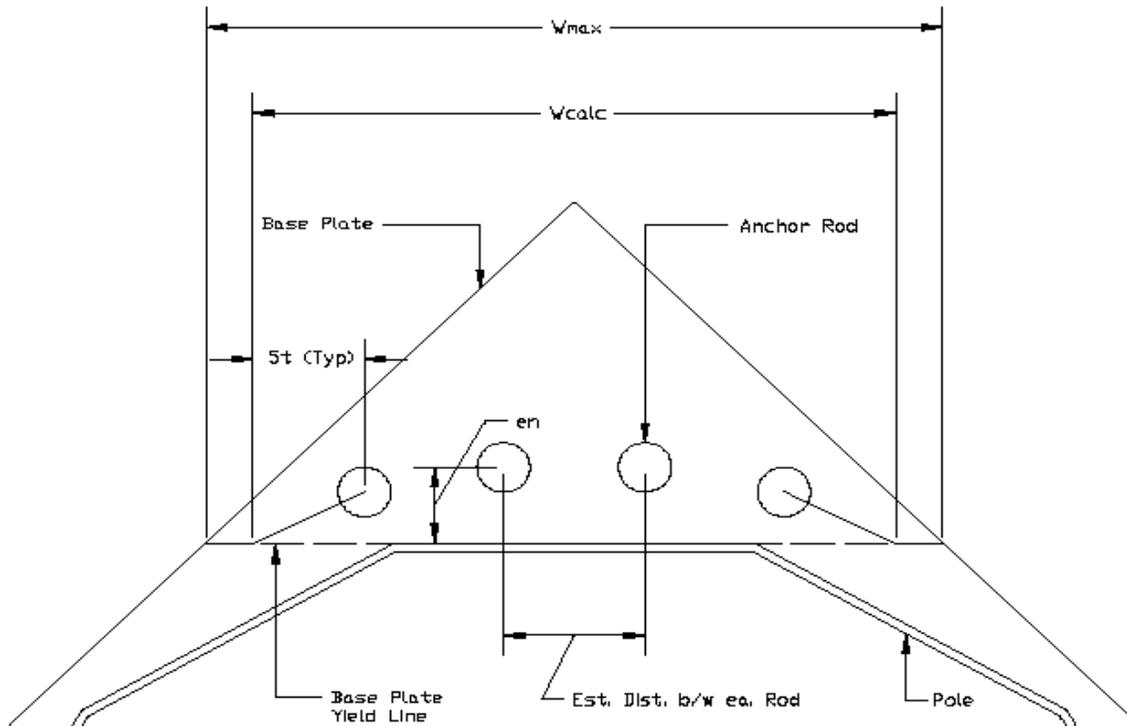
Anchor Rod and Base Plate Stresses
CTNL804B AMTRAK _ Old Lyme5
2015791.16

Overturing Moment =	658.61	k*ft
Axial Force =	9.28	k
Shear Force =	11.86	k

Acceptable Stress Ratio =	100.0%
---------------------------	--------

Anchor Rods		
Pole Diameter =	36.77	in
Number of Rods =	12	
Type =	Upset Rod	
Rod Yield Strength (Fy) =	75	ksi
ASIF =	1.333	
Rod Circle =	42.75	in
Rod Diameter =	2.25	in
Net Tensile Area =	3.25	in ²
Max Tension on Rod =	60.77	kips
Max Compression on Rod =	62.31	kips
Allow. Rod Force =	195.00	kips
Anchor Rod Capacity =	31.2%	OK

Base Plate		
Plate Strength (Fy) =	50	ksi
Plate Thickness =	2.5	in
Plate Width =	43.5	in
Est. Dist. b/w ea. Rod =	6	in
W _{calc} =	36.881	in
W _{max} =	24.748	in
w =	24.75	in
S =	25.78	in ³
fb =	17.21	ksi
Fb =	50	ksi
Base Plate Capacity =	34.4%	OK



APPENDIX F

Foundation Analysis



Mat Foundation Analysis
CTNL804B AMTRAK _ Old Lyme5
2015791.16

General Info	
Code	TIA/EIA-222-F (ASD)
Bearing On	Soil
Foundation Type	Mono Pad
Pier Type	Round
Reinforcing Known	Yes
Max Capacity	1

