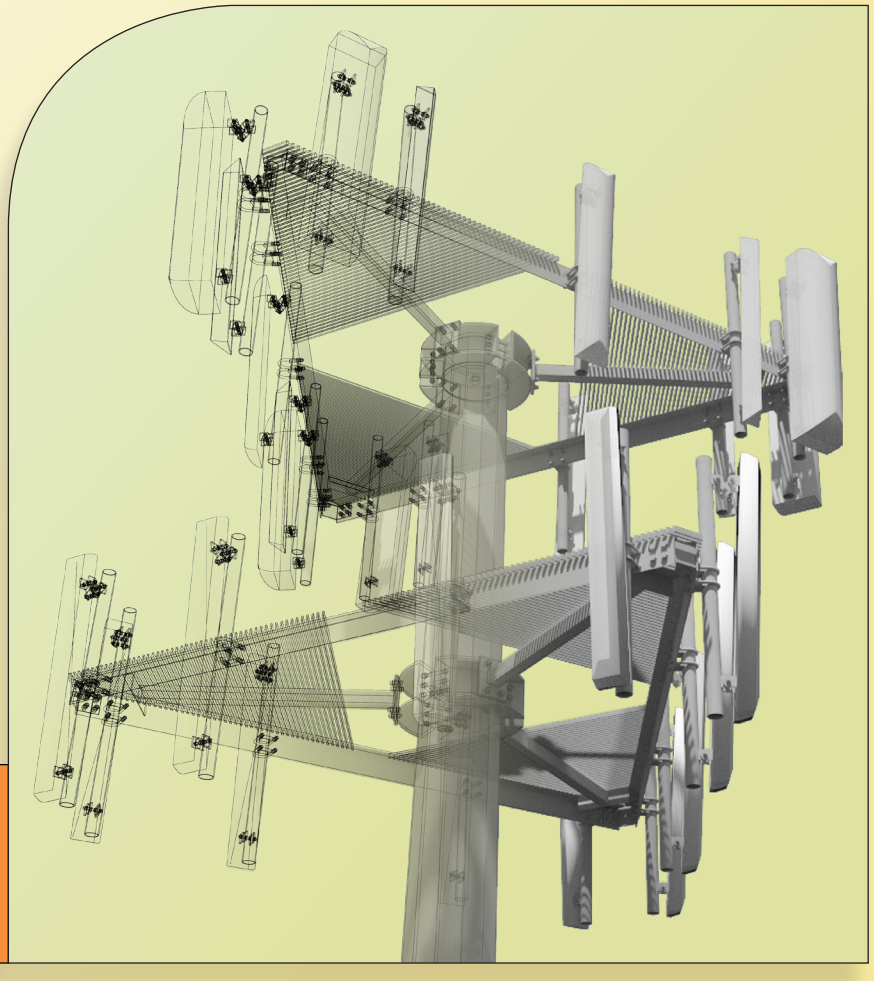
ATTACHMENT 6

Visibility Analysis

SOUTHBURY
CT2040
257 PERKINS ROAD
SOUTHBURY, CT



Prepared in October 2013 by:
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New Cingular Wireless PCS, LLC dba AT&T

ALL-POINTS
TECHNOLOGY CORPORATION

Project Introduction

New Cingular Wireless PCS, LLC, d/b/a AT&T is pursuing a Certificate of Environmental Compatibility and Public Need ("Certificate") from the Connecticut Siting Council ("Council") for the construction, maintenance and operation of a wireless communications facility ("Facility") at 257 Perkins Road in Southbury, Connecticut (identified herein as the "host Property").

The proposed Facility would be located in the southeast corner of the host Property and include a 170-foot tall monopole tower. AT&T would install a total of twelve (12) panel-type antennas with a center line of 170 feet above ground level ("AGL"). Supporting ground equipment would be housed within a 12-foot by 20-foot free-standing equipment shelter located near the base of the monopole. The entire Facility would be enclosed within a fenced, gravel-base compound measuring approximately 38 feet by 60 feet. The Facility would be located at a ground elevation of 570± feet Above Mean Sea Level ("AMSL"). Access to the Facility would be gained via a new, 12-foot wide gravel-base drive originating off the existing driveway and extending to the western property boundary and then turning south and ultimately east to the proposed compound location. Both the tower and compound are designed to accommodate multiple carriers and municipal emergency service providers, should the need arise.

