

App No:

2021111599

Revisions received 12.27.21 - JE

Application General Information

Applicant Name	Network Building and Consultin	Updated	11/3/2021
Application Type	Minor Modification	Ann. Plan?	Yes
Carrier	Verizon Wireless	Will site be used to support government telecommunications facilities or other equipment for government use?	No
Solution Type	Small Cell		
Existing	Existing	Gvt. Use Desc.	

Application Description

Project consists of removing (1) existing antenna and (1) existing remote radio head and installing (1) new proposed antenna as well as (1) new proposed remote radio head

Site Information

Site Id	692	Zoning	CRT-3.0 C-3.0 R-2.5 H-120
Structure Type	Building	Latitude	39.0534
Street Address	6015 Montrose Rd	Longitude	-77.1218
County Site Name	Rockville 12	Ground Elevation	370
Carrier Site Name	Rockville 12 ODAS	City	Rockville
Site Owner	Verizon Maryland Merge Co	Lease Status	Leased
Structure Owner	Verizon Maryland Merge Co	Does the structure require an antenna structure registration under FCC Title 47	No
Existing Structure Height	34.3	Distance to Residential Property (New, Replacement, Colocation Only)	
Provide the proposed height of the replacement structure without any antenna (New, Replacement Apps Only)		Distance to Commercial Property (New, Replacement, Colocation Only)	

Justification of why this site was selected:

N/A Existing site

Nearby Sites (New, Replacement Apps Only):

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

App No:

2021111599

6409 Questions

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

No

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?

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?

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?

Will the proposed installation require more the standard number of new equipment cabinets for the technology involved, but not to exceed four cabinets?YN

Will the proposed installation increase the height of the structure by: (1) more than 10% or (2) more than 10 feet, whichever is greater?

Does the structure or current installation have concealment elements/measures?

Yes

Will the proposed installation require excavation or expansion outside the current boundaries of the site?

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

Proposed antenna will be installed inside existing stealth concealment

Small Wireless Facility Informatio

Small Wireless Facility Questions

Small Wireless Facility?

Yes

Is the structure 10% taller than adjacent structures?

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

1.715

Please list adjacent structure heights

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

1

Tribal Lands?

No

ROW Information

PROW?

No

Pole Number

ROW owner

ROW width

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Antenna Information

Antenna Compliance

Compliance Desc

Antenna Location

Antenna Loc. Desc.

Env. Assessment

Cat. Excluded?

Routine Env. Evaluation

Antenna Model

Frequency

RAD Center Max ERP Antenna Dimensions
19.5"/> Quantity

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SAMSUNG

102 AT1K04

Product Specification

Specifies hardware configuration, functions, specifications, components, ports, and LED information for the radio units.

Radio Access Network

Document Version 2.0
November 2020

Document Number: 2600-00R405GA2

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This manual should be read and used as a guideline for properly installing and/or operating the product.

This manual may be changed for system improvement, standardization and other technical reasons without prior notice.

Updated manuals are available at:

<https://systems.samsungwireless.com/>

For questions on the manuals or their content, contact

[NetSys Tech Writer@sea.samsung.com](mailto:NetSys_Tech_Writer@sea.samsung.com)

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Preface

This document describes the AT1K04 series of Access Unit (AU) in a 5G network.

The document provides information that is useful to network operators during the installation, operation, and management cycles. It includes information such as the radio unit functions, hardware configuration, ports, and LED information.



Some hardware configurations are not supported by all software releases or approved for all markets.

Conventions in this Document

Samsung Networks product documentation uses the following conventions.

Symbols

Symbol	Description
	Indicates a task.
	Indicates a shortcut or an alternative method.
	Provides additional information.
	Provides information or instructions that you should follow to avoid service failure or damage to equipment.
	Provides information or instructions that you should follow to avoid personal injury or fatality.
	Provides antistatic precautions that you should observe.

Menu Commands

menu | **command**

This indicates that you must select a command on a menu, where **menu** is the name of the menu, and **command** is the name of the command on that menu.

File Names and Paths

These are indicated by a bold typeface. For example:

Copy **filename.ext** into the **/home/folder1/folder2/bin/** folder.

User Input and Console Screen Output Text

- The input and output text is presented in the Courier New font. For example, context <designated epc-context-name>
- The CLI command is presented in bold capital letters and Courier New font. For example, Type the **RTRV-NE-STS** command in the input field.
- The YANG object is presented in the small letters and boldface. For example, **eutran-cell-conf-idle**

New and Changed Information

This section describes information that has been added/changed since the previous publication of this manual.

- 'Chapter 1 Introduction' is added.
- In Chapter 4, specifications of Input current and Power consumption are modified.

Revision History

The following table lists all versions of this document.

Document Version	Publication Date	Remarks
1.0	October 2020	First version
2.0	November 2020	Specifications are modified

Organization of This Document

Section	Title	Description
Chapter 1	Introduction	Introduces this manual.
Chapter 2	AU Overview	Provides the hardware overview, functional description and general specifications.
Chapter 3	Functional Description	Describes function of this product in detail.
Chapter 4	Specifications	Describes specifications of this product.
Chapter 5	External Interface	Describes external interface of this product in detail.
Appendix	Acronyms	Describes the acronyms used in this manual.

Related Documentation

- 310 AU Installation Manual
- 101 5G NR gNB System Description

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Personal and Product Safety

This product safety information includes European directives, which you must follow. If these do not apply in your country, please follow similar directives that do apply in your country.

Electrical

All structural parts are grounded and all input and outputs have built-in isolation from the network. All input and output ports that connect to external power sources are designed to meet relevant national safety requirements.

The product contains hazardous energy levels as defined by UL 62368-1. Care must be taken when maintaining this equipment as injury to personnel or damage to the equipment could result from mistakes. Maintenance should only be carried out by trained and competent engineers who are familiar with the relevant procedures and instructions.

Lasers

The product is fitted with optic modules rated as Class 1 radiation-emitting devices under UL 60825-1. During installation, operation, and maintenance, never look into the end of an optical fiber directly or by reflection either with the naked eye or through an optical instrument. Do not operate equipment with exposed fiber connectors-cover these with fiber cables or blanking caps. Do not remove equipment covers during operation unless requested to do so in the documentation. Carry out normal safety precautions when trimming fibers during installation.

Manual Handling

Care should be taken when handling equipment. Give due consideration to the weight of the equipment, the physical capability of the individual(s) handling the equipment, and movements such as twisting, bending and stooping, which could lead to skeletal and muscular injuries.

Installation

Installation must be carried out by trained and competent engineers only. All relevant safety measures should be taken to ensure equipment is not connected to live power and transmission sources during installation. Equipment must be correctly installed in order to meet the relevant safety standards and approval conditions.

Each power feed to the unit requires a separate fused feed from the provided power supply. The cable between the power distribution point and the installed equipment must be 14 AWG or greater.

Rack-mountable equipment must be placed in a standard 19-inch rack and secured with the appropriate fixings as detailed in the installation manual.

Maintenance

Maintenance must only be carried out by a suitably trained and competent technician. All safety instructions must be carefully observed at all times. Equipment covers should not be removed while live power and transmission is connected unless in a controlled environment by trained technicians.

Fire

To protect against potential fire due to current overload, the equipment is fused.

Environment

The product must be operated in an environment with the specified relative humidity and ambient temperature ranges.

Keep all liquids away from the equipment as accidental spillage can cause severe damage.

Cooling

Natural convection cooling.

Anti-Static Precautions

The circuit boards and other modules in the product are sensitive to and easily damaged by static electricity. If any card or sub-assembly is removed from the unit, the following anti-static precautions must be observed at all times:

- Service personnel must wear anti-static wrist straps.
- Circuit boards and sub-assemblies must be placed on ground conductive mats or in conductive bags.
- All tools must be discharged to ground before use.
- The anti-static wrist strap and cord must be checked at regular intervals for their suitability for use.

Grounding

To comply with UL 62368-1, the equipment must be connected to a safety grounding point via a permanent link. Grounding points are located on the product for this purpose. Always connect the ground cable before fitting other cables. The product must remain grounded continuously unless all connections to the power supply and data network are all removed.

If equipment is grounded through a cabinet or rack, make sure it is done so properly according to the installation instructions.

Power Supply Connection

Power connections and installation of associated wiring must be carried out by a suitably qualified technician.

Only devices that comply with all relevant national safety requirements should be connected to the unit's power supply inlets. Other usage will invalidate any approval given to this equipment.

Connection of this equipment to devices that are not marked with all relevant national safety requirements may produce hazardous conditions on the network.

When the power supply is obtained by a rectifier/safety isolation transformer, the supply must meet the requirements of UL 62368-1 providing double/reinforced insulation between hazardous voltages and SELV/TNV circuits. Any battery must be separated from hazardous voltages by reinforced insulation.

Indirect Connection

Before indirectly connecting any equipment to another device through a shared power supply, ALWAYS seek advice from a competent engineer.

Devices that are not marked according to the relevant national safety standards may produce hazardous conditions on the network.

Product Disposal

To reduce the environmental impact of products, Samsung has joined WEEE compliance activities.

The WEEE symbol on the product indicates that the product is covered by the European Directive 2002/96/CE for the disposal of Waste Electrical and Electronic Equipment (WEEE). This means that the product should be disposed of separately from the municipal waste stream via designated collection facilities appointed by the government or the local authorities. This will help prevent potential negative consequences for the environment and human health. Please check the terms and conditions of the purchase contract for information about correct disposal.

Battery Disposal

The product contains a battery on the processor card. The battery should not be disposed of with other household waste. Where marked, the chemical symbols Hg, Cd or Pb indicate that the battery contains mercury, cadmium or lead above the reference levels in EC Directive 2006/66. The battery incorporated in this product is not user replaceable. For information on its replacement, please contact your service provider. Do not attempt to remove the battery or dispose it in a fire. Do not disassemble, crush, or puncture the battery.

End of life recycling materials information is available from Samsung.

California USA Only

This Perchlorate warning applies only to primary CR (Manganese Dioxide)
Lithium coin cells in the product sold or distributed ONLY in California USA

‘Perchlorate Material-special handling may apply, Refer to
www.dtsc.ca.gov/hazardouswaste/perchlorate.’

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Equipment Markings



This marking on the product, accessories or literature indicates that the product and its electronic accessories (e.g. charger, headset, USB cable) should not be disposed of with other household waste at the end of their working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources.

Household users should contact either the retailer where they purchased this product, or their local government office, for details of where and how they can take these items for environmentally safe recycling.

Business users should contact their supplier and check the terms and conditions of the purchase contract. This product and its electronic accessories should not be mixed with other commercial wastes for disposal.



Correct disposal of batteries in this product (Applicable in countries with separate collection systems.)

The marking on the battery, manual or packaging indicates that the battery in this product should not be disposed of with other household waste. Where marked, the chemical symbols Hg, Cd or Pb indicate that the battery contains mercury, cadmium or lead above the reference levels in EC Directive 2006/66.

The battery incorporated in this product is not user replaceable. For information on its replacement, please contact your service provider. Do not attempt to remove the battery or dispose it in a fire. Do not disassemble, crush, or puncture the battery. If you intend to discard the product, the waste collection site will take the appropriate measures for the recycling and treatment of the product, including the battery.



Hot surface warning

Allow to cool before servicing.

Do not touch before cooling.

Notice! Be careful not to touch due to high temperature.

The system must be installed in a restricted area, and make sure the work is done by personnel properly trained for the job.



Protective earth

AU should be grounded.

Chapter 1 Introduction

This document introduces an Access Unit (AU) which is integrated with a Digital Unit (DU), Radio Unit (RU), and antenna.

In addition, this document describes the product components, serving as the reference for the installation and O & M. It specifies hardware configuration, functions, specifications, component's ports, and LED information of AU products.

The document is divided into five chapters.

- Introduction
This chapter is an introduction of the document.
- AU Overview
This chapter describes hardware overview and appearance of the AU products.
- Functional Description
This chapter describes functional description such as clock and cooling for the AU products.
- Specifications
This chapter describes specifications of the AU products.
- External Interface
This chapter describes hardware components of AU in detail, such as appearance of external interface, and detail information of ports and LED of the AU products.
- Acronyms
This appendix lists acronyms used in this document.

Chapter 2 AU Overview

An Access Unit (AU) is integrated with a Digital Unit (DU), Radio Unit (RU), and antenna. It consists of a digital block that supports the function split option two and a radio block that transmits and receives the Radio Frequency (RF) signals. The digital block consists of a main processor and modem block. The radio block consists of a DAC/ADC, Radio Frequency integrated (RFIC), and 4T/4R antenna.

The following table outlines the name and description of the AU.

Table 1. Name and Description of Units

Model Name	Description
AT1K04	28 GHz 5G AU

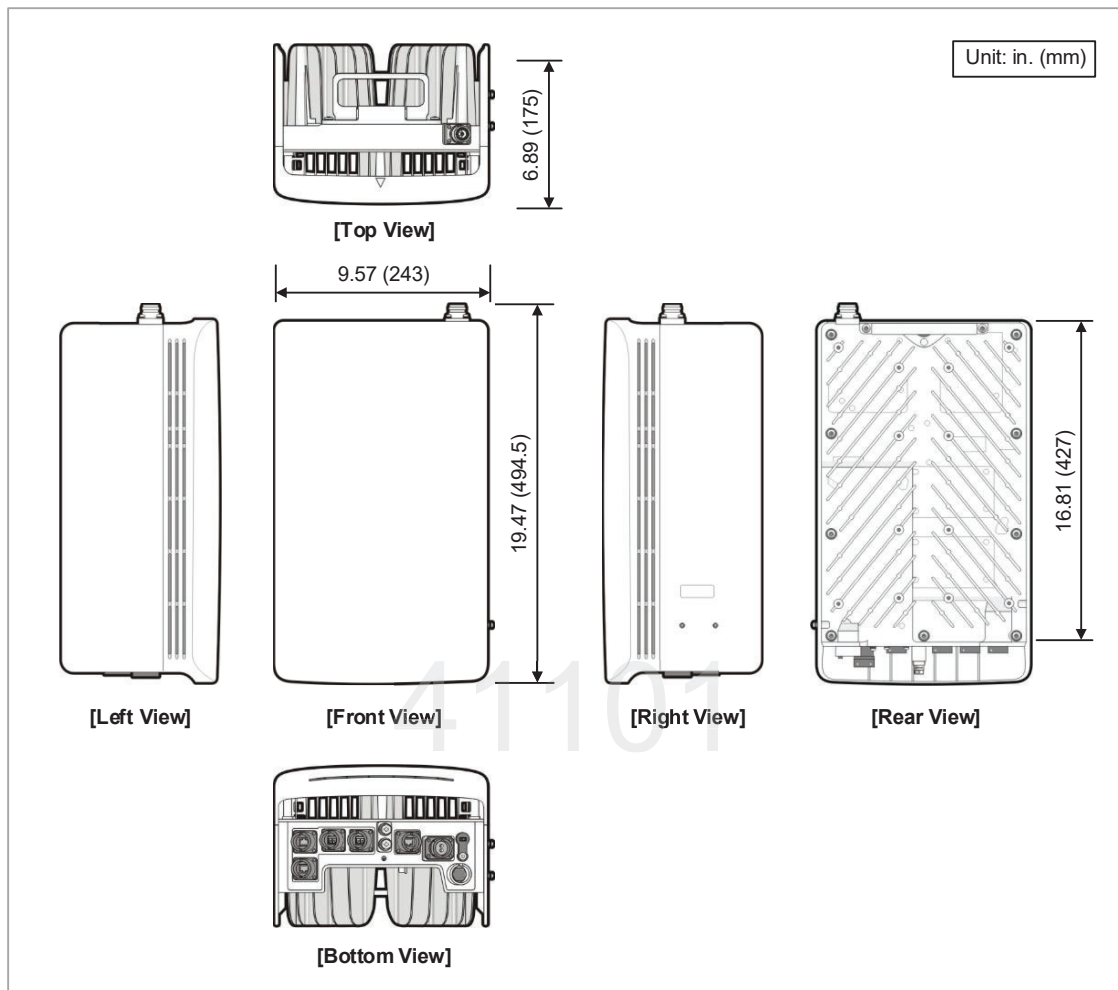


Some hardware configurations are not supported by all the software releases or approved for all the markets.

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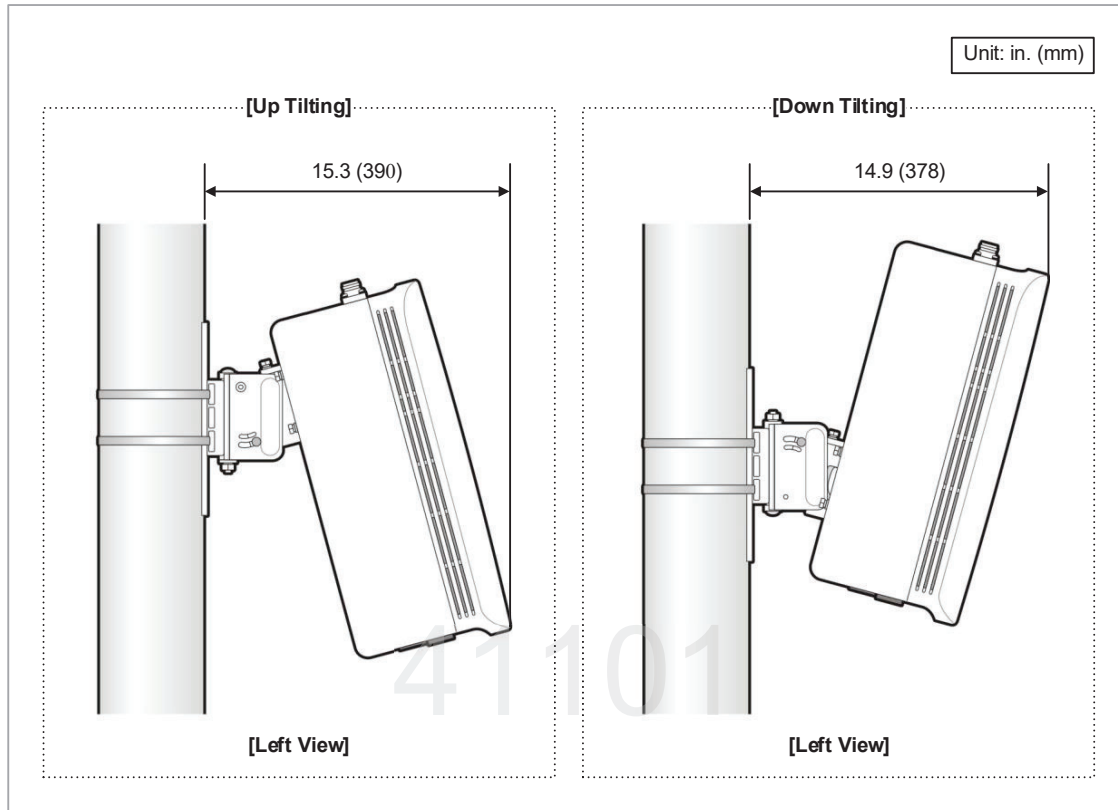
The following figures depict the physical views of the AT1K04.

Figure 1. AT1K04 Appearance



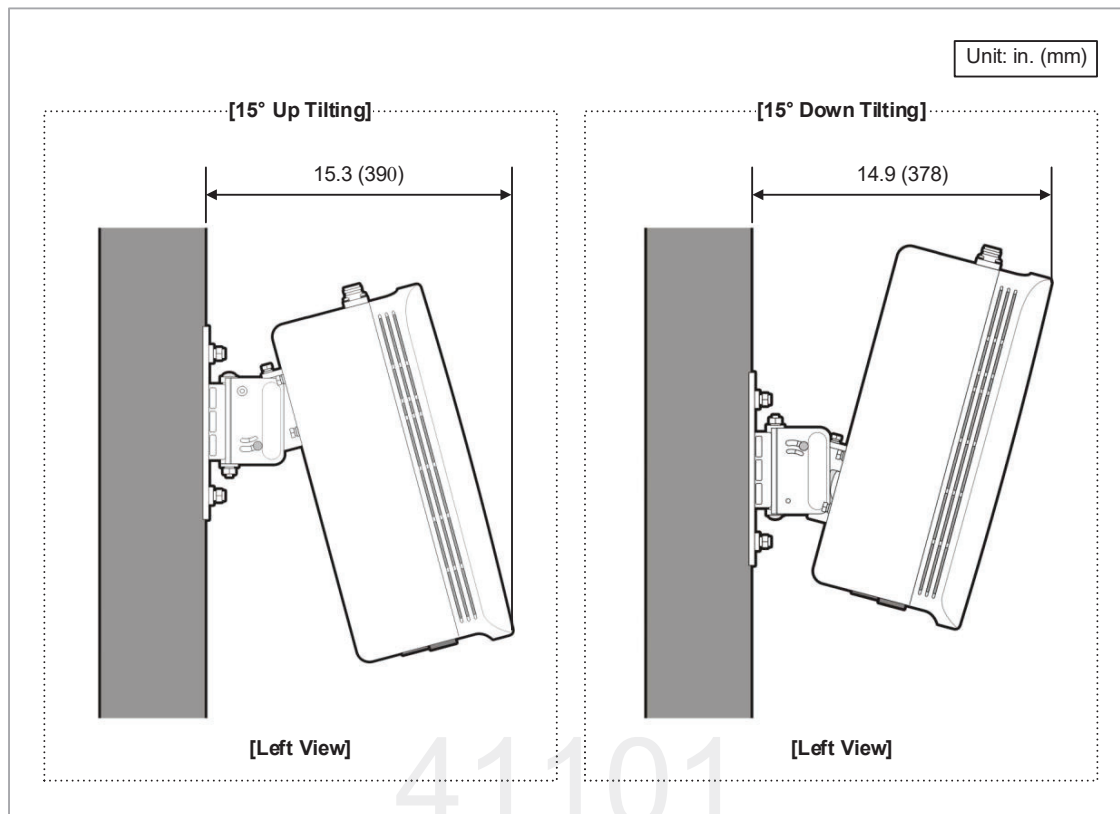
The AU can be mounted on a wall or pole as displayed in the following installation scenario.

Figure 2. Pole Type Installation



The above installation scenario might be different depending on the system configuration. For more information, refer to *310 AU Installation Manual*.

Figure 3. Wall Type Installation

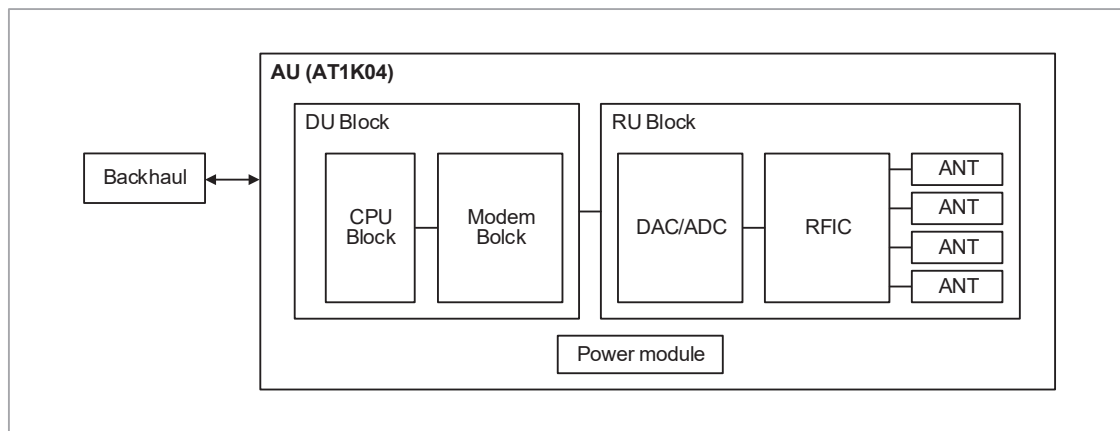


The above installation scenario might be different depending on the system configuration. For more information, refer to *310 AU Installation Manual*.

Chapter 3 Functional Description

The following figure displays the block diagram of AU.

Figure 4. Block Diagram of AU (AT1K04)



The 5G AU consists of the DU block and the RU block, and is powered by the external power.

The DU block consists of the CPU block and the modem block. The DU block supports the backhaul connection with the CU, operation and management of the AU, and processes the function of the Radio Link Control (RLC), Media Access Control (MAC), and the physical layer.

The RU block consists of the digital/analog converter, RFIC, and antenna. It processes the DAC/ADC, UP/Down conversion, and amplifier, filtering, beamforming functions of the transmitted/received signal.

Clock

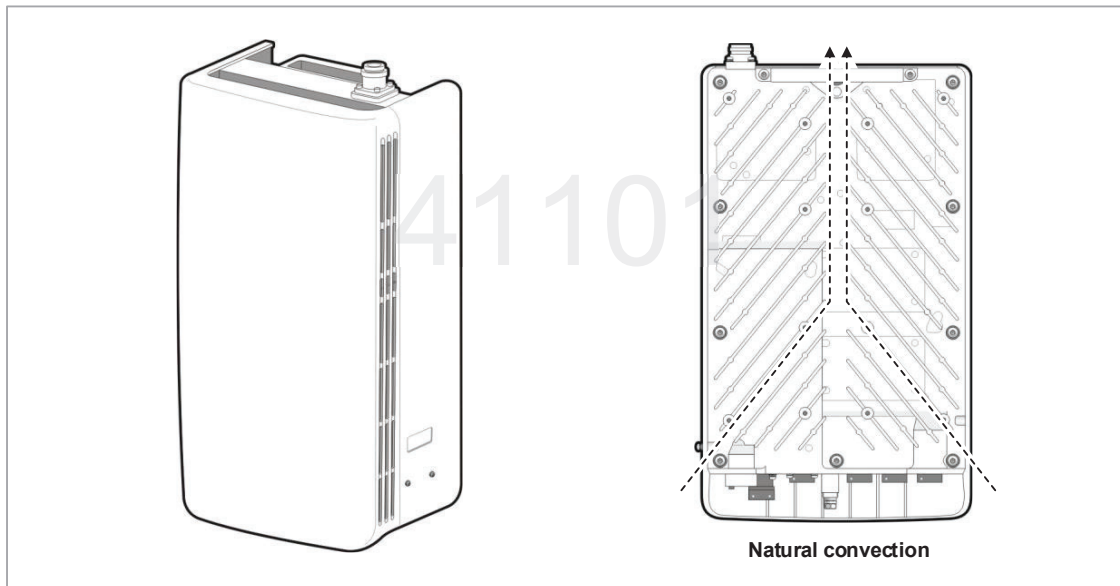
The AU uses the GNSS for synchronization. The Multi-Reference Synchronization Block (MRSB) of the AU is the GNSS/IEEE1588v2 receiver module that receives the synchronization signal from the GPS and backhaul. After receiving the signal, the MRSB generates and distributes the clock.

If the AU is unable to receive the GNSS signal due to a fault condition, it performs the holdover function to provide the existing normal clock for a specific period.

Cooling

The AU uses a natural convection cooling method without using a fan. The following figure displays the cooling structure of the AU.

Figure 5. Cooling Structure of AU



Chapter 4 Specifications

The following table displays the main specifications of the AU.

