Inspections Division
Date: 03/27/14

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GPD# 2014723.13.4340.02
March 25, 2014

RIGOROUS STRUCTURAL ANALYSIS REPORT WITH MODIFICATION DESIGN

AT&T DESIGNATION:	**Site USID:**	**4340**
	Site FA:	**10096382**
	Client #:	**ME5015**
	Site Name:	**NORTH PORTLAND**
	AT&T Project:	**Mod LTE2C/AIR install 11/6/2013**
ANALYSIS CRITERIA:	**Codes:**	**TIA-222-G & 2009 IBC** **100-mph (3-second gust) with 0" ice** **40-mph (3-second gust) with 1.00" ice**
SITE DATA:		**1340 Riverside St., Portland, ME 04103, Cumberland County** **Latitude 43° 42' 59.832" N, Longitude 70° 18' 18.936" W** **Market: New England** **177' Pirod Monopole**

Mr. Edward Onessimo,

GPD is pleased to submit this Rigorous Structural Analysis Report with Modification Design 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:	99.9%	Pass
Foundation Ratio with Proposed Equipment:	68.3%	Pass

Note: In order for this analysis results to be valid for the proposed, existing, and reserved loading in Appendix A the modifications referenced in the design drawings by GPD (Project #: 2014723.13.4340.02, dated 3/25/2014) must be installed.

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

Respectfully submitted,

STATE OF MAINE
John N. Kabak
12708
LICENSED
PROFESSIONAL ENGINEER

John B. Kabak, P.E.
Maine #: 12708

Inspections Division
Date: 03/27/14

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 AT&T Mobility to SAI Communications. This report was commissioned by Mr. Edward Onessimo of SAI Communications.

Modifications designed by GPD (Project #: 2014723.13.4340.02, dated 3/25/2014) have been considered in this analysis.

The proposed coax shall be installed internal to the pole in order for the analysis results to be valid.

TOWER SUMMARY AND RESULTS

Member	Capacity	Results
Monopole	99.0%	Pass
Anchor Rods	57.8%	Pass
Base Plate	80.9%	Pass
Flange Plates	99.9%	Pass
Flange Bolts	91.7%	Pass
Foundation	68.3%	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
Equipment Modification Form	AT&T Internal Loading Document, dated 12/10/2013	Siterra
Tower Design	PiROD File #: A-113355, dated 03/05/1997	Siterra
Foundation Design	PiROD File #: A-113355, dated 03/05/1997	Siterra
Geotechnical Report	Halaey & Aldrich File #: 80593-001, dated 02/28/1997	Siterra
Previous Structural Analysis	GPD Project #: 2013723.13.4340.01, dated 01/10/2014	Siterra
Modification Drawings	GPD Project #: 2014723.13.4340.02, dated 03/25/2014	GPD

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ASSUMPTIONS

This rigorous 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. All prior structural modifications are assumed to be as per data supplied/available and to have been properly installed.
10. 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.
11. All existing loading was obtained from the previous analysis by GPD Group (Project #: 2013723.13.4340.01, dated 01/10/2014), site photos, the provided Equipment Modification Form and is assumed to be accurate.
12. The proposed coax shall be installed internal to the pole in order for the analysis results to be valid.

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

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DISCLAIMER OF WARRANTIES

GPD GROUP 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 GROUP in connection with this Rigorous 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 GROUP 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 GROUP 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 GROUP, but are beyond the scope of this report.

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 GROUP 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 GROUP 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 GROUP pursuant to this report will be limited to the total fee received for preparation of this report.

APPENDIX A

Tower Analysis Summary Form

Inspections Division

Analysis Summary Form

Date: 03/27/14

Site Name	NORTH PORTLAND
Site Number	4340
FA Number	10096382
Date of Analysis	3/25/2014
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)	177'	
Tower Manufacturer	Pirod	
Tower Model	n/a	
Tower Design	PiROD File #: A-113355	03/05/1997
Foundation Design	PiROD File #: A-113355	03/05/1997
Geotech Report	Halaey & Aldrich File #: 80593-001	02/28/1997
Tower Mapping	n/a	
Previous Structural Analysis	GPD Project #: 2013723.13.4340.01	1/10/2014
Modification Drawings	GPD Project #: 2014723.13.4340.02	3/25/2014

Design Parameters

Design Code Used	TIA-222-G
	2009 IBC
Location of Tower (County, State)	Cumberland, ME
Basic Wind Speed (mph)	100 (3-second gust)
Ice Thickness (in)	1.00
Structure Classification (I, II, III)	II
Exposure Category (B, C, D)	C
Topographic Category (1 to 5)	1

Analysis Results (% Maximum Usage)

Existing/Reserved + Future + Proposed Condition	
Tower (%)	99.9%
Tower Base (%)	80.9%
Foundation (%)	68.3%
Foundation Adequate?	Yes

Modifications designed by GPD (Project #: 2014723.13.4340.02, dated 3/25/2014) have been considered in this analysis.

Steel Yield Strength (ksi)

Pole	42
Tower Base	36
Anchor Rods	A687
Flange Plate	36
Flange Bolts	A3325

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.
AT&T Mobility	179	180	6	Panel	Powerwave	7770.00	50/160/280	1	Unknown	13' Platform w/ rails	12	Unknown	1-5/8"	Internal
AT&T Mobility	179	180	1	Panel	Powerwave	P65-17-XLH-RR	50			on same mount	2	Power Cable	7/8"	Internal
AT&T Mobility	179	180	1	Panel	Andrew	SBNH-1D6565C	160			on same mount	1	Fiber Cable	3/8"	Internal
AT&T Mobility	179	180	1	Panel	KMW	AM-X-CD-14-65-00T-RET	280			on same mount				
AT&T Mobility	179	180	6	TMA	Powerwave	LGP21401				on same mount				
AT&T Mobility	179	180	6	Diplexer	Powerwave	LGP21903				on same mount				
AT&T Mobility	179	180	6	RRU	Ericsson	RRUS 11				on same mount				
AT&T Mobility	179	180	1	Surge	Raycap	DC6-48-60-18-8F				on same mount				
Nextel	160	160	12	Panel	Decibel	DB846G90A-XY		1	Unknown	15' LP Platform	15	Unknown	1-5/8"	Internal
Nextel	160	160	3	Panel	Decibel	932DG65T2E-M				on same mount				
Unknown	125	125	2	Dish	Unknown	4' Dish		2	Unknown	Pipe Mount	2	Unknown	EW90	Internal

Note: (3) 7770.00, (1) P65-17-XLH-RR, (1) SBNH-1D6565C and (1) AM-X-CD-14-65-00T-RET Antennas, (6) LGP21401 TMA's, (6) LGP21903 Diplexers, (6) RRUS 11's and (6) 1-5/8" coax at 180' shall be removed prior to the installation of the proposed loading.

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.
AT&T Mobility	179	180	6	Panel	CCI	HPA-65R-BUU-H8	50/160			on the existing mount	4	Power Cable	7/8"	Internal
AT&T Mobility	179	180	3	Panel	Andrew	SBNHH-1D65A	280			on the existing mount				
AT&T Mobility	179	180	3	TMA	CCI	DTMABP7819VG12A-BP				on the existing mount				
AT&T Mobility	179	180	6	RRU	Ericsson	RRUS 11				on the existing mount				
AT&T Mobility	179	180	6	RRU	Ericsson	RRUS 12				on the existing mount				
AT&T Mobility	179	180	3	RRU	Ericsson	RRUS E2				on the existing mount				
AT&T Mobility	179	180	3	RRU	Ericsson	RRUS 32				on the existing mount				
AT&T Mobility	179	180	6	Module	Ericsson	KRC 161 286-1 (A-2 Module)				on the existing mount				
AT&T Mobility	179	180	2	Surge	Raycap	DC6-48-60-18-8F				on the existing mount				

Note: The proposed loading shall be in addition to the remaining existing/reserved loading at the same elevation. The proposed coax shall be installed internal to the pole in order for the analysis results to be valid.

Future 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.

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APPENDIX B

tnxTower Output File

Inspections Division
Date: 03/27/14

tnxTower

GPD
520 South Main Street, Suite 2531
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Client	**Designed by**
SAI Communications	Teveslage

Tower Input Data

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

Tower is located in Cumberland County, Maine.
Basic wind speed of 100 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 40 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	*Sector*	*Component Type*	*Placement* *ft*	*Total Number*	*Number Per Row*	*Start/End Position*	*Width or Diameter* *in*	*Perimeter* *in*	*Weight* *plf*
PiROD Climbing Rungs	C	Surface Ar (CaAa)	177.50 - 8.00	1	1	0.000 0.000	0.6250		3.80
Safety Line (3/8")	C	Surface Ar (CaAa)	177.50 - 8.00	1	1	0.000 0.000	0.3750		0.22
8" x 1 1/2" Mod Plate	C	Surface Af (CaAa)	22.75 - 17.25	6	3	0.000 0.000	8.0000	19.0000	40.83
8" x 1 1/2" Mod Plate	C	Surface Af (CaAa)	42.75 - 37.25	6	3	0.000 0.000	8.0000	19.0000	40.83

Feed Line/Linear Appurtenances - Entered As Area

Description	*Face or Leg*	*Allow Shield*	*Component Type*	*Placement* *ft*	*Total Number*		C_AA_A ft^2/ft	*Weight* *plf*
LDF7-50A(1-5/8") (AT&T Mobiliity)	C	No	Inside Pole	177.50 - 8.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
7/8" DC Power Cable (AT&T Mobiliity)	C	No	Inside Pole	177.50 - 8.00	6	No Ice	0.00	0.60
						1/2" Ice	0.00	0.60
						1" Ice	0.00	0.60
3/8" Fiber Cable (AT&T Mobiliity)	C	No	Inside Pole	177.50 - 8.00	1	No Ice	0.00	0.10
						1/2" Ice	0.00	0.10
						1" Ice	0.00	0.10
LDF7-50A(1-5/8") (Nextel)	C	No	Inside Pole	160.00 - 8.00	15	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
EW90 (Unknown)	C	No	Inside Pole	125.00 - 8.00	2	No Ice	0.00	0.32
						1/2" Ice	0.00	0.32
						1" Ice	0.00	0.32

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Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Pirod 13' LP Platform w/Rails	C	None		0.0000	179.00	No Ice	33.04	33.04	2.17
(Lattice)						1/2" Ice	43.38	43.38	2.68
(AT&T Mobility)						1" Ice	53.72	53.72	3.19
7770.00 w/Mount Pipe	A	From	4.00	0.0000	179.00	No Ice	5.88	4.10	0.06
(AT&T Mobility)		Centroid-Le	0.00			1/2" Ice	6.31	4.73	0.11
		g	1.00			1" Ice	6.75	5.37	0.16
7770.00 w/Mount Pipe	B	From	4.00	0.0000	179.00	No Ice	5.88	4.10	0.06
(AT&T Mobility)		Centroid-Le	0.00			1/2" Ice	6.31	4.73	0.11
		g	1.00			1" Ice	6.75	5.37	0.16
7770.00 w/Mount Pipe	C	From	4.00	0.0000	179.00	No Ice	5.88	4.10	0.06
(AT&T Mobility)		Centroid-Le	0.00			1/2" Ice	6.31	4.73	0.11
		g	1.00			1" Ice	6.75	5.37	0.16
(3) HPA-65R-BUU-H8 w/	A	From	4.00	0.0000	179.00	No Ice	13.37	9.42	0.09
Mount Pipe		Centroid-Le	0.00			1/2" Ice	14.10	10.82	0.19
(AT&T Mobility)		g	1.00			1" Ice	14.83	12.07	0.29
(3) HPA-65R-BUU-H8 w/	B	From	4.00	0.0000	179.00	No Ice	13.37	9.42	0.09
Mount Pipe		Centroid-Le	0.00			1/2" Ice	14.10	10.82	0.19
(AT&T Mobility)		g	1.00			1" Ice	14.83	12.07	0.29
(3) SBNHH-1D65A w/	C	From	4.00	0.0000	179.00	No Ice	6.57	5.19	0.06
Mount Pipe		Centroid-Le	0.00			1/2" Ice	7.09	5.96	0.12
(AT&T Mobility)		g	1.00			1" Ice	7.59	6.70	0.18
DTMABP7819VG12A-BP	A	From	4.00	0.0000	179.00	No Ice	1.17	0.44	0.02
(AT&T Mobility)		Centroid-Le	0.00			1/2" Ice	1.32	0.56	0.03
		g	1.00			1" Ice	1.48	0.69	0.04
DTMABP7819VG12A-BP	B	From	4.00	0.0000	179.00	No Ice	1.17	0.44	0.02
(AT&T Mobility)		Centroid-Le	0.00			1/2" Ice	1.32	0.56	0.03
		g	1.00			1" Ice	1.48	0.69	0.04
DTMABP7819VG12A-BP	C	From	4.00	0.0000	179.00	No Ice	1.17	0.44	0.02
(AT&T Mobility)		Centroid-Le	0.00			1/2" Ice	1.32	0.56	0.03
		g	1.00			1" Ice	1.48	0.69	0.04
(2) RRUS 11	A	From	4.00	0.0000	179.00	No Ice	1.62	1.37	0.05
(AT&T Mobility)		Centroid-Le	0.00			1/2" Ice	1.75	1.55	0.07
		g	1.00			1" Ice	1.87	1.74	0.10
(2) RRUS 11	B	From	4.00	0.0000	179.00	No Ice	1.62	1.37	0.05
(AT&T Mobility)		Centroid-Le	0.00			1/2" Ice	1.75	1.55	0.07
		g	1.00			1" Ice	1.87	1.74	0.10
(2) RRUS 11	C	From	4.00	0.0000	179.00	No Ice	1.62	1.37	0.05
(AT&T Mobility)		Centroid-Le	0.00			1/2" Ice	1.75	1.55	0.07
		g	1.00			1" Ice	1.87	1.74	0.10
(2) RRUS 12	A	From	4.00	0.0000	179.00	No Ice	1.83	1.49	0.06
(AT&T Mobility)		Centroid-Le	0.00			1/2" Ice	1.96	1.67	0.08
		g	1.00			1" Ice	2.10	1.87	0.11
(2) RRUS 12	B	From	4.00	0.0000	179.00	No Ice	1.83	1.49	0.06
(AT&T Mobility)		Centroid-Le	0.00			1/2" Ice	1.96	1.67	0.08
		g	1.00			1" Ice	2.10	1.87	0.11
(2) RRUS 12	C	From	4.00	0.0000	179.00	No Ice	1.83	1.49	0.06
(AT&T Mobility)		Centroid-Le	0.00			1/2" Ice	1.96	1.67	0.08
		g	1.00			1" Ice	2.10	1.87	0.11
RRUS E2	A	From	4.00	0.0000	179.00	No Ice	3.67	1.49	0.06
(AT&T Mobility)		Centroid-Le	0.00			1/2" Ice	3.93	1.67	0.08
		g	1.00			1" Ice	4.19	1.87	0.11
RRUS E2	B	From	4.00	0.0000	179.00	No Ice	3.67	1.49	0.06
(AT&T Mobility)		Centroid-Le	0.00			1/2" Ice	3.93	1.67	0.08
		g	1.00			1" Ice	4.19	1.87	0.11

