App No: 2020071227

Revised 11.12.20 - JE

Application General Infomation

Applicant Name	Jacobs	Updated	8/8/2020
Application Type	Minor Modification	Ann. Plan?	Yes
Carrier	AT&T Wireless	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. AT&T is removing (6) existing antennas and (6) RRH. They are adding (6) new antennas and (9) new RRHs on existing rooftop wireless structure.

Site Infomation

Site Id	154	Zoning	CR-3.0
Structure Type	Building	Latitude	38.98032
Address	7101 Wisconsin Ave, Bethesda	Longitude	-77.091811
County Site Name	Continental Plaza	Ground Elevation	346
Carrier Site Name	Strathmore	City	Bethesda
Site Owner	7101 Wisconsin Owner LLC	Lease Status	Leased
Structure Owner	7101 Wisconsin Owner LLC	Does the structure require an antenna structure registration under FCC Title 47	No
Existing Structure Height	145		
Provide the proposed height of the replacement structure without any antenna (New, Replacement Apps Only)		Distance to Residential Property (New, Replacement, Colocation Only)	
		Distance to Commercial Property (New, Replacement, Colocation Only)	

Justification of why this site was selected:

The site is needed to provide coverage within the surrounding Bethesda, MD area. AT&T selected this site due to their existing wireless facility. By selecting this location, AT&T can address the demands for their telecommunications service in Montgomery C

NearbySites (New, Replacement Apps Only):

Monday, August 10, 2020

7:31:41 AM

App No: 2020071227

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

Monday, August 10, 2020

7:31:46 AM

App No: 2020071227

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? N/A

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? N/A

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? N/A

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? N/A

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: 9.16

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

Monday, August 10, 2020

7:31:46 AM

App No: 2020071227

Antenna Infomation

Antenna Compliance	Yes Compli
ance Desc	
Antenna Location	Yes
Antenna Loc. Desc.	
Env. Assessment	
Cat. Excluded?	
Routine Env. Evaluation. Checked	

Antenna Model	Commscope NNHH—65C-R4
Frequency	700/850/1900/2100 and 2300MHz

RAD Center 163 Max ERP 21,495 Antenna Dimensions 95.984”H 19.606”W 7.7 Quantity 6

704-710/734-740 MHz (700 Band 12)
710-716/740-746 MHz (700 Band 12)
758-768/788-798 MHz (700 Band 14)
824-835/869-880 MHz and 845-846.5/890-891.5 MHz (CLR Band 5)
1870-1885/1950-1965 MHz (B Block PCS band 2)
1865-1870/1945-1950 MHz (D Block PCS)
1710-1720/2110-2120 MHz
1760-1765/2160-2165 MHz (AWS-3)
1765-1770/2165-2170 MHz (AWS-3)
2305-2320/2345-2360 MHz (WCS)

Beiro, Alex

From: Arshia Malik <Arshia.Malik@bdnreit.com>
Sent: Thursday, March 9, 2017 9:00 AM
To: Capaci, Andrew; John McKenzie
Cc: Tony Eastridge
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Andrew,

The chief engineer has no problem with that.

Thank you,

Arshia Malik, MBA, LEED GA
Assistant Property Manager
Brandywine Realty Trust
1010 Wayne Avenue, Suite 200
Silver Spring, MD 20910
T: 240-821-1484
www.brandywinerealty.com

From: Capaci, Andrew [mailto:Andrew.Capaci@jacobs.com]
Sent: Thursday, March 09, 2017 8:59 AM
To: John McKenzie <John.McKenzie@bdnreit.com>
Cc: Arshia Malik <Arshia.Malik@bdnreit.com>; Tony Eastridge <Tony.Eastridge@bdnreit.com>
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Good morning, John!

Let us know if the pictures we sent on 3/2 are acceptable.

Thank you!

From: Capaci, Andrew
Sent: Thursday, March 02, 2017 1:47 PM
To: 'John McKenzie'
Cc: Arshia Malik; Tony Eastridge
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

John,

Here are photos of the existing hole in the alpha sector. The new one will be placed right by this one.

From: John McKenzie [mailto:John.McKenzie@bdnreit.com]
Sent: Thursday, March 02, 2017 1:41 PM
To: Capaci, Andrew
Cc: Arshia Malik; Tony Eastridge
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Andrew,

You'll need to provide us with a specific location of the penetration for us to review.

Thank you.

John McKenzie, Group Chief Engineer

Brandywine Realty Trust

1010 Wayne Avenue, Suite 200

Silver Spring, MD 20910

T: 240-821-1516

www.brandywinerealty.com

From: Capaci, Andrew [mailto:Andrew.Capaci@jacobs.com]
Sent: Thursday, March 02, 2017 12:38 PM
To: Arshia Malik <Arshia.Malik@bdnreit.com>; Tony Eastridge <Tony.Eastridge@bdnreit.com>
Cc: John McKenzie <John.McKenzie@bdnreit.com>
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Arshia,

I consulted with our construction team to be 100% certain and they said they will need to drill a small hole (2" max) in the screen wall in the alpha sector. It is a corrugated open metal screen wall.

Please advise.

Thanks!

From: Capaci, Andrew
Sent: Wednesday, March 01, 2017 2:11 PM
To: 'Arshia Malik'; Tony Eastridge
Cc: John McKenzie
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Thank you! Penetrations should not be necessary here.

We will reach out to coordinate construction when the time comes.

Thanks!

From: Arshia Malik [mailto:Arshia.Malik@bdnreit.com]
Sent: Wednesday, March 01, 2017 12:42 PM
To: Capaci, Andrew; Tony Eastridge
Cc: John McKenzie
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Good afternoon Andrew,

Sorry for the delay. We have reviewed the drawings and foresee no problem with them. One thing we do need to make sure is addressed and followed, if there will be any penetrations (none were mentioned on the drawing), they will have to be reviewed and approved by landlord before moving forward.

Thank you,

Arshia Malik, MBA, LEED GA
Assistant Property Manager
Brandywine Realty Trust
1010 Wayne Avenue, Suite 200
Silver Spring, MD 20910
T: 240-821-1484
www.brandywinerealty.com

From: Capaci, Andrew [mailto:Andrew.Capaci@jacobs.com]
Sent: Tuesday, February 28, 2017 8:42 AM
To: Arshia Malik <Arshia.Malik@bdnreit.com>; Tony Eastridge <Tony.Eastridge@bdnreit.com>
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Good morning Arshia and Tony!

Please advise on the status of the plan review. They were sent over on 2/1 and we have yet to hear back. Can you please jump in and help us out?

From: Capaci, Andrew
Sent: Monday, February 20, 2017 9:27 AM
To: 'Arshia Malik'; 'Tony Eastridge'
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Good morning!

I just wanted to check in and see if you could provide a timeline on the plan review here.

Thanks and have a great day!

From: Capaci, Andrew
Sent: Monday, February 13, 2017 9:52 AM
To: 'Arshia Malik'; Tony Eastridge
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Good morning, Arshia!

Would you please be able to provide a timeline on the plan review? If there are any questions let me know.

Thank you!

From: Arshia Malik [mailto:Arshia.Malik@bdnreit.com]
Sent: Thursday, February 09, 2017 3:58 PM
To: Capaci, Andrew; Tony Eastridge
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Andrew, we will review it and if we are able to fill it out, we will.

Thank you,
Arshia.

From: Capaci, Andrew [mailto:Andrew.Capaci@jacobs.com]
Sent: Monday, February 06, 2017 4:50 PM
To: Arshia Malik <Arshia.Malik@bdnreit.com>; Tony Eastridge <Tony.Eastridge@bdnreit.com>
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Thank you for your reply. Will you be able to fill out the attached form as well? We will need it to proceed with our compliance review.

Thank you!

From: Arshia Malik [mailto:Arshia.Malik@bdnreit.com]
Sent: Monday, February 06, 2017 1:31 PM
To: Capaci, Andrew; Tony Eastridge
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Good afternoon Andrew,

Sorry for the delay. We did receive it, will let you know if there are any concerns.

Thank you,

Arshia Malik, MBA, LEED GA
Assistant Property Manager
Brandywine Realty Trust
1010 Wayne Avenue, Suite 200
Silver Spring, MD 20910
T: 240-821-1484
www.brandywinerealty.com

From: Capaci, Andrew [mailto:Andrew.Capaci@jacobs.com]
Sent: Monday, February 06, 2017 11:58 AM
To: Arshia Malik <Arshia.Malik@bdnreit.com>; Tony Eastridge <Tony.Eastridge@bdnreit.com>
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Good morning! Happy Monday.

I just wanted to reach out and confirm you received our plans. Please let me know if you need anything from me.

Thanks!

From: Capaci, Andrew
Sent: Wednesday, February 01, 2017 3:32 PM

To: 'arshia.malik@bdnreit.com'; 'tony.eastridge@bdnreit.com'
Subject: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Arshia,

Per our phone conversation, please find the attached construction plans and consent letter to review, execute, and return.

Please don't hesitate to reach out for anything you may need from me. Thank you!

Andrew Capaci | JACOBS | 570.262.5601 mobile | andrew.capaci@jacobs.com | www.jacobs.com

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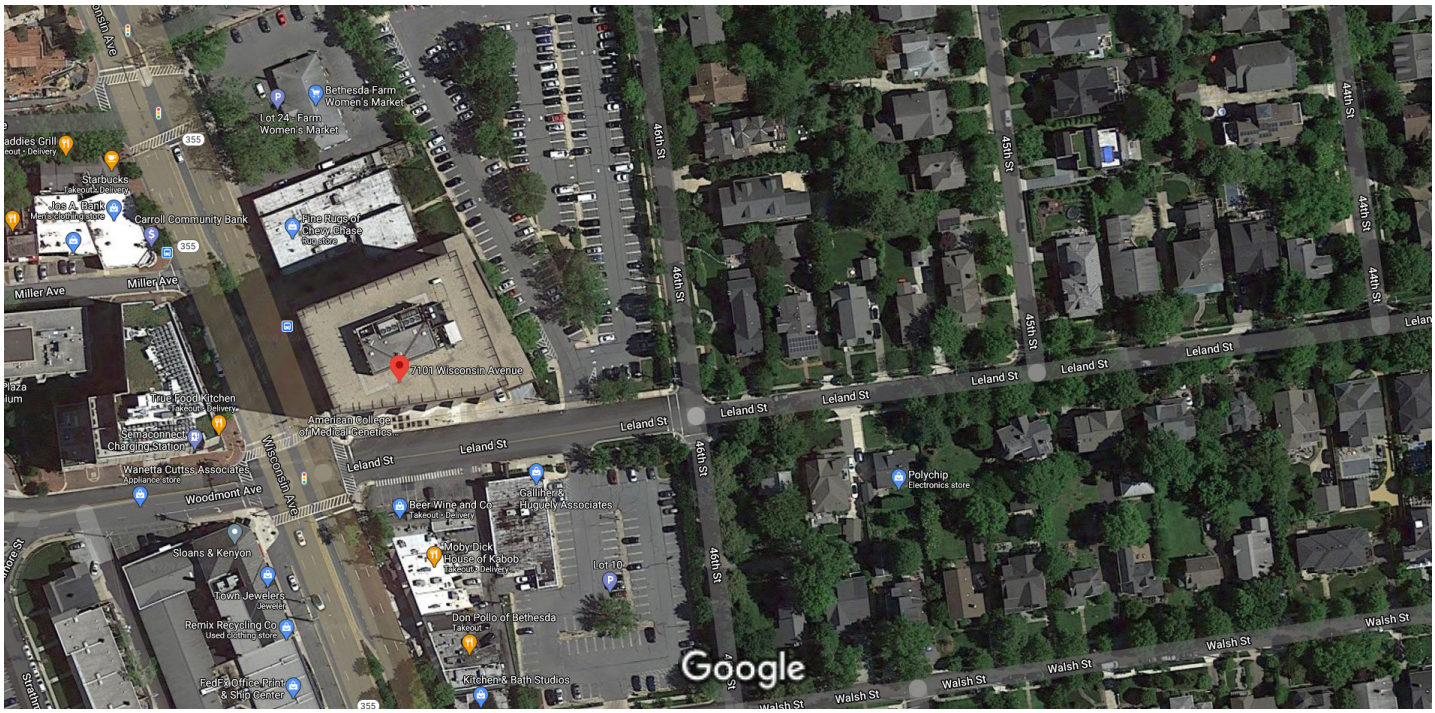
7101 Wisconsin Ave

AT&T site=Strathmore



50 ft

SITESAFE
RF COMPLIANCE EXPERTS

8618 Westwood Center Drive, Suite 315, Vienna, VA 22182
703.276.1100 ● 703.276.1169 fax
info@sitesafe.com ● www.sitesafe.com

Jacobs on behalf of AT&T Mobility, LLC Site FA – 10096268 USID – 16252 Site Name – STRATHMOORE (2251A0T8EQ)

7101 Wisconsin Avenue
Bethesda, MD 20814

Latitude: N38-58-49.73
Longitude: W77-05-29.81
Structure Type: Rooftop

Report generated date: May 14, 2020
Report by: Leo Romero
Customer Contact: Justin Bridges

AT&T Mobility, LLC is compliant based on the FCC Rules and Regulations.

Table of Contents

1 General Site Summary

1.1 Report Summary

AT&T Mobility, LLC	Summary
Max Cumulative Simulated RFE Level on the Rooftop	93.0% General Public Limit 4' behind/next to AT&T Mobility, LLC's Beta Sector Antenna #4
Max Cumulative Simulated RFE Level on the Rooftop Walking Surface	81.0% General Public Limit 50' in front of AT&T Mobility, LLC's Alpha Sector Antenna #2
Max Cumulative Simulated RFE Level on the Ground	<1% General Public Limit
Compliant per FCC Rules and Regulations?	Yes
Compliant per AT&T Mobility, LLC's Policy?	No

The following documents were provided by the client and were utilized to create this report:

RFDS: STRATHMOORE_2020-LTE-Next-Carrier_LTE-6C_ar351y_2251A0T7VA_10096268_16252_11-25-2019_Final-Approved_v1.00

CD's: LTE6C_10096268_AE203_STRATHMOORE_Rev B

RF Powers Used: MAX RRH Powers

1.2 Fall Arrest Anchor Point Summary

Fall Arrest Anchor & Parapet Info	Parapet Available (Y/N)	Parapet Height (inches)	Fall Arrest Anchor Available (Y/N)
Roof Safety Info	Y	4	N

1.3 Signage Summary

a. Pre-Site Visit AT&T Signage (Existing Signage)

AT&T Signage Locations	 Information 1	 Information 2	 Notice	 Notice 2	 Caution	 Caution 2	 Warning	 Warning 2	 Barriers
Access Point(s)	**4**								
Alpha	**1**								
Beta	**1**								
Gamma	**1**								

Note: All existing signage was documented during a previous site visit on 7/5/2017.

b. Proposed AT&T Signage

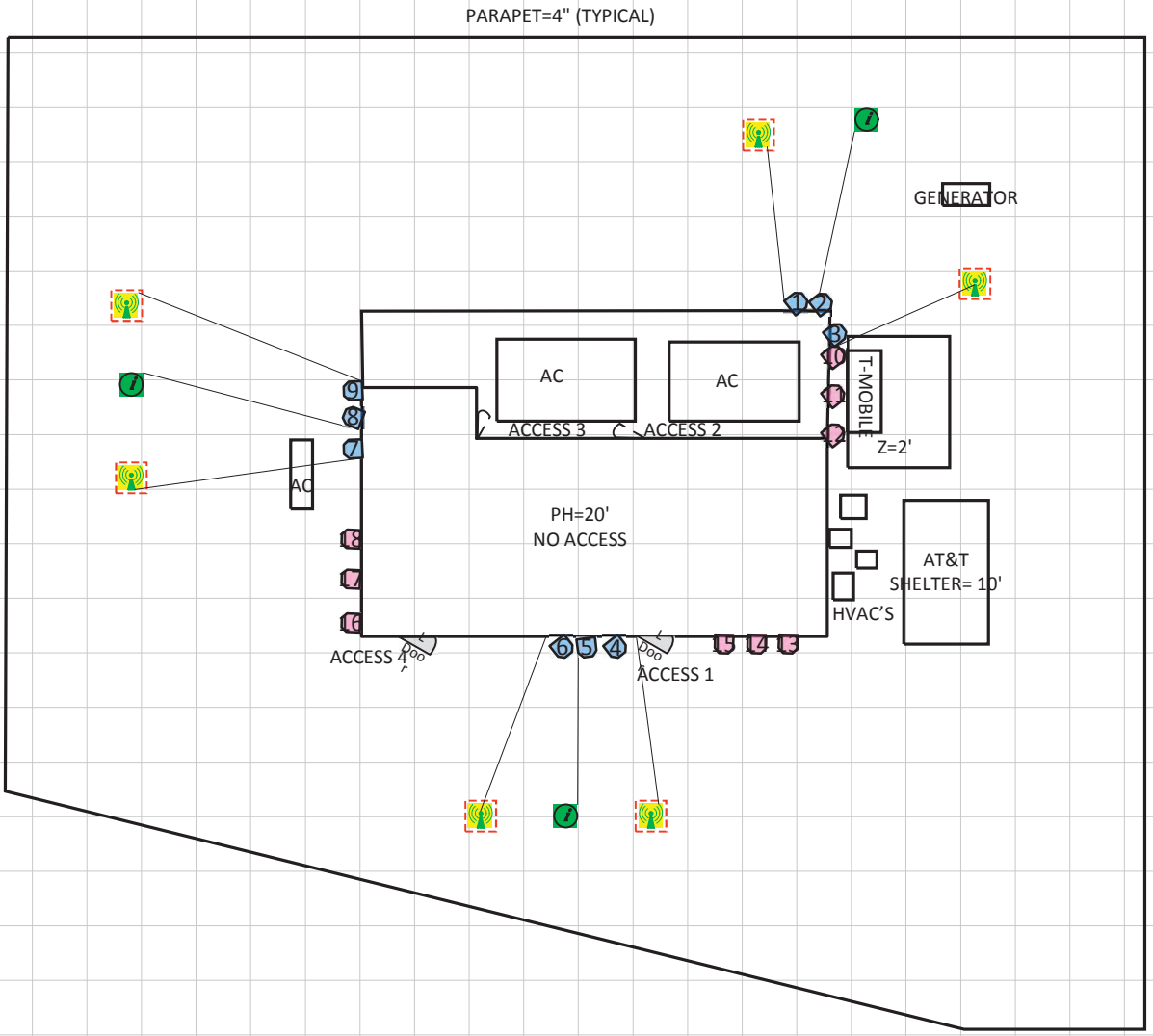
AT&T Signage Locations	 Information 1	 Information 2	 Notice	 Notice 2	 Caution	 Caution 2	 Warning	 Warning 2	 Barriers
Access Point(s)									
Alpha						**2**			
Beta						**2**			
Gamma						**2**			

2 Scale Maps of Site

The following diagrams are included:

- Site Scale Map
- RF Exposure Diagram
- AT&T Mobility, LLC Contribution

Site Scale Map For: STRATHMOORE



(Feet)

0 12.7 25.4

www.sitesafe.com
Site Name:STRATHMOORE
5/14/2020 8:42:15 AM

Carrier Identification

AT&T MOBILITY LLC | VERIZON WIRELESS | T-MOBILE | SPRINT | UNKNOWN CARRIER

Sign Legend

Caution 1 | Caution 2 | Notice 2 | Notice 1 | Warning | Warning 2 | Info 1 | Info 2 | RF Safety Plan

Barrier

Proposed Barriers/ Signs

3 Antenna Inventory

The following antenna inventory was obtained by the customer and was utilized to create the site model diagrams:

Ant ID	Operator	Antenna Make & Model	Type	TX Freq (MHz)	Technology	Az (Deg)	Hor BW (Deg)	Ant Len (ft)	Power	Power Type	Power Unit	Misc Loss	TX Count	Total ERP (Watts)	Ant Gain (dBd)	Z	MDT	EDT
1	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	722	LTE	30	73	8	50	TPO	Watt	0	1	966	12.86	14'	2°	12°
1	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	737	LTE	30	73	8	160	TPO	Watt	0	1	3091.1	12.86	14'	2°	12°
1	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	762	LTE	30	73	8	160	TPO	Watt	0	1	3091.1	12.86	14'	2°	12°
1	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	1900	LTE	30	59	8	160	TPO	Watt	0	1	7016.5	16.42	14'	2°	2°
1	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	2100	LTE	30	61	8	160	TPO	Watt	0	1	7330.3	16.61	14'	2°	5°
2	AT&T MOBILITY LLC	Kathrein-Scala 742-264	Panel	850	UMTS	30	68.4	4.3	40	TPO	Watt	0	1	634	12	15.8'	0°	12°
3	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	850	5G	30	71	8	160	TPO	Watt	0	1	3794.2	13.75	14'	0°	12°
3	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	2300	LTE	30	59	8	100	TPO	Watt	0	1	4775.3	16.79	14'	0°	5°
4	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	722	LTE	120	73	8	50	TPO	Watt	0	1	966	12.86	14'	2°	9°
4	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	737	LTE	120	73	8	160	TPO	Watt	0	1	3091.1	12.86	14'	2°	9°
4	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	763	LTE	120	73	8	160	TPO	Watt	0	1	3091.1	12.86	14'	2°	9°
4	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	1900	LTE	120	59	8	160	TPO	Watt	0	1	7016.5	16.42	14'	2°	2°
4	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	2100	LTE	120	61	8	160	TPO	Watt	0	1	7330.3	16.61	14'	2°	4°
5	AT&T MOBILITY LLC	Kathrein-Scala 742-264	Panel	850	UMTS	150	68.4	4.3	40	TPO	Watt	0	1	634	12	15.8'	0°	6°
6	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	850	5G	120	71	8	160	TPO	Watt	0	1	3794.2	13.75	14'	0°	9°
6	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	2300	LTE	120	59	8	100	TPO	Watt	0	1	4775.3	16.79	14'	0°	4°
7	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	722	LTE	245	73	8	50	TPO	Watt	0	1	966	12.86	14'	2°	12°
7	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	737	LTE	245	73	8	160	TPO	Watt	0	1	3091.1	12.86	14'	2°	12°
7	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	763	LTE	245	73	8	160	TPO	Watt	0	1	3091.1	12.86	14'	2°	12°

Ant ID	Operator	Antenna Make & Model	Type	TX Freq (MHz)	Technology	Az (Deg)	Hor BW (Deg)	Ant Len (ft)	Power	Power Type	Power Unit	Misc Loss	TX Count	Total ERP (Watts)	Ant Gain (dBd)	Z	MDT	EDT
7	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	1900	LTE	245	59	8	160	TPO	Watt	0	1	7016.5	16.42	14'	2°	6°
7	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	2100	LTE	245	61	8	160	TPO	Watt	0	1	7330.3	16.61	14'	2°	6°
8	AT&T MOBILITY LLC	Kathrein-Scala 742-264	Panel	850	UMTS	270	68.4	4.3	40	TPO	Watt	0	1	634	12	15.8'	0°	2°
9	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	850	5G	245	71	8	160	TPO	Watt	0	1	3794.2	13.75	14'	0°	12°
9	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	2300	LTE	245	59	8	100	TPO	Watt	0	1	4775.3	16.79	14'	0°	6°
10	T-MOBILE	Ericsson AIR 21 B2A B4P	Panel	1900		30	65	4.7	120	TPO	Watt	0	0	4132.2	15.37	15.7'	0°	0°
11	T-MOBILE	Andrew LNX-6515DS-VTM	Panel	700		30	65	8	160	TPO	Watt	0	0	4427.1	14.42	12'	0°	0°
12	T-MOBILE	Ericsson AIR 21 B4A B2P	Panel	2100		30	65	4.7	120	TPO	Watt	0	0	4132.2	15.37	15.7'	0°	0°
13	T-MOBILE	Ericsson AIR 21 B2A B4P	Panel	1900		160	65	4.7	120	TPO	Watt	0	0	4132.2	15.37	15.7'	0°	0°
14	T-MOBILE	Andrew LNX-6515DS-VTM	Panel	700		160	65	8	160	TPO	Watt	0	0	4427.1	14.42	12'	0°	0°
15	T-MOBILE	Ericsson AIR 21 B4A B2P	Panel	2100		160	65	4.7	120	TPO	Watt	0	0	4132.2	15.37	15.7'	0°	0°
16	T-MOBILE	Ericsson AIR 21 B2A B4P	Panel	1900		250	65	4.7	120	TPO	Watt	0	0	4132.2	15.37	15.7'	0°	0°
17	T-MOBILE	Andrew LNX-6515DS-VTM	Panel	700		250	65	8	160	TPO	Watt	0	0	4427.1	14.42	12'	0°	0°
18	T-MOBILE	Ericsson AIR 21 B4A B2P	Panel	2100		250	65	4.7	120	TPO	Watt	0	0	4132.2	15.37	15.7'	0°	0°

Note: The Z reference indicates the bottom of the antenna height above the main site level unless otherwise indicated. Effective Radiated Power (ERP) is provided by the operator or based on Sitesafe experience. The values used in the modeling may be greater than are currently deployed. Other operator's equipment, antenna models and powers used for modeling are based on obtained information or Sitesafe experience. Proposed equipment is tagged as *(Proposed)* under *Operator* or *Antenna Make & Model*.

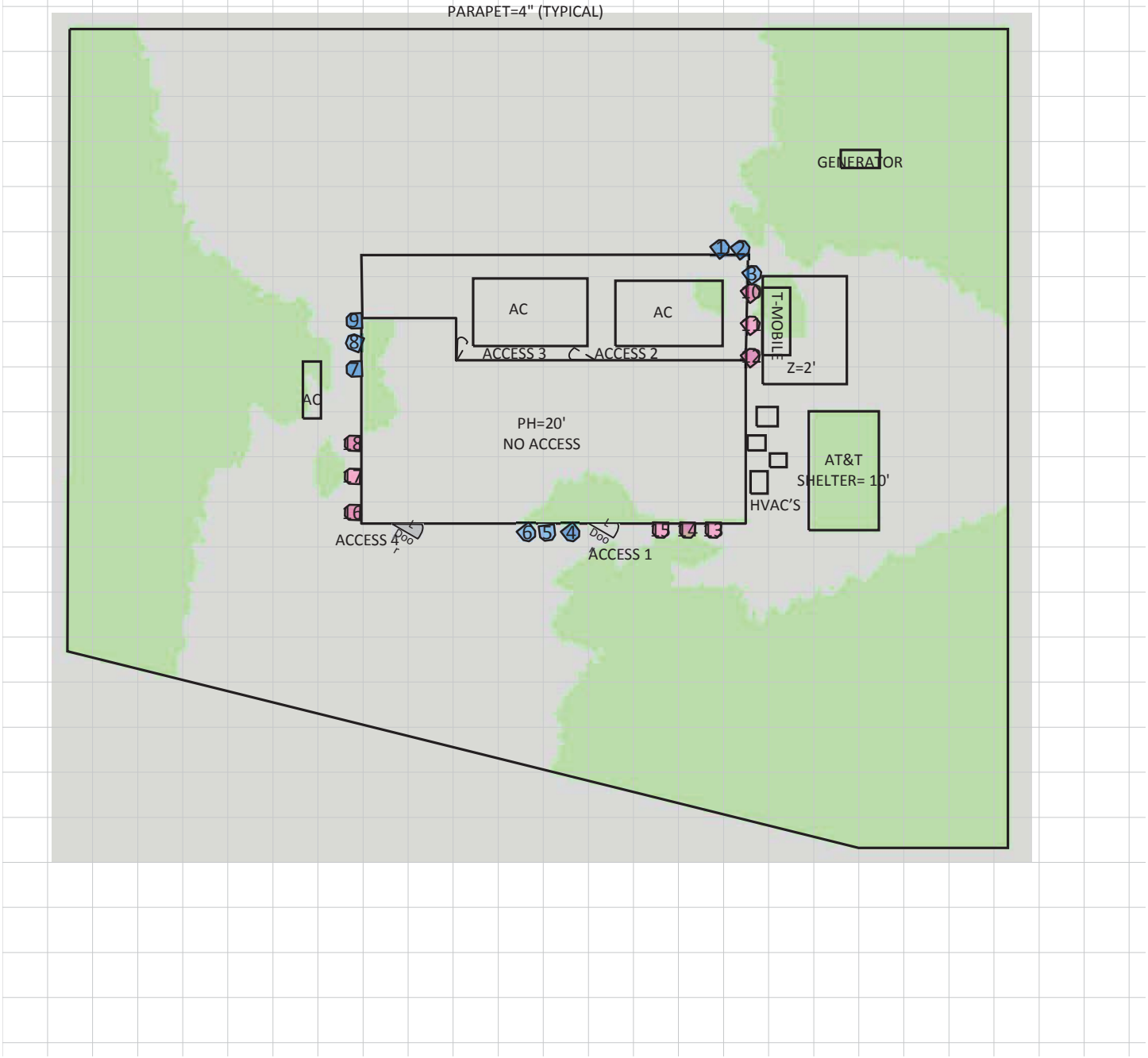
4 Emission Predictions

In the RF Exposure Simulations below, all heights are reflected with respect to main site level. In most rooftop cases this is the height of the main rooftop and in other cases this can be ground level. Each different height area, rooftop, or platform level is labeled with its height relative to the main site level. Emissions are calculated appropriately based on the relative height and location of that area to all antennas. The total analyzed elevations in the below RF Exposure Simulations are listed below.

- MAIN LEVEL = 0'
- PH1 = 20'
- AT&T Shelter = 10'
- T-Mobile Equipment Platform = 2'

The Antenna Inventory heights are referenced to the same level.

RF Exposure Simulation For: STRATHMOORE
Composite View



% of FCC Public Exposure Limit
Spatial Average 0' - 6'

% of FCC Public Exposure Limit

>= 5000	>= 500	>= 100	>= 5	< 5

Carrier Identification

AT&T MOBILITY LLC | VERIZON WIRELESS | T-MOBILE | SPRINT | UNKNOWN CARRIER

Barrier

Proposed Barriers/ Signs

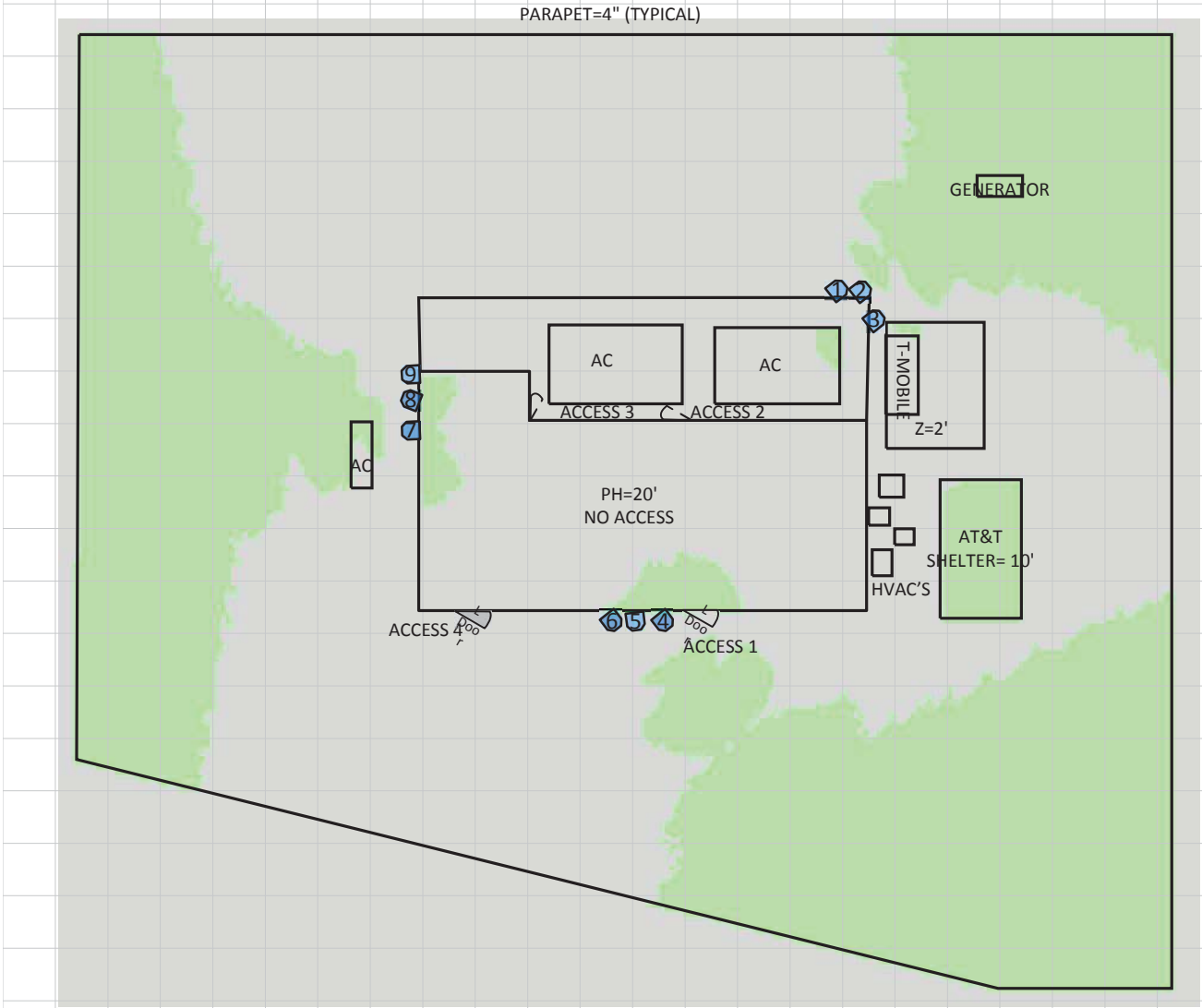
(Feet)

0 12.7 25.4

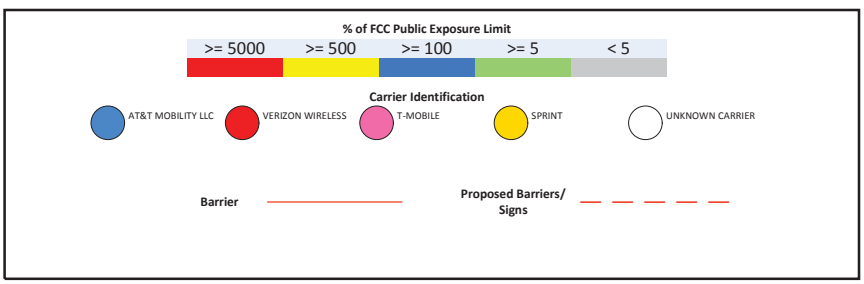
www.sitesafe.com
Site Name:STRATHMOORE
5/14/2020 8:36:18 AM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: STRATHMOORE
AT&T Mobility, LLC Contribution



% of FCC Public Exposure Limit
Spatial Average 0' - 6'



(Feet)

0 12.7 25.4

www.sitesafe.com
Site Name:STRATHMOORE
5/14/2020 8:39:10 AM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

5 Site Compliance

5.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, RF hazard signage and antenna locations, Sitesafe has determined that:

AT&T Mobility, LLC is compliant with the FCC Rules and Regulations, as described in OET Bulletin 65.

The compliance determination is based on General Public RFE levels derived from theoretical modeling, RF signage placement, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the proposed AT&T Mobility, LLC deployment plan could result in the site being rendered non-compliant.

Modeling is used for determining compliance and the percentage of MPE contribution.

5.2 Actions for Site Compliance

Based on FCC regulations, common industry practice, and our understanding of AT&T Mobility, LLC's RF Safety Policy requirements, this section provides a statement of recommendations for site compliance. Recommendations have been proposed based on our understanding of existing access restrictions, signage, and an analysis of predicted RFE levels.

AT&T Mobility, LLC is compliant with the FCC Rules and Regulations.

Recommended per AT&T Mobility, LLC's Policy:

Site Access Location

Sitesafe recommends that all AT&T Mobility, LLC signage be removed from all access points, as they are not required by AT&T Mobility, LLC's signage policy.

AT&T Mobility, LLC Proposed Alpha Sector Location

(2) Caution 2 sign(s) are recommended just below the bottom tip of the antennas. Remove the existing Information 1 sign(s) from this sector.

AT&T Mobility, LLC Proposed Beta Sector Location

(2) Caution 2 sign(s) are recommended just below the bottom tip of the antennas. Remove the existing Information 1 sign(s) from this sector.

AT&T Mobility, LLC Proposed Gamma Sector Location

(2) Caution 2 sign(s) are recommended just below the bottom tip of the antennas. Remove the existing Information 1 sign(s) from this sector.

Notes:

- Ensure all existing signage documented in this report still exist at the site, unless otherwise indicated.

6 Reviewer Certification

The reviewer whose signature appears below hereby certifies and affirms:

That I am an employee of Site Safe, LLC, in Vienna, Virginia, at which place the staff and I provide RF compliance services to clients in the wireless communications industry; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission (FCC) as well as the regulations of the Occupational Safety and Health Administration (OSHA), both in general and specifically as they apply to the FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields; and

That I have thoroughly reviewed this Site Compliance Report and believe it to be true and accurate to the best of my knowledge as assembled by and attested to by Leo Romero.

May 14, 2020

Anthony Handley

Appendix A – Statement of Limiting Conditions

Sitesafe has provided computer generated model(s) in this Site Compliance Report to show approximate dimensions of the site, and the model is included to assist the reader of the compliance report to visualize the site area, and to provide supporting documentation for Sitesafe's recommendations.

Sitesafe may note in the Site Compliance Report any adverse physical conditions, such as needed repairs, that Sitesafe became aware of during the normal research involved in creating this report. Sitesafe will not be responsible for any such conditions that do exist or for any engineering or testing that might be required to discover whether such conditions exist. Because Sitesafe is not an expert in the field of mechanical engineering or building maintenance, the Site Compliance Report must not be considered a structural or physical engineering report.

Sitesafe obtained information used in this Site Compliance Report from sources that Sitesafe considers reliable and believes them to be true and correct. Sitesafe does not assume any responsibility for the accuracy of such items that were furnished by other parties. When conflicts in information occur between data collected by Sitesafe provided by a second party and data collected by Sitesafe, the data will be used.

Appendix B – Regulatory Background Information

FCC Rules and Regulations

In 1996, the Federal Communications Commission (FCC) adopted regulations for evaluating the effects of RF emissions in 47 CFR § 1.1307 and 1.1310. The guideline from the FCC Office of Engineering and Technology is Bulletin 65 ("OET Bulletin 65"), *Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields*, Edition 97-01, published August 1997. Since 1996, the FCC periodically reviews these rules and regulations as per their congressional mandate.

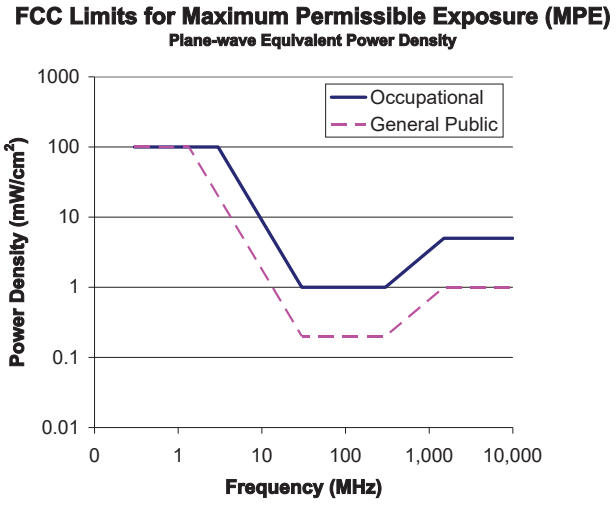
FCC regulations define two separate tiers of exposure limits: Occupational or "Controlled environment" and General Public or "Uncontrolled environment". The General Public limits are generally five times more conservative or restrictive than the Occupational limit. These limits apply to *accessible* areas where workers or the general public may be exposed to Radio Frequency (RF) electromagnetic fields.

Occupational or Controlled limits apply in situations in which persons are exposed as a consequence of their employment and where those persons exposed have been made fully aware of the potential for exposure and can exercise control over their exposure.

An area is considered a Controlled environment when access is limited to these aware personnel. Typical criteria are restricted access (i.e. locked or alarmed doors, barriers, etc.) to the areas where antennas are located coupled with proper RF warning signage. A site with Controlled environments is evaluated with Occupational limits.

All other areas are considered Uncontrolled environments. If a site has no access controls or no RF warning signage it is evaluated with General Public limits.

The theoretical modeling of the RF electromagnetic fields has been performed in accordance with OET Bulletin 65. The Maximum Permissible Exposure (MPE) limits utilized in this analysis are outlined in the following diagram:



Limits for Occupational/Controlled Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6

Limits for General Population/Uncontrolled Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

f = frequency in MHz *Plane-wave equivalent power density

OSHA Statement

The General Duty clause of the OSHA Act (Section 5) outlines the occupational safety and health responsibilities of the employer and employee. The General Duty clause in Section 5 states:

(a) Each employer –

(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;
(2) shall comply with occupational safety and health standards promulgated under this Act.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

OSHA has defined Radiofrequency and Microwave Radiation safety standards for workers who may enter hazardous RF areas. Regulation Standards 29 CFR § 1910.147 identify a generic Lockout/Tagout procedure aimed to control the unexpected energization or startup of machines when maintenance or service is being performed.

Appendix C – Safety Plan and Procedures

The following items are general safety recommendations that should be administered on a site by site basis as needed by the carrier.

General Maintenance Work: Any maintenance personnel required to work immediately in front of antennas and / or in areas indicated as above 100% of the Occupational MPE limits should coordinate with the wireless operators to disable transmitters during their work activities.

Training and Qualification Verification: All personnel accessing areas indicated as exceeding the General Population MPE limits should have a basic understanding of EME awareness and RF Safety procedures when working around transmitting antennas. Awareness training increases a worker's understanding to potential RF exposure scenarios. Awareness can be achieved in a number of ways (e.g. videos, formal classroom lecture or internet-based courses).

Physical Access Control: Access restrictions to transmitting antennas locations is the primary element in a site safety plan. Examples of access restrictions are as follows:

- Locked door or gate
- Alarmed door
- Locked ladder access
- Restrictive Barrier at antenna (e.g. Chain link with posted RF Sign)

RF Signage: Everyone should obey all posted signs at all times. RF signs play an important role in properly warning a worker prior to entering into a potential RF Exposure area.

Assume all antennas are active: Due to the nature of telecommunications transmissions, an antenna transmits intermittently. Always assume an antenna is transmitting. Never stop in front of an antenna. If you have to pass by an antenna, move through as quickly and safely as possible thereby reducing any exposure to a minimum.

Maintain a 3-foot clearance from all antennas: There is a direct correlation between the strength of an EME field and the distance from the transmitting antenna. The further away from an antenna, the lower the corresponding EME field is.

Site RF Emissions Diagram(s): Section 4 of this report contains RF Diagram(s) that outline various theoretical Maximum Permissible Exposure (MPE) areas at the site. The modeling is a worst-case scenario assuming a duty cycle of 100% for each transmitting antenna at full power. This analysis is based on one of two access control criteria: General Public criteria means the access to the site is uncontrolled and anyone can gain access. Occupational criteria means the access is restricted and only properly trained individuals can gain access to the antenna locations.

Appendix D – RF Emissions

The RF Emissions Simulation(s) in this report display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix E.

The key at the bottom of each RF Emissions Simulation indicates percentages displayed referenced to FCC General Public Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Areas indicated as Gray are predicted to be below 5% of the MPE limits. Gray represents areas more than 20 times below the most conservative exposure limit. **Gray areas are accessible to anyone**.
- Green represents areas are predicted to be between 5% and 100% of the MPE limits. **Green areas are accessible to anyone.**
- Blue represents areas predicted to exceed the General Public MPE limits but are less than Occupational limits. **Blue areas should be accessible only to RF trained workers**.
- Yellow represents areas predicted to exceed Occupational MPE limits. **Yellow areas should be accessible only to RF trained workers able to assess current exposure levels.**
- Red represents areas predicted to have exposure more than 10 times the Occupational MPE limits. **Red indicates that the RF levels must be reduced prior to access.** An RF Safety Plan is required which outlines how to reduce the RF energy in these areas prior to access.

If trained occupational personnel require access to areas that are delineated as above 100% of the limit, Sitesafe recommends that they utilize the proper personal protection equipment (RF monitors), coordinate with the carriers to reduce or shutdown power, or make real-time power density measurements with the appropriate power density meter to determine real-time MPE levels. This will allow the personnel to ensure that their work area is within exposure limits.

Appendix E – Assumptions and Definitions

General Model Assumptions

In this site compliance report, it is assumed that all antennas are operating at **full power at all times**. Software modeling was performed for all transmitting antennas located on the site. Sitesafe has further assumed a 100% duty cycle and maximum radiated power.

The modeling is based on recommendations from the FCC's OET-65 bulletin with the following variances per AT&T guidance. Reflection has not been considered in the modeling, i.e. the reflection factor is 1.0. The near / far field boundary has been set to 1.5 times the aperture height of the antenna and modeling beyond that point is the lesser of the near field cylindrical model and the far field model taking into account the gain of the antenna.

The site has been modeled with these assumptions to show the maximum RF energy density. Areas modeled with exposure greater than 100% of the General Public MPE level may not actually occur but are shown as a prediction that could be realized. Sitesafe believes these areas to be safe for entry by occupationally trained personnel utilizing appropriate personal protective equipment (in most cases, a personal monitor).

Use of Generic Antennas

For the purposes of this report, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information about a carrier, their FCC license and/or antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use our industry specific knowledge of equipment, antenna models, and transmit power to model the site. If more specific information can be obtained for the unknown measurement criteria, Sitesafe recommends remodeling of the site utilizing the more complete and accurate data. Information about similar facilities is used when the service is identified and associated with a particular antenna. If no information is available regarding the transmitting service associated with an unidentified antenna, using the antenna manufacturer's published data regarding the antenna's physical characteristics makes more conservative assumptions.

Where the frequency is unknown, Sitesafe uses the closest frequency in the antenna's range that corresponds to the highest Maximum Permissible Exposure (MPE), resulting in a conservative analysis.

Appendix F – Definitions

5% Rule – The rules adopted by the FCC specify that, in general, at multiple transmitter sites actions necessary to bring the area into compliance with the guidelines are the shared responsibility of all licensees whose transmitters produce field strengths or power density levels at the area in question in excess of 5% of the exposure limits. In other words, any wireless operator that contributes 5% or greater of the MPE limit in an area that is identified to be greater than 100% of the MPE limit is responsible for taking corrective actions to bring the site into compliance.

Compliance – The determination of whether a site complies with FCC standards with regards to Human Exposure to Radio Frequency Electromagnetic Fields from transmitting antennas.

Decibel (dB) – A unit for measuring power or strength of a signal.

Duty Cycle – The percent of pulse duration to the pulse period of a periodic pulse train. Also, may be a measure of the temporal transmission characteristic of an intermittently transmitting RF source such as a paging antenna by dividing average transmission duration by the average period for transmission. A duty cycle of 100% corresponds to continuous operation.

Effective (or Equivalent) Isotropic Radiated Power (EIRP) – The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna.

Effective Radiated Power (ERP) – The product of the power supplied to the antenna and the antenna gain in a given direction relative to a half-wave dipole antenna.

Gain (of an antenna) – The ratio of the maximum power in a given direction to the maximum power in the same direction from an isotropic radiator. Gain is a measure of the relative efficiency of a directional antenna as compared to an omnidirectional antenna.

General Population/Uncontrolled Environment – Defined by the FCC as an area where RF exposure may occur to persons who are **unaware** of the potential for exposure and who have no control over their exposure. General Population is also referenced as General Public.

Generic Antenna – For the purposes of this report, the use of "Generic" as an antenna model means the antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use its industry specific knowledge of antenna models to select a worst-case scenario antenna to model the site.

Isotropic Antenna – An antenna that is completely non-directional. In other words, an antenna that radiates energy equally in all directions.

Maximum Measurement – This measurement represents the single largest measurement recorded when performing a spatial average measurement.

Maximum Permissible Exposure (MPE) – The rms and peak electric and magnetic field strength, their squares, or the plane-wave equivalent power densities associated with these fields to which a person may be exposed without harmful effect and with acceptable safety factor.

Occupational/Controlled Environment – Defined by the FCC as an area where RF exposure may occur to persons who are **aware** of the potential for exposure as a condition of employment or specific activity and can exercise control over their exposure.

OET Bulletin 65 – Technical guideline developed by the FCC's Office of Engineering and Technology to determine the impact of RF exposure on humans. The guideline was published in August 1997.

OSHA (Occupational Safety and Health Administration) – Under the Occupational Safety and Health Act of 1970, employers are responsible for providing a safe and healthy workplace for their employees. OSHA's role is to promote the safety and health of America's working men and women by setting and enforcing standards; providing training, outreach and education; establishing partnerships; and encouraging continual process improvement in workplace safety and health. For more information, visit www.osha.gov.

Radio Frequency Exposure or Electromagnetic Fields – Electromagnetic waves that are propagated from antennas through space.

Spatial Average Measurement – A technique used to average a minimum of ten (10 measurements taken in a ten (10 second interval from zero (0 to six (6 feet. This measurement is intended to model the average energy a 6-foot tall human body will absorb while present in an electromagnetic field of energy.

Transmitter Power Output (TPO) – The radio frequency output power of a transmitter's final radio frequency stage as measured at the output terminal while connected to a load.

Appendix G – References

The following references can be followed for further information about RF Health and Safety.

Site Safe, LLC
http://www.sitesafe.com
FCC Radio Frequency Safety
http://www.fcc.gov/encyclopedia/radio-frequency-safety
National Council on Radiation Protection and Measurements (NCRP)
http://www.ncrponline.org
Institute of Electrical and Electronics Engineers, Inc., (IEEE)
http://www.ieee.org
American National Standards Institute (ANSI)
http://www.ansi.org
Environmental Protection Agency (EPA)
http://www.epa.gov/radtown/wireless-tech.html
National Institutes of Health (NIH)
http://www.niehs.nih.gov/health/topics/agents/emf/
Occupational Safety and Health Agency (OSHA)
http://www.osha.gov/SLTC/radiofrequencyradiation/
International Commission on Non-Ionizing Radiation Protection (ICNIRP)
http://www.icnirp.org
World Health Organization (WHO)
http://www.who.int/peh-emf/en/
National Cancer Institute
http://www.cancer.gov/cancertopics/factsheet/Risk/cellphones
American Cancer Society (ACS)
http://www.cancer.org/docroot/PED/content/PED_1_3X_Cellular_Phone_Towers.asp?siteareа=PED
European Commission Scientific Committee on Emerging and Newly Identified Health Risks
http://ec.europa.eu/health/ph_risk/committees/04_scenihr/docs/scenihr_o_022.pdf
Fairfax County, Virginia Public School Survey
http://www.fcps.edu/fts/safety-security/RFEESurvey/
UK Health Protection Agency Advisory Group on Non-Ionizing Radiation
http://www.hpa.org.uk/webw/HPAweb&HPAwebStandard/HPAweb_C/1317133826368
Norwegian Institute of Public Health
http://www.fhi.no/dokumenter/545eea7147.pdf

NNHH-65C-R4

8-port sector antenna, 4x 698–896 and 4x 1695–2360 MHz, 65° HPBW, 4x RETs

- Array configuration provides capability for 4T4R (4x MIMO) on Low band and High band
- Optimized SPR performance across all operating bands
- Excellent wind loading characteristics

General Specifications

Antenna Type	Sector
Band	Multiband
Color	Light gray
Effective Projective Area (EPA), frontal	0.9 m² | 9.688 ft²
Effective Projective Area (EPA), lateral	0.31 m² | 3.337 ft²
Grounding Type	RF connector inner conductor and body grounded to reflector and mounting bracket
Performance Note	Outdoor usage | Wind loading figures are validated by wind tunnel measurements described in white paper WP-112534-EN
Radome Material	Fiberglass, UV resistant
Radiator Material	Aluminum | Low loss circuit board
Reflector Material	Aluminum
RF Connector Interface	4.3-10 Female
RF Connector Location	Bottom
RF Connector Quantity, high band	4
RF Connector Quantity, low band	4
RF Connector Quantity, total	8

Remote Electrical Tilt (RET) Information, General

RET Hardware	CommRET v2
RET Interface	8-pin DIN Female | 8-pin DIN Male
RET Interface, quantity	1 female | 1 male

Dimensions

Width	498 mm | 19.606 in

NNHH-65C-R4

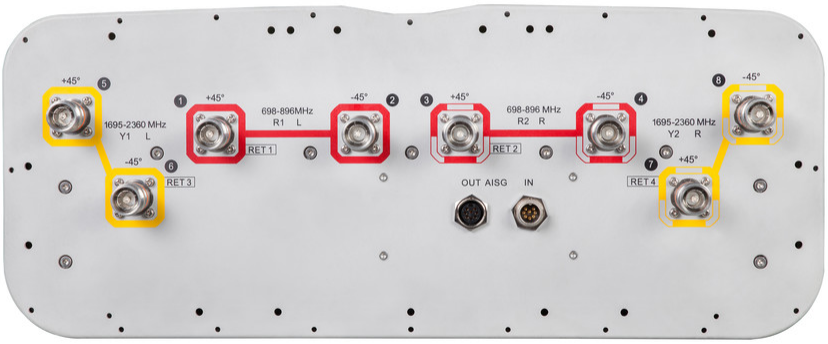
Length	2438 mm | 95.984 in
Depth	197 mm | 7.756 in

Array Layout

(Sizes of colored boxes are not true depictions of array sizes)

Array	Freq (MHz)	Conns	RET (MRET)	AISG RET UID
R1	698-896	1-2	1	CPxxxxxxxxxxxxxxxmm.1
R2	698-896	3-4	2	CPxxxxxxxxxxxxxxxmm.2
Y1	1695-2360	5-6	3	CPxxxxxxxxxxxxxxxmm.3
Y2	1695-2360	7-8	4	CPxxxxxxxxxxxxxxxmm.4

Port Configuration



Electrical Specifications

NNHH-65C-R4

Impedance	50 ohm
Operating Frequency Band	1695 – 2360 MHz | 698 – 896 MHz
Polarization	±45°
Total Input Power, maximum	900 W @ 50 °C

Remote Electrical Tilt (RET) Information, Electrical

Protocol	3GPP/AISG 2.0 (Multi-RET)
Power Consumption, idle state, maximum	1 W
Power Consumption, normal conditions, maximum	8 W
Input Voltage	10–30 Vdc
Internal RET	High band (2) | Low band (2)

Electrical Specifications

Frequency Band, MHz	**698–806**	**806–896**	**1695–1880**	**1850–1990**	**1920–2180**	**2300–2360**
Gain, dBi	15.7	16.1	18.3	18.8	19.1	19.3
Beamwidth, Horizontal, degrees	73	71	58	59	61	59
Beamwidth, Vertical, degrees	9.8	8.6	5.4	5	4.7	4.2
Beam Tilt, degrees	2–12	2–12	2–12	2–12	2–12	2–12
USLS (First Lobe), dB	20	20	19	19	20	20
Front-to-Back Ratio at 180°, dB	28	32	37	38	39	36
Isolation, Cross Polarization, dB	25	25	25	25	25	25
Isolation, Inter-band, dB	25	25	25	25	25	25
VSWR | Return loss, dB	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-150	-150	-150	-150	-150	-150
Input Power per Port at 50°C, maximum, watts	300	300	250	250	250	200

Electrical Specifications, BASTA

Frequency Band, MHz	**698–806**	**806–896**	**1695–1880**	**1850–1990**	**1920–2180**	**2300–2360**
Gain by all Beam Tilts, average, dBi	15.3	15.9	17.9	18.6	18.8	19
Gain by all Beam Tilts Tolerance, dB	±0.5	±0.5	±0.8	±0.3	±0.4	±0.4
Gain by Beam Tilt, average,	2 ° | 15.2	2 ° | 15.7	2 ° | 17.6	2 ° | 18.4	2 ° | 18.5	2 ° | 18.8

NNHH-65C-R4

dBi	7 ° | 15.4 12 ° | 15.2	7 ° | 16.0 12 ° | 15.8	7 ° | 18.0 12 ° | 17.8	7 ° | 18.7 12 ° | 18.5	7 ° | 19.0 12 ° | 18.7	7 ° | 19.1 12 ° | 18.8
Beamwidth, Horizontal Tolerance, degrees	±3	±3.3	±4.4	±2.8	±3.6	±4.9
Beamwidth, Vertical Tolerance, degrees	±0.7	±0.6	±0.3	±0.2	±0.3	±0.2
USLS, beampeak to 20° above beampeak, dB	16	16	16	17	18	17
Front-to-Back Total Power at 180° ± 30°, dB	23	22	30	33	30	29
CPR at Boresight, dB	22	24	19	23	22	18
CPR at Sector, dB	10	7	8	9	8	7

Mechanical Specifications

Wind Loading at Velocity, frontal	214.5 lbf @ 150 km/h | 954.0 N @ 150 km/h
Wind Loading at Velocity, lateral	331.0 N @ 150 km/h | 74.4 lbf @ 150 km/h
Wind Loading at Velocity, maximum	1,235.0 N @ 0 km/h | 277.6 lbf @ 0 km/h
Wind Loading at Velocity, rear	176.5 lbf @ 150 km/h | 785.0 N @ 150 km/h
Wind Speed, maximum	241 km/h | 149.75 mph

Packaging and Weights

Width, packed	608 mm | 23.937 in
Depth, packed	352 mm | 13.858 in
Length, packed	2630 mm | 103.543 in
Net Weight, without mounting kit	45.5 kg | 100.31 lb
Weight, gross	64.9 kg | 143.08 lb

Regulatory Compliance/Certifications

Agency	Classification
CHINA-ROHS	Above maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
ROHS	Compliant/Exempted

Included Products

BSAMNT-3

	— Wide Profile Antenna Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.
BSAMNT-M	— Middle Downtilt Mounting Kit for Long Antennas for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor bracket set.

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

AirScale RRH 4T4R B5 160W AHCA

Capacity, performance, low total cost of ownership and investment protection

Nokia AirScale Remote Radio Head (RRH) AHCA supports band 5 - full band- along with 4×4 MIMO and 256 QAM modulation to deliver higher data rates. It offers Nokia's unique book mounting for faster roll out and radio-integrated Passive Intermodulation (PIM) cancellation for enhanced network performance.

Furthermore, 4TX and 4RX paths in a single radio unit gives the flexibility to support 2T2R-2 sectors or 4T4R-single sector from a single unit, for cost-effective scaling of both coverage and capacity.

Capacity and performance

AirScale RRH 4T4R delivers 160 W (4×40 W) transmit power and can support 2×2 MIMO, 4×2 MIMO and 4×4 MIMO. The radio supports 256 QAM modulation in the downlink (DL) for up to 30 percent higher throughput. The Virtual Spectrum Analyzer feature enables both uplink and downlink spectrum to be analyzed.

Low total cost of ownership

With up to two sectors in a single radio, light weight and zero-bolt book mounting, AirScale RRH 4T4R allows operators to achieve faster roll outs and more cost-effective installation and maintenance of radios and tower space.

Investment protection

AirScale RRH 4T4R complements the AirScale System Module, offering a complete base station solution. AirScale System Module is 5G capable and offers 28 Gbps capacity. AirScale RRH is part of the AirScale Base Station portfolio, the next generation Nokia base station platform, and is backwards-compatible with the Nokia Flexi Multiradio 10 Base Station to best use an operator's existing investments.

Product name	AirScale RRH 4T4R B5 160W AHCA - 473966A
Supported frequency bands	3GPP band 5
Frequencies	DL 869-894MHz, UL 824-849MHz
Number of TX/RX ports	4/4
Instantaneous Bandwidth IBW	25MHz
Occupied Bandwidth OBW	25MHz
Output power	4T4R 40 W/ 2T4R 60W
Dimensions (mm) height x width x depth	337 x 295 x 165
Volume (liters)	16.4
Weight (kg)	16.7
Supply Voltage / Voltage Range	DC-48V / -36V to -60V
Typical Power Consumption	207 W (ETSI 24h Avg – 4x20W mode)
Antenna ports	4TX/4RX, 4.3-10+
Optical ports	2 x CPRI 9.8 Gbps
ALD control interfaces	AISG3.0 from ANT1, 2, 3, 4 and RET (Power supply ANT1 and ANT3)
Other interfaces	External alarm MDR-26 serial connector (4 inputs, 1 output) DC circular power connector
Operational temperature range	-40°C to 55°C (with no solar load)
Ingress protection class	IP65
Installation options	Pole or wall, RAS, vertical or horizontal book mount
Surge protection	Class II 5kA

Nokia Oyj
Karaportti 3
FI-02610 Espoo
Finland
Tel. +358 (0) 10 44 88 000

Product code: SR1611002341EN (April)

June 9, 2020

AT&T
Steven Safire
7150 Standard Drive
Hanover, MD 21706

Jacobs Telecommunications, Inc.
5449 Bells Ferry Road
Acworth, GA 30102
770-701-2500
www.jacobs.com

Subject:	**Rooftop Equipment Installation** **Structural Assessment Letter**
Carrier Designation:	**LTE 5C/6C/5G-Parent Rooftop** **Site Number: 16252** **Site Name: Strathmoore** **FA Location: 10096268** **PTN: 2251A0T8EQ, 2251A0T7VA, 2251A0T7B9, 2251A0T7Y5, 2251A0T82Z, 2251A0T84Z**
Building Owner Designation:	**7101 Wisconsin Owner, LLC** **Site ID: NA**
Engineering Firm Designation:	**Jacobs Telecommunications, Inc. Project: EP4TURWL**
Site Data:	**7101 Wisconsin Avenue** **Bethesda, Montgomery County, MD 20814** **Latitude: N38°58'49.73"±; Longitude: W77°05'29.81"±** **Ground Elevation: 340 ft ± NAVD 88; RT: 165 ft ± AGL**

Per your request, we present our structural assessment of the structure at the above referenced location for the equipment change noted in **Table A**. This assessment assumes the existing structure was properly designed and constructed, as well as being well maintained and is structurally sound.

The purpose of this assessment was to review the structure in accordance with the 2018 International Building Code (current building code) and the ANSI/TIA-222-H-1-2019 Structural Standard for Antenna Supporting Structures and Antennas (industry standard) for structural feasibility and integrity

Our review was conducted in conjunction with the existing AT&T installation information, mount assessment, previous structural evaluation, and the recent site visit photos and data. Based on a comparison of the current structural conditions and the required design criteria with the change in equipment loading, it has been determined that the proposed loading will cause minimal change in the both lateral and vertical loads supported by the structure. It is therefore the opinion of Jacobs that the structure is sufficient to support the proposed loading as listed in **Table A**.

As a result, the imposed additional loads should be within the allowable limits of the existing structural system; thus, the structure is assumed to resist the stress caused by the proposed equipment configuration and will satisfy all assumed structural strength requirements with no additional calculations required. **Thus, by comparison, it is our structural assessment that the proposed configuration will have negligible effect at this site.**

Please note that additional engineering review will be required prior to placing any future equipment. We trust you find our work satisfactory. Jacobs Telecommunications, Inc. appreciates the opportunity of providing continuing professional services to AT&T. Please do not hesitate to call should you have any questions.

Sincerely,

John Tam
Structural Engineer

Wensen Jiang, PE
Engineer of Record
PE No. 55911

6/9/2020

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. 55911, Expiration Date: 4/14/22.

REFERENCES

1. Mount analysis provided by Jacobs Telecommunications, Inc., project no. EP4TURWL, dated 6/9/20.
2. Structural analysis provided by Dewberry Engineers, Inc., dated 5/1/15.
3. Construction drawings provided by FDH Engineering, project no. 1310621950, dated 1/29/14.

CONCLUSION / SUMMARY

Loads determined by the latest IBC referencing ANSI/TIA-222 provide a more practical loading for comparison purposes and therefore are considered to govern for a conservative assessment. All additional loads imparted by the appurtenance configuration noted in **Table A** as determined by ANSI/TIA-222, will not increase the overall gravity load by more than 5% of the original overall structure nor will it increase the overall lateral load by more than 10% of the original overall structure. This comparison meets the additions and alterations requirement outlined in the IBC; thus, a more rigorous analysis/assessment is not required.

CODE INTERPRETATIONS

Per Section 1609.1 and 3108.1 of the International Building Code, the determination of lateral loads for antenna supporting structures and antennas shall be determined using the ANSI/TIA-222.

Mount analysis[1] procedures are based on Section 16 of the ANSI/TIA-222-H with any adjustments outlined in the Mount Technical Directive version 14 provided by AT&T.

Per Section 1103 of the International Building Code, the existing structure is considered to have adequate strength for the proposed appurtenance configuration loading if the *additions* or *alterations* to the existing structure do not increase the gravity load on any structural element of the existing structure by more than five percent, unless the increased forces on the element are still in compliance with the code for new structures. In addition, if the *additions* or *alterations* to the existing structure do not increase the lateral load on any structural element of the existing structure by more than ten percent cumulative since the original construction, unless the element has the capacity to resist the increased forces determined in accordance with Sections 1609 and 1613.

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ASSUMPTIONS

The existing substructure drawings were not available at the time of this assessment. The existing substructure is assumed to be sufficiently designed to resist the additional loading provided by the supplementary equipment such that Section 1103 of the IBC applies.

All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report such that Section 1103 of the IBC applies.

DISCLAIMERS

The scope of this assessment pertains only to the structural system of the additional appurtenance loads **Table A** imparted by the AT&T equipment deployment and as such does not include examination of any additional loads imparted by the equipment installation of others unknown to current mount analysis on file. Furthermore, no qualification is made nor implied by this document for the structural members or elements supporting the aforementioned equipment installation.

All previously installed equipment (microwaves, radios, omnis etc.) not represented in the mount loading **Table A** is to be decommissioned and removed from the antenna mounting system. These installation requirements must be implemented as previously described for this assessment to be valid.

CARRIER LOADING

Table A: Existing, Proposed and *Reserved* Appurtenance Configuration[1,2]

Elevation (AGL, ft)	Sector	Azimuth	Position[3]	Equipment[4]	Cables
163	Alpha	30°	1	**(1) Commscope NNHH-65C-R4 (Antenna)**	(2) 1-5/8" Coax (1) 1" DC (1) 3/8" Fiber (1) 2" Conduit
				(1) Nokia AirScale Dual RRH 4T4R B25/66 320W (RRH)	
				(1) Nokia B14/12/29 Triband (RRH)	
				(1) Raycap DC6-48-60-18-8F (Surge)	
				(1) Raycap DC2-48-60-0-9E (Surge)	
				(1) Raycap FC12-PC6-10E (Surge)	
			2	(1) Kathrein 742264 (Antenna)	
				(2) Powerwave LGP13519 (Diplexer)	
				(1) Raycap DC6-48-60-18-8F (Surge)	
			3	-	
			4	**(1) Commscope NNHH-65C-R4 (Antenna)**	
				(1) ALU RRH4x25-WCS-4R (RRH)	
				(1) Nokia AirScale RRH 4T4R B5 160W (RRH)	
				(1) Raycap DC6-48-60-18-8F (Surge)	
	Beta	120°	1	**(1) Commscope NNHH-65C-R4 (Antenna)**	(2) 1-5/8" Coax (1) 1" DC (1) 3/8" Fiber (1) 2" Conduit
				(1) Nokia AirScale Dual RRH 4T4R B25/66 320W (RRH)	
				(1) Nokia B14/12/29 Triband (RRH)	
				(1) Raycap DC2-48-60-0-9E (Surge)	
		150°	2	(1) Kathrein 742264 (Antenna)	
				(2) Powerwave LGP13519 (Diplexer)	

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163	Beta	-	3	-	-
		120°	4	**(1) Commscope NNHH-65C-R4 (Antenna)**	
				(1) ALU RRH4x25-WCS-4R (RRH)	
				(1) Nokia AirScale RRH 4T4R B5 160W (RRH)	
	Gamma	245°	1	**(1) Commscope NNHH-65C-R4 (Antenna)**	(2) 1-5/8" Coax (1) 1" DC (1) 3/8" Fiber (1) 2" Conduit
				(1) Nokia AirScale Dual RRH 4T4R B25/66 320W (RRH)	
				(1) Nokia B14/12/29 Triband (RRH)	
				(1) Raycap DC2-48-60-0-9E (Surge)	
		270°	2	(1) Kathrein 742264 (Antenna)	
				(2) Powerwave LGP13519 (Diplexer)	
		-	3	-	
		245°	4	**(1) Commscope NNHH-65C-R4 (Antenna)**	
				(1) ALU RRH4x25-WCS-4R (RRH)	
				(1) Nokia AirScale RRH 4T4R B5 160W (RRH)	

1 – Appurtenance Configuration as reflected in AT&T RFDS ID 3546758, updated 1/10/2020.
2 – The evaluation and analysis is modeled for the worse case loading shown.
3 – Position 1 is defined as right-most mount location when facing structure.
4 – Proposed equipment shown in **bold**.
5 – Surge locations shown in table match the RFDS; actual surge locations are to the standoff members and evenly distributed between sectors.

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FA# 10096268 USID#16252
BRANDYWINE WISCONSIN LLC
STRATHMOORE

LTE 5C/6C/4TX4RX ANTENNA RETROFIT/4TX4RX SOFTWARE RETROFIT/5G NR 1SR ROOFTOP

PROJECT DESCRIPTION

AT&T WIRELESS PROPOSES TO MODIFY AN EXISTING WIRELESS INSTALLATION. THE SCOPE WILL CONSIST OF THE FOLLOWING:

TOWER SOW
- REMOVE (6) EXISTING ANTENNAS
- REMOVE (3) EXISTING 700 BAND RRHS
- REMOVE (3) EXISTING AWS BAND RRHS
- REMOVE ALL EXISTING COAX EXCEPT FOR 6 TO REMAIN
- REMOVE (3) EXISTING 2" CONDUIT
- REMOVE (3) EXISTING DC2'S

- INSTALL (6) PROPOSED ANTENNAS
- INSTALL (3) PROPOSED 700 BAND RRHS
- INSTALL (3) PROPOSED 850 BAND RRHS
- INSTALL (3) PROPOSED 1900 BAND RRHS
- INSTALL (3) PROPOSED DC6 BOXES
- INSTALL (3) PROPOSED 24 PAIR FIBER TRUNK CABLE
- INSTALL (3) PROPOSE 6/C 6 AWG POWER TRUNK
- INSTALL (3) PROPOSE 2/C 8 AWG POWER TRUNK
- INSTALL (9) PROPOSE DUAL PAIR FIBER JUMPERS
- INSTALL (6) PROPOSED RET CABLES
- INSTALL (12) PROPOSED DM-HM JUMPERS
- INSTALL (44) PROPOSED HM-HM JUMPERS

GROUND SOW
- REMOVE (18) 1/C 8 AWG TELCOFLEX POWER

- INSTALL (3) PROPOSED DC2 MODULES
- INSTALL (18) PROPOSED 1/C 6 AWG POWER
- INSTALL (3) PROPOSED 25A BREAKERS
- INSTALL (6) PROPOSED 50A BREAKERS
- INSTALL (3) PROPOSED FIBER STORAGE BOXES
- INSTALL (1) PROPOSED 20A BREAKER

- NO SITE/CIVIL WORK

SITE INFORMATION

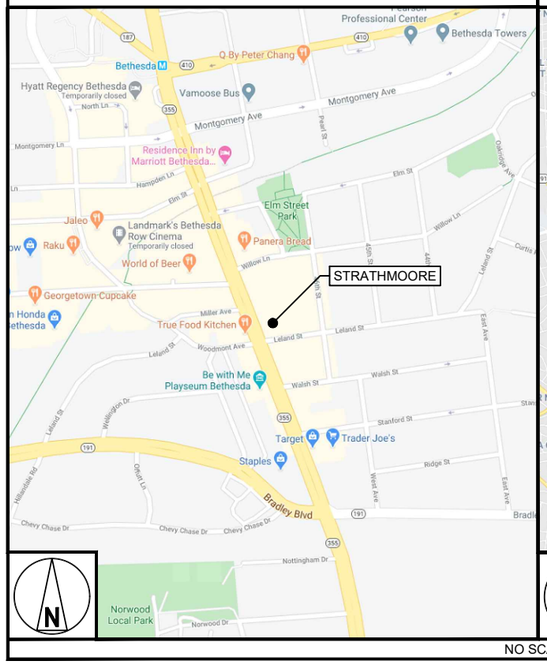
LANDLORD:	BRANDYWINE WISCONSIN LLC
SITE NAME:	STRATHMOORE
USID NUMBER:	16252
FA NUMBER:	10096268
SITE ADDRESS:	7101 WISCONSIN AVENUE BETHESDA, MD 20814
COUNTY:	MONTGOMERY
LATITUDE (NAD 83):	N 38° 58' 49.72"
LONGITUDE (NAD 83):	W 77° 5' 29.81"
RAD CENTER:	163' AGL
SITE ACQUISITION CONTACT:	ANDREW CAPACI Andrew.Capaci@jacobs.com
RF ENGINEER:	SANDEEP GUPTA AA913P@att.com
C&E MANAGER:	STEVEN SAFIRE SS0091@att.com
JURISDICTION:	MONTGOMERY COUNTY
APPLICANT/LESSEE:	AT&T 7150 STANDARD DRIVE SUITE A HANOVER, MD 21076

CONTACT INFORMATION

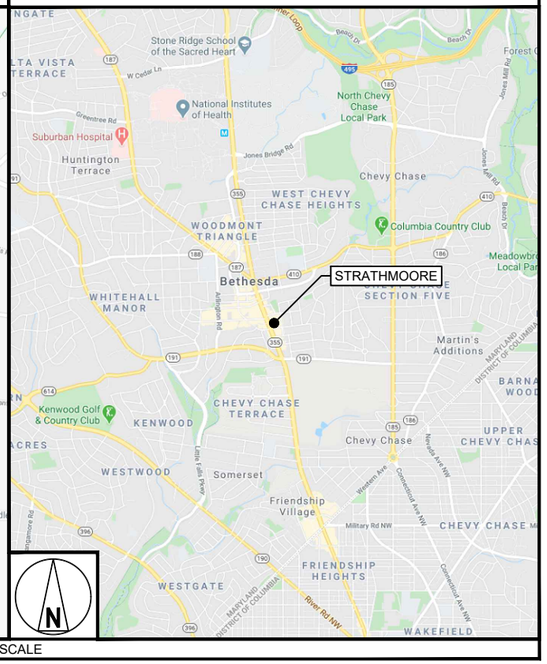
ENGINEER:	JACOBS TELECOMMUNICATIONS, INC. 7150 STANDARD DRIVE, SUITE B HANOVER, MD 21076
CONTACT:	LEAH WOODLY
PHONE:	443.230.4400x113

LOCATION MAPS

VICINITY MAP



LOCAL MAP



NO SCALE

DRIVING DIRECTIONS

DIRECTIONS FROM AT&T OFFICE: START OUT FROM 7150 STANDARD DR, HANOVER MD
TAKE ON MD-100 W FROM STANDARD DR, PARK CIR DR AND COCA COLA DR. TAKE I-95 S AND I-495 W TO MD-185 S/CONNECTICUT AVE IN CHEVY CHASE. TAKE EXIT 33 FROM I-495 W. CONTINUE ON MD-185 S/CONNECTICUT AVE TO YOUR DESTINATION IN BETHESDA TO THE SITE.

ENGINEERING

2015 INTERNATIONAL BUILDING CODE OR LATEST EDITION
2014 NATIONAL ELECTRIC CODE OR LATEST EDITION
TIA-222-H OR LATEST EDITION

GENERAL NOTES

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

RFDS

RFDS REVISION V2020_0.1 DATED 01/10/2020.

APPROVALS

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND MAY IMPOSE CHANGES OR MODIFICATIONS.

AT&T RF: _____ DATE: _____

AT&T OPERATIONS: _____ DATE: _____

AT&T SITE AQ: _____ DATE: _____

OCI: _____ DATE: _____

TOWER/PROPERTY OWNER: _____ DATE: _____

MUNICIPAL: _____ DATE: _____

DRAWING INDEX

SHEET NO:	SHEET TITLE
T-1	TITLE SHEET
C-1	SITE PLAN
C-2	SITE ELEVATION
C-3	EXISTING & PROPOSED EQUIPMENT LAYOUT
C-4	EXISTING & PROPOSED ANTENNA LAYOUT
C-5	SITE DETAILS
C-6	POWER STUDY
RF-1	RF SHEET AND PLUMBING DIAGRAM
E-1	BREAKER PANEL
G-1	GROUNDING DETAILS
S-1	ANTENNA CONNECTION DIAGRAM
S-2	COLOR CODE CHART
S-3	LTE RET NAMING CONVENTION
GN-1	GENERAL NOTES I
GN-2	GENERAL NOTES II
GN-3	GENERAL NOTES III

DO NOT SCALE DRAWINGS

CONTRACTOR SHALL VERIFY ALL PLANS & EXISTING DIMENSIONS & CONDITIONS ON THE JOB SITE & SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME

UNDERGROUND SERVICE ALERT
MISS UTILITY
811
48 HOURS BEFORE YOU DIG

at&t
7150 STANDARD DR
SUITE A
HANOVER, MD 21076

Jacobs
Challenging today.
Reinventing tomorrow.
Jacobs Telecommunications, Inc.
7150 STANDARD DR. SUITE B
HANOVER, MD 21076
443.230.4400x113

CERTIFICATION STATEMENT:
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. 55911 EXP.: 04/14/22

APPROVALS

LANDLORD _____
LEASING _____
R.F. _____
ZONING _____
CONSTRUCTION _____
A & E _____

PROJECT NO: EP4TURWL

DRAWN BY: RM

CHECKED BY: LW

SUBMITTALS

1	09/25/20	JX COMMENTS
0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

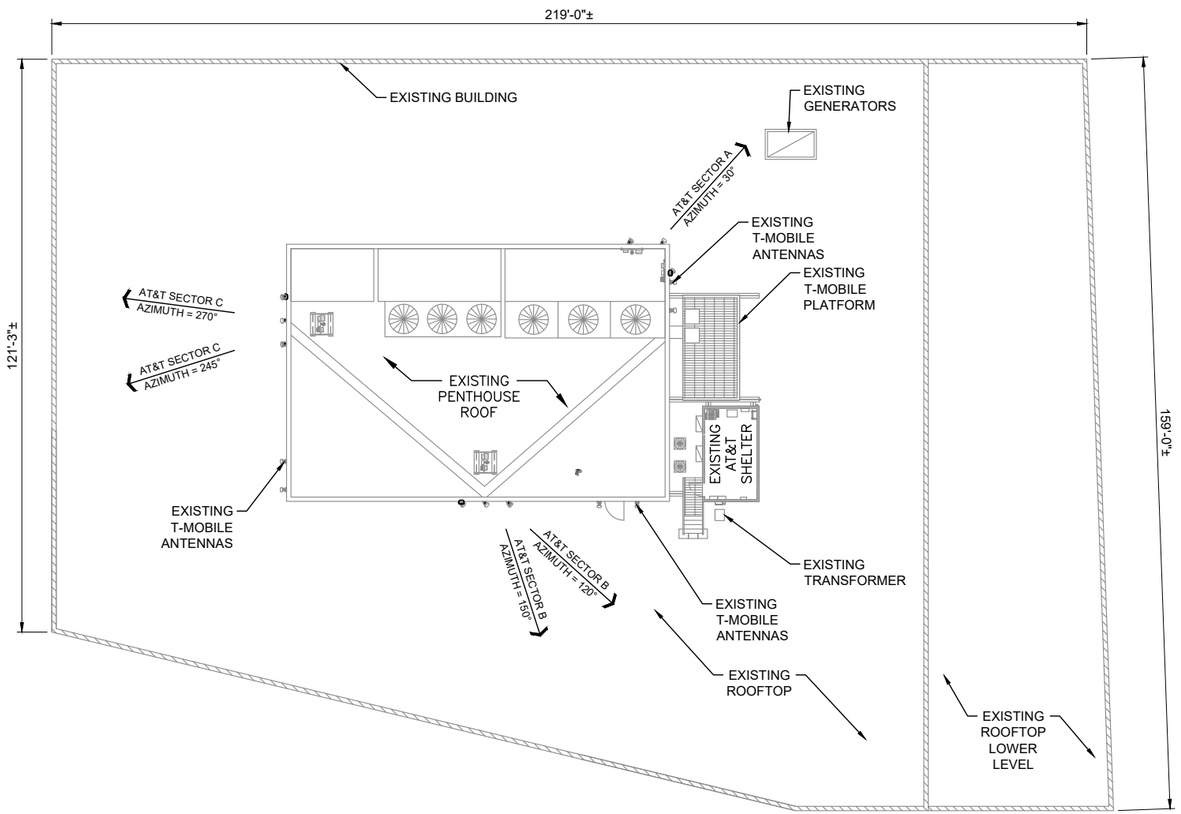
TITLE SHEET

T-1

TRUE NORTH

NOTES:

1. PLAN BASED ON AS-BUILT DRAWINGS ISSUED BY B+T GRP ON 01/20/17. CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS AND LOCATION/ORIENTATION OF EXISTING EQUIPMENT.
2. CONTRACTOR TO VERIFY FINAL RF CONFIGURATION AND NOTIFY CARRIER AND ENGINEER W/ ANY DISCREPANCIES PRIOR TO THE INSTALLATION.
3. CONTRACTOR SHALL VERIFY THE EXISTING ANTENNA CENTERLINE HEIGHT ABOVE GROUND LEVEL. PROPOSED ANTENNA CENTERLINE SHALL MATCH EXISTING.



