

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

Site No. P019  
MRANM039616  
T Birg Academy  
7401 East Redfield  
Scottsdale, Arizona 85260  
Maricopa County  
33.61017220; -111.91861110 NAD83  
Water Tank

**The proposed AT&T installation will be in compliance with FCC regulations upon proper installation of recommended signage.**

EBI Project No. 6222001660  
March 21, 2022



Prepared for:

AT&T Mobility, LLC  
c/o Smartlink, LLC  
8502 East Via de Ventura  
Scottsdale, AZ 85258

Prepared by:



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## EXECUTIVE SUMMARY

### Purpose of Report

EnviroBusiness Inc. (dba EBI Consulting) has been contracted by AT&T Mobility, LLC to conduct radio frequency electromagnetic (RF-EME) modeling for AT&T Site P019 located at 7401 East Redfield in Scottsdale, Arizona to determine RF-EME exposure levels from proposed AT&T wireless communications equipment at this site. As described in greater detail in Section 1.0 of this report, the Federal Communications Commission (FCC) has developed Maximum Permissible Exposure (MPE) Limits for general public exposures and occupational exposures. This report summarizes the results of RF-EME modeling in relation to relevant FCC RF-EME compliance standards for limiting human exposure to RF-EME fields.

This report contains the RF EME analysis for the site, including the following:

- Site Plan with antenna locations
- Graphical representation of theoretical MPE fields based on modeling
- Graphical representation of recommended signage and/or barriers

This document addresses the compliance of AT&T's transmitting facilities independently and in relation to all collocated facilities at the site.

### 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 exposures on any accessible rooftop or ground walking/working surface related to ATT's proposed antennas that exceed the FCC's occupational and/or general public exposure limits at this site. Additionally, there are areas where elevated workers may be exposed to power densities greater than the occupational limits. The worst-case emitted power density may exceed the FCC's occupational limit within approximately 21 feet of AT&T's proposed antennas at the antenna face level. Workers and the general public should be informed about the presence and locations of antennas and their associated fields.

As such, the proposed AT&T installation is in compliance with FCC regulations upon proper installation of recommended signage and/or barriers.

### AT&T Recommended Signage/Compliance Plan

AT&T's RF Exposure: Responsibilities, Procedures & Guidelines document, dated October 28, 2014, requires that:

1. All sites must be analyzed for RF exposure compliance;
2. All sites must have that analysis documented; and
3. All sites must have any necessary signage and barriers installed.

Site compliance recommendations have been developed based upon protocols presented in AT&T's RF Exposure: Responsibilities, Procedures & Guidelines document, dated October 28, 2014, additional guidance provided by AT&T, EBI's understanding of FCC and OSHA requirements, and common

industry practice. Barrier locations have been identified (when required) based on guidance presented in AT&T's RF Exposure: Responsibilities, Procedures & Guidelines document, dated October 28, 2014.

The following signage is recommended at this site:

- Yellow CAUTION 2 sign posted at the base of the water tank near the climbing ladder.

The signage proposed for installation at this site complies with AT&T's RF Exposure: Responsibilities, Procedures & Guidelines document and therefore complies with FCC and OSHA requirements. Barriers are not recommended on this site. To reduce the risk of exposure and/or injury, EBI recommends that access to the water tank or areas associated with the active antenna installation be restricted and secured where possible. More detailed information concerning site compliance recommendations is presented in Section 4.0 and Appendix B of this report.

## 1.0 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 (cm<sup>2</sup>). Known as the power density, the FCC has established an occupational MPE of 5 milliwatts per square centimeter (mW/cm<sup>2</sup>) and an uncontrolled MPE of 1 mW/cm<sup>2</sup> for equipment operating in the 1900 MHz frequency range. For the AT&T equipment operating at 850 MHz, the FCC's occupational MPE is 2.83 mW/cm<sup>2</sup> and an uncontrolled MPE of 0.57 mW/cm<sup>2</sup>. For the AT&T equipment operating at 700 MHz, the FCC's occupational MPE is 2.33 mW/cm<sup>2</sup> and an uncontrolled MPE of 0.47 mW/cm<sup>2</sup>. These limits are considered protective of these populations.

