

ATTACHMENT 1

ATTACHMENT 1

Statement of Public Need

The proposed tower facility will provide reliable wireless communications services to a large portion of northern Glastonbury around Candlewood Road, Griswold Street, Addison Road and other local roads and neighborhoods. The facility is needed by AT&T in conjunction with other existing and proposed facilities to provide reliable services to the public that is not currently provided in this part of Glastonbury. Attached is a Radio Frequency Engineering Report with coverage plots depicting the "Current Coverage" provided by AT&T's existing facilities in this area of the state and "Proposed Coverage" as predicted from the proposed tower site. Additional statistics regarding the overall area, population and roadway miles of expanded service in this area of Glastonbury are included in AT&T's report.

Radio Frequency Analysis Report

S3411
541 Griswold St, Glastonbury, CT



June 2, 2014



C Squared Systems, LLC
65 Dartmouth Drive, A3
Auburn, NH 03032

Phone: (603) 644-2800
Fax: (603) 644-2801
Support@csquaredsystems.com

Table of Contents

1.	Overview.....	1
2.	Technology Advances & Design Evolution.....	1
3.	Coverage Objective.....	2
4.	Conclusion.....	6
5.	Statement of Certification.....	6
6.	Attachments.....	7

List of Tables

Table 1:	Estimated Existing Coverage Gap Statistics.....	3
Table 2:	Coverage Statistics.....	5

List of Attachments

Attachment 1:	3D Terrain Map.....	7
Attachment 2:	Map of Distance to Neighbor Sites – Glastonbury.....	8
Attachment 3:	Neighbor Site Data and Distance to Proposed Site.....	9
Attachment 4:	“Existing 700 MHz LTE Coverage” for the Current AT&T Network.....	10
Attachment 5:	“Existing & Proposed 700 MHz LTE Coverage” with Glastonbury Site for the AT&T Network..	11
Attachment 6:	“Existing 1900 MHz LTE Coverage” for the Current AT&T Network.....	12
Attachment 7:	“Existing & Proposed 1900 MHz LTE Coverage” with Glastonbury Site for the AT&T Network	13
Attachment 8:	Connecticut DOT Average Annual Daily Traffic Data – Glastonbury.....	14

1. Overview

C Squared Systems was retained by New Cingular Wireless PCS, LLC (“AT&T”) to investigate the extent of coverage that could be potentially obtained by constructing the proposed wireless communications facility at 541 Griswold St, Glastonbury, CT at 116 feet AGL.

AT&T is licensed by the FCC to provide wireless communications services throughout the State of Connecticut including the Town of Glastonbury where the proposed facility would be located.

This report addresses AT&T’s need for the proposed wireless facility and confirms that there are no other suitable existing structures that could address the coverage gaps in their wireless communications network. The coverage analysis completed by C Squared Systems confirms: AT&T has a gap in reliable service in Glastonbury, and that the Proposed Facility provides AT&T with coverage in that service gap. Included as attachments in this report are coverage maps detailing the existing network and expected coverage from the proposed facility, pertinent site information, terrain and network layout maps.

2. Technology Advances & Design Evolution

AT&T provides digital voice and data services using 3rd Generation (3G) UMTS technology in the 800 MHz and 1900 MHz frequency band, and is in the midst of deploying advanced 4th Generation (4G) services over LTE technology in the 700 MHz and 1900 MHz frequency bands as allocated by the FCC. As part of their network expansion and ongoing technology advancements in Connecticut and elsewhere in the Country, the 4G LTE network rollout will build on the existing 3G data services that utilize UMTS technology. These data networks are used by mobile devices for fast web browsing, media streaming, and other applications that require broadband connections. The mobile devices that benefit from these advanced data networks are not limited to basic handheld phones, but also include devices such as smartphones, PDA’s, tablets, and laptop air-cards. With the evolving rollout of 4G LTE services and devices, AT&T customers will have even faster connections to people, information, and entertainment.

It is important to note that with AT&T’s migration from 3G to 4G services come changes in the base station infrastructure and resultant changes in the operating thresholds required by the LTE network. In the past, AT&T has presented receive signal thresholds of -74 dBm for their in-building coverage threshold and -82 dBm for their in-vehicle coverage threshold. Those thresholds were based on network requirements to support 2G/3G data speeds and past usage demand. Today, customers expect low latency and faster data speeds as evidenced by increasing data usage trends and customer demand.

