

TOWN OF HOLLISTON
ZONING BOARD OF APPEALS

TOWN HALL

HOLLISTON, MASSACHUSETTS 01746

2019 OCT 16 AM 10:18
OFFICE OF THE
TOWN CLERK
HOLLISTON, MASS.

APPLICATION FOR GRANT OF A SPECIAL PERMIT

Date Filed: 10/15/19

Applicant's Name: AT&T Mobility, New England

Applicant's Address: c/o Centerline Communications, LLC

750 W. Center St. W. Bridgewater, MA 02379

Applicant's Phone Number: c/o Simon Brighenti (413) 237-1550

Owner's Name: NSTAR Electric Company d/b/a Eversource Energy

Owner's Address: 247 Station Drive, SE 210, Westwood, MA 02090

The Owner hereby appoints Simon Brighenti of Centerline Communications LLC to its agent for the purposes of submitting and processing this application for a special permit.

The Owner's title to the land that is the subject matter of this application is derived under deed from Richard Finn, et. al., dated 10/31/2007 and recorded in the Middlesex County Registry of Deeds, Book 50290 at Page 51.

The land is shown in the Assessor's records as Lot 60 on Map 9, Block 2

And has an address of or is located at 0 Marilyn Street

in the Agricultural-Residential B zoning district.

Under the provisions of Section VI-D (2) to vary the terms of Section I-B and the following, the Applicant hereby petitions the Board of Appeals:

Nature and subject matter of Special Permit:

Installation of telecommunication facility on an existing utility structure.

Section of Zoning Bylaw that permits this use by grant of Special Permit:

Section V-O 4.C + 4.A.3 + 4.C.2.e

Previous Zoning Information (To be completed by Inspector of Buildings):

EXISTING UTILITY TRANSMISSION STRUCTURE IN AR-B ZONE. PROPOSED WIRELESS ANTENNA EXTENDS MORE THAN 12' ABOVE THE EXISTING STRUCTURE REQUIRING A SPECIAL PERMIT. FREE STANDING DEVICES GREATER THAN 40' IN HEIGHT REQUIRE A FINDING. CC 10/16/19

The Applicant presents the following evidence that supports the grant of the special Permit:

a. The use is in harmony with the general purpose and intent of the bylaw because:

See Proposed Findings attached

b. The general or specific provisions of a grant of a special permit, as set forth in the zoning bylaw are satisfied because:

See Proposed Findings attached

Will the proposed use include the storage or process of any hazardous substances?
Yes ____ (Please attach additional information.) No XXX

Applicant's Signature: 

Owner's Signature: 

Joseph L. Simonelli
Everstone Wireless Leasing Proj. Mgr
Eastern MA

**PROPOSED FINDINGS
per TOWN OF HOLLISTON
ZONING BYLAW CRITERIA**

Support Statements for Zoning Relief

Applicant: AT&T Mobility New England, by Centerline Communications LLC (hereinafter “AT&T” or “Applicant”)

Location: 0 (Off) Marilyn Street

Map ID: 009.0-0002-0060.1
Holliston, MA 01

Owner: NSTAR Electric Company

Zoning Relief Sought:

- **Special Permit** from the **Zoning Board of Appeals (“the Board”)** pursuant to Section V-O of the Town of Holliston Zoning Bylaw (hereinafter “the Bylaw”).

INTRODUCTION: Applicant is seeking zoning relief from the Board to approve and allow the installation of a 15-foot tall Wireless Communication Facility atop an existing utility structure in the Right of Way crossing the property know as 0 Marilyn Street. Applicant is licensed by the Federal Communications Commission (the “FCC”) to provide telecommunication service to Holliston and the surrounding areas as part of a robust nationwide network of interoperable facilities. In addition to providing such commercial service, Applicant is building - in concert with state and Federal officials and agencies - the First Responder Network Authority (“FirstNet”). www.firstnet.gov. FirstNet is an independent authority within the U.S. Department of Commerce and is overseeing development of a nationwide wireless broadband network for first responders being built and deployed through a first of its kind public-private partnership between the federal government and AT&T. FirstNet was authorized by Congress in 2012, with a genesis in the Report of the 9/11 Commission. Issued in 2004, this report identified gaps in emergency communications and recommended a nationwide network for public safety communications. Each facility constructed by AT&T will become available for integration into FirstNet.

In addition to the proposed findings set forth below, Applicant also presents the within requests for relief and consideration pursuant to the Federal Telecommunications Act of 1996 (“The TCA”), 47 U.S.C. section 332 (c) (7) et. seq.

SECTION V-O ANTENNAE

1. **Purpose** - This Section is adopted by the Town for the regulation and restriction of the construction, erection, installation, placement and/or use of antennas and other devices that perform the functions of antennas, and of accessory telecommunications structures, equipment and facilities and similar devices, within all zoning districts in the Town.

Finding: Applicant is submitting the within material pursuant to the letter and intent of this Bylaw.

2. Definitions

As used in this Section V-O the following words and terms shall have and include the following respective meanings:

Antenna — Any apparatus acting as an intentional radio-frequency and/or wireless transmitter and/or receiver used in the carriage of wireless telecommunication services.

Device — Any antenna or other apparatus that performs the function of antennas, together with any telecommunications structures, equipment and facilities ancillary and/or accessory thereto; by way of example and not limitation, "device" shall mean among other things panel antennas, whip antennas, pole antennas, dish and cone-shaped antennas, other free-standing antennas and personal wireless service facilities. The term "device" is intended to include facilities for the provision of wireless telecommunications services regulated by the Federal Communications Commission ("FCC") and defined as "personal wireless services" in Section 704, or other sections of the Federal Telecommunications Act of 1996 as amended; including, by way of example but not limitation, personal wireless services include cellular telephone services, so —called personal communications services ("PCS"), and paging services.

Free Standing Device — A monopole wireless service facility not requiring guy wires for support; and any other device mounted on the ground and not mounted on any existing building or structure.

Height — A distance measured from the average finished grade of the land surrounding the device to its highest point, surface or projection, in the case of free-standing devices, or a distance measured from the average finished grade of the land surrounding the exterior walls to the highest point, surface or projection of the device, in the case of devices mounted on existing buildings.

The definitions herein, especially that of a "device," are intended to encompass such devices as they may evolve through technological advances.

Finding: Applicant is applying for municipal permission to install the Device(s) described in the accompanying plans upon an existing utility structure.

3. Applicability

Other provisions of this Zoning By Law notwithstanding, the regulations and restrictions set forth herein shall apply to the construction, erection, installation, placement and/or use of devices (including but not limited to personal wireless service facilities) and free-standing devices, antennas of federally licensed amateur radio operators and so-called satellite dishes, on land, buildings or structures within the Town of Holliston. The terms of this Sections

shall override any conflicting terms elsewhere in the Zoning By Law, particularly including, but not limited to, Section VI-D 3, Variances, and Section III-A, Schedule of Use Regulations, regarding public service corporations and the height restrictions in Section N-B Schedule of Intensity Regulations.

No device exterior to an enclosed building and/or structure, whether mounted thereon or free-standing shall be constructed, erected, installed, placed and/or used on land, buildings and/or structures within the Town of Holliston on or after May 4, 1998 except in accordance with the provisions of this Section V-O. Devices in existence prior to May 4, 1998 shall be maintained and shall be kept in good condition. The Inspector of Buildings shall order the removal, repair or securing of any device for public safety purposes that is determined, by the Inspector of Buildings, to be hazardous to life or property, in poor condition, disrepair or damaged by storm or other cause.

Finding: Applicant is proposing to mount a Device on an existing utility structure in accordance with the provisions of this Section.

4. Regulations and Restrictions

a. General Standards

The construction, erection, installation and/or placement of all devices, except devices for customary private household use as further described in paragraph 4b(1) and devices, used by amateur radio operators pursuant to paragraph 4b (3), whether allowed by right in accordance with paragraph 4c, upon the granting of a Special Permit pursuant to paragraph 4c or pursuant to the provisions of paragraph B.6 of Section III, Schedule of Use Regulations, are subject to the following general standards:

(1) *Screening, Landscaping and Preservation of Existing Vegetation.*

Whenever possible devices shall be sited so as to minimize the visibility of such devices from adjacent property and shall be suitably screened from abutters and residential neighborhoods. To the extent feasible installation of freestanding devices shall minimize the removal of existing trees and other vegetation.

Finding: The proposed location is within a heavily vegetated area of town currently populated by several tall utility structures. Applicant is proposing the placement of a Device approximately Twelve (12) feet in height atop an existing utility structure One Hundred Thirty-Five (135) Feet in height. The concomitant ground equipment will be placed within the existing footprint of the utility structure, necessitating little to no removal of existing trees or other vegetation.

(2) ***Camouflage.***

To the extent reasonably possible, devices shall be camouflaged by location and/or design to disguise them from public view, whether by designing the device so as to disguise it as an existing or new building or structure appropriate in type and scale to its location (e.g. a light standard adjacent to a recreational area, a flagpole in a park, a silo in a field) where the antennae are hidden within or mounted on a structure so as to make them essentially invisible, or whether located in a place and manner that renders the device essentially invisible (e.g., siting the device within existing trees, providing effective screening by the use of landscaped buffers which camouflage the device at the time of planting and are effective year-round).

Finding: The proposed location is within a heavily vegetated area of town currently populated by several tall utility structures. Applicant is proposing the placement of a Device approximately Twelve (12) feet in height atop an existing utility structure One Hundred Thirty-Five (135) Feet in height. The concomitant ground equipment will be placed within the existing footprint of the utility structure. The relative scale of the two structures provides certain camouflage. Other nearby utility structures host such Devices.

(3) ***Height.***

A device shall be designed and installed at the minimum height necessary for the reasonable and proper functioning of the telecommunications services to be provided by the device at that location. Freestanding devices shall not exceed 40 feet in height unless the Zoning Board makes the findings under paragraph 4c(2)d. required for installation of a device at a height greater than 40 feet.

Finding: The proposed Device is designed at the minimum height necessary to meet the radio frequency propagation objective.

(4) ***Color***

Free-standing, wall mounted, and roof mounted devices shall be painted or otherwise colored or finished. in a manner which aesthetically minimizes the visibility of the devices in the surrounding landscape or on the building or structure to which they are attached.

Finding: Applicant is agreeable to working with the Board in furtherance of this requirement.

(5) ***Fencing***

Any fencing necessary to control access to devices shall be compatible with the character of the area.

