App No: 2020101317

Revised 11.24.20 - JE

Application General Infomation

Applicant Name: Site Link Wireless

Application Type: Minor Modification

Carrier: T-Mobile

Solution Type: Macro

Existing: Existing

Updated: 10/28/2020

Ann. Plan?: Yes

Will site be used to support government telecommunications facilities or other equipment for government use?: No

Gvt. Use Desc.:

Application Description

T-Mobile proposes to remove (3) existing antennas , remove (3) existing RRUs, and install (6) new antennas, install (6) new RRUs, and install (2) new cabinets at the existing telecom site.

Site Infomation

Site Id: 565

Structure Type: Building

Address: 12211 Middlebrook Rd, Germantown

County Site Name: EZ Storage- Middlebrook

Carrier Site Name: 7WAN101E

Site Owner: Middlebrook Land LLLP c/o Siena Cor

Structure Owner: Middlebrook Land LLLP c/o Siena Cor

Existing Structure Height: 56

Provide the proposed height of the replacement structure without any antenna (New, Replacement Apps Only):

Zoning: R-200

Latitude: 39.176211

Longitude: -77.253097

Ground Elevation: 448

City: Germantown

Lease Status: Leased

Does the structure require an antenna structure registration under FCC Title 47: No

Distance to Residential Property (New, Replacement, Colocation Only):

Distance to Commercial Property (New, Replacement, Colocation Only):

Justification of why this site was selected:

NearbySites (New, Replacement Apps Only):

Thursday, October 29, 2020

10:15:31 AM

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Screening considerations(New, Colocations, Replacement Apps Only):

Thursday, October 29, 2020

10:15:33 AM

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6409 Questions

Does this qualify as a 6409 application? (Minor Mod, Colocations Only): Yes

For towers outside the public ROW will the proposed installation increase the height of the structure by: (1) more than 10% or (2) more than 20 feet, whichever is greater? No

Will the proposed installation increase the width by adding appurtenance to the body of the structure that would protrude from the edge of the structure by more than 6 feet? No

For towers outside the public ROW will the proposed installation increase the width by adding appurtenance to the body of the structure that would protrude from the edge of the structure by more than 20 feet? No

More than four Equipment Cabinets? YN: No

Will the proposed installation require excavation or expansion outside the current boundaries of the site? No

Does the structure or current installation have concealment elements/measures? No

Will the proposed installation increase the height of the structure by: (1) more than 10% or (2) more than 10 feet, whichever is greater? No

If yes, describe how the proposed installation does not defeat the existing concealment.

Small Wireless Facility Informatio

Small Wireless Facility Questions

Small Wireless Facility? No

Is the structure 10% taller than adjacent structures?

Cumulative volume of the proposed wireless equipment(s) exclusive of antennas in cubic feet: 24

Please list adjacent structure heights

Tribal Lands? No

Cumulative volume of the proposed antenna antenna(s) exclusive of equipment

ROW Information

PROW? No

Pole Number

ROW owner

ROW width

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Antenna Infomation

Antenna Compliance	Yes
Compliance Desc	
Antenna Location	Yes
Antenna Loc. Desc.	
Env. Assessment	
Cat. Excluded?	
Routine Env. Evaluation	checked

Antenna Model	Ericsson AIR 6449 B4I						
Frequency	2496-2690 MHz						
RAD Center	65	Max ERP	5742	Antenna Dimensions	33.10"x20.6"x8.6"	Quantity	3

Antenna Model	RFS APXVAARR24_43-U-NA20						
Frequency	668-683, 728-734, 1965-1975 MHz; 622-637, 698-704, 1885-1895 MHz						
RAD Center	65	Max ERP	5276	Antenna Dimensions	95.9"x24"x8.7"	Quantity	3

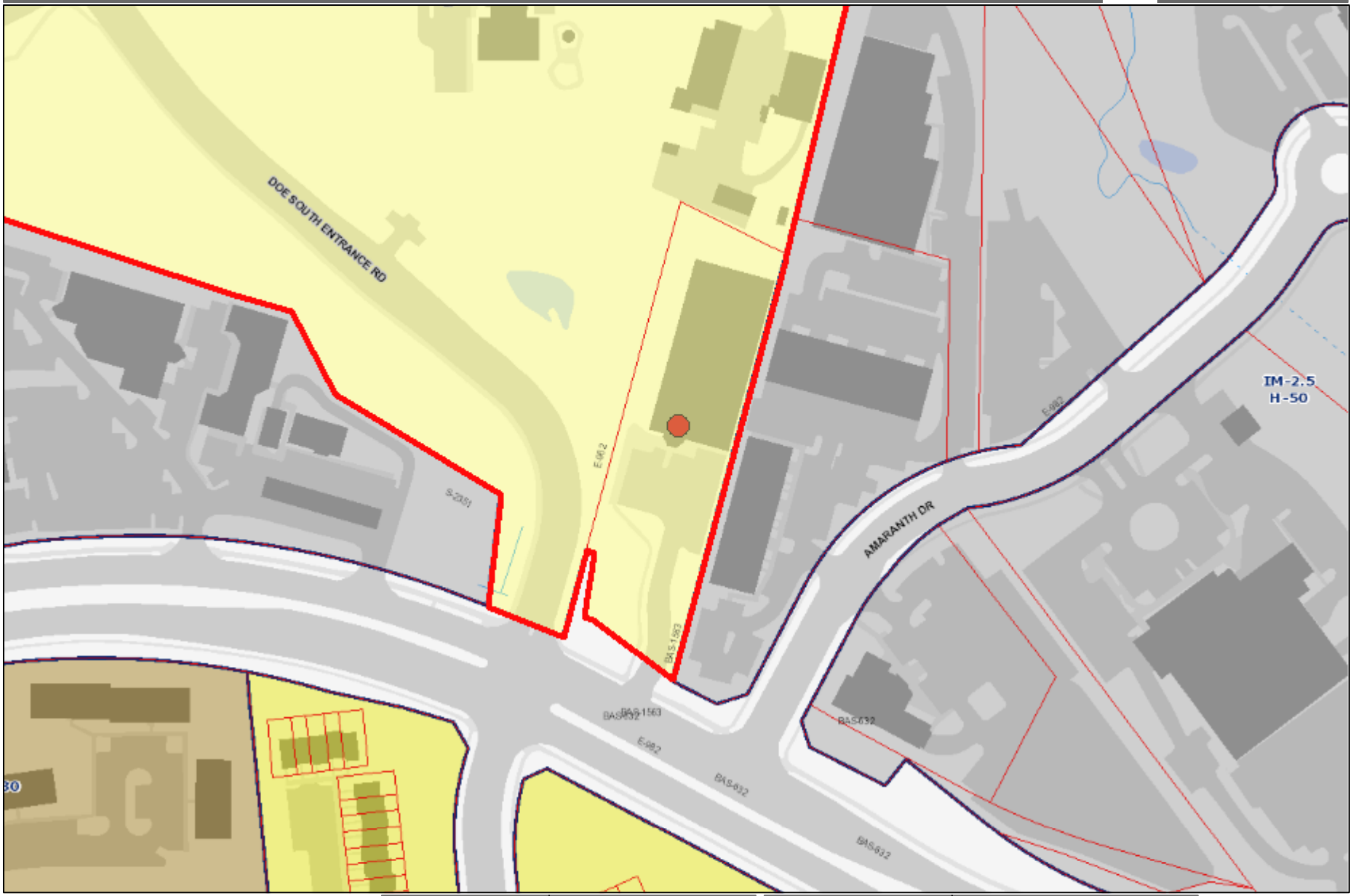
Thursday, October 29, 2020

10:15:33 AM

Montgomery County Zoning

Date: 10/28/2020

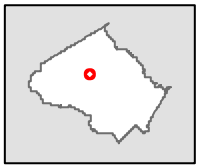
Montgomery County Planning Department
ITI Division



Account #	03298020
Address	12211 MIDDLEBROOK RD GERMANTOWN, 20874
Zone	R-200
Overlay Zone	N/A
TDR Overlay Zone	N/A
Landuse	Industrial
Parcel, Lot, Block	N944 , 11 , A
WSSC Grid	227NW12
Map Amendments	G-652 G-887 G-956

Parking District	N/A
CBD	N/A
Special Protection Area	N/A
Urban District	N/A
Enterprise Zone	N/A
Arts & Ent. District	N/A
Special Tax District	N/A
Legal Description	MIDDLEBROOK INDUSTRIAL PARK

Bike/Ped Priority Area	N/A
Urban Renewal Area	N/A
Metro Station Policy Area	N/A
Priority Funding Area	Yes
Septic Tier	Tier 1: Sewer existing
Municipality	N/A
Master Plan	GERMANTOWN SECTOR PLAN
Historic Site/District	N/A
Water/Sewer Categories	W-1 / S-1



1 inch = 230 feet

RADIO FREQUENCY SYSTEMS
The Clear Choice®

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-746/617-746/1695-2200/1695-2200MHz, 65deg, 15/15/18/18dBi, 2.4m (8ft), VET, RET, 0-12°/0-12°/2-12°/2-12°

FEATURES / BENEFITS

This antenna provides a 8 Port multi-band flexible platform for advanced use for flexible use in deployment scenarios for encompassing 600MHz, 700MHz, AWS & PCS applications.

- **24 Inch Width For Easier Zoning**
- **Field Replaceable (Integrated) AISG RET platform for reduced environmental exposure and long lasting quality**
- **Superior elevation pattern performance across the entire electrical down tilt range**
- **Includes three AISG RET motors - Includes 0.5m AISG jumper for optional diasy chain of two high band RET motors for one single AISG point of high band tilt control.**
- **Low band arrays driven by a single RET motor**

Technical Features

LOW BAND LEFT ARRAY (617-746 MHZ) [R1]

Frequency Band	MHz	617-698	698-746
Gain	dBi	15.1	15.5
Horizontal Beamwidth @3dB	Deg	65	62
Vertical Beamwidth @3dB	Deg	11.4	10.4
Electrical Downtilt Range	Deg	0-12	0-12
Upper Side Lobe Suppression 0 to +20	dB	19	20
Front-to-Back, at +/-30°, Copolar	dB	25	24
Cross Polar Discrimination (XPD) @ Boresight	dB	19	19
Cross Polar Discrimination (XPD) @ +/-60	dB	5	3
3rd Order PIM 2 x 43dBm	dBc		-153
VSWR	-	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25
Maximum Effective Power per Port	Watt	250	250

LOW BAND RIGHT ARRAY (617-746 MHZ) [R2]

Frequency Band	MHz	617-698	698-746
Gain	dBi	14.8	15.1
Horizontal Beamwidth @3dB	Deg	65	62
Vertical Beamwidth @3dB	Deg	11.4	10.3
Electrical Downtilt Range	Deg	0-12	0-12
Upper Side Lobe Suppression 0 to +20	dB	19	20
Front-to-Back, at +/-30°, Copolar	dB	25	23
Cross Polar Discrimination (XPD) @ Boresight	dB	19	19
Cross Polar Discrimination (XPD) @ +/-60	dB	5	3
3rd Order PIM 2 x 43dBm	dBc		-153
VSWR	-	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25
Maximum Effective Power per Port	Watt	250	250

RADIO FREQUENCY SYSTEMS
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Dual Slant Polarized Quad Band (8 Port) Antenna, 617-746/617-746/1695-2200/1695-2200MHz, 65deg, 15/15/18/18dBi, 2.4m (8ft), VET, RET, 0-12°/0-12°/2-12°/2-12°

HIGH BAND LEFT ARRAY (1695-2200 MHZ) [B1]

Frequency Band	MHz	1695-1880	1850-1990	1920-2200
Gain	dBi	17.3	17.8	18.5
Horizontal Beamwidth @3dB	Deg	66	59	59
Vertical Beamwidth @3dB	Deg	5.3	4.7	4.3
Electrical Downtilt Range	Deg	2-12	2-12	2-12
Upper Side Lobe Suppression 0 to +20	dB	15	15	15
Front-to-Back, at +/-30°, Copolar	dB	25	25	25
Cross Polar Discrimination (XPD) @ Boresight	dB	19	17	16
Cross Polar Discrimination (XPD) @ +/-60	dB	4	6	4
3rd Order PIM 2 x 43dBm	dBc	-153	-153	-153
VSWR	-	1.5:1	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25	25
Maximum Effective Power per Port	Watt	250	250	250

HIGH BAND RIGHT ARRAY (1695-2200 MHZ) [B2]

Frequency Band	MHz	1695-1880	1850-1990	1920-2200
Gain	dBi	17.1	17.8	18.5
Horizontal Beamwidth @3dB	Deg	66	59	59
Vertical Beamwidth @3dB	Deg	5.2	4.7	4.3
Electrical Downtilt Range	Deg	2-12	2-12	2-12
Upper Side Lobe Suppression 0 to +20	dB	15	15	15
Front-to-Back, at +/-30°, Copolar	dB	25	24	25
Cross Polar Discrimination (XPD) @ Boresight	dB	20	17	16
Cross Polar Discrimination (XPD) @ +/-60	dB	4	6	5
3rd Order PIM 2 x 43dBm	dBc	-153	-153	-153
VSWR	-	1.5:1	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25	25
Maximum Effective Power per Port	Watt	250	250	250

RADIO FREQUENCY SYSTEMS
The Clear Choice®

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-746/617-746/1695-2200/1695-2200MHz, 65deg, 15/15/18/18dBi, 2.4m (8ft), VET, RET, 0-12°/0-12°/2-12°/2-12°

ELECTRICAL SPECIFICATIONS

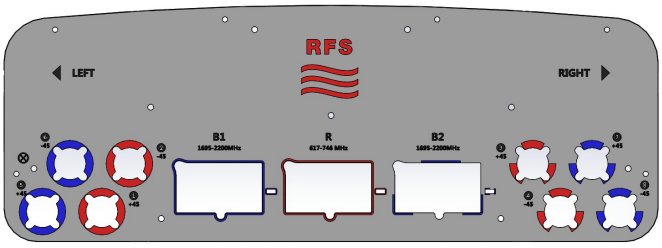
Impedance	Ohm	50.0
Polarization	Deg	±45°

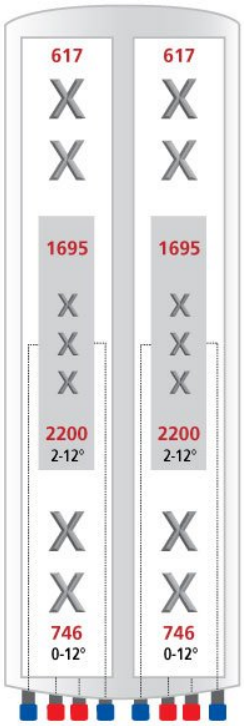
MECHANICAL SPECIFICATIONS

Dimensions - H x W x D	mm (in)	2436 x 609 x 222 (95.9 x 24 x 8.7)
Weight (Antenna Only)	kg (lb)	58 (128)
Weight (Mounting Hardware only)	kg (lb)	11.5 (25.3)
Shipping Weight	kg (lb)	80 (176)
Connector type		8 x 4.3-10 female at bottom + 6 AISG connectors (3 male, 3 female)
Adjustment mechanism		Integrated RET solution AISG compliant (Field Replaceable) + Manual Override + External Tilt Indicator
Mounting Hardware Material		Galvanized steel
Radome Material / Color		Fiber Glass / Light Grey RAL7035

TESTING AND ENVIRONMENTAL

Temperature Range	°C (°F)	-40 to 60 (-40 to 140)
Lightning protection		IEC 61000-4-5
Survival/Rated Wind Velocity	km/h	241 (150)
Environmental		ETSI 300-019-2-4 Class 4.1E





ORDERING INFORMATION

Order No.	Configuration	Mounting Hardware	Mounting pipe Diameter	Shipping Weight
APXVAARR24_43-U-NA20	Field Replace RET included (3)	APM40-5E Beam tilt kit (included)	60-120mm	80 Kg

RADIO FREQUENCY SYSTEMS
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External Document Links

APM40_Series_Installation_Instructions
Manual_Overdrive_Instructions
Global RFS Website

Notes

All electrical parameters are compliant with BASTA NGMN 9.6 requirements.

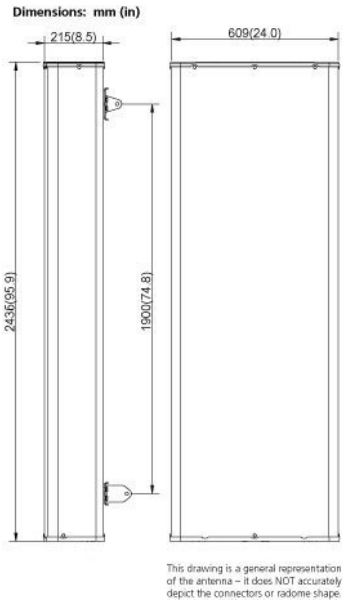
Available Configurations
APXVAARR24_43-U-NA20 -- External ACU is included -- shipping weight 80kg.

For additional mounting information please click "External Document Links".

This data is provisional and subject to changes.

External Link Reference

Global RFS Website	http://www.rfsworld.com



New Product Introduction

Massive MIMO Mid-Band
AIR6449 B41
New Product Introduction Notification

ERICSSON

(Refresh: Voltage Booster PSU 4813 is added in Ancillary Materials)

PURPOSE

Ericsson's next generation AIR6449 B41 massive MIMO (M-MIMO) single band product provides additional RF power and has full band IBW sufficient to transmit 180MHz of 4G/5G carrier bandwidth (vs. AIR6488 60+60MHz carrier bandwidth). The AIR6449 also offers enhanced RF performance via a 192 element antenna array (vs. AIR6488 with 128).

BACKGROUND

The AIR6449 has a combined antenna/radio with 64 TRX. It has advantages over the previous AIR6488 model such as:

- Full 194 MHz IBW and can support NR+LTE mixed mode vs. 100 MHz on AIR6488
- Smaller dimensions (in height and width) and lighter in weight
- 25 Gbps eCPRI support

AIR 6488 vs. AIR 6449 comparison is available at this link.

USAGE GUIDELINES

- AIR6449 is planned to replace AIR6488 on a go forward basis once available
- Full Anchor Design (2.5GHz + PCS) or 2.5GHz Only (AKA "Skinny")
- All markets except New York Boroughs
    - Use existing AIR6488 if entitlement is complete or expected to complete before July 1st, 2020 (see AIR6488 NPI)
    - Use existing AIR6488 if site is expected to be on-air before July 1st, 2020 (see AIR6488 NPI)
    - Use AIR6449 if entitlement complete is forecasted after July 1st, 2020
- NY Boroughs
    - Continue to use existing AIR6488M (see AIR6488 NPI)

TIMELINES

- Lab Entry: April 2020
- GA: June 30th, 2020
- New RFDS Templates for Anchor PORs reflecting AIR6449 have been created.
- This next generation hardware is expected to be available in commercial quantities in July 2020.

AFFECTED CONFIGURATIONS

Sites must be on an Anchor POR to use the AIR6449.

Site configurations that are designed with AIR6449 B41 will have a "**5A**" (5 for 2.5GHz + A for AIR6449) after the low-band indicator and/or before L19 indicator in the naming convention e.g., 67D92DB => 67D**5A**992DB, 92DB => **5A**992DB, etc.

PRODUCT DESCRIPTION

Frequency Range	LTE TDD B41: 2496 – 2690 MHz
Instantaneous BW	DL 194 MHz
Antenna Ports	64T64R
Technology	NR, LTE and NR+LTE MSMM
Antenna Elements	192
Output RF Power	300 W (=64 TRX x 4.6875W)
Data Ports	4 x 25Gb/s CPRI
5G NR Support	YES
DC Feed	-48V DC power connector
Cooling	Passive cooling (vs. active cooling on AIR32 DB)
Dimensions (H x W x D)	33.1" x 20.6" x 8.6" inches (=841 x 524 x 217 mm)
Weight	104 lbs (=47 kg)
Electrical downtilt	-3 to 11 degrees
Horizontal beamwidth	+/- 65 degrees
HW/SW Availability	July 2020
Material SAP #	34105 – AIR 6449 B41

WARRANTY: 1 Year

SPARES: 2% of install base. Additional units can be requested as per need.

Baseband Requirements

For a typical 3-sector site,

- LTE: one dedicated BB6630 per site
- NR: one dedicated BB6648 (see its NPI) per site

Supplementary/Ancillary Materials

SKU	Description	Qty
34106	AIR6449 mandatory install kit	1 per AIR6449
34110	AIR6449 25G SFP	8 per AIR6449

The AIR6449 requires a voltage booster (i.e., PSU 4813) in almost all cases when using the current HCS 6x12. Please refer to Voltage Booster design doc for its usage guidance (depending on the HCS length and gauge). Note the installation kit is different for each cabinet type.

SKU	Description	Qty
34132	PSU 4813 main unit	1
34133	PSU installation kit for RBS61xx	Choose 1 per cabinet type
34134	PSU installation kit for PBC6200	
34135	PSU installation kit for E6x60/P6230	

LINKS

- Ericsson New T-Mobile Anchor Network Playbook
- AIR 6488 vs. AIR 6449 Comparison

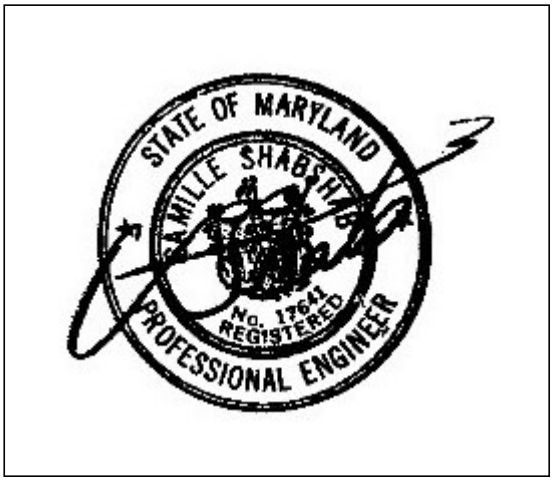
CONTACTS

Kyuho Son	Principal Engineer, RAN Architecture
Weston Berry	Engineer, RAN Architecture

Entrex Project Number:	1153.742	**Calculated By:**	RMC	**Page:**	1
Client:	T-Mobile			**Date:**	7/16/2020
Site Name:	EZ Storage Germantown			**Date:**	
Site Number:	7WAN101E			**Date:**	

STRUCTURAL NARRATIVE & CALCULATIONS
ANTENNA MOUNTS

T-MOBILE
EZ STORAGE GERMANTOWN
7WAN101E
12211 MIDDLEBROOK ROAD
GERMANTOWN, MD 20874



Engineer's Seal & Signature

Engineer: R Crumrine
Checked By: C Shabshab

PREPARED BY:
ENTREX COMMUNICATION SERVICES, INC.
6100 EXECUTIVE BLVD, SUITE 350
ROCKVILLE, MARYLAND 20852
TEL: (202) 408-0960

TABLE OF CONTENTS

0	Original Report	RMC	CS	CS	7/16/2020
No.	Reason for Revision	Engr	Checked	Approved	Date

Records of Revision Block

1.0 Introduction

This calculation was prepared to evaluate the structural adequacy of the existing antenna support frames at 1221 Middlebrook Rd, Germantown, MD 20874.

T-Mobile proposes to install two new antennas and two new RRHs on an existing non-penetrating antenna support frame located on the roof at three sector locations.

2.0 Criteria

The existing structure was analyzed and the new support frame was designed in accordance of the codes and standards listed below:

a. 2015 IBC	2015 International Building Code, International Code Council
b. ASCE 7-10	Minimum Design Loads for Building and Other Structure
c. AISC 360-10	Specification for Structural Steel Building Allowable Stress Design 14th Edition, AISC
d. ACI 318-14	Building Code Requirement for Structural Concrete

3.0 Assumptions

a. This analysis assumes that the original building structure members were properly designed and installed in accordance with the original drawings.
b. This analysis assumes that the as-built members are load-rated designed and constructed in accordance with accepted industry-wide standards.
c. This analysis assumes that the as-built conditions are structurally sound and properly maintained in accordance with the referenced standard and manufacturer's requirements.
d. Structural member sizes, building geometry, connection designs or steel/concrete/masonry material yield strengths, contrary to those assumed for the purpose of preparing this report could alter the findings and conclusions as stated.
e. The investigation of the structure or design of the structure analysis uses STAAD Pro finite element structural analysis computer program. In this analysis a finite element mathematical model of the structure was prepared based upon the exact structure geometry. The overall finite element model was loaded with live, dead & wind loading and weight associated with the structure itself.
f. For any structural components that were found to be rated up to 105% of its design capacity may be deemed acceptable. Overstressed percentages of 5% or less are considered to be within the accuracy limits of the calculations and are not consider to be critical.

4.0 Conclusions

Existing Antenna Support Frame - Sector 1:

The existing non-penetrating antenna support frame with (40) existing solid CMU half blocks to the front of the frame and (55) existing solid CMU half block blocks to the back of the frame was found to be adequate to supprt the existing and proposed antenna loads. The total weight of the frame with 95 CMU half blocks (32 lbs each) is 4475 lbs.

No changes were made to the existing support steel frame and the block quantity remains the same

This analysis assumes that, as part of the original T-Mobile antenna support frame design and/or subsequent upgrade, the existing building structure has been evaluated to support the existing T-Mobile loads and was found to be adequate.

Existing Antenna Support Frame - Sector 2:

The existing non-penetrating antenna support frame with (40) existing solid CMU half blocks to the front of the frame and (46) existing solid CMU half block blocks to the back of the frame was found to be adequate to supprt the existing and proposed antenna loads. The total weight of the frame with 86 CMU half blocks (32 lbs each) is 4187 lbs.

No changes were made to the existing support steel frame and the block quantity remains the same

This analysis assumes that, as part of the original T-Mobile antenna support frame design and/or subsequent upgrade, the existing building structure has been evaluated to support the existing T-Mobile loads and was found to be adequate.

Existing Antenna Support Frame - Sector 3:

The existing non-penetrating antenna support frame with (36) existing solid CMU half blocks to the front of the frame and (56) existing solid CMU half block blocks to the back of the frame was found to be adequate to supprt the existing and proposed antenna loads. The total weight of the frame with 92 CMU half blocks (32 lbs each) is 4379 lbs.

No changes were made to the existing support steel frame and the block quantity remains the same

This analysis assumes that, as part of the original T-Mobile antenna support frame design and/or subsequent upgrade, the existing building structure has been evaluated to support the existing T-Mobile loads and was found to be adequate.

entrex communication services, inc.	**Entrex Project Number:**	1153.742	**Calculated By:**	RMC	**Page:**	5
	Client:	T-Mobile			**Date:**	7/16/2020
	Site Name:	EZ Storage Germantown			**Date:**	
	Site Number:	7WAN101E			**Date:**	
	Engineering Objective:	Investigate Existing Antenna Support Frame			**Sector 1**	

5.0 Structural Calculations

a. Investigate Existing Antenna Support Frame - Sector 1

Problem Statement: T-Mobile proposes to install two new antennas and to install two new RRUs on an existing non-penetrating antenna support frame (Site Pro 1 RTW-14) located on the roof. There are 40 CMU half blocks (4x8x16 32 lbs each assumed) at the front tray and there are 55 CMU half blocks (4x8x16 32 lbs each assumed) at the back tray. The purpose of this calculation is to check the structural adequacy of the CMU block weight to support an existing antenna support frame, an existing panel antenna, two new panel antennas, and two new RRUs.

Design Code: The structural system analysis is in accordance with the requirements of the International Building Code 2015 (IBC 2015).

IBC 2015 Design Code Per Chapter 16 - Structural Design

Risk Category =	II	
Wind Exposure Category =	B	
V_{ult} =	115	mph (3-sec gust Ultimate Design Wind Speed - See Figure 1609B)

Wind Load Calc: Compute wind load per ASCE 7-10 (Section 29 Wind Loads on Other Structures)

Roof Elev. =	56.00	ft
Proposed Antenna Centerline Elev. =	65.00	ft
Proposed Antenna Ht Above Roof =	9.00	ft (from roof to Centerline of Antenna)

ASCE7-10 (29.3 Velocity Pressure)

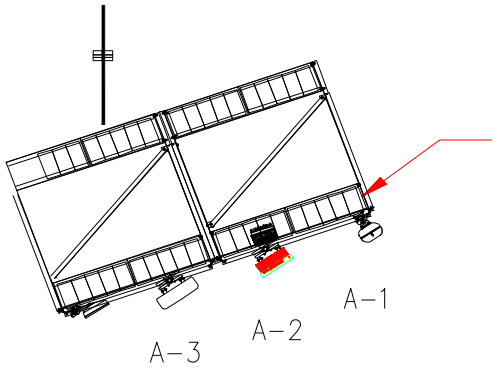
Velocity Pressure = $qz = (0.00256)\ (Kz)\ (Kzt)\ (Kd)\ (V)^2$ Eq 29.3-1

Kz =	0.87	Table 29.3-1 Exposure B
Kzt =	1.00	Section 26.8.2
Kd =	0.85	Table 26.6-1
V =	115	mph 3 second gust (Category II)
qz =	25.15	psf

ASCE7-10 (29.5)

F = qz G Cf Af Eq. 29.5-1

qz =	25.15	psf
G =	0.85	Section 26.9



Entrex Project Number:	1153.742	**Calculated By:**	RMC	**Page:**	6
Client:	T-Mobile			**Date:**	7/16/2020
Site Name:	EZ Storage Germantown			**Date:**	
Site Number:	7WAN101E			**Date:**	
Engineering Objective:	Investigate Existing Antenna Support Frame			**Sector 1**	

Proposed Loads:

WIND LOAD ON ANTENNAS & ANCILLARY ITEMS ; F = qz Gh Cf A

	ANTENNA/ANCILLARY DESCRIPTION	ELEV (FT)	qzGh	Cf	WIND AREA (sf)	F (lbs)	wt (lbs)	MOMENT ARM (FT)	OTM (LBS-FT)	COAX SIZE
	AIR32 KRD901146-1_B66A_B2A	65.0	21.37	1.34	5.07	145	132	9.00	1309	-
	AIR 6449 B41	65.0	21.37	1.30	4.74	132	104	9.00	1184	-
	RFS APXVAARR24_43-U-NA20	65.0	21.37	1.33	15.98	455	153	9.00	4099	-
Shielded	Radio 4449 B71+B85	65.0	21.37	1.30	1.64	0	75	6.00	0	-
Shielded	Radio 4415 B25	65.0	21.37	1.30	1.54	0	46	4.00	0	-
	Upper Horiz (2) L2.5 x 86.5" Long	65.0	21.37	2.00	3.00	128	-	6.13	786	-
	Lower Horiz (2) L2.5 x 86.5" Long	65.0	21.37	2.00	3.00	128	-	2.15	276	-
	Vertical Post (4) L2.5 x 70.5625" Long	65.0	21.37	2.00	4.90	209	-	3.04	638	-
	Diagonal (2) 2" Wide x 95" Long (Exposed)	65.0	21.37	2.00	2.64	113	-	3.75	423	-
	Kicker (4) L2.5 x 70" Long (Projected Length)	65.0	21.37	2.00	4.86	208	-	2.92	606	-
Exposed Pipe	(1) 2" Std Pipe x 10' Long (Position #1)	65.0	21.37	1.20	1.05	27	37	9.00	241	-
Exposed Pipe	(1) 2" Std Pipe x 10' Long (Position #2)	65.0	21.37	1.20	1.43	37	37	9.00	331	-
Exposed Pipe	(1) 2" Std Pipe x 10' Long (Position #3)	65.0	21.37	1.20	0.40	10	37	6.00	61	-
	(1) Vacant 2" Std Pipe x 10' Long (Position #4)	65.0	21.37	1.20	1.98	51	37	9.00	457	-

Total Wind Shear = 1593 lbs
Total Wind Moment = 9955 lbs-ft

Per IBC 2015 Allowable Shear = 0.6 Wind Shear Load = 956 lbs
Per IBC 2015 Allowable Shear = 0.6 Wind Moment Load = 5973 lbs-ft

Antenna, Pipes, & RRH Weight = 656 lbs
Ballast Steel Frame Weight = 779 lbs (without Antenna Pipes)
Existing Block Weight = 3040 lbs (95 Half CMU blocks x 32 lbs)

Total Weight = 4475 lbs

Ballast Sliding:

Investigate ballast resisting sliding shear force (friction coefficient = 0.7 steel vs. rubber)

Factored Frame Weight, 0.6 D = 2685 lbs
Shear Load, 0.6 WL = 956 lbs
Sliding Coefficient u = 0.7 (Sliding coefficient for steel vs. rubber)
Sliding Resistance = 1880 lbs

Sliding Force	<	Sliding Resistance	
956 lbs	<	1880 lbs	Ok, by inspection

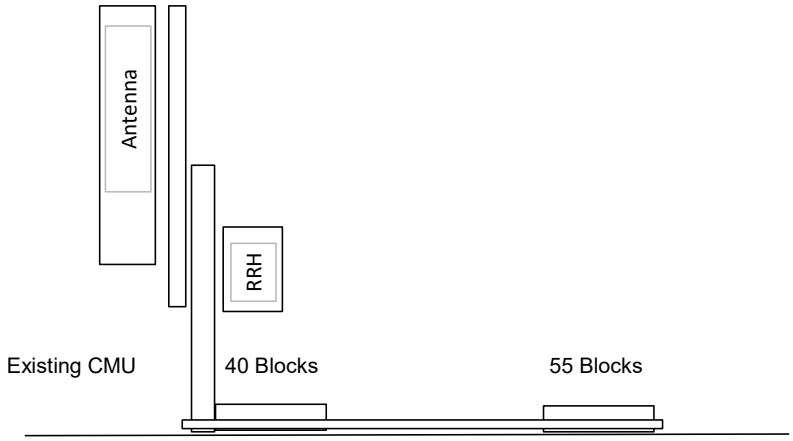
entrex communication services, inc.	**Entrex Project Number:**	1153.742	**Calculated By:**	RMC	**Page:**	7
	Client:	T-Mobile			**Date:**	7/16/2020
	Site Name:	EZ Storage Germantown			**Date:**	
	Site Number:	7WAN101E			**Date:**	
	Engineering Objective:	Investigate Existing Antenna Support Frame			**Sector 1**	

Ballast OTM:

Wind Load			**Ballast Frame Weight**		
OTM, 0.6 WL =	5973	lbs-ft	Total Weight =	4475	lbs
Ballast Width =	8.17	ft	Factored Total Weight, 0.6 D =	2685	lbs
			Resisting Moment =	10965	lbs-ft

$$\frac{\text{Resisting Moment}}{\text{OTM}} = \frac{10965}{5973} = 1.84 > 1.0 \text{ Req'd}$$

OTM	<	Moment Resistance	
5973 lbs-ft	<	10965 lbs-ft	Ok, by inspection



Antenna + Frame, 0.6 DL =	628	lbs	Frame, 0.6 DL =	234	lbs
Gravity Due to Moment 0.6 WL =	731	+/- lbs	Ballast 0.6 WL =	731	+/- lbs
Existing Block Weight, 0.6 DL =	768	lbs	Existing Block Weight, 0.6 DL =	1056	lbs
0.6 DL + 0.6 WL =	2127	lbs	0.6 DL + 0.6 WL =	2021	lbs
0.6 DL - 0.6 WL =	664	lbs	0.6 DL - 0.6 WL =	558	lbs

Conclusion:

The existing non-penetrating antenna support frame with (40) existing solid CMU half blocks to the front of the frame and (55) existing solid CMU half block blocks to the back of the frame was found to be adequate to supprt the existing and proposed antenna loads. The total weight of the frame with 95 CMU half blocks (32 lbs each) is 4475 lbs.

No changes were made to the existing support steel frame and the block quantity remains the same

This analysis assumes that, as part of the original T-Mobile antenna support frame design and/or subsequent upgrade, the existing building structure has been evaluated to support the existing T-Mobile loads and was found to be adequate.

5.0 Structural Calculations

b. Investigate Existing Antenna Support Frame - Sector 2

Problem Statement: T-Mobile proposes to install two new antennas and to install two new RRUs on an existing non-penetrating antenna support frame (Site Pro 1 RTW-14) located on the roof. There are 40 CMU half blocks (4x8x16 32 lbs each assumed) at the front tray and there are 46 CMU half blocks (4x8x16 32 lbs each assumed) at the back tray. The purpose of this calculation is to check the structural adequacy of the CMU block weight to support an existing antenna support frame, an existing panel antenna, two new panel antennas, and two new RRUs.

Design Code: The structural system analysis is in accordance with the requirements of the International Building Code 2015 (IBC 2015).