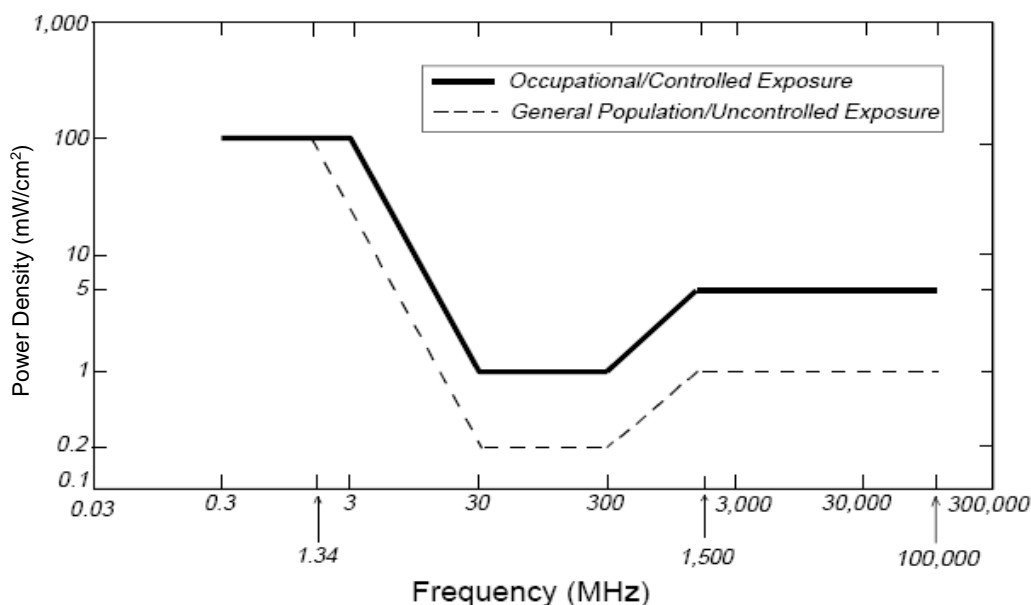
Table I: Limits for Maximum Permissible Exposure (MPE)				
(A) Limits for Occupational/Controlled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time [E] <sup>2</sup> , [H] <sup>2</sup> , or S (minutes)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

<b>(B) Limits for General Public/Uncontrolled Exposure</b>				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time [E] <sup>2</sup> , [H] <sup>2</sup> , or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f <sup>2</sup> )*	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 <sup>2</sup>	1.00 mW/cm <sup>2</sup>
Broadband Radio (BRS)	2,600 MHz	5.00 mW/cm <sup>2</sup>	1.00 mW/cm <sup>2</sup>
Wireless Communication (WCS)	2,300 MHz	5.00 mW/cm <sup>2</sup>	1.00 mW/cm <sup>2</sup>
Advanced Wireless (AWS)	2,100 MHz	5.00 mW/cm <sup>2</sup>	1.00 mW/cm <sup>2</sup>
Personal Communication (PCS)	1,950 MHz	5.00 mW/cm <sup>2</sup>	1.00 mW/cm <sup>2</sup>
Cellular Telephone	870 MHz	2.90 mW/cm <sup>2</sup>	0.58 mW/cm <sup>2</sup>
Specialized Mobile Radio (SMR)	855 MHz	2.85 mW/cm <sup>2</sup>	0.57 mW/cm <sup>2</sup>
Long Term Evolution (LTE)	700 MHz	2.33 mW/cm <sup>2</sup>	0.47 mW/cm <sup>2</sup>
Most Restrictive Frequency Range	30-300 MHz	1.00 mW/cm <sup>2</sup>	0.20 mW/cm <sup>2</sup>

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 AT&T in this area operate within a frequency range of 700-1900 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.

## **2.0 AT&T RF EXPOSURE POLICY REQUIREMENTS**

AT&T's RF Exposure: Responsibilities, Procedures & Guidelines document, dated October 28, 2014, requires that:

1. All sites must be analyzed for RF exposure compliance;
2. All sites must have that analysis documented; and
3. All sites must have any necessary signage and barriers installed.