Finding: Applicant is agreeable to working with the Board in furtherance of this requirement.

(6) *Signs*

There shall be no advertising permitted on or in the vicinity of devices. There shall be a sign not exceeding 4 square feet in area at each installation which shall display a phone number where the person responsible for the maintenance of the installation may be reached on a 24-hour basis. All other signage shall be consistent with the provision of Section V-B.

Finding: Applicant is agreeable to working with the Board in furtherance of this requirement, subject to all signage requirements imposed by State and Federal authorities having jurisdiction.

(7) *Lighting*

Night lighting of installations shall be prohibited except for such lighting as may be necessary for emergency repair purposes, public safety purposes or Federal Aviation Administration regulations.

Finding: Applicant is agreeable to working with the Board in furtherance of this requirement, subject to all lighting requirements imposed by State and Federal authorities having jurisdiction.

(8) *Personal Safety*

When devices are mounted in locations above or in the vicinity of pedestrian areas or other areas open to the public such installations shall be made in a manner that does not impede or restrict the movement of pedestrians nor pose a hazard to any person.

Finding: The proposed location is not generally frequented by pedestrians. However, Applicant is agreeable to working with the Board in furtherance of this requirement.

(9) *Prohibitions*

- a. Lattice style towers and facilities requiring three or more legs and/or guy wires for support are not allowed.
- b. Advertising signs are not allowed
- c. Fences using razor wire or barbed wire, or similar wire types shall not be allowed.

Finding: The Applicant shall comply with the stated prohibitions.

b. By Right Provisions

The following devices may be constructed, erected, installed, placed and/or used within the Town subject to the issuance of a building permit by the Inspector of Buildings in those instances when a building permit is required:

- (1) A device for customary private household use such as a conventional chimney-mount television antenna or home satellite dish not over 3 feet in diameter;
- (2) A device or (combination of devices) installed on a building or other structure provided that such a device or combination of devices, including its supports, is:
 - a. finished in a manner designed to be aesthetically consistent with the exterior finish of such building or structure and otherwise in accordance with the General Standards set forth in paragraph 4a; and
 - b. mounted in such a manner so that it does not:
 - (i) obscure any window or other exterior architectural feature;
 - (ii) extend above the highest point of the building or structure by more than 12 feet
 - (iii) extend beyond the face of any wall, or exterior surface in the case of structures that do not have walls, by more than 18 inches;
 - (iv) extend below the top of the wall, or exterior surface in the case of structures that do not have walls, of a one-story building or structure; or
 - (v) extend more than 8 feet below the top of the wall, or exterior surface in the case of structures that do not have walls, or a multi-story building or structure; and
 - c. is comprised of devices which do not individually or in the aggregate have a visible surface area facing surrounding streets and adjacent properties that exceeds 50 square feet in area;
- (3) A device owned by and located on the property of an amateur radio operator licensed by the FCC, which device shall be installed at the minimum height necessary for the proper functioning of amateur radio communications in accordance with the licensing requirements for that location.

- (4) A device installed wholly within and not protruding from the interior space of an existing building or structure (including interior space behind existing roofs or within existing mechanical penthouse space) or behind existing rooftop mechanical screens in such a manner that the device would not be visible from surrounding streets and from adjacent properties and only for so long as such device remains wholly within such space or behind such roofs or screens.

All other devices shall require a special permit in accordance with paragraph 4c.

Finding: Applicant acknowledges that a Special Permit is required to allow installation of the proposed facility.

c. Special Permit Provisions

In reviewing special permit applications for devices, the Zoning Board may hire an independent consultant, cost for same to be borne by the applicant in accordance with Chapter 583 of the Acts of 1989.

Finding: Applicant agrees to comply with any reasonable requirement imposed in furtherance of this section of the Bylaw.

The Zoning Board may issue a special permit in accordance with Section VI-E for:

- (1) A device (or combination of devices) installed on a building or structure, where such device or combination exceeds any one or more of the dimensional requirements of paragraph B above;

Finding: Applicant submits this application for approval of a Device to be installed on a structure as described in this section.

- (2) All other devices, provided the Zoning Board finds:

- a. that the device complies with the General Standards set forth in paragraph 4a;
- b. that the requested installation is essential to the proper functioning of the telecommunications services to be provided by the device at that location and that an alternative installation (or installations), which would meet the By-Right provisions of paragraph 4b, is not workable;
- c. that the requested installation will not adversely impact adjacent property materially;
- d. in the case of a free standing device, that the center point of the base of the monopole is set back from the: property lines of the lot on which such device is located by a distance equal to the overall vertical height of the monopole and

mounted device plus five feet, unless the applicant demonstrates that due to topography and/or other characteristics of the site lesser setbacks shall not pose any public safety danger to any adjacent properties; and

e. that the overall height does not exceed 40 feet, unless the Zoning Board also finds that a greater height is essential to the proper functioning of the telecommunications services to be provided by the device at that location and that a less intrusive, alternative installation (or installations) is not workable.

Finding: Applicant submits that the application meets or exceeds all conditions set forth in this section.

5. Certification and Evidence

In all cases, whether use is By-Right or otherwise, the owner and/or operator of any device except as described in paragraph 4b(1) and 4b(3) shall, prior to installation of any device and annually thereafter, file with the Inspector of Buildings a certificate attesting that the device is in use and submit copies of the device's current FCC license, evidence of continuing insurance coverage, and underlying lease agreement with the land and/or structure owner, a periodic (at least annual) maintenance schedule for the device and evidence that the device complies with the applicable standards of the Federal Communications Commission and the Federal Aviation Administration.

Finding: Applicant agrees to comply with the requirements of this section.

6. Cessation of Use

Each device, except as described in paragraph 4b(1) and 4b(3), shall be removed within one (1) year of cessation of use: by the owner and/or operator of the device or, in the absence of a current owner and/or operator, by the owner of the property or structure on which the device is located.

Should the owner and/or operator, or the owner of the land or structure on which the device is located, fail to remove a device within one (1) year of cessation of use, the Town may remove the same. A performance guarantee may be required as a condition of any special permit granted under this Section, in an amount deemed sufficient to cover the Town's cost of the demolition and removal of the device in the event of cessation of use.

Finding: Applicant agrees to comply with the requirements of this section.



C Squared Systems, LLC
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Calculated Radio Frequency Emissions Report



MA3574

0 Marilyn Street, Holliston, MA 01746

December 31, 2019

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1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed AT&T Mobility wireless communications facility on an existing transmission structure located at 0 Marilyn Street in Holliston, MA. The coordinates of the structure are 42° 12' 28.39" N, 71° 24' 8.91" W.

AT&T Mobility is proposing to install twelve (12) multi-band antennas (four per sector) to support the AT&T LTE network and the FirstNet National Public Safety Broadband Network ("NPSBN).

This report uses the planned antenna configuration for AT&T Mobility¹ to derive the resulting % MPE (Maximum Permissible Exposure), once the proposed installation has been completed.

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter (mW/cm²). The general population exposure limits for the various frequency ranges are defined in the attached "FCC Limits for Maximum Permissible Exposure (MPE)" in Attachment C of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment C contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

¹ As referenced to AT&T's preliminary Radio Frequency Design Sheet dated 09/26/2019.

3. RF Exposure Calculation Methods

The calculated ground-level power density results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

$$\text{Power Density} = \left(\frac{\text{EIRP}}{\pi \times R^2} \right) \times \text{Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power

R = Radial Distance = $\sqrt{H^2 + V^2}$

H = Horizontal Distance from antenna

V = Vertical Distance from radiation center of antenna in meters

Off Beam Loss is determined by the selected antenna patterns

Ground reflection factor of 2.0

These calculations assume that the transmitters are operating at full power and 100 percent capacity and that all radio channels are transmitting simultaneously. Obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not consider actual terrain elevations which could attenuate the signal. As a result, the calculated power density and corresponding % MPE levels reported below are much higher than the actual signal levels will be from the final installation.

4. Antenna Inventory

Table 1 below outlines AT&T Mobility's proposed antenna configuration for the site. The associated data sheets and antenna patterns for these specific antenna models are included in Attachments C.

Operator	Sector	TX Freq (MHz)	Power at Antenna (Watts)	Ant Gain (dBi)	Power EIRP (Watts)	Antenna Model	Beam Width	Mech. Tilt	Length (ft)	Antenna Centerline Height (ft)
AT&T	Alpha	763	80	15.5	2839	HPA65R-BU8A	67	0	8	143
		2100	240	18.3	16226		62			
		763	80	15.5	2839	HPA65R-BU8A	67	0	8	143
		2300	160	18.0	10095		60			
		739	80	15.5	2839	HPA65R-BU8A	67	0	8	143
		875	80	15.9	3112		67			
		739	80	15.5	2839	HPA65R-BU8A	67	0	8	143
		875	80	15.9	3112		67			
		1900	160	18.1	10330		62			
	Beta	763	80	15.5	2839	HPA65R-BU8A	67	0	8	143
		2100	240	18.3	16226		62			
		763	80	15.5	2839	HPA65R-BU8A	67	0	8	143
		2300	160	18.0	10095		60			
		739	80	15.5	2839	HPA65R-BU8A	67	0	8	143
		875	80	15.9	3112		67			
		739	80	15.5	2839	HPA65R-BU8A	67	0	8	143
		875	80	15.9	3112		67			
		1900	160	18.1	10330		62			
	Gamma	763	80	15.5	2839	HPA65R-BU8A	67	0	8	143
		2100	240	18.3	16226		62			
		763	80	15.5	2839	HPA65R-BU8A	67	0	8	143
		2300	160	18.0	10095		60			
		739	80	15.5	2839	HPA65R-BU8A	67	0	8	143
		875	80	15.9	3112		67			
		739	80	15.5	2839	HPA65R-BU8A	67	0	8	143
		875	80	15.9	3112		67			
		1900	160		10330		62			

Table 1: Proposed Antenna Inventory²

² Transmit power assumes 0 dB of cable loss.

5. Calculated % MPE Results

The calculated % MPE results are shown in Figure 1 below. For completeness, the calculations for this analysis range from 0 feet horizontal distance (directly below the antennas) to a value of 3,000 feet horizontal distance from the site. In addition to the other worst-case scenario considerations that were previously mentioned, the power density calculations to each horizontal distance point away from the antennas was completed using a local maximum off beam antenna gain (within ± 5 degrees of the true mathematical angle) to incorporate a realistic worst-case scenario.