At the request of AT&T, All-Points Technology Corporation, P.C. ("APT") prepared this Visibility Analysis to evaluate potential views associated with the Facility from within a two-mile radius ("Study Area"). In addition to the Town of Southbury, the Study Area includes portions of the neighboring municipalities of Roxbury (to the north) and Bridgewater (west).

Site Description and Setting

The host Property is developed with a single-family home located in its north central portion. Land use within the vicinity of the host Property is primarily residential in nature, with agricultural fields and large tracts of wooded areas. The host Property is abutted in all directions by other residential lots, separated by narrow strips of woods (less than 200 feet).

The topography within the Study Area is characterized by rolling hills with ground elevations that range from approximately 130 feet AMSL to nearly 870 feet AMSL. The tree cover within the Study Area (mixed deciduous hardwoods interspersed with stands of mature evergreens) occupies approximately 6,017 acres of the 8,042-acre study area (75%). The average tree canopy is estimated to be approximately 65 feet.

METHODOLOGY

APT used the combination of a predictive computer model and in-field analysis to evaluate the visibility associated with the proposed Facility. The predictive model provides an assessment of potential visibility throughout the entire Study Area, including private properties and other areas inaccessible for direct observations. A balloon float was also conducted to field verify results of the model, inventory visible and

nonvisible locations, and to provide photographic documentation from publicly accessible areas. A description of the procedures used in the analysis is provided below.

Preliminary Computer Modeling

Two computer modeling tools are used to calculate those areas from which at least the top of the proposed Facility is estimated to be visible: IDRISI image analysis program (developed by Clark Labs, Clark University) and ArcGIS®, developed by Environmental Systems Research Institute, Inc. Project- and Study Area-specific data were incorporated into the computer model, including the Site location, Facility height and ground elevation, as well as the surrounding topography and existing vegetation which are two primary features that can block direct lines of sight. Information used in the model included LiDAR[1]-based digital elevation data and customized land use data layers developed specifically for this analysis. The LiDAR-based Digital Elevation Model ("DEM") represents topographic information for the state of Connecticut that was derived through the spatial interpolation of airborne LiDAR-based data collected in the year 2000 and has a horizontal resolution of ten (10) feet. In addition, multiple land use data layers were created from the Natural Resources Conservation Service (through the USDA) aerial photography (1-meter resolution, flown in 2006, 2008, 2010 and 2012) using IDRISI image processing tools. The IDRISI tools implement light reflective classes defined by statistical analysis of individual pixels, which are then grouped based on common reflective values such that distinctions can be made automatically between deciduous and coniferous tree species, as well as grassland, impervious surface areas, water and other distinct land use features. This information is manually cross-checked with the recent USGS topographic land characteristics to quality assure the imaging analysis.

Once the data layers were entered, image processing tools were applied and overlaid onto USGS topographic base maps and aerial photographs to achieve an estimate of locations where the Facility might be visible. First, only the topography data layer (DEM) was incorporated to evaluate potential visibility with no intervening vegetative screening. The initial omission of the forest cover data layer results in an excessive over-prediction, but provides an opportunity to identify and evaluate those areas with potentially direct sight lines toward the Facility.

Eliminating the tree canopy altogether as performed in the preliminary analysis exaggerates areas of visibility because it assumes unobstructed sight lines everywhere but in those locations where intervening topography rises above the height of the proposed Facility. However, using this technique not only allows for an initial identification of direct sight lines, but also to gain some insight regarding seasonal views when the leaves are not on the trees[2]. This preliminary mapping is especially useful during the in-field activities (described below) to further evaluate "leaf-off" scenarios. A purposely low average tree canopy height of 50 feet was incorporated into the forest data layer and added to the DEM for a second iteration of the visibility maps, thus providing a conservative assessment of intervening vegetation for use during the in-field activities to compare the outcomes of the initial computer modeling with direct observations of the balloon float.

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[1] LiDAR is an acronym for Light Detection and Ranging. It is a technology that utilized lasers to determine the distance to an object or surface. LiDAR is similar to radar, but incorporates laser pulses rather than sound waves. It measures the time delay between transmission and reflection of the laser pulse.