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
RRUS E2	C	From	4.00	0.0000	179.00	No Ice	3.67	1.49	0.06
(AT&T Mobility)		Centroid-Le	0.00			1/2" Ice	3.93	1.67	0.08
		g	1.00			1" Ice	4.19	1.87	0.11
RRUS 32	A	From	4.00	0.0000	179.00	No Ice	3.87	2.76	0.08
(AT&T Mobility)		Centroid-Le	0.00			1/2" Ice	4.15	3.02	0.10
		g	1.00			1" Ice	4.44	3.29	0.14
RRUS 32	B	From	4.00	0.0000	179.00	No Ice	3.87	2.76	0.08
(AT&T Mobility)		Centroid-Le	0.00			1/2" Ice	4.15	3.02	0.10
		g	1.00			1" Ice	4.44	3.29	0.14
RRUS 32	C	From	4.00	0.0000	179.00	No Ice	3.87	2.76	0.08
(AT&T Mobility)		Centroid-Le	0.00			1/2" Ice	4.15	3.02	0.10
		g	1.00			1" Ice	4.44	3.29	0.14
(2) KRC 161 286-1 (A-2	A	From	4.00	0.0000	179.00	No Ice	1.87	0.43	0.02
Module)		Centroid-Le	0.00			1/2" Ice	2.05	0.54	0.03
(AT&T Mobility)		g	1.00			1" Ice	2.24	0.66	0.04
(2) KRC 161 286-1 (A-2	B	From	4.00	0.0000	179.00	No Ice	1.87	0.43	0.02
Module)		Centroid-Le	0.00			1/2" Ice	2.05	0.54	0.03
(AT&T Mobility)		g	1.00			1" Ice	2.24	0.66	0.04
(2) KRC 161 286-1 (A-2	C	From	4.00	0.0000	179.00	No Ice	1.87	0.43	0.02
Module)		Centroid-Le	0.00			1/2" Ice	2.05	0.54	0.03
(AT&T Mobility)		g	1.00			1" Ice	2.24	0.66	0.04
DC6-48-60-18-8F Surge	A	From Leg	1.00	0.0000	179.00	No Ice	1.47	1.47	0.02
Suppression Unit			0.00			1/2" Ice	1.67	1.67	0.04
(AT&T Mobility)			1.00			1" Ice	1.88	1.88	0.06
DC6-48-60-18-8F Surge	B	From Leg	1.00	0.0000	179.00	No Ice	1.47	1.47	0.02
Suppression Unit			0.00			1/2" Ice	1.67	1.67	0.04
(AT&T Mobility)			1.00			1" Ice	1.88	1.88	0.06
DC6-48-60-18-8F Surge	C	From Leg	1.00	0.0000	179.00	No Ice	1.47	1.47	0.02
Suppression Unit			0.00			1/2" Ice	1.67	1.67	0.04
(AT&T Mobility)			1.00			1" Ice	1.88	1.88	0.06
Pirod 15' LP Platform	C	None		0.0000	160.00	No Ice	18.85	18.85	1.50
(Nextel)						1/2" Ice	24.30	24.30	1.80
						1" Ice	29.75	29.75	2.09
(4) DB846G90A-XY w/	A	From	4.00	0.0000	160.00	No Ice	4.99	7.29	0.04
Mount Pipe		Centroid-Le	0.00			1/2" Ice	5.44	8.25	0.09
(Nextel)		g	0.00			1" Ice	5.90	9.08	0.15
(4) DB846G90A-XY w/	B	From	4.00	0.0000	160.00	No Ice	4.99	7.29	0.04
Mount Pipe		Centroid-Le	0.00			1/2" Ice	5.44	8.25	0.09
(Nextel)		g	0.00			1" Ice	5.90	9.08	0.15
(4) DB846G90A-XY w/	C	From	4.00	0.0000	160.00	No Ice	4.99	7.29	0.04
Mount Pipe		Centroid-Le	0.00			1/2" Ice	5.44	8.25	0.09
(Nextel)		g	0.00			1" Ice	5.90	9.08	0.15
932DG65T2E-M w/Mount	A	From	4.00	0.0000	160.00	No Ice	4.15	3.50	0.04
Pipe		Centroid-Le	0.00			1/2" Ice	4.79	4.54	0.07
(Nextel)		g	0.00			1" Ice	5.35	5.30	0.12
932DG65T2E-M w/Mount	B	From	4.00	0.0000	160.00	No Ice	4.15	3.50	0.04
Pipe		Centroid-Le	0.00			1/2" Ice	4.79	4.54	0.07
(Nextel)		g	0.00			1" Ice	5.35	5.30	0.12
932DG65T2E-M w/Mount	C	From	4.00	0.0000	160.00	No Ice	4.15	3.50	0.04
Pipe		Centroid-Le	0.00			1/2" Ice	4.79	4.54	0.07
(Nextel)		g	0.00			1" Ice	5.35	5.30	0.12
Pipe Mount 5'x2.375"	A	From Face	0.50	0.0000	125.00	No Ice	1.19	1.19	0.02
(Unknown)			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
Pipe Mount 5'x2.375"	B	From Leg	0.50	0.0000	125.00	No Ice	1.19	1.19	0.02
(Unknown)			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04

Inspections Division
Date: 03/27/14

tnxTower

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

Job	Page
ME5015 (4340) NORTH PORTLAND	4 of 4
Project	**Date**
2014723.13.4340.02	13:06:54 03/25/14
Client	**Designed by**
SAI Communications	Teveslage

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
4' Dish (Unknown)	A	Paraboloid w/Radome	From Face	1.00 0.00 0.00	0.0000		125.00	4.00	No Ice 1/2" Ice 1" Ice	12.57 13.10 13.62	0.08 0.09 0.10
4' Dish (Unknown)	B	Paraboloid w/Radome	From Leg	1.00 0.00 0.00	0.0000		125.00	4.00	No Ice 1/2" Ice 1" Ice	12.57 13.10 13.62	0.08 0.09 0.10

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
179.00	Pirod 13' LP Platform w/Rails (Lattice)	44	19.578	1.0433	0.0049	35276
160.00	Pirod 15' LP Platform	44	15.841	0.9782	0.0030	10477
125.00	4' Dish	44	9.431	0.7483	0.0014	8109

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	177.5 - 160	Pole	P24x3/8	1	-6.47	1052.07	37.9	Pass
L2	160 - 140	Pole	P30x3/8	2	-12.04	1311.06	65.5	Pass
L3	140 - 120	Pole	P36x3/8	3	-16.34	1490.10	78.7	Pass
L4	120 - 100	Pole	P42x3/8	4	-21.11	1668.87	86.3	Pass
L5	100 - 80	Pole	P48x3/8	5	-26.49	1847.49	90.4	Pass
L6	80 - 60	Pole	P54x3/8	6	-32.47	2026.00	92.7	Pass
L7	60 - 40	Pole	P60x3/8	7	-39.86	2204.43	94.2	Pass
L8	40 - 20	Pole	P60x1/2	8	-49.99	3125.69	83.7	Pass
L9	20 - 0	Pole	P60x1/2	9	-59.17	3125.69	99.0	Pass

Summary	ELC:	Existing + Proposed + Future
Pole (L9)	99.0	Pass
Rating =	99.0	Pass

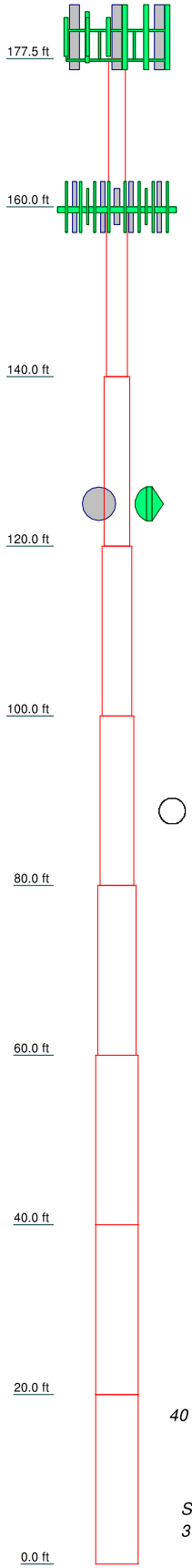
Inspections Division
Date: 03/27/14

APPENDIX C

Tower Elevation Drawing

Inspections Division
Date: 03/27/14

Section	Size	Length (ft)	Grade	Weight (K)
1	P24x	17.5	A53-B-42	1.7
2	P30x3/8	20.00		2.4
3	P36x3/8	20.00		2.9
4	P42x3/8	20.00		3.3
5	P48x3/8	20.00		3.8
6	P54x3/8	20.00		4.3
7	P60x3/8	20.00		4.8
8	P60x1/2	20.00		6.4
9	P60x1/2	20.00		6.4
				35.8



ALL REACTIONS ARE FACTORED

AXIAL 98 K
SHEAR 7 K
MOMENT 938 kip-ft
TORQUE 0 kip-ft
40 mph WIND - 1.0000 in ICE

AXIAL 56 K
SHEAR 37 K
MOMENT 4700 kip-ft
TORQUE 3 kip-ft
REACTIONS - 100 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Pirod 13' LP Platform w/Rails (Lattice) (ATI Mobility)	179	(2) RRUS 11 (ATI Mobility)	179
7770.00 w/Mount Pipe (ATI Mobility)	179	(2) RRUS 12 (ATI Mobility)	179
7770.00 w/Mount Pipe (ATI Mobility)	179	(2) RRUS 12 (ATI Mobility)	179
7770.00 w/Mount Pipe (ATI Mobility)	179	(2) RRUS 12 (ATI Mobility)	179
7770.00 w/Mount Pipe (ATI Mobility)	179	RRUS E2 (ATI Mobility)	179
7770.00 w/Mount Pipe (ATI Mobility)	179	RRUS E2 (ATI Mobility)	179
7770.00 w/Mount Pipe (ATI Mobility)	179	RRUS E2 (ATI Mobility)	179
7770.00 w/Mount Pipe (ATI Mobility)	179	RRUS 32 (ATI Mobility)	179
(3) HPA-65R-BUU-H8 w/ Mount Pipe (ATI Mobility)	179	RRUS 32 (ATI Mobility)	179
(3) HPA-65R-BUU-H8 w/ Mount Pipe (ATI Mobility)	179	RRUS 32 (ATI Mobility)	179
(3) SBNHH-1D65A w/ Mount Pipe (ATI Mobility)	179	(2) KRC 161 286-1 (A-2 Module) (ATI Mobility)	179
(2) LGP21903 Diplexer (ATI Mobility)	179	(2) KRC 161 286-1 (A-2 Module) (ATI Mobility)	179
(2) LGP21903 Diplexer (ATI Mobility)	179	(2) KRC 161 286-1 (A-2 Module) (ATI Mobility)	179
(2) LGP21903 Diplexer (ATI Mobility)	179	DC6-48-60-18-8F Surge Suppression Unit (ATI Mobility)	179
(2) LGP21401 (ATI Mobility)	179	DC6-48-60-18-8F Surge Suppression Unit (ATI Mobility)	179
(2) LGP21401 (ATI Mobility)	179	DC6-48-60-18-8F Surge Suppression Unit (ATI Mobility)	179
(2) LGP21401 (ATI Mobility)	179	Pirod 15' LP Platform (Nextel)	160
DTMABP7819VG12A-BP (ATI Mobility)	179	(4) DB846G90A-XY w/ Mount Pipe (Nextel)	160
DTMABP7819VG12A-BP (ATI Mobility)	179	(4) DB846G90A-XY w/ Mount Pipe (Nextel)	160
DTMABP7819VG12A-BP (ATI Mobility)	179	(4) DB846G90A-XY w/ Mount Pipe (Nextel)	160
P65-17-XLH-RR w/ Mount Pipe (ATI Mobility)	179	932DG65T2E-M w/Mount Pipe (Nextel)	160
SBNH-1D6565C w/ 5' Mount Pipe (ATI Mobility)	179	932DG65T2E-M w/Mount Pipe (Nextel)	160
AM-X-CD-14-65-00T-RET w/ 8' Mount Pipe (ATI Mobility)	179	932DG65T2E-M w/Mount Pipe (Nextel)	160
(2) RRUS 11 (ATI Mobility)	179	Pipe Mount 5'x2.375" (Unknown)	125
(2) RRUS 11 (ATI Mobility)	179	Pipe Mount 5'x2.375" (Unknown)	125
(2) RRUS 11 (ATI Mobility)	179	4' Dish (Unknown)	125
(2) RRUS 11 (ATI Mobility)	179	4' Dish (Unknown)	125
(2) RRUS 11 (ATI Mobility)	179		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Cumberland County, Maine.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 100 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 98.5%

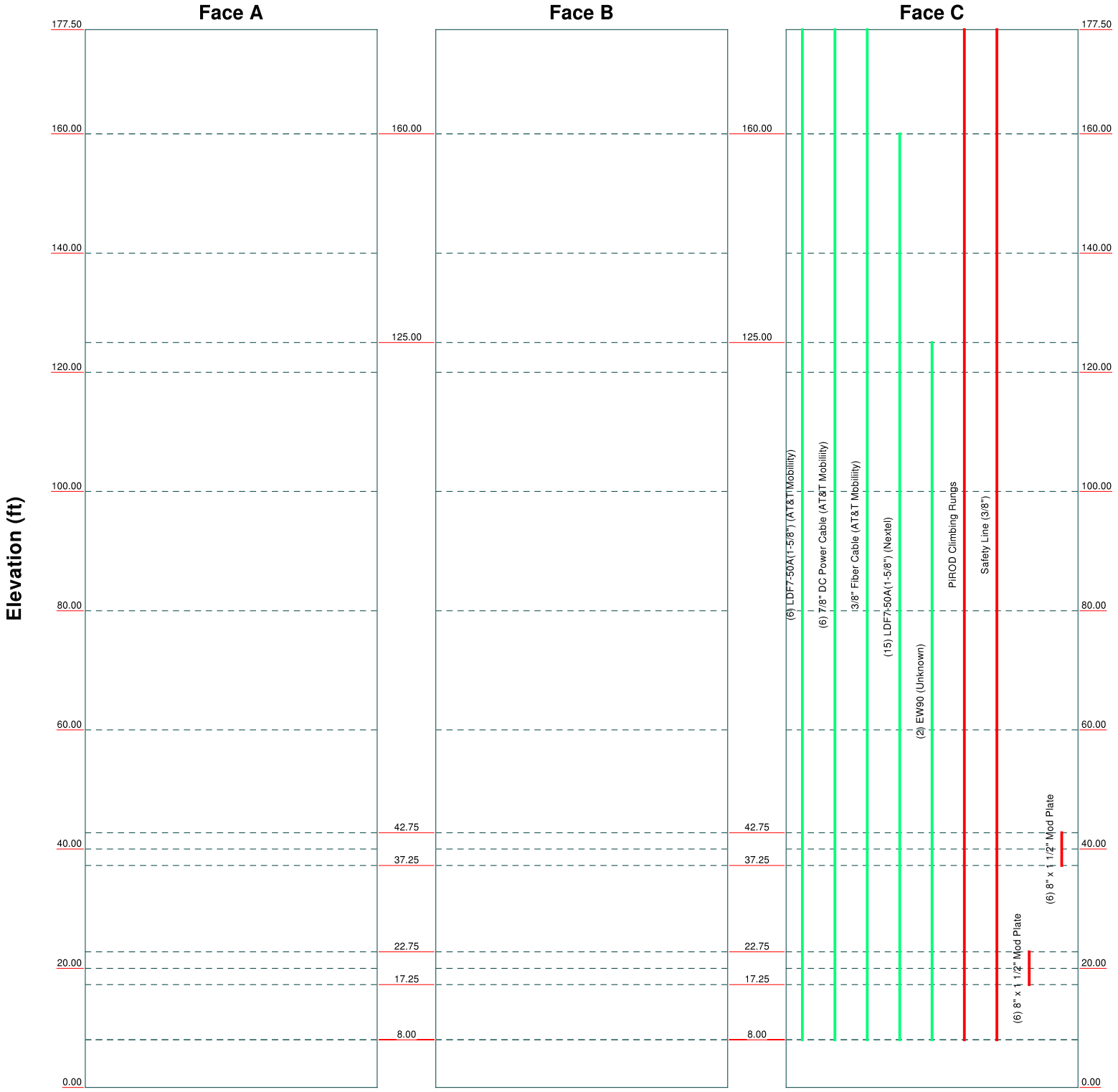
GPD
Consulting Engineers
520 South Main Street, Suite 2531
Akron, OH 44311
Phone: (330) 572-2100
FAX: (330) 572-3709