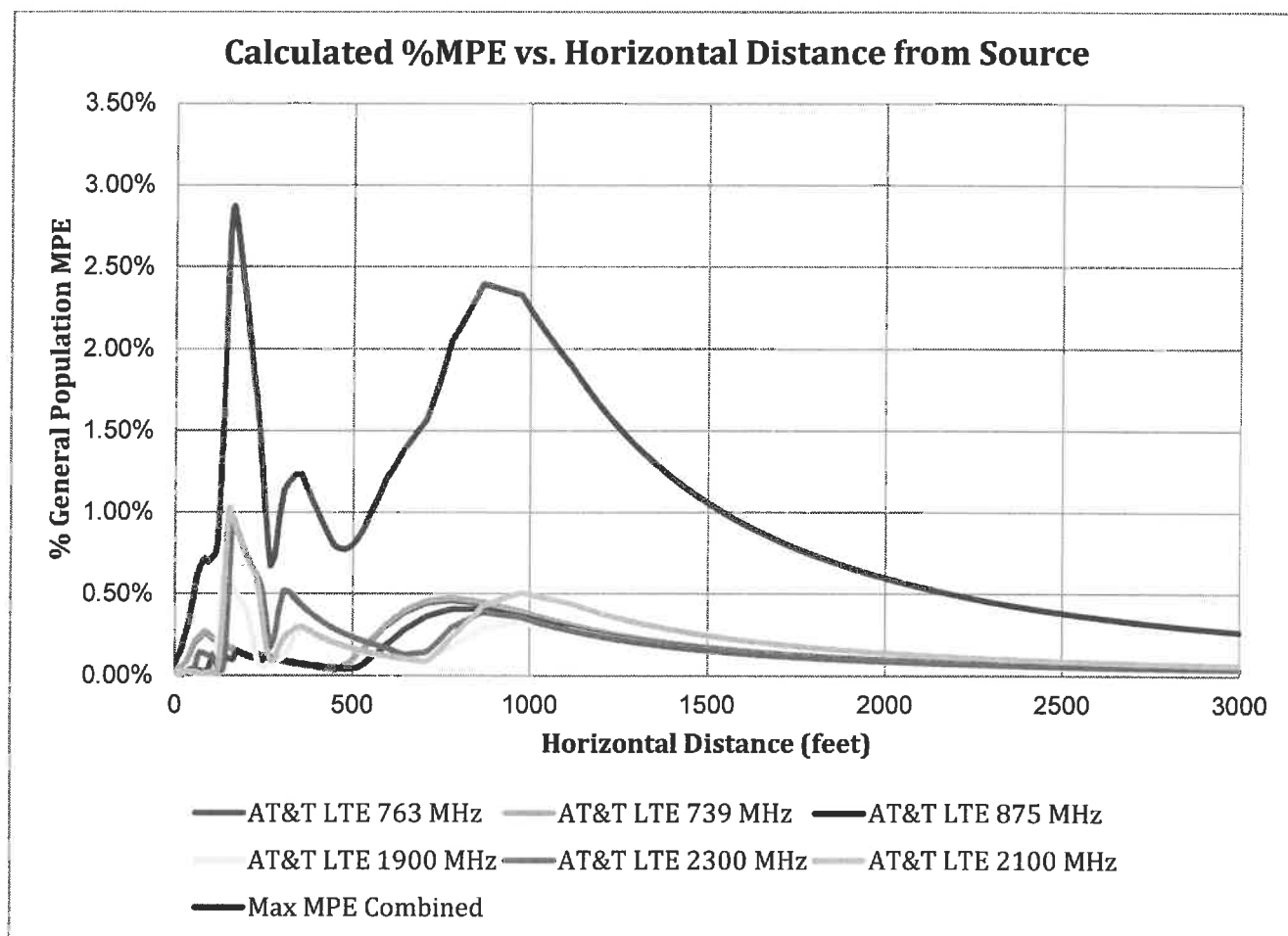


Figure 1: Graph of General Population % MPE vs. Distance

The highest percent of MPE (2.87% of the General Population limit) is calculated to occur at a horizontal distance of 163 feet from antennas. Please note that the percent of MPE calculations close to the site take into account off beam loss, which is determined from the vertical pattern of the antennas used. Therefore, RF power density levels may increase as the distance from the site increases. At distances of approximately 1000 feet and beyond, one would now be in the main beam of the antenna pattern and off beam loss is no longer considered. Beyond this point, RF levels become calculated solely on distance from the site and the percent of MPE decreases significantly as distance from the site increases.

Table 2 below lists percent of MPE values as well as the associated parameters that were included in the calculations. As stated in Section 3, all calculations assume that the antennas are operating at full power and 100 percent capacity, and that all antenna channels are transmitting simultaneously. Obstructions (trees, buildings etc.) that would normally attenuate the signal are not taken into account. In addition, a six foot height offset was considered in this analysis to account for average human height. As a result, the calculated % MPE levels are significantly higher than the actual signal levels will be from the final installation. The results presented in Figure 1 and Table 2 assume level ground elevation from the base of the transmission structure out to the horizontal distances calculated.

Carrier	Number of Transmitters	Power out of Base Station Per Transmitter (Watts)	Antenna Height (Feet)	Distance to the Base of Antennas (Feet)	Power Density (mW/cm ²)	Limit (mW/cm ²)	% MPE
AT&T LTE 1900 MHz	1	160.0	143.0	163	0.005376	1.000	0.54%
AT&T LTE 2100 MHz	1	240.0	143.0	163	0.009540	1.000	0.95%
AT&T LTE 2300 MHz	1	160.0	143.0	163	0.009605	1.000	0.96%
AT&T LTE 739 MHz	2	80.0	143.0	163	0.000810	0.493	0.16%
AT&T LTE 763 MHz	2	80.0	143.0	163	0.000810	0.509	0.16%
AT&T LTE 875 MHz	2	80.0	143.0	163	0.000574	0.583	0.10%
Total							2.87%

Table 2: Maximum Percent of General Population Exposure Values³


³ Please note that % MPE values listed are rounded to two decimal points. The total % MPE listed is a summation of each unrounded contribution. Therefore, summing each rounded value may not reflect the total value listed in the table.

6. Conclusion

The above analysis verifies that RF exposure levels from the site with AT&T's proposed antenna configuration will be well below the maximum permissible levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Using the conservative calculation methods and parameters detailed above, the maximum cumulative percent of MPE at 6' above ground level and in consideration of AT&T's proposed antenna installation is calculated to be **2.87% of the FCC limit (General Population/Uncontrolled)**. This maximum cumulative percent of MPE value is calculated to occur 163 feet away from the site.

7. Statement of Certification


I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in FCC OET Bulletin 65 Edition 97-01, IEEE Std. C95.1, IEEE Std. C95.3, and IEEE Std. C95.7.



Report Prepared By: Sokol Andoni
RF Engineer
C Squared Systems, LLC

December 31, 2019

Date



Reviewed/Approved By: Sohail Usmani
RF Engineering
C Squared Systems, LLC

December 31, 2019

Date

Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

IEEE C95.1-2005, IEEE Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz IEEE-SA Standards Board

IEEE C95.3-2002 (R2008), IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields With Respect to Human Exposure to Such Fields, 100 kHz-300 GHz IEEE-SA Standards Board

IEEE C95.7-2005 (R2014), IEEE Recommended Practice for Radio Frequency Safety Programs, 3 kHz to 300 GHz, IEEE-SA Standards Board

Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure⁴

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

(B) Limits for General Population/Uncontrolled Exposure⁵

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

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

Table 3: FCC Limits for Maximum Permissible Exposure

⁴ Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

⁵ General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

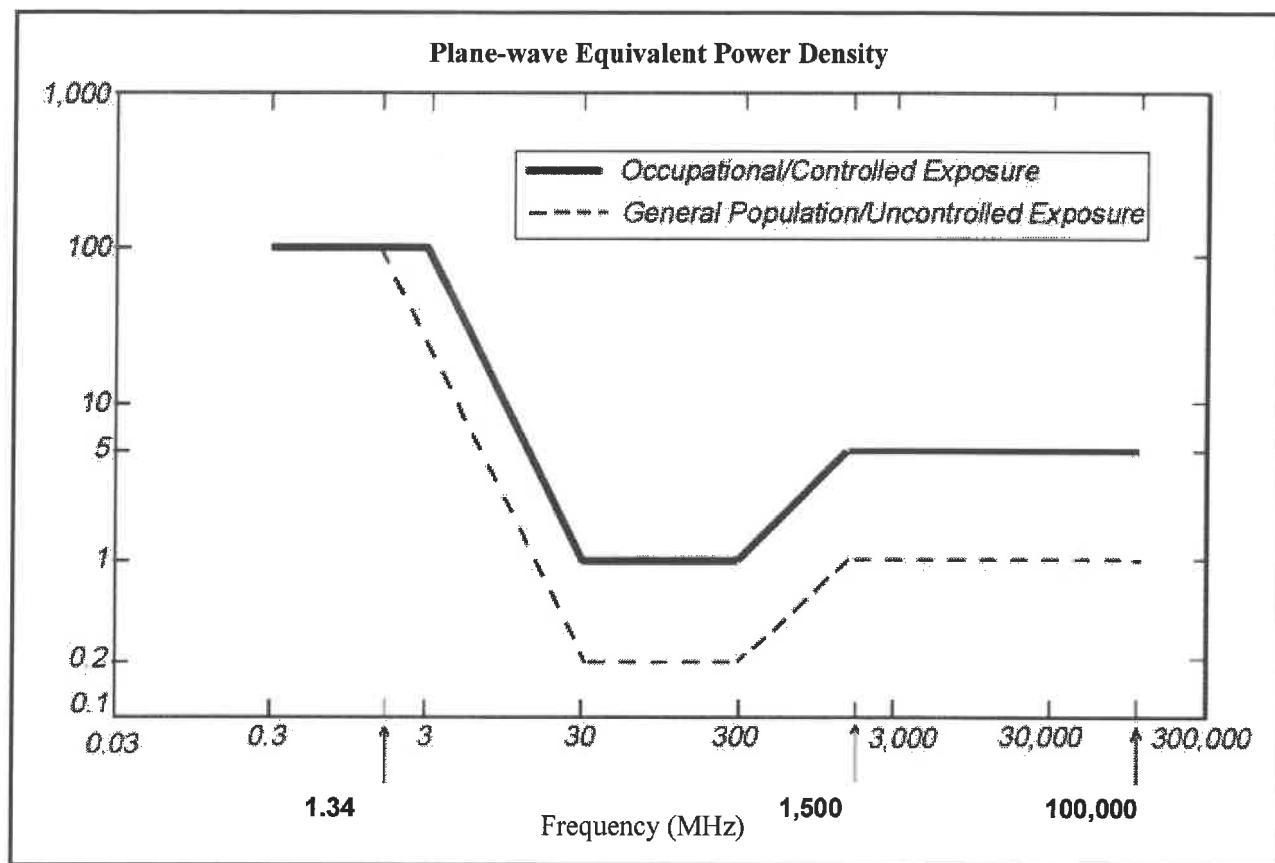
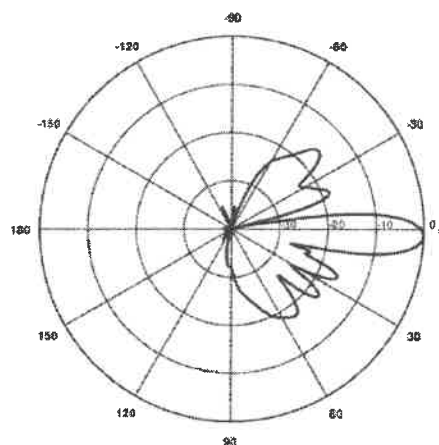