IBC 2015 Design Code Per Chapter 16 - Structural Design

Risk Category =	II	
Wind Exposure Category =	B	
V_{ult} =	115	mph (3-sec gust Ultimate Design Wind Speed - See Figure 1609B)

Wind Load Calc: Compute wind load per ASCE 7-10 (Section 29 Wind Loads on Other Structures)

Roof Elev. =	56.00	ft
Proposed Antenna Centerline Elev. =	65.00	ft
Proposed Antenna Ht Above Roof =	9.00	ft (from roof to Centerline of Antenna)

ASCE7-10 (29.3 Velocity Pressure)

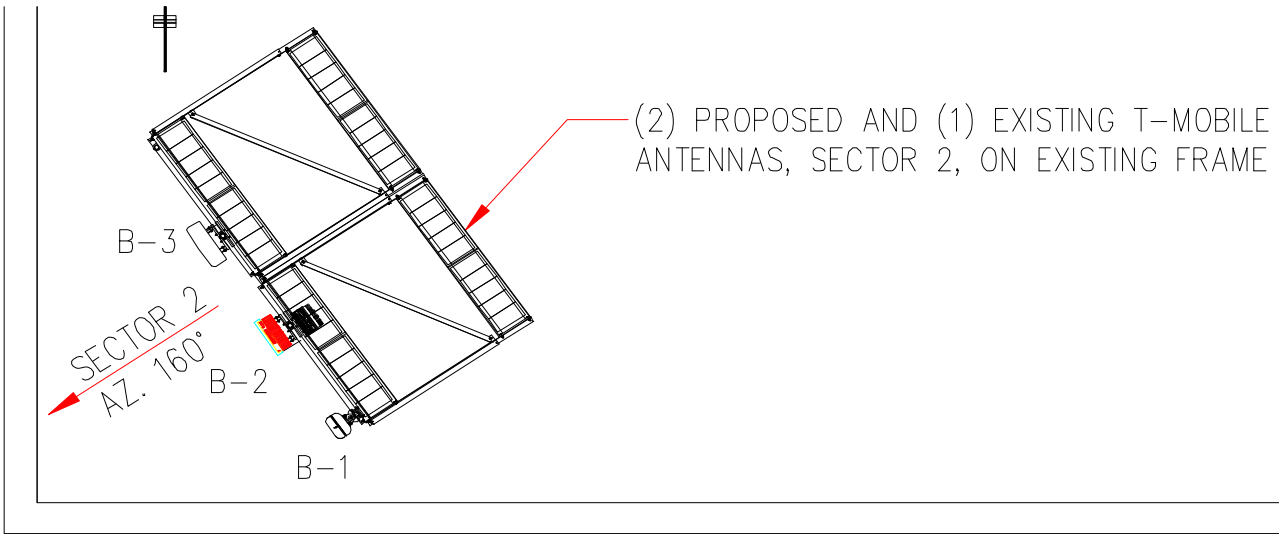
Velocity Pressure = $qz = (0.00256)\ (Kz)\ (Kzt)\ (Kd)\ (V)^2$ Eq 29.3-1

Kz =	0.87	Table 29.3-1 Exposure B
Kzt =	1.00	Section 26.8.2
Kd =	0.85	Table 26.6-1
V =	115	mph 3 second gust (Category II)
qz =	25.15	psf

ASCE7-10 (29.5)

F = qz G Cf Af Eq. 29.5-1

qz =	25.15	psf
G =	0.85	Section 26.9



Entrex Project Number:	1153.742	**Calculated By:**	RMC	**Page:**	9
Client:	T-Mobile			**Date:**	7/16/2020
Site Name:	EZ Storage Germantown			**Date:**	
Site Number:	7WAN101E			**Date:**	
Engineering Objective:	Investigate Existing Antenna Support Frame			**Sector 2**	

Proposed Loads:

WIND LOAD ON ANTENNAS & ANCILLARY ITEMS ; F = qz Gh Cf A

	ANTENNA/ANCILLARY DESCRIPTION	ELEV (FT)	qzGh	Cf	WIND AREA (sf)	F (lbs)	wt (lbs)	MOMENT ARM (FT)	OTM (LBS-FT)	COAX SIZE
	AIR32 KRD901146-1_B66A_B2A	65.0	21.37	1.34	5.07	145	132	9.00	1309	-
	AIR 6449 B41	65.0	21.37	1.30	4.74	132	104	9.00	1184	-
	RFS APXVAARR24_43-U-NA20	65.0	21.37	1.33	15.98	455	153	9.00	4099	-
Shielded	Radio 4449 B71+B85	65.0	21.37	1.30	1.64	0	75	6.00	0	-
Shielded	Radio 4415 B25	65.0	21.37	1.30	1.54	0	46	4.00	0	-
	Upper Horiz (2) L2.5 x 86.5" Long	65.0	21.37	2.00	3.00	128	-	6.13	786	-
	Lower Horiz (2) L2.5 x 86.5" Long	65.0	21.37	2.00	3.00	128	-	2.15	276	-
	Vertical Post (4) L2.5 x 70.5625" Long	65.0	21.37	2.00	4.90	209	-	3.04	638	-
	Diagonal (2) 2" Wide x 95" Long (Exposed)	65.0	21.37	2.00	2.64	113	-	3.75	423	-
	Kicker (4) L2.5 x 70" Long (Projected Length)	65.0	21.37	2.00	4.86	208	-	2.92	606	-
Exposed Pipe	(1) 2" Std Pipe x 10' Long (Position #1)	65.0	21.37	1.20	1.05	27	37	9.00	241	-
Exposed Pipe	(1) 2" Std Pipe x 10' Long (Position #2)	65.0	21.37	1.20	1.43	37	37	9.00	331	-
Exposed Pipe	(1) 2" Std Pipe x 10' Long (Position #3)	65.0	21.37	1.20	0.40	10	37	6.00	61	-
	(1) Vacant 2" Std Pipe x 10' Long (Position #4)	65.0	21.37	1.20	1.98	51	37	9.00	457	-

Total Wind Shear =	1593	lbs
Total Wind Moment =	9955	lbs-ft
Per IBC 2015 Allowable Shear = 0.6 Wind Shear Load =	956	lbs
Per IBC 2015 Allowable Shear = 0.6 Wind Moment Load =	5973	lbs-ft

Antenna, Pipes, & RRH Weight =	656	lbs
Ballast Steel Frame Weight =	779	lbs (without Antenna Pipes)
Existing Block Weight =	2752	lbs (86 Half CMU blocks x 32 lbs)
Total Weight =	4187	lbs

Ballast Sliding:

Investigate ballast resisting sliding shear force (friction coefficient = 0.7 steel vs. rubber)

Factored Frame Weight, 0.6 D =	2512	lbs
Shear Load, 0.6 WL =	956	lbs
Sliding Coefficient u =	0.7	(Sliding coefficient for steel vs. rubber)
Sliding Resistance =	1759	lbs

Sliding Force	<	Sliding Resistance	
956 lbs	<	1759 lbs	Ok, by inspection

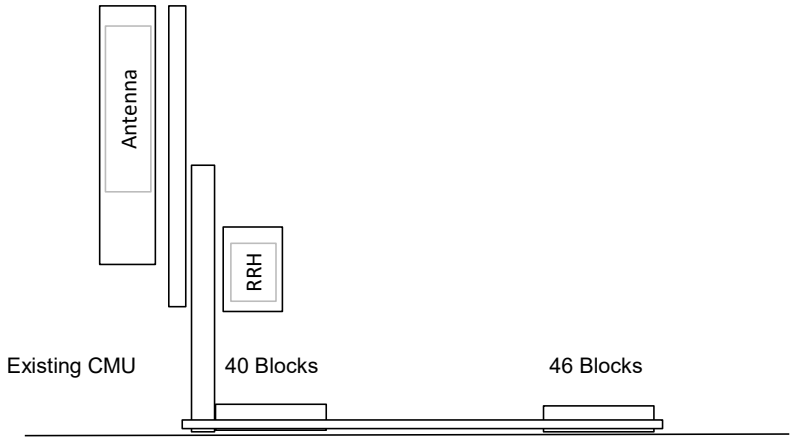
entrex communication services, inc.	**Entrex Project Number:**	1153.742	**Calculated By:**	RMC	**Page:**	10
	Client:	T-Mobile			**Date:**	7/16/2020
	Site Name:	EZ Storage Germantown			**Date:**	
	Site Number:	7WAN101E			**Date:**	
	Engineering Objective:	Investigate Existing Antenna Support Frame			**Sector 2**	

Ballast OTM:

Wind Load			**Ballast Frame Weight**		
OTM, 0.6 WL =	5973	lbs-ft	Total Weight =	4187	lbs
Ballast Width =	8.17	ft	Factored Total Weight, 0.6 D =	2512	lbs
			Resisting Moment =	10259	lbs-ft

$$\frac{\text{Resisting Moment}}{\text{OTM}} = \frac{10259}{5973} = 1.72 > 1.0 \text{ Req'd}$$

OTM	<	Moment Resistance	
5973 lbs-ft	<	10259 lbs-ft	Ok, by inspection



Antenna + Frame, 0.6 DL =	628	lbs	Frame, 0.6 DL =	234	lbs
Gravity Due to Moment 0.6 WL =	731	+/- lbs	Ballast 0.6 WL =	731	+/- lbs
Existing Block Weight, 0.6 DL =	768	lbs	Existing Block Weight, 0.6 DL =	883	lbs
0.6 DL + 0.6 WL =	2127	lbs	0.6 DL + 0.6 WL =	1848	lbs
0.6 DL - 0.6 WL =	664	lbs	0.6 DL - 0.6 WL =	386	lbs

Conclusion:

The existing non-penetrating antenna support frame with (40) existing solid CMU half blocks to the front of the frame and (46) existing solid CMU half block blocks to the back of the frame was found to be adequate to supprt the existing and proposed antenna loads. The total weight of the frame with 86 CMU half blocks (32 lbs each) is 4187 lbs.

No changes were made to the existing support steel frame and the block quantity remains the same

This analysis assumes that, as part of the original T-Mobile antenna support frame design and/or subsequent upgrade, the existing building structure has been evaluated to support the existing T-Mobile loads and was found to be adequate.

5.0 Structural Calculations

c. Investigate Existing Antenna Support Frame - Sector 3

Problem Statement: T-Mobile proposes to install two new antennas and to install two new RRUs on an existing non-penetrating antenna support frame (Site Pro 1 RTW-14) located on the roof. There are 36 CMU half blocks (4x8x16 32 lbs each assumed) at the front tray and there are 56 CMU half blocks (4x8x16 32 lbs each assumed) at the back tray. The purpose of this calculation is to check the structural adequacy of the CMU block weight to support an existing antenna support frame, an existing panel antenna, two new panel antennas, and two new RRUs.

Design Code: The structural system analysis is in accordance with the requirements of the International Building Code 2015 (IBC 2015).

IBC 2015 Design Code Per Chapter 16 - Structural Design

Risk Category =	II	
Wind Exposure Category =	B	
V_{ult} =	115	mph (3-sec gust Ultimate Design Wind Speed - See Figure 1609B)

Wind Load Calc: Compute wind load per ASCE 7-10 (Section 29 Wind Loads on Other Structures)

Roof Elev. =	56.00	ft
Proposed Antenna Centerline Elev. =	65.00	ft
Proposed Antenna Ht Above Roof =	9.00	ft (from roof to Centerline of Antenna)

ASCE7-10 (29.3 Velocity Pressure)

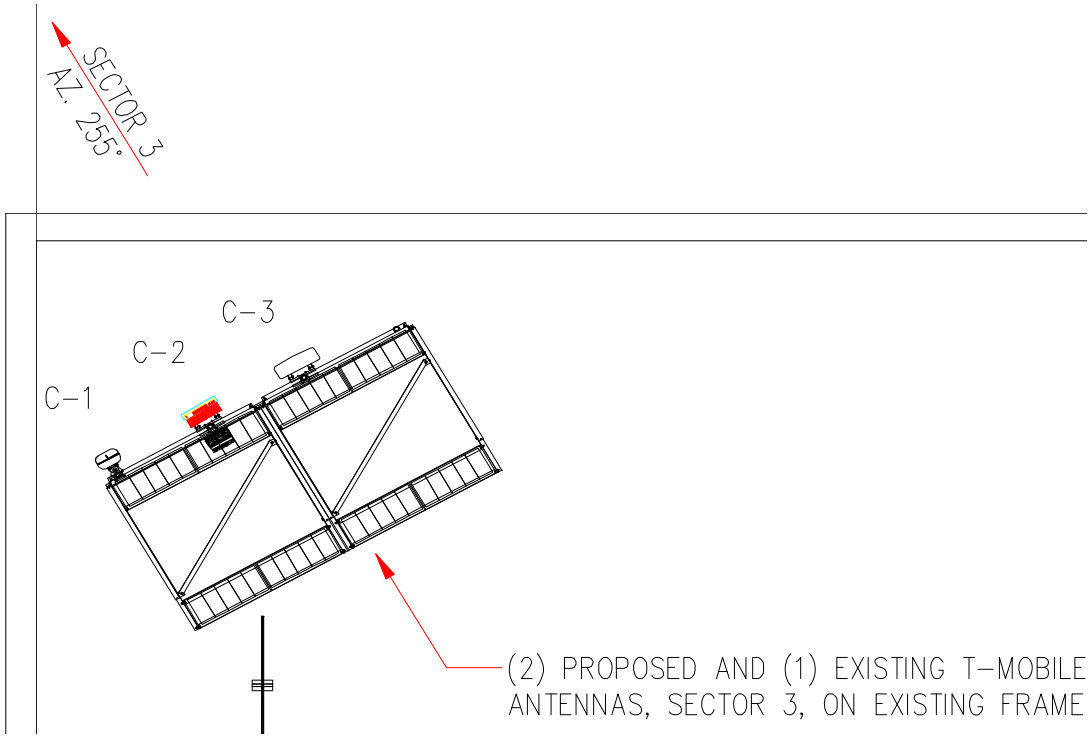
Velocity Pressure = $qz = (0.00256)\ (Kz)\ (Kzt)\ (Kd)\ (V)^2$ Eq 29.3-1

Kz =	0.87	Table 29.3-1 Exposure B
Kzt =	1.00	Section 26.8.2
Kd =	0.85	Table 26.6-1
V =	115	mph 3 second gust (Category II)
qz =	25.15	psf

ASCE7-10 (29.5)

F = qz G Cf Af Eq. 29.5-1

qz =	25.15	psf
G =	0.85	Section 26.9



Entrex Project Number:	1153.742	**Calculated By:**	RMC	**Page:**	12
Client:	T-Mobile			**Date:**	7/16/2020
Site Name:	EZ Storage Germantown			**Date:**	
Site Number:	7WAN101E			**Date:**	
Engineering Objective:	Investigate Existing Antenna Support Frame			**Sector 3**	

Proposed Loads:

WIND LOAD ON ANTENNAS & ANCILLARY ITEMS ; F = qz Gh Cf A

	ANTENNA/ANCILLARY DESCRIPTION	ELEV (FT)	qzGh	Cf	WIND AREA (sf)	F (lbs)	wt (lbs)	MOMENT ARM (FT)	OTM (LBS-FT)	COAX SIZE
	AIR32 KRD901146-1_B66A_B2A	65.0	21.37	1.34	5.07	145	132	9.00	1309	-
	AIR 6449 B41	65.0	21.37	1.30	4.74	132	104	9.00	1184	-
	RFS APXVAARR24_43-U-NA20	65.0	21.37	1.33	15.98	455	153	9.00	4099	-
Shielded	Radio 4449 B71+B85	65.0	21.37	1.30	1.64	0	75	6.00	0	-
Shielded	Radio 4415 B25	65.0	21.37	1.30	1.54	0	46	4.00	0	-
	Upper Horiz (2) L2.5 x 86.5" Long	65.0	21.37	2.00	3.00	128	-	6.13	786	-
	Lower Horiz (2) L2.5 x 86.5" Long	65.0	21.37	2.00	3.00	128	-	2.15	276	-
	Vertical Post (4) L2.5 x 70.5625" Long	65.0	21.37	2.00	4.90	209	-	3.04	638	-
	Diagonal (2) 2" Wide x 95" Long (Exposed)	65.0	21.37	2.00	2.64	113	-	3.75	423	-
	Kicker (4) L2.5 x 70" Long (Projected Length)	65.0	21.37	2.00	4.86	208	-	2.92	606	-
Exposed Pipe	(1) 2" Std Pipe x 10' Long (Position #1)	65.0	21.37	1.20	1.05	27	37	9.00	241	-
Exposed Pipe	(1) 2" Std Pipe x 10' Long (Position #2)	65.0	21.37	1.20	1.43	37	37	9.00	331	-
Exposed Pipe	(1) 2" Std Pipe x 10' Long (Position #3)	65.0	21.37	1.20	0.40	10	37	6.00	61	-
	(1) Vacant 2" Std Pipe x 10' Long (Position #4)	65.0	21.37	1.20	1.98	51	37	9.00	457	-

Total Wind Shear =	1593	lbs
Total Wind Moment =	9955	lbs-ft
Per IBC 2015 Allowable Shear = 0.6 Wind Shear Load =	956	lbs
Per IBC 2015 Allowable Shear = 0.6 Wind Moment Load =	5973	lbs-ft

Antenna, Pipes, & RRH Weight =	656	lbs
Ballast Steel Frame Weight =	779	lbs (without Antenna Pipes)
Existing Block Weight =	2944	lbs (92 Half CMU blocks x 32 lbs)
Total Weight =	4379	lbs

Ballast Sliding:

Investigate ballast resisting sliding shear force (friction coefficient = 0.7 steel vs. rubber)

Factored Frame Weight, 0.6 D =	2628	lbs
Shear Load, 0.6 WL =	956	lbs
Sliding Coefficient u =	0.7	(Sliding coefficient for steel vs. rubber)
Sliding Resistance =	1839	lbs

Sliding Force	<	Sliding Resistance	
956 lbs	<	1839 lbs	Ok, by inspection

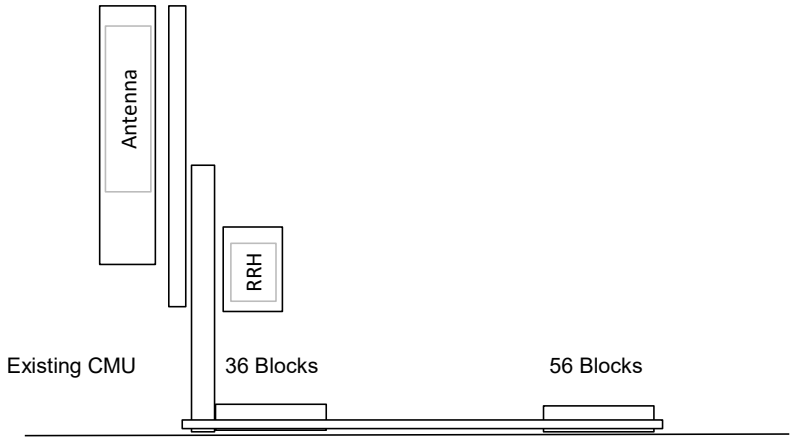
entrex communication services, inc.	**Entrex Project Number:**	1153.742	**Calculated By:**	RMC	**Page:**	13
	Client:	T-Mobile			**Date:**	7/16/2020
	Site Name:	EZ Storage Germantown			**Date:**	
	Site Number:	7WAN101E			**Date:**	
	Engineering Objective:	Investigate Existing Antenna Support Frame			**Sector 3**	

Ballast OTM:

Wind Load			**Ballast Frame Weight**		
OTM, 0.6 WL =	5973	lbs-ft	Total Weight =	4379	lbs
Ballast Width =	8.17	ft	Factored Total Weight, 0.6 D =	2628	lbs
			Resisting Moment =	10730	lbs-ft

$$\frac{\text{Resisting Moment}}{\text{OTM}} = \frac{10730}{5973} = 1.80 > 1.0 \text{ Req'd}$$

OTM	<	Moment Resistance	
5973 lbs-ft	<	10730 lbs-ft	Ok, by inspection



Antenna + Frame, 0.6 DL =	628	lbs	Frame, 0.6 DL =	234	lbs
Gravity Due to Moment 0.6 WL =	731	+/- lbs	Ballast 0.6 WL =	731	+/- lbs
Existing Block Weight, 0.6 DL =	691	lbs	Existing Block Weight, 0.6 DL =	1075	lbs
0.6 DL + 0.6 WL =	2050	lbs	0.6 DL + 0.6 WL =	2040	lbs
0.6 DL - 0.6 WL =	587	lbs	0.6 DL - 0.6 WL =	578	lbs

Conclusion:

The existing non-penetrating antenna support frame with (36) existing solid CMU half blocks to the front of the frame and (56) existing solid CMU half block blocks to the back of the frame was found to be adequate to supprt the existing and proposed antenna loads. The total weight of the frame with 92 CMU half blocks (32 lbs each) is 4379 lbs.

No changes were made to the existing support steel frame and the block quantity remains the same

This analysis assumes that, as part of the original T-Mobile antenna support frame design and/or subsequent upgrade, the existing building structure has been evaluated to support the existing T-Mobile loads and was found to be adequate.

T-MOBILE NORTHEAST LLC

SITE NUMBER: 7WAN101E
SITE NAME: EZ STORAGE GERMANTOWN

12211 MIDDLEBROOK RD
GERMANTOWN, MD 20874

CONFIGURATION: 67D5A997DB OUTDOOR

T-MOBILE NORTHEAST LLC
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705
PHONE: (240) 264-8600

entrex communication services, inc.
6100 EXECUTIVE BLVD
SUITE 350
ROCKVILLE, MD 20852
PHONE: (202) 408-0960

SITE LINK
Site Link Wireless, LLC
3620 Commerce Drive, Suite 707
Baltimore, MD 21227
www.sitelinkwireless.com
410-309-4949

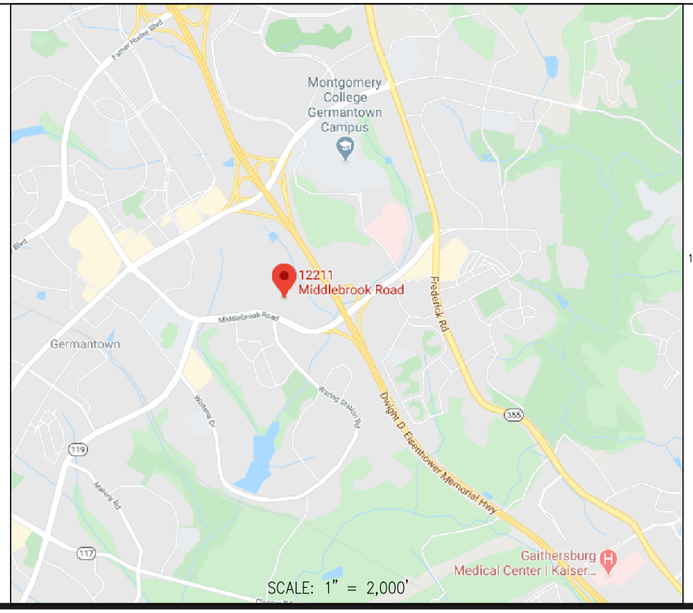
SITE INFORMATION

SCOPE OF WORK:
1. INSTALL (3) NEW AIR6449 B41 ANTENNAS ON EXISTING SUPPORT FRAMES.
2. REPLACE (3) EXISTING APXVF24-C-A20 ANTENNAS WITH (3) NEW APXVAARR24 ANTENNAS
2. REPLACE (3) EXISTING RRUS11 B12 WITH (3) NEW RADIO 6415 B25 AND (3) NEW RADIO 6449 B71+B85
3. INSTALL (2) PROPOSED EQUIPMENT CABINETS ON PROPOSED STEEL PLATFORM.
4. RECONFIGURE NEW & EXISTING CABLE CONNECTIONS TO ANTENNAS AND EXISTING EQUIPMENT CABINETS.
5. UPGRADE POWER TO 200A

JURISDICTION:	MONTGOMERY COUNTY
USE:	R200 – RESIDENTIAL DETACHED
TAX ACCOUNT NUMBER:	09-03298020
PARCEL OWNER:	MIDDLEBROOK LAND LLLP
ADDRESS:	C/O SIENA CORPORATION 8221 SNOWDEN RIVER PARKWAY COLUMBIA, MARYLAND 21045
MAP/ PARCEL:	EU52/ N944
STRUCTURE TYPE:	ROOFTOP
GROUND ELEVATION:	±448' AMSL
LATITUDE:	N 39° 10' 33.92"
LONGITUDE:	W 77° 15' 10.19"

NOTE TO GENERAL CONTRACTOR
NO WORK IS TO BE PERFORMED ON THIS SITE WITHOUT REVIEW OF THE APPROVED STRUCTURAL ANALYSIS. IF ANY DISCREPANCIES ARE FOUND THE GENERAL CONTRACTOR SHALL NOTIFY ENGINEER IN WRITING. AT NO TIME WILL ANY ADDITIONAL ANTENNAS BE INSTALLED WITHOUT WRITTEN CONSENT FROM TOWER ENGINEER.

VICINITY MAP



SHEET INDEX

7WAN101E
EZ STORAGE GERMANTOWN
12211 MIDDLEBROOK RD
GERMANTOWN, MD 20874

SEAL:

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 17641, Expiration Date: 12/27/2021

SUBMITTALS

DATE	DESCRIPTION	REV.
07-14-2020	CONSTRUCTION REVIEW	A
07-22-2020	CONSTRUCTION	0

PROJECT TEAM

APPLICANT:	T-MOBILE NORTHEAST LLC 12050 BALTIMORE AVE. BELTSVILLE, MD 20705 PHONE: (301) 264-8600
ARCHITECT/ENGINEER:	ENTREX COMMUNICATION SERVICES, INC. 6100 EXECUTIVE BLVD, SUITE 350 ROCKVILLE, MD 20852 CAMILLE SHABSHAB (202) 408-0960
PROJECT MANAGEMENT:	SITELINK WIRELESS LLC 3620 COMMERCE DR, SUITE 707 BALTIMORE, MD 21227 PROJECT MANAGER: PAUL OLER PHONE: (443) 270-8020

CODE COMPLIANCE

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

- 2015 INTERNATIONAL BUILDING CODE
- 2014 NFPA 70 NATIONAL ELECTRICAL CODE
- 2015 NFPA 101 LIFE SAFETY CODE
- 2015 INTERNATIONAL MECHANICAL CODE
- AMERICAN CONCRETE INSTITUTE
- AMERICAN INSTITUTE OF STEEL CONSTRUCTION
- MANUAL OF STEEL CONSTRUCTION 13TH EDITION
- ANSI/TIA-222-G
- TIA 607
- INSTITUTE FOR ELECTRICAL & ELECTRONICS ENGINEER 81
- IEEE C2 NATIONAL ELECTRIC SAFETY CODE LATEST EDITION
- ANSI/T 311

APPROVAL BLOCK

		APPROVED	APPROVED AS NOTED	REVISE & RESUBMIT
OWNER REPRESENTATIVE	DATE	☐	☐	☐
SITE AQUISITION	DATE	☐	☐	☐
CONSTRUCTION MANAGER	DATE	☐	☐	☐
ZONING	DATE	☐	☐	☐
RF ENGINEER	DATE	☐	☐	☐

PROJECT NO:	1153.742
DESIGNER:	A.J.
ENGINEER:	C.S.

THESE DRAWINGS ARE FORMATTED TO BE FULL-SIZE AT 22"X34"
0 1/2 1
GRAPHIC SCALE IN INCHES

TITLE:

TITLE SHEET

SHEET NUMBER:

T-1

STRUCUTRAL NOTES

1. THE STRUCTURAL STEEL CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ANCHOR BOLT LOCATIONS, ELEVATIONS OF TOP OF CONCRETE AND BEARING PLATES, ALIGNMENT ETC. PRIOR OF STEEL ERECTION.

2. THE LATEST EDITION OF THE FOLLOWING SPECIFICATIONS SHALL GOVERN:
   A. AISC- "ALLOWABLE STRESS DESIGN SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS".
   B. AISC- "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES".
   C. AWS- "D1.1 STRUCTURAL WELDING CODE-STEEL".

3. MATERIAL, UNLESS OTHERWISE NOTED, SHALL CONFORM TO THE FOLLOWING ASTM SPECIFICATIONS

STRUCTURAL WIDE FLANGE & M SHAPES	A992 OR A572, FY = 50KSI
OTHER STRUCTURAL SHAPES AND PLATES	A36, F = 36KSI
STRUCTURAL TUBING	A500, GRADE B, FY = 46KSI
HIGH STRENGTH BOLTS	A325
THREADED RODS	A354, GRANDE BC
ANCHOR BOLTS	A325 OR A354 BC
PIPE (HANDRAIL)	SCH 40 PIPE

4. ALL WELDING SHALL BE IN ACCORDANCE WITH AWS D1.1 USING E70XX ELECTRODES. UNLESS OTHERWISE NOTED PROVIDE CONTINUOUS MINIMUM SIZED FILLET WELDS PER AISC REQUIREMENTS.

5. HOLES IN STEEL SHALL BE DRILLED OR PUNCHED. ALL SLOTTED HOLES SHALL BE PROVIDED WITH SMOOTH EDGES. BURNING OF HOLES AND TORCH CUTTING AT THE SITE IN NOT PERMITTED. ALL HOLES IN BEARING PLATES SHALL BE DRILLED.

6. ALL STEEL TO BE HOT-DIPPED GALVANIZED AFTER FABRICATION PER ASTM A123.

7. EPOXY ANCHORS TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS.

8. ALL BOLTS SHALL BE TIGHTENED USING TURN-OF-THE-NUT METHOD PER AISC SPECIFICATIONS USING STANDARD HOLES.

9. THE INFORMATION SHOWN ON THESE DRAWINGS WAS OBTAINED BY FIELD MEASUREMENT. THE GENERAL CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIALS OR PROCEEDING WITH CONSTRUCTION.

10. THE GENERAL CONTRACTOR AND HIS SUB CONSULTANTS SHALL BE RESPONSIBLE FOR OBTAINING ALL BUILDING AND OR TRADE PERMITS AND INSPECTIONS THAT MAY BE REQUIRED FOR THE WORK.

11. STRUCTURAL THREADED FASTENERS FOR STEEL ANTENNA MOUNTING ASSEMBLIES SHALL CONFORM TO ASTM A307 OR ASTM A36. STRUCTURAL FASTENERS FOR STRUCTURAL STEEL FRAMING SHALL CONFORM TO ASTM A325. STRUCTURAL FASTENERS SHALL BE 5/8" DIAMETER BEARING TYPE CONNECTIONS WITH THE THREADS EXCLUDED FROM THE SHEAR PLANE FOR ANGLES. STRUCTURAL FASTENERS SHALL BE 3/4" DIAMETER BEARING TYPE CONNECTIONS WITH THE THREADS EXCLUDED FROM THE SHEAR PLANE FOR ALL OTHER STRUCTURAL SHAPES. ALL EXPOSED STRUCTURAL FASTENERS, NUTS AND WASHERS SHALL BE HOT DIP GALVANIZED UNLESS OTHERWISE NOTED.

12. EXPANSION ANCHORS INSTALLED IN CONCRETE SHALL BE HILTI STAINLESS STEEL ANCHORS AS SPECIFIED ON THE PLANS. THE EXPANSIONS ANCHORS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS DIRECTIONS.

13. NORTH ARROW SHOWN ON PLANS REFERS TO TRUE NORTH. CONTRACTOR SHALL SHALL VERIFY NORTH AND INFORM ARCHITECT/ENGINEER OF ANY DISCREPANCY BEFORE STARTING CONSTRUCTION.

14. ROOF PROTECTION PADS UNDER THE CABLE BRIDGE SLEEPERS AND ROOF PAVERS SHALL BE 0.30" THICK RUBBER FIRESTONE PROTECTION PADS. THE ROOF PROTECTION PADS SHALL EXTEND A MINIMUM OF 2" BEYOND THE PERIMETER OF THE OF THE SLEEPERS. PROVIDE A 28 LB FELT SEPARATOR SHEET 2" LARGER THAN THE ROOF PROTECTION PAD DIRECTLY ON THE ROOF. REMOVE ALL LOOSE STONES PRIOR TO PLACING THE SEPARATOR SHEET. ROOF PROTECTION PADS SHALL NOT BE PLACED WITH IN 6" OF AN ADJACENT PAD OR OTHER ROOF OBSTRUCTION TO FACILITATE DRAINAGE.

15. THE CONTRACTOR SHALL COORDINATE ALL WORK WITH THE BUILDING OWNER'S ROOF CONTRACTOR WHO WILL COMPLETE ALL WORK ASSOCIATED WITH THE ROOF. THE CONTRACTOR SHALL OBTAIN WRITTEN APPROVAL FROM THE BUILDING OWNER'S ROOF CONTRACTOR BEFORE INSTALLATION OF ANY ROOF MOUNTED EQUIPMENT.

16. ALL CAST IN PLACE CONCRETE SHALL BE MIXED AND PLACED IN ACCORDANCE WITH THE REQUIREMENTS OF ACI 318 AND ACI 301, AND SHALL HAVE A 28 DAY MINIMUM COMPRESSIVE STRENGTH OF 3000 psi (U.O.N). CONCRETE SHALL BE PLACED AGAINST UNDISTURBED SOIL, UNLESS OTHERWISE NOTED. MINIMUM CONCRETE COVER FOR REINFORCING STEEL SHALL BE 3 INCHES UNLESS OTHERWISE NOTED.

17. CONCRETE SHALL BE 4 TO 6% AIR ENTRAINED.

18. ALL REINFORCING STEEL SHALL CONFORM TO ASTM 615 GRADE 60. DEFORMED BILLET STEEL BARS. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185.

19. FENCED AREA SHALL BE CLEARED AND GRUBBED. REMOVE UNSUITABLE LOOSE OR SOFT SOIL, ORGANIC MATERIAL OR RUBBLE, TO FIRM SUBGRADE. FILL UNDER CUT AND COMPACT UP TO 6" BELOW FINISH GRADE. PLACE A MIRAFI 500X SOIL STABILIZATION FABRIC ON SUBGRADE. FILL WITH 6" OF AASHTO 57 STONE TO FINISH GRADE.

20. WHERE FILL IS REQUIRED, FILL IN LAYERS WHICH DO NOT EXCEED 8" BEFORE COMPACTION. SPREAD LAYER UNIFORMLY AND EVENLY. BLADE MIX EACH LAYER TO ENSURE MATERIAL UNIFORMITY. FILL MATERIAL SHALL NOT CONTAIN MATERIAL MORE THAN 3" IN DIAMETER. COMPACT EACH LAYER NOT LESS THAN 95% OF MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D1557 MODIFIED PROCTOR TEST OR (ASTM D698 STANDARD PROCTOR TEST). USE FILL MATERIAL WITH MOISTURE CONTENT AS REQUIRED TO ATTAIN THE SPECIFIED DEGREE OF COMPACTION. COMPACT USING MULTIPLE WHEEL PNEUMATIC TIRE ROLLED, VIBRATORY ROLLER, OR SHEEPS FOOT ROLLERS.

21. REPAIR, PATCH, RE-FINISH AND PAINT ALL SURFACES DAMAGED TO MATCH THE ADJACENT SURFACE AS A RESULT OF REMOVING, RECONFIGURING OR REPLACING EQUIPMENT.

22. IF NEEDED, PROVIDE FIRE SEAL AND CAULKING FOR ALL PENETRATIONS THROUGH FIRE RATED WALLS, FLOORS AND CEILINGS. NO SUCH PENETRATIONS ARE PROPOSED AS PART OF THIS SCOPE OF WORK.

GENERAL NOTES

1. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE CODES ORDINANCES, LAWS AND REGULATIONS OF ALL MUNICIPALITIES, UTILITIES COMPANY OR OTHER PUBLIC AUTHORITIES.

2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS THAT MAY BE REQUIRED BY ANY FEDERAL, STATE, COUNTY OR MUNICIPAL AUTHORITIES.

3. THE CONTRACTOR SHALL NOTIFY THE CONSTRUCTION MANAGER, IN WRITING, OF ANY CONFLICTS, ERRORS OR OMISSIONS PRIOR TO THE SUBMISSION OF BIDS OR PERFORMANCE OF WORK. MINOR OMISSIONS OR ERRORS IN THE BID DOCUMENTS SHALL NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY FOR THE OVERALL INTENT OF THESE DRAWINGS.

4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING SITE IMPROVEMENTS PRIOR TO COMMENCING CONSTRUCTION. THE CONTRACTOR SHALL REPAIR ANY DAMAGE CAUSED AS A RESULT OF CONSTRUCTION OF THIS FACILITY.

5. THE SCOPE OF WORK FOR THIS PROJECT SHALL INCLUDE PROVIDING ALL MATERIALS, EQUIPMENT AND LABOR REQUIRED TO COMPLETE THIS PROJECT. ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

6. THE CONTRACTOR SHALL VISIT THE PROJECT SITE PRIOR TO SUBMITTING A BID TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

7. CONTRACTOR SHALL VERIFY ANTENNA ELEVATION AND AZIMUTH WITH RF ENGINEERING PRIOR TO INSTALLATION.

8. TRANSMITTER EQUIPMENT AND ANTENNAS ARE DESIGNED TO MEET ANSI/EIA/TIA 222-G REQUIREMENTS.

9. ALL STRUCTURAL ELEMENTS SHALL BE HOT DIPPED GALVANIZED STEEL.

10. CONTRACTOR SHALL MAKE A UTILITY "ONE CALL" TO LOCATE ALL UTILITIES PRIOR TO EXCAVATING.

11. IF ANY UNDERGROUND UTILITIES OR STRUCTURES EXIST BENEATH THE PROJECT AREA, CONTRACTOR MUST LOCATE IT AND CONTACT THE APPLICANT & THE OWNER'S REPRESENTATIVE.

12. OCCUPANCY IS LIMITED TO PERIODIC MAINTENANCE AND INSPECTION BY TECHNICIANS APPROXIMATELY 2 TIMES PER MONTH.

13. PROPERTY LINE INFORMATION WAS PREPARED USING DEEDS, TAX MAPS, AND PLANS OF RECORD AND SHOULD NOT BE CONSTRUED AS AN ACCURATE BOUNDARY SURVEY.

14. THIS PLAN IS SUBJECT TO ALL EASEMENTS AND RESTRICTIONS OF RECORD.

15. THE PROPOSED FACILITY WILL CAUSE ONLY A "DE MINIMIS" INCREASE IN STORMWATER RUNOFF. THEREFORE, NO DRAINAGE STRUCTURES ARE PROPOSED.

16. NO SIGNIFICANT NOISE, SMOKE, DUST OR ODOR WILL RESULT FROM THIS FACILITY.

17. THE FACILITY IS UNMANNED AND NOT INTENDED FOR HUMAN HABITATION (NO HANDICAP ACCESS REQUIRED).

18. THE FACILITY IS UNMANNED AND DOES NOT REQUIRE POTABLE WATER OR SANITARY SERVICE.

19. POWER TO THE FACILITY WILL BE MONITORED BY A SEPARATE METER UNLESS OTHERWISE NOTED IN THIS DRAWING SET.

GROUNDING NOTES

1. GROUNDING SHALL COMPLY WITH ARTICLE 250 OF THE NATIONAL ELECTRICAL CODE.

2. ALL GROUNDING DEVICES SHALL BE U.L. APPROVED OR LISTED FOR THEIR INTENDED USE.

3. ALL WIRES SHALL BE AWG THHN/THWN COPPER UNLESS NOTED OTHERWISE.

4. GROUNDING CONNECTIONS TO GROUND RODS, GROUND RING WIRE, TOWER BASE AND FENCE POSTS SHALL BE EXOTHERMIC ("CADWELDS") UNLESS NOTES OTHERWISE. CLEAN SURFACES TO SHINY METAL. WHERE GROUND WIRES ARE CADWELDED TO GALVANIZED SURFACE, SPRAY CADWELD WITH GALVANIZING PAINT.

5. GROUNDING CONNECTIONS TO GROUND BARS ARE TO BE TWO HOLE BRASS MECHANICAL CONNECTORS WITH STAINLESS STEEL HARDWARE (INCLUDING SCREW SET) CLEAN GROUND BAR TO SHINY METAL. AFTER MECHANICAL CONNECTION, TREAT WITH PROTECTIVE ANTIOXIDANT COATING.

6. GROUND COAXIAL CABLE SHIELDS AT BOTH ENDS WITH MANUFACTURER'S GROUNDING KITS.

7. ROUTE GROUNDING CONDUCTORS THE SHORTEST AND STRAIGHTEST PATH POSSIBLE. BEND GROUNDING LEADS WITH A MINIMUM 12" RADIUS.