1 **SITE PLAN**

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

at&t
7150 STANDARD DR
SUITE A
HANOVER, MD 21076

Jacobs
Challenging today.
Reinventing tomorrow.
Jacobs Telecommunications, Inc.
7150 STANDARD DR. SUITE B
HANOVER, MD 21076
443.230.4400x113

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APPROVALS

LANDLORD _____

LEASING _____

R.F. _____

ZONING _____

CONSTRUCTION _____

A & E _____

PROJECT NO: EP4TURWL

DRAWN BY: RM

CHECKED BY: LW

SUBMITTALS

1	09/25/20	JX COMMENTS
0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

SITE PLAN

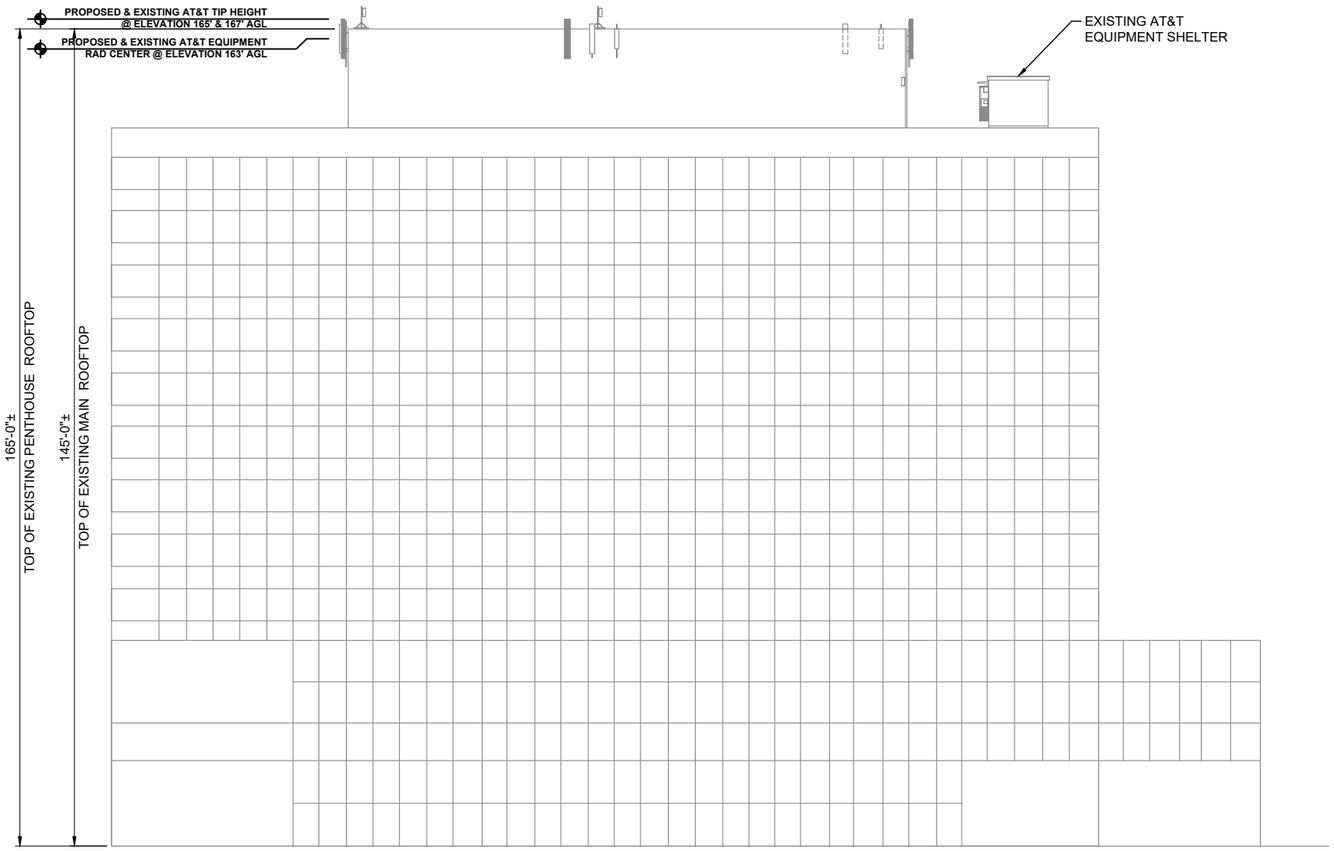
C-1

TOP-SIDE SCOPE OF WORK:

-REMOVE ALL COAX LINES BESIDES (6) TO REMAIN (2 PER SECTOR)
-REMOVE (3) 2" CONDUITS AND ASSOCIATED POWER/FIBERS (1 PER SECTOR)
-REMOVE (3) 700 RRH AND (3) 2100 RRHS AND ASSOCIATED JUMPERS/FIBER/POWER (2 PER SECTOR)
-REMOVE (3) DC2S (1 PER SECTOR)
-REMOVE (6) ANTENNAS (2 PER SECTOR)
-INSTALL (6) NNHH-65C-R4 ANTENNAS IN POSITIONS #1 AND #3 (2 PER SECTOR)
-MOVE (2) UMTS ANTENNAS IN POSITION #1 TO POSITION #2 (BETA/GAMMA SECTOR)
-INSTALL (3) NOKIA B14/B12/B29 TRIBAND RRHS ON (E) UNISTRUT FRAME (1 PER SECTOR)
-INSTALL (3) AIRSCALE B25/B66 DUALBAND RRHS ON (E) UNISTRUT FRAME (1 PER SECTOR)
-INSTALL (3) AIRSCALE B5 RRHS ON (E) UNISTRUT FRAME (1 PER SECTOR)
-INSTALL (3) DC6 BOXES ON (E) UNISTRUT FRAME (1 PER SECTOR)
-INSTALL (3) 6/C 6 AWG POWER TRUNKS FROM (E) DC12S TO (N) DC6 BOXES (1 PER SECTOR)
-INSTALL (3) 24 PAIR FIBER TRUNKS FROM (N) FIBER TRAYS TO (N) DC6 BOXES (1 PER SECTOR)
-INSTALL (9) 2/C 8 AWG POWER RUNS FROM (N) DC6 BOXES TO (N) RRHS (3 PER SECTOR)
-INSTALL (9) DUAL PAIR FIBER JUMPERS FROM (N) DC6 BOXES TO (N) RRHS (3 PER SECTOR)
-INSTALL (6) RET CABLES FROM (N) ANTENNAS TO (N) & (E) RRHS PER RFDS/MARKET SPEC (2 PER SECTOR)
-INSTALL (36) HM-HM JUMPERS FROM (N) ANTENNAS TO (N) RRHS (12 PER SECTOR)
-INSTALL (8) DM-HM JUMPERS FROM (E) WCS RRHS TO (E) WCS FILTERS (ALPHA/BETA SECTOR)
-INSTALL (8) HM-HM JUMPERS FROM (E) WCS FILTERS TO (N) ANTENNAS (ALPHA/BETA SECTOR)
-INSTALL (4) DM-HM JUMPERS FROM (E) WCS RRH TO (N) ANTENNAS (GAMMA SECTOR)
-LABEL ALL ANTENNAS/RRUS
-SECURE JUMPERS, POWER CABLES, FIBER, & RET CABLES WITH PIM RATED SNAP-INS
-PAINT ANTENNAS/JUMPERS ON BUILDING IF REQUIRED
-CONFIRM B5 RRH ANTENNAS ARE A MINIMUM OF 6' FROM THE B12/B14/B29 TRIBAND RRH ANTENNAS

1. EXISTING TOWER INFORMATION IS PROVIDED FOR REFERENCE ONLY. JACOBS ENGINEERING GROUP, INC. IS NOT RESPONSIBLE FOR THE ANALYSIS/DESIGN OF THE EXISTING TOWER, ITS CONNECTIONS & FOUNDATIONS. A STRUCTURAL ANALYSIS OF THE EXISTING TOWER AND FOUNDATIONS PERFORMED BY OTHERS. CONTRACTOR SHALL REFER TO THE LATEST STRUCTURAL ANALYSIS REPORT. MODIFICATIONS TO THE TOWER OR FOUNDATION THAT ARE NEEDED MUST BE PERFORMED PRIOR TO THE INSTALLATION OF THE EQUIPMENT SHOWN ON THE DRAWINGS.

2. CONTRACTOR SHALL VERIFY THE EXISTING ANTENNA CENTERLINE HEIGHT ABOVE GROUND LEVEL. PROPOSED ANTENNA CENTERLINE SHALL MATCH EXISTING.



NOTES:

1. ALL CABLES SHALL BE GROUNDED WITH COAXIAL CABLE GROUNDING KITS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.
   A. GROUNDING AT THE ANTENNA LEVEL.
   B. GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200', ADDITIONAL CABLE ROUNDING REQUIRED.
   C. GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
   D. GROUNDING OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
   E. GROUNDING INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.
2. ALL PROPOSED GROUNDING BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUNDING BAR DOWNLEADS A MINIMUM DISTANCE OF 4'-0" BELOW GROUNDING BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.
3. THE CONTRACTORS SHALL BE RESPONSIBLE FOR VERIFYING THE ANTENNA AND THE COAX CONFIGURATION IS THE CORRECT MAKE AND MODELS, PRIOR TO INSTALLATION.
4. ANTENNA CONTRACTOR SHALL FURNISH AND INSTALL A SECTOR ANTENNA MOUNT, INCLUDING ALL HARDWARE, WHEN APPLICABLE.
5. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S SPECIFICATION & RECOMMENDATIONS.
6. CONTRACTOR SHALL REFERENCE THE TOWER STRUCTURAL ANALYSIS/DESIGN DRAWINGS FOR DIRECTIONS ON CABLE DISTRIBUTION/ROUTING.

ANTENNA MOUNTING NOTES:

1. DESIGN AND CONSTRUCTION OF ANTENNA SUPPORTS SHALL CONFORM TO CURRENT ANSI/EIA/TIA-222 "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES" OR APPLICABLE LOCAL CODES. DESIGN WIND LOADING OBTAINED FROM ANSI/TIA-222-G, OR THE LATEST VERSION.
2. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS OTHERWISE NOTED.
3. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS OTHERWISE NOTED.
4. DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY COLD GALVANIZING IN ACCORDANCE WITH ASTM A780.
5. ALL ANTENNA MOUNTS SHALL BE INSTALLED WITH LOCK NUTS, DOUBLE NUTS AND SHALL BE TORQUED TO MANUFACTURER'S RECOMMENDATIONS.
6. ANTENNA CONTRACTOR SHALL ENSURE ALL ANTENNA MOUNTING PIPES ARE PLUMB AND LEVEL.
7. MULTI PORT ANTENNAS: TERMINATE UNUSED ANTENNA PORTS WITH CONNECTOR CAP & WEATHERPROOF THOROUGHLY. JUMPERS FROM THE TMA'S MUST TERMINATE TO OPPOSITE POLARIZATION'S IN EACH SECTOR.
8. CONTRACTOR SHALL RECORD THE SERIAL #, SECTOR, AND POSITION OF EACH ACTUATOR INSTALLED AT THE ANTENNAS AND PROVIDE THE DOCUMENTATION TO AT&T.
9. CONTRACTOR SHALL INSTALL ANTENNA PER MANUFACTURER'S RECOMMENDATION FOR INSTALLATION AND GROUNDING.

COAXIAL ANTENNA CABLE NOTES:

1. TYPES AND SIZES OF THE ANTENNA CABLE ARE BASED ON ESTIMATED LENGTHS. PRIOR TO ORDERING CABLE, CONTRACTOR SHALL VERIFY ACTUAL LENGTH BASED ON CONSTRUCTION LAYOUT AND NOTIFY THE PROJECT MANAGER IF ACTUAL LENGTHS EXCEED ESTIMATED LENGTHS.
2. CONTRACTOR SHALL VERIFY THE DOWN-TILT OF EACH ANTENNA WITH A DIGITAL LEVEL.
3. CONTRACTOR TO CONFIRM COAX COLOR CODING PRIOR TO CONSTRUCTION. REFER TO "ANTENNA SYSTEM LABELING STANDARD" ND-00027, REFER TO THE LATEST VERSION.
4. ALL JUMPERS TO THE ANTENNAS FROM THE MAIN TRANSMISSION LINE WILL BE 1/2" DIA. LDF AND SHALL NOT EXCEED 6'-0".
5. ALL COAXIAL CABLE WILL BE SECURED TO THE DESIGNED SUPPORT STRUCTURE, IN AN APPROVED MANNER, AT DISTANCES NOT TO EXCEED 4'-0" O.C.
6. CONTRACTOR MUST FOLLOW ALL MANUFACTURER'S RECOMMENDATIONS REGARDING BOTH THE INSTALLATION AND GROUNDING OF ALL COAXIAL CABLES, CONNECTORS, ANTENNAS, AND ALL OTHER EQUIPMENT.
7. WEATHERPROOF ALL ANTENNA CONNECTORS WITH SELF AMALGAMATING TAPE. WEATHERPROOFING SHALL BE COMPLETED IN STRICT ACCORDANCE WITH AT&T STANDARDS.
8. CONTRACTOR SHALL GROUND ALL EQUIPMENT, INCLUDING ANTENNAS, RET MOTORS, TMA'S, COAX CABLES, AND RET CONTROL CABLES AS A COMPLETE SYSTEM. GROUNDING SHALL BE EXECUTED BY QUALIFIED WIREMEN IN COMPLIANCE WITH MANUFACTURER'S SPECIFICATION AND RECOMMENDATION.
9. CONTRACTOR SHALL PROVIDE STRAIN-RELIEF AND CABLE SUPPORTS FOR ALL CABLE ASSEMBLIES, COAX CABLES, AND RET CONTROL CABLES. CABLE STRAIN-RELIEFS AND CABLE SUPPORTS SHALL BE APPROVED FOR THE PURPOSE. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.

FIBER & POWER CABLE MOUNTING NOTES:

1. CABLE TO BE SUPPORTED USING 1/2" SNAP-INS (PIM RATED)(SNAPTEK POLYMERS OR EQUIVALENT) OR 1/2" BUTTERFLY HANGERS (PIM RATED)(SNAPTEK POLYMERS OR EQUIVALENT) OR ENGINEER APPROVED EQUAL..
2. CABLE TO BE SUPPORTED EVERY 3'.
3. ALL SNAP-INS, RUBBER CABLE INSERTS, AND MOUNTING HARDWARE FOR FIBER AND DC CABLES SHALL BE SUPPLIED FROM ROSENBERGER.
4. RRUS TO BE INSTALLED WITHIN 16.4' (5.0 METERS) OF THE SURGE SUPPRESSOR. (CONTRACTOR TO FIELD VERIFY).

TORQUE REQUIREMENTS:

1. ALL RF CONNECTIONS SHALL BE TIGHTENED BY A TORQUE WRENCH.
2. ALL RF CONNECTIONS, GROUNDING HARDWARE AND ANTENNA HARDWARE SHALL HAVE A TORQUE MARK INSTALLED IN A CONTINUOUS STRAIGHT LINE FROM BOTH SIDES OF THE CONNECTION.
   A. RF CONNECTION BOTH SIDES OF THE CONNECTOR.
   B. GROUNDING AND ANTENNA HARDWARE ON THE NUT SIDE STARTING FROM THE THREADS TO THE SOLID SURFACE. EXAMPLE OF SOLID SURFACE: GROUND BAR, ANTENNA BRACKET METAL.
3. ALL 8M ANTENNA HARDWARE SHALL BE TIGHTENED TO 9 LB-FT (12 NM).
4. ALL 12M ANTENNA HARDWARE SHALL BE TIGHTENED TO 43 LB-FT (58 NM).
5. ALL GROUNDING HARDWARE SHALL TIGHTENED UNTIL THE LOCK WASHER COLLAPSES AND THE GROUND IS NO LONGER LOOSE.
6. ALL DIN TYPE CONNECTIONS ARE TO BE TORQUED TO 18-22 LB-FT (24.4 - 29.8 NM).
7. ALL N TYPE CONNECTIONS ARE TO BE TORQUED TO 15-20 LB-IN (1.7 - 2.3 NM).

1 **SITE ELEVATION** — SCALE: N.T.S.

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APPROVALS

LANDLORD _____
LEASING _____
R.F. _____
ZONING _____
CONSTRUCTION _____
A & E _____

PROJECT NO: EP4TURWL
DRAWN BY: RM
CHECKED BY: LW

SUBMITTALS

1	09/25/20	JX COMMENTS
0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

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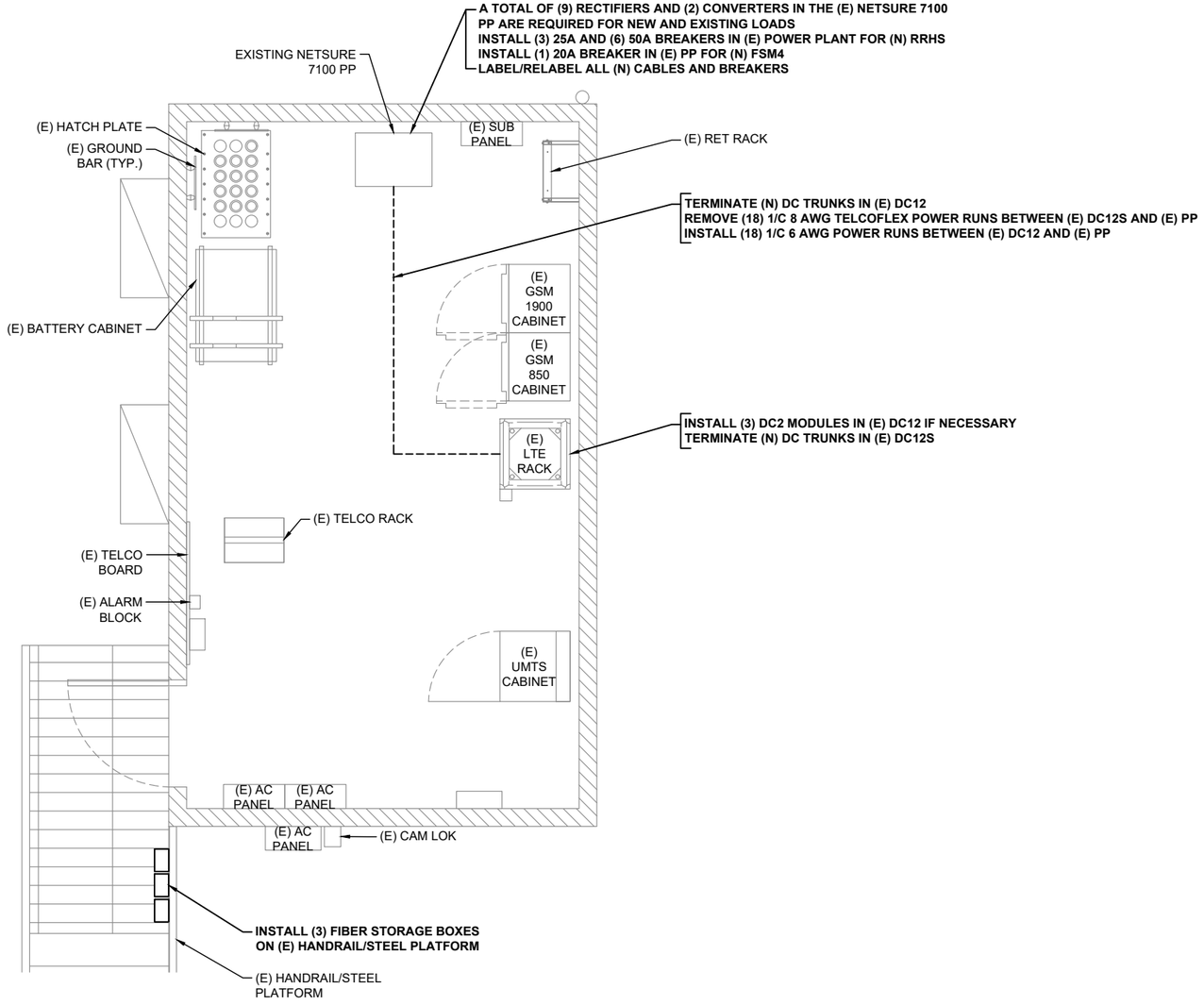
BETHESDA, MD 20814

SITE ELEVATION

C-2

TRUE NORTH



BOTTOMSIDE:
-INSTALL (3) DC2 MODULES IN (E) DC12 IF NECESSARY
-INSTALL A 20A BREAKER IN (E) POWER PLANT FOR (P) FSM4
-A TOTAL OF (9) RECTIFIERS AND (2) CONVERTERS IN THE (E) NETSURE 7100 PP ARE REQUIRED FOR NEW AND EXISTING LOADS
-TERMINATE (N) DC TRUNKS IN (E) DC12S
-INSTALL (3) FIBER STORAGE BOXES ON (E) HANDRAIL/STEEL PLATFORM
-REMOVE (18) 1/C 8 AWG TELCOFLEX POWER RUNS BETWEEN (E) DC12S AND (E) PP
-INSTALL (18) 1/C 6 AWG POWER RUNS BETWEEN (E) DC12 AND (E) PP
-INSTALL (3) 25A AND (6) 50A BREAKERS IN (E) POWER PLANT FOR (N) RRHS
-LABEL ALL (N) EQUIPMENT WITH PHENOLIC TAGS
-LABEL/RELABEL ALL (N) CABLES AND BREAKERS
-SUPPORT ALL JUMPERS, DC POWER, AND FIBER CABLES PER AT&T SPECIFICATIONS
-GROUND ALL (N) EQUIPMENT PER AT&T SPECIFICATIONS
-VERIFY CORRECT RATE SFP CARDS IN BBU AND RRH

1 **EXISTING EQUIPMENT PLAN**

SCALE: 1/2" = 1'-0"

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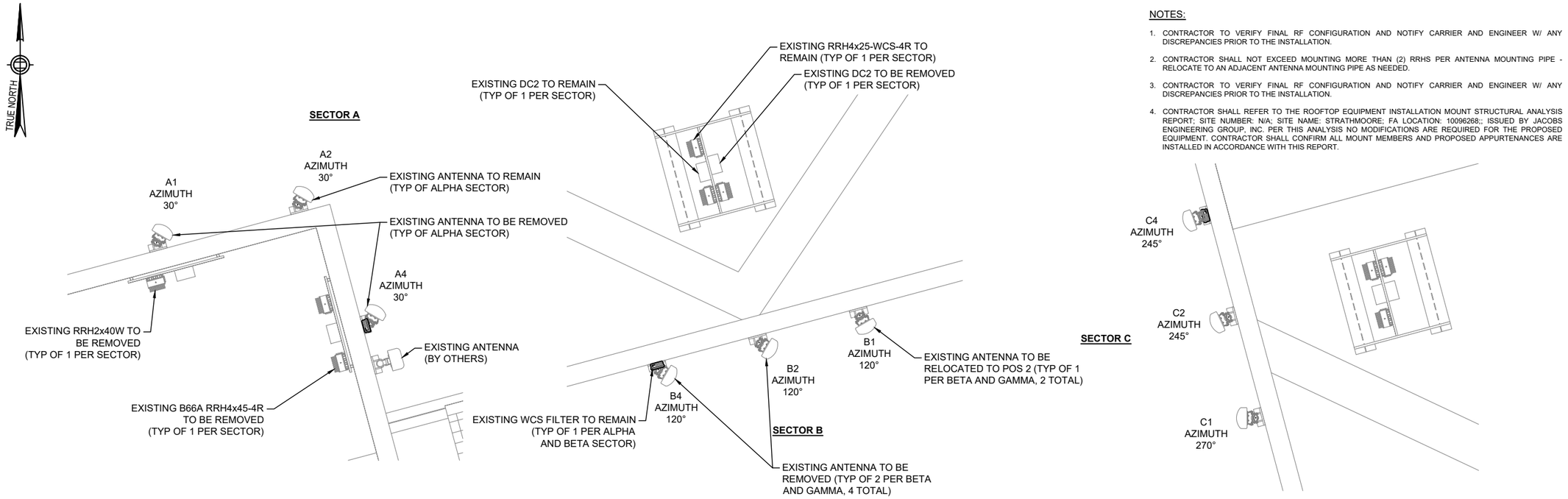
EXISTING & PROPOSED EQUIPMENT LAYOUT

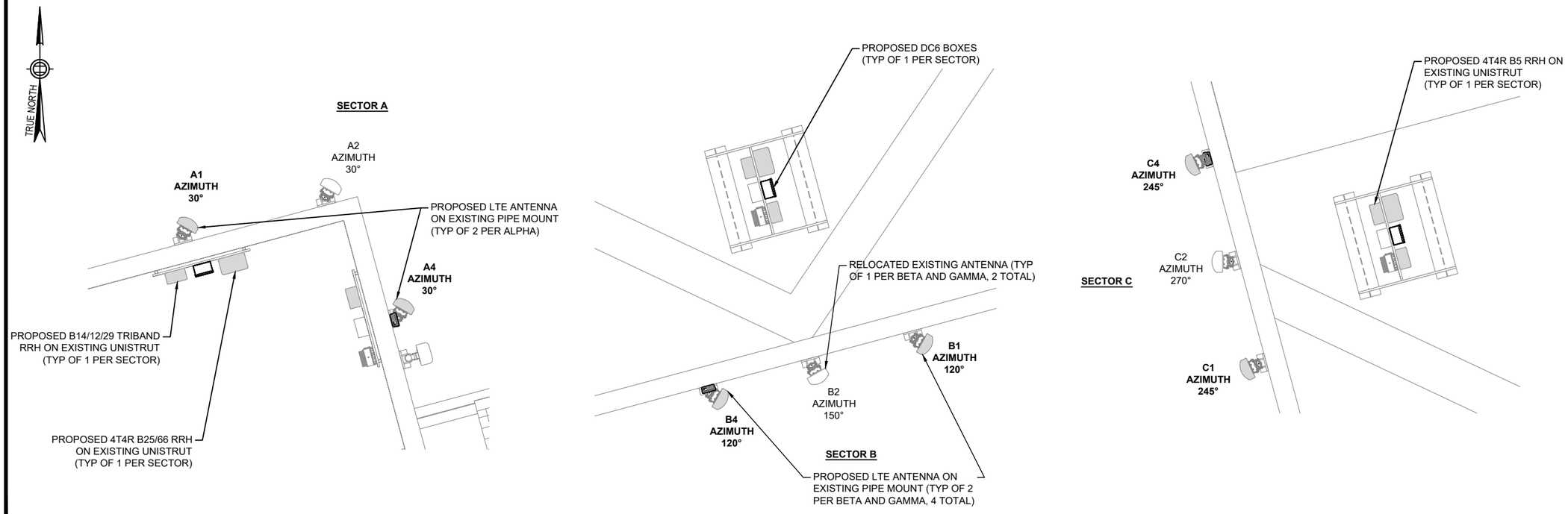
C-3



ELEVATION 163'

1 EXISTING ANTENNA LAYOUT

SCALE: N.T.S.



ELEVATION 163'

2 PROPOSED ANTENNA LAYOUT

SCALE: N.T.S.

NOTES:

1. CONTRACTOR TO VERIFY FINAL RF CONFIGURATION AND NOTIFY CARRIER AND ENGINEER W/ ANY DISCREPANCIES PRIOR TO THE INSTALLATION.
2. CONTRACTOR SHALL NOT EXCEED MOUNTING MORE THAN (2) RRHS PER ANTENNA MOUNTING PIPE - RELOCATE TO AN ADJACENT ANTENNA MOUNTING PIPE AS NEEDED.
3. CONTRACTOR TO VERIFY FINAL RF CONFIGURATION AND NOTIFY CARRIER AND ENGINEER W/ ANY DISCREPANCIES PRIOR TO THE INSTALLATION.
4. CONTRACTOR SHALL REFER TO THE ROOFTOP EQUIPMENT INSTALLATION MOUNT STRUCTURAL ANALYSIS REPORT; SITE NUMBER: N/A; SITE NAME: STRATHMOORE; FA LOCATION: 10096268;; ISSUED BY JACOBS ENGINEERING GROUP, INC. PER THIS ANALYSIS NO MODIFICATIONS ARE REQUIRED FOR THE PROPOSED EQUIPMENT. CONTRACTOR SHALL CONFIRM ALL MOUNT MEMBERS AND PROPOSED APPURTENANCES ARE INSTALLED IN ACCORDANCE WITH THIS REPORT.

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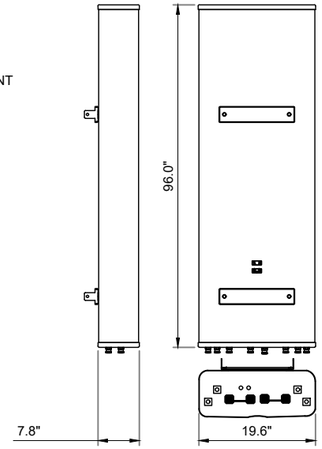
EXISTING & PROPOSED
ANTENNA LAYOUT

C-4

1 ANTENNA SPECIFICATIONS

SCALE: NTS

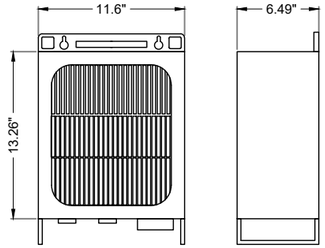
MANUFACTURER:	COMMSCOPE
MODEL NO.:	NNHH-65C-R4
RADOME MATERIAL:	FIBERGLASS, UV RESISTANT
COLOR:	LIGHT GRAY
DIMENSIONS (LxWxD):	96.0" x 19.6" x 7.8" 2438mm x 498mm x 197mm
WEIGHT (lbs):	99.2
CONNECTOR:	8 x 4.3-10 FEMALE
FRONT WIND LOAD:	214.5 LBF @ 150 KM/H 954 N @ 150 KM/H
SIDE WIND LOAD:	74.4 LBF @ 150 KM/H 331 N @ 150 KM/H
WIND SPEED MAX.:	>150 MPH (>241 KM/H)
WIND LOADING, MAX.:	277.6 LBF @ 150 KM/H 1235 N @ 150 KM/H



2 AIRSCALE 4T4R B5 160W AHCA SPECIFICATIONS

SCALE: NTS

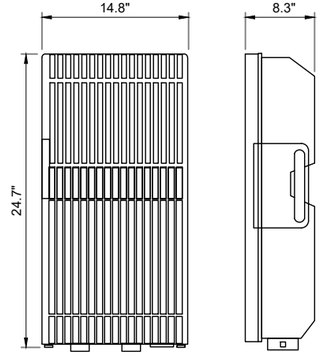
MANUFACTURER:	NOKIA
MODEL NO.:	AIRSCALE RRH 4T4R B5 160W
DIMENSIONS (HxWxD):	13.26" x 11.6" x 6.49" 337mm x 295mm x 165mm
WEIGHT (lbs):	36.8
POWER SUPPLY:	-48V
TEMP. W/O SOLAR LOAD:	-40 °C TO 55°C -40 °F TO 131°F



3 AIRSCALE 4T4R B12/B14/B29 TRI-BAND SPECIFICATIONS

SCALE: NTS

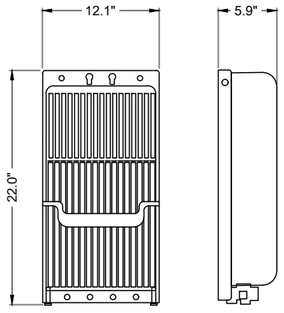
MANUFACTURER:	NOKIA
MODEL NO.:	AIRSCALE RRH 4T4R B14/B12/B29 TRIBAND
TECHNOLOGY:	TRI BAND
DIMENSIONS (HxWxD):	24.7" x 14.8" x 8.3" 627mm x 376mm x 210mm
WEIGHT (lbs):	<101.4
POWER SUPPLY:	-48V
TEMP. W/O SOLAR LOAD:	-40 °C TO 55°C -40 °F TO 131°F



4 AIRSCALE 4T4R B25/66 320W AHFIB SPECIFICATIONS

SCALE: NTS

MANUFACTURER:	NOKIA
MODEL NO.:	AIRSCALE RRH 4T4R B25/66 320W AHFIB
TECHNOLOGY:	DUAL BAND
DIMENSIONS (HxWxD):	22.0" x 12.1" x 5.9" 560mm x 308mm x 149mm
WEIGHT (lbs):	<66.1
POWER SUPPLY:	-48V
TEMP. W/O SOLAR LOAD:	-40 °C TO 55°C -40 °F TO 131°F

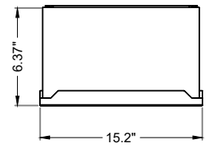


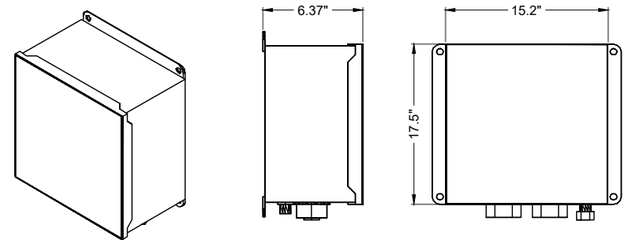
5 RAYCAP SPECIFICATIONS

SCALE: NTS

RAYCAP DC6-48-60-0-1E DC POWER OVER VOLTAGE DETAIL

DIMENSIONS (HxWxD):	17.5" x 15.2" x 6.37"
TOTAL WEIGHT (lbs):	35.0
NOMINAL OPERATING VOLTAGE:	48 VDC
NOMINAL DISCHARGE VOLTAGE:	20 kA 8/20 µs
MAXIMUM DISCHARGE CURRENT:	60 kA 8/20 µs
MAX. CONTINUOUS OPERATING CURRENT:	75 VDC
VOLTAGE PROTECTION RATING:	400 V





6 DETAIL NOT USED

SCALE: NTS

7 DETAIL NOT USED

SCALE: NTS

8 DETAIL NOT USED

SCALE: NTS

9 DETAIL NOT USED

SCALE: NTS

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APPROVALS

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ZONING _____

CONSTRUCTION _____

A & E _____

PROJECT NO:	EP4TURWL
DRAWN BY:	RM
CHECKED BY:	LW

SUBMITTALS

1	09/25/20	JX COMMENTS
0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

SITE DETAILS

C-5

SITE DATA INPUT WORKSHEET - INDOOR SITE POWER ESTIMATE TOOL

STEP 1: ENTER QUANTITIES OF EQUIPMENT & DC OPERATING VOLTAGE:

NOTE: LOAD VALUES FOR ANY EQUIPMENT CAN BE USER SPECIFIED ON THE POWER CONSUMPTION WORKSHEET - USER CHANGES TO DEFAULT LOAD VALUES ARE HIGHLIGHTED IN BRIGHT YELLOW

STEP 2: ENTER DC PLANT TYPE FROM DROP-DOWN MENU:

("GENERIC" +24V or -48V DC PLANT CAN BE SELECTED FOR ANY MANUFACTURER'S DC PLANT)

Emerson STD -48VDC NetSure 721 Plant 800A NEQ.15920

-48V PRIMARY DC PLANT SPECIFIED

(DC PLANT CONFIGURATION CAN BE REVIEWED ON DC PLANT WORKSHEET)

STEP 2A: THIS STEP ONLY SHOWN IF "GENERIC" DC PLANT PLANT TYPE HAS BEEN SELECTED:

STEP 2B: THIS STEP ONLY SHOWN IF TYCO GPS2424 DC PLANT PLANT TYPE HAS BEEN SELECTED:

STEP 3: DO YOU WANT TO CONFIGURE A STANDARD STAND-ALONE DC CONVERTER SYSTEM? N

NOTE: IF YOU SELECT "Y" ANY INTEGRATED DC PLANT CONVERTER OPTIONS WILL BE BYPASSED

STEP 4: ENTER INDOOR SITE BUILDING/SHELTER DATA:

(Square footage used for interior AC lighting LOAD calculation)

SELECT SITE BUILDING TYPE & SIZE: 11' 5" x 20' SHELTER

STEP 5: ENTER SITE HVAC SYSTEM DATA:

SPECIFY INDIVIDUAL HVAC UNIT SIZE (TONS): 4 SPECIFY QUANTITY: 2

DOES SITE HAVE ADDITIONAL HVAC (DIFFERENT SIZE)? N

ARE THERE SITE HVAC HEATING UNITS? N

TOTAL SPECIFIED SITE HVAC: 8-TONS ESTIMATED HVAC REQUIREMENT: TWO 4-TON UNITS

THIS TOOL DOES NOT APPLY TO SITES THAT ARE EQUIPPED WITH FREE STANDING DIRECT AIR COOLING

STEP 6: ENTER SITE STATIONARY GENERATOR DATA:

DOES SITE HAVE A STATIONARY GENERATOR? N

ESTIMATED CAPACITY REQUIRED: 31 KW (NO SITE GENERATOR)

STEP 7: ENTER SITE BATTERY CONFIGURATION DATA:

SELECT SINGLE STRING BATTERY CAPACITY (AH): 1496

SPECIFY TOTAL QUANTITY OF BATTERY STRINGS: 1

TOTAL SITE BATTERY CAPACITY (AH): 1496

NOTE: NON-STANDARD BATTERY CAPACITY HAS BEEN SPECIFIED

(4) 4/0 CONNECTION CABLES PER POLARITY ON EACH STRING ARE REQUIRED

ESTIMATED BATTERY RESERVE TIME: 8.78 HOURS (NO SITE GENSET)

SITES WITH STATIONARY GENSETS SHALL BE ENGINEERED WITH A MAX OF 3 SHELVES of 180 AH BATTERIES
(3 strings at -48v or 6 strings at +24v) - ALL OTHER SITES A MINIMUM OF 4 HOURS

SITE POWER CALCULATION TOOL - VERSION 4.3 - October 17, 2017 R. BADGERO

ANY QUESTIONS PLEASE CONTACT RICK BADGERO (RB6620@ATT.COM)

POWER SUMMARY:
CURRENT RECTIFIER COUNT: 9
REQUIRED RECTIFIERS COUNT: 9
CURRENT 48V CONVERTER COUNT: 4
REQUIRED 48V CONVERTER COUNT: 2

QTY	RADIO HEADS - Outdoor	VOLTAGE	WATTS
	Ericsson		
0	RRUS 01 B2, B5 (80W)	48	0
0	RRUS 01 B12 (60W)	48	0
0	RRUS 11 B12 (2x30W)	48	0
0	RRUS 11 B2, B4, B5, B12 (2x40W)	48	0
0	RRUS 12 B2, B4, B5 (2x60W)	48	0
0	RRUS 32 B2 (4x40W)	48	0
0	RRUS 32 B30 (4x25W)	48	0
0	RRUS 32 B66A	48	0
0	RRUS A2 B2, B4, B12	48	0
0	RRUSE2 B29	48	0
0	RRUW B2, B5	48	0
0	AIR 21 (60W)	48	0
0	RRUS 4478 B14	48	0
	(FUTURE)		
	A-LU		
0	4x45 B66A	48	0
0	FDD RRH2x40-07L (UHLA) B17	48	0
0	RRH2x40-07L-AT (UHLB) B17	48	0
0	B25 RRH4x30 (UHFA) B25	48	0
0	B25 RRH2x60 (UHFA) B25	48	0
0	2X60W-850 B5	48	0
0	2X60W-1900 B2	48	0
0	2X60W-1900A B2	48	0
0	RRH2x40-07L-DE (UHLC) B29	48	0
0	RRH 4T4R (FRBI) B14	48	0
3	RRH4X25 B30	48	1248
	(FUTURE)		0
	(FUTURE)		0

QTY	RADIO HEADS - Indoor	VOLTAGE	WATTS
	Ericsson		
0	RRUS 01 B2, B5 (80W)	48	0
0	RRUS 01 B12 (60W)	48	0
0	RRUS 11 B12 (2x30W)	48	0
0	RRUS 11 B2, B4, B5, B12 (2x40W)	48	0
0	RRUS 12 B2, B4, B5 (2x60W)	48	0
0	RRUS 32 B2 (4x40W)	48	0
0	RRUS 32 B30 (4x25W)	48	0
0	RRUS 32 B66A	48	0
0	RRUS A2 B2, B4, B12	48	0
0	RRUSE2 B29	48	0
0	RRUW B2, B5	48	0
0	AIR 21 (60W)	48	0
	RRUS 4478 B14	48	0
	(FUTURE)		0
	A-LU		
0	4x45 B66A	48	0
0	FDD RRH2x40-07L (UHLA) B17	48	0
0	RRH2x40-07L-AT (UHLB) B17	48	0
0	B25 RRH4x30 (UHFA) B25	48	0
0	B25 RRH2x60 (UHFA) B25	48	0
0	2X60W-850 B5	48	0
0	2X60W-1900 B2	48	0
0	2X60W-1900A B2	48	0
0	RRH2x40-07L-DE (UHLC) B29	48	0
0	RRH 4T4R (FRBI) B14	48	0
	RRH4X25 B30	48	0
	(FUTURE)		0
	(FUTURE)		0

QTY	LTE 4G & Multi-Std EQUIPMENT	VOLTAGE	WATTS
0	A-LU 9926 LTE BBU (w/max. 3 eCEM-u)	48	0
2	Nokia FSM-4	48	1996
	(FUTURE)		
	(FUTURE)		
	(FUTURE)		
	(FUTURE)		
0	Ericsson LTE IRBS6601 BBU - 1 DUL	48	0
0	Ericsson LTE RBS6601 BBU - 2 DUL	48	0
0	Ericsson W/CDMA RBS6601 - 1 DUW	48	0
0	Ericsson LTE RBS6601 BBU - 1DUS	48	0
0	Ericsson LTE RBS6601 BBU - 2DUS	48	0
0	Ericsson XMU	48	0
0	Ericsson LTE RBS5216	48	0
	(FUTURE)		
	(FUTURE)		
	(FUTURE)		
	(FUTURE)		

QTY	UMTS 3G EQUIPMENT	VOLTAGE	WATTS
1	A-LU MACRO NodeB (3S1C - 40W)	24	1014
0	A-LU MACRO NodeB (3S2C - 40W)	24	0
0	A-LU MACRO NodeB (3S3C - 40W)	24	0
0	A-LU MACRO NodeB (3S4C - 40W)	24	0
0	A-LU MACRO NodeB (3S5C - 40W - 2 CAB)	24	0
0	A-LU MICRO NodeB	24	0
0	A-LU 9396 d2U Distributed NodeB MU	48	0
0	A-LU 9396 d4U Distributed NodeB MU	48	0
	(FUTURE)		
	(FUTURE)		
0	Ericsson RBS3206 NodeB 3S1C - 1 CAB	24	0
0	Ericsson RBS3206 NodeB 3S2C - 1 CAB	24	0
	NON-OBIF Ericsson 3rd, 4th & 5th Carrier		
0	Ericsson RBS3206 NodeB 3S3C - 2 CAB	24	0
0	Ericsson RBS3206 NodeB 3S4C - 2 CAB	24	0
0	Ericsson RBS3206 NodeB 3S5C - 3 CAB	24	0
	OBIF Ericsson 3rd, 4th & 5th Carrier		
0	Ericsson RBS3206 NodeB 3S3C - 1 CAB (Select RRUS from left section)	24	0
0	Ericsson RBS3206 NodeB 3S4C - 1 CAB (Select RRUS from left section)	24	0
0	Ericsson RBS3206 NodeB 3S4C - 1 CAB (Select RRUS from left section)	24	0
0	Ericsson RBS3206 NodeB 3S5C - 2 CAB (Select RRUS from left section)	24	0
0	Ericsson 3303 MICRO NodeB	24	0
0	Ericsson RBS3418 Distributed NodeB MU	48	0
	(FUTURE)		
	(FUTURE)		

(CUSTOM AC LOADS DEFINED ON POWER CONSUMPTION WORKSHEET)

QTY	USER SPECIFIED AC EQUIPMENT	VOLTAGE	KVA
0	Emerson battery heater	120	0
0	Emerson GFCI	120	0
0	Argus HVAC	120	0
0	VZ	120	0
0	UMTS HEATER	240	0
0	GFCI	120	0
0	MARVAIR AC	240	0
0	MCLEAN AC	240	0
0	PURCELL AC	120	0
1	Tower Light	120	1.44
	TOTAL USER SPECIFIED KVA:		1.44
	TOTAL 120VAC AMPS:	12	
	TOTAL 240VAC AMPS:	0	

QTY	ANCILLARY CELL SITE EQUIPMENT	VOLTAGE	WATTS
1	A-LU 7705 SIAD	48	80
	(FUTURE)		
0	A-LU MPR-9500 MW Service Switch - MSS	48	0
0	A-Lu MPR-9500 MW Outdoor Unit - ODU	48	0
0	A-Lu MPR-9500 MW MPT-HL (Indoor)	48	0
	(FUTURE)		
0	Cisco MWR-2941 SIAD	48	0
0	Cisco SIAD ASR-901	48	0
0	Cisco 15310 EOS (SONET) MUX	48	0
0	Cisco 15454 MSP (MW Ring Config.)	48	0
	(FUTURE)		
0	Tru-Position LMU (E911)	48	0
0	DC Free Air (per HVAC unit)	48	0
1	GENERIC Ethernet NID	24	60
0	GENERIC Hydrogen Detector	48	0
1	GENERIC RET Controller	24	60
0	GENERIC RXAIT	48	0
0	GENERIC Smoke Detector	48	0
0	GENERIC TMA System	48	0
0	GENERIC Tower Lighting (DC)	48	0
0	NG480	48	0
0	Cisco 2911	48	0
	(FUTURE)		
	(FUTURE)		
	(FUTURE)		
	(FUTURE)		
	(FUTURE)		

QTY	TX RF AMP (MCPA or SCPA) EQPT.	VOLTAGE	WATTS
0	Andrew (12 module mcpa FRAME)	24	0
0	Andrew 135 Watt Module	24	0
	(FUTURE)		
0	Powerwave 12 module mcpa FRAME)	24	0
0	Powerwave 90 Watt Module	24	0
0	Powerwave 120 Watt Module	24	0
0	Powerwave 180 Watt Module	24	0
	(FUTURE)		
0	CCI 125 Watt DAB SCPA Module	24	0
0	CCI 125 Watt DAC SCPA Module	24	0
	(FUTURE)		

(CUSTOM DC LOADS DEFINED ON POWER CONSUMPTION WORKSHEET)

QTY	USER SPECIFIED DC EQUIPMENT	VOLTAGE	WATTS
0	FLX16 HEATERS	48	0
0	9412 Heaters	48	0
3	B25/66 Dual Band RRH	48	3600
0	B12/14 Dual Band RRH	48	0
3	B5 850 LTE RRH	48	1626
0	700 DE RRH	48	0
0	B30	48	0
3	B12/B14/B29	48	3300
0	B5/B29	48	0
0		48	0
0		48	0
0		48	0
0		48	0
0		48	0
0		48	0
	TOTAL USER SPECIFIED WATTS:		8526
	TOTAL +24V (27V) AMPS:	0	
	TOTAL -48V (54V) AMPS:	157.9	

-48V PRIMARY VOLTAGE DC PLANT SPECIFIED				
+24VDC EQUIPMENT LOAD:	1134 WATTS	=	42 AMPS	at +24V
-48VDC EQUIPMENT LOAD:	11850 WATTS	=	220 AMPS	at -48V
28 AMPS (1475 Watts) AT PRIMARY 48V REQUIRED TO SUPPORT 24V DC CONVERTER SYSTEM				
TOTAL PRIMARY 48V LOAD:	13325 WATTS	=	247 AMPS	at -48V

(DC PLANT CONFIGURATION CAN BE REVIEWED ON DC PLANT WORKSHEET)

DC PLANT: Emerson STD -48VDC NetSure 721 Plant 800A NEQ.15920	
-48V RECTIFIERS REQUIRED (N+1):	9
-48V RECTIFIER SLOTS:	22
CONV. TYPE: 0	
+24V CONVERTERS REQUIRED:	2
+24V CONVERTER SLOTS:	12
ESTIMATED BATTERY RESERVE TIME	
1 1496 AH 48V STRING =	8.78 HOURS (4 HOUR MINIMUM BATTERY RESERVE)

ESTIMATED SITE MAX. AC LOAD (AMPS):	172.13 AMPS
ESTIMATE 200A SERVICE SUFFICIENT	
SITE GENERATOR CAPACITY REQUIRED:	31 KW
ON SITE GENERATOR CAPACITY:	0 KW
(NO ON-SITE GENERATOR)	
RECOMMENDED HVAC SYSTEM:	TWO 4-TON
SPECIFIED SITE TOTAL HVAC CAPACITY:	8-TONS
ESTIMATE SUFFICIENT HVAC CAPACITY	

1 AC PANEL

SCALE: N.T.S.

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APPROVALS

LANDLORD _____

LEASING _____

R.F. _____

ZONING _____

CONSTRUCTION _____

A & E _____

PROJECT NO: EP4TURWL

DRAWN BY: RM

CHECKED BY: LW

SUBMITTALS

1	09/25/20	JX COMMENTS
0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

POWER STUDY

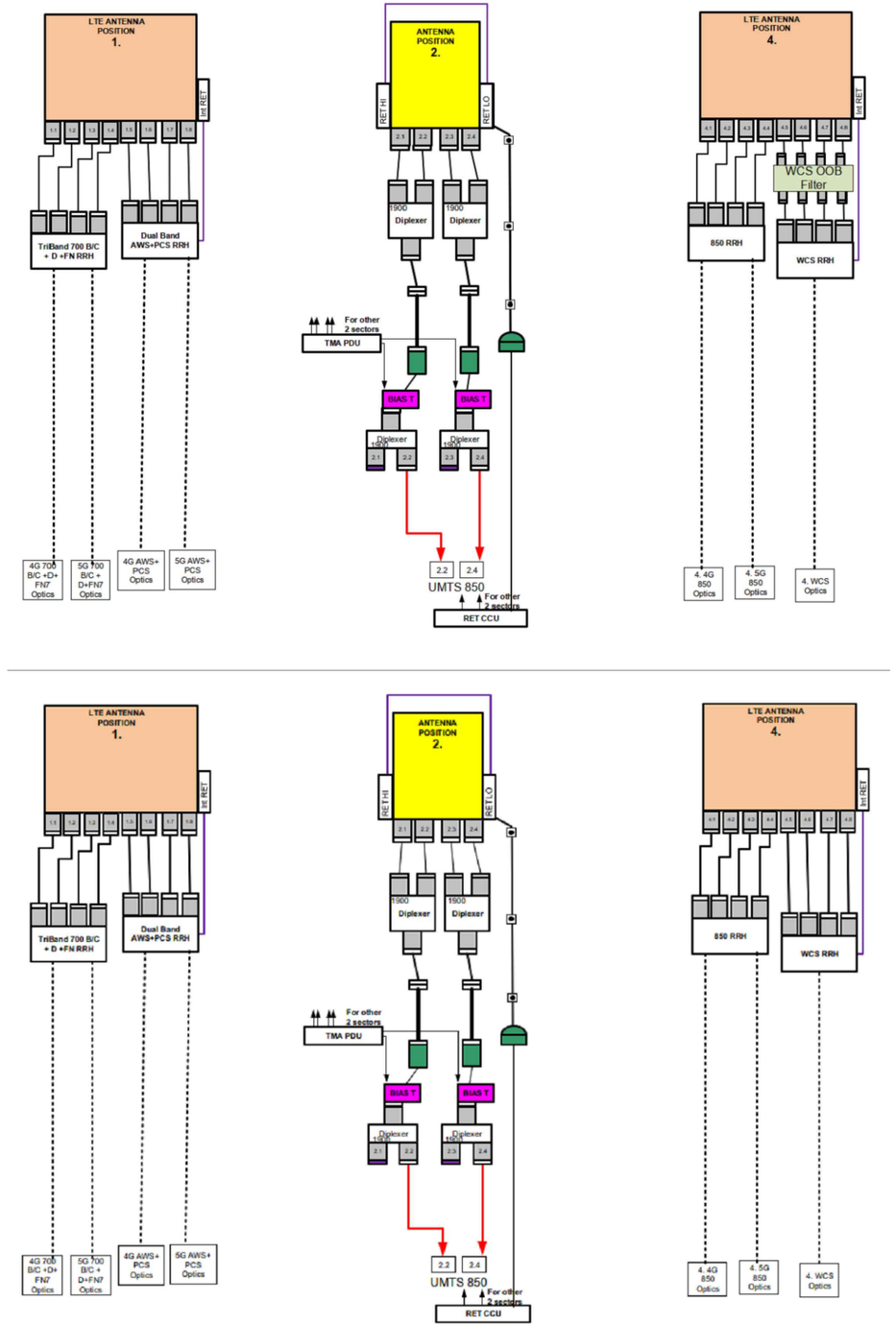
C-6

FINAL CONFIGURATION:
- (6) COMMSCOPE NNHH-65C-R4 ANTENNAS
- (3) KATHREIN 742264 ANTENNAS
- (6) LGP13519 DIPLEXERS
- (3) NOKIA B14/12/29 TRIBAND AHLBBA (700/700FN/700DE) RRHS
- (3) AIRSCALE DUAL RRH 4T4R B25/66 320W AHFIB (1900/2100) RRHS
- (3) AIRSCALE RRH 4T4R B5 160W AHCA (850) RRHS
- (3) RRH4X25-WCS-4R (2300) RRHS
- (3) DC2
- (3) DC6 BOX
- (6) 1-5/8" LINES OF COAX
- (3) 1" DC TRUNK (6 AWG 6 CONDUCTOR)
- (3) 2" CONDUIT
- (3) 3/8" FIBER TRUNK
- (0) 3/8" RET CABLES (USE WHATEVER CURRENTLY IS ON THE APP)

ANTENNA POSITION	ANTENNA MODEL	ANTENNA MAKE	AZIMUTH	MECH. TILT	ELEC. DOWNTILT	RAD CENTER FT. AGL.	TMAS, RRHS & DIPLEXERS	COAXIAL FEEDER	
							MODEL	SIZE	LENGTH
#1	**NNHH-65C-R4 (96.0"x19.6"x8.2") (121.3 LBS)**	**COMMSCOPE**	30°	2°	LTE 700: 12° LTE 1900: 2° LTE AWS: 5° LTE AWS: 5° LTE 700: 12° LTE 700: 12°	163'	**(1) RRH B14/12/29 (1) RRH 4T4R B25/66 AHFIB**	(6) SHARED FIBER	1 @ 90
#2	742264 (96.0"x19.6"x8.2") (121.3 LBS)	KATHREIN	30°	0°	UMTS 850: 12°	163'	**(2) LGP13519**	**7/8" ANDREW LDF5-50A**	**1 @ 90**
#3	-	-	-	-	-	-	-	-	-
#4	**NNHH-65C-R4 (96.0"x19.6"x8.2") (121.3 LBS)**	**COMMSCOPE**	**30°**	0°	**5G 850: 2°** **LTE WCS: 5°**	163'	**(1) RRH 4T4R B5 AHCA** (1) RRH4x25-WCS-4R	**(2) SHARED FIBER**	**1 @ 90**
#5	**NNHH-65C-R4 (96.0"x19.6"x8.2") (121.3 LBS)**	**COMMSCOPE**	120°	2°	LTE 700: 9° LTE 1900: 2° LTE AWS: 4° LTE AWS: 4° LTE 700: 9° LTE 700: 9°	163'	**(1) RRH B14/12/29 (1) RRH 4T4R B25/66 AHFIB**	(6) SHARED FIBER	1 @ 140
#6	742264 (96.0"x19.6"x8.2") (121.3 LBS)	KATHREIN	150°	0°	UMTS 850: 6°	163'	**(2) LGP13519**	**7/8" ANDREW LDF5-50A**	**1 @ 140**
#7	-	-	-	-	-	-	-	-	-
#8	**NNHH-65C-R4 (96.0"x19.6"x8.2") (121.3 LBS)**	**COMMSCOPE**	**120°**	0°	**5G 850: 9°** **LTE WCS: 4°**	163'	**(1) RRH 4T4R B5 AHCA** (1) RRH4x25-WCS-4R	**(2) SHARED FIBER**	**1 @ 140**
#9	**NNHH-65C-R4 (96.0"x19.6"x8.2") (121.3 LBS)**	**COMMSCOPE**	245°	2°	LTE 700: 12° LTE 1900: 6° LTE AWS: 6° LTE AWS: 6° LTE 700: 12° LTE 700: 12°	163'	**(1) RRH B14/12/29 (1) RRH 4T4R B25/66 AHFIB**	(6) SHARED FIBER	1 @ 190
#10	742264 (96.0"x19.6"x8.2") (121.3 LBS)	KATHREIN	270°	0°	UMTS 850: 2°	163'	**(2) LGP13519**	**7/8" ANDREW LDF5-50A**	**1 @ 190**
#11	-	-	-	-	-	-	-	-	-
#12	**NNHH-65C-R4 (96.0"x19.6"x8.2") (121.3 LBS)**	**COMMSCOPE**	**245°**	0°	**5G 850: 12°** **LTE WCS: 6°**	163'	**(1) RRH 4T4R B5 AHCA** (1) RRH4x25-WCS-4R	**(2) SHARED FIBER**	**1 @ 190**

NOTES:
1. VERIFY ANTENNA DIMENSIONS WITH MANUFACTURER.
2. ALL NEW ANTENNAS SHALL RECEIVE ANTENNA MOUNTING KIT FOR 2 TO 4.5 O.D. MAST (MODEL #DM380) (QTY. 2)
3. ALL NEW ANTENNAS SHALL RECEIVE A LOCKING TILT MOUNT KIT 0-13 DEGREES DOWNTILT ANGLE (MODEL #DB5083)
4. VERIFY FINAL ANTENNA MODEL WITH CURRENT VERSION OF THE **AT&T** RFDS.

1 **ANTENNA CHART** SCALE: N.T.S.



NOTES:
1. CONTRACTOR TO VERIFY FINAL RF CONFIGURATION AND NOTIFY CARRIER AND ENGINEER WITH ANY DISCREPANCIES PRIOR TO THE INSTALLATION.
2. PLUMBING DIAGRAM SHOWN IS BASED ON APPROVED FINAL RFDS V2020_0.1 DATED ON 01/10/20.

2 **RF EQUIPMENT SCHEMATIC** SCALE: N.T.S.

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APPROVALS

LANDLORD _____
LEASING _____
R.F. _____
ZONING _____
CONSTRUCTION _____
A & E _____

PROJECT NO: EP4TURWL
DRAWN BY: RM
CHECKED BY: LW

SUBMITTALS

1	09/25/20	JX COMMENTS
0	05/14/20	ISSUED

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USID# 16252
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BETHESDA, MD 20814

PLUMBING DIAGRAM

RF-1

DESCRIPTION																	FSM4	WCS RRH SECTOR A	WCS RRH SECTOR B	WCS RRH SECTOR C	4T4R B5 RRH SECTOR A	4T4R B5 RRH SECTOR B	4T4R B5 RRH SECTOR C	B14/12/29 TRIBAND RRH SECTOR A	B14/12/29 TRIBAND RRH SECTOR B	B14/12/29 TRIBAND RRH SECTOR C	B25/66 LTE RRH SECTOR A	B25/66 LTE RRH SECTOR B	B25/66 LTE RRH SECTOR C
BRKR (A)																	20A	20A	20A	20A	25A	25A	25A	50A	50A	50A	50A	50A	50A

NOTES:
1. END POSITIONS B1 AND B24 SHALL ONLY BE USED FOR SINGLE POSITION BREAKERS.
2. A 2-POLE ADAPTER LUG IS NOT REQUIRED ON THE RETURN BUS.

NETSURE 7100 POWER PLANT

1 **BREAKER PANEL** SCALE: N.T.S.

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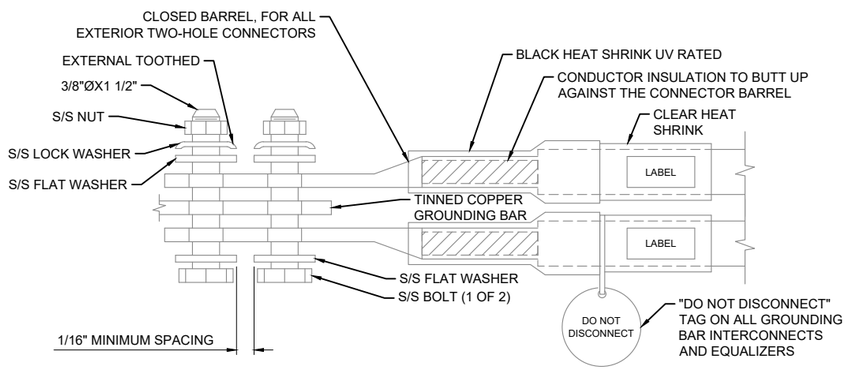
BREAKER PANEL

E-1

NOTES:

1. EXOTHERMIC WELD (2) TWO, #2 AWG BARE TINNED SOLID COPPER CONDUCTORS TO GROUNDING BAR. ROUTE CONDUCTORS TO BURIED GROUNDING RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
2. ALL GROUNDING BARS SHALL BE STAMPED IN TO THE METAL "IF STOLEN DO NOT RECYCLE." THE CONTRACTOR SHALL USE PERMANENT MARKER TO DRAW THE LINES BETWEEN EACH SECTION AND LABEL EACH SECTION ("P", "A", "N", "I") WITH 1" HIGH LETTERS.
3. ALL HARDWARE SHALL BE STAINLESS STEEL 3/8" DIAMETER OR LARGER. ALL HARDWARE 18-8 STAINLESS STEEL INCLUDING LOCK WASHERS, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
4. FOR GROUND BOND TO STEEL ONLY: INSERT A CADMIUM FLAT WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
5. DO NOT INSTALL CABLE GROUNDING KIT AT A BEND AND ALWAYS DIRECT GROUNDING CONDUCTOR DOWN TO GROUNDING BUS.
6. NUT & WASHER SHALL BE PLACED ON THE FRONT SIDE OF THE GROUNDING BAR AND BOLTED ON THE BACK SIDE. INSTALL BLACK HEAT-SHRINKING TUBE, 600 VOLT INSULATION, ON ALL GROUNDING TERMINATIONS. THE INTENT IS TO WEATHERPROOF THE COMPRESSION CONNECTION.
7. SUPPLIED AND INSTALLED BY CONTRACTOR.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL GROUNDING BAR AS REQUIRED, PROVIDING 50% SPARE CONNECTION POINTS.
9. ENSURE THE WIRE INSULATION TERMINATION IS WITHIN 1/8" OF THE BARREL (NO SHINERS).



1 EXTERIOR TWO HOLE LUG DETAIL — SCALE: N.T.S.

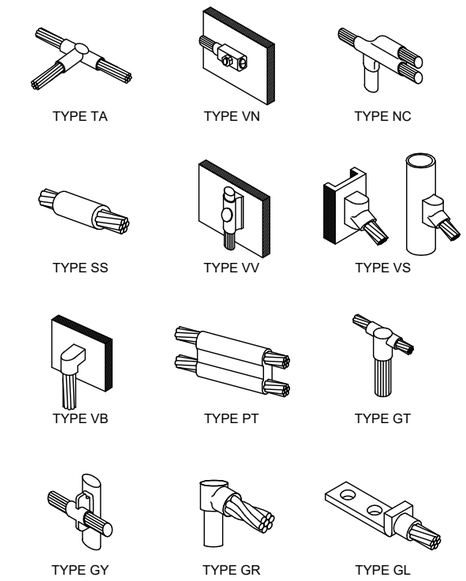
GENERAL NOTES:

1. CONTRACTOR SHALL HAVE A COMPLETE UNDERSTANDING OF THE CONTENTS OF AT&T STANDARD TP-76416.
2. ALL INSTALLATIONS SHALL BE FIELD VERIFIED.
3. ALL GROUND CONNECTIONS FOR ALL RELOCATED EQUIPMENT SHALL BE RE-ESTABLISHED BY THE CONTRACTOR. CONTRACTOR SHALL FURNISH ALL MATERIALS AS REQUIRED.

GROUNDING NOTES:

1. TOWER GROUNDING BAR: EXTEND (2) #2 AWG TINNED CU WIRE FROM BURIED GROUND RING UP TO THE TOWER GROUND BAR AND MAKE A MECHANICAL CONNECTION. SECURE GROUND BAR DIRECTLY TO TOWER WITH STAINLESS STEEL MOUNTING MATERIAL.
2. ANTENNA GROUNDING BAR: ANDREW CORPORATION PART #UGBKIT-0424-T MOUNT GROUND BAR DIRECTLY TO TOWER. SECURE TO TOWER WITH STAINLESS STEEL MOUNTING MATERIAL.
3. GROUNDING BAR: LOCATED CLOSE TO GRADE LOCK BOX TESSCO PART #351546: INSTALL PER MANUFACTURER GUIDELINES.
4. EXOTHERMIC OR COMPRESSION CONNECTION FOR PIPE MOUNT TO ANTENNA ROUTE CONDUCTOR TO NEAREST GROUNDING BAR SO THE GROUNDING CONDUCTORS PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND. USE #2 AWG SOLID TINNED COPPER CONDUCTOR. GROUNDING CONNECTION SHALL BE LOCATED AT THE TOP 2" OF PIPE.
5. ALL GROUNDING CONDUCTORS SHALL BE #2 AWG COPPER TINNED UNLESS NOTED OTHERWISE.
6. ALL GROUNDING CONDUCTORS SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND WITH GRADUAL BEND AS REQUIRED. GROUND WIRES SHALL NOT BE LOOPED OR SHARPLY BENT.
7. KOPR-SHIELD ANTI-OXIDATION COMPOUND SHALL BE USED ON ALL COMPRESSION GROUNDING CONNECTIONS.
8. ALL EXOTHERMIC CONNECTIONS SHALL BE INSTALLED UTILIZING THE PROPER CONNECTION/MOLD AND MATERIALS FOR THE PARTICULAR APPLICATION.
9. ALL BOLTED GROUNDING CONNECTIONS SHALL BE INSTALLED WITH AN EXTERNAL TOOTHED LOCK WASHER. GROUNDING BUS BARS MAY HAVE PRE-PUNCHED HOLES OR TAPPED HOLES. ALL HARDWARE SHALL BE SECURITY TORQUE HARDWARE 3/8" STAINLESS STEEL.
10. EXTERNAL GROUNDING CONDUCTOR SHALL NOT BE INSTALLED OR ROUTED THROUGH HOLES IN ANY METAL OBJECTS, CONDUITS, OR SUPPORTS TO PRECLUDE ESTABLISHING A MAGNETIC CHOKE POINT.
11. PLASTIC CLIPS SHALL BE USED TO FASTEN AND SUPPORT GROUNDING CONDUCTORS. FERROUS METAL CLIPS WHICH COMPLETELY SURROUND THE GROUNDING CONDUCTOR SHALL NOT BE USED.
12. IF COAX ON ICE BRIDGE IS MORE THAT 6' FROM THE GROUND BAR AT THE BASE OF THE TOWER, A SECOND GROUND BAR WILL BE NEEDED AT THE END OF THE ICE BRIDGE RUN TO GROUND THE COAX GROUND KIT AND THE IN-LINE SURGE ARRESTORS (SURGE ARRESTORS INSTALLED BY LUCENT ONLY HAVE 6' GROUND TAILS).
13. CONTRACTOR SHALL REPAIR/PLACE EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTORS EXPENSE.
14. DO NOT ALLOW THE COPPER CONDUCTOR TO TOUCH THE GALVANIZED GUY WIRE AT THE CONNECTION POINT OR AT ANY OTHER POINT. NO EXOTHERMICALLY WELDED CONNECTION SHALL BE MADE TO THE GUY WIRE.
15. CONTRACTOR SHALL VERIFY EXISTING SECTOR GROUNDING CONDITION AND GROUND THE PROPOSED EQUIPMENT IN THE SAME MANNER. A PROPOSED SECTOR GROUND BAR SHALL BE INSTALLED IF REQUIRED.

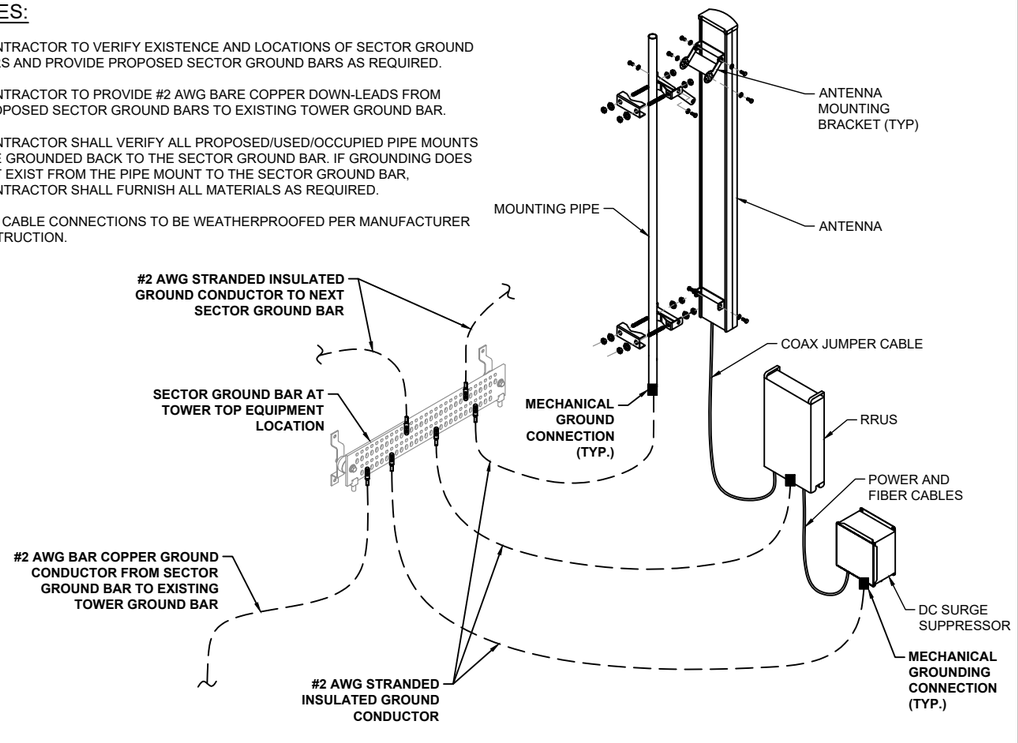
2 GROUNDING BAR DETAIL — SCALE: N.T.S.



3 GROUNDING DETAILS — SCALE: N.T.S.

NOTES:

1. CONTRACTOR TO VERIFY EXISTENCE AND LOCATIONS OF SECTOR GROUND BARS AND PROVIDE PROPOSED SECTOR GROUND BARS AS REQUIRED.
2. CONTRACTOR TO PROVIDE #2 AWG BARE COPPER DOWN-LEADS FROM PROPOSED SECTOR GROUND BARS TO EXISTING TOWER GROUND BAR.
3. CONTRACTOR SHALL VERIFY ALL PROPOSED/USED/OCCUPIED PIPE MOUNTS ARE GROUNDED BACK TO THE SECTOR GROUND BAR. IF GROUNDING DOES NOT EXIST FROM THE PIPE MOUNT TO THE SECTOR GROUND BAR, CONTRACTOR SHALL FURNISH ALL MATERIALS AS REQUIRED.
4. ALL CABLE CONNECTIONS TO BE WEATHERPROOFED PER MANUFACTURER INSTRUCTION.



4 TYPICAL ANTENNA GROUNDING SCHEMATIC — SCALE: N.T.S.

5 DETAIL NOT USED — SCALE: N.T.S.

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STRATHMOORE

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BETHESDA, MD 20814

GROUNDING DETAILS

G-1

Commscope_8-port_NNHH-65(A/B/C)-R4

RRH	ANT
RRH1	Port1
RRH2	Port2
RRH3	Port3
RRH4	Port4

AirScale RRH 4T4R B5 160W AHCA

1 **ANTENNA CONNECTION DIAGRAM** SCALE: N.T.S.

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ANTENNA CONNECTION DIAGRAM

S-1

AT&T COAX AND JUMPER COLOR CODE CHART FOR WV-VA SITES

Color Code for Hard-Line Coax to Antennas					
Sector	Coax Line	A1	A2	A3	A4
Alpha	1st Line				
Alpha	2nd Line				

*Note: Pipe 1 is to the left if you are standing behind the antennas in this sector.

Sector	Coax Line	B1	B2	B3	B4
Beta	1st Line				
Beta	2nd Line				

*Note: Pipe 1 is to the left if you are standing behind the antennas in this sector.

Sector	Coax Line	G1	G2	G3	G4
Gamma	1st Line	White	White	3 White	4 White
Gamma	2nd Line	White	White	3 White &	4 White &

*Note: Pipe 1 is to the left if you are standing behind the antennas in this sector.

Color Code for Jumpers from Antenna to TMAs/Diplexers or RRH -or- from Antenna to Hard-Line Coax														
Sector	Technology	Frequency	TX/RX	1st Band	2nd Band	3rd Band	4th Band	5th Band	6th Band	7th Band	8th Band	9th Band	Notes
A1-1	LTE	700 D/E	TXM/RXM			Orange							
A1-2	LTE	700 D/E	TXD1/RXD1			Orange							
A1-3	LTE	WCS	TXM/RXM										
A1-4	LTE	WCS	TXD1/RXD1										
A1-5	LTE	WCS	TXD2/RXD2										
A1-6	LTE	WCS	TXD3/RXD3										
A2-1	UMTS/GSM	850	TXM/RXM			Yellow	Orange						
A2-2	UMTS/GSM	850	TXD1/RXD1			Yellow	Orange						
A2-3	UMTS/GSM	1900	TXM/RXM			Yellow							
A2-4	UMTS/GSM	1900	TXD1/RXD1			Yellow							
A2-5	UMTS/LTE	1900	TXD2/RXD2			Yellow							
A2-6	UMTS/LTE	1900	TXD3/RXD3			Yellow							
A3-1	UMTS	850	TXM/RXM				Yellow	Orange					
A3-2	UMTS	850	TXD1/RXD1				Yellow	Orange					
A3-3	UMTS/LTE	1900	TXM/RXM				Yellow						
A3-4	UMTS/LTE	1900	TXD1/RXD1				Yellow						
A3-5	UMTS/LTE	1900	TXD2/RXD2				Yellow						
A3-6	UMTS/LTE	1900	TXD3/RXD3				Yellow						
A4-1	LTE	700	TXM/RXM						Orange				
A4-2	LTE	700	TXD1/RXD1						Orange				
A4-3	LTE	2100	TXM/RXM										
A4-4	LTE	2100	TXD1/RXD1										
A4-5	LTE	2100	TXD2/RXD2										
A4-6	LTE	2100	TXD3/RXD3										
B1-1	LTE	700 D/E	TXM/RXM			Orange							
B1-2	LTE	700 D/E	TXD1/RXD1			Orange							
B1-3	LTE	WCS	TXM/RXM										
B1-4	LTE	WCS	TXD1/RXD1										
B1-5	LTE	WCS	TXD2/RXD2										
B1-6	LTE	WCS	TXD3/RXD3										
B2-1	UMTS/GSM	850	TXM/RXM			Yellow	Orange						
B2-2	UMTS/GSM	850	TXD1/RXD1			Yellow	Orange						
B2-3	UMTS/GSM	1900	TXM/RXM			Yellow							
B2-4	UMTS/GSM	1900	TXD1/RXD1			Yellow							
B2-5	UMTS/LTE	1900	TXD2/RXD2			Yellow							
B2-6	UMTS/LTE	1900	TXD3/RXD3			Yellow							
B3-1	UMTS	850	TXM/RXM				Yellow	Orange					
B3-2	UMTS	850	TXD1/RXD1				Yellow	Orange					
B3-3	UMTS/LTE	1900	TXM/RXM				Yellow						
B3-4	UMTS/LTE	1900	TXD1/RXD1				Yellow						
B3-5	UMTS/LTE	1900	TXD2/RXD2				Yellow						
B3-6	UMTS/LTE	1900	TXD3/RXD3				Yellow						
B4-1	LTE	700	TXM/RXM						Orange				
B4-2	LTE	700	TXD1/RXD1						Orange				
B4-3	LTE	2100	TXM/RXM										
B4-4	LTE	2100	TXD1/RXD1										
B4-5	LTE	2100	TXD2/RXD2										
B4-6	LTE	2100	TXD3/RXD3										
G1-1	LTE	700 D/E	TXM/RXM	White		Orange							
G1-2	LTE	700 D/E	TXD1/RXD1	White		Orange							
G1-3	LTE	WCS	TXM/RXM	White									
G1-4	LTE	WCS	TXD1/RXD1	White									
G1-5	LTE	WCS	TXD2/RXD2	White									
G1-6	LTE	WCS	TXD3/RXD3	White									
G2-1	UMTS/GSM	850	TXM/RXM	White	White	Yellow	Orange						
G2-2	UMTS/GSM	850	TXD1/RXD1	White	White	Yellow	Orange						
G2-3	UMTS/GSM	1900	TXM/RXM	White	White	Yellow							
G2-4	UMTS/GSM	1900	TXD1/RXD1	White	White	Yellow							
G2-5	UMTS/LTE	1900	TXD2/RXD2	White	White	Yellow							
G2-6	UMTS/LTE	1900	TXD3/RXD3	White	White	Yellow							
G3-1	UMTS	850	TXM/RXM	White	White	White	Yellow	Orange					
G3-2	UMTS	850	TXD1/RXD1	White	White	White	Yellow	Orange					
G3-3	UMTS/LTE	1900	TXM/RXM	White	White	White	Yellow						
G3-4	UMTS/LTE	1900	TXD1/RXD1	White	White	White	Yellow						
G3-5	UMTS/LTE	1900	TXD2/RXD2	White	White	White	Yellow						
G3-6	UMTS/LTE	1900	TXD3/RXD3	White	White	White	Yellow						
G4-1	LTE	700	TXM/RXM	White	White	White	White		Orange				
G4-2	LTE	700	TXD1/RXD1	White	White	White	White		Orange				
G4-3	LTE	2100	TXM/RXM	White	White	White	White						
G4-4	LTE	2100	TXD1/RXD1	White	White	White	White						
G4-5	LTE	2100	TXD2/RXD2	White	White	White	White						
G4-6	LTE	2100	TXD3/RXD3	White	White	White	White						

Base Color	
Sector A	
Sector B	
Sector C	White

Technology Color	
LTE	
UMTS	Yellow
GSM	Black

Frequency Color	
700/850	Orange
WCS	
1900/2100	

Type Color	
Main (M)	White
Diversity (D)	

Jumpers from TMA to Antenna/Diplexer to Equipment: ORANGE band to note Low-Side frequencies VIOLET band to note High-Side frequencies YELLOW band to note UMTS GRAY band to note LTE

FIBER TRUNK IN COLOR CODE:
1ST=
2ND=

DC POWER TRUNK COLOR CODE:		
1ST=	1 WHITE	/
2ND=	2 WHITE	/
3RD=	3 WHITE	/
4TH=	4 WHITE	/

1 COLOR CODE CHART

SCALE: N.T.S.

at&t
7150 STANDARD DR
SUITE A
HANOVER, MD 21076

Jacobs
Challenging today.
Reinventing tomorrow.
Jacobs Telecommunications, Inc.
7150 STANDARD DR. SUITE B
HANOVER, MD 21076
443.230.4400x113

CERTIFICATION STATEMENT:
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. 55911 EXP.: 04/14/22

APPROVALS

LANDLORD _____

LEASING _____

R.F. _____

ZONING _____

CONSTRUCTION _____

A & E _____

PROJECT NO: EP4TURWL

DRAWN BY: RM

CHECKED BY: LW

SUBMITTALS

1	09/25/20	JX COMMENTS
0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

COLOR CODE CHART

S-2

Field	Length	Description	
USID	6	Six characters that defined the sites USID. USID's less than 6 characters in length are preceded with 0's (zeros) (example:003831)	
CellId1	1	Allowed Value	Description
		A	Alpha
		B	Beta
		C	Gamma
CellId2	1	D	Delta
		E	Epsilon
		F	Zeta
CellId3	1	-	No Transmitter connected to this port
AntPos	1	Allowed Value	Description
		1	Antenna Position 1 on this face
		2	Antenna Position 2 on this face
		;	Antenna Position x on this face
		;	Antenna Position x on this face
		9	Antenna Position 9 on this face
		-	Antenna Position unknown
FreqBand	1	Allowed Value	Description
		2	2100 MHz (AWS1) only
		3	2300 MHz (WCS) only
		6	Band 66 (AWS3) only
		7	700 MHz B & C Band only
		8	850 MHz only
		9	1900 MHz (PCS)
		A	2100 MHz (AWS1) & Band 66 (AWS3) combined
		B	1900 MHz (PCS) & Band 66 (AWS3) combined
		C	2100 MHz (AWS1) & Band 66 (AWS3) & 2300 MHz (WCS) combined
		D	1900 MHz (PCS) & 2100 MHz (AWS1) combined
		E	2300 MHz (WCS) & Band 66 (AWS3) combined
		F	1900 MHz (PCS) & 2300 MHz (WCS) combined
		G	1900 MHz (PCS) & 2100 MHz (AWS1) & Band 66 (AWS3) combined
		H	2100 MHz (AWS1) & 2300 MHz (WCS) combined
		I	1900 MHz (PCS) & 2300 MHz (WCS) & Band 66 (AWS3) combined
		J	1900 MHz (PCS) & 2100 MHz (AWS1) & 2300 MHz (WCS) combined
		K	700 MHz B & C Band & 850 MHz combined
		M	1900 MHz (PCS) & 2100 MHz (AWS1) & Band 66 (AWS3) & 2300 MHz (WCS) combined
		P	upper 700 MHz - Band 14 (FirstNet)
		Q	700 MHz D & E Band only
		R	700 MHz B & C & Band 14 (FirstNet) & 850 MHz combined
		S	700 MHz B & C & 700 MHz D & E & 850 MHz combined
		T	Tri-Band: Band 12 (700 MHz B&C), Band 14 (FirstNet), and Band 29 (700 MHz D&E)
		U	700 MHz B & C & 700 MHz D & E & Band 14 (FirstNet) & 850 MHz combined
		W	700 MHz D & E & Band 14 (FirstNet) combined
		X	700 MHz B & C & Band 14 (FirstNet) combined
		Y	700 MHz D & E & 850 MHz combined
		Z	Band 14 (FirstNet) & 850 MHz combined
		-	No Frequency Assigned "not-in-use"

Field	Length	Description	
Tech	1	Allowed Value	Technology / Technology Combination
		F	License protection/FCC compliance/FWLL
		G	Reserved
		J	LTE-5G NR
		K	UMTS-LTE-5G NR
		L	LTE
		N	None/Reserved
		U	UMTS
		V	UMTS-LTE
		Y	UMTS-5G NR
		H	Reserved
		M	Exception
		P	Reserved
		Q	Reserved
		R	5G NR
		S	Reserved
		T	Reserved

Delimiter	13th character
_	Delimiter
B	Border Control
C	CGSA
W	WCS in combination with other bands
P	License Protection
O	Optimized

Delimiter	14th character
_	Delimiter
Z	Programming Code for RET validated

2.3.1 Dual Broadband Antennas- TYPE 1

Powerwave, Kathrein and older Andrew antennas will be recognized by a RET controller as TYPE1 Antenna Line Devices. These require 2 AISG connections. One connection will be from the AISG source (RRH, TMA, RET Controller or Homerun Cable) to the first RET motor and the second connection will be from RET motor 1 to RET motor 2.

Connections from the RET controller will be made to the male connector of the RET motor. Appropriate daisy chain connection will then have to be made to the next RET motor. Figure 5 below is a Powerwave antenna, but the Kathrein will be very similar in appearance and connection.

For all Type 1 dual broadband antennas, the daisy chain connection should be made and both RET motors should be configured in the OSS, even if the high band RET motor is not to be utilized until future AWS launches.

Dual Broadband Antennas - TYPE 17

Newer Andrew antennas and all KMW antennas will be recognized by RET controllers as TYPE17 Antenna Line Devices since there are multiple ALDs on one bus. These antennas only require one AISG connection since both RET motors are inside the antenna. Connections from the RET controller will be made to the male connector of the RET/AISG Antenna Port. Figure 7 below is an Andrew antenna, but the KMW antenna will be very similar in appearance and connection.

Below is the list of approved RET Type 17 antennas as per 6/29/2011. Andrew will continue to phase out older models which are Type 1 with newer models that will be Type 17.