Table 2. Specifications (AT1K04)

Item		Description
Air Technology		5G NR
RF Chain		4Tx/4Rx
Operating Frequency		27.5 to 28.35 GHz
IBW/OBW		850/800 MHz
Channel Bandwidth		100 MHz, 50/100 MHz mixed
Capacity		800 M 4T4R, Max 8CC
MIMO Layer		DL 4 Layers/UL 2 Layers
Antenna Array Configuration		1024 AE (4T4R)
Antenna Array Element		256 AE (16 H 16 V)/path, 1024 AE/unit
Antenna Array Gain		28 dBi/path
Modulation (DL/UL)		64/64QAM
RF Output Power		26 dBm/path, 32 dBm/unit
EIRP		54 dBm/path, 60 dBm/unit
Dimension		243 (W) × 427 (H) × 175 mm (D), 18.2 L
Weight		14.5 kg
Input Voltage		-48 V DC or 100 to 240 V AC
Input Current		4.3 A (AC), 8.3 A (DC)
Operating Temperature		-40 to 55 °C (with solar load, wind speed 1.5 m/s)
Operating Humidity		5 to 100 % RH (Condensing, not to exceed 30 g/m ³ absolute humidity)
Altitude		-60 m to 1,800 m
Earthquake		Telcordia GR-63-CORE, Section 4.4.1 Earthquake (Zone 4)
Vibration ^{a)}		Telcordia GR-63-CORE
Wind Resistance		Telcordia GR-487-CORE
Noise (sound pressure level) ^{a)}		45 dBA or less
Ingress Protection Rating		• IEC 60529 • IP65
EMC		FCC part 15
Safety		UL 62368-1
RF		FCC Part 30
EVM		Support (EVM 8 % @ 64QAM)
Optic Interface		1/10/25 GbE × 2 ports
Power Consumption	AC	• Typical: 364 W (Load 50 %, Temp. 25 °C, TDD Ratio 4:1) • Max: 402 W (Load 100 %, Temp. 55 °C, TDD Ratio 4:1)
	DC	• Typical: 348 W (Load 50 %, Temp. 25 °C, TDD Ratio 4:1) • Max: 385 W (Load 100 %, Temp. 55 °C, TDD Ratio 4:1)
Synchronization		GPS/IEEE1588v2

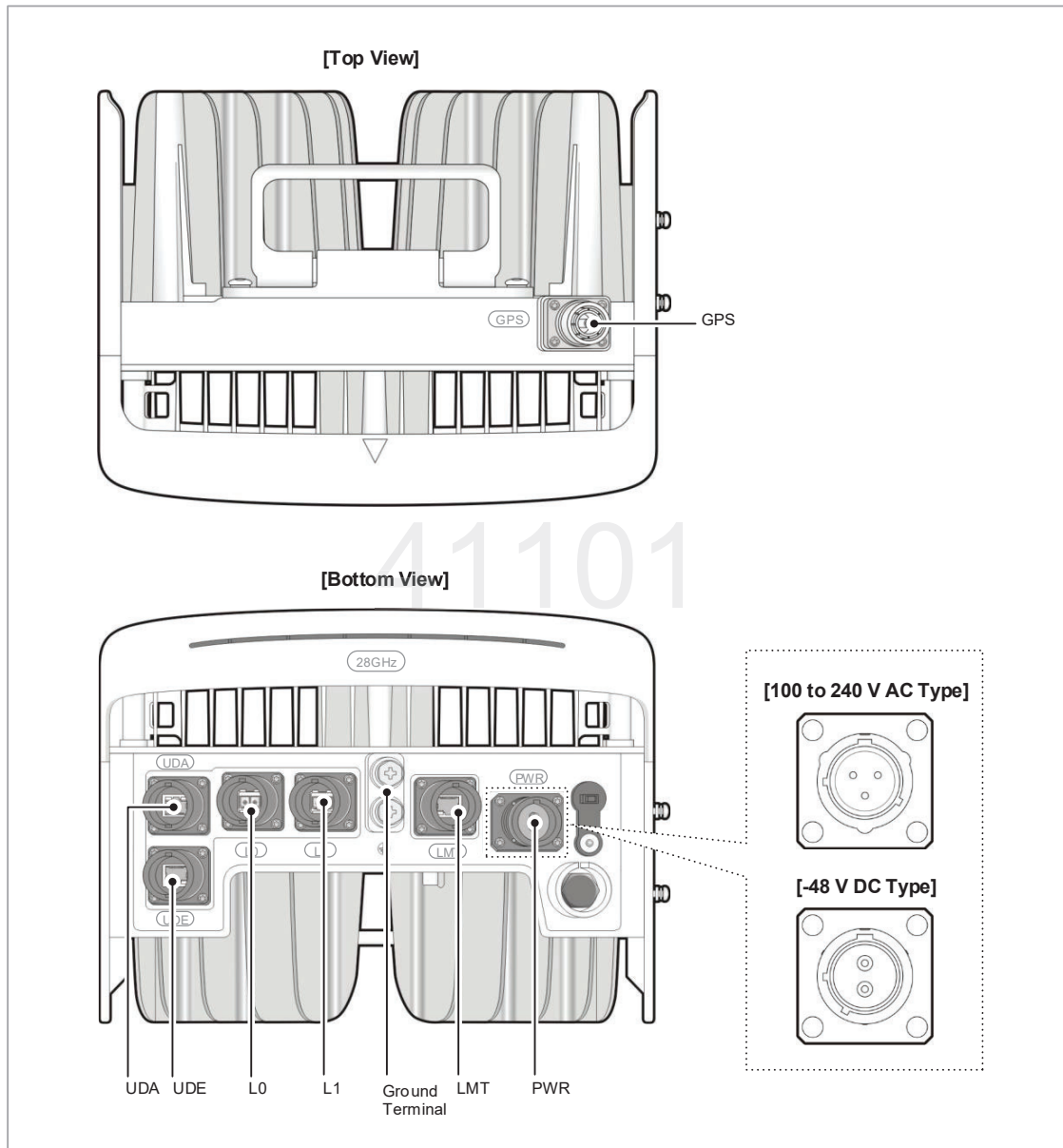
Item	Description
Cooling	Natural Convection cooling
Function Split	Option 2
Installation	Pole/Wall/Tower
a) Measures at the height of 1.0 m, and distance of 1.5 m.	

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Chapter 5 External Interface

The following figure depicts the external interface of an AT1K04.

Figure 6. AT1K04 External Interface



LED Information

The LED displays the current status of AT1K04. The following table outlines the status and description for the AT1K04.

Table 3. AT1K04 LED Information

Status		Description
●	Red on	Hardware initialization Critical alarm or backhaul link down detected.
◐	Red Blinking (Fast)	Boot flash firmware fusing state (Blinking period: 200 ms)
◑	Red Blinking (Slow)	Major/Minor Alarm detected (Blinking period: 1000 ms)
●	Amber on	Bootling completion
◐	Amber Blinking (Fast)	Software download state (Blinking period: 200 ms)
◑	Amber Blinking (Slow)	System registration state (Blinking period: 1000 ms)
●	Green on	Software activation state
◐	Green Blinking	Normal operation
○	LED off	Power off

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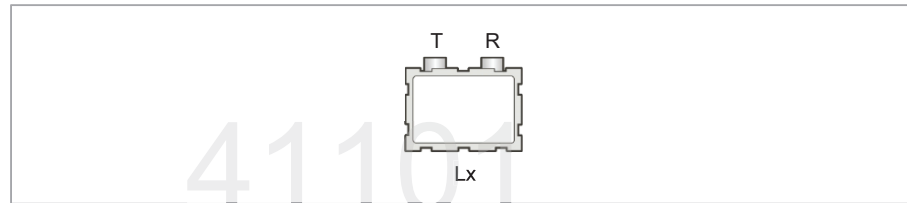
Port Information

The following table outlines the port information of AT1K04.

Table 4. AT1K04 Port Information

Port Name	Connector Type	Description
L0, L1	Push pull, SFP+/SFP28 type	1 GbE/10 GbE/25 GbE backhaul optic interface
PWR	Push pull	-48 V DC or 100 to 240 V AC
UDA	RJ45, push pull	User define alarm/external device status view and control
UDE	RJ45, push pull	Unused port (Disable)
LMT	RJ45, push pull	Local maintenance Ethernet port (10/100 Base-TX)
GNSS	4.3-10+	GPS Antenna interface port (Top of product)
LED	LED	Status LED

Small Form Factor Pluggable (SFP+/SFP28) cage is as follows:



L0 and L1 are optical modules. Do not look into the optical module to avoid damage to the eyes.



Appendix Acronyms

ADC	Analog to Digital Converter
AU	Access Unit
CPRI	Common Public Radio Interface
DAC	Digital to Analog Converter
EMC	Electromagnetic Compatibility
FCC	Federal Communications Commission
gNB	next generation Node B
gNB-CU	gNB-Centralized Unit
gNB-DU	gNB-Distributed Unit
LED	Light Emitting Diode
MAC	Media Access Control
RF	Radio Frequency
RFIC	Radio Frequency Integrated Circuit
RLC	Radio Link Control
RU	Radio Unit
SFP	Small Form Factor Pluggable
UDA	User Defined Alarm

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102 AT1K04
Product Specification

Document Version 2.0

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May 28, 2021

Lloyd Anderson
Principal Engineer – Construction
Embedded-Network Implementation-Washington/Baltimore
Verizon Wireless
7600 Montpelier Road, Laurel, MD 20723

Structural Letter for the Proposed UPGRADE RRH

Site Data: **Address:** 6015 Montrose Road, Rockville, MD 20852
Verizon Site Name: Rockville_12_ODAS-A
PCLC Code: 392955
FUZE Project ID: 16400009
NB+C ES Project Number: 100383

Dear Mr. Anderson:

Pursuant to your request, Network Building + Consulting Engineering Services (NB+C ES) has evaluated the proposed Verizon Wireless telecommunication upgrades at the subject location. The existing structure is a 34'-4"± tall building located in Rockville, MD. Verizon has proposed one (1) antenna and one (1) RRH, to replace one (1) existing antenna and one (1) existing RRH. The following table below shows the final equipment configuration:

Table 1 - Final Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Carrier	Feed Line Size (in)	Note
18.5	36.33	1	Samsung	VZ-AT1K04	Verizon	Existing Cables	-
	39.33	1	Andrew	VVSSP-65S-R1B			
	36.33	1	Samsung	B2/B66A RRH			

As part of this review and certification, NB+C ES has reviewed the RF Data Sheet provided by Verizon dated March 09, 2021; Final Construction Drawings by NB+C ES dated May 11, 2021; Previous As Built Drawings prepared by NB+C ES dated January 20, 2020; Previous Structural Analysis prepared by NB+C ES dated October 7, 2019; Previous Fabrication Drawings prepared by Raycap Stealth dated November 8, 2019, and Closeout Photos provided by NB+C ES personnel dated January 20, 2020.

This letter assumes that all structural members are in good condition. The contractor shall be responsible for the means and methods of construction. No structural qualification is made or implied by this letter for existing structural members not supporting the proposed installation. Any deterioration or localized damage or distress to the structure or mounts, should be documented and reported to the engineer and repaired by the contractor prior to the installation of the proposed antennas and RRHs.



Based on an assessment of the existing site conditions and by reviewing the aforementioned documents, and per the code provision of the *2018 International Building Code* and *ANSI/TIA-222-H Structural Standard for Antenna Supporting Structures and Antennas and Small Wind Turbine Support Structures* for applied gravity and lateral loads, using an ultimate design wind speed of one-hundred-and-fifteen (115) mph at 39'-4" and 36'-4" above ground level, NB+C ES has determined that the existing structure is adequate and can support the proposed installation without any structural modification or reinforcement to the existing structure.

The proposed antennas and RRHs will be mounted to existing mount pipes and Unistrut members connected to the existing ballast sleds. The proposed installation results in a negligible change in effective projected wind area and lateral loading when compared to the loading used for the previous certification prepared by **NB+C ES** dated January 20, 2020. The additional forces imparted due to wind loading is less than 10% of the original design loads. Therefore, by engineering judgement the existing structure is considered structurally **adequate**, and the previous certification dated January 20, 2020 remain valid and the proposed installation can be installed as intended.

NB+C ENGINEERING SERVICES, LLC

Prepared by: Michael L. Filkoski

Respectfully submitted by:

Krupakaran Kolandaivelu, PE
Director of Engineering
MD PE License #38489



5/28/2021

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: 38489

EXPIRATION DATE: 3.17.2022

Non-Ionizing Electromagnetic Radiation (NIER) Report

Site No. 392955
Rockville_12_ODAS
6015 Montrose Road
Rockville, Maryland 20852
Montgomery County
39° 3' 11.14" N, -77° 7' 18.45" W NAD83

EBI Project No. 6221007073
December 1, 2021



Prepared for:
Verizon Wireless
c/o Network Building & Consulting
120 Eastshore Drive Suite 300
Glen Allen, VA 23059

Prepared by:



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EXECUTIVE SUMMARY

Purpose of Report

EnviroBusiness Inc. (dba EBI Consulting) has been contracted by Verizon Wireless (“Verizon”) to conduct radio frequency electromagnetic (RF-EME) modeling for Verizon Site 392955 located at 6015 Montrose Road in Rockville, Maryland to determine RF-EME exposure levels from proposed Verizon communications equipment at this site. As described in greater detail in Appendix C of this report, the Federal Communications Commission (FCC) has developed Maximum Permissible Exposure (MPE) Limits for the general public and for occupational activities. This report summarizes the results of RF-EME modeling in relation to relevant FCC RF-EME compliance standards for limiting human exposure to RF-EME fields.

Statement of Compliance

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

As presented in the sections below, based on worst-case predictive modeling, the worst-case emitted power density may exceed the FCC’s general public limit within approximately 13 feet of Verizon’s proposed antennas at the main roof level. Modeling also indicates that the worst-case emitted power density may exceed the FCC’s occupational limit within approximately 6 feet of Verizon’s proposed antennas at the main roof level. Additionally, there are areas where workers who may be elevated above the rooftop or ground may be exposed to power densities greater than the occupational limits. Therefore, workers should be informed about the presence and locations of antennas and their associated fields.

At the nearest walking/working surfaces to the Verizon antennas, the maximum power density generated by the Verizon antennas is approximately **1,172.85** percent of the FCC’s general public limit (**234.57** percent of the FCC’s occupational limit).

The composite exposure level from all carriers on this site is approximately **1,172.85** percent of the FCC’s general public limit (**234.57** percent of the FCC’s occupational limit) at the nearest walking/working surface to each antenna.

Recommended control measures are outlined in Section 4.0 and within the Site Safety Plan (attached); Verizon should also provide procedures to shut down and lockout/tagout this wireless equipment in accordance with Verizon’s standard operating protocol. Non-telecom workers who will be working in areas of exceedance are required to contact Verizon since only Verizon has the ability to lockout/tagout the facility, or to authorize others to do so.

I.0 INTRODUCTION

Radio frequency waves are electromagnetic waves from the portion of the electromagnetic spectrum at frequencies lower than visible light and microwaves. The wavelengths of radio waves range from thousands of meters to around 30 centimeters. These wavelengths correspond to frequencies as low as 3 cycles per second (or hertz [Hz]) to as high as one gigahertz (one billion cycles per second).

Personal Communication (PCS) facilities used by Verizon in this area will potentially operate within a frequency range of 700 to 5000 MHz. Facilities typically consist of: 1) electronic transceivers (the radios or cabinets) connected to wired telephone lines; and 2) antennas that send the wireless signals created by the transceivers to be received by individual subscriber units (PCS telephones). Transceivers are typically connected to antennas by coaxial cables.

Because of the short wavelength of PCS services, the antennas require line-of-site paths for good propagation, and are typically installed a distance above ground level. Antennas are constructed to concentrate energy towards the horizon, with as little energy as possible scattered towards the ground or the sky. This design, combined with the low power of PCS facilities, generally results in no possibility for exposure to approach Maximum Permissible Exposure (MPE) levels, with the exception of in areas in the immediate vicinity of the antennas.

MPE limits do not represent levels where a health risk exists, since they are designed to provide a substantial margin of safety. These limits apply for continuous exposures and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size or health.

2.0 SITE DESCRIPTION

This project site includes the following proposed wireless telecommunication antennas on a rooftop located at 6015 Montrose Road in Rockville, Maryland.

Ant #	Operator	Antenna Make	Antenna Model	Frequency (MHz)	Azimuth (deg.)	Mechanical Downtilt (deg.)	Horizontal Beamwidth (Degrees)	Aperture (feet)	Total Power Input (Watts)	Antenna Gain (dBd)	Total ERP (Watts)	Total EIRP (Watts)
1	Verizon	SAMSUNG	SON_AT1K04 28GHz VZW	28000	230	0	6	1.4	2.42748	24	609.76	1000.00
2	Verizon	COMMSCOPE	VVSSP-65S-R1B 07DT 1900	1900	230	0	82	2.0	80	9.400001	553.46	907.68
2	Verizon	COMMSCOPE	VVSSP-65S-R1B 05DT 2100	2100	230	0	73	2.0	80	10.13	654.77	1073.83

• Note there are 2 Verizon antennas per sector at this site. For clarity, the different frequencies for each antenna are entered on separate lines.

Ant #	NAME	X	Y	Antenna Radiation Centerline	Z-Height Main Roof	Z-Height Adjacent Building	Z-Height Adjacent Building	Z-Height Ground
1	Verizon	54.3	2.8	36.3	2.0	-63.7	-13.7	36.3
2	Verizon	54.3	2.5	39.3	5.0	-60.7	-10.7	39.3

• Note the Z-Height represents the distance from the antenna centerline.

The above tables contain an inventory of proposed Verizon Antennas and other carrier antennas if sufficient information was available to model them. Note that EBI uses an assumed set of antenna specifications and powers for unknown and other carrier antennas for modeling purposes. The FCC guidelines incorporate two separate tiers of exposure limits that are based upon occupational/controlled exposure limits (for workers) and general population/uncontrolled exposure limits for members of the general public that may be exposed to antenna fields. While access to this site is considered uncontrolled, the analysis has considered exposures with respect to both controlled and uncontrolled limits as an untrained worker may access adjacent rooftop locations. Additional information regarding controlled/uncontrolled exposure limits is provided in Appendix C. Appendix B presents a site safety plan that provides a plan view of the rooftop with antenna locations.

3.0 WORST-CASE PREDICTIVE MODELING

EBI has performed theoretical MPE modeling using RoofMaster™ software to estimate the worst-case power density at the site's nearby broadcast levels resulting from operation of the antennas. RoofMaster™ is a widely-used predictive modeling program that has been developed by Waterford Consultants to predict RF power density values for rooftop and tower telecommunications sites produced by vertical collinear antennas that are typically used in the cellular, PCS, paging and other communications services. Using the computational methods set forth in Federal Communications Commission (FCC) Office of Engineering & Technology (OET) Bulletin 65, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields" (OET-65), RoofMaster™ calculates predicted power density in a scalable grid based on the contributions of all RF sources characterized in the study scenario. At each grid location, the cumulative power density is expressed as a percentage of the FCC limits. Manufacturer antenna pattern data is utilized in these calculations. RoofMaster™ models consist of the Far Field model as specified in OET-65 and an implementation of the OET-65 Cylindrical Model (Sula9). The models utilize several operational specifications for different types of antennas to produce a plot of spatially-averaged power densities that can be expressed as a percentage of the applicable exposure limit.

For this report, EBI utilized antenna and power data provided by Verizon and compared the resultant worst-case MPE levels to the FCC's occupational/controlled exposure limits outlined in OET Bulletin 65. The assumptions used in the modeling are based upon information provided by Verizon and information gathered from other sources. The parameters used for modeling are summarized in the Site Description antenna inventory table in Section 2.0.

There are no other wireless carriers with equipment installed at this site.

Based on worst-case predictive modeling, the worst-case emitted power density may exceed the FCC's general public limit within approximately 13 feet of Verizon's Sector A antennas on the main roof level. Modeling also indicates that the worst-case emitted power density may exceed the FCC's occupational limit within approximately 6 feet of Verizon's Sector A antennas on the main rooftop level. At the nearest walking/working surfaces to the Verizon antennas, the maximum power density generated by the Verizon antennas is approximately 1,172.85 percent of the FCC's general public limit (234.57 percent of the FCC's occupational limit). The composite exposure level from all carriers on this site is approximately 1,172.85 percent of the FCC's general public limit (234.57 percent of the FCC's occupational limit) at the nearest walking/working surface to each antenna.

The Site Safety Plan also presents areas where Verizon Wireless antennas contribute greater than 5% of the applicable MPE limit for a site. A site is considered out of compliance with FCC regulations if there are areas that exceed the FCC exposure limits and there are no RF hazard mitigation measures in place. Any carrier which has an installation that contributes more than 5% of the applicable MPE must participate in mitigating these RF hazards.

The inputs used in the modeling are summarized in the Site Description antenna inventory table in Section 2.0. A graphical representation of the RoofMaster™ modeling results is presented in Appendix B. Microwave dish antennas are designed for point-to-point operations at the elevations of the installed equipment rather than ground level coverage. The maximum power density generated by all carrier antennas, including microwaves and panel antennas, is included in the modeling results presented within this report.

4.0 MITIGATION/SITE CONTROL OPTIONS

EBI's modeling indicates that there are areas in front of the Verizon antennas that exceed the FCC standards for general public and occupational exposure. In order to alert people accessing the rooftop, a Guidelines sign and an NOC Information sign are recommended for installation at each access point to the rooftop. Additionally, yellow Caution signs and blue NOTICE are recommended for installation on the barrier in front of the Verizon Sector A antennas. These signs must be placed in a conspicuous manner so that they are visible to any person approaching the barrier from any direction.

Barriers are recommended for installation when possible to block access to the areas in front of the antennas that exceed the FCC general public and/or occupational limits. Barriers may consist of rope, chain, or fencing. Painted stripes should only be used as a last resort. Barriers are recommended 17 feet in front of the Verizon Sector A antennas.

These protocols and recommended control measures have been summarized and included with a graphic representation of the antennas and associated signage and control areas in a RF-EME Site Safety Plan, which is included as Appendix B. Individuals and workers accessing the rooftop should be provided with a copy of the attached Site Safety Plan, made aware of the posted signage and barriers, and signify their understanding of the Site Safety Plan.

To reduce the risk of exposure, EBI recommends that access to areas associated with the active antenna installation be restricted and secured where possible. Implementation of the signage and barriers recommended in the Site Safety Plan and in this report will bring this site into compliance with the FCC's rules and regulations.

5.0 SUMMARY AND CONCLUSIONS

EBI has prepared a Radiofrequency – Electromagnetic Energy (RF-EME) Compliance Report for telecommunications equipment installed by Verizon Site Number 392955 located at 6015 Montrose Road in Rockville, Maryland to determine worst-case predicted RF-EME exposure levels from wireless communications equipment installed at this site. This report summarizes the results of RF-EME modeling in relation to relevant Federal Communications Commission (FCC) RF-EME compliance standards for limiting human exposure to RF-EME fields.

As presented in the sections above, based on the FCC criteria, the worst-case emitted power density may exceed the FCC's general public limit within approximately 13 feet of Verizon's proposed antennas at the main roof level. Modeling also indicates that the worst-case emitted power density may exceed the FCC's occupational limit within approximately 6 feet of Verizon's proposed antennas at the main roof level.

Workers should be informed about the presence and locations of antennas and their associated fields. Recommended control measures are outlined in Section 4.0 and within the Site Safety Plan (attached); Verizon should also provide procedures to shut down and lockout/tagout this wireless equipment in accordance with Verizon's standard operating protocol. Non-telecom workers who will be working in areas of exceedance are required to contact Verizon since only Verizon has the ability to lockout/tagout the facility, or to authorize others to do so.

6.0 LIMITATIONS

This report was prepared for the use of Verizon Wireless. It was performed in accordance with generally accepted practices of other consultants undertaking similar studies at the same time and in the same locale under like circumstances. The conclusions provided by EBI are based solely on the information provided by the client. The observations in this report are valid on the date of the investigation. Any additional information that becomes available concerning the site should be provided to EBI so that our conclusions may be revised and modified, if necessary. This report has been prepared in accordance with Standard Conditions for Engagement and authorized proposal, both of which are integral parts of this report. No other warranty, expressed or implied, is made.

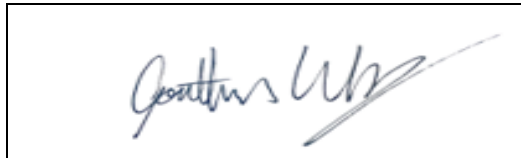
Appendix A

Certifications

Preparer Certification

I, Jonathan Walz, state that:

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

A rectangular box containing a handwritten signature in blue ink. The signature appears to read "Jonathan Walz" with a stylized flourish at the end.

Reviewed and Approved by:



sealed 02dec2021 mike@h2dc.com
H2DC PLLC MD CoA#: 50517

Michael McGuire
Electrical Engineer
mike@h2dc.com

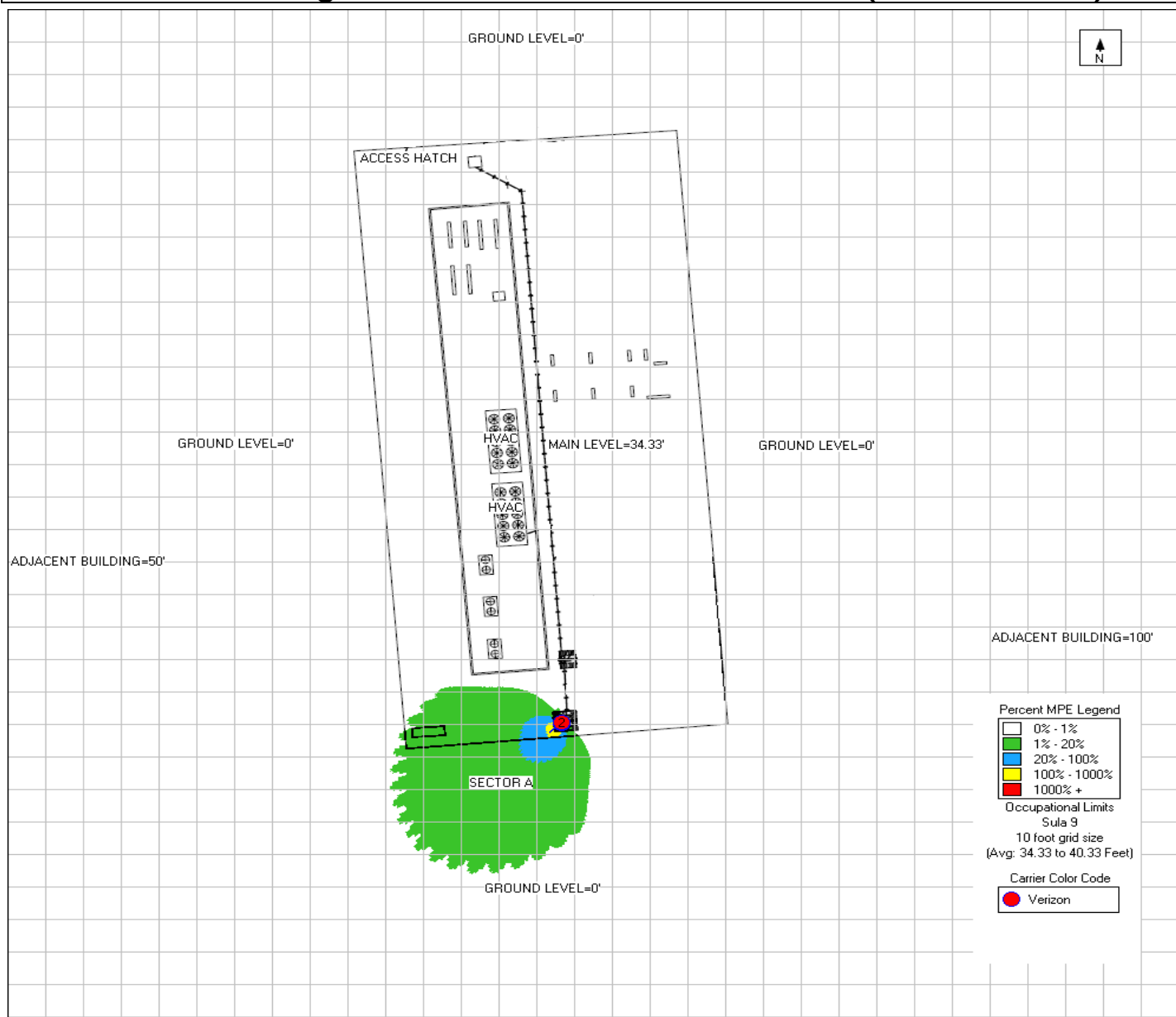
Note that EBI's scope of work is limited to an evaluation of the Radio Frequency – Electromagnetic Energy (RF-EME) field generated by the antennas and broadcast equipment noted in this report. The engineering and design of the building and related structures, as well as the impact of the antennas and broadcast equipment on the structural integrity of the building, are specifically excluded from EBI's scope of work.