8. INSTALL 2 AWG GREEN-INSULATED STRANDED WIRE FOR ABOVE GRADE GROUNDING AND 2 BARE TINNED COPPER WIRE FOR BELOW GRADE GROUNDING UNLESS OTHERWISE NOTED.

9. REFER TO GROUNDING PLAN FOR GROUND BAR LOCATIONS. GROUNDING CONNECTIONS SHALL BE EXOTHERMIC TYPE ("CADWELDS") TO ANTENNA MOUNTS AND GROUND RING. REMAINING GROUNDING CONNECTIONS SHALL BE COMPRESSION FITTINGS. CONNECTION TO GROUND BARS SHALL BE MADE WITH TWO-HOLE LUGS.

10. THE GROUND ELECTRODE SYSTEM SHALL CONSIST OF DRIVEN GROUND RODS POSITION ACCRUING TO GROUNDING PLAN. THE GROUND RODS SHALL BE 5/8"x8'-0" COPPER CLAD STEEL INTERCONNECTED WITH 2 BARE TINNED COPPER WIRE BURIED 30" BELOW GRADE. BURY GROUND RODS A MAXIMUM OF 15' APART, AND A MINIMUM OF 8' APART.

11. IF ROCK IS ENCOUNTERED GROUND RODS SHALL BE PLACED AT AN OBLIQUE ANGLE NOT TO EXCEED 45'.

12. EXOTHERMIC WELDS SHALL BE MADE IN ACCORDANCE WITH ERICO PRODUCTS BULLETIN A-AT.

13. CONSTRUCTION OF GROUND RING AND CONNECTIONS TO EXISTING GROUND RING SYSTEM SHALL BE DOCUMENTED WITH PHOTOGRAPHS PRIOR TO BACKFILLING SITE. PROVIDE PHOTOS TO THE T-MOBILE CONSTRUCTION MANAGER.

14. GROUND RING & CONNECTIONS TO IT SHALL BE 2 AWG SOLID BARE TINNED COPPER WIRE. EQUIPMENT GROUND CONNECTIONS TO MGB SHALL BE 2 AWG STRANDED TO WIRE.

15. PRIOR TO INSTALLING LUGS ON GROUND WIRES, APPLY THOMAS & BETTS KOPR-SHIELD (TM OF JET LUBE INC.). PRIOR TO BOLTING GROUND WIRE LUGS TO GROUND BARS, APPLY KOPR-SHIELD OR EQUAL.

16. ENGAGE AN INDEPENDENT ELECTRICAL TESTING FIRM TO TEST AND VERIFY THAT IMPEDANCE DOES NOT EXCEED FIVE OHMS TO GROUND BY MEANS OF "FALL OF POTENTIAL TEST". TEST SHALL BE WITNESSED BY A T-MOBILE REPRESENTATIVE, AND RECORDED ON THE "GROUND RESISTANCE TEST" FORM.

17. WHERE BARE COPPER GROUND WIRES ARE ROUTED FROM ANY CONNECTION ABOVE GRADE TO GROUND RING, INSTALL WIRE IN 3/4" PVC SLEEVE, FROM 1' BELOW GRADE AND SEAL TOP WITH SILICON MATERIAL.

18. PREPARE ALL BONDING SURFACES FOR GROUNDING CONNECTIONS BY REMOVING ALL PAINT AND CORROSION DOWN TO SHINY METAL. FOLLOWING CONNECTIONS, APPLY APPROPRIATE ANTI-OXIDIZATION PAINT.

19. ANY SITE WHERE THE EQUIPMENT (BTS, CABLE BRIDGE, PPC, GENERATOR, ETC.) IS LOCATED WITHIN 6 FEET OF METAL FENCING, THE GROUND RING SHALL BE BONDED TO THE NEAREST FENCE POST USING (3) RUNS OF 2 BARE TINNED COPPER WIRE.

20. TOWER BASE BUSS BAR REQUIRES (2) SOLID LEADS CADWELD TO THE BUSS BAR.

21. MAIN EQUIPMENT BUSS BAR REQUIRES (2) SOLID LEADS CADWELD TO IT AND TO THE GROUND RING.

22. ALL SOLID LEADS TERMINATED TO EITHER A BUSS BAR OR EQUIPMENT SHALL BE PROTECTED WITH CARFLEX.

23. ALL SOLID GROUND LEADS NOT BEING USED SHALL BE COILED UP (PIGTAILS) FOR FUTURE USE AS NEEDED.

ELECTRICAL NOTES

1. SUBMITTAL OF BID INDICATES THAT THE CONTRACTOR IS COGNIZANT OF ALL JOB SITE CONDITIONS AND WORK TO BE PERFORMED UNDER THIS CONTRACT.

2. CONTRACTOR SHALL PERFORM ALL VERIFICATIONS, OBSERVATION TESTS, AND EXAMINATION WORK PRIOR TO ORDERING OF ANY EQUIPMENT AND THE ACTUAL CONSTRUCTION. CONTRACTOR SHALL ISSUE A WRITTEN NOTICE OF ALL FINDINGS TO THE PROJECT MANAGER LISTING ALL MALFUNCTIONS, FAULTY EQUIPMENT AND DISCREPANCIES.

3. VERIFY HEIGHT WITH PROJECT MANAGER PRIOR TO INSTALLATION.

4. THESE PLANS ARE DIAGRAMMATIC ONLY, FOLLOW AS CLOSELY AS POSSIBLE.

5. CONTRACTOR SHALL COORDINATE ALL WORK BETWEEN TRADES AND ALL OTHER SCHEDULING AND PROVISIONALLY CIRCUMSTANCES SURROUNDING THE PROJECT.

6. CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, INSURANCE, EQUIPMENT INSTALLATION CONSTRUCTION TOOLS, TRANSPORTATION ETC., FOR COMPLETE AND FUNCTIONALLY OPERATING SYSTEMS ENERGIZED AND READY FOR USE THROUGHOUT AS INDICATED ON DRAWINGS, AS SPECIFIED HEREIN AND/OR AS OTHERWISE REQUIRED.

7. ALL MATERIAL AND EQUIPMENT SHALL BE NEW AND IN PERCENT CONDITION WHEN INSTALLED AND SHALL BE OF THE BEST GRADE AND OF THE SAME MANUFACTURER THROUGHOUT FOR EACH CLASS OR GROUP OF EQUIPMENT. ELECTRICAL MATERIALS SHALL BE LISTED AND APPROVED BY UNDERWRITER'S LABORATORIES AND SHALL BEAR THE INSPECTION LABEL "J" WHERE SUBJECT TO SUCH APPROVAL. MATERIALS SHALL MEET WITH APPROVAL OF ALL GOVERNING BODIES HAVING JURISDICTION OVER THE CONSTRUCTION. MATERIALS SHALL BE MANUFACTURED IN ACCORDANCE WITH ALL CURRENT APPLICABLE STANDARDS ESTABLISHED BY ANSI, NEMA AND NBFU. ALL MATERIALS AND EQUIPMENT SHALL BE APPROVED FOR THEIR INTENDED USE AND LOCATION.

8. ALL WORK SHALL COMPLY WITH ALL APPLICABLE GOVERNING STATE, COUNTY AND CITY CODES AND OSHA, NFPA, NEC & ASHRAE REQUIREMENTS.

9. ENTIRE JOB SHALL BE GUARANTEED FOR A PERIOD OF ONE (1) YEAR AFTER THE DATE OF JOB ACCEPTANCE. ALL WORK, MATERIAL AND EQUIPMENT FOUND TO BE FAULTY DURING THAT PERIOD SHALL BE CORRECTED AT ONCE, UPON WRITTEN NOTIFICATION, AT THE EXPENSE OF THE CONTRACTOR.

10. PROPERLY SEAL ALL PENETRATIONS. PROVIDE UL LISTED FIRE-STOPS WHERE PENETRATIONS ARE MADE THROUGH FIRE-RATED ASSEMBLIES. WATER-TIGHT USING SILICONE SEALANT.

11. LOCATE ALL PENETRATIONS SUCH THAT ALL REINFORCEMENT CONTAINED WITHIN THE EXISTING BUILDING CONSTRUCTION REMAINS INTACT AND UNDISTURBED. SUBMIT LOCATING METHOD TO PROJECT MANAGER FOR APPROVAL PRIOR TO EXECUTION.

12. DELIVER ALL BROCHURES, OPERATING MANUALS, CATALOGS AND SHOP DRAWINGS TO THE PROJECT MANAGER AT JOB COMPLETION. PROVIDE MAINTENANCE MANUALS FOR MECHANICAL EQUIPMENT. AFFIX MAINTENANCE LABELS TO MECHANICAL EQUIPMENT.

13. ALL CONDUCTORS SHALL BE COPPER. MINIMUM CONDUCTOR SIZE SHALL BE 12 AWG., UNLESS OTHERWISE NOTED. CONDUCTORS SHALL BE TYPE THHW, RATED IN ACCORDANCE WITH NEC 110-14(C).

14. ALL CIRCUIT BREAKERS, FUSES AND ELECTRICAL EQUIPMENT SHALL HAVE AN INTERRUPTING RATING NOT LESS THE MAXIMUM INTERRUPTING CURRENT TO WHICH THEY MAY BE SUBJECTED.

15. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE; ARTICLES 250 & 810 AND THE UTILITY COMPANY STANDARDS.

16. CONDUIT: ALL ABOVE GRADE CONDUITS SHALL BE RIGID & LFMC TO 6' AS STATED BELOW

   A. RIGID CONDUIT SHALL BE U.L. LABEL GALVANIZED ZINC COATED WITH ZINC INTERIOR AND SHALL BE USED WHEN INSTALLED IN OR UNDER CONCRETE SLABS, IN CONTACT WITH THE EARTH, UNDER PUBLIC ROADWAYS, IN MASONRY WALLS OR EXPOSED ON BUILDING EXTERIOR. RIGID CONDUIT IN CONTACT WITH EARTH SHALL BE 1/2 LAPPED WRAPPED WITH HUNTS WRAP PROCESS NO. 3.

   B. ELECTRICAL METALLIC TUBING SHALL HAVE U.L. LABEL, FITTINGS SHALL BE GLAND RING COMPRESSION TYPE. EMT SHALL BE USED ONLY FOR INTERIOR RUNS.

   C. LIQUID-TIGHT FLEXIBLE METAL CONDUIT SHALL BE U.L. LISTED AND SHALL BE USED AT FINAL CONNECTIONS TO MECHANICAL EQUIPMENT & RECTIFIERS AND WHERE PERMITTED BY CODE. ALL CONDUIT IN EXCESS OF SIX FEET IN LENGTH SHALL CONTAIN A FULL-SIZE GROUND CONDUCTOR.

   D. CONDUIT RUNS SHALL BE SURFACE MOUNTED ON CEILINGS OR WALLS UNLESS NOTED OTHERWISE. ALL CONDUIT SHALL RUN PARALLEL OR PERPENDICULAR TO WALLS, FLOOR, CEILING, OR BEAMS. VERIFY EXACT ROUTING OF ALL EXPOSED CONDUIT WITH THE PROJECT MANAGER PRIOR TO INSTALLING.

   E. PVC CONDUIT MAY BE PROVIDED ONLY WHERE SHOWN, OR IN UNDERGROUND INSTALLATIONS. PROVIDE UV-RESISTANT CONDUIT WHERE EXPOSED TO THE ATMOSPHERE. PROVIDE GROUND CONDUCTOR IN ALL PVC RUNS; EXCEPT WHERE PERMITTED BY CODE TO OMIT.

17. ALL ELECTRICAL EQUIPMENT SHALL BE LABELED WITH PERMANENT ENGRAVED PHENOLIC PLASTIC NAMEPLATES. PPC, METER, DISCONNECT, RAC353, PBC05, AND HF JUNCTION BOX. BACKGROUND SHALL BE BLACK WITH WHITE LETTERS; EXCEPT AS REQUIRED BY CODE TO FOLLOW A DIFFERENT SCHEME.

18. UPON COMPLETION OF WORK, CONDUCT CONTINUITY, SHORT CIRCUIT, AND FALL OF POTENTIAL GROUNDING TESTS FOR APPROVAL. SUBMIT TEST REPORTS TO T-MOBILE PROJECT MANAGER. GROUNDING SYSTEM RESISTANCE SHALL NOT EXCEED 5 OHMS. IF THE RESISTANCE VALUE IS EXCEEDED, NOTIFY THE T-MOBILE PROJECT MANAGER FOR FURTHER INSTRUCTION ON METHODS FOR REDUCING THE RESISTANCE VALUE.

19. CLEAN PREMISES OF ALL DEBRIS RESULTING FROM WORK AND LEAVE WORK IN A COMPLETE AND UNDAMAGED CONDITION. LEGALLY DISPOSE OF ALL REMOVED, UNUSED AND EXCESS MATERIAL GENERATED BY THE WORK OF THIS CONTRACT. DELIVER ITEMS INDICATED ON THE DRAWINGS TO THE OWNER IN GOOD CONDITION. OBTAIN SIGNED RECEIPT UPON DELIVERY.

20. COORDINATE WITH UTILITY COMPANY FOR CONNECTION OF TEMPORARY AND PERMANENT POWER TO THE SITE. THE TEMPORARY POWER AND ALL HOOKUP COSTS SHALL BE PAID BY THE CONTRACTOR.

21. VERIFY ALL EXISTING CIRCUITRY PRIOR TO REMOVAL AND NEW WORK. MAINTAIN POWER TO ALL OTHER AREAS & CIRCUITS NOT SCHEDULED FOR REMOVAL.

22. RED LINED AS-BUILT PLANS SHALL BE PROVIDED TO THE T-MOBILE CONSTRUCTION MANAGER.

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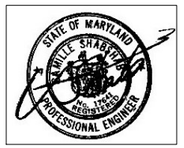
SEAL:



Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 17641, Expiration Date: 12/27/2021

SUBMITTALS

DATE	DESCRIPTION	REV.
07-14-2020	CONSTRUCTION REVIEW	A
07-22-2020	CONSTRUCTION	0

PROJECT NO:	1153.742
DESIGNER:	A.J.
ENGINEER:	C.S.

THESE DRAWINGS ARE FORMATTED TO BE FULL-SIZE AT 22"X34"
0 1/2 1
GRAPHIC SCALE IN INCHES

TITLE:

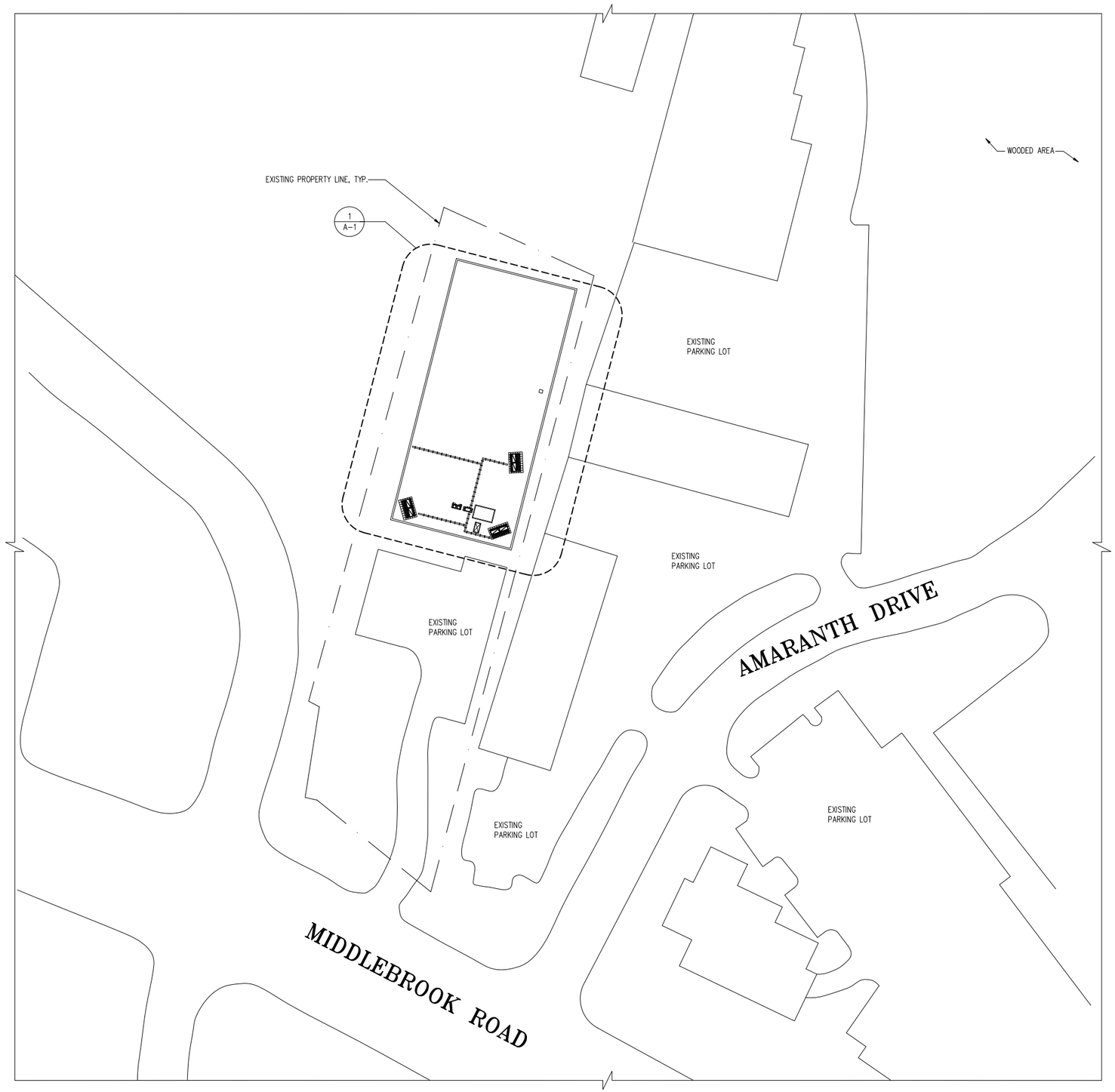
GENERAL NOTES

SHEET NUMBER:

N-1

VICINITY MAP
SCALE: 1"=2000'-0"

JURISDICTION:	MONTGOMERY COUNTY
USE:	R200 – RESIDENTIAL DETACHED
TAX ACCOUNT NUMBER:	09-03298020
PARCEL OWNER:	MIDDLEBROOK LAND LLLP C/O SIENA CORPORATION 8221 SNOWDEN RIVER PARKWAY COLUMBIA, MARYLAND 21045
MAP/ PARCEL:	EU52/ N944
STRUCTURE TYPE:	ROOFTOP
GROUND ELEVATION:	±448' AMSL
LATITUDE:	N 39° 10' 33.92"
LONGITUDE:	W 77° 15' 10.19"



SITE PLAN
SCALE: 1" = 50'-0"

1
C-1

TRUE NORTH

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SEAL:

STATE OF MARYLAND · CHARLES SHABESTARI · 17641 · REGISTERED · PROFESSIONAL ENGINEER

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 17641, Expiration Date: 12/27/2021

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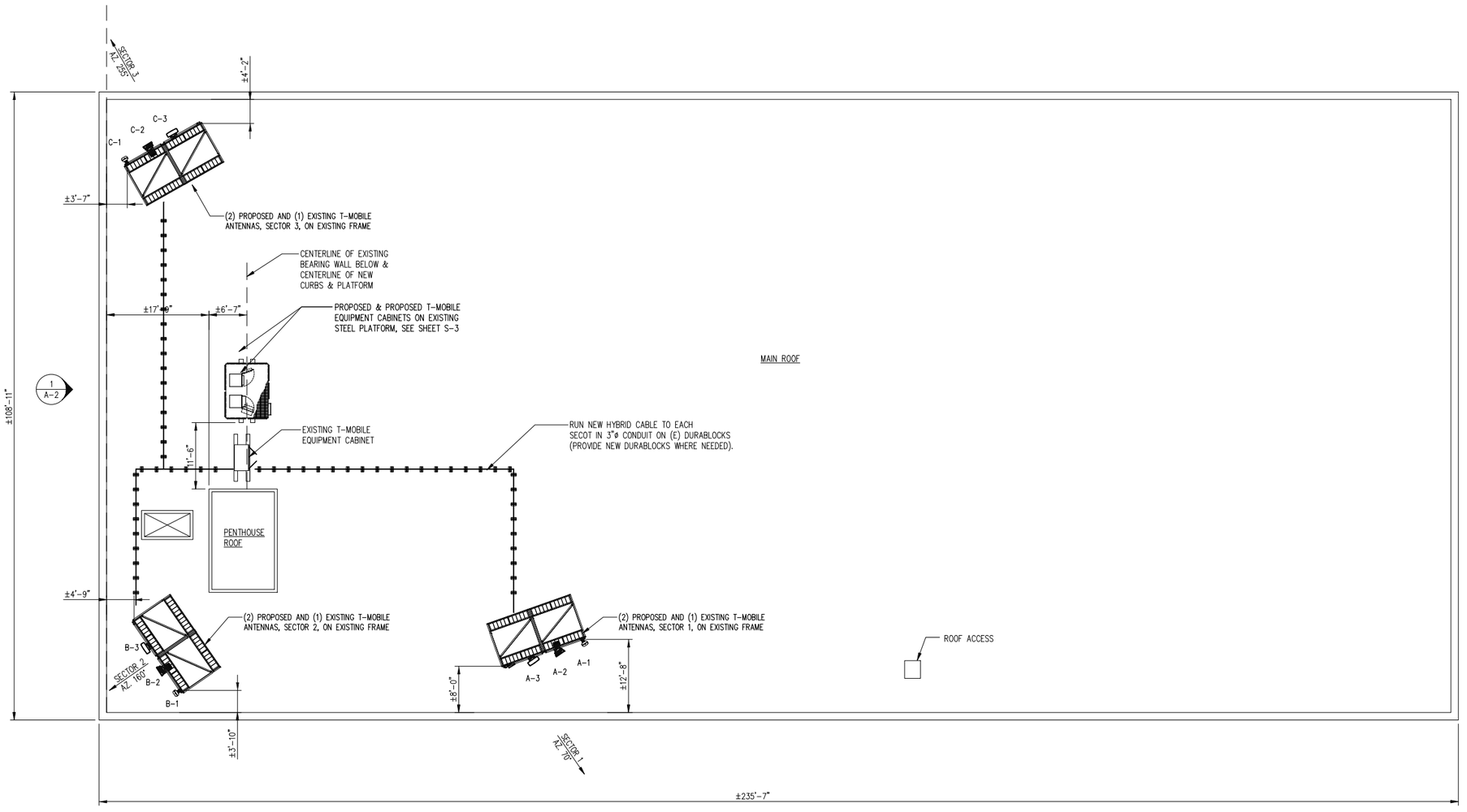
0 1/2 1
GRAPHIC SCALE IN INCHES

TITLE:
SITE PLAN

SHEET NUMBER:
C-1



NOTES:

1. EXISTING ROOF CONSTRUCTION: BALLASTED ROOF MEMBRANE ON PRECAST CONCRETE PLANKS.
2. SEE NOTES ON SHEET N-1 FOR INFORMATION NOT NOTED.
3. SEE ELECTRICAL SHEETS FOR ELECTRICAL AND GROUNDING DETAILS.

ROOF AND EQUIPMENT LOCATION PLAN

SCALE: 3/32"=1'-0"

1 / A-1

TRUE NORTH

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SEAL:

STATE OF MARYLAND · MICHELE SHABSTAR · No. 17541 · REGISTERED · PROFESSIONAL ENGINEER

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 17541, Expiration Date: 12/27/2021

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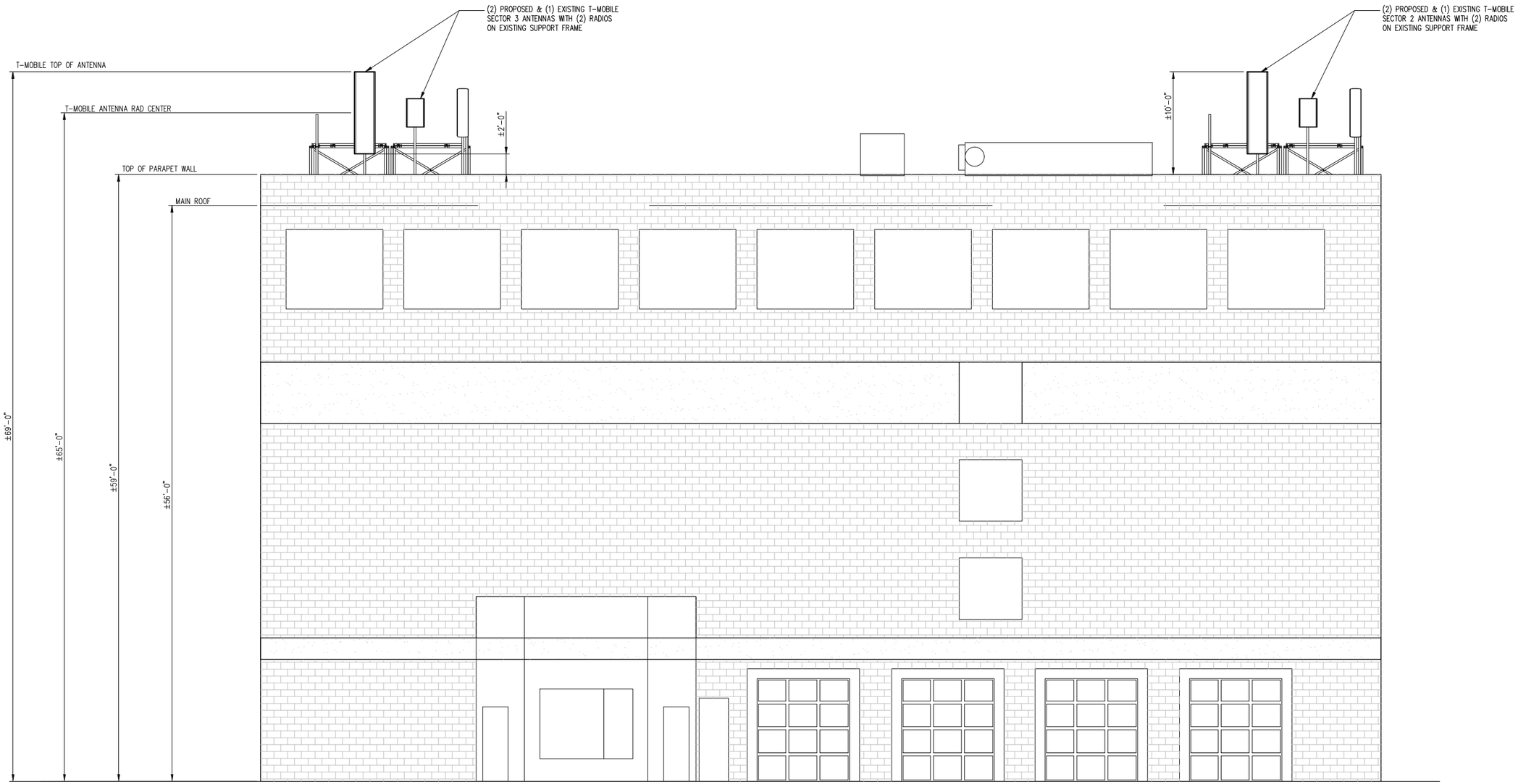
GRAPHIC SCALE IN INCHES

TITLE:

ROOF AND EQUIPMENT LOCATION PLAN

SHEET NUMBER:

A-1



SOUTH BUILDING ELEVATION (1 / A-2)

SCALE: 3/16"=1'-0"

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SITE LINK
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EZ STORAGE GERMANTOWN
12211 MIDDLEBROOK RD
GERMANTOWN, MD 20874

SEAL:

STATE OF MARYLAND · CHARLES SHABISTARI · No. 17641 · REGISTERED · PROFESSIONAL ENGINEER

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 17641, Expiration Date: 12/27/2021

SUBMITTALS

DATE	DESCRIPTION	REV.
07-14-2020	CONSTRUCTION REVIEW	A
07-22-2020	CONSTRUCTION	0

PROJECT NO:	1153.742
DESIGNER:	A.J.
ENGINEER:	C.S.

THESE DRAWINGS ARE FORMATTED TO BE FULL-SIZE AT 22"X34"

0 1/2 1

GRAPHIC SCALE IN INCHES

TITLE:

SOUTH BUILDING ELEVATION

SHEET NUMBER:

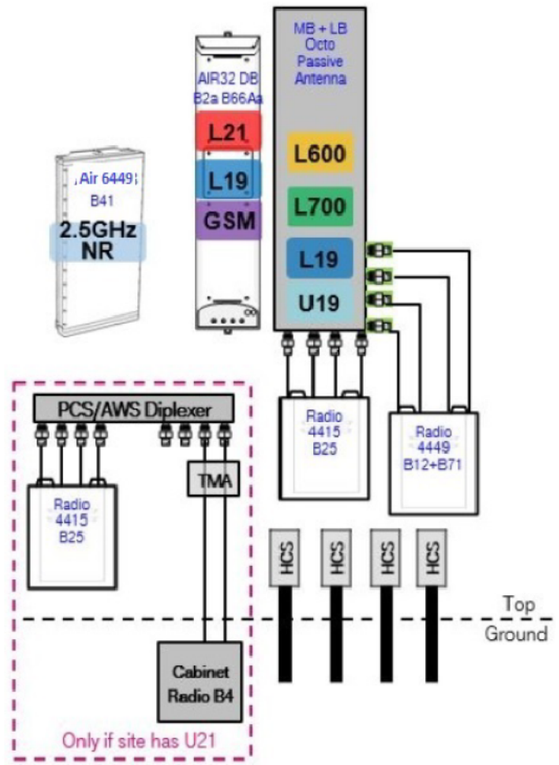
A-2

RF SYSTEM SCHEDULE

SECTOR	ANTENNA	TECHNOLOGY	ANTENNA MODEL	VENDOR	AZIMUTH	E-TILT	ANTENNA CENTERLINE	TMA/RRU MODEL	CABLE TYPE & LENGTH
1	A-1 (EXISTING)	L2100	AIR32 KRD901146-1_B66A_B2A	ERICSSON	70°	2°	65'	-	EXISTING 6x12 SHARED HYBRID
		L2100				2°			
		L1900				2°			
		L1900				2°			
	A-2 (PROPOSED)	L2500/N2500	AIR 6449 B41	ERICSSON	70°	2°	65'	-	±90 PROPOSED 6X12 6AWG HYBRID
		L2500/N2500				2°			
	A-3 (PROPOSED)	L700/L600/N600	APXVAARR24_43-U-NA20	RFS	70°	2°	65'	RADIO 4449 B71+B85	EXISTING 6x12 SHARED HYBRID
		L700/L600/N600				2°			
		L1900/U1900				2°		RADIO 4415 B25	
		L1900/U1900				2°			
2	B-1 (EXISTING)	L2100	AIR32 KRD901146-1_B66A_B2A	ERICSSON	160°	2°	65'	-	EXISTING 6x12 SHARED HYBRID
		L2100				2°			
		L1900				2°			
		L1900				2°			
	B-2 (PROPOSED)	L2500/N2500	AIR 6449 B41	ERICSSON	160°	2°	65'	-	±45 PROPOSED 6X12 6AWG HYBRID
		L2500/N2500				2°			
	B-3 (PROPOSED)	L700/L600/N600	APXVAARR24_43-U-NA20	RFS	160°	2°	65'	RADIO 4449 B71+B85	EXISTING 6x12 SHARED HYBRID
		L700/L600/N600				2°			
		L1900/U1900				2°		RADIO 4415 B25	
		L1900/U1900				2°			
3	C-1 (EXISTING)	L2100	AIR32 KRD901146-1_B66A_B2A	ERICSSON	255°	2°	65'	-	EXISTING 6x12 SHARED HYBRID
		L2100				2°			
		L1900				2°			
		L1900				2°			
	C-2 (PROPOSED)	L2500/N2500	AIR 6449 B41	ERICSSON	255°	2°	65'	-	±55 PROPOSED 6X12 6AWG HYBRID
		L2500/N2500				2°			
	C-3 (PROPOSED)	L700/L600/N600	APXVAARR24_43-U-NA20	RFS	255°	2°	65'	RADIO 4449 B71+B85	EXISTING 6x12 SHARED HYBRID
		L700/L600/N600				2°			
		L1900/U1900				2°		RADIO 4415 B25	
		L1900/U1900				2°			

TOTAL # OF CABLES:

(3) EXISTING 6x12 HYBRID CABLE TO REMAIN
(3) PROPOSED 6x12 HYBRID CABLE



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ENGINEER:	C.S.

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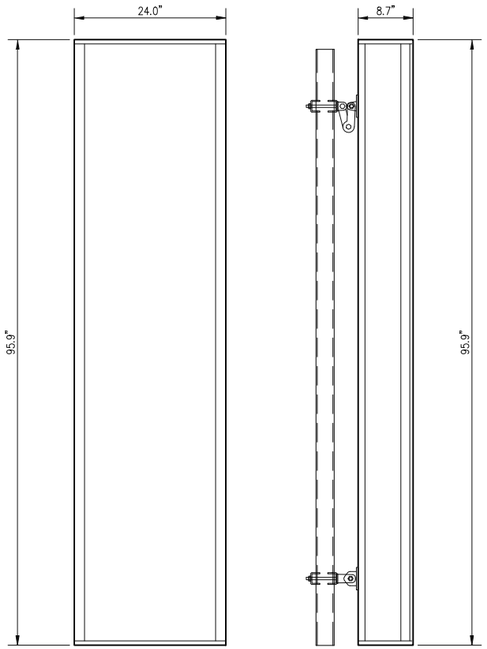
0 1/2 1
GRAPHIC SCALE IN INCHES

TITLE:
RF SYSTEM SCHEDULE & SCHEMATIC DIAGRAM

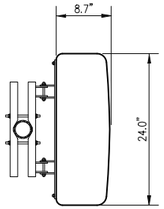
SHEET NUMBER:
S-1



FRONT VIEW

SIDE VIEW

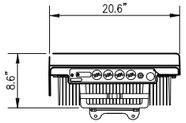
ANTENNA INFORMATION:
RFS APXVAARR24_43-U-NA20
SIZE: (95.9" H x 24.0" W x 8.7" D)
ANTENNA WEIGHT: 128.0 LBS
MOUNTING HARDWARE WEIGHT: 25.3 LBS



TOP VIEW

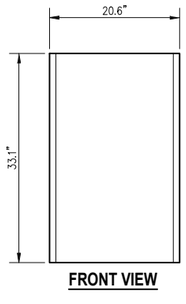
RFS APXVAARR24_43-U-NA20 ANTENNA DETAIL

SCALE: 1"=1'-0" (1 S-2)

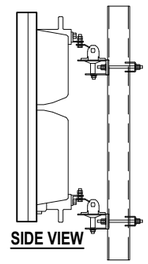


TOP VIEW

ANTENNA MODEL:
ERICSSON AIR6449 B41
SIZE: 33.1" H x 20.6" W x 8.6" D
WEIGHT: 104 LBS
(W/O MOUNTING HARDWARE)



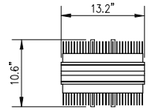
FRONT VIEW



SIDE VIEW

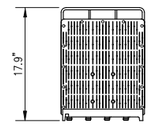
ERICSSON AIR6449 B41 ANTENNA

SCALE: 1"= 1'-0" (2 S-2)

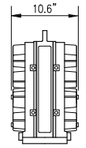


PLAN VIEW

RADIO INFORMATION:
WEIGHT: 75.0 LBS
(W/O MOUNTING HARDWARE)



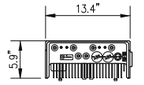
FRONT VIEW



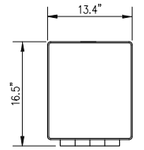
SIDE VIEW

ERICSSON 4449 B85 B71 RRU DETAIL

SCALE: 1"=1'-0" (3 S-2)



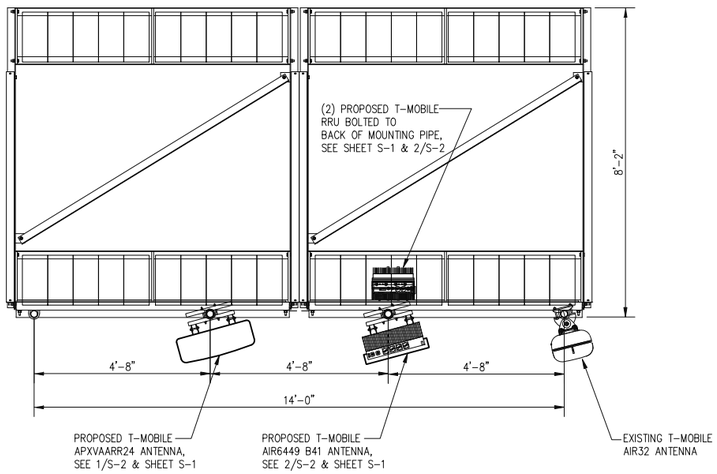
PLAN VIEW



FRONT VIEW

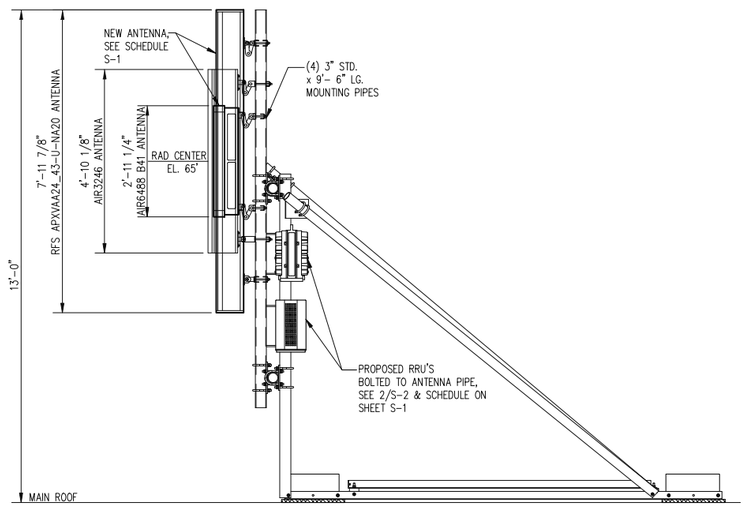
RRUS 4415 B25 DETAIL

SCALE: 1"=1'-0" (4 S-2)



ANTENNA SUPPORT FRAME PLAN

SCALE: 1/2"=1'-0" (5 S-2)



ANTENNA SUPPORT FRAME SECTION

SCALE: 1/2"=1'-0" (6 S-2)

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PROJECT NO:	1153.742
DESIGNER:	A.J.
ENGINEER:	C.S.