Vendor	Frequency Band	HBW	Length	Model
Andrew	Dual Broadband	65°	6'	SBNH-1D6565B
Andrew	Dual Broadband	65°	8'	SBNH-1D6565C
Andrew	Dual Broadband	85°	6'	SBNH-1D8585B
Andrew	Dual Broadband	85°	8'	SBNH-1D8585C
KMW	Dual Broadband	65°	4'	AM-X-CD-14-65-00T-RET
KMW	Dual Broadband	65°	6'	AM-X-CD-16-65-00T-RET
KMW	Dual Broadband	65°	8'	AM-X-CD-17-65-00T-RET
KMW	Dual Broadband	85°	4'	NOT AVAILABLE YET
KMW	Dual Broadband	85°	6'	NOT AVAILABLE YET
KMW	Dual Broadband	85°	8'	AM-X-CD-16-85-00T-RET
KMW	Single Broadband	65°	4'	AM-X-CW-14-65-00T-RET
KMW	Single Broadband	65°	6'	AM-X-CW-16-65-00T-RET
KMW	Single Broadband	65°	8'	AM-X-CW-18-65-00T-RET
KMW	Single Broadband	85°	4'	AM-X-CW-13-85-00T-RET
KMW	Single Broadband	85°	6'	AM-X-CW-15-85-00T-RET
KMW	Single Broadband	85°	8'	AM-X-CW-18-85-00T-RET

1 **LTE RET NAMING CONVENTION**

SCALE: N.T.S.

at&t
7150 STANDARD DR
SUITE A
HANOVER, MD 21076

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Challenging today.
Reinventing tomorrow.
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APPROVALS

LANDLORD _____
LEASING _____
R.F. _____
ZONING _____
CONSTRUCTION _____
A & E _____

PROJECT NO: EP4TURWL

DRAWN BY: RM

CHECKED BY: LW

SUBMITTALS

1	09/25/20	JX COMMENTS
0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

LTE RET NAMING CONVENTION

S-3

GENERAL CONSTRUCTION:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWINGS, THE FOLLOWING DEFINITIONS SHALL APPLY:
   GENERAL CONTRACTOR - (CONSTRUCTION)
   OWNER - AT&T
2. ALL SITE WORK SHALL BE COMPLETED AS INDICATED ON THE DRAWINGS AND AT&T PROJECT SPECIFICATIONS.
3. GENERAL CONTRACTOR SHALL VISIT THE SITE AND SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING THE PROPOSED WORK AND SHALL MAKE PROVISIONS. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS, DIMENSIONS, AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.
4. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. GENERAL CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF WORK.
5. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES, AND APPLICABLE REGULATIONS.
6. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
7. PLANS ARE NOT TO BE SCALED. THESE PLANS ARE INTENDED TO BE A DIAGRAMMATIC OUTLINE ONLY UNLESS OTHERWISE NOTED. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS OTHERWISE NOTED. SPACING BETWEEN EQUIPMENT IS THE MINIMUM REQUIRED CLEARANCE. THEREFORE, IT IS CRITICAL TO FIELD VERIFY DIMENSIONS, SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE ENGINEER PRIOR TO PROCEEDING WITH THE WORK. DETAILS ARE INTENDED TO SHOW DESIGN INTENT. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF WORK AND PREPARED BY THE ENGINEER PRIOR TO PROCEEDING WITH WORK.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE ENGINEER PRIOR TO PROCEEDING.
10. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF WORK AREA, ADJACENT AREAS AND BUILDING OCCUPANTS THAT ARE LIKELY TO BE AFFECTED BY THE WORK UNDER THIS CONTRACT. WORK SHALL CONFIRM TO ALL OSHA REQUIREMENTS AND THE LOCAL JURISDICTION.
11. GENERAL CONTRACTOR SHALL COORDINATE WORK AND SCHEDULE WORK ACTIVITIES WITH OTHER DISCIPLINES.
12. ERECTION SHALL BE DONE IN A WORKMANLIKE MANNER BY COMPETENT EXPERIENCED WORKMAN IN ACCORDANCE WITH APPLICABLE CODES AND THE BEST ACCEPTED PRACTICE. ALL MEMBERS SHALL BE LAID PLUMB AND TRUE AS INDICATED ON THE DRAWINGS.
13. SEAL PENETRATIONS THROUGH FIRE RATED AREAS WITH UL LISTED MATERIALS APPROVED BY LOCAL JURISDICTION. CONTRACTOR SHALL KEEP AREA CLEAN, HAZARD FREE, AND DISPOSE OF ALL DEBRIS.
14. WORK PREVIOUSLY COMPLETED IS REPRESENTED BY LIGHT SHADED LINES AND NOTES. THE SCOPE OF WORK FOR THIS PROJECT IS REPRESENTED BY DARK SHADED LINES AND NOTES. CONTRACTOR SHALL NOTIFY THE GENERAL CONTRACTOR OF ANY EXISTING CONDITIONS THAT DEVIATE FROM THE DRAWINGS PRIOR TO BEGINNING CONSTRUCTION.
15. CONTRACTOR SHALL PROVIDE WRITTEN NOTICE TO THE CONSTRUCTION MANAGER 48 HOURS PRIOR TO COMMENCEMENT OF WORK.
16. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
17. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
18. GENERAL CONTRACTOR SHALL COORDINATE AND MAINTAIN ACCESS FOR ALL TRADES AND CONTRACTORS TO THE SITE AND/OR BUILDING.
19. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR SECURITY OF THE SITE FOR THE DURATION OF CONSTRUCTION UNTIL JOB COMPLETION.
20. THE GENERAL CONTRACTOR SHALL MAINTAIN IN GOOD CONDITION ONE COMPLETE SET OF PLANS WITH ALL REVISIONS, ADDENDA, AND CHANGE ORDERS ON THE PREMISES AT ALL TIMES.
21. THE GENERAL CONTRACTOR SHALL PROVIDE PORTABLE FIRE EXTINGUISHERS WITH A RATING OF NOT LESS THAN 2-A OT 2-A:10-B:C AND SHALL BE WITHIN 25 FEET OF TRAVEL DISTANCE TO ALL PORTIONS OF WHERE THE WORK IS BEING COMPLETED DURING CONSTRUCTION.
22. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY THE ENGINEER. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS SHALL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION, B) CONFINED SPACE, C) ELECTRICAL SAFETY, AND D) TRENCHING & EXCAVATION.
23. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED, CAPPED, PLUGGED OR OTHERWISE DISCONNECTED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, AS DIRECTED BY THE RESPONSIBLE ENGINEER, AND SUBJECT TO THE APPROVAL OF THE OWNER AND/OR LOCAL UTILITIES.
24. THE AREAS OF THE OWNER'S PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION.
25. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO THE EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE FEDERAL AND LOCAL JURISDICTION FOR EROSION AND SEDIMENT CONTROL.
26. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUNDING. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
27. THE SUBGRADE SHALL BE BROUGHT TO A SMOOTH UNIFORM GRADE AND COMPACTED TO 95 PERCENT STANDARD PROCTOR DENSITY UNDER PAVEMENT AND STRUCTURES AND 80 PERCENT STANDARD PROCTOR DENSITY IN OPEN SPACE. ALL TRENCHES IN PUBLIC RIGHT OF WAY SHALL BE BACKFILLED WITH FLOWABLE FILL OR OTHER MATERIAL PRE-APPROVED BY THE LOCAL JURISDICTION.
28. ALL NECESSARY RUBBISH, STUMPS, DEBRIS, STICKS, STONES, AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN A LAWFUL MANNER.
29. ALL BROCHURES, OPERATING AND MAINTENANCE MANUALS, CATALOGS, SHOP DRAWINGS, AND OTHER DOCUMENTS SHALL BE TURNED OVER TO THE GENERAL CONTRACTOR AT COMPLETION OF CONSTRUCTION AND PRIOR TO PAYMENT.
30. CONTRACTOR SHALL SUBMIT A COMPLETE SET OF AS-BUILT REDLINES TO THE GENERAL CONTRACTOR UPON COMPLETION OF PROJECT AND PRIOR TO FINAL PAYMENT.
31. CONTRACTOR SHALL LEAVE PREMISES IN A CLEAN CONDITION.
32. THE PROPOSED FACILITY WILL BE UNMANNED AND DOES NOT REQUIRE POTABLE WATER OR SEWER SERVICE, AND IS NOT FOR HUMAN HABITAT (NO HANDICAP ACCESS REQUIRED).
33. OCCUPANCY IS LIMITED TO PERIODIC MAINTENANCE AND INSPECTION, APPROXIMATELY 2 TIMES PER MONTH, BY AT&T TECHNICIANS.
34. NO OUTDOOR STORAGE OR SOLID WASTE CONTAINERS ARE PROPOSED.
35. ALL MATERIAL SHALL BE FURNISHED AND WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST REVISION AT&T MOBILITY GROUNDING STANDARD "TECHNICAL SPECIFICATION FOR CONSTRUCTION OF GSM/GPRS WIRELESS SITES" AND "TECHNICAL SPECIFICATION FOR FACILITY GROUNDING". IN CASE OF A CONFLICT BETWEEN THE CONSTRUCTION SPECIFICATION AND THE DRAWINGS, THE DRAWINGS SHALL GOVERN.
36. CONTRACTORS SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS REQUIRED FOR CONSTRUCTION. IF CONTRACTOR CANNOT OBTAIN A PERMIT, THEY MUST NOTIFY THE GENERAL CONTRACTOR IMMEDIATELY.
37. CONTRACTOR SHALL REMOVE ALL TRASH AND DEBRIS FROM THE SITE ON A DAILY BASIS.
38. INFORMATION SHOWN ON THESE DRAWINGS WAS OBTAINED FROM SITE VISITS AND/OR DRAWINGS PROVIDED BY THE SITE OWNER. CONTRACTORS SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
39. NO WHITE STROBE LIGHTS ARE PERMITTED. LIGHTING IF REQUIRED, WILL MEET FAA STANDARDS AND REQUIREMENTS.
40. ALL COAXIAL CABLE INSTALLATIONS TO FOLLOW MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
41. CONTRACTOR WILL REFER TO LATEST RFDS SHEET PRIOR TO CONSTRUCTION COMMENCING.

PART 1 - GENERAL

1.1 SCOPE:

A. PROVIDE FABRICATION AND ERECTION OF STRUCTURAL STEEL AND OTHER ITEMS AS SHOWN ON THE DRAWINGS OR REQUIRED BY OTHER SECTIONS OF THESE SPECIFICATIONS.

1.2 REFERENCES:

A. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC). MANUAL OF STEEL CONSTRUCTION (13TH EDITION), ALLOWABLE STRESS DESIGN (ASD).

B. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM).
ASTM A36: STRUCTURAL STEEL
ASTM A53: PIPE, STEEL BLACK AND HOT DIPPED, ZINC-COATED WELDED AND SEAMLESS.
ASTM A108: STEEL BARS, CARBON, COLD FINISHED, STANDARD QUALITY.
ASTM A123: ZINC (HOT-DIPPED GALVANIZED) COATING ON IRON AND STEEL PRODUCTS.
ASTM A307: CARBON STEEL BOLTS AND STUDS, 60,000 PSI TENSILE STRENGTH.
ASTM A325: HIGH-STRENGTH BOLT FOR STRUCTURAL STEEL JOINTS.
ASTM A490: HEAT-TREATED, STRUCTURAL STEEL BOLTS, 150 (KSI) (1035MPA) TENSILE STRENGTH.
ASTM A500: COLD-FORMED WELDED AND SEAMLESS CARBON STEEL STRUCTURAL TUBING IN ROUNDS AND SHAPES.
ASTM A563: ARCBON AND ALLOY STEEL NUTS.
ASTM B695: COATINGS OF ZINC MECHANICALLY DEPOSITED ON IRON AND STEEL.
ASTM F436: HARDENED STEEL WASHERS.
ASTM F959: COMPRESSIBLE-WASHER-TYPE DIRECT TENSION INDICATOR FOR USE WITH STRUCTURAL FASTENERS.

C. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM).
ASTM A36: STRUCTURAL STEEL
AMERICAN WELDING SOCIETY (AWS):
AWS A5.1: COVERED CARBON STEEL ARC WELDING ELECTRODES.
AWS A5.5: LOW ALLOY STEEL COVERED ARC WELDING ELECTRODES.
AWS D1.1: STRUCTURAL WELDING CODE - STEEL.

D. RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS (RCSC): "SPECIFICATIONS FOR STRUCTURAL JOINTS USING ASTM A325 BOLTS OR ASTM A490 BOLTS" AS ENDORSED BY AISC.

E. STEEL STRUCTURES PAINTING COUNCIL (SSPC):
SSPC-SP3: POWER TOOL CLEANING.
SSPC-PAINT 11: RED IRON OXIDE, ZINC CHROME, RAW LINSEED OIL OR ALKYD PAINT.

1.3 SUBMITTALS:

A. SUBMIT THE FOLLOWING FOR APPROVAL:

1. FABRICATION AND ERECTION DRAWINGS SHOWING ALL DETAILS, CONNECTIONS, MATERIAL DESIGNATIONS, AND ALL TOP STEEL ELEVATIONS.

B. WELDERS SHALL BE QUALIFIED AS PRESCRIBED IN AWS D1.1.

PART 2 - PRODUCTS

2.1 STRUCTURAL STEEL:

A. SHAPES, PLATES AND BARS SHALL CONFORM TO ASTM A36 AND ASTM A992.

B. STRUCTURAL TUBING SHALL CONFORM TO ASTM A500, GRADE B. STEEL PIPE SHALL CONFORM TO ASTM A53, TYPE E OR S, GRADE B.

2.2 ANCHOR BOLTS:

A. ANCHOR BOLTS SHALL CONFORM TO ASTM A307 WITH HEAVY HEXAGONAL NUTS.

2.3 BOLTS:

A. COMMON (MACHINE) BOLTS SHALL CONFORM TO ASTM A307 GRADE A AND NUTS TO ASTM A563. ONE COMMON BOLT ASSEMBLY SHALL CONSIST OF A BOLT, A HEAVY HEX NUT, AND A HARDENED WASHER.

B. HIGH STRENGTH BOLT SHALL CONFORM TO ASTM A325, ONE HIGH STRENGTH BOLT ASSEMBLY SHALL CONSIST OF A HEAVY HEX STRUCTURAL BOLT, A HEAVY HEX NUT, A HARDENED WASHER CONFIRMING WITH ASTM F436 AND A DIRECT TENSION INDICATOR CONFORMING WITH STM F959. THE HARDENED WASHER SHALL BE INSTALLED AGAINST THE ELEMENT TURNED IN TIGHTENING.UNLESS NOTED OTHERWISE ON THE DRAWINGS, ALL CONNECTIONS SHALL BE BEARING TYPE CONNECTIONS.

2.4 WELDING ELECTRODES:

A. WELDING ELECTRODES SHALL COMPLY WITH AWS D1.1 USING A5.1 OR A5.5 E70XX AND SHALL BE COMPATIBLE WITH THE WELDING PROCESS SELECTED.

2.5 PRIMER:

A. PRIMER SHALL BE RED OXIDE-CHROMATE PRIMER COMPLYING WITH SSPC PAINT SPECIFICATION NO. 11.

PART 3 - EXECUTION

3.1 FABRICATION:

A. SHOP FABRICATE AND ASSEMBLY MATERIALS AS SPECIFIED HEREIN.

1. FABRICATE ITEMS OF STRUCTURAL STEEL IN ACCORDANCE WITH THE AISC-ASD SPECIFICATION, AND AS INDICATED ON THE APPROVED SHOP DRAWINGS.
2. ALL EXPOSED STRUCTURAL STEEL SHALL BE HOT DIP GALVANIZED PER ASTM.
3. PROPERLY MARK AND MATCH-MARK MATERIALS FOR FIELD ASSEMBLY AND FOR IDENTIFICATION AS TO LOCATION FOR WHICH INTENDED.
4. FABRICATE AND DELIVER IN A SEQUENCE WHICH WILL EXPEDITE ERECTION AND MINIMIZE FIELD HANDLING OF MATERIALS.
5. WHERE FINISHING IS REQUIRED, COMPLETE THE ASSEMBLY, INCLUDING THE WELDING OF UNITS, BEFORE START OF FINISHING OPERATIONS.
6. PROVIDE FINISH SURFACE OF MEMBERS EXPOSED IN THE FINAL STRUCTURE FREE FROM MARKINGS, BURNS, AND OTHER DEFECTS.

B. PROVIDE CONNECTIONS AS SPECIFIED HEREIN:

1. PROVIDE BOLTS AND WASHERS OF TYPES AND SIZE REQUIRED FOR COMPLETION OF FIELD ERECTION. USE 3/4 INCH DIAMETER A325 BOLTS UNLESS NOTED OTHERWISE.
2. INSTALL HIGH STRENGTH THREADED FASTENERS IN ACCORDANCE WITH RCSC "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR ASTM A490 BOLTS."
3. WELDED CONSTRUCTION SHALL COMPLY WITH AWS D1.1 FOR PROCEDURES, APPEARANCE, QUALITY OF WELD, AND METHODS USED IN CORRECTING WELDED WORK.
4. THE FABRICATOR SHALL FURNISH AND INSTALL ERECTION CLIPS FOR FIT-UP OF WELDED CONNECTIONS.
5. DOUBLE ANGLE MEMBERS SHALL HAVE WELDED FILLERS SPACED IN ACCORDANCE WITH CHAPTER E4 OF THE AISC-ASD SPECIFICATION.
6. GUSSET AND STIFFENER PLATES SHALL BE 3/8 INCH THICK MINIMUM.

3.2 PRIMING:

A. STRUCTURAL STEEL SHALL BE PRIMED AS SPECIFIED HEREIN, UNLESS SHOWN OTHERWISE ON THE DRAWINGS.

B. STRUCTURAL STEEL SURFACE PREPARATION SHALL CONFORM TO SSPC-SP3, "POWER TOOL CLEANING."

C. SURFACE PREPARATION AND PRIMER SHALL BE IN ACCORDANCE WITH AISC CODE OF STANDARD PRACTICE AS INCLUDED IN THE ASD MANUAL OF STEEL CONSTRUCTION.

D. MATERIALS SHALL REMAIN CLOSED UNTIL REQUIRED FOR USE, MANUFACTURER'S POT-LIFE REQUIREMENTS SHALL BE STRICTLY ADHERED TO.

E. PRIMER SHALL BE APPLIED TO DRY, CLEAN, PREPARED SURFACE AND UNDER FAVORABLE CONDITIONS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. UNLESS OTHERWISE RECOMMENDED BY THE MANUFACTURER PRIMING SHALL NOT BE DONE WHEN AMBIENT TEMPERATURE IS LESS THAN 50 DEGREE F. THE RELATIVE HUMIDITY IS MORE THAN 90 PERCENT, OR THE SURFACE TEMPERATURE IS LESS THAN 5 DEGREE F ABOVE THE DEW POINT.

F. GENERALLY ALL PRIMER SHALL BE SPRAY APPLIED. BRUSH OR ROLLER APPLICATION SHALL BE RESTRICTED TO TOUCHUP AND TO AREAS NOT ACCESSIBLE BY SPRAY GUN.

G. PRIMER SHALL BE UNIFORMLY APPLIED WITHOUT RUNS, SAGS, SOLVENT BLISTERS, DRY SPRAY OR OTHER BLEMISHES. ALL BLEMISHES AND OTHER IRREGULARITIES SHALL BE REPAIRED OR REMOVED AND THE AREA RE-COATED. SPECIAL ATTENTION SHALL BE PAID TO CREVICES, WELD LINES, BOLT HEADS, CORNERS, EDGES, ETC., TO OBTAIN THE REQUIRED NOMINAL FILM THICKNESS.

H. THE DRY FILM THICKNESS OF THE PRIMER SHALL BE 2.0 MILS.

I. IF THE PRIMER IS DAMAGED BY WELDING OR PHYSICAL ABUSE, THE AREA SHALL BE TOUCHED-UP AND REPAIRED. THE TOUCHUP PAINT SHALL BE COMPATIBLE WITH THE APPLIED PRIMER WITH MINIMUM DRY FILM THICKNESS OF 1.5 MILS.

3.3 INSTALLATION:

A. INSTALLATION OF STRUCTURAL STEEL SHALL COMPLY WITH AISC "CODE OF STANDARD PRACTICE."

B. STRUCTURAL FIELD WELDING SHALL BE DONE BY THE ELECTRIC SUBMERGED OR SHIELDED METAL ARC PROCESS. WELDED CONSTRUCTION SHALL COMPLY WITH AWS D1.1.

C. PROVIDE ANCHOR BOLTS AND OTHER CONNECTORS REQUIRED FOR SECURING STRUCTURAL STEEL TO ELEVATOR SHAFT WALLS AND OTHER IN-PLACE WORK. PROVIDE TEMPLATES AND OTHER DEVICES NECESSARY FOR PRESETTING BOLTS AND ANCHORS TO ACCURATE LOCATIONS.

D. SPLICE MEMBERS ONLY WHERE INDICATED ON THE DRAWINGS.

E. ANY GAS CUTTING TORCHES HAVE TO BE APPROVED IN WRITING BY THE PROJECT STRUCTURAL ENGINEER.

F. PROVIDE TEMPORARY SHORING BRACING WITH CONNECTIONS OF SUFFICIENT STRENGTH TO BEAR IMPOSED LOADS. REMOVE TEMPORARY CONNECTIONS AND MEMBERS WHEN PERMANENT MEMBERS ARE IN PLACE AND THE FINAL CONNECTIONS HAVE BEEN MADE.

G. ALIGN AND ADJUST MEMBERS, AND OTHER SURFACES WHICH WILL BE IN PERMANENT CONTACT, BEFORE ASSEMBLY.

H. HIGH-STRENGTH BOLTS AS A MINIMUM, SHALL BE TIGHTENED TO A "SNUG TIGHT" CONDITION AS DEFINED IN THE LATEST AISC SPECIFICATION. ALL HIGH-STRENGTH BOLTS SPECIFIED ON THE DESIGN DRAWINGS TO BE USED IN PRETENSIONED OR SLIP-CRITICAL JOINTS SHALL BE TIGHTENED TO A BOLT TENSION NOT LESS THAN THAT GIVEN IN AISC TABLE J3.1. INSTALLATION SHALL BE BY ANY OF THE FOLLOWING METHODS: TURN-OF NUT METHOD, A DIRECT-TENSION-INDICATOR, TWIST-OFF-TYPE TENSION-CONTROL BOLT, CALIBRATED WRENCH, OR ALTERNATIVE DESIGN BOLT.

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CERTIFICATION STATEMENT:
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. 55911 EXP.: 04/14/22

APPROVALS

LANDLORD _____

LEASING _____

R.F. _____

ZONING _____

CONSTRUCTION _____

A & E _____

PROJECT NO: EP4TURWL

DRAWN BY: RM

CHECKED BY: LW

SUBMITTALS

1	09/25/20	JX COMMENTS
0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

GENERAL NOTES I

GN-1

PART 1 - GENERAL

1.1 GENERAL CONDITIONS:

A. CONTRACTOR SHALL INSPECT THE EXISTING SITE CONDITIONS PRIOR TO SUBMITTING BID. ANY QUESTIONS ARISING DURING THE BID PERIOD IN REGARDS TO THE CONTRACTORS FUNCTIONS, THE SCOPE OF WORK, OR ANY OTHER ISSUE RELATED TO THIS PROJECT SHALL BE BROUGHT UP DURING THE BID PERIOD WITH THE PROJECT MANAGER FOR CLARIFICATION, NOT AFTER THE CONTRACT HAS BEEN AWARDED.

B. THE CONTRACTOR SHALL OBTAIN PERMITS, LICENSES, MAKE ALL DEPOSITS, AND PAY ALL FEES REQUIRED FOR THE CONSTRUCTION PERFORMANCE FOR THE WORK UNDER THIS SECTION.

C. DRAWINGS SHOW THE GENERAL ARRANGEMENT OF ALL SYSTEMS AND COMPONENTS COVERED UNDER THIS SECTION. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS. DRAWING SHALL NOT BE SCALED TO DETERMINE DIMENSIONS.

1.2 LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES.

A. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, AND ALL APPLICABLE LOCAL LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES. CONDUIT BENDS SHALL BE THE RADIUS BEND FOR THE TRADE SIZE OF CONDUIT IN COMPLIANCE WITH THE LATEST EDITIONS OF NEC.

1.3 REFERENCES:

A. THE PUBLICATIONS LISTED BELOW ARE PART OF THIS SPECIFICATION. EACH PUBLICATION SHALL BE THE LATEST REVISION AND ADDENDUM IN EFFECT ON THE DATE. THIS SPECIFICATION IS ISSUED FOR CONSTRUCTION UNLESS OTHERWISE NOTED. EXCEPT AS MODIFIED BY THE REQUIREMENT SPECIFIED HEREIN OR THE DETAILS OF THE DRAWINGS, WORK INCLUDED IN THIS SPECIFICATION SHALL CONFORM TO THE APPLICABLE PROVISION OF THESE PUBLICATIONS.

1. ANSI/IEEE (AMERICAN NATIONAL STANDARDS INSTITUTE)
2. ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)
3. ICEA (INSULATED CABLE ENGINEERS ASSOCIATION)
4. NEMA (NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION)
5. NFPA (NATIONAL FIRE PROTECTION ASSOCIATION)
6. OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION)
7. UL (UNDERWRITERS LABORATORIES INC.)
8. AT&T GROUNDING AND BONDING STANDARDS TP-76416

1.4 SCOPE OF WORK

A. WORK UNDER THIS SECTION SHALL CONSIST OF FURNISHING ALL LABOR, MATERIAL, AND ASSOCIATED SERVICES REQUIRED TO COMPLETE REQUIRED CONSTRUCTION AND BE OPERATIONAL.

B. ALL ELECTRICAL EQUIPMENT UNDER THIS CONTRACT SHALL BE PROPERLY TESTED, ADJUSTED, AND ALIGNED BY THE CONTRACTOR.

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATING, DRAINING, TRENCHES, BACKFILLING, AND REMOVAL OF EXCESS DIRT.

D. THE CONTRACTOR SHALL FURNISH TO THE OWNER WITH CERTIFICATES OF A FINAL INSPECTION AND APPROVAL FROM THE INSPECTION AUTHORITIES HAVING JURISDICTION.

E. THE CONTRACTOR SHALL PREPARE A COMPLETE SET OF AS-BUILT DRAWINGS, DOCUMENT ALL WIRING EQUIPMENT CONDITIONS, AND CHANGES WHILE COMPLETING THIS CONTRACT. THE AS-BUILT DRAWINGS SHALL BE SUBMITTED AT COMPLETION OF THE PROJECT.

PART 2 - PRODUCTS

2.1 GENERAL:

A. ALL MATERIALS AND EQUIPMENT SHALL BE UL LISTED, NEW, AND FREE FROM DEFECTS.

B. ALL ITEMS OF MATERIALS AND EQUIPMENT SHALL BE ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION AS SUITABLE FOR THE USE INTENDED.

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

D. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 10,000 AIC MINIMUM. VERIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PER THE GOVERNING JURISDICTION.

2.2 MATERIALS AND EQUIPMENT:

A. CONDUIT:

1. RIGID METAL CONDUIT (RMC) SHALL BE HOT-DIPPED GALVANIZED INSIDE AND OUTSIDE INCLUDING ENDS AND THREADS AND ENAMELED OR LACQUERED INSIDE IN ADDITION TO GALVANIZING.
2. LIQUIDTIGHT FLEXIBLE METAL CONDUIT SHALL BE UL LISTED.
3. CONDUIT CLAMPS, STRAPS AND SUPPORTS SHALL BE STEEL OR MALLEABLE IRON. ALL FITTINGS SHALL BE COMPRESSION AND CONCRETE TIGHT TYPE. GROUNDING BUSHINGS WITH INSULATED THROATS SHALL BE INSTALLED ON ALL CONDUIT TERMINATIONS.
4. NONMETALLIC CONDUIT AND FITTINGS SHALL BE SCHEDULE 40 PVC. INSTALL USING SOLVENT-CEMENT-TYPE JOINTS AS RECOMMENDED BY THE MANUFACTURER.

B. CONDUCTORS AND CABLE:

1. CONDUCTORS AND CABLE SHALL BE FLAME-RETARDANT, MOISTURE AND HEAT RESISTANT THERMOPLASTIC, SINGLE CONDUCTOR, COPPER, TYPE THHN/THWN-2, 600 VOLT, SIZE AS INDICATED, #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR USED.
2. #10 AWG AND SMALLER CONDUCTOR SHALL BE SOLID OR STRANDED AND #8 AWG AND LARGER CONDUCTORS SHALL BE STRANDED.
3. SOLDERLESS, COMPRESSION-TYPE CONNECTORS SHALL BE USED FOR TERMINATION OF ALL STRANDED CONDUCTORS.
4. STRAIN-RELIEF SUPPORTS GRIPS SHALL BE HUBBELL KELLEMS OR APPROVED EQUAL. CABLES SHALL BE SUPPORTED IN ACCORDANCE WITH THE NEC AND CABLE MANUFACTURER'S RECOMMENDATIONS.
5. ALL CONDUCTORS SHALL BE TAGGED AT BOTH ENDS OF THE CONDUCTOR, AT ALL PULL BOXES, J-BOXES, EQUIPMENT AND CABINETS AND SHALL BE IDENTIFIED WITH APPROVED PLASTIC TAGS (ACTION CRAFT, BRADY, OR APPROVED EQUAL).

C. DISCONNECT SWITCHES:

1. DISCONNECT SWITCHES SHALL BE HEAVY DUTY, DEAD-FRONT, QUICK-MAKE, QUICK-BREAK, EXTERNALLY OPERABLE, HANDLE LOCKABLE AND INTERLOCK WITH COVER IN CLOSED POSITION, RATING AS INDICATED, UL LABELED FURNISHED IN NEMA 3R ENCLOSURE, SQUARE-D OR ENGINEER APPROVED EQUAL.

D. CHEMICAL ELECTROLYTIC GROUNDING SYSTEM:

1. INSTALL CHEMICAL GROUNDING AS REQUIRED. THE SYSTEM SHALL BE ELECTROLYTIC MAINTENANCE FREE ELECTRODE CONSISTING OF RODS WITH A MINIMUM #2 AWG CU EXOTHERMICALLY WELDED PIGTAIL, PROTECTIVE BOXES, AND BACKFILL MATERIAL. MANUFACTURER SHALL BE LYNCOLE XIT GROUNDING ROD TYPES K2-(*)CS OR K2L-(*)CS (*) LENGTH AS REQUIRED.
2. GROUND ACCESS BOX SHALL BE A POLYPLASTIC BOX FOR NON-TRAFFIC APPLICATIONS, INCLUDING BOLT DOWN FLUSH COVER WITH "BREATHER" HOLES, XIT MODEL #XB-22. ALL DISCONNECT SWITCHES AND CONTROLLING DEVICES SHALL BE PROVIDED WITH ENGRAVED LAMICOID NAMEPLATES INDICATING EQUIPMENT CONTROLLED, BRANCH CIRCUITS ID NUMBERING, AND THE ELECTRICAL POWER SOURCE.
3. BACKFILL MATERIAL SHALL BE LYNCONITE AND LYNCOLE GROUNDING GRAVEL.

E. SYSTEM GROUNDING:

1. ALL GROUNDING COMPONENTS SHALL BE TINNED AND GROUNDING CONDUCTOR SHALL BE #2 AWG BARE, SOLID, TINNED, COPPER. ABOVE GRADE GROUNDING CONDUCTORS SHALL BE INSULATED WHERE NOTED.
2. GROUNDING BUSES SHALL BE BARE, TINNED, ANNEALED COPPER BARS OF RECTANGULAR CROSS SECTION. STANDARD BUS BARS MGB, SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. THEY SHALL NOT BE FABRICATED OR MODIFIED IN THE FIELD. ALL GROUNDING BUSES SHALL BE IDENTIFIED WITH MINIMUM 3/4" LETTERS BY WAY OF STENCILING OR DESIGNATION PLATE.
3. CONNECTORS SHALL BE HIGH-CONDUCTIVITY, HEAVY DUTY, LISTED AND LABELED AS GROUNDING CONNECTORS FOR THE MATERIALS USED. USE TWO-HOLE COMPRESSION LUGS WITH HEAT SHRINK FOR MECHANICAL CONNECTIONS. INTERIOR CONNECTIONS USE TWO-HOLE COMPRESSION LUGS WITH INSPECTION WINDOW AND CLEAR HEAT SHRINK.
4. EXOTHERMIC WELDED CONNECTIONS SHALL BE PROVIDED IN KIT FORM AND SELECTED FOR THE SPECIFIC TYPES, SIZES, AND COMBINATIONS OF CONDUCTORS AND OTHER ITEMS TO BE CONNECTED.
5. GROUND RODS SHALL BE COPPER-CLAD STEEL WITH HIGH-STRENGTH STEEL CORE AND ELECTROLYTIC-GRADE COPPER OUTER SHEATH, MOLTEN WELDED TO CORE, 5/8"x10'-0". ALL GROUNDING RODS SHALL BE INSTALLED WITH INSPECTION SLEEVES.
6. INSTALL AN EQUIPMENT GROUNDING CONDUCTOR IN ALL CONDUITS IN COMPLIANCE WITH THE AT&T SPECIFICATIONS AND NEC. THE EQUIPMENT GROUNDING CONDUCTORS SHALL BE BONDED AT ALL JUNCTION BOXES, PULLBOXES, DISCONNECT SWITCHES, STARTERS, AND EQUIPMENT CABINETS.

F. OTHER MATERIALS:

1. THE CONTRACTOR SHALL PROVIDE OTHER MATERIALS, THOUGH NOT SPECIFICALLY DESCRIBED, WHICH ARE REQUIRED FOR A COMPLETELY OPERATIONAL SYSTEM AND PROPER INSTALLATION OF THE WORK.
2. PROVIDE PULL BOXES AND JUNCTION BOXES WHERE SHOWN OR REQUIRED BY NEC.
3. PANELS AND LOAD CENTERS:
4. ALL PANEL DIRECTORIES SHALL BE TYPEWRITTEN.

PART 3 - EXECUTION

3.1 GENERAL:

A. ALL MATERIAL AND EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

B. EQUIPMENT SHALL BE TIGHTLY COVERED AND PROTECTED AGAINST DIRT OR WATER, AND AGAINST CHEMICAL OR MECHANICAL INJURY DURING INSTALLATION AND CONSTRUCTION PERIODS.

3.2 LABOR AND WORKMANSHIP:

A. ALL LABOR FOR THE INSTALLATION OF MATERIALS AND EQUIPMENT FURNISHED FOR THE ELECTRICAL SYSTEM SHALL BE INSTALLED BY EXPERIENCED WIREMEN, IN A NEAT AND WORKMAN-LIKE MANNER.

B. ALL ELECTRICAL EQUIPMENT SHALL BE ADJUSTED, ALIGNED AND TESTED BY THE CONTRACTOR AS REQUIRED TO PRODUCE THE INTENDED PERFORMANCE.

C. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL THOROUGHLY CLEAN ALL EXPOSED EQUIPMENT, REMOVE ALL LABELS AND ANY DEBRIS, CRATING OR CARTONS AND LEAVE THE INSTALLATION FINISHED AND READY FOR OPERATION.

3.3 COORDINATION:

A. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ELECTRICAL ITEMS WITH THE OWNER-FURNISHED EQUIPMENT DELIVERY SCHEDULE TO PREVENT UNNECESSARY DELAYS IN THE TOTAL WORK.

3.4 INSTALLATION:

A. CONDUIT:

1. ALL ELECTRICAL WIRING SHALL BE INSTALLED IN CONDUIT AS SPECIFIED. NO CONDUIT OR TUBING OF LESS THAN 3/4 INCH TRADE SIZE.
2. PROVIDE RIGID PVC SCHEDULE 80 CONDUITS FOR ALL RISERS, RMC OTHERWISE NOTED. EMT MAY BE INSTALLED FOR EXTERIOR CONDUITS WHERE NOT SUBJECT TO PHYSICAL DAMAGE.
3. INSTALL SCHEDULE 40 PVC CONDUIT WITH A MINIMUM COVER OF 24" UNDER ROADWAYS, PARKING LOTS, STREETS, AND ALLEYS. CONDUIT SHALL HAVE A MINIMUM COVER OF 18" IN ALL OTHER NON-TRAFFIC APPLICATIONS (REFER TO 2017 NEC, TABLE 300.5).
4. USE GALVANIZED FLEXIBLE STEEL CONDUIT WHERE DIRECT CONNECTION TO EQUIPMENT WITH MOVEMENT, VIBRATION, OR FOR EASE OF MAINTENANCE. USE LIQUID TIGHT, FLEXIBLE METAL CONDUIT FOR OUTDOOR APPLICATIONS. INSTALL GALVANIZED FLEXIBLE STEEL CONDUIT AT ALL POINTS OF CONNECTION TO EQUIPMENT MOUNTED ON SUPPORT TO ALLOW FOR EXPANSION AND CONTRACTION.
5. A RUN OF CONDUIT BETWEEN BOXES OR EQUIPMENT SHALL NOT CONTAIN MORE THAN THE EQUIVALENT OF THREE QUARTER-BENDS. CONDUIT BEND SHALL BE MADE WITH THE UL LISTED BENDER OR FACTORY 90 DEGREE ELBOWS MAY BE USED.
6. FIELD FABRICATED CONDUITS SHALL BE CUT SQUARE WITH A CONDUIT CUTTING TOOL AND REAMED TO PROVIDE A SMOOTH INSIDE SURFACE.
7. PROVIDE INSULATED GROUNDING BUSHING FOR ALL CONDUITS.
8. CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL CONDUITS DURING CONSTRUCTION. TEMPORARY OPENINGS IN THE CONDUIT SYSTEM SHALL BE PLUGGED OR CAPPED TO PREVENT ENTRANCE OF MOISTURE OR FOREIGN MATTER. CONTRACTOR SHALL REPLACE ANY CONDUITS CONTAINING FOREIGN MATERIALS THAT CANNOT BE REMOVED.
9. ALL CONDUITS SHALL BE SWABBED CLEAN BY PULLING AN APPROPRIATE SIZE MANDREL THROUGH THE CONDUIT BEFORE INSTALLATION OF CONDUCTORS OR CABLES. CONDUIT SHALL BE FREE OF DIRT AND DEBRIS.
10. INSTALL PULL STRINGS IN ALL CLEAN EMPTY CONDUITS. IDENTIFY PULL STRINGS AT EACH END.
11. INSTALL 2" HIGHLY VISIBLE AND DETECTABLE TAPE 12" ABOVE ALL UNDERGROUND CONDUITS AND CONDUCTORS.
12. CONDUITS SHALL BE INSTALLED IN SUCH A MANNER AS TO INSURE AGAINST COLLECTION OF TRAPPED CONDENSATION.
13. PROVIDE CORE DRILLING AS NECESSARY FOR PENETRATIONS TO ALLOW FOR RACEWAYS AND CABLES TO BE ROUTED THROUGH THE BUILDING. DO NOT PENETRATE STRUCTURAL MEMBERS. SLEEVES AND/OR PENETRATIONS IN FIRE RATED CONSTRUCTION SHALL BE EFFECTIVELY SEALED WITH FIRE RATED MATERIAL WHICH SHALL MAINTAIN THE FIRE RATING OF THE WALL OR STRUCTURE. FIRE STOPS AT FLOOR PENETRATIONS SHALL PREVENT PASSAGE OF WATER, SMOKE, FIRE, AND FUMES. ALL MATERIAL SHALL BE UL APPROVED FOR THIS PURPOSE.

B. CONDUCTORS AND CABLE:

1. ALL POWER WIRING SHALL BE COLOR CODED AS FOLLOWS:

DESCRIPTION	208/240/120 VOLT SYSTEMS
PHASE A	BLACK
PHASE B	RED
PHASE C	BLUE
NEUTRAL	WHITE
GROUNDING	GREEN

2. SPLICES SHALL BE MADE ONLY AT OUTLETS, JUNCTION BOXES, OR ACCESSIBLE RACEWAY CONDUITS APPROVED FOR THIS PURPOSE.
3. PULLING LUBRICANTS SHALL BE UL APPROVED. CONTRACTOR SHALL USE NYLON OR HEMP ROPE FOR PULLING CONDUCTOR OR CABLES INTO THE CONDUIT.
4. CABLES SHALL BE NEATLY TRAINED, WITHOUT INTERLACING, AND BE OF SUFFICIENT LENGTH IN ALL BOXES & EQUIPMENT TO PERMIT MAKING A NEAT ARRANGEMENT. CABLES SHALL BE SECURED IN A MANNER TO AVOID TENSION ON CONDUCTORS OR TERMINALS. CONDUCTORS SHALL BE PROTECTED FROM MECHANICAL INJURY AND MOISTURE. SHARP BENDS OVER CONDUIT BUSHINGS IS PROHIBITED. DAMAGED CABLES SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE.

C. DISCONNECT SWITCHES:

1. INSTALL DISCONNECT SWITCHES LEVEL AND PLUMB. CONNECT TO WIRING SYSTEM AND GROUNDING SYSTEM AS INDICATED.

D. GROUNDING:

1. ALL METALLIC PARTS OF ELECTRICAL EQUIPMENT WHICH DO NOT CARRY CURRENT SHALL BE GROUNDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE BUILDING MANUFACTURER, AT&T GROUNDING AND BONDING STANDARDS TP-76416, ND-00135, AND THE NATIONAL ELECTRICAL CODE.
2. PROVIDE ELECTRICAL GROUNDING AND BONDING SYSTEM INDICATED WITH ASSEMBLY OF MATERIALS, INCLUDING GROUNDING ELECTRODES, BONDING JUMPERS AND ADDITIONAL ACCESSORIES AS REQUIRED FOR A COMPLETE INSTALLATION.
3. ALL GROUNDING CONDUCTORS SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND WITH GRADUAL BEND AS REQUIRED. GROUNDING CONDUCTORS SHALL NOT BE LOOPED OR SHARPLY BENT. ROUTE GROUNDING CONNECTIONS AND CONDUCTORS TO GROUND IN THE SHORTEST AND STRAIGHTEST PATHS POSSIBLE TO MINIMIZE TRANSIENT VOLTAGE RISES.
4. BUILDINGS AND/OR NEW TOWERS GREATER THAN 75 FEET IN HEIGHT AND WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 AWG COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY). SEE STANDARD 6.3.2.2.
5. TIGHTEN GROUNDING AND BONDING CONNECTORS, INCLUDING SCREWS AND BOLTS, IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED TORQUE TIGHTENING VALUES FOR CONNECTORS AND BOLTS. WHERE MANUFACTURER'S TORQUING REQUIREMENTS ARE NOT AVAILABLE, TIGHTEN CONNECTIONS TO COMPLY WITH TIGHTENING TORQUE VALUES SPECIFIED IN UL TO ASSURE PERMANENT AND EFFECTIVE GROUNDING.
6. CONTRACTOR SHALL VERIFY THE LOCATIONS OF GROUNDING TIE-IN-POINTS TO THE EXISTING GROUNDING SYSTEM. ALL UNDERGROUND GROUNDING CONNECTIONS SHALL BE MADE BY THE EXOTHERMIC WELD PROCESS AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
7. ALL GROUNDING CONNECTIONS SHALL BE INSPECTED FOR TIGHTNESS. EXOTHERMIC WELDED CONNECTIONS SHALL BE APPROVED BY THE INSPECTOR HAVING JURISDICTION BEFORE BEING PERMANENTLY CONCEALED.
8. APPLY CORROSION-RESISTANT FINISH TO FIELD CONNECTIONS AND PLACES WHERE FACTORY APPLIED PROTECTIVE COATINGS HAVE BEEN DESTROYED. USE KOPR-SHIELD ANTI-OXIDATION COMPOUND ON ALL COMPRESSION GROUNDING CONNECTIONS.
9. A SEPARATE, CONTINUOUS, INSULATED EQUIPMENT GROUNDING CONDUCTOR SHALL BE INSTALLED IN ALL FEEDER AND BRANCH CIRCUITS.
10. BOND ALL INSULATED GROUNDING BUSHINGS WITH A BARE #6 AWG GROUNDING CONDUCTOR TO A GROUND BUS.
11. DIRECT BURIED GROUNDING CONDUCTORS SHALL BE INSTALLED AT A NOMINAL DEPTH OF 36" MINIMUM BELOW GRADE, OR 6" BELOW THE FROST LINE, USE THE GREATER OF THE TWO DISTANCES.
12. ALL GROUNDING CONDUCTORS EMBEDDED IN OR PENETRATING CONCRETE SHALL BE INSTALLED IN SCHEDULE 40 PVC CONDUIT.
13. THE INSTALLATION OF CHEMICAL ELECTROLYTIC GROUNDING SYSTEM IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. REMOVE SEALING TAPE FROM LEACHING AND BREATHER HOLES. INSTALL PROTECTIVE BOX FLUSH WITH GRADE.
14. DRIVE GROUND RODS UNTIL TOPS ARE A MINIMUM DISTANCE OF 36" DEPTH OR 6" BELOW FROST LINE, USING THE GREATER OF THE TWO DISTANCES.
15. IF COAX ON THE ICE BRIDGE IS MORE THAN 6 FT. FROM THE GROUNDING BAR AT THE BASE OF THE TOWER, A SECOND GROUNDING BAR WILL BE NEEDED AT THE END OF THE ICE BRIDGE, TO GROUND THE COAX CABLE GROUNDING KITS AND IN-LINE ARRESTORS.
16. CONTRACTOR SHALL REPAIR, AND/OR REPLACE, EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTORS EXPENSE.

3.5 ACCEPTANCE TESTING:

A. CERTIFIED PERSONNEL USING CERTIFIED EQUIPMENT SHALL PERFORM REQUIRED TESTS AND SUBMIT WRITTEN TEST REPORTS UPON COMPLETION.

B. WHEN MATERIAL AND/OR WORKMANSHIP IS FOUND NOT TO COMPLY WITH THE SPECIFIED REQUIREMENTS, THE NON-COMPLYING ITEMS SHALL BE REMOVED FROM THE PROJECT SITE AND REPLACED WITH ITEMS COMPLYING WITH THE SPECIFIED REQUIREMENTS PROMPTLY AFTER RECEIPT OF NOTICE FOR NON-COMPLIANCE.

C. TEST PROCEDURES:

1. ALL FEEDERS SHALL HAVE INSULATION TESTED AFTER INSTALLATION, BEFORE CONNECTION TO DEVICES. THE CONDUCTORS SHALL TEST FREE FROM SHORT CIRCUITS AND GROUNDS. TESTING SHALL BE FOR ONE MINUTE USING 1000V DC. PROVIDE WRITTEN DOCUMENTATION FOR ALL TEST RESULTS.
2. PRIOR TO ENERGIZING CIRCUITRY, TEST WIRING DEVICES FOR ELECTRICAL CONTINUITY AND PROPER POLARITY CONNECTIONS.
3. MEASURE AND RECORD VOLTAGES BETWEEN PHASES AND BETWEEN PHASE CONDUCTORS AND NEUTRALS. SUBMIT A REPORT OF MAXIMUM AND MINIMUM VOLTAGES.
4. PERFORM GROUNDING TEST TO MEASURE GROUNDING RESISTANCE OF GROUNDING SYSTEM USING THE IEEE STANDARD 3-POINT "FALL-OF-POTENTIAL" METHOD. PROVIDE PLOTTED TEST VALUES AND LOCATION SKETCH. NOTIFY THE ENGINEER IMMEDIATELY IF MEASURED VALUE IS OVER 5 OHMS.

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443.230.4400x113

CERTIFICATION STATEMENT:
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. 55911 EXP.: 04/14/22

APPROVALS

LANDLORD _____

LEASING _____

R.F. _____

ZONING _____

CONSTRUCTION _____

A & E _____

PROJECT NO: EP4TURWL

DRAWN BY: RM

CHECKED BY: LW

SUBMITTALS

1	09/25/20	JX COMMENTS
0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

GENERAL NOTES II

GN-2

ANTENNA MOUNTING

1. DESIGN AND CONSTRUCTION OF ANTENNA SUPPORTS SHALL CONFORM TO CURRENT ANSI/TIA-222 OR APPLICABLE LOCAL CODES.
2. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS NOTED OTHERWISE.
3. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS NOTED OTHERWISE.
4. DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY COLD GALVANIZING IN ACCORDANCE WITH ASTM A780.
5. ALL ANTENNA MOUNTS SHALL BE INSTALLED WITH LOCK NUTS, DOUBLE NUTS AND SHALL BE TORQUED TO MANUFACTURER'S RECOMMENDATIONS.
6. CONTRACTOR SHALL INSTALL ANTENNA PER MANUFACTURER'S RECOMMENDATION FOR INSTALLATION AND GROUNDING.
7. ALL UNUSED PORTS ON ANY ANTENNAS SHALL BE TERMINATED WITH A 50-OHM LOAD TO ENSURE ANTENNAS PERFORM AS DESIGNED.
8. PRIOR TO SETTING ANTENNA AZIMUTHS AND DOWNTILTS, ANTENNA CONTRACTOR SHALL CHECK THE ANTENNA MOUNT FOR TIGHTNESS AND ENSURE THAT THEY ARE PLUMB. ANTENNA AZIMUTHS SHALL BE SET FROM TRUE NORTH AND BE ORIENTED WITHIN +/- 5% AS DEFINED BY THE RFDS. ANTENNA DOWNTILTS SHALL BE WITHIN +/- 0.5% AS DEFINED BY THE RFDS. REFER TO ND-00246.
9. JUMPERS FROM THE TMA'S MUST TERMINATE TO OPPOSITE POLARIZATION'S IN EACH SECTOR.
10. CONTRACTOR SHALL RECORD THE SERIAL #, SECTOR, AND POSITION OF EACH ACTUATOR INSTALLED AT THE ANTENNAS AND PROVIDE THE INFORMATION TO AT&T.
11. TMA'S SHALL BE MOUNTED ON PIPE DIRECTLY BEHIND ANTENNAS AS CLOSE TO ANTENNA AS FEASIBLE IN A VERTICAL POSITION.

TORQUE REQUIREMENTS

12. ALL RF CONNECTIONS SHALL BE TIGHTENED BY A TORQUE WRENCH.
13. ALL RF CONNECTIONS, GROUNDING HARDWARE AND ANTENNA HARDWARE SHALL HAVE A TORQUE MARK INSTALLED IN A CONTINUOUS STRAIGHT LINE FROM BOTH SIDES OF THE CONNECTION.
    A. RF CONNECTION BOTH SIDES OF THE CONNECTOR.
    B. GROUNDING AND ANTENNA HARDWARE ON THE NUT SIDE STARTING FROM THE THREADS TO THE SOLID SURFACE. EXAMPLE OF SOLID SURFACE: GROUND BAR, ANTENNA BRACKET METAL.
    C. ALL 8M ANTENNA HARDWARE SHALL BE TIGHTENED TO 9 LB-FT (12 NM).
14. ALL 12M ANTENNA HARDWARE SHALL BE TIGHTENED TO 43 LB-FT (58 NM).
15. ALL GROUNDING HARDWARE SHALL BE TIGHTENED UNTIL THE LOCK WASHER COLLAPSES AND THE GROUNDING HARDWARE IS NO LONGER LOOSE.
16. ALL DIN TYPE CONNECTIONS SHALL BE TIGHTENED TO 18-22 LB-FT (24.4 - 29.8 NM).
17. ALL N TYPE CONNECTIONS SHALL BE TIGHTENED TO 15-20 LB-IN (1.7 - 2.3 NM).

FIBER & POWER CABLE MOUNTING

18. THE FIBER OPTIC TRUNK CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY. WHEN INSTALLING FIBER OPTIC TRUNK CABLES INTO A CABLE TRAY SYSTEM, THEY SHALL BE INSTALLED INTO AN INTER DUCT AND A PARTITION BARRIER SHALL BE INSTALLED BETWEEN THE 600 VOLT CABLES AND THE INTER DUCT IN ORDER TO SEGREGATE CABLE TYPES. OPTIC FIBER TRUNK CABLES SHALL HAVE APPROVED CABLE RESTRAINTS EVERY (60) SIXTY FEET AND SECURELY FASTENED TO THE CABLE TRAY SYSTEM. NFPA 70 (NEC) ARTICLE 770 RULES SHALL APPLY.
19. THE TYPE TC-ER CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY AND SHALL BE SECURED AT INTERVALS NOT EXCEEDING (6) SIX FEET. AN EXCEPTION; WHERE TYPE TC-ER CABLES ARE NOT SUBJECT TO PHYSICAL DAMAGE, CABLES SHALL BE PERMITTED TO MAKE A TRANSITION BETWEEN CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY WHICH ARE SERVING UTILIZATION EQUIPMENT OR DEVICES, A DISTANCE (6) SIX FEET SHALL NOT BE EXCEEDED WITHOUT CONTINUOUS SUPPORTING. NFPA 70 (NEC) ARTICLES 336 AND 392 RULES SHALL APPLY.
20. WHEN INSTALLING OPTIC FIBER TRUNK CABLES OR TYPE TC-ER CABLES INTO CONDUITS, NFPA 70 (NEC) ARTICLE 300 RULES SHALL APPLY.

COAXIAL CABLE NOTES

21. TYPES AND SIZES OF THE ANTENNA CABLE ARE BASED ON ESTIMATED LENGTHS. PRIOR TO ORDERING CABLE, CONTRACTOR SHALL VERIFY ACTUAL LENGTH BASED ON CONSTRUCTION LAYOUT AND NOTIFY THE PROJECT MANAGER IF ACTUAL LENGTHS EXCEED ESTIMATED LENGTHS.
22. CONTRACTOR SHALL VERIFY THE DOWN-TILT OF EACH ANTENNA WITH A DIGITAL LEVEL.
23. CONTRACTOR SHALL CONFIRM COAX COLOR CODING PRIOR TO CONSTRUCTION. REFER TO "ANTENNA SYSTEM LABELING STANDARD" ND-00027 LATEST VERSION.
24. ALL JUMPERS TO THE ANTENNAS FROM THE MAIN TRANSMISSION LINE SHALL BE 1/2" DIA. LDF AND SHALL NOT EXCEED 6'-0".
25. ALL COAXIAL CABLE SHALL BE SECURED TO THE DESIGNED SUPPORT STRUCTURE, IN AN APPROVED MANNER, AT DISTANCES NOT TO EXCEED 4'-0" O.C.
26. CONTRACTOR SHALL FOLLOW ALL MANUFACTURER'S RECOMMENDATIONS REGARDING BOTH THE INSTALLATION AND GROUNDING OF ALL COAXIAL CABLES, CONNECTORS, ANTENNAS, AND ALL OTHER EQUIPMENT.
27. CONTRACTOR SHALL WEATHERPROOF ALL ANTENNA CONNECTORS WITH SELF AMALGAMATING TAPE. WEATHERPROOFING SHALL BE COMPLETED IN STRICT ACCORDANCE WITH AT&T STANDARDS.
28. CONTRACTOR SHALL GROUND ALL EQUIPMENT. INCLUDING ANTENNAS, RET MOTORS, TMA'S, COAX CABLES, AND RET CONTROL CABLES AS A COMPLETE SYSTEM. GROUNDING SHALL BE EXECUTED BY QUALIFIED WIREMEN IN COMPLIANCE WITH MANUFACTURER'S SPECIFICATION AND RECOMMENDATION.
29. CONTRACTOR SHALL PROVIDE STRAIN-RELIEF AND CABLE SUPPORTS FOR ALL CABLE ASSEMBLIES, COAX CABLES, AND RET CONTROL CABLES. CABLE STRAIN-RELIEFS AND CABLE SUPPORTS SHALL BE APPROVED FOR THE PURPOSE. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
30. CONTRACTOR TO VERIFY THAT EXISTING COAX HANGERS ARE STACKABLE SNAP IN HANGERS. IF EXISTING HANGERS ARE NOT STACKABLE SNAP IN HANGERS THE CONTRACTOR SHALL REPLACE EXISTING HANGERS WITH NEW SNAP IN HANGERS IF APPLICABLE.

GENERAL CABLE AND EQUIPMENT NOTES

31. CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY ANTENNA, TMAS, DIPLEXERS, AND COAX CONFIGURATION, MAKE AND MODELS PRIOR TO INSTALLATION.
32. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S RECOMMENDATIONS.
33. CONTRACTOR SHALL REFERENCE THE TOWER STRUCTURAL ANALYSIS/DESIGN DRAWINGS FOR DIRECTIONS ON CABLE DISTRIBUTION/ROUTING.
34. ALL OUTDOOR RF CONNECTORS/CONNECTIONS SHALL BE WEATHERPROOFED, EXCEPT THE RET CONNECTORS, USING BUTYL TAPE AFTER INSTALLATION AND FINAL CONNECTIONS ARE MADE. BUTYL TAPE SHALL HAVE A MINIMUM OF ONE-HALF TAPE WIDTH OVERLAP ON EACH TURN AND EACH LAYER SHALL BE WRAPPED THREE TIMES. WEATHERPROOFING SHALL BE SMOOTH WITHOUT BUCKLING. BUTYL BLEEDING IS NOT ALLOWED.
35. IF REQUIRED TO PAINT ANTENNAS AND/OR COAX:
    A. TEMPERATURE SHALL BE ABOVE 50° F.
    B. PAINT COLOR MUST BE APPROVED BY BUILDING OWNER/LANDLORD.
    C. FOR REGULATED TOWERS, FAA/FCC APPROVED PAINT IS REQUIRED.
    D. DO NOT PAINT OVER COLOR CODING OR ON EQUIPMENT MODEL NUMBERS.
36. ALL CABLES SHALL BE GROUNDED WITH COAXIAL CABLE GROUND KITS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.
    A. GROUNDING AT THE ANTENNA LEVEL.
    B. GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200'-0", ADDITIONAL CABLE GROUNDING REQUIRED.
    C. GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
    D. GROUNDING OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
    E. GROUNDING INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.
37. ALL PROPOSED GROUND BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUND.
38. BAR DOWNLEADS A MINIMUM DISTANCE OF 4'-0" BELOW GROUND BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.
39. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ANTENNA AND THE COAX CONFIGURATION IS THE CORRECT MAKE AND MODELS, PRIOR TO INSTALLATION.
40. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S SPECIFICATION & RECOMMENDATIONS.
41. ANTENNA CONTRACTOR SHALL FURNISH AND INSTALL A 12'-0" T-BOOM SECTOR ANTENNA MOUNT, IF APPLICABLE, INCLUDING ALL HARDWARE.

GROUNDING NOTES

42. GROUNDING IS SHOWN DIAGRAMMATICALLY ONLY.
43. CONTRACTOR SHALL GROUND ALL EQUIPMENT AS A COMPLETE SYSTEM. GROUNDING SHALL BE IN COMPLIANCE WITH NEC SECTION 250 AND AT&T GROUNDING AND BONDING REQUIREMENTS (ATT-TP-76416) AND MANUFACTURER'S SPECIFICATIONS.
44. ALL GROUND CONDUCTORS SHALL BE COPPER; NO ALUMINUM CONDUCTORS SHALL BE USED.
45. ALL CABLES SHALL BE GROUNDED WITH COAXIAL CABLE GROUNDING KITS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.
    A. GROUNDING AT THE ANTENNA LEVEL.
    B. GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200', ADDITIONAL CABLE GROUNDING REQUIRED.
    C. GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
    D. GROUNDING OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
    E. GROUNDING INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.
46. ALL PROPOSED GROUNDING BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUNDING BAR DOWNLEADS A MINIMUM DISTANCE OF 4'-0" BELOW GROUNDING BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.

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

EXOTHERMIC CONNECTION
MECHANICAL CONNECTION
CHEMICAL ELECTROLYTIC GROUNDING SYSTEM
TEST CHEMICAL ELECTROLYTIC GROUNDING SYSTEM (T)
EXOTHERMIC WITH INSPECTION SLEEVE
GROUNDING BAR
SHELTER GROUNDING BAR
GROUND ROD
TEST GROUND ROD WITH INSPECTION SLEEVE (T)
SINGLE POLE SWITCH ($)
DUPLEX RECEPTACLE
DUPLEX GFCI RECEPTACLE (GFCI)
FLUORESCENT LIGHTING FIXTURE (F)
(2) TWO LAMPS 48-T8
EXISTING SMOKE DETECTION (DC) (SD)
EXISTING EMERGENCY LIGHTING (DC)
SECURITY LIGHT W/PHOTOCELL LITHONIA ALXW LED-1-25A400/51K-SR4-120-PE-DDBTXD
EXISTING UTILITY POLE
EXISTING CHAIN LINK FENCE
EXISTING WOOD/WROUGHT IRON FENCE
EXISTING WALL STRUCTURE
LEASE AREA
PROPERTY LINE (PL)
SETBACKS
PROPOSED/EXISTING ICE BRIDGE
PROPOSED/EXISTING CABLE TRAY
EXISTING WATER LINE (W)
PROPOSED UNDERGROUND POWER (P)
PROPOSED UNDERGROUND TELCO (T)
PROPOSED OVERHEAD UTILITIES (O/H)

CALLOUT REFERENCE (X)
REVISION REFERENCE (1)
WORKPOINT (W.P.)
SECTION REFERENCE (XX / X-X)
DETAIL REFERENCE (XX / X-X)
ELEVATION REFERENCE (X / X)

at&t
7150 STANDARD DR
SUITE A
HANOVER, MD 21076

Jacobs
Challenging today.
Reinventing tomorrow.
Jacobs Telecommunications, Inc.
7150 STANDARD DR. SUITE B
HANOVER, MD 21076
443.230.4400x113

CERTIFICATION STATEMENT:
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. 55911 EXP.: 04/14/22

APPROVALS

LANDLORD _____
LEASING _____
R.F. _____
ZONING _____
CONSTRUCTION _____
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PROJECT NO: EP4TURWL

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SUBMITTALS

1	09/25/20	JX COMMENTS
0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

GENERAL NOTES III

GN-3

App No: 2020071227

Revised 11.4.20 - JE

Application General Infomation

Applicant Name	Jacobs	Updated	8/8/2020
Application Type	Minor Modification	Ann. Plan?	Yes
Carrier	AT&T Wireless	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. AT&T is removing (6) existing antennas and (6) RRH. They are adding (6) new antennas and (9) new RRHs on existing rooftop wireless structure.

Site Infomation

Site Id	154	Zoning	CR-3.0
Structure Type	Building	Latitude	38.98032
Address	7101 Wisconsin Ave, Bethesda	Longitude	-77.091811
County Site Name	Continental Plaza	Ground Elevation	346
Carrier Site Name	Strathmore	City	Bethesda
Site Owner	7101 Wisconsin Owner LLC	Lease Status	Leased
Structure Owner	7101 Wisconsin Owner LLC	Does the structure require an antenna structure registration under FCC Title 47	No
Existing Structure Height	163		
Provide the proposed height of the replacement structure without any antenna (New, Replacement Apps Only)		Distance to Residential Property (New, Replacement, Colocation Only)	
		Distance to Commercial Property (New, Replacement, Colocation Only)	

Justification of why this site was selected:

The site is needed to provide coverage within the surrounding Bethesda, MD area. AT&T selected this site due to their existing wireless facility. By selecting this location, AT&T can address the demands for their telecommunications service in Montgomery C

NearbySites (New, Replacement Apps Only):

App No: 2020071227

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

Monday, August 10, 2020

7:31:46 AM

App No: 2020071227

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? N/A

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? N/A

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? N/A

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? N/A

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: 9.16

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

Monday, August 10, 2020

7:31:46 AM

App No: 2020071227

Antenna Infomation

Antenna Compliance	Yes Compli
ance Desc	
Antenna Location	Yes
Antenna Loc. Desc.	
Env. Assessment	
Cat. Excluded?	
Routine Env. Evaluation. Checked	

Antenna Model	Commscope NNHH—65C-R4						
Frequency	700/850/1900/2100 and 2300MHz						
RAD Center	163	Max ERP	7330	Antenna Dimensions	95.984”H 19.606”W 7.7	Quantity	6

Band 25: DL 1930–1995MHz, UL 1850–1915MHz
Band 66: DL 2110–2200MHz, UL 1710–1780MHz

Monday, August 10, 2020

7:31:46 AM

Beiro, Alex

From: Arshia Malik <Arshia.Malik@bdnreit.com>
Sent: Thursday, March 9, 2017 9:00 AM
To: Capaci, Andrew; John McKenzie
Cc: Tony Eastridge
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Andrew,

The chief engineer has no problem with that.

Thank you,

Arshia Malik, MBA, LEED GA
Assistant Property Manager
Brandywine Realty Trust
1010 Wayne Avenue, Suite 200
Silver Spring, MD 20910
T: 240-821-1484
www.brandywinerealty.com

From: Capaci, Andrew [mailto:Andrew.Capaci@jacobs.com]
Sent: Thursday, March 09, 2017 8:59 AM
To: John McKenzie <John.McKenzie@bdnreit.com>
Cc: Arshia Malik <Arshia.Malik@bdnreit.com>; Tony Eastridge <Tony.Eastridge@bdnreit.com>
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Good morning, John!

Let us know if the pictures we sent on 3/2 are acceptable.

Thank you!

From: Capaci, Andrew
Sent: Thursday, March 02, 2017 1:47 PM
To: 'John McKenzie'
Cc: Arshia Malik; Tony Eastridge
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

John,

Here are photos of the existing hole in the alpha sector. The new one will be placed right by this one.

From: John McKenzie [mailto:John.McKenzie@bdnreit.com]
Sent: Thursday, March 02, 2017 1:41 PM
To: Capaci, Andrew
Cc: Arshia Malik; Tony Eastridge
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Andrew,

You'll need to provide us with a specific location of the penetration for us to review.

Thank you.

John McKenzie, Group Chief Engineer

Brandywine Realty Trust

1010 Wayne Avenue, Suite 200

Silver Spring, MD 20910

T: 240-821-1516

www.brandywinerealty.com

From: Capaci, Andrew [mailto:Andrew.Capaci@jacobs.com]
Sent: Thursday, March 02, 2017 12:38 PM
To: Arshia Malik <Arshia.Malik@bdnreit.com>; Tony Eastridge <Tony.Eastridge@bdnreit.com>
Cc: John McKenzie <John.McKenzie@bdnreit.com>
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Arshia,

I consulted with our construction team to be 100% certain and they said they will need to drill a small hole (2" max) in the screen wall in the alpha sector. It is a corrugated open metal screen wall.

Please advise.

Thanks!

From: Capaci, Andrew
Sent: Wednesday, March 01, 2017 2:11 PM
To: 'Arshia Malik'; Tony Eastridge
Cc: John McKenzie
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Thank you! Penetrations should not be necessary here.

We will reach out to coordinate construction when the time comes.

Thanks!

From: Arshia Malik [mailto:Arshia.Malik@bdnreit.com]
Sent: Wednesday, March 01, 2017 12:42 PM
To: Capaci, Andrew; Tony Eastridge
Cc: John McKenzie
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Good afternoon Andrew,

Sorry for the delay. We have reviewed the drawings and foresee no problem with them. One thing we do need to make sure is addressed and followed, if there will be any penetrations (none were mentioned on the drawing), they will have to be reviewed and approved by landlord before moving forward.

Thank you,

Arshia Malik, MBA, LEED GA
Assistant Property Manager
Brandywine Realty Trust
1010 Wayne Avenue, Suite 200
Silver Spring, MD 20910
T: 240-821-1484
www.brandywinerealty.com

From: Capaci, Andrew [mailto:Andrew.Capaci@jacobs.com]
Sent: Tuesday, February 28, 2017 8:42 AM
To: Arshia Malik <Arshia.Malik@bdnreit.com>; Tony Eastridge <Tony.Eastridge@bdnreit.com>
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Good morning Arshia and Tony!

Please advise on the status of the plan review. They were sent over on 2/1 and we have yet to hear back. Can you please jump in and help us out?

From: Capaci, Andrew
Sent: Monday, February 20, 2017 9:27 AM
To: 'Arshia Malik'; 'Tony Eastridge'
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Good morning!

I just wanted to check in and see if you could provide a timeline on the plan review here.

Thanks and have a great day!

From: Capaci, Andrew
Sent: Monday, February 13, 2017 9:52 AM
To: 'Arshia Malik'; Tony Eastridge
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Good morning, Arshia!

Would you please be able to provide a timeline on the plan review? If there are any questions let me know.

Thank you!

From: Arshia Malik [mailto:Arshia.Malik@bdnreit.com]
Sent: Thursday, February 09, 2017 3:58 PM
To: Capaci, Andrew; Tony Eastridge
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Andrew, we will review it and if we are able to fill it out, we will.

Thank you,
Arshia.

From: Capaci, Andrew [mailto:Andrew.Capaci@jacobs.com]
Sent: Monday, February 06, 2017 4:50 PM
To: Arshia Malik <Arshia.Malik@bdnreit.com>; Tony Eastridge <Tony.Eastridge@bdnreit.com>
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Thank you for your reply. Will you be able to fill out the attached form as well? We will need it to proceed with our compliance review.

Thank you!

From: Arshia Malik [mailto:Arshia.Malik@bdnreit.com]
Sent: Monday, February 06, 2017 1:31 PM
To: Capaci, Andrew; Tony Eastridge
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Good afternoon Andrew,

Sorry for the delay. We did receive it, will let you know if there are any concerns.

Thank you,

Arshia Malik, MBA, LEED GA
Assistant Property Manager
Brandywine Realty Trust
1010 Wayne Avenue, Suite 200
Silver Spring, MD 20910
T: 240-821-1484
www.brandywinerealty.com

From: Capaci, Andrew [mailto:Andrew.Capaci@jacobs.com]
Sent: Monday, February 06, 2017 11:58 AM
To: Arshia Malik <Arshia.Malik@bdnreit.com>; Tony Eastridge <Tony.Eastridge@bdnreit.com>
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Good morning! Happy Monday.

I just wanted to reach out and confirm you received our plans. Please let me know if you need anything from me.

Thanks!

From: Capaci, Andrew
Sent: Wednesday, February 01, 2017 3:32 PM

To: 'arshia.malik@bdnreit.com'; 'tony.eastridge@bdnreit.com'
Subject: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Arshia,

Per our phone conversation, please find the attached construction plans and consent letter to review, execute, and return.

Please don't hesitate to reach out for anything you may need from me. Thank you!

Andrew Capaci | JACOBS | 570.262.5601 mobile | andrew.capaci@jacobs.com | www.jacobs.com

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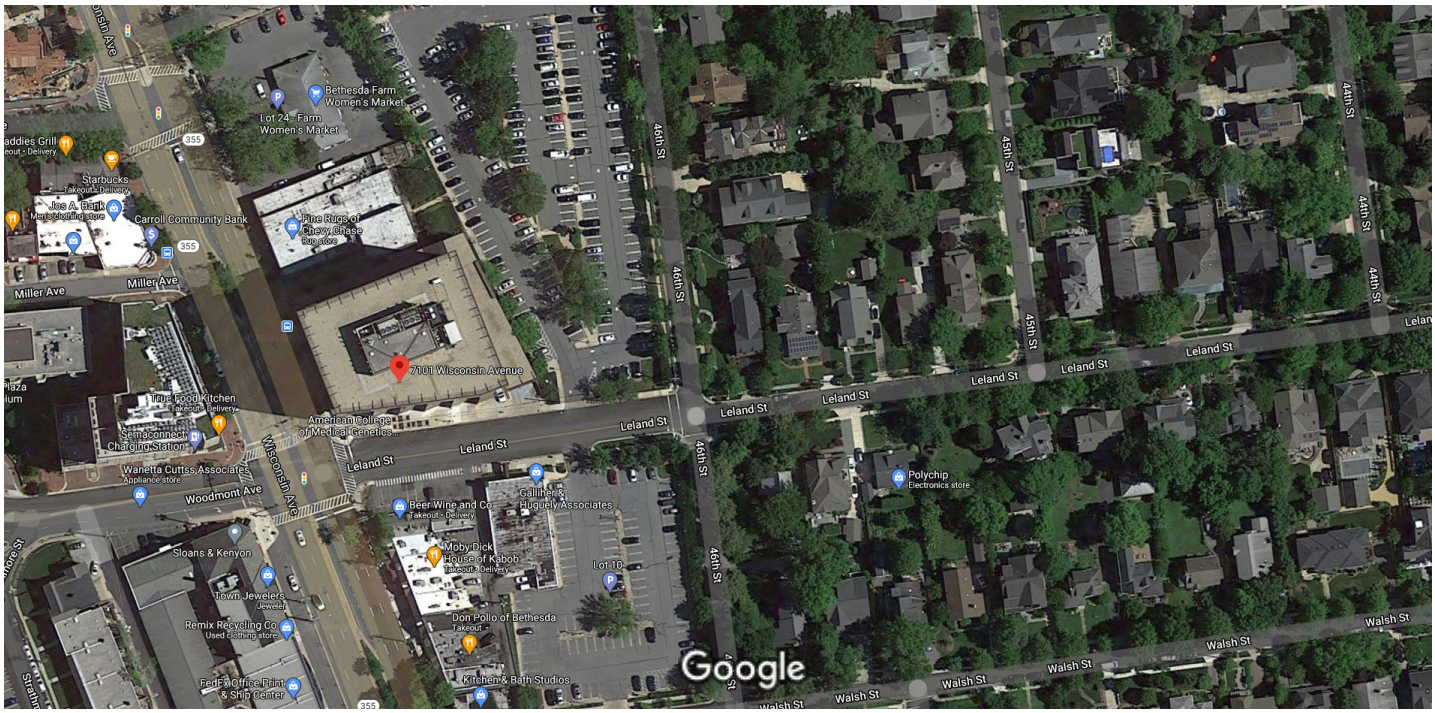
7101 Wisconsin Ave

AT&T site=Strathmore



50 ft

SITESAFE
RF COMPLIANCE EXPERTS

8618 Westwood Center Drive, Suite 315, Vienna, VA 22182
703.276.1100 ● 703.276.1169 fax
info@sitesafe.com ● www.sitesafe.com

Jacobs on behalf of AT&T Mobility, LLC Site FA – 10096268 USID – 16252 Site Name – STRATHMOORE (2251A0T8EQ)

7101 Wisconsin Avenue
Bethesda, MD 20814

Latitude: N38-58-49.73
Longitude: W77-05-29.81
Structure Type: Rooftop

Report generated date: May 14, 2020
Report by: Leo Romero
Customer Contact: Justin Bridges

AT&T Mobility, LLC is compliant based on the FCC Rules and Regulations.

Table of Contents

1 General Site Summary

1.1 Report Summary

AT&T Mobility, LLC	Summary
Max Cumulative Simulated RFE Level on the Rooftop	93.0% General Public Limit 4' behind/next to AT&T Mobility, LLC's Beta Sector Antenna #4
Max Cumulative Simulated RFE Level on the Rooftop Walking Surface	81.0% General Public Limit 50' in front of AT&T Mobility, LLC's Alpha Sector Antenna #2
Max Cumulative Simulated RFE Level on the Ground	<1% General Public Limit
Compliant per FCC Rules and Regulations?	Yes
Compliant per AT&T Mobility, LLC's Policy?	No

The following documents were provided by the client and were utilized to create this report:

RFDS: STRATHMOORE_2020-LTE-Next-Carrier_LTE-6C_ar351y_2251A0T7VA_10096268_16252_11-25-2019_Final-Approved_v1.00

CD's: LTE6C_10096268_AE203_STRATHMOORE_Rev B

RF Powers Used: MAX RRH Powers

1.2 Fall Arrest Anchor Point Summary

Fall Arrest Anchor & Parapet Info	Parapet Available (Y/N)	Parapet Height (inches)	Fall Arrest Anchor Available (Y/N)
Roof Safety Info	Y	4	N

1.3 Signage Summary

a. Pre-Site Visit AT&T Signage (Existing Signage)

AT&T Signage Locations	 Information 1	 Information 2	 Notice	 Notice 2	 Caution	 Caution 2	 Warning	 Warning 2	 Barriers
Access Point(s)	**4**								
Alpha	**1**								
Beta	**1**								
Gamma	**1**								

Note: All existing signage was documented during a previous site visit on 7/5/2017.

b. Proposed AT&T Signage

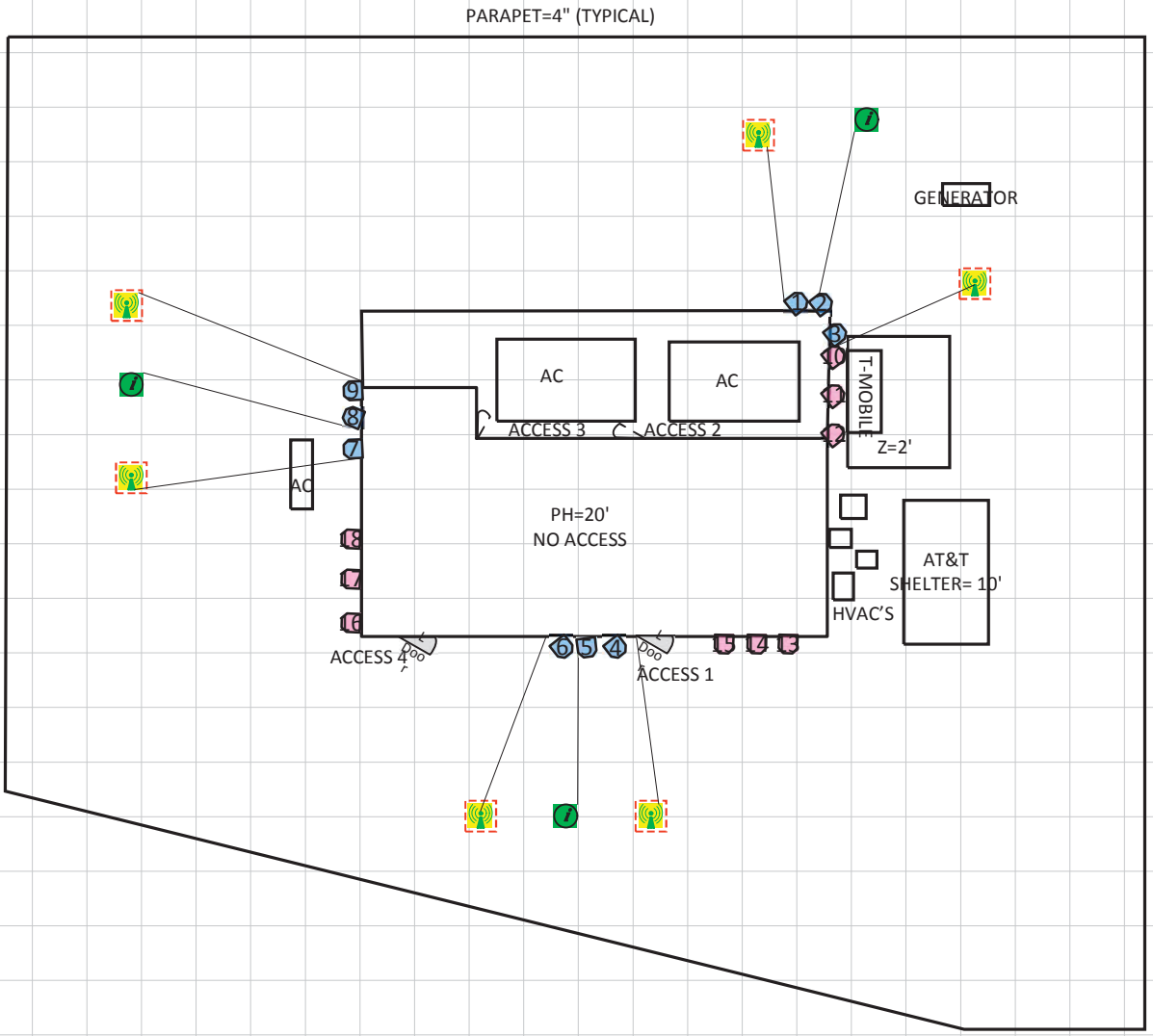
AT&T Signage Locations	 Information 1	 Information 2	 Notice	 Notice 2	 Caution	 Caution 2	 Warning	 Warning 2	 Barriers
Access Point(s)									
Alpha						**2**			
Beta						**2**			
Gamma						**2**			

2 Scale Maps of Site

The following diagrams are included:

- Site Scale Map
- RF Exposure Diagram
- AT&T Mobility, LLC Contribution

Site Scale Map For: STRATHMOORE



(Feet)

0 12.7 25.4

www.sitesafe.com
Site Name:STRATHMOORE
5/14/2020 8:42:15 AM

Carrier Identification

AT&T MOBILITY LLC | VERIZON WIRELESS | T-MOBILE | SPRINT | UNKNOWN CARRIER

Sign Legend

Caution 1 | Caution 2 | Notice 2 | Notice 1 | Warning | Warning 2 | Info 1 | Info 2 | RF Safety Plan

Barrier

Proposed Barriers/ Signs

3 Antenna Inventory

The following antenna inventory was obtained by the customer and was utilized to create the site model diagrams:

Ant ID	Operator	Antenna Make & Model	Type	TX Freq (MHz)	Technology	Az (Deg)	Hor BW (Deg)	Ant Len (ft)	Power	Power Type	Power Unit	Misc Loss	TX Count	Total ERP (Watts)	Ant Gain (dBd)	Z	MDT	EDT
1	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	722	LTE	30	73	8	50	TPO	Watt	0	1	966	12.86	14'	2°	12°
1	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	737	LTE	30	73	8	160	TPO	Watt	0	1	3091.1	12.86	14'	2°	12°
1	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	762	LTE	30	73	8	160	TPO	Watt	0	1	3091.1	12.86	14'	2°	12°
1	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	1900	LTE	30	59	8	160	TPO	Watt	0	1	7016.5	16.42	14'	2°	2°
1	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	2100	LTE	30	61	8	160	TPO	Watt	0	1	7330.3	16.61	14'	2°	5°
2	AT&T MOBILITY LLC	Kathrein-Scala 742-264	Panel	850	UMTS	30	68.4	4.3	40	TPO	Watt	0	1	634	12	15.8'	0°	12°
3	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	850	5G	30	71	8	160	TPO	Watt	0	1	3794.2	13.75	14'	0°	12°
3	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	2300	LTE	30	59	8	100	TPO	Watt	0	1	4775.3	16.79	14'	0°	5°
4	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	722	LTE	120	73	8	50	TPO	Watt	0	1	966	12.86	14'	2°	9°
4	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	737	LTE	120	73	8	160	TPO	Watt	0	1	3091.1	12.86	14'	2°	9°
4	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	763	LTE	120	73	8	160	TPO	Watt	0	1	3091.1	12.86	14'	2°	9°
4	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	1900	LTE	120	59	8	160	TPO	Watt	0	1	7016.5	16.42	14'	2°	2°
4	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	2100	LTE	120	61	8	160	TPO	Watt	0	1	7330.3	16.61	14'	2°	4°
5	AT&T MOBILITY LLC	Kathrein-Scala 742-264	Panel	850	UMTS	150	68.4	4.3	40	TPO	Watt	0	1	634	12	15.8'	0°	6°
6	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	850	5G	120	71	8	160	TPO	Watt	0	1	3794.2	13.75	14'	0°	9°
6	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	2300	LTE	120	59	8	100	TPO	Watt	0	1	4775.3	16.79	14'	0°	4°
7	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	722	LTE	245	73	8	50	TPO	Watt	0	1	966	12.86	14'	2°	12°
7	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	737	LTE	245	73	8	160	TPO	Watt	0	1	3091.1	12.86	14'	2°	12°
7	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	763	LTE	245	73	8	160	TPO	Watt	0	1	3091.1	12.86	14'	2°	12°

Ant ID	Operator	Antenna Make & Model	Type	TX Freq (MHz)	Technology	Az (Deg)	Hor BW (Deg)	Ant Len (ft)	Power	Power Type	Power Unit	Misc Loss	TX Count	Total ERP (Watts)	Ant Gain (dBd)	Z	MDT	EDT
7	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	1900	LTE	245	59	8	160	TPO	Watt	0	1	7016.5	16.42	14'	2°	6°
7	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	2100	LTE	245	61	8	160	TPO	Watt	0	1	7330.3	16.61	14'	2°	6°
8	AT&T MOBILITY LLC	Kathrein-Scala 742-264	Panel	850	UMTS	270	68.4	4.3	40	TPO	Watt	0	1	634	12	15.8'	0°	2°
9	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	850	5G	245	71	8	160	TPO	Watt	0	1	3794.2	13.75	14'	0°	12°
9	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	2300	LTE	245	59	8	100	TPO	Watt	0	1	4775.3	16.79	14'	0°	6°
10	T-MOBILE	Ericsson AIR 21 B2A B4P	Panel	1900		30	65	4.7	120	TPO	Watt	0	0	4132.2	15.37	15.7'	0°	0°
11	T-MOBILE	Andrew LNX-6515DS-VTM	Panel	700		30	65	8	160	TPO	Watt	0	0	4427.1	14.42	12'	0°	0°
12	T-MOBILE	Ericsson AIR 21 B4A B2P	Panel	2100		30	65	4.7	120	TPO	Watt	0	0	4132.2	15.37	15.7'	0°	0°
13	T-MOBILE	Ericsson AIR 21 B2A B4P	Panel	1900		160	65	4.7	120	TPO	Watt	0	0	4132.2	15.37	15.7'	0°	0°
14	T-MOBILE	Andrew LNX-6515DS-VTM	Panel	700		160	65	8	160	TPO	Watt	0	0	4427.1	14.42	12'	0°	0°
15	T-MOBILE	Ericsson AIR 21 B4A B2P	Panel	2100		160	65	4.7	120	TPO	Watt	0	0	4132.2	15.37	15.7'	0°	0°
16	T-MOBILE	Ericsson AIR 21 B2A B4P	Panel	1900		250	65	4.7	120	TPO	Watt	0	0	4132.2	15.37	15.7'	0°	0°
17	T-MOBILE	Andrew LNX-6515DS-VTM	Panel	700		250	65	8	160	TPO	Watt	0	0	4427.1	14.42	12'	0°	0°
18	T-MOBILE	Ericsson AIR 21 B4A B2P	Panel	2100		250	65	4.7	120	TPO	Watt	0	0	4132.2	15.37	15.7'	0°	0°

Note: The Z reference indicates the bottom of the antenna height above the main site level unless otherwise indicated. Effective Radiated Power (ERP) is provided by the operator or based on Sitesafe experience. The values used in the modeling may be greater than are currently deployed. Other operator's equipment, antenna models and powers used for modeling are based on obtained information or Sitesafe experience. Proposed equipment is tagged as *(Proposed)* under *Operator* or *Antenna Make & Model*.