AT&T’s 4G LTE technology is designed to thresholds of -83 dBm and -93 dBm for their 700 MHz LTE and -86 dBm and -96 dBm for their 1900 MHz LTE.¹ The stronger thresholds (-83 dBm and -86 dBm) yield greater throughputs and improved customer experience. The -93 dBm and -96 dBm thresholds are the minimum acceptable levels required to meet customer expectations for 4G service.

¹ The threshold range differences between the 700 MHz and 1900 MHz frequency bands directly correlates to the type branch diversity receivers deployed in AT&T’s receiver design.

3. Coverage Objective

There is a significant coverage deficiency in the existing AT&T wireless communications network along Griswold Street, Addison Road and the surrounding residential areas in Glastonbury. A deficiency in coverage is evidenced by the inability to adequately and reliably transmit/receive quality calls and/or utilize data services offered by the network. Seamless reliable coverage provides users with the ability to successfully originate, receive, and maintain quality calls and/or utilize data applications throughout a service area. Overlapping coverage is required for users to be able to move throughout the service area and reliably “hand-off” between cells to maintain uninterrupted connections.

Due to terrain characteristics and the distance between the targeted coverage area and the existing sites, AT&T's options to provide services in this area are quite limited (maps of the terrain in this area and the distance to neighboring AT&T sites from the proposed site are included as Attachments 1 & 2, respectively.) AT&T's network requires a deployment of antennas throughout the area to be covered. These antennas are connected to receivers and transmitters that operate in a limited geographic area known as a “cell.” AT&T's wireless network, including their wireless handsets and devices, operate by transmitting and receiving low power radio frequency signals to and from these cell sites. The signals are transferred to and from the landline telephone network and routed to their destinations by sophisticated electronic equipment. The size of the area served by each cell site is dependent on several factors, including the number of antennas used, the height at which the antennas are deployed, the topography of the land, vegetative cover and natural or man-made obstructions in the area. As customers move throughout the service area, the transmission from the portable devices is automatically transferred to the AT&T facility with the best connection to the device, without interruption in service provided that there is overlapping coverage from the cells.

In order to define the extent of the coverage gap to be filled, both propagation modeling and real-world drive testing has been conducted in the area of Glastonbury around the subject areas. Propagation modeling uses PC software to determine the network coverage based on the specific technical parameters of each site including, but not limited to, location, ground elevation, antenna models, antenna heights, and also databases of terrain and ground cover in the area. Drive testing consists of traveling along area roadways in a vehicle equipped with a sophisticated setup of test devices and receivers that collect a variety of network performance metrics. The data are then processed and mapped in conjunction with the propagation modeling to determine the coverage gaps.

Analysis of the propagation modeling and drive testing in and around Glastonbury reveal that AT&T's network is unreliable throughout much of the area due to gaps in coverage, and that there is a service deficiency as a result. In order to fill in these coverage gaps and improve the network reliability to Glastonbury, a new facility is needed in the area.

Table 1 below approximates the current coverage gap of AT&T's 700 MHz and 1900 MHz (PCS) LTE technology in the vicinity of the proposed site.

	Existing 700 MHz LTE Coverage Gap		Existing 1900 MHz LTE Coverage Gap	
Population:²	(≥ -83 dBm)	3,303	(≥ -86 dBm)	4,492
	(≥ -93 dBm)	3,641	(≥ -96 dBm)	4,833
Area (mi²):	(≥ -83 dBm)	1.32	(≥ -86 dBm)	2.76
	(≥ -93 dBm)	2.08	(≥ -96 dBm)	3.99
Roadway (mi):	Main:	2.3	Main:	3.2
	Secondary:	13.7	Secondary:	17.0
	Total:	16.0	Total:	20.2

Table 1: Estimated Existing Coverage Gap Statistics

² Population figures are based upon 2010 US Census Block Data

Included with this report are Attachments 1-8, which are explained below to help describe AT&T's network in and around Glastonbury, and the need for the proposed facility.

