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VIA EMAIL: [APAVLICA@GARFIELDNJ.ORG](mailto:APAVLICA@GARFIELDNJ.ORG)

Municipal Clerk  
City of Garfield  
111 Outwater Lane  
Garfield, NJ 07026

Re: RF Health and Safety Report  
5G Technology in Municipal Rights-of-Way  
City of Garfield

Dear Mr. Pavlica,

Enclosed herein, please find the RF health and safety report for this 5G wireless site location.

Overall, the report depicts an acceptable EME exposure level, with minimal risk to public and private citizens and vehicles in the nearby right-of-way and homes and buildings. Please refer to the report for further clarification and details

Please feel free to contact me if you have any questions or need any further information.

Very truly yours,

**Peter J. Lupo**

Hoplite Communications, LLC



A Veteran Owned Small Business



June 29, 2020

City of Garfield  
111 Outwater Lane  
Garfield, NJ 07026

RE: AT&T Site NJ12345 – 174 Passaic Street

To Whom It May Concern

Thank you for providing your feedback. Below is some information on cellular antennas that may be helpful in addressing your concerns in relation to health & safety.

Radiofrequency emissions from antennas used for cellular and PCS transmissions result in exposure levels on the ground that are typically “hundreds to thousands of times less than” safety limits. These safety limits were adopted by the FCC based on the recommendations of expert organizations and endorsed by agencies of the Federal Government responsible for health and safety. Therefore, there is no reason to believe that such towers could constitute a potential health hazard to nearby residents or students.

Also, per the FCC, there is “no conclusive evidence” of a relationship between the radio frequency emitted both from cellular phones/antennas and cancer.

## **WHAT ARE "RADIOFREQUENCY" AND MICROWAVE RADIATION?**

Electromagnetic radiation consists of waves of electric and magnetic energy moving together (*i.e.*, radiating) through space at the speed of light. Taken together, all forms of electromagnetic energy are referred to as the electromagnetic "spectrum." Radio waves and microwaves emitted by transmitting antennas are one form of electromagnetic energy. They are collectively referred to as "radiofrequency" or "RF" energy or radiation. Note that the term “radiation” does not mean “radioactive.” Often, the terms "electromagnetic field" or "radiofrequency field" are used to indicate the presence of electromagnetic or RF energy.

The RF waves emanating from an antenna are generated by the movement of electrical charges in the antenna. Electromagnetic waves can be characterized by a wavelength and a frequency. The wavelength is the distance covered by one complete cycle of the electromagnetic wave, while the frequency is the number of electromagnetic waves