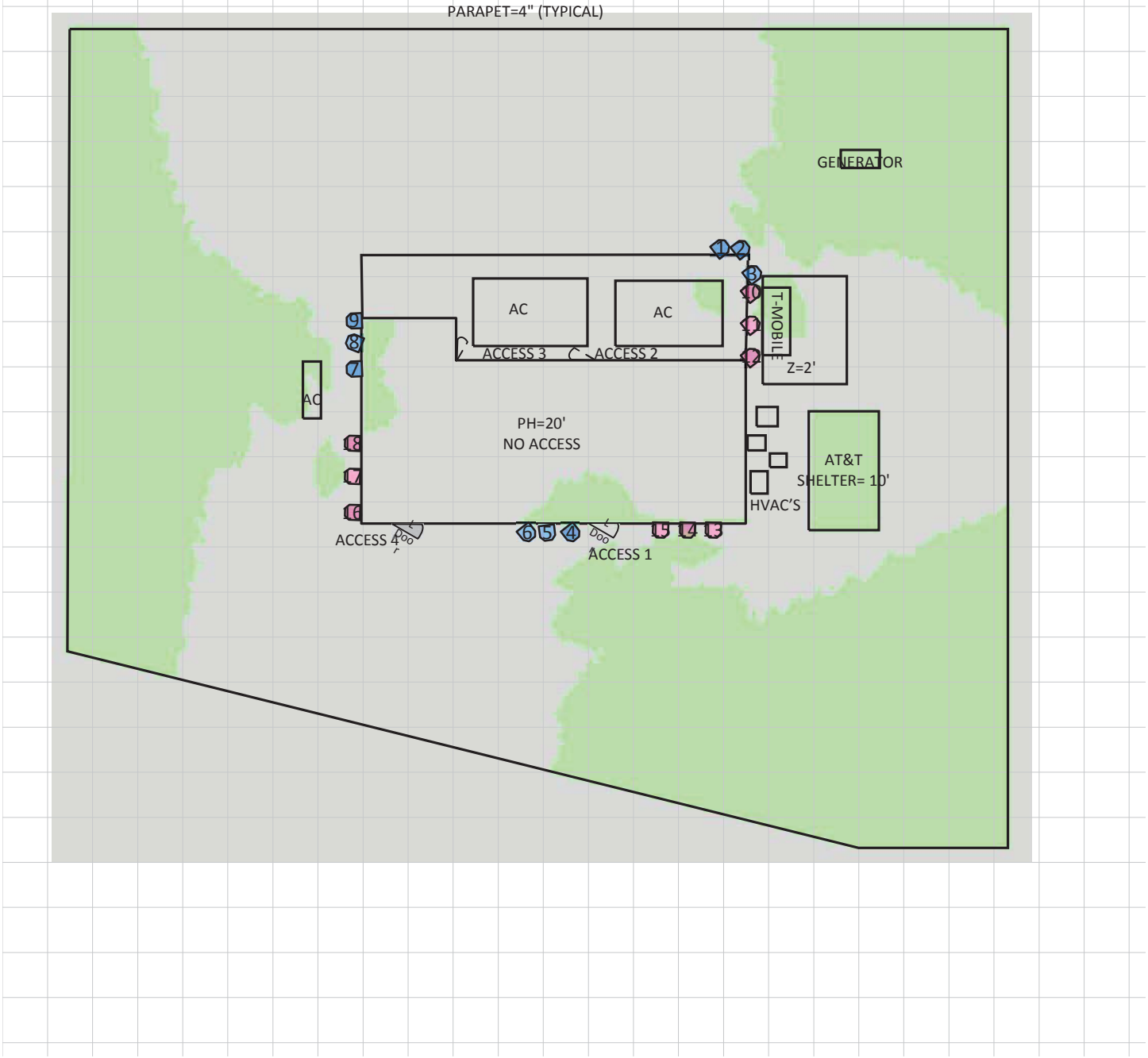
4 Emission Predictions

In the RF Exposure Simulations below, all heights are reflected with respect to main site level. In most rooftop cases this is the height of the main rooftop and in other cases this can be ground level. Each different height area, rooftop, or platform level is labeled with its height relative to the main site level. Emissions are calculated appropriately based on the relative height and location of that area to all antennas. The total analyzed elevations in the below RF Exposure Simulations are listed below.

- MAIN LEVEL = 0'
- PH1 = 20'
- AT&T Shelter = 10'
- T-Mobile Equipment Platform = 2'

The Antenna Inventory heights are referenced to the same level.

RF Exposure Simulation For: STRATHMOORE
Composite View



% of FCC Public Exposure Limit
Spatial Average 0' - 6'

% of FCC Public Exposure Limit

>= 5000	>= 500	>= 100	>= 5	< 5

Carrier Identification

AT&T MOBILITY LLC | VERIZON WIRELESS | T-MOBILE | SPRINT | UNKNOWN CARRIER

Barrier

Proposed Barriers/ Signs

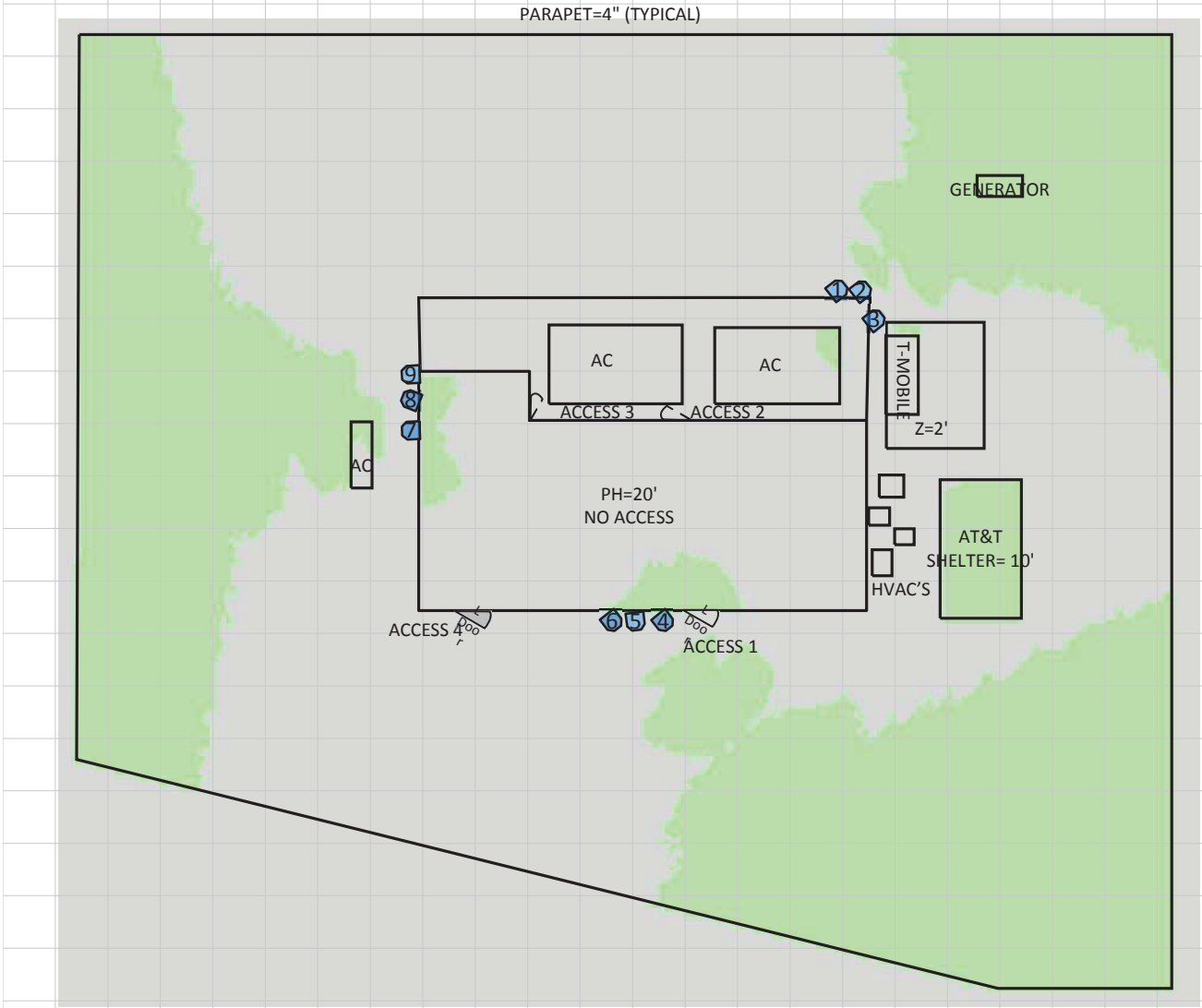
(Feet)

0 12.7 25.4

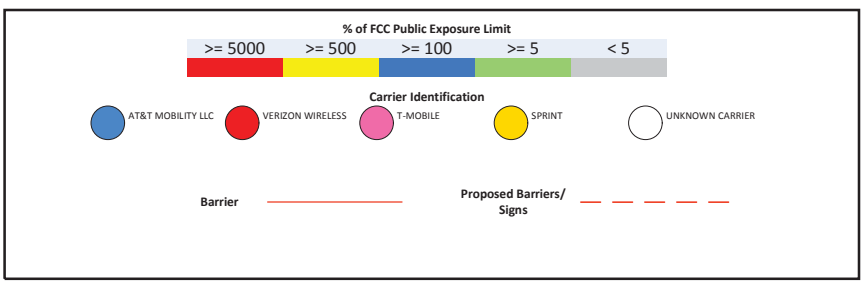
www.sitesafe.com
Site Name:STRATHMOORE
5/14/2020 8:36:18 AM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: STRATHMOORE
AT&T Mobility, LLC Contribution



% of FCC Public Exposure Limit
Spatial Average 0' - 6'



(Feet)

0 12.7 25.4

www.sitesafe.com
Site Name:STRATHMOORE
5/14/2020 8:39:10 AM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

5 Site Compliance

5.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, RF hazard signage and antenna locations, Sitesafe has determined that:

AT&T Mobility, LLC is compliant with the FCC Rules and Regulations, as described in OET Bulletin 65.

The compliance determination is based on General Public RFE levels derived from theoretical modeling, RF signage placement, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the proposed AT&T Mobility, LLC deployment plan could result in the site being rendered non-compliant.

Modeling is used for determining compliance and the percentage of MPE contribution.

5.2 Actions for Site Compliance

Based on FCC regulations, common industry practice, and our understanding of AT&T Mobility, LLC's RF Safety Policy requirements, this section provides a statement of recommendations for site compliance. Recommendations have been proposed based on our understanding of existing access restrictions, signage, and an analysis of predicted RFE levels.

AT&T Mobility, LLC is compliant with the FCC Rules and Regulations.

Recommended per AT&T Mobility, LLC's Policy:

Site Access Location

Sitesafe recommends that all AT&T Mobility, LLC signage be removed from all access points, as they are not required by AT&T Mobility, LLC's signage policy.

AT&T Mobility, LLC Proposed Alpha Sector Location

(2) Caution 2 sign(s) are recommended just below the bottom tip of the antennas. Remove the existing Information 1 sign(s) from this sector.

AT&T Mobility, LLC Proposed Beta Sector Location

(2) Caution 2 sign(s) are recommended just below the bottom tip of the antennas. Remove the existing Information 1 sign(s) from this sector.

AT&T Mobility, LLC Proposed Gamma Sector Location

(2) Caution 2 sign(s) are recommended just below the bottom tip of the antennas. Remove the existing Information 1 sign(s) from this sector.

Notes:

- Ensure all existing signage documented in this report still exist at the site, unless otherwise indicated.

6 Reviewer Certification

The reviewer whose signature appears below hereby certifies and affirms:

That I am an employee of Site Safe, LLC, in Vienna, Virginia, at which place the staff and I provide RF compliance services to clients in the wireless communications industry; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission (FCC) as well as the regulations of the Occupational Safety and Health Administration (OSHA), both in general and specifically as they apply to the FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields; and

That I have thoroughly reviewed this Site Compliance Report and believe it to be true and accurate to the best of my knowledge as assembled by and attested to by Leo Romero.

May 14, 2020

Anthony Handley

Appendix A – Statement of Limiting Conditions

Sitesafe has provided computer generated model(s) in this Site Compliance Report to show approximate dimensions of the site, and the model is included to assist the reader of the compliance report to visualize the site area, and to provide supporting documentation for Sitesafe's recommendations.

Sitesafe may note in the Site Compliance Report any adverse physical conditions, such as needed repairs, that Sitesafe became aware of during the normal research involved in creating this report. Sitesafe will not be responsible for any such conditions that do exist or for any engineering or testing that might be required to discover whether such conditions exist. Because Sitesafe is not an expert in the field of mechanical engineering or building maintenance, the Site Compliance Report must not be considered a structural or physical engineering report.

Sitesafe obtained information used in this Site Compliance Report from sources that Sitesafe considers reliable and believes them to be true and correct. Sitesafe does not assume any responsibility for the accuracy of such items that were furnished by other parties. When conflicts in information occur between data collected by Sitesafe provided by a second party and data collected by Sitesafe, the data will be used.

Appendix B – Regulatory Background Information

FCC Rules and Regulations

In 1996, the Federal Communications Commission (FCC) adopted regulations for evaluating the effects of RF emissions in 47 CFR § 1.1307 and 1.1310. The guideline from the FCC Office of Engineering and Technology is Bulletin 65 ("OET Bulletin 65"), *Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields*, Edition 97-01, published August 1997. Since 1996, the FCC periodically reviews these rules and regulations as per their congressional mandate.

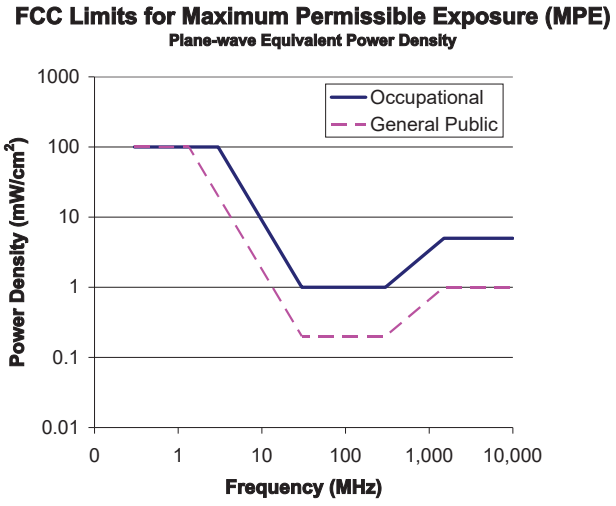
FCC regulations define two separate tiers of exposure limits: Occupational or "Controlled environment" and General Public or "Uncontrolled environment". The General Public limits are generally five times more conservative or restrictive than the Occupational limit. These limits apply to *accessible* areas where workers or the general public may be exposed to Radio Frequency (RF) electromagnetic fields.

Occupational or Controlled limits apply in situations in which persons are exposed as a consequence of their employment and where those persons exposed have been made fully aware of the potential for exposure and can exercise control over their exposure.

An area is considered a Controlled environment when access is limited to these aware personnel. Typical criteria are restricted access (i.e. locked or alarmed doors, barriers, etc.) to the areas where antennas are located coupled with proper RF warning signage. A site with Controlled environments is evaluated with Occupational limits.

All other areas are considered Uncontrolled environments. If a site has no access controls or no RF warning signage it is evaluated with General Public limits.

The theoretical modeling of the RF electromagnetic fields has been performed in accordance with OET Bulletin 65. The Maximum Permissible Exposure (MPE) limits utilized in this analysis are outlined in the following diagram:



Limits for Occupational/Controlled Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6

Limits for General Population/Uncontrolled Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

f = frequency in MHz *Plane-wave equivalent power density

OSHA Statement

The General Duty clause of the OSHA Act (Section 5) outlines the occupational safety and health responsibilities of the employer and employee. The General Duty clause in Section 5 states:

(a) Each employer –

(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;
(2) shall comply with occupational safety and health standards promulgated under this Act.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

OSHA has defined Radiofrequency and Microwave Radiation safety standards for workers who may enter hazardous RF areas. Regulation Standards 29 CFR § 1910.147 identify a generic Lockout/Tagout procedure aimed to control the unexpected energization or startup of machines when maintenance or service is being performed.

Appendix C – Safety Plan and Procedures

The following items are general safety recommendations that should be administered on a site by site basis as needed by the carrier.

General Maintenance Work: Any maintenance personnel required to work immediately in front of antennas and / or in areas indicated as above 100% of the Occupational MPE limits should coordinate with the wireless operators to disable transmitters during their work activities.

Training and Qualification Verification: All personnel accessing areas indicated as exceeding the General Population MPE limits should have a basic understanding of EME awareness and RF Safety procedures when working around transmitting antennas. Awareness training increases a worker's understanding to potential RF exposure scenarios. Awareness can be achieved in a number of ways (e.g. videos, formal classroom lecture or internet-based courses).

Physical Access Control: Access restrictions to transmitting antennas locations is the primary element in a site safety plan. Examples of access restrictions are as follows:

- Locked door or gate
- Alarmed door
- Locked ladder access
- Restrictive Barrier at antenna (e.g. Chain link with posted RF Sign)

RF Signage: Everyone should obey all posted signs at all times. RF signs play an important role in properly warning a worker prior to entering into a potential RF Exposure area.

Assume all antennas are active: Due to the nature of telecommunications transmissions, an antenna transmits intermittently. Always assume an antenna is transmitting. Never stop in front of an antenna. If you have to pass by an antenna, move through as quickly and safely as possible thereby reducing any exposure to a minimum.

Maintain a 3-foot clearance from all antennas: There is a direct correlation between the strength of an EME field and the distance from the transmitting antenna. The further away from an antenna, the lower the corresponding EME field is.

Site RF Emissions Diagram(s): Section 4 of this report contains RF Diagram(s) that outline various theoretical Maximum Permissible Exposure (MPE) areas at the site. The modeling is a worst-case scenario assuming a duty cycle of 100% for each transmitting antenna at full power. This analysis is based on one of two access control criteria: General Public criteria means the access to the site is uncontrolled and anyone can gain access. Occupational criteria means the access is restricted and only properly trained individuals can gain access to the antenna locations.

Appendix D – RF Emissions

The RF Emissions Simulation(s) in this report display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix E.

The key at the bottom of each RF Emissions Simulation indicates percentages displayed referenced to FCC General Public Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Areas indicated as Gray are predicted to be below 5% of the MPE limits. Gray represents areas more than 20 times below the most conservative exposure limit. **Gray areas are accessible to anyone**.
- Green represents areas are predicted to be between 5% and 100% of the MPE limits. **Green areas are accessible to anyone.**
- Blue represents areas predicted to exceed the General Public MPE limits but are less than Occupational limits. **Blue areas should be accessible only to RF trained workers**.
- Yellow represents areas predicted to exceed Occupational MPE limits. **Yellow areas should be accessible only to RF trained workers able to assess current exposure levels.**
- Red represents areas predicted to have exposure more than 10 times the Occupational MPE limits. **Red indicates that the RF levels must be reduced prior to access.** An RF Safety Plan is required which outlines how to reduce the RF energy in these areas prior to access.

If trained occupational personnel require access to areas that are delineated as above 100% of the limit, Sitesafe recommends that they utilize the proper personal protection equipment (RF monitors), coordinate with the carriers to reduce or shutdown power, or make real-time power density measurements with the appropriate power density meter to determine real-time MPE levels. This will allow the personnel to ensure that their work area is within exposure limits.

Appendix E – Assumptions and Definitions

General Model Assumptions

In this site compliance report, it is assumed that all antennas are operating at **full power at all times**. Software modeling was performed for all transmitting antennas located on the site. Sitesafe has further assumed a 100% duty cycle and maximum radiated power.

The modeling is based on recommendations from the FCC's OET-65 bulletin with the following variances per AT&T guidance. Reflection has not been considered in the modeling, i.e. the reflection factor is 1.0. The near / far field boundary has been set to 1.5 times the aperture height of the antenna and modeling beyond that point is the lesser of the near field cylindrical model and the far field model taking into account the gain of the antenna.

The site has been modeled with these assumptions to show the maximum RF energy density. Areas modeled with exposure greater than 100% of the General Public MPE level may not actually occur but are shown as a prediction that could be realized. Sitesafe believes these areas to be safe for entry by occupationally trained personnel utilizing appropriate personal protective equipment (in most cases, a personal monitor).

Use of Generic Antennas

For the purposes of this report, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information about a carrier, their FCC license and/or antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use our industry specific knowledge of equipment, antenna models, and transmit power to model the site. If more specific information can be obtained for the unknown measurement criteria, Sitesafe recommends remodeling of the site utilizing the more complete and accurate data. Information about similar facilities is used when the service is identified and associated with a particular antenna. If no information is available regarding the transmitting service associated with an unidentified antenna, using the antenna manufacturer's published data regarding the antenna's physical characteristics makes more conservative assumptions.

Where the frequency is unknown, Sitesafe uses the closest frequency in the antenna's range that corresponds to the highest Maximum Permissible Exposure (MPE), resulting in a conservative analysis.

Appendix F – Definitions

5% Rule – The rules adopted by the FCC specify that, in general, at multiple transmitter sites actions necessary to bring the area into compliance with the guidelines are the shared responsibility of all licensees whose transmitters produce field strengths or power density levels at the area in question in excess of 5% of the exposure limits. In other words, any wireless operator that contributes 5% or greater of the MPE limit in an area that is identified to be greater than 100% of the MPE limit is responsible for taking corrective actions to bring the site into compliance.

Compliance – The determination of whether a site complies with FCC standards with regards to Human Exposure to Radio Frequency Electromagnetic Fields from transmitting antennas.

Decibel (dB) – A unit for measuring power or strength of a signal.

Duty Cycle – The percent of pulse duration to the pulse period of a periodic pulse train. Also, may be a measure of the temporal transmission characteristic of an intermittently transmitting RF source such as a paging antenna by dividing average transmission duration by the average period for transmission. A duty cycle of 100% corresponds to continuous operation.

Effective (or Equivalent) Isotropic Radiated Power (EIRP) – The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna.

Effective Radiated Power (ERP) – The product of the power supplied to the antenna and the antenna gain in a given direction relative to a half-wave dipole antenna.

Gain (of an antenna) – The ratio of the maximum power in a given direction to the maximum power in the same direction from an isotropic radiator. Gain is a measure of the relative efficiency of a directional antenna as compared to an omnidirectional antenna.

General Population/Uncontrolled Environment – Defined by the FCC as an area where RF exposure may occur to persons who are **unaware** of the potential for exposure and who have no control over their exposure. General Population is also referenced as General Public.

Generic Antenna – For the purposes of this report, the use of "Generic" as an antenna model means the antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use its industry specific knowledge of antenna models to select a worst-case scenario antenna to model the site.

Isotropic Antenna – An antenna that is completely non-directional. In other words, an antenna that radiates energy equally in all directions.

Maximum Measurement – This measurement represents the single largest measurement recorded when performing a spatial average measurement.

Maximum Permissible Exposure (MPE) – The rms and peak electric and magnetic field strength, their squares, or the plane-wave equivalent power densities associated with these fields to which a person may be exposed without harmful effect and with acceptable safety factor.

Occupational/Controlled Environment – Defined by the FCC as an area where RF exposure may occur to persons who are **aware** of the potential for exposure as a condition of employment or specific activity and can exercise control over their exposure.

OET Bulletin 65 – Technical guideline developed by the FCC's Office of Engineering and Technology to determine the impact of RF exposure on humans. The guideline was published in August 1997.

OSHA (Occupational Safety and Health Administration) – Under the Occupational Safety and Health Act of 1970, employers are responsible for providing a safe and healthy workplace for their employees. OSHA's role is to promote the safety and health of America's working men and women by setting and enforcing standards; providing training, outreach and education; establishing partnerships; and encouraging continual process improvement in workplace safety and health. For more information, visit www.osha.gov.

Radio Frequency Exposure or Electromagnetic Fields – Electromagnetic waves that are propagated from antennas through space.

Spatial Average Measurement – A technique used to average a minimum of ten (10 measurements taken in a ten (10 second interval from zero (0 to six (6 feet. This measurement is intended to model the average energy a 6-foot tall human body will absorb while present in an electromagnetic field of energy.

Transmitter Power Output (TPO) – The radio frequency output power of a transmitter's final radio frequency stage as measured at the output terminal while connected to a load.

Appendix G – References

The following references can be followed for further information about RF Health and Safety.

Site Safe, LLC
http://www.sitesafe.com
FCC Radio Frequency Safety
http://www.fcc.gov/encyclopedia/radio-frequency-safety
National Council on Radiation Protection and Measurements (NCRP)
http://www.ncrponline.org
Institute of Electrical and Electronics Engineers, Inc., (IEEE)
http://www.ieee.org
American National Standards Institute (ANSI)
http://www.ansi.org
Environmental Protection Agency (EPA)
http://www.epa.gov/radtown/wireless-tech.html
National Institutes of Health (NIH)
http://www.niehs.nih.gov/health/topics/agents/emf/
Occupational Safety and Health Agency (OSHA)
http://www.osha.gov/SLTC/radiofrequencyradiation/
International Commission on Non-Ionizing Radiation Protection (ICNIRP)
http://www.icnirp.org
World Health Organization (WHO)
http://www.who.int/peh-emf/en/
National Cancer Institute
http://www.cancer.gov/cancertopics/factsheet/Risk/cellphones
American Cancer Society (ACS)
http://www.cancer.org/docroot/PED/content/PED_1_3X_Cellular_Phone_Towers.asp?siteareа=PED
European Commission Scientific Committee on Emerging and Newly Identified Health Risks
http://ec.europa.eu/health/ph_risk/committees/04_scenihr/docs/scenihr_o_022.pdf
Fairfax County, Virginia Public School Survey
http://www.fcps.edu/fts/safety-security/RFEESurvey/
UK Health Protection Agency Advisory Group on Non-Ionizing Radiation
http://www.hpa.org.uk/webw/HPAweb&HPAwebStandard/HPAweb_C/1317133826368
Norwegian Institute of Public Health
http://www.fhi.no/dokumenter/545eea7147.pdf

NNHH-65C-R4

8-port sector antenna, 4x 698–896 and 4x 1695–2360 MHz, 65° HPBW, 4x RETs

- Array configuration provides capability for 4T4R (4x MIMO) on Low band and High band
- Optimized SPR performance across all operating bands
- Excellent wind loading characteristics

General Specifications

Antenna Type	Sector
Band	Multiband
Color	Light gray
Effective Projective Area (EPA), frontal	0.9 m² | 9.688 ft²
Effective Projective Area (EPA), lateral	0.31 m² | 3.337 ft²
Grounding Type	RF connector inner conductor and body grounded to reflector and mounting bracket
Performance Note	Outdoor usage | Wind loading figures are validated by wind tunnel measurements described in white paper WP-112534-EN
Radome Material	Fiberglass, UV resistant
Radiator Material	Aluminum | Low loss circuit board
Reflector Material	Aluminum
RF Connector Interface	4.3-10 Female
RF Connector Location	Bottom
RF Connector Quantity, high band	4
RF Connector Quantity, low band	4
RF Connector Quantity, total	8

Remote Electrical Tilt (RET) Information, General

RET Hardware	CommRET v2
RET Interface	8-pin DIN Female | 8-pin DIN Male
RET Interface, quantity	1 female | 1 male

Dimensions

Width	498 mm | 19.606 in

NNHH-65C-R4

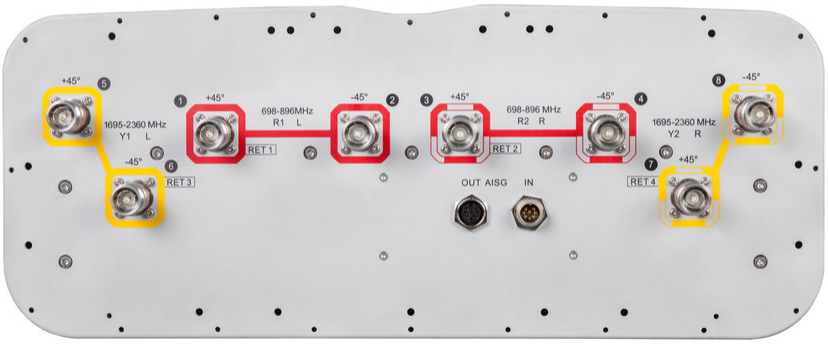
Length	2438 mm | 95.984 in
Depth	197 mm | 7.756 in

Array Layout

(Sizes of colored boxes are not true depictions of array sizes)

Array	Freq (MHz)	Conns	RET (MRET)	AISG RET UID
R1	698-896	1-2	1	CPxxxxxxxxxxxxxxxmm.1
R2	698-896	3-4	2	CPxxxxxxxxxxxxxxxmm.2
Y1	1695-2360	5-6	3	CPxxxxxxxxxxxxxxxmm.3
Y2	1695-2360	7-8	4	CPxxxxxxxxxxxxxxxmm.4

Port Configuration



Electrical Specifications

NNHH-65C-R4

Impedance	50 ohm
Operating Frequency Band	1695 – 2360 MHz | 698 – 896 MHz
Polarization	±45°
Total Input Power, maximum	900 W @ 50 °C

Remote Electrical Tilt (RET) Information, Electrical

Protocol	3GPP/AISG 2.0 (Multi-RET)
Power Consumption, idle state, maximum	1 W
Power Consumption, normal conditions, maximum	8 W
Input Voltage	10–30 Vdc
Internal RET	High band (2) | Low band (2)

Electrical Specifications

Frequency Band, MHz	**698–806**	**806–896**	**1695–1880**	**1850–1990**	**1920–2180**	**2300–2360**
Gain, dBi	15.7	16.1	18.3	18.8	19.1	19.3
Beamwidth, Horizontal, degrees	73	71	58	59	61	59
Beamwidth, Vertical, degrees	9.8	8.6	5.4	5	4.7	4.2
Beam Tilt, degrees	2–12	2–12	2–12	2–12	2–12	2–12
USLS (First Lobe), dB	20	20	19	19	20	20
Front-to-Back Ratio at 180°, dB	28	32	37	38	39	36
Isolation, Cross Polarization, dB	25	25	25	25	25	25
Isolation, Inter-band, dB	25	25	25	25	25	25
VSWR | Return loss, dB	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-150	-150	-150	-150	-150	-150
Input Power per Port at 50°C, maximum, watts	300	300	250	250	250	200

Electrical Specifications, BASTA

Frequency Band, MHz	**698–806**	**806–896**	**1695–1880**	**1850–1990**	**1920–2180**	**2300–2360**
Gain by all Beam Tilts, average, dBi	15.3	15.9	17.9	18.6	18.8	19
Gain by all Beam Tilts Tolerance, dB	±0.5	±0.5	±0.8	±0.3	±0.4	±0.4
Gain by Beam Tilt, average,	2 ° | 15.2	2 ° | 15.7	2 ° | 17.6	2 ° | 18.4	2 ° | 18.5	2 ° | 18.8

NNHH-65C-R4

dBi	7 ° | 15.4 12 ° | 15.2	7 ° | 16.0 12 ° | 15.8	7 ° | 18.0 12 ° | 17.8	7 ° | 18.7 12 ° | 18.5	7 ° | 19.0 12 ° | 18.7	7 ° | 19.1 12 ° | 18.8
Beamwidth, Horizontal Tolerance, degrees	±3	±3.3	±4.4	±2.8	±3.6	±4.9
Beamwidth, Vertical Tolerance, degrees	±0.7	±0.6	±0.3	±0.2	±0.3	±0.2
USLS, beampeak to 20° above beampeak, dB	16	16	16	17	18	17
Front-to-Back Total Power at 180° ± 30°, dB	23	22	30	33	30	29
CPR at Boresight, dB	22	24	19	23	22	18
CPR at Sector, dB	10	7	8	9	8	7

Mechanical Specifications

Wind Loading at Velocity, frontal	214.5 lbf @ 150 km/h | 954.0 N @ 150 km/h
Wind Loading at Velocity, lateral	331.0 N @ 150 km/h | 74.4 lbf @ 150 km/h
Wind Loading at Velocity, maximum	1,235.0 N @ 0 km/h | 277.6 lbf @ 0 km/h
Wind Loading at Velocity, rear	176.5 lbf @ 150 km/h | 785.0 N @ 150 km/h
Wind Speed, maximum	241 km/h | 149.75 mph

Packaging and Weights

Width, packed	608 mm | 23.937 in
Depth, packed	352 mm | 13.858 in
Length, packed	2630 mm | 103.543 in
Net Weight, without mounting kit	45.5 kg | 100.31 lb
Weight, gross	64.9 kg | 143.08 lb

Regulatory Compliance/Certifications

Agency	Classification
CHINA-ROHS	Above maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
ROHS	Compliant/Exempted

Included Products

BSAMNT-3

	— Wide Profile Antenna Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.
BSAMNT-M	— Middle Downtilt Mounting Kit for Long Antennas for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor bracket set.

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

AirScale RRH 4T4R B5 160W AHCA

Capacity, performance, low total cost of ownership and investment protection

Nokia AirScale Remote Radio Head (RRH) AHCA supports band 5 - full band- along with 4×4 MIMO and 256 QAM modulation to deliver higher data rates. It offers Nokia's unique book mounting for faster roll out and radio-integrated Passive Intermodulation (PIM) cancellation for enhanced network performance.

Furthermore, 4TX and 4RX paths in a single radio unit gives the flexibility to support 2T2R-2 sectors or 4T4R-single sector from a single unit, for cost-effective scaling of both coverage and capacity.

Capacity and performance

AirScale RRH 4T4R delivers 160 W (4×40 W) transmit power and can support 2×2 MIMO, 4×2 MIMO and 4×4 MIMO. The radio supports 256 QAM modulation in the downlink (DL) for up to 30 percent higher throughput. The Virtual Spectrum Analyzer feature enables both uplink and downlink spectrum to be analyzed.

Low total cost of ownership

With up to two sectors in a single radio, light weight and zero-bolt book mounting, AirScale RRH 4T4R allows operators to achieve faster roll outs and more cost-effective installation and maintenance of radios and tower space.

Investment protection

AirScale RRH 4T4R complements the AirScale System Module, offering a complete base station solution. AirScale System Module is 5G capable and offers 28 Gbps capacity. AirScale RRH is part of the AirScale Base Station portfolio, the next generation Nokia base station platform, and is backwards-compatible with the Nokia Flexi Multiradio 10 Base Station to best use an operator's existing investments.

Product name	AirScale RRH 4T4R B5 160W AHCA - 473966A
Supported frequency bands	3GPP band 5
Frequencies	DL 869-894MHz, UL 824-849MHz
Number of TX/RX ports	4/4
Instantaneous Bandwidth IBW	25MHz
Occupied Bandwidth OBW	25MHz
Output power	4T4R 40 W/ 2T4R 60W
Dimensions (mm) height x width x depth	337 x 295 x 165
Volume (liters)	16.4
Weight (kg)	16.7
Supply Voltage / Voltage Range	DC-48V / -36V to -60V
Typical Power Consumption	207 W (ETSI 24h Avg – 4x20W mode)
Antenna ports	4TX/4RX, 4.3-10+
Optical ports	2 x CPRI 9.8 Gbps
ALD control interfaces	AISG3.0 from ANT1, 2, 3, 4 and RET (Power supply ANT1 and ANT3)
Other interfaces	External alarm MDR-26 serial connector (4 inputs, 1 output) DC circular power connector
Operational temperature range	-40°C to 55°C (with no solar load)
Ingress protection class	IP65
Installation options	Pole or wall, RAS, vertical or horizontal book mount
Surge protection	Class II 5kA

Nokia Oyj
Karaportti 3
FI-02610 Espoo
Finland
Tel. +358 (0) 10 44 88 000

Product code: SR1611002341EN (April)

June 9, 2020

AT&T
Steven Safire
7150 Standard Drive
Hanover, MD 21706

Jacobs Telecommunications, Inc.
5449 Bells Ferry Road
Acworth, GA 30102
770-701-2500
www.jacobs.com

Subject:	**Rooftop Equipment Installation** **Structural Assessment Letter**
Carrier Designation:	**LTE 5C/6C/5G-Parent Rooftop** **Site Number: 16252** **Site Name: Strathmoore** **FA Location: 10096268** **PTN: 2251A0T8EQ, 2251A0T7VA, 2251A0T7B9, 2251A0T7Y5, 2251A0T82Z, 2251A0T84Z**
Building Owner Designation:	**7101 Wisconsin Owner, LLC** **Site ID: NA**
Engineering Firm Designation:	**Jacobs Telecommunications, Inc. Project: EP4TURWL**
Site Data:	**7101 Wisconsin Avenue** **Bethesda, Montgomery County, MD 20814** **Latitude: N38°58'49.73"±; Longitude: W77°05'29.81"±** **Ground Elevation: 340 ft ± NAVD 88; RT: 165 ft ± AGL**

Per your request, we present our structural assessment of the structure at the above referenced location for the equipment change noted in **Table A**. This assessment assumes the existing structure was properly designed and constructed, as well as being well maintained and is structurally sound.

The purpose of this assessment was to review the structure in accordance with the 2018 International Building Code (current building code) and the ANSI/TIA-222-H-1-2019 Structural Standard for Antenna Supporting Structures and Antennas (industry standard) for structural feasibility and integrity

Our review was conducted in conjunction with the existing AT&T installation information, mount assessment, previous structural evaluation, and the recent site visit photos and data. Based on a comparison of the current structural conditions and the required design criteria with the change in equipment loading, it has been determined that the proposed loading will cause minimal change in the both lateral and vertical loads supported by the structure. It is therefore the opinion of Jacobs that the structure is sufficient to support the proposed loading as listed in **Table A**.

As a result, the imposed additional loads should be within the allowable limits of the existing structural system; thus, the structure is assumed to resist the stress caused by the proposed equipment configuration and will satisfy all assumed structural strength requirements with no additional calculations required. **Thus, by comparison, it is our structural assessment that the proposed configuration will have negligible effect at this site.**

Please note that additional engineering review will be required prior to placing any future equipment. We trust you find our work satisfactory. Jacobs Telecommunications, Inc. appreciates the opportunity of providing continuing professional services to AT&T. Please do not hesitate to call should you have any questions.

Sincerely,

John Tam
Structural Engineer

Wensen Jiang, PE
Engineer of Record
PE No. 55911

6/9/2020

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. 55911, Expiration Date: 4/14/22.

REFERENCES

1. Mount analysis provided by Jacobs Telecommunications, Inc., project no. EP4TURWL, dated 6/9/20.
2. Structural analysis provided by Dewberry Engineers, Inc., dated 5/1/15.
3. Construction drawings provided by FDH Engineering, project no. 1310621950, dated 1/29/14.

CONCLUSION / SUMMARY

Loads determined by the latest IBC referencing ANSI/TIA-222 provide a more practical loading for comparison purposes and therefore are considered to govern for a conservative assessment. All additional loads imparted by the appurtenance configuration noted in **Table A** as determined by ANSI/TIA-222, will not increase the overall gravity load by more than 5% of the original overall structure nor will it increase the overall lateral load by more than 10% of the original overall structure. This comparison meets the additions and alterations requirement outlined in the IBC; thus, a more rigorous analysis/assessment is not required.

CODE INTERPRETATIONS

Per Section 1609.1 and 3108.1 of the International Building Code, the determination of lateral loads for antenna supporting structures and antennas shall be determined using the ANSI/TIA-222.

Mount analysis[1] procedures are based on Section 16 of the ANSI/TIA-222-H with any adjustments outlined in the Mount Technical Directive version 14 provided by AT&T.

Per Section 1103 of the International Building Code, the existing structure is considered to have adequate strength for the proposed appurtenance configuration loading if the *additions* or *alterations* to the existing structure do not increase the gravity load on any structural element of the existing structure by more than five percent, unless the increased forces on the element are still in compliance with the code for new structures. In addition, if the *additions* or *alterations* to the existing structure do not increase the lateral load on any structural element of the existing structure by more than ten percent cumulative since the original construction, unless the element has the capacity to resist the increased forces determined in accordance with Sections 1609 and 1613.

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ASSUMPTIONS

The existing substructure drawings were not available at the time of this assessment. The existing substructure is assumed to be sufficiently designed to resist the additional loading provided by the supplementary equipment such that Section 1103 of the IBC applies.

All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report such that Section 1103 of the IBC applies.

DISCLAIMERS

The scope of this assessment pertains only to the structural system of the additional appurtenance loads **Table A** imparted by the AT&T equipment deployment and as such does not include examination of any additional loads imparted by the equipment installation of others unknown to current mount analysis on file. Furthermore, no qualification is made nor implied by this document for the structural members or elements supporting the aforementioned equipment installation.

All previously installed equipment (microwaves, radios, omnis etc.) not represented in the mount loading **Table A** is to be decommissioned and removed from the antenna mounting system. These installation requirements must be implemented as previously described for this assessment to be valid.

CARRIER LOADING

Table A: Existing, Proposed and *Reserved* Appurtenance Configuration[1,2]

Elevation (AGL, ft)	Sector	Azimuth	Position[3]	Equipment[4]	Cables
163	Alpha	30°	1	**(1) Commscope NNHH-65C-R4 (Antenna)**	(2) 1-5/8" Coax (1) 1" DC (1) 3/8" Fiber (1) 2" Conduit
				(1) Nokia AirScale Dual RRH 4T4R B25/66 320W (RRH)	
				(1) Nokia B14/12/29 Triband (RRH)	
				(1) Raycap DC6-48-60-18-8F (Surge)	
				(1) Raycap DC2-48-60-0-9E (Surge)	
				(1) Raycap FC12-PC6-10E (Surge)	
			2	(1) Kathrein 742264 (Antenna)	
				(2) Powerwave LGP13519 (Diplexer)	
				(1) Raycap DC6-48-60-18-8F (Surge)	
			3	-	
			4	**(1) Commscope NNHH-65C-R4 (Antenna)**	
				(1) ALU RRH4x25-WCS-4R (RRH)	
				(1) Nokia AirScale RRH 4T4R B5 160W (RRH)	
				(1) Raycap DC6-48-60-18-8F (Surge)	
	Beta	120°	1	**(1) Commscope NNHH-65C-R4 (Antenna)**	(2) 1-5/8" Coax (1) 1" DC (1) 3/8" Fiber (1) 2" Conduit
				(1) Nokia AirScale Dual RRH 4T4R B25/66 320W (RRH)	
				(1) Nokia B14/12/29 Triband (RRH)	
				(1) Raycap DC2-48-60-0-9E (Surge)	
		150°	2	(1) Kathrein 742264 (Antenna)	
				(2) Powerwave LGP13519 (Diplexer)	

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163	Beta	-	3	-	-
		120°	4	**(1) Commscope NNHH-65C-R4 (Antenna)**	
				(1) ALU RRH4x25-WCS-4R (RRH)	
				(1) Nokia AirScale RRH 4T4R B5 160W (RRH)	
	Gamma	245°	1	**(1) Commscope NNHH-65C-R4 (Antenna)**	(2) 1-5/8" Coax (1) 1" DC (1) 3/8" Fiber (1) 2" Conduit
				(1) Nokia AirScale Dual RRH 4T4R B25/66 320W (RRH)	
				(1) Nokia B14/12/29 Triband (RRH)	
				(1) Raycap DC2-48-60-0-9E (Surge)	
		270°	2	(1) Kathrein 742264 (Antenna)	
				(2) Powerwave LGP13519 (Diplexer)	
		-	3	-	
		245°	4	**(1) Commscope NNHH-65C-R4 (Antenna)**	
				(1) ALU RRH4x25-WCS-4R (RRH)	
				(1) Nokia AirScale RRH 4T4R B5 160W (RRH)	

1 – Appurtenance Configuration as reflected in AT&T RFDS ID 3546758, updated 1/10/2020.
2 – The evaluation and analysis is modeled for the worse case loading shown.
3 – Position 1 is defined as right-most mount location when facing structure.
4 – Proposed equipment shown in **bold**.
5 – Surge locations shown in table match the RFDS; actual surge locations are to the standoff members and evenly distributed between sectors.

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FA# 10096268 USID#16252
BRANDYWINE WISCONSIN LLC
STRATHMOORE

LTE 5C/6C/4TX4RX ANTENNA RETROFIT/4TX4RX SOFTWARE RETROFIT/5G NR 1SR ROOFTOP

PROJECT DESCRIPTION

AT&T WIRELESS PROPOSES TO MODIFY AN EXISTING WIRELESS INSTALLATION. THE SCOPE WILL CONSIST OF THE FOLLOWING:

TOWER SOW
- REMOVE (6) EXISTING ANTENNAS
- REMOVE (3) EXISTING 700 BAND RRHS
- REMOVE (3) EXISTING AWS BAND RRHS
- REMOVE ALL EXISTING COAX EXCEPT FOR 6 TO REMAIN
- REMOVE (3) EXISTING 2" CONDUIT
- REMOVE (3) EXISTING DC2'S

- INSTALL (6) PROPOSED ANTENNAS
- INSTALL (3) PROPOSED 700 BAND RRHS
- INSTALL (3) PROPOSED 850 BAND RRHS
- INSTALL (3) PROPOSED 1900 BAND RRHS
- INSTALL (3) PROPOSED DC6 BOXES
- INSTALL (3) PROPOSED 24 PAIR FIBER TRUNK CABLE
- INSTALL (3) PROPOSE 6/C 6 AWG POWER TRUNK
- INSTALL (3) PROPOSE 2/C 8 AWG POWER TRUNK
- INSTALL (9) PROPOSE DUAL PAIR FIBER JUMPERS
- INSTALL (6) PROPOSED RET CABLES
- INSTALL (12) PROPOSED DM-HM JUMPERS
- INSTALL (44) PROPOSED HM-HM JUMPERS

GROUND SOW
- REMOVE (18) 1/C 8 AWG TELCOFLEX POWER

- INSTALL (3) PROPOSED DC2 MODULES
- INSTALL (18) PROPOSED 1/C 6 AWG POWER
- INSTALL (3) PROPOSED 25A BREAKERS
- INSTALL (6) PROPOSED 50A BREAKERS
- INSTALL (3) PROPOSED FIBER STORAGE BOXES
- INSTALL (1) PROPOSED 20A BREAKER

- NO SITE/CIVIL WORK

SITE INFORMATION

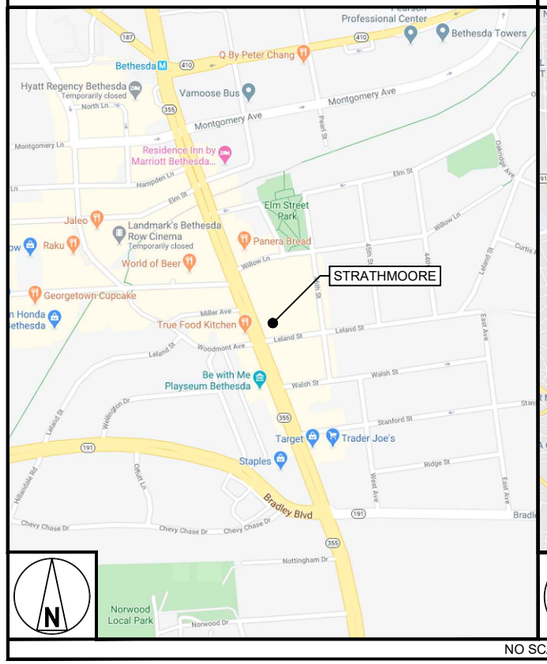
LANDLORD:	BRANDYWINE WISCONSIN LLC
SITE NAME:	STRATHMOORE
USID NUMBER:	16252
FA NUMBER:	10096268
SITE ADDRESS:	7101 WISCONSIN AVENUE BETHESDA, MD 20814
COUNTY:	MONTGOMERY
LATITUDE (NAD 83):	N 38° 58' 49.72"
LONGITUDE (NAD 83):	W 77° 5' 29.81"
RAD CENTER:	163' AGL
SITE ACQUISITION CONTACT:	ANDREW CAPACI Andrew.Capaci@jacobs.com
RF ENGINEER:	SANDEEP GUPTA AA913P@att.com
C&E MANAGER:	STEVEN SAFIRE SS0091@att.com
JURISDICTION:	MONTGOMERY COUNTY
APPLICANT/LESSEE:	AT&T 7150 STANDARD DRIVE SUITE A HANOVER, MD 21076

CONTACT INFORMATION

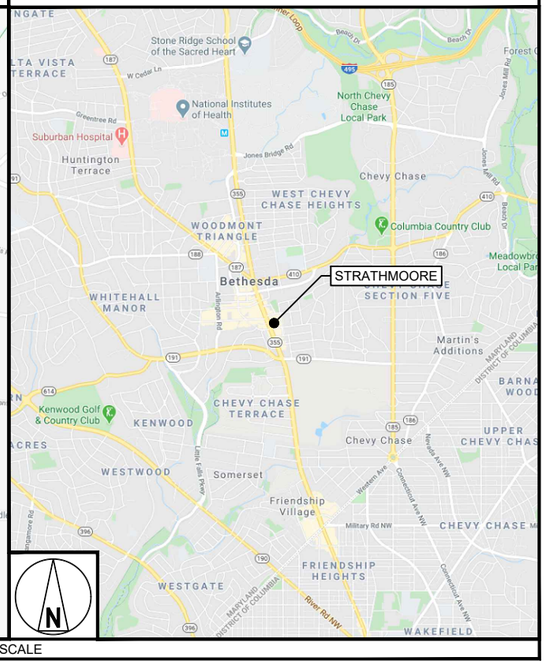
ENGINEER:	JACOBS TELECOMMUNICATIONS, INC. 7150 STANDARD DRIVE, SUITE B HANOVER, MD 21076
CONTACT:	LEAH WOODLY
PHONE:	443.230.4400x113

LOCATION MAPS

VICINITY MAP



LOCAL MAP



NO SCALE

DRIVING DIRECTIONS

DIRECTIONS FROM AT&T OFFICE: START OUT FROM 7150 STANDARD DR, HANOVER MD
TAKE ON MD-100 W FROM STANDARD DR, PARK CIR DR AND COCA COLA DR. TAKE I-95 S AND I-495 W TO MD-185 S/CONNECTICUT AVE IN CHEVY CHASE. TAKE EXIT 33 FROM I-495 W. CONTINUE ON MD-185 S/CONNECTICUT AVE TO YOUR DESTINATION IN BETHESDA TO THE SITE.

ENGINEERING

2015 INTERNATIONAL BUILDING CODE OR LATEST EDITION
2014 NATIONAL ELECTRIC CODE OR LATEST EDITION
TIA-222-H OR LATEST EDITION

GENERAL NOTES

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

RFDS

RFDS REVISION V2020_0.1 DATED 01/10/2020.

APPROVALS

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND MAY IMPOSE CHANGES OR MODIFICATIONS.

AT&T RF: _____ DATE: _____

AT&T OPERATIONS: _____ DATE: _____

AT&T SITE AQ: _____ DATE: _____

OCI: _____ DATE: _____

TOWER/PROPERTY OWNER: _____ DATE: _____

MUNICIPAL: _____ DATE: _____

DRAWING INDEX

SHEET NO:	SHEET TITLE
T-1	TITLE SHEET
C-1	SITE PLAN
C-2	SITE ELEVATION
C-3	EXISTING & PROPOSED EQUIPMENT LAYOUT
C-4	EXISTING & PROPOSED ANTENNA LAYOUT
C-5	SITE DETAILS
C-6	POWER STUDY
RF-1	RF SHEET AND PLUMBING DIAGRAM
E-1	BREAKER PANEL
G-1	GROUNDING DETAILS
S-1	ANTENNA CONNECTION DIAGRAM
S-2	COLOR CODE CHART
S-3	LTE RET NAMING CONVENTION
GN-1	GENERAL NOTES I
GN-2	GENERAL NOTES II
GN-3	GENERAL NOTES III

DO NOT SCALE DRAWINGS

CONTRACTOR SHALL VERIFY ALL PLANS & EXISTING DIMENSIONS & CONDITIONS ON THE JOB SITE & SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME

UNDERGROUND SERVICE ALERT
MISS UTILITY
811
48 HOURS BEFORE YOU DIG

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CERTIFICATION STATEMENT:
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APPROVALS

LANDLORD _____
LEASING _____
R.F. _____
ZONING _____
CONSTRUCTION _____
A & E _____

PROJECT NO: EP4TURWL

DRAWN BY: RM

CHECKED BY: LW

SUBMITTALS

1	09/25/20	JX COMMENTS
0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

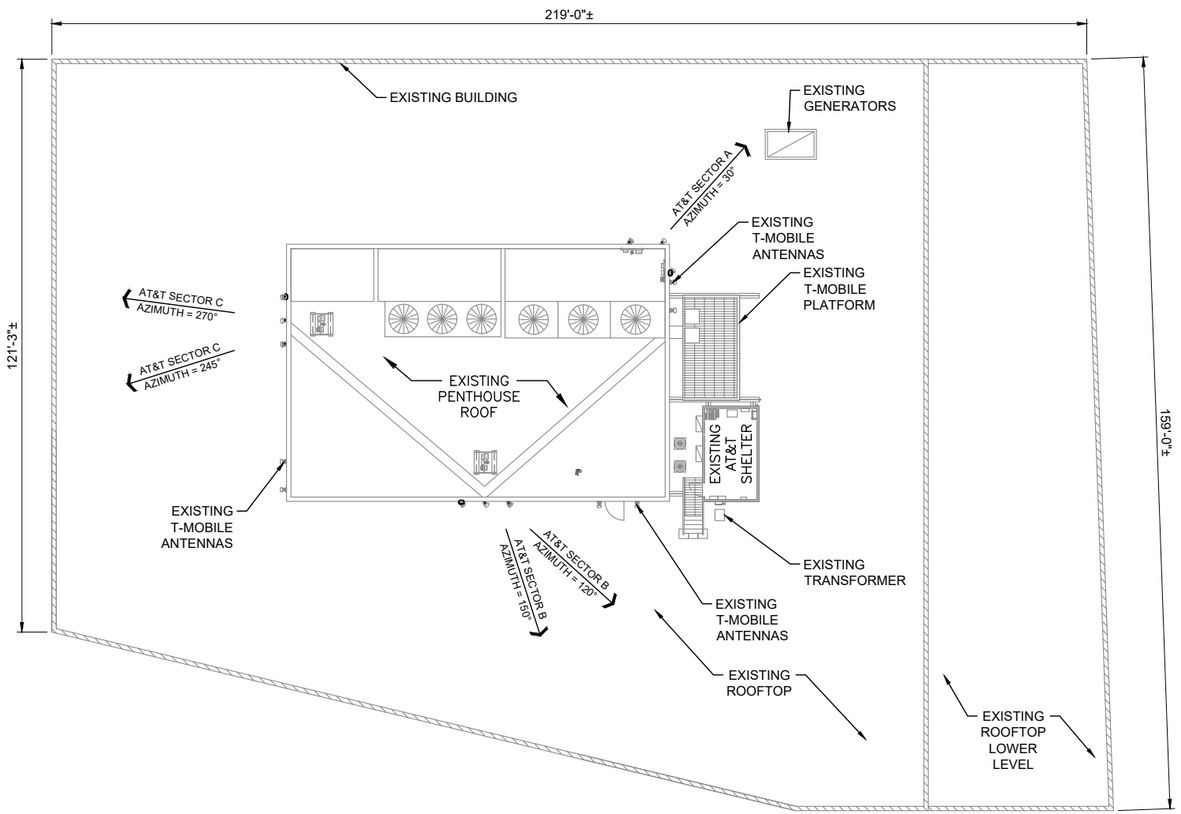
TITLE SHEET

T-1

TRUE NORTH

NOTES:

1. PLAN BASED ON AS-BUILT DRAWINGS ISSUED BY B+T GRP ON 01/20/17. CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS AND LOCATION/ORIENTATION OF EXISTING EQUIPMENT.
2. CONTRACTOR TO VERIFY FINAL RF CONFIGURATION AND NOTIFY CARRIER AND ENGINEER W/ ANY DISCREPANCIES PRIOR TO THE INSTALLATION.
3. CONTRACTOR SHALL VERIFY THE EXISTING ANTENNA CENTERLINE HEIGHT ABOVE GROUND LEVEL. PROPOSED ANTENNA CENTERLINE SHALL MATCH EXISTING.



1 **SITE PLAN**

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

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FA# 10096268
USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

SITE PLAN

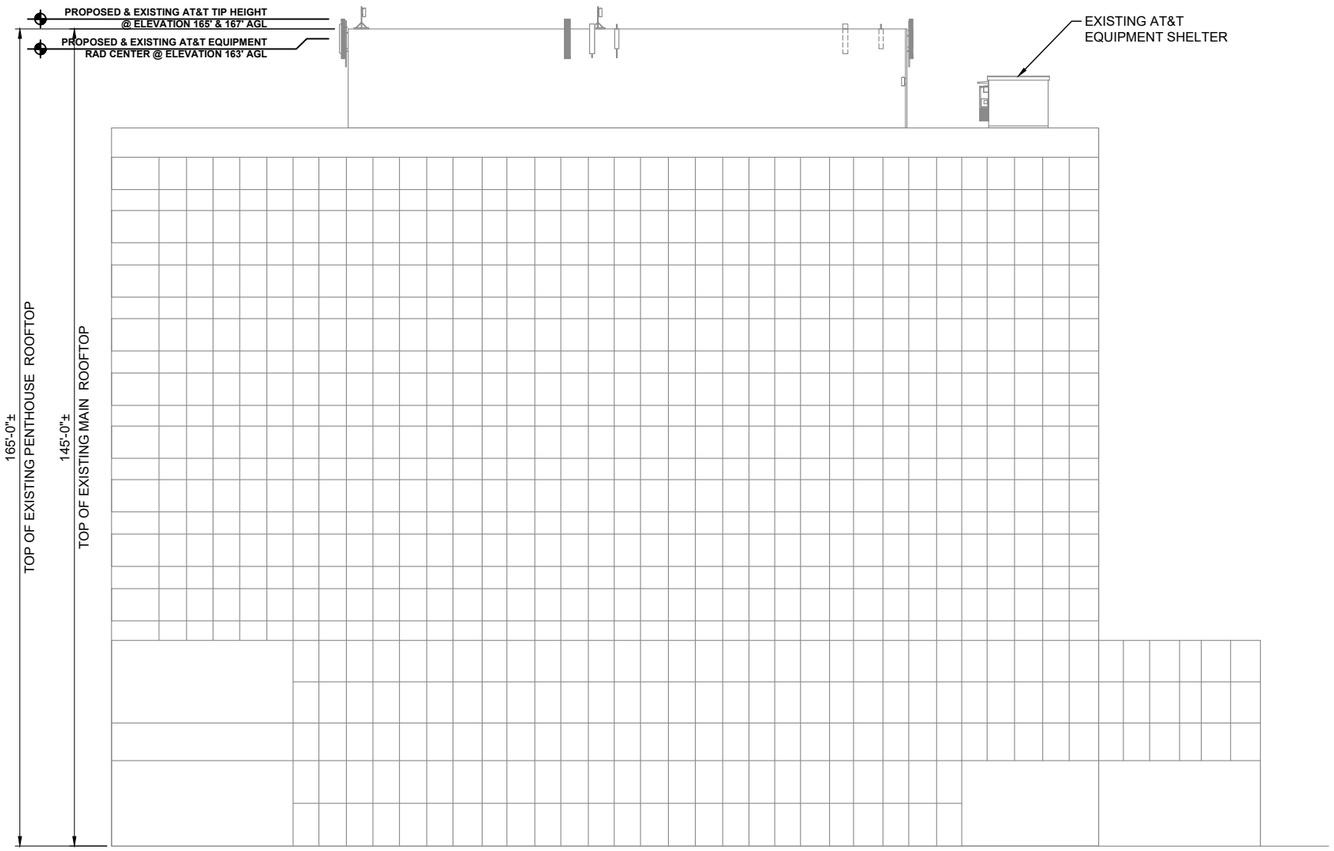
C-1

TOP-SIDE SCOPE OF WORK:

-REMOVE ALL COAX LINES BESIDES (6) TO REMAIN (2 PER SECTOR)
-REMOVE (3) 2" CONDUITS AND ASSOCIATED POWER/FIBERS (1 PER SECTOR)
-REMOVE (3) 700 RRH AND (3) 2100 RRHS AND ASSOCIATED JUMPERS/FIBER/POWER (2 PER SECTOR)
-REMOVE (3) DC2S (1 PER SECTOR)
-REMOVE (6) ANTENNAS (2 PER SECTOR)
-INSTALL (6) NNHH-65C-R4 ANTENNAS IN POSITIONS #1 AND #3 (2 PER SECTOR)
-MOVE (2) UMTS ANTENNAS IN POSITION #1 TO POSITION #2 (BETA/GAMMA SECTOR)
-INSTALL (3) NOKIA B14/B12/B29 TRIBAND RRHS ON (E) UNISTRUT FRAME (1 PER SECTOR)
-INSTALL (3) AIRSCALE B25/B66 DUALBAND RRHS ON (E) UNISTRUT FRAME (1 PER SECTOR)
-INSTALL (3) AIRSCALE B5 RRHS ON (E) UNISTRUT FRAME (1 PER SECTOR)
-INSTALL (3) DC6 BOXES ON (E) UNISTRUT FRAME (1 PER SECTOR)
-INSTALL (3) 6/C 6 AWG POWER TRUNKS FROM (E) DC12S TO (N) DC6 BOXES (1 PER SECTOR)
-INSTALL (3) 24 PAIR FIBER TRUNKS FROM (N) FIBER TRAYS TO (N) DC6 BOXES (1 PER SECTOR)
-INSTALL (9) 2/C 8 AWG POWER RUNS FROM (N) DC6 BOXES TO (N) RRHS (3 PER SECTOR)
-INSTALL (9) DUAL PAIR FIBER JUMPERS FROM (N) DC6 BOXES TO (N) RRHS (3 PER SECTOR)
-INSTALL (6) RET CABLES FROM (N) ANTENNAS TO (N) & (E) RRHS PER RFDS/MARKET SPEC (2 PER SECTOR)
-INSTALL (36) HM-HM JUMPERS FROM (N) ANTENNAS TO (N) RRHS (12 PER SECTOR)
-INSTALL (8) DM-HM JUMPERS FROM (E) WCS RRHS TO (E) WCS FILTERS (ALPHA/BETA SECTOR)
-INSTALL (8) HM-HM JUMPERS FROM (E) WCS FILTERS TO (N) ANTENNAS (ALPHA/BETA SECTOR)
-INSTALL (4) DM-HM JUMPERS FROM (E) WCS RRH TO (N) ANTENNAS (GAMMA SECTOR)
-LABEL ALL ANTENNAS/RRUS
-SECURE JUMPERS, POWER CABLES, FIBER, & RET CABLES WITH PIM RATED SNAP-INS
-PAINT ANTENNAS/JUMPERS ON BUILDING IF REQUIRED
-CONFIRM B5 RRH ANTENNAS ARE A MINIMUM OF 6' FROM THE B12/B14/B29 TRIBAND RRH ANTENNAS

1. EXISTING TOWER INFORMATION IS PROVIDED FOR REFERENCE ONLY. JACOBS ENGINEERING GROUP, INC. IS NOT RESPONSIBLE FOR THE ANALYSIS/DESIGN OF THE EXISTING TOWER, ITS CONNECTIONS & FOUNDATIONS. A STRUCTURAL ANALYSIS OF THE EXISTING TOWER AND FOUNDATIONS PERFORMED BY OTHERS. CONTRACTOR SHALL REFER TO THE LATEST STRUCTURAL ANALYSIS REPORT. MODIFICATIONS TO THE TOWER OR FOUNDATION THAT ARE NEEDED MUST BE PERFORMED PRIOR TO THE INSTALLATION OF THE EQUIPMENT SHOWN ON THE DRAWINGS.

2. CONTRACTOR SHALL VERIFY THE EXISTING ANTENNA CENTERLINE HEIGHT ABOVE GROUND LEVEL. PROPOSED ANTENNA CENTERLINE SHALL MATCH EXISTING.



NOTES:

1. ALL CABLES SHALL BE GROUNDED WITH COAXIAL CABLE GROUNDING KITS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.
   A. GROUNDING AT THE ANTENNA LEVEL.
   B. GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200', ADDITIONAL CABLE ROUNDING REQUIRED.
   C. GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
   D. GROUNDING OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
   E. GROUNDING INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.
2. ALL PROPOSED GROUNDING BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUNDING BAR DOWNLEADS A MINIMUM DISTANCE OF 4'-0" BELOW GROUNDING BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.
3. THE CONTRACTORS SHALL BE RESPONSIBLE FOR VERIFYING THE ANTENNA AND THE COAX CONFIGURATION IS THE CORRECT MAKE AND MODELS, PRIOR TO INSTALLATION.
4. ANTENNA CONTRACTOR SHALL FURNISH AND INSTALL A SECTOR ANTENNA MOUNT, INCLUDING ALL HARDWARE, WHEN APPLICABLE.
5. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S SPECIFICATION & RECOMMENDATIONS.
6. CONTRACTOR SHALL REFERENCE THE TOWER STRUCTURAL ANALYSIS/DESIGN DRAWINGS FOR DIRECTIONS ON CABLE DISTRIBUTION/ROUTING.

ANTENNA MOUNTING NOTES:

1. DESIGN AND CONSTRUCTION OF ANTENNA SUPPORTS SHALL CONFORM TO CURRENT ANSI/EIA/TIA-222 "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES" OR APPLICABLE LOCAL CODES. DESIGN WIND LOADING OBTAINED FROM ANSI/TIA-222-G, OR THE LATEST VERSION.
2. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS OTHERWISE NOTED.
3. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS OTHERWISE NOTED.
4. DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY COLD GALVANIZING IN ACCORDANCE WITH ASTM A780.
5. ALL ANTENNA MOUNTS SHALL BE INSTALLED WITH LOCK NUTS, DOUBLE NUTS AND SHALL BE TORQUED TO MANUFACTURER'S RECOMMENDATIONS.
6. ANTENNA CONTRACTOR SHALL ENSURE ALL ANTENNA MOUNTING PIPES ARE PLUMB AND LEVEL.
7. MULTI PORT ANTENNAS: TERMINATE UNUSED ANTENNA PORTS WITH CONNECTOR CAP & WEATHERPROOF THOROUGHLY. JUMPERS FROM THE TMA'S MUST TERMINATE TO OPPOSITE POLARIZATION'S IN EACH SECTOR.
8. CONTRACTOR SHALL RECORD THE SERIAL #, SECTOR, AND POSITION OF EACH ACTUATOR INSTALLED AT THE ANTENNAS AND PROVIDE THE DOCUMENTATION TO AT&T.
9. CONTRACTOR SHALL INSTALL ANTENNA PER MANUFACTURER'S RECOMMENDATION FOR INSTALLATION AND GROUNDING.

COAXIAL ANTENNA CABLE NOTES:

1. TYPES AND SIZES OF THE ANTENNA CABLE ARE BASED ON ESTIMATED LENGTHS. PRIOR TO ORDERING CABLE, CONTRACTOR SHALL VERIFY ACTUAL LENGTH BASED ON CONSTRUCTION LAYOUT AND NOTIFY THE PROJECT MANAGER IF ACTUAL LENGTHS EXCEED ESTIMATED LENGTHS.
2. CONTRACTOR SHALL VERIFY THE DOWN-TILT OF EACH ANTENNA WITH A DIGITAL LEVEL.
3. CONTRACTOR TO CONFIRM COAX COLOR CODING PRIOR TO CONSTRUCTION. REFER TO "ANTENNA SYSTEM LABELING STANDARD" ND-00027, REFER TO THE LATEST VERSION.
4. ALL JUMPERS TO THE ANTENNAS FROM THE MAIN TRANSMISSION LINE WILL BE 1/2" DIA. LDF AND SHALL NOT EXCEED 6'-0".
5. ALL COAXIAL CABLE WILL BE SECURED TO THE DESIGNED SUPPORT STRUCTURE, IN AN APPROVED MANNER, AT DISTANCES NOT TO EXCEED 4'-0" O.C.
6. CONTRACTOR MUST FOLLOW ALL MANUFACTURER'S RECOMMENDATIONS REGARDING BOTH THE INSTALLATION AND GROUNDING OF ALL COAXIAL CABLES, CONNECTORS, ANTENNAS, AND ALL OTHER EQUIPMENT.
7. WEATHERPROOF ALL ANTENNA CONNECTORS WITH SELF AMALGAMATING TAPE. WEATHERPROOFING SHALL BE COMPLETED IN STRICT ACCORDANCE WITH AT&T STANDARDS.
8. CONTRACTOR SHALL GROUND ALL EQUIPMENT, INCLUDING ANTENNAS, RET MOTORS, TMA'S, COAX CABLES, AND RET CONTROL CABLES AS A COMPLETE SYSTEM. GROUNDING SHALL BE EXECUTED BY QUALIFIED WIREMEN IN COMPLIANCE WITH MANUFACTURER'S SPECIFICATION AND RECOMMENDATION.
9. CONTRACTOR SHALL PROVIDE STRAIN-RELIEF AND CABLE SUPPORTS FOR ALL CABLE ASSEMBLIES, COAX CABLES, AND RET CONTROL CABLES. CABLE STRAIN-RELIEFS AND CABLE SUPPORTS SHALL BE APPROVED FOR THE PURPOSE. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.

FIBER & POWER CABLE MOUNTING NOTES:

1. CABLE TO BE SUPPORTED USING 1/2" SNAP-INS (PIM RATED)(SNAPTEK POLYMERS OR EQUIVALENT) OR 1/2" BUTTERFLY HANGERS (PIM RATED)(SNAPTEK POLYMERS OR EQUIVALENT) OR ENGINEER APPROVED EQUAL..
2. CABLE TO BE SUPPORTED EVERY 3'.
3. ALL SNAP-INS, RUBBER CABLE INSERTS, AND MOUNTING HARDWARE FOR FIBER AND DC CABLES SHALL BE SUPPLIED FROM ROSENBERGER.
4. RRUS TO BE INSTALLED WITHIN 16.4' (5.0 METERS) OF THE SURGE SUPPRESSOR. (CONTRACTOR TO FIELD VERIFY).

TORQUE REQUIREMENTS:

1. ALL RF CONNECTIONS SHALL BE TIGHTENED BY A TORQUE WRENCH.
2. ALL RF CONNECTIONS, GROUNDING HARDWARE AND ANTENNA HARDWARE SHALL HAVE A TORQUE MARK INSTALLED IN A CONTINUOUS STRAIGHT LINE FROM BOTH SIDES OF THE CONNECTION.
   A. RF CONNECTION BOTH SIDES OF THE CONNECTOR.
   B. GROUNDING AND ANTENNA HARDWARE ON THE NUT SIDE STARTING FROM THE THREADS TO THE SOLID SURFACE. EXAMPLE OF SOLID SURFACE: GROUND BAR, ANTENNA BRACKET METAL.
3. ALL 8M ANTENNA HARDWARE SHALL BE TIGHTENED TO 9 LB-FT (12 NM).
4. ALL 12M ANTENNA HARDWARE SHALL BE TIGHTENED TO 43 LB-FT (58 NM).
5. ALL GROUNDING HARDWARE SHALL TIGHTENED UNTIL THE LOCK WASHER COLLAPSES AND THE GROUND IS NO LONGER LOOSE.
6. ALL DIN TYPE CONNECTIONS ARE TO BE TORQUED TO 18-22 LB-FT (24.4 - 29.8 NM).
7. ALL N TYPE CONNECTIONS ARE TO BE TORQUED TO 15-20 LB-IN (1.7 - 2.3 NM).

1 **SITE ELEVATION** — SCALE: N.T.S.

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APPROVALS

LANDLORD _____
LEASING _____
R.F. _____
ZONING _____
CONSTRUCTION _____
A & E _____

PROJECT NO: EP4TURWL
DRAWN BY: RM
CHECKED BY: LW

SUBMITTALS

1	09/25/20	JX COMMENTS
0	05/14/20	ISSUED

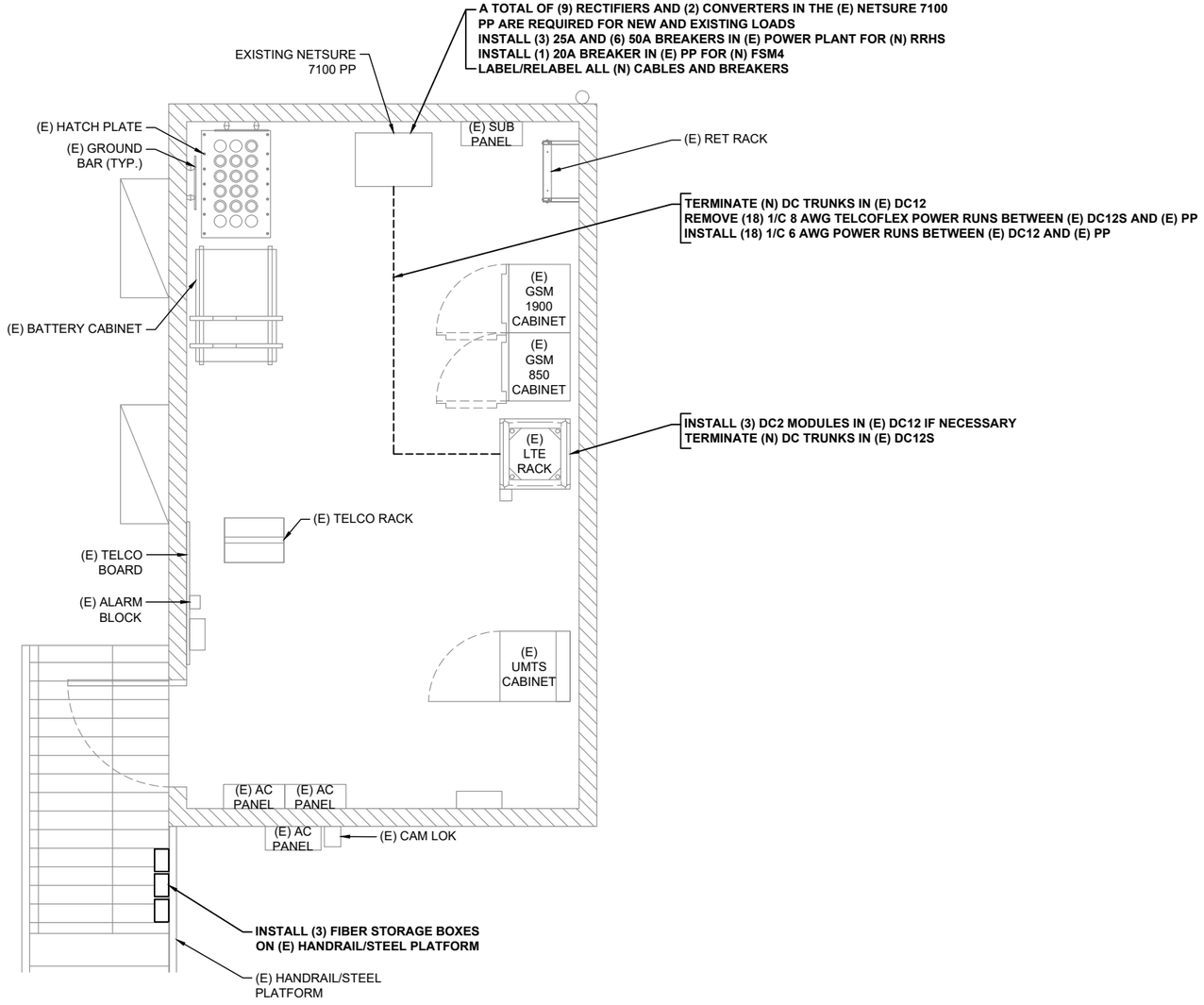
FA# 10096268
USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

SITE ELEVATION

C-2

TRUE NORTH



BOTTOMSIDE:
-INSTALL (3) DC2 MODULES IN (E) DC12 IF NECESSARY
-INSTALL A 20A BREAKER IN (E) POWER PLANT FOR (P) FSM4
-A TOTAL OF (9) RECTIFIERS AND (2) CONVERTERS IN THE (E) NETSURE 7100 PP ARE REQUIRED FOR NEW AND EXISTING LOADS
-TERMINATE (N) DC TRUNKS IN (E) DC12S
-INSTALL (3) FIBER STORAGE BOXES ON (E) HANDRAIL/STEEL PLATFORM
-REMOVE (18) 1/C 8 AWG TELCOFLEX POWER RUNS BETWEEN (E) DC12S AND (E) PP
-INSTALL (18) 1/C 6 AWG POWER RUNS BETWEEN (E) DC12 AND (E) PP
-INSTALL (3) 25A AND (6) 50A BREAKERS IN (E) POWER PLANT FOR (N) RRHS
-LABEL ALL (N) EQUIPMENT WITH PHENOLIC TAGS
-LABEL/RELABEL ALL (N) CABLES AND BREAKERS
-SUPPORT ALL JUMPERS, DC POWER, AND FIBER CABLES PER AT&T SPECIFICATIONS
-GROUND ALL (N) EQUIPMENT PER AT&T SPECIFICATIONS
-VERIFY CORRECT RATE SFP CARDS IN BBU AND RRH

1 **EXISTING EQUIPMENT PLAN**

SCALE: 1/2" = 1'-0"

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FA# 10096268
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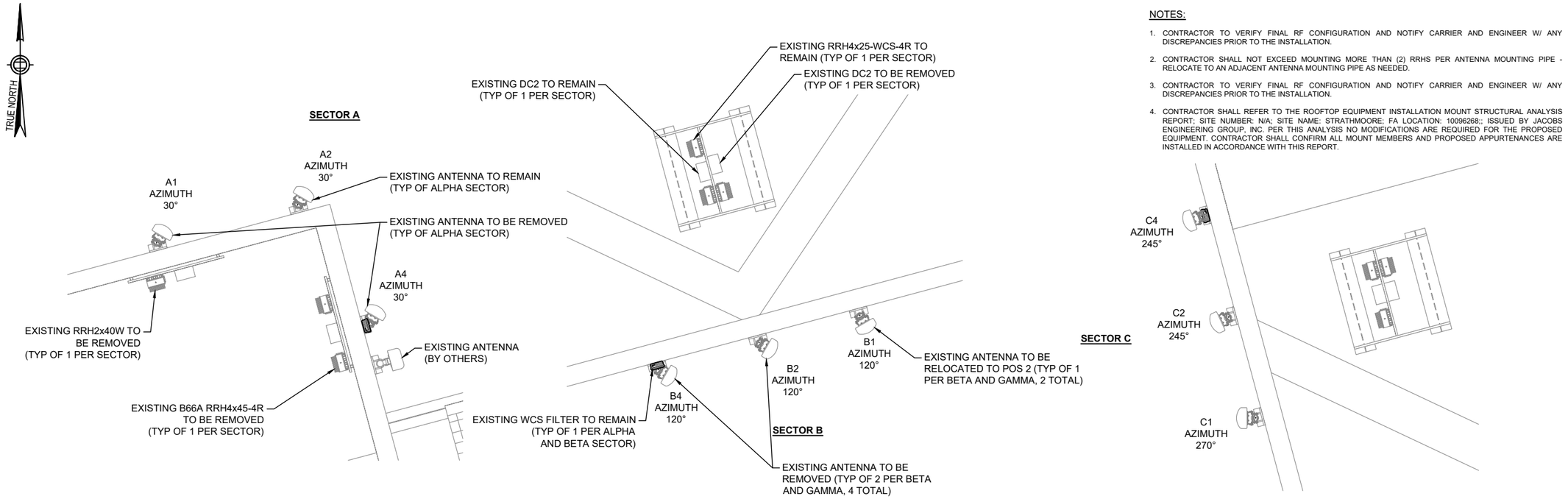
7101 WISCONSIN AVENUE
BETHESDA, MD 20814

EXISTING & PROPOSED EQUIPMENT LAYOUT

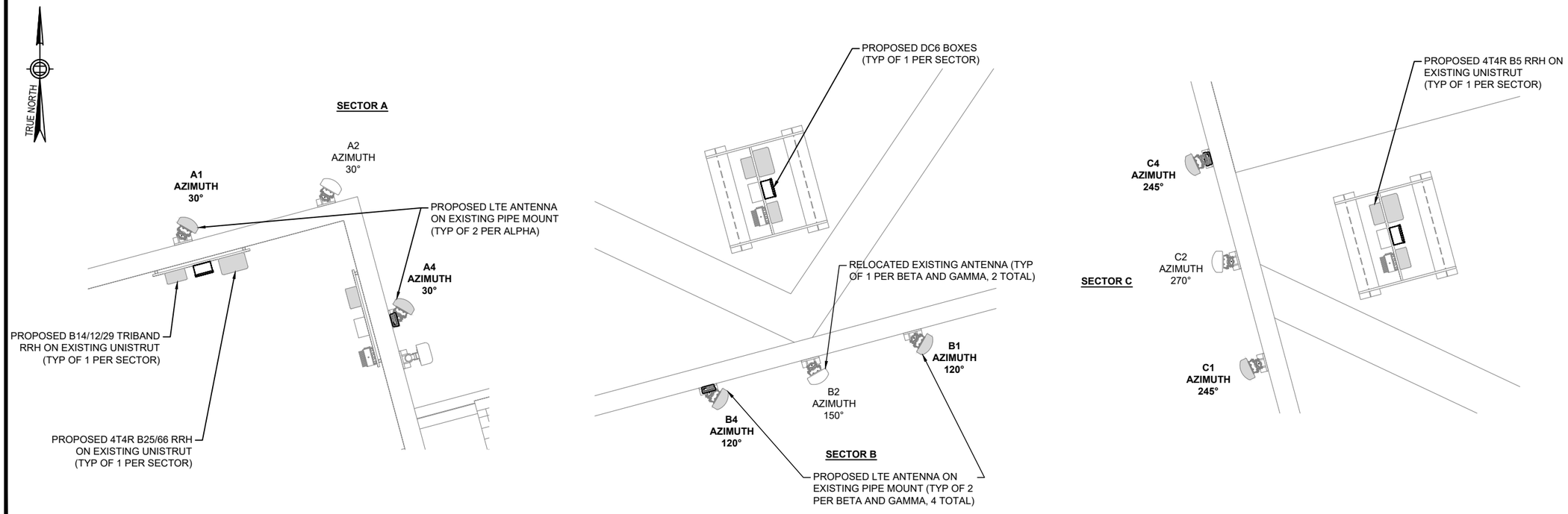
C-3



ELEVATION 163'

1 EXISTING ANTENNA LAYOUT

SCALE: N.T.S.



ELEVATION 163'

2 PROPOSED ANTENNA LAYOUT

SCALE: N.T.S.

NOTES:

1. CONTRACTOR TO VERIFY FINAL RF CONFIGURATION AND NOTIFY CARRIER AND ENGINEER W/ ANY DISCREPANCIES PRIOR TO THE INSTALLATION.
2. CONTRACTOR SHALL NOT EXCEED MOUNTING MORE THAN (2) RRHS PER ANTENNA MOUNTING PIPE - RELOCATE TO AN ADJACENT ANTENNA MOUNTING PIPE AS NEEDED.
3. CONTRACTOR TO VERIFY FINAL RF CONFIGURATION AND NOTIFY CARRIER AND ENGINEER W/ ANY DISCREPANCIES PRIOR TO THE INSTALLATION.
4. CONTRACTOR SHALL REFER TO THE ROOFTOP EQUIPMENT INSTALLATION MOUNT STRUCTURAL ANALYSIS REPORT; SITE NUMBER: N/A; SITE NAME: STRATHMOORE; FA LOCATION: 10096268;; ISSUED BY JACOBS ENGINEERING GROUP, INC. PER THIS ANALYSIS NO MODIFICATIONS ARE REQUIRED FOR THE PROPOSED EQUIPMENT. CONTRACTOR SHALL CONFIRM ALL MOUNT MEMBERS AND PROPOSED APPURTENANCES ARE INSTALLED IN ACCORDANCE WITH THIS REPORT.

