

Radio Frequency - Electromagnetic Energy (RF-EME) Jurisdictional Report

Site No. 783410
Freshwater Rd
250 Misty Hill Lane
Eureka, California 95503
Humboldt County
40° 46' 14.74" N, -124° 5' 18.32" W NAD83

EBI Project No. 027812-PR
September 5, 2024



Prepared for:
Verizon Wireless
c/o Complete Wireless Consulting, Inc.
2009 V Street
Sacramento, CA 95818

Prepared by:
 **EBI Consulting**
environmental | engineering | due diligence

TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
1.0 INTRODUCTION.....	2
2.0 SITE DESCRIPTION	2
3.0 WORST-CASE PREDICTIVE MODELING.....	3
4.0 MITIGATION/SITE CONTROL OPTIONS	4
5.0 SUMMARY AND CONCLUSIONS	5
6.0 LIMITATIONS	5

APPENDICES

APPENDIX A CERTIFICATIONS	
APPENDIX B RADIO FREQUENCY ELECTROMAGNETIC ENERGY SAFETY / SIGNAGE PLANS	
APPENDIX C FEDERAL COMMUNICATIONS COMMISSION (FCC) REQUIREMENTS	

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 783410 located at 250 Misty Hill Lane in Eureka, California 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, there are no modeled areas on any accessible ground-level walking/working surface related to the proposed antennas that exceed the FCC's occupational or general public exposure limits at this site. 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 **5.51** percent of the FCC's general public limit (**1.10** percent of the FCC's occupational limit).

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.

1.0 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 inside a faux monopole located at 250 Misty Hill Lane in Eureka, California.

Ant #	Sector	Operator	Antenna Model	Mechanical Downtilt (Degrees)	Azimuth (Degrees)	Technology and Frequency (MHz)	Electrical Downtilt (Degrees)	Horizontal Beamwidth (Degrees)	Aperture (feet)	Total Power Input (Watts)	Antenna Gain (dBd)	Total ERP (Watts)
1	Alpha	Verizon	SON_NHH-65C-R2B 700	0	0	LTE 700	SON	65	8.0	120	13.58	2736.41
1	Alpha	Verizon	SON_NHH-65C-R2B 850	0	0	LTE/5G 850	SON	62	8.0	120	13.73	2832.57
2	Alpha	Verizon	SON_NHH-65C-R2B 700	0	0	LTE 700	SON	65	8.0	120	13.58	2736.41
2	Alpha	Verizon	SON_NHH-65C-R2B 850	0	0	LTE/5G 850	SON	62	8.0	120	13.73	2832.57
2	Alpha	Verizon	SON_NHH-65C-R2B 2100	0	0	LTE 2100	SON	62	8.0	240	16.38	10428.25
3	Alpha	Verizon	SON_AIR6419 TB 03.21.2023 3700 VZW	0	0	LSub6 3700	SON	11	2.4	320	23.45	70819.03
4	Beta	Verizon	SON_NHH-65C-R2B 700	0	110	LTE 700	SON	65	8.0	120	13.58	2736.41
4	Beta	Verizon	SON_NHH-65C-R2B 850	0	110	LTE/5G 850	SON	62	8.0	120	13.73	2832.57
5	Beta	Verizon	SON_NHH-65C-R2B 700	0	110	LTE 700	SON	65	8.0	120	13.58	2736.41
5	Beta	Verizon	SON_NHH-65C-R2B 850	0	110	LTE/5G 850	SON	62	8.0	120	13.73	2832.57
5	Beta	Verizon	SON_NHH-65C-R2B 2100	0	110	LTE 2100	SON	62	8.0	240	16.38	10428.25
6	Beta	Verizon	SON_AIR6419 TB 03.21.2023 3700 VZW	0	110	LSub6 3700	SON	11	2.4	320	23.45	70819.03
7	Gamma	Verizon	SON_NHH-65C-R2B 700	0	250	LTE 700	SON	65	8.0	120	13.58	2736.41
7	Gamma	Verizon	SON_NHH-65C-R2B 850	0	250	LTE/5G 850	SON	62	8.0	120	13.73	2832.57
8	Gamma	Verizon	SON_NHH-65C-R2B 700	0	250	LTE 700	SON	65	8.0	120	13.58	2736.41
8	Gamma	Verizon	SON_NHH-65C-R2B 850	0	250	LTE/5G 850	SON	62	8.0	120	13.73	2832.57
8	Gamma	Verizon	SON_NHH-65C-R2B 2100	0	250	LTE 2100	SON	62	8.0	240	16.38	10428.25