Appendix B

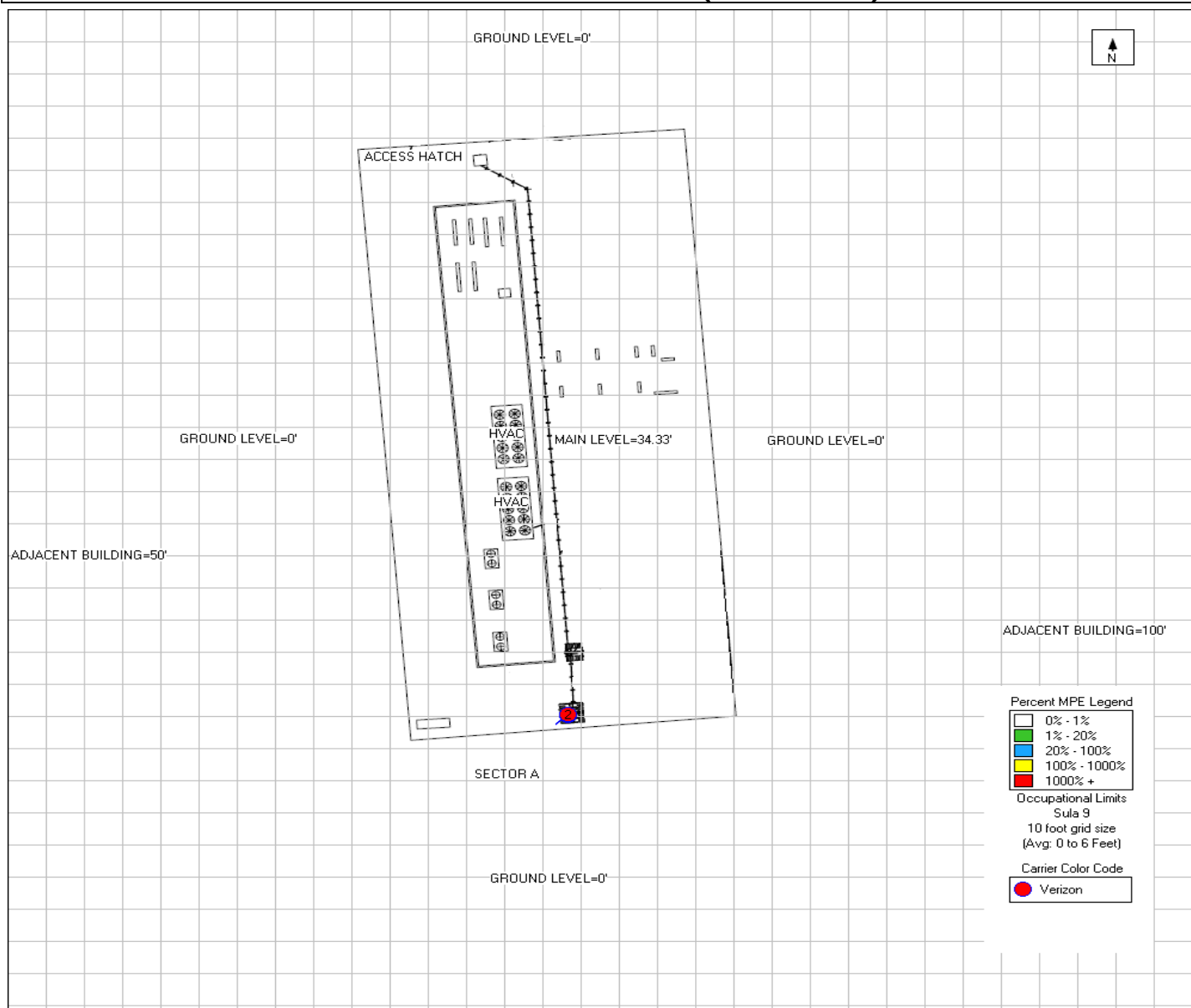
Radio Frequency Electromagnetic Energy

Safety Information and Signage Plans

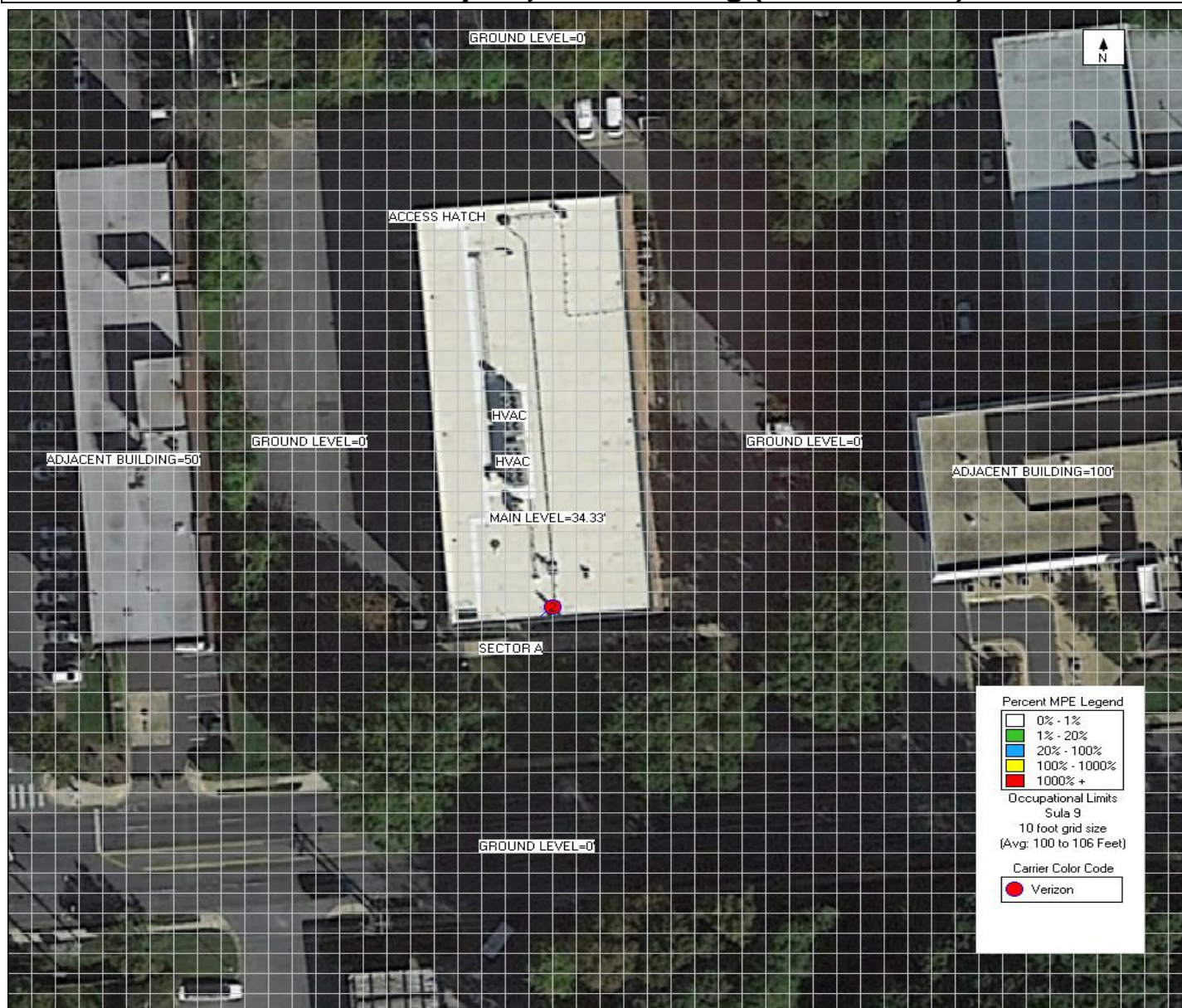
Nearest Walking Surface Simulation Main Roof Level (34.33 feet AGL)



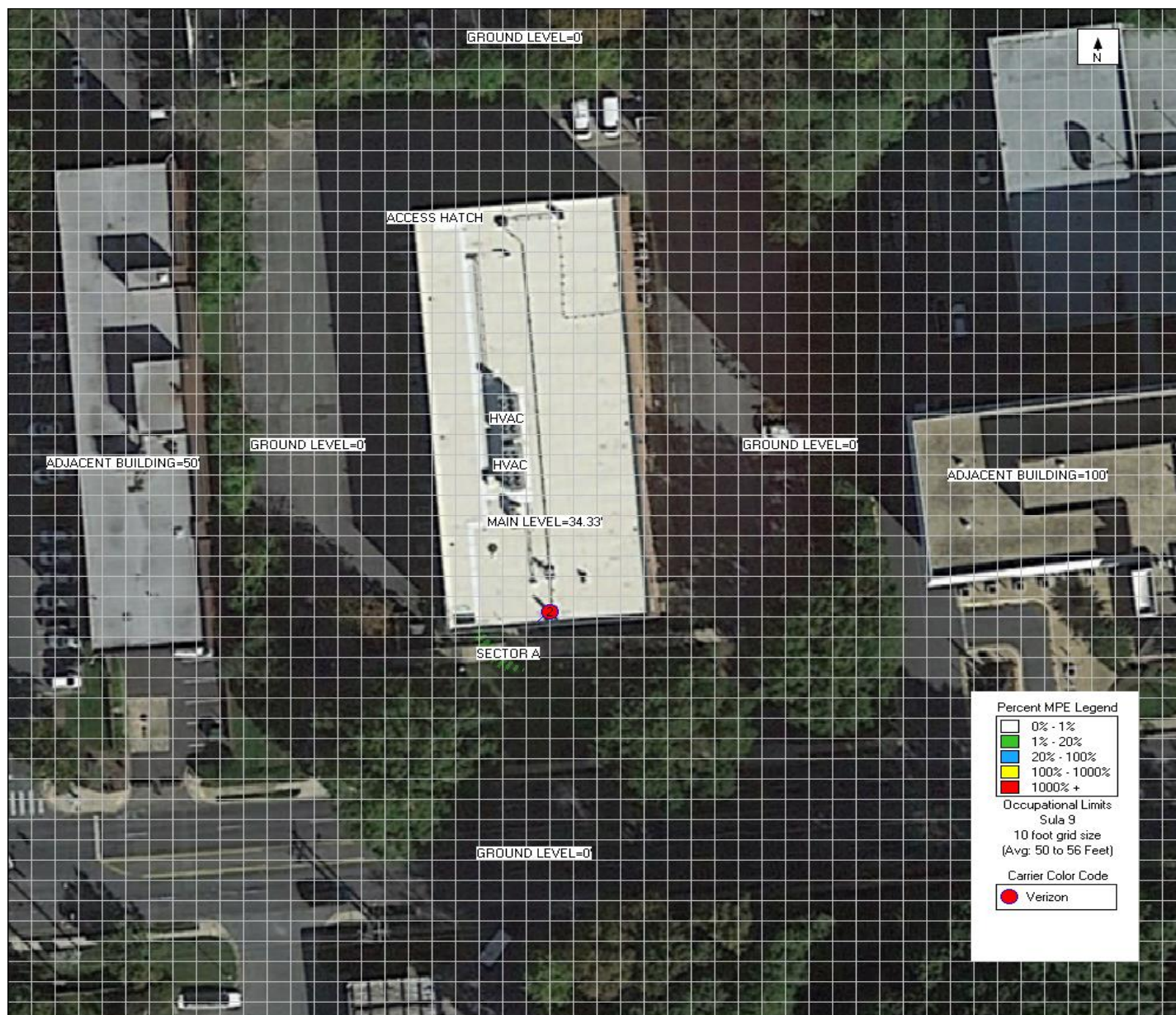
Ground Level Simulation (0 feet AGL)



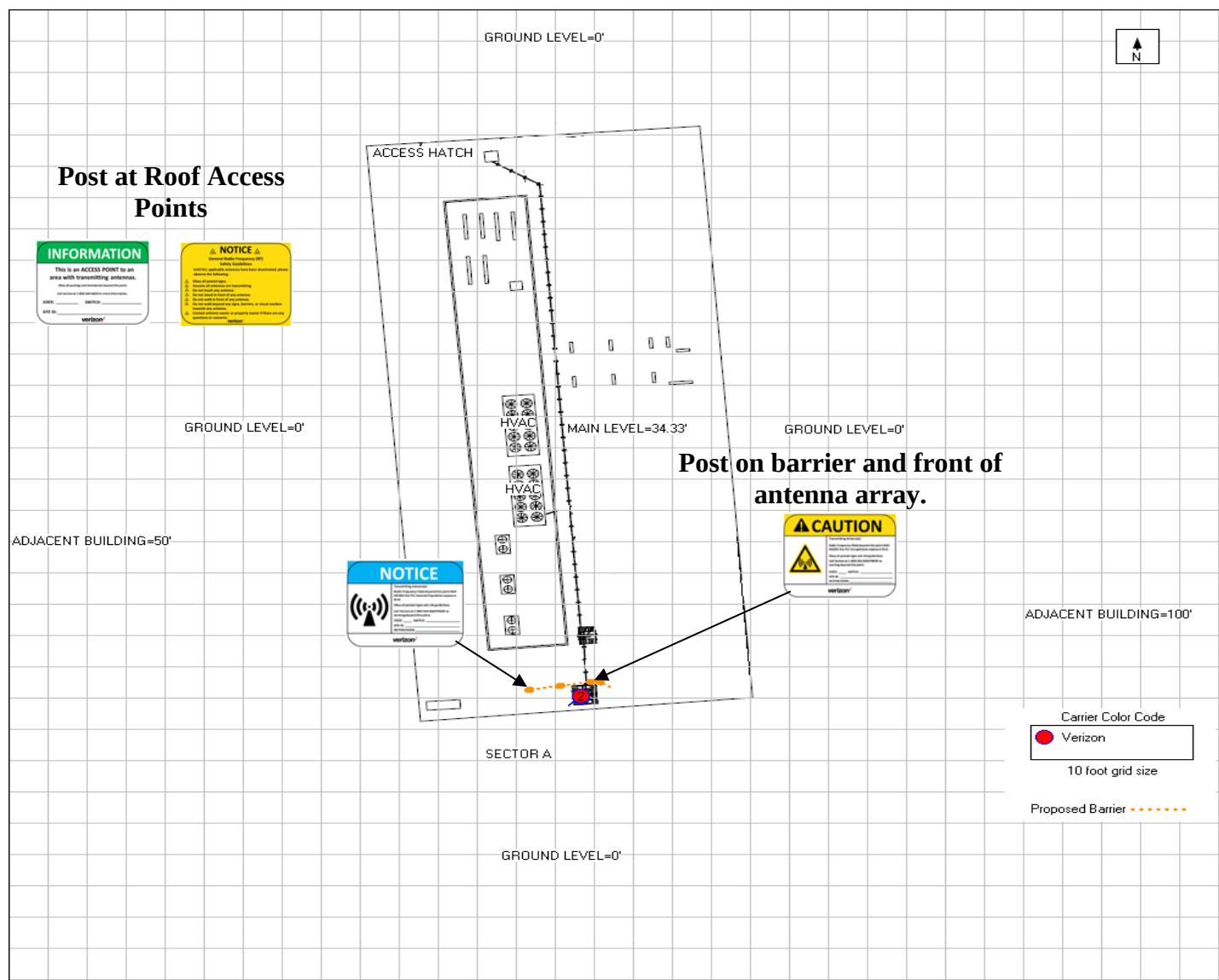
Sattelite Overlay Adjacent Building (100 feet AGL)



Satellite Overlay Adjacent building (50 feet AGL)



Verizon Signage Plan

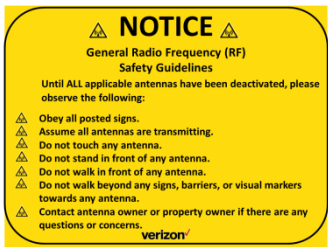
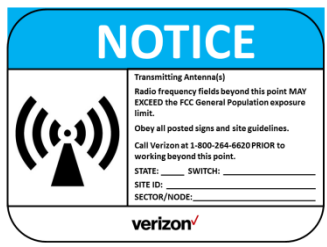
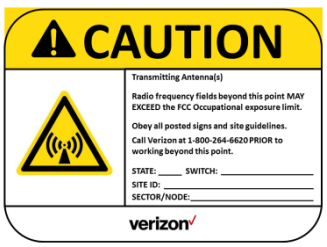
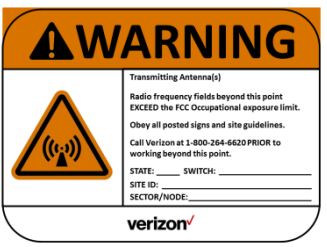


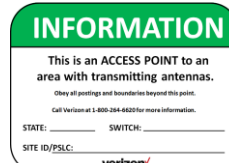
Sign	Posting Instructions	Required Signage / Mitigation
	Securely post at every point of access to the site in a manner conspicuous to all individuals entering thereon as indicated in the signage plan.	1 on each access hatch
	Securely post at every point of access to the site in a manner conspicuous to all individuals entering thereon as indicated in the signage plan.	1 on each access hatch
	Securely post on the proposed/existing barrier in a manner conspicuous to all individuals entering thereon as indicated in the signage plan.	1 on approaching sides of barrier at Sector A
	Securely post on the proposed/existing barrier in a manner conspicuous to all individuals entering thereon as indicated in the signage plan.	4 on approaching sides of barrier and front of antenna array at Sector A
	Securely post on the proposed/existing barrier in a manner conspicuous to all individuals entering thereon as indicated in the signage plan.	N/A

RF Signage and Safety Information

RF Signage

Areas or portions of any transmitter site may be susceptible to high power densities that could cause personnel exposures in excess of the FCC guidelines. These areas must be demarcated by conspicuously posted signage that identifies the potential exposure. Signage must be viewable regardless of the viewer's position. Signs must be legible and readily viewable and readable at a minimum distance of five feet (1.52 meters) from the boundary (and as necessary on approach to this boundary) at which the applicable limits are exceeded, and that controls or indicators be placed at compliance boundaries. The minimum readable letter height at 5 feet from the signage is 0.20 inches for the Message and 0.44 inches for the Signal.

GUIDELINES	NOTICE	CAUTION	WARNING
This sign will inform anyone of the basic precautions to follow when entering an access point to an area with transmitting radiofrequency equipment.	This sign indicates that RF emissions may exceed the FCC General Population MPE limit.	This sign indicates that RF emissions may exceed the FCC Occupational MPE limit.	This sign indicates that RF emissions may exceed at least 10x the FCC Occupational MPE limit.
			

NOC INFORMATION	INFORMATION
Information signs are used as a means to provide contact information for any questions or concerns. They will include specific cell site identification information and the Verizon Wireless Network Operations Center phone number.	

Physical Barriers

Physical barriers are control measures that require awareness and participation of personnel. Physical barriers are employed as an additional administration control to complement RF signage and physically demarcate an area in which RF exposure levels may exceed the FCC General Population limit. **Example:** chain-connected stanchions

Indicative Markers

Indicative markers are visible control measures that require awareness and participation of personnel, as they cannot physically prevent someone from entering an area of potential concern. Indicative markers are employed as an additional administration control to complement RF signage and visually demarcate an area in which RF exposure levels may exceed the FCC General Population limit. **Example:** paint stripes

Occupational Safety and Health Administration (OSHA) Requirements

A formal adopter of FCC Standards, OSHA stipulates that those in the Occupational classification must complete training in the following: RF Safety, RF Awareness, and Utilization of Personal Protective Equipment. OSHA also provides options for Hazard Prevention and Control:

Hazard Prevention	Control
- Utilization of good equipment - Enact control of hazard areas - Limit exposures - Employ medical surveillance and accident response	- Employ Lockout/Tag out - Utilize personal alarms & protective clothing - Prevent access to hazardous locations - Develop or operate an administrative control program

Appendix C

Federal Communications Commission (FCC) Requirements

The FCC has established Maximum Permissible Exposure (MPE) limits for human exposure to Radiofrequency Electromagnetic (RF-EME) energy fields, based on exposure limits recommended by the National Council on Radiation Protection and Measurements (NCRP) and, over a wide range of frequencies, the exposure limits developed by the Institute of Electrical and Electronics Engineers, Inc. (IEEE) and adopted by the American National Standards Institute (ANSI) to replace the 1982 ANSI guidelines. Limits for localized absorption are based on recommendations of both ANSI/IEEE and NCRP.

The FCC guidelines incorporate two separate tiers of exposure limits that are based upon occupational/controlled exposure limits (for workers) and general public/uncontrolled exposure limits for members of the general public.

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

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

Table I and Figure I (below), which are included within the FCC's OET Bulletin 65, summarize the MPE limits for RF emissions. These limits are designed to provide a substantial margin of safety. They vary by frequency to take into account the different types of equipment that may be in operation at a particular facility and are "time-averaged" limits to reflect different durations resulting from controlled and uncontrolled exposures.

The FCC's MPEs are measured in terms of power (mW) over a unit surface area (cm²). Known as the power density, the FCC has established an occupational MPE of 5 milliwatts per square centimeter (mW/cm²) and an uncontrolled MPE of 1 mW/cm² for equipment operating in the 1900 MHz frequency range. For the Verizon equipment operating at 700 MHz or 850 MHz, the FCC's occupational MPE is 2.83 mW/cm² and an uncontrolled MPE of 0.57 mW/cm². For the Verizon equipment operating at 1900 MHz, the FCC's occupational MPE is 5.0 mW/cm² and an uncontrolled MPE limit of 1.0 mW/cm². These limits are considered protective of these populations.

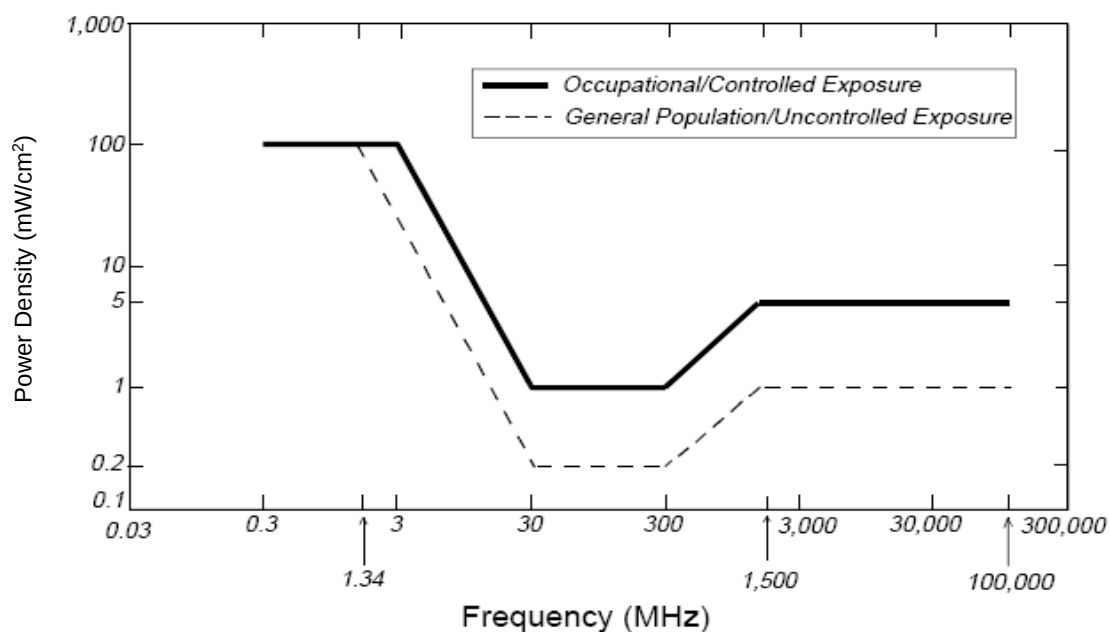
Table 1: Limits for Maximum Permissible Exposure (MPE)				
(A) Limits for Occupational/Controlled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time [E] ² , [H] ² , or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f ²)*	6
30-300	61.4	0.163	1.0	6
300-1,500	--	--	f/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Public/Uncontrolled Exposure				
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
300-1,500	--	--	f/1,500	30
1,500-100,000	--	--	1.0	30

f = Frequency in (MHz)

* Plane-wave equivalent power density

Figure 1. FCC Limits for Maximum Permissible Exposure (MPE)

Plane-wave Equivalent Power Density



Based on the above, the most restrictive thresholds for exposures of unlimited duration to RF energy for several personal wireless services are summarized below:

Personal Wireless Service	Approximate Frequency	Occupational MPE	Public MPE
Microwave (Point-to-Point)	5,000 - 80,000 MHz	5.00 mW/cm ²	1.00 mW/cm ²
Broadband Radio (BRS)	2,600 MHz	5.00 mW/cm ²	1.00 mW/cm ²
Wireless Communication (WCS)	2,300 MHz	5.00 mW/cm ²	1.00 mW/cm ²
Advanced Wireless (AWS)	2,100 MHz	5.00 mW/cm ²	1.00 mW/cm ²
Personal Communication (PCS)	1,950 MHz	5.00 mW/cm ²	1.00 mW/cm ²
Cellular Telephone	870 MHz	2.90 mW/cm ²	0.58 mW/cm ²
Specialized Mobile Radio (SMR)	855 MHz	2.85 mW/cm ²	0.57 mW/cm ²
Long Term Evolution (LTE)	700 MHz	2.33 mW/cm ²	0.47 mW/cm ²
Most Restrictive Frequency Range	30-300 MHz	1.00 mW/cm ²	0.20 mW/cm ²

MPE limits are designed to provide a substantial margin of safety. These limits apply for continuous exposures and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size, or health.

Personal Communication (PCS) facilities used by Verizon in this area will potentially operate within a frequency range of 700 to 2100 MHz. Facilities typically consist of: 1) electronic transceivers (the radios or cabinets) connected to wired telephone lines; and 2) antennas that send the wireless signals created by the transceivers to be received by individual subscriber units (PCS telephones). Transceivers are typically connected to antennas by coaxial cables.

Because of the short wavelength of PCS services, the antennas require line-of-site paths for good propagation, and are typically installed above ground level. Antennas are constructed to concentrate energy towards the horizon, with as little energy as possible scattered towards the ground or the sky. This design, combined with the low power of PCS facilities, generally results in no possibility for exposure to approach Maximum Permissible Exposure (MPE) levels, with the exception of areas directly in front of the antennas.

FCC Compliance Requirement

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



SITE NAME: ROCKVILLE_12_ODAS-A

PROJECT: UPGRADE-RRH

6015 MONTROSE ROAD
ROCKVILLE, MD 20852
MONTGOMERY COUNTY



Know what's below.
Call before you dig.

SCOPE OF WORK

SCOPE OF WORK:	PROJECT CONSISTS OF: REMOVING: (1) EXISTING ANTENNA (1) EXISTING RRH PROPOSED: (1) PROPOSED ANTENNA (1) PROPOSED RRH
SITE ADDRESS:	6015 MONTROSE ROAD ROCKVILLE, MD 20852
PROPERTY OWNER: ADDRESS:	VERIZON MARYLAND MERGE CO PO BOX 152206 IRVING, TX 152206 - 2206
PARCEL ACCOUNT #:	160400046935
PARCEL AREA:	1.84± ACRES
JURISDICTION:	MONTGOMERY COUNTY
ZONING:	CRT-3.0 C-3.0 R-2.5 H-120 (COMMERCIAL RESIDENTIAL TOWN)
GROUND ELEVATION:	370'-0"± (AMSL)
STRUCTURE TYPE:	COMMERCIAL BUILDING
STRUCTURE HEIGHT:	38'-4"± (AGL)
LATITUDE:	39.053094° / 39° 3' 11.1384" N
LONGITUDE:	-77.121792° / 77° 7' 18.4512" W

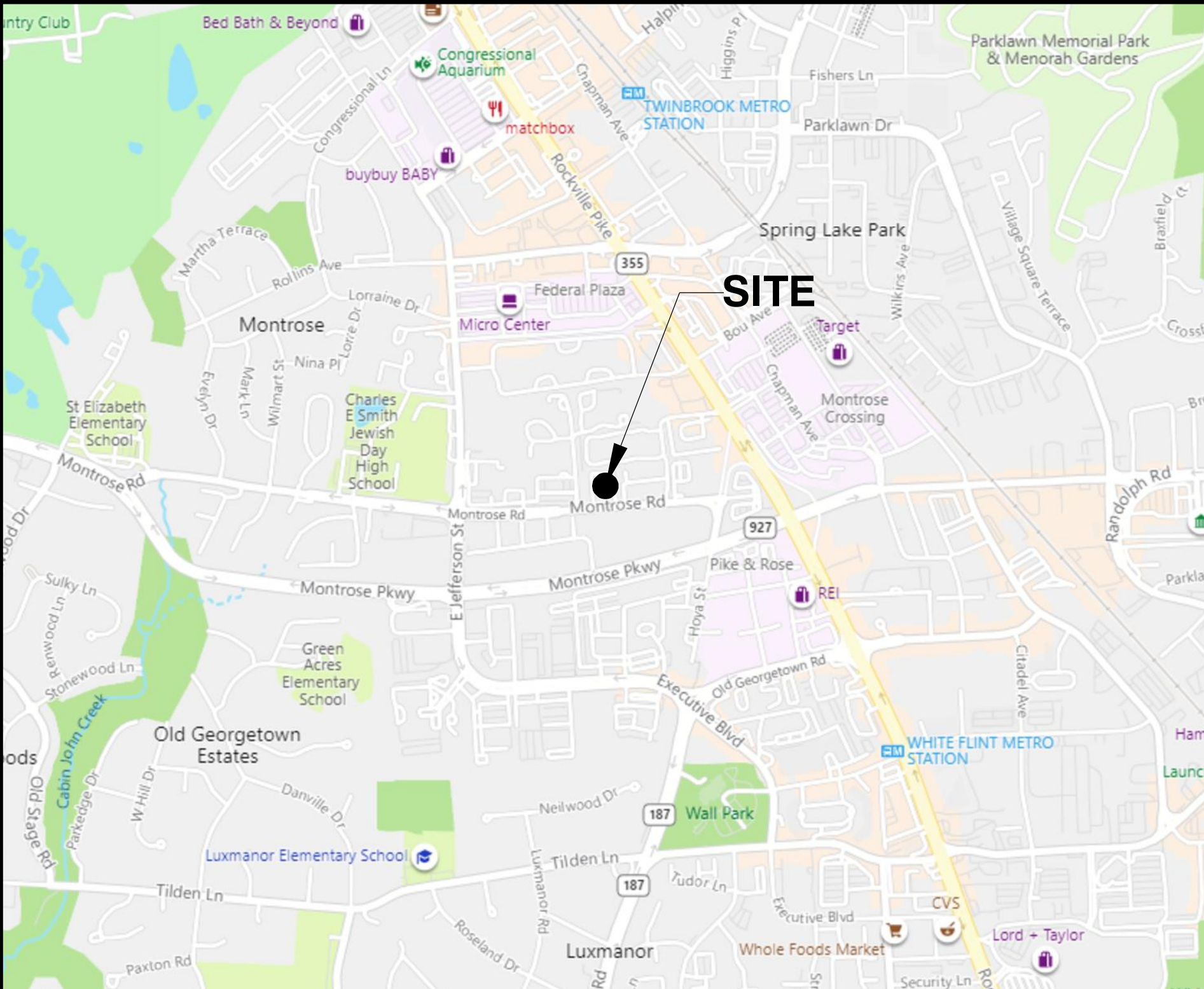
PROJECT TEAM

APPLICANT:	VERIZON WIRELESS 10170 JUNCTION DRIVE, FLOOR 3, ANNAPOLIS JUNCTION, MD 20701 (301) 617-4210
ENGINEERING FIRM:	NB+C ENGINEERING SERVICES, LLC. 6095 MARSHALEE DRIVE, SUITE 300 ELKRIDGE, MD 21075 (410) 712-7092

DO NOT SCALE DRAWINGS

THESE DRAWINGS ARE FORMATTED TO BE FULL-SIZE AT 22"X34". CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE DESIGNER / ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR MATERIAL ORDERS OR BE RESPONSIBLE FOR THE SAME. CONTRACTOR SHALL USE BEST MANAGEMENT PRACTICE TO PREVENT STORM WATER POLLUTION DURING CONSTRUCTION.