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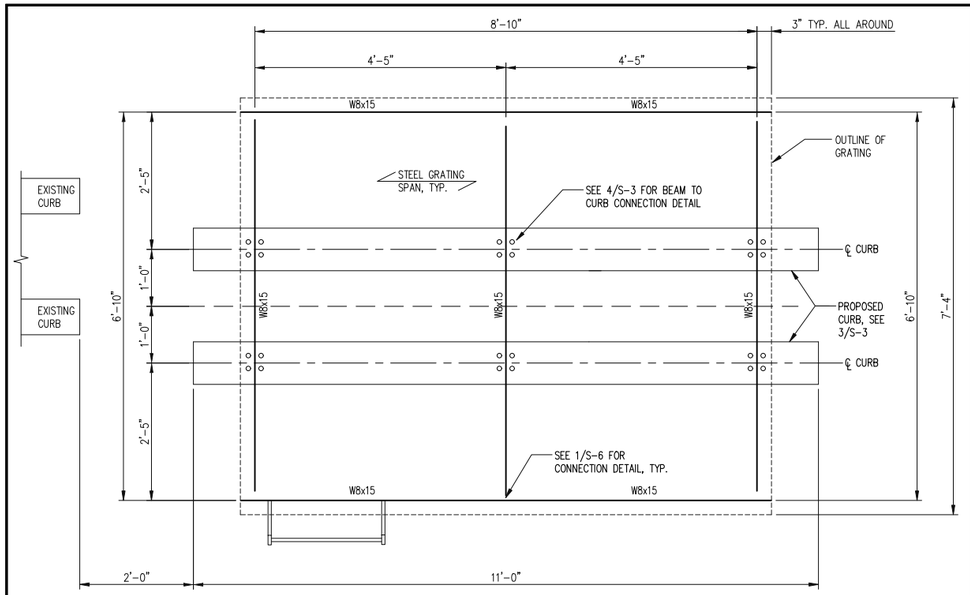
0 1/2 1
GRAPHIC SCALE IN INCHES

TITLE:

ANTENNA,RRU AND SUPPORT FRAME DETAILS

SHEET NUMBER:

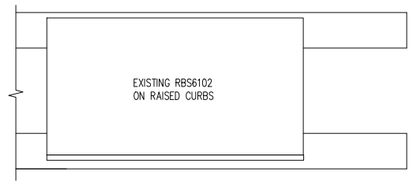
S-2

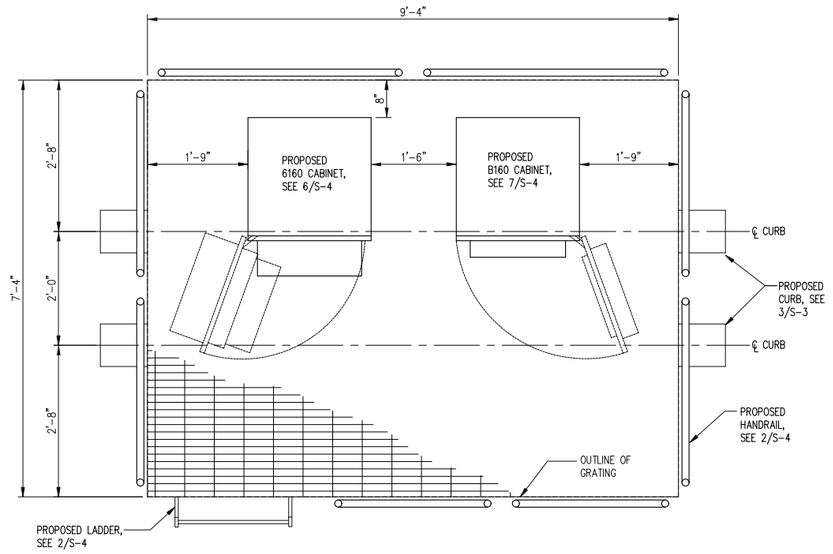


EQUIPMENT PLATFORM FRAMING PLAN

SCALE: 3/4"=1'-0"

1 S-3

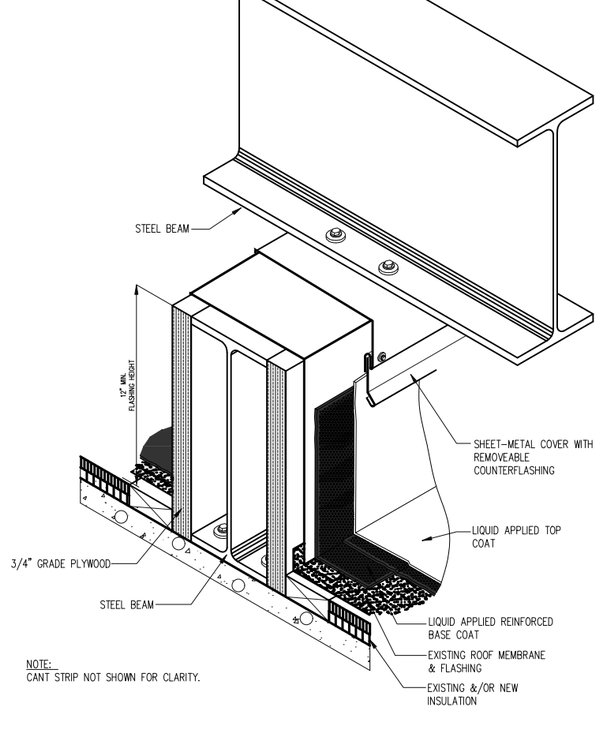




EQUIPMENT LAYOUT PLAN

SCALE: 3/8"=1'-0"

2 S-3



NOTE:
CANT STRIP NOT SHOWN FOR CLARITY.

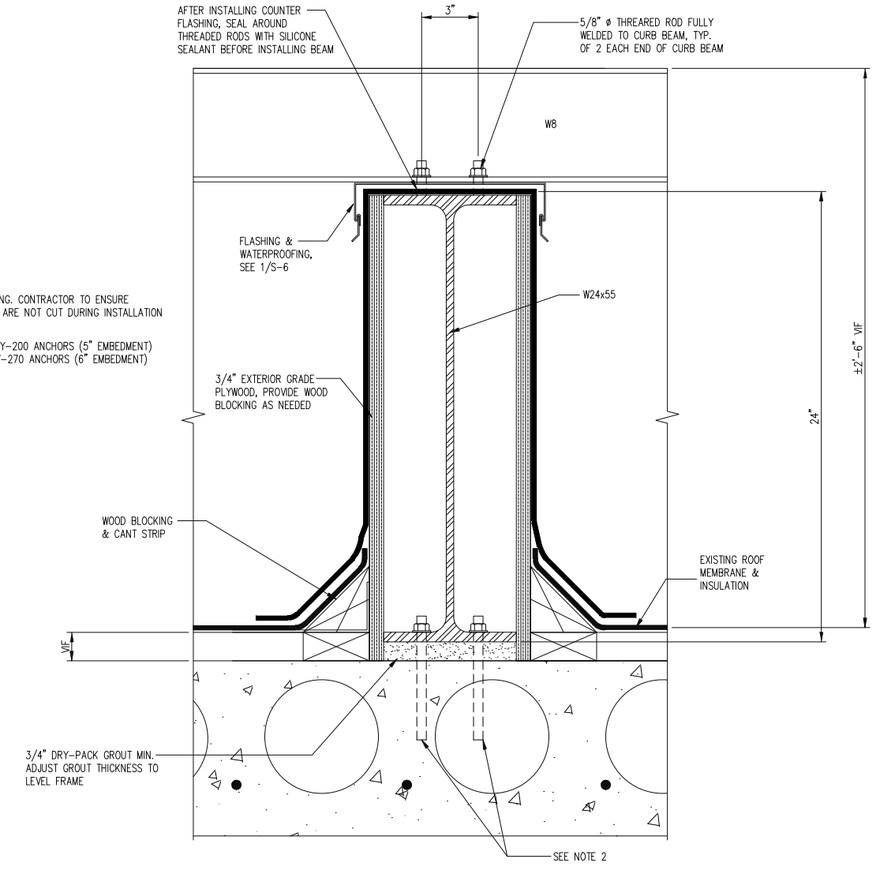
WATERPROOFING DETAIL

SCALE: N.T.S.

3 S-3

NOTES

1. LOCATE REINFORCING STEEL PRIOR TO DRILLING. CONTRACTOR TO ENSURE PRESTRESSING STRANDS/REINFORCING STEEL ARE NOT CUT DURING INSTALLATION OF PLATFORM.
2. AT SOLID LOCATIONS, USE 1/2"ø HILTI HIT HY-200 ANCHORS (5" EMBEDMENT) AT VOID LOCATIONS, USE 1/2"ø HILTI HIT HY-270 ANCHORS (6" EMBEDMENT)



W8 TO W24 CONNECTION DETAIL

SCALE: 3"=1'-0"

4 S-3

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ENGINEER:	C.S.

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0 1/2 1

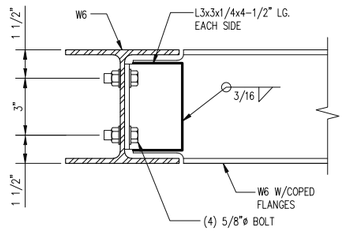
GRAPHIC SCALE IN INCHES

TITLE:

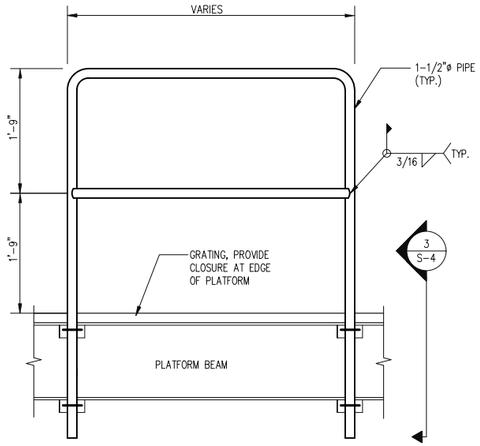
EQUIPMENT LAYOUT PLAN AND DETAILS

SHEET NUMBER:

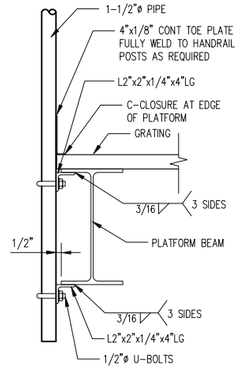
S-3



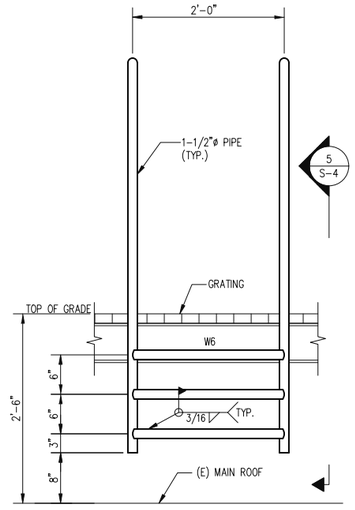
W6 TO W6 CONNECTION DETAIL 1 S-4
SCALE: 3"=1'-0"



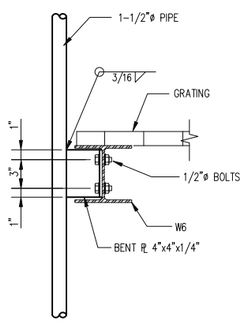
HANDRAIL DETAIL 2 S-4
SCALE: 1"=1'-0"



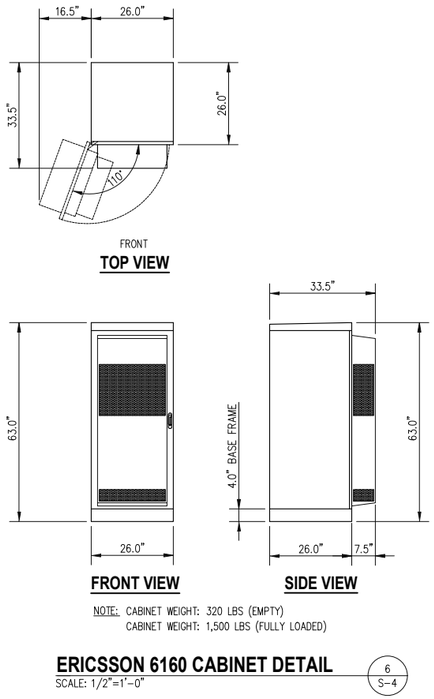
DETAIL 3 S-4
SCALE: 1-1/2"=1'-0"



LADDER DETAIL 4 S-4
SCALE: 1"=1'-0"

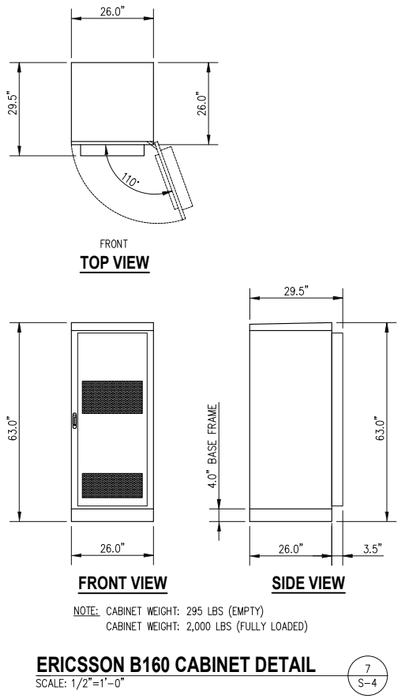


DETAIL 5 S-4
SCALE: 1-1/2"=1'-0"



NOTE: CABINET WEIGHT: 320 LBS (EMPTY)
CABINET WEIGHT: 1,500 LBS (FULLY LOADED)

ERICSSON 6160 CABINET DETAIL 6 S-4
SCALE: 1/2"=1'-0"



NOTE: CABINET WEIGHT: 295 LBS (EMPTY)
CABINET WEIGHT: 2,000 LBS (FULLY LOADED)

ERICSSON B160 CABINET DETAIL 7 S-4
SCALE: 1/2"=1'-0"

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ENGINEER: C.S.

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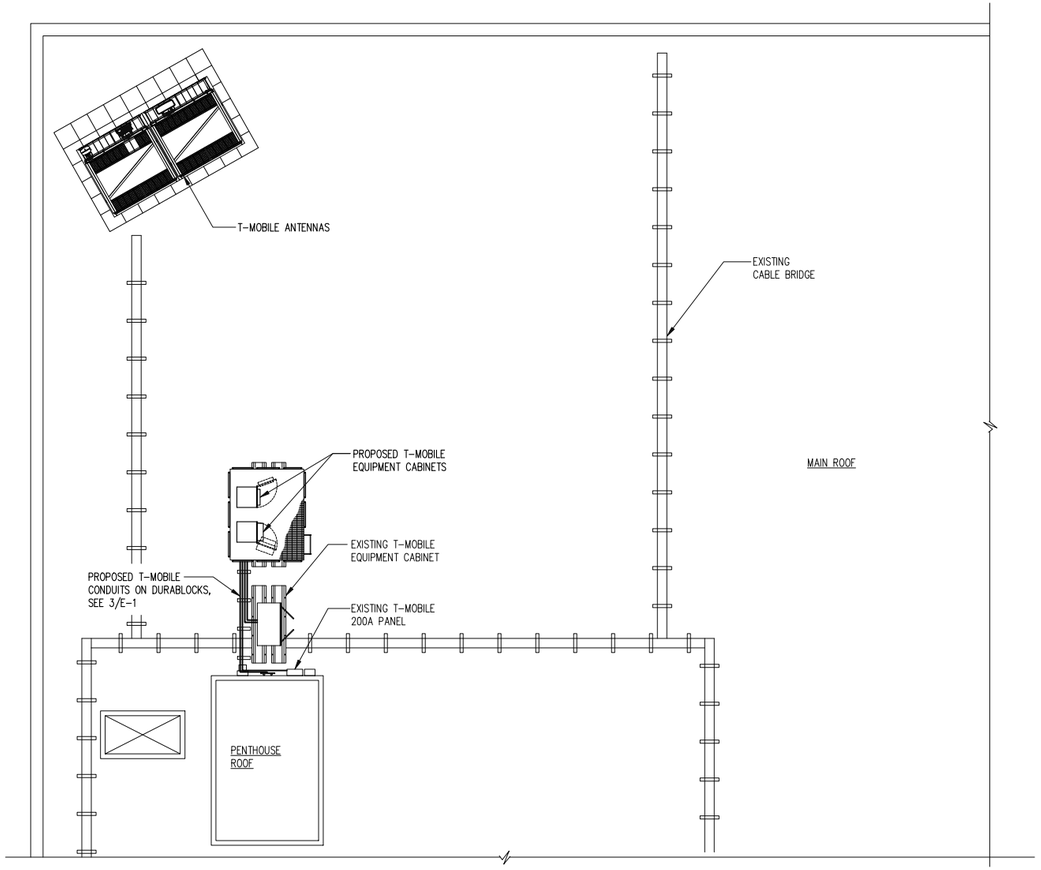
TITLE:

PLATFORM AND EQUIPMENT DETAILS

SHEET NUMBER:

S-4



ELECTRICAL PLAN

SCALE: 1/8"=1'-0"

1 / E-1

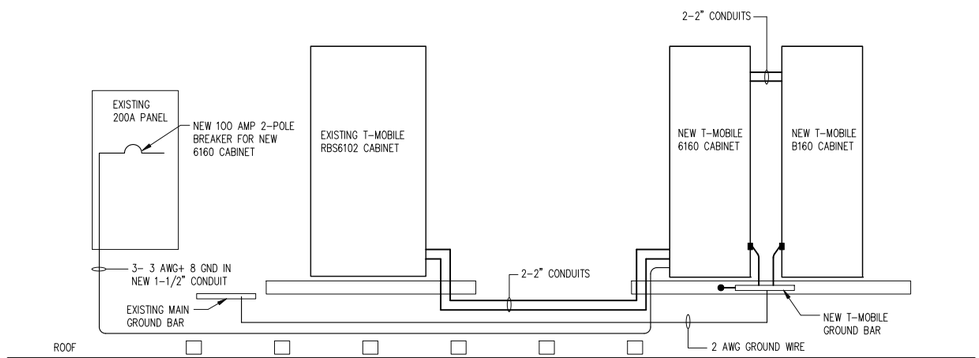
TRUE NORTH

EXISTING T-MOBILE PANEL									
VOLTAGE: 120/240 1 PHASE 3 WIRE 200 AMP M.C.B.									
LOAD DESCRIPTION	AMPS	BKR	CKT	ø A	ø B	CKT	BKR	AMPS	LOAD DESCRIPTION
EXISTING RBS6102 (NOTE 1)		100	1			2	60	–	SURGE PROTECTIVE DEVICE
			3			4		–	
LIGHT	2	15	5	2		6			SPACE
GFI RECEPTACLES	2	20	7		2	8			SPACE
EXISTING RBS6102 (NOTE 2)	26	150	9	26		10			SPACE
	26		11		26	12			SPACE
	26		13	26		14			SPACE
	26		15		26	16			SPACE
NEW 6160 CABINET (NOTE 3)	70	100	17	70		18			SPACE
	70		19		70	20			SPACE
SPACE			21			22			SPACE
SPACE			23			24			SPACE
SPACE			25			26			SPACE
SPACE			27			28			SPACE
SPACE			29			30			SPACE
	TOTAL ø A			124	124	TOTAL ø B			
						29.76 kVA			

PANEL CAPACITY: 48 kVA; PANEL CONNECTED LOAD: 29.76 kVA
29.76 kVA x 1.25 = 37.2 kVA
THE CONNECTED LOAD DOES NOT EXCEED THE PANEL'S CAPACITY.

PANELBOARD NOTES:

1. TURN OFF BREAKER AND DISCONNECT CONDUCTORS
2. INSTALL 150A 4 POLE BREAKER IN AVAILABLE SPACE.
   HAVING AN A.I.C. RATING NOT LESS THAN EXISTING BREAKERS IN PANEL.
   RUN NEW 3-1/0 AWG + 6 GND IN 1-1/2" CONDUIT TO EXISTING 6131 CABINET
3. INSTALL 100A 2 POLE BREAKER IN AVAILABLE SPACE.
   HAVING AN A.I.C. RATING NOT LESS THAN EXISTING BREAKERS IN PANEL.
   RUN NEW 3-3 AWG + 8 GND IN 1-1/2" CONDUIT TO NEW 6160 CABINET
4. UPDATE BREAKER LABEL



NOTES:

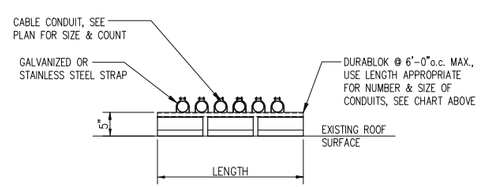
1. ALL GROUND WIRES SHALL BE 2 AWG GREEN-INSULATED UNLESS NOTED OTHERWISE.

ONE-LINE DIAGRAM

SCALE: N.T.S.

2 / E-1

DURABLOCK DB SERIES LENGTH CHART	
PART NUMBER	LENGTH
DB5	4.8"
DB10	9.6"
DB20	20.2"
DB30	30.8"
DB40	41.4"



CONDUIT SUPPORT DETAIL

SCALE: 3/4"= 1'-0"

3 / E-1

T-MOBILE NORTHEAST LLC
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705
PHONE: (240) 264-8600

entrex communication services, inc.
6100 EXECUTIVE BLVD
SUITE 350
ROCKVILLE, MD 20852
PHONE: (202) 408-0960

SITE LINK
Site Link Wireless, LLC
3620 Commerce Drive, Suite 707
Baltimore, MD 21227
www.sitelinkwireless.com
410-309-4949

7WAN101E
EZ STORAGE GERMANTOWN
12211 MIDDLEBROOK RD
GERMANTOWN, MD 20874

SEAL:

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 17641, Expiration Date: 12/27/2021

SUBMITTALS

DATE	DESCRIPTION	REV.
07-14-2020	CONSTRUCTION REVIEW	A
07-22-2020	CONSTRUCTION	0

PROJECT NO:	1153.742
DESIGNER:	N.B.
ENGINEER:	C.S.

THESE DRAWINGS ARE FORMATTED TO BE FULL-SIZE AT 22"X34"

0 1/2 1

GRAPHIC SCALE IN INCHES

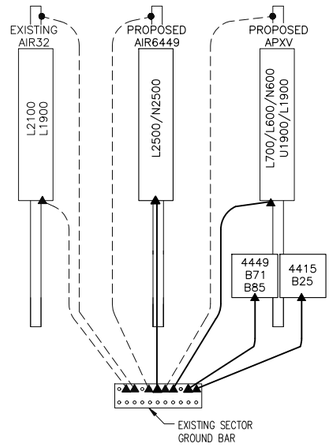
TITLE:

ELECTRICAL PLAN, DIAGRAM, DETAIL AND PANEL SCHEDULE

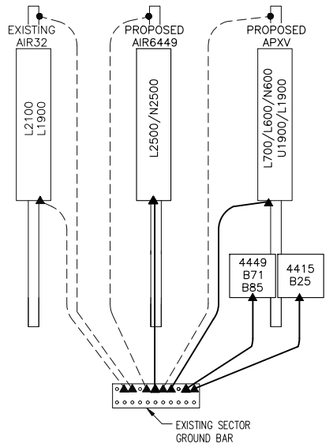
SHEET NUMBER:

E-1

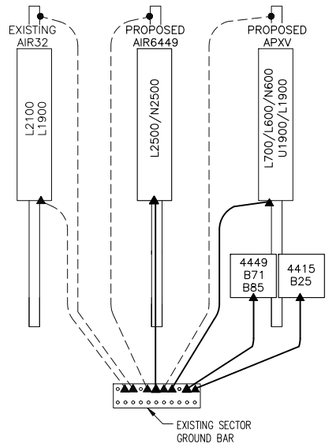
ONE



TWO



THREE

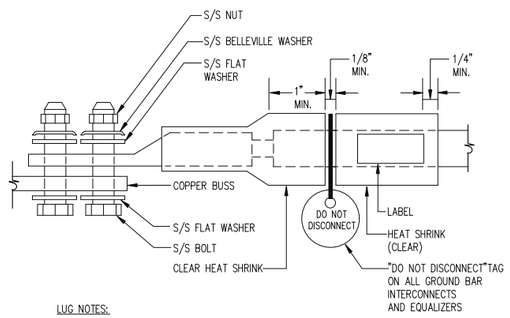


GROUNDING LEGEND

▲	COMPRESSION FITTING CONNECTION
●	EXOTHERMIC WELD CONNECTION
———	PROPOSED GROUND WIRING

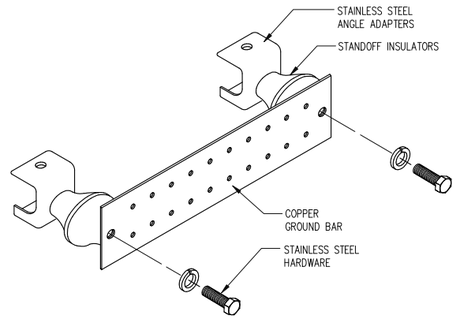
NOTES:
1. ALL GROUND WIRES SHALL BE 2 AWG GREEN-INSULATED UNLESS NOTED OTHERWISE.

ANTENNA GROUNDING DIAGRAM (1 / E-2)
SCALE: N.T.S.



LUG NOTES:
1. ALL HARDWARE IS 18-8 STAINLESS STEEL INCLUDING BELLEVILLES.
2. ALL HARDWARE SHALL BE S/S 3/8-INCH DIAMETER OR LARGER.
3. FOR GROUND BOND TO STEEL ONLY: INSERT A DRAGON-TOOTH WASHER BETWEEN LUG AND STEEL AND COAT ALL SURFACES WITH ANTI-OXIDIZATION COMPOUND PRIOR TO MATING.

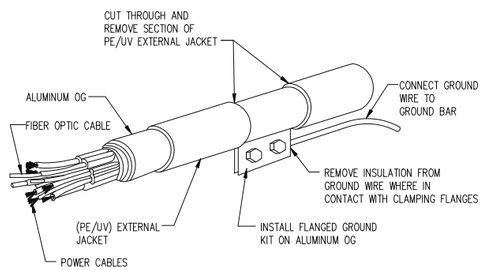
LUG DETAIL (2 / E-2)
SCALE: TO SCALE



LEGEND

1. COPPER GROUND BAR, 1/4"X 4"X 20", HARGER CAT.NO. GBA 14220G 7/16" DIAMETER HOLE CENTERS SPACED 1" APART. ANTENNA AND EQUIPMENT GROUND BARS SHALL BE HARGER CAT.NO. GBA14212G.
2. INSULATORS BETWEEN ANGLE ADAPTERS AND GROUND BAR
3. HARGER LIGHTNING PROTECTION: TELEPHONE 800-842-7434

GROUND BAR ISOMETRIC (3 / E-2)
SCALE: N.T.S.



NOTES:
1. CLAMP #6 GROUND WIRE BETWEEN FLANGES AND FORM BOND WITH COMPRESSION HARDWARE PROVIDED WITH KIT.
2. FOLLOWING INSTALLATION OF GROUND KIT, WATERPROOF ASSEMBLY WITH WATERPROOFING KIT AND TAPE.

HYBRID GROUNDING KIT DETAIL (4 / E-2)
SCALE: N.T.S.

T-MOBILE NORTHEAST LLC
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705
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7WAN101E
EZ STORAGE GERMANTOWN
12211 MIDDLEBROOK RD
GERMANTOWN, MD 20874

SEAL:

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 17641, Expiration Date: 12/27/2021

SUBMITTALS

DATE	DESCRIPTION	REV.
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PROJECT NO:	1153.742
DESIGNER:	N.B.
ENGINEER:	C.S.

THESE DRAWINGS ARE FORMATTED TO BE FULL-SIZE AT 22"X34"
0 1/2 1
GRAPHIC SCALE IN INCHES

TITLE:
GROUNDING DIAGRAM AND DETAILS

SHEET NUMBER:
E-2

Montgomery County Department of Permitting
Executive Office Building
101 Monroe Street, 2nd Floor
Rockville, MD 20850

RE: MC2020101317 – T-Mobile site 7WAN101E
12211 Middlebrook Road, Germantown, MD

To Whom It May Concern,

I write on behalf of the T-Mobile Northeast, LLC ("T-Mobile") concerning the above referenced application, which has been submitted to the Montgomery County Telecommunications Transmission Facility Coordinating Group (the "County"). In connection with that application, the County has requested a full EME report for the site. We believe this request goes beyond what is required under Sec. 2-58E of the County's code, which simply requires confirmation that the "… antenna installation be in compliance with the maximum permissible RF exposure limits set forth in § 1.1310 of the FCC Rules and Regulations."

It is T-Mobile's position the full EME reports contain sensitive and confidential T-Mobile business information, which is why we typically provide compliance summaries based on the full reports. The summaries are prepared by the same RF engineering and regulatory compliance experts as the underlying reports. While we believe such summaries would fully satisfy the code requirements, in the interest of working with the County we have enclosed the full report for the above referenced site. We submit the full report in the spirt of cooperation and are not waiving our rights to object to such requirements in the future.

We appreciate your prompt attention to our application. Please let me know if you have any questions about the enclosed information or the underlying application. You can reach me at William.Brown54@t-mobile.com or by phone at 443-850-8838.

Sincerely,

William G. Brown
Development Manager, DC Market

Radio Frequency – Electromagnetic Energy (RF-EME) Compliance Report (Anchor)

T-Mobile Proposed Facility

Site ID: 7WAN101E
EZ Storage Germantown
12211 Middlebrook Road, Germantown, Maryland 20874

September 17, 2020

EBI Project Number:
6220004684

Status:	**The proposed site will be compliant with the installation of the mitigation measures described in Attachment 1.**

Remarks: See signage plan for mitigation measures to be installed upon upgrade/installation of the site to comply with FCC and T-Mobile standards.

Prepared by:

EBI Consulting
environmental | engineering | due diligence

TABLE OF CONTENTS

1.0 Executive Summary

EnviroBusiness Inc. (dba EBI Consulting) has been contracted by T-Mobile to conduct radio frequency electromagnetic (RF-EME) modeling for T-Mobile Site 7WAN101E located at 12211 Middlebrook Road in Germantown, Maryland to determine RF-EME exposure levels from proposed T-Mobile wireless communications equipment at this site. As described in detail in Appendix B of this report, the Federal Communications Commission (FCC) has developed Maximum Permissible Exposure (MPE) Limits for general public exposures and occupational exposures. This report summarizes the results of RF-EME modeling in relation to relevant FCC RF-EME compliance standards for limiting human exposure to RF-EME fields. This report contains a detailed summary of the RF EME analysis for the site.

This document addresses the compliance of T-Mobile's proposed transmitting facilities independently at the site.

The Maximum Emissions Value is 298.7900% of the FCC's general public limit (59.7580% of the FCC's occupational limit) at the main roof level. The proposed site will be compliant with Federal regulations regarding (radio frequency) RF Emissions with the installation of the mitigation measures.

At the nearest walking/working surfaces to the T-Mobile antennas on the main roof level, the maximum power density generated by the T-Mobile antennas is approximately 298.7900 percent of the FCC's general public limit (59.7580 percent of the FCC's occupational limit).

Based on worst-case predictive modeling, the worst-case emitted power density may exceed the FCC's general public limit within approximately 28 feet of T-Mobile's proposed antennas at the main roof level. Modeling also indicates that the worst-case emitted power density will not exceed the FCC's occupational limit at the main roof level.

Signage is recommended at the site as presented in Attachment 1. Posting of the signage brings the site into compliance with FCC rules and regulations.

2.0 MPE Calculations

Calculations were completed for the proposed T-Mobile Wireless antenna rooftop facility located at 12211 Middlebrook Road in Germantown, Maryland using the equipment information listed below. All calculations were performed per the specifications under FCC Office of Engineering & Technology (OET) Bulletin 65, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields" (OET-65). Because of the short wavelength of PCS services, the antennas require line-of-site paths for good propagation and are typically installed a distance above ground level. Antennas are constructed to concentrate energy towards the horizon, with as little energy as possible scattered towards the ground or the sky. This design, combined with the low power of PCS facilities, generally results in no possibility for exposure to approach Maximum Permissible Exposure (MPE) levels, with the exception of areas in the immediate vicinity of the antennas.

In accordance with T-Mobile's RF Exposure policy, EBI performed theoretical modeling using RoofMaster™ software to estimate the worst-case power density at the site rooftop-level resulting from operation of the antennas. Using the computational methods set forth in OET-65, RoofMaster™ calculates power density in a scalable grid based on the contributions of all RF sources characterized in the study scenario. At each grid location, the cumulative power density is expressed as a percentage of the FCC limits. Manufacturer antenna pattern data is utilized in these calculations. RoofMaster™ models consist of the Far Field model as specified in OET-65 and an implementation of the OET-65 Cylindrical Model (Sula9). The models utilize several operational specifications for different types of antennas to produce a plot of spatially-averaged power densities that can be expressed as a percentage of the applicable exposure limit.

For this report, EBI utilized antenna and power data provided by T-Mobile and compared the resultant worst-case MPE levels to the FCC's general public/uncontrolled exposure limits outlined in OET Bulletin 65. EBI has performed theoretical worst-case modeling using RoofMaster™ to estimate the maximum potential power density from each proposed antenna based on worst-case assumptions for the number of antennas and power. All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmission paths per carrier prescribed configuration.

The assumptions used in the modeling are based upon information provided by T-Mobile in the supplied drawings.

There are no collocated carriers on the rooftop.

The data for all T-Mobile antennas used in this analysis is shown in Section 3.0. Actual antenna gains for each antenna were used per manufacturer's specifications. All calculations were done with respect to the FCC's general public/uncontrolled threshold limits.

Based on information provided by T-Mobile, access to this site is considered uncontrolled.

3.0 T-Mobile Antenna Inventory

Sector	Antenna Number	Antenna Make	Antenna Model	Centerline Height (ft) Above Nearest Walking Surface	Azimuth (°)	Technology	Frequency Band	Power Per Channel (W)	Number of Channels	ERP (W)
A	1	Ericsson	AIR 32_KRD901146-1 02DT 2100	9.0	70	LTE	AWS - 2100 MHz	60	2	4113
A	1	Ericsson	AIR 32_KRD901146-1 02DT 1900	9.0	70	LTE	PCS - 1900 MHz	60	2	4113
A	2	Ericsson	SON_AIR6449_B41FB_LTE_dlMacro	9.0	70	LTE	2500 MHz	40	2	2871
A	2	Ericsson	SON_AIR6449_B41FB_NR_dlMacro	9.0	70	NR	2500 MHz	40	2	2871
A	3	RFS	APXVAARR24 43-U-NA20 02DT 700	9.0	70	LTE	700 MHz	30	1	548
A	3	RFS	APXVAARR24 43-U-NA20 02DT 600	9.0	70	LTE	600 MHz	30	1	540
A	3	RFS	APXVAARR24 43-U-NA20 02DT 600	9.0	70	NR	600 MHz	80	1	1441
A	3	RFS	APXVAARR24_43-U-NA20 02DT 1900	9.0	70	LTE/UMTS	PCS - 1900 MHz	90	2	5276
B	1	Ericsson	AIR 32_KRD901146-1 02DT 2100	9.0	160	LTE	AWS - 2100 MHz	60	2	4113
B	1	Ericsson	AIR 32_KRD901146-1 02DT 1900	9.0	160	LTE	PCS - 1900 MHz	60	2	4113
B	2	Ericsson	SON_AIR6449_B41FB_LTE_dlMacro	9.0	160	LTE	2500 MHz	40	2	2871
B	2	Ericsson	SON_AIR6449_B41FB_NR_dlMacro	9.0	160	NR	2500 MHz	40	2	2871
B	3	RFS	APXVAARR24 43-U-NA20 02DT 700	9.0	160	LTE	700 MHz	30	1	548
B	3	RFS	APXVAARR24 43-U-NA20 02DT 600	9.0	160	LTE	600 MHz	30	1	540
B	3	RFS	APXVAARR24 43-U-NA20 02DT 600	9.0	160	NR	600 MHz	80	1	1441
B	3	RFS	APXVAARR24_43-U-NA20 02DT 1900	9.0	160	LTE/UMTS	PCS - 1900 MHz	90	2	5276
C	1	Ericsson	AIR 32_KRD901146-1 02DT 2100	9.0	255	LTE	AWS - 2100 MHz	60	2	4113
C	1	Ericsson	AIR 32_KRD901146-1 02DT 1900	9.0	255	LTE	PCS - 1900 MHz	60	2	4113
C	2	Ericsson	SON_AIR6449_B41FB_LTE_dlMacro	9.0	255	LTE	2500 MHz	40	2	2871
C	2	Ericsson	SON_AIR6449_B41FB_NR_dlMacro	9.0	255	NR	2500 MHz	40	2	2871
C	3	RFS	APXVAARR24 43-U-NA20 02DT 700	9.0	255	LTE	700 MHz	30	1	548
C	3	RFS	APXVAARR24 43-U-NA20 02DT 600	9.0	255	LTE	600 MHz	30	1	540
C	3	RFS	APXVAARR24 43-U-NA20 02DT 600	9.0	255	NR	600 MHz	80	1	1441
C	3	RFS	APXVAARR24_43-U-NA20 02DT 1900	9.0	255	LTE/UMTS	PCS - 1900 MHz	90	2	5276

• This table contains an inventory of T-Mobile Antennas and Power Values.

4.0 Summary and Conclusions

All calculations performed for this analysis yielded results that were above the allowable limits for exposure to RF Emissions. Based on predictive modeling, the worst-case emitted power density may exceed the FCC's general public limit within approximately 28 feet of T-Mobile's proposed antennas at the main roof level. Modeling also indicates that the worst-case emitted power density will not exceed the FCC's occupational limit at the main roof level.