Ant #	Sector	Operator	Antenna Model	Mechanical Downtilt (Degrees)	Azimuth (Degrees)	Technology and Frequency (MHz)	Electrical Downtilt (Degrees)	Horizontal Beamwidth (Degrees)	Aperture (feet)	Total Power Input (Watts)	Antenna Gain (dBd)	Total ERP (Watts)
9	Gamma	Verizon	SON_AIR6419 TB 03.21.2023 3700 VZW	0	250	LSub6 3700	SON	11	2.4	320	23.45	70819.03

• Note there are 3 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 Adjacent Building Roof	Z-Height Barn Roof	Z-Height Ground
1	Verizon	223.1	3.1	146.0	134.0	136.0	146.0
2	Verizon	224.9	3.1	146.0	134.0	136.0	146.0
3	Verizon	230.1	3.1	148.8	136.8	138.8	148.8
4	Verizon	233.2	11.8	146.0	134.0	136.0	146.0
5	Verizon	232.8	13.1	146.0	134.0	136.0	146.0
6	Verizon	230.1	17.0	148.8	136.8	138.8	148.8
7	Verizon	223.6	15.7	146.0	134.0	136.0	146.0
8	Verizon	222.3	14.8	146.0	134.0	136.0	146.0
9	Verizon	218.8	10.5	148.8	136.8	138.8	148.8

• 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 controlled, 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 monopole 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, there are no modeled areas on any accessible ground-level walking/working surface related to the proposed Verizon antennas that exceed the FCC's occupational or general public exposure limits at this site. At the nearest walking/working surfaces to the Verizon antennas, the maximum power density generated by the Verizon antennas is approximately 5.51 percent of the FCC's general public limit (1.10 percent of the FCC's occupational limit).

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 no areas in front of the Verizon antennas that exceed the FCC standards for occupational or general public exposure. All exposures above the FCC's safe limits require that individuals be elevated above the rooftop/ground. In accordance with the official Verizon Wireless Signage and Demarcation Policy for tower structures, no signage is recommended at this site.

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. There are no barriers recommended on this site.

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 monopole 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. All persons accessing elevated positions on adjacent structures (ex. rooftop, utility pole, monopole, etc.) along with nearby elevated features, such

as trees, within areas exceeding the general public MPE, must be made aware of the presence and locations of antennas and their associated fields, where applicable.

5.0 SUMMARY AND CONCLUSIONS

EBI has prepared a Radiofrequency – Electromagnetic Energy (RF-EME) Compliance Report for telecommunications equipment installed by Verizon Site Number 783410 located at 250 Misty Hill Lane in Eureka, California 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, there are no modeled areas on any accessible ground-level walking/working surface related to the proposed antennas that exceed the FCC's occupational or general public exposure limits at this site.

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, Kobi Thompson, 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.

Kobi Thompson

Reviewed and Approved by:



sealed 05sep2024

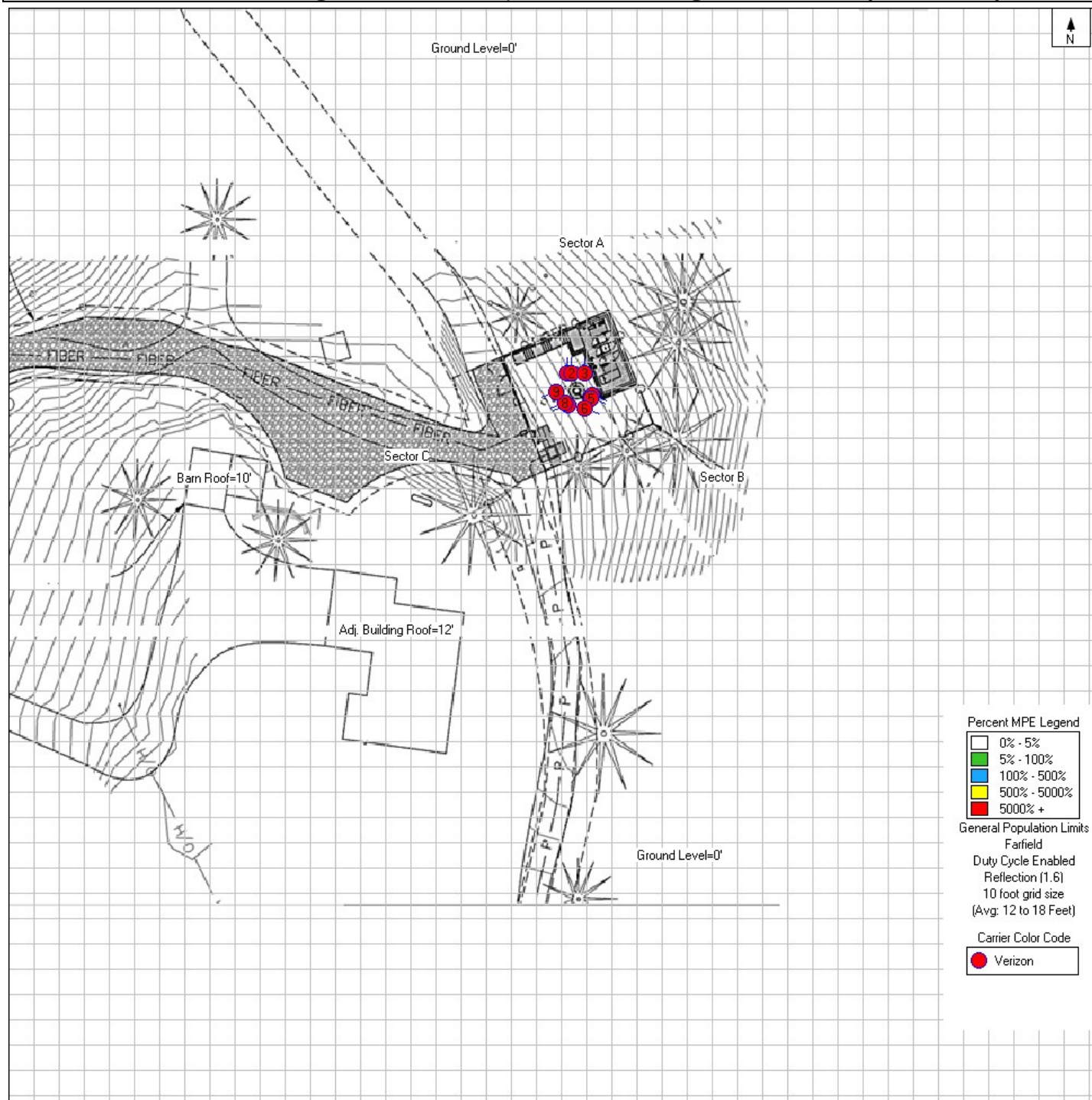
Michael McGuire
Electrical Engineer
mike@h2dc.com

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.