[2] Visibility varies seasonally with increased, albeit obstructed, views occurring during "leaf-off" conditions. Each individual Study Area includes mature vegetation with a unique composition and density of woodlands, with mast or pole timber and branching providing the majority of screening in leafless conditions. Because tree spacing, dimensions and branching patterns as well as the understory differ greatly over even small areas, creating an accurate Study Area-specific "leaf-off" tree density data layer covering a two-mile radius becomes unmanageable. Considering that a given Study Area has its own discrete forest characteristics, modeling for seasonal variations of visibility is problematic and, in our experience, even when incorporating conservative constraints into the model, the results tend to over-predict visibility in "leaf-off" conditions.

Additional data was reviewed and incorporated into the visibility analysis, including protected private and public open space, parks, recreational facilities, hiking trails, schools, and historic districts. Ivers Nature Preserve and Paradise Hill Preserve, both located southwest of the host Property in Southbury, have a series hiking trails. No Connecticut blue-blazed trails are located within the Study Area. Based on a review of publicly-available information, no designated state scenic roads exist within the Study Area.

In-Field Activities

To supplement and substantiate the results of the computer modeling efforts, APT completed in-field verification activities consisting of a balloon float, vehicular and pedestrian reconnaissance, and photo-documentation.

Balloon Float and Field Reconnaissance

A balloon float was conducted on June 24, 2013. The balloon float consisted of raising an approximately four-foot diameter, helium-filled balloon tethered to a height of 170 feet AGL at the proposed Facility location. Once the balloon was secured at the proposed Facility height, a Study Area reconnaissance was performed by driving along the local and State roads and locations where the balloon could be seen above/through the tree mast and canopy were inventoried. Visual observations from the reconnaissance were also used to evaluate the results of the preliminary visibility mapping and identify any discrepancies in the initial modeling. Weather conditions on the day of the balloon float included partly sunny skies with a temperature of approximately 80 degrees Fahrenheit and calm winds (less than 3 mph).

During the balloon float, several trees were randomly surveyed using a hand-held infrared laser range finder and Suunto clinometer to ascertain their heights. Numerous locations were selected to obtain tree canopy heights, including along roadways, wooded lots, and high- and low-lying areas to provide for the irregularities associated with different land characteristics and uses found within the Study Area. The average canopy height was developed based on measurements and comparative observations, in this case approximately 65 feet AGL. Throughout Connecticut, the tree canopy height varies from about 55 feet to in excess of 80 feet (where eastern white pine becomes a dominant component of the forest type, average tree heights may be even slightly higher). This general uniformity is most likely the result of historic state-wide clear cutting of forests to produce charcoal and fuelwood, not only for home use, but also for the local brick, brass, and iron industries from the late 1800s to early 1900s[3]. Approximately 69% of Connecticut's forests are characterized as mature[4].

Information obtained during the balloon float was subsequently incorporated into the computer model to refine the visibility map.

Photographic Documentation

During the balloon float, a field reconnaissance was completed by driving the public roads within the Study Area and recording observations, including photo-documentation, of those areas where the balloon was and was not visible. Photographs were obtained from several vantage points to document the view towards the

[3] Ward, J.S., Worthley, T.E. Forest Regeneration Handbook. A guide for forest owners, harvesting practitioners, and public officials. The Connecticut Agricultural Experiment Station and University of Connecticut, Cooperative Extension. Pg. 5.

[4] USDA Resource Bulletin NE-160, 2004.

proposed Facility. At each photo location, the geographic coordinates of the camera's position were logged using global positioning system ("GPS") equipment technology.

Photographs were taken with a Nikon D-3000 digital camera body and Nikon 18 to 135 millimeter ("mm") zoom lens. For all but one of the views the lens was set to 50 mm. Photo point location 1 was taken using a 24 mm focal length in order to provide a greater depth of field for presentation in this report. Focal lengths ranging from 24 mm to 50 mm approximate views similar to that achieved by the human eye. However, two key aspects of an image can be directly affected by the specific focal length that is selected: field of view and relation of sizes between objects in the frame. A 24 mm focal length provides a wider field of view, representative of the extent the human eyes may see (including some peripheral vision), but the relation of sizes between objects at the edges of the photos can become minimally skewed. A 50 mm focal length has a narrower field of view than the human eye but the relation of sizes between objects is represented similar to what the human eye might perceive.