VICINITY MAP



CODE COMPLIANCE

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

• 2018 INTERNATIONAL BUILDING CODE	• 2018 INTERNATIONAL PLUMBING CODE
• 2018 INTERNATIONAL ENERGY CONSERVATION CODE	• 2012 INTERNATIONAL PROPERTY MAINTENANCE CODE
• 2018 INTERNATIONAL EXISTING BUILDING CODE	• 2018 INTERNATIONAL RESIDENTIAL CODE
• 2012 INTERNATIONAL GREEN CONSTRUCTION CODE	• 2018 INTERNATIONAL FUEL GAS CODE
• 2018 INTERNATIONAL MECHANICAL CODE	

DRAWING INDEX

T-1	TITLE SHEET
GN-1	GENERAL NOTES
GN-2	PMI CHECKLIST
SP-1	SITE PLAN
C-1	ROOFTOP PLAN & ELEVATION
A-1	ANTENNA SCHEDULE & PLANS
A-2	ANTENNA DETAILS
G-1	GROUNDING DETAILS & NOTES

APPROVAL BLOCK

		APPROVED	APPROVED AS NOTED	DISAPPROVED/ REVISE
PROPERTY OWNER	DATE	☐	☐	☐
SITE ACQUISITION	DATE	☐	☐	☐
CONSTRUCTION MANAGER	DATE	☐	☐	☐
ZONING	DATE	☐	☐	☐
RF ENGINEER	DATE	☐	☐	☐

ENGINEER

NB+CTM
TOTALLY COMMITTED.

NB+C ENGINEERING SERVICES, LLC.
6095 MARSHALEE DRIVE, SUITE 300
ELKRIDGE, MD 21075
(410) 712-7092

APPLICANT

verizon[✓]

10170 JUNCTION DRIVE, FLOOR 3,
ANNAPOLIS JUNCTION, MD 20701
(301) 617-4210

SITE INFORMATION

ROCKVILLE_12_ODAS-A
6015 MONTROSE ROAD
ROCKVILLE, MD 20852
MONTGOMERY COUNTY

DESIGN RECORD

REVISIONS

REV	DATE	DESCRIPTION	BY
0	05/11/21	FINAL CDs	CSZ
A	04/06/21	PRELIMINARY CDs	AMM

PROFESSIONAL STAMP



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. 55491, EXPIRATION DATE 01/08/2022

ENGINEER

TRENT TRAVIS SNARR, P.E.
MARYLAND PROFESSIONAL ENGINEER
LICENSE #55491

SHEET TITLE

TITLE SHEET

SHEET NUMBER

T-1

POST–MODIFICATION INSPECTION (PMI) REQUIREMENT

1. PMI REQUIRED FOR ALL SITES, REFER TO VERIZON NSTD–446 SECTIONS 1.5 AND 2.3 FOR MORE INFORMATION.
2. REFER TO THE MOUNT ANALYSIS BY XXXXXX DATED XX/XX/XX FOR ADDITIONAL DETAILS.
3. GENERAL CONTRACTOR SHALL PROVIDE THE BELOW DOCUMENTATION TO THE ENGINEER OF RECORD VIA EMAIL TO VZWMOUNTS@NBCLLC.COM, DROPBOX, OR OTHER FILESHARE METHOD. PROVIDE HIGH RESOLUTION PHOTOS (DO NOT COMPRESS).
4. ENGINEER OF RECORD WILL CONDUCT A REVIEW OF THE PROVIDED DOCUMENTS TO PREPARE A PMI REPORT. ENGINEER OF RECORD WILL NOTIFY GENERAL CONTRACTOR IF ANY ADDITIONAL DOCUMENTATION IS REQUIRED TO COMPLETE THE PMI.
5. PMI DOCUMENTATION SHALL BE SUFFICIENT TO CONFIRM THE UPGRADE WAS BUILT AS DESIGNED, INCLUDING EQUIPMENT CHANGES AND STRUCTURAL MODIFICATIONS, AND IS IN ADDITION TO ANY OTHER REQUIRED CLOSEOUT PACKAGE DOCUMENTATION.
6. REQUIRED DOCUMENTATION FOR PMI INCLUDES THE FOLLOWING AT A MINIMUM. REFER TO THE MOUNT ANALYSIS FOR POSSIBLE ADDITIONAL INFORMATION. IF STRUCTURAL MODIFICATIONS ARE REQUIRED, REFER TO THE MODIFICATION DRAWINGS FOR POSSIBLE ADDITIONAL REQUIREMENTS.

6A. PROVIDE PRE–AND–POST CONSTRUCTION PHOTOS OF EACH SECTOR FROM THE MOUNT ELEVATION AND THE GROUND. CONTRACTOR IS RESPONSIBLE FOR ENSURING THE PHOTOS PROVIDED PROVIDE POSITIVE CONFIRMATION THAT THE MODIFICATION/UPGRADE WAS COMPLETED IN ACCORDANCE WITH THESE CONSTRUCTION DRAWINGS AND ANY STRUCTURAL/MOUNT MODIFICATION DRAWINGS. CONTRACTOR SHALL RELAY ANY DATA THAT CAN IMPACT THE PERFORMANCE OF THE MOUNT OR MOUNT MODIFICATION, INCLUDING SAFETY ISSUES. PHOTOS SHALL HAVE A DATE/TIME STAMP IN THE PHOTO. REFER TO THE MOUNT ANALYSIS FOR FILE STRUCTURE SCHEDULE OF PHOTOS. PROVIDE PHOTOS OF THE GATE SIGNS AND CARRIER SHELTER TO IDENTIFY THE TOWER OWNER, SITE NAME, SITE NUMBER, ETC.

6B. VERIFICATION OF THE MEMBER CONNECTIONS, BRACING, AND RELEVANT DIMENSIONS.

6C. VERIFICATION OF THE ANTENNA AND OTHER EQUIPMENT CONFIGURATION (PHOTOS OF MODEL NUMBERS/TAGS FOR ALL EQUIPMENT, AS WELL AS THE FEEDLINE CONFIGURATION). TAKE PHOTOS OF THE BACK SIDE OF EACH SECTOR AS WELL AS CLOSE–UPS OF ALL EQUIPMENT. PHOTOS SHOULD CONFIRM THE HORIZONTAL AND VERTICAL POSITIONING OF THE ANTENNAS AND EQUIPMENT AND SHALL HAVE TAPE MEASURES IN THE PHOTOS TO CONFIRM.

6D. FOR TIE–BACKS, STRUTS, MOUNT PIPES, PHOTOS TO CONFIRM THE ANGLES AND LOCATION OF ATTACHMENT POINT AT BOTH ENDS OF MEMBER, AS WELL AS DIMENSIONS, THICKNESS, AND LENGTHS OF THE MEMBERS. REFER TO THE CHECKLIST IN THE MOUNT ANALYSIS FOR ADDITIONAL INFORMATION.

6E. MOUNT ATTACHMENT TO THE SUPPORTING STRUCTURE, INCLUDING ANY KICKERS OR SUPPORTS, OR TIEBACKS.

6F. MATERIALS USED (TYPE, STRENGTH, DIMENSIONS, ETC). PROVIDE BILL OF MATERIALS AND MATERIAL SPEC TO CONFIRM MATERIAL GRADES AND SIZES. PROVIDE DOCUMENTATION FOR GALVANIZATION OF MEMBERS WHETHER HOT–DIPPED OR COLD–GALVANIZED. IF MATERIALS DIFFER FROM THOSE SPECIFIED ON THESE DRAWINGS, PROVIDE DOCUMENTATION THAT THE "EQUIVALENT" MATERIAL HAS THE SAME SPECIFICATIONS.

6G. MOUNT ORIENTATION/AZIMUTH AND ELEVATION. PROVIDE TAPE DROP PHOTOS OF ANTENNA CENTERLINE(S) AND MOUNT ATTACHMENT POINTS TO THE SUPPORTING STRUCTURE. IF THERE ARE MULTIPLE RAD CENTERS, PROVIDE PHOTOS OF ALL ELEVATIONS.

POST–MODIFICATION INSPECTION (PMI) REQUIREMENT CONT.

6H. VERIFICATION THAT THE INSTALL HAS NOT CAUSED DAMAGE TO OR UNPLANNED OBSTRUCTION OF THE FOLLOWING:

CLIMBING FACILITIES

SAFETY CLIMB IF PRESENT, INCLUDING PHOTOS ABOVE AND BELOW THE MOUNT.

LIGHTING SYSTEM

OTHER INSTALLED SYSTEMS ON THE STRUCTURE.

CONTRACTOR SHALL ENSURE THE SAFETY CLIMB IS SUPPORTED AND NOT ADVERSELY AFFECTED BY THE INSTALLATION OF NEW COMPONENTS. THIS MAY INVOLVE THE INSTALLATION OF WIRE ROPE GUIDES OR OTHER ITEMS TO PROTECT THE WIRE ROPE.

6I. OTHER ITEMS DETERMINED BY THE STRUCTURAL ENGINEER TO ENSURE THE MOUNT WILL PERFORM AS DESIGNED. PHOTOS OF RELEVANT MEASUREMENTS, WITH SUFFICIENT DETAILS TO CONFIRM CONNECTION DETAILS, PLACEMENT OF EQUIPMENT, WALL ANCHOR DETAILS, BALLAST QUANTITIES, STRUCTURAL MODIFICATIONS ETC. DIAMETERS AND THICKNESSES OF BOLTS/THREADED RODS/ANGLES/TUBES ETC SHALL HAVE PHOTOS CONFIRMING CALIPER MEASUREMENTS.

CONFIRMATION THAT ALL HARDWARE WAS PROPERLY INSTALLED, AND EXISTING HARDWARE WAS INSPECTED FOR ANY ISSUES.

FOR BALLAST SLEDS, DOCUMENTATION OF THE WEIGHT OF BALLAST IN EACH SECTOR.

FOR WALL ANCHORS, PHOTOS AND MEASUREMENTS OF OUTSIDE AND INSIDE OF CONNECTIONS. DOCUMENTATION OF ADHESIVE USED, SIZE AND LENGTH OF ANCHORS, EFFECTIVE EMBEDMENT DEPTH OF THE ANCHORS, GROUTING OF HOLLOW WALLS, SPACING AND EDGE DISTANCE MEASUREMENTS, AND ANY THROUGH–BOLTS OR BACKING PLATES.

FOR STUD WELD CONNECTIONS, DOCUMENTATION TO CONFIRM SURFACE PREPARATION, STUD WELD SIZE, GRADE, LENGTH, AND SPACING.

FOR FABRICATED PARTS, SHOP DRAWINGS TO BE APPROVED BY THE ENGINEER OF RECORD PRIOR TO CONSTRUCTION.

FOR WELDED PARTS, CERTIFIED WELD INSPECTION.

FOR BOLTED PARTS, BOLT INSTALLATION AND TORQUE.

1. CONTRACTOR SHALL PROVIDE, IN ADDITION TO THE ABOVE, AS–BUILT CDS WITH REDLINES IDENTIFYING ANY CHANGES. THE AS–BUILTS SHALL THE CONTRACTOR’S NAME, PREPARER’S SIGNATURE, AND DATE.
2. IF THE MODIFICATION INSTALLATION WOULD FAIL THE PMI ("FAILED PMI"), THE CONTRACTOR SHALL WORK WITH THE ENGINEER OF RECORD TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:

8A. CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENTAL PMI.

8B. OR, WITH THE EOR’S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE–ANALYZE THE MODIFICATION/REINFORCEMENT/UPGRADE USING THE AS–BUILT CONDITION.

8. NOTE: IF LOADING IS DIFFERENT THAN THAT SHOWN IN THESE CONSTRUCTION DRAWINGS OR STRUCTURAL/MOUNT MODIFICATION DRAWINGS, CONTRACTOR SHALL NOTIFY THE ENGINEER OF RECORD IMMEDIATELY FOR RESOLUTION.
9. THE ENGINEERING FIRM PERFORMING AN ANALYSIS SHALL PROVIDE A CONTRACTOR’S PHOTO LOG AND CHECKLIST TO BE COMPLETED BY THE INSTALLING CONTRACTOR. THE CONTRACTOR SHALL THEN PROVIDE POST–INSTALLATION INFORMATION TO THE STRUCTURAL ENGINEER. THE STRUCTURAL ENGINEER SHALL REVIEW THE DOCUMENTS FOR ANY DEFICIENCIES THAT CAN BE DETERMINED FROM THE DESKTOP REVIEW OF THE DATA. THE ENGINEERING FIRM SHALL THEN PROVIDE DOCUMENTATION TO VZW THAT THE SITE IS COMPLETED, AND THE PMI REPORT IS APPROVED.

ENGINEER

NB+C™

TOTALLY COMMITTED.

NB+C ENGINEERING SERVICES, LLC.

6095 MARSHALEE DRIVE, SUITE 300
ELKRIDGE, MD 21075
(410) 712-7082

APPLICANT

verizon

10170 JUNCTION DRIVE, FLOOR 3,
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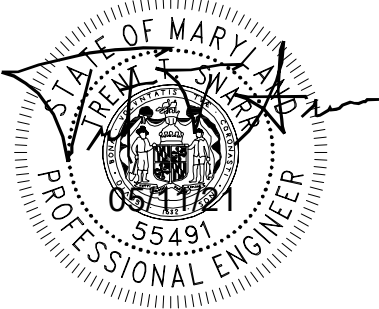
SITE INFORMATION

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6015 MONTROSE ROAD
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MONTGOMERY COUNTY

DESIGN RECORD

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ENGINEER

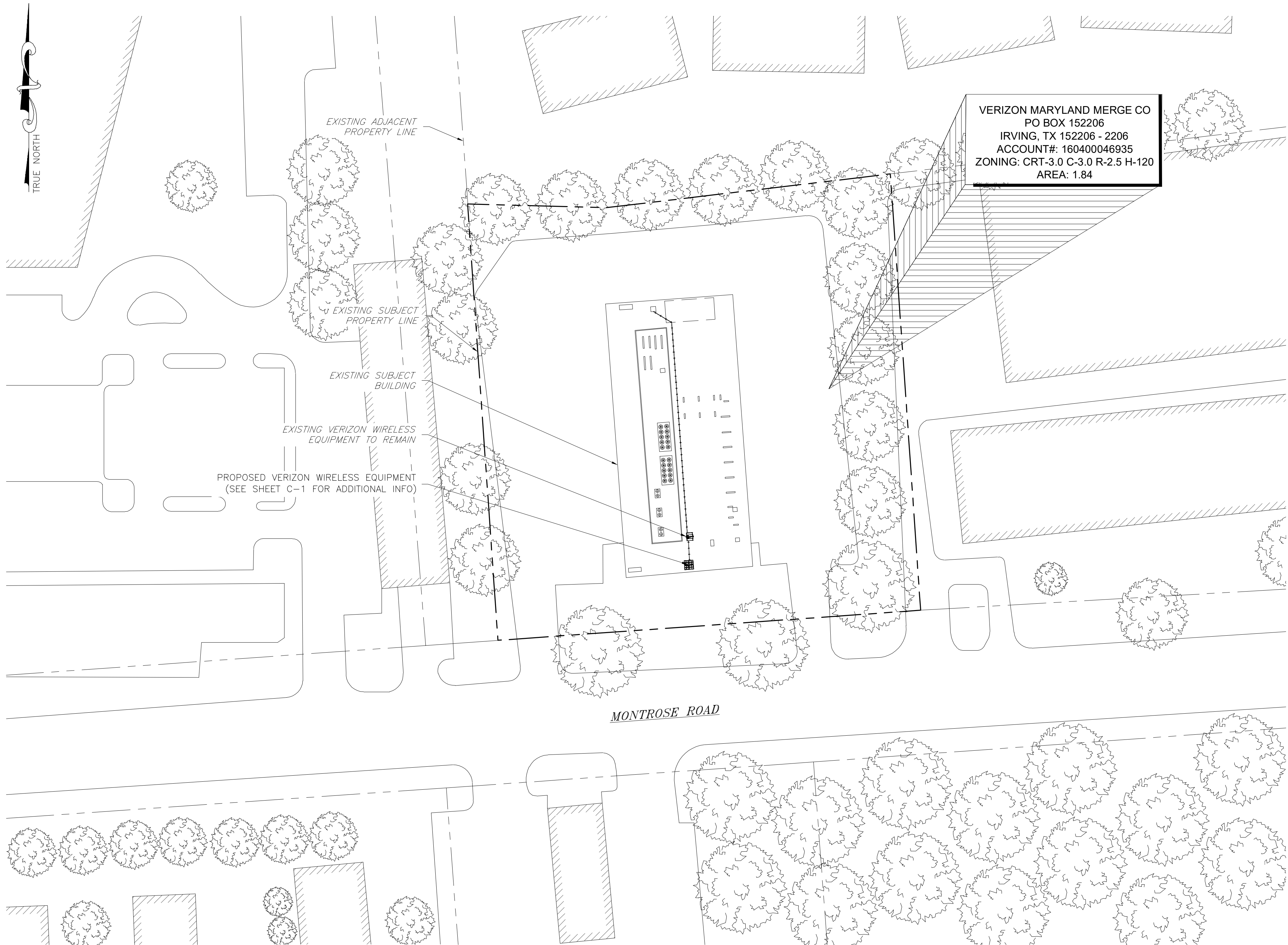
TRENT TRAVIS SNARR, P.E.
MARYLAND PROFESSIONAL ENGINEER
LICENSE #55491

SHEET TITLE

PMI CHECKLIST

SHEET NUMBER

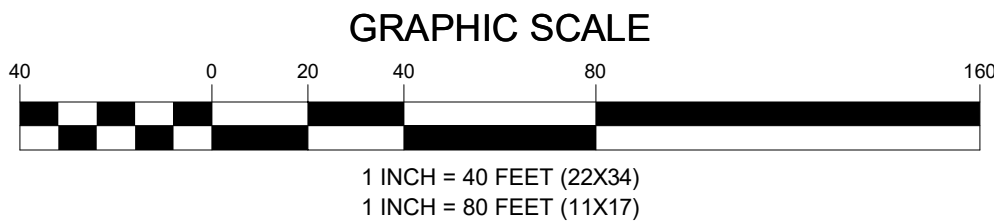
GN-2



ZONING INFORMATION		
JURISDICTION: MONTGOMERY COUNTY		
ZONING: CRT-3.0 C-3.0 R-2.5 H-120 (COMMERCIAL RESIDENTIAL TOWN)		
DIMENSION	EXISTING ±	PROPOSED ±
FRONT YARD SETBACK:	NO CHANGE	NO CHANGE
SIDE YARD SETBACK:	NO CHANGE	NO CHANGE
REAR YARD SETBACK:	NO CHANGE	NO CHANGE
LOT AREA: 1.84± ACRES		
(ALL MEASUREMENTS ARE IN FEET ± UNLESS OTHERWISE NOTED)		
NOTES:		
1) SITE PLAN IS NOT THE RESULT OF A SURVEY. IT IS BASED ON FIELD MEASUREMENTS AND SCALED ASSESSORS MAPS AVAILABLE. ALL INFORMATION SHOWN IS APPROXIMATE ONLY AND SUBJECT TO ANY CONDITION THAT A SURVEY MAY REVEAL.		
2) ALL SETBACKS SHOWN ARE FROM EXISTING BUILDING TO EXISTING PROPERTY LINES.		

LEGEND	
	PROPERTY LINE - SUBJECT PARCEL
	PROPERTY LINE - ABUTTERS
	EXISTING ROAD
	EXISTING BUILDING

1 SITE PLAN
SP-1
SCALE: 1" = 40' (22X34)
SCALE: 1" = 80' (11X17)



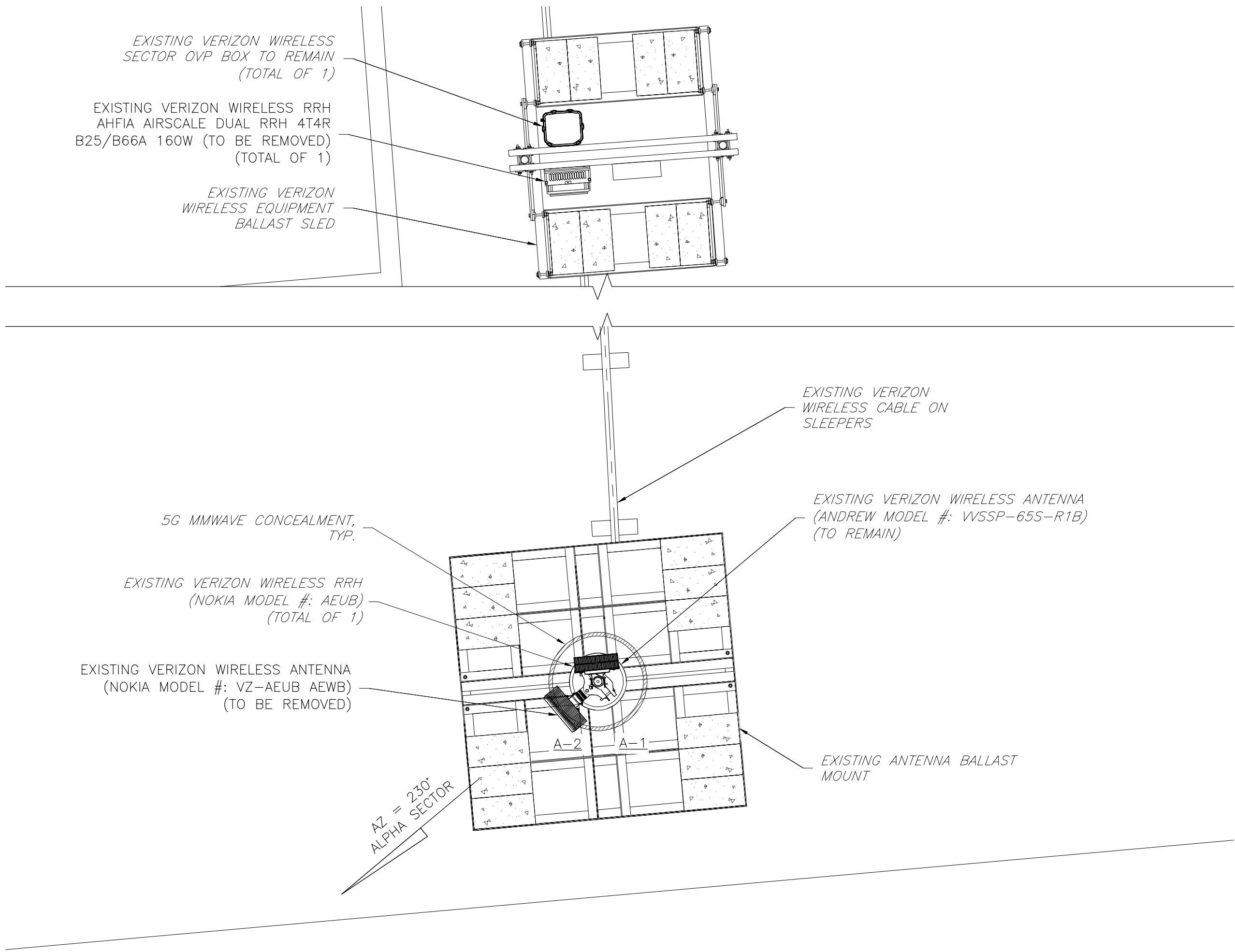
ENGINEER	NB+CTM TOTALLY COMMITTED. NB+C ENGINEERING SERVICES, LLC. 6095 MARSHALEE DRIVE, SUITE 300 ELK RIDGE, MD 21075 (410) 712-7082																																				
APPLICANT	verizon 10170 JUNCTION DRIVE, FLOOR 3, ANNAPOLIS JUNCTION, MD 20701 (301) 617-4210																																				
SITE INFORMATION	ROCKVILLE_12_ODAS-A 6015 MONTROSE ROAD ROCKVILLE, MD 20852 MONTGOMERY COUNTY																																				
DESIGN RECORD	REVISIONS <table><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td>0</td><td>05/11/21</td><td>FINAL CDs</td><td>CSZ</td></tr><tr><td>A</td><td>04/06/21</td><td>PRELIMINARY CDs</td><td>AMM</td></tr><tr><td>REV</td><td>DATE</td><td>DESCRIPTION</td><td>BY</td></tr></table>																									0	05/11/21	FINAL CDs	CSZ	A	04/06/21	PRELIMINARY CDs	AMM	REV	DATE	DESCRIPTION	BY
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SHEET TITLE	SITE PLAN																																				
SHEET NUMBER	SP-1																																				

STRUCTURAL NOTE:
CONTRACTOR IS TO VERIFY THAT ALL PROPOSED AND EXISTING
EQUIPMENT WAS CONSIDERED AND PASSED A STRUCTURAL ANALYSIS
PERFORMED BY A LICENSED ENGINEER PRIOR TO INSTALLATION.

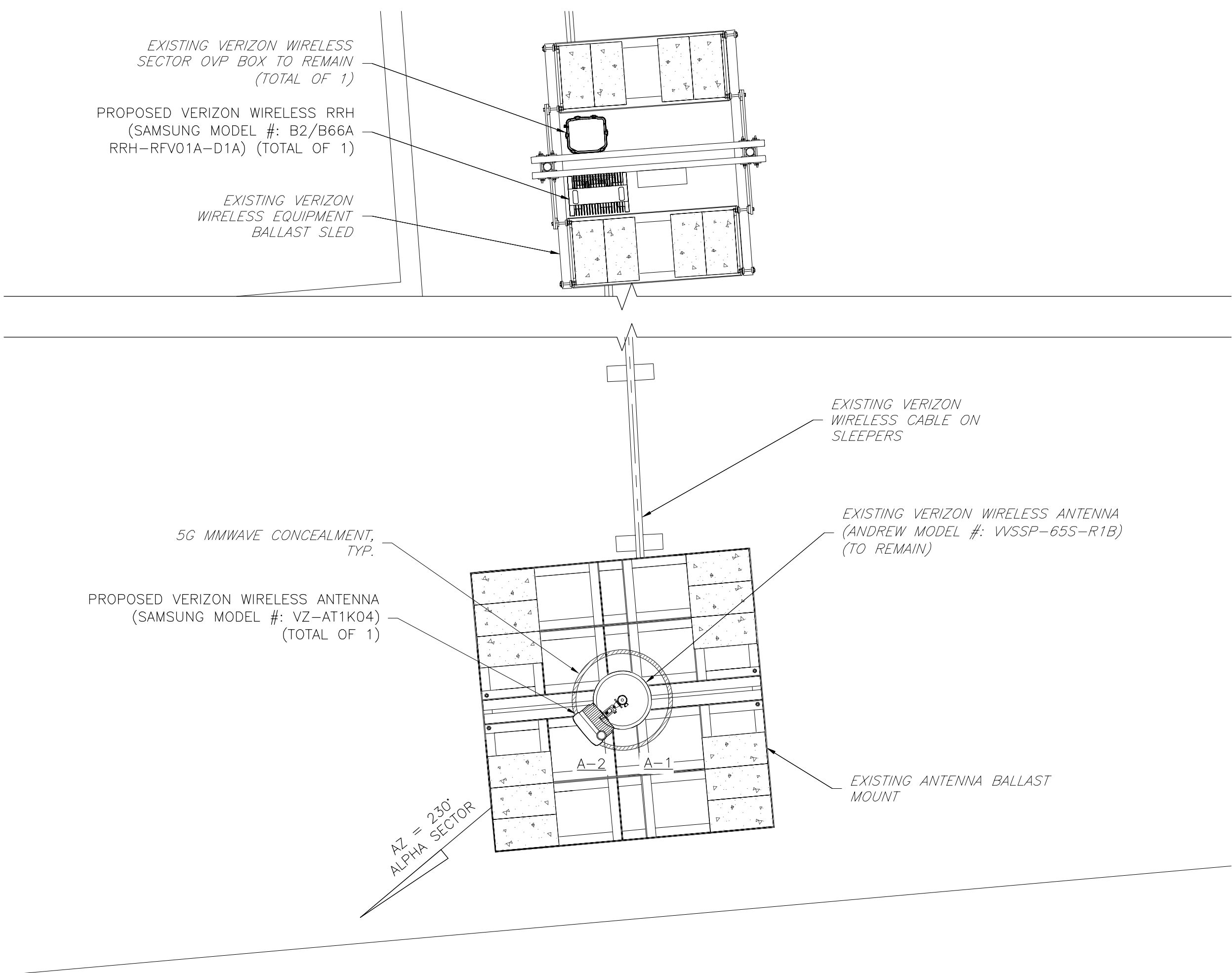
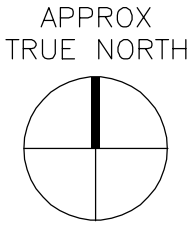
ANTENNA SCHEDULE									
SECTOR	STATUS	TECHNOLOGY	ANTENNA MANUFACTURER	ANTENNA MODEL	ANTENNA DIMENSIONS (HxWxD)	WEIGHT	RAD CENTER	AZIMUTH	RRH QUANTITY & MODEL
A1	EXISTING	1900, AWS, AWS3,	COMMSCOPE	WSSP-65S-R1B	23.6"x7.87"ø	13.0 LBS	39"-4"	230°	(1) AHFIA RRH 4T4R B25/B66A RRH 160W (TBR) (1) B2/B66A RRH-BR049 (RFV01U-D1A)
A2	TO BE REMOVED	28 GHz	NOKIA	VZ-AEUA	23.62"x11.97"x4.72"	44.092 LBS	36'-4"	230°	(1) AEUB+ASOD DC (INTEGRATED) (TBR)
A2	PROPOSED	28 GHz	SAMSUNG	VZ-AT1K04	19.5"x9.6"x6.9"	32.00 LBS	36'-4"	230°	(1) AT1K04 (INTEGRATED)

NOTES:
1. CONTRACTOR TO VERIFY PROPOSED ANTENNA INFORMATION IS THE MOST CURRENT DATA AT TIME OF CONSTRUCTION.
2. CONTRACTOR TO CONFIRM CABLE LENGTHS PRIOR TO CONSTRUCTION.