Pursuant to this guidance, worst-case predictive modeling was performed for the site. This modeling is described below in Section 3.0. Lastly, based on the modeling and survey data, EBI has produced a Compliance Plan for this site that outlines the recommended signage and barriers. The recommended Compliance Plan for this site is described in Section 4.0.

## **3.0 WORST-CASE PREDICTIVE MODELING**

In accordance with AT&T's RF Exposure policy, EBI performed theoretical modeling using RoofMaster™ software to estimate the worst-case power density at the site rooftop and ground-level and/or nearby rooftops resulting from operation of the antennas. RoofMaster™ is a widely-used predictive modeling program that has been developed 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 (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. A statistical power factor may be applied to the antenna system based on guidance from the carrier and system manufacturers.

For this report, EBI utilized antenna and power data provided by AT&T 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 AT&T and information gathered from other sources. An Unknown Carrier also has antennas on the water tank. Information about these antennas was included in the modeling analysis.

Based on worst-case predictive modeling, there are no modeled exposures on any accessible rooftop or ground walking/working surface related to ATT's proposed antennas that exceed the FCC's occupational and/or general public exposure limits at this site. Additionally, there are areas where elevated workers may be exposed to power densities greater than the occupational limits. The worst-case emitted power density may exceed the FCC's occupational limit within approximately 21 feet of AT&T's proposed antennas at the antenna face level. Workers and the general public should be informed about the presence and locations of antennas and their associated fields.

At the nearest walking/working surfaces to the AT&T antennas on the catwalk level, the maximum power density generated by the AT&T antennas is approximately 2.25 percent of the FCC's general public limit (0.45 percent of the FCC's occupational limit). The composite exposure level from all carriers on this site is approximately 1,182.52 percent of the FCC's general public limit (236.50 percent of the FCC's occupational limit) at the nearest walking/working surface to each antenna. Based on worst-case predictive modeling, there are no areas at ground/street level related to the proposed AT&T antennas that exceed the FCC's occupational or general public exposure limits at this site. At ground/street level, the maximum power density generated by the antennas is approximately 0.14 percent of the FCC's general public limit (0.028 percent of the FCC's occupational limit).

There were also worst-case predicted exposures above the general public MPE in front of the Sector A, B, and C Unknown Carrier antennas. Modeling indicates that the AT&T contribution to these areas is 5% or less of the general public MPE and, as such, under FCC regulations, AT&T is not responsible for these predicted exceedances.

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. Based on AT&T's RF Exposure: Responsibilities, Procedures & Guidelines document, dated October 28, 2014, microwave antennas are considered compliant if they are higher than 20 feet above any accessible walking/working surface. All microwaves on site are considered compliant with AT&T's guidance and were not included in the modeling analysis.

#### 4.0 RECOMMENDED SIGNAGE/COMPLIANCE PLAN

Signs are the primary means for control of access to areas where RF exposure levels may potentially exceed the MPE. As presented in the AT&T guidance document, the signs must:

- Be posted at a conspicuous point;
- Be posted at the appropriate locations;
- Be readily visible; and
- Make the reader aware of the potential risks prior to entering the affected area.

The table below presents the signs that may be used for AT&T installations.

CRAN / HETNET Small Cell Decals / Signs		Alerting Signs	
	NOTICE DECAL		
	NOTICE SIGN		
	CAUTION DECAL		
	CAUTION SIGN		

Based upon protocols presented in AT&T's RF Exposure: Responsibilities, Procedures & Guidelines document, dated October 28, 2014, and additional guidance provided by AT&T, the following signage is recommended on the site:

- Yellow CAUTION 2 sign posted at the base of the water tank near the climbing ladder.

No barriers are required for this site. Barriers are not recommended because the areas of concern extend into free space over lower walking/working surfaces. Barriers should be constructed of weather-resistant plastic or wood fencing. Barriers may consist of railing, rope, chain, or weather-resistant plastic if no other types are permitted or are feasible. Painted stripes should only be used as a last resort and only in regions where there is little chance of snowfall. If painted stripes are selected as barriers, it is recommended that the stripes and signage be illuminated. The signage and any barriers are graphically represented in the Signage Plan presented in Appendix B. It is important to note that this Signage Plan is specific for AT&T antennas only, and does not address RF emissions of other carrier antennas.