Figure 2: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: AT&T Mobility Antenna Model Data Sheets and Electrical Patterns

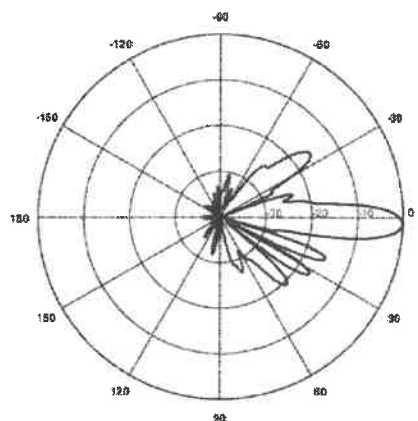
739/763 MHz

Manufacturer: CCI
 Model #: HPA65R-BU8A
 Frequency Band: 698-806 MHz
 Gain: 15.5 dBi
 Vertical Beamwidth: 9.7°
 Horizontal Beamwidth: 67°
 Polarization: ±45°
 Dimensions (L x W x D): 96.0" x 11.7" x 7.6"



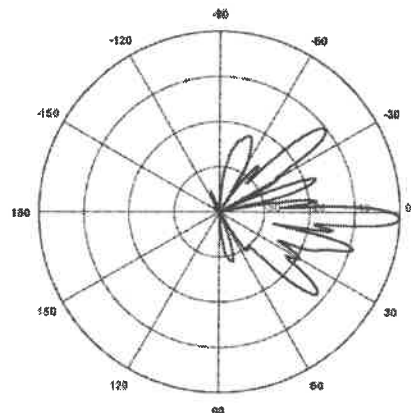
875 MHz

Manufacturer: CCI
 Model #: HPA65R-BU8A
 Frequency Band: 824-896 MHz
 Gain: 15.9 dBi
 Vertical Beamwidth: 8.1°
 Horizontal Beamwidth: 67°
 Polarization: ±45°
 Dimensions (L x W x D): 96.0" x 11.7" x 7.6"



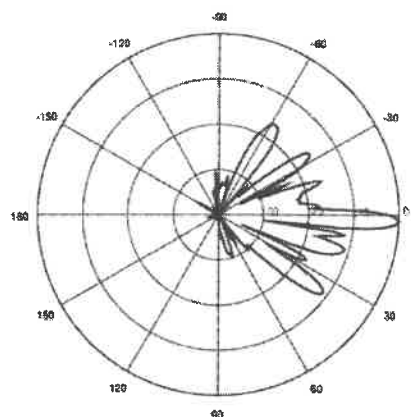
1900 MHz

Manufacturer: CCI
 Model #: HPA65R-BU8A
 Frequency Band: 1850-1990 MHz
 Gain: 18.1 dBi
 Vertical Beamwidth: 5.1°
 Horizontal Beamwidth: 62°
 Polarization: ±45°
 Dimensions (L x W x D): 96.0" x 11.7" x 7.6"



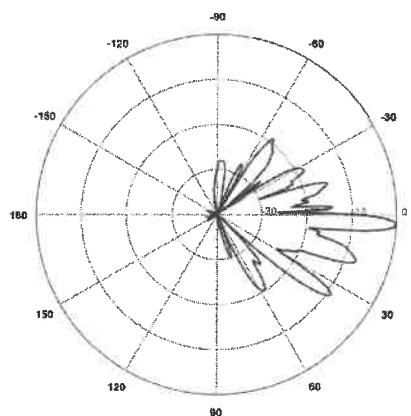
2100 MHz

Manufacturer: CCI
 Model #: HPA65R-BU8A
 Frequency Band: 1920-2180 MHz
 Gain: 18.3 dBi
 Vertical Beamwidth: 4.7°
 Horizontal Beamwidth: 62°
 Polarization: ±45°
 Dimensions (L x W x D): 96.0" x 11.7" x 7.6"



2300 MHz

Manufacturer: CCI
 Model #: HPA65R-BU8A
 Frequency Band: 2300-2400 MHz
 Gain: 18.0 dBi
 Vertical Beamwidth: 4.0°
 Horizontal Beamwidth: 60°
 Polarization: ±45°
 Dimensions (L x W x D): 96.0" x 11.7" x 7.6"



Existing

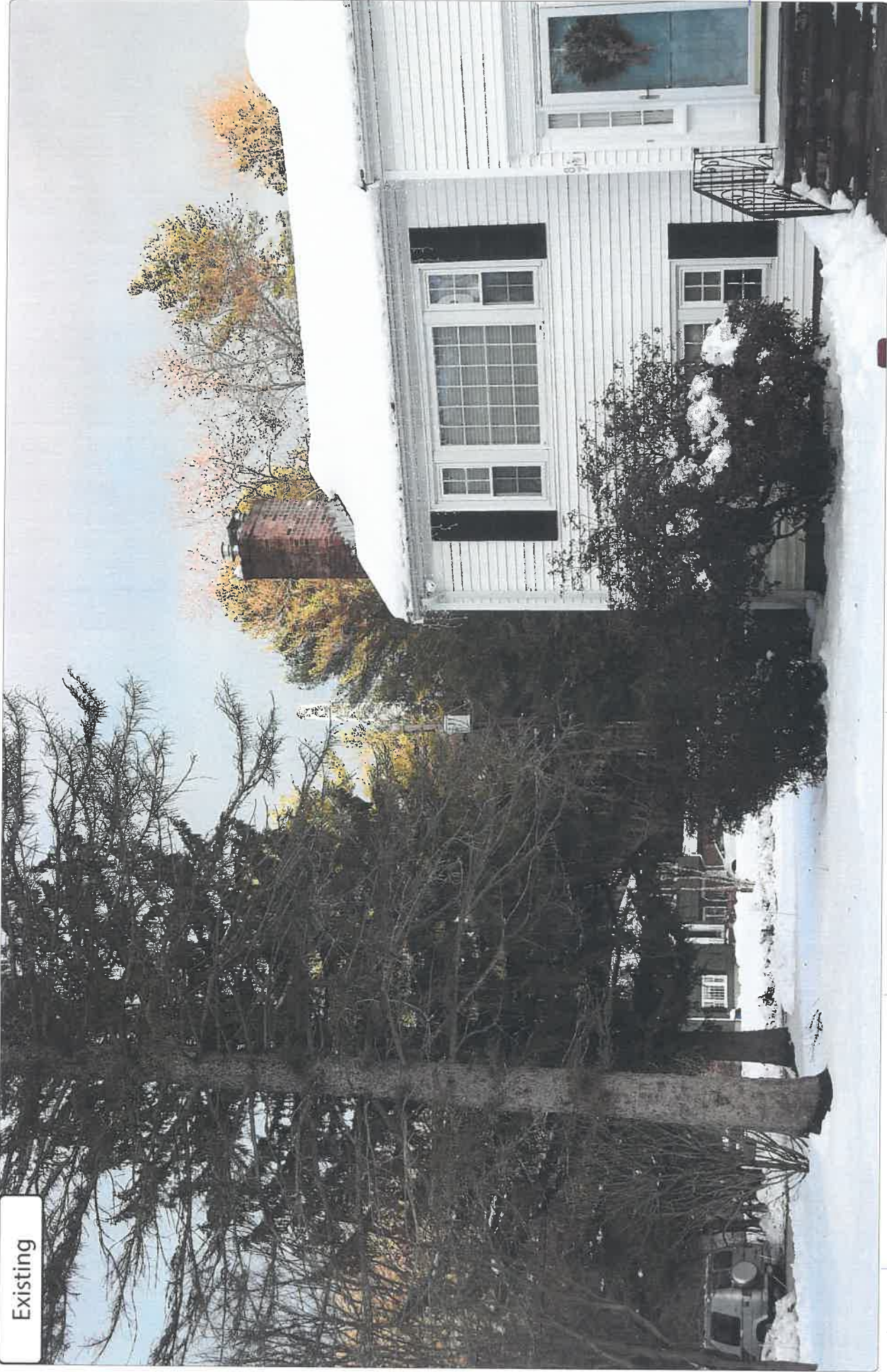


Photo #	Location	Gps Coordinates	Distance to site	Orientation	Bearing to site	Visibility
1	101 Marilyn St	42.20736 -71.40475	0.12 Miles	West	74	Year Round

Site: MA3574 Marilyn Street

Photo Simulations are for demonstration purposes only. It should not be used in any other fashion or with any other intent. The accuracy of the resulting data is not guaranteed and is not for redistribution