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FA# 10096268
USID# 16252
STRATHMOORE

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BETHESDA, MD 20814

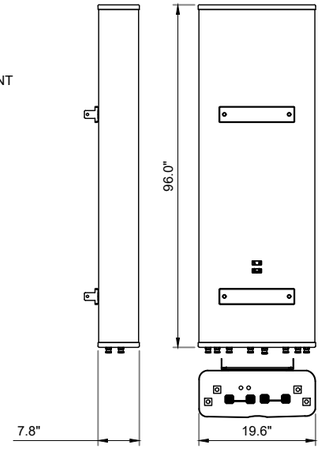
EXISTING & PROPOSED
ANTENNA LAYOUT

C-4

1 ANTENNA SPECIFICATIONS

SCALE: NTS

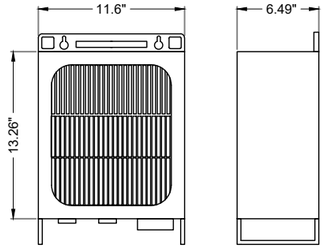
MANUFACTURER:	COMMSCOPE
MODEL NO.:	NNHH-65C-R4
RADOME MATERIAL:	FIBERGLASS, UV RESISTANT
COLOR:	LIGHT GRAY
DIMENSIONS (LxWxD):	96.0" x 19.6" x 7.8" 2438mm x 498mm x 197mm
WEIGHT (lbs):	99.2
CONNECTOR:	8 x 4.3-10 FEMALE
FRONT WIND LOAD:	214.5 LBF @ 150 KM/H 954 N @ 150 KM/H
SIDE WIND LOAD:	74.4 LBF @ 150 KM/H 331 N @ 150 KM/H
WIND SPEED MAX.:	>150 MPH (>241 KM/H)
WIND LOADING, MAX.:	277.6 LBF @ 150 KM/H 1235 N @ 150 KM/H



2 AIRSCALE 4T4R B5 160W AHCA SPECIFICATIONS

SCALE: NTS

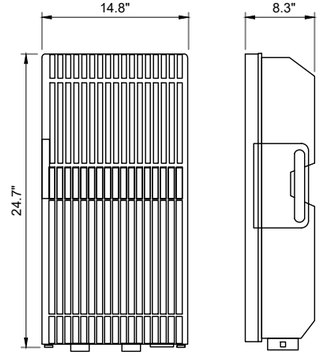
MANUFACTURER:	NOKIA
MODEL NO.:	AIRSCALE RRH 4T4R B5 160W
DIMENSIONS (HxWxD):	13.26" x 11.6" x 6.49" 337mm x 295mm x 165mm
WEIGHT (lbs):	36.8
POWER SUPPLY:	-48V
TEMP. W/O SOLAR LOAD:	-40 °C TO 55°C -40 °F TO 131°F



3 AIRSCALE 4T4R B12/B14/B29 TRI-BAND SPECIFICATIONS

SCALE: NTS

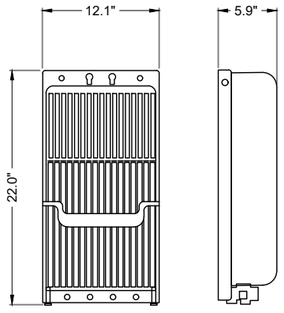
MANUFACTURER:	NOKIA
MODEL NO.:	AIRSCALE RRH 4T4R B14/B12/B29 TRIBAND
TECHNOLOGY:	TRI BAND
DIMENSIONS (HxWxD):	24.7" x 14.8" x 8.3" 627mm x 376mm x 210mm
WEIGHT (lbs):	<101.4
POWER SUPPLY:	-48V
TEMP. W/O SOLAR LOAD:	-40 °C TO 55°C -40 °F TO 131°F



4 AIRSCALE 4T4R B25/66 320W AHFIB SPECIFICATIONS

SCALE: NTS

MANUFACTURER:	NOKIA
MODEL NO.:	AIRSCALE RRH 4T4R B25/66 320W AHFIB
TECHNOLOGY:	DUAL BAND
DIMENSIONS (HxWxD):	22.0" x 12.1" x 5.9" 560mm x 308mm x 149mm
WEIGHT (lbs):	<66.1
POWER SUPPLY:	-48V
TEMP. W/O SOLAR LOAD:	-40 °C TO 55°C -40 °F TO 131°F

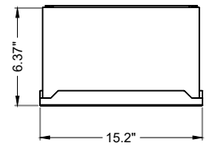


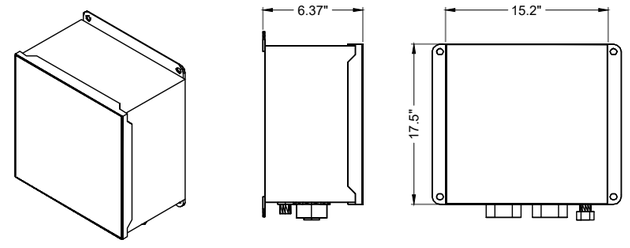
5 RAYCAP SPECIFICATIONS

SCALE: NTS

RAYCAP DC6-48-60-0-1E DC POWER OVER VOLTAGE DETAIL

DIMENSIONS (HxWxD):	17.5" x 15.2" x 6.37"
TOTAL WEIGHT (lbs):	35.0
NOMINAL OPERATING VOLTAGE:	48 VDC
NOMINAL DISCHARGE VOLTAGE:	20 kA 8/20 µs
MAXIMUM DISCHARGE CURRENT:	60 kA 8/20 µs
MAX. CONTINUOUS OPERATING CURRENT:	75 VDC
VOLTAGE PROTECTION RATING:	400 V





6 DETAIL NOT USED

SCALE: NTS

7 DETAIL NOT USED

SCALE: NTS

8 DETAIL NOT USED

SCALE: NTS

9 DETAIL NOT USED

SCALE: NTS

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SUITE A
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1	09/25/20	JX COMMENTS
0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

SITE DETAILS

C-5

SITE DATA INPUT WORKSHEET - INDOOR SITE POWER ESTIMATE TOOL

STEP 1: ENTER QUANTITIES OF EQUIPMENT & DC OPERATING VOLTAGE:

NOTE: LOAD VALUES FOR ANY EQUIPMENT CAN BE USER SPECIFIED ON THE POWER CONSUMPTION WORKSHEET - USER CHANGES TO DEFAULT LOAD VALUES ARE HIGHLIGHTED IN BRIGHT YELLOW

STEP 2: ENTER DC PLANT TYPE FROM DROP-DOWN MENU:

("GENERIC" +24V or -48V DC PLANT CAN BE SELECTED FOR ANY MANUFACTURER'S DC PLANT)

Emerson STD -48VDC NetSure 721 Plant 800A NEQ.15920

-48V PRIMARY DC PLANT SPECIFIED

(DC PLANT CONFIGURATION CAN BE REVIEWED ON DC PLANT WORKSHEET)

STEP 2A: THIS STEP ONLY SHOWN IF "GENERIC" DC PLANT PLANT TYPE HAS BEEN SELECTED:

STEP 2B: THIS STEP ONLY SHOWN IF TYCO GPS2424 DC PLANT PLANT TYPE HAS BEEN SELECTED:

STEP 3: DO YOU WANT TO CONFIGURE A STANDARD STAND-ALONE DC CONVERTER SYSTEM? N

NOTE: IF YOU SELECT "Y" ANY INTEGRATED DC PLANT CONVERTER OPTIONS WILL BE BYPASSED

STEP 4: ENTER INDOOR SITE BUILDING/SHELTER DATA:

(Square footage used for interior AC lighting LOAD calculation)

SELECT SITE BUILDING TYPE & SIZE: 11' 5" x 20' SHELTER

STEP 5: ENTER SITE HVAC SYSTEM DATA:

SPECIFY INDIVIDUAL HVAC UNIT SIZE (TONS): 4 SPECIFY QUANTITY: 2

DOES SITE HAVE ADDITIONAL HVAC (DIFFERENT SIZE)? N

ARE THERE SITE HVAC HEATING UNITS? N

TOTAL SPECIFIED SITE HVAC: 8-TONS ESTIMATED HVAC REQUIREMENT: TWO 4-TON UNITS

THIS TOOL DOES NOT APPLY TO SITES THAT ARE EQUIPPED WITH FREE STANDING DIRECT AIR COOLING

STEP 6: ENTER SITE STATIONARY GENERATOR DATA:

DOES SITE HAVE A STATIONARY GENERATOR? N

ESTIMATED CAPACITY REQUIRED: 31 KW (NO SITE GENERATOR)

STEP 7: ENTER SITE BATTERY CONFIGURATION DATA:

SELECT SINGLE STRING BATTERY CAPACITY (AH): 1496

SPECIFY TOTAL QUANTITY OF BATTERY STRINGS: 1

TOTAL SITE BATTERY CAPACITY (AH): 1496

NOTE: NON-STANDARD BATTERY CAPACITY HAS BEEN SPECIFIED

(4) 4/0 CONNECTION CABLES PER POLARITY ON EACH STRING ARE REQUIRED

ESTIMATED BATTERY RESERVE TIME: 8.78 HOURS (NO SITE GENSET)

SITES WITH STATIONARY GENSETS SHALL BE ENGINEERED WITH A MAX OF 3 SHELVES of 180 AH BATTERIES
(3 strings at -48v or 6 strings at +24v) - ALL OTHER SITES A MINIMUM OF 4 HOURS

SITE POWER CALCULATION TOOL - VERSION 4.3 - October 17, 2017 R. BADGERO

ANY QUESTIONS PLEASE CONTACT RICK BADGERO (RB6620@ATT.COM)

POWER SUMMARY:
CURRENT RECTIFIER COUNT: 9
REQUIRED RECTIFIERS COUNT: 9
CURRENT 48V CONVERTER COUNT: 4
REQUIRED 48V CONVERTER COUNT: 2

QTY	RADIO HEADS - Outdoor	VOLTAGE	WATTS
	Ericsson		
0	RRUS 01 B2, B5 (80W)	48	0
0	RRUS 01 B12 (60W)	48	0
0	RRUS 11 B12 (2x30W)	48	0
0	RRUS 11 B2, B4, B5, B12 (2x40W)	48	0
0	RRUS 12 B2, B4, B5 (2x60W)	48	0
0	RRUS 32 B2 (4x40W)	48	0
0	RRUS 32 B30 (4x25W)	48	0
0	RRUS 32 B66A	48	0
0	RRUS A2 B2, B4, B12	48	0
0	RRUSE2 B29	48	0
0	RRUW B2, B5	48	0
0	AIR 21 (60W)	48	0
0	RRUS 4478 B14	48	0
	(FUTURE)		
	A-LU		
0	4x45 B66A	48	0
0	FDD RRH2x40-07L (UHLA) B17	48	0
0	RRH2x40-07L-AT (UHLB) B17	48	0
0	B25 RRH4x30 (UHFA) B25	48	0
0	B25 RRH2x60 (UHFA) B25	48	0
0	2X60W-850 B5	48	0
0	2X60W-1900 B2	48	0
0	2X60W-1900A B2	48	0
0	RRH2x40-07L-DE (UHLC) B29	48	0
0	RRH 4T4R (FRBI) B14	48	0
3	RRH4X25 B30	48	1248
	(FUTURE)		0
	(FUTURE)		0

QTY	RADIO HEADS - Indoor	VOLTAGE	WATTS
	Ericsson		
0	RRUS 01 B2, B5 (80W)	48	0
0	RRUS 01 B12 (60W)	48	0
0	RRUS 11 B12 (2x30W)	48	0
0	RRUS 11 B2, B4, B5, B12 (2x40W)	48	0
0	RRUS 12 B2, B4, B5 (2x60W)	48	0
0	RRUS 32 B2 (4x40W)	48	0
0	RRUS 32 B30 (4x25W)	48	0
0	RRUS 32 B66A	48	0
0	RRUS A2 B2, B4, B12	48	0
0	RRUSE2 B29	48	0
0	RRUW B2, B5	48	0
0	AIR 21 (60W)	48	0
	RRUS 4478 B14	48	0
	(FUTURE)		0
	A-LU		
0	4x45 B66A	48	0
0	FDD RRH2x40-07L (UHLA) B17	48	0
0	RRH2x40-07L-AT (UHLB) B17	48	0
0	B25 RRH4x30 (UHFA) B25	48	0
0	B25 RRH2x60 (UHFA) B25	48	0
0	2X60W-850 B5	48	0
0	2X60W-1900 B2	48	0
0	2X60W-1900A B2	48	0
0	RRH2x40-07L-DE (UHLC) B29	48	0
0	RRH 4T4R (FRBI) B14	48	0
	RRH4X25 B30	48	0
	(FUTURE)		0
	(FUTURE)		0

QTY	LTE 4G & Multi-Std EQUIPMENT	VOLTAGE	WATTS
0	A-LU 9926 LTE BBU (w/max. 3 eCEM-u)	48	0
2	Nokia FSM-4	48	1996
	(FUTURE)		
	(FUTURE)		
	(FUTURE)		
	(FUTURE)		
0	Ericsson LTE IRBS6601 BBU - 1 DUL	48	0
0	Ericsson LTE RBS6601 BBU - 2 DUL	48	0
0	Ericsson W/CDMA RBS6601 - 1 DUW	48	0
0	Ericsson LTE RBS6601 BBU - 1DUS	48	0
0	Ericsson LTE RBS6601 BBU - 2DUS	48	0
0	Ericsson XMU	48	0
0	Ericsson LTE RBS5216	48	0
	(FUTURE)		
	(FUTURE)		
	(FUTURE)		
	(FUTURE)		

QTY	UMTS 3G EQUIPMENT	VOLTAGE	WATTS
1	A-LU MACRO NodeB (3S1C - 40W)	24	1014
0	A-LU MACRO NodeB (3S2C - 40W)	24	0
0	A-LU MACRO NodeB (3S3C - 40W)	24	0
0	A-LU MACRO NodeB (3S4C - 40W)	24	0
0	A-LU MACRO NodeB (3S5C - 40W - 2 CAB)	24	0
0	A-LU MICRO NodeB	24	0
0	A-LU 9396 d2U Distributed NodeB MU	48	0
0	A-LU 9396 d4U Distributed NodeB MU	48	0
	(FUTURE)		
	(FUTURE)		
0	Ericsson RBS3206 NodeB 3S1C - 1 CAB	24	0
0	Ericsson RBS3206 NodeB 3S2C - 1 CAB	24	0
	NON-OBIF Ericsson 3rd, 4th & 5th Carrier		
0	Ericsson RBS3206 NodeB 3S3C - 2 CAB	24	0
0	Ericsson RBS3206 NodeB 3S4C - 2 CAB	24	0
0	Ericsson RBS3206 NodeB 3S5C - 3 CAB	24	0
	OBIF Ericsson 3rd, 4th & 5th Carrier		
0	Ericsson RBS3206 NodeB 3S3C - 1 CAB (Select RRUS from left section)	24	0
0	Ericsson RBS3206 NodeB 3S4C - 1 CAB (Select RRUS from left section)	24	0
0	Ericsson RBS3206 NodeB 3S4C - 1 CAB (Select RRUS from left section)	24	0
0	Ericsson RBS3206 NodeB 3S5C - 2 CAB (Select RRUS from left section)	24	0
0	Ericsson 3303 MICRO NodeB	24	0
0	Ericsson RBS3418 Distributed NodeB MU	48	0
	(FUTURE)		
	(FUTURE)		

(CUSTOM AC LOADS DEFINED ON POWER CONSUMPTION WORKSHEET)

QTY	USER SPECIFIED AC EQUIPMENT	VOLTAGE	KVA
0	Emerson battery heater	120	0
0	Emerson GFCI	120	0
0	Argus HVAC	120	0
0	VZ	120	0
0	UMTS HEATER	240	0
0	GFCI	120	0
0	MARVAIR AC	240	0
0	MCLEAN AC	240	0
0	PURCELL AC	120	0
1	Tower Light	120	1.44
	TOTAL USER SPECIFIED KVA:		1.44
	TOTAL 120VAC AMPS:	12	
	TOTAL 240VAC AMPS:	0	

QTY	ANCILLARY CELL SITE EQUIPMENT	VOLTAGE	WATTS
1	A-LU 7705 SIAD	48	80
	(FUTURE)		
0	A-LU MPR-9500 MW Service Switch - MSS	48	0
0	A-Lu MPR-9500 MW Outdoor Unit - ODU	48	0
0	A-Lu MPR-9500 MW MPT-HL (Indoor)	48	0
	(FUTURE)		
0	Cisco MWR-2941 SIAD	48	0
0	Cisco SIAD ASR-901	48	0
0	Cisco 15310 EOS (SONET) MUX	48	0
0	Cisco 15454 MSP (MW Ring Config.)	48	0
	(FUTURE)		
0	Tru-Position LMU (E911)	48	0
0	DC Free Air (per HVAC unit)	48	0
1	GENERIC Ethernet NID	24	60
0	GENERIC Hydrogen Detector	48	0
1	GENERIC RET Controller	24	60
0	GENERIC RXAIT	48	0
0	GENERIC Smoke Detector	48	0
0	GENERIC TMA System	48	0
0	GENERIC Tower Lighting (DC)	48	0
0	NG480	48	0
0	Cisco 2911	48	0
	(FUTURE)		
	(FUTURE)		
	(FUTURE)		
	(FUTURE)		
	(FUTURE)		

QTY	TX RF AMP (MCPA or SCPA) EQPT.	VOLTAGE	WATTS
0	Andrew (12 module mcpa FRAME)	24	0
0	Andrew 135 Watt Module	24	0
	(FUTURE)		
0	Powerwave 12 module mcpa FRAME)	24	0
0	Powerwave 90 Watt Module	24	0
0	Powerwave 120 Watt Module	24	0
0	Powerwave 180 Watt Module	24	0
	(FUTURE)		
0	CCI 125 Watt DAB SCPA Module	24	0
0	CCI 125 Watt DAC SCPA Module	24	0
	(FUTURE)		

(CUSTOM DC LOADS DEFINED ON POWER CONSUMPTION WORKSHEET)

QTY	USER SPECIFIED DC EQUIPMENT	VOLTAGE	WATTS
0	FLX16 HEATERS	48	0
0	9412 Heaters	48	0
3	B25/66 Dual Band RRH	48	3600
0	B12/14 Dual Band RRH	48	0
3	B5 850 LTE RRH	48	1626
0	700 DE RRH	48	0
0	B30	48	0
3	B12/B14/B29	48	3300
0	B5/B29	48	0
0		48	0
0		48	0
0		48	0
0		48	0
0		48	0
0		48	0
	TOTAL USER SPECIFIED WATTS:		8526
	TOTAL +24V (27V) AMPS:	0	
	TOTAL -48V (54V) AMPS:	157.9	

-48V PRIMARY VOLTAGE DC PLANT SPECIFIED				
+24VDC EQUIPMENT LOAD:	1134 WATTS	=	42 AMPS	at +24V
-48VDC EQUIPMENT LOAD:	11850 WATTS	=	220 AMPS	at -48V
28 AMPS (1475 Watts) AT PRIMARY 48V REQUIRED TO SUPPORT 24V DC CONVERTER SYSTEM				
TOTAL PRIMARY 48V LOAD:	13325 WATTS	=	247 AMPS	at -48V

(DC PLANT CONFIGURATION CAN BE REVIEWED ON DC PLANT WORKSHEET)

DC PLANT: Emerson STD -48VDC NetSure 721 Plant 800A NEQ.15920	
-48V RECTIFIERS REQUIRED (N+1):	9
-48V RECTIFIER SLOTS:	22
CONV. TYPE: 0	
+24V CONVERTERS REQUIRED:	2
+24V CONVERTER SLOTS:	12
ESTIMATED BATTERY RESERVE TIME	
1 1496 AH 48V STRING =	8.78 HOURS (4 HOUR MINIMUM BATTERY RESERVE)

ESTIMATED SITE MAX. AC LOAD (AMPS):	172.13 AMPS
ESTIMATE 200A SERVICE SUFFICIENT	
SITE GENERATOR CAPACITY REQUIRED:	31 KW
ON SITE GENERATOR CAPACITY:	0 KW
(NO ON-SITE GENERATOR)	
RECOMMENDED HVAC SYSTEM:	TWO 4-TON
SPECIFIED SITE TOTAL HVAC CAPACITY:	8-TONS
ESTIMATE SUFFICIENT HVAC CAPACITY	

1 AC PANEL

SCALE: N.T.S.

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CHECKED BY: LW

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1	09/25/20	JX COMMENTS
0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

POWER STUDY

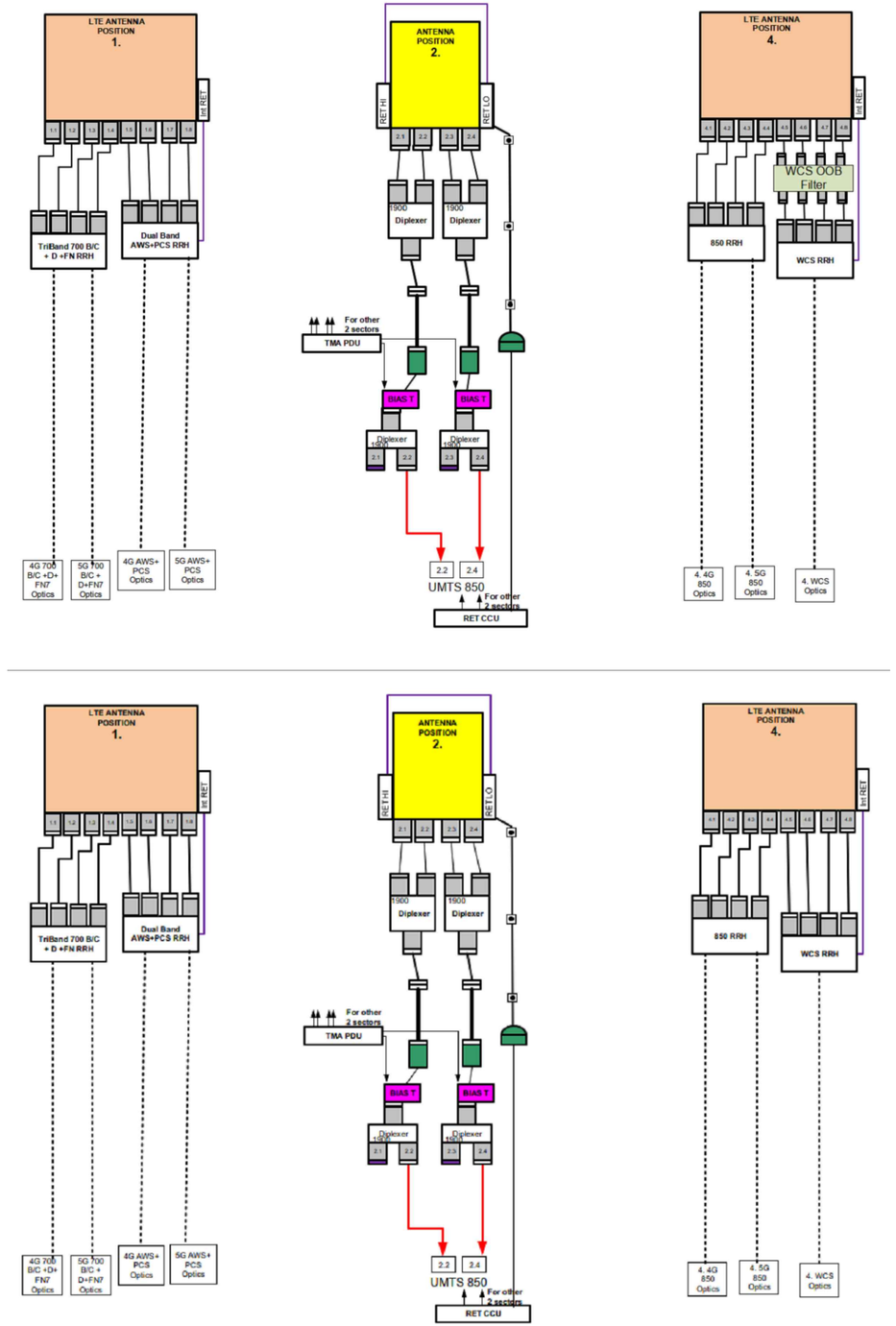
C-6

FINAL CONFIGURATION:
- (6) COMMSCOPE NNHH-65C-R4 ANTENNAS
- (3) KATHREIN 742264 ANTENNAS
- (6) LGP13519 DIPLEXERS
- (3) NOKIA B14/12/29 TRIBAND AHLBBA (700/700FN/700DE) RRHS
- (3) AIRSCALE DUAL RRH 4T4R B25/66 320W AHFIB (1900/2100) RRHS
- (3) AIRSCALE RRH 4T4R B5 160W AHCA (850) RRHS
- (3) RRH4X25-WCS-4R (2300) RRHS
- (3) DC2
- (3) DC6 BOX
- (6) 1-5/8" LINES OF COAX
- (3) 1" DC TRUNK (6 AWG 6 CONDUCTOR)
- (3) 2" CONDUIT
- (3) 3/8" FIBER TRUNK
- (0) 3/8" RET CABLES (USE WHATEVER CURRENTLY IS ON THE APP)

ANTENNA POSITION	ANTENNA MODEL	ANTENNA MAKE	AZIMUTH	MECH. TILT	ELEC. DOWNTILT	RAD CENTER FT. AGL.	TMAS, RRHS & DIPLEXERS	COAXIAL FEEDER	
							MODEL	SIZE	LENGTH
#1	**NNHH-65C-R4 (96.0"x19.6"x8.2") (121.3 LBS)**	**COMMSCOPE**	30°	2°	LTE 700: 12° LTE 1900: 2° LTE AWS: 5° LTE AWS: 5° LTE 700: 12° LTE 700: 12°	163'	**(1) RRH B14/12/29 (1) RRH 4T4R B25/66 AHFIB**	(6) SHARED FIBER	1 @ 90
#2	742264 (96.0"x19.6"x8.2") (121.3 LBS)	KATHREIN	30°	0°	UMTS 850: 12°	163'	**(2) LGP13519**	**7/8" ANDREW LDF5-50A**	**1 @ 90**
#3	-	-	-	-	-	-	-	-	-
#4	**NNHH-65C-R4 (96.0"x19.6"x8.2") (121.3 LBS)**	**COMMSCOPE**	**30°**	0°	**5G 850: 2°** **LTE WCS: 5°**	163'	**(1) RRH 4T4R B5 AHCA** (1) RRH4x25-WCS-4R	**(2) SHARED FIBER**	**1 @ 90**
#5	**NNHH-65C-R4 (96.0"x19.6"x8.2") (121.3 LBS)**	**COMMSCOPE**	120°	2°	LTE 700: 9° LTE 1900: 2° LTE AWS: 4° LTE AWS: 4° LTE 700: 9° LTE 700: 9°	163'	**(1) RRH B14/12/29 (1) RRH 4T4R B25/66 AHFIB**	(6) SHARED FIBER	1 @ 140
#6	742264 (96.0"x19.6"x8.2") (121.3 LBS)	KATHREIN	150°	0°	UMTS 850: 6°	163'	**(2) LGP13519**	**7/8" ANDREW LDF5-50A**	**1 @ 140**
#7	-	-	-	-	-	-	-	-	-
#8	**NNHH-65C-R4 (96.0"x19.6"x8.2") (121.3 LBS)**	**COMMSCOPE**	**120°**	0°	**5G 850: 9°** **LTE WCS: 4°**	163'	**(1) RRH 4T4R B5 AHCA** (1) RRH4x25-WCS-4R	**(2) SHARED FIBER**	**1 @ 140**
#9	**NNHH-65C-R4 (96.0"x19.6"x8.2") (121.3 LBS)**	**COMMSCOPE**	245°	2°	LTE 700: 12° LTE 1900: 6° LTE AWS: 6° LTE AWS: 6° LTE 700: 12° LTE 700: 12°	163'	**(1) RRH B14/12/29 (1) RRH 4T4R B25/66 AHFIB**	(6) SHARED FIBER	1 @ 190
#10	742264 (96.0"x19.6"x8.2") (121.3 LBS)	KATHREIN	270°	0°	UMTS 850: 2°	163'	**(2) LGP13519**	**7/8" ANDREW LDF5-50A**	**1 @ 190**
#11	-	-	-	-	-	-	-	-	-
#12	**NNHH-65C-R4 (96.0"x19.6"x8.2") (121.3 LBS)**	**COMMSCOPE**	**245°**	0°	**5G 850: 12°** **LTE WCS: 6°**	163'	**(1) RRH 4T4R B5 AHCA** (1) RRH4x25-WCS-4R	**(2) SHARED FIBER**	**1 @ 190**

NOTES:
1. VERIFY ANTENNA DIMENSIONS WITH MANUFACTURER.
2. ALL NEW ANTENNAS SHALL RECEIVE ANTENNA MOUNTING KIT FOR 2 TO 4.5 O.D. MAST (MODEL #DM380) (QTY. 2)
3. ALL NEW ANTENNAS SHALL RECEIVE A LOCKING TILT MOUNT KIT 0-13 DEGREES DOWNTILT ANGLE (MODEL #DB5083)
4. VERIFY FINAL ANTENNA MODEL WITH CURRENT VERSION OF THE **AT&T** RFDS.

1 **ANTENNA CHART** SCALE: N.T.S.



NOTES:
1. CONTRACTOR TO VERIFY FINAL RF CONFIGURATION AND NOTIFY CARRIER AND ENGINEER WITH ANY DISCREPANCIES PRIOR TO THE INSTALLATION.
2. PLUMBING DIAGRAM SHOWN IS BASED ON APPROVED FINAL RFDS V2020_0.1 DATED ON 01/10/20.

2 **RF EQUIPMENT SCHEMATIC** SCALE: N.T.S.

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APPROVALS

LANDLORD _____
LEASING _____
R.F. _____
ZONING _____
CONSTRUCTION _____
A & E _____

PROJECT NO: EP4TURWL
DRAWN BY: RM
CHECKED BY: LW

SUBMITTALS

1	09/25/20	JX COMMENTS
0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

PLUMBING DIAGRAM

RF-1

DESCRIPTION																	FSM4	WCS RRH SECTOR A	WCS RRH SECTOR B	WCS RRH SECTOR C	4T4R B5 RRH SECTOR A	4T4R B5 RRH SECTOR B	4T4R B5 RRH SECTOR C	B14/12/29 TRIBAND RRH SECTOR A	B14/12/29 TRIBAND RRH SECTOR B	B14/12/29 TRIBAND RRH SECTOR C	B25/66 LTE RRH SECTOR A	B25/66 LTE RRH SECTOR B	B25/66 LTE RRH SECTOR C
BRKR (A)																	20A	20A	20A	20A	25A	25A	25A	50A	50A	50A	50A	50A	50A

NOTES:
1. END POSITIONS B1 AND B24 SHALL ONLY BE USED FOR SINGLE POSITION BREAKERS.
2. A 2-POLE ADAPTER LUG IS NOT REQUIRED ON THE RETURN BUS.

NETSURE 7100 POWER PLANT

1 **BREAKER PANEL** SCALE: N.T.S.

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0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

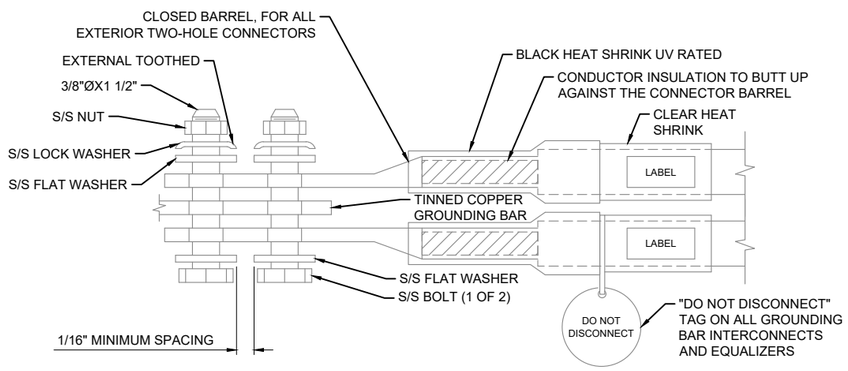
7101 WISCONSIN AVENUE
BETHESDA, MD 20814

BREAKER PANEL

E-1

NOTES:

1. EXOTHERMIC WELD (2) TWO, #2 AWG BARE TINNED SOLID COPPER CONDUCTORS TO GROUNDING BAR. ROUTE CONDUCTORS TO BURIED GROUNDING RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
2. ALL GROUNDING BARS SHALL BE STAMPED IN TO THE METAL "IF STOLEN DO NOT RECYCLE." THE CONTRACTOR SHALL USE PERMANENT MARKER TO DRAW THE LINES BETWEEN EACH SECTION AND LABEL EACH SECTION ("P", "A", "N", "I") WITH 1" HIGH LETTERS.
3. ALL HARDWARE SHALL BE STAINLESS STEEL 3/8" DIAMETER OR LARGER. ALL HARDWARE 18-8 STAINLESS STEEL INCLUDING LOCK WASHERS, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
4. FOR GROUND BOND TO STEEL ONLY: INSERT A CADMIUM FLAT WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
5. DO NOT INSTALL CABLE GROUNDING KIT AT A BEND AND ALWAYS DIRECT GROUNDING CONDUCTOR DOWN TO GROUNDING BUS.
6. NUT & WASHER SHALL BE PLACED ON THE FRONT SIDE OF THE GROUNDING BAR AND BOLTED ON THE BACK SIDE. INSTALL BLACK HEAT-SHRINKING TUBE, 600 VOLT INSULATION, ON ALL GROUNDING TERMINATIONS. THE INTENT IS TO WEATHERPROOF THE COMPRESSION CONNECTION.
7. SUPPLIED AND INSTALLED BY CONTRACTOR.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL GROUNDING BAR AS REQUIRED, PROVIDING 50% SPARE CONNECTION POINTS.
9. ENSURE THE WIRE INSULATION TERMINATION IS WITHIN 1/8" OF THE BARREL (NO SHINERS).



1 EXTERIOR TWO HOLE LUG DETAIL — SCALE: N.T.S.

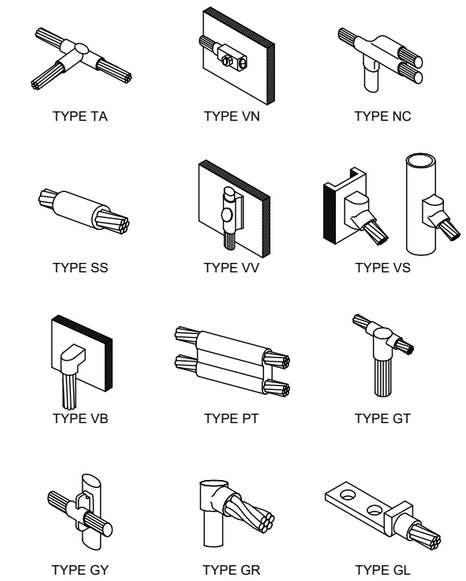
GENERAL NOTES:

1. CONTRACTOR SHALL HAVE A COMPLETE UNDERSTANDING OF THE CONTENTS OF AT&T STANDARD TP-76416.
2. ALL INSTALLATIONS SHALL BE FIELD VERIFIED.
3. ALL GROUND CONNECTIONS FOR ALL RELOCATED EQUIPMENT SHALL BE RE-ESTABLISHED BY THE CONTRACTOR. CONTRACTOR SHALL FURNISH ALL MATERIALS AS REQUIRED.

GROUNDING NOTES:

1. TOWER GROUNDING BAR: EXTEND (2) #2 AWG TINNED CU WIRE FROM BURIED GROUND RING UP TO THE TOWER GROUND BAR AND MAKE A MECHANICAL CONNECTION. SECURE GROUND BAR DIRECTLY TO TOWER WITH STAINLESS STEEL MOUNTING MATERIAL.
2. ANTENNA GROUNDING BAR: ANDREW CORPORATION PART #UGBKIT-0424-T MOUNT GROUND BAR DIRECTLY TO TOWER. SECURE TO TOWER WITH STAINLESS STEEL MOUNTING MATERIAL.
3. GROUNDING BAR: LOCATED CLOSE TO GRADE LOCK BOX TESSCO PART #351546: INSTALL PER MANUFACTURER GUIDELINES.
4. EXOTHERMIC OR COMPRESSION CONNECTION FOR PIPE MOUNT TO ANTENNA ROUTE CONDUCTOR TO NEAREST GROUNDING BAR SO THE GROUNDING CONDUCTORS PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND. USE #2 AWG SOLID TINNED COPPER CONDUCTOR. GROUNDING CONNECTION SHALL BE LOCATED AT THE TOP 2" OF PIPE.
5. ALL GROUNDING CONDUCTORS SHALL BE #2 AWG COPPER TINNED UNLESS NOTED OTHERWISE.
6. ALL GROUNDING CONDUCTORS SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND WITH GRADUAL BEND AS REQUIRED. GROUND WIRES SHALL NOT BE LOOPED OR SHARPLY BENT.
7. KOPR-SHIELD ANTI-OXIDATION COMPOUND SHALL BE USED ON ALL COMPRESSION GROUNDING CONNECTIONS.
8. ALL EXOTHERMIC CONNECTIONS SHALL BE INSTALLED UTILIZING THE PROPER CONNECTION/MOLD AND MATERIALS FOR THE PARTICULAR APPLICATION.
9. ALL BOLTED GROUNDING CONNECTIONS SHALL BE INSTALLED WITH AN EXTERNAL TOOTHED LOCK WASHER. GROUNDING BUS BARS MAY HAVE PRE-PUNCHED HOLES OR TAPPED HOLES. ALL HARDWARE SHALL BE SECURITY TORQUE HARDWARE 3/8" STAINLESS STEEL.
10. EXTERNAL GROUNDING CONDUCTOR SHALL NOT BE INSTALLED OR ROUTED THROUGH HOLES IN ANY METAL OBJECTS, CONDUITS, OR SUPPORTS TO PRECLUDE ESTABLISHING A MAGNETIC CHOKE POINT.
11. PLASTIC CLIPS SHALL BE USED TO FASTEN AND SUPPORT GROUNDING CONDUCTORS. FERROUS METAL CLIPS WHICH COMPLETELY SURROUND THE GROUNDING CONDUCTOR SHALL NOT BE USED.
12. IF COAX ON ICE BRIDGE IS MORE THAT 6' FROM THE GROUND BAR AT THE BASE OF THE TOWER, A SECOND GROUND BAR WILL BE NEEDED AT THE END OF THE ICE BRIDGE RUN TO GROUND THE COAX GROUND KIT AND THE IN-LINE SURGE ARRESTORS (SURGE ARRESTORS INSTALLED BY LUCENT ONLY HAVE 6' GROUND TAILS).
13. CONTRACTOR SHALL REPAIR/PLACE EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTORS EXPENSE.
14. DO NOT ALLOW THE COPPER CONDUCTOR TO TOUCH THE GALVANIZED GUY WIRE AT THE CONNECTION POINT OR AT ANY OTHER POINT. NO EXOTHERMICALLY WELDED CONNECTION SHALL BE MADE TO THE GUY WIRE.
15. CONTRACTOR SHALL VERIFY EXISTING SECTOR GROUNDING CONDITION AND GROUND THE PROPOSED EQUIPMENT IN THE SAME MANNER. A PROPOSED SECTOR GROUND BAR SHALL BE INSTALLED IF REQUIRED.

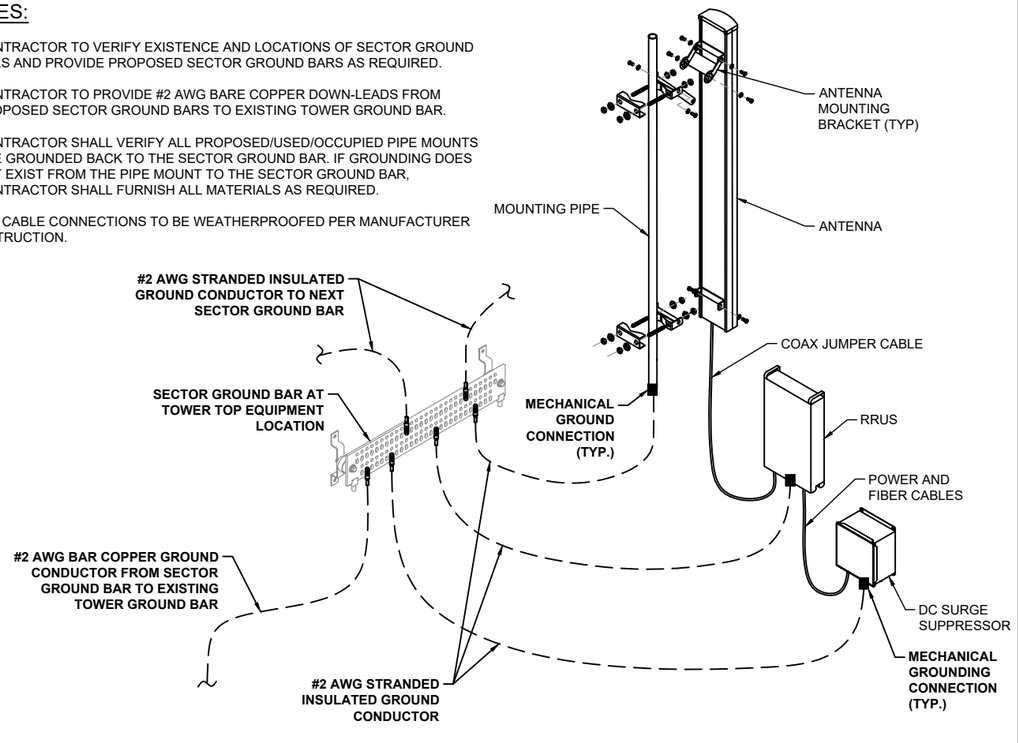
2 GROUNDING BAR DETAIL — SCALE: N.T.S.



3 GROUNDING DETAILS — SCALE: N.T.S.

NOTES:

1. CONTRACTOR TO VERIFY EXISTENCE AND LOCATIONS OF SECTOR GROUND BARS AND PROVIDE PROPOSED SECTOR GROUND BARS AS REQUIRED.
2. CONTRACTOR TO PROVIDE #2 AWG BARE COPPER DOWN-LEADS FROM PROPOSED SECTOR GROUND BARS TO EXISTING TOWER GROUND BAR.
3. CONTRACTOR SHALL VERIFY ALL PROPOSED/USED/OCCUPIED PIPE MOUNTS ARE GROUNDED BACK TO THE SECTOR GROUND BAR. IF GROUNDING DOES NOT EXIST FROM THE PIPE MOUNT TO THE SECTOR GROUND BAR, CONTRACTOR SHALL FURNISH ALL MATERIALS AS REQUIRED.
4. ALL CABLE CONNECTIONS TO BE WEATHERPROOFED PER MANUFACTURER INSTRUCTION.



4 TYPICAL ANTENNA GROUNDING SCHEMATIC — SCALE: N.T.S.

5 DETAIL NOT USED — SCALE: N.T.S.

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R.F. _____
ZONING _____
CONSTRUCTION _____
A & E _____

PROJECT NO: EP4TURWL
DRAWN BY: RM
CHECKED BY: LW

SUBMITTALS

1	09/25/20	JX COMMENTS
0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

GROUNDING DETAILS

G-1

Commscope_8-port_NNHH-65(A/B/C)-R4

RRH	ANT
RRH1	Port1
RRH2	Port2
RRH3	Port3
RRH4	Port4

AirScale RRH 4T4R B5 160W AHCA

1 **ANTENNA CONNECTION DIAGRAM** SCALE: N.T.S.

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SUBMITTALS

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BETHESDA, MD 20814

ANTENNA CONNECTION DIAGRAM

S-1

AT&T COAX AND JUMPER COLOR CODE CHART FOR WV-VA SITES

Color Code for Hard-Line Coax to Antennas					
Sector	Coax Line	A1	A2	A3	A4
Alpha	1st Line				
Alpha	2nd Line				

*Note: Pipe 1 is to the left if you are standing behind the antennas in this sector.

Sector	Coax Line	B1	B2	B3	B4
Beta	1st Line				
Beta	2nd Line				

*Note: Pipe 1 is to the left if you are standing behind the antennas in this sector.

Sector	Coax Line	G1	G2	G3	G4
Gamma	1st Line	White	White	3 White	4 White
Gamma	2nd Line	White	White	3 White &	4 White &

*Note: Pipe 1 is to the left if you are standing behind the antennas in this sector.

Color Code for Jumpers from Antenna to TMAs/Diplexers or RRH -or- from Antenna to Hard-Line Coax														
Sector	Technology	Frequency	TX/RX	1st Band	2nd Band	3rd Band	4th Band	5th Band	6th Band	7th Band	8th Band	9th Band	Notes
A1-1	LTE	700 D/E	TXM/RXM			Orange							
A1-2	LTE	700 D/E	TXD1/RXD1			Orange							
A1-3	LTE	WCS	TXM/RXM										
A1-4	LTE	WCS	TXD1/RXD1										
A1-5	LTE	WCS	TXD2/RXD2										
A1-6	LTE	WCS	TXD3/RXD3										
A2-1	UMTS/GSM	850	TXM/RXM			Yellow	Orange						
A2-2	UMTS/GSM	850	TXD1/RXD1			Yellow	Orange						
A2-3	UMTS/GSM	1900	TXM/RXM			Yellow							
A2-4	UMTS/GSM	1900	TXD1/RXD1			Yellow							
A2-5	UMTS/LTE	1900	TXD2/RXD2			Yellow							
A2-6	UMTS/LTE	1900	TXD3/RXD3			Yellow							
A3-1	UMTS	850	TXM/RXM				Yellow	Orange					
A3-2	UMTS	850	TXD1/RXD1				Yellow	Orange					
A3-3	UMTS/LTE	1900	TXM/RXM				Yellow						
A3-4	UMTS/LTE	1900	TXD1/RXD1				Yellow						
A3-5	UMTS/LTE	1900	TXD2/RXD2				Yellow						
A3-6	UMTS/LTE	1900	TXD3/RXD3				Yellow						
A4-1	LTE	700	TXM/RXM						Orange				
A4-2	LTE	700	TXD1/RXD1						Orange				
A4-3	LTE	2100	TXM/RXM										
A4-4	LTE	2100	TXD1/RXD1										
A4-5	LTE	2100	TXD2/RXD2										
A4-6	LTE	2100	TXD3/RXD3										
B1-1	LTE	700 D/E	TXM/RXM			Orange							
B1-2	LTE	700 D/E	TXD1/RXD1			Orange							
B1-3	LTE	WCS	TXM/RXM										
B1-4	LTE	WCS	TXD1/RXD1										
B1-5	LTE	WCS	TXD2/RXD2										
B1-6	LTE	WCS	TXD3/RXD3										
B2-1	UMTS/GSM	850	TXM/RXM			Yellow	Orange						
B2-2	UMTS/GSM	850	TXD1/RXD1			Yellow	Orange						
B2-3	UMTS/GSM	1900	TXM/RXM			Yellow							
B2-4	UMTS/GSM	1900	TXD1/RXD1			Yellow							
B2-5	UMTS/LTE	1900	TXD2/RXD2			Yellow							
B2-6	UMTS/LTE	1900	TXD3/RXD3			Yellow							
B3-1	UMTS	850	TXM/RXM				Yellow	Orange					
B3-2	UMTS	850	TXD1/RXD1				Yellow	Orange					
B3-3	UMTS/LTE	1900	TXM/RXM				Yellow						
B3-4	UMTS/LTE	1900	TXD1/RXD1				Yellow						
B3-5	UMTS/LTE	1900	TXD2/RXD2				Yellow						
B3-6	UMTS/LTE	1900	TXD3/RXD3				Yellow						
B4-1	LTE	700	TXM/RXM						Orange				
B4-2	LTE	700	TXD1/RXD1						Orange				
B4-3	LTE	2100	TXM/RXM										
B4-4	LTE	2100	TXD1/RXD1										
B4-5	LTE	2100	TXD2/RXD2										
B4-6	LTE	2100	TXD3/RXD3										
G1-1	LTE	700 D/E	TXM/RXM	White		Orange							
G1-2	LTE	700 D/E	TXD1/RXD1	White		Orange							
G1-3	LTE	WCS	TXM/RXM	White									
G1-4	LTE	WCS	TXD1/RXD1	White									
G1-5	LTE	WCS	TXD2/RXD2	White									
G1-6	LTE	WCS	TXD3/RXD3	White									
G2-1	UMTS/GSM	850	TXM/RXM	White	White	Yellow	Orange						
G2-2	UMTS/GSM	850	TXD1/RXD1	White	White	Yellow	Orange						
G2-3	UMTS/GSM	1900	TXM/RXM	White	White	Yellow							
G2-4	UMTS/GSM	1900	TXD1/RXD1	White	White	Yellow							
G2-5	UMTS/LTE	1900	TXD2/RXD2	White	White	Yellow							
G2-6	UMTS/LTE	1900	TXD3/RXD3	White	White	Yellow							
G3-1	UMTS	850	TXM/RXM	White	White	White	Yellow	Orange					
G3-2	UMTS	850	TXD1/RXD1	White	White	White	Yellow	Orange					
G3-3	UMTS/LTE	1900	TXM/RXM	White	White	White	Yellow						
G3-4	UMTS/LTE	1900	TXD1/RXD1	White	White	White	Yellow						
G3-5	UMTS/LTE	1900	TXD2/RXD2	White	White	White	Yellow						
G3-6	UMTS/LTE	1900	TXD3/RXD3	White	White	White	Yellow						
G4-1	LTE	700	TXM/RXM	White	White	White	White		Orange				
G4-2	LTE	700	TXD1/RXD1	White	White	White	White		Orange				
G4-3	LTE	2100	TXM/RXM	White	White	White	White						
G4-4	LTE	2100	TXD1/RXD1	White	White	White	White						
G4-5	LTE	2100	TXD2/RXD2	White	White	White	White						
G4-6	LTE	2100	TXD3/RXD3	White	White	White	White						

Base Color	
Sector A	
Sector B	
Sector C	White

Technology Color	
LTE	
UMTS	Yellow
GSM	Black

Frequency Color	
700/850	Orange
WCS	
1900/2100	

Type Color	
Main (M)	White
Diversity (D)	

Jumpers from TMA to Antenna/Diplexer to Equipment: ORANGE band to note Low-Side frequencies VIOLET band to note High-Side frequencies YELLOW band to note UMTS GRAY band to note LTE

FIBER TRUNK IN COLOR CODE:
1ST=
2ND=

DC POWER TRUNK COLOR CODE:		
1ST=	1 WHITE	/
2ND=	2 WHITE	/
3RD=	3 WHITE	/
4TH=	4 WHITE	/

1 COLOR CODE CHART

SCALE: N.T.S.

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USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

COLOR CODE CHART

S-2

Field	Length	Description	
USID	6	Six characters that defined the sites USID. USID's less than 6 characters in length are preceded with 0's (zeros) (example:003831)	
CellId1	1	Allowed Value	Description
		A	Alpha
		B	Beta
		C	Gamma
CellId2	1	D	Delta
		E	Epsilon
		F	Zeta
CellId3	1	-	No Transmitter connected to this port
AntPos	1	Allowed Value	Description
		1	Antenna Position 1 on this face
		2	Antenna Position 2 on this face
		;	Antenna Position x on this face
		;	Antenna Position x on this face
		9	Antenna Position 9 on this face
		-	Antenna Position unknown
FreqBand	1	Allowed Value	Description
		2	2100 MHz (AWS1) only
		3	2300 MHz (WCS) only
		6	Band 66 (AWS3) only
		7	700 MHz B & C Band only
		8	850 MHz only
		9	1900 MHz (PCS)
		A	2100 MHz (AWS1) & Band 66 (AWS3) combined
		B	1900 MHz (PCS) & Band 66 (AWS3) combined
		C	2100 MHz (AWS1) & Band 66 (AWS3) & 2300 MHz (WCS) combined
		D	1900 MHz (PCS) & 2100 MHz (AWS1) combined
		E	2300 MHz (WCS) & Band 66 (AWS3) combined
		F	1900 MHz (PCS) & 2300 MHz (WCS) combined
		G	1900 MHz (PCS) & 2100 MHz (AWS1) & Band 66 (AWS3) combined
		H	2100 MHz (AWS1) & 2300 MHz (WCS) combined
		I	1900 MHz (PCS) & 2300 MHz (WCS) & Band 66 (AWS3) combined
		J	1900 MHz (PCS) & 2100 MHz (AWS1) & 2300 MHz (WCS) combined
		K	700 MHz B & C Band & 850 MHz combined
		M	1900 MHz (PCS) & 2100 MHz (AWS1) & Band 66 (AWS3) & 2300 MHz (WCS) combined
		P	upper 700 MHz - Band 14 (FirstNet)
		Q	700 MHz D & E Band only
		R	700 MHz B & C & Band 14 (FirstNet) & 850 MHz combined
		S	700 MHz B & C & 700 MHz D & E & 850 MHz combined
		T	Tri-Band: Band 12 (700 MHz B&C), Band 14 (FirstNet), and Band 29 (700 MHz D&E)
		U	700 MHz B & C & 700 MHz D & E & Band 14 (FirstNet) & 850 MHz combined
		W	700 MHz D & E & Band 14 (FirstNet) combined
		X	700 MHz B & C & Band 14 (FirstNet) combined
		Y	700 MHz D & E & 850 MHz combined
		Z	Band 14 (FirstNet) & 850 MHz combined
		-	No Frequency Assigned "not-in-use"

Field	Length	Description	
Tech	1	Allowed Value	Technology / Technology Combination
		F	License protection/FCC compliance/FWLL
		G	Reserved
		J	LTE-5G NR
		K	UMTS-LTE-5G NR
		L	LTE
		N	None/Reserved
		U	UMTS
		V	UMTS-LTE
		Y	UMTS-5G NR
		H	Reserved
		M	Exception
		P	Reserved
		Q	Reserved
		R	5G NR
		S	Reserved
		T	Reserved

Delimiter	13th character
_	Delimiter
B	Border Control
C	CGSA
W	WCS in combination with other bands
P	License Protection
O	Optimized

Delimiter	14th character
_	Delimiter
Z	Programming Code for RET validated

2.3.1 Dual Broadband Antennas- TYPE 1

Powerwave, Kathrein and older Andrew antennas will be recognized by a RET controller as TYPE1 Antenna Line Devices. These require 2 AISG connections. One connection will be from the AISG source (RRH, TMA, RET Controller or Homerun Cable) to the first RET motor and the second connection will be from RET motor 1 to RET motor 2.

Connections from the RET controller will be made to the male connector of the RET motor. Appropriate daisy chain connection will then have to be made to the next RET motor. Figure 5 below is a Powerwave antenna, but the Kathrein will be very similar in appearance and connection.

For all Type 1 dual broadband antennas, the daisy chain connection should be made and both RET motors should be configured in the OSS, even if the high band RET motor is not to be utilized until future AWS launches.

Dual Broadband Antennas - TYPE 17

Newer Andrew antennas and all KMW antennas will be recognized by RET controllers as TYPE17 Antenna Line Devices since there are multiple ALDs on one bus. These antennas only require one AISG connection since both RET motors are inside the antenna. Connections from the RET controller will be made to the male connector of the RET/AISG Antenna Port. Figure 7 below is an Andrew antenna, but the KMW antenna will be very similar in appearance and connection.

Below is the list of approved RET Type 17 antennas as per 6/29/2011. Andrew will continue to phase out older models which are Type 1 with newer models that will be Type 17.

Vendor	Frequency Band	HBW	Length	Model
Andrew	Dual Broadband	65°	6'	SBNH-1D6565B
Andrew	Dual Broadband	65°	8'	SBNH-1D6565C
Andrew	Dual Broadband	85°	6'	SBNH-1D8585B
Andrew	Dual Broadband	85°	8'	SBNH-1D8585C
KMW	Dual Broadband	65°	4'	AM-X-CD-14-65-00T-RET
KMW	Dual Broadband	65°	6'	AM-X-CD-16-65-00T-RET
KMW	Dual Broadband	65°	8'	AM-X-CD-17-65-00T-RET
KMW	Dual Broadband	85°	4'	NOT AVAILABLE YET
KMW	Dual Broadband	85°	6'	NOT AVAILABLE YET
KMW	Dual Broadband	85°	8'	AM-X-CD-16-85-00T-RET
KMW	Single Broadband	65°	4'	AM-X-CW-14-65-00T-RET
KMW	Single Broadband	65°	6'	AM-X-CW-16-65-00T-RET
KMW	Single Broadband	65°	8'	AM-X-CW-18-65-00T-RET
KMW	Single Broadband	85°	4'	AM-X-CW-13-85-00T-RET
KMW	Single Broadband	85°	6'	AM-X-CW-15-85-00T-RET
KMW	Single Broadband	85°	8'	AM-X-CW-18-85-00T-RET

1 **LTE RET NAMING CONVENTION**

SCALE: N.T.S.

at&t
7150 STANDARD DR
SUITE A
HANOVER, MD 21076

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Reinventing tomorrow.
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7150 STANDARD DR. SUITE B
HANOVER, MD 21076
443.230.4400x113

CERTIFICATION STATEMENT:
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. 55911 EXP.: 04/14/22

APPROVALS

LANDLORD _____
LEASING _____
R.F. _____
ZONING _____
CONSTRUCTION _____
A & E _____

PROJECT NO: EP4TURWL

DRAWN BY: RM

CHECKED BY: LW

SUBMITTALS

1	09/25/20	JX COMMENTS
0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

LTE RET NAMING CONVENTION

S-3

GENERAL CONSTRUCTION:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWINGS, THE FOLLOWING DEFINITIONS SHALL APPLY:
   GENERAL CONTRACTOR - (CONSTRUCTION)
   OWNER - AT&T
2. ALL SITE WORK SHALL BE COMPLETED AS INDICATED ON THE DRAWINGS AND AT&T PROJECT SPECIFICATIONS.
3. GENERAL CONTRACTOR SHALL VISIT THE SITE AND SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING THE PROPOSED WORK AND SHALL MAKE PROVISIONS. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS, DIMENSIONS, AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.
4. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. GENERAL CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF WORK.
5. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES, AND APPLICABLE REGULATIONS.
6. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
7. PLANS ARE NOT TO BE SCALED. THESE PLANS ARE INTENDED TO BE A DIAGRAMMATIC OUTLINE ONLY UNLESS OTHERWISE NOTED. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS OTHERWISE NOTED. SPACING BETWEEN EQUIPMENT IS THE MINIMUM REQUIRED CLEARANCE. THEREFORE, IT IS CRITICAL TO FIELD VERIFY DIMENSIONS, SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE ENGINEER PRIOR TO PROCEEDING WITH THE WORK. DETAILS ARE INTENDED TO SHOW DESIGN INTENT. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF WORK AND PREPARED BY THE ENGINEER PRIOR TO PROCEEDING WITH WORK.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE ENGINEER PRIOR TO PROCEEDING.
10. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF WORK AREA, ADJACENT AREAS AND BUILDING OCCUPANTS THAT ARE LIKELY TO BE AFFECTED BY THE WORK UNDER THIS CONTRACT. WORK SHALL CONFIRM TO ALL OSHA REQUIREMENTS AND THE LOCAL JURISDICTION.
11. GENERAL CONTRACTOR SHALL COORDINATE WORK AND SCHEDULE WORK ACTIVITIES WITH OTHER DISCIPLINES.
12. ERECTION SHALL BE DONE IN A WORKMANLIKE MANNER BY COMPETENT EXPERIENCED WORKMAN IN ACCORDANCE WITH APPLICABLE CODES AND THE BEST ACCEPTED PRACTICE. ALL MEMBERS SHALL BE LAID PLUMB AND TRUE AS INDICATED ON THE DRAWINGS.
13. SEAL PENETRATIONS THROUGH FIRE RATED AREAS WITH UL LISTED MATERIALS APPROVED BY LOCAL JURISDICTION. CONTRACTOR SHALL KEEP AREA CLEAN, HAZARD FREE, AND DISPOSE OF ALL DEBRIS.
14. WORK PREVIOUSLY COMPLETED IS REPRESENTED BY LIGHT SHADED LINES AND NOTES. THE SCOPE OF WORK FOR THIS PROJECT IS REPRESENTED BY DARK SHADED LINES AND NOTES. CONTRACTOR SHALL NOTIFY THE GENERAL CONTRACTOR OF ANY EXISTING CONDITIONS THAT DEVIATE FROM THE DRAWINGS PRIOR TO BEGINNING CONSTRUCTION.
15. CONTRACTOR SHALL PROVIDE WRITTEN NOTICE TO THE CONSTRUCTION MANAGER 48 HOURS PRIOR TO COMMENCEMENT OF WORK.
16. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
17. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
18. GENERAL CONTRACTOR SHALL COORDINATE AND MAINTAIN ACCESS FOR ALL TRADES AND CONTRACTORS TO THE SITE AND/OR BUILDING.
19. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR SECURITY OF THE SITE FOR THE DURATION OF CONSTRUCTION UNTIL JOB COMPLETION.
20. THE GENERAL CONTRACTOR SHALL MAINTAIN IN GOOD CONDITION ONE COMPLETE SET OF PLANS WITH ALL REVISIONS, ADDENDA, AND CHANGE ORDERS ON THE PREMISES AT ALL TIMES.
21. THE GENERAL CONTRACTOR SHALL PROVIDE PORTABLE FIRE EXTINGUISHERS WITH A RATING OF NOT LESS THAN 2-A OT 2-A:10-B:C AND SHALL BE WITHIN 25 FEET OF TRAVEL DISTANCE TO ALL PORTIONS OF WHERE THE WORK IS BEING COMPLETED DURING CONSTRUCTION.
22. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY THE ENGINEER. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS SHALL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION, B) CONFINED SPACE, C) ELECTRICAL SAFETY, AND D) TRENCHING & EXCAVATION.
23. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED, CAPPED, PLUGGED OR OTHERWISE DISCONNECTED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, AS DIRECTED BY THE RESPONSIBLE ENGINEER, AND SUBJECT TO THE APPROVAL OF THE OWNER AND/OR LOCAL UTILITIES.
24. THE AREAS OF THE OWNER'S PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION.
25. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO THE EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE FEDERAL AND LOCAL JURISDICTION FOR EROSION AND SEDIMENT CONTROL.
26. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUNDING. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
27. THE SUBGRADE SHALL BE BROUGHT TO A SMOOTH UNIFORM GRADE AND COMPACTED TO 95 PERCENT STANDARD PROCTOR DENSITY UNDER PAVEMENT AND STRUCTURES AND 80 PERCENT STANDARD PROCTOR DENSITY IN OPEN SPACE. ALL TRENCHES IN PUBLIC RIGHT OF WAY SHALL BE BACKFILLED WITH FLOWABLE FILL OR OTHER MATERIAL PRE-APPROVED BY THE LOCAL JURISDICTION.
28. ALL NECESSARY RUBBISH, STUMPS, DEBRIS, STICKS, STONES, AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN A LAWFUL MANNER.
29. ALL BROCHURES, OPERATING AND MAINTENANCE MANUALS, CATALOGS, SHOP DRAWINGS, AND OTHER DOCUMENTS SHALL BE TURNED OVER TO THE GENERAL CONTRACTOR AT COMPLETION OF CONSTRUCTION AND PRIOR TO PAYMENT.
30. CONTRACTOR SHALL SUBMIT A COMPLETE SET OF AS-BUILT REDLINES TO THE GENERAL CONTRACTOR UPON COMPLETION OF PROJECT AND PRIOR TO FINAL PAYMENT.
31. CONTRACTOR SHALL LEAVE PREMISES IN A CLEAN CONDITION.
32. THE PROPOSED FACILITY WILL BE UNMANNED AND DOES NOT REQUIRE POTABLE WATER OR SEWER SERVICE, AND IS NOT FOR HUMAN HABITAT (NO HANDICAP ACCESS REQUIRED).
33. OCCUPANCY IS LIMITED TO PERIODIC MAINTENANCE AND INSPECTION, APPROXIMATELY 2 TIMES PER MONTH, BY AT&T TECHNICIANS.
34. NO OUTDOOR STORAGE OR SOLID WASTE CONTAINERS ARE PROPOSED.
35. ALL MATERIAL SHALL BE FURNISHED AND WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST REVISION AT&T MOBILITY GROUNDING STANDARD "TECHNICAL SPECIFICATION FOR CONSTRUCTION OF GSM/GPRS WIRELESS SITES" AND "TECHNICAL SPECIFICATION FOR FACILITY GROUNDING". IN CASE OF A CONFLICT BETWEEN THE CONSTRUCTION SPECIFICATION AND THE DRAWINGS, THE DRAWINGS SHALL GOVERN.
36. CONTRACTORS SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS REQUIRED FOR CONSTRUCTION. IF CONTRACTOR CANNOT OBTAIN A PERMIT, THEY MUST NOTIFY THE GENERAL CONTRACTOR IMMEDIATELY.
37. CONTRACTOR SHALL REMOVE ALL TRASH AND DEBRIS FROM THE SITE ON A DAILY BASIS.
38. INFORMATION SHOWN ON THESE DRAWINGS WAS OBTAINED FROM SITE VISITS AND/OR DRAWINGS PROVIDED BY THE SITE OWNER. CONTRACTORS SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
39. NO WHITE STROBE LIGHTS ARE PERMITTED. LIGHTING IF REQUIRED, WILL MEET FAA STANDARDS AND REQUIREMENTS.
40. ALL COAXIAL CABLE INSTALLATIONS TO FOLLOW MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
41. CONTRACTOR WILL REFER TO LATEST RFDS SHEET PRIOR TO CONSTRUCTION COMMENCING.

PART 1 - GENERAL

1.1 SCOPE:

A. PROVIDE FABRICATION AND ERECTION OF STRUCTURAL STEEL AND OTHER ITEMS AS SHOWN ON THE DRAWINGS OR REQUIRED BY OTHER SECTIONS OF THESE SPECIFICATIONS.

1.2 REFERENCES:

A. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC). MANUAL OF STEEL CONSTRUCTION (13TH EDITION), ALLOWABLE STRESS DESIGN (ASD).

B. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM).
ASTM A36: STRUCTURAL STEEL
ASTM A53: PIPE, STEEL BLACK AND HOT DIPPED, ZINC-COATED WELDED AND SEAMLESS.
ASTM A108: STEEL BARS, CARBON, COLD FINISHED, STANDARD QUALITY.
ASTM A123: ZINC (HOT-DIPPED GALVANIZED) COATING ON IRON AND STEEL PRODUCTS.
ASTM A307: CARBON STEEL BOLTS AND STUDS, 60,000 PSI TENSILE STRENGTH.
ASTM A325: HIGH-STRENGTH BOLT FOR STRUCTURAL STEEL JOINTS.
ASTM A490: HEAT-TREATED, STRUCTURAL STEEL BOLTS, 150 (KSI) (1035MPA) TENSILE STRENGTH.
ASTM A500: COLD-FORMED WELDED AND SEAMLESS CARBON STEEL STRUCTURAL TUBING IN ROUNDS AND SHAPES.
ASTM A563: ARCBON AND ALLOY STEEL NUTS.
ASTM B695: COATINGS OF ZINC MECHANICALLY DEPOSITED ON IRON AND STEEL.
ASTM F436: HARDENED STEEL WASHERS.
ASTM F959: COMPRESSIBLE-WASHER-TYPE DIRECT TENSION INDICATOR FOR USE WITH STRUCTURAL FASTENERS.

C. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM).
ASTM A36: STRUCTURAL STEEL
AMERICAN WELDING SOCIETY (AWS):
AWS A5.1: COVERED CARBON STEEL ARC WELDING ELECTRODES.
AWS A5.5: LOW ALLOY STEEL COVERED ARC WELDING ELECTRODES.
AWS D1.1: STRUCTURAL WELDING CODE - STEEL.

D. RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS (RCSC): "SPECIFICATIONS FOR STRUCTURAL JOINTS USING ASTM A325 BOLTS OR ASTM A490 BOLTS" AS ENDORSED BY AISC.

E. STEEL STRUCTURES PAINTING COUNCIL (SSPC):
SSPC-SP3: POWER TOOL CLEANING.
SSPC-PAINT 11: RED IRON OXIDE, ZINC CHROME, RAW LINSEED OIL OR ALKYD PAINT.

1.3 SUBMITTALS:

A. SUBMIT THE FOLLOWING FOR APPROVAL:

1. FABRICATION AND ERECTION DRAWINGS SHOWING ALL DETAILS, CONNECTIONS, MATERIAL DESIGNATIONS, AND ALL TOP STEEL ELEVATIONS.

B. WELDERS SHALL BE QUALIFIED AS PRESCRIBED IN AWS D1.1.

PART 2 - PRODUCTS

2.1 STRUCTURAL STEEL:

A. SHAPES, PLATES AND BARS SHALL CONFORM TO ASTM A36 AND ASTM A992.

B. STRUCTURAL TUBING SHALL CONFORM TO ASTM A500, GRADE B. STEEL PIPE SHALL CONFORM TO ASTM A53, TYPE E OR S, GRADE B.

2.2 ANCHOR BOLTS:

A. ANCHOR BOLTS SHALL CONFORM TO ASTM A307 WITH HEAVY HEXAGONAL NUTS.

2.3 BOLTS:

A. COMMON (MACHINE) BOLTS SHALL CONFORM TO ASTM A307 GRADE A AND NUTS TO ASTM A563. ONE COMMON BOLT ASSEMBLY SHALL CONSIST OF A BOLT, A HEAVY HEX NUT, AND A HARDENED WASHER.

B. HIGH STRENGTH BOLT SHALL CONFORM TO ASTM A325, ONE HIGH STRENGTH BOLT ASSEMBLY SHALL CONSIST OF A HEAVY HEX STRUCTURAL BOLT, A HEAVY HEX NUT, A HARDENED WASHER CONFIRMING WITH ASTM F436 AND A DIRECT TENSION INDICATOR CONFORMING WITH STM F959. THE HARDENED WASHER SHALL BE INSTALLED AGAINST THE ELEMENT TURNED IN TIGHTENING.UNLESS NOTED OTHERWISE ON THE DRAWINGS, ALL CONNECTIONS SHALL BE BEARING TYPE CONNECTIONS.

2.4 WELDING ELECTRODES:

A. WELDING ELECTRODES SHALL COMPLY WITH AWS D1.1 USING A5.1 OR A5.5 E70XX AND SHALL BE COMPATIBLE WITH THE WELDING PROCESS SELECTED.

2.5 PRIMER:

A. PRIMER SHALL BE RED OXIDE-CHROMATE PRIMER COMPLYING WITH SSPC PAINT SPECIFICATION NO. 11.

PART 3 - EXECUTION

3.1 FABRICATION:

A. SHOP FABRICATE AND ASSEMBLY MATERIALS AS SPECIFIED HEREIN.

1. FABRICATE ITEMS OF STRUCTURAL STEEL IN ACCORDANCE WITH THE AISC-ASD SPECIFICATION, AND AS INDICATED ON THE APPROVED SHOP DRAWINGS.
2. ALL EXPOSED STRUCTURAL STEEL SHALL BE HOT DIP GALVANIZED PER ASTM.
3. PROPERLY MARK AND MATCH-MARK MATERIALS FOR FIELD ASSEMBLY AND FOR IDENTIFICATION AS TO LOCATION FOR WHICH INTENDED.
4. FABRICATE AND DELIVER IN A SEQUENCE WHICH WILL EXPEDITE ERECTION AND MINIMIZE FIELD HANDLING OF MATERIALS.
5. WHERE FINISHING IS REQUIRED, COMPLETE THE ASSEMBLY, INCLUDING THE WELDING OF UNITS, BEFORE START OF FINISHING OPERATIONS.
6. PROVIDE FINISH SURFACE OF MEMBERS EXPOSED IN THE FINAL STRUCTURE FREE FROM MARKINGS, BURNS, AND OTHER DEFECTS.

B. PROVIDE CONNECTIONS AS SPECIFIED HEREIN:

1. PROVIDE BOLTS AND WASHERS OF TYPES AND SIZE REQUIRED FOR COMPLETION OF FIELD ERECTION. USE 3/4 INCH DIAMETER A325 BOLTS UNLESS NOTED OTHERWISE.
2. INSTALL HIGH STRENGTH THREADED FASTENERS IN ACCORDANCE WITH RCSC "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR ASTM A490 BOLTS."
3. WELDED CONSTRUCTION SHALL COMPLY WITH AWS D1.1 FOR PROCEDURES, APPEARANCE, QUALITY OF WELD, AND METHODS USED IN CORRECTING WELDED WORK.
4. THE FABRICATOR SHALL FURNISH AND INSTALL ERECTION CLIPS FOR FIT-UP OF WELDED CONNECTIONS.
5. DOUBLE ANGLE MEMBERS SHALL HAVE WELDED FILLERS SPACED IN ACCORDANCE WITH CHAPTER E4 OF THE AISC-ASD SPECIFICATION.
6. GUSSET AND STIFFENER PLATES SHALL BE 3/8 INCH THICK MINIMUM.

3.2 PRIMING:

A. STRUCTURAL STEEL SHALL BE PRIMED AS SPECIFIED HEREIN, UNLESS SHOWN OTHERWISE ON THE DRAWINGS.

B. STRUCTURAL STEEL SURFACE PREPARATION SHALL CONFORM TO SSPC-SP3, "POWER TOOL CLEANING."

C. SURFACE PREPARATION AND PRIMER SHALL BE IN ACCORDANCE WITH AISC CODE OF STANDARD PRACTICE AS INCLUDED IN THE ASD MANUAL OF STEEL CONSTRUCTION.

D. MATERIALS SHALL REMAIN CLOSED UNTIL REQUIRED FOR USE, MANUFACTURER'S POT-LIFE REQUIREMENTS SHALL BE STRICTLY ADHERED TO.

E. PRIMER SHALL BE APPLIED TO DRY, CLEAN, PREPARED SURFACE AND UNDER FAVORABLE CONDITIONS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. UNLESS OTHERWISE RECOMMENDED BY THE MANUFACTURER PRIMING SHALL NOT BE DONE WHEN AMBIENT TEMPERATURE IS LESS THAN 50 DEGREE F. THE RELATIVE HUMIDITY IS MORE THAN 90 PERCENT, OR THE SURFACE TEMPERATURE IS LESS THAN 5 DEGREE F ABOVE THE DEW POINT.

F. GENERALLY ALL PRIMER SHALL BE SPRAY APPLIED. BRUSH OR ROLLER APPLICATION SHALL BE RESTRICTED TO TOUCHUP AND TO AREAS NOT ACCESSIBLE BY SPRAY GUN.

G. PRIMER SHALL BE UNIFORMLY APPLIED WITHOUT RUNS, SAGS, SOLVENT BLISTERS, DRY SPRAY OR OTHER BLEMISHES. ALL BLEMISHES AND OTHER IRREGULARITIES SHALL BE REPAIRED OR REMOVED AND THE AREA RE-COATED. SPECIAL ATTENTION SHALL BE PAID TO CREVICES, WELD LINES, BOLT HEADS, CORNERS, EDGES, ETC., TO OBTAIN THE REQUIRED NOMINAL FILM THICKNESS.

H. THE DRY FILM THICKNESS OF THE PRIMER SHALL BE 2.0 MILS.

I. IF THE PRIMER IS DAMAGED BY WELDING OR PHYSICAL ABUSE, THE AREA SHALL BE TOUCHED-UP AND REPAIRED. THE TOUCHUP PAINT SHALL BE COMPATIBLE WITH THE APPLIED PRIMER WITH MINIMUM DRY FILM THICKNESS OF 1.5 MILS.

3.3 INSTALLATION:

A. INSTALLATION OF STRUCTURAL STEEL SHALL COMPLY WITH AISC "CODE OF STANDARD PRACTICE."

B. STRUCTURAL FIELD WELDING SHALL BE DONE BY THE ELECTRIC SUBMERGED OR SHIELDED METAL ARC PROCESS. WELDED CONSTRUCTION SHALL COMPLY WITH AWS D1.1.

C. PROVIDE ANCHOR BOLTS AND OTHER CONNECTORS REQUIRED FOR SECURING STRUCTURAL STEEL TO ELEVATOR SHAFT WALLS AND OTHER IN-PLACE WORK. PROVIDE TEMPLATES AND OTHER DEVICES NECESSARY FOR PRESETTING BOLTS AND ANCHORS TO ACCURATE LOCATIONS.

D. SPLICE MEMBERS ONLY WHERE INDICATED ON THE DRAWINGS.

E. ANY GAS CUTTING TORCHES HAVE TO BE APPROVED IN WRITING BY THE PROJECT STRUCTURAL ENGINEER.

F. PROVIDE TEMPORARY SHORING BRACING WITH CONNECTIONS OF SUFFICIENT STRENGTH TO BEAR IMPOSED LOADS. REMOVE TEMPORARY CONNECTIONS AND MEMBERS WHEN PERMANENT MEMBERS ARE IN PLACE AND THE FINAL CONNECTIONS HAVE BEEN MADE.

G. ALIGN AND ADJUST MEMBERS, AND OTHER SURFACES WHICH WILL BE IN PERMANENT CONTACT, BEFORE ASSEMBLY.

H. HIGH-STRENGTH BOLTS AS A MINIMUM, SHALL BE TIGHTENED TO A "SNUG TIGHT" CONDITION AS DEFINED IN THE LATEST AISC SPECIFICATION. ALL HIGH-STRENGTH BOLTS SPECIFIED ON THE DESIGN DRAWINGS TO BE USED IN PRETENSIONED OR SLIP-CRITICAL JOINTS SHALL BE TIGHTENED TO A BOLT TENSION NOT LESS THAN THAT GIVEN IN AISC TABLE J3.1. INSTALLATION SHALL BE BY ANY OF THE FOLLOWING METHODS: TURN-OF NUT METHOD, A DIRECT-TENSION-INDICATOR, TWIST-OFF-TYPE TENSION-CONTROL BOLT, CALIBRATED WRENCH, OR ALTERNATIVE DESIGN BOLT.

at&t
7150 STANDARD DR
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Jacobs
Challenging today.
Reinventing tomorrow.
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443.230.4400x113

CERTIFICATION STATEMENT:
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. 55911 EXP.: 04/14/22

APPROVALS

LANDLORD _____

LEASING _____

R.F. _____

ZONING _____

CONSTRUCTION _____

A & E _____

PROJECT NO: EP4TURWL

DRAWN BY: RM

CHECKED BY: LW

SUBMITTALS

1	09/25/20	JX COMMENTS
0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

GENERAL NOTES I

GN-1

PART 1 - GENERAL

1.1 GENERAL CONDITIONS:

A. CONTRACTOR SHALL INSPECT THE EXISTING SITE CONDITIONS PRIOR TO SUBMITTING BID. ANY QUESTIONS ARISING DURING THE BID PERIOD IN REGARDS TO THE CONTRACTORS FUNCTIONS, THE SCOPE OF WORK, OR ANY OTHER ISSUE RELATED TO THIS PROJECT SHALL BE BROUGHT UP DURING THE BID PERIOD WITH THE PROJECT MANAGER FOR CLARIFICATION, NOT AFTER THE CONTRACT HAS BEEN AWARDED.

B. THE CONTRACTOR SHALL OBTAIN PERMITS, LICENSES, MAKE ALL DEPOSITS, AND PAY ALL FEES REQUIRED FOR THE CONSTRUCTION PERFORMANCE FOR THE WORK UNDER THIS SECTION.

C. DRAWINGS SHOW THE GENERAL ARRANGEMENT OF ALL SYSTEMS AND COMPONENTS COVERED UNDER THIS SECTION. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS. DRAWING SHALL NOT BE SCALED TO DETERMINE DIMENSIONS.

1.2 LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES.

A. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, AND ALL APPLICABLE LOCAL LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES. CONDUIT BENDS SHALL BE THE RADIUS BEND FOR THE TRADE SIZE OF CONDUIT IN COMPLIANCE WITH THE LATEST EDITIONS OF NEC.

1.3 REFERENCES:

A. THE PUBLICATIONS LISTED BELOW ARE PART OF THIS SPECIFICATION. EACH PUBLICATION SHALL BE THE LATEST REVISION AND ADDENDUM IN EFFECT ON THE DATE. THIS SPECIFICATION IS ISSUED FOR CONSTRUCTION UNLESS OTHERWISE NOTED. EXCEPT AS MODIFIED BY THE REQUIREMENT SPECIFIED HEREIN OR THE DETAILS OF THE DRAWINGS, WORK INCLUDED IN THIS SPECIFICATION SHALL CONFORM TO THE APPLICABLE PROVISION OF THESE PUBLICATIONS.

1. ANSI/IEEE (AMERICAN NATIONAL STANDARDS INSTITUTE)
2. ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)
3. ICEA (INSULATED CABLE ENGINEERS ASSOCIATION)
4. NEMA (NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION)
5. NFPA (NATIONAL FIRE PROTECTION ASSOCIATION)
6. OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION)
7. UL (UNDERWRITERS LABORATORIES INC.)
8. AT&T GROUNDING AND BONDING STANDARDS TP-76416

1.4 SCOPE OF WORK

A. WORK UNDER THIS SECTION SHALL CONSIST OF FURNISHING ALL LABOR, MATERIAL, AND ASSOCIATED SERVICES REQUIRED TO COMPLETE REQUIRED CONSTRUCTION AND BE OPERATIONAL.

B. ALL ELECTRICAL EQUIPMENT UNDER THIS CONTRACT SHALL BE PROPERLY TESTED, ADJUSTED, AND ALIGNED BY THE CONTRACTOR.

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATING, DRAINING, TRENCHES, BACKFILLING, AND REMOVAL OF EXCESS DIRT.

D. THE CONTRACTOR SHALL FURNISH TO THE OWNER WITH CERTIFICATES OF A FINAL INSPECTION AND APPROVAL FROM THE INSPECTION AUTHORITIES HAVING JURISDICTION.

E. THE CONTRACTOR SHALL PREPARE A COMPLETE SET OF AS-BUILT DRAWINGS, DOCUMENT ALL WIRING EQUIPMENT CONDITIONS, AND CHANGES WHILE COMPLETING THIS CONTRACT. THE AS-BUILT DRAWINGS SHALL BE SUBMITTED AT COMPLETION OF THE PROJECT.

PART 2 - PRODUCTS

2.1 GENERAL:

A. ALL MATERIALS AND EQUIPMENT SHALL BE UL LISTED, NEW, AND FREE FROM DEFECTS.

B. ALL ITEMS OF MATERIALS AND EQUIPMENT SHALL BE ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION AS SUITABLE FOR THE USE INTENDED.

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

D. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 10,000 AIC MINIMUM. VERIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PER THE GOVERNING JURISDICTION.

2.2 MATERIALS AND EQUIPMENT:

A. CONDUIT:

1. RIGID METAL CONDUIT (RMC) SHALL BE HOT-DIPPED GALVANIZED INSIDE AND OUTSIDE INCLUDING ENDS AND THREADS AND ENAMELED OR LACQUERED INSIDE IN ADDITION TO GALVANIZING.
2. LIQUIDTIGHT FLEXIBLE METAL CONDUIT SHALL BE UL LISTED.
3. CONDUIT CLAMPS, STRAPS AND SUPPORTS SHALL BE STEEL OR MALLEABLE IRON. ALL FITTINGS SHALL BE COMPRESSION AND CONCRETE TIGHT TYPE. GROUNDING BUSHINGS WITH INSULATED THROATS SHALL BE INSTALLED ON ALL CONDUIT TERMINATIONS.
4. NONMETALLIC CONDUIT AND FITTINGS SHALL BE SCHEDULE 40 PVC. INSTALL USING SOLVENT-CEMENT-TYPE JOINTS AS RECOMMENDED BY THE MANUFACTURER.

B. CONDUCTORS AND CABLE:

1. CONDUCTORS AND CABLE SHALL BE FLAME-RETARDANT, MOISTURE AND HEAT RESISTANT THERMOPLASTIC, SINGLE CONDUCTOR, COPPER, TYPE THHN/THWN-2, 600 VOLT, SIZE AS INDICATED, #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR USED.
2. #10 AWG AND SMALLER CONDUCTOR SHALL BE SOLID OR STRANDED AND #8 AWG AND LARGER CONDUCTORS SHALL BE STRANDED.
3. SOLDERLESS, COMPRESSION-TYPE CONNECTORS SHALL BE USED FOR TERMINATION OF ALL STRANDED CONDUCTORS.
4. STRAIN-RELIEF SUPPORTS GRIPS SHALL BE HUBBELL KELLEMS OR APPROVED EQUAL. CABLES SHALL BE SUPPORTED IN ACCORDANCE WITH THE NEC AND CABLE MANUFACTURER'S RECOMMENDATIONS.
5. ALL CONDUCTORS SHALL BE TAGGED AT BOTH ENDS OF THE CONDUCTOR, AT ALL PULL BOXES, J-BOXES, EQUIPMENT AND CABINETS AND SHALL BE IDENTIFIED WITH APPROVED PLASTIC TAGS (ACTION CRAFT, BRADY, OR APPROVED EQUAL).

C. DISCONNECT SWITCHES:

1. DISCONNECT SWITCHES SHALL BE HEAVY DUTY, DEAD-FRONT, QUICK-MAKE, QUICK-BREAK, EXTERNALLY OPERABLE, HANDLE LOCKABLE AND INTERLOCK WITH COVER IN CLOSED POSITION, RATING AS INDICATED, UL LABELED FURNISHED IN NEMA 3R ENCLOSURE, SQUARE-D OR ENGINEER APPROVED EQUAL.

D. CHEMICAL ELECTROLYTIC GROUNDING SYSTEM:

1. INSTALL CHEMICAL GROUNDING AS REQUIRED. THE SYSTEM SHALL BE ELECTROLYTIC MAINTENANCE FREE ELECTRODE CONSISTING OF RODS WITH A MINIMUM #2 AWG CU EXOTHERMICALLY WELDED PIGTAIL, PROTECTIVE BOXES, AND BACKFILL MATERIAL. MANUFACTURER SHALL BE LYNCOLE XIT GROUNDING ROD TYPES K2-(*)CS OR K2L-(*)CS (*) LENGTH AS REQUIRED.
2. GROUND ACCESS BOX SHALL BE A POLYPLASTIC BOX FOR NON-TRAFFIC APPLICATIONS, INCLUDING BOLT DOWN FLUSH COVER WITH "BREATHER" HOLES, XIT MODEL #XB-22. ALL DISCONNECT SWITCHES AND CONTROLLING DEVICES SHALL BE PROVIDED WITH ENGRAVED LAMICOID NAMEPLATES INDICATING EQUIPMENT CONTROLLED, BRANCH CIRCUITS ID NUMBERING, AND THE ELECTRICAL POWER SOURCE.
3. BACKFILL MATERIAL SHALL BE LYNCONITE AND LYNCOLE GROUNDING GRAVEL.