Job: ME5015 (4340) NORTH PORTLAND			
Project: 2014723.13.4340.02			
Client: SAI Communications	Drawn by: Teveslage	App'd:	
Code: TIA-222-G	Date: 03/25/14	Scale: NTS	
Path: \\AKRN03.gpdco.com\DATA\2011\ATandT\4340\04 2014723 13 4340 02 SAI MODS TLL\tnx\4340 North Portland.eri		Dwg No. E-1	

Inspections Division
Date: 03/27/14

Feed Line Distribution Chart
0' - 177'6"

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



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520 South Main Street, Suite 2531
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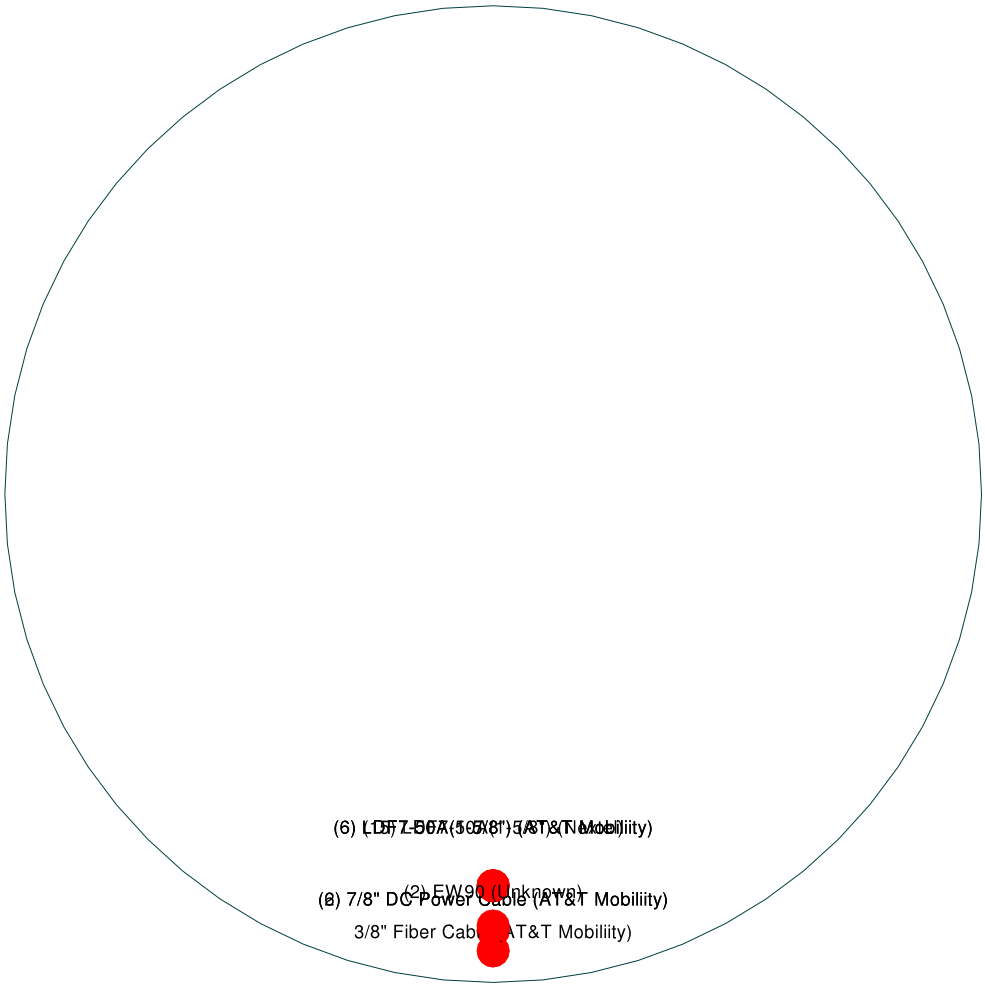
Job: ME5015 (4340) NORTH PORTLAND		
Project: 2014723.13.4340.02		
Client: SAI Communications	Drawn by: Teveslage	App'd:
Code: TIA-222-G	Date: 03/25/14	Scale: NTS
Path: \\AKRN03.gpdco.com\DATA\2011\ATandT\4340\04 2014723 13 4340.02 SAI MODS TLL\trx\4340 North Portland.er		Dwg No. E-7

Feed Line Plan
20'

Round Flat App In Face App Out Face

Inspections Division
Date: 03/27/14

Section @ 20'



GPD 520 South Main Street, Suite 2531 Akron, OH 44311 Phone: (330) 572-2100 FAX: (330) 572-3709 Consulting Engineers	Job: ME5015 (4340) NORTH PORTLAND		
	Project: 2014723.13.4340.02		
	Client: SAI Communications	Drawn by: Teveslage	App'd:
	Code: TIA-222-G	Date: 03/25/14	Scale: NTS
	Path: \\AKRN03.gpdco.com\DATA\2011\ATandT\4340\04 2014723 13 4340.02 SAI MODS TLL\trx\4340 North Portland.er		Dwg No. E-7

Inspections Division
Date: 03/27/14

APPENDIX D

Base Plate & Anchor Rod Analysis

Inspections Division
Date: 03/27/14

GPD GROUP

Anchor Rod and Base Plate Stresses, TIA-222-G-1
4340 (ME5015) NORTH PORTLAND
2014723.13.4340.02

Overturning Moment =	4700.00	k*ft
Axial Force =	56.00	k
Shear Force =	37.00	k

Acceptable Stress Ratio =	105.0%

Anchor Rods (Section 4.9.9, TIA-222-G-1)		
Number of Rods =	52	
ϕ =	0.8	
Rod Ultimate Strength (F_u) =	150	ksi
Base Plate Detail Type* =	d	
Rod Circle =	67	in
Rod Diameter =	1.25	in
Net Tensile Area =	0.97	in^2
Max Tension on Rod =	63.66	kips
Max Compression on Rod =	65.82	kips
P_u =	65.82	kips
V_u =	0.71	kips
η =	0.50	
φR_{nt} =	116.28	kips
Anchor Rod Capacity =	**57.8%**	**OK**

***This analysis assumes the clear distance from the top of the concrete to the bottom of the leveling nut is less than the diameter of the anchor rod. Notify GPD Group immediately if existing field conditions do not meet this assumption.**

Base Plate		
Location =	External	
Plate Strength (Fy) =	36	ksi
ϕ =	0.9	
Outside Diameter =	70	in
Plate Thickness =	1.25	in
b =	3.30	in
Le =	4.50	in
Z =	2.34	in^3
M_u =	56.01	k-in
φM_n =	75.94	k-in
BP Capacity =	**73.8%**	**OK**

Pole		
Pole Diameter =	60	in
Number of Sides =	Round	
Thickness =	0.5	in
Pole Yield Strength =	42	ksi

Stiffeners		
Configuration =	Every Rod	
Thickness =	0.75	in
Width =	4.5	in
Notch =	0.5	in
Height =	8	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.375	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.375	in
Weld Strength =	70	ksi
Stiffener Vertical Force =	45.09	kips
Vert. Weld Capacity =	47.9%	kips
Horiz. Weld Capacity =	72.4%	kips
Stiffener Capacity =	80.9%	kips
Controlling Capacity =	**80.9%**	**OK**

Inspections Division
Date: 03/27/14

APPENDIX E

Flange Plate Analysis

Inspections Division

Date: 03/27/14

GPD GROUP

Existing Flange Connection @ 20'
4340 (ME5015) NORTH PORTLAND
2014723.13.4340.02

*O.T. Moment =	2322.6	k*ft
Axial =	49.99	kips
Shear =	33.04	kips

*Above reactions have been adjusted due to consideration of modifications. See attached hand calculations for determination of flange bolt forces used in the analysis.

Acceptable Stress Ratio =	105.0%

Flange Bolts

# Bolts =	32	
Bolt Type =	A325	
Threads Included? =	Yes	
Bolt Diameter =	1.7677	in
Bolt Circle =	50	in
ϕ_t =	0.75	
ϕ_v =	0.75	

Tension & Shear (TIA-222-G-1, Section 4.9.6)

F_{ub} =	105	ksi
A_b =	2.454183	in^2
A_n =	1.9	in^2
ϕR_{nv} =	86.97	kips
ϕR_{nt} =	149.63	kips
V_{ub} =	1.03	kips
T_{ub} =	68.07	kips

Prying Action Check

N/A for stiffened flange

Max Comp. on Bolt =	71.20	kips
Shear Capacity =	1.2%	
Tensile Capacity =	45.5%	
Interaction Capacity =	20.7%	
Bolt Capacity =	**45.5%**	**OK**

Pole Information

Shaft Diam. (Upper) =	60	in
Thickness (Upper)=	0.5	in
# of Sides (Upper) =	Round	
F_y (Upper) =	42	ksi
Shaft Diam. (Lower) =	60	in
Thickness (Lower)=	0.5	in
# of Sides (Lower) =	Round	
F_y (Lower) =	42	ksi

Upper Flange Plate

Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Tensile (F_u) =	58	ksi
Plate Thickness =	1.25	in
Hole Diameter =	43	in
ϕ_f =	0.9	
b =	4.28	in
Le =	7.00	in
Z =	2.34	in^3
M_u =	45.31	k-in
ϕM_n =	75.9375	k-in
UP Capacity =	**59.7%**	**OK**

Lower Flange Plate

Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	43	in
b =	4.28	in
Le =	7.00	in
Z =	2.34	in^3
M_u =	45.31	k-in
ϕM_n =	75.9375	k-in
LP Capacity =	**59.7%**	**OK**

UpperStiffeners

Configuration =	Every Bolt	
Thickness =	0.625	in
Width =	7	in
Notch =	0.5	in
Height =	10	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.375	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.375	in
Weld Strength =	70	ksi
Stiffener Vertical Force =	35.34	kips
Vert. Weld Capacity =	32.6%	kips
Horiz. Weld Capacity =	35.9%	kips
Stiffener Capacity =	64.5%	kips
Controlling Capacity =	**64.5%**	**OK**

Lower Stiffeners

Configuration =	Every Bolt	
Thickness =	0.625	in
Width =	7	in
Notch =	0.5	in
Height =	10	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.375	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.375	in
Weld Strength =	70	ksi
Stiffener Vertical Force =	35.34	kips
Vert. Weld Capacity =	32.6%	kips
Horiz. Weld Capacity =	35.9%	kips
Stiffener Capacity =	64.5%	kips
Controlling Capacity =	**64.5%**	**OK**

Inspections Division
Date: 03/27/14

20 South Main Street • Suite 2531 • Akron, Ohio 44311• PHONE 330-572-2100 • FAX 330-572-2101

GPD GROUP
Glaus, Pyle, Schomer, Burns & DeHaven, Inc.

GPD GROUP
Engineers • Architects • Planners

Job #: 2014723.13.4340.02
Sheet No 1 Of 1

Calculated By: TRE Date: 3/25/2014
Checked By: Date:

BOLT AND BRIDGE STIFFENER CALCULATIONS

@ 20'

Moment from TNX (M) =	3987.85	kip-ft	Code =	TIA-222-G			
Axial from TNX (P) =	49.99	kip	ASIF =	1.00			
Inner Bolt Diameter =	1.3125	in					
Inner Bolt Area (A_{inner}) =	1.35	in^2	Inner Bolt Circle (BC_{inner}) =	47	in		
Inner Bolt MOI ($I_{o.inner}$) =	0.15	in^4	Total Area ($A_{tot.in}$) =	43.30	in^2	Axial, Inner Bolts ($P*\eta_{in}$) =	13.65 kips
Number Inner Bolts (N_{inner}) =	32		Percent Total Area (η_{in}) =	27.3%			
Outer Bolt Diameter =	1.3125	in					
Outer Bolt Area (A_{outer}) =	1.35	in^2	Outer Bolt Circle (BC_{outer}) =	53	in		
Outer Bolt MOI ($I_{o.outer}$) =	0.15	in^4	Total Area ($A_{tot.out}$) =	43.30	in^2	Axial, Outer Bolts ($P*\eta_{out}$) =	13.65 kips
Number Outer Bolts (N_{outer}) =	32		Percent Total Area (η_{out}) =	27.3%			
Bridge Stiffener Width =	8.00	in					
Bridge Stiffener Thickness =	1.50	in	Connection Bolt Hole Size =	1.21875	in		
Bridge Stiffener Unbraced Length =	24.00	in	Net Bridge Stiffener Area ($A_{e.pl}$)	10.078	in		
Bridge Stiffener Area (A_{pl}) =	12.00	in^2	Bridge Stiffener Circle (BC_{pl}) =	61.5	in		
Bridge Stiffener MOI (I_o) =	2.25	in^4	Total Area ($A_{tot.pl}$) =	72.00	in^2	Axial, Bridge Stiffener ($P*\eta_{pl}$) =	22.70 kips
Number Bridge Stiffeners (N_{pl})	6		Percent Total Area (η_{pl}) =	45.4%			

I_{inner} =	11959.51	$in.^4$	$(N_{inner}*A_{inner}*BC_{inner}^2/8 + N_{inner}*I_{o.inner})$
I_{pl} =	34053.75	$in.^4$	$(N_{pl}*A_{pl}*BC_{pl}^2/8 + N_{pl}*I_{o.pl})$
I_{tot} =	46013.26	$in.^4$	$(I_{inner} + I_{outer} + I_{pl})$
$P_{u.t.inner}$ =	33.5	kips	$(M*(BC_{inner}/2)*A_{inner})/I_{total} + P*\eta_{in}/N_{inner})$
$P_{u.t.outer}$ =	37.7	kips	$(M*(BC_{outer}/2)*A_{outer})/I_{total} + P*\eta_{out}/N_{outer})$
$P_{u.t.pl}$ =	380.0	kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} - P*\eta_{pl}/N_{pl})$
$P_{u.c.pl}$ =	387.5	kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} + P*\eta_{pl}/N_{pl})$

Bridge Stiffener Check

f_y =	50	ksi
f_u =	65	ksi
E =	29000	ksi
K =	1.00	
KL/r =	55.426	
F_e =	93.17	ksi
F_{cr} =	39.94	ksi
ϕP_{nc} =	431.36	kips
ϕP_{nt} =	491.309	kips
Bridge Stiffener Rating =	**89.8%**	OK

Inspections Division

Date: 03/27/14

GPD GROUP

Existing Flange Connection @ 40'
4340 (ME5015) NORTH PORTLAND
2014723.13.4340.02

*O.T. Moment =	1919.6	k*ft
Axial =	39.86	kips
Shear =	33.27	kips

*Above reactions have been adjusted due to consideration of modifications. See attached hand calculations for determination of flange bolt forces used in the analysis.