- Attachment 1: *3D Terrain Map* details the terrain features around the area of deficient service being targeted by the proposed site in Glastonbury. These terrain features play a key role in determining site designs and dictating the unique coverage achieved from a given location. This map is included to provide a visual representation of the ridges and valleys that must be considered when siting a wireless facility. The darker green and blue shades correspond to lower elevations, whereas the yellow and red shades indicate higher elevations.
- Attachment 2: *Map of Distance to Neighbor Sites* – Glastonbury provides an overview of AT&T's network of sites in the area, with distances shown from the proposed Glastonbury site to the existing sites in the surrounding area.
- Attachment 3: *Neighbor Site Data and Distance to Proposed Site* provides site specific information of existing neighboring sites used to perform the coverage analysis provided in Attachments 4 through 7.
- Attachment 4: *"Existing 700 MHz LTE Coverage" for the Current AT&T Network* depicts 700 MHz LTE coverage from existing sites and demonstrates that there are currently gaps in 700 MHz LTE coverage effecting service along Griswold Street, Addison Road and the surrounding residential neighborhoods in Glastonbury. The coverage shown is where the signal strengths are: > -83 dBm (minimum level required for reliable, high quality service and performance at 700 MHz) and, > -93 dBm (minimum level required for adequate level of service at 700 MHz). In an effort to provide the required levels of coverage to these areas, AT&T is proposing to install a wireless facility at the 541 Griswold St location.
- Attachment 5: *"Existing & Proposed 700 MHz LTE Coverage" with Glastonbury Site for the AT&T Network* shows how this proposed site would fill in the existing coverage gaps and improve AT&T's 700 MHz LTE network within the targeted areas, as detailed in Table 2.
- Attachment 6: *"Existing 1900 MHz LTE Coverage" for the Current AT&T Network* depicts 1900 MHz LTE coverage from existing sites and demonstrates that there are currently gaps in 1900 MHz LTE coverage effecting service along Griswold Street, Addison Road and the surrounding residential neighborhoods in the Glastonbury, CT area. The coverage shown is where the signal strengths are > -86 dBm (minimum level required for reliable high quality service and performance at 1900 MHz) and > -96 dBm (the minimum required for adequate level of service at 1900 MHz).
- Attachment 7: *"Existing & Proposed 1900 MHz Coverage" with Glastonbury Site for the AT&T Network* shows how this proposed site would fill in the existing coverage gaps and improve AT&T's 1900 MHz LTE network within the targeted areas, as detailed in Table 2.
- Attachment 8: *Connecticut DOT Average Annual Daily Traffic Data - Glastonbury* shows the available vehicular traffic volume data for the subject area from the Connecticut Department of Transportation. This data shows as many as 5900 vehicles per day passing through the subject area on Griswold St and 4500 vehicles per day on Addison Road.

Table 2 below lists the coverage statistics that were compiled for each frequency band of the proposed site:

	Incremental Coverage from Proposed Site (700 MHz)		Incremental Coverage from Proposed Site (1900 MHz)	
Population Coverage: ³	(≥ -83 dBm)	1,704	(≥ -86 dBm)	718
	(≥ -93 dBm)	1,638	(≥ -96 dBm)	1529
Area Covered (mi²):				
Area Covered (mi²):	(≥ -83 dBm)	0.66	(≥ -86 dBm)	0.35
	(≥ -93 dBm)	0.97	(≥ -96 dBm)	0.72
Roadway Coverage (mi):				
Roadway Coverage (mi):	Main:	1.2	Main:	0.1
	Secondary:	7.0	Secondary:	7.3
	Total:	8.2	Total:	7.4

Table 2: Coverage Statistics

³ Population figures are based upon 2010 US Census Block Data

4. Conclusion

AT&T has identified an area of deficient coverage affecting a significant portion of Glastonbury, including key traffic corridors through the residential areas of the town. The proposed Glastonbury facility will bring the needed fill-in coverage to significant portions of along Griswold Street, Addison Road and the residential neighborhoods in the vicinity of these roads, all of which are currently within this coverage gap of AT&T's network.

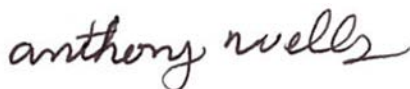
No existing structures were identified and available that would be able to satisfy the coverage requirements needed for this area. The location and the minimum height selected were chosen to achieve an optimal balance between meeting coverage objectives, overcoming the tree line for signal propagation, minimizing the aesthetic impact to the community, and future collocation.

As discussed in this report and depicted in the attached plots, the proposed AT&T site will provide the public need for service in this area, by providing an appropriate coverage footprint for the Glastonbury community along with effective connectivity to the rest of AT&T's existing network.

Without a site in this area, at the height requested, significant gaps in service will exist within the Town of Glastonbury, and the identified public need for reliable wireless services in this area will not be met.