E. SYSTEM GROUNDING:

1. ALL GROUNDING COMPONENTS SHALL BE TINNED AND GROUNDING CONDUCTOR SHALL BE #2 AWG BARE, SOLID, TINNED, COPPER. ABOVE GRADE GROUNDING CONDUCTORS SHALL BE INSULATED WHERE NOTED.
2. GROUNDING BUSES SHALL BE BARE, TINNED, ANNEALED COPPER BARS OF RECTANGULAR CROSS SECTION. STANDARD BUS BARS MGB, SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. THEY SHALL NOT BE FABRICATED OR MODIFIED IN THE FIELD. ALL GROUNDING BUSES SHALL BE IDENTIFIED WITH MINIMUM 3/4" LETTERS BY WAY OF STENCILING OR DESIGNATION PLATE.
3. CONNECTORS SHALL BE HIGH-CONDUCTIVITY, HEAVY DUTY, LISTED AND LABELED AS GROUNDING CONNECTORS FOR THE MATERIALS USED. USE TWO-HOLE COMPRESSION LUGS WITH HEAT SHRINK FOR MECHANICAL CONNECTIONS. INTERIOR CONNECTIONS USE TWO-HOLE COMPRESSION LUGS WITH INSPECTION WINDOW AND CLEAR HEAT SHRINK.
4. EXOTHERMIC WELDED CONNECTIONS SHALL BE PROVIDED IN KIT FORM AND SELECTED FOR THE SPECIFIC TYPES, SIZES, AND COMBINATIONS OF CONDUCTORS AND OTHER ITEMS TO BE CONNECTED.
5. GROUND RODS SHALL BE COPPER-CLAD STEEL WITH HIGH-STRENGTH STEEL CORE AND ELECTROLYTIC-GRADE COPPER OUTER SHEATH, MOLTEN WELDED TO CORE, 5/8"x10'-0". ALL GROUNDING RODS SHALL BE INSTALLED WITH INSPECTION SLEEVES.
6. INSTALL AN EQUIPMENT GROUNDING CONDUCTOR IN ALL CONDUITS IN COMPLIANCE WITH THE AT&T SPECIFICATIONS AND NEC. THE EQUIPMENT GROUNDING CONDUCTORS SHALL BE BONDED AT ALL JUNCTION BOXES, PULLBOXES, DISCONNECT SWITCHES, STARTERS, AND EQUIPMENT CABINETS.

F. OTHER MATERIALS:

1. THE CONTRACTOR SHALL PROVIDE OTHER MATERIALS, THOUGH NOT SPECIFICALLY DESCRIBED, WHICH ARE REQUIRED FOR A COMPLETELY OPERATIONAL SYSTEM AND PROPER INSTALLATION OF THE WORK.
2. PROVIDE PULL BOXES AND JUNCTION BOXES WHERE SHOWN OR REQUIRED BY NEC.
3. PANELS AND LOAD CENTERS:
4. ALL PANEL DIRECTORIES SHALL BE TYPEWRITTEN.

PART 3 - EXECUTION

3.1 GENERAL:

A. ALL MATERIAL AND EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

B. EQUIPMENT SHALL BE TIGHTLY COVERED AND PROTECTED AGAINST DIRT OR WATER, AND AGAINST CHEMICAL OR MECHANICAL INJURY DURING INSTALLATION AND CONSTRUCTION PERIODS.

3.2 LABOR AND WORKMANSHIP:

A. ALL LABOR FOR THE INSTALLATION OF MATERIALS AND EQUIPMENT FURNISHED FOR THE ELECTRICAL SYSTEM SHALL BE INSTALLED BY EXPERIENCED WIREMEN, IN A NEAT AND WORKMAN-LIKE MANNER.

B. ALL ELECTRICAL EQUIPMENT SHALL BE ADJUSTED, ALIGNED AND TESTED BY THE CONTRACTOR AS REQUIRED TO PRODUCE THE INTENDED PERFORMANCE.

C. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL THOROUGHLY CLEAN ALL EXPOSED EQUIPMENT, REMOVE ALL LABELS AND ANY DEBRIS, CRATING OR CARTONS AND LEAVE THE INSTALLATION FINISHED AND READY FOR OPERATION.

3.3 COORDINATION:

A. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ELECTRICAL ITEMS WITH THE OWNER-FURNISHED EQUIPMENT DELIVERY SCHEDULE TO PREVENT UNNECESSARY DELAYS IN THE TOTAL WORK.

3.4 INSTALLATION:

A. CONDUIT:

1. ALL ELECTRICAL WIRING SHALL BE INSTALLED IN CONDUIT AS SPECIFIED. NO CONDUIT OR TUBING OF LESS THAN 3/4 INCH TRADE SIZE.
2. PROVIDE RIGID PVC SCHEDULE 80 CONDUITS FOR ALL RISERS, RMC OTHERWISE NOTED. EMT MAY BE INSTALLED FOR EXTERIOR CONDUITS WHERE NOT SUBJECT TO PHYSICAL DAMAGE.
3. INSTALL SCHEDULE 40 PVC CONDUIT WITH A MINIMUM COVER OF 24" UNDER ROADWAYS, PARKING LOTS, STREETS, AND ALLEYS. CONDUIT SHALL HAVE A MINIMUM COVER OF 18" IN ALL OTHER NON-TRAFFIC APPLICATIONS (REFER TO 2017 NEC, TABLE 300.5).
4. USE GALVANIZED FLEXIBLE STEEL CONDUIT WHERE DIRECT CONNECTION TO EQUIPMENT WITH MOVEMENT, VIBRATION, OR FOR EASE OF MAINTENANCE. USE LIQUID TIGHT, FLEXIBLE METAL CONDUIT FOR OUTDOOR APPLICATIONS. INSTALL GALVANIZED FLEXIBLE STEEL CONDUIT AT ALL POINTS OF CONNECTION TO EQUIPMENT MOUNTED ON SUPPORT TO ALLOW FOR EXPANSION AND CONTRACTION.
5. A RUN OF CONDUIT BETWEEN BOXES OR EQUIPMENT SHALL NOT CONTAIN MORE THAN THE EQUIVALENT OF THREE QUARTER-BENDS. CONDUIT BEND SHALL BE MADE WITH THE UL LISTED BENDER OR FACTORY 90 DEGREE ELBOWS MAY BE USED.
6. FIELD FABRICATED CONDUITS SHALL BE CUT SQUARE WITH A CONDUIT CUTTING TOOL AND REAMED TO PROVIDE A SMOOTH INSIDE SURFACE.
7. PROVIDE INSULATED GROUNDING BUSHING FOR ALL CONDUITS.
8. CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL CONDUITS DURING CONSTRUCTION. TEMPORARY OPENINGS IN THE CONDUIT SYSTEM SHALL BE PLUGGED OR CAPPED TO PREVENT ENTRANCE OF MOISTURE OR FOREIGN MATTER. CONTRACTOR SHALL REPLACE ANY CONDUITS CONTAINING FOREIGN MATERIALS THAT CANNOT BE REMOVED.
9. ALL CONDUITS SHALL BE SWABBED CLEAN BY PULLING AN APPROPRIATE SIZE MANDREL THROUGH THE CONDUIT BEFORE INSTALLATION OF CONDUCTORS OR CABLES. CONDUIT SHALL BE FREE OF DIRT AND DEBRIS.
10. INSTALL PULL STRINGS IN ALL CLEAN EMPTY CONDUITS. IDENTIFY PULL STRINGS AT EACH END.
11. INSTALL 2" HIGHLY VISIBLE AND DETECTABLE TAPE 12" ABOVE ALL UNDERGROUND CONDUITS AND CONDUCTORS.
12. CONDUITS SHALL BE INSTALLED IN SUCH A MANNER AS TO INSURE AGAINST COLLECTION OF TRAPPED CONDENSATION.
13. PROVIDE CORE DRILLING AS NECESSARY FOR PENETRATIONS TO ALLOW FOR RACEWAYS AND CABLES TO BE ROUTED THROUGH THE BUILDING. DO NOT PENETRATE STRUCTURAL MEMBERS. SLEEVES AND/OR PENETRATIONS IN FIRE RATED CONSTRUCTION SHALL BE EFFECTIVELY SEALED WITH FIRE RATED MATERIAL WHICH SHALL MAINTAIN THE FIRE RATING OF THE WALL OR STRUCTURE. FIRE STOPS AT FLOOR PENETRATIONS SHALL PREVENT PASSAGE OF WATER, SMOKE, FIRE, AND FUMES. ALL MATERIAL SHALL BE UL APPROVED FOR THIS PURPOSE.

B. CONDUCTORS AND CABLE:

1. ALL POWER WIRING SHALL BE COLOR CODED AS FOLLOWS:

DESCRIPTION	208/240/120 VOLT SYSTEMS
PHASE A	BLACK
PHASE B	RED
PHASE C	BLUE
NEUTRAL	WHITE
GROUNDING	GREEN

2. SPLICES SHALL BE MADE ONLY AT OUTLETS, JUNCTION BOXES, OR ACCESSIBLE RACEWAY CONDUITS APPROVED FOR THIS PURPOSE.
3. PULLING LUBRICANTS SHALL BE UL APPROVED. CONTRACTOR SHALL USE NYLON OR HEMP ROPE FOR PULLING CONDUCTOR OR CABLES INTO THE CONDUIT.
4. CABLES SHALL BE NEATLY TRAINED, WITHOUT INTERLACING, AND BE OF SUFFICIENT LENGTH IN ALL BOXES & EQUIPMENT TO PERMIT MAKING A NEAT ARRANGEMENT. CABLES SHALL BE SECURED IN A MANNER TO AVOID TENSION ON CONDUCTORS OR TERMINALS. CONDUCTORS SHALL BE PROTECTED FROM MECHANICAL INJURY AND MOISTURE. SHARP BENDS OVER CONDUIT BUSHINGS IS PROHIBITED. DAMAGED CABLES SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE.

C. DISCONNECT SWITCHES:

1. INSTALL DISCONNECT SWITCHES LEVEL AND PLUMB. CONNECT TO WIRING SYSTEM AND GROUNDING SYSTEM AS INDICATED.

D. GROUNDING:

1. ALL METALLIC PARTS OF ELECTRICAL EQUIPMENT WHICH DO NOT CARRY CURRENT SHALL BE GROUNDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE BUILDING MANUFACTURER, AT&T GROUNDING AND BONDING STANDARDS TP-76416, ND-00135, AND THE NATIONAL ELECTRICAL CODE.
2. PROVIDE ELECTRICAL GROUNDING AND BONDING SYSTEM INDICATED WITH ASSEMBLY OF MATERIALS, INCLUDING GROUNDING ELECTRODES, BONDING JUMPERS AND ADDITIONAL ACCESSORIES AS REQUIRED FOR A COMPLETE INSTALLATION.
3. ALL GROUNDING CONDUCTORS SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND WITH GRADUAL BEND AS REQUIRED. GROUNDING CONDUCTORS SHALL NOT BE LOOPED OR SHARPLY BENT. ROUTE GROUNDING CONNECTIONS AND CONDUCTORS TO GROUND IN THE SHORTEST AND STRAIGHTEST PATHS POSSIBLE TO MINIMIZE TRANSIENT VOLTAGE RISES.
4. BUILDINGS AND/OR NEW TOWERS GREATER THAN 75 FEET IN HEIGHT AND WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 AWG COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY). SEE STANDARD 6.3.2.2.
5. TIGHTEN GROUNDING AND BONDING CONNECTORS, INCLUDING SCREWS AND BOLTS, IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED TORQUE TIGHTENING VALUES FOR CONNECTORS AND BOLTS. WHERE MANUFACTURER'S TORQUING REQUIREMENTS ARE NOT AVAILABLE, TIGHTEN CONNECTIONS TO COMPLY WITH TIGHTENING TORQUE VALUES SPECIFIED IN UL TO ASSURE PERMANENT AND EFFECTIVE GROUNDING.
6. CONTRACTOR SHALL VERIFY THE LOCATIONS OF GROUNDING TIE-IN-POINTS TO THE EXISTING GROUNDING SYSTEM. ALL UNDERGROUND GROUNDING CONNECTIONS SHALL BE MADE BY THE EXOTHERMIC WELD PROCESS AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
7. ALL GROUNDING CONNECTIONS SHALL BE INSPECTED FOR TIGHTNESS. EXOTHERMIC WELDED CONNECTIONS SHALL BE APPROVED BY THE INSPECTOR HAVING JURISDICTION BEFORE BEING PERMANENTLY CONCEALED.
8. APPLY CORROSION-RESISTANT FINISH TO FIELD CONNECTIONS AND PLACES WHERE FACTORY APPLIED PROTECTIVE COATINGS HAVE BEEN DESTROYED. USE KOPR-SHIELD ANTI-OXIDATION COMPOUND ON ALL COMPRESSION GROUNDING CONNECTIONS.
9. A SEPARATE, CONTINUOUS, INSULATED EQUIPMENT GROUNDING CONDUCTOR SHALL BE INSTALLED IN ALL FEEDER AND BRANCH CIRCUITS.
10. BOND ALL INSULATED GROUNDING BUSHINGS WITH A BARE #6 AWG GROUNDING CONDUCTOR TO A GROUND BUS.
11. DIRECT BURIED GROUNDING CONDUCTORS SHALL BE INSTALLED AT A NOMINAL DEPTH OF 36" MINIMUM BELOW GRADE, OR 6" BELOW THE FROST LINE, USE THE GREATER OF THE TWO DISTANCES.
12. ALL GROUNDING CONDUCTORS EMBEDDED IN OR PENETRATING CONCRETE SHALL BE INSTALLED IN SCHEDULE 40 PVC CONDUIT.
13. THE INSTALLATION OF CHEMICAL ELECTROLYTIC GROUNDING SYSTEM IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. REMOVE SEALING TAPE FROM LEACHING AND BREATHER HOLES. INSTALL PROTECTIVE BOX FLUSH WITH GRADE.
14. DRIVE GROUND RODS UNTIL TOPS ARE A MINIMUM DISTANCE OF 36" DEPTH OR 6" BELOW FROST LINE, USING THE GREATER OF THE TWO DISTANCES.
15. IF COAX ON THE ICE BRIDGE IS MORE THAN 6 FT. FROM THE GROUNDING BAR AT THE BASE OF THE TOWER, A SECOND GROUNDING BAR WILL BE NEEDED AT THE END OF THE ICE BRIDGE, TO GROUND THE COAX CABLE GROUNDING KITS AND IN-LINE ARRESTORS.
16. CONTRACTOR SHALL REPAIR, AND/OR REPLACE, EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTORS EXPENSE.

3.5 ACCEPTANCE TESTING:

A. CERTIFIED PERSONNEL USING CERTIFIED EQUIPMENT SHALL PERFORM REQUIRED TESTS AND SUBMIT WRITTEN TEST REPORTS UPON COMPLETION.

B. WHEN MATERIAL AND/OR WORKMANSHIP IS FOUND NOT TO COMPLY WITH THE SPECIFIED REQUIREMENTS, THE NON-COMPLYING ITEMS SHALL BE REMOVED FROM THE PROJECT SITE AND REPLACED WITH ITEMS COMPLYING WITH THE SPECIFIED REQUIREMENTS PROMPTLY AFTER RECEIPT OF NOTICE FOR NON-COMPLIANCE.

C. TEST PROCEDURES:

1. ALL FEEDERS SHALL HAVE INSULATION TESTED AFTER INSTALLATION, BEFORE CONNECTION TO DEVICES. THE CONDUCTORS SHALL TEST FREE FROM SHORT CIRCUITS AND GROUNDS. TESTING SHALL BE FOR ONE MINUTE USING 1000V DC. PROVIDE WRITTEN DOCUMENTATION FOR ALL TEST RESULTS.
2. PRIOR TO ENERGIZING CIRCUITRY, TEST WIRING DEVICES FOR ELECTRICAL CONTINUITY AND PROPER POLARITY CONNECTIONS.
3. MEASURE AND RECORD VOLTAGES BETWEEN PHASES AND BETWEEN PHASE CONDUCTORS AND NEUTRALS. SUBMIT A REPORT OF MAXIMUM AND MINIMUM VOLTAGES.
4. PERFORM GROUNDING TEST TO MEASURE GROUNDING RESISTANCE OF GROUNDING SYSTEM USING THE IEEE STANDARD 3-POINT "FALL-OF-POTENTIAL" METHOD. PROVIDE PLOTTED TEST VALUES AND LOCATION SKETCH. NOTIFY THE ENGINEER IMMEDIATELY IF MEASURED VALUE IS OVER 5 OHMS.

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CERTIFICATION STATEMENT:
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. 55911 EXP.: 04/14/22

APPROVALS

LANDLORD _____

LEASING _____

R.F. _____

ZONING _____

CONSTRUCTION _____

A & E _____

PROJECT NO: EP4TURWL

DRAWN BY: RM

CHECKED BY: LW

SUBMITTALS

1	09/25/20	JX COMMENTS
0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

GENERAL NOTES II

GN-2

ANTENNA MOUNTING

1. DESIGN AND CONSTRUCTION OF ANTENNA SUPPORTS SHALL CONFORM TO CURRENT ANSI/TIA-222 OR APPLICABLE LOCAL CODES.
2. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS NOTED OTHERWISE.
3. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS NOTED OTHERWISE.
4. DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY COLD GALVANIZING IN ACCORDANCE WITH ASTM A780.
5. ALL ANTENNA MOUNTS SHALL BE INSTALLED WITH LOCK NUTS, DOUBLE NUTS AND SHALL BE TORQUED TO MANUFACTURER'S RECOMMENDATIONS.
6. CONTRACTOR SHALL INSTALL ANTENNA PER MANUFACTURER'S RECOMMENDATION FOR INSTALLATION AND GROUNDING.
7. ALL UNUSED PORTS ON ANY ANTENNAS SHALL BE TERMINATED WITH A 50-OHM LOAD TO ENSURE ANTENNAS PERFORM AS DESIGNED.
8. PRIOR TO SETTING ANTENNA AZIMUTHS AND DOWNTILTS, ANTENNA CONTRACTOR SHALL CHECK THE ANTENNA MOUNT FOR TIGHTNESS AND ENSURE THAT THEY ARE PLUMB. ANTENNA AZIMUTHS SHALL BE SET FROM TRUE NORTH AND BE ORIENTED WITHIN +/- 5% AS DEFINED BY THE RFDS. ANTENNA DOWNTILTS SHALL BE WITHIN +/- 0.5% AS DEFINED BY THE RFDS. REFER TO ND-00246.
9. JUMPERS FROM THE TMA'S MUST TERMINATE TO OPPOSITE POLARIZATION'S IN EACH SECTOR.
10. CONTRACTOR SHALL RECORD THE SERIAL #, SECTOR, AND POSITION OF EACH ACTUATOR INSTALLED AT THE ANTENNAS AND PROVIDE THE INFORMATION TO AT&T.
11. TMA'S SHALL BE MOUNTED ON PIPE DIRECTLY BEHIND ANTENNAS AS CLOSE TO ANTENNA AS FEASIBLE IN A VERTICAL POSITION.

TORQUE REQUIREMENTS

12. ALL RF CONNECTIONS SHALL BE TIGHTENED BY A TORQUE WRENCH.
13. ALL RF CONNECTIONS, GROUNDING HARDWARE AND ANTENNA HARDWARE SHALL HAVE A TORQUE MARK INSTALLED IN A CONTINUOUS STRAIGHT LINE FROM BOTH SIDES OF THE CONNECTION.
    A. RF CONNECTION BOTH SIDES OF THE CONNECTOR.
    B. GROUNDING AND ANTENNA HARDWARE ON THE NUT SIDE STARTING FROM THE THREADS TO THE SOLID SURFACE. EXAMPLE OF SOLID SURFACE: GROUND BAR, ANTENNA BRACKET METAL.
    C. ALL 8M ANTENNA HARDWARE SHALL BE TIGHTENED TO 9 LB-FT (12 NM).
14. ALL 12M ANTENNA HARDWARE SHALL BE TIGHTENED TO 43 LB-FT (58 NM).
15. ALL GROUNDING HARDWARE SHALL BE TIGHTENED UNTIL THE LOCK WASHER COLLAPSES AND THE GROUNDING HARDWARE IS NO LONGER LOOSE.
16. ALL DIN TYPE CONNECTIONS SHALL BE TIGHTENED TO 18-22 LB-FT (24.4 - 29.8 NM).
17. ALL N TYPE CONNECTIONS SHALL BE TIGHTENED TO 15-20 LB-IN (1.7 - 2.3 NM).

FIBER & POWER CABLE MOUNTING

18. THE FIBER OPTIC TRUNK CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY. WHEN INSTALLING FIBER OPTIC TRUNK CABLES INTO A CABLE TRAY SYSTEM, THEY SHALL BE INSTALLED INTO AN INTER DUCT AND A PARTITION BARRIER SHALL BE INSTALLED BETWEEN THE 600 VOLT CABLES AND THE INTER DUCT IN ORDER TO SEGREGATE CABLE TYPES. OPTIC FIBER TRUNK CABLES SHALL HAVE APPROVED CABLE RESTRAINTS EVERY (60) SIXTY FEET AND SECURELY FASTENED TO THE CABLE TRAY SYSTEM. NFPA 70 (NEC) ARTICLE 770 RULES SHALL APPLY.
19. THE TYPE TC-ER CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY AND SHALL BE SECURED AT INTERVALS NOT EXCEEDING (6) SIX FEET. AN EXCEPTION; WHERE TYPE TC-ER CABLES ARE NOT SUBJECT TO PHYSICAL DAMAGE, CABLES SHALL BE PERMITTED TO MAKE A TRANSITION BETWEEN CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY WHICH ARE SERVING UTILIZATION EQUIPMENT OR DEVICES, A DISTANCE (6) SIX FEET SHALL NOT BE EXCEEDED WITHOUT CONTINUOUS SUPPORTING. NFPA 70 (NEC) ARTICLES 336 AND 392 RULES SHALL APPLY.
20. WHEN INSTALLING OPTIC FIBER TRUNK CABLES OR TYPE TC-ER CABLES INTO CONDUITS, NFPA 70 (NEC) ARTICLE 300 RULES SHALL APPLY.

COAXIAL CABLE NOTES

21. TYPES AND SIZES OF THE ANTENNA CABLE ARE BASED ON ESTIMATED LENGTHS. PRIOR TO ORDERING CABLE, CONTRACTOR SHALL VERIFY ACTUAL LENGTH BASED ON CONSTRUCTION LAYOUT AND NOTIFY THE PROJECT MANAGER IF ACTUAL LENGTHS EXCEED ESTIMATED LENGTHS.
22. CONTRACTOR SHALL VERIFY THE DOWN-TILT OF EACH ANTENNA WITH A DIGITAL LEVEL.
23. CONTRACTOR SHALL CONFIRM COAX COLOR CODING PRIOR TO CONSTRUCTION. REFER TO "ANTENNA SYSTEM LABELING STANDARD" ND-00027 LATEST VERSION.
24. ALL JUMPERS TO THE ANTENNAS FROM THE MAIN TRANSMISSION LINE SHALL BE 1/2" DIA. LDF AND SHALL NOT EXCEED 6'-0".
25. ALL COAXIAL CABLE SHALL BE SECURED TO THE DESIGNED SUPPORT STRUCTURE, IN AN APPROVED MANNER, AT DISTANCES NOT TO EXCEED 4'-0" O.C.
26. CONTRACTOR SHALL FOLLOW ALL MANUFACTURER'S RECOMMENDATIONS REGARDING BOTH THE INSTALLATION AND GROUNDING OF ALL COAXIAL CABLES, CONNECTORS, ANTENNAS, AND ALL OTHER EQUIPMENT.
27. CONTRACTOR SHALL WEATHERPROOF ALL ANTENNA CONNECTORS WITH SELF AMALGAMATING TAPE. WEATHERPROOFING SHALL BE COMPLETED IN STRICT ACCORDANCE WITH AT&T STANDARDS.
28. CONTRACTOR SHALL GROUND ALL EQUIPMENT. INCLUDING ANTENNAS, RET MOTORS, TMA'S, COAX CABLES, AND RET CONTROL CABLES AS A COMPLETE SYSTEM. GROUNDING SHALL BE EXECUTED BY QUALIFIED WIREMEN IN COMPLIANCE WITH MANUFACTURER'S SPECIFICATION AND RECOMMENDATION.
29. CONTRACTOR SHALL PROVIDE STRAIN-RELIEF AND CABLE SUPPORTS FOR ALL CABLE ASSEMBLIES, COAX CABLES, AND RET CONTROL CABLES. CABLE STRAIN-RELIEFS AND CABLE SUPPORTS SHALL BE APPROVED FOR THE PURPOSE. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
30. CONTRACTOR TO VERIFY THAT EXISTING COAX HANGERS ARE STACKABLE SNAP IN HANGERS. IF EXISTING HANGERS ARE NOT STACKABLE SNAP IN HANGERS THE CONTRACTOR SHALL REPLACE EXISTING HANGERS WITH NEW SNAP IN HANGERS IF APPLICABLE.

GENERAL CABLE AND EQUIPMENT NOTES

31. CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY ANTENNA, TMAS, DIPLEXERS, AND COAX CONFIGURATION, MAKE AND MODELS PRIOR TO INSTALLATION.
32. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S RECOMMENDATIONS.
33. CONTRACTOR SHALL REFERENCE THE TOWER STRUCTURAL ANALYSIS/DESIGN DRAWINGS FOR DIRECTIONS ON CABLE DISTRIBUTION/ROUTING.
34. ALL OUTDOOR RF CONNECTORS/CONNECTIONS SHALL BE WEATHERPROOFED, EXCEPT THE RET CONNECTORS, USING BUTYL TAPE AFTER INSTALLATION AND FINAL CONNECTIONS ARE MADE. BUTYL TAPE SHALL HAVE A MINIMUM OF ONE-HALF TAPE WIDTH OVERLAP ON EACH TURN AND EACH LAYER SHALL BE WRAPPED THREE TIMES. WEATHERPROOFING SHALL BE SMOOTH WITHOUT BUCKLING. BUTYL BLEEDING IS NOT ALLOWED.
35. IF REQUIRED TO PAINT ANTENNAS AND/OR COAX:
    A. TEMPERATURE SHALL BE ABOVE 50° F.
    B. PAINT COLOR MUST BE APPROVED BY BUILDING OWNER/LANDLORD.
    C. FOR REGULATED TOWERS, FAA/FCC APPROVED PAINT IS REQUIRED.
    D. DO NOT PAINT OVER COLOR CODING OR ON EQUIPMENT MODEL NUMBERS.
36. ALL CABLES SHALL BE GROUNDED WITH COAXIAL CABLE GROUND KITS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.
    A. GROUNDING AT THE ANTENNA LEVEL.
    B. GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200'-0", ADDITIONAL CABLE GROUNDING REQUIRED.
    C. GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
    D. GROUNDING OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
    E. GROUNDING INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.
37. ALL PROPOSED GROUND BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUND.
38. BAR DOWNLEADS A MINIMUM DISTANCE OF 4'-0" BELOW GROUND BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.
39. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ANTENNA AND THE COAX CONFIGURATION IS THE CORRECT MAKE AND MODELS, PRIOR TO INSTALLATION.
40. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S SPECIFICATION & RECOMMENDATIONS.
41. ANTENNA CONTRACTOR SHALL FURNISH AND INSTALL A 12'-0" T-BOOM SECTOR ANTENNA MOUNT, IF APPLICABLE, INCLUDING ALL HARDWARE.

GROUNDING NOTES

42. GROUNDING IS SHOWN DIAGRAMMATICALLY ONLY.
43. CONTRACTOR SHALL GROUND ALL EQUIPMENT AS A COMPLETE SYSTEM. GROUNDING SHALL BE IN COMPLIANCE WITH NEC SECTION 250 AND AT&T GROUNDING AND BONDING REQUIREMENTS (ATT-TP-76416) AND MANUFACTURER'S SPECIFICATIONS.
44. ALL GROUND CONDUCTORS SHALL BE COPPER; NO ALUMINUM CONDUCTORS SHALL BE USED.
45. ALL CABLES SHALL BE GROUNDED WITH COAXIAL CABLE GROUNDING KITS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.
    A. GROUNDING AT THE ANTENNA LEVEL.
    B. GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200', ADDITIONAL CABLE GROUNDING REQUIRED.
    C. GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
    D. GROUNDING OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
    E. GROUNDING INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.
46. ALL PROPOSED GROUNDING BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUNDING BAR DOWNLEADS A MINIMUM DISTANCE OF 4'-0" BELOW GROUNDING BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.

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

EXOTHERMIC CONNECTION
MECHANICAL CONNECTION
CHEMICAL ELECTROLYTIC GROUNDING SYSTEM
TEST CHEMICAL ELECTROLYTIC GROUNDING SYSTEM (T)
EXOTHERMIC WITH INSPECTION SLEEVE
GROUNDING BAR
SHELTER GROUNDING BAR
GROUND ROD
TEST GROUND ROD WITH INSPECTION SLEEVE (T)
SINGLE POLE SWITCH ($)
DUPLEX RECEPTACLE
DUPLEX GFCI RECEPTACLE (GFCI)
FLUORESCENT LIGHTING FIXTURE (F)
(2) TWO LAMPS 48-T8
EXISTING SMOKE DETECTION (DC) (SD)
EXISTING EMERGENCY LIGHTING (DC)
SECURITY LIGHT W/PHOTOCELL LITHONIA ALXW LED-1-25A400/51K-SR4-120-PE-DDBTXD
EXISTING UTILITY POLE
EXISTING CHAIN LINK FENCE
EXISTING WOOD/WROUGHT IRON FENCE
EXISTING WALL STRUCTURE
LEASE AREA
PROPERTY LINE (PL)
SETBACKS
PROPOSED/EXISTING ICE BRIDGE
PROPOSED/EXISTING CABLE TRAY
EXISTING WATER LINE (W)
PROPOSED UNDERGROUND POWER (P)
PROPOSED UNDERGROUND TELCO (T)
PROPOSED OVERHEAD UTILITIES (O/H)

CALLOUT REFERENCE (X)
REVISION REFERENCE (1)
WORKPOINT (W.P.)
SECTION REFERENCE (XX / X-X)
DETAIL REFERENCE (XX / X-X)
ELEVATION REFERENCE (X / X)

at&t
7150 STANDARD DR
SUITE A
HANOVER, MD 21076

Jacobs
Challenging today.
Reinventing tomorrow.
Jacobs Telecommunications, Inc.
7150 STANDARD DR. SUITE B
HANOVER, MD 21076
443.230.4400x113

CERTIFICATION STATEMENT:
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. 55911 EXP.: 04/14/22

APPROVALS

LANDLORD _____
LEASING _____
R.F. _____
ZONING _____
CONSTRUCTION _____
A & E _____

PROJECT NO: EP4TURWL

DRAWN BY: RM

CHECKED BY: LW

SUBMITTALS

1	09/25/20	JX COMMENTS
0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

GENERAL NOTES III

GN-3

App No: 2020071227

Application General Infomation

Applicant Name	Jacobs	Updated	8/8/2020
Application Type	Minor Modification	Ann. Plan?	Yes
Carrier	AT&T Wireless	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

Regarding the rooftop base station:Remove 6 existing antennas Remove 6 RRHs Install 6 new NNH4—65C-R4 Commscope antennas Install 3 new B14/12/29 Band Nokia Remote Radio Heads Install 3 new B5 Band Nokia Remote Radio Heads install miscellaneous jumpers/fiber/coax

Site Infomation

Site Id	154	Zoning	CR-3.0
Structure Type	Building	Latitude	38.98032
Address	7101 Wisconsin Ave, Bethesda	Longitude	-77.091811
County Site Name	Continental Plaza	Ground Elevation	346
Carrier Site Name	Strathmore	City	Bethesda
Site Owner	7101 Wisconsin Owner LLC	Lease Status	Leased
Structure Owner	Brandywine Wisconsin LLC	Does the structure require an antenna structure registration under FCC Title 47	No
Existing Structure Height	163		
Provide the proposed height of the replacement structure without any antenna (New, Replacement Apps Only)		Distance to Residential Property (New, Replacement, Colocation Only)	
		Distance to Commercial Property (New, Replacement, Colocation Only)	

Justification of why this site was selected:

The site is needed to provide coverage within the surrounding Bethesda, MD area. AT&T selected this site due to their existing wireless facility. By selecting this location, AT&T can address the demands for their telecommunications service in Montgomery C

NearbySites (New, Replacement Apps Only):

App No: 2020071227

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

Monday, August 10, 2020

7:31:46 AM

App No: 2020071227

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? N/A

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? N/A

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? N/A

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? N/A

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: 9.16

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

Monday, August 10, 2020

7:31:46 AM

App No: 2020071227

Antenna Infomation

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

Antenna Model	Commscope NNHH—65C-R4						
Frequency	700 850 1900						
RAD Center	163	Max ERP	7330	Antenna Dimensions	95.984”H 19.606”W 7.7	Quantity	6

Monday, August 10, 2020

7:31:46 AM

Beiro, Alex

From: Arshia Malik <Arshia.Malik@bdnreit.com>
Sent: Thursday, March 9, 2017 9:00 AM
To: Capaci, Andrew; John McKenzie
Cc: Tony Eastridge
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Andrew,

The chief engineer has no problem with that.

Thank you,

Arshia Malik, MBA, LEED GA
Assistant Property Manager
Brandywine Realty Trust
1010 Wayne Avenue, Suite 200
Silver Spring, MD 20910
T: 240-821-1484
www.brandywinerealty.com

From: Capaci, Andrew [mailto:Andrew.Capaci@jacobs.com]
Sent: Thursday, March 09, 2017 8:59 AM
To: John McKenzie <John.McKenzie@bdnreit.com>
Cc: Arshia Malik <Arshia.Malik@bdnreit.com>; Tony Eastridge <Tony.Eastridge@bdnreit.com>
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Good morning, John!

Let us know if the pictures we sent on 3/2 are acceptable.

Thank you!

From: Capaci, Andrew
Sent: Thursday, March 02, 2017 1:47 PM
To: 'John McKenzie'
Cc: Arshia Malik; Tony Eastridge
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

John,

Here are photos of the existing hole in the alpha sector. The new one will be placed right by this one.

From: John McKenzie [mailto:John.McKenzie@bdnreit.com]
Sent: Thursday, March 02, 2017 1:41 PM
To: Capaci, Andrew
Cc: Arshia Malik; Tony Eastridge
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Andrew,

You'll need to provide us with a specific location of the penetration for us to review.

Thank you.

John McKenzie, Group Chief Engineer

Brandywine Realty Trust

1010 Wayne Avenue, Suite 200

Silver Spring, MD 20910

T: 240-821-1516

www.brandywinerealty.com

From: Capaci, Andrew [mailto:Andrew.Capaci@jacobs.com]
Sent: Thursday, March 02, 2017 12:38 PM
To: Arshia Malik <Arshia.Malik@bdnreit.com>; Tony Eastridge <Tony.Eastridge@bdnreit.com>
Cc: John McKenzie <John.McKenzie@bdnreit.com>
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Arshia,

I consulted with our construction team to be 100% certain and they said they will need to drill a small hole (2" max) in the screen wall in the alpha sector. It is a corrugated open metal screen wall.

Please advise.

Thanks!

From: Capaci, Andrew
Sent: Wednesday, March 01, 2017 2:11 PM
To: 'Arshia Malik'; Tony Eastridge
Cc: John McKenzie
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Thank you! Penetrations should not be necessary here.

We will reach out to coordinate construction when the time comes.

Thanks!

From: Arshia Malik [mailto:Arshia.Malik@bdnreit.com]
Sent: Wednesday, March 01, 2017 12:42 PM
To: Capaci, Andrew; Tony Eastridge
Cc: John McKenzie
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Good afternoon Andrew,

Sorry for the delay. We have reviewed the drawings and foresee no problem with them. One thing we do need to make sure is addressed and followed, if there will be any penetrations (none were mentioned on the drawing), they will have to be reviewed and approved by landlord before moving forward.

Thank you,

Arshia Malik, MBA, LEED GA
Assistant Property Manager
Brandywine Realty Trust
1010 Wayne Avenue, Suite 200
Silver Spring, MD 20910
T: 240-821-1484
www.brandywinerealty.com

From: Capaci, Andrew [mailto:Andrew.Capaci@jacobs.com]
Sent: Tuesday, February 28, 2017 8:42 AM
To: Arshia Malik <Arshia.Malik@bdnreit.com>; Tony Eastridge <Tony.Eastridge@bdnreit.com>
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Good morning Arshia and Tony!

Please advise on the status of the plan review. They were sent over on 2/1 and we have yet to hear back. Can you please jump in and help us out?

From: Capaci, Andrew
Sent: Monday, February 20, 2017 9:27 AM
To: 'Arshia Malik'; 'Tony Eastridge'
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Good morning!

I just wanted to check in and see if you could provide a timeline on the plan review here.

Thanks and have a great day!

From: Capaci, Andrew
Sent: Monday, February 13, 2017 9:52 AM
To: 'Arshia Malik'; Tony Eastridge
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Good morning, Arshia!

Would you please be able to provide a timeline on the plan review? If there are any questions let me know.

Thank you!

From: Arshia Malik [mailto:Arshia.Malik@bdnreit.com]
Sent: Thursday, February 09, 2017 3:58 PM
To: Capaci, Andrew; Tony Eastridge
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Andrew, we will review it and if we are able to fill it out, we will.

Thank you,
Arshia.

From: Capaci, Andrew [mailto:Andrew.Capaci@jacobs.com]
Sent: Monday, February 06, 2017 4:50 PM
To: Arshia Malik <Arshia.Malik@bdnreit.com>; Tony Eastridge <Tony.Eastridge@bdnreit.com>
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Thank you for your reply. Will you be able to fill out the attached form as well? We will need it to proceed with our compliance review.

Thank you!

From: Arshia Malik [mailto:Arshia.Malik@bdnreit.com]
Sent: Monday, February 06, 2017 1:31 PM
To: Capaci, Andrew; Tony Eastridge
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Good afternoon Andrew,

Sorry for the delay. We did receive it, will let you know if there are any concerns.

Thank you,

Arshia Malik, MBA, LEED GA
Assistant Property Manager
Brandywine Realty Trust
1010 Wayne Avenue, Suite 200
Silver Spring, MD 20910
T: 240-821-1484
www.brandywinerealty.com

From: Capaci, Andrew [mailto:Andrew.Capaci@jacobs.com]
Sent: Monday, February 06, 2017 11:58 AM
To: Arshia Malik <Arshia.Malik@bdnreit.com>; Tony Eastridge <Tony.Eastridge@bdnreit.com>
Subject: RE: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Good morning! Happy Monday.

I just wanted to reach out and confirm you received our plans. Please let me know if you need anything from me.

Thanks!

From: Capaci, Andrew
Sent: Wednesday, February 01, 2017 3:32 PM

To: 'arshia.malik@bdnreit.com'; 'tony.eastridge@bdnreit.com'
Subject: AT&T Cell Site at 7101 Wisconsin Ave (Strathmoore)

Arshia,

Per our phone conversation, please find the attached construction plans and consent letter to review, execute, and return.

Please don't hesitate to reach out for anything you may need from me. Thank you!

Andrew Capaci | JACOBS | 570.262.5601 mobile | andrew.capaci@jacobs.com | www.jacobs.com

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SITESAFE
RF COMPLIANCE EXPERTS

8618 Westwood Center Drive, Suite 315, Vienna, VA 22182
703.276.1100 ● 703.276.1169 fax
info@sitesafe.com ● www.sitesafe.com

Jacobs on behalf of AT&T Mobility, LLC Site FA – 10096268 USID – 16252 Site Name – STRATHMOORE (2251A0T8EQ)

7101 Wisconsin Avenue
Bethesda, MD 20814

Latitude: N38-58-49.73
Longitude: W77-05-29.81
Structure Type: Rooftop

Report generated date: May 14, 2020
Report by: Leo Romero
Customer Contact: Justin Bridges

AT&T Mobility, LLC is compliant based on the FCC Rules and Regulations.

Table of Contents

1 General Site Summary

1.1 Report Summary

AT&T Mobility, LLC	Summary
Max Cumulative Simulated RFE Level on the Rooftop	93.0% General Public Limit 4' behind/next to AT&T Mobility, LLC's Beta Sector Antenna #4
Max Cumulative Simulated RFE Level on the Rooftop Walking Surface	81.0% General Public Limit 50' in front of AT&T Mobility, LLC's Alpha Sector Antenna #2
Max Cumulative Simulated RFE Level on the Ground	<1% General Public Limit
Compliant per FCC Rules and Regulations?	Yes
Compliant per AT&T Mobility, LLC's Policy?	No

The following documents were provided by the client and were utilized to create this report:

RFDS: STRATHMOORE_2020-LTE-Next-Carrier_LTE-6C_ar351y_2251A0T7VA_10096268_16252_11-25-2019_Final-Approved_v1.00

CD's: LTE6C_10096268_AE203_STRATHMOORE_Rev B

RF Powers Used: MAX RRH Powers

1.2 Fall Arrest Anchor Point Summary

Fall Arrest Anchor & Parapet Info	Parapet Available (Y/N)	Parapet Height (inches)	Fall Arrest Anchor Available (Y/N)
Roof Safety Info	Y	4	N

1.3 Signage Summary

a. Pre-Site Visit AT&T Signage (Existing Signage)

AT&T Signage Locations	 Information 1	 Information 2	 Notice	 Notice 2	 Caution	 Caution 2	 Warning	 Warning 2	 Barriers
Access Point(s)	**4**								
Alpha	**1**								
Beta	**1**								
Gamma	**1**								

Note: All existing signage was documented during a previous site visit on 7/5/2017.

b. Proposed AT&T Signage

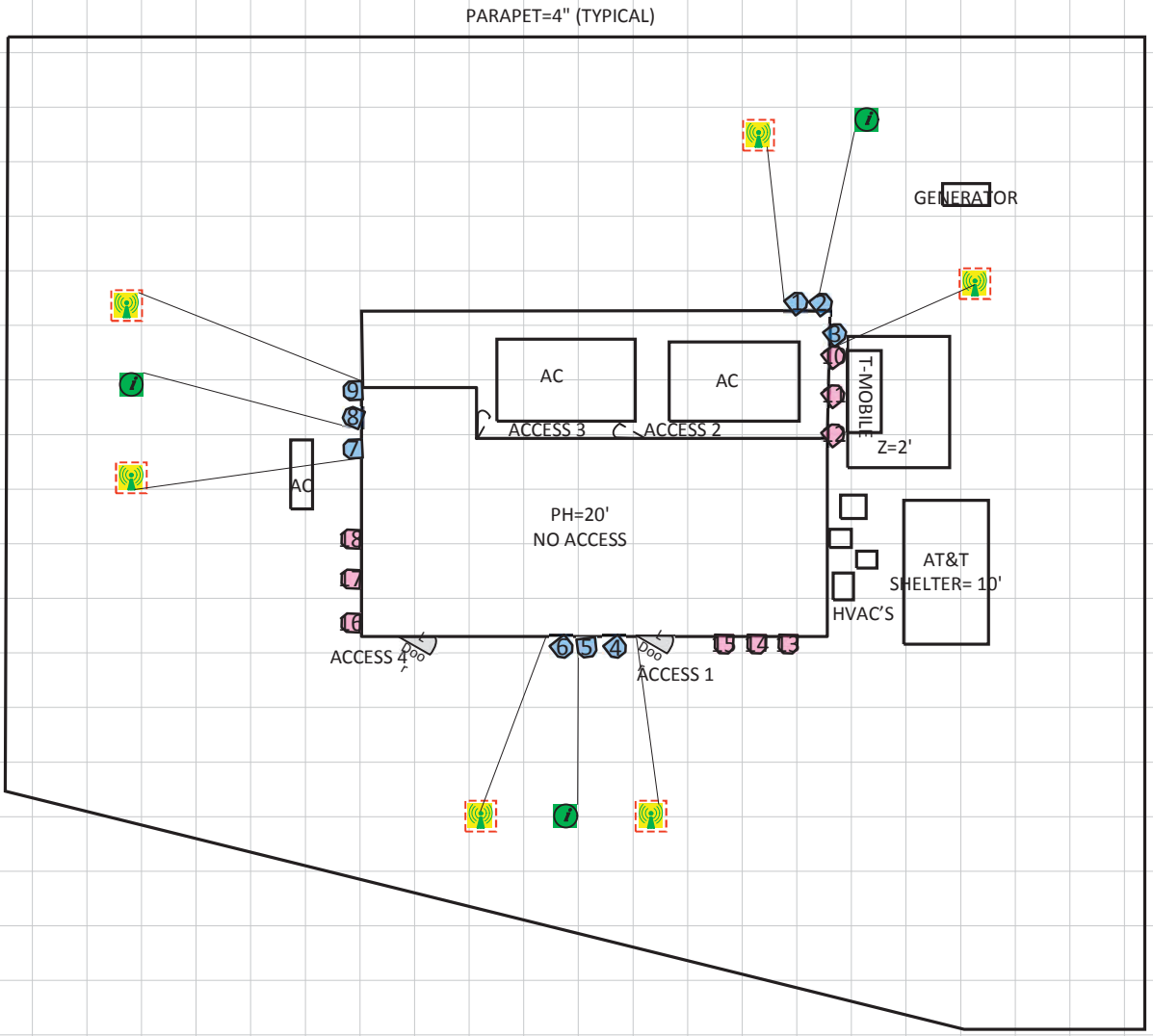
AT&T Signage Locations	 Information 1	 Information 2	 Notice	 Notice 2	 Caution	 Caution 2	 Warning	 Warning 2	 Barriers
Access Point(s)									
Alpha						**2**			
Beta						**2**			
Gamma						**2**			

2 Scale Maps of Site

The following diagrams are included:

- Site Scale Map
- RF Exposure Diagram
- AT&T Mobility, LLC Contribution

Site Scale Map For: STRATHMOORE



(Feet)

0 12.7 25.4

www.sitesafe.com
Site Name:STRATHMOORE
5/14/2020 8:42:15 AM

Carrier Identification

AT&T MOBILITY LLC | VERIZON WIRELESS | T-MOBILE | SPRINT | UNKNOWN CARRIER

Sign Legend

Caution 1 | Caution 2 | Notice 2 | Notice 1 | Warning | Warning 2 | Info 1 | Info 2 | RF Safety Plan

Barrier

Proposed Barriers/ Signs

3 Antenna Inventory

The following antenna inventory was obtained by the customer and was utilized to create the site model diagrams:

Ant ID	Operator	Antenna Make & Model	Type	TX Freq (MHz)	Technology	Az (Deg)	Hor BW (Deg)	Ant Len (ft)	Power	Power Type	Power Unit	Misc Loss	TX Count	Total ERP (Watts)	Ant Gain (dBd)	Z	MDT	EDT
1	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	722	LTE	30	73	8	50	TPO	Watt	0	1	966	12.86	14'	2°	12°
1	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	737	LTE	30	73	8	160	TPO	Watt	0	1	3091.1	12.86	14'	2°	12°
1	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	762	LTE	30	73	8	160	TPO	Watt	0	1	3091.1	12.86	14'	2°	12°
1	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	1900	LTE	30	59	8	160	TPO	Watt	0	1	7016.5	16.42	14'	2°	2°
1	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	2100	LTE	30	61	8	160	TPO	Watt	0	1	7330.3	16.61	14'	2°	5°
2	AT&T MOBILITY LLC	Kathrein-Scala 742-264	Panel	850	UMTS	30	68.4	4.3	40	TPO	Watt	0	1	634	12	15.8'	0°	12°
3	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	850	5G	30	71	8	160	TPO	Watt	0	1	3794.2	13.75	14'	0°	12°
3	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	2300	LTE	30	59	8	100	TPO	Watt	0	1	4775.3	16.79	14'	0°	5°
4	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	722	LTE	120	73	8	50	TPO	Watt	0	1	966	12.86	14'	2°	9°
4	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	737	LTE	120	73	8	160	TPO	Watt	0	1	3091.1	12.86	14'	2°	9°
4	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	763	LTE	120	73	8	160	TPO	Watt	0	1	3091.1	12.86	14'	2°	9°
4	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	1900	LTE	120	59	8	160	TPO	Watt	0	1	7016.5	16.42	14'	2°	2°
4	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	2100	LTE	120	61	8	160	TPO	Watt	0	1	7330.3	16.61	14'	2°	4°
5	AT&T MOBILITY LLC	Kathrein-Scala 742-264	Panel	850	UMTS	150	68.4	4.3	40	TPO	Watt	0	1	634	12	15.8'	0°	6°
6	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	850	5G	120	71	8	160	TPO	Watt	0	1	3794.2	13.75	14'	0°	9°
6	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	2300	LTE	120	59	8	100	TPO	Watt	0	1	4775.3	16.79	14'	0°	4°
7	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	722	LTE	245	73	8	50	TPO	Watt	0	1	966	12.86	14'	2°	12°
7	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	737	LTE	245	73	8	160	TPO	Watt	0	1	3091.1	12.86	14'	2°	12°
7	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	763	LTE	245	73	8	160	TPO	Watt	0	1	3091.1	12.86	14'	2°	12°

Ant ID	Operator	Antenna Make & Model	Type	TX Freq (MHz)	Technology	Az (Deg)	Hor BW (Deg)	Ant Len (ft)	Power	Power Type	Power Unit	Misc Loss	TX Count	Total ERP (Watts)	Ant Gain (dBd)	Z	MDT	EDT
7	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	1900	LTE	245	59	8	160	TPO	Watt	0	1	7016.5	16.42	14'	2°	6°
7	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	2100	LTE	245	61	8	160	TPO	Watt	0	1	7330.3	16.61	14'	2°	6°
8	AT&T MOBILITY LLC	Kathrein-Scala 742-264	Panel	850	UMTS	270	68.4	4.3	40	TPO	Watt	0	1	634	12	15.8'	0°	2°
9	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	850	5G	245	71	8	160	TPO	Watt	0	1	3794.2	13.75	14'	0°	12°
9	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	2300	LTE	245	59	8	100	TPO	Watt	0	1	4775.3	16.79	14'	0°	6°
10	T-MOBILE	Ericsson AIR 21 B2A B4P	Panel	1900		30	65	4.7	120	TPO	Watt	0	0	4132.2	15.37	15.7'	0°	0°
11	T-MOBILE	Andrew LNX-6515DS-VTM	Panel	700		30	65	8	160	TPO	Watt	0	0	4427.1	14.42	12'	0°	0°
12	T-MOBILE	Ericsson AIR 21 B4A B2P	Panel	2100		30	65	4.7	120	TPO	Watt	0	0	4132.2	15.37	15.7'	0°	0°
13	T-MOBILE	Ericsson AIR 21 B2A B4P	Panel	1900		160	65	4.7	120	TPO	Watt	0	0	4132.2	15.37	15.7'	0°	0°
14	T-MOBILE	Andrew LNX-6515DS-VTM	Panel	700		160	65	8	160	TPO	Watt	0	0	4427.1	14.42	12'	0°	0°
15	T-MOBILE	Ericsson AIR 21 B4A B2P	Panel	2100		160	65	4.7	120	TPO	Watt	0	0	4132.2	15.37	15.7'	0°	0°
16	T-MOBILE	Ericsson AIR 21 B2A B4P	Panel	1900		250	65	4.7	120	TPO	Watt	0	0	4132.2	15.37	15.7'	0°	0°
17	T-MOBILE	Andrew LNX-6515DS-VTM	Panel	700		250	65	8	160	TPO	Watt	0	0	4427.1	14.42	12'	0°	0°
18	T-MOBILE	Ericsson AIR 21 B4A B2P	Panel	2100		250	65	4.7	120	TPO	Watt	0	0	4132.2	15.37	15.7'	0°	0°

Note: The Z reference indicates the bottom of the antenna height above the main site level unless otherwise indicated. Effective Radiated Power (ERP) is provided by the operator or based on Sitesafe experience. The values used in the modeling may be greater than are currently deployed. Other operator's equipment, antenna models and powers used for modeling are based on obtained information or Sitesafe experience. Proposed equipment is tagged as *(Proposed)* under *Operator* or *Antenna Make & Model*.

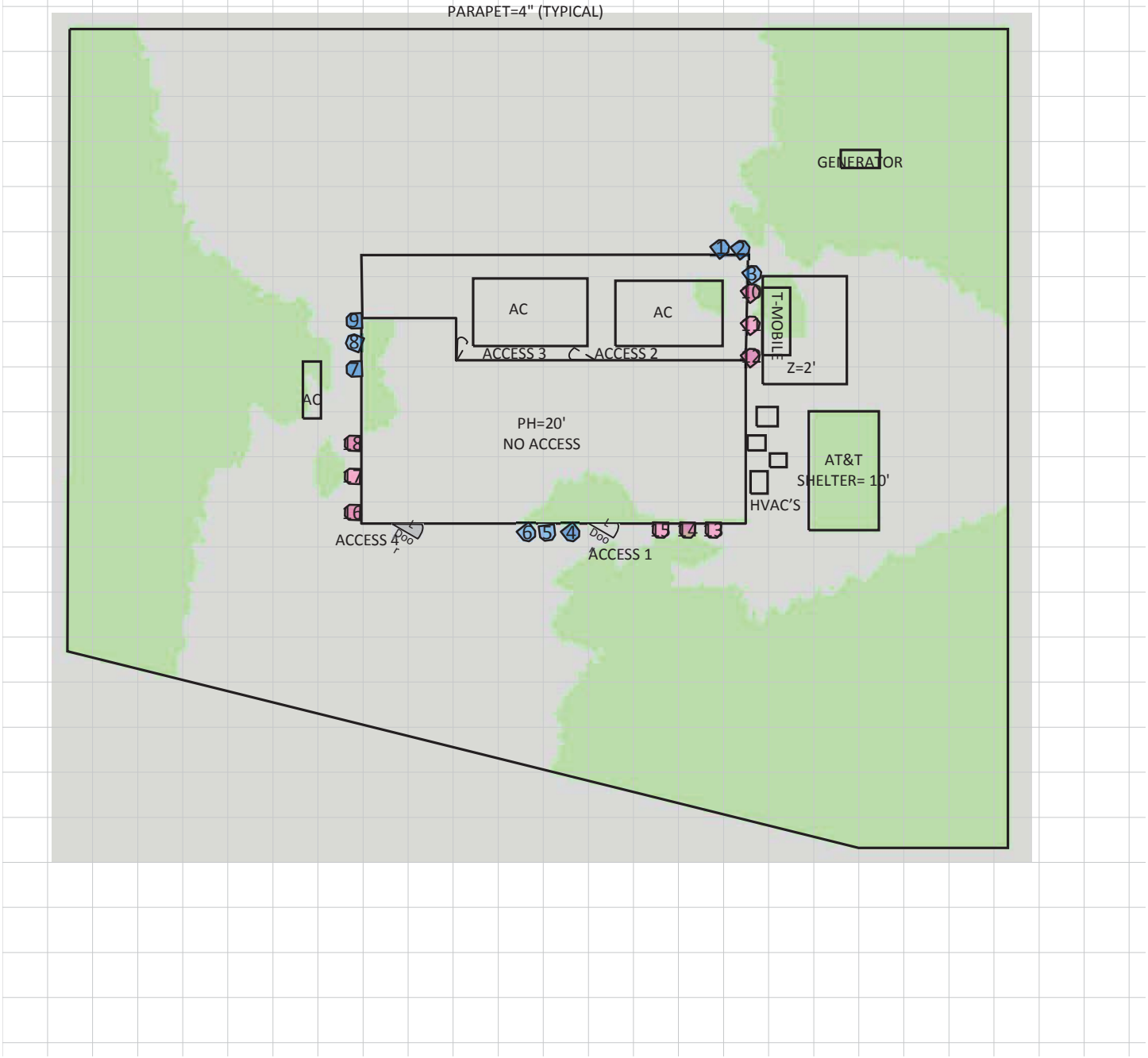
4 Emission Predictions

In the RF Exposure Simulations below, all heights are reflected with respect to main site level. In most rooftop cases this is the height of the main rooftop and in other cases this can be ground level. Each different height area, rooftop, or platform level is labeled with its height relative to the main site level. Emissions are calculated appropriately based on the relative height and location of that area to all antennas. The total analyzed elevations in the below RF Exposure Simulations are listed below.

- MAIN LEVEL = 0'
- PH1 = 20'
- AT&T Shelter = 10'
- T-Mobile Equipment Platform = 2'

The Antenna Inventory heights are referenced to the same level.

RF Exposure Simulation For: STRATHMOORE
Composite View



% of FCC Public Exposure Limit
Spatial Average 0' - 6'

% of FCC Public Exposure Limit

>= 5000	>= 500	>= 100	>= 5	< 5

Carrier Identification

AT&T MOBILITY LLC | VERIZON WIRELESS | T-MOBILE | SPRINT | UNKNOWN CARRIER

Barrier

Proposed Barriers/ Signs

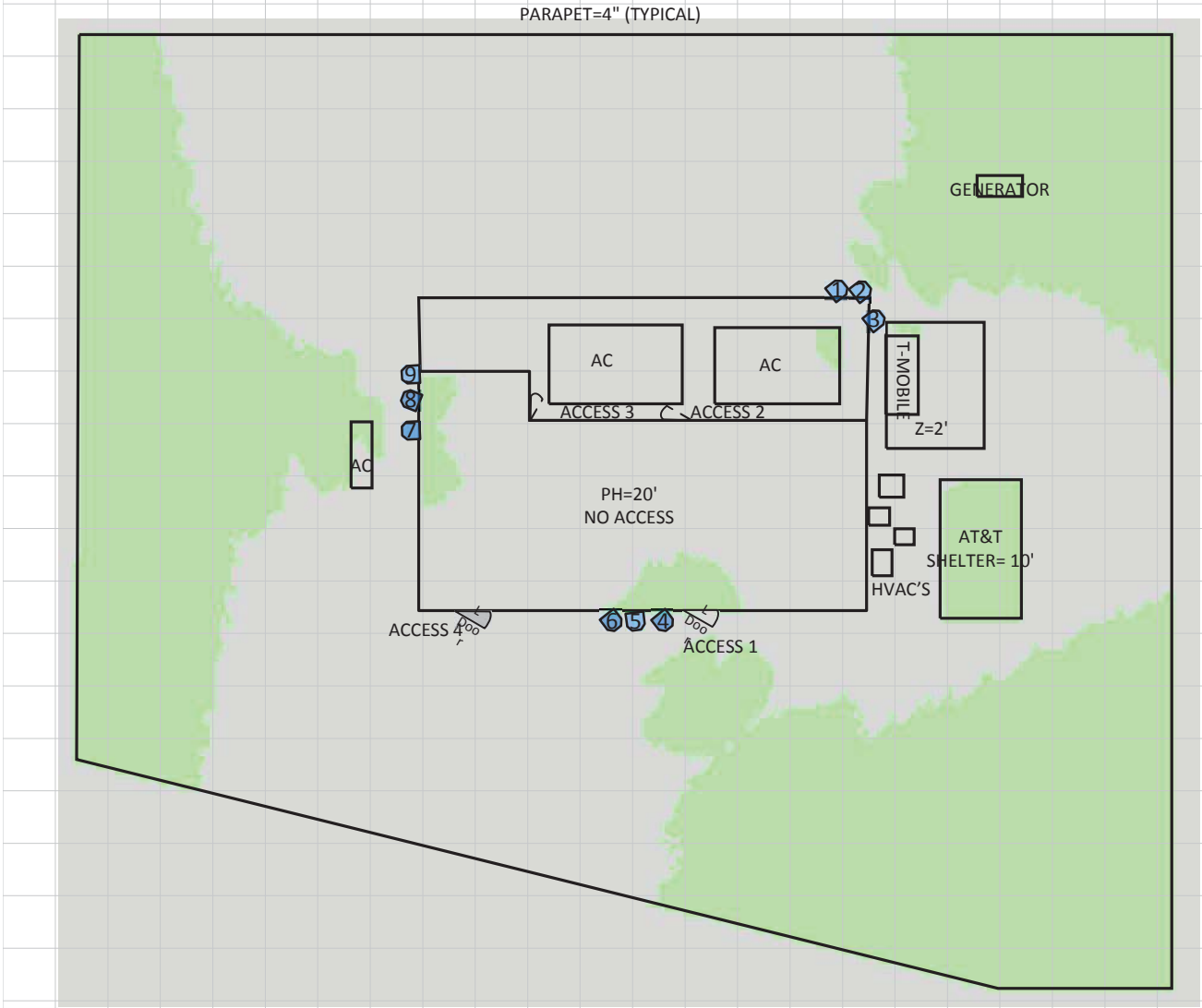
(Feet)

0 12.7 25.4

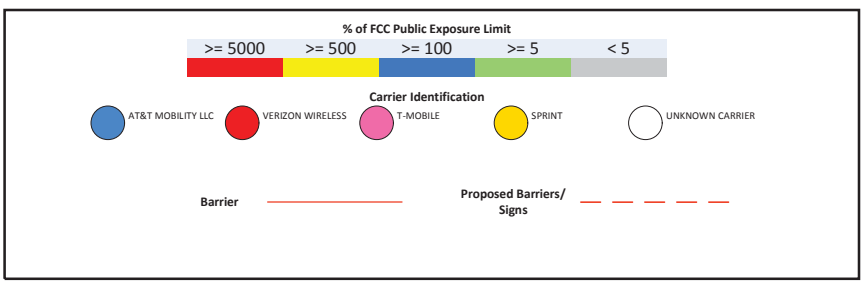
www.sitesafe.com
Site Name:STRATHMOORE
5/14/2020 8:36:18 AM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: STRATHMOORE
AT&T Mobility, LLC Contribution



% of FCC Public Exposure Limit
Spatial Average 0' - 6'



(Feet)

0 12.7 25.4

www.sitesafe.com
Site Name:STRATHMOORE
5/14/2020 8:39:10 AM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

5 Site Compliance

5.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, RF hazard signage and antenna locations, Sitesafe has determined that:

AT&T Mobility, LLC is compliant with the FCC Rules and Regulations, as described in OET Bulletin 65.

The compliance determination is based on General Public RFE levels derived from theoretical modeling, RF signage placement, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the proposed AT&T Mobility, LLC deployment plan could result in the site being rendered non-compliant.

Modeling is used for determining compliance and the percentage of MPE contribution.

5.2 Actions for Site Compliance

Based on FCC regulations, common industry practice, and our understanding of AT&T Mobility, LLC's RF Safety Policy requirements, this section provides a statement of recommendations for site compliance. Recommendations have been proposed based on our understanding of existing access restrictions, signage, and an analysis of predicted RFE levels.

AT&T Mobility, LLC is compliant with the FCC Rules and Regulations.

Recommended per AT&T Mobility, LLC's Policy:

Site Access Location

Sitesafe recommends that all AT&T Mobility, LLC signage be removed from all access points, as they are not required by AT&T Mobility, LLC's signage policy.

AT&T Mobility, LLC Proposed Alpha Sector Location

(2) Caution 2 sign(s) are recommended just below the bottom tip of the antennas. Remove the existing Information 1 sign(s) from this sector.

AT&T Mobility, LLC Proposed Beta Sector Location

(2) Caution 2 sign(s) are recommended just below the bottom tip of the antennas. Remove the existing Information 1 sign(s) from this sector.

AT&T Mobility, LLC Proposed Gamma Sector Location

(2) Caution 2 sign(s) are recommended just below the bottom tip of the antennas. Remove the existing Information 1 sign(s) from this sector.

Notes:

- Ensure all existing signage documented in this report still exist at the site, unless otherwise indicated.

6 Reviewer Certification

The reviewer whose signature appears below hereby certifies and affirms:

That I am an employee of Site Safe, LLC, in Vienna, Virginia, at which place the staff and I provide RF compliance services to clients in the wireless communications industry; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission (FCC) as well as the regulations of the Occupational Safety and Health Administration (OSHA), both in general and specifically as they apply to the FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields; and

That I have thoroughly reviewed this Site Compliance Report and believe it to be true and accurate to the best of my knowledge as assembled by and attested to by Leo Romero.

May 14, 2020

Anthony Handley

Appendix A – Statement of Limiting Conditions

Sitesafe has provided computer generated model(s) in this Site Compliance Report to show approximate dimensions of the site, and the model is included to assist the reader of the compliance report to visualize the site area, and to provide supporting documentation for Sitesafe's recommendations.

Sitesafe may note in the Site Compliance Report any adverse physical conditions, such as needed repairs, that Sitesafe became aware of during the normal research involved in creating this report. Sitesafe will not be responsible for any such conditions that do exist or for any engineering or testing that might be required to discover whether such conditions exist. Because Sitesafe is not an expert in the field of mechanical engineering or building maintenance, the Site Compliance Report must not be considered a structural or physical engineering report.

Sitesafe obtained information used in this Site Compliance Report from sources that Sitesafe considers reliable and believes them to be true and correct. Sitesafe does not assume any responsibility for the accuracy of such items that were furnished by other parties. When conflicts in information occur between data collected by Sitesafe provided by a second party and data collected by Sitesafe, the data will be used.

Appendix B – Regulatory Background Information

FCC Rules and Regulations

In 1996, the Federal Communications Commission (FCC) adopted regulations for evaluating the effects of RF emissions in 47 CFR § 1.1307 and 1.1310. The guideline from the FCC Office of Engineering and Technology is Bulletin 65 ("OET Bulletin 65"), *Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields*, Edition 97-01, published August 1997. Since 1996, the FCC periodically reviews these rules and regulations as per their congressional mandate.

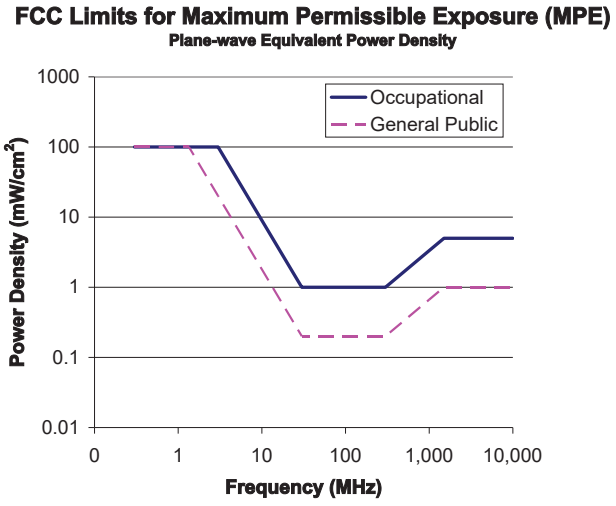
FCC regulations define two separate tiers of exposure limits: Occupational or "Controlled environment" and General Public or "Uncontrolled environment". The General Public limits are generally five times more conservative or restrictive than the Occupational limit. These limits apply to *accessible* areas where workers or the general public may be exposed to Radio Frequency (RF) electromagnetic fields.

Occupational or Controlled limits apply in situations in which persons are exposed as a consequence of their employment and where those persons exposed have been made fully aware of the potential for exposure and can exercise control over their exposure.

An area is considered a Controlled environment when access is limited to these aware personnel. Typical criteria are restricted access (i.e. locked or alarmed doors, barriers, etc.) to the areas where antennas are located coupled with proper RF warning signage. A site with Controlled environments is evaluated with Occupational limits.

All other areas are considered Uncontrolled environments. If a site has no access controls or no RF warning signage it is evaluated with General Public limits.

The theoretical modeling of the RF electromagnetic fields has been performed in accordance with OET Bulletin 65. The Maximum Permissible Exposure (MPE) limits utilized in this analysis are outlined in the following diagram:



Limits for Occupational/Controlled Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6

Limits for General Population/Uncontrolled Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

f = frequency in MHz *Plane-wave equivalent power density

OSHA Statement

The General Duty clause of the OSHA Act (Section 5) outlines the occupational safety and health responsibilities of the employer and employee. The General Duty clause in Section 5 states:

(a) Each employer –

(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;
(2) shall comply with occupational safety and health standards promulgated under this Act.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

OSHA has defined Radiofrequency and Microwave Radiation safety standards for workers who may enter hazardous RF areas. Regulation Standards 29 CFR § 1910.147 identify a generic Lockout/Tagout procedure aimed to control the unexpected energization or startup of machines when maintenance or service is being performed.

Appendix C – Safety Plan and Procedures

The following items are general safety recommendations that should be administered on a site by site basis as needed by the carrier.

General Maintenance Work: Any maintenance personnel required to work immediately in front of antennas and / or in areas indicated as above 100% of the Occupational MPE limits should coordinate with the wireless operators to disable transmitters during their work activities.

Training and Qualification Verification: All personnel accessing areas indicated as exceeding the General Population MPE limits should have a basic understanding of EME awareness and RF Safety procedures when working around transmitting antennas. Awareness training increases a worker's understanding to potential RF exposure scenarios. Awareness can be achieved in a number of ways (e.g. videos, formal classroom lecture or internet-based courses).

Physical Access Control: Access restrictions to transmitting antennas locations is the primary element in a site safety plan. Examples of access restrictions are as follows:

- Locked door or gate
- Alarmed door
- Locked ladder access
- Restrictive Barrier at antenna (e.g. Chain link with posted RF Sign)

RF Signage: Everyone should obey all posted signs at all times. RF signs play an important role in properly warning a worker prior to entering into a potential RF Exposure area.

Assume all antennas are active: Due to the nature of telecommunications transmissions, an antenna transmits intermittently. Always assume an antenna is transmitting. Never stop in front of an antenna. If you have to pass by an antenna, move through as quickly and safely as possible thereby reducing any exposure to a minimum.

Maintain a 3-foot clearance from all antennas: There is a direct correlation between the strength of an EME field and the distance from the transmitting antenna. The further away from an antenna, the lower the corresponding EME field is.

Site RF Emissions Diagram(s): Section 4 of this report contains RF Diagram(s) that outline various theoretical Maximum Permissible Exposure (MPE) areas at the site. The modeling is a worst-case scenario assuming a duty cycle of 100% for each transmitting antenna at full power. This analysis is based on one of two access control criteria: General Public criteria means the access to the site is uncontrolled and anyone can gain access. Occupational criteria means the access is restricted and only properly trained individuals can gain access to the antenna locations.

Appendix D – RF Emissions

The RF Emissions Simulation(s) in this report display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix E.

The key at the bottom of each RF Emissions Simulation indicates percentages displayed referenced to FCC General Public Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Areas indicated as Gray are predicted to be below 5% of the MPE limits. Gray represents areas more than 20 times below the most conservative exposure limit. **Gray areas are accessible to anyone**.
- Green represents areas are predicted to be between 5% and 100% of the MPE limits. **Green areas are accessible to anyone.**
- Blue represents areas predicted to exceed the General Public MPE limits but are less than Occupational limits. **Blue areas should be accessible only to RF trained workers**.
- Yellow represents areas predicted to exceed Occupational MPE limits. **Yellow areas should be accessible only to RF trained workers able to assess current exposure levels.**
- Red represents areas predicted to have exposure more than 10 times the Occupational MPE limits. **Red indicates that the RF levels must be reduced prior to access.** An RF Safety Plan is required which outlines how to reduce the RF energy in these areas prior to access.

If trained occupational personnel require access to areas that are delineated as above 100% of the limit, Sitesafe recommends that they utilize the proper personal protection equipment (RF monitors), coordinate with the carriers to reduce or shutdown power, or make real-time power density measurements with the appropriate power density meter to determine real-time MPE levels. This will allow the personnel to ensure that their work area is within exposure limits.

Appendix E – Assumptions and Definitions

General Model Assumptions

In this site compliance report, it is assumed that all antennas are operating at **full power at all times**. Software modeling was performed for all transmitting antennas located on the site. Sitesafe has further assumed a 100% duty cycle and maximum radiated power.

The modeling is based on recommendations from the FCC's OET-65 bulletin with the following variances per AT&T guidance. Reflection has not been considered in the modeling, i.e. the reflection factor is 1.0. The near / far field boundary has been set to 1.5 times the aperture height of the antenna and modeling beyond that point is the lesser of the near field cylindrical model and the far field model taking into account the gain of the antenna.

The site has been modeled with these assumptions to show the maximum RF energy density. Areas modeled with exposure greater than 100% of the General Public MPE level may not actually occur but are shown as a prediction that could be realized. Sitesafe believes these areas to be safe for entry by occupationally trained personnel utilizing appropriate personal protective equipment (in most cases, a personal monitor).

Use of Generic Antennas

For the purposes of this report, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information about a carrier, their FCC license and/or antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use our industry specific knowledge of equipment, antenna models, and transmit power to model the site. If more specific information can be obtained for the unknown measurement criteria, Sitesafe recommends remodeling of the site utilizing the more complete and accurate data. Information about similar facilities is used when the service is identified and associated with a particular antenna. If no information is available regarding the transmitting service associated with an unidentified antenna, using the antenna manufacturer's published data regarding the antenna's physical characteristics makes more conservative assumptions.

Where the frequency is unknown, Sitesafe uses the closest frequency in the antenna's range that corresponds to the highest Maximum Permissible Exposure (MPE), resulting in a conservative analysis.

Appendix F – Definitions

5% Rule – The rules adopted by the FCC specify that, in general, at multiple transmitter sites actions necessary to bring the area into compliance with the guidelines are the shared responsibility of all licensees whose transmitters produce field strengths or power density levels at the area in question in excess of 5% of the exposure limits. In other words, any wireless operator that contributes 5% or greater of the MPE limit in an area that is identified to be greater than 100% of the MPE limit is responsible for taking corrective actions to bring the site into compliance.

Compliance – The determination of whether a site complies with FCC standards with regards to Human Exposure to Radio Frequency Electromagnetic Fields from transmitting antennas.

Decibel (dB) – A unit for measuring power or strength of a signal.

Duty Cycle – The percent of pulse duration to the pulse period of a periodic pulse train. Also, may be a measure of the temporal transmission characteristic of an intermittently transmitting RF source such as a paging antenna by dividing average transmission duration by the average period for transmission. A duty cycle of 100% corresponds to continuous operation.

Effective (or Equivalent) Isotropic Radiated Power (EIRP) – The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna.

Effective Radiated Power (ERP) – The product of the power supplied to the antenna and the antenna gain in a given direction relative to a half-wave dipole antenna.

Gain (of an antenna) – The ratio of the maximum power in a given direction to the maximum power in the same direction from an isotropic radiator. Gain is a measure of the relative efficiency of a directional antenna as compared to an omnidirectional antenna.

General Population/Uncontrolled Environment – Defined by the FCC as an area where RF exposure may occur to persons who are **unaware** of the potential for exposure and who have no control over their exposure. General Population is also referenced as General Public.

Generic Antenna – For the purposes of this report, the use of "Generic" as an antenna model means the antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use its industry specific knowledge of antenna models to select a worst-case scenario antenna to model the site.

Isotropic Antenna – An antenna that is completely non-directional. In other words, an antenna that radiates energy equally in all directions.

Maximum Measurement – This measurement represents the single largest measurement recorded when performing a spatial average measurement.

Maximum Permissible Exposure (MPE) – The rms and peak electric and magnetic field strength, their squares, or the plane-wave equivalent power densities associated with these fields to which a person may be exposed without harmful effect and with acceptable safety factor.

Occupational/Controlled Environment – Defined by the FCC as an area where RF exposure may occur to persons who are **aware** of the potential for exposure as a condition of employment or specific activity and can exercise control over their exposure.

OET Bulletin 65 – Technical guideline developed by the FCC's Office of Engineering and Technology to determine the impact of RF exposure on humans. The guideline was published in August 1997.

OSHA (Occupational Safety and Health Administration) – Under the Occupational Safety and Health Act of 1970, employers are responsible for providing a safe and healthy workplace for their employees. OSHA's role is to promote the safety and health of America's working men and women by setting and enforcing standards; providing training, outreach and education; establishing partnerships; and encouraging continual process improvement in workplace safety and health. For more information, visit www.osha.gov.

Radio Frequency Exposure or Electromagnetic Fields – Electromagnetic waves that are propagated from antennas through space.

Spatial Average Measurement – A technique used to average a minimum of ten (10 measurements taken in a ten (10 second interval from zero (0 to six (6 feet. This measurement is intended to model the average energy a 6-foot tall human body will absorb while present in an electromagnetic field of energy.

Transmitter Power Output (TPO) – The radio frequency output power of a transmitter's final radio frequency stage as measured at the output terminal while connected to a load.

Appendix G – References

The following references can be followed for further information about RF Health and Safety.

Site Safe, LLC
http://www.sitesafe.com
FCC Radio Frequency Safety
http://www.fcc.gov/encyclopedia/radio-frequency-safety
National Council on Radiation Protection and Measurements (NCRP)
http://www.ncrponline.org
Institute of Electrical and Electronics Engineers, Inc., (IEEE)
http://www.ieee.org
American National Standards Institute (ANSI)
http://www.ansi.org
Environmental Protection Agency (EPA)
http://www.epa.gov/radtown/wireless-tech.html
National Institutes of Health (NIH)
http://www.niehs.nih.gov/health/topics/agents/emf/
Occupational Safety and Health Agency (OSHA)
http://www.osha.gov/SLTC/radiofrequencyradiation/
International Commission on Non-Ionizing Radiation Protection (ICNIRP)
http://www.icnirp.org
World Health Organization (WHO)
http://www.who.int/peh-emf/en/
National Cancer Institute
http://www.cancer.gov/cancertopics/factsheet/Risk/cellphones
American Cancer Society (ACS)
http://www.cancer.org/docroot/PED/content/PED_1_3X_Cellular_Phone_Towers.asp?siteareа=PED
European Commission Scientific Committee on Emerging and Newly Identified Health Risks
http://ec.europa.eu/health/ph_risk/committees/04_scenihr/docs/scenihr_o_022.pdf
Fairfax County, Virginia Public School Survey
http://www.fcps.edu/fts/safety-security/RFEESurvey/
UK Health Protection Agency Advisory Group on Non-Ionizing Radiation
http://www.hpa.org.uk/webw/HPAweb&HPAwebStandard/HPAweb_C/1317133826368
Norwegian Institute of Public Health
http://www.fhi.no/dokumenter/545eea7147.pdf

AirScale RRH 4T4R B5 160W AHCA

Capacity, performance, low total cost of ownership and investment protection

Nokia AirScale Remote Radio Head (RRH) AHCA supports band 5 - full band- along with 4×4 MIMO and 256 QAM modulation to deliver higher data rates. It offers Nokia's unique book mounting for faster roll out and radio-integrated Passive Intermodulation (PIM) cancellation for enhanced network performance.

Furthermore, 4TX and 4RX paths in a single radio unit gives the flexibility to support 2T2R-2 sectors or 4T4R-single sector from a single unit, for cost-effective scaling of both coverage and capacity.

Capacity and performance

AirScale RRH 4T4R delivers 160 W (4×40 W) transmit power and can support 2×2 MIMO, 4×2 MIMO and 4×4 MIMO. The radio supports 256 QAM modulation in the downlink (DL) for up to 30 percent higher throughput. The Virtual Spectrum Analyzer feature enables both uplink and downlink spectrum to be analyzed.

Low total cost of ownership

With up to two sectors in a single radio, light weight and zero-bolt book mounting, AirScale RRH 4T4R allows operators to achieve faster roll outs and more cost-effective installation and maintenance of radios and tower space.

Investment protection

AirScale RRH 4T4R complements the AirScale System Module, offering a complete base station solution. AirScale System Module is 5G capable and offers 28 Gbps capacity. AirScale RRH is part of the AirScale Base Station portfolio, the next generation Nokia base station platform, and is backwards-compatible with the Nokia Flexi Multiradio 10 Base Station to best use an operator's existing investments.

Product name	AirScale RRH 4T4R B5 160W AHCA - 473966A
Supported frequency bands	3GPP band 5
Frequencies	DL 869-894MHz, UL 824-849MHz
Number of TX/RX ports	4/4
Instantaneous Bandwidth IBW	25MHz
Occupied Bandwidth OBW	25MHz
Output power	4T4R 40 W/ 2T4R 60W
Dimensions (mm) height x width x depth	337 x 295 x 165
Volume (liters)	16.4
Weight (kg)	16.7
Supply Voltage / Voltage Range	DC-48V / -36V to -60V
Typical Power Consumption	207 W (ETSI 24h Avg – 4x20W mode)
Antenna ports	4TX/4RX, 4.3-10+
Optical ports	2 x CPRI 9.8 Gbps
ALD control interfaces	AISG3.0 from ANT1, 2, 3, 4 and RET (Power supply ANT1 and ANT3)
Other interfaces	External alarm MDR-26 serial connector (4 inputs, 1 output) DC circular power connector
Operational temperature range	-40°C to 55°C (with no solar load)
Ingress protection class	IP65
Installation options	Pole or wall, RAS, vertical or horizontal book mount
Surge protection	Class II 5kA

Nokia Oyj
Karaportti 3
FI-02610 Espoo
Finland
Tel. +358 (0) 10 44 88 000

Product code: SR1611002341EN (April)

June 9, 2020

AT&T
Steven Safire
7150 Standard Drive
Hanover, MD 21706

Jacobs Telecommunications, Inc.
5449 Bells Ferry Road
Acworth, GA 30102
770-701-2500
www.jacobs.com

Subject:	**Rooftop Equipment Installation** **Structural Assessment Letter**
Carrier Designation:	**LTE 5C/6C/5G-Parent Rooftop** **Site Number: 16252** **Site Name: Strathmoore** **FA Location: 10096268** **PTN: 2251A0T8EQ, 2251A0T7VA, 2251A0T7B9, 2251A0T7Y5, 2251A0T82Z, 2251A0T84Z**
Building Owner Designation:	**7101 Wisconsin Owner, LLC** **Site ID: NA**
Engineering Firm Designation:	**Jacobs Telecommunications, Inc. Project: EP4TURWL**
Site Data:	**7101 Wisconsin Avenue** **Bethesda, Montgomery County, MD 20814** **Latitude: N38°58'49.73"±; Longitude: W77°05'29.81"±** **Ground Elevation: 340 ft ± NAVD 88; RT: 165 ft ± AGL**

Per your request, we present our structural assessment of the structure at the above referenced location for the equipment change noted in **Table A**. This assessment assumes the existing structure was properly designed and constructed, as well as being well maintained and is structurally sound.

The purpose of this assessment was to review the structure in accordance with the 2018 International Building Code (current building code) and the ANSI/TIA-222-H-1-2019 Structural Standard for Antenna Supporting Structures and Antennas (industry standard) for structural feasibility and integrity

Our review was conducted in conjunction with the existing AT&T installation information, mount assessment, previous structural evaluation, and the recent site visit photos and data. Based on a comparison of the current structural conditions and the required design criteria with the change in equipment loading, it has been determined that the proposed loading will cause minimal change in the both lateral and vertical loads supported by the structure. It is therefore the opinion of Jacobs that the structure is sufficient to support the proposed loading as listed in **Table A**.

As a result, the imposed additional loads should be within the allowable limits of the existing structural system; thus, the structure is assumed to resist the stress caused by the proposed equipment configuration and will satisfy all assumed structural strength requirements with no additional calculations required. **Thus, by comparison, it is our structural assessment that the proposed configuration will have negligible effect at this site.**

Please note that additional engineering review will be required prior to placing any future equipment. We trust you find our work satisfactory. Jacobs Telecommunications, Inc. appreciates the opportunity of providing continuing professional services to AT&T. Please do not hesitate to call should you have any questions.

Sincerely,

John Tam
Structural Engineer

Wensen Jiang, PE
Engineer of Record
PE No. 55911

6/9/2020

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. 55911, Expiration Date: 4/14/22.

REFERENCES

1. Mount analysis provided by Jacobs Telecommunications, Inc., project no. EP4TURWL, dated 6/9/20.
2. Structural analysis provided by Dewberry Engineers, Inc., dated 5/1/15.
3. Construction drawings provided by FDH Engineering, project no. 1310621950, dated 1/29/14.

CONCLUSION / SUMMARY

Loads determined by the latest IBC referencing ANSI/TIA-222 provide a more practical loading for comparison purposes and therefore are considered to govern for a conservative assessment. All additional loads imparted by the appurtenance configuration noted in **Table A** as determined by ANSI/TIA-222, will not increase the overall gravity load by more than 5% of the original overall structure nor will it increase the overall lateral load by more than 10% of the original overall structure. This comparison meets the additions and alterations requirement outlined in the IBC; thus, a more rigorous analysis/assessment is not required.

CODE INTERPRETATIONS

Per Section 1609.1 and 3108.1 of the International Building Code, the determination of lateral loads for antenna supporting structures and antennas shall be determined using the ANSI/TIA-222.

Mount analysis[1] procedures are based on Section 16 of the ANSI/TIA-222-H with any adjustments outlined in the Mount Technical Directive version 14 provided by AT&T.

Per Section 1103 of the International Building Code, the existing structure is considered to have adequate strength for the proposed appurtenance configuration loading if the *additions* or *alterations* to the existing structure do not increase the gravity load on any structural element of the existing structure by more than five percent, unless the increased forces on the element are still in compliance with the code for new structures. In addition, if the *additions* or *alterations* to the existing structure do not increase the lateral load on any structural element of the existing structure by more than ten percent cumulative since the original construction, unless the element has the capacity to resist the increased forces determined in accordance with Sections 1609 and 1613.