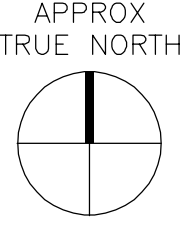
1
A-1
NTS
ANTENNA SCHEDULE



2
A-1
NTS
EXISTING ANTENNA ORIENTATION PLAN



3
A-1
NTS
PROPOSED ANTENNA ORIENTATION PLAN



ENGINEER

APPLICANT

SITE INFORMATION

DESIGN RECORD

PROFESSIONAL STAMP

ENGINEER

SHEET TITLE

SHEET NUMBER

NB+CTM
TOTALLY COMMITTED.

NB+C ENGINEERING SERVICES, LLC.
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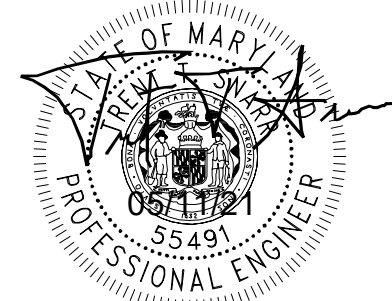
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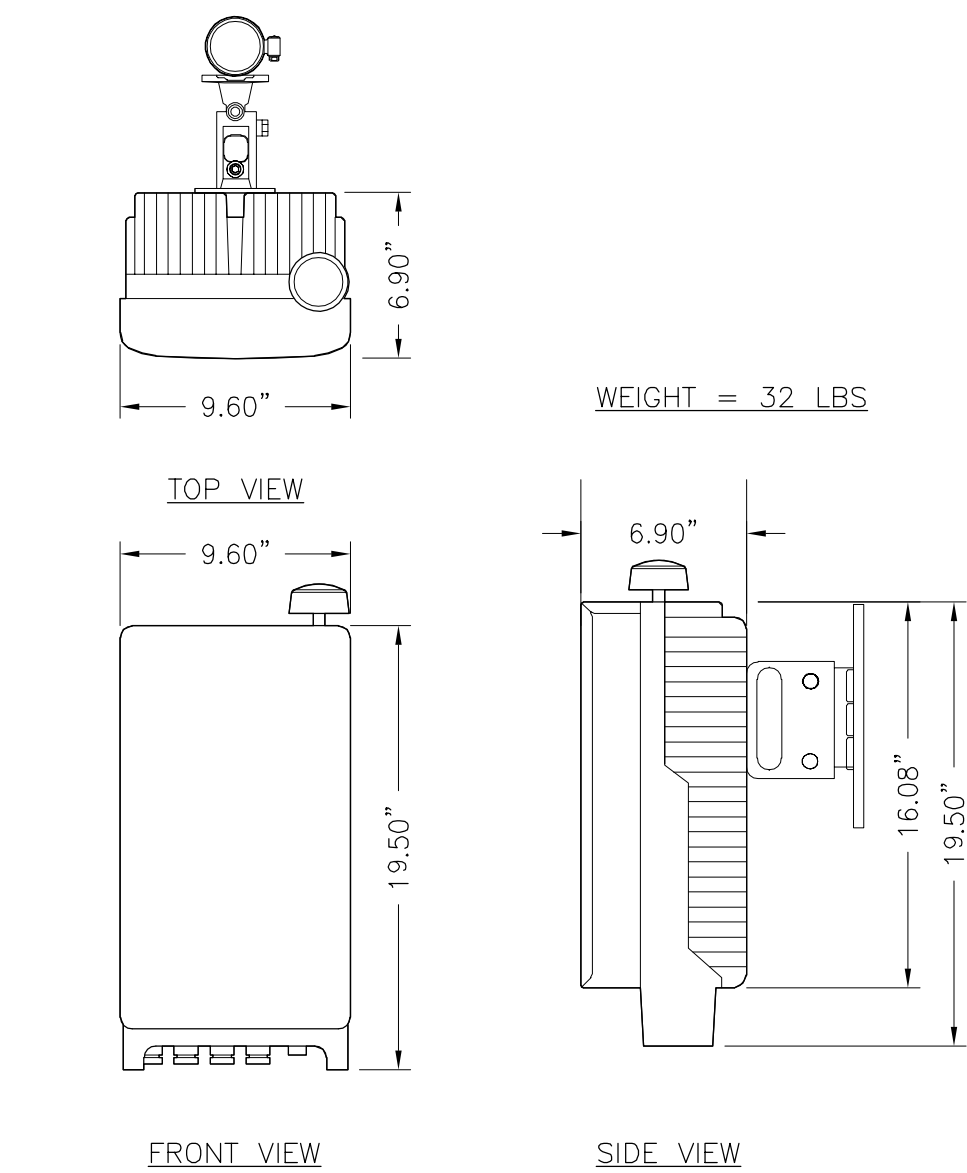
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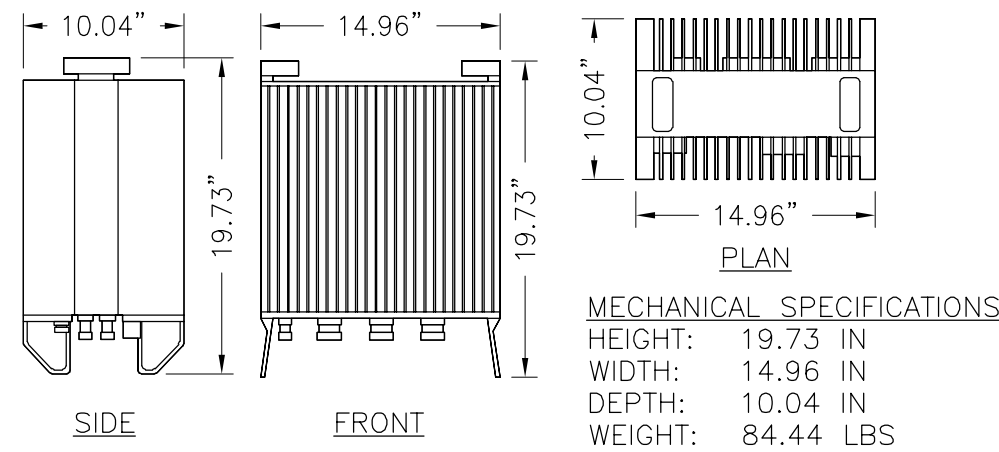
ANTENNA SCHEDULE & PLANS

A-1

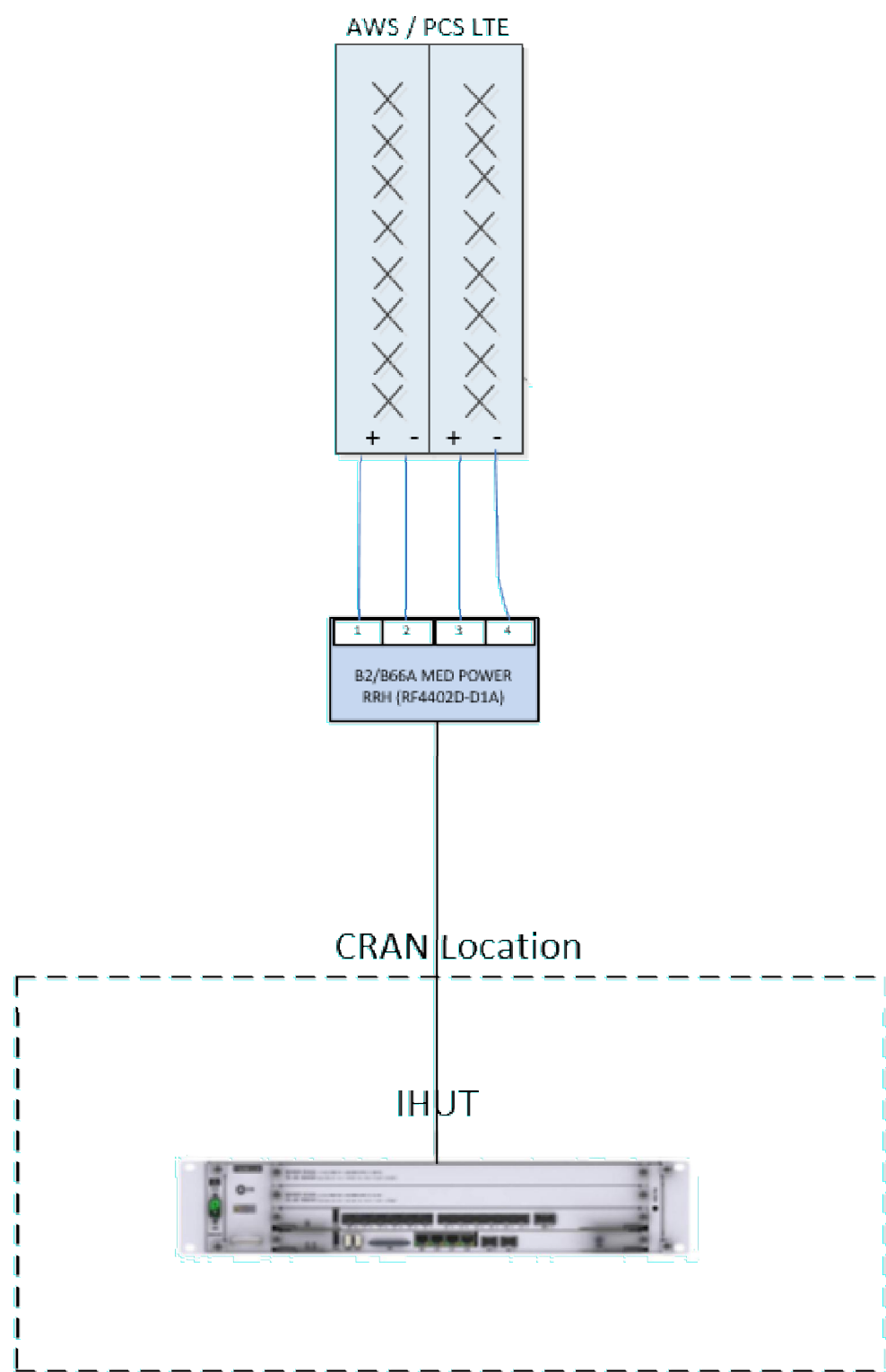
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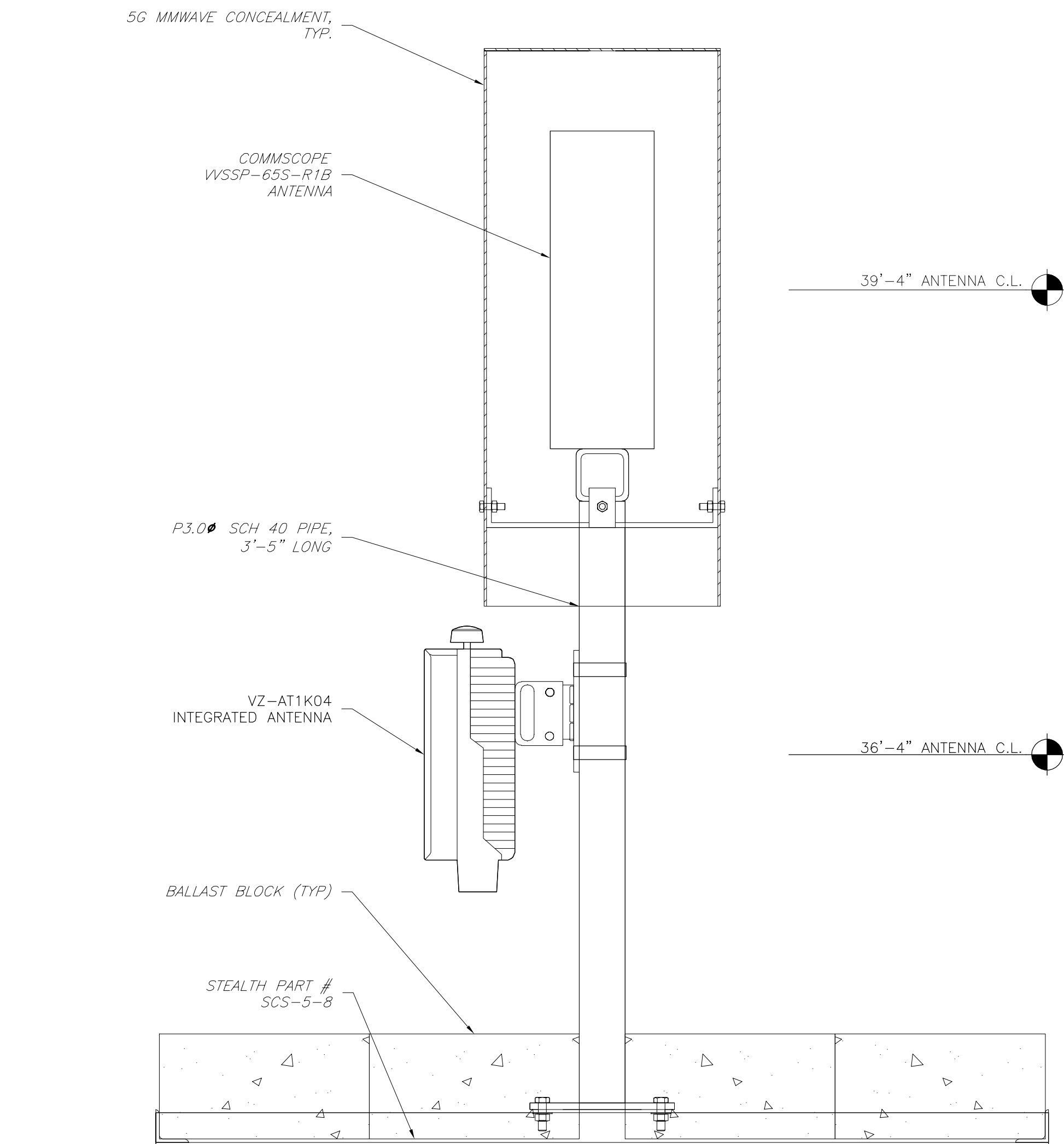
1 VZ- AT1K04 INTEGRATED ANTENNA
A-2 NTS



2 B2/B66a RRH - BR049 DETAIL
A-2 NTS



3 PLUMBING DIAGRAM DETAIL
A-2 NTS



4 PROPOSED ANTENNA MOUNTING DETAIL
A-2 NTS

ENGINEER

APPLICANT

SITE INFORMATION

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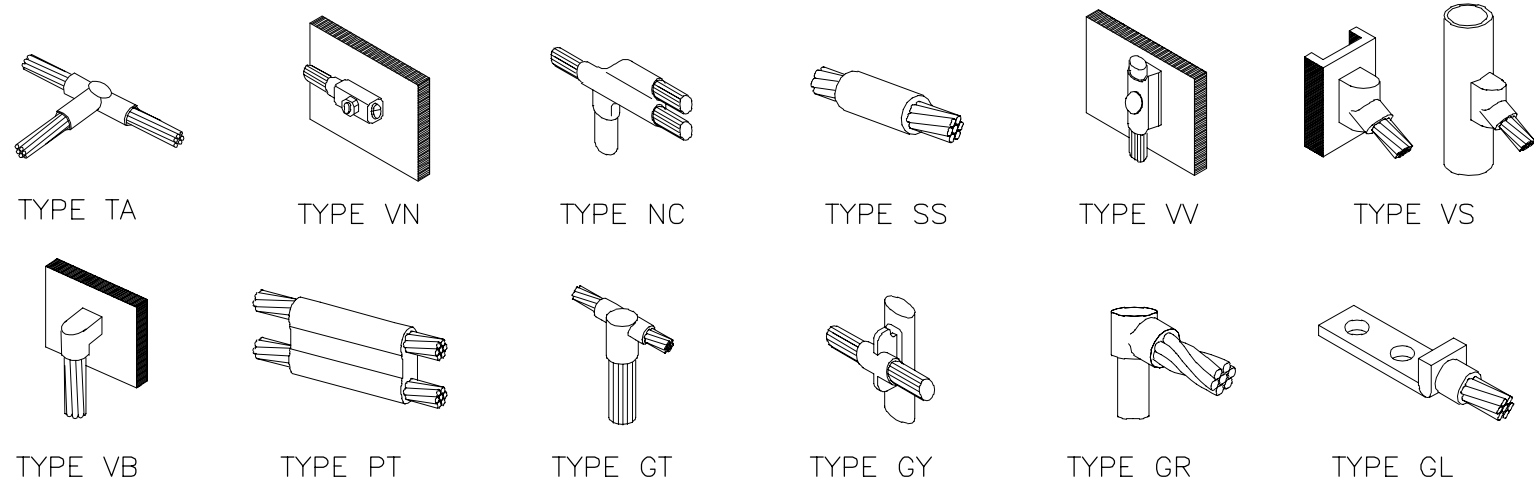
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MARYLAND PROFESSIONAL ENGINEER
LICENSE #55491

ANTENNA DETAILS

A-2

GROUNDING NOTES

1. GROUNDING SHALL COMPLY WITH NEC ART. 250. ADDITIONALLY, GROUNDING, BONDING AND LIGHTING PROTECTION SHALL BE DONE IN ACCORDANCE WITH VERIZON WIRELESS GROUNDING STANDARDS.
2. GROUND CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURERS CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.
3. USE #6 COPPER STRANDED WIRE WITH GREEN COLOR INSULATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE DRAWING.
4. ALL POWER AND GROUND CONNECTIONS TO BE CRIMP-STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY HARGER (OR APPROVED EQUAL) RATED FOR OPERATION AT NO LESS THAN 75°C OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.
5. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AT RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #6 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY. BOND ANY METAL OBJECTS WITHIN 6 FEET OF PROJECT OWNER EQUIPMENT OR CABINET TO MASTER GROUND BAR OR GROUNDING RING.
6. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LUGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
7. APPLY OXIDE INHIBITING COMPOUND TO ALL MECHANICAL GROUND CONNECTIONS.
8. CONTRACTOR SHALL PROVIDE AND INSTALL OMNI DIRECTIONAL ELECTRONIC MARKER SYSTEM (EMS) BALLS OVER EACH GROUND ROD AND BONDING POINT BETWEEN EXISTING TOWER/ MONOPOLE GROUNDING RING AND EQUIPMENT GROUNDING RING.
9. CONTRACTOR SHALL TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION. 5 OHMNS MINIMUM RESISTANCE REQUIRED.
10. CONTRACTOR SHALL CONDUCT ANTENNA, CABLE, AND LNA RETURN-LOSS AND DISTANCE-TO-FAULT MEASUREMENTS (SWEEP TESTS) AND RECORD RESULTS FOR PROJECT CLOSE OUT.

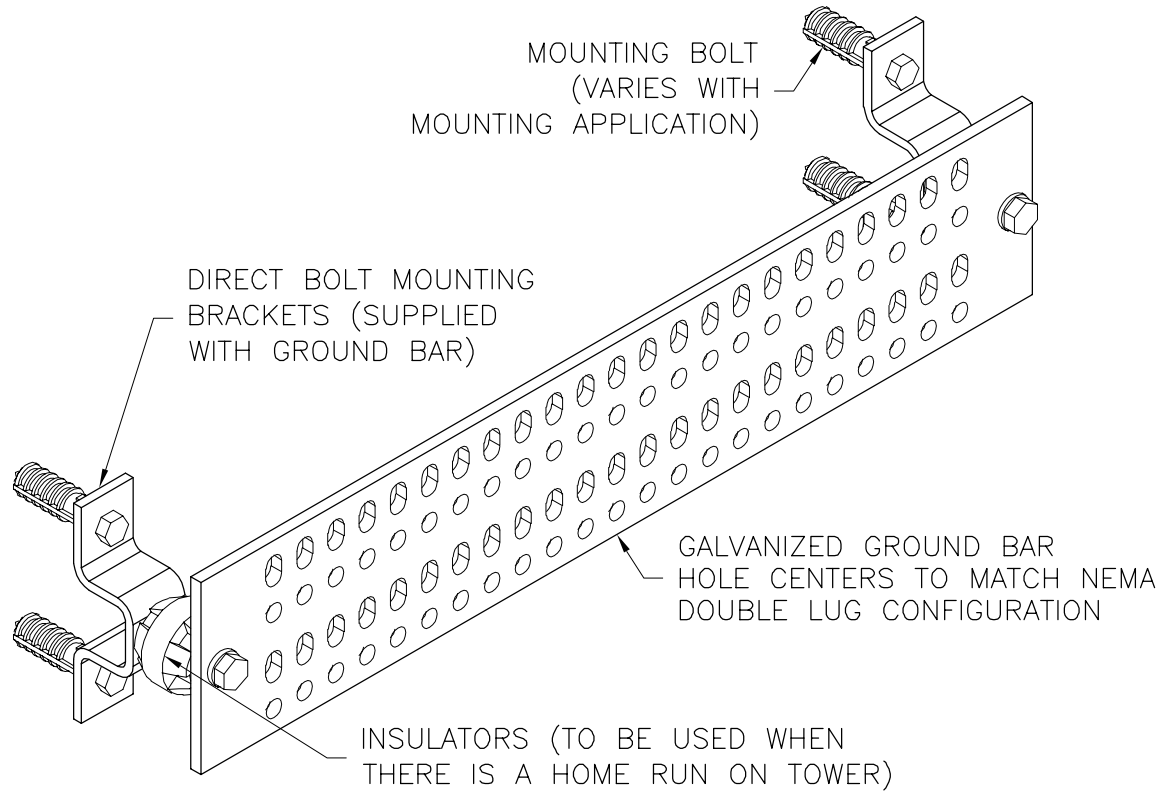


1

G-1

CADWELD GROUNDING CONNECTION DETAILS

NTS



GROUND BAR SCHEDULE				
TYPE	QTY	MANUFACTURER	PART NO.	REMARKS
MGB	2	ITS	GB12	OR EQUAL
CBG	3	ITS	GB24	OR EQUAL

2

G-1

GROUND BAR DETAIL

NTS

STRUCTURAL NOTES

1. THE STRUCTURAL STEEL CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ANCHOR BOLT LOCATIONS, ELEVATION OF TOP OF CONCRETE AND BEARING PLATES, ALIGNMENT ETC. PRIOR TO START OF STEEL ERECTION.
2. THE LATEST EDITION OF THE FOLLOWING SPECIFICATIONS SHALL GOVERN:

A. AISC – "ALLOWABLE STRESS DESIGN SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS"

B. AISC – "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES".

C. AWS – "D1.1 STRUCTURAL WELDING CODE – STEEL".
3. MATERIAL, UNLESS OTHERWISE NOTED, SHALL CONFORM TO THE FOLLOWING ASTM SPECIFICATIONS

STRUCTURAL WIDE FLANGE & M SHAPES

OTHER STRUCTURAL SHAPES AND PLATES

STRUCTURAL TUBING

HIGH STRENGTH BOLTS

THREADED RODS

ANCHOR BOLTS

PIPE (HANDRAIL)

A992 OR A572

Fy = 50KSI

A36, Fy = 36 KSI

A500, GRADE B

Fy = 46 KSI

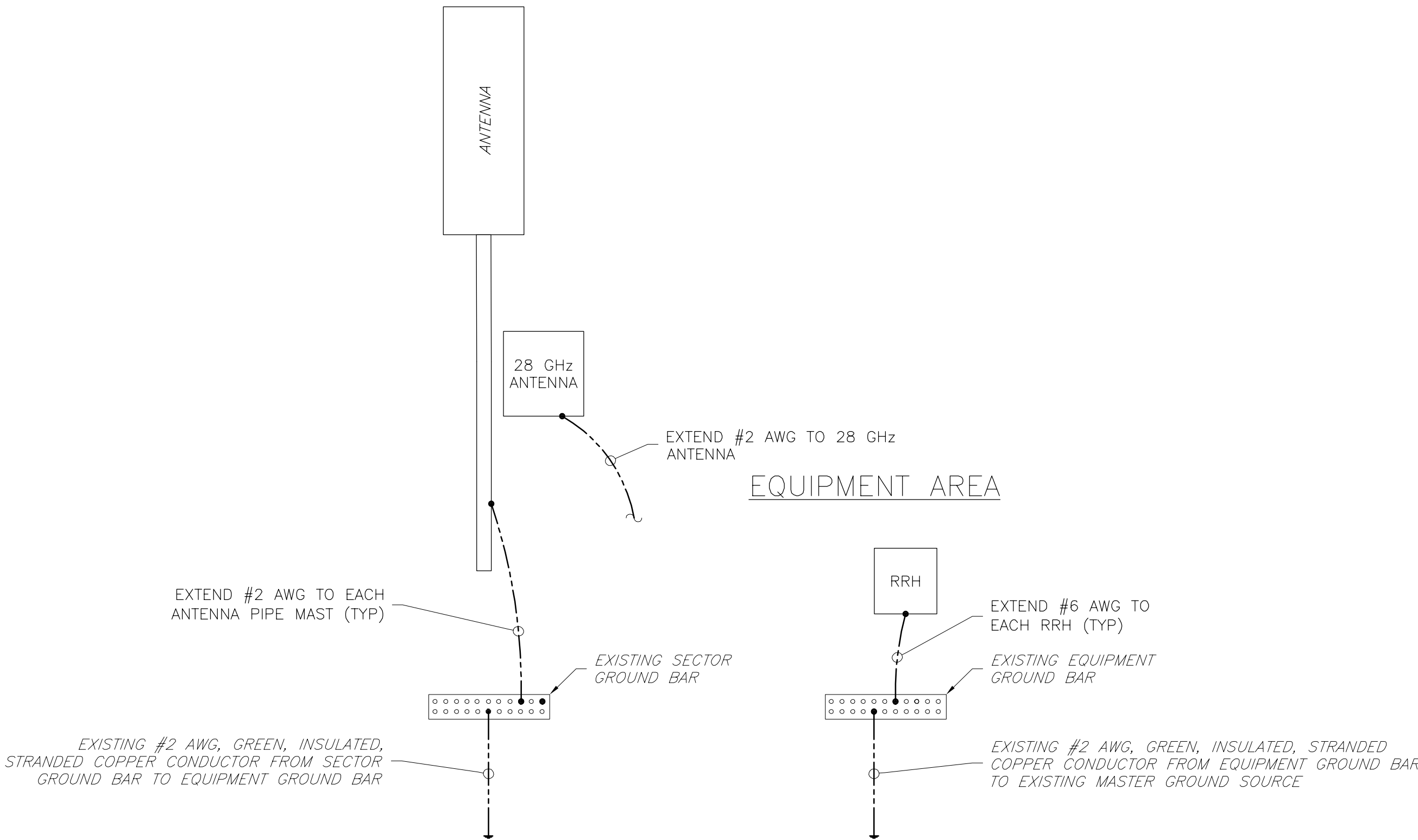
A325

A354, GRADE BC

A325 OR A354 BC

SCH 40 PIPE
4. ALL WELDING SHALL BE IN ACCORDANCE WITH AWS D1.1 USING E70XX ELECTRODES. UNLESS OTHERWISE NOTED PROVIDE CONTINUOUS MINIMUM SIZED FILLET WELDS PER AISC REQUIREMENTS.
5. HOLES IN STEEL SHALL BE DRILLED OR PUNCHED. ALL SLOTTED HOLES SHALL BE PROVIDED WITH SMOOTH EDGES. BURNING OF HOLES AND TORCH CUTTING AT THE SITE IS NOT PERMITTED. ALL HOLES IN BEARING PLATES SHALL BE DRILLED.
6. ALL STEEL TO BE HOT-DIPPED GALVANIZED AFTER FABRICATION PER ASTM A123.
7. EPOXY ANCHORS TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS.
8. ALL BOLTS SHALL BE TIGHTENED USING TURN-OF-THE-NUT METHOD PER AISC SPECIFICATIONS USING STANDARD HOLES.
9. CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS AND FIT PRIOR TO FABRICATION.
10. THE FABRICATOR SHALL FURNISH CHECKED SHOP AND ERECTION DRAWINGS TO THE ENGINEER, AND OBTAIN APPROVAL PRIOR TO FABRICATING ANY STRUCTURAL STEEL. SHOP DRAWINGS SHALL CONFORM TO AISC "DETAILING FOR STEEL CONSTRUCTION".