> *"The lens that most closely approximates the view of the unaided human eye is known as the normal focal-length lens. For the 35 mm camera format, which gives a 24x36 mm image, the normal focal length is about 50 mm.*[5]*"*

When taking photographs for these analyses, APT prefers a focal length of 50 mm; however there are times when wider views (requiring the use of the 24 mm lens setting, in this case) can better reflect "real world" viewing conditions by providing greater context to the scene. Regardless of the lens setting, the scale of the subject in the photograph (the balloon) and corresponding simulation (the Facility) remains proportional to its surroundings.

The table below summarizes characteristics of the photographs presented in the attachment to this report including a description of each location, view orientation, the distance from where the photo was taken relative to the proposed Facility, and whether the balloon was visible or not.

Photo No.	Location	View Orientation	Distance to Facility	Visibility
1	Host Property (24 mm focal length)	South	± 0.05 Mile	Year-round
2	Brown Brook Road	Northeast	± 0.14 Mile	Year-round
3	Adjacent to #184 Brown Brook Road	Northwest	± 0.18 Mile	Year-round
4	Adjacent to #84 Perkins Road	West	± 0.16 Mile	Year-round
5	Adjacent to #101 Perkins Road	West	± 0.15 Mile	Year-round
6	Adjacent to #149 Perkins Road	Southwest	± 0.17 Mile	Year-round
7	Adjacent to #225 Perkins Road	Southwest	± 0.28 Mile	Seasonal
8	Adjacent to #290 Perkins Road	South	± 0.25 Mile	Year-round
9	Adjacent to #64 Minor Bridge Road	Southeast	± 1.33 Miles	Year-round
10	Intersection of Hut Hill Road and Town Line Road	Southeast	± 1.81 Miles	Year-round
11	Town Line Road	Southeast	± 1.89 Miles	Year-round
12	Town Line Road	Southeast	± 2.00 Miles	Year-round

[5] Warren, Bruce. Photography, West Publishing Company, Eagan, MN, c. 1993, (page 70).

Final Visibility Mapping

Field data and observations were incorporated into the mapping data layers, including the photo locations, areas that experienced land use changes since the 2012 aerial photo flight, and those places where the initial model was found to either under or over-predict visibility.

The revised average tree canopy height data layer (using 65 feet AGL) was merged with the DEM and added to the base ground elevations. As a final step, forested areas were extracted from areas of potential visibility, assuming that a person standing within a forest would not be able to view the Facility from beyond a certain distance due to the presence of intervening tree mast and/or understory. APT elected to use a distance of 500 feet for this analysis. Each location is dependent on the specific density and composition of the surrounding woodlands, and it is understood that some locations within this distance could provide visibility of at least portions of the Facility at any time of the year. In "leaf-on" conditions, this distance may be overly conservative as the deciduous vegetation would substantially hinder direct views in many cases at close range. However, even in "leaf off" conditions when views expand, tree mast can still serve to block lines of sight, even at distances less than 500 feet. For purposes of this analysis, it was reasoned that contiguous forested land beyond 500 feet of the Facility would consist of light-impenetrable trees of a uniform height.

Once the additional data was integrated into the model, APT re-calculated the visibility of the Facility from within the Study Area to produce the final visibility map.

Photographic Simulations

Photo simulations of the proposed Facility were generated for the corresponding photographs where the balloon was visible above the tree canopy during the in-field activities. The photo simulations portray scaled renderings of the Facility from these locations. Using field data, site plan information and 3-dimension (3D) modeling software, spatially referenced models of the site area and Facility were generated and merged. The geographic coordinates obtained in the field for the photograph locations were incorporated into the model to produce virtual camera positions within the spatial 3D model. The photo simulation was then created using a combination of renderings generated in the 3D model and photo-rendering software programs[6].

A photolog map (depicting the photo locations), photo-documentation and the simulations are presented in the attachment at the end of this report. The photographs of the balloon are included to provide visual reference points for the location, height and proportion of the proposed Facility relative to the scene.

As stated earlier, APT has elected to use a 50 mm focal length whenever possible; however, there are occasions when the use of a wider-angle lens setting is preferred. For presentation purposes in this report, the photographs are produced in an approximate 7" by 10.5" format. When viewing in this format size, we believe it is important to provide the largest representational image while maintaining an accurate relation

[6] As a final step, the accuracy and scale of select simulations are tested against photographs of existing Facilities with recorded camera position, focal length, photo location, and Facility location.

of sizes between objects within the frame of the photograph. Photograph 1 was taken with a 24 mm focal length to balance preserving the integrity of the scene's setting while depicting the subject (the Facility location) in a way similar to what an observer might see, to the greatest extent possible.