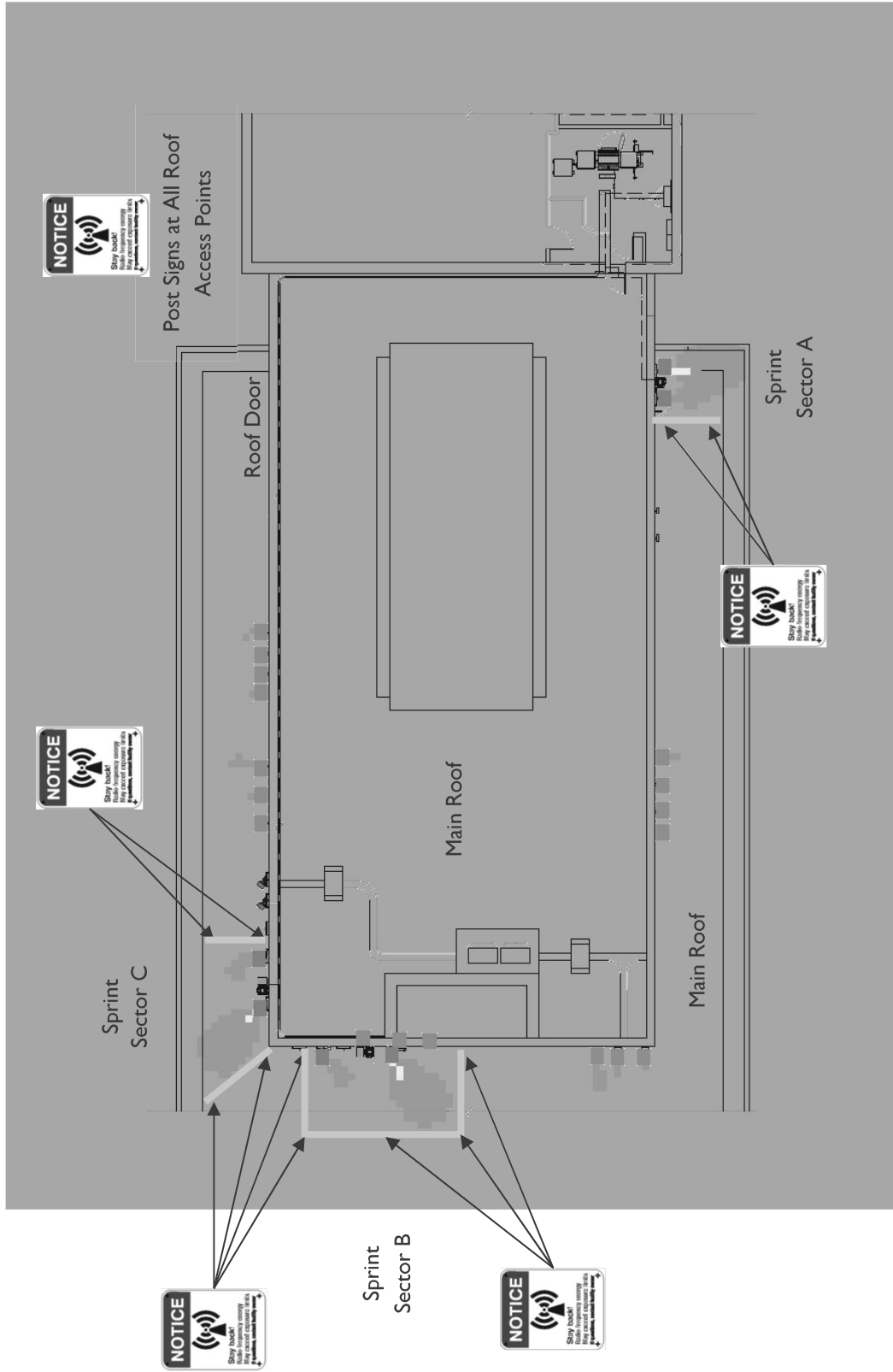
passing a given point in one second. The frequency of an RF signal is usually expressed in terms of a unit called the "hertz" (abbreviated "Hz"). One Hz equals one cycle per second. One megahertz MHz equals one million cycles per second.

Different forms of electromagnetic energy are categorized by their wavelengths and frequencies. The RF part of the electromagnetic spectrum is generally defined as that part of the spectrum where electromagnetic waves have frequencies in the range of about 3 kilohertz (3 kHz) to 300 gigahertz (300 GHz). Microwaves are a specific category of radio waves that can be loosely defined as radiofrequency energy at frequencies ranging from about 1 GHz to 30 GHz. ([Back to Index](#))

## **WHAT IS NON-IONIZING RADIATION?**

"Ionization" is a process by which electrons are stripped from atoms and molecules. This process can produce molecular changes that can lead to damage in biological tissue, including effects on DNA, the genetic material of living organisms. This process requires interaction with high levels of electromagnetic energy. Those types of electromagnetic radiation with enough energy to ionize biological material include X-radiation and gamma radiation. Therefore, X-rays and gamma rays are examples of ionizing radiation.