Acceptable Stress Ratio =	105.0%

Flange Bolts

# Bolts =	32	
Bolt Type =	A325	
Threads Included? =	Yes	
Bolt Diameter =	1.7677	in
Bolt Circle =	50	in
ϕ_t =	0.75	
ϕ_v =	0.75	

Tension & Shear (TIA-222-G-1, Section 4.9.6)

F_{ub} =	105	ksi
A_b =	2.454183	in^2
A_n =	1.9	in^2
ϕR_{nv} =	86.97	kips
ϕR_{nt} =	149.63	kips
V_{ub} =	1.04	kips
T_{ub} =	56.31	kips

Prying Action Check

N/A for stiffened flange

Max Comp. on Bolt =	58.80	kips
Shear Capacity =	1.2%	
Tensile Capacity =	37.6%	
Interaction Capacity =	14.2%	
Bolt Capacity =	**37.6%**	**OK**

Pole Information

Shaft Diam. (Upper) =	60	in
Thickness (Upper)=	0.375	in
# of Sides (Upper) =	Round	
F_y (Upper) =	42	ksi
Shaft Diam. (Lower) =	60	in
Thickness (Lower)=	0.5	in
# of Sides (Lower) =	Round	
F_y (Lower) =	42	ksi

Upper Flange Plate

Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Tensile (F_u) =	58	ksi
Plate Thickness =	1.25	in
Hole Diameter =	43	in
ϕ_f =	0.9	
b =	4.28	in
Le =	7.00	in
Z =	2.34	in^3
M_u =	37.42	k-in
ϕM_n =	75.9375	k-in
UP Capacity =	**49.3%**	**OK**

Lower Flange Plate

Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	43	in
b =	4.28	in
Le =	7.00	in
Z =	2.34	in^3
M_u =	37.42	k-in
ϕM_n =	75.9375	k-in
LP Capacity =	**49.3%**	**OK**

UpperStiffeners

Configuration =	Every Bolt	
Thickness =	0.625	in
Width =	7	in
Notch =	0.5	in
Height =	10	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.375	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.375	in
Weld Strength =	70	ksi
Stiffener Vertical Force =	33.11	kips
Vert. Weld Capacity =	30.5%	kips
Horiz. Weld Capacity =	33.7%	kips
Stiffener Capacity =	60.4%	kips
Controlling Capacity =	**60.4%**	**OK**

Lower Stiffeners

Configuration =	Every Bolt	
Thickness =	0.625	in
Width =	7	in
Notch =	0.5	in
Height =	10	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.375	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.375	in
Weld Strength =	70	ksi
Stiffener Vertical Force =	29.18	kips
Vert. Weld Capacity =	26.9%	kips
Horiz. Weld Capacity =	29.7%	kips
Stiffener Capacity =	53.3%	kips
Controlling Capacity =	**53.3%**	**OK**

Inspections Division
Date: 03/27/14

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GPD GROUP
Glaus, Pyle, Schomer, Burns & DeHaven, Inc.

GPD GROUP
Engineers • Architects • Planners

Job #: 2014723.13.4340.02
Sheet No 1 Of 1

Calculated By: TRE Date: 3/25/2014
Checked By: Date:

BOLT AND BRIDGE STIFFENER CALCULATIONS

@ 40'

Moment from TNX (M) =	3294.12	kip-ft	Code =	TIA-222-G			
Axial from TNX (P) =	39.86	kip	ASIF =	1.00			
Inner Bolt Diameter =	1.3125	in					
Inner Bolt Area (A_{inner}) =	1.35	in^2	Inner Bolt Circle (BC_{inner}) =	47	in		
Inner Bolt MOI ($I_{o.inner}$) =	0.15	in^4	Total Area ($A_{tot.in}$) =	43.30	in^2	Axial, Inner Bolts ($P*\eta_{in}$) =	10.88 kips
Number Inner Bolts (N_{inner}) =	32		Percent Total Area (η_{in}) =	27.3%			
Outer Bolt Diameter =	1.3125	in					
Outer Bolt Area (A_{outer}) =	1.35	in^2	Outer Bolt Circle (BC_{outer}) =	53	in		
Outer Bolt MOI ($I_{o.outer}$) =	0.15	in^4	Total Area ($A_{tot.out}$) =	43.30	in^2	Axial, Outer Bolts ($P*\eta_{out}$) =	10.88 kips
Number Outer Bolts (N_{outer}) =	32		Percent Total Area (η_{out}) =	27.3%			
Bridge Stiffener Width =	8.00	in					
Bridge Stiffener Thickness =	1.50	in	Connection Bolt Hole Size =	1.21875	in		
Bridge Stiffener Unbraced Length =	24.00	in	Net Bridge Stiffener Area ($A_{e.pl}$)	10.078	in		
Bridge Stiffener Area (A_{pl}) =	12.00	in^2	Bridge Stiffener Circle (BC_{pl}) =	61.5	in		
Bridge Stiffener MOI (I_o) =	2.25	in^4	Total Area ($A_{tot.pl}$) =	72.00	in^2	Axial, Bridge Stiffener ($P*\eta_{pl}$) =	18.10 kips
Number Bridge Stiffeners (N_{pl})	6		Percent Total Area (η_{pl}) =	45.4%			

I_{inner} =	11959.51	$in.^4$	$(N_{inner}*A_{inner}*BC_{inner}^2/8 + N_{inner}*I_{o.inner})$
I_{pl} =	34053.75	$in.^4$	$(N_{pl}*A_{pl}*BC_{pl}^2/8 + N_{pl}*I_{o.pl})$
I_{tot} =	46013.26	$in.^4$	$(I_{inner} + I_{outer} + I_{pl})$
$P_{u.t.inner}$ =	27.7	kips	$(M*(BC_{inner}/2)*A_{inner})/I_{total} + P*\eta_{in}/N_{inner})$
$P_{u.t.outer}$ =	31.1	kips	$(M*(BC_{outer}/2)*A_{outer})/I_{total} + P*\eta_{out}/N_{outer})$
$P_{u.t.pl}$ =	314.0	kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} - P*\eta_{pl}/N_{pl})$
$P_{u.c.pl}$ =	320.0	kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} + P*\eta_{pl}/N_{pl})$

Bridge Stiffener Check

f_y =	50	ksi
f_u =	65	ksi
E =	29000	ksi
K =	1.00	
KL/r =	55.426	
F_e =	93.17	ksi
F_{cr} =	39.94	ksi
ϕP_{nc} =	431.36	kips
ϕP_{nt} =	491.309	kips
Bridge Stiffener Rating =	**74.2%**	OK

Inspections Division

Date: 03/27/14

GPD GROUP

Existing Flange Connection @ 60'
4340 (ME5015) NORTH PORTLAND
2014723.13.4340.02

O.T. Moment =	2651.42	k*ft
Axial =	32.47	kips
Shear =	30.71	kips

Acceptable Stress Ratio =	105.0%

Flange Bolts		
# Bolts =	48	
Bolt Type =	A325	
Threads Included? =	Yes	
Bolt Diameter =	1	in
Bolt Circle =	57	in
ϕ_t =	0.75	
ϕ_v =	0.75	
Tension & Shear (TIA-222-G-1, Section 4.9.6)		
F_{ub} =	120	ksi
A_b =	0.785398	in^2
A_n =	0.606	in^2
ϕR_{nv} =	31.81	kips
ϕR_{nt} =	54.54	kips
V_{ub} =	0.64	kips
T_{ub} =	45.83	kips
Prying Action Check		
N/A, top flange thickness > tc		
Max Comp. on Bolt =	47.19	kips
Shear Capacity =	2.0%	
Tensile Capacity =	84.0%	
Interaction Capacity =	70.7%	
Bolt Capacity =	**84.0%**	**OK**

Pole Information		
Shaft Diam. (Upper) =	54	in
Thickness (Upper)=	0.375	in
# of Sides (Upper) =	Round	
F_y (Upper) =	42	ksi
Shaft Diam. (Lower) =	60	in
Thickness (Lower)=	0.375	in
# of Sides (Lower) =	Round	
F_y (Lower) =	42	ksi

Upper Flange Plate		
Location =	External	
Plate Strength (F_y) =	36	ksi
Plate Tensile (F_u) =	58	ksi
Plate Thickness =	1.25	in
Outer Diameter =	60	in
ϕ_f =	0.9	
b =	3.11	in
Le =	3.00	in
Z =	2.34	in^3
M_u =	63.35	k-in
ϕM_n =	75.9375	k-in
UP Capacity =	**83.4%**	**OK**

Lower Flange Plate		
Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	54	in
b =	3.11	in
Le =	2.00	in
Z =	2.34	in^3
M_u =	71.58	k-in
ϕM_n =	75.9375	k-in
LP Capacity =	**94.3%**	**OK**

UpperStiffeners		
Configuration =	Every Bolt	
Thickness =	0.625	in
Width =	3	in
Notch =	0.5	in
Height =	5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.375	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.375	in
Weld Strength =	70	ksi
Stiffener Vertical Force =	26.97	kips
Vert. Weld Capacity =	49.4%	kips
Horiz. Weld Capacity =	70.4%	kips
Stiffener Capacity =	93.8%	kips
Controlling Capacity =	**93.8%**	**OK**

Lower Stiffeners		
Configuration =	Every Bolt	
Thickness =	0.625	in
Width =	2	in
Notch =	0.5	in
Height =	3.5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.375	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.375	in
Weld Strength =	70	ksi
Stiffener Vertical Force =	17.42	kips
Vert. Weld Capacity =	47.3%	kips
Horiz. Weld Capacity =	75.9%	kips
Stiffener Capacity =	85.9%	kips
Controlling Capacity =	**85.9%**	**OK**

Inspections Division

Date: 03/27/14

GPD GROUP

Existing Flange Connection @ 80'
4340 (ME5015) NORTH PORTLAND
2014723.13.4340.02

*O.T. Moment =	836.5	k*ft
Axial =	26.49	kips
Shear =	28.04	kips

*Above reactions have been adjusted due to consideration of modifications. See attached hand calculations for determination of flange bolt forces used in the analysis.

Acceptable Stress Ratio =	105.0%

Flange Bolts

# Bolts =	36	
Bolt Type =	A325	
Threads Included? =	Yes	
Bolt Diameter =	1	in
Bolt Circle =	51	in
ϕ_t =	0.75	
ϕ_v =	0.75	

Tension & Shear (TIA-222-G-1, Section 4.9.6)

F_{ub} =	120	ksi
A_b =	0.785398	in^2
A_n =	0.606	in^2
ϕR_{nv} =	31.81	kips
ϕR_{nt} =	54.54	kips
V_{ub} =	0.78	kips
T_{ub} =	21.13	kips

Prying Action Check

N/A, top flange thickness > tc

Max Comp. on Bolt =	22.60	kips
Shear Capacity =	2.4%	
Tensile Capacity =	38.7%	
Interaction Capacity =	15.1%	
Bolt Capacity =	**38.7%**	**OK**

Pole Information

Shaft Diam. (Upper) =	48	in
Thickness (Upper)=	0.375	in
# of Sides (Upper) =	Round	
F_y (Upper) =	42	ksi
Shaft Diam. (Lower) =	54	in
Thickness (Lower)=	0.375	in
# of Sides (Lower) =	Round	
F_y (Lower) =	42	ksi

Upper Flange Plate

Location =	External	
Plate Strength (F_y) =	36	ksi
Plate Tensile (F_u) =	58	ksi
Plate Thickness =	1.25	in
Outer Diameter =	54	in
ϕ_f =	0.9	
b =	3.83	in
Le =	3.00	in
Z =	2.34	in^3
M_u =	31.36	k-in
ϕM_n =	75.9375	k-in
UP Capacity =	**41.3%**	**OK**

Lower Flange Plate

Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	48	in
b =	3.83	in
Le =	2.00	in
Z =	2.34	in^3
M_u =	33.25	k-in
ϕM_n =	75.9375	k-in
LP Capacity =	**43.8%**	**OK**

UpperStiffeners

Configuration =	Every Bolt	
Thickness =	0.625	in
Width =	3	in
Notch =	0.5	in
Height =	5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.375	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.375	in
Weld Strength =	70	ksi
Stiffener Vertical Force =	12.05	kips
Vert. Weld Capacity =	22.1%	kips
Horiz. Weld Capacity =	31.5%	kips
Stiffener Capacity =	41.9%	kips
Controlling Capacity =	**41.9%**	**OK**

Lower Stiffeners

Configuration =	Every Bolt	
Thickness =	0.625	in
Width =	2	in
Notch =	0.5	in
Height =	3.5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.375	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.375	in
Weld Strength =	70	ksi
Stiffener Vertical Force =	7.37	kips
Vert. Weld Capacity =	20.0%	kips
Horiz. Weld Capacity =	32.1%	kips
Stiffener Capacity =	36.3%	kips
Controlling Capacity =	**36.3%**	**OK**

Inspections Division

Date: 03/27/14

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GPD GROUP
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Job #: 2014723.13.4340.02
Sheet No 1 Of 1

Calculated By: TRE Date: 3/25/2014
Checked By: Date:

BOLT AND BRIDGE STIFFENER CALCULATIONS

@ 80'

Moment from TNX (M) =	2063.02	kip-ft	Code =	TIA-222-G			
Axial from TNX (P) =	26.49	kip	ASIF =	1.00			
Inner Bolt Diameter =	1	in					
Inner Bolt Area (A_{inner}) =	0.79	in^2	Inner Bolt Circle (BC_{inner}) =	51	in		
Inner Bolt MOI ($I_{o.inner}$) =	0.05	in^4	Total Area ($A_{tot.in}$) =	28.27	in^2	Axial, Inner Bolts ($P*\eta_{in}$) =	12.85 kips
Number Inner Bolts (N_{inner}) =	36		Percent Total Area (η_{in}) =	48.5%			
Bridge Stiffener Width =	5.00	in					
Bridge Stiffener Thickness =	1.00	in	Connection Bolt Hole Size =	0	in		
Bridge Stiffener Unbraced Length =	12.00	in	Net Bridge Stiffener Area ($A_{e.pl}$)	5.000	in		
Bridge Stiffener Area (A_{pl}) =	5.00	in^2	Bridge Stiffener Circle (BC_{pl}) =	59	in		
Bridge Stiffener MOI (I_o) =	0.42	in^4	Total Area ($A_{tot.pl}$) =	30.00	in^2	Axial, Bridge Stiffener ($P*\eta_{pl}$) =	13.64 kips
Number Bridge Stiffeners (N_{pl})	6		Percent Total Area (η_{pl}) =	51.5%			

I_{inner} =	9194.46	$in.^4$	$(N_{inner}*A_{inner}*BC_{inner}^2/8 + N_{inner}*I_{o.inner})$
I_{pl} =	13056.25	$in.^4$	$(N_{pl}*A_{pl}*BC_{pl}^2/8 + N_{pl}*I_{o.pl})$
I_{tot} =	22250.71	$in.^4$	$(I_{inner} + I_{outer} + I_{pl})$
$P_{u.t.inner}$ =	22.6	kips	$(M*(BC_{inner}/2)*A_{inner})/I_{total} + P*\eta_{in}/N_{inner})$
$P_{u.t.pl}$ =	161.8	kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} - P*\eta_{pl}/N_{pl})$
$P_{u.c.pl}$ =	166.4	kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} + P*\eta_{pl}/N_{pl})$

Bridge Stiffener Check

f_y =	50	ksi
f_u =	65	ksi
E =	29000	ksi
K =	1.00	
KL/r =	41.569	
F_{cr} =	44.07	ksi
ϕP_{nc} =	198.29	kips
ϕP_{nt} =	225.000	kips
Bridge Stiffener Rating =	**83.9%**	OK

Inspections Division

Date: 03/27/14

GPD GROUP

Existing Flange Connection @ 100'
4340 (ME5015) NORTH PORTLAND
2014723.13.4340.02