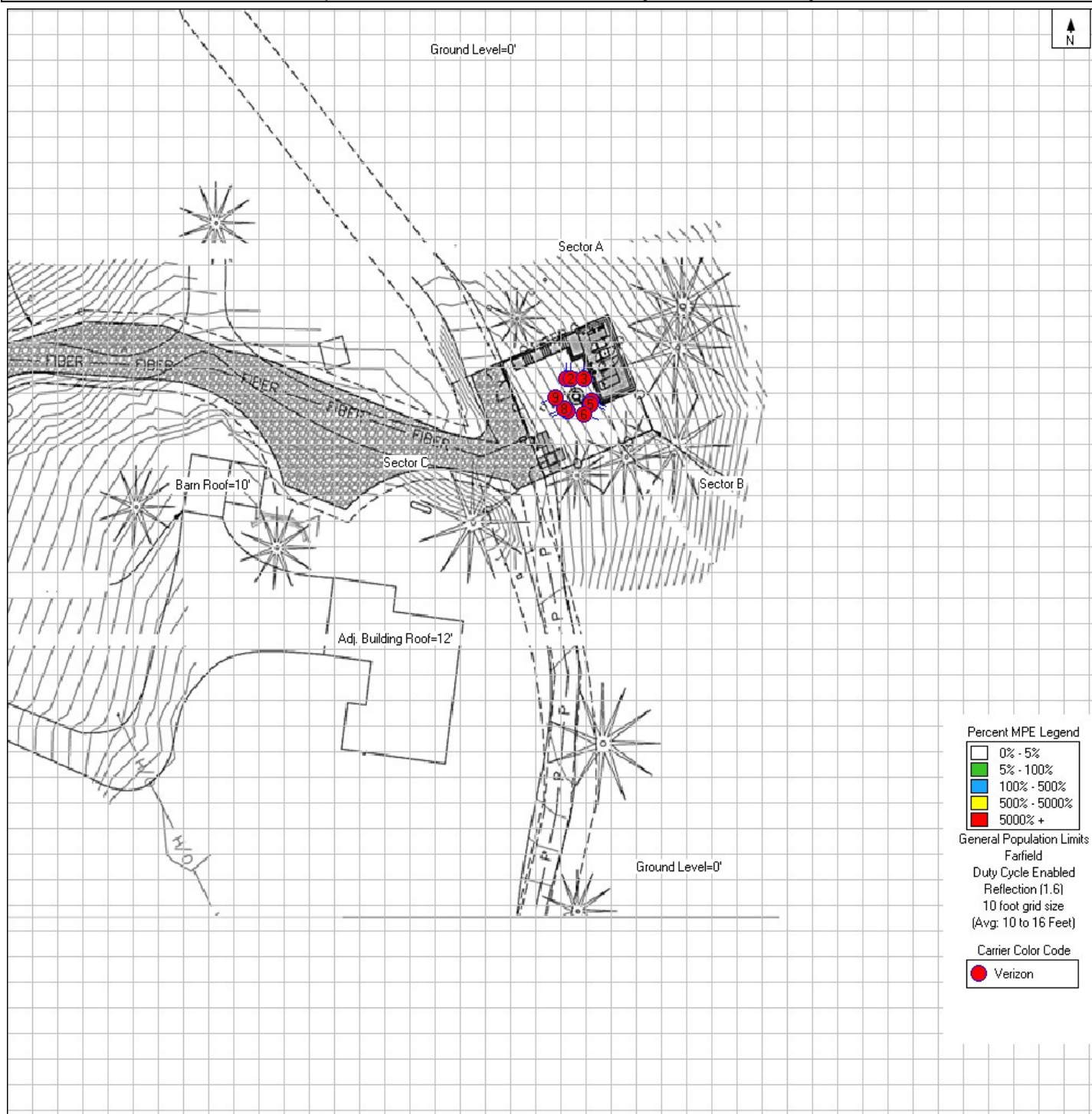
Appendix B

Radio Frequency Electromagnetic Energy Safety Information and Signage Plans