Tower Reactions	
Moment, M	658.61 k-ft
Axial, P	9.28 k
Shear, V	11.86 k

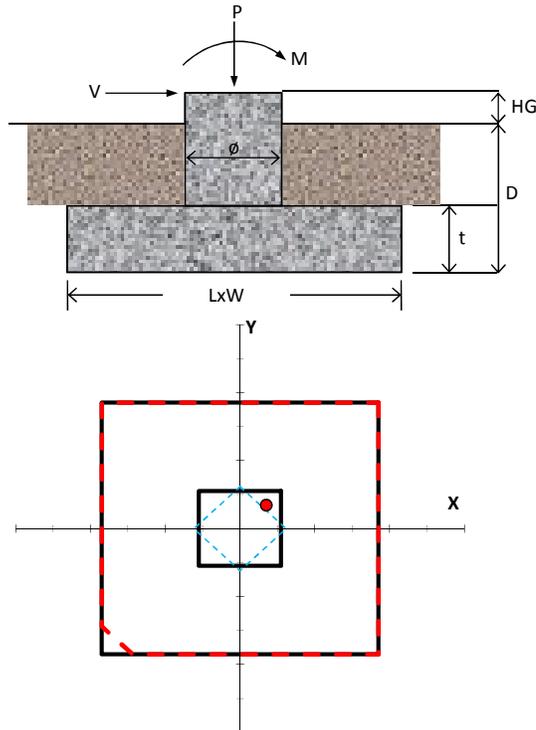
Pad & Pier Geometry		
Pier Diameter, ϕ	5.5	ft
Pad Length, L	18.5	ft
Pad Width, W	18.5	ft
Pad Thickness, t	1.5	ft
Depth, D	5.6	ft
Height Above Grade, HG	1	ft

Pad & Pier Reinforcing		
Rebar Fy	60	ksi
Concrete Fc'	4	ksi
Clear Cover	3	in
Reinforced Top & Bottom?	Yes	
Pad Reinforcing Size	# 8	
Pad Quantity Per Layer	20	
Pier Rebar Size	# 7	
Pier Quantity of Rebar	30	

Soil Properties	
Soil Type	Granular
Soil Unit Weight	120 pcf
Angle of Friction, ϕ	30 °
Bearing Type	Net
Ultimate Bearing	6 ksf
Water Table Depth	99 ft
Frost Depth	3.5 ft

Bearing Summary			Load Case
Qxmax	1.31	ksf	1D+1W
Qymax	1.31	ksf	1D+1W
Qmax @ 45°	1.62	ksf	1D+1W
Q _{(all) Gross}	3.34	ksf	
Controlling Capacity	48.6%	Pass	

Overturning Summary (Required FS=1.5)			Load Case
FS(ot)x	4.18	≥1.5	1D+1W
FS(ot)y	4.18	≥1.5	1D+1W
Controlling Capacity	35.9%	Pass	





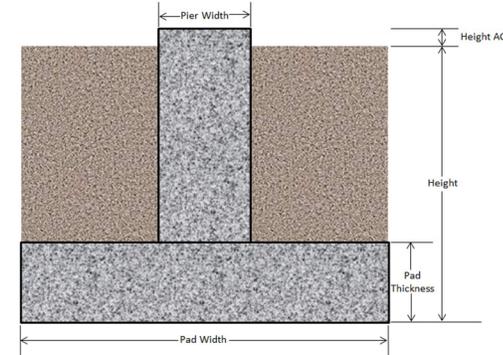
Base Foundation Reinforcement Check
CTNL804B AMTRAK _ Old Lyme5
2015791.16

Code
TIA/EIA-222-F

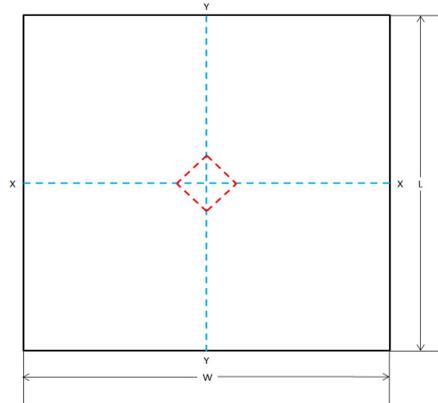
Tower Reactions	
Moment	658.61 k-ft
Axial	9.28 k
Shear	11.86 k

Overall Capacities		
Reinforcement Capacity	27.4%	OK
As Min Met?	Yes	
Controlling Capacity	27.4%	OK

Pad & Pier Geometry	
Height	5.6 ft
Height above Grade	1 ft
Pad Length, L	18.5 ft
Pad Width, W	18.5 ft
Pad Thickness	1.5 ft
Pier Shape	Round
Round Pier Diameter	5.5 ft



Pad & Pier Reinforcing	
Reinforcing Known	Yes
f'_c	4 ksi
Clear Cover	3 in
Rebar F_y	60 ksi
Reinforced Top & Bottom?	Yes
Pad Rebar Size	# 8
Pad Rebar Quantity	20
Pier Rebar Size	# 7
Pier Rebar Quantity	30



Unit Weights	
Concrete Unit Weight	150 pcf
Soil Unit Weight	120 pcf

Orthogonal Bearing	
Q_{max}	1.53 ksf
Q_{min}	0.01 ksf

Pad Moment Capacity		
$M_u =$	8.87 k-ft	
$\phi M_n =$	49.47 k-ft	
Moment Capacity	17.9%	OK
<i>One-Way (Wide-Beam) Shear</i>		
$V_u =$	37.50 kips	
$\phi V_n =$	284.32 kips	
Shear Capacity	13.2%	OK
<i>Two-Way (Punching) Shear</i>		
$V_u =$	196.15 kips	
$\phi V_n =$	714.60 kips	
Shear Capacity	27.4%	OK
<i>Pier Compression</i>		
$P_u =$	12.06 kips	
$\phi P_n =$	6578.45 kips	
Compression Capacity	0.2%	OK