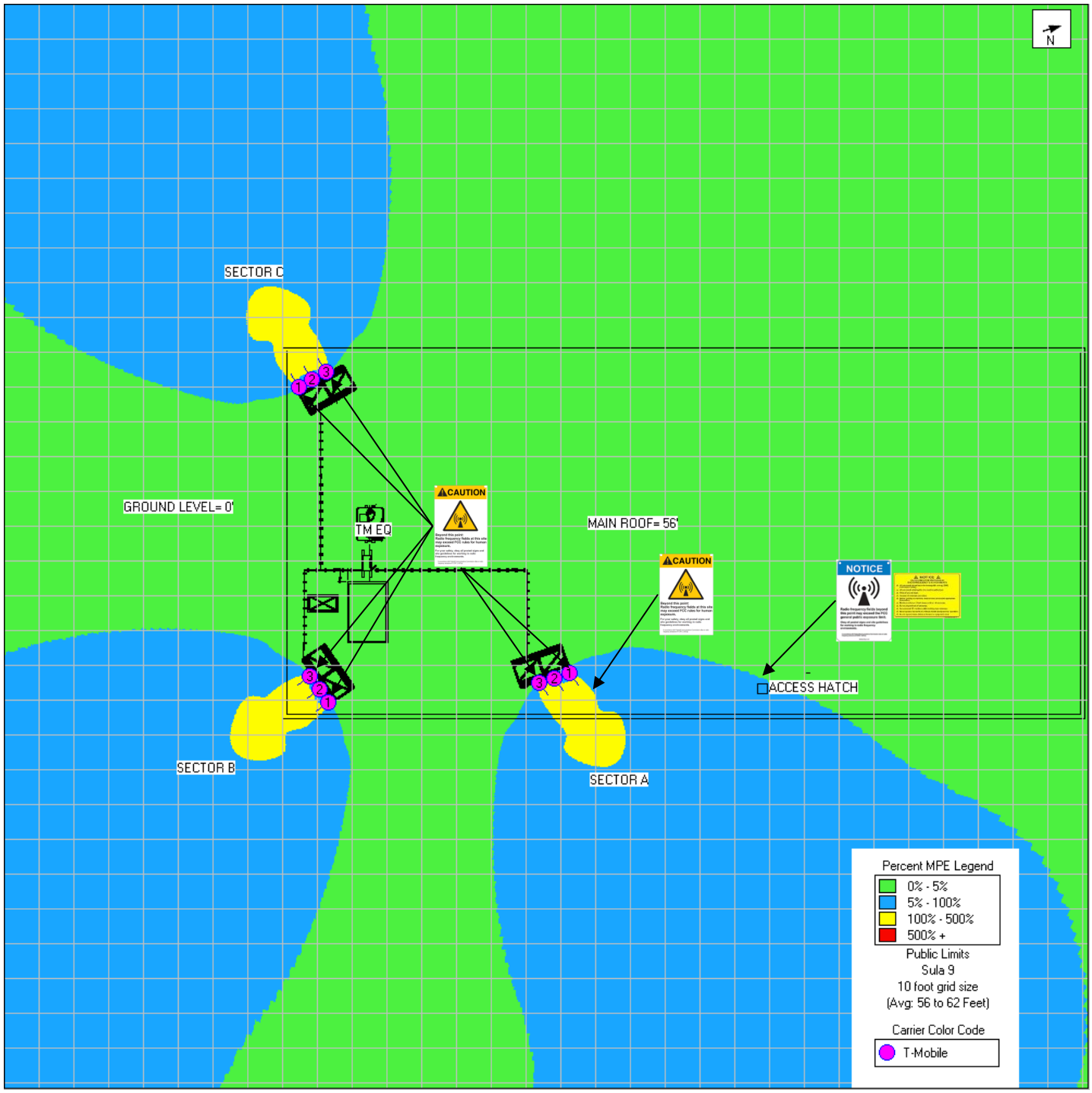
There are no collocated carriers on the rooftop.

The anticipated maximum contribution from each sector of the proposed T-Mobile facility is 298.7900% of the allowable FCC established general public limit (59.7580% of the FCC occupational limit). This was determined through calculations along a radial from each sector taking full power values into account as well as actual vertical plane antenna gain values per the manufacturer-supplied specifications for gain. Based on worst-case predictive modeling, there are no areas at ground level related to the proposed antennas that exceed the FCC's occupational or general public exposure limits at this site. At ground level, the maximum power density generated by the antennas is approximately 0.2100% of the FCC's general public limit (0.0420% of the FCC's occupational limit).

A site is considered out of compliance with FCC regulations if there are areas that exceed the FCC exposure limits and there are no RF hazard mitigation measures in place. Any carrier which has an installation that contributes more than 5% of the applicable MPE must participate in mitigating these RF hazards. For this facility, the calculated values were above the allowable 100% threshold standard per the federal government.

EBI's modeling indicates that there are areas in front of the T-Mobile antennas at the rooftop level that exceed the FCC standards for general public exposure. Based on worst-case predictive modeling, the worst-case emitted power density may exceed the FCC's general public limit within approximately 28 feet of T-Mobile's Sector A, B, and C antennas. In order to alert any workers potentially accessing the site, a blue Notice sign and a yellow Guidelines sign are recommended at the first point(s) of access to the rooftop. To reduce the risk of exposure and/or injury, EBI recommends that access to the rooftop or areas associated with the active antenna installation be restricted and secured where possible. Caution signage is recommended at the site as presented in the Signage Plan – Attachment 1.

Attachment 1: MPE Analysis and Recommended Signage (Main Roof Level)



Sign	Sign Count	Description	Posting Instructions
	**Unknown**	**Blue Notice Sign** Used to notify individuals they are entering an area where the power density emitted from transmitting antennas may exceed the FCC's MPE limit for the general public or occupational exposures.	Securely post at all access points to the site in a manner conspicuous to all individuals entering thereon.
	**Unknown**	**Guidelines** Informational sign used to notify workers that there are active antennas installed and provide guidelines for working in RF environments.	Securely post at all access points to the site in a manner conspicuous to all individuals entering thereon.
	**7**	**Yellow Caution Sign** Used to notify individuals that they are entering a hot spot where either the general public or occupational FCC's MPE limit is or could be exceeded.	Securely post near areas where the general public or occupational MPE limit could be exceeded as shown in Attachment 1 at the site in a manner that prominently alerts occupational workers and the general public of RF emissions.
	**N/A**	**Red Warning Sign** Used to notify individuals that they are entering a hot zone where either the general public or occupational FCC's MPE limit has been exceeded.	Signage not required.
Notes:	**The proposed site will be compliant with the installation of the mitigation measures.** The actual number of access points may vary based on documentation provided and/or if a survey was conducted. Recommended signage locations, if applicable, are based on T-Mobile's guidance for the worst-case scenario in each sector. The actual signage installation is dependent on accessibility of the facility and antennas. Locations deemed inaccessible due to OSHA safety standards (proximity to unprotected roof edge or slope, etc.) will be compliant upon installation of recommended signage at the closest accessible point.		

Attachment 2: RoofMaster™ Import File

Carrier	Antenna Number	Emitter Number	Caption	Pattern(.ant)	Frequency	Power (W) ERP/EiRP	Length (m)	Azimuth(n)	Mechanical Downtilt	Height(ft)	X(ft)	Y(ft)
T-Mobile	1	1	TMO A1	AIR 32_KRD901146-1 02DT 2100.ant	2100	6745.67	1.44	70	0	65.0	81.9	1.3
T-Mobile	1	2	TMO A1	AIR 32_KRD901146-1 02DT 1900.ant	1900	6745.67	1.44	70	0	65.0	81.9	1.3
T-Mobile	2	1	TMO A2	SON_AIR6449_B41FB_LTE_dlMacro.ant	2500	4709.06	0.84	70	0	65.0	77.4	0.3
T-Mobile	2	2	TMO A2	SON_AIR6449_B41FB_NR_dlMacro.ant	2500	4709.06	0.84	70	0	65.0	77.4	0.3
T-Mobile	3	1	TMO A3	APXVAARR24 43-U-NA20 02DT 700.ant	700	547.80	2.44	70	0	65.0	73	1.6
T-Mobile	3	2	TMO A3	APXVAARR24 43-U-NA20 02DT 600.ant	600	540.28	2.44	70	0	65.0	73	1.6
T-Mobile	3	3	TMO A3	APXVAARR24 43-U-NA20 02DT 600.ant	600	1440.75	2.44	70	0	65.0	73	1.6
T-Mobile	3	4	TMO A3	APXVAARR24_43-U-NA20 02DT 1900.ant	1900	8652.00	2.44	70	0	65.0	73	1.6
T-Mobile	4	1	TMO B1	AIR 32_KRD901146-1 02DT 2100.ant	2100	6745.67	1.44	160	0	65.0	12	7.2
T-Mobile	4	2	TMO B1	AIR 32_KRD901146-1 02DT 1900.ant	1900	6745.67	1.44	160	0	65.0	12	7.2
T-Mobile	5	1	TMO B2	SON_AIR6449_B41FB_LTE_dlMacro.ant	2500	4709.06	0.84	160	0	65.0	9.4	3.5
T-Mobile	5	2	TMO B2	SON_AIR6449_B41FB_NR_dlMacro.ant	2500	4709.06	0.84	160	0	65.0	9.4	3.5
T-Mobile	6	1	TMO B3	APXVAARR24 43-U-NA20 02DT 700.ant	700	547.80	2.44	160	0	65.0	6.6	0.3
T-Mobile	6	2	TMO B3	APXVAARR24 43-U-NA20 02DT 600.ant	600	540.28	2.44	160	0	65.0	6.6	0.3
T-Mobile	6	3	TMO B3	APXVAARR24 43-U-NA20 02DT 600.ant	600	1440.75	2.44	160	0	65.0	6.6	0.3
T-Mobile	6	4	TMO B3	APXVAARR24_43-U-NA20 02DT 1900.ant	1900	8652.00	2.44	160	0	65.0	6.6	0.3
T-Mobile	7	1	TMO C1	AIR 32_KRD901146-1 02DT 2100.ant	2100	6745.67	1.44	255	0	65.0	3.5	84.1
T-Mobile	7	2	TMO C1	AIR 32_KRD901146-1 02DT 1900.ant	1900	6745.67	1.44	255	0	65.0	3.5	84.1
T-Mobile	8	1	TMO C2	SON_AIR6449_B41FB_LTE_dlMacro.ant	2500	4709.06	0.84	255	0	65.0	7.2	86.3
T-Mobile	8	2	TMO C2	SON_AIR6449_B41FB_NR_dlMacro.ant	2500	4709.06	0.84	255	0	65.0	7.2	86.3
T-Mobile	9	1	TMO C3	APXVAARR24 43-U-NA20 02DT 700.ant	700	547.80	2.44	255	0	65.0	11.3	88.5
T-Mobile	9	2	TMO C3	APXVAARR24 43-U-NA20 02DT 600.ant	600	540.28	2.44	255	0	65.0	11.3	88.5
T-Mobile	9	3	TMO C3	APXVAARR24 43-U-NA20 02DT 600.ant	600	1440.75	2.44	255	0	65.0	11.3	88.5
T-Mobile	9	4	TMO C3	APXVAARR24_43-U-NA20 02DT 1900.ant	1900	8652.00	2.44	255	0	65.0	11.3	88.5

Appendix A: Certifications

Preparer Certification

I, Ian Burk, state that:

- I am an employee of EnviroBusiness Inc. (d/b/a EBI Consulting), which provides RF-EME safety and compliance services to the wireless communications industry.
- I have successfully completed RF-EME safety training, and I am aware of the potential hazards from RF-EME and would be classified "occupational" under the FCC regulations.
- I am fully aware of and familiar with the Rules and Regulations of both the Federal Communications Commissions (FCC) and the Occupational Safety and Health Administration (OSHA) with regard to Human Exposure to Radio Frequency Radiation.
- I have been trained on RF-EME modeling using RoofMaster™ modeling software.
- I have reviewed the data provided by the client and incorporated it into this Site Compliance Report such that the information contained in this report is true and accurate to the best of my knowledge.

Appendix B: Federal Communications Commission (FCC) Requirements

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu W/cm^2$). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the 700 and 800 MHz Bands is 467 $\mu W/cm^2$ and 567 $\mu W/cm^2$ respectively, and the general population exposure limit for the PCS and AWS bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

A site is considered out of compliance with FCC regulations if there are areas that exceed the FCC exposure limits and there are no RF hazard mitigation measures in place. Any carrier which has an installation that contributes more than 5% of the applicable MPE must participate in mitigating these RF hazards.

Additional details can be found in FCC OET 65.

App No: 2020101317

Application General Infomation

Applicant Name	Site Link Wireless	Updated	10/28/2020
Application Type	Minor Modification	Ann. Plan?	Yes
Carrier	T-Mobile	Will site be used to support government telecommunications facilities or other equipment for government use?	No
Solution Type	Macro		
Existing	Existing	Gvt. Use Desc.	

Application Description

#Deleted

Site Infomation

Site Id	565	Zoning	R-200
Structure Type	Building	Latitude	39.176211
Address	12211 Middlebrook Rd, Germantown	Longitude	-77.253097
County Site Name	EZ Storage- Middlebrook	Ground Elevation	448
Carrier Site Name	7WAN101E	City	Germantown
Site Owner	Middlebrook Land LLLP c/o Siena Cor	Lease Status	Leased
Structure Owner	Middlebrook Land LLLP c/o Siena Cor	Does the structure require an antenna structure registration under FCC Title 47	No
Existing Structure Height	56	Distance to Residential Property (New, Replacement, Colocation Only)	
Provide the proposed height of the replacement structure without any antenna (New, Replacement Apps Only)		Distance to Commercial Property (New, Replacement, Colocation Only)	

Justification of why this site was selected:

NearbySites (New, Replacement Apps Only):

App No: 2020101317

Screening considerations(New, Colocations, Replacement Apps Only):

Thursday, October 29, 2020

10:15:33 AM

App No: 2020101317

6409 Questions

Does this qualify as a 6409 application? (Minor Mod, Colocations Only): Yes

For towers outside the public ROW will the proposed installation increase the height of the structure by: (1) more than 10% or (2) more than 20 feet, whichever is greater? No

Will the proposed installation increase the width by adding appurtenance to the body of the structure that would protrude from the edge of the structure by more than 6 feet? No

For towers outside the public ROW will the proposed installation increase the width by adding appurtenance to the body of the structure that would protrude from the edge of the structure by more than 20 feet? No

More than four Equipment Cabinets? YN: No

Will the proposed installation require excavation or expansion outside the current boundaries of the site? No

Does the structure or current installation have concealment elements/measures? No

Will the proposed installation increase the height of the structure by: (1) more than 10% or (2) more than 10 feet, whichever is greater? No

If yes, describe how the proposed installation does not defeat the existing concealment.

Small Wireless Facility Informatio

Small Wireless Facility Questions

Small Wireless Facility? No

Is the structure 10% taller than adjacent structures?

Cumulative volume of the proposed wireless equipment(s) exclusive of antennas in cubic feet: 24

Please list adjacent structure heights

Tribal Lands? No

Cumulative volume of the proposed antenna antenna(s) exclusive of equipment

ROW Information

PROW? No

Pole Number

ROW owner

ROW width

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Antenna Infomation

Antenna Compliance	Yes
Compliance Desc	
Antenna Location	Yes
Antenna Loc. Desc.	
Env. Assessment	
Cat. Excluded?	checked
Routine Env. Evaluation	

Antenna Model	Ericsson AIR 6449 B4I						
Frequency	2496-2690 MHz						
RAD Center	65	Max ERP	250	Antenna Dimensions	33.10"x20.6"x8.6"	Quantity	3

Antenna Model	RFS APXVAARR24_43-U-NA20						
Frequency	668-683, 728-734, 1965-1975 MHz; 622-637, 698-704, 1885-1895 MHz						
RAD Center	65	Max ERP	574	Antenna Dimensions	95.9"x24"x8.7"	Quantity	3

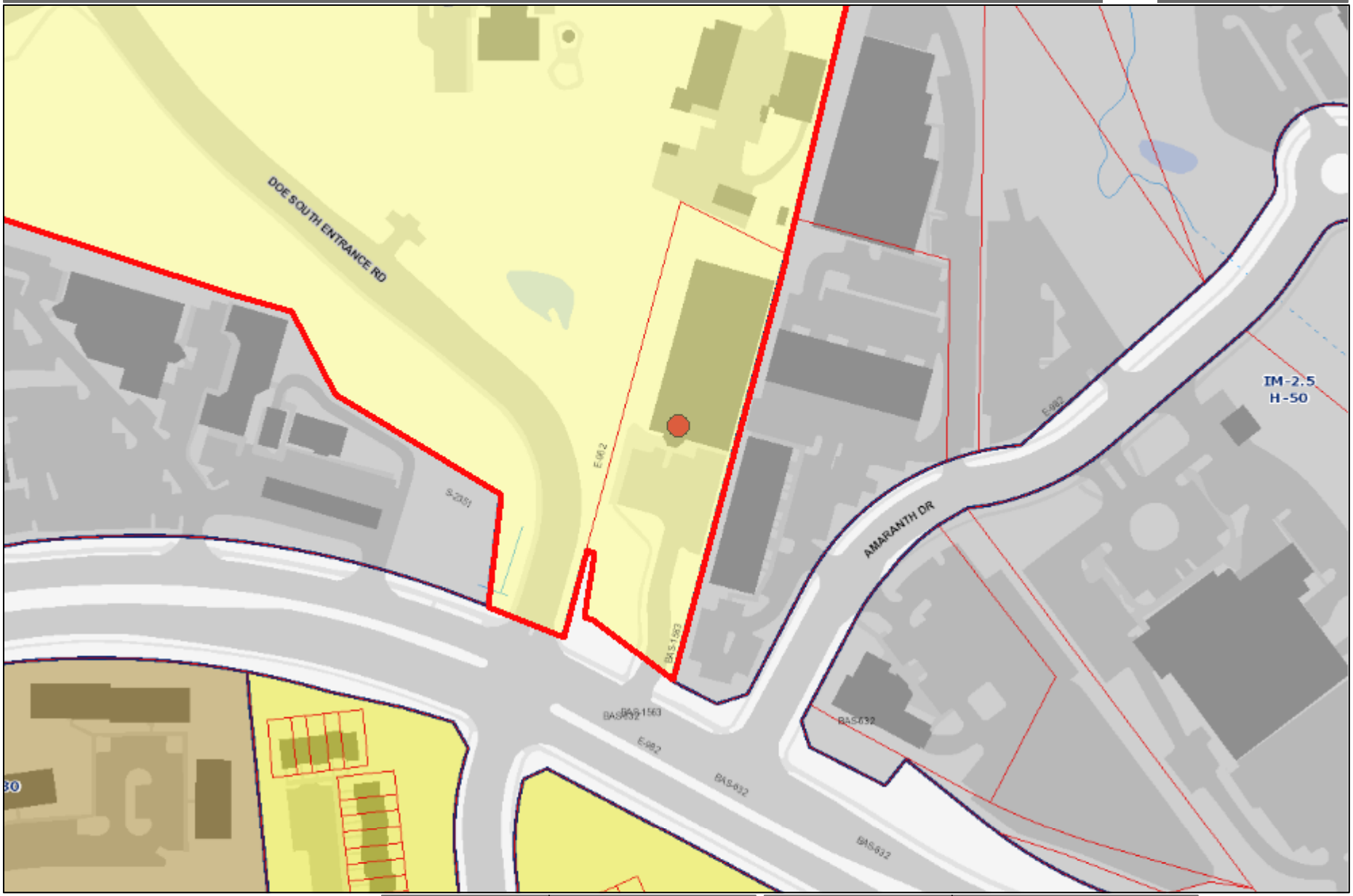
Thursday, October 29, 2020

10:15:33 AM

Montgomery County Zoning

Date: 10/28/2020

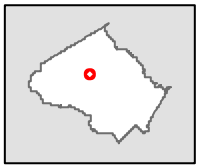
Montgomery County Planning Department
ITI Division



Account #	03298020
Address	12211 MIDDLEBROOK RD GERMANTOWN, 20874
Zone	R-200
Overlay Zone	N/A
TDR Overlay Zone	N/A
Landuse	Industrial
Parcel, Lot, Block	N944 , 11 , A
WSSC Grid	227NW12
Map Amendments	G-652 G-887 G-956

Parking District	N/A
CBD	N/A
Special Protection Area	N/A
Urban District	N/A
Enterprise Zone	N/A
Arts & Ent. District	N/A
Special Tax District	N/A
Legal Description	MIDDLEBROOK INDUSTRIAL PARK

Bike/Ped Priority Area	N/A
Urban Renewal Area	N/A
Metro Station Policy Area	N/A
Priority Funding Area	Yes
Septic Tier	Tier 1: Sewer existing
Municipality	N/A
Master Plan	GERMANTOWN SECTOR PLAN
Historic Site/District	N/A
Water/Sewer Categories	W-1 / S-1



1 inch = 230 feet

RADIO FREQUENCY SYSTEMS
The Clear Choice®

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-746/617-746/1695-2200/1695-2200MHz, 65deg, 15/15/18/18dBi, 2.4m (8ft), VET, RET, 0-12°/0-12°/2-12°/2-12°

FEATURES / BENEFITS

This antenna provides a 8 Port multi-band flexible platform for advanced use for flexible use in deployment scenarios for encompassing 600MHz, 700MHz, AWS & PCS applications.

- **24 Inch Width For Easier Zoning**
- **Field Replaceable (Integrated) AISG RET platform for reduced environmental exposure and long lasting quality**
- **Superior elevation pattern performance across the entire electrical down tilt range**
- **Includes three AISG RET motors - Includes 0.5m AISG jumper for optional diasy chain of two high band RET motors for one single AISG point of high band tilt control.**
- **Low band arrays driven by a single RET motor**

Technical Features

LOW BAND LEFT ARRAY (617-746 MHZ) [R1]

Frequency Band	MHz	617-698	698-746
Gain	dBi	15.1	15.5
Horizontal Beamwidth @3dB	Deg	65	62
Vertical Beamwidth @3dB	Deg	11.4	10.4
Electrical Downtilt Range	Deg	0-12	0-12
Upper Side Lobe Suppression 0 to +20	dB	19	20
Front-to-Back, at +/-30°, Copolar	dB	25	24
Cross Polar Discrimination (XPD) @ Boresight	dB	19	19
Cross Polar Discrimination (XPD) @ +/-60	dB	5	3
3rd Order PIM 2 x 43dBm	dBc		-153
VSWR	-	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25
Maximum Effective Power per Port	Watt	250	250

LOW BAND RIGHT ARRAY (617-746 MHZ) [R2]

Frequency Band	MHz	617-698	698-746
Gain	dBi	14.8	15.1
Horizontal Beamwidth @3dB	Deg	65	62
Vertical Beamwidth @3dB	Deg	11.4	10.3
Electrical Downtilt Range	Deg	0-12	0-12
Upper Side Lobe Suppression 0 to +20	dB	19	20
Front-to-Back, at +/-30°, Copolar	dB	25	23
Cross Polar Discrimination (XPD) @ Boresight	dB	19	19
Cross Polar Discrimination (XPD) @ +/-60	dB	5	3
3rd Order PIM 2 x 43dBm	dBc		-153
VSWR	-	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25
Maximum Effective Power per Port	Watt	250	250

RADIO FREQUENCY SYSTEMS
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Dual Slant Polarized Quad Band (8 Port) Antenna, 617-746/617-746/1695-2200/1695-2200MHz, 65deg, 15/15/18/18dBi, 2.4m (8ft), VET, RET, 0-12°/0-12°/2-12°/2-12°

HIGH BAND LEFT ARRAY (1695-2200 MHZ) [B1]

Frequency Band	MHz	1695-1880	1850-1990	1920-2200
Gain	dBi	17.3	17.8	18.5
Horizontal Beamwidth @3dB	Deg	66	59	59
Vertical Beamwidth @3dB	Deg	5.3	4.7	4.3
Electrical Downtilt Range	Deg	2-12	2-12	2-12
Upper Side Lobe Suppression 0 to +20	dB	15	15	15
Front-to-Back, at +/-30°, Copolar	dB	25	25	25
Cross Polar Discrimination (XPD) @ Boresight	dB	19	17	16
Cross Polar Discrimination (XPD) @ +/-60	dB	4	6	4
3rd Order PIM 2 x 43dBm	dBc	-153	-153	-153
VSWR	-	1.5:1	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25	25
Maximum Effective Power per Port	Watt	250	250	250

HIGH BAND RIGHT ARRAY (1695-2200 MHZ) [B2]

Frequency Band	MHz	1695-1880	1850-1990	1920-2200
Gain	dBi	17.1	17.8	18.5
Horizontal Beamwidth @3dB	Deg	66	59	59
Vertical Beamwidth @3dB	Deg	5.2	4.7	4.3
Electrical Downtilt Range	Deg	2-12	2-12	2-12
Upper Side Lobe Suppression 0 to +20	dB	15	15	15
Front-to-Back, at +/-30°, Copolar	dB	25	24	25
Cross Polar Discrimination (XPD) @ Boresight	dB	20	17	16
Cross Polar Discrimination (XPD) @ +/-60	dB	4	6	5
3rd Order PIM 2 x 43dBm	dBc	-153	-153	-153
VSWR	-	1.5:1	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25	25
Maximum Effective Power per Port	Watt	250	250	250

RADIO FREQUENCY SYSTEMS
The Clear Choice®

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-746/617-746/1695-2200/1695-2200MHz, 65deg, 15/15/18/18dBi, 2.4m (8ft), VET, RET, 0-12°/0-12°/2-12°/2-12°

ELECTRICAL SPECIFICATIONS

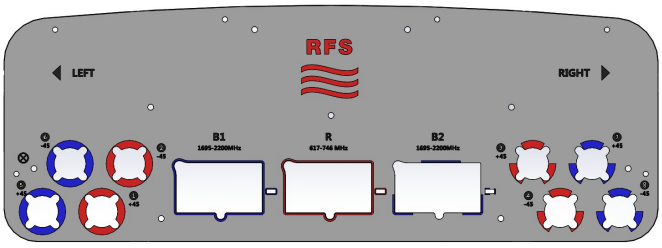
Impedance	Ohm	50.0
Polarization	Deg	±45°

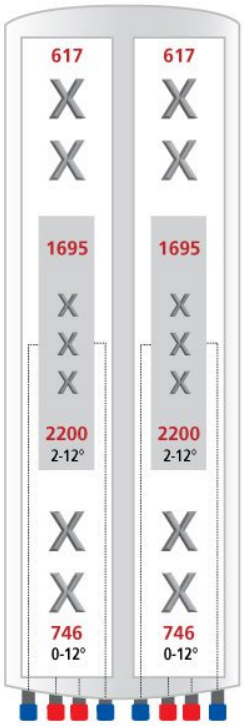
MECHANICAL SPECIFICATIONS

Dimensions - H x W x D	mm (in)	2436 x 609 x 222 (95.9 x 24 x 8.7)
Weight (Antenna Only)	kg (lb)	58 (128)
Weight (Mounting Hardware only)	kg (lb)	11.5 (25.3)
Shipping Weight	kg (lb)	80 (176)
Connector type		8 x 4.3-10 female at bottom + 6 AISG connectors (3 male, 3 female)
Adjustment mechanism		Integrated RET solution AISG compliant (Field Replaceable) + Manual Override + External Tilt Indicator
Mounting Hardware Material		Galvanized steel
Radome Material / Color		Fiber Glass / Light Grey RAL7035

TESTING AND ENVIRONMENTAL

Temperature Range	°C (°F)	-40 to 60 (-40 to 140)
Lightning protection		IEC 61000-4-5
Survival/Rated Wind Velocity	km/h	241 (150)
Environmental		ETSI 300-019-2-4 Class 4.1E





ORDERING INFORMATION

Order No.	Configuration	Mounting Hardware	Mounting pipe Diameter	Shipping Weight
APXVAARR24_43-U-NA20	Field Replace RET included (3)	APM40-5E Beam tilt kit (included)	60-120mm	80 Kg

RADIO FREQUENCY SYSTEMS
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External Document Links

APM40_Series_Installation_Instructions
Manual_Overdrive_Instructions
Global RFS Website

Notes

All electrical parameters are compliant with BASTA NGMN 9.6 requirements.

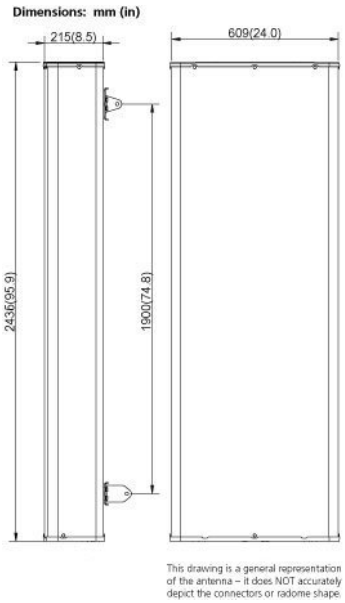
Available Configurations
APXVAARR24_43-U-NA20 -- External ACU is included -- shipping weight 80kg.

For additional mounting information please click "External Document Links".

This data is provisional and subject to changes.

External Link Reference

Global RFS Website	http://www.rfsworld.com



New Product Introduction

Massive MIMO Mid-Band
AIR6449 B41
New Product Introduction Notification

ERICSSON

(Refresh: Voltage Booster PSU 4813 is added in Ancillary Materials)

PURPOSE

Ericsson's next generation AIR6449 B41 massive MIMO (M-MIMO) single band product provides additional RF power and has full band IBW sufficient to transmit 180MHz of 4G/5G carrier bandwidth (vs. AIR6488 60+60MHz carrier bandwidth). The AIR6449 also offers enhanced RF performance via a 192 element antenna array (vs. AIR6488 with 128).

BACKGROUND

The AIR6449 has a combined antenna/radio with 64 TRX. It has advantages over the previous AIR6488 model such as:

- Full 194 MHz IBW and can support NR+LTE mixed mode vs. 100 MHz on AIR6488
- Smaller dimensions (in height and width) and lighter in weight
- 25 Gbps eCPRI support

AIR 6488 vs. AIR 6449 comparison is available at this link.

USAGE GUIDELINES

- AIR6449 is planned to replace AIR6488 on a go forward basis once available
- Full Anchor Design (2.5GHz + PCS) or 2.5GHz Only (AKA "Skinny")
- All markets except New York Boroughs
    - Use existing AIR6488 if entitlement is complete or expected to complete before July 1st, 2020 (see AIR6488 NPI)
    - Use existing AIR6488 if site is expected to be on-air before July 1st, 2020 (see AIR6488 NPI)
    - Use AIR6449 if entitlement complete is forecasted after July 1st, 2020
- NY Boroughs
    - Continue to use existing AIR6488M (see AIR6488 NPI)

TIMELINES

- Lab Entry: April 2020
- GA: June 30th, 2020
- New RFDS Templates for Anchor PORs reflecting AIR6449 have been created.
- This next generation hardware is expected to be available in commercial quantities in July 2020.

AFFECTED CONFIGURATIONS

Sites must be on an Anchor POR to use the AIR6449.

Site configurations that are designed with AIR6449 B41 will have a "**5A**" (5 for 2.5GHz + A for AIR6449) after the low-band indicator and/or before L19 indicator in the naming convention e.g., 67D92DB => 67D**5A**992DB, 92DB => **5A**992DB, etc.

PRODUCT DESCRIPTION

Frequency Range	LTE TDD B41: 2496 – 2690 MHz
Instantaneous BW	DL 194 MHz
Antenna Ports	64T64R
Technology	NR, LTE and NR+LTE MSMM
Antenna Elements	192
Output RF Power	300 W (=64 TRX x 4.6875W)
Data Ports	4 x 25Gb/s CPRI
5G NR Support	YES
DC Feed	-48V DC power connector
Cooling	Passive cooling (vs. active cooling on AIR32 DB)
Dimensions (H x W x D)	33.1" x 20.6" x 8.6" inches (=841 x 524 x 217 mm)
Weight	104 lbs (=47 kg)
Electrical downtilt	-3 to 11 degrees
Horizontal beamwidth	+/- 65 degrees
HW/SW Availability	July 2020
Material SAP #	34105 – AIR 6449 B41

WARRANTY: 1 Year

SPARES: 2% of install base. Additional units can be requested as per need.

Baseband Requirements

For a typical 3-sector site,

- LTE: one dedicated BB6630 per site
- NR: one dedicated BB6648 (see its NPI) per site

Supplementary/Ancillary Materials

SKU	Description	Qty
34106	AIR6449 mandatory install kit	1 per AIR6449
34110	AIR6449 25G SFP	8 per AIR6449

The AIR6449 requires a voltage booster (i.e., PSU 4813) in almost all cases when using the current HCS 6x12. Please refer to Voltage Booster design doc for its usage guidance (depending on the HCS length and gauge). Note the installation kit is different for each cabinet type.

SKU	Description	Qty
34132	PSU 4813 main unit	1
34133	PSU installation kit for RBS61xx	Choose 1 per cabinet type
34134	PSU installation kit for PBC6200	
34135	PSU installation kit for E6x60/P6230	

LINKS

- Ericsson New T-Mobile Anchor Network Playbook
- AIR 6488 vs. AIR 6449 Comparison

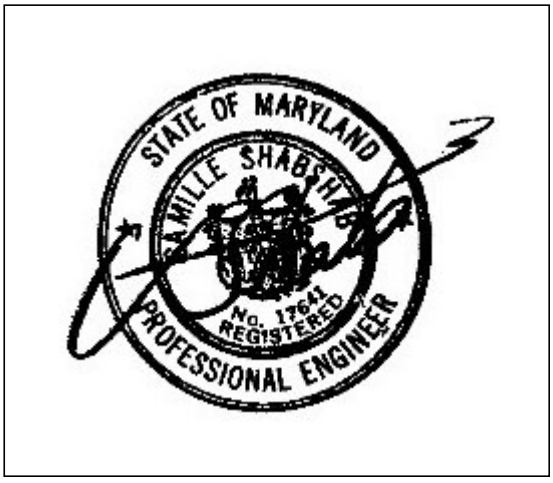
CONTACTS

Kyuho Son	Principal Engineer, RAN Architecture
Weston Berry	Engineer, RAN Architecture

Entrex Project Number:	1153.742	**Calculated By:**	RMC	**Page:**	1
Client:	T-Mobile			**Date:**	7/16/2020
Site Name:	EZ Storage Germantown			**Date:**	
Site Number:	7WAN101E			**Date:**	

STRUCTURAL NARRATIVE & CALCULATIONS
ANTENNA MOUNTS

T-MOBILE
EZ STORAGE GERMANTOWN
7WAN101E
12211 MIDDLEBROOK ROAD
GERMANTOWN, MD 20874



Engineer's Seal & Signature

Engineer: R Crumrine
Checked By: C Shabshab

PREPARED BY:
ENTREX COMMUNICATION SERVICES, INC.
6100 EXECUTIVE BLVD, SUITE 350
ROCKVILLE, MARYLAND 20852
TEL: (202) 408-0960

TABLE OF CONTENTS

0	Original Report	RMC	CS	CS	7/16/2020
No.	Reason for Revision	Engr	Checked	Approved	Date

Records of Revision Block

1.0 Introduction

This calculation was prepared to evaluate the structural adequacy of the existing antenna support frames at 1221 Middlebrook Rd, Germantown, MD 20874.

T-Mobile proposes to install two new antennas and two new RRHs on an existing non-penetrating antenna support frame located on the roof at three sector locations.

2.0 Criteria

The existing structure was analyzed and the new support frame was designed in accordance of the codes and standards listed below:

a. 2015 IBC	2015 International Building Code, International Code Council
b. ASCE 7-10	Minimum Design Loads for Building and Other Structure
c. AISC 360-10	Specification for Structural Steel Building Allowable Stress Design 14th Edition, AISC
d. ACI 318-14	Building Code Requirement for Structural Concrete

3.0 Assumptions

a. This analysis assumes that the original building structure members were properly designed and installed in accordance with the original drawings.
b. This analysis assumes that the as-built members are load-rated designed and constructed in accordance with accepted industry-wide standards.
c. This analysis assumes that the as-built conditions are structurally sound and properly maintained in accordance with the referenced standard and manufacturer's requirements.
d. Structural member sizes, building geometry, connection designs or steel/concrete/masonry material yield strengths, contrary to those assumed for the purpose of preparing this report could alter the findings and conclusions as stated.
e. The investigation of the structure or design of the structure analysis uses STAAD Pro finite element structural analysis computer program. In this analysis a finite element mathematical model of the structure was prepared based upon the exact structure geometry. The overall finite element model was loaded with live, dead & wind loading and weight associated with the structure itself.
f. For any structural components that were found to be rated up to 105% of its design capacity may be deemed acceptable. Overstressed percentages of 5% or less are considered to be within the accuracy limits of the calculations and are not consider to be critical.

4.0 Conclusions

Existing Antenna Support Frame - Sector 1:

The existing non-penetrating antenna support frame with (40) existing solid CMU half blocks to the front of the frame and (55) existing solid CMU half block blocks to the back of the frame was found to be adequate to supprt the existing and proposed antenna loads. The total weight of the frame with 95 CMU half blocks (32 lbs each) is 4475 lbs.

No changes were made to the existing support steel frame and the block quantity remains the same

This analysis assumes that, as part of the original T-Mobile antenna support frame design and/or subsequent upgrade, the existing building structure has been evaluated to support the existing T-Mobile loads and was found to be adequate.

Existing Antenna Support Frame - Sector 2:

The existing non-penetrating antenna support frame with (40) existing solid CMU half blocks to the front of the frame and (46) existing solid CMU half block blocks to the back of the frame was found to be adequate to supprt the existing and proposed antenna loads. The total weight of the frame with 86 CMU half blocks (32 lbs each) is 4187 lbs.

No changes were made to the existing support steel frame and the block quantity remains the same

This analysis assumes that, as part of the original T-Mobile antenna support frame design and/or subsequent upgrade, the existing building structure has been evaluated to support the existing T-Mobile loads and was found to be adequate.

Existing Antenna Support Frame - Sector 3:

The existing non-penetrating antenna support frame with (36) existing solid CMU half blocks to the front of the frame and (56) existing solid CMU half block blocks to the back of the frame was found to be adequate to supprt the existing and proposed antenna loads. The total weight of the frame with 92 CMU half blocks (32 lbs each) is 4379 lbs.

No changes were made to the existing support steel frame and the block quantity remains the same

This analysis assumes that, as part of the original T-Mobile antenna support frame design and/or subsequent upgrade, the existing building structure has been evaluated to support the existing T-Mobile loads and was found to be adequate.

entrex communication services, inc.	**Entrex Project Number:**	1153.742	**Calculated By:**	RMC	**Page:**	5
	Client:	T-Mobile			**Date:**	7/16/2020
	Site Name:	EZ Storage Germantown			**Date:**	
	Site Number:	7WAN101E			**Date:**	
	Engineering Objective:	Investigate Existing Antenna Support Frame			**Sector 1**	

5.0 Structural Calculations

a. Investigate Existing Antenna Support Frame - Sector 1

Problem Statement: T-Mobile proposes to install two new antennas and to install two new RRUs on an existing non-penetrating antenna support frame (Site Pro 1 RTW-14) located on the roof. There are 40 CMU half blocks (4x8x16 32 lbs each assumed) at the front tray and there are 55 CMU half blocks (4x8x16 32 lbs each assumed) at the back tray. The purpose of this calculation is to check the structural adequacy of the CMU block weight to support an existing antenna support frame, an existing panel antenna, two new panel antennas, and two new RRUs.