Visibility Analysis Results

Results of this analysis are graphically displayed on the visibility analysis maps provided in the attachment at the end of this report. A total of 75± acres within the Study Area would have some visibility of the proposed Facility above the tree canopy year-round (that is, during both "leaf-off" and "leaf-on" conditions). This represents less than one percent of the 8,042-acre Study Area. As depicted on the visibility analysis map, year-round visibility associated with proposed Facility is mostly limited to an area within approximately 0.25 mile of the host Property, characterized as a mix of year-round and seasonal (during "leaf-off" conditions) visibility. Year-round views appear to be limited to specific locations in the general Perkins Road and Brown Brook Road area, as represented by photograph locations 1 through 8. That is not to suggest that these are the only locations within the area that would achieve views of the proposed Facility on a year-round basis; we anticipate that select locations on private properties will have at least partial views. More distant year-round views are anticipated over elevated open agricultural fields on the Southbury Training School property to the east and along a short section of Minor Bridge Road to the northwest (see Photo 9). We estimate that approximately 26 residential properties may attain at least partial year-round views of the proposed Facility[7].

Approximately 100 additional acres have the potential to offer some views of the Facility through the trees during "leaf-off" conditions. As discussed above, these areas are generally restricted to locations within about 0.25 mile of the host Property. It is possible that up to five (5) additional residential properties may have limited views of the Facility through the intervening trees when the leaves are off the deciduous trees.

In general, the predicted visibility of the proposed Facility is minimal as a result of the rolling topography and dense mature tree canopy found within the Study Area. However, the majority of near views would occur within 0.25 mile of the Facility. No locations along the trails systems within the Ivers Nature Preserve or Paradise Hill Nature Preserve are expected to have views of the Facility.

Proximity to Schools and Commercial Child Day Care Centers

No school or commercial child day care facilities are located within 250 feet of the host property. The nearest school (Center Elementary School) is located approximately 3.87 mile to the southwest at 8 Obtuse Road North in Brookfield, Connecticut. The nearest commercial child day care center (Child's World Preschool and Child Care) is located at 449 Grassy Hill Road in Woodbury, Connecticut, approximately 3.09 miles northeast of the host Property. Neither of these locations would have views of the proposed Facility.

[7] Note that residential properties on Perkins Road and Brown Brook Road within the area depicted as seasonal (in orange) on the visibility analysis maps were all conservatively characterized herein as having potential year-round views from some portion of the parcel and are included in this total estimate.