5. Statement of Certification

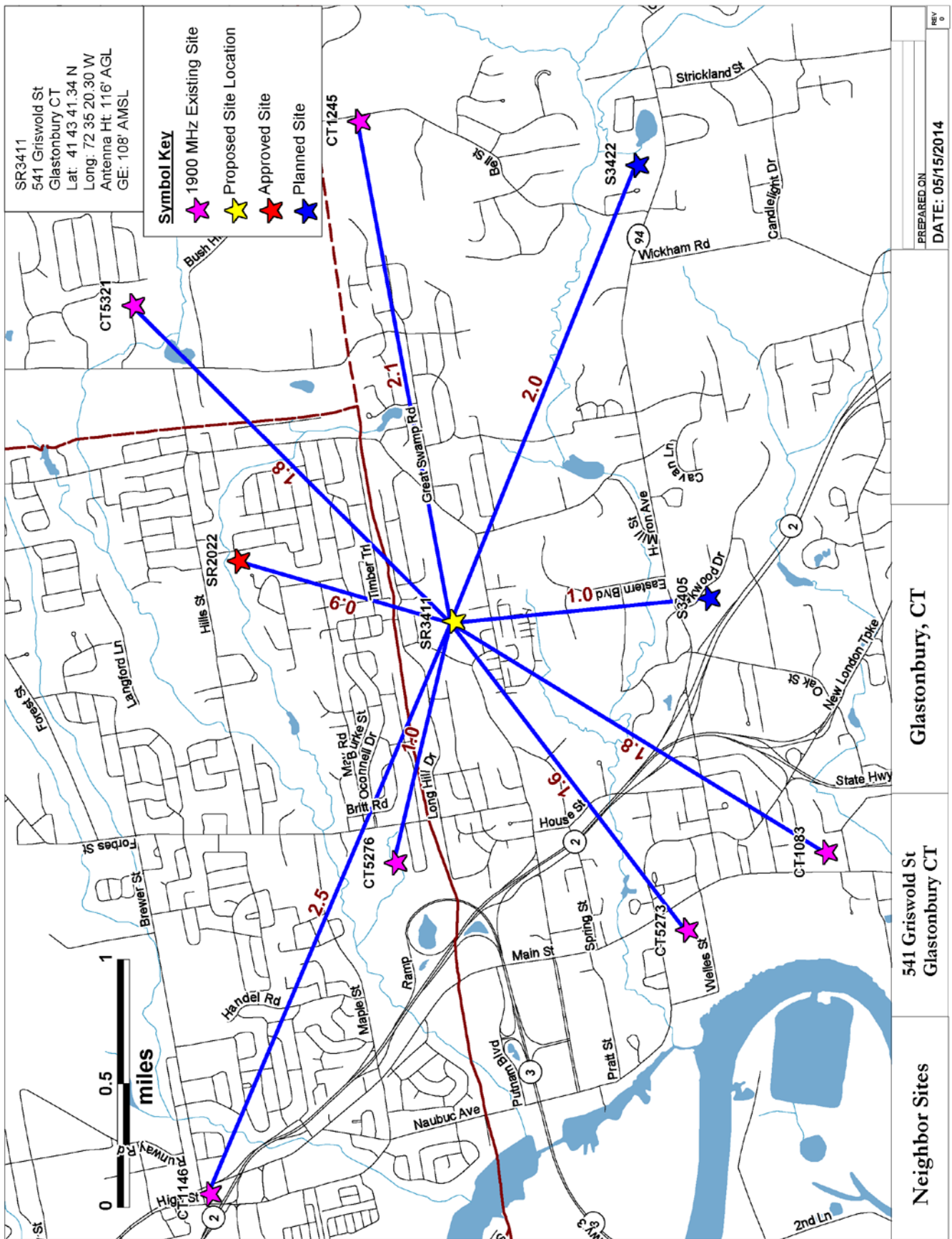
I certify to the best of my knowledge that the statements in this report are true and accurate.