Existing

Changes not visible from this location

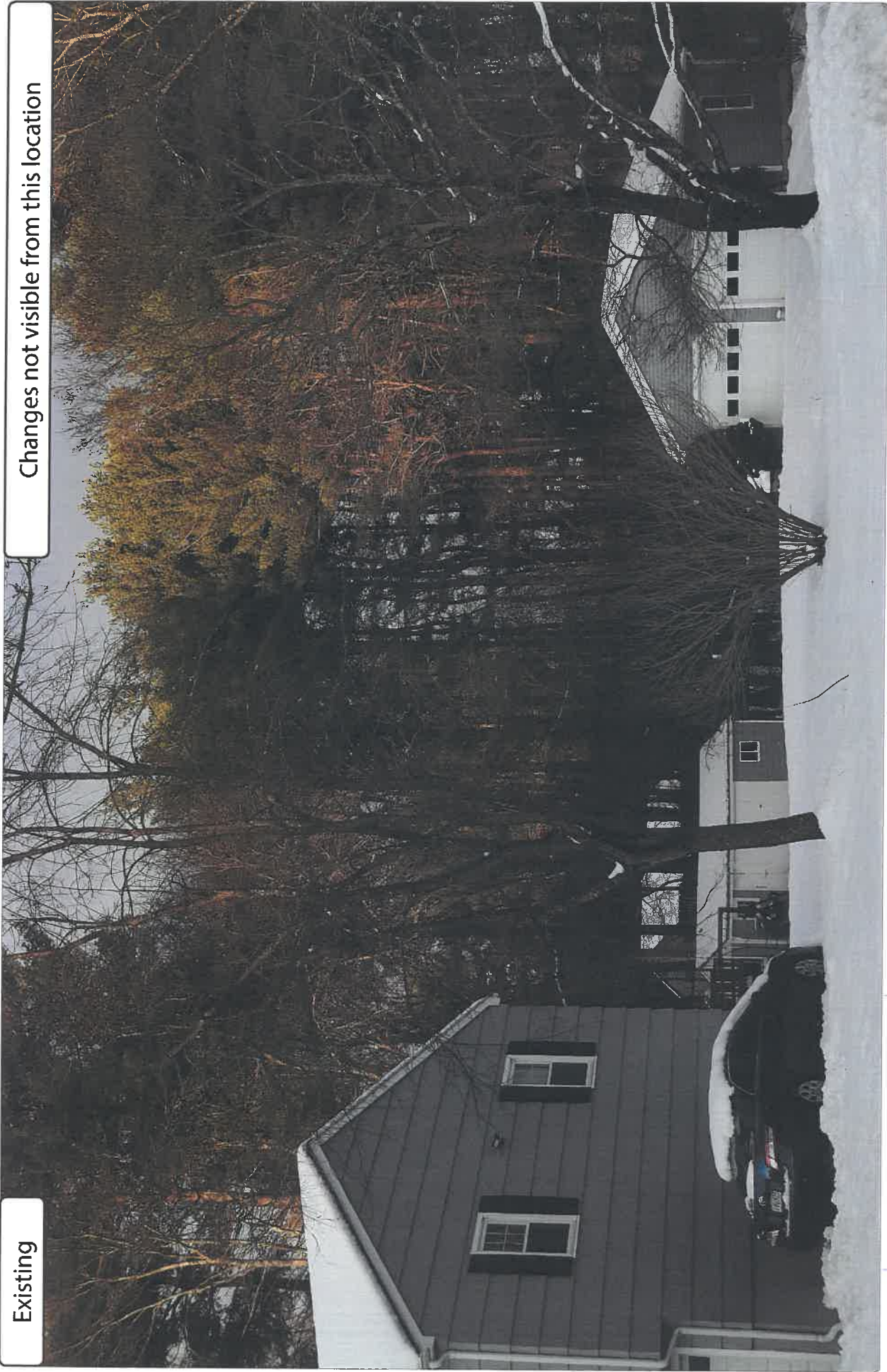


Photo #	Location	Gps Coordinates	Distance to site	Orientation	Bearing to site	Visibility
4	52 Northway St	42.20621 -71.40439	0.15 Miles	South-West	41	Not Visible

Site: MA3574 Marilyn Street

Photo Simulations are for demonstration purposes only. It should not be used in any other fashion or with any other intent. The accuracy of the resulting data is not guaranteed and is not for redistribution



Existing

Changes not visible from this location



Photo #	Location	Gps Coordinates	Distance to site	Orientation	Bearing to site	Visibility
6	60 Marilyn St	42.20733 -71.40647	0.21 Miles	West	80	Not Visible

Site: MA3574 Marilyn Street



at&t

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Simulation

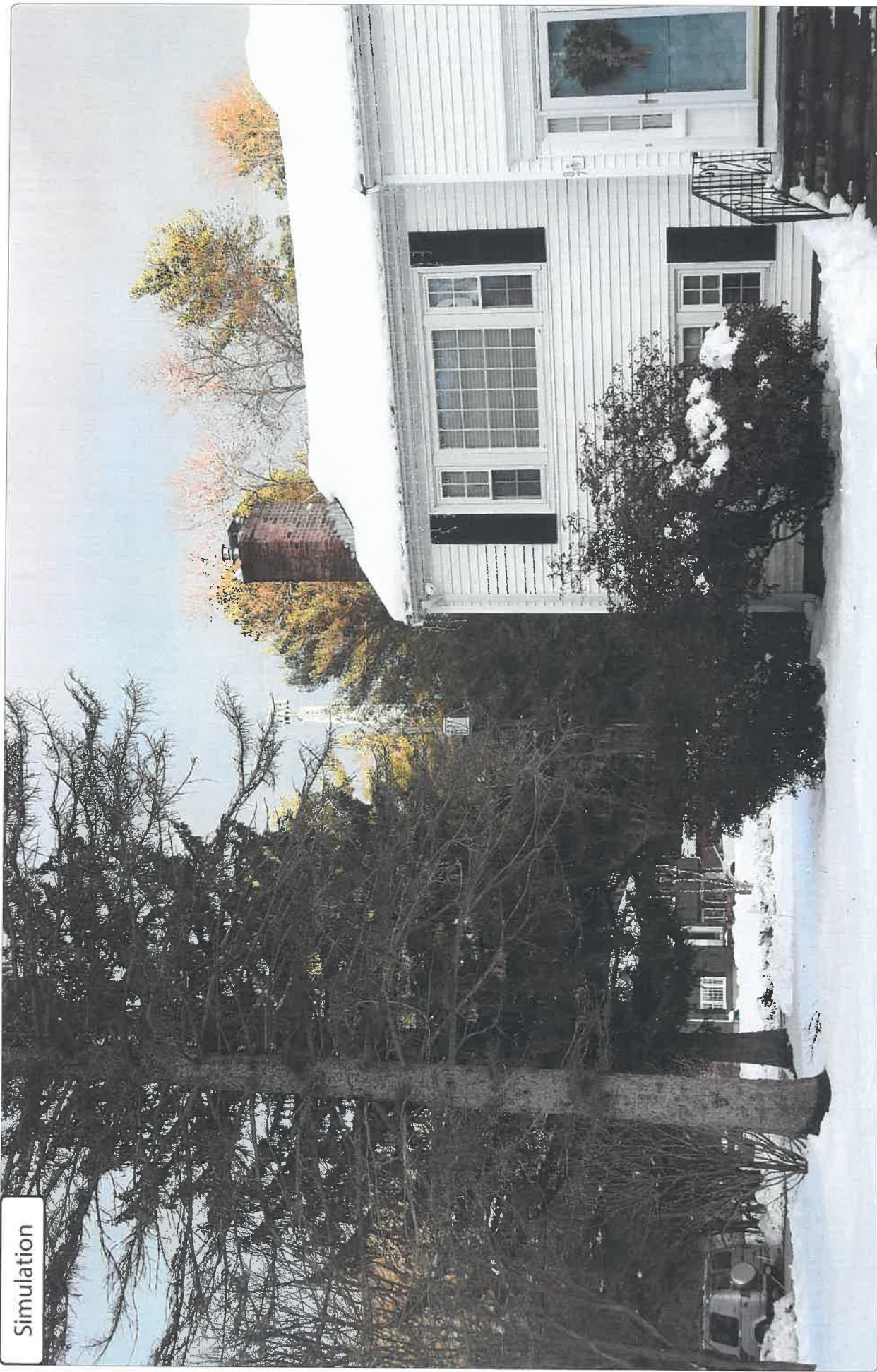


Photo #	Location	Gps Coordinates	Distance to site	Orientation	Bearing to site	Visibility
1	101 Marilyn St	42.20736 -71.40475	0.12 Miles	West	74	Year Round

Site: MA3574 Marilyn Street

Photo Simulations are for demonstration purposes only. It should not be used in any other fashion or with any other intent. The accuracy of the resulting data is not guaranteed and is not for redistribution



Existing



Photo #	Location	Gps Coordinates	Distance to site	Orientation	Bearing to site	Visibility
5	76 Marilyn St	42.20775 -71.40609	0.18 Miles	West	88	Year Round

Site: MA3574 Marilyn Street

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Simulation



Photo #	Location	Gps Coordinates	Distance to site	Orientation	Bearing to site	Visibility
5	76 Marilyn St	42.20775 -71.40609	0.18 Miles	West	88	Year Round

Site: MA3574 Marilyn Street

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Existing



Photo #	Location	Gps Coordinates	Distance to site	Orientation	Bearing to site	Visibility
3	91 Marilyn St	42.20761 -71.40516	0.14 Miles	West	83	Year Round

Site: MA3574 Marilyn Street

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Simulation

Photo #	Location	Gps Coordinates	Distance to site	Orientation	Bearing to site	Visibility
3	91 Marilyn St	42.20761 -71.40516	0.14 Miles	West	83	Year Round