ATTACHMENTS

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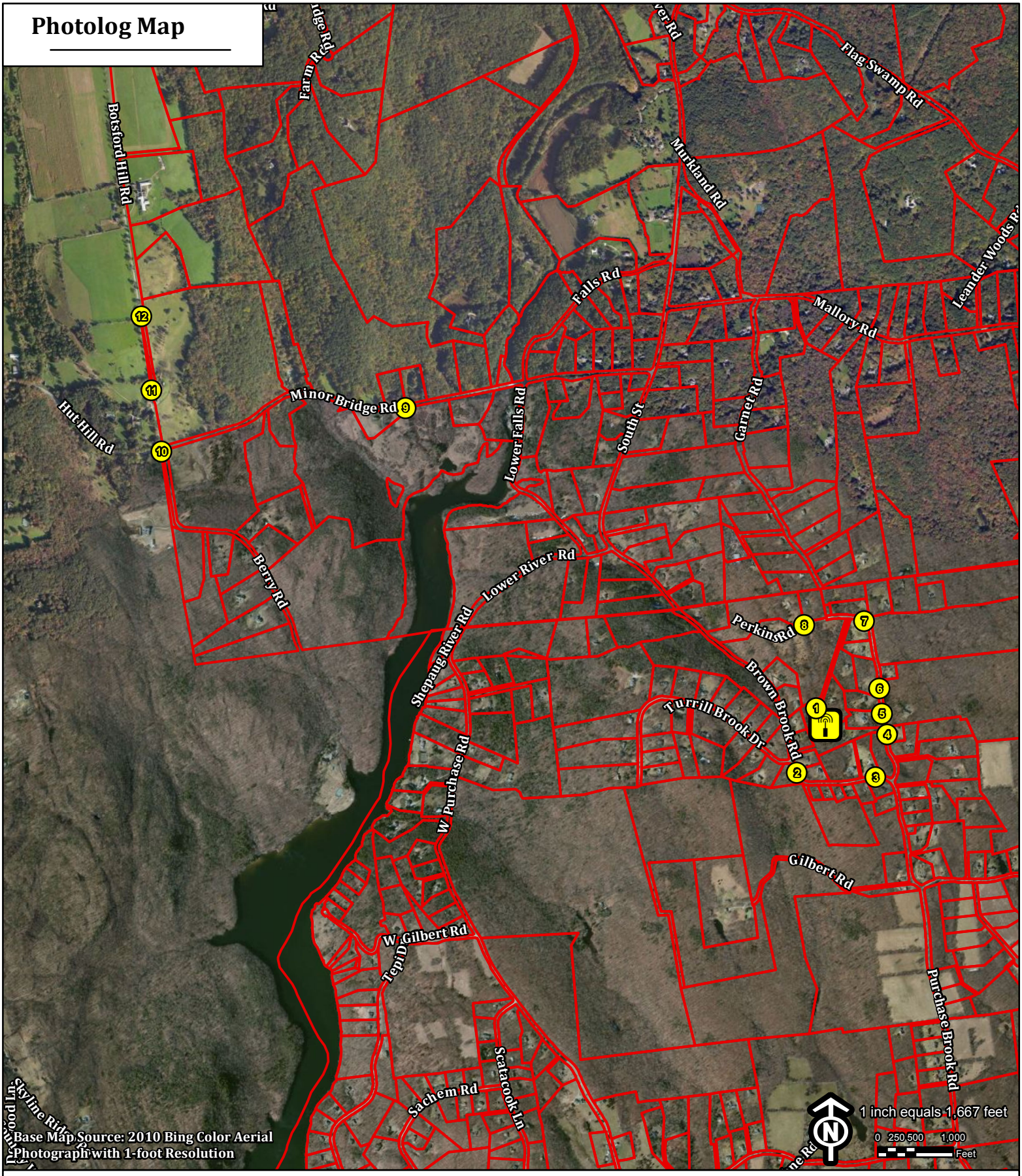

Legend

- Proposed Tower Location
- Photo Point (PP)
- Connecticut Parcel

Proposed AT&T Wireless Communications Facility
257 Perkins Road
Southbury, Connecticut

Monday, July 08, 2013

at&t

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DOCUMENTATION

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
1	**HOST PROPERTY** (24mm focal length)	**SOUTHEAST**	**+/- 0.05 MILE**	**YEAR ROUND**

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SIMULATION

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
1	**HOST PROPERTY (24mm focal length)**	**SOUTHEAST**	**+/- 0.05 MILE**	**YEAR ROUND**