## **5.0 SUMMARY AND CONCLUSIONS**

EBI has prepared this Radiofrequency Emissions Compliance Report for the proposed AT&T telecommunications equipment at the site located at 7401 East Redfield in Scottsdale, Arizona.

EBI has conducted theoretical modeling to estimate the worst-case power density from AT&T antennas and other carrier antennas to document potential MPE levels at this location and ensure that site control measures are adequate to meet FCC and OSHA requirements, as well as AT&T's corporate RF safety policies. As presented in the preceding sections, based on worst-case predictive modeling, there are no modeled exposures on any accessible rooftop or ground walking/working surface related to ATT's proposed antennas that exceed the FCC's occupational and/or general public exposure limits at this site. Additionally, there are areas where elevated workers may be exposed to power densities greater than the occupational limits. The worst-case emitted power density may exceed the FCC's occupational limit within approximately 21 feet of AT&T's proposed antennas at the antenna face level. Workers and the general public should be informed about the presence and locations of antennas and their associated fields.

To reduce the risk of exposure and/or injury, EBI recommends that access to the water tank or areas associated with the active antenna installation be restricted and secured where possible. Signage is recommended at the site as presented in Section 4.0 and Appendix B. Posting of the signage brings the site into compliance with FCC rules and regulations and AT&T's corporate RF safety policies. Workers or members of the general public accessing areas directly in front of the other carrier antennas should contact the carrier and/or landlord to determine appropriate setbacks or measures to safely occupy those areas.

## **6.0 LIMITATIONS**

This report was prepared for the use of AT&T Mobility, LLC to meet requirements outlined in AT&T's corporate RF safety guidelines. 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 and its partners are based solely on information supplied by AT&T, including modeling instructions, inputs, parameters and methods. Calculations, data, and modeling methodologies for C Band equipment include a statistical factor reducing the power to 32% of maximum theoretical power to account for spatial distribution of users, network utilization, time division duplexing, and scheduling time. AT&T recommends the use of this factor based on a combination of guidance from its antenna system manufacturers, supporting international industry standards, industry publications, and its extensive experience. 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.

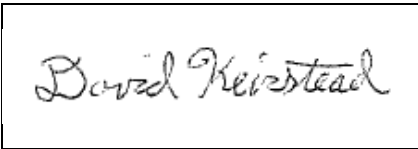
# **Appendix A**

## **Personnel Certifications**

## Preparer Certification

I, David Keirstead, state that:

- I am an employee of EnviroBusiness Inc. (d/b/a EBI Consulting), which provides RF-EME safety and compliance services to the wireless communications industry.
- I have successfully completed RF-EME safety training, and I am aware of the potential hazards from RF-EME and would be classified “occupational” under the FCC regulations.
- I am fully aware of and familiar with the Rules and Regulations of both the Federal Communications Commissions (FCC) and the Occupational Safety and Health Administration (OSHA) with regard to Human Exposure to Radio Frequency Radiation.
- I have been trained in on the procedures outlined in AT&T’s RF Exposure: Responsibilities, Procedures & Guidelines document (dated October 28, 2014) and on RF-EME modeling using RoofMaster™ modeling software.
- I have reviewed the data provided by the client and incorporated it into this Site Compliance Report such that the information contained in this report is true and accurate to the best of my knowledge.



Reviewed and Approved by:



sealed 21mar2022 mike@h2dc.com  
H2DC PLLC AZ CoA#: 19074

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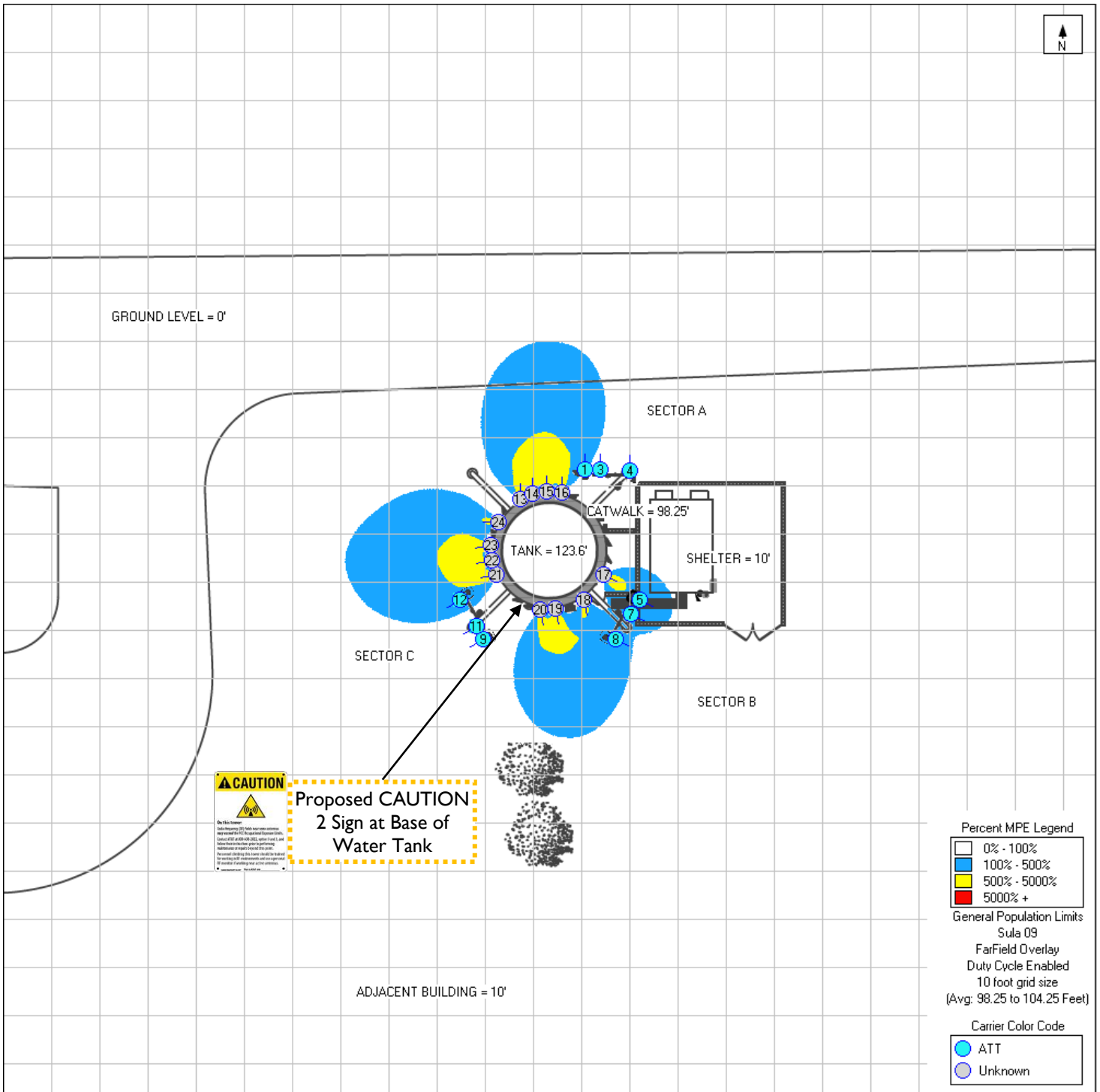
Michael McGuire  
Electrical Engineer  
[mike@h2dc.com](mailto:mike@h2dc.com)

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**

# **Compliance/Signage Plan**

## Nearest Walking Surface (Catwalk Level) Simulation



	Existing Sign
	Proposed Sign
	Installed Sign

SIGN IDENTIFICATION LEGEND			
	AT&T NOTICE 2 Sign		AT&T CAUTION 2 – Rooftop Sign
	AT&T WARNING 1B and 2A Signs		AT&T CAUTION 2B – Tower Sign
	AT&T NOTICE Small Cell Signs		AT&T CAUTION 2C – Parapet Sign
	AT&T CAUTION Small Cell Signs		AT&T TRILINGUAL NOTICE Sign