O.T. Moment =	1520.97	k*ft
Axial =	21.11	kips
Shear =	25.59	kips

Acceptable Stress Ratio =	105.0%

Flange Bolts		
# Bolts =	32	
Bolt Type =	A325	
Threads Included? =	Yes	
Bolt Diameter =	1	in
Bolt Circle =	45	in
ϕ_t =	0.75	
ϕ_v =	0.75	
Tension & Shear (TIA-222-G-1, Section 4.9.6)		
F_{ub} =	120	ksi
A_b =	0.785398	in^2
A_n =	0.606	in^2
ϕR_{nv} =	31.81	kips
ϕR_{nt} =	54.54	kips
V_{ub} =	0.80	kips
T_{ub} =	50.03	kips
Prying Action Check		
N/A, top flange thickness > tc		
Max Comp. on Bolt =	51.35	kips
Shear Capacity =	2.5%	
Tensile Capacity =	91.7%	
Interaction Capacity =	84.2%	
Bolt Capacity =	**91.7%**	**OK**

Pole Information		
Shaft Diam. (Upper) =	42	in
Thickness (Upper)=	0.375	in
# of Sides (Upper) =	Round	
F_y (Upper) =	42	ksi
Shaft Diam. (Lower) =	48	in
Thickness (Lower)=	0.375	in
# of Sides (Lower) =	Round	
F_y (Lower) =	42	ksi

Upper Flange Plate		
Location =	External	
Plate Strength (F_y) =	36	ksi
Plate Tensile (F_u) =	58	ksi
Plate Thickness =	1.25	in
Outer Diameter =	48	in
ϕ_f =	0.9	
b =	3.79	in
Le =	3.00	in
Z =	2.34	in^3
M_u =	71.29	k-in
ϕM_n =	75.9375	k-in
UP Capacity =	**93.9%**	**OK**

Lower Flange Plate		
Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	42	in
b =	3.79	in
Le =	2.00	in
Z =	2.34	in^3
M_u =	75.90	k-in
ϕM_n =	75.9375	k-in
LP Capacity =	**99.9%**	**OK**

UpperStiffeners		
Configuration =	Every Bolt	
Thickness =	0.625	in
Width =	3	in
Notch =	0.5	in
Height =	5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.375	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.375	in
Weld Strength =	70	ksi
Stiffener Vertical Force =	27.85	kips
Vert. Weld Capacity =	51.0%	kips
Horiz. Weld Capacity =	72.7%	kips
Stiffener Capacity =	96.9%	kips
Controlling Capacity =	**96.9%**	**OK**

Lower Stiffeners		
Configuration =	Every Bolt	
Thickness =	0.625	in
Width =	2	in
Notch =	0.5	in
Height =	3.5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.375	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.375	in
Weld Strength =	70	ksi
Stiffener Vertical Force =	16.58	kips
Vert. Weld Capacity =	45.0%	kips
Horiz. Weld Capacity =	72.2%	kips
Stiffener Capacity =	81.7%	kips
Controlling Capacity =	**81.7%**	**OK**

Inspections Division

Date: 03/27/14

GPD GROUP

Existing Flange Connection @ 120'
4340 (ME5015) NORTH PORTLAND
2014723.13.4340.02

O.T. Moment =	1037.05	k*ft
Axial =	16.34	kips
Shear =	23.24	kips

Acceptable Stress Ratio =	105.0%

Flange Bolts		
# Bolts =	28	
Bolt Type =	A325	
Threads Included? =	Yes	
Bolt Diameter =	1	in
Bolt Circle =	39	in
ϕ_t =	0.75	
ϕ_v =	0.75	
Tension & Shear (TIA-222-G-1, Section 4.9.6)		
F_{ub} =	120	ksi
A_b =	0.785398	in^2
A_n =	0.606	in^2
ϕR_{nv} =	31.81	kips
ϕR_{nt} =	54.54	kips
V_{ub} =	0.83	kips
T_{ub} =	44.99	kips
Prying Action Check		
N/A, top flange thickness > tc		
Max Comp. on Bolt =	46.15	kips
Shear Capacity =	2.6%	
Tensile Capacity =	82.5%	
Interaction Capacity =	68.1%	
Bolt Capacity =	**82.5% OK**	

Pole Information		
Shaft Diam. (Upper) =	36	in
Thickness (Upper)=	0.375	in
# of Sides (Upper) =	Round	
F_y (Upper) =	42	ksi
Shaft Diam. (Lower) =	42	in
Thickness (Lower)=	0.375	in
# of Sides (Lower) =	Round	
F_y (Lower) =	42	ksi

Upper Flange Plate		
Location =	External	
Plate Strength (F_y) =	36	ksi
Plate Tensile (F_u) =	58	ksi
Plate Thickness =	1.25	in
Outer Diameter =	42	in
ϕ_f =	0.9	
wcalc =	15.00	in
wmax =	25.38	in
w =	15.00	in
Z =	5.86	in^3
M_u =	161.73	k-in
ϕM_n =	189.8438	k-in
UP Capacity =	**85.2% OK**	

UpperStiffeners		
Configuration =	Every Other	
Thickness =	0.625	in
Width =	3	in
Notch =	0.5	in
Height =	5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.375	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.375	in
Weld Strength =	70	ksi

Stiffeners ineffective - check plate unstiffened

Lower Flange Plate		
Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	36	in
Pole Inner Diameter =	41.25	in
e =	1.13	in
w =	4.63	in
Z =	1.81	in^3
M_u =	51.92	k-in
ϕM_n =	58.57615	k-in
LP Capacity =	**88.6% OK**	

Lower Stiffeners		
Configuration =	Every Other	
Thickness =	0.625	in
Width =	2	in
Notch =	0.5	in
Height =	3.5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.375	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.375	in
Weld Strength =	70	ksi

Stiffeners ineffective - check plate unstiffened

Inspections Division

Date: 03/27/14

GPD GROUP

Existing Flange Connection @ 140'
4340 (ME5015) NORTH PORTLAND
2014723.13.4340.02

O.T. Moment =	611.27	k*ft
Axial =	12.04	kips
Shear =	19.90	kips

Acceptable Stress Ratio =	105.0%

Flange Bolts		
# Bolts =	24	
Bolt Type =	A325	
Threads Included? =	Yes	
Bolt Diameter =	1	in
Bolt Circle =	33	in
ϕ_t =	0.75	
ϕ_v =	0.75	
Tension & Shear (TIA-222-G-1, Section 4.9.6)		
F_{ub} =	120	ksi
A_b =	0.785398	in^2
A_n =	0.606	in^2
ϕR_{nv} =	31.81	kips
ϕR_{nt} =	54.54	kips
V_{ub} =	0.83	kips
T_{ub} =	36.53	kips
Prying Action Check		
N/A, top flange thickness > tc		
Max Comp. on Bolt =	37.53	kips
Shear Capacity =	2.6%	
Tensile Capacity =	67.0%	
Interaction Capacity =	44.9%	
Bolt Capacity =	**67.0% OK**	

Pole Information		
Shaft Diam. (Upper) =	30	in
Thickness (Upper)=	0.375	in
# of Sides (Upper) =	Round	
F_y (Upper) =	42	ksi
Shaft Diam. (Lower) =	36	in
Thickness (Lower)=	0.375	in
# of Sides (Lower) =	Round	
F_y (Lower) =	42	ksi

Upper Flange Plate		
Location =	External	
Plate Strength (F_y) =	36	ksi
Plate Tensile (F_u) =	58	ksi
Plate Thickness =	1.25	in
Outer Diameter =	36	in
ϕ_f =	0.9	
wcalc =	13.75	in
wmax =	21.04	in
w =	13.75	in
Z =	5.37	in^3
M_u =	124.32	k-in
ϕM_n =	173.9947	k-in
UP Capacity =	**71.5% OK**	

UpperStiffeners		
Configuration =	Every Other	
Thickness =	0.625	in
Width =	3	in
Notch =	0.5	in
Height =	5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.375	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.375	in
Weld Strength =	70	ksi

Stiffeners ineffective - check plate unstiffened

Lower Flange Plate		
Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	30	in
Pole Inner Diameter =	35.25	in
e =	1.13	in
w =	4.61	in
Z =	1.80	in^3
M_u =	42.22	k-in
ϕM_n =	58.39865	k-in
LP Capacity =	**72.3% OK**	

Lower Stiffeners		
Configuration =	Every Other	
Thickness =	0.625	in
Width =	2	in
Notch =	0.5	in
Height =	3.5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.375	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.375	in
Weld Strength =	70	ksi

Stiffeners ineffective - check plate unstiffened

Inspections Division

Date: 03/27/14

GPD GROUP

Existing Flange Connection @ 160'
4340 (ME5015) NORTH PORTLAND
2014723.13.4340.02

O.T. Moment =	232.3	k*ft
Axial =	6.47	kips
Shear =	12.57	kips

Acceptable Stress Ratio =	105.0%

Flange Bolts		
# Bolts =	20	
Bolt Type =	A325	
Threads Included? =	Yes	
Bolt Diameter =	1	in
Bolt Circle =	27	in
ϕ_t =	0.75	
ϕ_v =	0.75	
Tension & Shear (TIA-222-G-1, Section 4.9.6)		
F_{ub} =	120	ksi
A_b =	0.785398	in^2
A_n =	0.606	in^2
ϕR_{nv} =	31.81	kips
ϕR_{nt} =	54.54	kips
V_{ub} =	0.63	kips
T_{ub} =	20.31	kips
Prying Action Check		
N/A, top flange thickness > tc		
Max Comp. on Bolt =	20.96	kips
Shear Capacity =	2.0%	
Tensile Capacity =	37.2%	
Interaction Capacity =	13.9%	
Bolt Capacity =	**37.2% OK**	

Pole Information		
Shaft Diam. (Upper) =	24	in
Thickness (Upper)=	0.375	in
# of Sides (Upper) =	Round	
F_y (Upper) =	42	ksi
Shaft Diam. (Lower) =	30	in
Thickness (Lower)=	0.375	in
# of Sides (Lower) =	Round	
F_y (Lower) =	42	ksi

Upper Flange Plate		
Location =	External	
Plate Strength (F_y) =	36	ksi
Plate Tensile (F_u) =	58	ksi
Plate Thickness =	1.25	in
Outer Diameter =	30	in
ϕ_f =	0.9	
wcalc =	12.37	in
wmax =	20.84	in
w =	12.37	in
Z =	4.83	in^3
M_u =	64.92	k-in
ϕM_n =	156.5492	k-in
UP Capacity =	**41.5% OK**	

Lower Flange Plate		
Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	24	in
Pole Inner Diameter =	29.25	in
e =	1.13	in
w =	4.59	in
Z =	1.79	in^3
M_u =	23.58	k-in
ϕM_n =	58.15014	k-in
LP Capacity =	**40.5% OK**	

UpperStiffeners		
Configuration =	Every Other	
Thickness =	0.625	in
Width =	3	in
Notch =	0.5	in
Height =	5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.375	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.375	in
Weld Strength =	70	ksi

Stiffeners ineffective - check plate unstiffened

Lower Stiffeners		
Configuration =	Every Other	
Thickness =	0.625	in
Width =	2	in
Notch =	0.5	in
Height =	3.5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.375	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.375	in
Weld Strength =	70	ksi

Stiffeners ineffective - check plate unstiffened

Inspections Division
Date: 03/27/14

APPENDIX F

Foundation Analysis

Inspections Division
Date: 03/27/14

GPD GROUP

Mat Foundation Analysis
4340 (ME5015) NORTH PORTLAND
2014723.13.4340.02

General Info	
Code	TIA-222-G
Bearing On	Soil
Foundation Type	Mono Pad
Pier Type	Round
Reinforcing Known	No
Max Capacity	1.05

Tower Reactions		
Moment, M	4700	k-ft
Axial, P	56	k
Shear, V	37	k

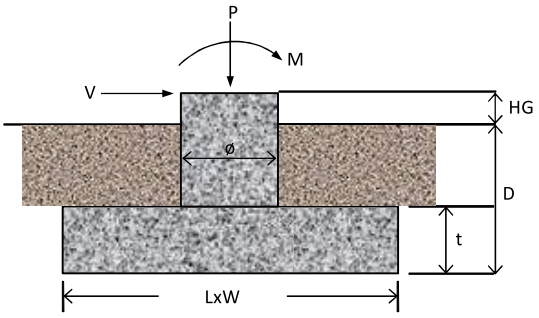
Pad & Pier Geometry		
Pier Diameter, ø	7	ft
Pad Length, L	24	ft
Pad Width, W	24	ft
Pad Thickness, t	3	ft
Depth, D	12	ft
Height Above Grade, HG	0.5	ft

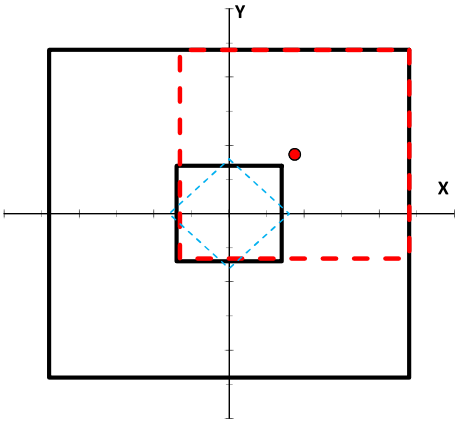
Pad & Pier Reinforcing		
Rebar Fy	60	ksi
Concrete Fc'	4	ksi
Clear Cover	3	in
Reinforced Top & Bottom?	Yes	
Pad Reinforcing Size	# 9	
Pad Quantity Per Layer	31	
Pier Rebar Size	# 11	
Pier Quantity of Rebar	38	

Soil Properties		
Soil Type	Cohesive	
Soil Unit Weight	120	pcf
Cohesion, Cu	0	ksf
Bearing Type	Gross	
Ultimate Bearing	9	ksf
Water Table Depth	5	ft
Frost Depth	5.833	ft

Bearing Summary			Load Case
Qxmax	3.40	ksf	0.9D+1.6W
Qymax	3.40	ksf	0.9D+1.6W
Qmax @ 45°	4.07	ksf	0.9D+1.6W
$Q_{(all)\ Gross}$	6.75	ksf	
Controlling Capacity	**60.2%**	**Pass**	

Overturning Summary (Required FS=1.0)			Load Case
FS(ot)x	1.46	≥1.0	0.9D+1.6W
FS(ot)y	1.46	≥1.0	0.9D+1.6W
Controlling Capacity	**68.3%**	**Pass**	





GPD Mat Foundation Analysis - V1.02

Inspections Division
Date: 03/27/14

APPENDIX G

Modification Drawings

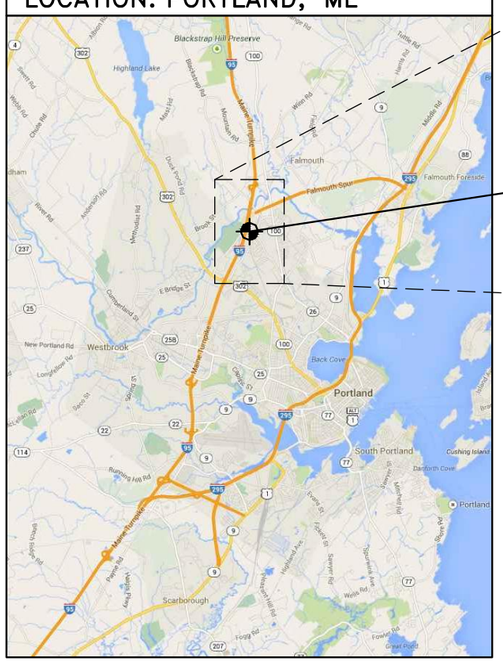
Inspections Division
Date: 03/27/14

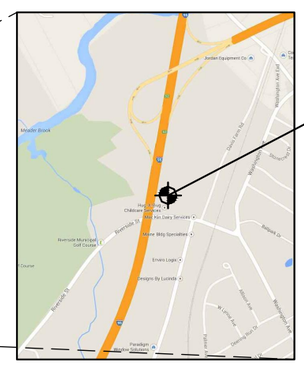
NORTH PORTLAND
USID #: 4340
CLIENT #: ME5015

177' PIROD MONOPOLE

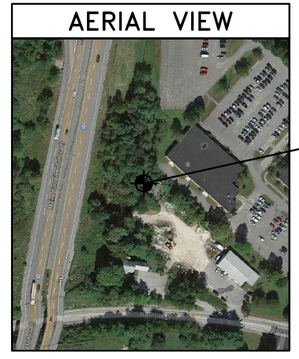
STATE OF MAINE
John N. Kabak
12708
PROFESSIONAL ENGINEER

LOCATION: PORTLAND, ME





AERIAL VIEW



PROJECT SUMMARY

TOWER OWNER:	AT&T TOWERS
TOWER TYPE:	MONOPOLE
GOVERNING CODE:	TIA-222-G AND 2009 IBC
LATITUDE:	43° 42' 59.832" N
LONGITUDE:	70° 18' 18.936" W
OWNER CONTACT:	MR. EDWARD ONESSIMO 27 NORTHWESTERN DRIVE SALEM, NH 03079 (503) 961-1313
ENGINEER CONTACT:	MR. JIBRIL SHEHU 520 SOUTH MAIN STREET, SUITE 2531 AKRON, OH 44311 (330) 572-2216

PROJECT OVERVIEW:
THE LISTED DRAWINGS REPRESENT MODIFICATIONS TO THE EXISTING TOWER BY INSTALLING FLAT PLATES AND BRIDGE STIFFENERS TO THE EXISTING TOWER SHAFT.