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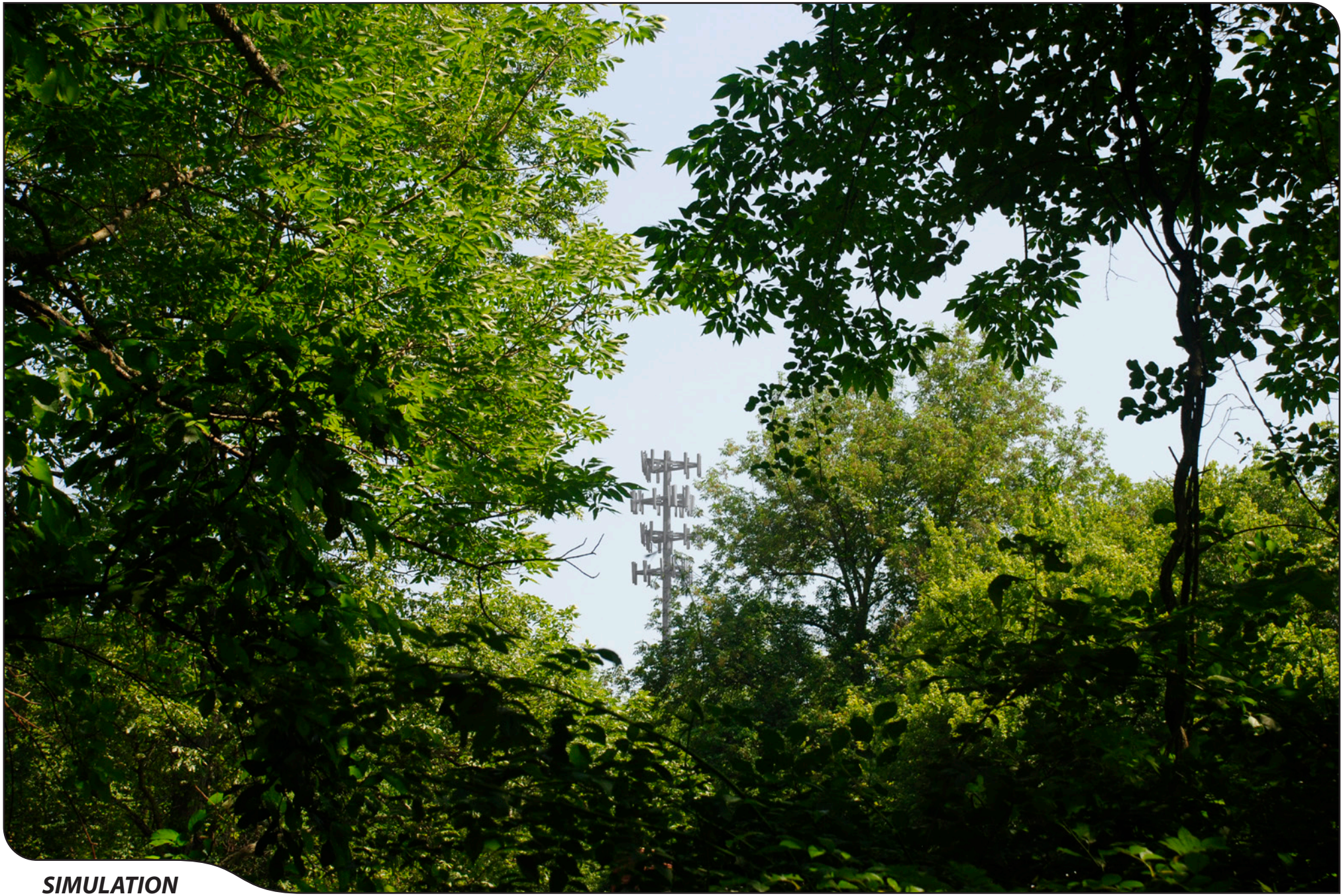
DOCUMENTATION

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
2	**BROWN BROOK RD**	**NORTHEAST**	**+/- 0.14 MILE**	**YEAR ROUND**



SIMULATION

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
2	**BROWN BROOK RD**	**NORTHEAST**	**+/- 0.14 MILE**	**YEAR ROUND**