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ASSUMPTIONS

The existing substructure drawings were not available at the time of this assessment. The existing substructure is assumed to be sufficiently designed to resist the additional loading provided by the supplementary equipment such that Section 1103 of the IBC applies.

All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report such that Section 1103 of the IBC applies.

DISCLAIMERS

The scope of this assessment pertains only to the structural system of the additional appurtenance loads **Table A** imparted by the AT&T equipment deployment and as such does not include examination of any additional loads imparted by the equipment installation of others unknown to current mount analysis on file. Furthermore, no qualification is made nor implied by this document for the structural members or elements supporting the aforementioned equipment installation.

All previously installed equipment (microwaves, radios, omnis etc.) not represented in the mount loading **Table A** is to be decommissioned and removed from the antenna mounting system. These installation requirements must be implemented as previously described for this assessment to be valid.

CARRIER LOADING

Table A: Existing, Proposed and *Reserved* Appurtenance Configuration[1,2]

Elevation (AGL, ft)	Sector	Azimuth	Position[3]	Equipment[4]	Cables
163	Alpha	30°	1	**(1) Commscope NNHH-65C-R4 (Antenna)**	(2) 1-5/8" Coax (1) 1" DC (1) 3/8" Fiber (1) 2" Conduit
				(1) Nokia AirScale Dual RRH 4T4R B25/66 320W (RRH)	
				(1) Nokia B14/12/29 Triband (RRH)	
				(1) Raycap DC6-48-60-18-8F (Surge)	
				(1) Raycap DC2-48-60-0-9E (Surge)	
				(1) Raycap FC12-PC6-10E (Surge)	
			2	(1) Kathrein 742264 (Antenna)	
				(2) Powerwave LGP13519 (Diplexer)	
				(1) Raycap DC6-48-60-18-8F (Surge)	
			3	-	
			4	**(1) Commscope NNHH-65C-R4 (Antenna)**	
				(1) ALU RRH4x25-WCS-4R (RRH)	
				(1) Nokia AirScale RRH 4T4R B5 160W (RRH)	
				(1) Raycap DC6-48-60-18-8F (Surge)	
	Beta	120°	1	**(1) Commscope NNHH-65C-R4 (Antenna)**	(2) 1-5/8" Coax (1) 1" DC (1) 3/8" Fiber (1) 2" Conduit
				(1) Nokia AirScale Dual RRH 4T4R B25/66 320W (RRH)	
				(1) Nokia B14/12/29 Triband (RRH)	
				(1) Raycap DC2-48-60-0-9E (Surge)	
		150°	2	(1) Kathrein 742264 (Antenna)	
				(2) Powerwave LGP13519 (Diplexer)	

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163	Beta	-	3	-	-
		120°	4	**(1) Commscope NNHH-65C-R4 (Antenna)**	
				(1) ALU RRH4x25-WCS-4R (RRH)	
				(1) Nokia AirScale RRH 4T4R B5 160W (RRH)	
	Gamma	245°	1	**(1) Commscope NNHH-65C-R4 (Antenna)**	(2) 1-5/8" Coax (1) 1" DC (1) 3/8" Fiber (1) 2" Conduit
				(1) Nokia AirScale Dual RRH 4T4R B25/66 320W (RRH)	
				(1) Nokia B14/12/29 Triband (RRH)	
				(1) Raycap DC2-48-60-0-9E (Surge)	
		270°	2	(1) Kathrein 742264 (Antenna)	
				(2) Powerwave LGP13519 (Diplexer)	
		-	3	-	
		245°	4	**(1) Commscope NNHH-65C-R4 (Antenna)**	
				(1) ALU RRH4x25-WCS-4R (RRH)	
				(1) Nokia AirScale RRH 4T4R B5 160W (RRH)	

1 – Appurtenance Configuration as reflected in AT&T RFDS ID 3546758, updated 1/10/2020.
2 – The evaluation and analysis is modeled for the worse case loading shown.
3 – Position 1 is defined as right-most mount location when facing structure.
4 – Proposed equipment shown in **bold**.
5 – Surge locations shown in table match the RFDS; actual surge locations are to the standoff members and evenly distributed between sectors.

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FA# 10096268 USID#16252
BRANDYWINE WISCONSIN LLC
STRATHMOORE

LTE 5C/6C/4TX4RX ANTENNA RETROFIT/4TX4RX SOFTWARE RETROFIT/5G NR 1SR ROOFTOP

PROJECT DESCRIPTION

AT&T WIRELESS PROPOSES TO MODIFY AN EXISTING WIRELESS INSTALLATION. THE SCOPE WILL CONSIST OF THE FOLLOWING:

TOWER SOW
- REMOVE (6) EXISTING ANTENNAS
- REMOVE (3) EXISTING 700 BAND RRHS
- REMOVE (3) EXISTING AWS BAND RRHS
- REMOVE ALL EXISTING COAX EXCEPT FOR 6 TO REMAIN
- REMOVE (3) EXISTING 2" CONDUIT
- REMOVE (3) EXISTING DC2'S

- INSTALL (6) PROPOSED ANTENNAS
- INSTALL (3) PROPOSED 700 BAND RRHS
- INSTALL (3) PROPOSED 850 BAND RRHS
- INSTALL (3) PROPOSED 1900 BAND RRHS
- INSTALL (3) PROPOSED DC6 BOXES
- INSTALL (3) PROPOSED 24 PAIR FIBER TRUNK CABLE
- INSTALL (3) PROPOSE 6/C 6 AWG POWER TRUNK
- INSTALL (3) PROPOSE 2/C 8 AWG POWER TRUNK
- INSTALL (9) PROPOSE DUAL PAIR FIBER JUMPERS
- INSTALL (6) PROPOSED RET CABLES
- INSTALL (12) PROPOSED DM-HM JUMPERS
- INSTALL (44) PROPOSED HM-HM JUMPERS

GROUND SOW
- REMOVE (18) 1/C 8 AWG TELCOFLEX POWER

- INSTALL (3) PROPOSED DC2 MODULES
- INSTALL (18) PROPOSED 1/C 6 AWG POWER
- INSTALL (3) PROPOSED 25A BREAKERS
- INSTALL (6) PROPOSED 50A BREAKERS
- INSTALL (3) PROPOSED FIBER STORAGE BOXES
- INSTALL (1) PROPOSED 20A BREAKER

- NO SITE/CIVIL WORK

SITE INFORMATION

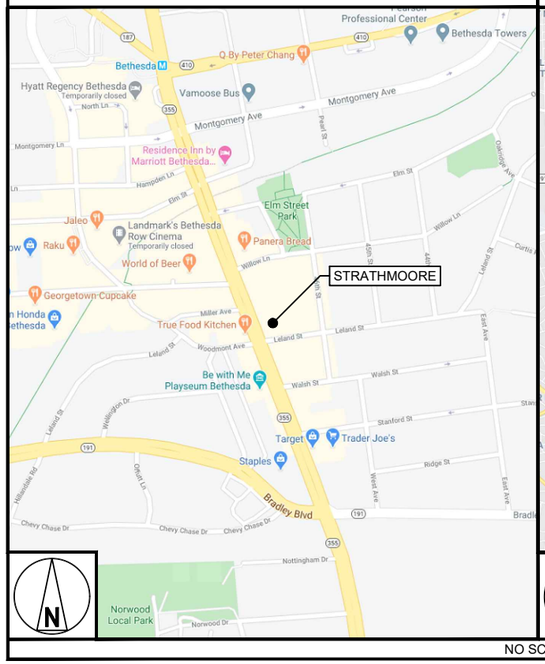
LANDLORD:	BRANDYWINE WISCONSIN LLC
SITE NAME:	STRATHMOORE
USID NUMBER:	16252
FA NUMBER:	10096268
SITE ADDRESS:	7101 WISCONSIN AVENUE BETHESDA, MD 20814
COUNTY:	MONTGOMERY
LATITUDE (NAD 83):	N 38° 58' 49.72"
LONGITUDE (NAD 83):	W 77° 5' 29.81"
RAD CENTER:	163' AGL
SITE ACQUISITION CONTACT:	ANDREW CAPACI Andrew.Capaci@jacobs.com
RF ENGINEER:	SANDEEP GUPTA AA913P@att.com
C&E MANAGER:	STEVEN SAFIRE SS0091@att.com
JURISDICTION:	MONTGOMERY COUNTY
APPLICANT/LESSEE:	AT&T 7150 STANDARD DRIVE SUITE A HANOVER, MD 21076

CONTACT INFORMATION

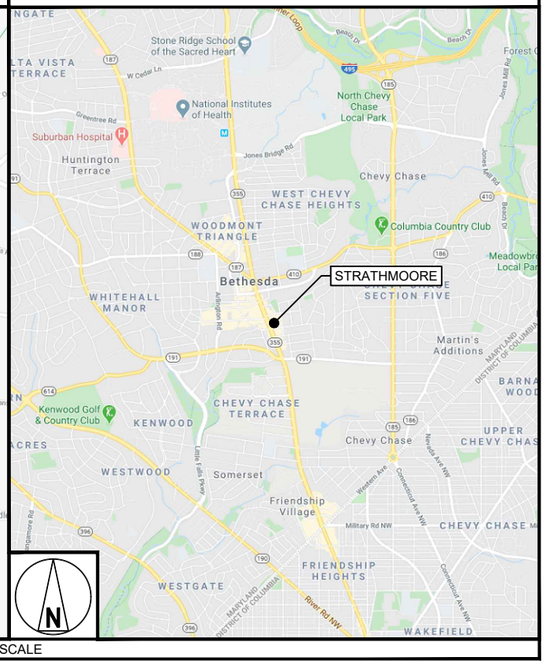
ENGINEER:	JACOBS TELECOMMUNICATIONS, INC. 7150 STANDARD DRIVE, SUITE B HANOVER, MD 21076
CONTACT:	LEAH WOODLY
PHONE:	443.230.4400x113

LOCATION MAPS

VICINITY MAP



LOCAL MAP



NO SCALE

DRIVING DIRECTIONS

DIRECTIONS FROM AT&T OFFICE: START OUT FROM 7150 STANDARD DR, HANOVER MD
TAKE ON MD-100 W FROM STANDARD DR, PARK CIR DR AND COCA COLA DR. TAKE I-95 S AND I-495 W TO MD-185 S/CONNECTICUT AVE IN CHEVY CHASE. TAKE EXIT 33 FROM I-495 W. CONTINUE ON MD-185 S/CONNECTICUT AVE TO YOUR DESTINATION IN BETHESDA TO THE SITE.

ENGINEERING

2015 INTERNATIONAL BUILDING CODE OR LATEST EDITION
2014 NATIONAL ELECTRIC CODE OR LATEST EDITION
TIA-222-H OR LATEST EDITION

GENERAL NOTES

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

RFDS

RFDS REVISION V2020_0.1 DATED 01/10/2020.

APPROVALS

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND MAY IMPOSE CHANGES OR MODIFICATIONS.

AT&T RF: _____ DATE: _____

AT&T OPERATIONS: _____ DATE: _____

AT&T SITE AQ: _____ DATE: _____

OCI: _____ DATE: _____

TOWER/PROPERTY OWNER: _____ DATE: _____

MUNICIPAL: _____ DATE: _____

DRAWING INDEX

SHEET NO:	SHEET TITLE
T-1	TITLE SHEET
C-1	SITE PLAN
C-2	SITE ELEVATION
C-3	EXISTING & PROPOSED EQUIPMENT LAYOUT
C-4	EXISTING & PROPOSED ANTENNA LAYOUT
C-5	SITE DETAILS
C-6	POWER STUDY
RF-1	RF SHEET AND PLUMBING DIAGRAM
E-1	BREAKER PANEL
G-1	GROUNDING DETAILS
S-1	ANTENNA CONNECTION DIAGRAM
S-2	COLOR CODE CHART
S-3	LTE RET NAMING CONVENTION
GN-1	GENERAL NOTES I
GN-2	GENERAL NOTES II
GN-3	GENERAL NOTES III

DO NOT SCALE DRAWINGS

CONTRACTOR SHALL VERIFY ALL PLANS & EXISTING DIMENSIONS & CONDITIONS ON THE JOB SITE & SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME

UNDERGROUND SERVICE ALERT
MISS UTILITY
811
48 HOURS BEFORE YOU DIG

at&t
7150 STANDARD DR
SUITE A
HANOVER, MD 21076

Jacobs
Challenging today.
Reinventing tomorrow.
Jacobs Telecommunications, Inc.
7150 STANDARD DR. SUITE B
HANOVER, MD 21076
443.230.4400x113

STATE OF MARYLAND
WENSEN JING
55911
PROFESSIONAL ENGINEER
ADDITIONS, DELETIONS OR MODIFICATIONS TO THESE DOCUMENTS ARE TO BE MADE BY OR UNDER THE DIRECT SUPERVISION OF A PROFESSIONAL ENGINEER LICENSED AND REGISTERED UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE EXP.: 04/14/22
05/14/2020

APPROVALS

LANDLORD _____
LEASING _____
R.F. _____
ZONING _____
CONSTRUCTION _____
A & E _____

PROJECT NO:	EP4TURWL
DRAWN BY:	RM
CHECKED BY:	LW

SUBMITTALS

0	05/14/20	ISSUED

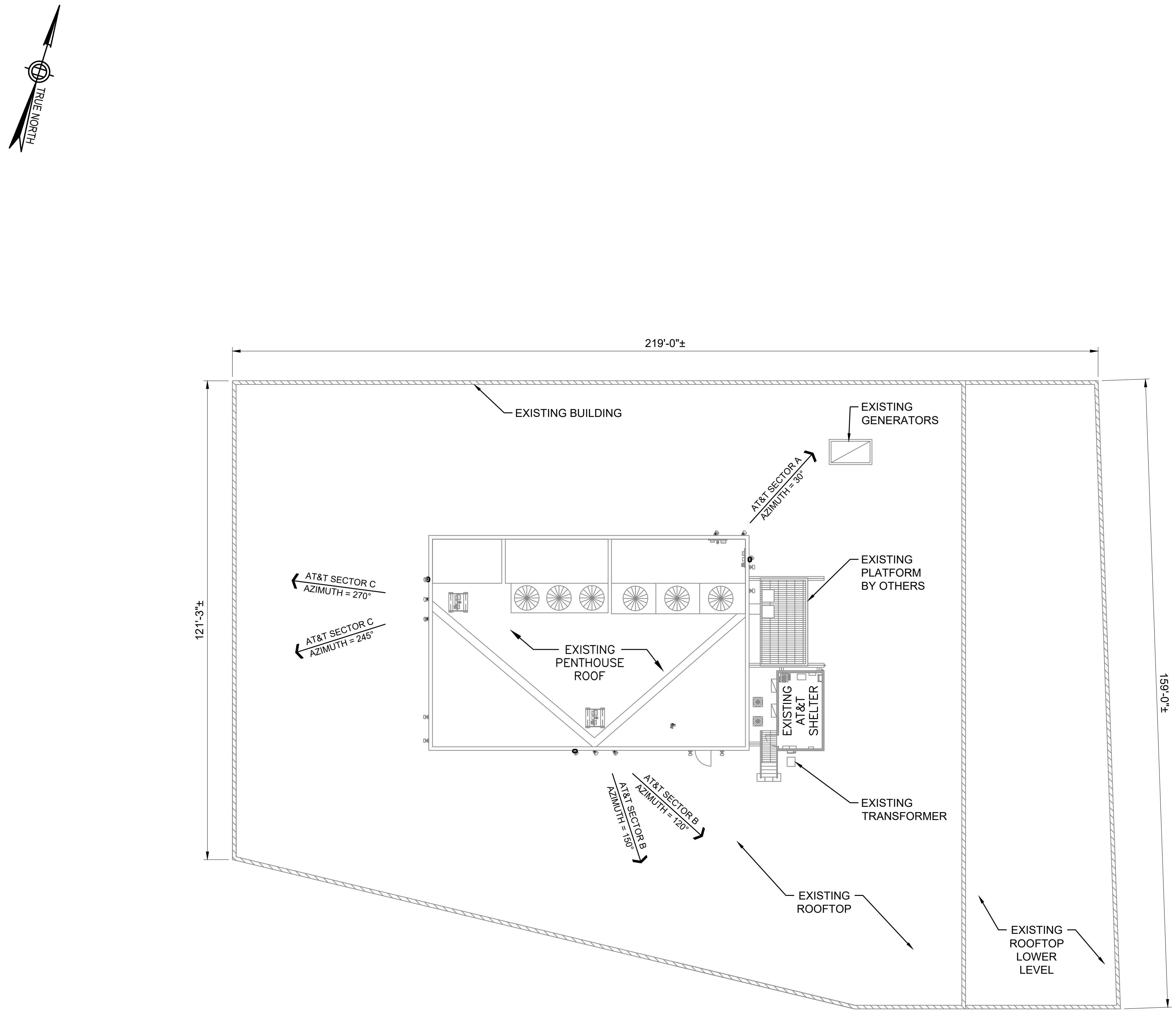
FA# 10096268
USID# 16252
STRATHMOORE
7101 WISCONSIN AVENUE
BETHESDA, MD 20814

TITLE SHEET

T-1

NOTES:

1. PLAN BASED ON AS-BUILT DRAWINGS ISSUED BY B+T GRP ON 01/20/17. CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS AND LOCATION/ORIENTATION OF EXISTING EQUIPMENT.
2. CONTRACTOR TO VERIFY FINAL RF CONFIGURATION AND NOTIFY CARRIER AND ENGINEER W/ ANY DISCREPANCIES PRIOR TO THE INSTALLATION.
3. CONTRACTOR SHALL VERIFY THE EXISTING ANTENNA CENTERLINE HEIGHT ABOVE GROUND LEVEL. PROPOSED ANTENNA CENTERLINE SHALL MATCH EXISTING.



1 SITE PLAN

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

at&t
7150 STANDARD DR
SUITE A
HANOVER, MD 21076

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443.230.4400x113

STATE OF MARYLAND
WENSEN JIANG
55911
PROFESSIONAL ENGINEER
5/14/2020

APPROVALS

LANDLORD ________

LEASING ________

R.F. ________

ZONING ________

CONSTRUCTION ________

A & E ________

PROJECT NO:	EP4TURWL
DRAWN BY:	RM
CHECKED BY:	LW

SUBMITTALS

0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

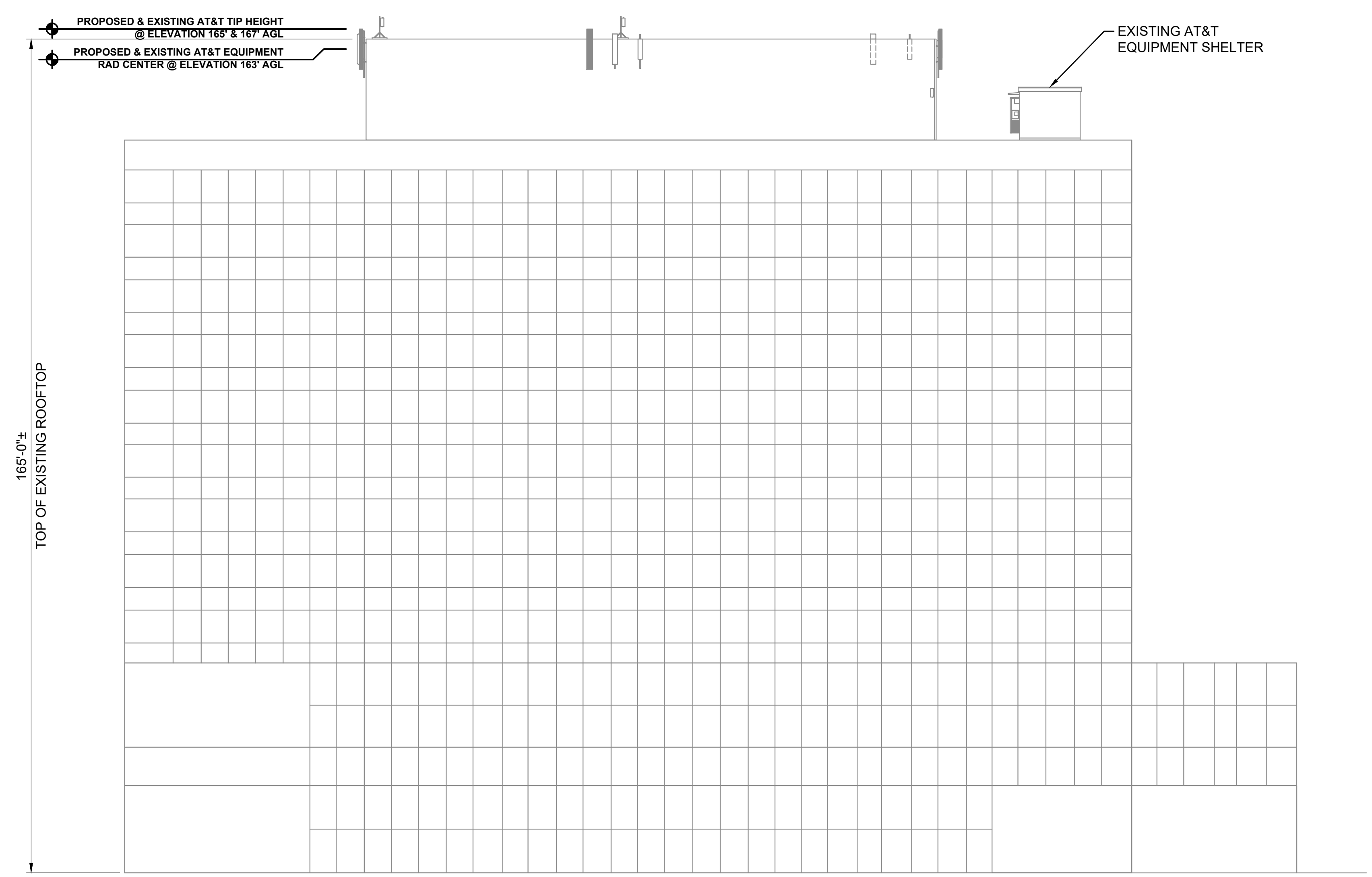
SITE PLAN

C-1

TOP-SIDE SCOPE OF WORK:

-REMOVE ALL COAX LINES BESIDES (6) TO REMAIN (2 PER SECTOR)
-REMOVE (3) 2" CONDUITS AND ASSOCIATED POWER/FIBERS (1 PER SECTOR)
-REMOVE (3) 700 RRH AND (3) 2100 RRHS AND ASSOCIATED JUMPERS/FIBER/POWER (2 PER SECTOR)
-REMOVE (3) DC2S (1 PER SECTOR)
-REMOVE (6) ANTENNAS (2 PER SECTOR)
-INSTALL (6) NNHH-65C-R4 ANTENNAS IN POSITIONS #1 AND #3 (2 PER SECTOR)
-MOVE (2) UMTS ANTENNAS IN POSITION #1 TO POSITION #2 (BETA/GAMMA SECTOR)
-INSTALL (3) NOKIA B14/B12/B29 TRIBAND RRHS ON (E) UNISTRUT FRAME (1 PER SECTOR)
-INSTALL (3) AIRSCALE B25/B66 DUALBAND RRHS ON (E) UNISTRUT FRAME (1 PER SECTOR)
-INSTALL (3) AIRSCALE B5 RRHS ON (E) UNISTRUT FRAME (1 PER SECTOR)
-INSTALL (3) DC6 BOXES ON (E) UNISTRUT FRAME (1 PER SECTOR)
-INSTALL (3) 6/C 6 AWG POWER TRUNKS FROM (E) DC12S TO (N) DC6 BOXES (1 PER SECTOR)
-INSTALL (3) 24 PAIR FIBER TRUNKS FROM (N) FIBER TRAYS TO (N) DC6 BOXES (1 PER SECTOR)
-INSTALL (9) 2/C 8 AWG POWER RUNS FROM (N) DC6 BOXES TO (N) RRHS (3 PER SECTOR)
-INSTALL (9) DUAL PAIR FIBER JUMPERS FROM (N) DC6 BOXES TO (N) RRHS (3 PER SECTOR)
-INSTALL (6) RET CABLES FROM (N) ANTENNAS TO (N) & (E) RRHS PER RFDS/MARKET SPEC (2 PER SECTOR)
-INSTALL (36) HM-HM JUMPERS FROM (N) ANTENNAS TO (N) RRHS (12 PER SECTOR)
-INSTALL (8) DM-HM JUMPERS FROM (E) WCS RRHS TO (E) WCS FILTERS (ALPHA/BETA SECTOR)
-INSTALL (8) HM-HM JUMPERS FROM (E) WCS FILTERS TO (N) ANTENNAS (ALPHA/BETA SECTOR)
-INSTALL (4) DM-HM JUMPERS FROM (E) WCS RRH TO (N) ANTENNAS (GAMMA SECTOR)
-LABEL ALL ANTENNAS/RRUS
-SECURE JUMPERS, POWER CABLES, FIBER, & RET CABLES WITH PIM RATED SNAP-INS
-PAINT ANTENNAS/JUMPERS ON BUILDING IF REQUIRED
-CONFIRM B5 RRH ANTENNAS ARE A MINIMUM OF 6' FROM THE B12/B14/B29 TRIBAND RRH ANTENNAS

1. EXISTING TOWER INFORMATION IS PROVIDED FOR REFERENCE ONLY. JACOBS ENGINEERING GROUP, INC. IS NOT RESPONSIBLE FOR THE ANALYSIS/DESIGN OF THE EXISTING TOWER, ITS CONNECTIONS & FOUNDATIONS. A STRUCTURAL ANALYSIS OF THE EXISTING TOWER AND FOUNDATIONS PERFORMED BY OTHERS. CONTRACTOR SHALL REFER TO THE LATEST STRUCTURAL ANALYSIS REPORT. MODIFICATIONS TO THE TOWER OR FOUNDATION THAT ARE NEEDED MUST BE PERFORMED PRIOR TO THE INSTALLATION OF THE EQUIPMENT SHOWN ON THE DRAWINGS.
2. CONTRACTOR SHALL VERIFY THE EXISTING ANTENNA CENTERLINE HEIGHT ABOVE GROUND LEVEL. PROPOSED ANTENNA CENTERLINE SHALL MATCH EXISTING.



1 **SITE ELEVATION** SCALE: N.T.S.

NOTES:

1. ALL CABLES SHALL BE GROUNDED WITH COAXIAL CABLE GROUNDING KITS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.
   A. GROUNDING AT THE ANTENNA LEVEL.
   B. GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200', ADDITIONAL CABLE ROUNDING REQUIRED.
   C. GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
   D. GROUNDING OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
   E. GROUNDING INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.
2. ALL PROPOSED GROUNDING BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUNDING BAR DOWNLEADS A MINIMUM DISTANCE OF 4'-0" BELOW GROUNDING BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.
3. THE CONTRACTORS SHALL BE RESPONSIBLE FOR VERIFYING THE ANTENNA AND THE COAX CONFIGURATION IS THE CORRECT MAKE AND MODELS, PRIOR TO INSTALLATION.
4. ANTENNA CONTRACTOR SHALL FURNISH AND INSTALL A SECTOR ANTENNA MOUNT, INCLUDING ALL HARDWARE, WHEN APPLICABLE.
5. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S SPECIFICATION & RECOMMENDATIONS.
6. CONTRACTOR SHALL REFERENCE THE TOWER STRUCTURAL ANALYSIS/DESIGN DRAWINGS FOR DIRECTIONS ON CABLE DISTRIBUTION/ROUTING.

ANTENNA MOUNTING NOTES:

1. DESIGN AND CONSTRUCTION OF ANTENNA SUPPORTS SHALL CONFORM TO CURRENT ANSI/EIA/TIA-222 "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES" OR APPLICABLE LOCAL CODES. DESIGN WIND LOADING OBTAINED FROM ANSI/TIA-222-G, OR THE LATEST VERSION.
2. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS OTHERWISE NOTED.
3. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS OTHERWISE NOTED.
4. DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY COLD GALVANIZING IN ACCORDANCE WITH ASTM A780.
5. ALL ANTENNA MOUNTS SHALL BE INSTALLED WITH LOCK NUTS, DOUBLE NUTS AND SHALL BE TORQUED TO MANUFACTURER'S RECOMMENDATIONS.
6. ANTENNA CONTRACTOR SHALL ENSURE ALL ANTENNA MOUNTING PIPES ARE PLUMB AND LEVEL.
7. MULTI PORT ANTENNAS: TERMINATE UNUSED ANTENNA PORTS WITH CONNECTOR CAP & WEATHERPROOF THOROUGHLY. JUMPERS FROM THE TMA'S MUST TERMINATE TO OPPOSITE POLARIZATION'S IN EACH SECTOR.
8. CONTRACTOR SHALL RECORD THE SERIAL #, SECTOR, AND POSITION OF EACH ACTUATOR INSTALLED AT THE ANTENNAS AND PROVIDE THE DOCUMENTATION TO AT&T.
9. CONTRACTOR SHALL INSTALL ANTENNA PER MANUFACTURER'S RECOMMENDATION FOR INSTALLATION AND GROUNDING.

COAXIAL ANTENNA CABLE NOTES:

1. TYPES AND SIZES OF THE ANTENNA CABLE ARE BASED ON ESTIMATED LENGTHS. PRIOR TO ORDERING CABLE, CONTRACTOR SHALL VERIFY ACTUAL LENGTH BASED ON CONSTRUCTION LAYOUT AND NOTIFY THE PROJECT MANAGER IF ACTUAL LENGTHS EXCEED ESTIMATED LENGTHS.
2. CONTRACTOR SHALL VERIFY THE DOWN-TILT OF EACH ANTENNA WITH A DIGITAL LEVEL.
3. CONTRACTOR TO CONFIRM COAX COLOR CODING PRIOR TO CONSTRUCTION. REFER TO "ANTENNA SYSTEM LABELING STANDARD" ND-00027, REFER TO THE LATEST VERSION.
4. ALL JUMPERS TO THE ANTENNAS FROM THE MAIN TRANSMISSION LINE WILL BE 1/2" DIA. LDF AND SHALL NOT EXCEED 6'-0".
5. ALL COAXIAL CABLE WILL BE SECURED TO THE DESIGNED SUPPORT STRUCTURE, IN AN APPROVED MANNER, AT DISTANCES NOT TO EXCEED 4'-0" O.C.
6. CONTRACTOR MUST FOLLOW ALL MANUFACTURER'S RECOMMENDATIONS REGARDING BOTH THE INSTALLATION AND GROUNDING OF ALL COAXIAL CABLES, CONNECTORS, ANTENNAS, AND ALL OTHER EQUIPMENT.
7. WEATHERPROOF ALL ANTENNA CONNECTORS WITH SELF AMALGAMATING TAPE. WEATHERPROOFING SHALL BE COMPLETED IN STRICT ACCORDANCE WITH AT&T STANDARDS.
8. CONTRACTOR SHALL GROUND ALL EQUIPMENT. INCLUDING ANTENNAS, RET MOTORS, TMA'S, COAX CABLES, AND RET CONTROL CABLES AS A COMPLETE SYSTEM. GROUNDING SHALL BE EXECUTED BY QUALIFIED WIREMEN IN COMPLIANCE WITH MANUFACTURER'S SPECIFICATION AND RECOMMENDATION.
9. CONTRACTOR SHALL PROVIDE STRAIN-RELIEF AND CABLE SUPPORTS FOR ALL CABLE ASSEMBLIES, COAX CABLES, AND RET CONTROL CABLES. CABLE STRAIN-RELIEFS AND CABLE SUPPORTS SHALL BE APPROVED FOR THE PURPOSE. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.

FIBER & POWER CABLE MOUNTING NOTES:

1. CABLE TO BE SUPPORTED USING 1/2" SNAP-INS (PIM RATED)(SNAPTEK POLYMERS OR EQUIVALENT) OR 1/2" BUTTERFLY HANGERS (PIM RATED)(SNAPTEK POLYMERS OR EQUIVALENT) OR ENGINEER APPROVED EQUAL..
2. CABLE TO BE SUPPORTED EVERY 3'.
3. ALL SNAP-INS, RUBBER CABLE INSERTS, AND MOUNTING HARDWARE FOR FIBER AND DC CABLES SHALL BE SUPPLIED FROM ROSENBERGER.
4. RRUS TO BE INSTALLED WITHIN 16.4' (5.0 METERS) OF THE SURGE SUPPRESSOR. (CONTRACTOR TO FIELD VERIFY).

TORQUE REQUIREMENTS:

1. ALL RF CONNECTIONS SHALL BE TIGHTENED BY A TORQUE WRENCH.
2. ALL RF CONNECTIONS, GROUNDING HARDWARE AND ANTENNA HARDWARE SHALL HAVE A TORQUE MARK INSTALLED IN A CONTINUOUS STRAIGHT LINE FROM BOTH SIDES OF THE CONNECTION.
   A. RF CONNECTION BOTH SIDES OF THE CONNECTOR.
   B. GROUNDING AND ANTENNA HARDWARE ON THE NUT SIDE STARTING FROM THE THREADS TO THE SOLID SURFACE. EXAMPLE OF SOLID SURFACE: GROUND BAR, ANTENNA BRACKET METAL.
3. ALL 8M ANTENNA HARDWARE SHALL BE TIGHTENED TO 9 LB-FT (12 NM).
4. ALL 12M ANTENNA HARDWARE SHALL BE TIGHTENED TO 43 LB-FT (58 NM).
5. ALL GROUNDING HARDWARE SHALL TIGHTENED UNTIL THE LOCK WASHER COLLAPSES AND THE GROUND IS NO LONGER LOOSE.
6. ALL DIN TYPE CONNECTIONS ARE TO BE TORQUED TO 18-22 LB-FT (24.4 - 29.8 NM).
7. ALL N TYPE CONNECTIONS ARE TO BE TORQUED TO 15-20 LB-IN (1.7 - 2.3 NM).

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55911
5/14/2020

APPROVALS

LANDLORD ____
LEASING ____
R.F. ____
ZONING ____
CONSTRUCTION ____
A & E ____

PROJECT NO:	EP4TURWL
DRAWN BY:	RM
CHECKED BY:	LW

SUBMITTALS

0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

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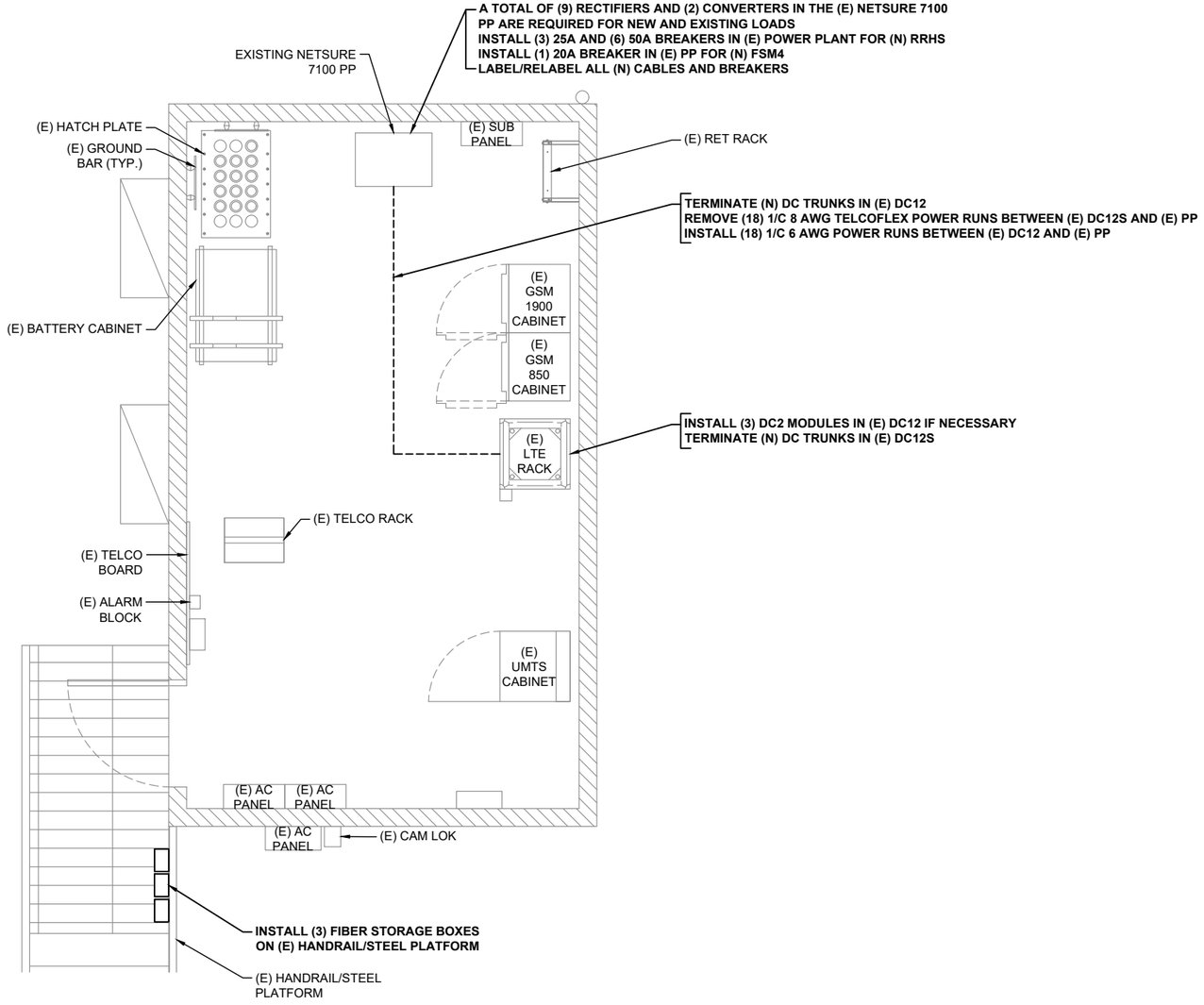
BETHESDA, MD 20814

SITE ELEVATION

C-2

TRUE NORTH



BOTTOMSIDE:
-INSTALL (3) DC2 MODULES IN (E) DC12 IF NECESSARY
-INSTALL A 20A BREAKER IN (E) POWER PLANT FOR (P) FSM4
-A TOTAL OF (9) RECTIFIERS AND (2) CONVERTERS IN THE (E) NETSURE 7100 PP ARE REQUIRED FOR NEW AND EXISTING LOADS
-TERMINATE (N) DC TRUNKS IN (E) DC12S
-INSTALL (3) FIBER STORAGE BOXES ON (E) HANDRAIL/STEEL PLATFORM
-REMOVE (18) 1/C 8 AWG TELCOFLEX POWER RUNS BETWEEN (E) DC12S AND (E) PP
-INSTALL (18) 1/C 6 AWG POWER RUNS BETWEEN (E) DC12 AND (E) PP
-INSTALL (3) 25A AND (6) 50A BREAKERS IN (E) POWER PLANT FOR (N) RRHS
-LABEL ALL (N) EQUIPMENT WITH PHENOLIC TAGS
-LABEL/RELABEL ALL (N) CABLES AND BREAKERS
-SUPPORT ALL JUMPERS, DC POWER, AND FIBER CABLES PER AT&T SPECIFICATIONS
-GROUND ALL (N) EQUIPMENT PER AT&T SPECIFICATIONS
-VERIFY CORRECT RATE SFP CARDS IN BBU AND RRH

1 **EXISTING EQUIPMENT PLAN**

SCALE: 1/2" = 1'-0"

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APPROVALS

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CONSTRUCTION _____
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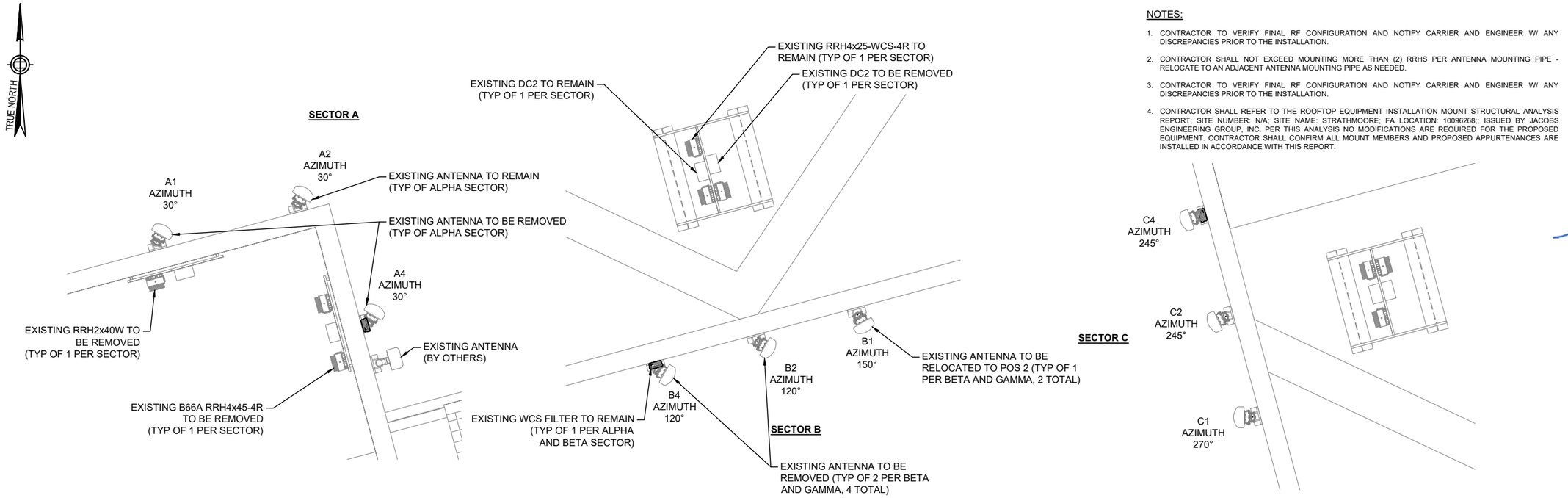
EXISTING & PROPOSED EQUIPMENT LAYOUT

C-3



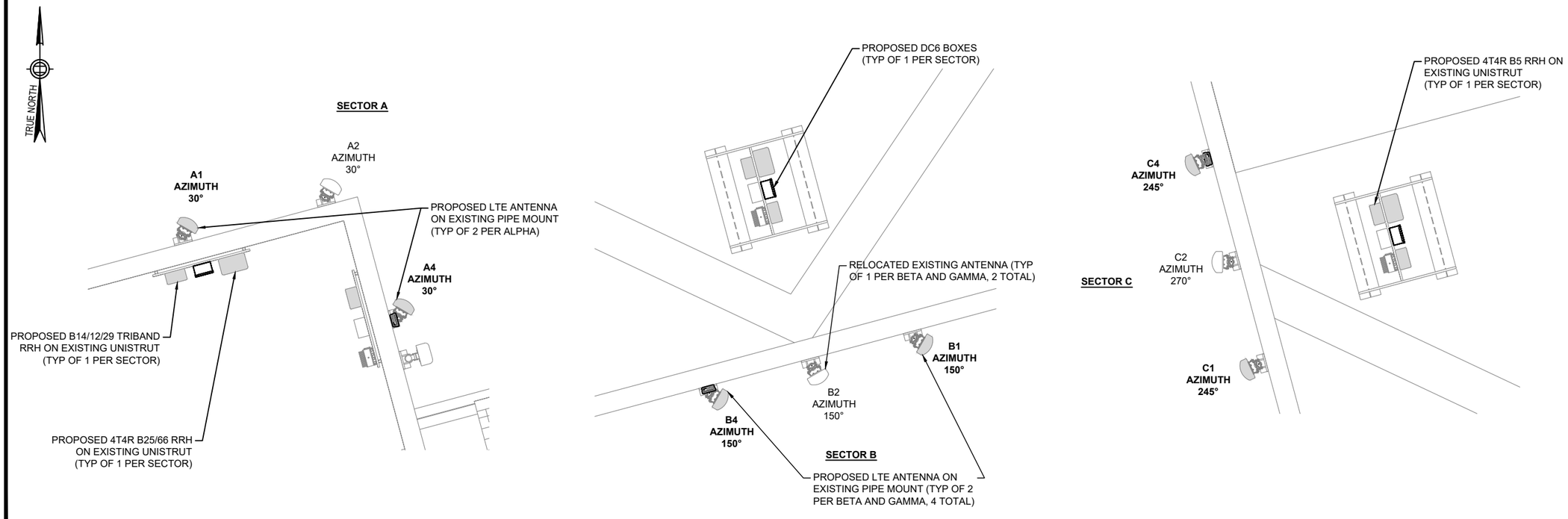
ELEVATION 163'

1 EXISTING ANTENNA LAYOUT

SCALE: N.T.S.

NOTES:

1. CONTRACTOR TO VERIFY FINAL RF CONFIGURATION AND NOTIFY CARRIER AND ENGINEER W/ ANY DISCREPANCIES PRIOR TO THE INSTALLATION.
2. CONTRACTOR SHALL NOT EXCEED MOUNTING MORE THAN (2) RRHS PER ANTENNA MOUNTING PIPE - RELOCATE TO AN ADJACENT ANTENNA MOUNTING PIPE AS NEEDED.
3. CONTRACTOR TO VERIFY FINAL RF CONFIGURATION AND NOTIFY CARRIER AND ENGINEER W/ ANY DISCREPANCIES PRIOR TO THE INSTALLATION.
4. CONTRACTOR SHALL REFER TO THE ROOFTOP EQUIPMENT INSTALLATION MOUNT STRUCTURAL ANALYSIS REPORT; SITE NUMBER: N/A; SITE NAME: STRATHMOORE; FA LOCATION: 10096268;; ISSUED BY JACOBS ENGINEERING GROUP, INC. PER THIS ANALYSIS NO MODIFICATIONS ARE REQUIRED FOR THE PROPOSED EQUIPMENT. CONTRACTOR SHALL CONFIRM ALL MOUNT MEMBERS AND PROPOSED APPURTENANCES ARE INSTALLED IN ACCORDANCE WITH THIS REPORT.



ELEVATION 163'

2 PROPOSED ANTENNA LAYOUT

SCALE: N.T.S.

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APPROVALS

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R.F. _____

ZONING _____

CONSTRUCTION _____

A & E _____

PROJECT NO: EP4TURWL

DRAWN BY: RM

CHECKED BY: LW

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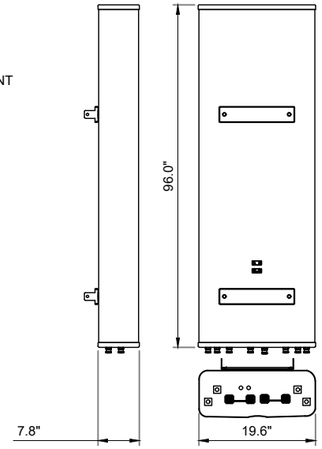
EXISTING & PROPOSED
ANTENNA LAYOUT

C-4

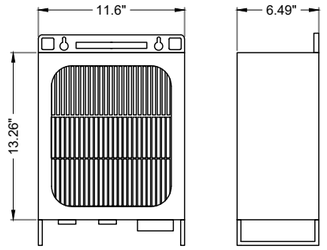
MANUFACTURER:	COMMSCOPE
MODEL NO.:	NNHH-65C-R4
RADOME MATERIAL:	FIBERGLASS, UV RESISTANT
COLOR:	LIGHT GRAY
DIMENSIONS (LxWxD):	96.0" x 19.6" x 7.8" 2438mm x 498mm x 197mm
WEIGHT (lbs):	99.2
CONNECTOR:	8 x 4.3-10 FEMALE
FRONT WIND LOAD:	214.5 LBF @ 150 KM/H 954 N @ 150 KM/H
SIDE WIND LOAD:	74.4 LBF @ 150 KM/H 331 N @ 150 KM/H
WIND SPEED MAX.:	>150 MPH (>241 KM/H)
WIND LOADING, MAX.:	277.6 LBF @ 150 KM/H 1235 N @ 150 KM/H



1 ANTENNA SPECIFICATIONS

SCALE: NTS

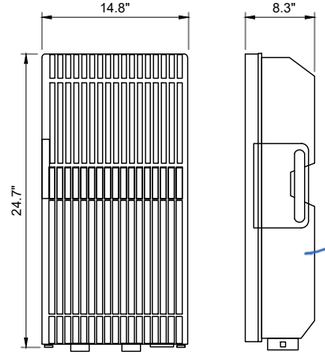
MANUFACTURER:	NOKIA
MODEL NO.:	AIRSCALE RRH 4T4R B5 160W
DIMENSIONS (HxWxD):	13.26" x 11.6" x 6.49" 337mm x 295mm x 165mm
WEIGHT (lbs):	36.8
POWER SUPPLY:	-48V
TEMP. W/O SOLAR LOAD:	-40 °C TO 55°C -40 °F TO 131°F



2 AIRSCALE 4T4R B5 160W AHCA SPECIFICATIONS

SCALE: NTS

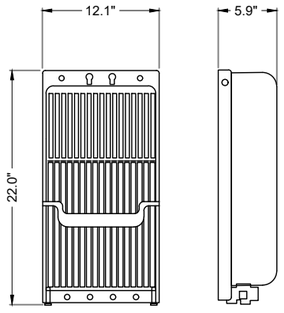
MANUFACTURER:	NOKIA
MODEL NO.:	AIRSCALE RRH 4T4R B14/B12/B29 TRIBAND
TECHNOLOGY:	TRI BAND
DIMENSIONS (HxWxD):	24.7" x 14.8" x 8.3" 627mm x 376mm x 210mm
WEIGHT (lbs):	<101.4
POWER SUPPLY:	-48V
TEMP. W/O SOLAR LOAD:	-40 °C TO 55°C -40 °F TO 131°F



3 AIRSCALE 4T4R B12/B14/B29 TRI-BAND SPECIFICATIONS

SCALE: NTS

MANUFACTURER:	NOKIA
MODEL NO.:	AIRSCALE RRH 4T4R B25/66 320W AHFIB
TECHNOLOGY:	DUAL BAND
DIMENSIONS (HxWxD):	22.0" x 12.1" x 5.9" 560mm x 308mm x 149mm
WEIGHT (lbs):	<66.1
POWER SUPPLY:	-48V
TEMP. W/O SOLAR LOAD:	-40 °C TO 55°C -40 °F TO 131°F

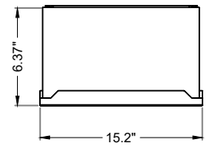


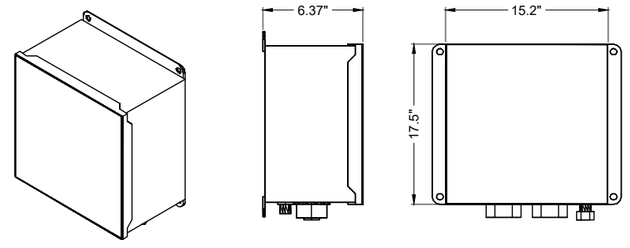
4 AIRSCALE 4T4R B25/66 320W AHFIB SPECIFICATIONS

SCALE: NTS

RAYCAP DC6-48-60-0-1E DC POWER OVER VOLTAGE DETAIL

DIMENSIONS (HxWxD):	17.5" x 15.2" x 6.37"
TOTAL WEIGHT (lbs):	35.0
NOMINAL OPERATING VOLTAGE:	48 VDC
NOMINAL DISCHARGE VOLTAGE:	20 kA 8/20 µs
MAXIMUM DISCHARGE CURRENT:	60 kA 8/20 µs
MAX. CONTINUOUS OPERATING CURRENT:	75 VDC
VOLTAGE PROTECTION RATING:	400 V





5 RAYCAP SPECIFICATIONS

SCALE: NTS

6 DETAIL NOT USED

SCALE: NTS

7 DETAIL NOT USED

SCALE: NTS

8 DETAIL NOT USED

SCALE: NTS

9 DETAIL NOT USED

SCALE: NTS

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CONSTRUCTION _____
A & E _____

PROJECT NO:	EP4TURWL
DRAWN BY:	RM
CHECKED BY:	LW

SUBMITTALS

0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

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SITE DETAILS

C-5

SITE DATA INPUT WORKSHEET - INDOOR SITE POWER ESTIMATE TOOL

STEP 1: ENTER QUANTITIES OF EQUIPMENT & DC OPERATING VOLTAGE:

STEP 2: ENTER DC PLANT TYPE FROM DROP-DOWN MENU:

("GENERIC" +24V or -48V DC PLANT CAN BE SELECTED FOR ANY MANUFACTURER'S DC PLANT)

Emerson STD -48VDC NetSure 721 Plant 800A NEQ.15920

-48V PRIMARY DC PLANT SPECIFIED

(DC PLANT CONFIGURATION CAN BE REVIEWED ON DC PLANT WORKSHEET)

STEP 2A: THIS STEP ONLY SHOWN IF "GENERIC" DC PLANT PLANT TYPE HAS BEEN SELECTED:

STEP 2B: THIS STEP ONLY SHOWN IF TYCO GPS2424 DC PLANT PLANT TYPE HAS BEEN SELECTED:

STEP 3: DO YOU WANT TO CONFIGURE A STANDARD STAND-ALONE DC CONVERTER SYSTEM? N

NOTE: IF YOU SELECT "Y" ANY INTEGRATED DC PLANT CONVERTER OPTIONS WILL BE BYPASSED

STEP 4: ENTER INDOOR SITE BUILDING/SHELTER DATA:

(Square footage used for interior AC lighting LOAD calculation)

SELECT SITE BUILDING TYPE & SIZE: 11' 5" x 20' SHELTER

STEP 5: ENTER SITE HVAC SYSTEM DATA:

SPECIFY INDIVIDUAL HVAC UNIT SIZE (TONS): 4 SPECIFY QUANTITY: 2

DOES SITE HAVE ADDITIONAL HVAC (DIFFERENT SIZE)? N

ARE THERE SITE HVAC HEATING UNITS? N

TOTAL SPECIFIED SITE HVAC: 8-TONS ESTIMATED HVAC REQUIREMENT: TWO 4-TON UNITS

THIS TOOL DOES NOT APPLY TO SITES THAT ARE EQUIPPED WITH FREE STANDING DIRECT AIR COOLING

STEP 6: ENTER SITE STATIONARY GENERATOR DATA:

DOES SITE HAVE A STATIONARY GENERATOR? N

ESTIMATED CAPACITY REQUIRED: 31 KW (NO SITE GENERATOR)

STEP 7: ENTER SITE BATTERY CONFIGURATION DATA:

SELECT SINGLE STRING BATTERY CAPACITY (AH): 1496

SPECIFY TOTAL QUANTITY OF BATTERY STRINGS: 1

TOTAL SITE BATTERY CAPACITY (AH): 1496

NOTE: NON-STANDARD BATTERY CAPACITY HAS BEEN SPECIFIED

(4) 4/0 CONNECTION CABLES PER POLARITY ON EACH STRING ARE REQUIRED

ESTIMATED BATTERY RESERVE TIME: 8.78 HOURS (NO SITE GENSET)

SITES WITH STATIONARY GENSETS SHALL BE ENGINEERED WITH A MAX OF 3 SHELVES of 180 AH BATTERIES (3 strings at -48v or 6 strings at +24v) - ALL OTHER SITES A MINIMUM OF 4 HOURS

SITE POWER CALCULATION TOOL - VERSION 4.3 - October 17, 2017 R. BADGERO

ANY QUESTIONS PLEASE CONTACT RICK BADGERO (RB6620@ATT.COM)

NOTE: LOAD VALUES FOR ANY EQUIPMENT CAN BE USER SPECIFIED ON THE POWER CONSUMPTION WORKSHEET - USER CHANGES TO DEFAULT LOAD VALUES ARE HIGHLIGHTED IN BRIGHT YELLOW

QTY	RADIO HEADS - Outdoor	VOLTAGE	WATTS
	Ericsson		
0	RRUS 01 B2, B5 (80W)	48	0
0	RRUS 01 B12 (60W)	48	0
0	RRUS 11 B12 (2x30W)	48	0
0	RRUS 11 B2, B4, B5, B12 (2x40W)	48	0
0	RRUS 12 B2, B4, B5 (2x60W)	48	0
0	RRUS 32 B2 (4x40W)	48	0
0	RRUS 32 B30 (4x25W)	48	0
0	RRUS 32 B66A	48	0
0	RRUS A2 B2, B4, B12	48	0
0	RRUSE2 B29	48	0
0	RRUW B2, B5	48	0
0	AIR 21 (60W)	48	0
0	RRUS 4478 B14	48	0
	(FUTURE)		
	A-LU		
0	4x45 B66A	48	0
0	FDD RRH2x40-07L (UHLA) B17	48	0
0	RRH2x40-07L-AT (UHLB) B17	48	0
0	B25 RRH4x30 (UHFA) B25	48	0
0	B25 RRH2x60 (UHFA) B25	48	0
0	2X60W-850 B5	48	0
0	2X60W-1900 B2	48	0
0	2X60W-1900A B2	48	0
0	RRH2x40-07L-DE (UHLC) B29	48	0
0	RRH 4T4R (FRBI) B14	48	0
3	RRH4X25 B30	48	1248
	(FUTURE)		0
	(FUTURE)		0

QTY	RADIO HEADS - Indoor	VOLTAGE	WATTS
	Ericsson		
0	RRUS 01 B2, B5 (80W)	48	0
0	RRUS 01 B12 (60W)	48	0
0	RRUS 11 B12 (2x30W)	48	0
0	RRUS 11 B2, B4, B5, B12 (2x40W)	48	0
0	RRUS 12 B2, B4, B5 (2x60W)	48	0
0	RRUS 32 B2 (4x40W)	48	0
0	RRUS 32 B30 (4x25W)	48	0
0	RRUS 32 B66A	48	0
0	RRUS A2 B2, B4, B12	48	0
0	RRUSE2 B29	48	0
0	RRUW B2, B5	48	0
0	AIR 21 (60W)	48	0
	RRUS 4478 B14	48	0
	(FUTURE)		0
	A-LU		
0	4x45 B66A	48	0
0	FDD RRH2x40-07L (UHLA) B17	48	0
0	RRH2x40-07L-AT (UHLB) B17	48	0
0	B25 RRH4x30 (UHFA) B25	48	0
0	B25 RRH2x60 (UHFA) B25	48	0
0	2X60W-850 B5	48	0
0	2X60W-1900 B2	48	0
0	2X60W-1900A B2	48	0
0	RRH2x40-07L-DE (UHLC) B29	48	0
0	RRH 4T4R (FRBI) B14	48	0
	RRH4X25 B30	48	0
	(FUTURE)		0
	(FUTURE)		0

QTY	LTE 4G & Multi-Std EQUIPMENT	VOLTAGE	WATTS
0	A-LU 9926 LTE BBU (w/max. 3 eCEM-u)	48	0
2	Nokia FSM-4	48	1996
	(FUTURE)		
	(FUTURE)		
	(FUTURE)		
	(FUTURE)		
0	Ericsson LTE IRBS6601 BBU - 1 DUL	48	0
0	Ericsson LTE RBS6601 BBU - 2 DUL	48	0
0	Ericsson W/CDMA RBS6601 - 1 DUW	48	0
0	Ericsson LTE RBS6601 BBU - 1DUS	48	0
0	Ericsson LTE RBS6601 BBU - 2DUS	48	0
0	Ericsson XMU	48	0
0	Ericsson LTE RBS5216	48	0
	(FUTURE)		
	(FUTURE)		
	(FUTURE)		
	(FUTURE)		

QTY	UMTS 3G EQUIPMENT	VOLTAGE	WATTS
1	A-LU MACRO NodeB (3S1C - 40W)	24	1014
0	A-LU MACRO NodeB (3S2C - 40W)	24	0
0	A-LU MACRO NodeB (3S3C - 40W)	24	0
0	A-LU MACRO NodeB (3S4C - 40W)	24	0
0	A-LU MACRO NodeB (3S5C - 40W - 2 CAB)	24	0
0	A-LU MICRO NodeB	24	0
0	A-LU 9396 d2U Distributed NodeB MU	48	0
0	A-LU 9396 d4U Distributed NodeB MU	48	0
	(FUTURE)		
	(FUTURE)		
0	Ericsson RBS3206 NodeB 3S1C - 1 CAB	24	0
0	Ericsson RBS3206 NodeB 3S2C - 1 CAB	24	0
	NON-OBIF Ericsson 3rd, 4th & 5th Carrier		
0	Ericsson RBS3206 NodeB 3S3C - 2 CAB	24	0
0	Ericsson RBS3206 NodeB 3S4C - 2 CAB	24	0
0	Ericsson RBS3206 NodeB 3S5C - 3 CAB	24	0
	OBIF Ericsson 3rd, 4th & 5th Carrier		
0	Ericsson RBS3206 NodeB 3S3C - 1 CAB (Select RRUS from left section)	24	0
0	Ericsson RBS3206 NodeB 3S4C - 1 CAB (Select RRUS from left section)	24	0
0	Ericsson RBS3206 NodeB 3S4C - 1 CAB (Select RRUS from left section)	24	0
0	Ericsson RBS3206 NodeB 3S5C - 2 CAB (Select RRUS from left section)	24	0
0	Ericsson 3303 MICRO NodeB	24	0
0	Ericsson RBS3418 Distributed NodeB MU	48	0
	(FUTURE)		
	(FUTURE)		

(CUSTOM AC LOADS DEFINED ON POWER CONSUMPTION WORKSHEET)

QTY	USER SPECIFIED AC EQUIPMENT	VOLTAGE	KVA
0	Emerson battery heater	120	0
0	Emerson GFCI	120	0
0	Argus HVAC	120	0
0	VZ	120	0
0	UMTS HEATER	240	0
0	GFCI	120	0
0	MARVAIR AC	240	0
0	MCLEAN AC	240	0
0	PURCELL AC	120	0
1	Tower Light	120	1.44
		TOTAL USER SPECIFIED KVA:	1.44
	TOTAL 120VAC AMPS:	12	
	TOTAL 240VAC AMPS:	0	

QTY	ANCILLARY CELL SITE EQUIPMENT	VOLTAGE	WATTS
1	A-LU 7705 SIAD	48	80
	(FUTURE)		
0	A-LU MPR-9500 MW Service Switch - MSS	48	0
0	A-Lu MPR-9500 MW Outdoor Unit - ODU	48	0
0	A-Lu MPR-9500 MW MPT-HL (Indoor)	48	0
	(FUTURE)		
0	Cisco MWR-2941 SIAD	48	0
0	Cisco SIAD ASR-901	48	0
0	Cisco 15310 EOS (SONET) MUX	48	0
0	Cisco 15454 MSP (MW Ring Config.)	48	0
	(FUTURE)		
0	Tru-Position LMU (E911)	48	0
0	DC Free Air (per HVAC unit)	48	0
1	GENERIC Ethernet NID	24	60
0	GENERIC Hydrogen Detector	48	0
1	GENERIC RET Controller	24	60
0	GENERIC RXAIT	48	0
0	GENERIC Smoke Detector	48	0
0	GENERIC TMA System	48	0
0	GENERIC Tower Lighting (DC)	48	0
0	NG480	48	0
0	Cisco 2911	48	0
	(FUTURE)		
	(FUTURE)		
	(FUTURE)		
	(FUTURE)		
	(FUTURE)		

QTY	TX RF AMP (MCPA or SCPA) EQPT.	VOLTAGE	WATTS
0	Andrew (12 module mcpa FRAME)	24	0
0	Andrew 135 Watt Module	24	0
	(FUTURE)		
0	Powerwave 12 module mcpa FRAME)	24	0
0	Powerwave 90 Watt Module	24	0
0	Powerwave 120 Watt Module	24	0
0	Powerwave 180 Watt Module	24	0
	(FUTURE)		
0	CCI 125 Watt DAB SCPA Module	24	0
0	CCI 125 Watt DAC SCPA Module	24	0
	(FUTURE)		

(CUSTOM DC LOADS DEFINED ON POWER CONSUMPTION WORKSHEET)

QTY	USER SPECIFIED DC EQUIPMENT	VOLTAGE	WATTS
0	FLX16 HEATERS	48	0
0	9412 Heaters	48	0
3	B25/66 Dual Band RRH	48	3600
0	B12/14 Dual Band RRH	48	0
3	B5 850 LTE RRH	48	1626
0	700 DE RRH	48	0
0	B30	48	0
3	B12/B14/B29	48	3300
0	B5/B29	48	0
0		48	0
0		48	0
0		48	0
0		48	0
0		48	0
0		48	0
		TOTAL USER SPECIFIED WATTS:	8526
	TOTAL +24V (27V) AMPS:	0	
	TOTAL -48V (54V) AMPS:	157.9	

-48V PRIMARY VOLTAGE DC PLANT SPECIFIED			
+24VDC EQUIPMENT LOAD:	1134 WATTS	=	42 AMPS at +24V
-48VDC EQUIPMENT LOAD:	11850 WATTS	=	220 AMPS at -48V
28 AMPS (1475 Watts) AT PRIMARY 48V REQUIRED TO SUPPORT 24V DC CONVERTER SYSTEM			
TOTAL PRIMARY 48V LOAD:	13325 WATTS	=	247 AMPS at -48V

(DC PLANT CONFIGURATION CAN BE REVIEWED ON DC PLANT WORKSHEET)

DC PLANT: Emerson STD -48VDC NetSure 721 Plant 800A NEQ.15920	
-48V RECTIFIERS REQUIRED (N+1):	9
-48V RECTIFIER SLOTS:	22
CONV. TYPE: 0	
+24V CONVERTERS REQUIRED:	2
+24V CONVERTER SLOTS:	12
ESTIMATED BATTERY RESERVE TIME	
1 1496 AH 48V STRING =	8.78 HOURS (4 HOUR MINIMUM BATTERY RESERVE)

ESTIMATED SITE MAX. AC LOAD (AMPS):	172.13 AMPS
ESTIMATE 200A SERVICE SUFFICIENT	

SITE GENERATOR CAPACITY REQUIRED:	31 KW
ON SITE GENERATOR CAPACITY:	0 KW
(NO ON-SITE GENERATOR)	

RECOMMENDED HVAC SYSTEM:	TWO 4-TON
SPECIFIED SITE TOTAL HVAC CAPACITY:	8-TONS
ESTIMATE SUFFICIENT HVAC CAPACITY	

POWER SUMMARY:
CURRENT RECTIFIER COUNT: 9
REQUIRED RECTIFIERS COUNT: 9
CURRENT 48V CONVERTER COUNT: 4
REQUIRED 48V CONVERTER COUNT: 2

1 AC PANEL

SCALE: N.T.S.

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STATE OF MARYLAND
JENSEN JIANG
PROFESSIONAL ENGINEER
55911
5/14/2020

CERTIFICATION STATEMENT: 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. 55911, EXP.: 04/14/22

APPROVALS

LANDLORD ______
LEASING ______
R.F. ______
ZONING ______
CONSTRUCTION ______
A & E ______

PROJECT NO: EP4TURWL

DRAWN BY: RM

CHECKED BY: LW

SUBMITTALS

0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

POWER STUDY

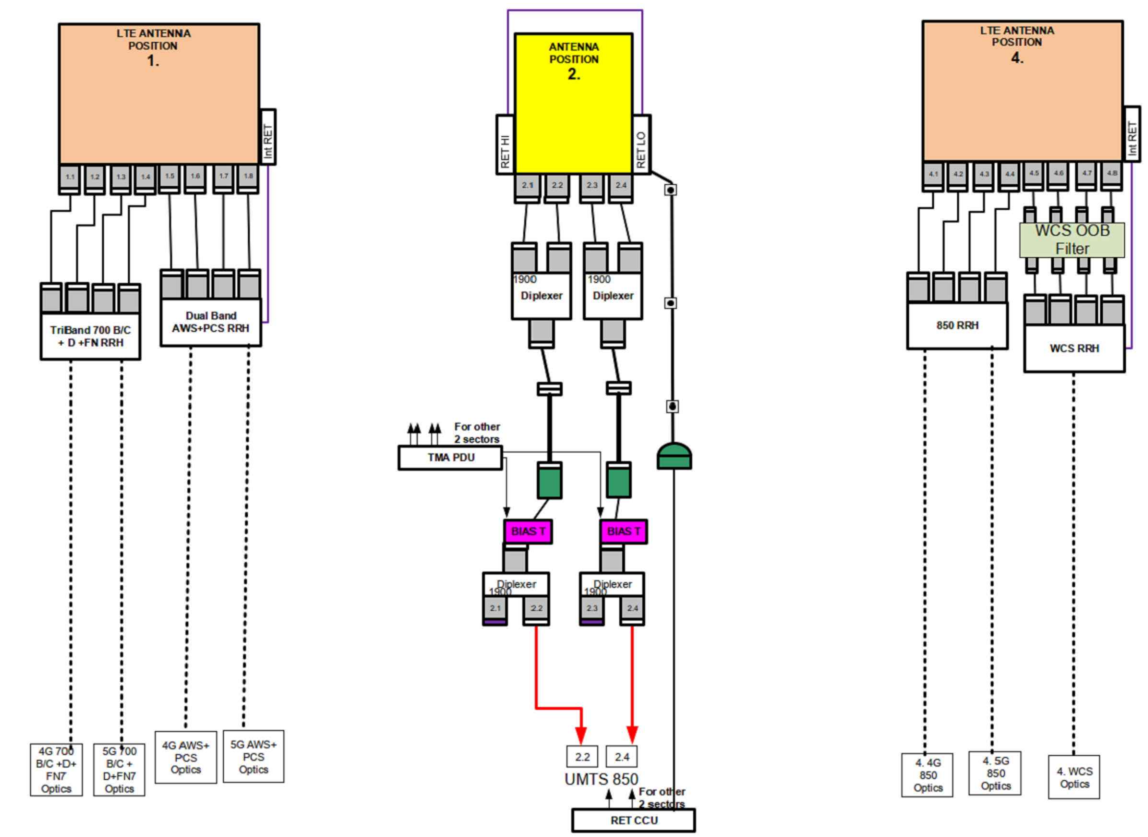
C-6

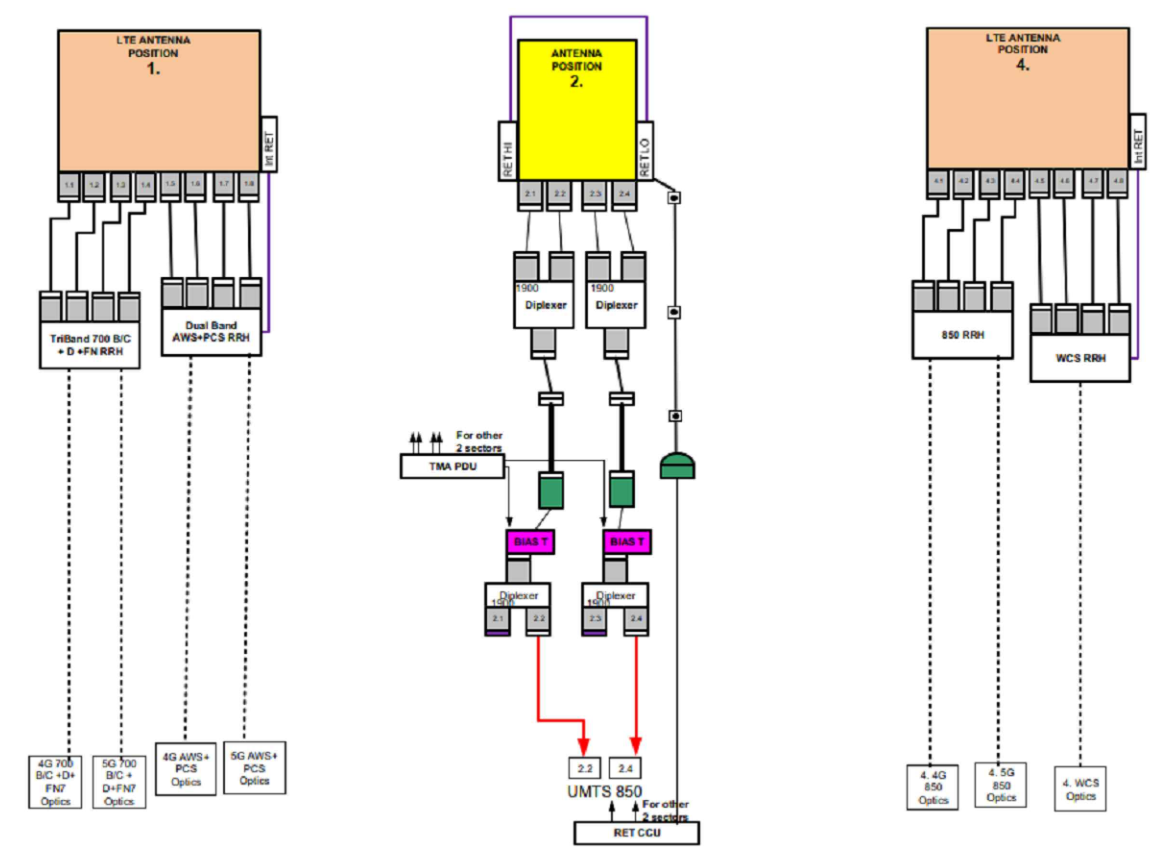
FINAL CONFIGURATION:
- (6) COMMSCOPE NNHH-65C-R4 ANTENNAS
- (3) KATHREIN 742264 ANTENNAS
- (6) LGP13519 DIPLEXERS
- (3) NOKIA B14/12/29 TRIBAND AHLBBA (700/700FN/700DE) RRHS
- (3) AIRSCALE DUAL RRH 4T4R B25/66 320W AHFIB (1900/2100) RRHS
- (3) AIRSCALE RRH 4T4R B5 160W AHCA (850) RRHS
- (3) RRH4X25-WCS-4R (2300) RRHS
- (3) DC2
- (3) DC6 BOX
- (6) 1-5/8" LINES OF COAX
- (3) 1" DC TRUNK (6 AWG 6 CONDUCTOR)
- (3) 2" CONDUIT
- (3) 3/8" FIBER TRUNK
- (0) 3/8" RET CABLES (USE WHATEVER CURRENTLY IS ON THE APP)

ANTENNA POSITION	ANTENNA MODEL	ANTENNA MAKE	AZIMUTH	MECH. TILT	ELEC. DOWNTILT	RAD CENTER FT. AGL.	TMAS, RRHS & DIPLEXERS	COAXIAL FEEDER	
							MODEL	SIZE	LENGTH
#1	**NNHH-65C-R4 (96.0"x19.6"x8.2") (121.3 LBS)**	**COMMSCOPE**	30°	2°	LTE 700: 12° LTE 1900: 2° LTE AWS: 5° LTE AWS: 5° LTE 700: 12° LTE 700: 12°	163'	**(1) RRH B14/12/29 (1) RRH 4T4R B25/66 AHFIB**	(6) SHARED FIBER	1 @ 90
#2	742264 (96.0"x19.6"x8.2") (121.3 LBS)	KATHREIN	30°	0°	UMTS 850: 12°	163'	**(2) LGP13519**	**7/8" ANDREW LDF5-50A**	**1 @ 90**
#3	-	-	-	-	-	-	-	-	-
#4	**NNHH-65C-R4 (96.0"x19.6"x8.2") (121.3 LBS)**	**COMMSCOPE**	**30°**	0°	**5G 850: 2° LTE WCS: 5°**	163'	**(1) RRH 4T4R B5 AHCA** (1) RRH4x25-WCS-4R	**(2) SHARED FIBER**	**1 @ 90**
#5	**NNHH-65C-R4 (96.0"x19.6"x8.2") (121.3 LBS)**	**COMMSCOPE**	150°	2°	LTE 700: 9° LTE 1900: 2° LTE AWS: 4° LTE AWS: 4° LTE 700: 9° LTE 700: 9°	163'	**(1) RRH B14/12/29 (1) RRH 4T4R B25/66 AHFIB**	(6) SHARED FIBER	1 @ 140
#6	742264 (96.0"x19.6"x8.2") (121.3 LBS)	KATHREIN	150°	0°	UMTS 850: 6°	163'	**(2) LGP13519**	**7/8" ANDREW LDF5-50A**	**1 @ 140**
#7	-	-	-	-	-	-	-	-	-
#8	**NNHH-65C-R4 (96.0"x19.6"x8.2") (121.3 LBS)**	**COMMSCOPE**	**150°**	0°	**5G 850: 9° LTE WCS: 4°**	163'	**(1) RRH 4T4R B5 AHCA** (1) RRH4x25-WCS-4R	**(2) SHARED FIBER**	**1 @ 140**
#9	**NNHH-65C-R4 (96.0"x19.6"x8.2") (121.3 LBS)**	**COMMSCOPE**	245°	2°	LTE 700: 12° LTE 1900: 6° LTE AWS: 6° LTE AWS: 6° LTE 700: 12° LTE 700: 12°	163'	**(1) RRH B14/12/29 (1) RRH 4T4R B25/66 AHFIB**	(6) SHARED FIBER	1 @ 190
#10	742264 (96.0"x19.6"x8.2") (121.3 LBS)	KATHREIN	270°	0°	UMTS 850: 2°	163'	**(2) LGP13519**	**7/8" ANDREW LDF5-50A**	**1 @ 190**
#11	-	-	-	-	-	-	-	-	-
#12	**NNHH-65C-R4 (96.0"x19.6"x8.2") (121.3 LBS)**	**COMMSCOPE**	**245°**	0°	**5G 850: 12° LTE WCS: 6°**	163'	**(1) RRH 4T4R B5 AHCA** (1) RRH4x25-WCS-4R	**(2) SHARED FIBER**	**1 @ 190**

NOTES:
1. VERIFY ANTENNA DIMENSIONS WITH MANUFACTURER.
2. ALL NEW ANTENNAS SHALL RECEIVE ANTENNA MOUNTING KIT FOR 2 TO 4.5 O.D. MAST (MODEL #DM380) (QTY. 2)
3. ALL NEW ANTENNAS SHALL RECEIVE A LOCKING TILT MOUNT KIT 0-13 DEGREES DOWNTILT ANGLE (MODEL #DB5083)
4. VERIFY FINAL ANTENNA MODEL WITH CURRENT VERSION OF THE **AT&T** RFDS.

1 **ANTENNA CHART** SCALE: N.T.S.





NOTES:
1. CONTRACTOR TO VERIFY FINAL RF CONFIGURATION AND NOTIFY CARRIER AND ENGINEER WITH ANY DISCREPANCIES PRIOR TO THE INSTALLATION.
2. PLUMBING DIAGRAM SHOWN IS BASED ON APPROVED FINAL RFDS V2020_0.1 DATED ON 01/10/20.

2 **RF EQUIPMENT SCHEMATIC** SCALE: N.T.S.

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APPROVALS

LANDLORD ____
LEASING ____
R.F. ____
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CONSTRUCTION ____
A & E ____

PROJECT NO: EP4TURWL

DRAWN BY: RM

CHECKED BY: LW

SUBMITTALS

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USID# 16252
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BETHESDA, MD 20814

PLUMBING DIAGRAM

RF-1

DESCRIPTION																	FSM4	WCS RRH SECTOR A	WCS RRH SECTOR B	WCS RRH SECTOR C	4T4R B5 RRH SECTOR A	4T4R B5 RRH SECTOR B	4T4R B5 RRH SECTOR C	B14/12/29 TRIBAND RRH SECTOR A	B14/12/29 TRIBAND RRH SECTOR B	B14/12/29 TRIBAND RRH SECTOR C	B25/66 LTE RRH SECTOR A	B25/66 LTE RRH SECTOR B	B25/66 LTE RRH SECTOR C
BRKR (A)																	20A	20A	20A	20A	25A	25A	25A	50A	50A	50A	50A	50A	50A

NOTES:
1. END POSITIONS B1 AND B24 SHALL ONLY BE USED FOR SINGLE POSITION BREAKERS.
2. A 2-POLE ADAPTER LUG IS NOT REQUIRED ON THE RETURN BUS.

NETSURE 7100 POWER PLANT

1 **BREAKER PANEL** SCALE: N.T.S.

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EXP.: 04/14/22

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APPROVALS

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R.F. _____
ZONING _____
CONSTRUCTION _____
A & E _____

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CHECKED BY: LW

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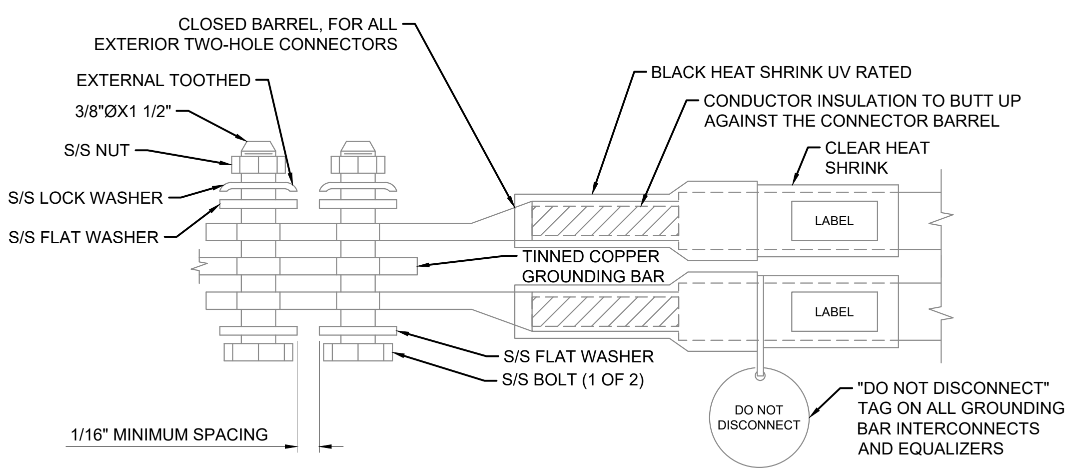
BREAKER PANEL

E-1

NOTES:

1. EXOTHERMIC WELD (2) TWO, #2 AWG BARE TINNED SOLID COPPER CONDUCTORS TO GROUNDING BAR. ROUTE CONDUCTORS TO BURIED GROUNDING RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
2. ALL GROUNDING BARS SHALL BE STAMPED IN TO THE METAL "IF STOLEN DO NOT RECYCLE." THE CONTRACTOR SHALL USE PERMANENT MARKER TO DRAW THE LINES BETWEEN EACH SECTION AND LABEL EACH SECTION ("P", "A", "N", "I") WITH 1" HIGH LETTERS.
3. ALL HARDWARE SHALL BE STAINLESS STEEL 3/8" DIAMETER OR LARGER. ALL HARDWARE 18-8 STAINLESS STEEL INCLUDING LOCK WASHERS, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
4. FOR GROUND BOND TO STEEL ONLY: INSERT A CADMIUM FLAT WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
5. DO NOT INSTALL CABLE GROUNDING KIT AT A BEND AND ALWAYS DIRECT GROUNDING CONDUCTOR DOWN TO GROUNDING BUS.
6. NUT & WASHER SHALL BE PLACED ON THE FRONT SIDE OF THE GROUNDING BAR AND BOLTED ON THE BACK SIDE. INSTALL BLACK HEAT-SHRINKING TUBE, 600 VOLT INSULATION, ON ALL GROUNDING TERMINATIONS. THE INTENT IS TO WEATHERPROOF THE COMPRESSION CONNECTION.
7. SUPPLIED AND INSTALLED BY CONTRACTOR.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL GROUNDING BAR AS REQUIRED, PROVIDING 50% SPARE CONNECTION POINTS.
9. ENSURE THE WIRE INSULATION TERMINATION IS WITHIN 1/8" OF THE BARREL (NO SHINERS).



1 EXTERIOR TWO HOLE LUG DETAIL SCALE: N.T.S.

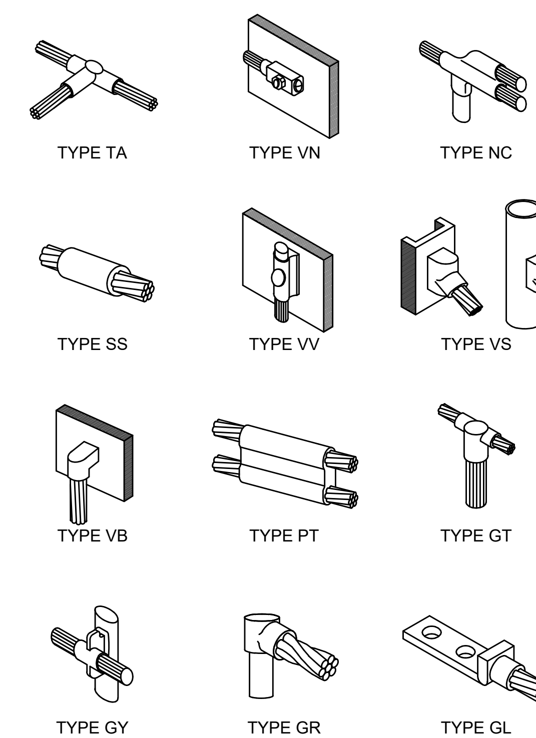
GENERAL NOTES:

1. CONTRACTOR SHALL HAVE A COMPLETE UNDERSTANDING OF THE CONTENTS OF AT&T STANDARD TP-76416.
2. ALL INSTALLATIONS SHALL BE FIELD VERIFIED.
3. ALL GROUND CONNECTIONS FOR ALL RELOCATED EQUIPMENT SHALL BE RE-ESTABLISHED BY THE CONTRACTOR. CONTRACTOR SHALL FURNISH ALL MATERIALS AS REQUIRED.