DRAWING INDEX

T-01 TITLE SHEET
N-01 PROJECT NOTES
S-01 TOWER ELEVATION & MODIFICATION SCHEDULE
S-02 MODIFICATION DETAILS & SECTIONS
S-03 ADDITIONAL DETAIL & SECTIONS
S-04 ADDITIONAL DETAILS
MI-01 MODIFICATION INSPECTION CHECKLIST

INTEGRATED BY:

SAI communications

GPD GROUP.
Gbaus, Pyle, Schomer, Burns & DeHaven, Inc.
520 South Main Street, Suite 2531
Akron, OH 44311
330.572.2100 Fax 330.572.2101

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at&t

REV.	DATE	DESCRIPTION

4340 - NORTH PORTLAND
1340 RIVERSIDE ST.
PORTLAND, ME 04103

TITLE SHEET

ISSUED FOR:	
PERMIT	03/25/14
BID	-
CONSTRUCTION	-
RECORD	-

PROJECT MANAGER	DESIGNER
JS	TRE

JOB NO.
2014723.13.4340.02

T-01

Inspections Division
Date: 03/27/14

GENERAL NOTES

1. THE MODIFICATIONS REPRESENTED WITHIN THESE DRAWINGS ARE BASED ON A STRUCTURAL ANALYSIS REPORT BY GPD GROUP (PROJECT #: 2013723.13.4340.01, DATED JANUARY 10, 2014). ALL MODIFICATIONS MUST BE INSTALLED TO BRING THE TOWER INTO CONFORMANCE WITH TIA-222-G AND 2009 IBC.

2. THESE MODIFICATIONS HAVE BEEN DESIGNED IN ACCORDANCE WITH THE GOVERNING PROVISIONS OF TIA-222-G, 2009 IBC, AWS, AND AISC. MATERIALS AND SERVICES PROVIDED BY THE CONTRACTOR SHALL CONFORM TO THE ABOVE MENTIONED CODES AND THE CONTRACT SPECIFICATIONS.

3. ALL ORIGINAL TOWER INFORMATION WAS OBTAINED IN THE FORM OF TOWER DESIGN BY PIROD (FILE #: A-113355, DATED MARCH 5, 1997). CONTRACTOR SHALL OBTAIN AND BECOME FAMILIAR WITH THE REFERENCED TOWER DOCUMENTS.

4. THIS DESIGN ASSUMES THE TOWER AND FOUNDATIONS HAVE BEEN WELL MAINTAINED, IN GOOD CONDITION, AND ARE WITHOUT DEFECT. BENT MEMBERS, CORRODED MEMBERS, LOOSE BOLTS, CRACKED WELDS AND OTHER MEMBER DEFECTS HAVE NOT BEEN CONSIDERED. THE TOWER IS ASSUMED TO BE PLUMB AND THE SITE IS ASSUMED TO BE LEVEL. THIS DESIGN IS BEING PROVIDED WITHOUT THE BENEFIT OF A CONDITION ASSESSMENT BY GPD GROUP. **CONTRACTOR SHALL COMMISSION A COMPLETE CONDITION ASSESSMENT PRIOR TO ORDERING ANY REINFORCING MATERIALS. CONTRACTOR SHALL SUPPLY CONDITION ASSESSMENT TO ENGINEER FOR REVIEW, SEE CONTRACTOR NOTES.**

5. MANUFACTURER TOLERANCES, FIELD ADJUSTMENTS, INCORRECT STACKING, AND TEMPERATURE CAN CAUSE DIMENSION DISCREPANCIES. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS PRIOR TO ORDERING MATERIALS. ALL FIELD MEASUREMENTS MUST BE REPORTED TO ENGINEER.

6. ALL NEW STEEL SHALL BE HOT DIPPED GALVANIZED FOR FULL WEATHER PROTECTION. IN ADDITION ALL NEW STEEL SHALL BE PAINTED TO MATCH EXISTING STEEL. CONTRACTOR SHALL OBTAIN WRITTEN PERMISSION TO PROTECT STEEL BY ANY OTHER MEANS.

7. ALL EXISTING PAINTED/GALVANIZED SURFACES DAMAGED DURING REHAB SHALL BE WIRE BRUSHED CLEAN, REPAIRED BY COLD GALVANIZING BRUSH APPLIED PAINT (ZRC OR EQUAL), AND REPAINTED TO MATCH THE EXISTING FINISH (IF APPLICABLE).

8. CAULKING SHALL BE PROVIDED AROUND PERIMETER OF ANY AND ALL MODIFICATION MEMBERS TO ENSURE COMPLETE SEAL BETWEEN EXISTING STRUCTURE AND REINFORCING MEMBERS. SEALANT IS TO BE EXTERIOR GRADE, PAINTABLE SILICONE CAULKING AS MANUFACTURED BY DOW AND ACCEPTABLE TO GPD.

9. LOADINGS:

   WIND LOADS:

   3 SECOND GUST WIND SPEED (PER: TIA-222-G AND 2009 IBC) (CUMBERLAND COUNTY, MASSACHUSETTS) — 100 MPH

   ICE LOADS:

   1" RADIAL BASE ICE
   3 SECOND GUST WIND SPEED (CONCURRENT W/ ICE) — 40 MPH

STRUCTURE CLASS	II
EXPOSURE CATEGORY	C
TOPOGRAPHIC CATEGORY	1

10. STRUCTURAL STEEL:

    SPECIFICATIONS (LATEST EDITION OF AISC)

    MATERIALS

PLATES	ASTM A572 (GR 50)
BRIDGE STIFFENERS	ASTM A572 (GR 50)
ONE-SIDE BOLTS	AJAX M20 (GR PC8.8) W/ HIGH STRENGTH SLEEVE (Fu=120 KSI)
HOT DIPPED GALVANIZING	ASTM A123
WELDS	E70XX
PAINT	NEW STEEL TO BE PAINTED TO MATCH EXISTING TOWER

11. ALL MATERIAL UTILIZED FOR THIS PROJECT MUST BE NEW AND FREE OF ANY DEFECTS. ANY MATERIAL SUBSTITUTIONS, INCLUDING BUT NOT LIMITED TO ALTERED SIZES AND/OR STRENGTHS, MUST BE APPROVED BY THE OWNER AND ENGINEER IN WRITING.

12. ALL BOLT ASSEMBLIES FOR STRUCTURAL MEMBERS REPRESENTED IN THIS DRAWING REQUIRE LOCKING DEVICES TO BE INSTALLED IN ACCORDANCE WITH TIA-222-G SECTION 4.9.2 REQUIREMENTS.

13. ALL SUBSTITUTES PROPOSED BY THE CONTRACTOR SHALL BE APPROVED IN WRITING BY THE ENGINEER. CONTRACTOR SHALL PROVIDE DOCUMENTATION TO ENGINEER FOR DETERMINING IF SUBSTITUTE IS SUITABLE FOR USE AND MEETS THE ORIGINAL DESIGN CRITERIA. DIFFERENCES FROM THE ORIGINAL DESIGN, INCLUDING MAINTENANCE, REPAIR AND REPLACEMENT, SHALL BE NOTED. ESTIMATES OF COSTS/CREDITS ASSOCIATED WITH THE SUBSTITUTION (INCLUDING RE-DESIGN COSTS AND COSTS TO SUB-CONTRACTORS) SHALL BE PROVIDED TO THE ENGINEER. CONTRACTOR SHALL PROVIDE ADDITIONAL DOCUMENTATION AND/OR SPECIFICATIONS TO THE ENGINEER AS REQUESTED.

14. PROVIDE STRUCTURAL STEEL SHOP DRAWINGS TO ENGINEER FOR APPROVAL PRIOR TO FABRICATION.

15. UNLESS NOTED OTHERWISE, ALL NEW MEMBERS SHALL MAINTAIN THE EXISTING MEMBER WORK LINES AND NOT INTRODUCE ECCENTRICITIES INTO THE STRUCTURE.

16. THE ENGINEER (GPD GROUP) SHALL MAKE POST INSTALLATION OBSERVATION FOR TOWER. CONTRACTOR SHALL COORDINATE W/ENGINEER (GPD GROUP) WITHIN 72 HOURS AFTER 100% COMPLETION OF THE TOWER MODIFICATION INSTALLATION. INSTALLATION OF PROPOSED LOADING WITHOUT ENGINEER APPROVAL IS PROHIBITED. INSTALLATION OF THE PROPOSED LOADING IS BY OTHERS, AND IS BEYOND THE SCOPE OF THESE DRAWINGS.

CONTRACTOR NOTES

1. ALL CONTRACTORS AND LOWER TIER CONTRACTORS MUST ACKNOWLEDGE IN WRITING TO TOWER OWNER AND GPD GROUP THAT THEY HAVE OBTAINED, UNDERSTAND, AND WILL FOLLOW TOWER OWNER STANDARDS OF PRACTICE, CONSTRUCTION GUIDELINES, ALL SITE AND TOWER SAFETY PROCEDURES, ALL PRODUCT LIMITATIONS AND INSTALLATION PROCEDURES USED ON SITE, AND PROPOSED MODIFICATIONS DESCRIBED. RECEIPT OF ACKNOWLEDGMENT MUST OCCUR PRIOR TO BEGINNING CONSTRUCTION OR CLIMBING. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO PROVIDE THIS DOCUMENTATION FOR TOWER OWNER AND GPD GROUP ON COMPANY LETTERHEAD AND THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO OBTAIN THIS DOCUMENTATION FROM LOWER TIER SUBCONTRACTORS (ON SUBCONTRACTOR LETTERHEAD) AND DELIVER IT TO TOWER OWNER AND GPD GROUP.

2. IF THE CONTRACTOR DISCOVERS ANY EXISTING CONDITIONS THAT ARE NOT REPRESENTED ON THESE DRAWINGS, OR ANY CONDITIONS THAT WOULD INTERFERE WITH THE INSTALLATION OF THE MODIFICATIONS, GPD GROUP SHALL BE CONTACTED IMMEDIATELY TO EVALUATE THE SIGNIFICANCE OF THE DEVIATION.

3. IT IS ASSUMED THAT ANY STRUCTURAL MODIFICATION WORK SPECIFIED ON THESE PLANS WILL BE ACCOMPLISHED BY KNOWLEDGEABLE WORKMEN WITH TOWER CONSTRUCTION EXPERIENCE. THIS INCLUDES PROVIDING THE NECESSARY CERTIFICATIONS TO THE TOWER OWNER AND ENGINEER.

4. THESE DRAWINGS DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION METHODS, MEANS, TECHNIQUES, SEQUENCES, AND PROCEDURES.

5. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PROGRAMS AND PRECAUTIONS IN CONNECTION WITH THIS WORK.

6. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING; ANY PROBLEMS WITH ACCESS, INTERFERENCE, ETC. SHALL BE RESOLVED PRIOR TO MOBILIZATION. THE CONTRACTOR MUST VISIT THE SITE PRIOR TO ORDERING ANY MATERIAL AND MUST RESOLVE ALL ISSUES WITH THE OWNER PREVENTING A CONTINUOUS INSTALLATION. CONTRACTOR SHALL NOTE ALL GUY ATTACHMENT POINTS, ANTENNAS, MOUNTS, COAX, LIGHTING, CLIMBING SUPPORTS, STEP BOLTS, PORT HOLES, AND ANY OTHER TOWER APPURTENANCES IN THE REGION OF THE MODIFICATIONS. SEE GENERAL NOTES #4 AND #5 THIS SHEET.

7. CONTRACTOR IS RESPONSIBLE FOR TEMPORARILY REMOVING ALL COAX, T-BRACKETS, ANTENNA MOUNTS, AND ANY OTHER TOWER APPURTENANCE THAT MAY INTERFERE WITH THE TOWER MODIFICATIONS. ALL TOWER APPURTENANCES MUST BE REPLACED AND/OR RESTORED TO ITS ORIGINAL LOCATION. ANY CARRIER DOWNTIME MUST BE COORDINATED WITH THE TOWER OWNER IN WRITING.

8. SOME ATTACHMENTS MAY REQUIRE CUSTOM MODIFICATIONS TO PROPERLY FIT THE MODIFIED REGION OF THE STRUCTURE. THESE CUSTOMIZATIONS ARE DESIGNED BY OTHERS AND MUST BE APPROVED BY THE ENGINEER PRIOR TO REMOVING SUCH ATTACHMENTS. ANY CARRIER DOWNTIME MUST BE COORDINATED WITH THE TOWER OWNER IN WRITING.

9. CONTRACTOR SHALL ONLY WORK WITHIN THE LIMITS OF THE TOWER OWNER'S PROPERTY OR LEASE AREA AND APPROVED EASEMENTS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY WORK IS WITHIN THESE BOUNDARIES. CONTRACTOR SHALL EMPLOY A SURVEYOR AS REQUIRED. ANY WORK OUTSIDE THESE BOUNDARIES SHALL BE APPROVED IN WRITING BY THE LAND OWNER PRIOR TO MOBILIZATION. CONSTRUCTION STAKING AND BOUNDARY MARKING IS THE RESPONSIBILITY OF THE CONTRACTOR.

10. **WORK SHALL ONLY BE PERFORMED DURING CALM DRY DAYS (WINDS LESS THAN 10-MPH). CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY LOCAL TOWER SHORING, TEMPORARY GLOBAL TOWER SHORING, AND ALL SHORING OF SURROUNDING BUILDINGS, PADS, AND OTHER OUTDOOR SITE OBSTRUCTIONS. ALL SHORING, TEMPORARY BRACING, AND TEMPORARY SUPPORTS ARE THE RESPONSIBILITY OF THE CONTRACTOR.**

11. ALL MODIFICATIONS PERFORMED ON THIS TOWER SHALL BE COMPLETED IN ACCORDANCE WITH THE REQUIREMENTS OF TIA-1019-A CONSTRUCTION STANDARDS.

12. ALL MANUFACTURERS HARDWARE AND ASSEMBLY INSTRUCTIONS SHALL BE FOLLOWED EXACTLY. DEVIATION FROM THE INSTRUCTIONS IS UNACCEPTABLE AND REQUIRES WRITTEN APPROVAL FROM ENGINEER.

13. 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.