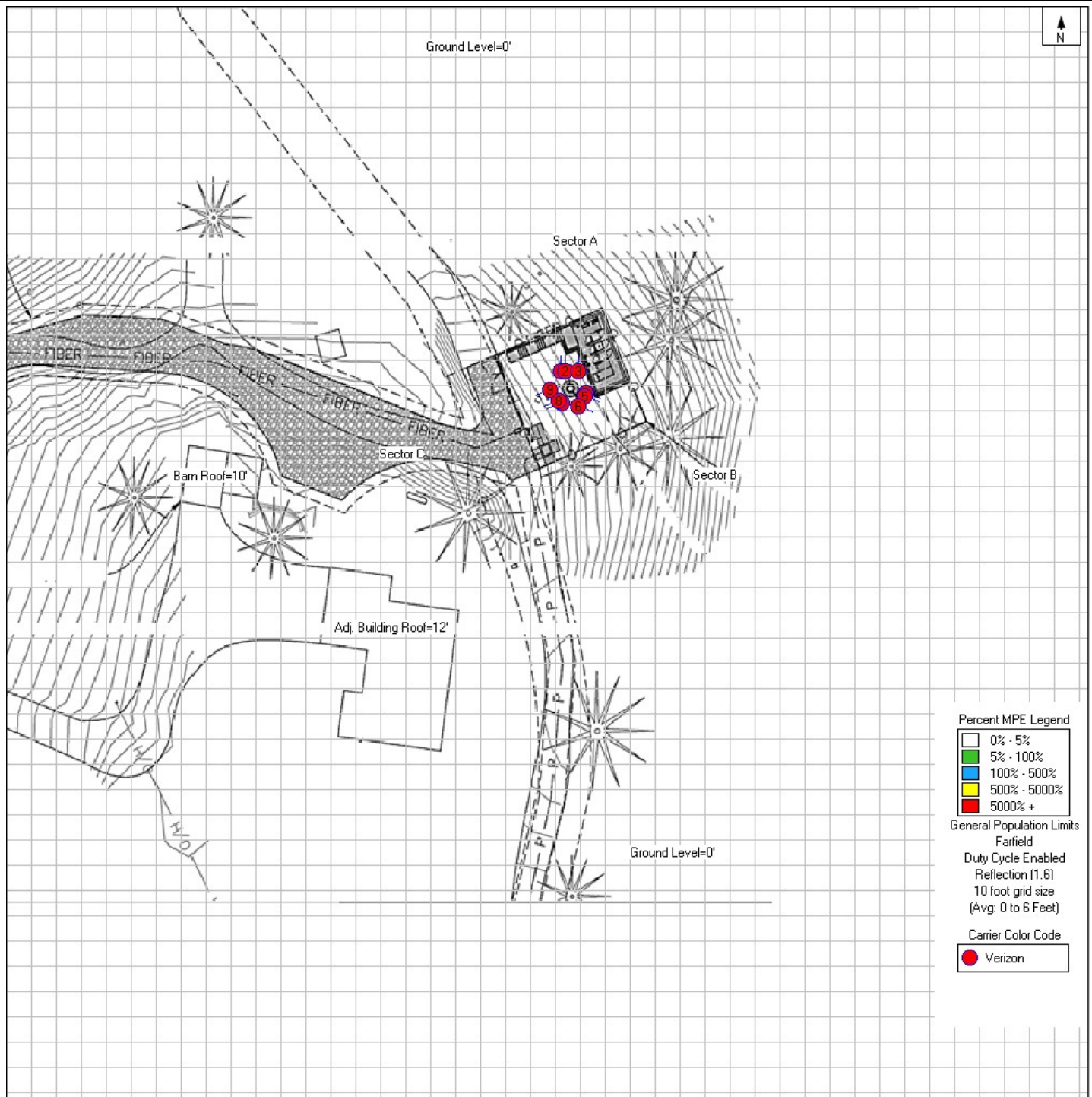
Nearest Walking Surface – Adjacent Building Roof Level (12ft AGL)