ANTENNA SECTOR



3

G-1

GROUNDING DIAGRAM

NTS

ENGINEER

APPLICANT

SITE INFORMATION

DESIGN RECORD

PROFESSIONAL STAMP

ENGINEER

SHEET TITLE

SHEET NUMBER



NB+C ENGINEERING SERVICES, LLC.
6095 MARSHALEE DRIVE, SUITE 300
ELKRIDGE, MD 21075
(410) 712-7082



10170 JUNCTION DRIVE, FLOOR 3,
ANNAPOLIS JUNCTION, MD 20701
(301) 617-4210

ROCKVILLE_12_ODAS-A
6015 MONTROSE ROAD
ROCKVILLE, MD 20852
MONTGOMERY COUNTY

REVISIONS

REV	DATE	DESCRIPTION	BY
0	05/11/21	FINAL CDs	CSZ
A	04/06/21	PRELIMINARY CDs	AMM



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. 55491, EXPIRATION DATE 01/08/2022

TRENT TRAVIS SNARR, P.E.
MARYLAND PROFESSIONAL ENGINEER
LICENSE #55491

GROUNDING
DETAILS & NOTES

G-1

App No:

2021111599

Application General Information

Applicant Name	Network Building and Consultin	Updated	11/3/2021
Application Type	Minor Modification	Ann. Plan?	Yes
Carrier	Verizon Wireless	Will site be used to support government telecommunications facilities or other equipment for government use?	No
Solution Type	Small Cell		
Existing	Existing	Gvt. Use Desc.	

Application Description

Project consists of removing (1) existing antenna and (1) existing remote radio head and installing (1) new proposed antenna as well as (1) new proposed remote radio head

Site Information

Site Id	692	Zoning	CRT-3.0
Structure Type	Building	Latitude	39.0534
Street Address	6015 Montrose Rd	Longitude	-77.1218
County Site Name	Rockville 12	Ground Elevation	370
Carrier Site Name	Rockville 12 ODAS	City	Rockville
Site Owner	Verizon Maryland Merge Co	Lease Status	Leased
Structure Owner	Verizon Maryland Merge Co	Does the structure require an antenna structure registration under FCC Title 47	No
Existing Structure Height	34.3	Distance to Residential Property (New, Replacement, Colocation Only)	
Provide the proposed height of the replacement structure without any antenna (New, Replacement Apps Only)		Distance to Commercial Property (New, Replacement, Colocation Only)	

Justification of why this site was selected:

N/A Existing site

Nearby Sites (New, Replacement Apps Only):

Wednesday, November 3, 2021

4:28:37 PM

App No:

2021111599

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

--

App No:

2021111599

6409 Questions

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

No

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?

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?

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?

Will the proposed installation require more the standard number of new equipment cabinets for the technology involved, but not to exceed four cabinets?YN

Will the proposed installation increase the height of the structure by: (1) more than 10% or (2) more than 10 feet, whichever is greater?

Does the structure or current installation have concealment elements/measures?

Yes

Will the proposed installation require excavation or expansion outside the current boundaries of the site?

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

Proposed antenna will be installed inside existing stealth concealment

Small Wireless Facility Informatio

Small Wireless Facility Questions

Small Wireless Facility?

Yes

Is the structure 10% taller than adjacent structures?

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

1.715

Please list adjacent structure heights

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

1

Tribal Lands?

No

ROW Information

PROW?

No

Pole Number

ROW owner

ROW width

Wednesday, November 3, 2021

4:28:37 PM

App No:

2021111599

Antenna Information

Antenna Compliance

Compliance Desc

Antenna Location

Antenna Loc. Desc.

Env. Assessment

Cat. Excluded?

Routine Env. Evaluation

Antenna Model

Frequency

RAD Center Max ERP Antenna Dimensions Quantity

Wednesday, November 3, 2021

4:28:37 PM



102 AT1K04 Product Specification

Specifies hardware configuration, functions, specifications, components, ports, and LED information for the radio units.

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This manual should be read and used as a guideline for properly installing and/or operating the product.

This manual may be changed for system improvement, standardization and other technical reasons without prior notice.

Updated manuals are available at:

<https://systems.samsungwireless.com/>

For questions on the manuals or their content, contact

[NetSys Tech Writer@sea.samsung.com](mailto:NetSys_Tech_Writer@sea.samsung.com)

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Preface

This document describes the AT1K04 series of Access Unit (AU) in a 5G network.

The document provides information that is useful to network operators during the installation, operation, and management cycles. It includes information such as the radio unit functions, hardware configuration, ports, and LED information.



Some hardware configurations are not supported by all software releases or approved for all markets.

Conventions in this Document

Samsung Networks product documentation uses the following conventions.

Symbols

Symbol	Description
	Indicates a task.
	Indicates a shortcut or an alternative method.
	Provides additional information.
	Provides information or instructions that you should follow to avoid service failure or damage to equipment.
	Provides information or instructions that you should follow to avoid personal injury or fatality.
	Provides antistatic precautions that you should observe.

Menu Commands

menu | **command**

This indicates that you must select a command on a menu, where **menu** is the name of the menu, and **command** is the name of the command on that menu.

File Names and Paths

These are indicated by a bold typeface. For example:

Copy **filename.ext** into the **/home/folder1/folder2/bin/** folder.

User Input and Console Screen Output Text

- The input and output text is presented in the Courier New font. For example, context <designated epc-context-name>
- The CLI command is presented in bold capital letters and Courier New font. For example, Type the **RTRV-NE-STS** command in the input field.
- The YANG object is presented in the small letters and boldface. For example, **eutran-cell-conf-idle**

New and Changed Information

This section describes information that has been added/changed since the previous publication of this manual.

- 'Chapter 1 Introduction' is added.
- In Chapter 4, specifications of Input current and Power consumption are modified.

Revision History

The following table lists all versions of this document.

Document Version	Publication Date	Remarks
1.0	October 2020	First version
2.0	November 2020	Specifications are modified

Organization of This Document

Section	Title	Description
Chapter 1	Introduction	Introduces this manual.
Chapter 2	AU Overview	Provides the hardware overview, functional description and general specifications.
Chapter 3	Functional Description	Describes function of this product in detail.
Chapter 4	Specifications	Describes specifications of this product.
Chapter 5	External Interface	Describes external interface of this product in detail.
Appendix	Acronyms	Describes the acronyms used in this manual.

Related Documentation

- 310 AU Installation Manual
- 101 5G NR gNB System Description

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Personal and Product Safety

This product safety information includes European directives, which you must follow. If these do not apply in your country, please follow similar directives that do apply in your country.

Electrical

All structural parts are grounded and all input and outputs have built-in isolation from the network. All input and output ports that connect to external power sources are designed to meet relevant national safety requirements.

The product contains hazardous energy levels as defined by UL 62368-1. Care must be taken when maintaining this equipment as injury to personnel or damage to the equipment could result from mistakes. Maintenance should only be carried out by trained and competent engineers who are familiar with the relevant procedures and instructions.

Lasers

The product is fitted with optic modules rated as Class 1 radiation-emitting devices under UL 60825-1. During installation, operation, and maintenance, never look into the end of an optical fiber directly or by reflection either with the naked eye or through an optical instrument. Do not operate equipment with exposed fiber connectors-cover these with fiber cables or blanking caps. Do not remove equipment covers during operation unless requested to do so in the documentation. Carry out normal safety precautions when trimming fibers during installation.

Manual Handling

Care should be taken when handling equipment. Give due consideration to the weight of the equipment, the physical capability of the individual(s) handling the equipment, and movements such as twisting, bending and stooping, which could lead to skeletal and muscular injuries.

Installation

Installation must be carried out by trained and competent engineers only. All relevant safety measures should be taken to ensure equipment is not connected to live power and transmission sources during installation. Equipment must be correctly installed in order to meet the relevant safety standards and approval conditions.

Each power feed to the unit requires a separate fused feed from the provided power supply. The cable between the power distribution point and the installed equipment must be 14 AWG or greater.

Rack-mountable equipment must be placed in a standard 19-inch rack and secured with the appropriate fixings as detailed in the installation manual.

Maintenance

Maintenance must only be carried out by a suitably trained and competent technician. All safety instructions must be carefully observed at all times. Equipment covers should not be removed while live power and transmission is connected unless in a controlled environment by trained technicians.

Fire

To protect against potential fire due to current overload, the equipment is fused.

Environment

The product must be operated in an environment with the specified relative humidity and ambient temperature ranges.

Keep all liquids away from the equipment as accidental spillage can cause severe damage.

Cooling

Natural convection cooling.

Anti-Static Precautions

The circuit boards and other modules in the product are sensitive to and easily damaged by static electricity. If any card or sub-assembly is removed from the unit, the following anti-static precautions must be observed at all times:

- Service personnel must wear anti-static wrist straps.
- Circuit boards and sub-assemblies must be placed on ground conductive mats or in conductive bags.
- All tools must be discharged to ground before use.
- The anti-static wrist strap and cord must be checked at regular intervals for their suitability for use.

Grounding

To comply with UL 62368-1, the equipment must be connected to a safety grounding point via a permanent link. Grounding points are located on the product for this purpose. Always connect the ground cable before fitting other cables. The product must remain grounded continuously unless all connections to the power supply and data network are all removed.

If equipment is grounded through a cabinet or rack, make sure it is done so properly according to the installation instructions.

Power Supply Connection

Power connections and installation of associated wiring must be carried out by a suitably qualified technician.

Only devices that comply with all relevant national safety requirements should be connected to the unit's power supply inlets. Other usage will invalidate any approval given to this equipment.

Connection of this equipment to devices that are not marked with all relevant national safety requirements may produce hazardous conditions on the network.

When the power supply is obtained by a rectifier/safety isolation transformer, the supply must meet the requirements of UL 62368-1 providing double/reinforced insulation between hazardous voltages and SELV/TNV circuits. Any battery must be separated from hazardous voltages by reinforced insulation.

Indirect Connection

Before indirectly connecting any equipment to another device through a shared power supply, ALWAYS seek advice from a competent engineer.

Devices that are not marked according to the relevant national safety standards may produce hazardous conditions on the network.

Product Disposal

To reduce the environmental impact of products, Samsung has joined WEEE compliance activities.

The WEEE symbol on the product indicates that the product is covered by the European Directive 2002/96/CE for the disposal of Waste Electrical and Electronic Equipment (WEEE). This means that the product should be disposed of separately from the municipal waste stream via designated collection facilities appointed by the government or the local authorities. This will help prevent potential negative consequences for the environment and human health. Please check the terms and conditions of the purchase contract for information about correct disposal.

Battery Disposal

The product contains a battery on the processor card. The battery should not be disposed of with other household waste. Where marked, the chemical symbols Hg, Cd or Pb indicate that the battery contains mercury, cadmium or lead above the reference levels in EC Directive 2006/66. The battery incorporated in this product is not user replaceable. For information on its replacement, please contact your service provider. Do not attempt to remove the battery or dispose it in a fire. Do not disassemble, crush, or puncture the battery.

End of life recycling materials information is available from Samsung.

California USA Only

This Perchlorate warning applies only to primary CR (Manganese Dioxide)
Lithium coin cells in the product sold or distributed ONLY in California USA

‘Perchlorate Material-special handling may apply, Refer to
www.dtsc.ca.gov/hazardouswaste/perchlorate.’

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Equipment Markings



This marking on the product, accessories or literature indicates that the product and its electronic accessories (e.g. charger, headset, USB cable) should not be disposed of with other household waste at the end of their working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources.

Household users should contact either the retailer where they purchased this product, or their local government office, for details of where and how they can take these items for environmentally safe recycling.

Business users should contact their supplier and check the terms and conditions of the purchase contract. This product and its electronic accessories should not be mixed with other commercial wastes for disposal.



Correct disposal of batteries in this product (Applicable in countries with separate collection systems.)

The marking on the battery, manual or packaging indicates that the battery in this product should not be disposed of with other household waste. Where marked, the chemical symbols Hg, Cd or Pb indicate that the battery contains mercury, cadmium or lead above the reference levels in EC Directive 2006/66.

The battery incorporated in this product is not user replaceable. For information on its replacement, please contact your service provider. Do not attempt to remove the battery or dispose it in a fire. Do not disassemble, crush, or puncture the battery. If you intend to discard the product, the waste collection site will take the appropriate measures for the recycling and treatment of the product, including the battery.



Hot surface warning

Allow to cool before servicing.

Do not touch before cooling.

Notice! Be careful not to touch due to high temperature.

The system must be installed in a restricted area, and make sure the work is done by personnel properly trained for the job.



Protective earth

AU should be grounded.

Chapter 1 Introduction

This document introduces an Access Unit (AU) which is integrated with a Digital Unit (DU), Radio Unit (RU), and antenna.

In addition, this document describes the product components, serving as the reference for the installation and O & M. It specifies hardware configuration, functions, specifications, component's ports, and LED information of AU products.

The document is divided into five chapters.

- Introduction
This chapter is an introduction of the document.
- AU Overview
This chapter describes hardware overview and appearance of the AU products.
- Functional Description
This chapter describes functional description such as clock and cooling for the AU products.
- Specifications
This chapter describes specifications of the AU products.
- External Interface
This chapter describes hardware components of AU in detail, such as appearance of external interface, and detail information of ports and LED of the AU products.
- Acronyms
This appendix lists acronyms used in this document.

Chapter 2 AU Overview

An Access Unit (AU) is integrated with a Digital Unit (DU), Radio Unit (RU), and antenna. It consists of a digital block that supports the function split option two and a radio block that transmits and receives the Radio Frequency (RF) signals. The digital block consists of a main processor and modem block. The radio block consists of a DAC/ADC, Radio Frequency integrated (RFIC), and 4T/4R antenna.

The following table outlines the name and description of the AU.

Table 1. Name and Description of Units

Model Name	Description
AT1K04	28 GHz 5G AU

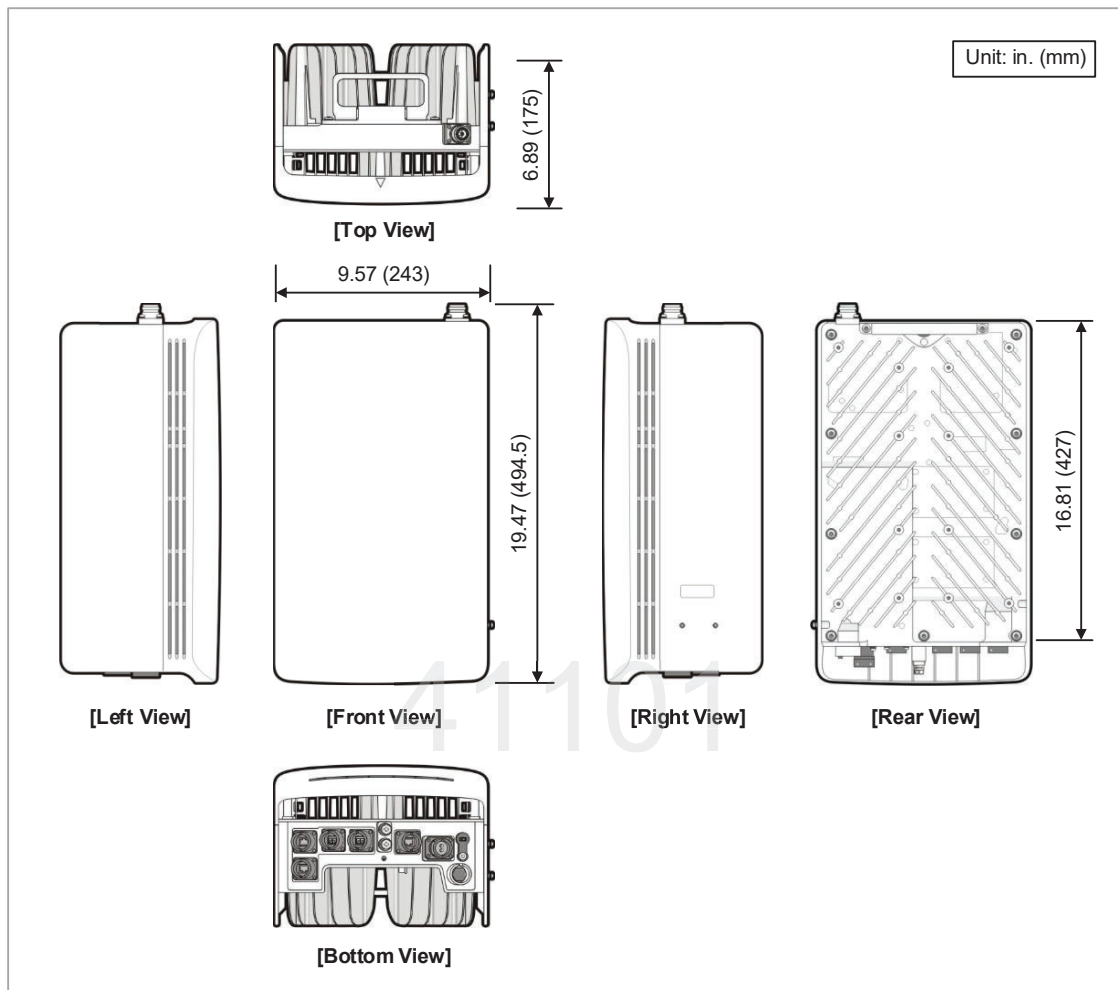


Some hardware configurations are not supported by all the software releases or approved for all the markets.

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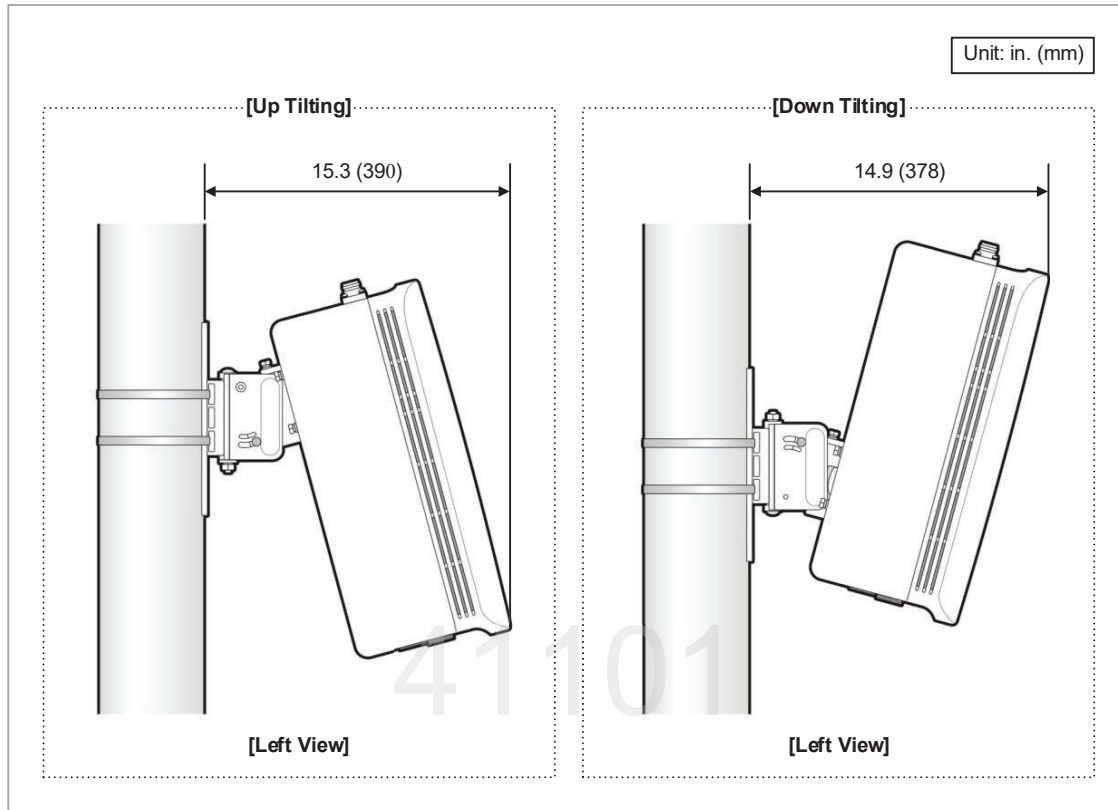
The following figures depict the physical views of the AT1K04.

Figure 1. AT1K04 Appearance



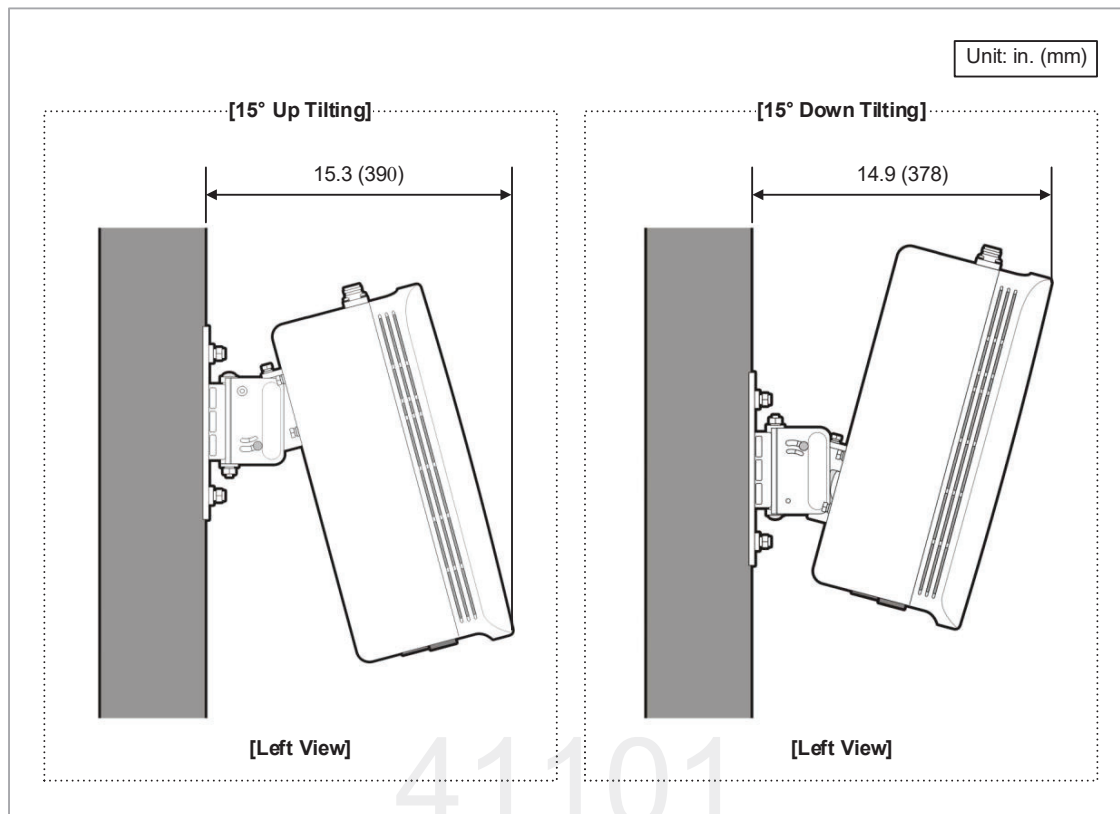
The AU can be mounted on a wall or pole as displayed in the following installation scenario.

Figure 2. Pole Type Installation



The above installation scenario might be different depending on the system configuration. For more information, refer to *310 AU Installation Manual*.

Figure 3. Wall Type Installation

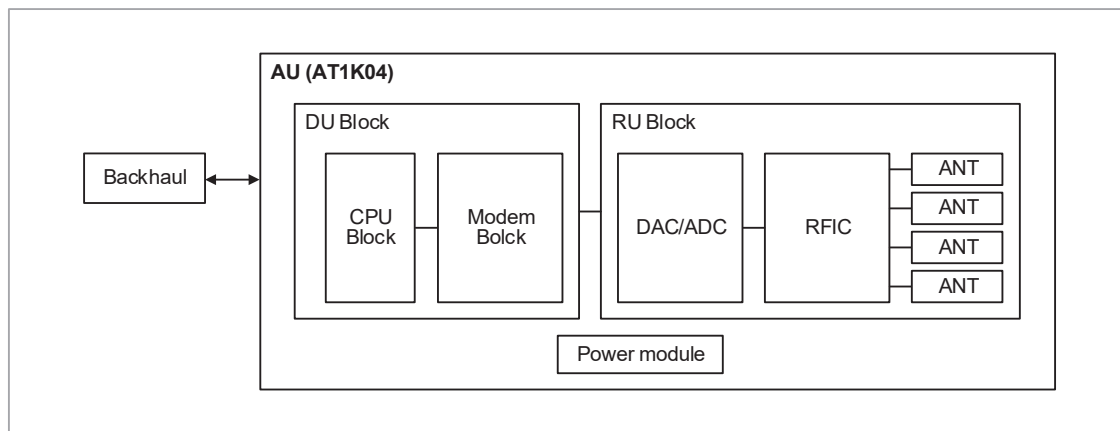


The above installation scenario might be different depending on the system configuration. For more information, refer to *310 AU Installation Manual*.

Chapter 3 Functional Description

The following figure displays the block diagram of AU.

Figure 4. Block Diagram of AU (AT1K04)



The 5G AU consists of the DU block and the RU block, and is powered by the external power.

The DU block consists of the CPU block and the modem block. The DU block supports the backhaul connection with the CU, operation and management of the AU, and processes the function of the Radio Link Control (RLC), Media Access Control (MAC), and the physical layer.

The RU block consists of the digital/analog converter, RFIC, and antenna. It processes the DAC/ADC, UP/Down conversion, and amplifier, filtering, beamforming functions of the transmitted/received signal.

Clock

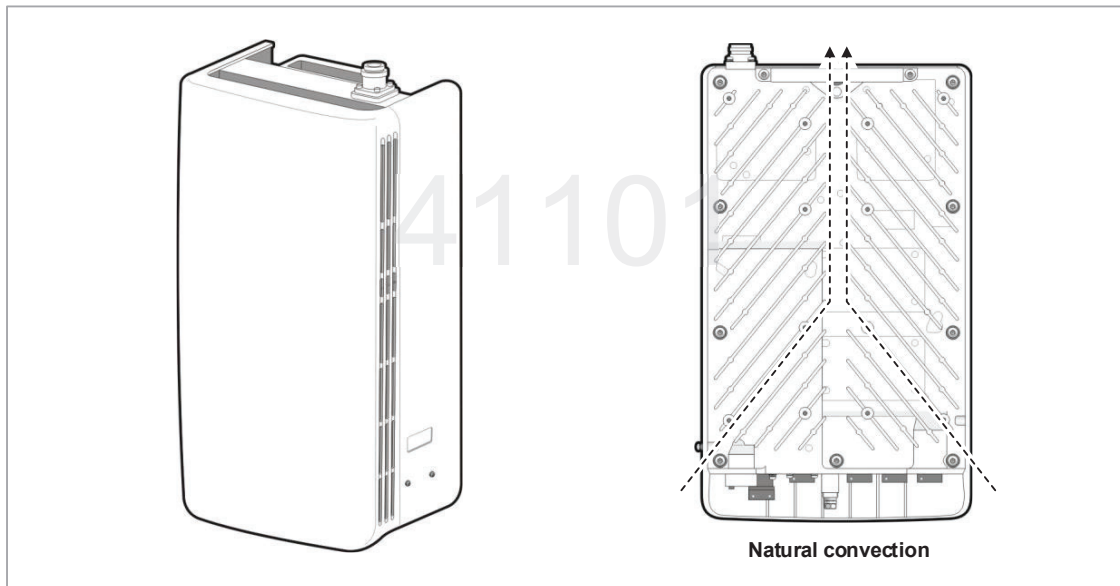
The AU uses the GNSS for synchronization. The Multi-Reference Synchronization Block (MRSB) of the AU is the GNSS/IEEE1588v2 receiver module that receives the synchronization signal from the GPS and backhaul. After receiving the signal, the MRSB generates and distributes the clock.

If the AU is unable to receive the GNSS signal due to a fault condition, it performs the holdover function to provide the existing normal clock for a specific period.

Cooling

The AU uses a natural convection cooling method without using a fan. The following figure displays the cooling structure of the AU.

Figure 5. Cooling Structure of AU



Chapter 4 Specifications

The following table displays the main specifications of the AU.