GROUNDING NOTES:

1. TOWER GROUNDING BAR: EXTEND (2) #2 AWG TINNED CU WIRE FROM BURIED GROUND RING UP TO THE TOWER GROUND BAR AND MAKE A MECHANICAL CONNECTION. SECURE GROUND BAR DIRECTLY TO TOWER WITH STAINLESS STEEL MOUNTING MATERIAL.
2. ANTENNA GROUNDING BAR: ANDREW CORPORATION PART #UGBKIT-0424-T MOUNT GROUND BAR DIRECTLY TO TOWER. SECURE TO TOWER WITH STAINLESS STEEL MOUNTING MATERIAL.
3. GROUNDING BAR: LOCATED CLOSE TO GRADE LOCK BOX TESSCO PART #351546: INSTALL PER MANUFACTURER GUIDELINES.
4. EXOTHERMIC OR COMPRESSION CONNECTION FOR PIPE MOUNT TO ANTENNA ROUTE CONDUCTOR TO NEAREST GROUNDING BAR SO THE GROUNDING CONDUCTORS PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND. USE #2 AWG SOLID TINNED COPPER CONDUCTOR. GROUNDING CONNECTION SHALL BE LOCATED AT THE TOP 2" OF PIPE.
5. ALL GROUNDING CONDUCTORS SHALL BE #2 AWG COPPER TINNED UNLESS NOTED OTHERWISE.
6. ALL GROUNDING CONDUCTORS SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND WITH GRADUAL BEND AS REQUIRED. GROUND WIRES SHALL NOT BE LOOPED OR SHARPLY BENT.
7. KOPR-SHIELD ANTI-OXIDATION COMPOUND SHALL BE USED ON ALL COMPRESSION GROUNDING CONNECTIONS.
8. ALL EXOTHERMIC CONNECTIONS SHALL BE INSTALLED UTILIZING THE PROPER CONNECTION/MOLD AND MATERIALS FOR THE PARTICULAR APPLICATION.
9. ALL BOLTED GROUNDING CONNECTIONS SHALL BE INSTALLED WITH AN EXTERNAL TOOTHED LOCK WASHER. GROUNDING BUS BARS MAY HAVE PRE-PUNCHED HOLES OR TAPPED HOLES. ALL HARDWARE SHALL BE SECURITY TORQUE HARDWARE 3/8" STAINLESS STEEL.
10. EXTERNAL GROUNDING CONDUCTOR SHALL NOT BE INSTALLED OR ROUTED THROUGH HOLES IN ANY METAL OBJECTS, CONDUITS, OR SUPPORTS TO PRECLUDE ESTABLISHING A MAGNETIC CHOKE POINT.
11. PLASTIC CLIPS SHALL BE USED TO FASTEN AND SUPPORT GROUNDING CONDUCTORS. FERROUS METAL CLIPS WHICH COMPLETELY SURROUND THE GROUNDING CONDUCTOR SHALL NOT BE USED.
12. IF COAX ON ICE BRIDGE IS MORE THAT 6' FROM THE GROUND BAR AT THE BASE OF THE TOWER, A SECOND GROUND BAR WILL BE NEEDED AT THE END OF THE ICE BRIDGE RUN TO GROUND THE COAX GROUND KIT AND THE IN-LINE SURGE ARRESTORS (SURGE ARRESTORS INSTALLED BY LUCENT ONLY HAVE 6' GROUND TAILS).
13. CONTRACTOR SHALL REPAIR/PLACE EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTORS EXPENSE.
14. DO NOT ALLOW THE COPPER CONDUCTOR TO TOUCH THE GALVANIZED GUY WIRE AT THE CONNECTION POINT OR AT ANY OTHER POINT. NO EXOTHERMICALLY WELDED CONNECTION SHALL BE MADE TO THE GUY WIRE.
15. CONTRACTOR SHALL VERIFY EXISTING SECTOR GROUNDING CONDITION AND GROUND THE PROPOSED EQUIPMENT IN THE SAME MANNER. A PROPOSED SECTOR GROUND BAR SHALL BE INSTALLED IF REQUIRED.

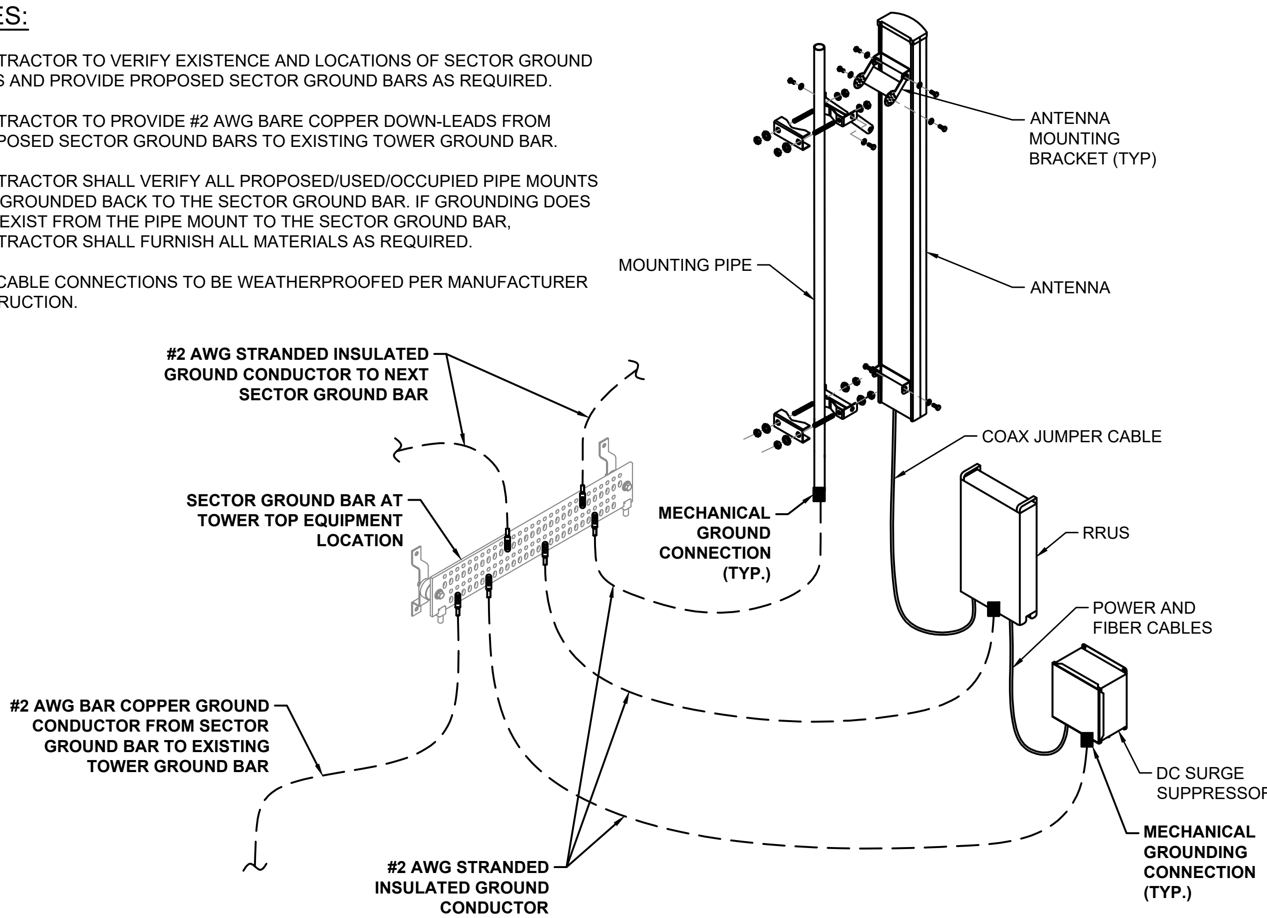
2 GROUNDING BAR DETAIL SCALE: N.T.S.



3 GROUNDING DETAILS SCALE: N.T.S.

NOTES:

1. CONTRACTOR TO VERIFY EXISTENCE AND LOCATIONS OF SECTOR GROUND BARS AND PROVIDE PROPOSED SECTOR GROUND BARS AS REQUIRED.
2. CONTRACTOR TO PROVIDE #2 AWG BARE COPPER DOWN-LEADS FROM PROPOSED SECTOR GROUND BARS TO EXISTING TOWER GROUND BAR.
3. CONTRACTOR SHALL VERIFY ALL PROPOSED/USED/OCCUPIED PIPE MOUNTS ARE GROUNDED BACK TO THE SECTOR GROUND BAR. IF GROUNDING DOES NOT EXIST FROM THE PIPE MOUNT TO THE SECTOR GROUND BAR, CONTRACTOR SHALL FURNISH ALL MATERIALS AS REQUIRED.
4. ALL CABLE CONNECTIONS TO BE WEATHERPROOFED PER MANUFACTURER INSTRUCTION.



4 TYPICAL ANTENNA GROUNDING SCHEMATIC SCALE: N.T.S.

5 DETAIL NOT USED SCALE: N.T.S.

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BETHESDA, MD 20814

GROUNDING DETAILS

G-1

Commscope_8-port_NNHH-65(A/B/C)-R4

RRH	ANT
RRH1	Port1
RRH2	Port2
RRH3	Port3
RRH4	Port4

AirScale RRH 4T4R B5 160W AHCA

1 **ANTENNA CONNECTION DIAGRAM** SCALE: N.T.S.

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ANTENNA CONNECTION DIAGRAM

S-1

AT&T COAX AND JUMPER COLOR CODE CHART FOR WV-VA SITES

Color Code for Hard-Line Coax to Antennas					
Sector	Coax Line	A1	A2	A3	A4
Alpha	1st Line				
Alpha	2nd Line				

*Note: Pipe 1 is to the left if you are standing behind the antennas in this sector.

Sector	Coax Line	B1	B2	B3	B4
Beta	1st Line				
Beta	2nd Line				

*Note: Pipe 1 is to the left if you are standing behind the antennas in this sector.

Sector	Coax Line	G1	G2	G3	G4
Gamma	1st Line	White	White	3 White	4 White
Gamma	2nd Line	White	White	3 White &	4 White &

*Note: Pipe 1 is to the left if you are standing behind the antennas in this sector.

Color Code for Jumpers from Antenna to TMAs/Diplexers or RRH -or- from Antenna to Hard-Line Coax														
Sector	Technology	Frequency	TX/RX	1st Band	2nd Band	3rd Band	4th Band	5th Band	6th Band	7th Band	8th Band	9th Band	Notes
A1-1	LTE	700 D/E	TXM/RXM			Orange							
A1-2	LTE	700 D/E	TXD1/RXD1			Orange							
A1-3	LTE	WCS	TXM/RXM										
A1-4	LTE	WCS	TXD1/RXD1										
A1-5	LTE	WCS	TXD2/RXD2										
A1-6	LTE	WCS	TXD3/RXD3										
A2-1	UMTS/GSM	850	TXM/RXM			Yellow	Orange						
A2-2	UMTS/GSM	850	TXD1/RXD1			Yellow	Orange						
A2-3	UMTS/GSM	1900	TXM/RXM			Yellow							
A2-4	UMTS/GSM	1900	TXD1/RXD1			Yellow							
A2-5	UMTS/LTE	1900	TXD2/RXD2			Yellow							
A2-6	UMTS/LTE	1900	TXD3/RXD3			Yellow							
A3-1	UMTS	850	TXM/RXM				Yellow	Orange					
A3-2	UMTS	850	TXD1/RXD1				Yellow	Orange					
A3-3	UMTS/LTE	1900	TXM/RXM				Yellow						
A3-4	UMTS/LTE	1900	TXD1/RXD1				Yellow						
A3-5	UMTS/LTE	1900	TXD2/RXD2				Yellow						
A3-6	UMTS/LTE	1900	TXD3/RXD3				Yellow						
A4-1	LTE	700	TXM/RXM						Orange				
A4-2	LTE	700	TXD1/RXD1						Orange				
A4-3	LTE	2100	TXM/RXM										
A4-4	LTE	2100	TXD1/RXD1										
A4-5	LTE	2100	TXD2/RXD2										
A4-6	LTE	2100	TXD3/RXD3										
B1-1	LTE	700 D/E	TXM/RXM			Orange							
B1-2	LTE	700 D/E	TXD1/RXD1			Orange							
B1-3	LTE	WCS	TXM/RXM										
B1-4	LTE	WCS	TXD1/RXD1										
B1-5	LTE	WCS	TXD2/RXD2										
B1-6	LTE	WCS	TXD3/RXD3										
B2-1	UMTS/GSM	850	TXM/RXM			Yellow	Orange						
B2-2	UMTS/GSM	850	TXD1/RXD1			Yellow	Orange						
B2-3	UMTS/GSM	1900	TXM/RXM			Yellow							
B2-4	UMTS/GSM	1900	TXD1/RXD1			Yellow							
B2-5	UMTS/LTE	1900	TXD2/RXD2			Yellow							
B2-6	UMTS/LTE	1900	TXD3/RXD3			Yellow							
B3-1	UMTS	850	TXM/RXM				Yellow	Orange					
B3-2	UMTS	850	TXD1/RXD1				Yellow	Orange					
B3-3	UMTS/LTE	1900	TXM/RXM				Yellow						
B3-4	UMTS/LTE	1900	TXD1/RXD1				Yellow						
B3-5	UMTS/LTE	1900	TXD2/RXD2				Yellow						
B3-6	UMTS/LTE	1900	TXD3/RXD3				Yellow						
B4-1	LTE	700	TXM/RXM						Orange				
B4-2	LTE	700	TXD1/RXD1						Orange				
B4-3	LTE	2100	TXM/RXM										
B4-4	LTE	2100	TXD1/RXD1										
B4-5	LTE	2100	TXD2/RXD2										
B4-6	LTE	2100	TXD3/RXD3										
G1-1	LTE	700 D/E	TXM/RXM	White		Orange							
G1-2	LTE	700 D/E	TXD1/RXD1	White		Orange							
G1-3	LTE	WCS	TXM/RXM	White									
G1-4	LTE	WCS	TXD1/RXD1	White									
G1-5	LTE	WCS	TXD2/RXD2	White									
G1-6	LTE	WCS	TXD3/RXD3	White									
G2-1	UMTS/GSM	850	TXM/RXM	White	White	Yellow	Orange						
G2-2	UMTS/GSM	850	TXD1/RXD1	White	White	Yellow	Orange						
G2-3	UMTS/GSM	1900	TXM/RXM	White	White	Yellow							
G2-4	UMTS/GSM	1900	TXD1/RXD1	White	White	Yellow							
G2-5	UMTS/LTE	1900	TXD2/RXD2	White	White	Yellow							
G2-6	UMTS/LTE	1900	TXD3/RXD3	White	White	Yellow							
G3-1	UMTS	850	TXM/RXM	White	White	White	Yellow	Orange					
G3-2	UMTS	850	TXD1/RXD1	White	White	White	Yellow	Orange					
G3-3	UMTS/LTE	1900	TXM/RXM	White	White	White	Yellow						
G3-4	UMTS/LTE	1900	TXD1/RXD1	White	White	White	Yellow						
G3-5	UMTS/LTE	1900	TXD2/RXD2	White	White	White	Yellow						
G3-6	UMTS/LTE	1900	TXD3/RXD3	White	White	White	Yellow						
G4-1	LTE	700	TXM/RXM	White	White	White	White		Orange				
G4-2	LTE	700	TXD1/RXD1	White	White	White	White		Orange				
G4-3	LTE	2100	TXM/RXM	White	White	White	White						
G4-4	LTE	2100	TXD1/RXD1	White	White	White	White						
G4-5	LTE	2100	TXD2/RXD2	White	White	White	White						
G4-6	LTE	2100	TXD3/RXD3	White	White	White	White						

Base Color	
Sector A	
Sector B	
Sector C	White

Technology Color	
LTE	
UMTS	Yellow
GSM	Black

Frequency Color	
700/850	Orange
WCS	
1900/2100	

Type Color	
Main (M)	White
Diversity (D)	

Jumpers from TMA to Antenna/Diplexer to Equipment: ORANGE band to note Low-Side frequencies VIOLET band to note High-Side frequencies YELLOW band to note UMTS GRAY band to note LTE

FIBER TRUNK IN COLOR CODE:
1ST=
2ND=

DC POWER TRUNK COLOR CODE:		
1ST=	1 WHITE	/
2ND=	2 WHITE	/
3RD=	3 WHITE	/
4TH=	4 WHITE	/

1 COLOR CODE CHART

SCALE: N.T.S.

at&t
7150 STANDARD DR
SUITE A
HANOVER, MD 21076

Jacobs
Challenging today.
Reinventing tomorrow.
Jacobs Telecommunications, Inc.
7150 STANDARD DR. SUITE B
HANOVER, MD 21076
443.230.4400x113

STATE OF MARYLAND
WENSEN JING
55911
PROFESSIONAL ENGINEER
LICENSED PROFESSIONAL ENGINEER
EXP.: 04/14/22

05/14/2020

APPROVALS

LANDLORD _____

LEASING _____

R.F. _____

ZONING _____

CONSTRUCTION _____

A & E _____

PROJECT NO:	EP4TURWL
DRAWN BY:	RM
CHECKED BY:	LW

SUBMITTALS

0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

COLOR CODE CHART

S-2

Field	Length	Description	
USID	6	Six characters that defined the sites USID. USID's less than 6 characters in length are preceded with 0's (zeros) (example:003831)	
		Allowed Value	Description
CellId1	1	A	Alpha
		B	Beta
		C	Gamma
CellId2	1	D	Delta
		E	Epsilon
		F	Zeta
CellId3	1	-	No Transmitter connected to this port
		Allowed Value	Description
AntPos	1	1	Antenna Position 1 on this face
		2	Antenna Position 2 on this face
		:	Antenna Position x on this face
		:	Antenna Position x on this face
		9	Antenna Position 9 on this face
		-	Antenna Position unknown
		Allowed Value	Description
FreqBand	1	2	2100 MHz (AWS1) only
		3	2300 MHz (WCS) only
		6	Band 66 (AWS3) only
		7	700 MHz B & C Band only
		8	850 MHz only
		9	1900 MHz (PCS)
		A	2100 MHz (AWS1) & Band 66 (AWS3) combined
		B	1900 MHz (PCS) & Band 66 (AWS3) combined
		C	2100 MHz (AWS1) & Band 66 (AWS3) & 2300 MHz (WCS) combined
		D	1900 MHz (PCS) & 2100 MHz (AWS1) combined
		E	2300 MHz (WCS) & Band 66 (AWS3) combined
		F	1900 MHz (PCS) & 2300 MHz (WCS) combined
		G	1900 MHz (PCS) & 2100 MHz (AWS1) & Band 66 (AWS3) combined
		H	2100 MHz (AWS1) & 2300 MHz (WCS) combined
		I	1900 MHz (PCS) & 2300 MHz (WCS) & Band 66 (AWS3) combined
		J	1900 MHz (PCS) & 2100 MHz (AWS1) & 2300 MHz (WCS) combined
		K	700 MHz B & C Band & 850 MHz combined
		M	1900 MHz (PCS) & 2100 MHz (AWS1) & Band 66 (AWS3) & 2300 MHz (WCS) combined
		P	upper 700 MHz - Band 14 (FirstNet)
		Q	700 MHz D & E Band only
		R	700 MHz B & C & Band 14 (FirstNet) & 850 MHz combined
		S	700 MHz B & C & 700 MHz D & E & 850 MHz combined
		T	Tri-Band: Band 12 (700 MHz B&C), Band 14 (FirstNet), and Band 29 (700 MHz D&E)
		U	700 MHz B & C & 700 MHz D & E & Band 14 (FirstNet) & 850 MHz combined
		W	700 MHz D & E Band 14 (FirstNet) combined
		X	700 MHz B & C & Band 14 (FirstNet) combined
		Y	700 MHz D & E & 850 MHz combined
		Z	Band 14 (FirstNet) & 850 MHz combined
		-	No Frequency Assigned "not-in-use"

Field	Length	Description	
Tech	1	Allowed Value	Technology / Technology Combination
		F	License protection/FCC compliance/FWLL
		G	Reserved
		J	LTE-5G NR
		K	UMTS-LTE-5G NR
		L	LTE
		N	None/Reserved
		U	UMTS
		V	UMTS-LTE
		Y	UMTS-5G NR
		H	Reserved
		M	Exception
		P	Reserved
		Q	Reserved
		R	5G NR
		S	Reserved
		T	Reserved

Delimiter	13th character
_	Delimiter
B	Border Control
C	CGSA
W	WCS in combination with other bands
P	License Protection
O	Optimized
Delimiter	**14th character**
_	Delimiter
Z	Programming Code for RET validated

2.3.1 Dual Broadband Antennas- TYPE 1

Powerwave, Kathrein and older Andrew antennas will be recognized by a RET controller as TYPE1 Antenna Line Devices. These require 2 AISG connections. One connection will be from the AISG source (RRH, TMA, RET Controller or Homerun Cable) to the first RET motor and the second connection will be from RET motor 1 to RET motor 2.

Connections from the RET controller will be made to the male connector of the RET motor. Appropriate daisy chain connection will then have to be made to the next RET motor. Figure 5 below is a Powerwave antenna, but the Kathrein will be very similar in appearance and connection.

For all Type 1 dual broadband antennas, the daisy chain connection should be made and both RET motors should be configured in the OSS, even if the high band RET motor is not to be utilized until future AWS launches.

Dual Broadband Antennas - TYPE 17

Newer Andrew antennas and all KMW antennas will be recognized by RET controllers as TYPE17 Antenna Line Devices since there are multiple ALDs on one bus. These antennas only require one AISG connection since both RET motors are inside the antenna. Connections from the RET controller will be made to the male connector of the RET/AISG Antenna Port. Figure 7 below is an Andrew antenna, but the KMW antenna will be very similar in appearance and connection.

Below is the list of approved RET Type 17 antennas as per 6/29/2011. Andrew will continue to phase out older models which are Type 1 with newer models that will be Type 17.

Vendor	Frequency Band	HBW	Length	Model
Andrew	Dual Broadband	65°	6'	SBNH-1D6565B
Andrew	Dual Broadband	65°	8'	SBNH-1D6565C
Andrew	Dual Broadband	85°	6'	SBNH-1D8585B
Andrew	Dual Broadband	85°	8'	SBNH-1D8585C
KMW	Dual Broadband	65°	4'	AM-X-CD-14-65-00T-RET
KMW	Dual Broadband	65°	6'	AM-X-CD-16-65-00T-RET
KMW	Dual Broadband	65°	8'	AM-X-CD-17-65-00T-RET
KMW	Dual Broadband	85°	4'	NOT AVAILABLE YET
KMW	Dual Broadband	85°	6'	NOT AVAILABLE YET
KMW	Dual Broadband	85°	8'	AM-X-CD-16-85-00T-RET
KMW	Single Broadband	65°	4'	AM-X-CW-14-65-00T-RET
KMW	Single Broadband	65°	6'	AM-X-CW-16-65-00T-RET
KMW	Single Broadband	65°	8'	AM-X-CW-18-65-00T-RET
KMW	Single Broadband	85°	4'	AM-X-CW-13-85-00T-RET
KMW	Single Broadband	85°	6'	AM-X-CW-15-85-00T-RET
KMW	Single Broadband	85°	8'	AM-X-CW-16-85-00T-RET

1 LTE RET NAMING CONVENTION

SCALE: N.T.S.

at&t
7150 STANDARD DR
SUITE A
HANOVER, MD 21076

Jacobs.
Challenging today.
Reinventing tomorrow.
Jacobs Telecommunications, Inc.
7150 STANDARD DR. SUITE B
HANOVER, MD 21076
443.230.4400x113

STATE OF MARYLAND
WENSEN JIANG
55911
PROFESSIONAL ENGINEER
5/14/2020

CERTIFICATION STATEMENT:
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. 55911 EXP.: 04/14/22

APPROVALS

LANDLORD

LEASING

R.F.

ZONING

CONSTRUCTION

A & E

PROJECT NO: EP4TURWL

DRAWN BY: RM

CHECKED BY: LW

SUBMITTALS

0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

LTE RET NAMING CONVENTION

S-3

GENERAL CONSTRUCTION:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWINGS, THE FOLLOWING DEFINITIONS SHALL APPLY:
   GENERAL CONTRACTOR - (CONSTRUCTION)
   OWNER - AT&T
2. ALL SITE WORK SHALL BE COMPLETED AS INDICATED ON THE DRAWINGS AND AT&T PROJECT SPECIFICATIONS.
3. GENERAL CONTRACTOR SHALL VISIT THE SITE AND SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING THE PROPOSED WORK AND SHALL MAKE PROVISIONS. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS, DIMENSIONS, AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.
4. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. GENERAL CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF WORK.
5. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES, AND APPLICABLE REGULATIONS.
6. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
7. PLANS ARE NOT TO BE SCALED. THESE PLANS ARE INTENDED TO BE A DIAGRAMMATIC OUTLINE ONLY UNLESS OTHERWISE NOTED. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS OTHERWISE NOTED. SPACING BETWEEN EQUIPMENT IS THE MINIMUM REQUIRED CLEARANCE. THEREFORE, IT IS CRITICAL TO FIELD VERIFY DIMENSIONS, SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION. DETAILS ARE INTENDED TO SHOW DESIGN INTENT. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF WORK AND PREPARED BY THE ENGINEER PRIOR TO PROCEEDING WITH WORK.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE ENGINEER PRIOR TO PROCEEDING.
10. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF WORK AREA, ADJACENT AREAS AND BUILDING OCCUPANTS THAT ARE LIKELY TO BE AFFECTED BY THE WORK UNDER THIS CONTRACT. WORK SHALL CONFIRM TO ALL OSHA REQUIREMENTS AND THE LOCAL JURISDICTION.
11. GENERAL CONTRACTOR SHALL COORDINATE WORK AND SCHEDULE WORK ACTIVITIES WITH OTHER DISCIPLINES.
12. ERECTION SHALL BE DONE IN A WORKMANLIKE MANNER BY COMPETENT EXPERIENCED WORKMAN IN ACCORDANCE WITH APPLICABLE CODES AND THE BEST ACCEPTED PRACTICE. ALL MEMBERS SHALL BE LAID PLUMB AND TRUE AS INDICATED ON THE DRAWINGS.
13. SEAL PENETRATIONS THROUGH FIRE RATED AREAS WITH UL LISTED MATERIALS APPROVED BY LOCAL JURISDICTION. CONTRACTOR SHALL KEEP AREA CLEAN, HAZARD FREE, AND DISPOSE OF ALL DEBRIS.
14. WORK PREVIOUSLY COMPLETED IS REPRESENTED BY LIGHT SHADED LINES AND NOTES. THE SCOPE OF WORK FOR THIS PROJECT IS REPRESENTED BY DARK SHADED LINES AND NOTES. CONTRACTOR SHALL NOTIFY THE GENERAL CONTRACTOR OF ANY EXISTING CONDITIONS THAT DEVIATE FROM THE DRAWINGS PRIOR TO BEGINNING CONSTRUCTION.
15. CONTRACTOR SHALL PROVIDE WRITTEN NOTICE TO THE CONSTRUCTION MANAGER 48 HOURS PRIOR TO COMMENCEMENT OF WORK.
16. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
17. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
18. GENERAL CONTRACTOR SHALL COORDINATE AND MAINTAIN ACCESS FOR ALL TRADES AND CONTRACTORS TO THE SITE AND/OR BUILDING.
19. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR SECURITY OF THE SITE FOR THE DURATION OF CONSTRUCTION UNTIL JOB COMPLETION.
20. THE GENERAL CONTRACTOR SHALL MAINTAIN IN GOOD CONDITION ONE COMPLETE SET OF PLANS WITH ALL REVISIONS, ADDENDA, AND CHANGE ORDERS ON THE PREMISES AT ALL TIMES.
21. THE GENERAL CONTRACTOR SHALL PROVIDE PORTABLE FIRE EXTINGUISHERS WITH A RATING OF NOT LESS THAN 2-A OT 2-A:10-B:C AND SHALL BE WITHIN 25 FEET OF TRAVEL DISTANCE TO ALL PORTIONS OF WHERE THE WORK IS BEING COMPLETED DURING CONSTRUCTION.
22. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY THE ENGINEER. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS SHALL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION, B) CONFINED SPACE, C) ELECTRICAL SAFETY, AND D) TRENCHING & EXCAVATION.
23. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED, CAPPED, PLUGGED OR OTHERWISE DISCONNECTED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, AS DIRECTED BY THE RESPONSIBLE ENGINEER, AND SUBJECT TO THE APPROVAL OF THE OWNER AND/OR LOCAL UTILITIES.
24. THE AREAS OF THE OWNER'S PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION.
25. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO THE EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE FEDERAL AND LOCAL JURISDICTION FOR EROSION AND SEDIMENT CONTROL.
26. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUNDING. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
27. THE SUBGRADE SHALL BE BROUGHT TO A SMOOTH UNIFORM GRADE AND COMPACTED TO 95 PERCENT STANDARD PROCTOR DENSITY UNDER PAVEMENT AND STRUCTURES AND 80 PERCENT STANDARD PROCTOR DENSITY IN OPEN SPACE. ALL TRENCHES IN PUBLIC RIGHT OF WAY SHALL BE BACKFILLED WITH FLOWABLE FILL OR OTHER MATERIAL PRE-APPROVED BY THE LOCAL JURISDICTION.
28. ALL NECESSARY RUBBISH, STUMPS, DEBRIS, STICKS, STONES, AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN A LAWFUL MANNER.
29. ALL BROCHURES, OPERATING AND MAINTENANCE MANUALS, CATALOGS, SHOP DRAWINGS, AND OTHER DOCUMENTS SHALL BE TURNED OVER TO THE GENERAL CONTRACTOR AT COMPLETION OF CONSTRUCTION AND PRIOR TO PAYMENT.
30. CONTRACTOR SHALL SUBMIT A COMPLETE SET OF AS-BUILT REDLINES TO THE GENERAL CONTRACTOR UPON COMPLETION OF PROJECT AND PRIOR TO FINAL PAYMENT.
31. CONTRACTOR SHALL LEAVE PREMISES IN A CLEAN CONDITION.
32. THE PROPOSED FACILITY WILL BE UNMANNED AND DOES NOT REQUIRE POTABLE WATER OR SEWER SERVICE, AND IS NOT FOR HUMAN HABITAT (NO HANDICAP ACCESS REQUIRED).
33. OCCUPANCY IS LIMITED TO PERIODIC MAINTENANCE AND INSPECTION, APPROXIMATELY 2 TIMES PER MONTH, BY AT&T TECHNICIANS.
34. NO OUTDOOR STORAGE OR SOLID WASTE CONTAINERS ARE PROPOSED.
35. ALL MATERIAL SHALL BE FURNISHED AND WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST REVISION AT&T MOBILITY GROUNDING STANDARD "TECHNICAL SPECIFICATION FOR CONSTRUCTION OF GSM/GPRS WIRELESS SITES" AND "TECHNICAL SPECIFICATION FOR FACILITY GROUNDING". IN CASE OF A CONFLICT BETWEEN THE CONSTRUCTION SPECIFICATION AND THE DRAWINGS, THE DRAWINGS SHALL GOVERN.
36. CONTRACTORS SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS REQUIRED FOR CONSTRUCTION. IF CONTRACTOR CANNOT OBTAIN A PERMIT, THEY MUST NOTIFY THE GENERAL CONTRACTOR IMMEDIATELY.
37. CONTRACTOR SHALL REMOVE ALL TRASH AND DEBRIS FROM THE SITE ON A DAILY BASIS.
38. INFORMATION SHOWN ON THESE DRAWINGS WAS OBTAINED FROM SITE VISITS AND/OR DRAWINGS PROVIDED BY THE SITE OWNER. CONTRACTORS SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
39. NO WHITE STROBE LIGHTS ARE PERMITTED. LIGHTING IF REQUIRED, WILL MEET FAA STANDARDS AND REQUIREMENTS.
40. ALL COAXIAL CABLE INSTALLATIONS TO FOLLOW MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
41. CONTRACTOR WILL REFER TO LATEST RFDS SHEET PRIOR TO CONSTRUCTION COMMENCING.

PART 1 - GENERAL

1.1 SCOPE:

A. PROVIDE FABRICATION AND ERECTION OF STRUCTURAL STEEL AND OTHER ITEMS AS SHOWN ON THE DRAWINGS OR REQUIRED BY OTHER SECTIONS OF THESE SPECIFICATIONS.

1.2 REFERENCES:

A. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC). MANUAL OF STEEL CONSTRUCTION (13TH EDITION), ALLOWABLE STRESS DESIGN (ASD).

B. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM).
ASTM A36: STRUCTURAL STEEL
ASTM A53: PIPE, STEEL BLACK AND HOT DIPPED, ZINC-COATED WELDED AND SEAMLESS.
ASTM A108: STEEL BARS, CARBON, COLD FINISHED, STANDARD QUALITY.
ASTM A123: ZINC (HOT-DIPPED GALVANIZED) COATING ON IRON AND STEEL PRODUCTS.
ASTM A307: CARBON STEEL BOLTS AND STUDS, 60,000 PSI TENSILE STRENGTH.
ASTM A325: HIGH-STRENGTH BOLT FOR STRUCTURAL STEEL JOINTS.
ASTM A490: HEAT-TREATED, STRUCTURAL STEEL BOLTS, 150 (KSI) (1035MPA) TENSILE STRENGTH.
ASTM A500: COLD-FORMED WELDED AND SEAMLESS CARBON STEEL STRUCTURAL TUBING IN ROUNDS AND SHAPES.
ASTM A563: ARCBON AND ALLOY STEEL NUTS.
ASTM B695: COATINGS OF ZINC MECHANICALLY DEPOSITED ON IRON AND STEEL.
ASTM F436: HARDENED STEEL WASHERS.
ASTM F959: COMPRESSIBLE-WASHER-TYPE DIRECT TENSION INDICATOR FOR USE WITH STRUCTURAL FASTENERS.

C. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM).
ASTM A36: STRUCTURAL STEEL
AMERICAN WELDING SOCIETY (AWS):
AWS A5.1: COVERED CARBON STEEL ARC WELDING ELECTRODES.
AWS A5.5: LOW ALLOY STEEL COVERED ARC WELDING ELECTRODES.
AWS D1.1: STRUCTURAL WELDING CODE - STEEL.

D. RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS (RCSC): "SPECIFICATIONS FOR STRUCTURAL JOINTS USING ASTM A325 BOLTS OR ASTM A490 BOLTS" AS ENDORSED BY AISC.

E. STEEL STRUCTURES PAINTING COUNCIL (SSPC):
SSPC-SP3: POWER TOOL CLEANING.
SSPC-PAINT 11: RED IRON OXIDE, ZINC CHROME, RAW LINSEED OIL OR ALKYD PAINT.

1.3 SUBMITTALS:

A. SUBMIT THE FOLLOWING FOR APPROVAL:

1. FABRICATION AND ERECTION DRAWINGS SHOWING ALL DETAILS, CONNECTIONS, MATERIAL DESIGNATIONS, AND ALL TOP STEEL ELEVATIONS.

B. WELDERS SHALL BE QUALIFIED AS PRESCRIBED IN AWS D1.1.

PART 2 - PRODUCTS

2.1 STRUCTURAL STEEL:

A. SHAPES, PLATES AND BARS SHALL CONFORM TO ASTM A36 AND ASTM A992.

B. STRUCTURAL TUBING SHALL CONFORM TO ASTM A500, GRADE B. STEEL PIPE SHALL CONFORM TO ASTM A53, TYPE E OR S, GRADE B.

2.2 ANCHOR BOLTS:

A. ANCHOR BOLTS SHALL CONFORM TO ASTM A307 WITH HEAVY HEXAGONAL NUTS.

2.3 BOLTS:

A. COMMON (MACHINE) BOLTS SHALL CONFORM TO ASTM A307 GRADE A AND NUTS TO ASTM A563. ONE COMMON BOLT ASSEMBLY SHALL CONSIST OF A BOLT, A HEAVY HEX NUT, AND A HARDENED WASHER.

B. HIGH STRENGTH BOLT SHALL CONFORM TO ASTM A325, ONE HIGH STRENGTH BOLT ASSEMBLY SHALL CONSIST OF A HEAVY HEX STRUCTURAL BOLT, A HEAVY HEX NUT, A HARDENED WASHER CONFIRMING WITH ASTM F436 AND A DIRECT TENSION INDICATOR CONFORMING WITH STM F959. THE HARDENED WASHER SHALL BE INSTALLED AGAINST THE ELEMENT TURNED IN TIGHTENING.UNLESS NOTED OTHERWISE ON THE DRAWINGS, ALL CONNECTIONS SHALL BE BEARING TYPE CONNECTIONS.

2.4 WELDING ELECTRODES:

A. WELDING ELECTRODES SHALL COMPLY WITH AWS D1.1 USING A5.1 OR A5.5 E70XX AND SHALL BE COMPATIBLE WITH THE WELDING PROCESS SELECTED.

2.5 PRIMER:

A. PRIMER SHALL BE RED OXIDE-CHROMATE PRIMER COMPLYING WITH SSPC PAINT SPECIFICATION NO. 11.

PART 3 - EXECUTION

3.1 FABRICATION:

A. SHOP FABRICATE AND ASSEMBLY MATERIALS AS SPECIFIED HEREIN.

1. FABRICATE ITEMS OF STRUCTURAL STEEL IN ACCORDANCE WITH THE AISC-ASD SPECIFICATION, AND AS INDICATED ON THE APPROVED SHOP DRAWINGS.
2. ALL EXPOSED STRUCTURAL STEEL SHALL BE HOT DIP GALVANIZED PER ASTM.
3. PROPERLY MARK AND MATCH-MARK MATERIALS FOR FIELD ASSEMBLY AND FOR IDENTIFICATION AS TO LOCATION FOR WHICH INTENDED.
4. FABRICATE AND DELIVER IN A SEQUENCE WHICH WILL EXPEDITE ERECTION AND MINIMIZE FIELD HANDLING OF MATERIALS.
5. WHERE FINISHING IS REQUIRED, COMPLETE THE ASSEMBLY, INCLUDING THE WELDING OF UNITS, BEFORE START OF FINISHING OPERATIONS.
6. PROVIDE FINISH SURFACE OF MEMBERS EXPOSED IN THE FINAL STRUCTURE FREE FROM MARKINGS, BURNS, AND OTHER DEFECTS.

B. PROVIDE CONNECTIONS AS SPECIFIED HEREIN:

1. PROVIDE BOLTS AND WASHERS OF TYPES AND SIZE REQUIRED FOR COMPLETION OF FIELD ERECTION. USE 3/4 INCH DIAMETER A325 BOLTS UNLESS NOTED OTHERWISE.
2. INSTALL HIGH STRENGTH THREADED FASTENERS IN ACCORDANCE WITH RCSC "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR ASTM A490 BOLTS."
3. WELDED CONSTRUCTION SHALL COMPLY WITH AWS D1.1 FOR PROCEDURES, APPEARANCE, QUALITY OF WELD, AND METHODS USED IN CORRECTING WELDED WORK.
4. THE FABRICATOR SHALL FURNISH AND INSTALL ERECTION CLIPS FOR FIT-UP OF WELDED CONNECTIONS.
5. DOUBLE ANGLE MEMBERS SHALL HAVE WELDED FILLERS SPACED IN ACCORDANCE WITH CHAPTER E4 OF THE AISC-ASD SPECIFICATION.
6. GUSSET AND STIFFENER PLATES SHALL BE 3/8 INCH THICK MINIMUM.

3.2 PRIMING:

A. STRUCTURAL STEEL SHALL BE PRIMED AS SPECIFIED HEREIN, UNLESS SHOWN OTHERWISE ON THE DRAWINGS.

B. STRUCTURAL STEEL SURFACE PREPARATION SHALL CONFORM TO SSPC-SP3, "POWER TOOL CLEANING."

C. SURFACE PREPARATION AND PRIMER SHALL BE IN ACCORDANCE WITH AISC CODE OF STANDARD PRACTICE AS INCLUDED IN THE ASD MANUAL OF STEEL CONSTRUCTION.

D. MATERIALS SHALL REMAIN CLOSED UNTIL REQUIRED FOR USE, MANUFACTURER'S POT-LIFE REQUIREMENTS SHALL BE STRICTLY ADHERED TO.

E. PRIMER SHALL BE APPLIED TO DRY, CLEAN, PREPARED SURFACE AND UNDER FAVORABLE CONDITIONS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. UNLESS OTHERWISE RECOMMENDED BY THE MANUFACTURER PRIMING SHALL NOT BE DONE WHEN AMBIENT TEMPERATURE IS LESS THAN 50 DEGREE F. THE RELATIVE HUMIDITY IS MORE THAN 90 PERCENT, OR THE SURFACE TEMPERATURE IS LESS THAN 5 DEGREE F ABOVE THE DEW POINT.

F. GENERALLY ALL PRIMER SHALL BE SPRAY APPLIED. BRUSH OR ROLLER APPLICATION SHALL BE RESTRICTED TO TOUCHUP AND TO AREAS NOT ACCESSIBLE BY SPRAY GUN.

G. PRIMER SHALL BE UNIFORMLY APPLIED WITHOUT RUNS, SAGS, SOLVENT BLISTERS, DRY SPRAY OR OTHER BLEMISHES. ALL BLEMISHES AND OTHER IRREGULARITIES SHALL BE REPAIRED OR REMOVED AND THE AREA RE-COATED. SPECIAL ATTENTION SHALL BE PAID TO CREVICES, WELD LINES, BOLT HEADS, CORNERS, EDGES, ETC., TO OBTAIN THE REQUIRED NOMINAL FILM THICKNESS.

H. THE DRY FILM THICKNESS OF THE PRIMER SHALL BE 2.0 MILS.

I. IF THE PRIMER IS DAMAGED BY WELDING OR PHYSICAL ABUSE, THE AREA SHALL BE TOUCHED-UP AND REPAIRED. THE TOUCHUP PAINT SHALL BE COMPATIBLE WITH THE APPLIED PRIMER WITH MINIMUM DRY FILM THICKNESS OF 1.5 MILS.

3.3 INSTALLATION:

A. INSTALLATION OF STRUCTURAL STEEL SHALL COMPLY WITH AISC "CODE OF STANDARD PRACTICE."

B. STRUCTURAL FIELD WELDING SHALL BE DONE BY THE ELECTRIC SUBMERGED OR SHIELDED METAL ARC PROCESS. WELDED CONSTRUCTION SHALL COMPLY WITH AWS D1.1.

C. PROVIDE ANCHOR BOLTS AND OTHER CONNECTORS REQUIRED FOR SECURING STRUCTURAL STEEL TO ELEVATOR SHAFT WALLS AND OTHER IN-PLACE WORK. PROVIDE TEMPLATES AND OTHER DEVICES NECESSARY FOR PRESETTING BOLTS AND ANCHORS TO ACCURATE LOCATIONS.

D. SPLICE MEMBERS ONLY WHERE INDICATED ON THE DRAWINGS.

E. ANY GAS CUTTING TORCHES HAVE TO BE APPROVED IN WRITING BY THE PROJECT STRUCTURAL ENGINEER.

F. PROVIDE TEMPORARY SHORING BRACING WITH CONNECTIONS OF SUFFICIENT STRENGTH TO BEAR IMPOSED LOADS. REMOVE TEMPORARY CONNECTIONS AND MEMBERS WHEN PERMANENT MEMBERS ARE IN PLACE AND THE FINAL CONNECTIONS HAVE BEEN MADE.

G. ALIGN AND ADJUST MEMBERS, AND OTHER SURFACES WHICH WILL BE IN PERMANENT CONTACT, BEFORE ASSEMBLY.

H. HIGH-STRENGTH BOLTS AS A MINIMUM, SHALL BE TIGHTENED TO A "SNUG TIGHT" CONDITION AS DEFINED IN THE LATEST AISC SPECIFICATION. ALL HIGH-STRENGTH BOLTS SPECIFIED ON THE DESIGN DRAWINGS TO BE USED IN PRETENSIONED OR SLIP-CRITICAL JOINTS SHALL BE TIGHTENED TO A BOLT TENSION NOT LESS THAN THAT GIVEN IN AISC TABLE J3.1. INSTALLATION SHALL BE BY ANY OF THE FOLLOWING METHODS: TURN-OF-NUT METHOD, A DIRECT-TENSION-INDICATOR, TWIST-OFF-TYPE TENSION-CONTROL BOLT, CALIBRATED WRENCH, OR ALTERNATIVE DESIGN BOLT.

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STATE OF MARYLAND
WENSEN JIANG
55911
PROFESSIONAL ENGINEER
5/14/2020

CERTIFICATION STATEMENT:
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. 55911 EXP.: 04/14/22

APPROVALS

LANDLORD ____
LEASING ____
R.F. ____
ZONING ____
CONSTRUCTION ____
A & E ____

PROJECT NO:	EP4TURWL
DRAWN BY:	RM
CHECKED BY:	LW

SUBMITTALS

0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

GENERAL NOTES I

GN-1

PART 1 - GENERAL

1.1 GENERAL CONDITIONS:

A. CONTRACTOR SHALL INSPECT THE EXISTING SITE CONDITIONS PRIOR TO SUBMITTING BID. ANY QUESTIONS ARISING DURING THE BID PERIOD IN REGARDS TO THE CONTRACTORS FUNCTIONS, THE SCOPE OF WORK, OR ANY OTHER ISSUE RELATED TO THIS PROJECT SHALL BE BROUGHT UP DURING THE BID PERIOD WITH THE PROJECT MANAGER FOR CLARIFICATION, NOT AFTER THE CONTRACT HAS BEEN AWARDED.

B. THE CONTRACTOR SHALL OBTAIN PERMITS, LICENSES, MAKE ALL DEPOSITS, AND PAY ALL FEES REQUIRED FOR THE CONSTRUCTION PERFORMANCE FOR THE WORK UNDER THIS SECTION.

C. DRAWINGS SHOW THE GENERAL ARRANGEMENT OF ALL SYSTEMS AND COMPONENTS COVERED UNDER THIS SECTION. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS. DRAWING SHALL NOT BE SCALED TO DETERMINE DIMENSIONS.

1.2 LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES.

A. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, AND ALL APPLICABLE LOCAL LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES. CONDUIT BENDS SHALL BE THE RADIUS BEND FOR THE TRADE SIZE OF CONDUIT IN COMPLIANCE WITH THE LATEST EDITIONS OF NEC.

1.3 REFERENCES:

A. THE PUBLICATIONS LISTED BELOW ARE PART OF THIS SPECIFICATION. EACH PUBLICATION SHALL BE THE LATEST REVISION AND ADDENDUM IN EFFECT ON THE DATE. THIS SPECIFICATION IS ISSUED FOR CONSTRUCTION UNLESS OTHERWISE NOTED. EXCEPT AS MODIFIED BY THE REQUIREMENT SPECIFIED HEREIN OR THE DETAILS OF THE DRAWINGS, WORK INCLUDED IN THIS SPECIFICATION SHALL CONFORM TO THE APPLICABLE PROVISION OF THESE PUBLICATIONS.

1. ANSI/IEEE (AMERICAN NATIONAL STANDARDS INSTITUTE)
2. ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)
3. ICEA (INSULATED CABLE ENGINEERS ASSOCIATION)
4. NEMA (NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION)
5. NFPA (NATIONAL FIRE PROTECTION ASSOCIATION)
6. OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION)
7. UL (UNDERWRITERS LABORATORIES INC.)
8. AT&T GROUNDING AND BONDING STANDARDS TP-76416

1.4 SCOPE OF WORK

A. WORK UNDER THIS SECTION SHALL CONSIST OF FURNISHING ALL LABOR, MATERIAL, AND ASSOCIATED SERVICES REQUIRED TO COMPLETE REQUIRED CONSTRUCTION AND BE OPERATIONAL.

B. ALL ELECTRICAL EQUIPMENT UNDER THIS CONTRACT SHALL BE PROPERLY TESTED, ADJUSTED, AND ALIGNED BY THE CONTRACTOR.

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATING, DRAINING, TRENCHES, BACKFILLING, AND REMOVAL OF EXCESS DIRT.

D. THE CONTRACTOR SHALL FURNISH TO THE OWNER WITH CERTIFICATES OF A FINAL INSPECTION AND APPROVAL FROM THE INSPECTION AUTHORITIES HAVING JURISDICTION.

E. THE CONTRACTOR SHALL PREPARE A COMPLETE SET OF AS-BUILT DRAWINGS, DOCUMENT ALL WIRING EQUIPMENT CONDITIONS, AND CHANGES WHILE COMPLETING THIS CONTRACT. THE AS-BUILT DRAWINGS SHALL BE SUBMITTED AT COMPLETION OF THE PROJECT.

PART 2 - PRODUCTS

2.1 GENERAL:

A. ALL MATERIALS AND EQUIPMENT SHALL BE UL LISTED, NEW, AND FREE FROM DEFECTS.

B. ALL ITEMS OF MATERIALS AND EQUIPMENT SHALL BE ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION AS SUITABLE FOR THE USE INTENDED.

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

D. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 10,000 AIC MINIMUM. VERIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PER THE GOVERNING JURISDICTION.

2.2 MATERIALS AND EQUIPMENT:

A. CONDUIT:

1. RIGID METAL CONDUIT (RMC) SHALL BE HOT-DIPPED GALVANIZED INSIDE AND OUTSIDE INCLUDING ENDS AND THREADS AND ENAMELED OR LACQUERED INSIDE IN ADDITION TO GALVANIZING.
2. LIQUIDTIGHT FLEXIBLE METAL CONDUIT SHALL BE UL LISTED.
3. CONDUIT CLAMPS, STRAPS AND SUPPORTS SHALL BE STEEL OR MALLEABLE IRON. ALL FITTINGS SHALL BE COMPRESSION AND CONCRETE TIGHT TYPE. GROUNDING BUSHINGS WITH INSULATED THROATS SHALL BE INSTALLED ON ALL CONDUIT TERMINATIONS.
4. NONMETALLIC CONDUIT AND FITTINGS SHALL BE SCHEDULE 40 PVC. INSTALL USING SOLVENT-CEMENT-TYPE JOINTS AS RECOMMENDED BY THE MANUFACTURER.

B. CONDUCTORS AND CABLE:

1. CONDUCTORS AND CABLE SHALL BE FLAME-RETARDANT, MOISTURE AND HEAT RESISTANT THERMOPLASTIC, SINGLE CONDUCTOR, COPPER, TYPE THHN/THWN-2, 600 VOLT, SIZE AS INDICATED, #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR USED.
2. #10 AWG AND SMALLER CONDUCTOR SHALL BE SOLID OR STRANDED AND #8 AWG AND LARGER CONDUCTORS SHALL BE STRANDED.
3. SOLDERLESS, COMPRESSION-TYPE CONNECTORS SHALL BE USED FOR TERMINATION OF ALL STRANDED CONDUCTORS.
4. STRAIN-RELIEF SUPPORTS GRIPS SHALL BE HUBBELL KELLEMS OR APPROVED EQUAL. CABLES SHALL BE SUPPORTED IN ACCORDANCE WITH THE NEC AND CABLE MANUFACTURER'S RECOMMENDATIONS.
5. ALL CONDUCTORS SHALL BE TAGGED AT BOTH ENDS OF THE CONDUCTOR, AT ALL PULL BOXES, J-BOXES, EQUIPMENT AND CABINETS AND SHALL BE IDENTIFIED WITH APPROVED PLASTIC TAGS (ACTION CRAFT, BRADY, OR APPROVED EQUAL).

C. DISCONNECT SWITCHES:

1. DISCONNECT SWITCHES SHALL BE HEAVY DUTY, DEAD-FRONT, QUICK-MAKE, QUICK-BREAK, EXTERNALLY OPERABLE, HANDLE LOCKABLE AND INTERLOCK WITH COVER IN CLOSED POSITION, RATING AS INDICATED, UL LABELED FURNISHED IN NEMA 3R ENCLOSURE, SQUARE-D OR ENGINEER APPROVED EQUAL.

D. CHEMICAL ELECTROLYTIC GROUNDING SYSTEM:

1. INSTALL CHEMICAL GROUNDING AS REQUIRED. THE SYSTEM SHALL BE ELECTROLYTIC MAINTENANCE FREE ELECTRODE CONSISTING OF RODS WITH A MINIMUM #2 AWG CU EXOTHERMICALLY WELDED PIGTAIL, PROTECTIVE BOXES, AND BACKFILL MATERIAL. MANUFACTURER SHALL BE LYNCOLE XIT GROUNDING ROD TYPES K2-(*)CS OR K2L-(*)CS (*) LENGTH AS REQUIRED.
2. GROUND ACCESS BOX SHALL BE A POLYPLASTIC BOX FOR NON-TRAFFIC APPLICATIONS, INCLUDING BOLT DOWN FLUSH COVER WITH "BREATHER" HOLES, XIT MODEL #XB-22. ALL DISCONNECT SWITCHES AND CONTROLLING DEVICES SHALL BE PROVIDED WITH ENGRAVED LAMICOID NAMEPLATES INDICATING EQUIPMENT CONTROLLED, BRANCH CIRCUITS ID NUMBERING, AND THE ELECTRICAL POWER SOURCE.
3. BACKFILL MATERIAL SHALL BE LYNCONITE AND LYNCOLE GROUNDING GRAVEL.

E. SYSTEM GROUNDING:

1. ALL GROUNDING COMPONENTS SHALL BE TINNED AND GROUNDING CONDUCTOR SHALL BE #2 AWG BARE, SOLID, TINNED, COPPER. ABOVE GRADE GROUNDING CONDUCTORS SHALL BE INSULATED WHERE NOTED.
2. GROUNDING BUSES SHALL BE BARE, TINNED, ANNEALED COPPER BARS OF RECTANGULAR CROSS SECTION. STANDARD BUS BARS MGB, SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. THEY SHALL NOT BE FABRICATED OR MODIFIED IN THE FIELD. ALL GROUNDING BUSES SHALL BE IDENTIFIED WITH MINIMUM 3/4" LETTERS BY WAY OF STENCILING OR DESIGNATION PLATE.
3. CONNECTORS SHALL BE HIGH-CONDUCTIVITY, HEAVY DUTY, LISTED AND LABELED AS GROUNDING CONNECTORS FOR THE MATERIALS USED. USE TWO-HOLE COMPRESSION LUGS WITH HEAT SHRINK FOR MECHANICAL CONNECTIONS. INTERIOR CONNECTIONS USE TWO-HOLE COMPRESSION LUGS WITH INSPECTION WINDOW AND CLEAR HEAT SHRINK.
4. EXOTHERMIC WELDED CONNECTIONS SHALL BE PROVIDED IN KIT FORM AND SELECTED FOR THE SPECIFIC TYPES, SIZES, AND COMBINATIONS OF CONDUCTORS AND OTHER ITEMS TO BE CONNECTED.
5. GROUND RODS SHALL BE COPPER-CLAD STEEL WITH HIGH-STRENGTH STEEL CORE AND ELECTROLYTIC-GRADE COPPER OUTER SHEATH, MOLTEN WELDED TO CORE, 5/8"x10'-0". ALL GROUNDING RODS SHALL BE INSTALLED WITH INSPECTION SLEEVES.
6. INSTALL AN EQUIPMENT GROUNDING CONDUCTOR IN ALL CONDUITS IN COMPLIANCE WITH THE AT&T SPECIFICATIONS AND NEC. THE EQUIPMENT GROUNDING CONDUCTORS SHALL BE BONDED AT ALL JUNCTION BOXES, PULLBOXES, DISCONNECT SWITCHES, STARTERS, AND EQUIPMENT CABINETS.

F. OTHER MATERIALS:

1. THE CONTRACTOR SHALL PROVIDE OTHER MATERIALS, THOUGH NOT SPECIFICALLY DESCRIBED, WHICH ARE REQUIRED FOR A COMPLETELY OPERATIONAL SYSTEM AND PROPER INSTALLATION OF THE WORK.
2. PROVIDE PULL BOXES AND JUNCTION BOXES WHERE SHOWN OR REQUIRED BY NEC.
3. PANELS AND LOAD CENTERS:
4. ALL PANEL DIRECTORIES SHALL BE TYPEWRITTEN.

PART 3 - EXECUTION

3.1 GENERAL:

A. ALL MATERIAL AND EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

B. EQUIPMENT SHALL BE TIGHTLY COVERED AND PROTECTED AGAINST DIRT OR WATER, AND AGAINST CHEMICAL OR MECHANICAL INJURY DURING INSTALLATION AND CONSTRUCTION PERIODS.

3.2 LABOR AND WORKMANSHIP:

A. ALL LABOR FOR THE INSTALLATION OF MATERIALS AND EQUIPMENT FURNISHED FOR THE ELECTRICAL SYSTEM SHALL BE INSTALLED BY EXPERIENCED WIREMEN, IN A NEAT AND WORKMAN-LIKE MANNER.

B. ALL ELECTRICAL EQUIPMENT SHALL BE ADJUSTED, ALIGNED AND TESTED BY THE CONTRACTOR AS REQUIRED TO PRODUCE THE INTENDED PERFORMANCE.

C. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL THOROUGHLY CLEAN ALL EXPOSED EQUIPMENT, REMOVE ALL LABELS AND ANY DEBRIS, CRATING OR CARTONS AND LEAVE THE INSTALLATION FINISHED AND READY FOR OPERATION.

3.3 COORDINATION:

A. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ELECTRICAL ITEMS WITH THE OWNER-FURNISHED EQUIPMENT DELIVERY SCHEDULE TO PREVENT UNNECESSARY DELAYS IN THE TOTAL WORK.

3.4 INSTALLATION:

A. CONDUIT:

1. ALL ELECTRICAL WIRING SHALL BE INSTALLED IN CONDUIT AS SPECIFIED. NO CONDUIT OR TUBING OF LESS THAN 3/4 INCH TRADE SIZE.
2. PROVIDE RIGID PVC SCHEDULE 80 CONDUITS FOR ALL RISERS, RMC OTHERWISE NOTED. EMT MAY BE INSTALLED FOR EXTERIOR CONDUITS WHERE NOT SUBJECT TO PHYSICAL DAMAGE.
3. INSTALL SCHEDULE 40 PVC CONDUIT WITH A MINIMUM COVER OF 24" UNDER ROADWAYS, PARKING LOTS, STREETS, AND ALLEYS. CONDUIT SHALL HAVE A MINIMUM COVER OF 18" IN ALL OTHER NON-TRAFFIC APPLICATIONS (REFER TO 2017 NEC, TABLE 300.5).
4. USE GALVANIZED FLEXIBLE STEEL CONDUIT WHERE DIRECT CONNECTION TO EQUIPMENT WITH MOVEMENT, VIBRATION, OR FOR EASE OF MAINTENANCE. USE LIQUID TIGHT, FLEXIBLE METAL CONDUIT FOR OUTDOOR APPLICATIONS. INSTALL GALVANIZED FLEXIBLE STEEL CONDUIT AT ALL POINTS OF CONNECTION TO EQUIPMENT MOUNTED ON SUPPORT TO ALLOW FOR EXPANSION AND CONTRACTION.
5. A RUN OF CONDUIT BETWEEN BOXES OR EQUIPMENT SHALL NOT CONTAIN MORE THAN THE EQUIVALENT OF THREE QUARTER-BENDS. CONDUIT BEND SHALL BE MADE WITH THE UL LISTED BENDER OR FACTORY 90 DEGREE ELBOWS MAY BE USED.
6. FIELD FABRICATED CONDUITS SHALL BE CUT SQUARE WITH A CONDUIT CUTTING TOOL AND REAMED TO PROVIDE A SMOOTH INSIDE SURFACE.
7. PROVIDE INSULATED GROUNDING BUSHING FOR ALL CONDUITS.
8. CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL CONDUITS DURING CONSTRUCTION. TEMPORARY OPENINGS IN THE CONDUIT SYSTEM SHALL BE PLUGGED OR CAPPED TO PREVENT ENTRANCE OF MOISTURE OR FOREIGN MATTER. CONTRACTOR SHALL REPLACE ANY CONDUITS CONTAINING FOREIGN MATERIALS THAT CANNOT BE REMOVED.
9. ALL CONDUITS SHALL BE SWABBED CLEAN BY PULLING AN APPROPRIATE SIZE MANDREL THROUGH THE CONDUIT BEFORE INSTALLATION OF CONDUCTORS OR CABLES. CONDUIT SHALL BE FREE OF DIRT AND DEBRIS.
10. INSTALL PULL STRINGS IN ALL CLEAN EMPTY CONDUITS. IDENTIFY PULL STRINGS AT EACH END.
11. INSTALL 2" HIGHLY VISIBLE AND DETECTABLE TAPE 12" ABOVE ALL UNDERGROUND CONDUITS AND CONDUCTORS.
12. CONDUITS SHALL BE INSTALLED IN SUCH A MANNER AS TO INSURE AGAINST COLLECTION OF TRAPPED CONDENSATION.
13. PROVIDE CORE DRILLING AS NECESSARY FOR PENETRATIONS TO ALLOW FOR RACEWAYS AND CABLES TO BE ROUTED THROUGH THE BUILDING. DO NOT PENETRATE STRUCTURAL MEMBERS. SLEEVES AND/OR PENETRATIONS IN FIRE RATED CONSTRUCTION SHALL BE EFFECTIVELY SEALED WITH FIRE RATED MATERIAL WHICH SHALL MAINTAIN THE FIRE RATING OF THE WALL OR STRUCTURE. FIRE STOPS AT FLOOR PENETRATIONS SHALL PREVENT PASSAGE OF WATER, SMOKE, FIRE, AND FUMES. ALL MATERIAL SHALL BE UL APPROVED FOR THIS PURPOSE.

B. CONDUCTORS AND CABLE:

1. ALL POWER WIRING SHALL BE COLOR CODED AS FOLLOWS:

DESCRIPTION	208/240/120 VOLT SYSTEMS
PHASE A	BLACK
PHASE B	RED
PHASE C	BLUE
NEUTRAL	WHITE
GROUNDING	GREEN

2. SPLICES SHALL BE MADE ONLY AT OUTLETS, JUNCTION BOXES, OR ACCESSIBLE RACEWAY CONDUITS APPROVED FOR THIS PURPOSE.
3. PULLING LUBRICANTS SHALL BE UL APPROVED. CONTRACTOR SHALL USE NYLON OR HEMP ROPE FOR PULLING CONDUCTOR OR CABLES INTO THE CONDUIT.
4. CABLES SHALL BE NEATLY TRAINED, WITHOUT INTERLACING, AND BE OF SUFFICIENT LENGTH IN ALL BOXES & EQUIPMENT TO PERMIT MAKING A NEAT ARRANGEMENT. CABLES SHALL BE SECURED IN A MANNER TO AVOID TENSION ON CONDUCTORS OR TERMINALS. CONDUCTORS SHALL BE PROTECTED FROM MECHANICAL INJURY AND MOISTURE. SHARP BENDS OVER CONDUIT BUSHINGS IS PROHIBITED. DAMAGED CABLES SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE.

C. DISCONNECT SWITCHES:

1. INSTALL DISCONNECT SWITCHES LEVEL AND PLUMB. CONNECT TO WIRING SYSTEM AND GROUNDING SYSTEM AS INDICATED.

D. GROUNDING:

1. ALL METALLIC PARTS OF ELECTRICAL EQUIPMENT WHICH DO NOT CARRY CURRENT SHALL BE GROUNDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE BUILDING MANUFACTURER, AT&T GROUNDING AND BONDING STANDARDS TP-76416, ND-00135, AND THE NATIONAL ELECTRICAL CODE.
2. PROVIDE ELECTRICAL GROUNDING AND BONDING SYSTEM INDICATED WITH ASSEMBLY OF MATERIALS, INCLUDING GROUNDING ELECTRODES, BONDING JUMPERS AND ADDITIONAL ACCESSORIES AS REQUIRED FOR A COMPLETE INSTALLATION.
3. ALL GROUNDING CONDUCTORS SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND WITH GRADUAL BEND AS REQUIRED. GROUNDING CONDUCTORS SHALL NOT BE LOOPED OR SHARPLY BENT. ROUTE GROUNDING CONNECTIONS AND CONDUCTORS TO GROUND IN THE SHORTEST AND STRAIGHTEST PATHS POSSIBLE TO MINIMIZE TRANSIENT VOLTAGE RISES.
4. BUILDINGS AND/OR NEW TOWERS GREATER THAN 75 FEET IN HEIGHT AND WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 AWG COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY). SEE STANDARD 6.3.2.2.
5. TIGHTEN GROUNDING AND BONDING CONNECTORS, INCLUDING SCREWS AND BOLTS, IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED TORQUE TIGHTENING VALUES FOR CONNECTORS AND BOLTS. WHERE MANUFACTURER'S TORQUING REQUIREMENTS ARE NOT AVAILABLE, TIGHTEN CONNECTIONS TO COMPLY WITH TIGHTENING TORQUE VALUES SPECIFIED IN UL TO ASSURE PERMANENT AND EFFECTIVE GROUNDING.
6. CONTRACTOR SHALL VERIFY THE LOCATIONS OF GROUNDING TIE-IN-POINTS TO THE EXISTING GROUNDING SYSTEM. ALL UNDERGROUND GROUNDING CONNECTIONS SHALL BE MADE BY THE EXOTHERMIC WELD PROCESS AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
7. ALL GROUNDING CONNECTIONS SHALL BE INSPECTED FOR TIGHTNESS. EXOTHERMIC WELDED CONNECTIONS SHALL BE APPROVED BY THE INSPECTOR HAVING JURISDICTION BEFORE BEING PERMANENTLY CONCEALED.
8. APPLY CORROSION-RESISTANT FINISH TO FIELD CONNECTIONS AND PLACES WHERE FACTORY APPLIED PROTECTIVE COATINGS HAVE BEEN DESTROYED. USE KOPR-SHIELD ANTI-OXIDATION COMPOUND ON ALL COMPRESSION GROUNDING CONNECTIONS.
9. A SEPARATE, CONTINUOUS, INSULATED EQUIPMENT GROUNDING CONDUCTOR SHALL BE INSTALLED IN ALL FEEDER AND BRANCH CIRCUITS.
10. BOND ALL INSULATED GROUNDING BUSHINGS WITH A BARE #6 AWG GROUNDING CONDUCTOR TO A GROUND BUS.
11. DIRECT BURIED GROUNDING CONDUCTORS SHALL BE INSTALLED AT A NOMINAL DEPTH OF 36" MINIMUM BELOW GRADE, OR 6" BELOW THE FROST LINE, USE THE GREATER OF THE TWO DISTANCES.
12. ALL GROUNDING CONDUCTORS EMBEDDED IN OR PENETRATING CONCRETE SHALL BE INSTALLED IN SCHEDULE 40 PVC CONDUIT.
13. THE INSTALLATION OF CHEMICAL ELECTROLYTIC GROUNDING SYSTEM IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. REMOVE SEALING TAPE FROM LEACHING AND BREATHER HOLES. INSTALL PROTECTIVE BOX FLUSH WITH GRADE.
14. DRIVE GROUND RODS UNTIL TOPS ARE A MINIMUM DISTANCE OF 36" DEPTH OR 6" BELOW FROST LINE, USING THE GREATER OF THE TWO DISTANCES.
15. IF COAX ON THE ICE BRIDGE IS MORE THAN 6 FT. FROM THE GROUNDING BAR AT THE BASE OF THE TOWER, A SECOND GROUNDING BAR WILL BE NEEDED AT THE END OF THE ICE BRIDGE, TO GROUND THE COAX CABLE GROUNDING KITS AND IN-LINE ARRESTORS.
16. CONTRACTOR SHALL REPAIR, AND/OR REPLACE, EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTORS EXPENSE.

3.5 ACCEPTANCE TESTING:

A. CERTIFIED PERSONNEL USING CERTIFIED EQUIPMENT SHALL PERFORM REQUIRED TESTS AND SUBMIT WRITTEN TEST REPORTS UPON COMPLETION.

B. WHEN MATERIAL AND/OR WORKMANSHIP IS FOUND NOT TO COMPLY WITH THE SPECIFIED REQUIREMENTS, THE NON-COMPLYING ITEMS SHALL BE REMOVED FROM THE PROJECT SITE AND REPLACED WITH ITEMS COMPLYING WITH THE SPECIFIED REQUIREMENTS PROMPTLY AFTER RECEIPT OF NOTICE FOR NON-COMPLIANCE.

C. TEST PROCEDURES:

1. ALL FEEDERS SHALL HAVE INSULATION TESTED AFTER INSTALLATION, BEFORE CONNECTION TO DEVICES. THE CONDUCTORS SHALL TEST FREE FROM SHORT CIRCUITS AND GROUNDS. TESTING SHALL BE FOR ONE MINUTE USING 1000V DC. PROVIDE WRITTEN DOCUMENTATION FOR ALL TEST RESULTS.
2. PRIOR TO ENERGIZING CIRCUITRY, TEST WIRING DEVICES FOR ELECTRICAL CONTINUITY AND PROPER POLARITY CONNECTIONS.
3. MEASURE AND RECORD VOLTAGES BETWEEN PHASES AND BETWEEN PHASE CONDUCTORS AND NEUTRALS. SUBMIT A REPORT OF MAXIMUM AND MINIMUM VOLTAGES.
4. PERFORM GROUNDING TEST TO MEASURE GROUNDING RESISTANCE OF GROUNDING SYSTEM USING THE IEEE STANDARD 3-POINT "FALL-OF-POTENTIAL" METHOD. PROVIDE PLOTTED TEST VALUES AND LOCATION SKETCH. NOTIFY THE ENGINEER IMMEDIATELY IF MEASURED VALUE IS OVER 5 OHMS.

at&t
7150 STANDARD DR
SUITE A
HANOVER, MD 21076

Jacobs.
Challenging today.
Reinventing tomorrow.
Jacobs Telecommunications, Inc.
7150 STANDARD DR. SUITE B
HANOVER, MD 21076
443.230.4400x113

STATE OF MARYLAND
WENSEN JIANG
55911
PROFESSIONAL ENGINEER
5/14/2020

CERTIFICATION STATEMENT:
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. 55911 EXP.: 04/14/22

APPROVALS

LANDLORD ______
LEASING ______
R.F. ______
ZONING ______
CONSTRUCTION ______
A & E ______

PROJECT NO:	EP4TURWL
DRAWN BY:	RM
CHECKED BY:	LW

SUBMITTALS

0	05/14/20	ISSUED

FA# 10096268
USID# 16252
STRATHMOORE

7101 WISCONSIN AVENUE
BETHESDA, MD 20814

GENERAL NOTES II

GN-2

ANTENNA MOUNTING

1. DESIGN AND CONSTRUCTION OF ANTENNA SUPPORTS SHALL CONFORM TO CURRENT ANSI/TIA-222 OR APPLICABLE LOCAL CODES.
2. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS NOTED OTHERWISE.
3. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS NOTED OTHERWISE.
4. DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY COLD GALVANIZING IN ACCORDANCE WITH ASTM A780.
5. ALL ANTENNA MOUNTS SHALL BE INSTALLED WITH LOCK NUTS, DOUBLE NUTS AND SHALL BE TORQUED TO MANUFACTURER'S RECOMMENDATIONS.
6. CONTRACTOR SHALL INSTALL ANTENNA PER MANUFACTURER'S RECOMMENDATION FOR INSTALLATION AND GROUNDING.
7. ALL UNUSED PORTS ON ANY ANTENNAS SHALL BE TERMINATED WITH A 50-OHM LOAD TO ENSURE ANTENNAS PERFORM AS DESIGNED.
8. PRIOR TO SETTING ANTENNA AZIMUTHS AND DOWNTILTS, ANTENNA CONTRACTOR SHALL CHECK THE ANTENNA MOUNT FOR TIGHTNESS AND ENSURE THAT THEY ARE PLUMB. ANTENNA AZIMUTHS SHALL BE SET FROM TRUE NORTH AND BE ORIENTED WITHIN +/- 5% AS DEFINED BY THE RFDS. ANTENNA DOWNTILTS SHALL BE WITHIN +/- 0.5% AS DEFINED BY THE RFDS. REFER TO ND-00246.
9. JUMPERS FROM THE TMA'S MUST TERMINATE TO OPPOSITE POLARIZATION'S IN EACH SECTOR.
10. CONTRACTOR SHALL RECORD THE SERIAL #, SECTOR, AND POSITION OF EACH ACTUATOR INSTALLED AT THE ANTENNAS AND PROVIDE THE INFORMATION TO AT&T.
11. TMA'S SHALL BE MOUNTED ON PIPE DIRECTLY BEHIND ANTENNAS AS CLOSE TO ANTENNA AS FEASIBLE IN A VERTICAL POSITION.

TORQUE REQUIREMENTS

12. ALL RF CONNECTIONS SHALL BE TIGHTENED BY A TORQUE WRENCH.
13. ALL RF CONNECTIONS, GROUNDING HARDWARE AND ANTENNA HARDWARE SHALL HAVE A TORQUE MARK INSTALLED IN A CONTINUOUS STRAIGHT LINE FROM BOTH SIDES OF THE CONNECTION.
    A. RF CONNECTION BOTH SIDES OF THE CONNECTOR.
    B. GROUNDING AND ANTENNA HARDWARE ON THE NUT SIDE STARTING FROM THE THREADS TO THE SOLID SURFACE. EXAMPLE OF SOLID SURFACE: GROUND BAR, ANTENNA BRACKET METAL.
    C. ALL 8M ANTENNA HARDWARE SHALL BE TIGHTENED TO 9 LB-FT (12 NM).
14. ALL 12M ANTENNA HARDWARE SHALL BE TIGHTENED TO 43 LB-FT (58 NM).
15. ALL GROUNDING HARDWARE SHALL BE TIGHTENED UNTIL THE LOCK WASHER COLLAPSES AND THE GROUNDING HARDWARE IS NO LONGER LOOSE.
16. ALL DIN TYPE CONNECTIONS SHALL BE TIGHTENED TO 18-22 LB-FT (24.4 - 29.8 NM).
17. ALL N TYPE CONNECTIONS SHALL BE TIGHTENED TO 15-20 LB-IN (1.7 - 2.3 NM).

FIBER & POWER CABLE MOUNTING

18. THE FIBER OPTIC TRUNK CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY. WHEN INSTALLING FIBER OPTIC TRUNK CABLES INTO A CABLE TRAY SYSTEM, THEY SHALL BE INSTALLED INTO AN INTER DUCT AND A PARTITION BARRIER SHALL BE INSTALLED BETWEEN THE 600 VOLT CABLES AND THE INTER DUCT IN ORDER TO SEGREGATE CABLE TYPES. OPTIC FIBER TRUNK CABLES SHALL HAVE APPROVED CABLE RESTRAINTS EVERY (60) SIXTY FEET AND SECURELY FASTENED TO THE CABLE TRAY SYSTEM. NFPA 70 (NEC) ARTICLE 770 RULES SHALL APPLY.
19. THE TYPE TC-ER CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY AND SHALL BE SECURED AT INTERVALS NOT EXCEEDING (6) SIX FEET. AN EXCEPTION; WHERE TYPE TC-ER CABLES ARE NOT SUBJECT TO PHYSICAL DAMAGE, CABLES SHALL BE PERMITTED TO MAKE A TRANSITION BETWEEN CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY WHICH ARE SERVING UTILIZATION EQUIPMENT OR DEVICES, A DISTANCE (6) SIX FEET SHALL NOT BE EXCEEDED WITHOUT CONTINUOUS SUPPORTING. NFPA 70 (NEC) ARTICLES 336 AND 392 RULES SHALL APPLY.
20. WHEN INSTALLING OPTIC FIBER TRUNK CABLES OR TYPE TC-ER CABLES INTO CONDUITS, NFPA 70 (NEC) ARTICLE 300 RULES SHALL APPLY.

COAXIAL CABLE NOTES

21. TYPES AND SIZES OF THE ANTENNA CABLE ARE BASED ON ESTIMATED LENGTHS. PRIOR TO ORDERING CABLE, CONTRACTOR SHALL VERIFY ACTUAL LENGTH BASED ON CONSTRUCTION LAYOUT AND NOTIFY THE PROJECT MANAGER IF ACTUAL LENGTHS EXCEED ESTIMATED LENGTHS.
22. CONTRACTOR SHALL VERIFY THE DOWN-TILT OF EACH ANTENNA WITH A DIGITAL LEVEL.
23. CONTRACTOR SHALL CONFIRM COAX COLOR CODING PRIOR TO CONSTRUCTION. REFER TO "ANTENNA SYSTEM LABELING STANDARD" ND-00027 LATEST VERSION.
24. ALL JUMPERS TO THE ANTENNAS FROM THE MAIN TRANSMISSION LINE SHALL BE 1/2" DIA. LDF AND SHALL NOT EXCEED 6'-0".
25. ALL COAXIAL CABLE SHALL BE SECURED TO THE DESIGNED SUPPORT STRUCTURE, IN AN APPROVED MANNER, AT DISTANCES NOT TO EXCEED 4'-0" O.C.
26. CONTRACTOR SHALL FOLLOW ALL MANUFACTURER'S RECOMMENDATIONS REGARDING BOTH THE INSTALLATION AND GROUNDING OF ALL COAXIAL CABLES, CONNECTORS, ANTENNAS, AND ALL OTHER EQUIPMENT.
27. CONTRACTOR SHALL WEATHERPROOF ALL ANTENNA CONNECTORS WITH SELF AMALGAMATING TAPE. WEATHERPROOFING SHALL BE COMPLETED IN STRICT ACCORDANCE WITH AT&T STANDARDS.
28. CONTRACTOR SHALL GROUND ALL EQUIPMENT. INCLUDING ANTENNAS, RET MOTORS, TMA'S, COAX CABLES, AND RET CONTROL CABLES AS A COMPLETE SYSTEM. GROUNDING SHALL BE EXECUTED BY QUALIFIED WIREMEN IN COMPLIANCE WITH MANUFACTURER'S SPECIFICATION AND RECOMMENDATION.
29. CONTRACTOR SHALL PROVIDE STRAIN-RELIEF AND CABLE SUPPORTS FOR ALL CABLE ASSEMBLIES, COAX CABLES, AND RET CONTROL CABLES. CABLE STRAIN-RELIEFS AND CABLE SUPPORTS SHALL BE APPROVED FOR THE PURPOSE. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
30. CONTRACTOR TO VERIFY THAT EXISTING COAX HANGERS ARE STACKABLE SNAP IN HANGERS. IF EXISTING HANGERS ARE NOT STACKABLE SNAP IN HANGERS THE CONTRACTOR SHALL REPLACE EXISTING HANGERS WITH NEW SNAP IN HANGERS IF APPLICABLE.

GENERAL CABLE AND EQUIPMENT NOTES

31. CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY ANTENNA, TMAS, DIPLEXERS, AND COAX CONFIGURATION, MAKE AND MODELS PRIOR TO INSTALLATION.
32. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S RECOMMENDATIONS.
33. CONTRACTOR SHALL REFERENCE THE TOWER STRUCTURAL ANALYSIS/DESIGN DRAWINGS FOR DIRECTIONS ON CABLE DISTRIBUTION/ROUTING.
34. ALL OUTDOOR RF CONNECTORS/CONNECTIONS SHALL BE WEATHERPROOFED, EXCEPT THE RET CONNECTORS, USING BUTYL TAPE AFTER INSTALLATION AND FINAL CONNECTIONS ARE MADE. BUTYL TAPE SHALL HAVE A MINIMUM OF ONE-HALF TAPE WIDTH OVERLAP ON EACH TURN AND EACH LAYER SHALL BE WRAPPED THREE TIMES. WEATHERPROOFING SHALL BE SMOOTH WITHOUT BUCKLING. BUTYL BLEEDING IS NOT ALLOWED.
35. IF REQUIRED TO PAINT ANTENNAS AND/OR COAX:
    A. TEMPERATURE SHALL BE ABOVE 50° F.
    B. PAINT COLOR MUST BE APPROVED BY BUILDING OWNER/LANDLORD.
    C. FOR REGULATED TOWERS, FAA/FCC APPROVED PAINT IS REQUIRED.
    D. DO NOT PAINT OVER COLOR CODING OR ON EQUIPMENT MODEL NUMBERS.
36. ALL CABLES SHALL BE GROUNDED WITH COAXIAL CABLE GROUND KITS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.
    A. GROUNDING AT THE ANTENNA LEVEL.
    B. GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200'-0", ADDITIONAL CABLE GROUNDING REQUIRED.
    C. GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
    D. GROUNDING OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
    E. GROUNDING INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.
37. ALL PROPOSED GROUND BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUND.
38. BAR DOWNLEADS A MINIMUM DISTANCE OF 4'-0" BELOW GROUND BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.
39. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ANTENNA AND THE COAX CONFIGURATION IS THE CORRECT MAKE AND MODELS, PRIOR TO INSTALLATION.
40. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S SPECIFICATION & RECOMMENDATIONS.
41. ANTENNA CONTRACTOR SHALL FURNISH AND INSTALL A 12'-0" T-BOOM SECTOR ANTENNA MOUNT, IF APPLICABLE, INCLUDING ALL HARDWARE.

GROUNDING NOTES

42. GROUNDING IS SHOWN DIAGRAMMATICALLY ONLY.
43. CONTRACTOR SHALL GROUND ALL EQUIPMENT AS A COMPLETE SYSTEM. GROUNDING SHALL BE IN COMPLIANCE WITH NEC SECTION 250 AND AT&T GROUNDING AND BONDING REQUIREMENTS (ATT-TP-76416) AND MANUFACTURER'S SPECIFICATIONS.
44. ALL GROUND CONDUCTORS SHALL BE COPPER; NO ALUMINUM CONDUCTORS SHALL BE USED.
45. ALL CABLES SHALL BE GROUNDED WITH COAXIAL CABLE GROUNDING KITS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.
    A. GROUNDING AT THE ANTENNA LEVEL.
    B. GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200', ADDITIONAL CABLE GROUNDING REQUIRED.
    C. GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
    D. GROUNDING OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
    E. GROUNDING INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.
46. ALL PROPOSED GROUNDING BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUNDING BAR DOWNLEADS A MINIMUM DISTANCE OF 4'-0" BELOW GROUNDING BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.

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

EXOTHERMIC CONNECTION
MECHANICAL CONNECTION
CHEMICAL ELECTROLYTIC GROUNDING SYSTEM
TEST CHEMICAL ELECTROLYTIC GROUNDING SYSTEM (T)
EXOTHERMIC WITH INSPECTION SLEEVE
GROUNDING BAR
SHELTER GROUNDING BAR
GROUND ROD
TEST GROUND ROD WITH INSPECTION SLEEVE (T)
SINGLE POLE SWITCH
DUPLEX RECEPTACLE
DUPLEX GFCI RECEPTACLE (GFCI)
FLUORESCENT LIGHTING FIXTURE (F)
(2) TWO LAMPS 48-T8
EXISTING SMOKE DETECTION (DC) (SD)
EXISTING EMERGENCY LIGHTING (DC)
SECURITY LIGHT W/PHOTOCELL LITHONIA ALXW LED-1-25A400/51K-SR4-120-PE-DDBTXD
EXISTING UTILITY POLE
EXISTING CHAIN LINK FENCE
EXISTING WOOD/WROUGHT IRON FENCE
EXISTING WALL STRUCTURE
LEASE AREA
PROPERTY LINE (PL)
SETBACKS
PROPOSED/EXISTING ICE BRIDGE
PROPOSED/EXISTING CABLE TRAY
EXISTING WATER LINE (W)
PROPOSED UNDERGROUND POWER (P)
PROPOSED UNDERGROUND TELCO (T)
PROPOSED OVERHEAD UTILITIES (O/H)

CALLOUT REFERENCE (X)
REVISION REFERENCE (1)
WORKPOINT (W.P.)
SECTION REFERENCE (XX / X-X)
DETAIL REFERENCE (XX / X-X)
ELEVATION REFERENCE (X / X)

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GENERAL NOTES III

GN-3