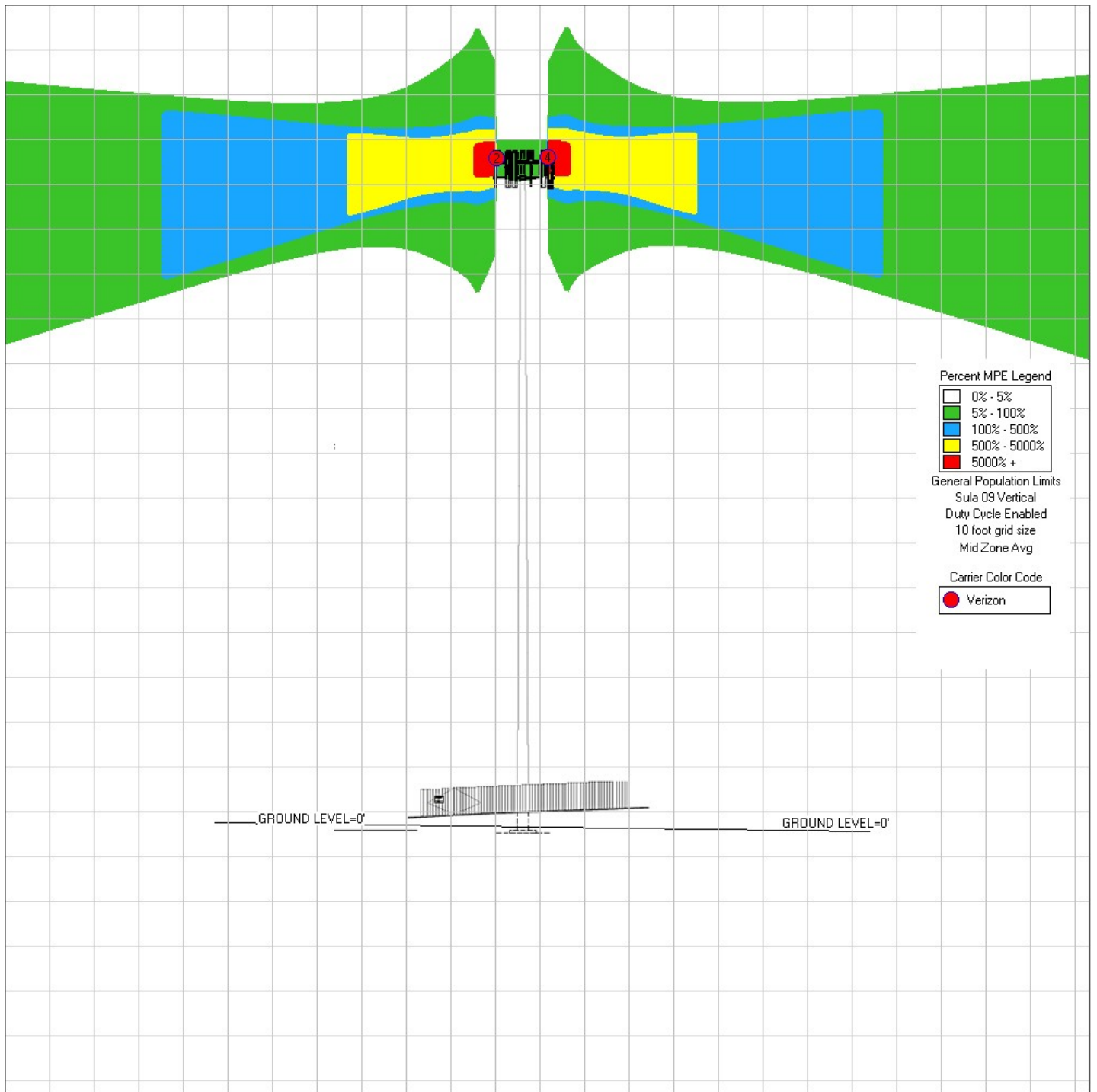
Adjacent Barn Roof Level (10 feet AGL)



Ground Level (0ft AGL)