Table 2. Specifications (AT1K04)

Item		Description
Air Technology		5G NR
RF Chain		4Tx/4Rx
Operating Frequency		27.5 to 28.35 GHz
IBW/OBW		850/800 MHz
Channel Bandwidth		100 MHz, 50/100 MHz mixed
Capacity		800 M 4T4R, Max 8CC
MIMO Layer		DL 4 Layers/UL 2 Layers
Antenna Array Configuration		1024 AE (4T4R)
Antenna Array Element		256 AE (16 H 16 V)/path, 1024 AE/unit
Antenna Array Gain		28 dBi/path
Modulation (DL/UL)		64/64QAM
RF Output Power		26 dBm/path, 32 dBm/unit
EIRP		54 dBm/path, 60 dBm/unit
Dimension		243 (W) × 427 (H) × 175 mm (D), 18.2 L
Weight		14.5 kg
Input Voltage		-48 V DC or 100 to 240 V AC
Input Current		4.3 A (AC), 8.3 A (DC)
Operating Temperature		-40 to 55 °C (with solar load, wind speed 1.5 m/s)
Operating Humidity		5 to 100 % RH (Condensing, not to exceed 30 g/m ³ absolute humidity)
Altitude		-60 m to 1,800 m
Earthquake		Telcordia GR-63-CORE, Section 4.4.1 Earthquake (Zone 4)
Vibration ^{a)}		Telcordia GR-63-CORE
Wind Resistance		Telcordia GR-487-CORE
Noise (sound pressure level) ^{a)}		45 dBA or less
Ingress Protection Rating		• IEC 60529 • IP65
EMC		FCC part 15
Safety		UL 62368-1
RF		FCC Part 30
EVM		Support (EVM 8 % @ 64QAM)
Optic Interface		1/10/25 GbE × 2 ports
Power Consumption	AC	• Typical: 364 W (Load 50 %, Temp. 25 °C, TDD Ratio 4:1) • Max: 402 W (Load 100 %, Temp. 55 °C, TDD Ratio 4:1)
	DC	• Typical: 348 W (Load 50 %, Temp. 25 °C, TDD Ratio 4:1) • Max: 385 W (Load 100 %, Temp. 55 °C, TDD Ratio 4:1)
Synchronization		GPS/IEEE1588v2

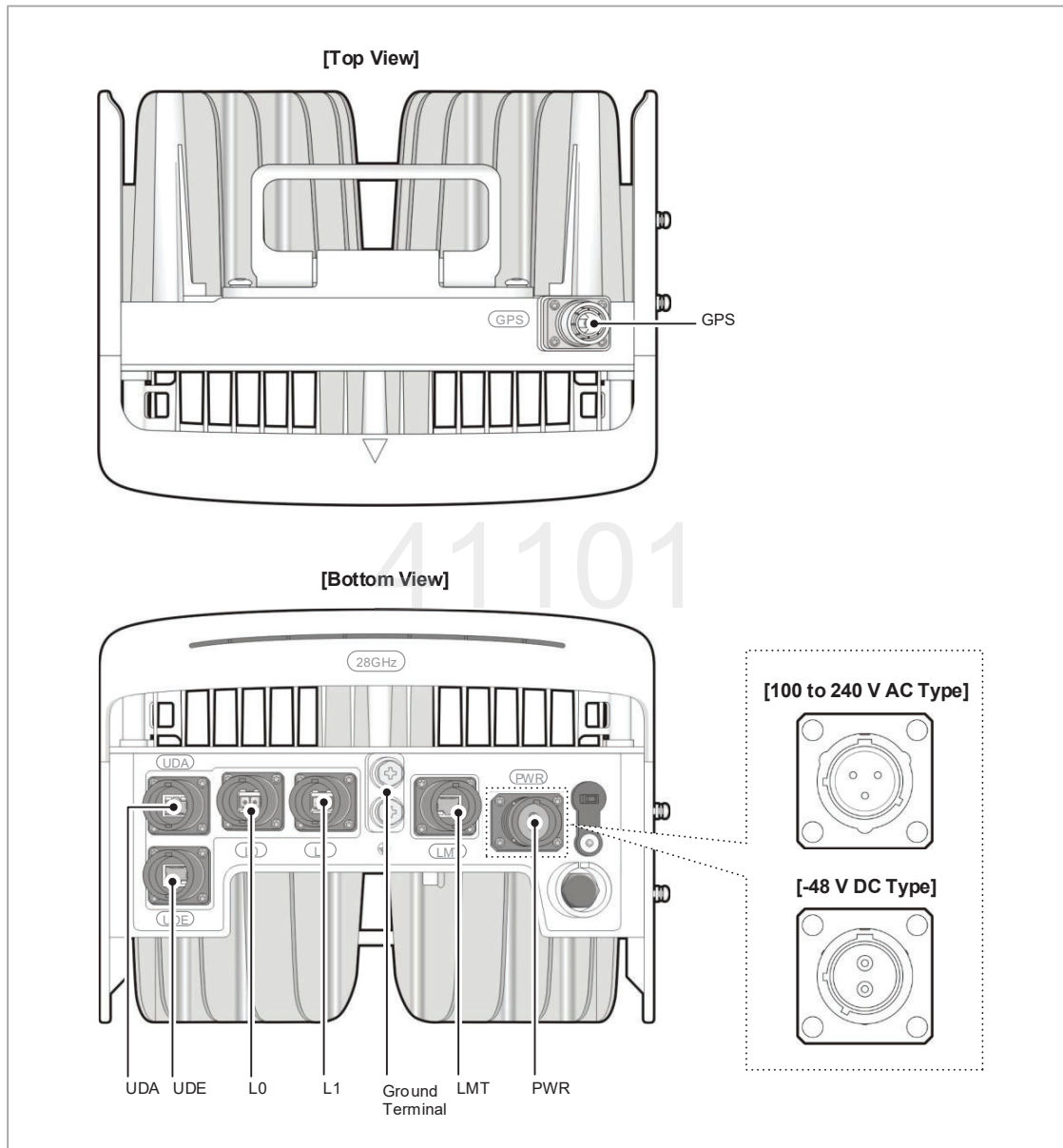
Item	Description
Cooling	Natural Convection cooling
Function Split	Option 2
Installation	Pole/Wall/Tower
a) Measures at the height of 1.0 m, and distance of 1.5 m.	

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Chapter 5 External Interface

The following figure depicts the external interface of an AT1K04.

Figure 6. AT1K04 External Interface



LED Information

The LED displays the current status of AT1K04. The following table outlines the status and description for the AT1K04.

Table 3. AT1K04 LED Information

Status	Description
●	Red on Hardware initialization Critical alarm or backhaul link down detected.
◐	Red Blinking (Fast) Boot flash firmware fusing state (Blinking period: 200 ms)
◑	Red Blinking (Slow) Major/Minor Alarm detected (Blinking period: 1000 ms)
●	Amber on Bootling completion
◐	Amber Blinking (Fast) Software download state (Blinking period: 200 ms)
◑	Amber Blinking (Slow) System registration state (Blinking period: 1000 ms)
●	Green on Software activation state
◐	Green Blinking Normal operation
○	LED off Power off

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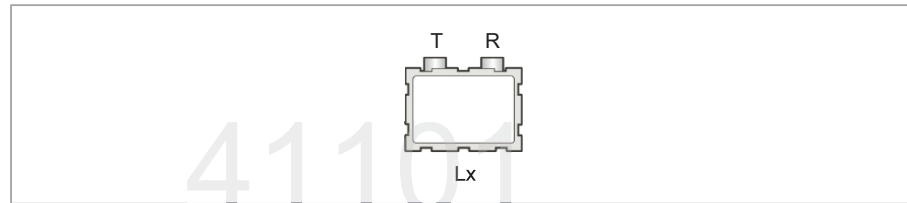
Port Information

The following table outlines the port information of AT1K04.

Table 4. AT1K04 Port Information

Port Name	Connector Type	Description
L0, L1	Push pull, SFP+/SFP28 type	1 GbE/10 GbE/25 GbE backhaul optic interface
PWR	Push pull	-48 V DC or 100 to 240 V AC
UDA	RJ45, push pull	User define alarm/external device status view and control
UDE	RJ45, push pull	Unused port (Disable)
LMT	RJ45, push pull	Local maintenance Ethernet port (10/100 Base-TX)
GNSS	4.3-10+	GPS Antenna interface port (Top of product)
LED	LED	Status LED

Small Form Factor Pluggable (SFP+/SFP28) cage is as follows:



L0 and L1 are optical modules. Do not look into the optical module to avoid damage to the eyes.



Appendix Acronyms

ADC	Analog to Digital Converter
AU	Access Unit
CPRI	Common Public Radio Interface
DAC	Digital to Analog Converter
EMC	Electromagnetic Compatibility
FCC	Federal Communications Commission
gNB	next generation Node B
gNB-CU	gNB-Centralized Unit
gNB-DU	gNB-Distributed Unit
LED	Light Emitting Diode
MAC	Media Access Control
RF	Radio Frequency
RFIC	Radio Frequency Integrated Circuit
RLC	Radio Link Control
RU	Radio Unit
SFP	Small Form Factor Pluggable
UDA	User Defined Alarm

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102 AT1K04
Product Specification

Document Version 2.0

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May 28, 2021

Lloyd Anderson
Principal Engineer – Construction
Embedded-Network Implementation-Washington/Baltimore
Verizon Wireless
7600 Montpelier Road, Laurel, MD 20723

Structural Letter for the Proposed UPGRADE RRH

Site Data: **Address:** 6015 Montrose Road, Rockville, MD 20852
 Verizon Site Name: Rockville_12_ODAS-A
 PCLC Code: 392955
 FUZE Project ID: 16400009
 NB+C ES Project Number: 100383

Dear Mr. Anderson:

Pursuant to your request, Network Building + Consulting Engineering Services (NB+C ES) has evaluated the proposed Verizon Wireless telecommunication upgrades at the subject location. The existing structure is a 34'-4"± tall building located in Rockville, MD. Verizon has proposed one (1) antenna and one (1) RRH, to replace one (1) existing antenna and one (1) existing RRH. The following table below shows the final equipment configuration:

Table 1 - Final Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Carrier	Feed Line Size (in)	Note
18.5	36.33	1	Samsung	VZ-AT1K04	Verizon	Existing Cables	-
	39.33	1	Andrew	VVSSP-65S-R1B			
	36.33	1	Samsung	B2/B66A RRH			

As part of this review and certification, NB+C ES has reviewed the RF Data Sheet provided by Verizon dated March 09, 2021; Final Construction Drawings by NB+C ES dated May 11, 2021; Previous As Built Drawings prepared by NB+C ES dated January 20, 2020; Previous Structural Analysis prepared by NB+C ES dated October 7, 2019; Previous Fabrication Drawings prepared by Raycap Stealth dated November 8, 2019, and Closeout Photos provided by NB+C ES personnel dated January 20, 2020.

This letter assumes that all structural members are in good condition. The contractor shall be responsible for the means and methods of construction. No structural qualification is made or implied by this letter for existing structural members not supporting the proposed installation. Any deterioration or localized damage or distress to the structure or mounts, should be documented and reported to the engineer and repaired by the contractor prior to the installation of the proposed antennas and RRHs.



Based on an assessment of the existing site conditions and by reviewing the aforementioned documents, and per the code provision of the *2018 International Building Code* and *ANSI/TIA-222-H Structural Standard for Antenna Supporting Structures and Antennas and Small Wind Turbine Support Structures* for applied gravity and lateral loads, using an ultimate design wind speed of one-hundred-and-fifteen (115) mph at 39'-4" and 36'-4" above ground level, NB+C ES has determined that the existing structure is adequate and can support the proposed installation without any structural modification or reinforcement to the existing structure.

The proposed antennas and RRHs will be mounted to existing mount pipes and Unistrut members connected to the existing ballast sleds. The proposed installation results in a negligible change in effective projected wind area and lateral loading when compared to the loading used for the previous certification prepared by **NB+C ES** dated January 20, 2020. The additional forces imparted due to wind loading is less than 10% of the original design loads. Therefore, by engineering judgement the existing structure is considered structurally **adequate**, and the previous certification dated January 20, 2020 remain valid and the proposed installation can be installed as intended.

NB+C ENGINEERING SERVICES, LLC

Prepared by: Michael L. Filkoski

Respectfully submitted by:

Krupakaran Kolandaivelu, PE
Director of Engineering
MD PE License #38489



5/28/2021

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: 38489

EXPIRATION DATE: 3.17.2022



6015 MONTROSE ROAD
ROCKVILLE, MD 20852
MONTGOMERY COUNTY

SCOPE OF WORK:	PROJECT CONSISTS OF: REMOVING: • (1) EXISTING ANTENNA • (1) EXISTING RRH
	PROPOSED: • (1) PROPOSED ANTENNA • (1) PROPOSED RRH
SITE ADDRESS:	6015 MONTEROSE ROAD ROCKVILLE, MD 20852
PROPERTY OWNER: ADDRESS:	VERIZON MARYLAND MERGE CO PO BOX 152206 IRVING, TX 152206 - 2206
PARCEL ACCOUNT #:	160400046935
PARCEL AREA:	1.84± ACRES
JURISDICTION:	MONTGOMERY COUNTY
ZONING:	CRT-3.0 C-3.0 R-2.5 H-120 (COMMERCIAL RESIDENTIAL TOWN)
GROUND ELEVATION:	370'-0"± (AMSL)
STRUCTURE TYPE:	COMMERCIAL BUILDING
STRUCTURE HEIGHT:	38'-4"± (AGL)
LATITUDE:	39.053094° / 39° 3' 11.1384" N
LONGITUDE:	-77.121792° / 77° 7' 18.4512" W

The map shows the Montrose neighborhood in Dallas, Texas. A black dot on Montrose Rd, just north of Montrose Pkwy, is labeled 'SITE' with a black arrow pointing to it. The map includes various landmarks and businesses such as Montrose Crossing, Target, and the White Flint Metro Station. Major roads like Montrose Rd, Montrose Pkwy, and Tilden Ln are clearly visible. The map also shows the locations of several schools, including St. Elizabeth Elementary School and Green Acres Elementary School. The map is color-coded with green for parks and blue for water bodies.

T-1	TITLE SHEET
GN-1	GENERAL NOTES
GN-2	PMI CHECKLIST
SP-1	SITE PLAN
C-1	ROOFTOP PLAN & ELEVATION
A-1	ANTENNA SCHEDULE & PLANS
A-2	ANTENNA DETAILS
G-1	GROUNDING DETAILS & NOTES

APPLICANT:	VERIZON WIRELESS 10170 JUNCTION DRIVE, FLOOR 3, ANNAPOLIS JUNCTION, MD 20701 (301) 617-4210
ENGINEERING FIRM:	NB+C ENGINEERING SERVICES, LLC. 6095 MARSHALEE DRIVE, SUITE 300 ELKRIDGE, MD 21075 (410) 712-7092

- 2018 INTERNATIONAL BUILDING CODE
- 2018 INTERNATIONAL PLUMBING CODE
- 2018 INTERNATIONAL ENERGY CONSERVATION CODE
- 2012 INTERNATIONAL PROPERTY MAINTENANCE CODE
- 2018 INTERNATIONAL EXISTING BUILDING CODE
- 2018 INTERNATIONAL RESIDENTIAL CODE
- 2012 INTERNATIONAL GREEN CONSTRUCTION CODE
- 2018 INTERNATIONAL FUEL GAS CODE
- 2018 INTERNATIONAL MECHANICAL CODE

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

- 2018 INTERNATIONAL BUILDING CODE
- 2018 INTERNATIONAL PLUMBING CODE
- 2018 INTERNATIONAL ENERGY CONSERVATION CODE
- 2012 INTERNATIONAL PROPERTY MAINTENANCE CODE
- 2018 INTERNATIONAL EXISTING BUILDING CODE
- 2018 INTERNATIONAL RESIDENTIAL CODE
- 2012 INTERNATIONAL GREEN CONSTRUCTION CODE
- 2018 INTERNATIONAL FUEL GAS CODE
- 2018 INTERNATIONAL MECHANICAL CODE

		APPROVED	APPROVED AS NOTED	DISAPPROVE REVISE
PROPERTY OWNER	DATE	☐	☐	☐
SITE ACQUISITION	DATE	☐	☐	☐
CONSTRUCTION MANAGER	DATE	☐	☐	☐
ZONING	DATE	☐	☐	☐
RF ENGINEER	DATE	☐	☐	☐

NB+CTM
TOTALLY COMMITTED.

NB+C ENGINEERING SERVICES, LLC.
 6095 MARSHALLE DRIVE, SUITE 300
 ELKREDGE, MD 21075
 (410) 712-7062

verizon
10170 JUNCTION DRIVE, FLOOR 3,
ANNAPOLIS JUNCTION, MD 20701
(301) 617-4210

ROCKVILLE_12_ODAS-A
6015 MONTROSE ROAD
ROCKVILLE, MD 20852
MONTGOMERY COUNTY

REVISIONS

0	05/11/21	FINAL CDs	CSZ
A	04/06/21	PRELIMINARY CDs	AMM
REV	DATE	DESCRIPTION	BY

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. 55491, EXPIRATION DATE 01/06/2022

TRENT TRAVIS SNARR, P.E.
MARYLAND PROFESSIONAL ENGINEER
LICENSE #55491

TITLE SHEET

T-1

1. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK. THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES.
2. THE ARCHITECT/ENGINEER HAS MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONTRACT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.
3. THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE CONSTRUCTION MANAGER OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF THE CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK. IN THE EVENT OF DISCREPANCIES THE CONTRACTOR SHALL PRICE THE MORE COSTLY OR EXTENSIVE WORK, UNLESS DIRECTED IN WRITING OTHERWISE.
4. THE CONTRACTOR'S SCOPE OF WORK SHALL INCLUDE FURNISHING ALL MATERIALS, EQUIPMENT, AND LABOR REQUIRED TO COMPLETE THE WORK/PROJECT AS DESCRIBED HEREIN.
5. THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THE PROJECT REQUIREMENTS.
6. THE CONTRACTOR SHALL OBTAIN AUTHORIZATION TO PROCEED WITH CONSTRUCTION PRIOR TO STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED BY THE CONSTRUCTION DRAWING/CONTRACT DOCUMENTS.
7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S/VENDOR'S SPECIFICATION UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.
8. THE CONTRACTOR SHALL MAINTAIN A FULL SET OF CONSTRUCTION DOCUMENTS AT THE SITE UPDATED WITH THE LATEST REVISIONS AND ADDENDA OR CLARIFICATIONS AVAILABLE FOR USE BY ALL PERSONNEL INVOLVED WITH THE PROJECT. REDLINED AS-BUILTS ARE TO BE DELIVERED TO THE CLIENT AT CLOSEOUT.
9. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS WHICH MAY BE REQUIRED FOR THE WORK BY THE ARCHITECT/ENGINEER, THE STATE, COUNTY OR LOCAL GOVERNMENT AUTHORITY.
11. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, EASEMENTS, PAVING, CURBING, ETC. DURING CONSTRUCTION. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL REPAIR ANY DAMAGE THAT MAY HAVE OCCURRED DUE TO CONSTRUCTION ON OR ABOUT THE PROPERTY.
12. THE CONTRACTOR SHALL KEEP THE GENERAL WORK AREA CLEAN AND HAZARD FREE DURING CONSTRUCTION AND DISPOSE OF ALL DIRT, DEBRIS, RUBBISH AND REMOVE EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY. PREMISES SHALL BE LEFT IN CLEAN CONDITION AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE.
13. THE CONTRACTOR SHALL COMPLY WITH ALL OSHA REQUIREMENTS AS THEY APPLY TO THIS PROJECT.
14. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, PROPERTY LINES, ETC. ON THE JOB.
15. FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION (HANDICAPPED ACCESS NOT REQUIRED).
16. FACILITY HAS NO PLUMBING.
17. PRIOR TO OR UPON ENTERING INTO THE SITE COMPOUND, THE PERSONNEL ENTERING THE SITE ARE TO CONTACT THE SWITCH AND THE CLIENT NOC INFORMING THEM OF THE FOLLOWING INFORMATION: WHO IS ENTERING THE SITE AND WHAT COMPANY THEY ARE WITH, WHY THEY ARE ENTERING THE SITE AND HOW LONG THEY PLAN TO BE AT THE SITE.
18. UPON LEAVING THE SITE, THE "SITE" PERSONNEL ARE TO CONTACT THE SWITCH AND CLIENT NOC INFORMING THEM OF DEPARTURE.
19. SHOULD THE SITE ACCESS OCCUR WHILE THE SWITCH IS UNMANNED, THEN AT MINIMUM THE CLIENT NOC WILL BE NOTIFIED OF THE ABOVE INFORMATION.
20. ALL INSTALLATION DEBRIS AND TRASH SHALL BE REMOVED FROM THE SITE ON A DAILY BASIS, ANY EXPENSE THAT IS INCURRED BY CLIENT FOR TRASH REMOVAL WILL BE BACK-CHARGED TO THE SUBCONTRACTOR.
21. THE CONTRACTOR SHALL NOTIFY ENGINEER, WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE CONSTRUCTION MANAGER.
22. ALL ANTENNA OUTAGES MUST BE PLANNED AT A MINIMUM OF 24 HOURS IN ADVANCE. CONTRACTOR MUST CONTACT THE SWITCH AND THE NOC TO COORDINATE. IF THIS POLICY IS NOT ADHERED TO, THE CONTRACTOR WILL BE REMOVED FROM THE BIDDER'S LIST AND ANY OPPORTUNITY FOR FUTURE WORK.

AIR CONDITIONING
ADJUSTABLE
ABOVE FINISH FLOOR
APPROXIMATELY
AMERICAN SOCIETY FOR TESTING AND MATERIALS
ANALOG WIRE GAUGE
AMPERE
BASE TRANSMISSION STATION
BUILDING
BLOCK
BUILDING STANDARD
GROUND BAR
CEILING
CLEAR
CONCRETE
CONSTRUCTION
CONTINUOUS
CONTRACTOR FURNISHED CONTRACTOR INSTALLED
DOUBLE
DIAMETER
DIAGONAL
DIMENSION
DOWN
DETAIL
DRAWING
EAST
EACH
ELEVATION
ELECTRICAL
ELECTRICAL METALLIC TUBING
EQUAL
EQUIPMENT
EACH WAY
EXISTING
EXTERIOR
FINISH
FLOOR
FOOT
GALVANIZED RIGID CONDUIT
GROUND
GAUGE
GALVANIZED
GENERAL CONTRACTOR
GENERATOR
HORIZONTAL
HOUR
HEIGHT
HEATING, VENTILATING AND AIR CONDITIONING
INSIDE DIA.
INCH
INFORMATION
INSULATION
INTERIOR
KILOWOLTS-AMPERE
KILOWATT
POUND(S)
MASTER GROUND BAR
MAXIMUM
MECHANICAL
MANUFACTURER
MANAGER
MINIMUM
MISCELLANEOUS
MOUNTED
NATIONAL ELECTRICAL CODE
NEUTRAL
NORTH
NOT APPLICABLE
NOT IN CONTRACT
NETWORK OPERATIONS CENTER
NOMINAL PIPE SIZE
NOT TO SCALE
OWNER FURNISHED CONTRACTOR INSTALLED
ON CENTER
OPPOSITE
OUTSIDE DIAMETER
OVERHEAD POWER
OVERHEAD TELEPHONE
OVERHEAD UTILITY LINES
PLYWOOD
PAIR
PHASE
POLYVINYL CHLORIDE
PROJECT
PROPERTY
PRESSURE TREATED
RECEPTACLE

	MATCH LINE	
	WORK POINT	(1)
	MECHANICAL BONDING CONNECTION	
OR 	EXOTHERMICALLY WELDED BONDING CONNECTION	
	POWER POLE	
	DISCONNECT SWITCH	
	DOUBLE-THROW MANUAL TRANSFER SWITCH	
	CIRCUIT BREAKER	
	EMERGENCY GENERATOR RECEPTACLE	
	TELCO PEDESTAL	
	GROUND ROD	
	GROUND ROD INSPECTION WELL	
	REPRESENTS DETAIL NUMBER	
	REF. DRAWING NUMBER	



SHEET NUMBER



POST-MODIFICATION INSPECTION (PMI) REQUIREMENT

1. PMI REQUIRED FOR ALL SITES, REFER TO VERIZON NSTD-446 SECTIONS 1.5 AND 2.3 FOR MORE INFORMATION.
2. REFER TO THE MOUNT ANALYSIS BY XXXXXX DATED XX/XX/XX FOR ADDITIONAL DETAILS.
3. GENERAL CONTRACTOR SHALL PROVIDE THE BELOW DOCUMENTATION TO THE ENGINEER OF RECORD VIA EMAIL TO VZWMOUNTS@NBCLLC.COM, DROPBOX, OR OTHER FILESHARE METHOD. PROVIDE HIGH RESOLUTION PHOTOS (DO NOT COMPRESS).
4. ENGINEER OF RECORD WILL CONDUCT A REVIEW OF THE PROVIDED DOCUMENTS TO PREPARE A PMI REPORT. ENGINEER OF RECORD WILL NOTIFY GENERAL CONTRACTOR IF ANY ADDITIONAL DOCUMENTATION IS REQUIRED TO COMPLETE THE PMI.
5. PMI DOCUMENTATION SHALL BE SUFFICIENT TO CONFIRM THE UPGRADE WAS BUILT AS DESIGNED, INCLUDING EQUIPMENT CHANGES AND STRUCTURAL MODIFICATIONS, AND IS IN ADDITION TO ANY OTHER REQUIRED CLOSEOUT PACKAGE DOCUMENTATION.
6. REQUIRED DOCUMENTATION FOR PMI INCLUDES THE FOLLOWING AT A MINIMUM. REFER TO THE MOUNT ANALYSIS FOR POSSIBLE ADDITIONAL INFORMATION. IF STRUCTURAL MODIFICATIONS ARE REQUIRED, REFER TO THE MODIFICATION DRAWINGS FOR POSSIBLE ADDITIONAL REQUIREMENTS.
- 6A. PROVIDE PRE-AND-POST CONSTRUCTION PHOTOS OF EACH SECTOR FROM THE MOUNT ELEVATION AND THE GROUND. CONTRACTOR IS RESPONSIBLE FOR ENSURING THE PHOTOS PROVIDED PROVIDE POSITIVE CONFIRMATION THAT THE MODIFICATION/UPGRADE WAS COMPLETED IN ACCORDANCE WITH THESE CONSTRUCTION DRAWINGS AND ANY STRUCTURAL/MOUNT MODIFICATION DRAWINGS. CONTRACTOR SHALL RELAY ANY DATA THAT CAN IMPACT THE PERFORMANCE OF THE MOUNT OR MOUNT MODIFICATION, INCLUDING SAFETY ISSUES. PHOTOS SHALL HAVE A DATE/TIME STAMP IN THE PHOTO. REFER TO THE MOUNT ANALYSIS FOR FILE STRUCTURE SCHEDULE OF PHOTOS. PROVIDE PHOTOS OF THE GATE SIGNS AND CARRIER SHELTER TO IDENTIFY THE TOWER OWNER, SITE NAME, SITE NUMBER, ETC.
- 6B. VERIFICATION OF THE MEMBER CONNECTIONS, BRACING, AND RELEVANT DIMENSIONS.
- 6C. VERIFICATION OF THE ANTENNA AND OTHER EQUIPMENT CONFIGURATION (PHOTOS OF MODEL NUMBERS/TAGS FOR ALL EQUIPMENT, AS WELL AS THE FEEDLINE CONFIGURATION). TAKE PHOTOS OF THE BACK SIDE OF EACH SECTOR AS WELL AS CLOSE-UPS OF ALL EQUIPMENT. PHOTOS SHOULD CONFIRM THE HORIZONTAL AND VERTICAL POSITIONING OF THE ANTENNAS AND EQUIPMENT AND SHALL HAVE TAPE MEASURES IN THE PHOTOS TO CONFIRM.
- 6D. FOR TIE-BACKS, STRUTS, MOUNT PIPES, PHOTOS TO CONFIRM THE ANGLES AND LOCATION OF ATTACHMENT POINT AT BOTH ENDS OF MEMBER, AS WELL AS DIMENSIONS, THICKNESS, AND LENGTHS OF THE MEMBERS. REFER TO THE CHECKLIST IN THE MOUNT ANALYSIS FOR ADDITIONAL INFORMATION.
- 6E. MOUNT ATTACHMENT TO THE SUPPORTING STRUCTURE, INCLUDING ANY KICKERS OR SUPPORTS, OR TIEBACKS.
- 6F. MATERIALS USED (TYPE, STRENGTH, DIMENSIONS, ETC). PROVIDE BILL OF MATERIALS AND MATERIAL SPEC TO CONFIRM MATERIAL GRADES AND SIZES. PROVIDE DOCUMENTATION FOR GALVANIZATION OF MEMBERS WHETHER HOT-DIPPED OR COLD-GALVANIZED. IF MATERIALS DIFFER FROM THOSE SPECIFIED ON THESE DRAWINGS, PROVIDE DOCUMENTATION THAT THE "EQUIVALENT" MATERIAL HAS THE SAME SPECIFICATIONS.
- 6G. MOUNT ORIENTATION/AZIMUTH AND ELEVATION. PROVIDE TAPE DROP PHOTOS OF ANTENNA CENTERLINE(S) AND MOUNT ATTACHMENT POINTS TO THE SUPPORTING STRUCTURE. IF THERE ARE MULTIPLE RAD CENTERS, PROVIDE PHOTOS OF ALL ELEVATIONS.