WELD NOTES

1. **CONTRACTOR IS RESPONSIBLE FOR COMMISSIONING A THIRD PARTY CERTIFIED WELD INSPECTOR (CWI) THROUGHOUT THE ENTIRETY OF THE PROJECT. A PASSING CWI REPORT SHALL BE PROVIDED TO THE ENGINEER UPON COMPLETION OF THE PROJECT.**

2. WELDING CERTIFICATES MUST BE PROVIDED TO CWI AND GPD GROUP PRIOR TO WELDING CONTRACTOR BEGINNING WORK ON SITE. CERTIFICATE WILL BE ASKED FOR AS PART OF INSPECTION PROCESS. ALL WELDING SHOULD BE PERFORMED BY AN AWS QUALIFIED WELDER WHO HAS EXPERIENCE WITH GALVANIZED SURFACES AND IN ACCORDANCE WITH ANSI/AWS D1.1 AND ANSI Z 49.1 OR LATEST EDITIONS.

3. OXY FUEL GAS WELDING OR BRAZING IS STRICTLY PROHIBITED. SPECIFICALLY, NO TORCH CUTTING IS PERMITTED ON SITE. ALL HOLES SHALL BE CUT WITH A GRINDER.

4. INSTALL 3000° (NFPA 701) FIRE BLANKET AROUND ALL COAX.

5. MORE SPLATTER AND SPARKS SHALL BE ANTICIPATED GIVEN THE PREVIOUSLY GALV. SURFACE.

6. **COAX IS FLAMMABLE AND CAN CATCH FIRE IF PROPER PRECAUTIONS ARE NOT MADE TO SHIELD COAX FROM ALL WELDING PROCEDURES. ALL COAX SHALL BE SHIELDED AT AND BELOW EACH WELDING PROCEDURE AND ELEVATION. IN ADDITION, COAX SHALL BE PUSHED AWAY FROM TOWER FACE WHERE WELDING IS BEING PERFORMED.**

7. CONTRACTOR SHALL EXERCISE CAUTION WHEN WELDING ON A GALVANIZED SURFACE. IF THE WELD MATERIAL IS CONTAMINATED WITH ZINC IT DOES NOT PROVIDE A STRUCTURAL WELD.

8. FUMES CREATED FROM WELDING ON A PREVIOUSLY GALV. SURFACE CAN BE HAZARDOUS.

9. PRIOR TO WELDING, ALL SURFACES SHALL BE PROPERLY GROUND TO REMOVE GALVANIZING.

10. ALL FIELD WELDS SHALL BE TOUCHED UP WITH A GALVANIZING PAINT REPAIR (ZRC OR APPROVED EQUIVALENT).

11. WATER SHALL BE ON SITE, OF ADEQUATE AMOUNT, AND AVAILABLE AT SHORT NOTICE AT ALL TIMES DURING WELDING ACTIVITY. A MINIMUM OF 500 GAL. OF WATER SHALL BE PROVIDED. WATER SHALL BE CAPABLE OF REACHING HEIGHT WHERE WELDING IS BEING PERFORMED. IN ADDITION, A MINIMUM OF SIX (6) 10 LB. CLASS ABC MULTIPURPOSE FIRE EXTINGUISHERS FULLY CHARGED AND CAPABLE OF DISCHARGE WITHIN 30 SECONDS OF DETECTING A FIRE SHALL BE PROVIDED. FIRE EXTINGUISHERS SHALL BE STRATEGICALLY LOCATED AROUND COMPOUND AND IN THE AIR (I.E. ON THE MAN LIFT WHERE WELDING IS BEING PERFORMED).

12. CLEAN OUT ALL DEBRIS THROUGHOUT MONOPOLE AND MONOPOLE BASE PRIOR TO WELDING.

MODIFICATION PLATE NOTES

1. CONTRACTOR SHALL INSTALL PLATES AT LOCATIONS PER PLAN VIEW.

2. USE AJAX BOLTS WITH CORRECT SLEEVE LENGTHS PER DETAILS. BOLT THREADS SHALL NOT BE IN THE SHEAR PLANE.

3. ALL HOLES DRILLED IN POLE SHALL BE SOLVENT CLEANED AND TOUCHED UP WITH ZRC ZINC RICH COLD GALVANIZING PAINT.

4. AJAX BOLTS SHALL BE TIGHTENED PER AISC "SNUG-TIGHT CONDITION".

5. **FINAL SHOP DRAWINGS MUST BE SENT TO DESIGN ENGINEER FOR FINAL APPROVAL PRIOR TO FABRICATION.**

6. CONTRACTOR SHALL VERIFY THAT TOWER IS PLUMB PRIOR TO THE INSTALLATION OF ANY TOWER MODIFICATIONS.

STATE OF MAINE
John N. Kabak
12708

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PROJECT NOTES

ISSUED FOR:	
PERMIT	03/25/14
BID	-
CONSTRUCTION	-
RECORD	-

PROJECT MANAGER	DESIGNER
JS	TRE

JOB NO.
2014723.13.4340.02

N-01

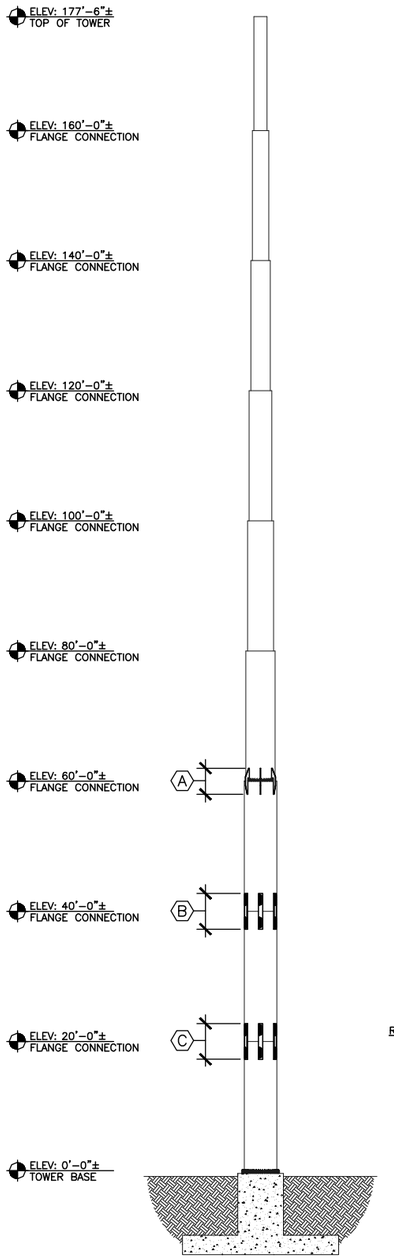
Inspections Division
Date: 03/27/14

ANTENNA SCHEDULE

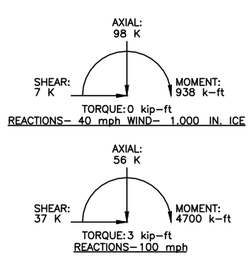
ELEVATION	STATUS	ANTENNA	MOUNT	COAX
179'-0"	EXISTING	(3) 7770.00	(1) 13' PLATFORM W/ RAILS	(6) 1-5/8"
	EXISTING	(1) DC6-48-60-18-8F		(2) 7/8"
	EXISTING			(1) 3/8"
	REMOVE	(3) 7770.00		(6) 1-5/8"
	REMOVE	(1) P65-17-XLH-RR		
	REMOVE	(1) SBNH-1D6565C		
	REMOVE	(1) AM-X-CD-14-65-00T-RET		
	REMOVE	(6) LGP21401		
	REMOVE	(6) LGP21903		
	REMOVE	(6) RRUS 11		
	PROPOSED	**(6) HPA-65R-BUU-H8**		**(4) 7/8"**
	PROPOSED	**(3) SBNHH-1D65A**		
	PROPOSED	**(3) DTMABP7819VG12A-BP**		
	PROPOSED	**(6) RRUS 11**		
	PROPOSED	**(6) RRUS 12**		
	PROPOSED	**(3) RRUS E2**		
	PROPOSED	**(3) RRUS 32**		
	PROPOSED	**(6) KRC 161 286-1 (A-2 MODULE)**		
	PROPOSED	**(2) DC6-48-60-18-8F**		
160'-0"	EXISTING	(12) DB846G90A-XY	(1) 15' LP PLATFORM	(15) 1-5/8"
	EXISTING	(3) 932DG65T2E-M		
125'-0"	EXISTING	(2) 4' DISH	(2) PIPE MOUNT	(2) EW90

MODIFICATION SCHEDULE

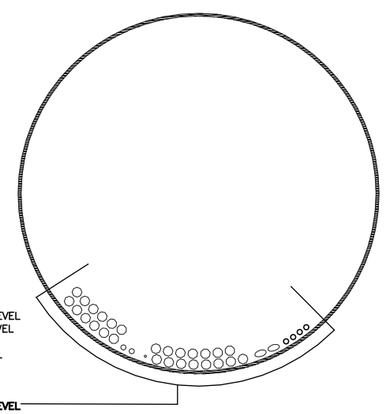
SYMBOL	ELEVATION	MEMBER TYPE	EXISTING MEMBER	NEW MEMBER	NOTES
A	80'-0"±	BRIDGE STIFFENERS	-	(6) 1" THICK BRIDGE STIFFENERS	INSTALL NEW BRIDGE STIFFENERS TO THE TOWER SHAFT. SEE DETAIL 3/S-03 AND SECTIONS C/S-03 AND D/S-03 FOR MORE INFORMATION.
B	37'-3"± TO 42'-9"±	TOWER SHAFT	MONOPOLE	(6) 8"x1-1/2" THICK PLATES	INSTALL NEW FLAT PLATES TO THE TOWER SHAFT. SEE DETAILS 2/S-02 AND 5/S-04 FOR MORE INFORMATION.
C	17'-3"± TO 22'-9"±	TOWER SHAFT	MONOPOLE	(6) 8"x1-1/2" THICK PLATES	INSTALL NEW FLAT PLATES TO THE TOWER SHAFT. SEE DETAILS 1/S-02 AND 4/S-04 FOR MORE INFORMATION.



TOWER ELEVATION
3/32"=1'-0"



(EXISTING)
(6) 1-5/8" COAX TO 179 FT LEVEL
(2) 7/8" POWER CABLE TO 176 FT LEVEL
(1) 3/8" FIBER CABLE TO 176 FT LEVEL
(15) 1-5/8" COAX TO 160 FT LEVEL
(2) EW90 ELLIPTICAL TO 125 FT LEVEL
(REMOVE)
(6) 1-5/8" COAX TO 179 FT LEVEL
(PROPOSED)
(4) 7/8" POWER CABLE TO 179 FT LEVEL



NORTH

COAX LAYOUT
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TOWER ELEVATION & MODIFICATION SCHEDULE

ISSUED FOR:	
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RECORD	-

PROJECT MANAGER	DESIGNER
JS	TRE

JOB NO.
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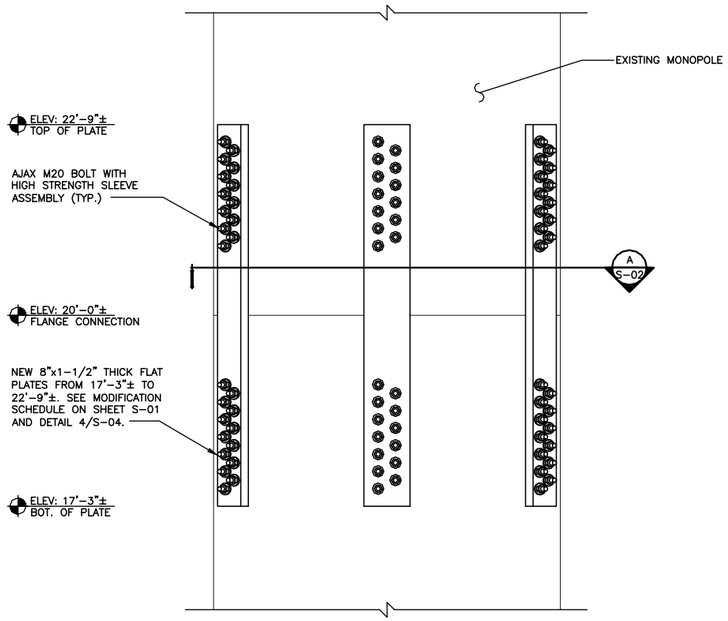
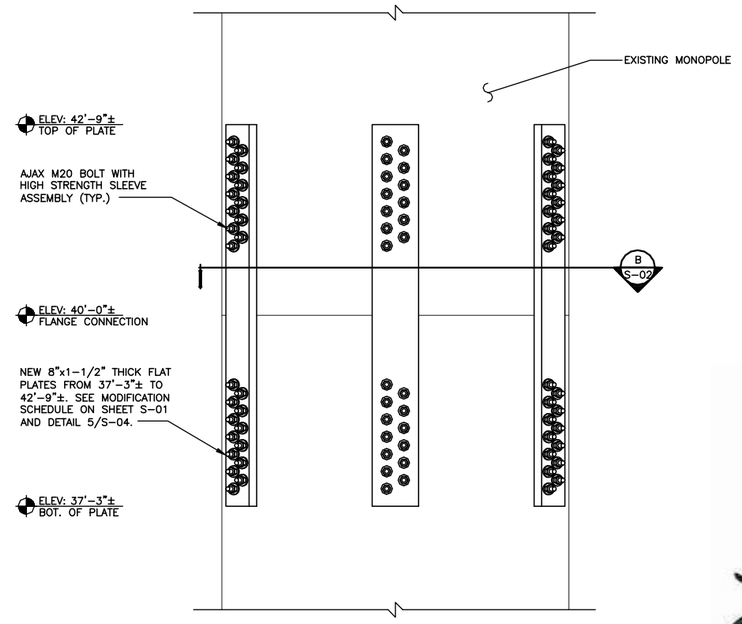
S-01

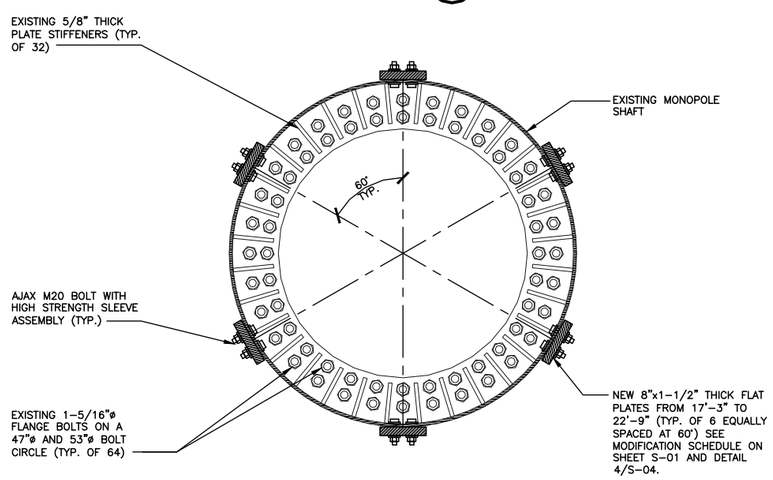
Inspections Division
Date: 03/27/14



DETAIL 1 S-02
1"=1'-0"

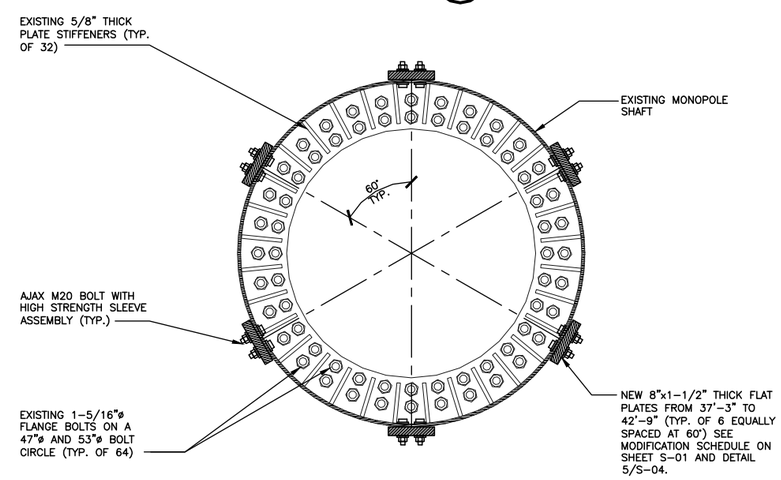


DETAIL 2 S-02
1"=1'-0"



SECTION A S-02
1"=1'-0"

NOTE: REMOVE AND REPLACE EXISTING STEP PEGS AND SAFETY CLIMB AS REQUIRED.