Design Code: The structural system analysis is in accordance with the requirements of the International Building Code 2015 (IBC 2015).

IBC 2015 Design Code Per Chapter 16 - Structural Design

Risk Category =	II	
Wind Exposure Category =	B	
V_{ult} =	115	mph (3-sec gust Ultimate Design Wind Speed - See Figure 1609B)

Wind Load Calc: Compute wind load per ASCE 7-10 (Section 29 Wind Loads on Other Structures)

Roof Elev. =	56.00	ft
Proposed Antenna Centerline Elev. =	65.00	ft
Proposed Antenna Ht Above Roof =	9.00	ft (from roof to Centerline of Antenna)

ASCE7-10 (29.3 Velocity Pressure)

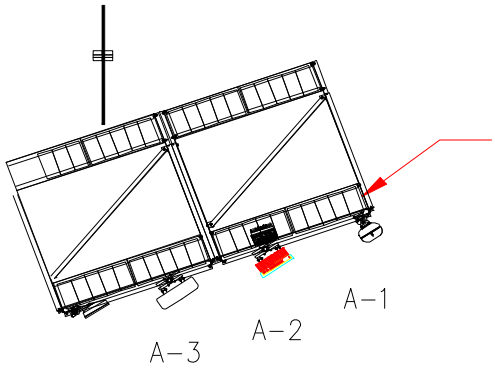
Velocity Pressure = $qz = (0.00256)\ (Kz)\ (Kzt)\ (Kd)\ (V)^2$ Eq 29.3-1

Kz =	0.87	Table 29.3-1 Exposure B
Kzt =	1.00	Section 26.8.2
Kd =	0.85	Table 26.6-1
V =	115	mph 3 second gust (Category II)
qz =	25.15	psf

ASCE7-10 (29.5)

F = qz G Cf Af Eq. 29.5-1

qz =	25.15	psf
G =	0.85	Section 26.9



Entrex Project Number:	1153.742	**Calculated By:**	RMC	**Page:**	6
Client:	T-Mobile			**Date:**	7/16/2020
Site Name:	EZ Storage Germantown			**Date:**	
Site Number:	7WAN101E			**Date:**	
Engineering Objective:	Investigate Existing Antenna Support Frame			**Sector 1**	

Proposed Loads:

WIND LOAD ON ANTENNAS & ANCILLARY ITEMS ; F = qz Gh Cf A

	ANTENNA/ANCILLARY DESCRIPTION	ELEV (FT)	qzGh	Cf	WIND AREA (sf)	F (lbs)	wt (lbs)	MOMENT ARM (FT)	OTM (LBS-FT)	COAX SIZE
	AIR32 KRD901146-1_B66A_B2A	65.0	21.37	1.34	5.07	145	132	9.00	1309	-
	AIR 6449 B41	65.0	21.37	1.30	4.74	132	104	9.00	1184	-
	RFS APXVAARR24_43-U-NA20	65.0	21.37	1.33	15.98	455	153	9.00	4099	-
Shielded	Radio 4449 B71+B85	65.0	21.37	1.30	1.64	0	75	6.00	0	-
Shielded	Radio 4415 B25	65.0	21.37	1.30	1.54	0	46	4.00	0	-
	Upper Horiz (2) L2.5 x 86.5" Long	65.0	21.37	2.00	3.00	128	-	6.13	786	-
	Lower Horiz (2) L2.5 x 86.5" Long	65.0	21.37	2.00	3.00	128	-	2.15	276	-
	Vertical Post (4) L2.5 x 70.5625" Long	65.0	21.37	2.00	4.90	209	-	3.04	638	-
	Diagonal (2) 2" Wide x 95" Long (Exposed)	65.0	21.37	2.00	2.64	113	-	3.75	423	-
	Kicker (4) L2.5 x 70" Long (Projected Length)	65.0	21.37	2.00	4.86	208	-	2.92	606	-
Exposed Pipe	(1) 2" Std Pipe x 10' Long (Position #1)	65.0	21.37	1.20	1.05	27	37	9.00	241	-
Exposed Pipe	(1) 2" Std Pipe x 10' Long (Position #2)	65.0	21.37	1.20	1.43	37	37	9.00	331	-
Exposed Pipe	(1) 2" Std Pipe x 10' Long (Position #3)	65.0	21.37	1.20	0.40	10	37	6.00	61	-
	(1) Vacant 2" Std Pipe x 10' Long (Position #4)	65.0	21.37	1.20	1.98	51	37	9.00	457	-

Total Wind Shear = 1593 lbs
Total Wind Moment = 9955 lbs-ft

Per IBC 2015 Allowable Shear = 0.6 Wind Shear Load = 956 lbs
Per IBC 2015 Allowable Shear = 0.6 Wind Moment Load = 5973 lbs-ft

Antenna, Pipes, & RRH Weight = 656 lbs
Ballast Steel Frame Weight = 779 lbs (without Antenna Pipes)
Existing Block Weight = 3040 lbs (95 Half CMU blocks x 32 lbs)

Total Weight = 4475 lbs

Ballast Sliding:

Investigate ballast resisting sliding shear force (friction coefficient = 0.7 steel vs. rubber)

Factored Frame Weight, 0.6 D = 2685 lbs
Shear Load, 0.6 WL = 956 lbs
Sliding Coefficient u = 0.7 (Sliding coefficient for steel vs. rubber)
Sliding Resistance = 1880 lbs

Sliding Force	<	Sliding Resistance	
956 lbs	<	1880 lbs	Ok, by inspection

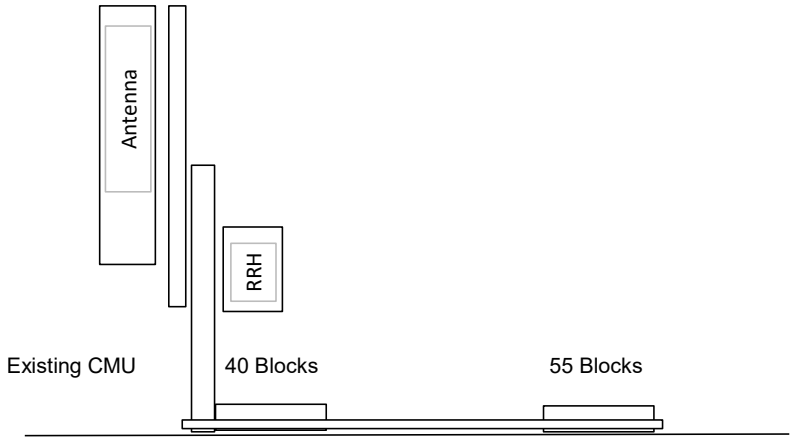
entrex communication services, inc.	**Entrex Project Number:**	1153.742	**Calculated By:**	RMC	**Page:**	7
	Client:	T-Mobile			**Date:**	7/16/2020
	Site Name:	EZ Storage Germantown			**Date:**	
	Site Number:	7WAN101E			**Date:**	
	Engineering Objective:	Investigate Existing Antenna Support Frame			**Sector 1**	

Ballast OTM:

Wind Load			**Ballast Frame Weight**		
OTM, 0.6 WL =	5973	lbs-ft	Total Weight =	4475	lbs
Ballast Width =	8.17	ft	Factored Total Weight, 0.6 D =	2685	lbs
			Resisting Moment =	10965	lbs-ft

$$\frac{\text{Resisting Moment}}{\text{OTM}} = \frac{10965}{5973} = 1.84 > 1.0 \text{ Req'd}$$

OTM	<	Moment Resistance	
5973 lbs-ft	<	10965 lbs-ft	Ok, by inspection



Antenna + Frame, 0.6 DL =	628	lbs	Frame, 0.6 DL =	234	lbs
Gravity Due to Moment 0.6 WL =	731	+/- lbs	Ballast 0.6 WL =	731	+/- lbs
Existing Block Weight, 0.6 DL =	768	lbs	Existing Block Weight, 0.6 DL =	1056	lbs
0.6 DL + 0.6 WL =	2127	lbs	0.6 DL + 0.6 WL =	2021	lbs
0.6 DL - 0.6 WL =	664	lbs	0.6 DL - 0.6 WL =	558	lbs

Conclusion:

The existing non-penetrating antenna support frame with (40) existing solid CMU half blocks to the front of the frame and (55) existing solid CMU half block blocks to the back of the frame was found to be adequate to supprt the existing and proposed antenna loads. The total weight of the frame with 95 CMU half blocks (32 lbs each) is 4475 lbs.

No changes were made to the existing support steel frame and the block quantity remains the same

This analysis assumes that, as part of the original T-Mobile antenna support frame design and/or subsequent upgrade, the existing building structure has been evaluated to support the existing T-Mobile loads and was found to be adequate.

5.0 Structural Calculations

b. Investigate Existing Antenna Support Frame - Sector 2

Problem Statement: T-Mobile proposes to install two new antennas and to install two new RRUs on an existing non-penetrating antenna support frame (Site Pro 1 RTW-14) located on the roof. There are 40 CMU half blocks (4x8x16 32 lbs each assumed) at the front tray and there are 46 CMU half blocks (4x8x16 32 lbs each assumed) at the back tray. The purpose of this calculation is to check the structural adequacy of the CMU block weight to support an existing antenna support frame, an existing panel antenna, two new panel antennas, and two new RRUs.

Design Code: The structural system analysis is in accordance with the requirements of the International Building Code 2015 (IBC 2015).

IBC 2015 Design Code Per Chapter 16 - Structural Design

Risk Category =	II	
Wind Exposure Category =	B	
V_{ult} =	115	mph (3-sec gust Ultimate Design Wind Speed - See Figure 1609B)

Wind Load Calc: Compute wind load per ASCE 7-10 (Section 29 Wind Loads on Other Structures)

Roof Elev. =	56.00	ft
Proposed Antenna Centerline Elev. =	65.00	ft
Proposed Antenna Ht Above Roof =	9.00	ft (from roof to Centerline of Antenna)

ASCE7-10 (29.3 Velocity Pressure)

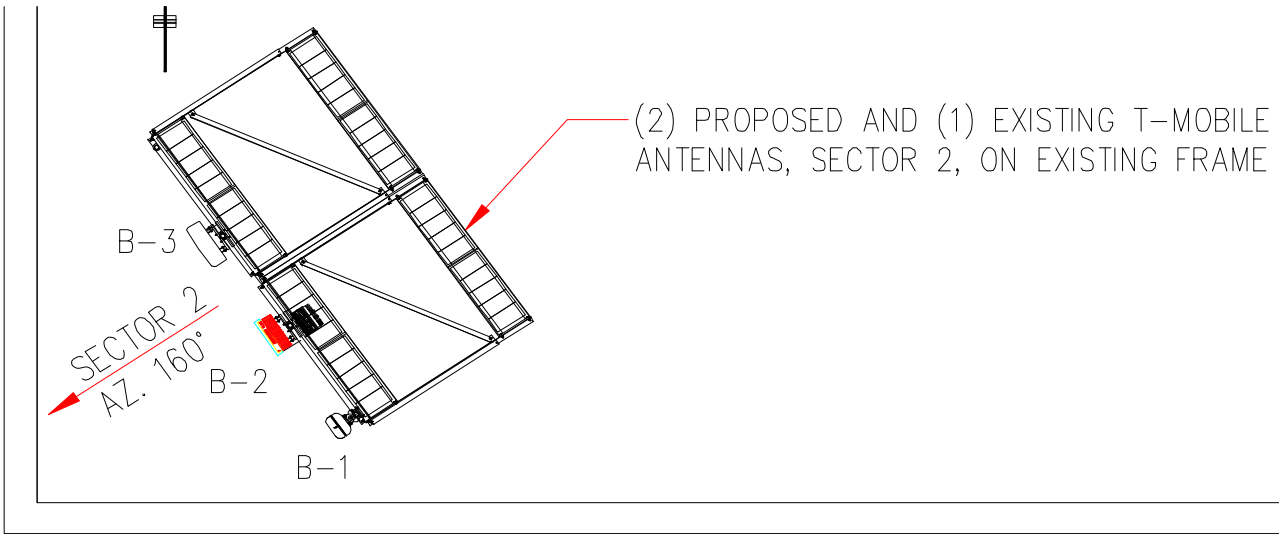
Velocity Pressure = $qz = (0.00256)\ (Kz)\ (Kzt)\ (Kd)\ (V)^2$ Eq 29.3-1

Kz =	0.87	Table 29.3-1 Exposure B
Kzt =	1.00	Section 26.8.2
Kd =	0.85	Table 26.6-1
V =	115	mph 3 second gust (Category II)
qz =	25.15	psf

ASCE7-10 (29.5)

F = qz G Cf Af Eq. 29.5-1

qz =	25.15	psf
G =	0.85	Section 26.9



Entrex Project Number:	1153.742	**Calculated By:**	RMC	**Page:**	9
Client:	T-Mobile			**Date:**	7/16/2020
Site Name:	EZ Storage Germantown			**Date:**	
Site Number:	7WAN101E			**Date:**	
Engineering Objective:	Investigate Existing Antenna Support Frame			**Sector 2**	

Proposed Loads:

WIND LOAD ON ANTENNAS & ANCILLARY ITEMS ; F = qz Gh Cf A

	ANTENNA/ANCILLARY DESCRIPTION	ELEV (FT)	qzGh	Cf	WIND AREA (sf)	F (lbs)	wt (lbs)	MOMENT ARM (FT)	OTM (LBS-FT)	COAX SIZE
	AIR32 KRD901146-1_B66A_B2A	65.0	21.37	1.34	5.07	145	132	9.00	1309	-
	AIR 6449 B41	65.0	21.37	1.30	4.74	132	104	9.00	1184	-
	RFS APXVAARR24_43-U-NA20	65.0	21.37	1.33	15.98	455	153	9.00	4099	-
Shielded	Radio 4449 B71+B85	65.0	21.37	1.30	1.64	0	75	6.00	0	-
Shielded	Radio 4415 B25	65.0	21.37	1.30	1.54	0	46	4.00	0	-
	Upper Horiz (2) L2.5 x 86.5" Long	65.0	21.37	2.00	3.00	128	-	6.13	786	-
	Lower Horiz (2) L2.5 x 86.5" Long	65.0	21.37	2.00	3.00	128	-	2.15	276	-
	Vertical Post (4) L2.5 x 70.5625" Long	65.0	21.37	2.00	4.90	209	-	3.04	638	-
	Diagonal (2) 2" Wide x 95" Long (Exposed)	65.0	21.37	2.00	2.64	113	-	3.75	423	-
	Kicker (4) L2.5 x 70" Long (Projected Length)	65.0	21.37	2.00	4.86	208	-	2.92	606	-
Exposed Pipe	(1) 2" Std Pipe x 10' Long (Position #1)	65.0	21.37	1.20	1.05	27	37	9.00	241	-
Exposed Pipe	(1) 2" Std Pipe x 10' Long (Position #2)	65.0	21.37	1.20	1.43	37	37	9.00	331	-
Exposed Pipe	(1) 2" Std Pipe x 10' Long (Position #3)	65.0	21.37	1.20	0.40	10	37	6.00	61	-
	(1) Vacant 2" Std Pipe x 10' Long (Position #4)	65.0	21.37	1.20	1.98	51	37	9.00	457	-

Total Wind Shear =	1593	lbs
Total Wind Moment =	9955	lbs-ft
Per IBC 2015 Allowable Shear = 0.6 Wind Shear Load =	956	lbs
Per IBC 2015 Allowable Shear = 0.6 Wind Moment Load =	5973	lbs-ft

Antenna, Pipes, & RRH Weight =	656	lbs
Ballast Steel Frame Weight =	779	lbs (without Antenna Pipes)
Existing Block Weight =	2752	lbs (86 Half CMU blocks x 32 lbs)
Total Weight =	4187	lbs

Ballast Sliding:

Investigate ballast resisting sliding shear force (friction coefficient = 0.7 steel vs. rubber)

Factored Frame Weight, 0.6 D =	2512	lbs
Shear Load, 0.6 WL =	956	lbs
Sliding Coefficient u =	0.7	(Sliding coefficient for steel vs. rubber)
Sliding Resistance =	1759	lbs

Sliding Force	<	Sliding Resistance	
956 lbs	<	1759 lbs	Ok, by inspection

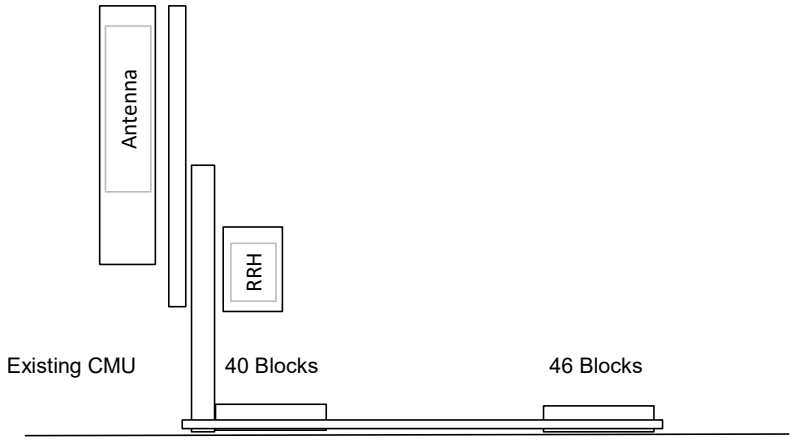
entrex communication services, inc.	**Entrex Project Number:**	1153.742	**Calculated By:**	RMC	**Page:**	10
	Client:	T-Mobile			**Date:**	7/16/2020
	Site Name:	EZ Storage Germantown			**Date:**	
	Site Number:	7WAN101E			**Date:**	
	Engineering Objective:	Investigate Existing Antenna Support Frame			**Sector 2**	

Ballast OTM:

Wind Load			**Ballast Frame Weight**		
OTM, 0.6 WL =	5973	lbs-ft	Total Weight =	4187	lbs
Ballast Width =	8.17	ft	Factored Total Weight, 0.6 D =	2512	lbs
			Resisting Moment =	10259	lbs-ft

$$\frac{\text{Resisting Moment}}{\text{OTM}} = \frac{10259}{5973} = 1.72 > 1.0 \text{ Req'd}$$

OTM	<	Moment Resistance	
5973 lbs-ft	<	10259 lbs-ft	Ok, by inspection



Antenna + Frame, 0.6 DL =	628	lbs	Frame, 0.6 DL =	234	lbs
Gravity Due to Moment 0.6 WL =	731	+/- lbs	Ballast 0.6 WL =	731	+/- lbs
Existing Block Weight, 0.6 DL =	768	lbs	Existing Block Weight, 0.6 DL =	883	lbs
0.6 DL + 0.6 WL =	2127	lbs	0.6 DL + 0.6 WL =	1848	lbs
0.6 DL - 0.6 WL =	664	lbs	0.6 DL - 0.6 WL =	386	lbs

Conclusion:

The existing non-penetrating antenna support frame with (40) existing solid CMU half blocks to the front of the frame and (46) existing solid CMU half block blocks to the back of the frame was found to be adequate to supprt the existing and proposed antenna loads. The total weight of the frame with 86 CMU half blocks (32 lbs each) is 4187 lbs.

No changes were made to the existing support steel frame and the block quantity remains the same

This analysis assumes that, as part of the original T-Mobile antenna support frame design and/or subsequent upgrade, the existing building structure has been evaluated to support the existing T-Mobile loads and was found to be adequate.

5.0 Structural Calculations

c. Investigate Existing Antenna Support Frame - Sector 3

Problem Statement: T-Mobile proposes to install two new antennas and to install two new RRUs on an existing non-penetrating antenna support frame (Site Pro 1 RTW-14) located on the roof. There are 36 CMU half blocks (4x8x16 32 lbs each assumed) at the front tray and there are 56 CMU half blocks (4x8x16 32 lbs each assumed) at the back tray. The purpose of this calculation is to check the structural adequacy of the CMU block weight to support an existing antenna support frame, an existing panel antenna, two new panel antennas, and two new RRUs.

Design Code: The structural system analysis is in accordance with the requirements of the International Building Code 2015 (IBC 2015).

IBC 2015 Design Code Per Chapter 16 - Structural Design

Risk Category =	II	
Wind Exposure Category =	B	
V_{ult} =	115	mph (3-sec gust Ultimate Design Wind Speed - See Figure 1609B)

Wind Load Calc: Compute wind load per ASCE 7-10 (Section 29 Wind Loads on Other Structures)

Roof Elev. =	56.00	ft
Proposed Antenna Centerline Elev. =	65.00	ft
Proposed Antenna Ht Above Roof =	9.00	ft (from roof to Centerline of Antenna)

ASCE7-10 (29.3 Velocity Pressure)

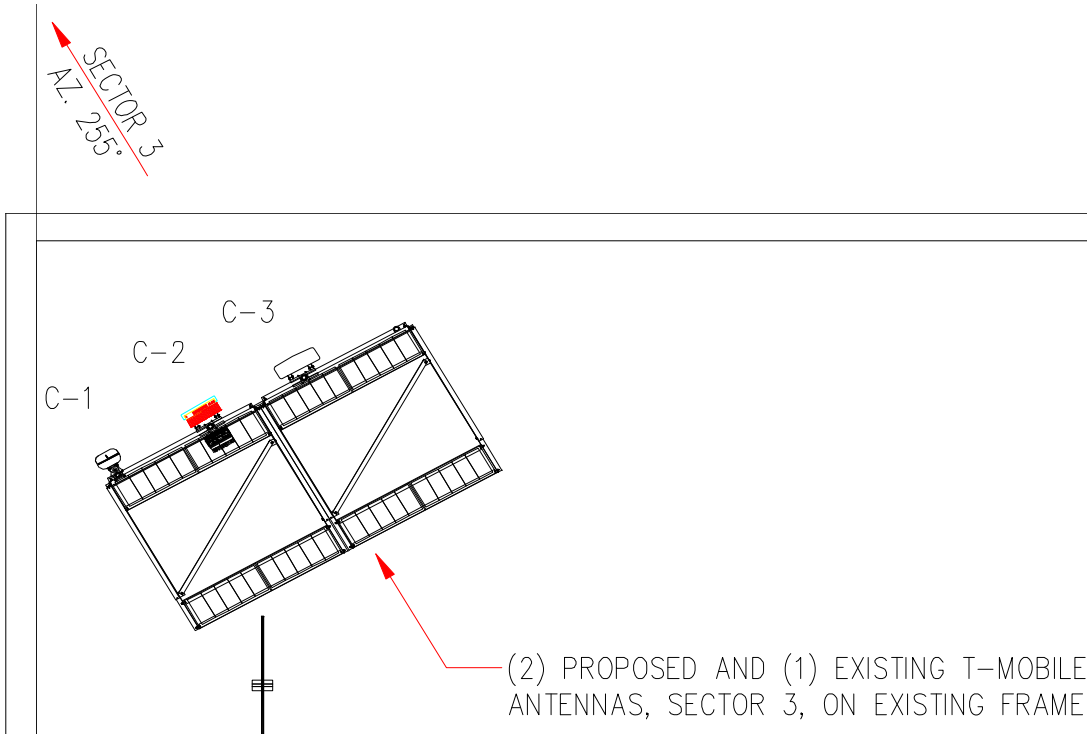
Velocity Pressure = $qz = (0.00256)\ (Kz)\ (Kzt)\ (Kd)\ (V)^2$ Eq 29.3-1

Kz =	0.87	Table 29.3-1 Exposure B
Kzt =	1.00	Section 26.8.2
Kd =	0.85	Table 26.6-1
V =	115	mph 3 second gust (Category II)
qz =	25.15	psf

ASCE7-10 (29.5)

F = qz G Cf Af Eq. 29.5-1

qz =	25.15	psf
G =	0.85	Section 26.9



Entrex Project Number:	1153.742	**Calculated By:**	RMC	**Page:**	12
Client:	T-Mobile			**Date:**	7/16/2020
Site Name:	EZ Storage Germantown			**Date:**	
Site Number:	7WAN101E			**Date:**	
Engineering Objective:	Investigate Existing Antenna Support Frame			**Sector 3**	

Proposed Loads:

WIND LOAD ON ANTENNAS & ANCILLARY ITEMS ; F = qz Gh Cf A

	ANTENNA/ANCILLARY DESCRIPTION	ELEV (FT)	qzGh	Cf	WIND AREA (sf)	F (lbs)	wt (lbs)	MOMENT ARM (FT)	OTM (LBS-FT)	COAX SIZE
	AIR32 KRD901146-1_B66A_B2A	65.0	21.37	1.34	5.07	145	132	9.00	1309	-
	AIR 6449 B41	65.0	21.37	1.30	4.74	132	104	9.00	1184	-
	RFS APXVAARR24_43-U-NA20	65.0	21.37	1.33	15.98	455	153	9.00	4099	-
Shielded	Radio 4449 B71+B85	65.0	21.37	1.30	1.64	0	75	6.00	0	-
Shielded	Radio 4415 B25	65.0	21.37	1.30	1.54	0	46	4.00	0	-
	Upper Horiz (2) L2.5 x 86.5" Long	65.0	21.37	2.00	3.00	128	-	6.13	786	-
	Lower Horiz (2) L2.5 x 86.5" Long	65.0	21.37	2.00	3.00	128	-	2.15	276	-
	Vertical Post (4) L2.5 x 70.5625" Long	65.0	21.37	2.00	4.90	209	-	3.04	638	-
	Diagonal (2) 2" Wide x 95" Long (Exposed)	65.0	21.37	2.00	2.64	113	-	3.75	423	-
	Kicker (4) L2.5 x 70" Long (Projected Length)	65.0	21.37	2.00	4.86	208	-	2.92	606	-
Exposed Pipe	(1) 2" Std Pipe x 10' Long (Position #1)	65.0	21.37	1.20	1.05	27	37	9.00	241	-
Exposed Pipe	(1) 2" Std Pipe x 10' Long (Position #2)	65.0	21.37	1.20	1.43	37	37	9.00	331	-
Exposed Pipe	(1) 2" Std Pipe x 10' Long (Position #3)	65.0	21.37	1.20	0.40	10	37	6.00	61	-
	(1) Vacant 2" Std Pipe x 10' Long (Position #4)	65.0	21.37	1.20	1.98	51	37	9.00	457	-

Total Wind Shear =	1593	lbs
Total Wind Moment =	9955	lbs-ft
Per IBC 2015 Allowable Shear = 0.6 Wind Shear Load =	956	lbs
Per IBC 2015 Allowable Shear = 0.6 Wind Moment Load =	5973	lbs-ft

Antenna, Pipes, & RRH Weight =	656	lbs
Ballast Steel Frame Weight =	779	lbs (without Antenna Pipes)
Existing Block Weight =	2944	lbs (92 Half CMU blocks x 32 lbs)
Total Weight =	4379	lbs

Ballast Sliding:

Investigate ballast resisting sliding shear force (friction coefficient = 0.7 steel vs. rubber)

Factored Frame Weight, 0.6 D =	2628	lbs
Shear Load, 0.6 WL =	956	lbs
Sliding Coefficient u =	0.7	(Sliding coefficient for steel vs. rubber)
Sliding Resistance =	1839	lbs

Sliding Force	<	Sliding Resistance	
956 lbs	<	1839 lbs	Ok, by inspection

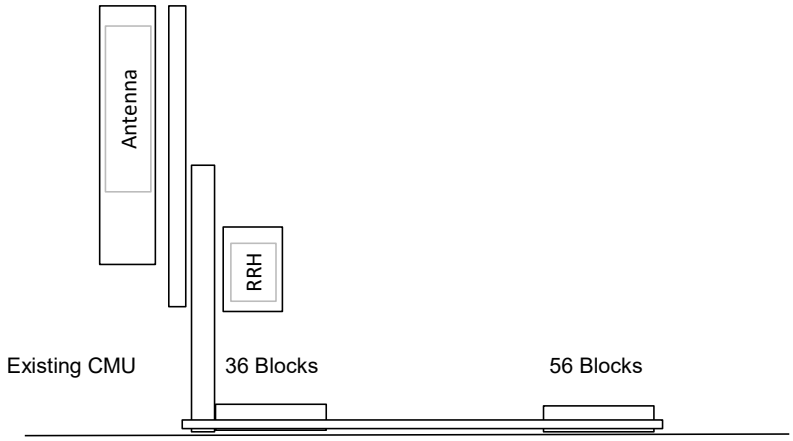
entrex communication services, inc.	**Entrex Project Number:**	1153.742	**Calculated By:**	RMC	**Page:**	13
	Client:	T-Mobile			**Date:**	7/16/2020
	Site Name:	EZ Storage Germantown			**Date:**	
	Site Number:	7WAN101E			**Date:**	
	Engineering Objective:	Investigate Existing Antenna Support Frame			**Sector 3**	

Ballast OTM:

Wind Load			**Ballast Frame Weight**		
OTM, 0.6 WL =	5973	lbs-ft	Total Weight =	4379	lbs
Ballast Width =	8.17	ft	Factored Total Weight, 0.6 D =	2628	lbs
			Resisting Moment =	10730	lbs-ft

$$\frac{\text{Resisting Moment}}{\text{OTM}} = \frac{10730}{5973} = 1.80 > 1.0 \text{ Req'd}$$

OTM	<	Moment Resistance	
5973 lbs-ft	<	10730 lbs-ft	Ok, by inspection



Antenna + Frame, 0.6 DL =	628	lbs	Frame, 0.6 DL =	234	lbs
Gravity Due to Moment 0.6 WL =	731	+/- lbs	Ballast 0.6 WL =	731	+/- lbs
Existing Block Weight, 0.6 DL =	691	lbs	Existing Block Weight, 0.6 DL =	1075	lbs
0.6 DL + 0.6 WL =	2050	lbs	0.6 DL + 0.6 WL =	2040	lbs
0.6 DL - 0.6 WL =	587	lbs	0.6 DL - 0.6 WL =	578	lbs

Conclusion:

The existing non-penetrating antenna support frame with (36) existing solid CMU half blocks to the front of the frame and (56) existing solid CMU half block blocks to the back of the frame was found to be adequate to supprt the existing and proposed antenna loads. The total weight of the frame with 92 CMU half blocks (32 lbs each) is 4379 lbs.

No changes were made to the existing support steel frame and the block quantity remains the same

This analysis assumes that, as part of the original T-Mobile antenna support frame design and/or subsequent upgrade, the existing building structure has been evaluated to support the existing T-Mobile loads and was found to be adequate.

T-MOBILE NORTHEAST LLC

SITE NUMBER: 7WAN101E
SITE NAME: EZ STORAGE GERMANTOWN

12211 MIDDLEBROOK RD
GERMANTOWN, MD 20874

CONFIGURATION: 67D5A997DB OUTDOOR

T-MOBILE NORTHEAST LLC
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705
PHONE: (240) 264-8600

entrex communication services, inc.
6100 EXECUTIVE BLVD
SUITE 350
ROCKVILLE, MD 20852
PHONE: (202) 408-0960

SITE LINK
Site Link Wireless, LLC
3620 Commerce Drive, Suite 707
Baltimore, MD 21227
www.sitelinkwireless.com
410-309-4949

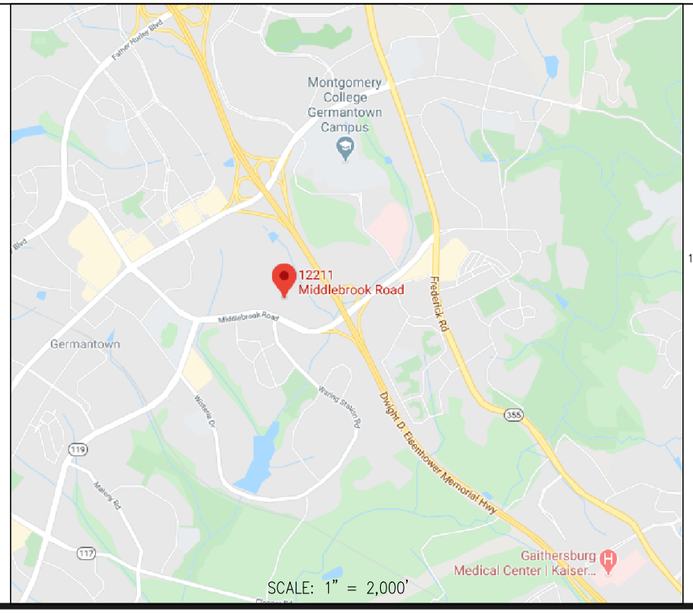
SITE INFORMATION

SCOPE OF WORK:
1. INSTALL (3) NEW AIR6449 B41 ANTENNAS ON EXISTING SUPPORT FRAMES.
2. REPLACE (3) EXISTING APXVF24-C-A20 ANTENNAS WITH (3) NEW APXVAARR24 ANTENNAS
2. REPLACE (3) EXISTING RRUS11 B12 WITH (3) NEW RADIO 6415 B25 AND (3) NEW RADIO 6449 B71+B85
3. INSTALL (2) PROPOSED EQUIPMENT CABINETS ON PROPOSED STEEL PLATFORM.
4. RECONFIGURE NEW & EXISTING CABLE CONNECTIONS TO ANTENNAS AND EXISTING EQUIPMENT CABINETS.
5. UPGRADE POWER TO 200A

JURISDICTION:	MONTGOMERY COUNTY
USE:	R200 – RESIDENTIAL DETACHED
TAX ACCOUNT NUMBER:	09-03298020
PARCEL OWNER:	MIDDLEBROOK LAND LLLP
ADDRESS:	C/O SIENA CORPORATION 8221 SNOWDEN RIVER PARKWAY COLUMBIA, MARYLAND 21045
MAP/ PARCEL:	EU52/ N944
STRUCTURE TYPE:	ROOFTOP
GROUND ELEVATION:	±448' AMSL
LATITUDE:	N 39° 10' 33.92"
LONGITUDE:	W 77° 15' 10.19"

NOTE TO GENERAL CONTRACTOR
NO WORK IS TO BE PERFORMED ON THIS SITE WITHOUT REVIEW OF THE APPROVED STRUCTURAL ANALYSIS. IF ANY DISCREPANCIES ARE FOUND THE GENERAL CONTRACTOR SHALL NOTIFY ENGINEER IN WRITING. AT NO TIME WILL ANY ADDITIONAL ANTENNAS BE INSTALLED WITHOUT WRITTEN CONSENT FROM TOWER ENGINEER.

VICINITY MAP



SHEET INDEX

7WAN101E
EZ STORAGE GERMANTOWN
12211 MIDDLEBROOK RD
GERMANTOWN, MD 20874

SEAL:

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 17641, Expiration Date: 12/27/2021

SUBMITTALS

DATE	DESCRIPTION	REV.
07-14-2020	CONSTRUCTION REVIEW	A
07-22-2020	CONSTRUCTION	0

PROJECT TEAM

APPLICANT:	T-MOBILE NORTHEAST LLC 12050 BALTIMORE AVE. BELTSVILLE, MD 20705 PHONE: (301) 264-8600
ARCHITECT/ENGINEER:	ENTREX COMMUNICATION SERVICES, INC. 6100 EXECUTIVE BLVD, SUITE 350 ROCKVILLE, MD 20852 CAMILLE SHABSHAB (202) 408-0960
PROJECT MANAGEMENT:	SITELINK WIRELESS LLC 3620 COMMERCE DR, SUITE 707 BALTIMORE, MD 21227 PROJECT MANAGER: PAUL OLER PHONE: (443) 270-8020

CODE COMPLIANCE

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

- 2015 INTERNATIONAL BUILDING CODE
- 2014 NFPA 70 NATIONAL ELECTRICAL CODE
- 2015 NFPA 101 LIFE SAFETY CODE
- 2015 INTERNATIONAL MECHANICAL CODE
- AMERICAN CONCRETE INSTITUTE
- AMERICAN INSTITUTE OF STEEL CONSTRUCTION
- MANUAL OF STEEL CONSTRUCTION 13TH EDITION
- ANSI/TIA-222-G
- TIA 607
- INSTITUTE FOR ELECTRICAL & ELECTRONICS ENGINEER 81
- IEEE C2 NATIONAL ELECTRIC SAFETY CODE LATEST EDITION
- ANSI/T 311

APPROVAL BLOCK

		APPROVED	APPROVED AS NOTED	REVISE & RESUBMIT
OWNER REPRESENTATIVE	DATE	☐	☐	☐
SITE AQUISITION	DATE	☐	☐	☐
CONSTRUCTION MANAGER	DATE	☐	☐	☐
ZONING	DATE	☐	☐	☐
RF ENGINEER	DATE	☐	☐	☐

PROJECT NO:	1153.742
DESIGNER:	A.J.
ENGINEER:	C.S.

THESE DRAWINGS ARE FORMATTED TO BE FULL-SIZE AT 22"X34"
0 1/2 1
GRAPHIC SCALE IN INCHES

TITLE:

TITLE SHEET

SHEET NUMBER:

T-1

STRUCUTRAL NOTES

1. THE STRUCTURAL STEEL CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ANCHOR BOLT LOCATIONS, ELEVATIONS OF TOP OF CONCRETE AND BEARING PLATES, ALIGNMENT ETC. PRIOR OF STEEL ERECTION.

2. THE LATEST EDITION OF THE FOLLOWING SPECIFICATIONS SHALL GOVERN:
   A. AISC- "ALLOWABLE STRESS DESIGN SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS".
   B. AISC- "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES".
   C. AWS- "D1.1 STRUCTURAL WELDING CODE-STEEL".

3. MATERIAL, UNLESS OTHERWISE NOTED, SHALL CONFORM TO THE FOLLOWING ASTM SPECIFICATIONS

STRUCTURAL WIDE FLANGE & M SHAPES	A992 OR A572, FY = 50KSI
OTHER STRUCTURAL SHAPES AND PLATES	A36, F = 36KSI
STRUCTURAL TUBING	A500, GRADE B, FY = 46KSI
HIGH STRENGTH BOLTS	A325
THREADED RODS	A354, GRANDE BC
ANCHOR BOLTS	A325 OR A354 BC
PIPE (HANDRAIL)	SCH 40 PIPE

4. ALL WELDING SHALL BE IN ACCORDANCE WITH AWS D1.1 USING E70XX ELECTRODES. UNLESS OTHERWISE NOTED PROVIDE CONTINUOUS MINIMUM SIZED FILLET WELDS PER AISC REQUIREMENTS.

5. HOLES IN STEEL SHALL BE DRILLED OR PUNCHED. ALL SLOTTED HOLES SHALL BE PROVIDED WITH SMOOTH EDGES. BURNING OF HOLES AND TORCH CUTTING AT THE SITE IN NOT PERMITTED. ALL HOLES IN BEARING PLATES SHALL BE DRILLED.