POST-MODIFICATION INSPECTION (PMI) REQUIREMENT CONT.

- 6H. VERIFICATION THAT THE INSTALL HAS NOT CAUSED DAMAGE TO OR UNPLANNED OBSTRUCTION OF THE FOLLOWING:
- CLIMBING FACILITIES
 - SAFETY CLIMB IF PRESENT, INCLUDING PHOTOS ABOVE AND BELOW THE MOUNT.
 - LIGHTING SYSTEM
 - OTHER INSTALLED SYSTEMS ON THE STRUCTURE.
- CONTRACTOR SHALL ENSURE THE SAFETY CLIMB IS SUPPORTED AND NOT ADVERSELY AFFECTED BY THE INSTALLATION OF NEW COMPONENTS. THIS MAY INVOLVE THE INSTALLATION OF WIRE ROPE GUIDES OR OTHER ITEMS TO PROTECT THE WIRE ROPE.
- 6I. OTHER ITEMS DETERMINED BY THE STRUCTURAL ENGINEER TO ENSURE THE MOUNT WILL PERFORM AS DESIGNED. PHOTOS OF RELEVANT MEASUREMENTS, WITH SUFFICIENT DETAILS TO CONFIRM CONNECTION DETAILS, PLACEMENT OF EQUIPMENT, WALL ANCHOR DETAILS, BALLAST QUANTITIES, STRUCTURAL MODIFICATIONS ETC. DIAMETERS AND THICKNESSES OF BOLTS/THEADED RODS/ANGLES/TUBES ETC SHALL HAVE PHOTOS CONFIRMING CALIPER MEASUREMENTS.
- CONFIRMATION THAT ALL HARDWARE WAS PROPERLY INSTALLED, AND EXISTING HARDWARE WAS INSPECTED FOR ANY ISSUES.
 - FOR BALLAST SLEDS, DOCUMENTATION OF THE WEIGHT OF BALLAST IN EACH SECTOR.
 - FOR WALL ANCHORS, PHOTOS AND MEASUREMENTS OF OUTSIDE AND INSIDE OF CONNECTIONS. DOCUMENTATION OF ADHESIVE USED, SIZE AND LENGTH OF ANCHORS, EFFECTIVE EMBEDMENT DEPTH OF THE ANCHORS, GROUTING OF HOLLOW WALLS, SPACING AND EDGE DISTANCE MEASUREMENTS, AND ANY THROUGH-BOLTS OR BACKING PLATES.
 - FOR STUD WELD CONNECTIONS, DOCUMENTATION TO CONFIRM SURFACE PREPARATION, STUD WELD SIZE, GRADE, LENGTH, AND SPACING.
 - FOR FABRICATED PARTS, SHOP DRAWINGS TO BE APPROVED BY THE ENGINEER OF RECORD PRIOR TO CONSTRUCTION.
 - FOR WELDED PARTS, CERTIFIED WELD INSPECTION.
 - FOR BOLTED PARTS, BOLT INSTALLATION AND TORQUE.
1. CONTRACTOR SHALL PROVIDE, IN ADDITION TO THE ABOVE, AS-BUILT CDS WITH REDLINES IDENTIFYING ANY CHANGES. THE AS-BUILTS SHALL THE CONTRACTOR'S NAME, PREPARER'S SIGNATURE, AND DATE.
2. IF THE MODIFICATION INSTALLATION WOULD FAIL THE PMI ('FAILED PMI'), THE CONTRACTOR SHALL WORK WITH THE ENGINEER OF RECORD TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:
- 8A. CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENTAL PMI.
- 8B. OR, WITH THE EOR'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT/UPGRADE USING THE AS-BUILT CONDITION.
8. NOTE: IF LOADING IS DIFFERENT THAN THAT SHOWN IN THESE CONSTRUCTION DRAWINGS OR STRUCTURAL/MOUNT MODIFICATION DRAWINGS, CONTRACTOR SHALL NOTIFY THE ENGINEER OF RECORD IMMEDIATELY FOR RESOLUTION.
9. THE ENGINEERING FIRM PERFORMING AN ANALYSIS SHALL PROVIDE A CONTRACTOR'S PHOTO LOG AND CHECKLIST TO BE COMPLETED BY THE INSTALLING CONTRACTOR. THE CONTRACTOR SHALL THEN PROVIDE POST-INSTALLATION INFORMATION TO THE STRUCTURAL ENGINEER. THE STRUCTURAL ENGINEER SHALL REVIEW THE DOCUMENTS FOR ANY DEFICIENCIES THAT CAN BE DETERMINED FROM THE DESKTOP REVIEW OF THE DATA. THE ENGINEERING FIRM SHALL THEN PROVIDE DOCUMENTATION TO VZW THAT THE SITE IS COMPLETED, AND THE PMI REPORT IS APPROVED.

ENGINEER



APPLICANT



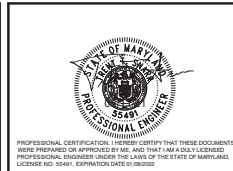
SITE INFORMATION

ROCKVILLE 12 ODAS-A
6015 MONTROSE ROAD
ROCKVILLE, MD 20852
MONTGOMERY COUNTY

DESIGN RECORD

REVISIONS			
B	05/11/21	FINAL CDS	CS2
A	04/06/21	PRELIMINARY CDS	AIM4
REV	DATE	DESCRIPTION	BY

PROFESSIONAL STAMP



ENGINEER

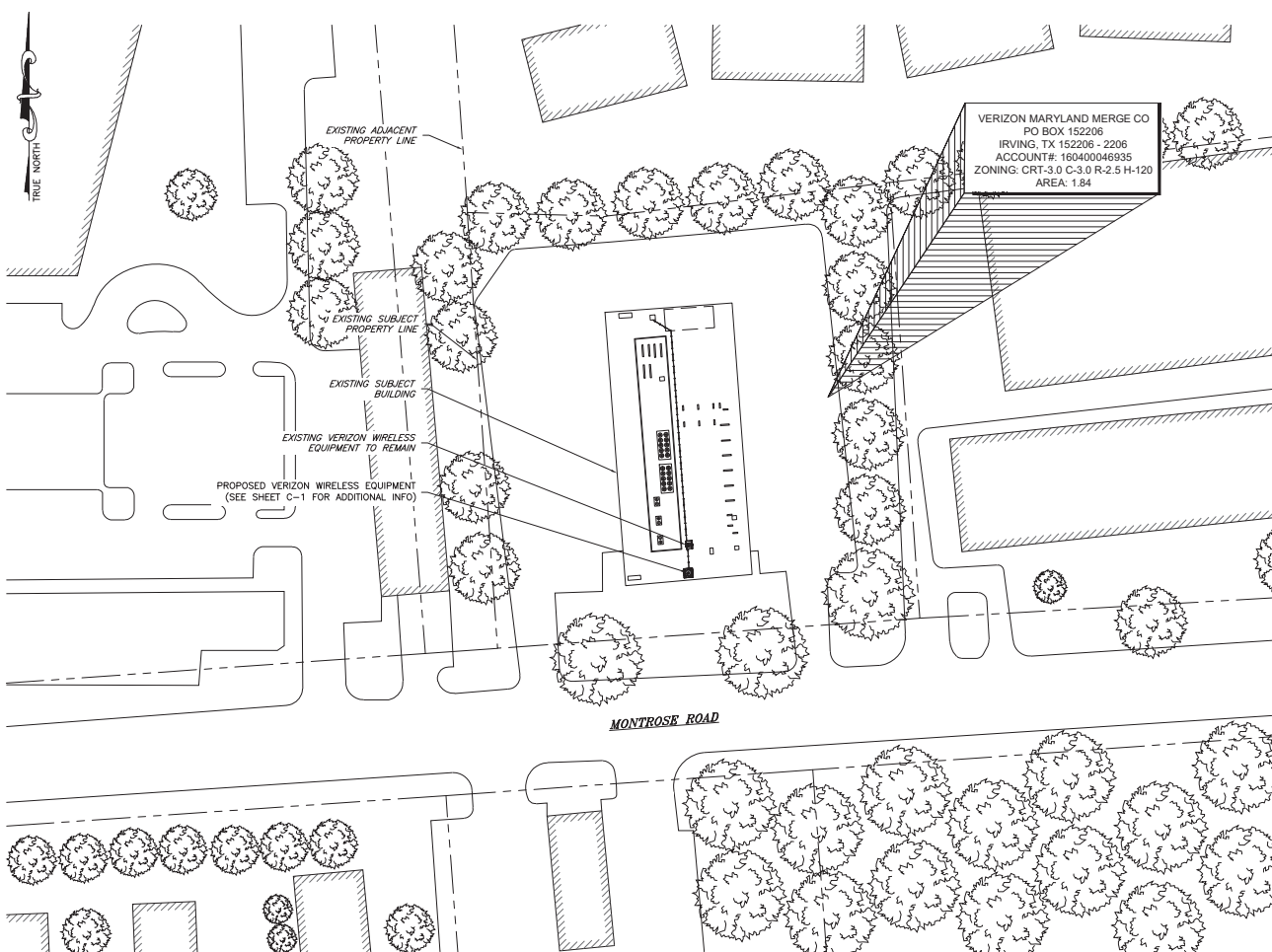
TRENT TRAVIS SNARR, P.E.
MARYLAND PROFESSIONAL ENGINEER
LICENSE #54941

SHEET TITLE

PMI CHECKLIST

SHEET NUMBER

GN-2



ZONING INFORMATION		
JURISDICTION: MONTGOMERY COUNTY		
ZONING:	CRT-3.0 C-3.0 R-2.5 H-120 (COMMERCIAL RESIDENTIAL TOWN)	
DIMENSION	EXISTING ±	PROPOSED ±
FRONT YARD SETBACK:	NO CHANGE	NO CHANGE
SIDE YARD SETBACK:	NO CHANGE	NO CHANGE
REAR YARD SETBACK:	NO CHANGE	NO CHANGE
LOT AREA:	1.84± ACRES	
(ALL MEASUREMENTS ARE IN FEET ± UNLESS OTHERWISE NOTED)		
NOTES:		
1) SITE PLAN IS NOT THE RESULT OF A SURVEY. IT IS BASED ON FIELD MEASUREMENTS AND SCALED ASSESSORS MAPS AVAILABLE. ALL INFORMATION SHOWN IS APPROXIMATE ONLY AND SUBJECT TO ANY CONDITION THAT A SURVEY MAY REVEAL.		
2) ALL SETBACKS SHOWN ARE FROM EXISTING BUILDING TO EXISTING PROPERTY LINES.		

LEGEND	
	PROPERTY LINE - SUBJECT PARCEL
	PROPERTY LINE - ADJUTERS
	EXISTING ROAD
	EXISTING BUILDING

ENGINEER	 TOTALLY COMMITTED. NB+C ENGINEERING SERVICES, LLC. 8005 MARSHALL DRIVE, SUITE 300 ELLSWORTH, MD 21035 (410) 712-7092																
APPLICANT	 10170 JUNCTION DRIVE, FLOOR 3, ANNAPOLIS JUNCTION, MD 20701 (301) 617-4210																
SITE INFORMATION	ROCKVILLE 12 ODAS-A 6015 MONTROSE ROAD ROCKVILLE, MD 20852 MONTGOMERY COUNTY																
DESIGN RECORD	<table><tr><th colspan="4">REVISIONS</th></tr><tr><td>0</td><td>05/11/21</td><td>FINAL CD</td><td>CS2</td></tr><tr><td>A</td><td>04/06/21</td><td>PRELIMINARY CD</td><td>AM4</td></tr><tr><td>REV</td><td>DATE</td><td>DESCRIPTION</td><td>BY</td></tr></table>	REVISIONS				0	05/11/21	FINAL CD	CS2	A	04/06/21	PRELIMINARY CD	AM4	REV	DATE	DESCRIPTION	BY
REVISIONS																	
0	05/11/21	FINAL CD	CS2														
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REV	DATE	DESCRIPTION	BY														
PROFESSIONAL STAMP																	
ENGINEER	TRENT TRAVIS SNARR, P.E. MARYLAND PROFESSIONAL ENGINEER LICENSE #55491																
SHEET TITLE	SITE PLAN																
SHEET NUMBER	SP-1																

NB+CTM
TOTALLY COMMITTED.

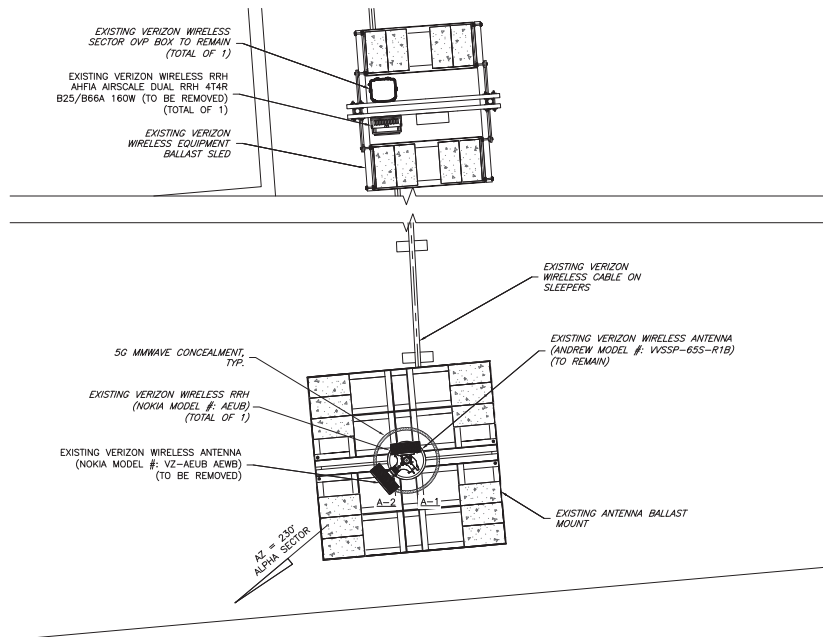
NB+C ENGINEERING SERVICES, LLC.
6995 MARSHALLE DRIVE, SUITE 300
ELKDRIDGE, MD 21075
(410) 712-7062

ANTENNA SCHEDULE									
SECTOR	STATUS	TECHNOLOGY	ANTENNA MANUFACTURER	ANTENNA MODEL	ANTENNA DIMENSIONS (HxWxD)	WEIGHT	RAD CENTER	AZIMUTH	RRH QUANTITY & MODEL
A1	EXISTING	1900, AWS, AWS3,	COMMSCOPE	WSSP-65S-R18	23.6"x7.87"ø	13.0 LBS	39"-4"	230°	(1) AHFA RRH 4T4R B25/B66A RRH 160W (TB (1) B2/B66A RRH+BR049 (RFV01U-D1A)
A2	TO BE REMOVED	28 GHz	NOKIA	VZ-AEU4	23.62"x11.97"x4.72"	44.092 LBS	36"-4"	230°	(1) AEUB+ASOD DC (INTEGRATED) (TBR)
A2	PROPOSED	28 GHz	SAMSUNG	VZ-AT1K04	16.8"x9.56"x6.88"	32.00 LBS	36"-4"	230°	(1) AT1K04 (NTEGRATED)

verizon ✓
10170 JUNCTION DRIVE, FLOOR 3,
ANNAPOLIS JUNCTION, MD 20701
(301) 617-4210

ROCKVILLE_12_ODAS-A
6015 MONTROSE ROAD
ROCKVILLE, MD 20852
MONTGOMERY COUNTY

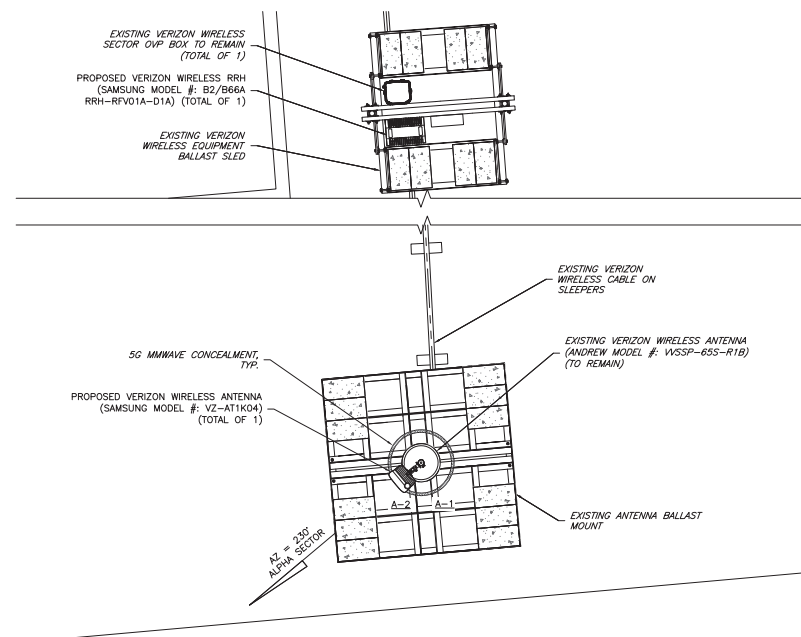
1 ANTENNA SCHEDULE
A-1 NTS



2
A-1

EXISTING ANTENNA ORIENTATION PLAN

NTS



3 PROPOSED ANTENNA ORIENTATION PLAN
A-1 NTS



REVISIONS

0	05/11/21	FINAL CD's	CSZ
A	04/06/21	PRELIMINARY CD's	AMM
REV	DATE	DESCRIPTION	BY



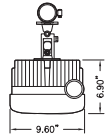
PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS
WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED
PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND,
LICENSE NO. 55491, EXPIRATION DATE 01/08/2022

TRENT TRAVIS SNARR, P.E.
MARYLAND PROFESSIONAL ENGINEER
LICENSE #55491

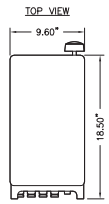
ANTENNA SCHEDULE & PLANS

A-1

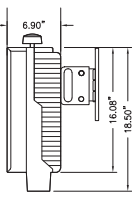
STRUCTURAL NOTE:
CONTRACTOR IS TO VERIFY THAT ALL PROPOSED AND EXISTING
EQUIPMENT WAS CONSIDERED AND PASSED A STRUCTURAL ANALYSIS
PERFORMED BY A LICENSED ENGINEER PRIOR TO INSTALLATION.



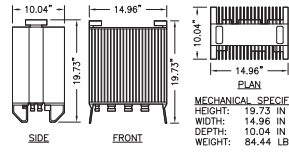
WEIGHT = 32 LBS



FRONT VIEW



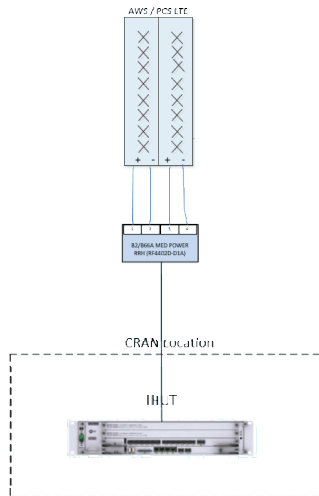
SIDE VIEW



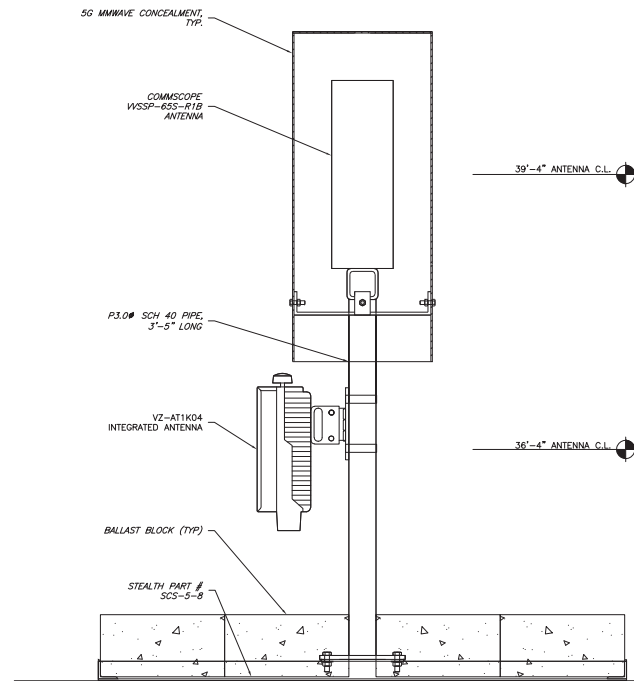
MECHANICAL SPECIFICATIONS
HEIGHT: 19.73 IN
WIDTH: 14.96 IN
DEPTH: 10.04 IN
WEIGHT: 84.44 LBS

2 B2/B66a RRH - BR049 DETAIL
A-2 NTS

1 VZ-AT1K04 INTEGRATED ANTENNA
A-2 NTS



3 PLUMBING DIAGRAM DETAIL
A-2 NTS



4 PROPOSED ANTENNA MOUNTING DETAIL
A-2 NTS

ENGINEER

NB+C
TOTALLY COMMITTED.
NB+C ENGINEERING SERVICES, LLC.
8005 MARSHALLE DRIVE, SUITE 300
ELKREEGE, MD 20755
(410) 712-7002

APPLICANT

verizon
10170 JUNCTION DRIVE, FLOOR 3,
ANNAPOLIS JUNCTION, MD 20701
(301) 617-4210

SITE INFORMATION

ROCKVILLE 12 ODAS-A
6015 MONTROSE ROAD
ROCKVILLE, MD 20852
MONTGOMERY COUNTY

DESIGN RECORD

REVISIONS

REV	DATE	DESCRIPTION	BY
0	05/11/21	FINAL CD	CS2
A	04/06/21	PRELIMINARY CD	AMM

PROFESSIONAL STAMP

STATE OF MARYLAND
PROFESSIONAL ENGINEER
TRENT TRAVIS SNARR, P.E.
MARYLAND PROFESSIONAL ENGINEER
LICENSE #55491

ENGINEER

SHEET TITLE

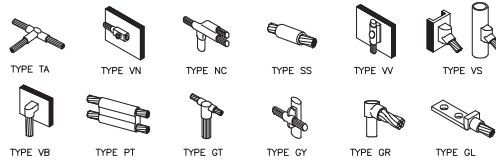
**ANTENNA
DETAILS**

SHEET NUMBER

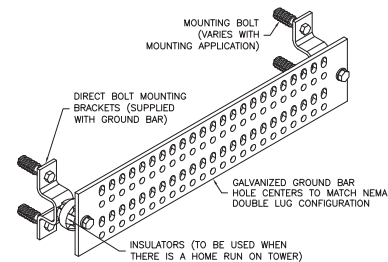
A-2

GROUNDING NOTES

1. GROUNDING SHALL COMPLY WITH NEC ART. 250, ADDITIONALLY, GROUNDING, BONDING AND LIGHTING PROTECTION SHALL BE DONE IN ACCORDANCE WITH VERIZON WIRELESS GROUNDING STANDARDS.
2. GROUND CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURERS CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.
3. USE #6 COPPER STRANDED WIRE WITH GREEN COLOR INSULATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE DRAWING.
4. ALL POWER AND GROUND CONNECTIONS TO BE CRIMP-STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY HARGER (OR APPROVED EQUAL) RATED FOR OPERATION AT NO LESS THAN 75°C OR COLDWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.
5. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AT RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #6 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY. BOND ANY METAL OBJECTS WITHIN 6 FEET OF PROJECT OWNER EQUIPMENT OR CABINET TO MASTER GROUND BAR OR GROUNDING RING.
6. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LUGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
7. APPLY OXIDE INHIBITING COMPOUND TO ALL MECHANICAL GROUND CONNECTIONS.
8. CONTRACTOR SHALL PROVIDE AND INSTALL OMNI DIRECTIONAL ELECTRONIC MARKER SYSTEM (EMS) BALLS OVER EACH GROUND ROD AND BONDING POINT BETWEEN EXISTING TOWER/ MONOPOLE GROUNDING RING AND EQUIPMENT GROUNDING RING.
9. CONTRACTOR SHALL TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION. 5 OHMS MINIMUM RESISTANCE REQUIRED.
10. CONTRACTOR SHALL CONDUCT ANTENNA, CABLE, AND LNA RETURN-LOSS AND DISTANCE-TO-FAULT MEASUREMENTS (SWEEP TESTS) AND RECORD RESULTS FOR PROJECT CLOSE OUT.



1 CADWELD GROUNDING CONNECTION DETAILS
G-1 NTS



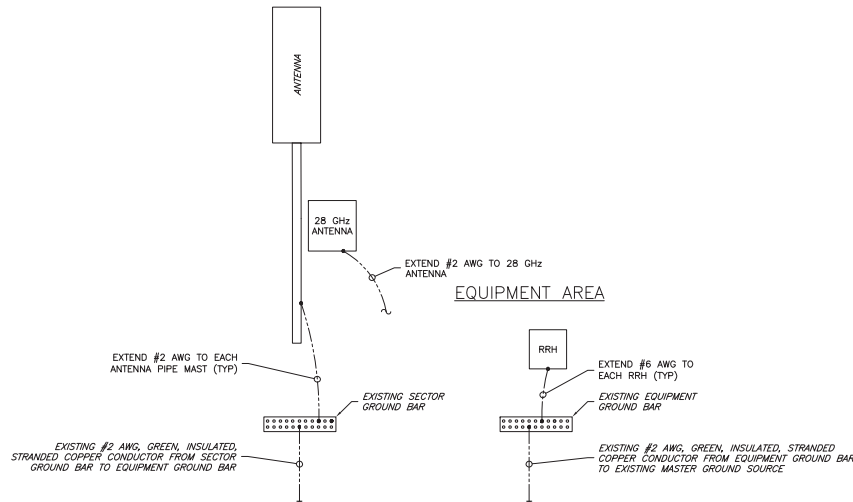
GROUND BAR SCHEDULE				
TYPE	QTY	MANUFACTURER	PART NO.	REMARKS
MGB	2	ITS	GB12	OR EQUAL
CBG	3	ITS	GB24	OR EQUAL

2 GROUND BAR DETAIL
G-1 NTS

STRUCTURAL NOTES

1. THE STRUCTURAL STEEL CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ANCHOR BOLT LOCATIONS, ELEVATION OF TOP OF CONCRETE AND BEARING PLATES, ALIGNMENT ETC. PRIOR TO START OF STEEL ERECTION.
2. THE LATEST EDITION OF THE FOLLOWING SPECIFICATIONS SHALL GOVERN:
A. AISC - "ALLOWABLE STRESS DESIGN SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS".
B. AISC - "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES".
C. AWS - "D1.1 STRUCTURAL WELDING CODE - STEEL".
3. MATERIAL, UNLESS OTHERWISE NOTED, SHALL CONFORM TO THE FOLLOWING ASTM SPECIFICATIONS
- | | |
|------------------------------------|------------------|
| STRUCTURAL WIDE FLANGE & M SHAPES | A992 OR A572 |
| OTHER STRUCTURAL SHAPES AND PLATES | Fy = 50KSI |
| STRUCTURAL TUBING | A36, Fy = 36 KSI |
| | A500, GRADE B |
| | Fy = 46 KSI |
| HIGH STRENGTH BOLTS | A325 |
| THREADED RODS | A354, GRADE BC |
| ANCHOR BOLTS | A325 OR A354 BC |
| PIPE (HANDRAIL) | SCH 40 PIPE |
4. ALL WELDING SHALL BE IN ACCORDANCE WITH AWS D1.1 USING E70XX ELECTRODES, UNLESS OTHERWISE NOTED PROVIDE CONTINUOUS MINIMUM SIZED FILLET WELDS PER AISC REQUIREMENTS.
5. HOLES IN STEEL SHALL BE DRILLED OR PUNCHED. ALL SLOTTED HOLES SHALL BE PROVIDED WITH SMOOTH EDGES. BURNING OF HOLES AND TORCH CUTTING AT THE SITE IS NOT PERMITTED. ALL HOLES IN BEARING PLATES SHALL BE DRILLED.
6. ALL STEEL TO BE HOT-DIPPED GALVANIZED AFTER FABRICATION PER ASTM A123.
7. EPOXY ANCHORS TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS.
8. ALL BOLTS SHALL BE TIGHTENED USING TURN-OFF-THE-NUT METHOD PER AISC SPECIFICATIONS USING STANDARD HOLES.
9. CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS AND FIT PRIOR TO FABRICATION.
10. THE FABRICATOR SHALL FURNISH CHECKED SHOP AND ERECTION DRAWINGS TO THE ENGINEER, AND OBTAIN APPROVAL PRIOR TO FABRICATING ANY STRUCTURAL STEEL. SHOP DRAWINGS SHALL CONFORM TO AISC "DETAILING FOR STEEL CONSTRUCTION".

ANTENNA SECTOR



3 GROUNDING DIAGRAM
G-1 NTS

ENGINEER



APPLICANT



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GROUNDING
DETAILS & NOTES

SHEET NUMBER

G-1