Site: MA3574 Marilyn Street

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Existing

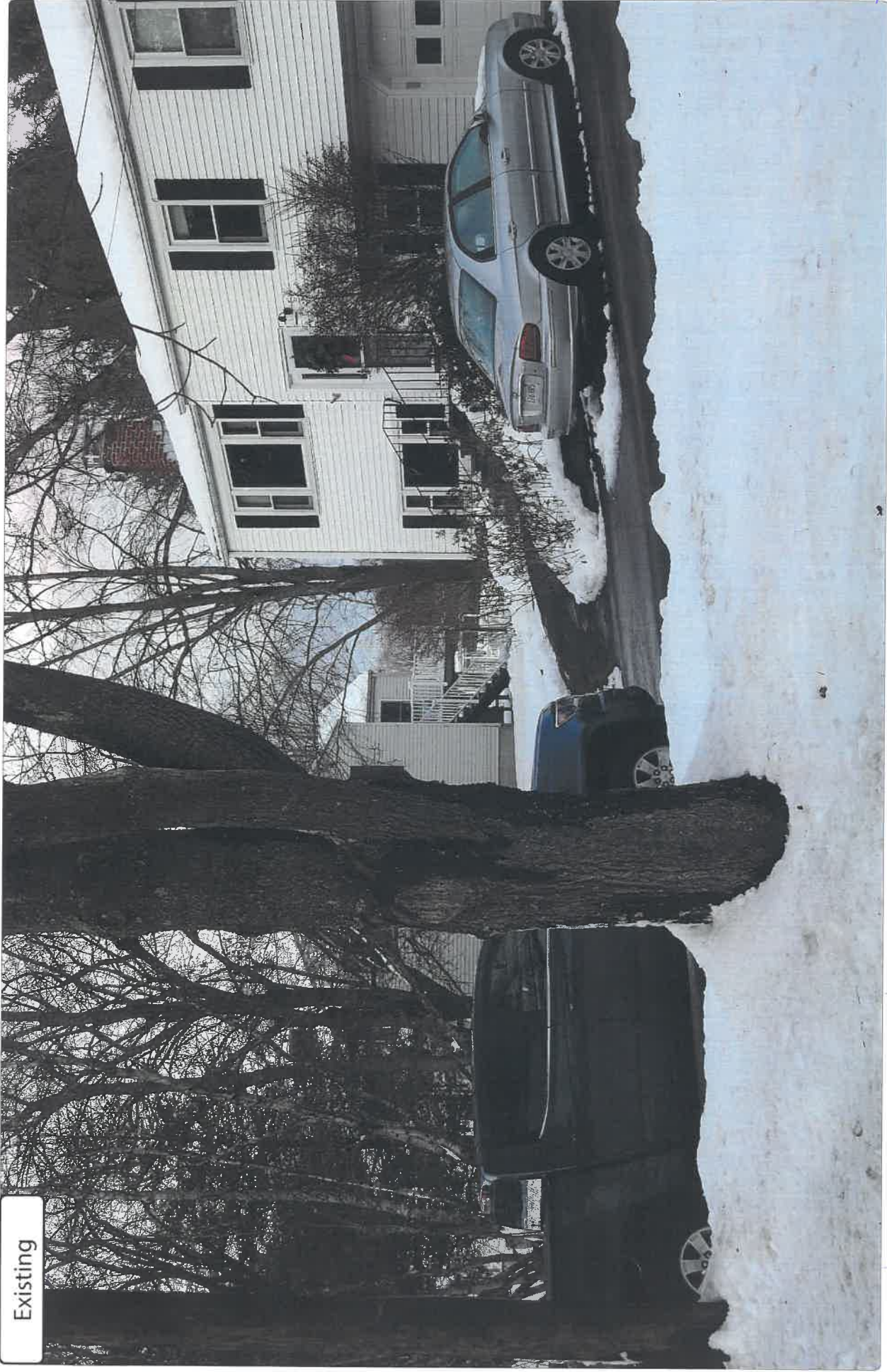


Photo #	Location	Gps Coordinates	Distance to site	Orientation	Bearing to site	Visibility
7	28 Marilyn St	42.20618 -71.40625	0.22 Miles	South-West	59	Obscured

Site: MA3574 Marilyn Street

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1/27/2020

Simulation

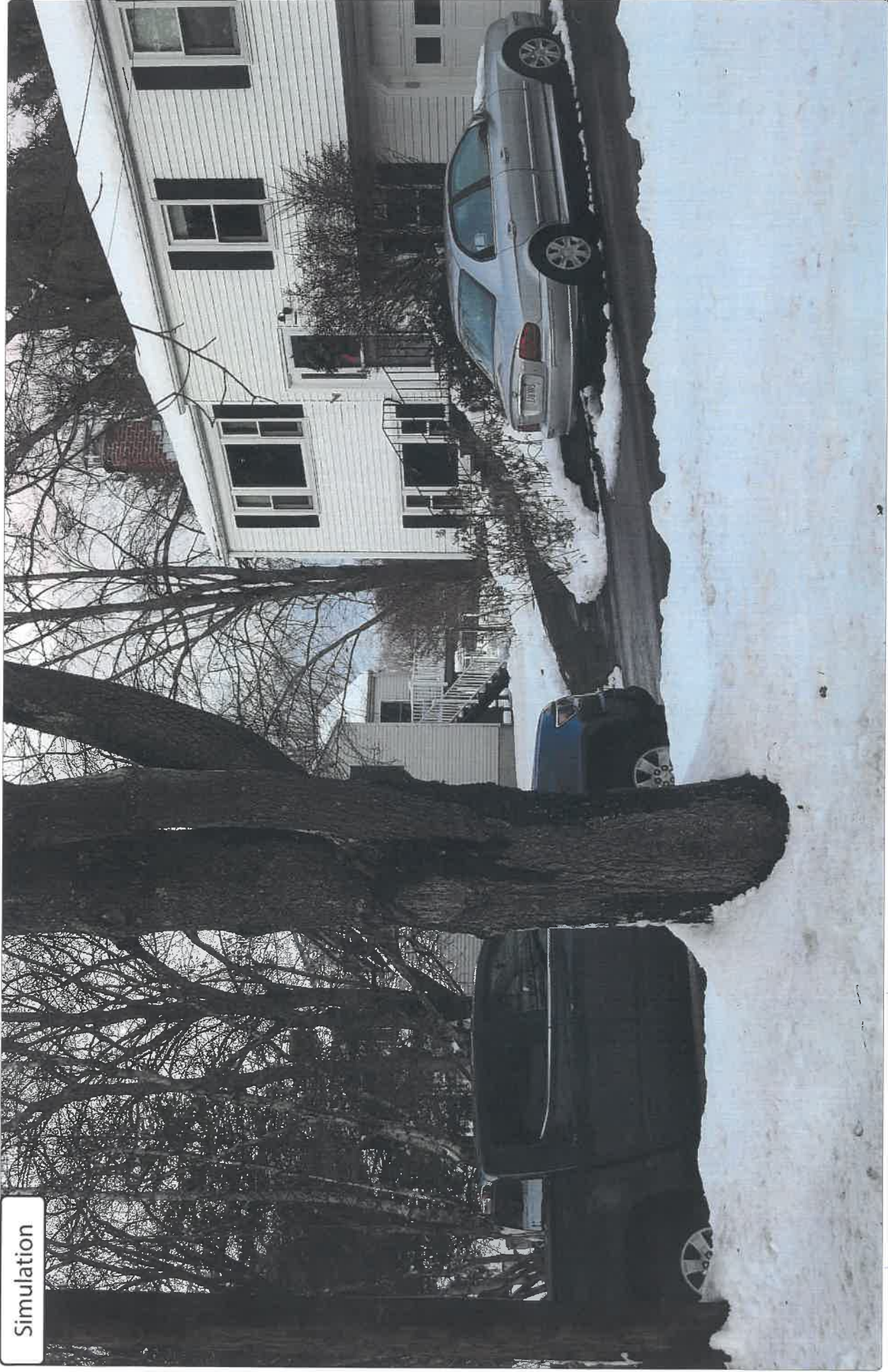


Photo #	Location	Gps Coordinates	Distance to site	Orientation	Bearing to site	Visibility
7	28 Marilyn St	42.20618 -71.40625	0.22 Miles	South-West	59	Obscured

Site: MA3574 Marilyn Street

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Existing

Changes not visible from this location



Photo #	Location	Gps Coordinates	Distance to site	Orientation	Bearing to site	Visibility
2	76 Northway St	42.20705 -71.40487	0.13 Miles	South-West	66	Not Visible

Site: MA3574 Marilyn Street

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at&t

FILED COM 1/27/2020



Lynch, Diane <lynchd@holliston.k12.ma.us>

0 Marilyn St.

Fwd: Potential Peer Review contract - Town of Holliston MA3574S

1 message

Karen Sherman <shermank@holliston.k12.ma.us>
To: Diane Lynch <lynchd@holliston.k12.ma.us>

Fri, Feb 21, 2020 at 7:58 AM

For ZBA

Sent from my iPad

Begin forwarded message:

From: Simon Brighenti <sbrighenti@clinellc.com>
Date: February 20, 2020 at 3:55:11 PM EST
To: "Sherman, Karen" <shermank@holliston.k12.ma.us>
Cc: Jeff DelliColli <jdellicolli@clinellc.com>, Michael Gentile <mgentile@clinellc.com>
Subject: RE: Potential Peer Review contract - Town of Holliston MA3574S

Thank you. Please see below.

1. The check is being sent out today and should be at the town hall tomorrow (Friday) or Monday at the latest. Attached is the UPS mailer for tracking purposes.

2. Also attached you will find three documents related to the generator. Details below.

The generator AT&T will use is a 24kW Propane/LNG model. As Ivan pointed out there was some discrepancy in the descriptions and plans submitted. This will be made uniform in a construction drawing submitted with a building permit application should this proposal receive all needed approvals. As is noted in the attached "Sound Data" section of the manufactures spec sheet, the sound levels are **54 dB(A)** during weekly engine exercises and **61 dB(A)** during full-speed generator diagnostics and normal operation." Note that these levels "are measured at 7 meters [approximately 22 feet] with no load". The town bylaw states that "[n]o person shall operate or cause to be operated any source sound level of **10 dBA** ambient...measured at the property boundary of the receiving land use...". The nearest residential property lines are approximately 77 to 80 meters [i.e. 250 to 260 feet] distant from the generator location. In addition, the generator is proposed to be located on the side of the existing tower away from the residences. In between the generator will be the cement WIC, or "walk-in" cabinet, the utility structure itself, an 8' fence, and a copse of trees and brush approximately 175 feet deep. All of these will serve as sound buffers. On the plan we submitted, a chain link fence is proposed which AT&T is agreeable to replacing with a stockade fence. In addition, AT&T is offering to install what is know in the industry as a "sound-attenuating" buffer structure. A sample for illustration purposes is attached as well. As you know, these types of barriers or walls are used along highways and in other strategic locations to deaden sound.

The final attachment brings some context to the matter. This is decibel comparison information compiled by

Purdue University from various federal agencies and additional educational sources. You will note that the lowest level mirrors the level incorporated in the bylaw. Sound at this level is designated as "Barely audible". The stated range of the generator (which will be cycled on once a week for approximately a half hour and otherwise in emergency situations) is likened to "[q]uiet suburb, conversation at home. Large electrical transformers at 100 feet" at the lower range and "[c]onversation in restaurant, office, background music, Air conditioning unit at 100 ft". 60 dB(A) is designated as "Fairly quiet". You will see that common items such as power lawn mowers (100dB), dishwashers (80dB) and vacuum cleaners (70dB) all operate at higher levels. Again, these comparisons are at the source unless otherwise noted.

Based on this information, AT&T submits that the presence of the generator will not be noticeable and even though that is the case, the proposed mitigation measures would add additional assurance.