6. ALL STEEL TO BE HOT-DIPPED GALVANIZED AFTER FABRICATION PER ASTM A123.

7. EPOXY ANCHORS TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS.

8. ALL BOLTS SHALL BE TIGHTENED USING TURN-OF-THE-NUT METHOD PER AISC SPECIFICATIONS USING STANDARD HOLES.

9. THE INFORMATION SHOWN ON THESE DRAWINGS WAS OBTAINED BY FIELD MEASUREMENT. THE GENERAL CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIALS OR PROCEEDING WITH CONSTRUCTION.

10. THE GENERAL CONTRACTOR AND HIS SUB CONSULTANTS SHALL BE RESPONSIBLE FOR OBTAINING ALL BUILDING AND OR TRADE PERMITS AND INSPECTIONS THAT MAY BE REQUIRED FOR THE WORK.

11. STRUCTURAL THREADED FASTENERS FOR STEEL ANTENNA MOUNTING ASSEMBLIES SHALL CONFORM TO ASTM A307 OR ASTM A36. STRUCTURAL FASTENERS FOR STRUCTURAL STEEL FRAMING SHALL CONFORM TO ASTM A325. STRUCTURAL FASTENERS SHALL BE 5/8" DIAMETER BEARING TYPE CONNECTIONS WITH THE THREADS EXCLUDED FROM THE SHEAR PLANE FOR ANGLES. STRUCTURAL FASTENERS SHALL BE 3/4" DIAMETER BEARING TYPE CONNECTIONS WITH THE THREADS EXCLUDED FROM THE SHEAR PLANE FOR ALL OTHER STRUCTURAL SHAPES. ALL EXPOSED STRUCTURAL FASTENERS, NUTS AND WASHERS SHALL BE HOT DIP GALVANIZED UNLESS OTHERWISE NOTED.

12. EXPANSION ANCHORS INSTALLED IN CONCRETE SHALL BE HILTI STAINLESS STEEL ANCHORS AS SPECIFIED ON THE PLANS. THE EXPANSIONS ANCHORS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS DIRECTIONS.

13. NORTH ARROW SHOWN ON PLANS REFERS TO TRUE NORTH. CONTRACTOR SHALL SHALL VERIFY NORTH AND INFORM ARCHITECT/ENGINEER OF ANY DISCREPANCY BEFORE STARTING CONSTRUCTION.

14. ROOF PROTECTION PADS UNDER THE CABLE BRIDGE SLEEPERS AND ROOF PAVERS SHALL BE 0.30" THICK RUBBER FIRESTONE PROTECTION PADS. THE ROOF PROTECTION PADS SHALL EXTEND A MINIMUM OF 2" BEYOND THE PERIMETER OF THE OF THE SLEEPERS. PROVIDE A 28 LB FELT SEPARATOR SHEET 2" LARGER THAN THE ROOF PROTECTION PAD DIRECTLY ON THE ROOF. REMOVE ALL LOOSE STONES PRIOR TO PLACING THE SEPARATOR SHEET. ROOF PROTECTION PADS SHALL NOT BE PLACED WITH IN 6" OF AN ADJACENT PAD OR OTHER ROOF OBSTRUCTION TO FACILITATE DRAINAGE.

15. THE CONTRACTOR SHALL COORDINATE ALL WORK WITH THE BUILDING OWNER'S ROOF CONTRACTOR WHO WILL COMPLETE ALL WORK ASSOCIATED WITH THE ROOF. THE CONTRACTOR SHALL OBTAIN WRITTEN APPROVAL FROM THE BUILDING OWNER'S ROOF CONTRACTOR BEFORE INSTALLATION OF ANY ROOF MOUNTED EQUIPMENT.

16. ALL CAST IN PLACE CONCRETE SHALL BE MIXED AND PLACED IN ACCORDANCE WITH THE REQUIREMENTS OF ACI 318 AND ACI 301, AND SHALL HAVE A 28 DAY MINIMUM COMPRESSIVE STRENGTH OF 3000 psi (U.O.N). CONCRETE SHALL BE PLACED AGAINST UNDISTURBED SOIL, UNLESS OTHERWISE NOTED. MINIMUM CONCRETE COVER FOR REINFORCING STEEL SHALL BE 3 INCHES UNLESS OTHERWISE NOTED.

17. CONCRETE SHALL BE 4 TO 6% AIR ENTRAINED.

18. ALL REINFORCING STEEL SHALL CONFORM TO ASTM 615 GRADE 60. DEFORMED BILLET STEEL BARS. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185.

19. FENCED AREA SHALL BE CLEARED AND GRUBBED. REMOVE UNSUITABLE LOOSE OR SOFT SOIL, ORGANIC MATERIAL OR RUBBLE, TO FIRM SUBGRADE. FILL UNDER CUT AND COMPACT UP TO 6" BELOW FINISH GRADE. PLACE A MIRAFI 500X SOIL STABILIZATION FABRIC ON SUBGRADE. FILL WITH 6" OF AASHTO 57 STONE TO FINISH GRADE.

20. WHERE FILL IS REQUIRED, FILL IN LAYERS WHICH DO NOT EXCEED 8" BEFORE COMPACTION. SPREAD LAYER UNIFORMLY AND EVENLY. BLADE MIX EACH LAYER TO ENSURE MATERIAL UNIFORMITY. FILL MATERIAL SHALL NOT CONTAIN MATERIAL MORE THAN 3" IN DIAMETER. COMPACT EACH LAYER NOT LESS THAN 95% OF MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D1557 MODIFIED PROCTOR TEST OR (ASTM D698 STANDARD PROCTOR TEST). USE FILL MATERIAL WITH MOISTURE CONTENT AS REQUIRED TO ATTAIN THE SPECIFIED DEGREE OF COMPACTION. COMPACT USING MULTIPLE WHEEL PNEUMATIC TIRE ROLLED, VIBRATORY ROLLER, OR SHEEPS FOOT ROLLERS.

21. REPAIR, PATCH, RE-FINISH AND PAINT ALL SURFACES DAMAGED TO MATCH THE ADJACENT SURFACE AS A RESULT OF REMOVING, RECONFIGURING OR REPLACING EQUIPMENT.

22. IF NEEDED, PROVIDE FIRE SEAL AND CAULKING FOR ALL PENETRATIONS THROUGH FIRE RATED WALLS, FLOORS AND CEILINGS. NO SUCH PENETRATIONS ARE PROPOSED AS PART OF THIS SCOPE OF WORK.

GENERAL NOTES

1. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE CODES ORDINANCES, LAWS AND REGULATIONS OF ALL MUNICIPALITIES, UTILITIES COMPANY OR OTHER PUBLIC AUTHORITIES.

2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS THAT MAY BE REQUIRED BY ANY FEDERAL, STATE, COUNTY OR MUNICIPAL AUTHORITIES.

3. THE CONTRACTOR SHALL NOTIFY THE CONSTRUCTION MANAGER, IN WRITING, OF ANY CONFLICTS, ERRORS OR OMISSIONS PRIOR TO THE SUBMISSION OF BIDS OR PERFORMANCE OF WORK. MINOR OMISSIONS OR ERRORS IN THE BID DOCUMENTS SHALL NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY FOR THE OVERALL INTENT OF THESE DRAWINGS.

4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING SITE IMPROVEMENTS PRIOR TO COMMENCING CONSTRUCTION. THE CONTRACTOR SHALL REPAIR ANY DAMAGE CAUSED AS A RESULT OF CONSTRUCTION OF THIS FACILITY.

5. THE SCOPE OF WORK FOR THIS PROJECT SHALL INCLUDE PROVIDING ALL MATERIALS, EQUIPMENT AND LABOR REQUIRED TO COMPLETE THIS PROJECT. ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

6. THE CONTRACTOR SHALL VISIT THE PROJECT SITE PRIOR TO SUBMITTING A BID TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

7. CONTRACTOR SHALL VERIFY ANTENNA ELEVATION AND AZIMUTH WITH RF ENGINEERING PRIOR TO INSTALLATION.

8. TRANSMITTER EQUIPMENT AND ANTENNAS ARE DESIGNED TO MEET ANSI/EIA/TIA 222-G REQUIREMENTS.

9. ALL STRUCTURAL ELEMENTS SHALL BE HOT DIPPED GALVANIZED STEEL.

10. CONTRACTOR SHALL MAKE A UTILITY "ONE CALL" TO LOCATE ALL UTILITIES PRIOR TO EXCAVATING.

11. IF ANY UNDERGROUND UTILITIES OR STRUCTURES EXIST BENEATH THE PROJECT AREA, CONTRACTOR MUST LOCATE IT AND CONTACT THE APPLICANT & THE OWNER'S REPRESENTATIVE.

12. OCCUPANCY IS LIMITED TO PERIODIC MAINTENANCE AND INSPECTION BY TECHNICIANS APPROXIMATELY 2 TIMES PER MONTH.

13. PROPERTY LINE INFORMATION WAS PREPARED USING DEEDS, TAX MAPS, AND PLANS OF RECORD AND SHOULD NOT BE CONSTRUED AS AN ACCURATE BOUNDARY SURVEY.

14. THIS PLAN IS SUBJECT TO ALL EASEMENTS AND RESTRICTIONS OF RECORD.

15. THE PROPOSED FACILITY WILL CAUSE ONLY A "DE MINIMIS" INCREASE IN STORMWATER RUNOFF. THEREFORE, NO DRAINAGE STRUCTURES ARE PROPOSED.

16. NO SIGNIFICANT NOISE, SMOKE, DUST OR ODOR WILL RESULT FROM THIS FACILITY.

17. THE FACILITY IS UNMANNED AND NOT INTENDED FOR HUMAN HABITATION (NO HANDICAP ACCESS REQUIRED).

18. THE FACILITY IS UNMANNED AND DOES NOT REQUIRE POTABLE WATER OR SANITARY SERVICE.

19. POWER TO THE FACILITY WILL BE MONITORED BY A SEPARATE METER UNLESS OTHERWISE NOTED IN THIS DRAWING SET.

GROUNDING NOTES

1. GROUNDING SHALL COMPLY WITH ARTICLE 250 OF THE NATIONAL ELECTRICAL CODE.

2. ALL GROUNDING DEVICES SHALL BE U.L. APPROVED OR LISTED FOR THEIR INTENDED USE.

3. ALL WIRES SHALL BE AWG THHN/THWN COPPER UNLESS NOTED OTHERWISE.

4. GROUNDING CONNECTIONS TO GROUND RODS, GROUND RING WIRE, TOWER BASE AND FENCE POSTS SHALL BE EXOTHERMIC ("CADWELDS") UNLESS NOTES OTHERWISE. CLEAN SURFACES TO SHINY METAL. WHERE GROUND WIRES ARE CADWELDED TO GALVANIZED SURFACE, SPRAY CADWELD WITH GALVANIZING PAINT.

5. GROUNDING CONNECTIONS TO GROUND BARS ARE TO BE TWO HOLE BRASS MECHANICAL CONNECTORS WITH STAINLESS STEEL HARDWARE (INCLUDING SCREW SET) CLEAN GROUND BAR TO SHINY METAL. AFTER MECHANICAL CONNECTION, TREAT WITH PROTECTIVE ANTIOXIDANT COATING.

6. GROUND COAXIAL CABLE SHIELDS AT BOTH ENDS WITH MANUFACTURER'S GROUNDING KITS.

7. ROUTE GROUNDING CONDUCTORS THE SHORTEST AND STRAIGHTEST PATH POSSIBLE. BEND GROUNDING LEADS WITH A MINIMUM 12" RADIUS.

8. INSTALL 2 AWG GREEN-INSULATED STRANDED WIRE FOR ABOVE GRADE GROUNDING AND 2 BARE TINNED COPPER WIRE FOR BELOW GRADE GROUNDING UNLESS OTHERWISE NOTED.

9. REFER TO GROUNDING PLAN FOR GROUND BAR LOCATIONS. GROUNDING CONNECTIONS SHALL BE EXOTHERMIC TYPE ("CADWELDS") TO ANTENNA MOUNTS AND GROUND RING. REMAINING GROUNDING CONNECTIONS SHALL BE COMPRESSION FITTINGS. CONNECTION TO GROUND BARS SHALL BE MADE WITH TWO-HOLE LUGS.

10. THE GROUND ELECTRODE SYSTEM SHALL CONSIST OF DRIVEN GROUND RODS POSITION ACCRUING TO GROUNDING PLAN. THE GROUND RODS SHALL BE 5/8"x8'-0" COPPER CLAD STEEL INTERCONNECTED WITH 2 BARE TINNED COPPER WIRE BURIED 30" BELOW GRADE. BURY GROUND RODS A MAXIMUM OF 15' APART, AND A MINIMUM OF 8' APART.

11. IF ROCK IS ENCOUNTERED GROUND RODS SHALL BE PLACED AT AN OBLIQUE ANGLE NOT TO EXCEED 45'.

12. EXOTHERMIC WELDS SHALL BE MADE IN ACCORDANCE WITH ERICO PRODUCTS BULLETIN A-AT.

13. CONSTRUCTION OF GROUND RING AND CONNECTIONS TO EXISTING GROUND RING SYSTEM SHALL BE DOCUMENTED WITH PHOTOGRAPHS PRIOR TO BACKFILLING SITE. PROVIDE PHOTOS TO THE T-MOBILE CONSTRUCTION MANAGER.

14. GROUND RING & CONNECTIONS TO IT SHALL BE 2 AWG SOLID BARE TINNED COPPER WIRE. EQUIPMENT GROUND CONNECTIONS TO MGB SHALL BE 2 AWG STRANDED TO WIRE.

15. PRIOR TO INSTALLING LUGS ON GROUND WIRES, APPLY THOMAS & BETTS KOPR-SHIELD (TM OF JET LUBE INC.). PRIOR TO BOLTING GROUND WIRE LUGS TO GROUND BARS, APPLY KOPR-SHIELD OR EQUAL.

16. ENGAGE AN INDEPENDENT ELECTRICAL TESTING FIRM TO TEST AND VERIFY THAT IMPEDANCE DOES NOT EXCEED FIVE OHMS TO GROUND BY MEANS OF "FALL OF POTENTIAL TEST". TEST SHALL BE WITNESSED BY A T-MOBILE REPRESENTATIVE, AND RECORDED ON THE "GROUND RESISTANCE TEST" FORM.

17. WHERE BARE COPPER GROUND WIRES ARE ROUTED FROM ANY CONNECTION ABOVE GRADE TO GROUND RING, INSTALL WIRE IN 3/4" PVC SLEEVE, FROM 1' BELOW GRADE AND SEAL TOP WITH SILICON MATERIAL.

18. PREPARE ALL BONDING SURFACES FOR GROUNDING CONNECTIONS BY REMOVING ALL PAINT AND CORROSION DOWN TO SHINY METAL. FOLLOWING CONNECTIONS, APPLY APPROPRIATE ANTI-OXIDIZATION PAINT.

19. ANY SITE WHERE THE EQUIPMENT (BTS, CABLE BRIDGE, PPC, GENERATOR, ETC.) IS LOCATED WITHIN 6 FEET OF METAL FENCING, THE GROUND RING SHALL BE BONDED TO THE NEAREST FENCE POST USING (3) RUNS OF 2 BARE TINNED COPPER WIRE.

20. TOWER BASE BUSS BAR REQUIRES (2) SOLID LEADS CADWELD TO THE BUSS BAR.

21. MAIN EQUIPMENT BUSS BAR REQUIRES (2) SOLID LEADS CADWELD TO IT AND TO THE GROUND RING.

22. ALL SOLID LEADS TERMINATED TO EITHER A BUSS BAR OR EQUIPMENT SHALL BE PROTECTED WITH CARFLEX.

23. ALL SOLID GROUND LEADS NOT BEING USED SHALL BE COILED UP (PIGTAILS) FOR FUTURE USE AS NEEDED.

ELECTRICAL NOTES

1. SUBMITTAL OF BID INDICATES THAT THE CONTRACTOR IS COGNIZANT OF ALL JOB SITE CONDITIONS AND WORK TO BE PERFORMED UNDER THIS CONTRACT.

2. CONTRACTOR SHALL PERFORM ALL VERIFICATIONS, OBSERVATION TESTS, AND EXAMINATION WORK PRIOR TO ORDERING OF ANY EQUIPMENT AND THE ACTUAL CONSTRUCTION. CONTRACTOR SHALL ISSUE A WRITTEN NOTICE OF ALL FINDINGS TO THE PROJECT MANAGER LISTING ALL MALFUNCTIONS, FAULTY EQUIPMENT AND DISCREPANCIES.

3. VERIFY HEIGHT WITH PROJECT MANAGER PRIOR TO INSTALLATION.

4. THESE PLANS ARE DIAGRAMMATIC ONLY, FOLLOW AS CLOSELY AS POSSIBLE.

5. CONTRACTOR SHALL COORDINATE ALL WORK BETWEEN TRADES AND ALL OTHER SCHEDULING AND PROVISIONALLY CIRCUMSTANCES SURROUNDING THE PROJECT.

6. CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, INSURANCE, EQUIPMENT INSTALLATION CONSTRUCTION TOOLS, TRANSPORTATION ETC., FOR COMPLETE AND FUNCTIONALLY OPERATING SYSTEMS ENERGIZED AND READY FOR USE THROUGHOUT AS INDICATED ON DRAWINGS, AS SPECIFIED HEREIN AND/OR AS OTHERWISE REQUIRED.

7. ALL MATERIAL AND EQUIPMENT SHALL BE NEW AND IN PERCENT CONDITION WHEN INSTALLED AND SHALL BE OF THE BEST GRADE AND OF THE SAME MANUFACTURER THROUGHOUT FOR EACH CLASS OR GROUP OF EQUIPMENT. ELECTRICAL MATERIALS SHALL BE LISTED AND APPROVED BY UNDERWRITER'S LABORATORIES AND SHALL BEAR THE INSPECTION LABEL "J" WHERE SUBJECT TO SUCH APPROVAL. MATERIALS SHALL MEET WITH APPROVAL OF ALL GOVERNING BODIES HAVING JURISDICTION OVER THE CONSTRUCTION. MATERIALS SHALL BE MANUFACTURED IN ACCORDANCE WITH ALL CURRENT APPLICABLE STANDARDS ESTABLISHED BY ANSI, NEMA AND NBFU. ALL MATERIALS AND EQUIPMENT SHALL BE APPROVED FOR THEIR INTENDED USE AND LOCATION.

8. ALL WORK SHALL COMPLY WITH ALL APPLICABLE GOVERNING STATE, COUNTY AND CITY CODES AND OSHA, NFPA, NEC & ASHRAE REQUIREMENTS.

9. ENTIRE JOB SHALL BE GUARANTEED FOR A PERIOD OF ONE (1) YEAR AFTER THE DATE OF JOB ACCEPTANCE. ALL WORK, MATERIAL AND EQUIPMENT FOUND TO BE FAULTY DURING THAT PERIOD SHALL BE CORRECTED AT ONCE, UPON WRITTEN NOTIFICATION, AT THE EXPENSE OF THE CONTRACTOR.

10. PROPERLY SEAL ALL PENETRATIONS. PROVIDE UL LISTED FIRE-STOPS WHERE PENETRATIONS ARE MADE THROUGH FIRE-RATED ASSEMBLIES. WATER-TIGHT USING SILICONE SEALANT.

11. LOCATE ALL PENETRATIONS SUCH THAT ALL REINFORCEMENT CONTAINED WITHIN THE EXISTING BUILDING CONSTRUCTION REMAINS INTACT AND UNDISTURBED. SUBMIT LOCATING METHOD TO PROJECT MANAGER FOR APPROVAL PRIOR TO EXECUTION.

12. DELIVER ALL BROCHURES, OPERATING MANUALS, CATALOGS AND SHOP DRAWINGS TO THE PROJECT MANAGER AT JOB COMPLETION. PROVIDE MAINTENANCE MANUALS FOR MECHANICAL EQUIPMENT. AFFIX MAINTENANCE LABELS TO MECHANICAL EQUIPMENT.

13. ALL CONDUCTORS SHALL BE COPPER. MINIMUM CONDUCTOR SIZE SHALL BE 12 AWG., UNLESS OTHERWISE NOTED. CONDUCTORS SHALL BE TYPE THHW, RATED IN ACCORDANCE WITH NEC 110-14(C).

14. ALL CIRCUIT BREAKERS, FUSES AND ELECTRICAL EQUIPMENT SHALL HAVE AN INTERRUPTING RATING NOT LESS THE MAXIMUM INTERRUPTING CURRENT TO WHICH THEY MAY BE SUBJECTED.

15. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE; ARTICLES 250 & 810 AND THE UTILITY COMPANY STANDARDS.

16. CONDUIT: ALL ABOVE GRADE CONDUITS SHALL BE RIGID & LFMC TO 6' AS STATED BELOW

   A. RIGID CONDUIT SHALL BE U.L. LABEL GALVANIZED ZINC COATED WITH ZINC INTERIOR AND SHALL BE USED WHEN INSTALLED IN OR UNDER CONCRETE SLABS, IN CONTACT WITH THE EARTH, UNDER PUBLIC ROADWAYS, IN MASONRY WALLS OR EXPOSED ON BUILDING EXTERIOR. RIGID CONDUIT IN CONTACT WITH EARTH SHALL BE 1/2 LAPPED WRAPPED WITH HUNTS WRAP PROCESS NO. 3.

   B. ELECTRICAL METALLIC TUBING SHALL HAVE U.L. LABEL, FITTINGS SHALL BE GLAND RING COMPRESSION TYPE. EMT SHALL BE USED ONLY FOR INTERIOR RUNS.

   C. LIQUID-TIGHT FLEXIBLE METAL CONDUIT SHALL BE U.L. LISTED AND SHALL BE USED AT FINAL CONNECTIONS TO MECHANICAL EQUIPMENT & RECTIFIERS AND WHERE PERMITTED BY CODE. ALL CONDUIT IN EXCESS OF SIX FEET IN LENGTH SHALL CONTAIN A FULL-SIZE GROUND CONDUCTOR.

   D. CONDUIT RUNS SHALL BE SURFACE MOUNTED ON CEILINGS OR WALLS UNLESS NOTED OTHERWISE. ALL CONDUIT SHALL RUN PARALLEL OR PERPENDICULAR TO WALLS, FLOOR, CEILING, OR BEAMS. VERIFY EXACT ROUTING OF ALL EXPOSED CONDUIT WITH THE PROJECT MANAGER PRIOR TO INSTALLING.

   E. PVC CONDUIT MAY BE PROVIDED ONLY WHERE SHOWN, OR IN UNDERGROUND INSTALLATIONS. PROVIDE UV-RESISTANT CONDUIT WHERE EXPOSED TO THE ATMOSPHERE. PROVIDE GROUND CONDUCTOR IN ALL PVC RUNS; EXCEPT WHERE PERMITTED BY CODE TO OMIT.

17. ALL ELECTRICAL EQUIPMENT SHALL BE LABELED WITH PERMANENT ENGRAVED PHENOLIC PLASTIC NAMEPLATES. PPC, METER, DISCONNECT, RAC353, PBC05, AND HF JUNCTION BOX. BACKGROUND SHALL BE BLACK WITH WHITE LETTERS; EXCEPT AS REQUIRED BY CODE TO FOLLOW A DIFFERENT SCHEME.

18. UPON COMPLETION OF WORK, CONDUCT CONTINUITY, SHORT CIRCUIT, AND FALL OF POTENTIAL GROUNDING TESTS FOR APPROVAL. SUBMIT TEST REPORTS TO T-MOBILE PROJECT MANAGER. GROUNDING SYSTEM RESISTANCE SHALL NOT EXCEED 5 OHMS. IF THE RESISTANCE VALUE IS EXCEEDED, NOTIFY THE T-MOBILE PROJECT MANAGER FOR FURTHER INSTRUCTION ON METHODS FOR REDUCING THE RESISTANCE VALUE.

19. CLEAN PREMISES OF ALL DEBRIS RESULTING FROM WORK AND LEAVE WORK IN A COMPLETE AND UNDAMAGED CONDITION. LEGALLY DISPOSE OF ALL REMOVED, UNUSED AND EXCESS MATERIAL GENERATED BY THE WORK OF THIS CONTRACT. DELIVER ITEMS INDICATED ON THE DRAWINGS TO THE OWNER IN GOOD CONDITION. OBTAIN SIGNED RECEIPT UPON DELIVERY.

20. COORDINATE WITH UTILITY COMPANY FOR CONNECTION OF TEMPORARY AND PERMANENT POWER TO THE SITE. THE TEMPORARY POWER AND ALL HOOKUP COSTS SHALL BE PAID BY THE CONTRACTOR.

21. VERIFY ALL EXISTING CIRCUITRY PRIOR TO REMOVAL AND NEW WORK. MAINTAIN POWER TO ALL OTHER AREAS & CIRCUITS NOT SCHEDULED FOR REMOVAL.

22. RED LINED AS-BUILT PLANS SHALL BE PROVIDED TO THE T-MOBILE CONSTRUCTION MANAGER.

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410-309-4949

7WAN101E
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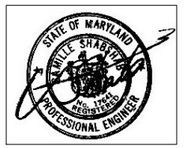
12211 MIDDLEBROOK RD
GERMANTOWN, MD 20874

SEAL:



Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 17641, Expiration Date: 12/27/2021

SUBMITTALS

DATE	DESCRIPTION	REV.
07-14-2020	CONSTRUCTION REVIEW	A
07-22-2020	CONSTRUCTION	0

PROJECT NO:	1153.742
DESIGNER:	A.J.
ENGINEER:	C.S.

THESE DRAWINGS ARE FORMATTED TO BE FULL-SIZE AT 22"X34"
0 1/2 1
GRAPHIC SCALE IN INCHES

TITLE:

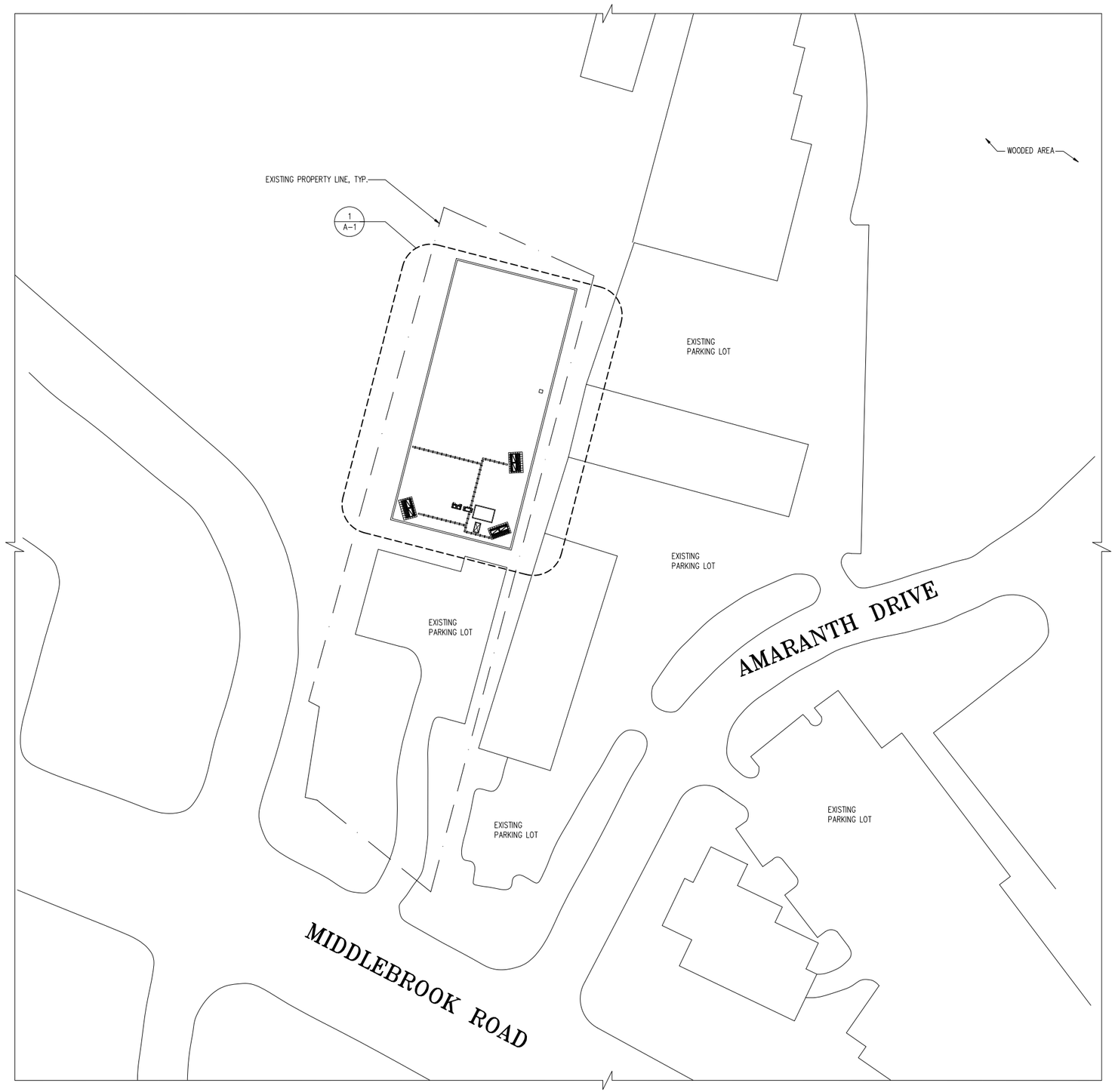
GENERAL NOTES

SHEET NUMBER:

N-1

VICINITY MAP
SCALE: 1"=2000'-0"

JURISDICTION:	MONTGOMERY COUNTY
USE:	R200 – RESIDENTIAL DETACHED
TAX ACCOUNT NUMBER:	09-03298020
PARCEL OWNER:	MIDDLEBROOK LAND LLLP C/O SIENA CORPORATION 8221 SNOWDEN RIVER PARKWAY COLUMBIA, MARYLAND 21045
MAP/ PARCEL:	EU52/ N944
STRUCTURE TYPE:	ROOFTOP
GROUND ELEVATION:	±448' AMSL
LATITUDE:	N 39° 10' 33.92"
LONGITUDE:	W 77° 15' 10.19"



SITE PLAN
SCALE: 1" = 50'-0"

1
C-1

TRUE NORTH

T-MOBILE NORTHEAST LLC
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SEAL:

STATE OF MARYLAND · CHARLES SHABESTARI · 17641 · REGISTERED · PROFESSIONAL ENGINEER

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SITE PLAN

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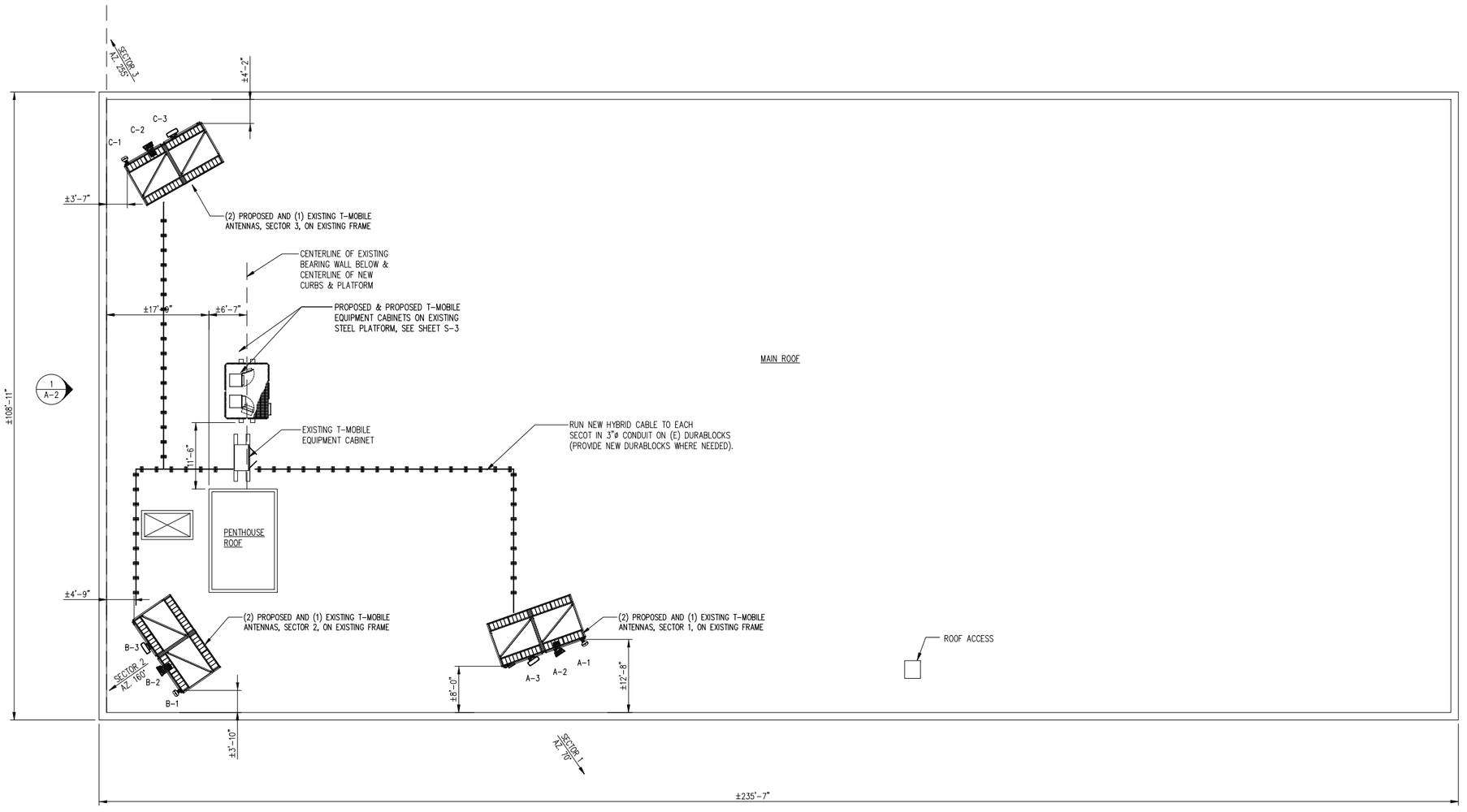

NOTES:

1. EXISTING ROOF CONSTRUCTION: BALLASTED ROOF MEMBRANE ON PRECAST CONCRETE PLANKS.
2. SEE NOTES ON SHEET N-1 FOR INFORMATION NOT NOTED.
3. SEE ELECTRICAL SHEETS FOR ELECTRICAL AND GROUNDING DETAILS.

ROOF AND EQUIPMENT LOCATION PLAN

SCALE: 3/32"=1'-0"

1 / A-1

TRUE NORTH

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STATE OF MARYLAND · MICHELE SHABSTAR · No. 17541 · REGISTERED · PROFESSIONAL ENGINEER

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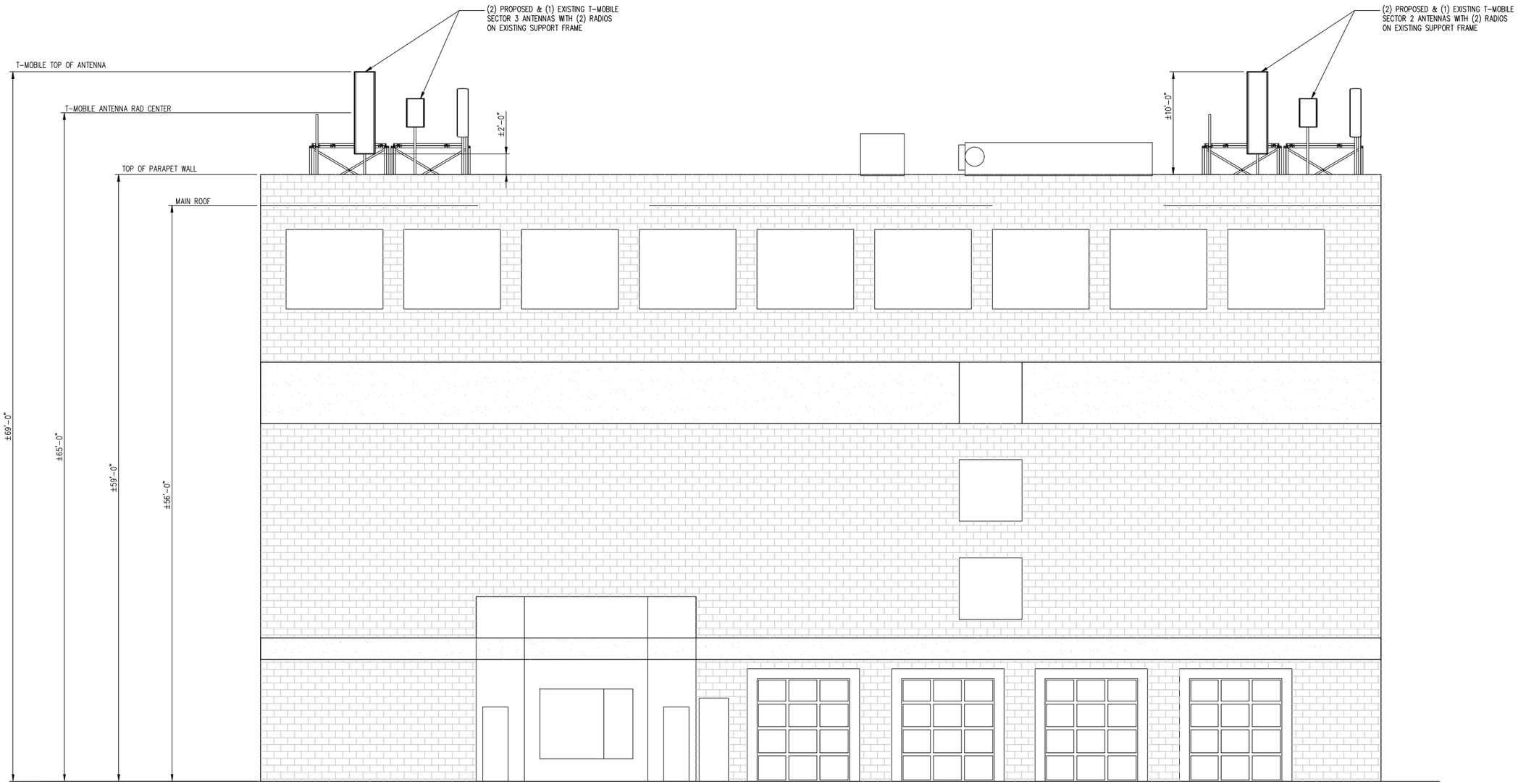
GRAPHIC SCALE IN INCHES

TITLE:

ROOF AND EQUIPMENT LOCATION PLAN

SHEET NUMBER:

A-1



SOUTH BUILDING ELEVATION (1 / A-2)

SCALE: 3/16"=1'-0"

T-MOBILE NORTHEAST LLC
12050 BALTIMORE AVENUE
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EZ STORAGE GERMANTOWN
12211 MIDDLEBROOK RD
GERMANTOWN, MD 20874

SEAL:

STATE OF MARYLAND · CHARLES SHABISTARI · No. 17641 · REGISTERED · PROFESSIONAL ENGINEER

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 17641, Expiration Date: 12/27/2021

SUBMITTALS

DATE	DESCRIPTION	REV.
07-14-2020	CONSTRUCTION REVIEW	A
07-22-2020	CONSTRUCTION	0

PROJECT NO:	1153.742
DESIGNER:	A.J.
ENGINEER:	C.S.