Anthony Wells
C Squared Systems, LLC

June 2, 2014

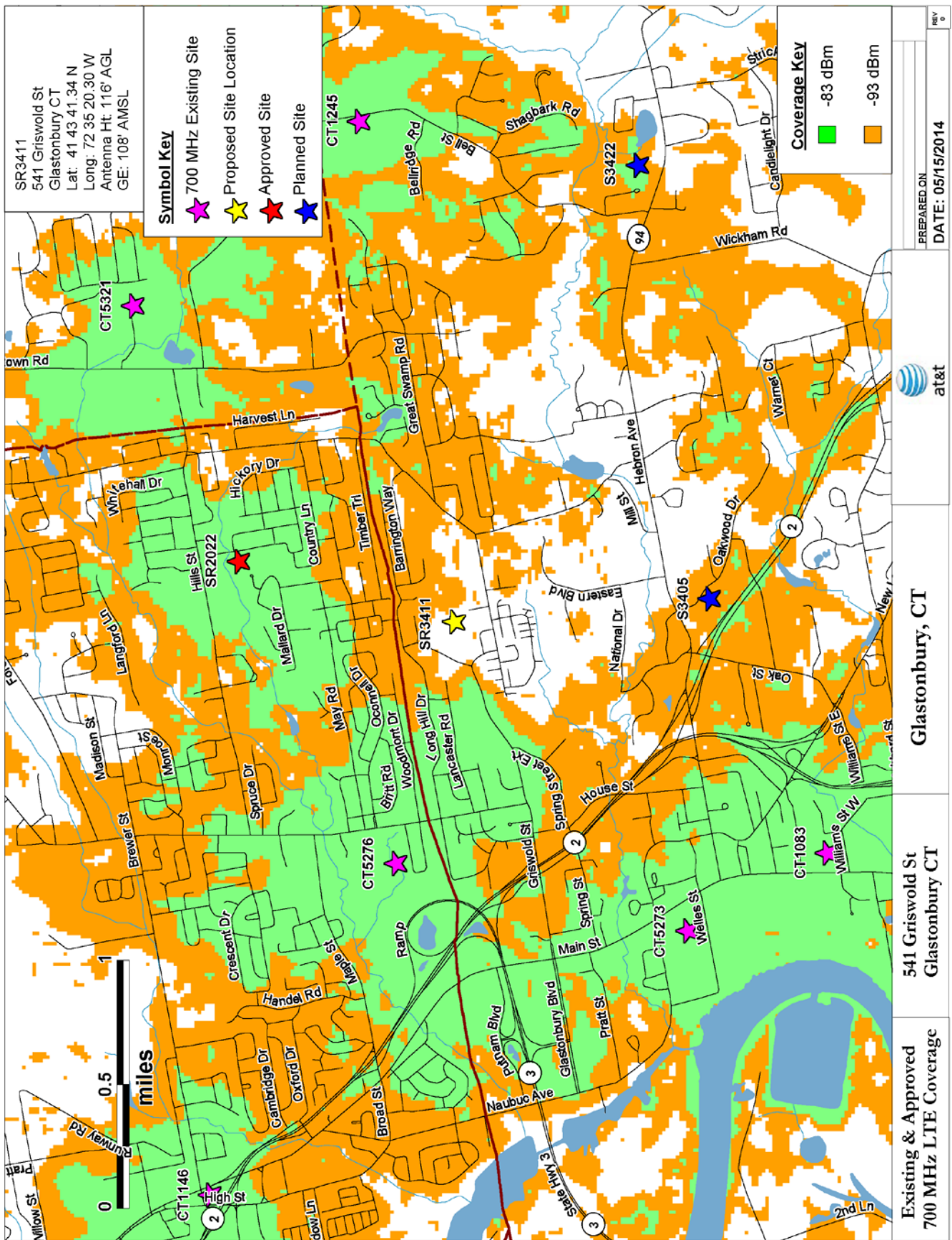
Date



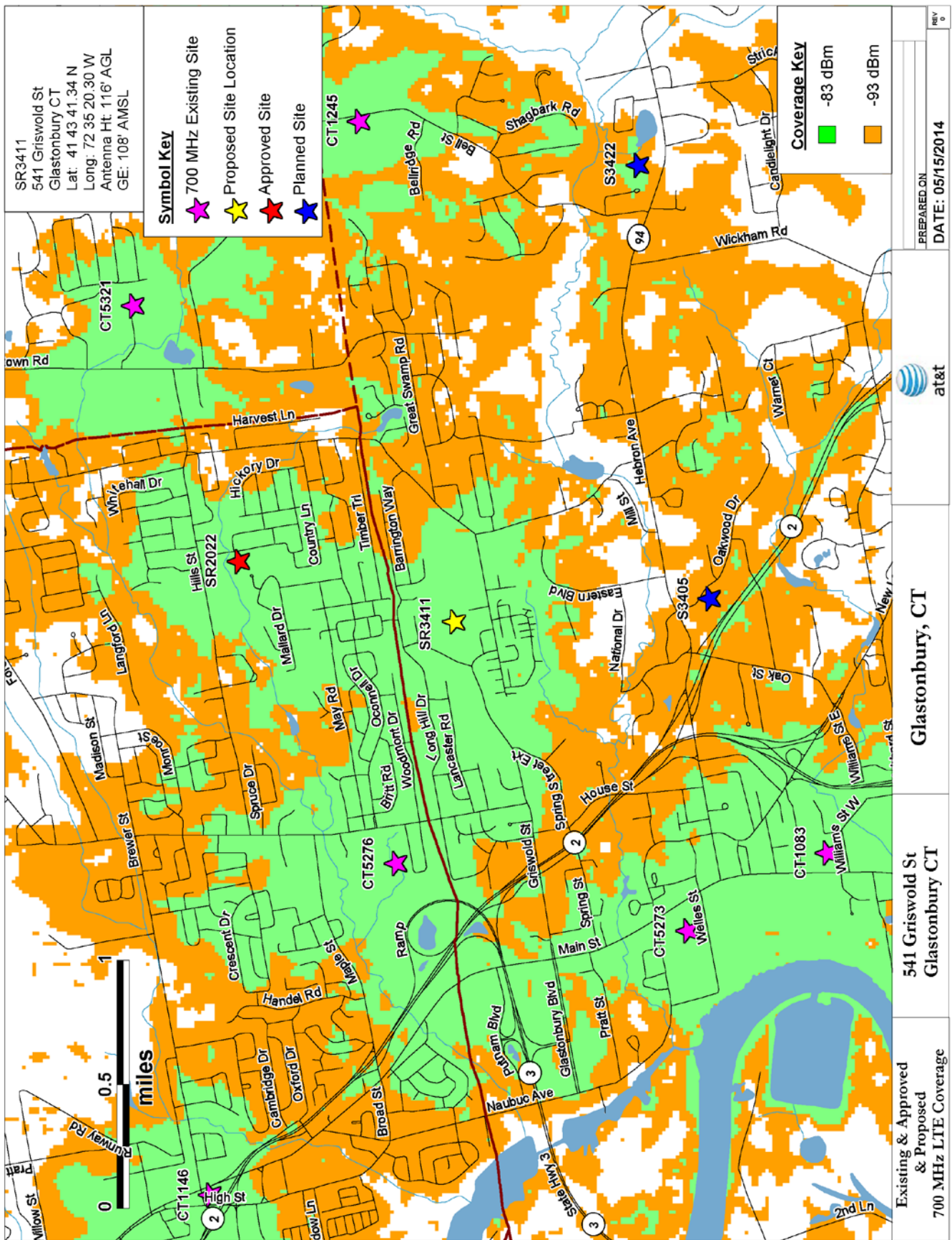
Attachment 2: Map of Distance to Neighbor Sites – Glastonbury

Site Name	Address	Town	Latitude	Longitude	Antenna Centerline (feet)	Distance to Proposed Site (miles)	Structure Type	Ground Elevation (feet)
CT1245	577 BELL STREET	GLASTONBURY	41.7336	-72.5497	93	2.1	Lattice Tower	354
CT5321	575 HILLSTOWN ROAD	MANCHESTER	41.7469	-72.5641	70	1.8	Monopole	176
CT1083	GLASTONBURY P.D.	GLASTONBURY	41.7062	-72.6069	166	1.8	Lattice Tower	46
CT1146	287 MAIN STREET	EAST HARTFORD	41.7424	-72.6337	63	2.5	Rooftop	65
CT5273	2577 MAIN STREET	GLASTONBURY	41.7144	-72.613	110	1.6	Monopole	29
CT5276	1455 FORBES AVENUE	EAST HARTFORD	41.7315	-72.6077	120	1.0	Monopole	74
SR2022	465 HILLS STREET	EAST HARTFORD	41.7407	-72.5841	100	0.9	Monopole	105
SR3405	628 HEBRON AVENUE	GLASTONBURY	41.7131	-72.5870	60	1.0	Rooftop	115
SR3422	HEBRON AVENUE	GLASTONBURY	41.7173	-72.5531	132	2.0	Power Pole	170

Attachment 3: Neighbor Site Data and Distance to Proposed Site



Attachment 4: "Existing 700 MHz LTE Coverage" for the Current AT&T Network



Attachment 5: "Existing & Proposed 700 MHz LTE Coverage" with Glastonbury Site for the AT&T Network



Attachment 8: Connecticut DOT Average Annual Daily Traffic Data – Glastonbury