3. We are consulting with the holder of the relevant property rights as to whether entry from Fiske Street is feasible. Either way, AT&T is agreeable to a condition requiring non-idling of vehicles during maintenance visits to the property,

Thank you.

Simon J. Brighenti, Jr., JD | Senior Site Acquisition Consultant

750 West Center St. -Suite 301, West Bridgewater, MA 02379
Phone: 413.237.1550

sbrighenti@clinellc.com | www.centerlinecommunications.com

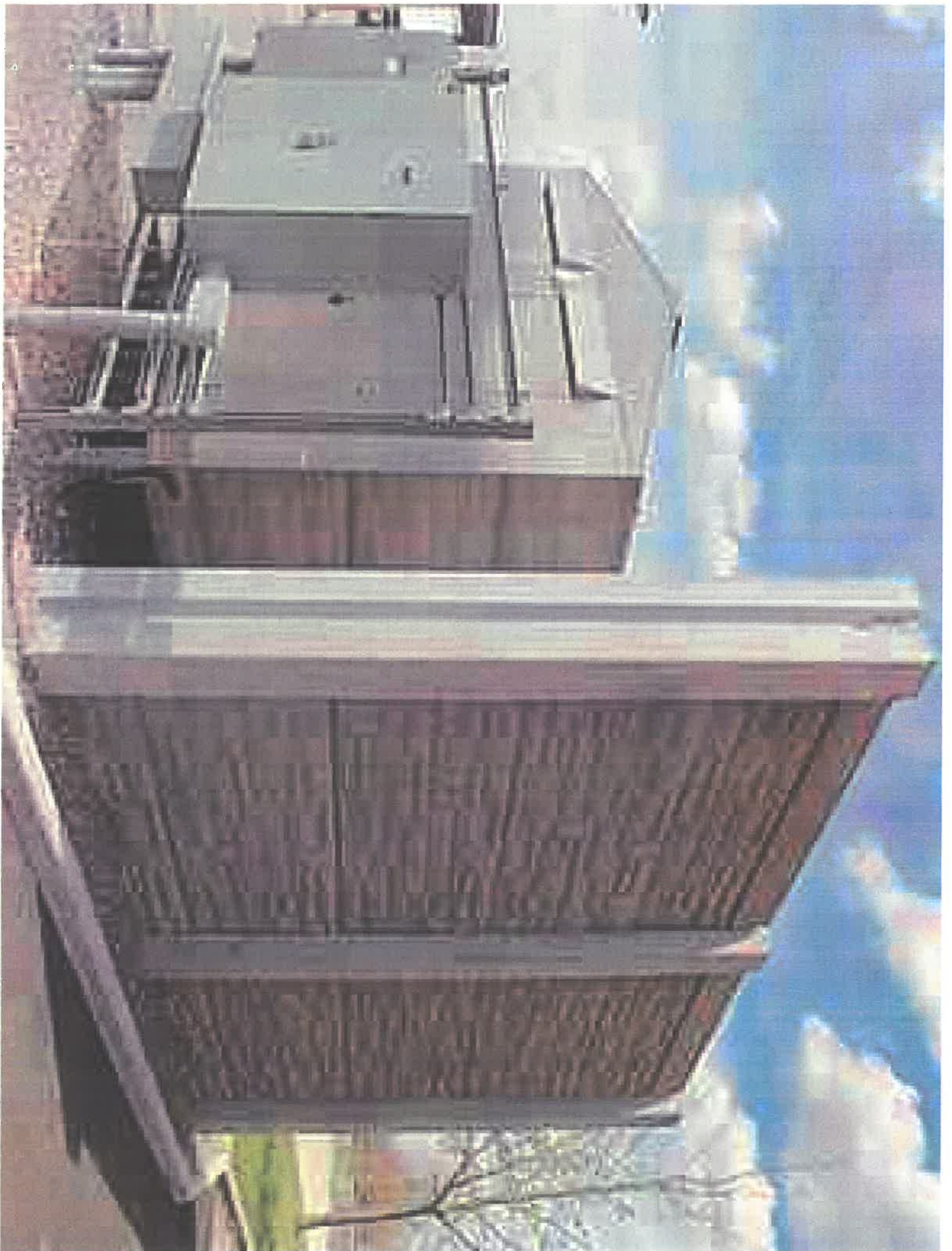
-

From: Sherman, Karen <shermank@holliston.k12.ma.us>
Sent: Wednesday, February 19, 2020 9:03 AM
To: Simon Brighenti <sbrighenti@clinellc.com>
Subject: Fwd: Potential Peer Review contract - Town of Holliston

Peer review comments attached. Assuming you are providing AT&T check for escrow and supplemental info ASAP?

Thanks!

Karen



Noise Sources and Their Effects

Noise Source	Decibel Level	comment
Jet take-off (at 25 meters)	150	Eardrum rupture
Aircraft carrier deck	140	
Military jet aircraft take-off from aircraft carrier with afterburner at 50 ft (130 dB).	130	
Thunderclap, chain saw. Oxygen torch (121 dB).	120	Painful. 32 times as loud as 70 dB.
Steel mill, auto horn at 1 meter. Turbo-fan aircraft at takeoff power at 200 ft (118 dB). Riveting machine (110 dB); live rock music (108 - 114 dB).	110	Average human pain threshold. 16 times as loud as 70 dB.
Jet take-off (at 305 meters), use of outboard motor, power lawn mower, motorcycle, farm tractor, jackhammer, garbage truck. Boeing 707 or DC-8 aircraft at one nautical mile (6080 ft) before landing (106 dB); jet flyover at 1000 feet (103 dB); Bell J-2A helicopter at 100 ft (100 dB).	100	8 times as loud as 70 dB. Serious damage possible in 8 hr exposure
Boeing 737 or DC-9 aircraft at one nautical mile (6080 ft) before landing (97 dB); power mower (96 dB); motorcycle at 25 ft (90 dB). Newspaper press (97 dB).	90	4 times as loud as 70 dB. Likely damage 8 hr exp
Garbage disposal, dishwasher, average factory, freight train (at 15 meters). Car wash at 20 ft (89 dB); propeller plane flyover at 1000 ft (88 dB); diesel truck 40 mph at 50 ft (84 dB); diesel train at 45 mph at 100 ft (83 dB). Food blender (88 dB); milling machine (85 dB); garbage disposal (80 dB).	80	2 times as loud as 70 dB. Possible damage in 8 h exposure.
Passenger car at 65 mph at 25 ft (77 dB); freeway at 50 ft from pavement edge 10 a.m. (76 dB). Living room music (76 dB); radio or TV-audio, vacuum cleaner (70 dB).	70	Arbitrary base of comparison. Upper 70s are annoyingly loud to some people.

Conversation in restaurant, office, background music, Air conditioning unit at 100 ft	60	Half as loud as 70 dB. Fairly quiet
Quiet suburb, conversation at home. Large electrical transformers at 100 ft	50	One-fourth as loud as 70 dB.
Library, bird calls (44 dB); lowest limit of urban ambient sound	40	One-eighth as loud as 70 dB.
Quiet rural area	30	One-sixteenth as loud as 70 dB. Very Quiet
Whisper, rustling leaves	20	
Breathing	10	Barely audible

[modified from <http://www.wenet.net/~hpb/dblevels.html>] on 2/2000. SOURCES: Temple University Department of Civil/Environmental Engineering (www.temple.edu/departments/CETP/environ10.html), and *Federal Agency Review of Selected Airport Noise Analysis Issues*, Federal Interagency Committee on Noise (August 1992). Source of the information is attributed to *Outdoor Noise and the Metropolitan Environment*, M.C. Branch et al., Department of City Planning, City of Los Angeles, 1970.

Application Data

Cooling

Radiator System	60 Hz	50 Hz
Ambient temperature, °C (°F)	45 (113)	
Engine jacket water capacity, L (gal.)	2.65 (0.7)	
Radiator system capacity, including engine, L (gal.)	13.2 (3.5)	
Water pump type	Centrifugal	
Fan diameter, mm (in.)	qty. 3 @ 406 (16)	
Fan power requirements (powered by engine battery charging alternator)	12VDC, 18 amps each	

Operation Requirements

Air Requirements	60 Hz	50 Hz
Radiator-cooled cooling air, m ³ /min. (scfm) [†]	51 (1800)	51 (1800)
Combustion air, m ³ /min. (cfm)	1.4 (49)	1.2 (42)
Air over engine, m ³ /min. (cfm)	25 (900)	25 (900)

[†] Air density = 1.20 kg/m³ (0.075 lbm/ft³)

Fuel Consumption[‡]

Natural Gas, m ³ /hr. (cfh) at % load	60 Hz	50 Hz
100%	8.5 (301)	7.8 (275)
75%	6.3 (223)	6.4 (225)
50%	5.6 (199)	5.4 (192)
25%	4.0 (140)	3.3 (116)
Exercise	2.8 (97)	2.9 (103)
LP Gas, m ³ /hr. (cfh) at % load	60 Hz	50 Hz
100%	3.2 (113)	2.7 (96)
75%	2.8 (97)	2.3 (81)
50%	2.4 (84)	2.0 (72)
25%	1.8 (63)	1.7 (60)
Exercise	1.4 (51)	1.4 (48)

[‡] Nominal Fuel Rating: Natural gas, 37 MJ/m³ (1000 Btu/ft³)
LP Vapor, 93 MJ/m³ (2500 Btu/ft³)

LP vapor conversion factors:

8.58 ft.³ = 1 lb.
0.535 m³ = 1 kg.
36.39 ft.³ = 1 gal.

Sound Enclosure Features

- Sound-attenuating enclosure uses acoustic insulation that meets UL 94 HF1 flammability classification and repels moisture absorption.
- Internally mounted critical silencer.
- Skid-mounted, aluminum construction with two removable access panels.
- Fade-, scratch-, and corrosion-resistant Kohler® cashmere powder-baked finish.

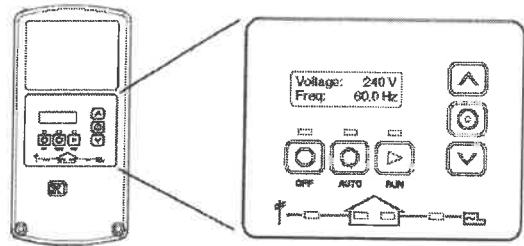
Sound Data

Model 24RCL 8 point logarithmic average sound levels are 54 dB(A) during weekly engine exercise and 61 dB(A) during full-speed generator diagnostics and normal operation. For comparison to competitor ratings, the lowest point sound levels are 52 dB(A) and 60 dB(A) respectively.*

All sound levels are measured at 7 meters with no load.