The energy levels associated with RF and microwave radiation, on the other hand, are not great enough to cause the ionization of atoms and molecules, and RF energy is, therefore, is a type of non-ionizing radiation. Other types of non-ionizing radiation include visible and infrared light. Often the term "radiation" is used, colloquially, to imply that ionizing radiation (radioactivity), such as that associated with nuclear power plants, is present. Ionizing radiation should not be confused with the lower-energy, non-ionizing radiation with respect to possible biological effects, since the mechanisms of action are quite different. ([Back to Index](#))



- Sprint Antennas
- Other Carrier Antennas
- Recommended Hard Barrier

% FCC Public Exposure Limit	
	Exposure Level $\geq 5,000$
	$500 < \text{Exposure Level} \leq 5,000$
	$100 < \text{Exposure Level} \leq 500$
	Exposure Level $\leq 100$

**MPE Analysis and Recommended Signage**  
 Facility Operator: Sprint  
 Site Name: NY03XC019  
 Sprint Site Number: NY03XC019  
 Report Date: January 7, 2020



**Appendix B**  
**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 and 2500 MHz frequency ranges. For the Sprint equipment operating at 800 MHz, the FCC’s occupational MPE is 2.66 mW/cm<sup>2</sup> and an uncontrolled MPE limit of 0.53 mW/cm<sup>2</sup>. For the Sprint equipment operating at 1900 MHz, the FCC’s occupational MPE is 5.0 mW/cm<sup>2</sup> and an uncontrolled MPE limit of 1.0 mW/cm<sup>2</sup>. These limits are considered protective of these populations.

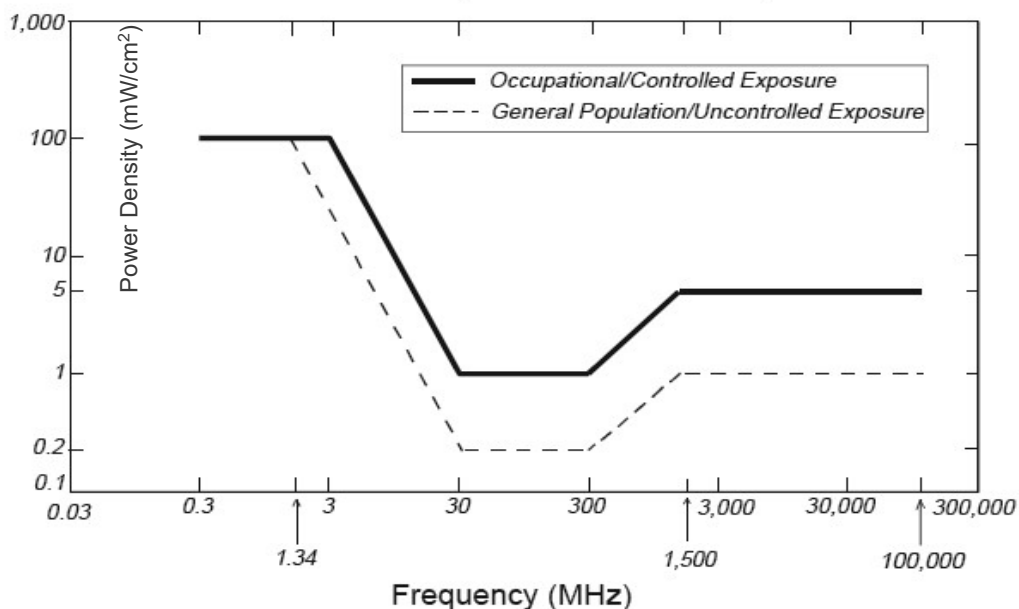
Table I: Limits for Maximum Permissible Exposure (MPE)				
(A) Limits for Occupational/Controlled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time [E] <sup>2</sup> , [H] <sup>2</sup> , or S (minutes)
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

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)
(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 <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
Long-Term Evolution (LTE)	2,100 MHz	5.00 mW/cm <sup>2</sup>	1.00 mW/cm <sup>2</sup>
Personal Communication Services (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	855 MHz	2.85 mW/cm <sup>2</sup>	0.57 mW/cm <sup>2</sup>

<b>Personal Wireless Service</b>	<b>Approximate Frequency</b>	<b>Occupational MPE</b>	<b>Public MPE</b>
Most Restrictive Freq, 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 Services (PCS) facilities used by Sprint in this area operate within a frequency range of 800-2500 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.