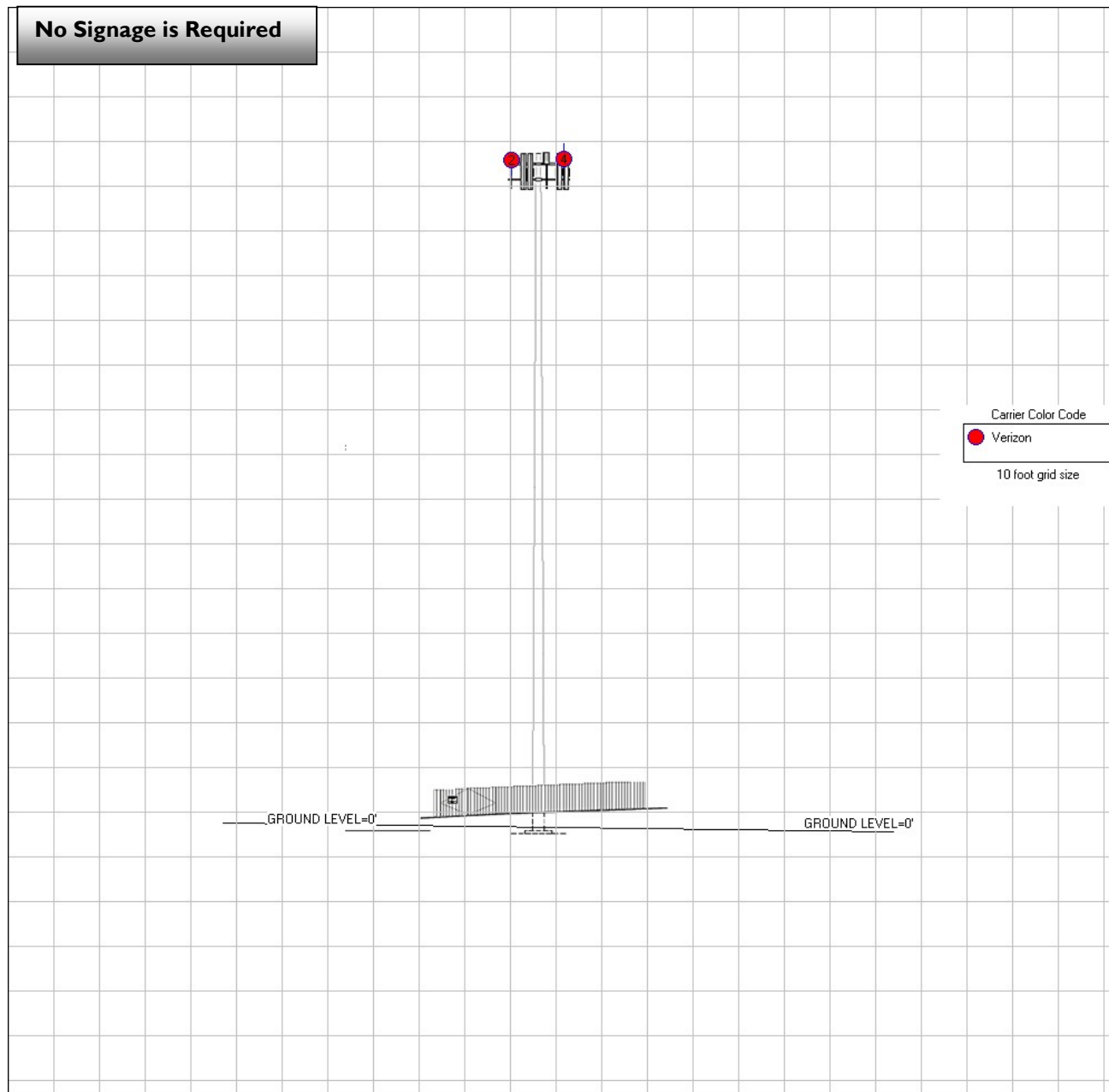




Elevation View



Verizon Signage Plan

No Signage is Required



Sign	Description	Posting Instructions	Required Signage / Mitigation
	Blue Notice Sign Used to alert individuals that they are entering an area where the power density emitted from transmitting antennas exceeds the FCC's maximum permissible exposure limit for the general public but is less than the occupational exposure limit.	N/A	N/A
	Yellow Caution Sign Used to alert individuals that they are entering an area where the power density emitted from transmitting antennas may exceed the FCC's maximum permissible exposure limit for the general public and the occupational exposure limit.	N/A	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.