* Lowest of 8 points measured around the generator. Sound levels at other points around generator may vary depending on installation parameters.

RDC2 Controller



The RDC2 controller provides integrated control for the generator set, Kohler® Model RXT transfer switch, programmable interface module (PIM), and load management.

The RDC2 controller's 2-line LCD screen displays status messages and system settings that are clear and easy to read, even in direct sunlight or low light.

RDC2 Controller Features

- Membrane keypad
 - OFF, AUTO, and RUN push buttons
 - Select and arrow buttons for access to system configuration and adjustment menus
- LED indicators for OFF, AUTO, and RUN modes
- LED indicators for utility power and generator set source availability and ATS position (Model RXT transfer switch required)
- LCD screen
 - Two lines x 16 characters per line
 - Backlit display with adjustable contrast for excellent visibility in all lighting conditions
- Scrolling system status display
 - Generator set status
 - Voltage and frequency
 - Engine temperature
 - Oil pressure
 - Battery voltage
 - Engine runtime hours
- Date and time displays
- Smart engine cooldown senses engine temperature
- Digital isochronous governor to maintain steady-state speed at all loads
- Digital voltage regulation: ± 1.0% RMS no-load to full-load
- Automatic start with programmed cranking cycle
- Programmable exerciser can be set to start automatically on any future day and time, and to run every week or every two weeks
- Exercise modes
 - Unloaded exercise with complete system diagnostics
 - Unloaded full-speed exercise
 - Loaded full-speed exercise (Model RXT ATS required)
- Front-access mini USB connector for SiteTech™ connection
- Integral Ethernet connector for Kohler® OnCue® Plus
- Built-in 2.5 amp battery charger
- Remote two-wire start/stop capability for optional connection of a Model RDT transfer switch

See additional controller features on the next page.

AFFIDAVIT
of
RADIO FREQUENCY EXPERT

The undersigned, being first duly sworn, hereby states the following in support of the application by Sprint Spectrum L.P. d/b/a Sprint PCS ("Sprint PCS") to erect a monopole with attached antenna array and locate a related equipment cabinets (the "Project") on the property owned by Mike Alves located at 1569 Washington St, Holliston, Massachusetts (the "Site"):

1. I am a Radio Frequency Engineer Consultant for Sprint Spectrum L.P. responsible for radio frequency design in Massachusetts.
2. The list of my qualifications attached to this affidavit is true, accurate, and complete in all material respects.
3. I have thoroughly reviewed the application for the proposed Project, as well as all radio frequency engineering studies, reports, and computer models prepared by Sprint PCS with respect to the Site.
4. As set forth below, Sprint PCS is seeking to attach an antenna array at a total height of 120' (centerline) on the monopole. At any height less than 120', the signal would travel a limited distance and uninterrupted service could not be provided. In such a scenario, there would be significant areas of inadequate coverage throughout the town of Holliston. Accordingly, to limit the antenna to a height below the proposed 120' (centerline) would effectively prohibit Sprint PCS from providing its service in the area of Holliston and would prevent Sprint PCS from connecting its network.
5. Sprint PCS is a communications venture committed to providing a single integrated offering of wireless personal communications services by building a national wireless network using PCS technology. PCS technology is a new generation of wireless service that uses digital transmission to improve the services available. It provides a clearer connection and fewer dropped calls for its users, and better accommodate the requirements of computer and telecopier transmission.
6. In order to meet its obligations under the FCC license, Sprint PCS must, within the time established under the license, have in place a system of "cell sites" to serve portable wireless communication handsets and mobile telephones. These cell sites consist of an antenna mounted on a pole, building or other structure, connected to a small equipment cabinet located near the antenna. The antenna feeds the low power radio signal received from mobile communications devices through electronic devices located in the equipment cabinets and, ultimately, into an ordinary phone line from which the call can be routed anywhere in the world.

7. Cell sites are integral to Sprint PCS's PCS network. To maintain effective, uninterrupted service to a PCS telephone user traveling in a given area, there must be a continuous interconnected series of cells, which overlap in a grid pattern approximating a honeycomb. Additionally, each cell site must be located within a limited area so that it can properly interact with the surrounding cell sites and thereby provide reliable coverage throughout the cell.
8. In conformity with its FCC license, Sprint PCS is actively building its PCS network. As Sprint PCS began providing service to eastern Massachusetts in November of 1997, it continues to acquire interests in sites for additional facilities and is applying for, and obtaining local governmental approvals to construct the transmissions sites in order to eliminate gaps in service coverage. Any delays at this point in time severely curtail Sprint PCS's ability to satisfy both the federally-mandated time requirements, and to achieve a market position that will allow it to compete for customers.
9. The Town of Holliston is critical to the overall engineering and technical plan of Sprint PCS's network. This site will connect the adjacent sites in Millis, Medway & Milford and will provide coverage to the businesses and residents of Holliston.
10. Within the Boston MTA, Sprint PCS currently has either zoning board applications or approvals or actual, on-air facilities, sufficient to cover the Route 16 & Route 126 except for the area of Holliston.
11. In my professional opinion, unlike other parcels of land in the area, the Site has unique radio frequency characteristics due to the topography of the Site, the height of the monopole, and its location within the narrow search area specified by Sprint PCS's service area computer model which make it especially suitable for Sprint PCS's proposed wireless telecommunications transmission facility.
12. In my professional opinion, without a wireless transmission facility located at or near the Site, there will be a substantial gap in Sprint PCS's wireless personal communications services ("PCS") coverage. This gap would adversely impact the service Sprint PCS is able to provide to the citizens of Holliston and the commuters traveling on the main roads through and around the Town, including Routes 16, & Route 126.
13. The result of such a gap will be an abrupt and complete loss of signal at the time that an individual enters the gap area. Unlike other wireless technologies, in which diminished coverage may result merely in a weaker, or less clear, transmission, PCS technology simply cuts off when encountering such a gap. The transmission is not restored when the gap is over. Rather, the individual must reinitiate the communication.
14. The radio frequency exposure levels to be generated by the proposed facility are substantially below the applicable health and safety standards established by the

Introduction

My name is Joshua Cohen. I am a Senior Research Associate at the Harvard Center for Risk Analysis, which is part of the Harvard School of Public Health. I have prepared this memo to help put into perspective the health issues associated with the proposed AT&T antenna installation at 1556-1576 Washington Street in Holliston, and to explain why this installation poses no health risks. I should add that these comments are based on technical information included in the Massachusetts Department of Public Health submission prepared for this site by AT&T Wireless, field strength computations made by SRS Engineering working on behalf of AT&T Wireless, and my own review of the literature on this topic.

General Comments

Cell phone base antennas are an inherently safe technology because their power output is so low. The total apparent¹ power output of the proposed Washington Street installation is less than 2000 watts – around twice as much as the power emitted by a household iron. Because the antennas are more than 100 feet off the ground and their beam is aimed at the horizon, the signal strength is far too weak to adversely affect the health of individuals living or working in the vicinity.

The maximum signal strength at any location at which there may be people is nearly a factor of 1,000 times lower than the maximum acceptable level established by the Massachusetts Department of Public Health and by the Federal Communications Commission. Moreover, the maximum acceptable level specified by these regulatory bodies is very protective because it was established by identifying the lowest power level at which health effects might occur in people and then dividing that level by a safety factor of 50.

Despite this level of protection, it is my understanding that some members of the public in Holliston have expressed concern regarding the health effects associated with this technology. This concern may be due in part to occasional media reports of studies purporting to show an association between adverse health effects and the use of cell phones. However, these reports should not be cause for alarm. First, the majority of scientists involved in this field have concluded that these findings reflect study design flaws or statistical chance, and that while they

are sometimes intriguing, they do not indicate that cell phones harm people. Any time a technology is evaluated as rigorously as cell phones have been evaluated – and for cell phones there have been hundreds, if not thousands of studies on this and closely related topics – there is a virtual guarantee that at least some studies will (incorrectly) produce findings that suggest a potential risk. The challenge that scientists face is in interpreting these so-called “positive” findings. In the case of this technology, a wide range of organizations, including the US Environmental Protection Agency, the US National Academy of Sciences, and the World Health Organization, have concluded that at low power levels, such as those associated with cellular phone base antennas, radio frequency energy poses no threat to human health.

Second, the minority of reports that do raise questions regarding the potential risks of cell phone technology focus on health effects associated with use of the handset, which can involve holding a transmitter in close proximity to the head. They do not raise questions about the safety of the base antennas, which produce exposures to radio transmissions that are orders of magnitude weaker than those associated with use of a handset. In fact, a recent scientific panel in Britain (the Stewart Commission), which has been among the most skeptical regarding the safety of cell phone handsets, stated the following with respect to base antenna radio transmissions:

We conclude that the balance of evidence indicates that there is no general risk to the health of people living near to base stations on the basis that exposures are expected to be small fractions of guidelines.

In summary, signals generated by the proposed AT&T installation will be many times lower than the regulatory limit set by the state and federal governments, and this regulatory limit reflects a broad scientific consensus that cell phone technology is safe.

Site Specific Information

The strength of the signal generated by a base antenna depends on the location at which it is measured. For the purpose of making the concrete calculations, I have chosen the point at approximately 125 feet from the proposed installation and 16 feet above ground level. Signal strength at this location is likely to exceed the strength of the signal at any other location at which

¹ This value is the “Effective Radiating Power” along the centerline of the transmission beam. The actual power output of the transmitter (*i.e.*, averaged over all directions) is substantially less.

people might congregate. The table below compares the signal strength at this location to several other benchmarks.

Benchmark	Signal Strength Relative to Regulatory Limit ²
Regulatory Limit	100%
Allowable leakage from a new microwave oven	100%
60 feet from a 100 watt automobile police radio	2.6%
3 feet from a baby monitor	1.2%
2 feet from a computer monitor	0.5%
5 miles from a 5 megawatt TV transmitter	0.2%
Proposed AT&T installation	0.1%

Because the signal that would be generated by the proposed AT&T Wireless installation is well within regulatory limits, and because there is a substantial body of scientific literature supporting the appropriateness of these limits, I conclude that the proposed Washington Street facility would pose no risk to public health.

² These comparisons have been adjusted to account for the efficiency at which energy at different frequencies is absorbed by the human body.