Advanced Wireless Services (AWS) facilities used by Sprint in this area operate within a frequency range of 2496 - 2690 MHz. Facilities typically consist of: 1) electronic transceivers (the radios or cabinets); and 2) antennas that send the wireless signals created by the transceivers to be received by individual subscriber units. Transceivers are typically connected to antennas by coaxial cables.

Because of the short wavelength of PCS/AWS 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.



## **Appendix C**

### **Certifications**

## Field Personnel Certification

I, Adam Piombino, 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 the proper use of the RF-EME measurement equipment, and have successfully completed EBI training in the policies and procedures for site survey protocols.
- All information collected during the site survey and contained in this report is true and accurate to the best of my knowledge and based on the data gathered.



## Preparer Certification

I, Adam Piombino, state that:

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



## **Appendix D**

### **Roofview® Export File / Antenna Inventory**

List Of Areas  
SUS41:SPXS210

StartMapDefinition	Roof Max X	Map Max Y	Map Max X	Y Offset	X Offset	Number of Areas	envelope	SUS41:SPXS210	SUS41:SPXS210	SUS41:SPXS210	Ap Ht Mult	p Ht Method	(ft)	X	Y	Z	(ft)	Type	(ft)	Aper	dBd	BWdth	Uptime Profile	flag	
StartSettingsData	210	210	210	20	20	1	1	5000	5000	3	1.5	1	121	38	6.4	6.4	13.05	65:170	2.1	13.05	65:230	ON			
StartAntennaData	Method	Uptime (MHz)	Scale Factor	Low Thr	Low Color	Mid Thr	Mid Color	Hi Thr	Hi Color	Over Color	Model	Ap Ht Mult	p Ht Method	(ft)	X	Y	Z	(ft)	Type	(ft)	Aper	dBd	BWdth	Uptime Profile	flag
SPT A2	Sprint	2500	40	3	0	0	0	120.0	120.0	Nokia	MAA-AAHC	1.5	1	121	38	6.4	6.4	13.05	65:170	2.1	13.05	65:230	ON		
SPT B2	Sprint	2500	40	3	0	0	0	120.0	120.0	Nokia	MAA-AAHC	1.5	1	31	88	6.4	6.4	13.05	65:230	2.1	13.05	65:230	ON		
SPT C2	Sprint	2500	40	3	0	0	0	120.0	120.0	Nokia	MAA-AAHC	1.5	1	46	97	6.4	6.4	13.05	65:230	2.1	13.05	65:230	ON		
SPT A1	Sprint	800	50	2	10	1/2 LDF	0.5	84.3	84.3	RFS	APXVSP18-C-A20	1.5	1	125	38	4.5	4.5	13.40	65:170	6.0	13.40	65:170	ON		
SPT A1	Sprint	1900	45	4	10	1/2 LDF	0.5	151.8	151.8	RFS	APXVSP18-C-A20	1.5	1	125	38	4.5	4.5	15.90	65:170	6.0	15.90	65:170	ON		
SPT B1	Sprint	800	50	2	10	1/2 LDF	0.5	84.3	84.3	RFS	APXVSP18-C-A20	1.5	1	31	79	4.5	4.5	13.40	65:230	6.0	13.40	65:230	ON		