GUIDELINES	Category Two - Notice	Category Three - Caution	Category Four - Warning
This sign will inform anyone of the basic precautions to follow when entering an area with transmitting radiofrequency equipment.	This sign indicates that RF emissions may exceed the FCC General Population MPE limit. • Sign Color Blue • Sign Signal Word "Notice"	This sign indicates that RF emissions may exceed the FCC Occupational MPE limit. • Sign Color Yellow • Sign Signal Word "Caution"	This sign indicates that RF emissions may exceed at least 10x the FCC Occupational MPE limit. • Sign Color Orange for Warning • Sign Signal Word "Warning"

Category One - 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. • Sign Color Green • Sign Signal Word "Information"	

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
<ul style="list-style-type: none"> Utilization of good equipment Enact control of hazard areas Limit exposures Employ medical surveillance and accident response 	<ul style="list-style-type: none"> 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 for equipment operating at frequencies range from 300 Mhz to 1,500 Mhz the Occupational/Controlled limit of $(f/300)$ mW/cm² where f is the Frequency in (MHz) and the General Population / Uncontrolled limit of $(f/1500)$ mW/cm² where f is the Frequency in (MHz). For equipment operating at frequency ranges from 1900 MHz to 100,000 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.

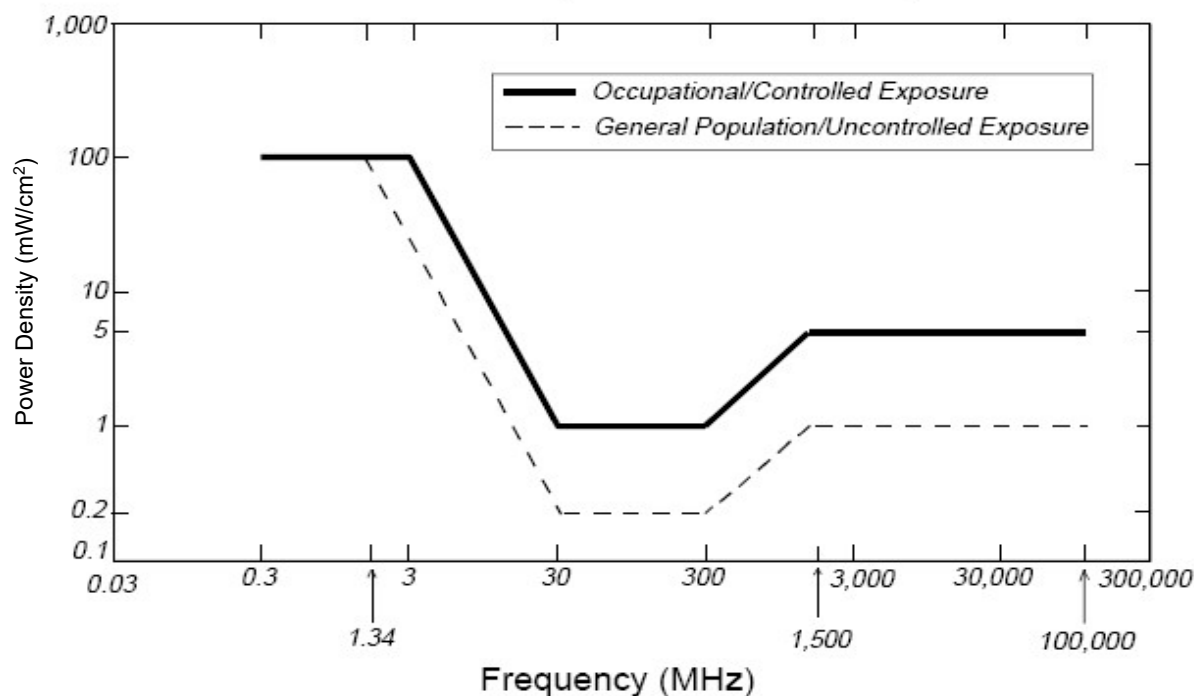
Table 1: Limits for Maximum Permissible Exposure (MPE)				
(A) Limits for Occupational/Controlled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time [E] ² , [H] ² , or S (minutes)
0.3-3.0	614	1.63	(100)*	6
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



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.