THESE DRAWINGS ARE FORMATTED TO BE FULL-SIZE AT 22"X34"

0 1/2 1

GRAPHIC SCALE IN INCHES

TITLE:

SOUTH BUILDING ELEVATION

SHEET NUMBER:

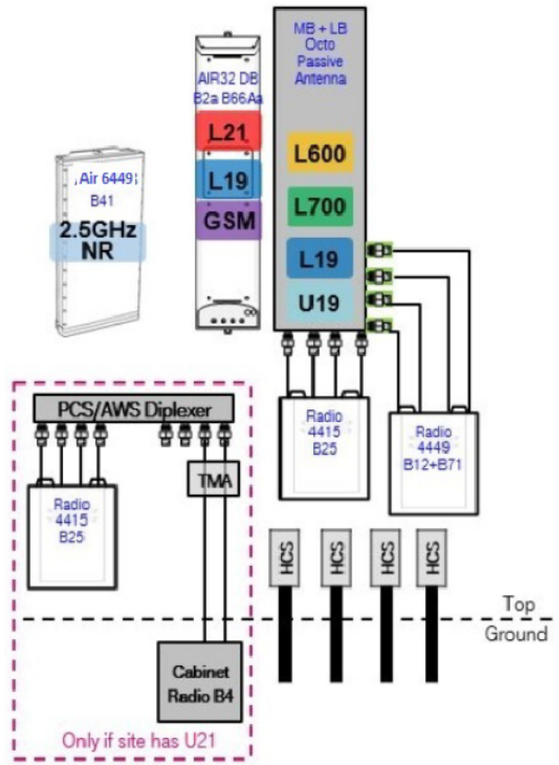
A-2

RF SYSTEM SCHEDULE

SECTOR	ANTENNA	TECHNOLOGY	ANTENNA MODEL	VENDOR	AZIMUTH	E-TILT	ANTENNA CENTERLINE	TMA/RRU MODEL	CABLE TYPE & LENGTH
1	A-1 (EXISTING)	L2100	AIR32 KRD901146-1_B66A_B2A	ERICSSON	70°	2°	65'	-	EXISTING 6x12 SHARED HYBRID
		L2100				2°			
		L1900				2°			
		L1900				2°			
	A-2 (PROPOSED)	L2500/N2500	AIR 6449 B41	ERICSSON	70°	2°	65'	-	±90 PROPOSED 6X12 6AWG HYBRID
		L2500/N2500				2°			
	A-3 (PROPOSED)	L700/L600/N600	APXVAARR24_43-U-NA20	RFS	70°	2°	65'	RADIO 4449 B71+B85	EXISTING 6x12 SHARED HYBRID
		L700/L600/N600				2°			
		L1900/U1900				2°		RADIO 4415 B25	
		L1900/U1900				2°			
2	B-1 (EXISTING)	L2100	AIR32 KRD901146-1_B66A_B2A	ERICSSON	160°	2°	65'	-	EXISTING 6x12 SHARED HYBRID
		L2100				2°			
		L1900				2°			
		L1900				2°			
	B-2 (PROPOSED)	L2500/N2500	AIR 6449 B41	ERICSSON	160°	2°	65'	-	±45 PROPOSED 6X12 6AWG HYBRID
		L2500/N2500				2°			
	B-3 (PROPOSED)	L700/L600/N600	APXVAARR24_43-U-NA20	RFS	160°	2°	65'	RADIO 4449 B71+B85	EXISTING 6x12 SHARED HYBRID
		L700/L600/N600				2°			
		L1900/U1900				2°		RADIO 4415 B25	
		L1900/U1900				2°			
3	C-1 (EXISTING)	L2100	AIR32 KRD901146-1_B66A_B2A	ERICSSON	255°	2°	65'	-	EXISTING 6x12 SHARED HYBRID
		L2100				2°			
		L1900				2°			
		L1900				2°			
	C-2 (PROPOSED)	L2500/N2500	AIR 6449 B41	ERICSSON	255°	2°	65'	-	±55 PROPOSED 6X12 6AWG HYBRID
		L2500/N2500				2°			
	C-3 (PROPOSED)	L700/L600/N600	APXVAARR24_43-U-NA20	RFS	255°	2°	65'	RADIO 4449 B71+B85	EXISTING 6x12 SHARED HYBRID
		L700/L600/N600				2°			
		L1900/U1900				2°		RADIO 4415 B25	
		L1900/U1900				2°			

TOTAL # OF CABLES:

(3) EXISTING 6x12 HYBRID CABLE TO REMAIN
(3) PROPOSED 6x12 HYBRID CABLE



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07-22-2020	CONSTRUCTION	0

PROJECT NO:	1153.742
DESIGNER:	A.J.
ENGINEER:	C.S.

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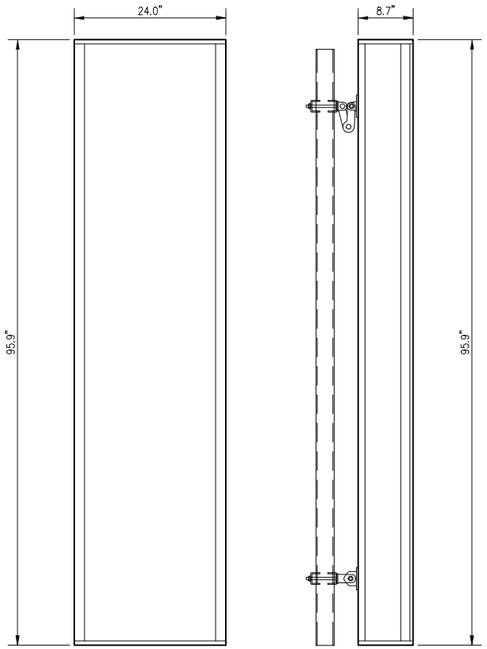
0 1/2 1
GRAPHIC SCALE IN INCHES

TITLE:
RF SYSTEM SCHEDULE & SCHEMATIC DIAGRAM

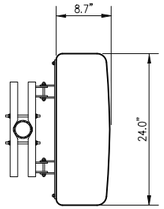
SHEET NUMBER:
S-1



FRONT VIEW

SIDE VIEW

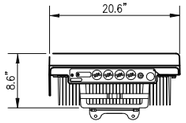
ANTENNA INFORMATION:
RFS APXVAARR24_43-U-NA20
SIZE: (95.9" H x 24.0" W x 8.7" D)
ANTENNA WEIGHT: 128.0 LBS
MOUNTING HARDWARE WEIGHT: 25.3 LBS



TOP VIEW

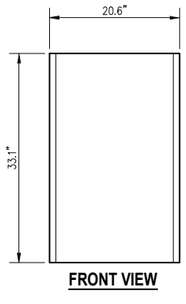
RFS APXVAARR24_43-U-NA20 ANTENNA DETAIL

SCALE: 1"=1'-0" (1 S-2)

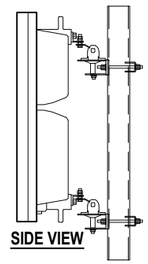


TOP VIEW

ANTENNA MODEL:
ERICSSON AIR6449 B41
SIZE: 33.1" H x 20.6" W x 8.6" D
WEIGHT: 104 LBS
(W/O MOUNTING HARDWARE)



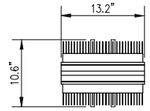
FRONT VIEW



SIDE VIEW

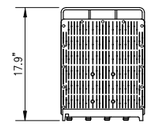
ERICSSON AIR6449 B41 ANTENNA

SCALE: 1"= 1'-0" (2 S-2)

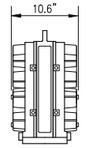


PLAN VIEW

RADIO INFORMATION:
WEIGHT: 75.0 LBS
(W/O MOUNTING HARDWARE)



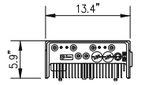
FRONT VIEW



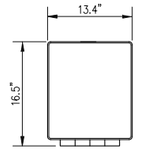
SIDE VIEW

ERICSSON 4449 B85 B71 RRU DETAIL

SCALE: 1"=1'-0" (3 S-2)



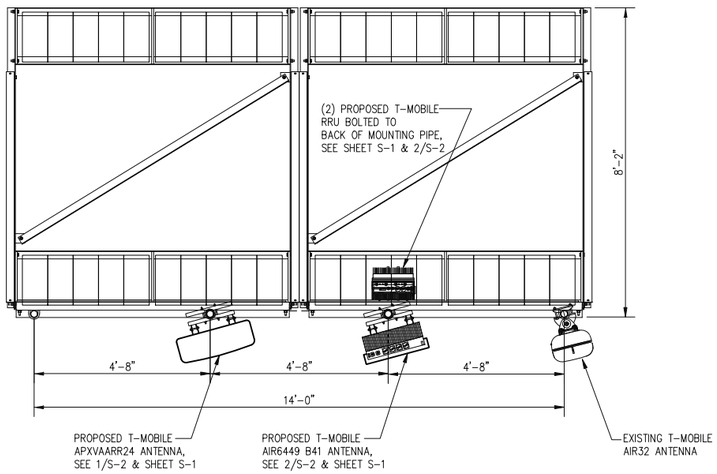
PLAN VIEW



FRONT VIEW

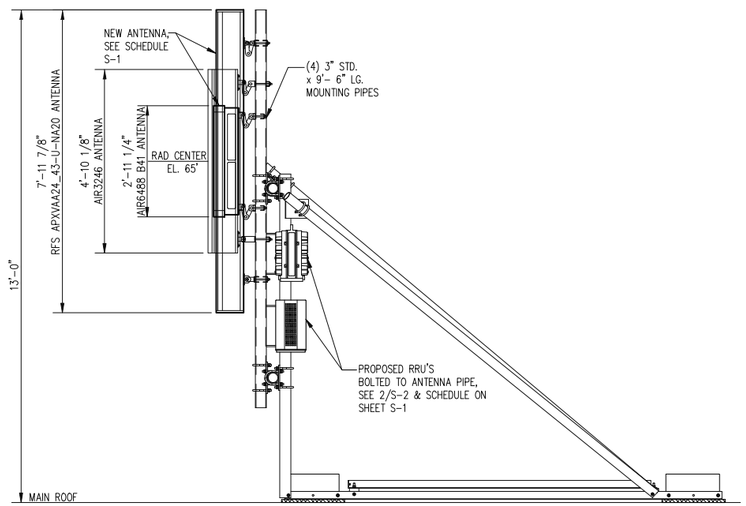
RRUS 4415 B25 DETAIL

SCALE: 1"=1'-0" (4 S-2)



ANTENNA SUPPORT FRAME PLAN

SCALE: 1/2"=1'-0" (5 S-2)



ANTENNA SUPPORT FRAME SECTION

SCALE: 1/2"=1'-0" (6 S-2)

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07-22-2020	CONSTRUCTION	0

PROJECT NO:	1153.742
DESIGNER:	A.J.
ENGINEER:	C.S.

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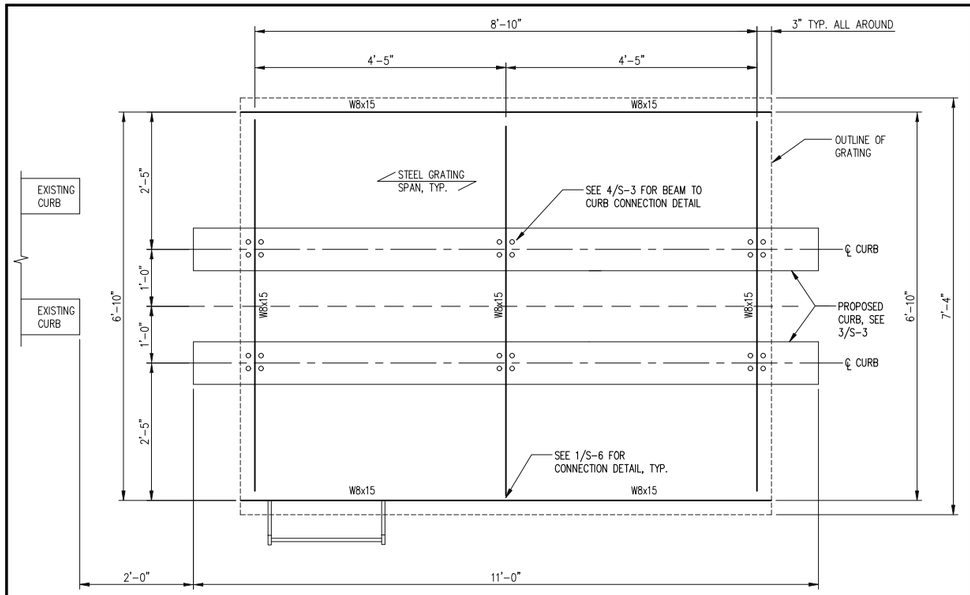
0 1/2 1
GRAPHIC SCALE IN INCHES

TITLE:

ANTENNA,RRU AND SUPPORT FRAME DETAILS

SHEET NUMBER:

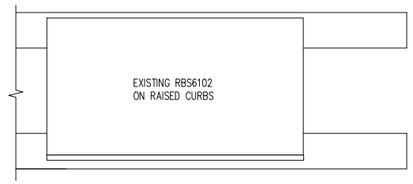
S-2

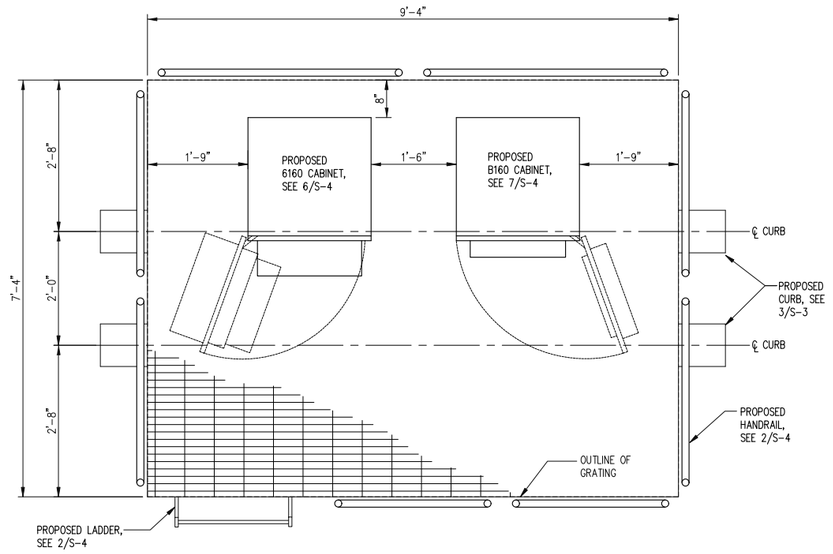


EQUIPMENT PLATFORM FRAMING PLAN

SCALE: 3/4"=1'-0"

1 S-3

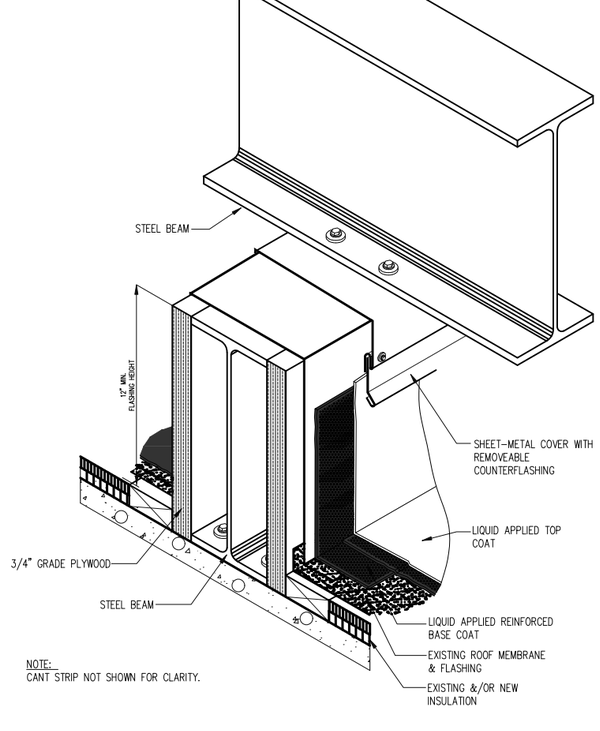




EQUIPMENT LAYOUT PLAN

SCALE: 3/8"=1'-0"

2 S-3



NOTE:
CANT STRIP NOT SHOWN FOR CLARITY.

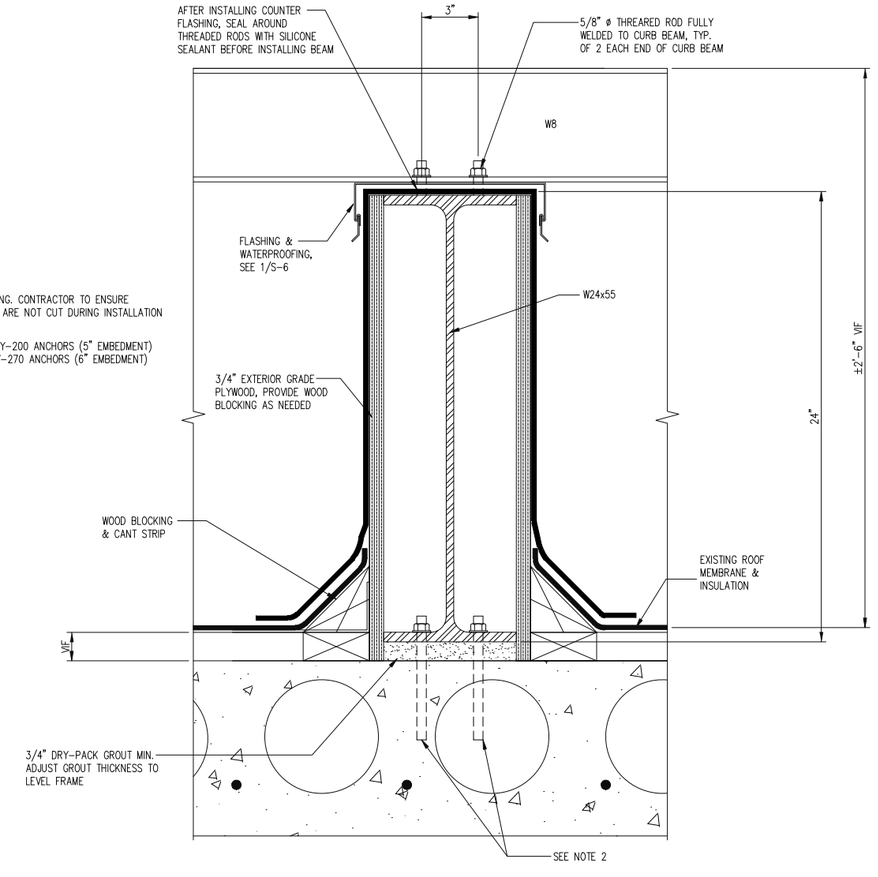
WATERPROOFING DETAIL

SCALE: N.T.S.

3 S-3

NOTES

1. LOCATE REINFORCING STEEL PRIOR TO DRILLING. CONTRACTOR TO ENSURE PRESTRESSING STRANDS/REINFORCING STEEL ARE NOT CUT DURING INSTALLATION OF PLATFORM.
2. AT SOLID LOCATIONS, USE 1/2"ø HILTI HIT HY-200 ANCHORS (5" EMBEDMENT) AT VOID LOCATIONS, USE 1/2"ø HILTI HIT HY-270 ANCHORS (6" EMBEDMENT)



W8 TO W24 CONNECTION DETAIL

SCALE: 3"=1'-0"

4 S-3

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PROJECT NO:	1153.742
DESIGNER:	A.J.
ENGINEER:	C.S.

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0 1/2 1

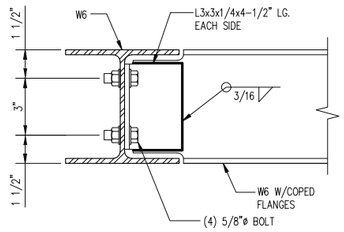
GRAPHIC SCALE IN INCHES

TITLE:

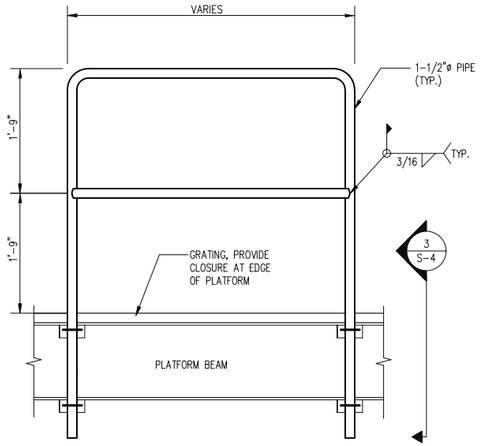
EQUIPMENT LAYOUT PLAN AND DETAILS

SHEET NUMBER:

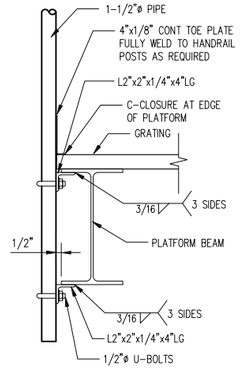
S-3



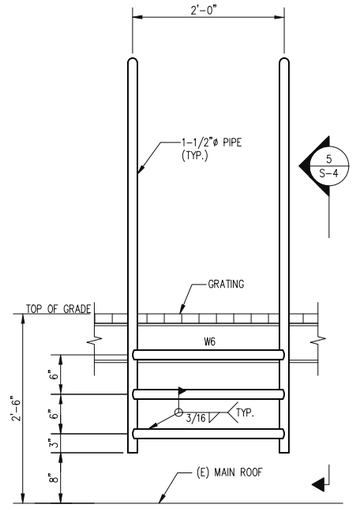
W6 TO W6 CONNECTION DETAIL 1 S-4
SCALE: 3"=1'-0"



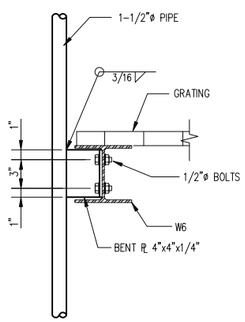
HANDRAIL DETAIL 2 S-4
SCALE: 1"=1'-0"



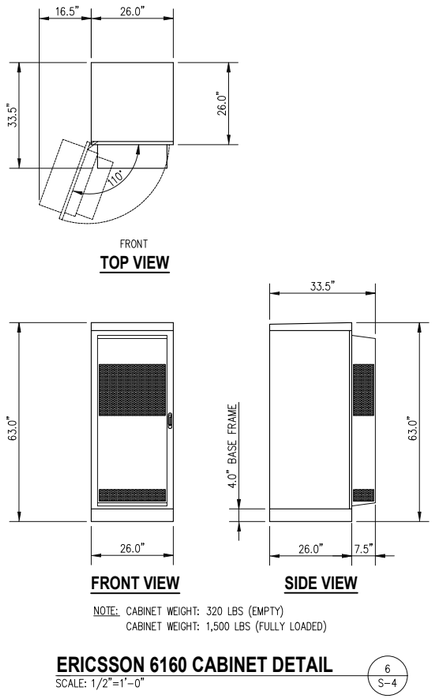
DETAIL 3 S-4
SCALE: 1-1/2"=1'-0"



LADDER DETAIL 4 S-4
SCALE: 1"=1'-0"

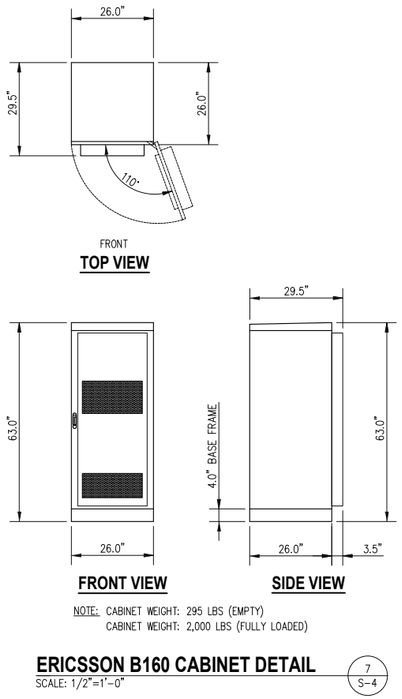


DETAIL 5 S-4
SCALE: 1-1/2"=1'-0"



NOTE: CABINET WEIGHT: 320 LBS (EMPTY)
CABINET WEIGHT: 1,500 LBS (FULLY LOADED)

ERICSSON 6160 CABINET DETAIL 6 S-4
SCALE: 1/2"=1'-0"



NOTE: CABINET WEIGHT: 295 LBS (EMPTY)
CABINET WEIGHT: 2,000 LBS (FULLY LOADED)

ERICSSON B160 CABINET DETAIL 7 S-4
SCALE: 1/2"=1'-0"

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07-22-2020	CONSTRUCTION	0

PROJECT NO: 1153.742
DESIGNER: A.J.
ENGINEER: C.S.

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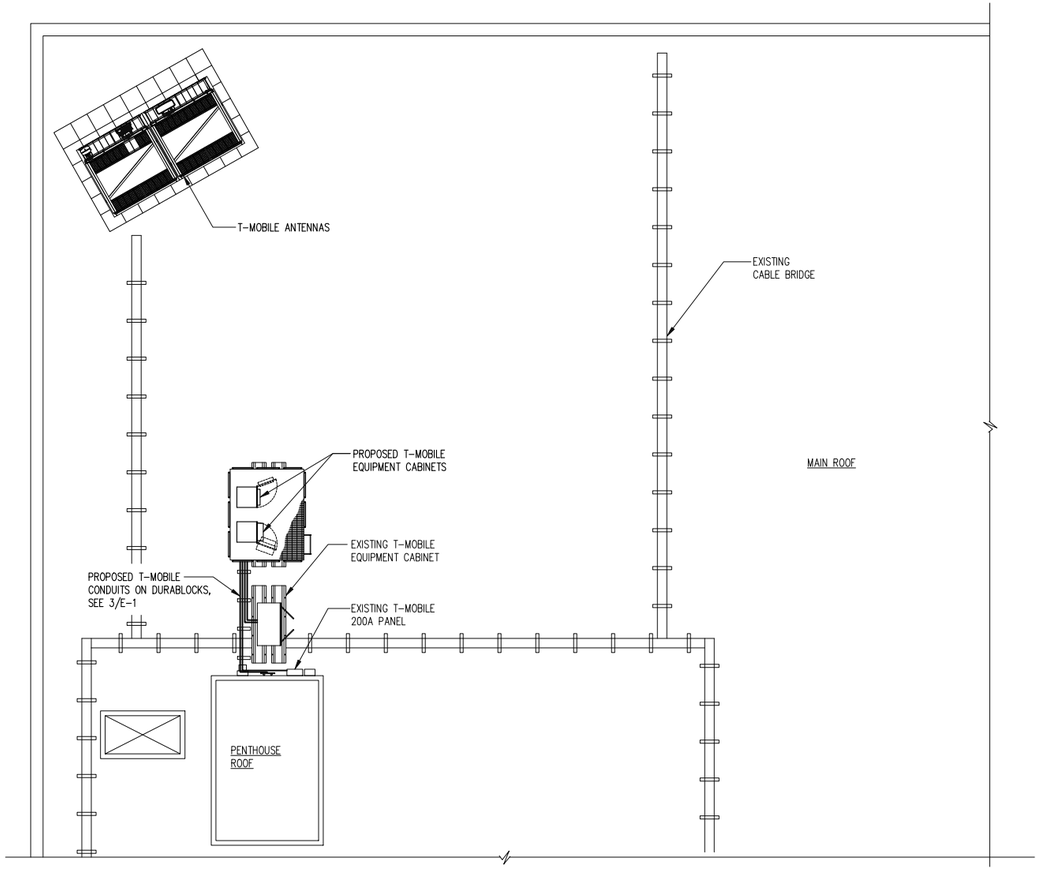
0 1/2 1
GRAPHIC SCALE IN INCHES

TITLE:

PLATFORM AND EQUIPMENT DETAILS

SHEET NUMBER:

S-4



ELECTRICAL PLAN

SCALE: 1/8"=1'-0"

1 / E-1

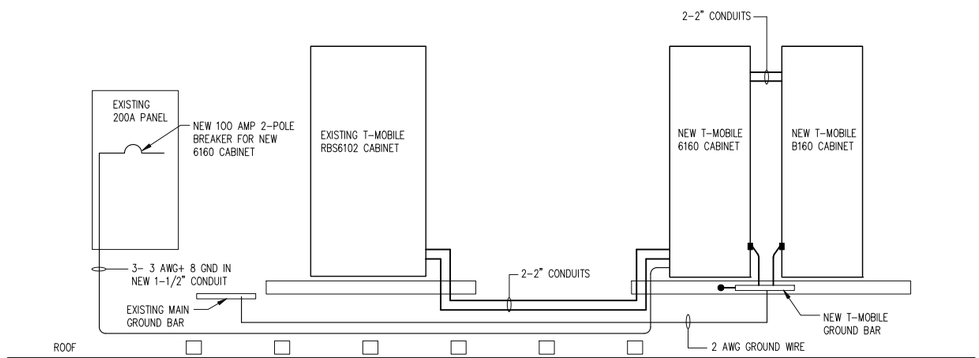
TRUE NORTH

EXISTING T-MOBILE PANEL									
VOLTAGE: 120/240 1 PHASE 3 WIRE 200 AMP M.C.B.									
LOAD DESCRIPTION	AMPS	BKR	CKT	ø A	ø B	CKT	BKR	AMPS	LOAD DESCRIPTION
EXISTING RBS6102 (NOTE 1)		100	1			2	60	–	SURGE PROTECTIVE DEVICE
			3			4		–	
LIGHT	2	15	5	2		6			SPACE
GFI RECEPTACLES	2	20	7		2	8			SPACE
EXISTING RBS6102 (NOTE 2)	26	150	9	26		10			SPACE
	26		11		26	12			SPACE
	26		13	26		14			SPACE
	26		15		26	16			SPACE
NEW 6160 CABINET (NOTE 3)	70	100	17	70		18			SPACE
	70		19		70	20			SPACE
SPACE			21			22			SPACE
SPACE			23			24			SPACE
SPACE			25			26			SPACE
SPACE			27			28			SPACE
SPACE			29			30			SPACE
	TOTAL ø A			124	124	TOTAL ø B			
						29.76 kVA			

PANEL CAPACITY: 48 kVA; PANEL CONNECTED LOAD: 29.76 kVA
29.76 kVA x 1.25 = 37.2 kVA
THE CONNECTED LOAD DOES NOT EXCEED THE PANEL'S CAPACITY.

PANELBOARD NOTES:

1. TURN OFF BREAKER AND DISCONNECT CONDUCTORS
2. INSTALL 150A 4 POLE BREAKER IN AVAILABLE SPACE.
   HAVING AN A.I.C. RATING NOT LESS THAN EXISTING BREAKERS IN PANEL.
   RUN NEW 3-1/0 AWG + 6 GND IN 1-1/2" CONDUIT TO EXISTING 6131 CABINET
3. INSTALL 100A 2 POLE BREAKER IN AVAILABLE SPACE.
   HAVING AN A.I.C. RATING NOT LESS THAN EXISTING BREAKERS IN PANEL.
   RUN NEW 3-3 AWG + 8 GND IN 1-1/2" CONDUIT TO NEW 6160 CABINET
4. UPDATE BREAKER LABEL



NOTES:

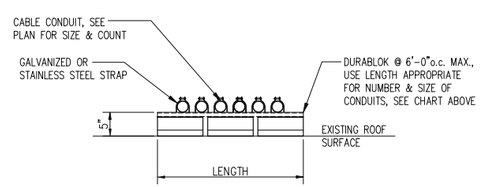
1. ALL GROUND WIRES SHALL BE 2 AWG GREEN-INSULATED UNLESS NOTED OTHERWISE.

ONE-LINE DIAGRAM

SCALE: N.T.S.

2 / E-1

DURABLOCK DB SERIES LENGTH CHART	
PART NUMBER	LENGTH
DB5	4.8"
DB10	9.6"
DB20	20.2"
DB30	30.8"
DB40	41.4"



CONDUIT SUPPORT DETAIL

SCALE: 3/4"= 1'-0"

3 / E-1

T-MOBILE NORTHEAST LLC
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EZ STORAGE GERMANTOWN
12211 MIDDLEBROOK RD
GERMANTOWN, MD 20874

SEAL:

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 17641, Expiration Date: 12/27/2021

SUBMITTALS

DATE	DESCRIPTION	REV.
07-14-2020	CONSTRUCTION REVIEW	A
07-22-2020	CONSTRUCTION	0

PROJECT NO:	1153.742
DESIGNER:	N.B.
ENGINEER:	C.S.

THESE DRAWINGS ARE FORMATTED TO BE FULL-SIZE AT 22"X34"

0 1/2 1

GRAPHIC SCALE IN INCHES

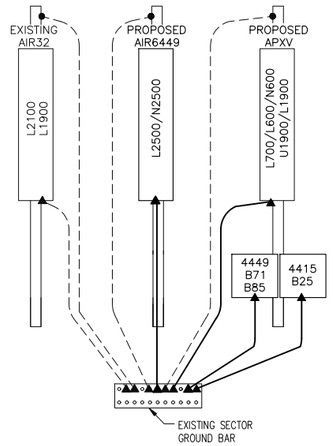
TITLE:

ELECTRICAL PLAN, DIAGRAM, DETAIL AND PANEL SCHEDULE

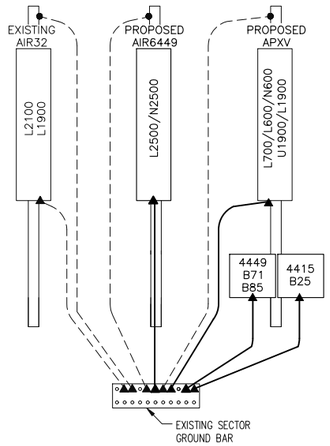
SHEET NUMBER:

E-1

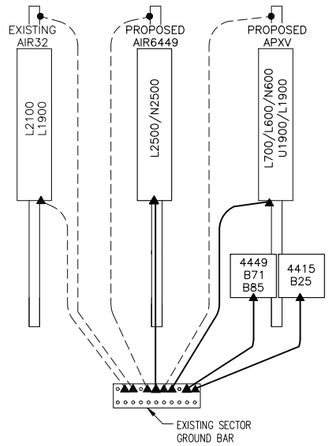
ONE



TWO



THREE

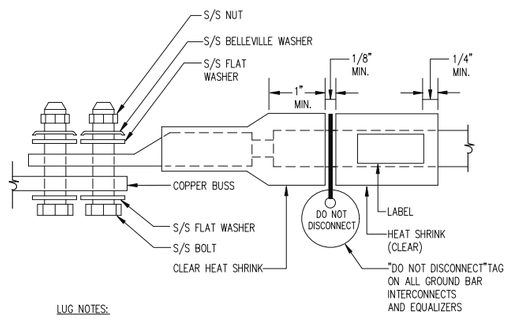


GROUNDING LEGEND

▲	COMPRESSION FITTING CONNECTION
●	EXOTHERMIC WELD CONNECTION
———	PROPOSED GROUND WIRING

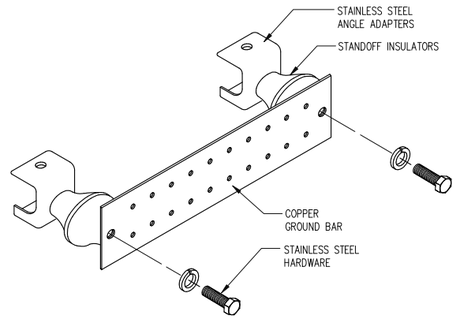
NOTES:
1. ALL GROUND WIRES SHALL BE 2 AWG GREEN-INSULATED UNLESS NOTED OTHERWISE.

ANTENNA GROUNDING DIAGRAM (1 / E-2)
SCALE: N.T.S.



LUG NOTES:
1. ALL HARDWARE IS 18-8 STAINLESS STEEL INCLUDING BELLEVILLES.
2. ALL HARDWARE SHALL BE S/S 3/8-INCH DIAMETER OR LARGER.
3. FOR GROUND BOND TO STEEL ONLY: INSERT A DRAGON-TOOTH WASHER BETWEEN LUG AND STEEL AND COAT ALL SURFACES WITH ANTI-OXIDIZATION COMPOUND PRIOR TO MATING.

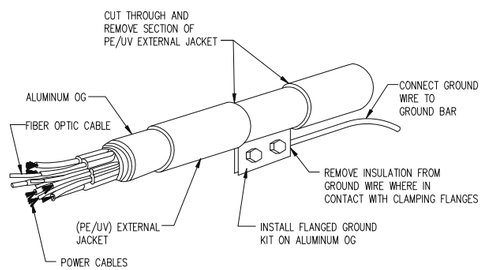
LUG DETAIL (2 / E-2)
SCALE: TO SCALE



LEGEND

1. COPPER GROUND BAR, 1/4"X 4"X 20", HARGER CAT.NO. GBA 14220G 7/16" DIAMETER HOLE CENTERS SPACED 1" APART. ANTENNA AND EQUIPMENT GROUND BARS SHALL BE HARGER CAT.NO. GBA14212G.
2. INSULATORS BETWEEN ANGLE ADAPTERS AND GROUND BAR
3. HARGER LIGHTNING PROTECTION: TELEPHONE 800-842-7434

GROUND BAR ISOMETRIC (3 / E-2)
SCALE: N.T.S.



NOTES:
1. CLAMP #6 GROUND WIRE BETWEEN FLANGES AND FORM BOND WITH COMPRESSION HARDWARE PROVIDED WITH KIT.
2. FOLLOWING INSTALLATION OF GROUND KIT, WATERPROOF ASSEMBLY WITH WATERPROOFING KIT AND TAPE.

HYBRID GROUNDING KIT DETAIL (4 / E-2)
SCALE: N.T.S.

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0 1/2 1
GRAPHIC SCALE IN INCHES

TITLE:
GROUNDING DIAGRAM AND DETAILS

SHEET NUMBER:
E-2