SPT B1	Sprint	1900	45	4	10	1/2 LDF	0.5	151.8	151.8	RFS	APXVSP18-C-A20	1.5	1	31	79	4.5	4.5	15.90	65:230	6.0	15.90	65:230	ON		
SPT C1	Sprint	800	50	2	10	1/2 LDF	0.5	84.3	84.3	RFS	APXVSP18-C-A20	1.5	1	38	96	4.5	4.5	13.40	65:310	6.0	13.40	65:310	ON		
SPT C1	Sprint	1900	45	4	10	1/2 LDF	0.5	151.8	151.8	RFS	APXVSP18-C-A20	1.5	1	38	96	4.5	4.5	15.90	65:310	6.0	15.90	65:310	ON		
ATT A1	AT&T	850	30	4	0	0	3	60.1	60.1	Unknown	Unknown	1.5	1	74	38	7.0	7.0	12.00	65:200	5.0	12.00	65:200	ON		
ATT A2	AT&T	1900	30	4	0	0	3	60.1	60.1	Unknown	Unknown	1.5	1	70	38	7.0	7.0	16.00	65:200	5.0	16.00	65:200	ON		
ATT A3	AT&T	2100	40	2	0	0	3	40.1	40.1	Unknown	Unknown	1.5	1	66	38	7.0	7.0	16.00	65:200	5.0	16.00	65:200	ON		
ATT A4	AT&T	700	60	1	0	0	3	30.1	30.1	Unknown	Unknown	1.5	1	62	38	7.0	7.0	12.00	65:200	5.0	12.00	65:200	ON		
ATT B1	AT&T	850	30	4	0	0	3	60.1	60.1	Unknown	Unknown	1.5	1	92	96	7.0	7.0	12.00	65:320	5.0	12.00	65:320	ON		
ATT B2	AT&T	1900	30	4	0	0	3	60.1	60.1	Unknown	Unknown	1.5	1	89	96	7.0	7.0	16.00	65:320	5.0	16.00	65:320	ON		
ATT B3	AT&T	2100	40	2	0	0	3	40.1	40.1	Unknown	Unknown	1.5	1	86	96	7.0	7.0	12.00	65:320	5.0	12.00	65:320	ON		
ATT B4	AT&T	700	60	1	0	0	3	30.1	30.1	Unknown	Unknown	1.5	1	83	96	7.0	7.0	16.00	65:320	5.0	16.00	65:320	ON		
TMO A1	T-Mobile	1900	15	4	0	0	3	30.1	30.1	Unknown	Unknown	1.5	1	31	41	5.0	5.0	16.00	65:260	5.0	16.00	65:260	ON		
TMO A2	T-Mobile	1900	15	4	0	0	3	30.1	30.1	Unknown	Unknown	1.5	1	31	45	5.0	5.0	16.00	65:260	5.0	16.00	65:260	ON		
TMO A3	T-Mobile	2100	30	4	0	0	0.5	107.0	107.0	Unknown	Unknown	1.5	1	31	48	5.0	5.0	16.00	65:360	5.0	16.00	65:360	ON		
TMO B1	T-Mobile	1900	15	4	0	0	3	30.1	30.1	Unknown	Unknown	1.5	1	64	96	5.0	5.0	16.00	65:360	5.0	16.00	65:360	ON		
TMO B2	T-Mobile	1900	15	4	0	0	3	30.1	30.1	Unknown	Unknown	1.5	1	68	96	5.0	5.0	16.00	65:360	5.0	16.00	65:360	ON		
TMO B3	T-Mobile	2100	30	4	0	0	0.5	107.0	107.0	Unknown	Unknown	1.5	1	73	96	5.0	5.0	16.00	63:260	4.0	12.00	63:260	ON		
UNK A1	Unknown	850	33	1	0	0	3	16.5	16.5	Unknown	Unknown	1.5	1	34	81	14.5	14.5	12.00	63:260	4.0	12.00	63:260	ON		
UNK A2	Unknown	850	34	1	0	0	3	17.0	17.0	Unknown	Unknown	1.5	1	34	76	14.5	14.5	12.00	63:260	4.0	12.00	63:260	ON		
UNK A3	Unknown	850	33	1	0	0	3	16.5	16.5	Unknown	Unknown	1.5	1	34	72	14.5	14.5	12.00	63:260	4.0	12.00	63:260	ON		

StartSymbolData	Sym	Roof X	Roof Y	Map Label	Description (notes for this table only)
Sym	Sym	5	35	AC Unit	Sample symbols
Sym	Sym	14	5	Roof Access	
Sym	Sym	45	5	AC Unit	
Sym	Sym	45	20	Ladder	

# **Appendix E**

## **Monitoring Plan**