SECTION B S-02
1"=1'-0"

NOTE: REMOVE AND REPLACE EXISTING STEP PEGS AND SAFETY CLIMB AS REQUIRED.

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MODIFICATION DETAILS & SECTIONS

ISSUED FOR:	
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CONSTRUCTION	-
RECORD	-

PROJECT MANAGER	DESIGNER
JS	TRE

JOB NO.
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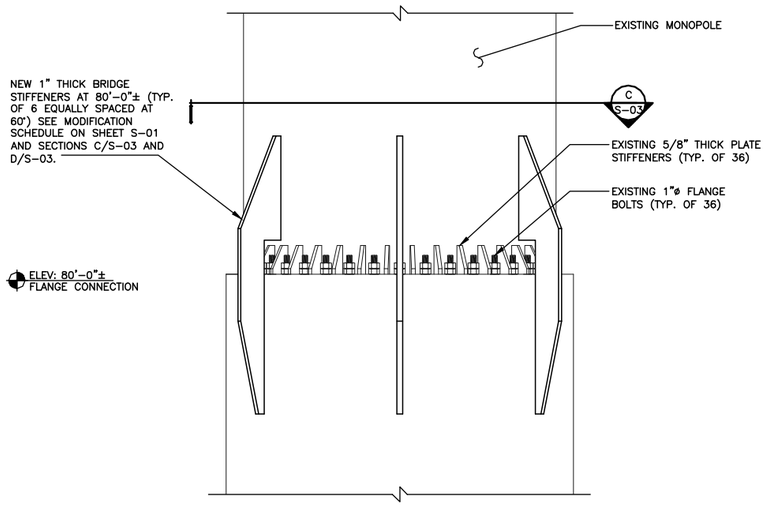
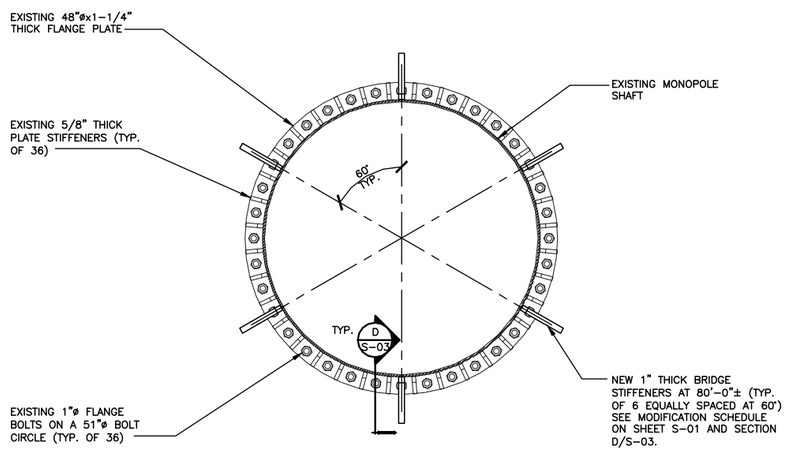
S-02

Inspections Division
Date: 03/27/14

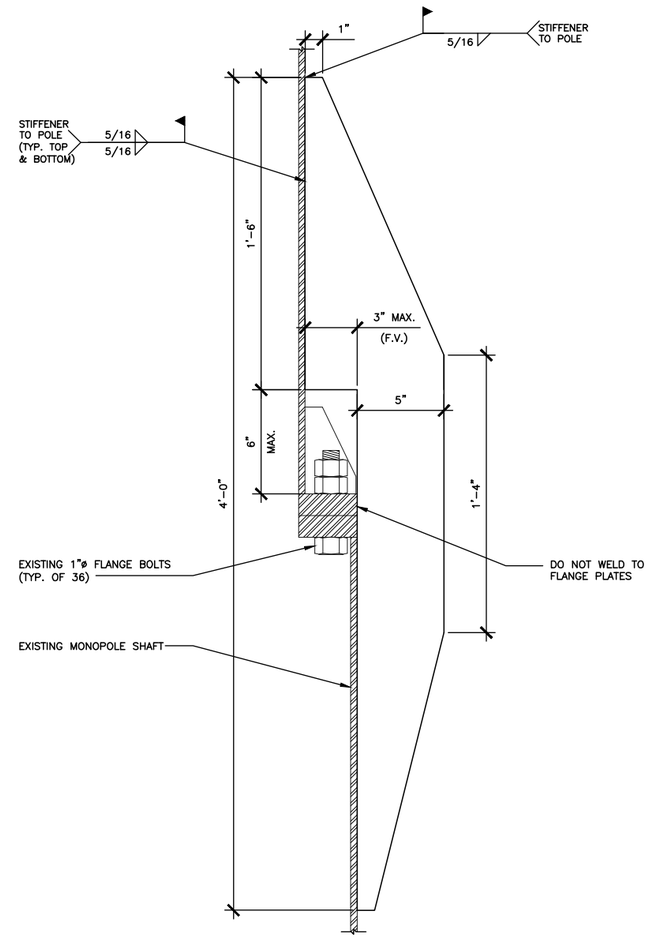


DETAIL 3 / S-03
1"=1'-0"



SECTION C / S-03
1"=1'-0"

NOTE: REMOVE AND REPLACE EXISTING STEP PEGS AND SAFETY CLIMB AS REQUIRED.



SECTION D / S-03
3"=1'-0"

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ADDITIONAL DETAIL & SECTIONS

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PROJECT MANAGER	DESIGNER
JS	TRE

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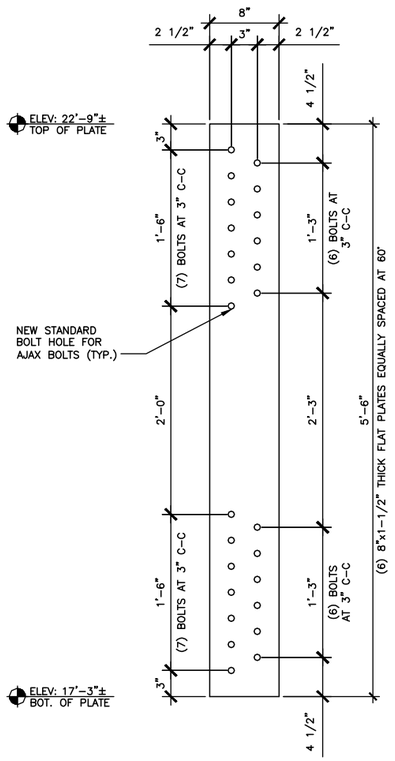
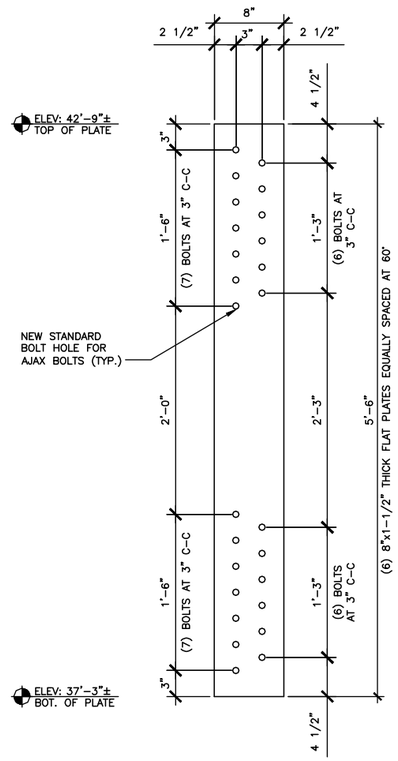
S-03

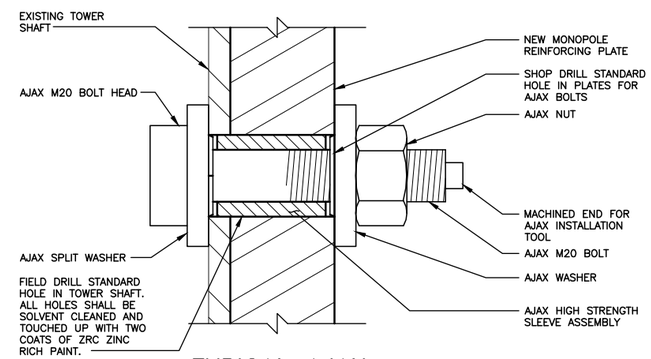
Inspections Division
Date: 03/27/14



DETAIL 4
1-1/2"=1'-0"
S-04



DETAIL 5
1-1/2"=1'-0"
S-04



TYPICAL AJAX BOLT DETAIL
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S-04

Inspections Division
Date: 03/27/14

NOTE: X DENOTES A DOCUMENT NEEDED FOR THE MODIFICATION INSPECTION REPORT
– DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE MODIFICATION INSPECTION REPORT

STANDARD MODIFICATION DOCUMENTATION REQUIREMENTS

CONSTRUCTION PROCESS			REPORT ITEM	STAMPED REPORT REQUIRED
BEFORE	DURING	AFTER		
X	–	–	SHOP DRAWINGS	
X	–	–	MATERIAL TEST REPORT (ALL MODIFICATION MATERIALS)	
X	–	–	PACKING SLIPS	
			PHOTOS:	
X	–	–	PRE–CONSTRUCTION PHOTOS (COMPOUND, ACCESS DRIVE, ROAD ENTRANCE, TOWER)	
–	X	–	DURING CONSTRUCTION	
–	–	X	POST CONSTRUCTION	
–	–	–	BASE PLATE GROUT VERIFICATION	
–	–	X	ON SITE COLD GALVANIZING VERIFICATION	
–	–	X	GC AS–BUILT DRAWINGS	
–	–	X	LIEN RELEASE (GPD SERVICES ONLY)	

WELDING: FABRICATION & ONSITE

CONSTRUCTION PROCESS			REPORT ITEM	STAMPED REPORT REQUIRED
BEFORE	DURING	AFTER		
–	X	–	NDT – ALL FULL PEN OR WELDS >5/16"	AWS
–	–	X	VISUAL INSPECTION IN ACCRODANCE WITH ANSI/AWS D1.1	AWS
X	–	–	NDT – MONOPOLE EXISTING PERIMETER BASE WELD	AWS
X	X	X	ELECTRODE VERIFICATION – ONSITE PHOTO OF ELECTRODE STRENGTH	
X	–	–	WELDER'S CERTIFICATIONS	
–	–	X	3RD PARTY CERTIFIED WELD INSPECTORS REPORT	AWS

MODIFICATION INSPECTION NOTES:

GENERAL NOTES

1. THE MODIFICATION INSPECTION IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNED BY THE ENGINEER OF RECORD.

2. THE MODIFICATION INSPECTION IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, NOR DOES THE MODIFICATION INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTENT RESIDES WITH THE ENGINEER OF RECORD AT ALL TIMES.

3. **TO ENSURE THAT THE REQUIREMENTS OF THE MODIFICATION INSPECTION ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MODIFICATION INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO OR PAYMENT IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. CONTACT LISTED ON THE TITLE SHEET SHALL BE CONTACTED IF SPECIFIC INSPECTOR CONTACT INFORMATION IS NOT KNOWN.**

MODIFICATION INSPECTOR

1. THE MODIFICATION INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO OR PAYMENT FOR THE MODIFICATION INSPECTION TO:

   – REVIEW THE REQUIREMENTS OF THE MODIFICATION INSPECTION CHECKLIST
   – WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON–SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS
   – DISCUSS ANY SITE SPECIFIC INSPECTIONS OR CONCERNS

2. THE MODIFICATION INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GENERAL CONTRACTOR (GC) INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE IN–FIELD INSPECTIONS, AND SUBMITTING THE MODIFICATION INSPECTION REPORT.

GENERAL CONTRACTOR

1. THE GC IS REQUIRED TO CONTACT THE MODIFICATION INSPECTOR AS SOON AS RECEIVING A PO OR PAYMENT FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT TO:

   – REVIEW THE REQUIREMENTS OF THE MODIFICATION INSPECTION CHECKLIST
   – WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON–SITE MODIFICATION INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS
   – BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS

2. THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MODIFICATION INSPECTION CHECKLIST.

RECOMMENDATIONS

THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING A MODIFICATION INSPECTION REPORT:

– IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLY 10, TO THE MODIFICATION INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MODIFICATION INSPECTION TO BE CONDUCTED.
– THE GC AND MODIFICATION INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
– WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MODIFICATION INSPECTOR ON–SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE–TENSIONING OPERATIONS.
– IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MODIFICATION INSPECTION(S) TO COMMENCE WITH ONE SITE VISIT.
– WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MODIFICATION INSPECTOR ON–SITE DURING THE MODIFICATION INSPECTION TO HAVE ANY DEFICIENCIES CORRECTED DURING THE INITIAL MODIFICATION INSPECTION. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MODIFICATION INSPECTION CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

CANCELLATION OR DELAYS

1. **IF THE GC AND MODIFICATION INSPECTOR AGREE TO A DATE ON WHICH THE MODIFICATION INSPECTION WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, THE TOWER OWNER SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON–SITE, ETC.). EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.**

FAILING INSPECTION CORRECTIONS

1. IF THE MODIFICATION INSTALLATION WOULD FAIL THE MODIFICATION INSPECTION ("FAILED MODIFICATION INSPECTION"), THE GC SHALL WORK WITH MODIFICATION INSPECTOR TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:

   – CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MODIFICATION INSPECTION.
   – OR, WITH TOWER OWNER'S APPROVAL, THE GC MAY WORK WITH THE ENGINEER OF RECORD TO RE–ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS–BUILT CONDITION.

VERIFICATION INSPECTIONS

1. TOWER OWNER RESERVES THE RIGHT TO CONDUCT A VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MODIFICATION INSPECTION(S) ON TOWER MODIFICATION PROJECTS.

2. VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT FIRM AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED "PASSING MODIFICATION INSPECTION" OR "PASS AS NOTED MODIFICATION INSPECTION" REPORT FOR THE ORIGINAL PROJECT.

REQUIRED PHOTOS

1. BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS ARE TO BE TAKEN AND INCLUDED IN THE MODIFICATION INSPECTION REPORT:

   – PRE–CONSTRUCTION GENERAL SITE CONDITION
   – PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION:
     - RAW MATERIALS
     - PHOTOS OF ALL CRITICAL DETAILS
     - FOUNDATION MODIFICATIONS
     - WELD PREPARATION
     - BOLT INSTALLATION AND TORQUE
     - FINAL INSTALLED CONDITION
     - SURFACE COATING REPAIR
   – POST CONSTRUCTION PHOTOGRAPHS:
     - FINAL INFIELD CONDITION
   – ANY OTHER PHOTOS DEEMED RELEVANT TO SHOW COMPLETE DETAILS OF MODIFICATIONS.

2. PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.

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MODIFICATION INSPECTION CHECKLIST

ISSUED FOR:	
PERMIT	03/25/14
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CONSTRUCTION	-
RECORD	-

PROJECT MANAGER	DESIGNER
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