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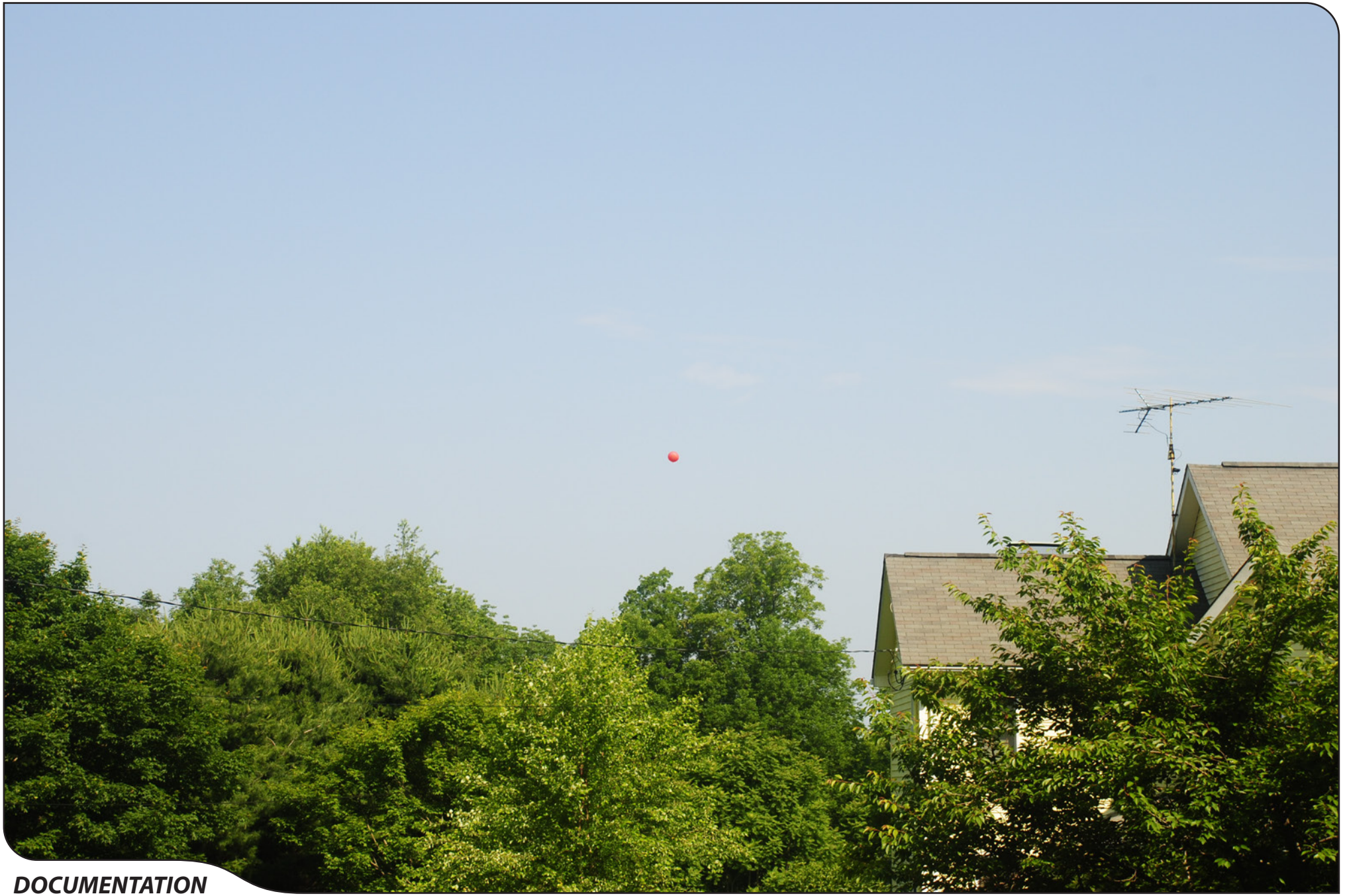

DOCUMENTATION

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
3	**ADJACENT TO #184 BROWNS BROOK ROAD**	**NORTHWEST**	**+/- 0.18 MILE**	**YEAR ROUND**

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SIMULATION

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
3	**ADJACENT TO #184 BROWNS BROOK ROAD**	**NORTHWEST**	**+/- 0.18 MILE**	**YEAR ROUND**

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DOCUMENTATION

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
4	**ADJACENT TO #84 PERKINS ROAD**	**WEST**	**+/- 0.16 MILE**	**YEAR ROUND**

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SIMULATION

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
4	**ADJACENT TO #84 PERKINS ROAD**	**WEST**	**+/- 0.16 MILE**	**YEAR ROUND**

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DOCUMENTATION

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
5	**ADJACENT TO #101 PERKINS ROAD**	**SOUTHWEST**	**+/- 0.15 MILE**	**YEAR ROUND**

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SIMULATION

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
5	**ADJACENT TO #101 PERKINS ROAD**	**SOUTHWEST**	**+/- 0.15 MILE**	**YEAR ROUND**

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DOCUMENTATION

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
6	**ADJACENT TO #149 PERKINS ROAD**	**SOUTHWEST**	**+/- 0.17 MILE**	**YEAR ROUND**

SIMULATION

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
6	**ADJACENT TO #149 PERKINS ROAD**	**SOUTHWEST**	**+/- 0.17 MILE**	**YEAR ROUND**

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DOCUMENTATION

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
7	**ADJACENT TO #225 PERKINS ROAD**	**SOUTHWEST**	**+/- 0.28 MILE**	**YEAR ROUND**

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DOCUMENTATION

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
8	**ADJACENT TO #290 PERKINS ROAD**	**SOUTHEAST**	**+/- 0.25 MILE**	**YEAR ROUND**

SIMULATION

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
8	**ADJACENT TO #290 PERKINS ROAD**	**SOUTHEAST**	**+/- 0.25 MILE**	**YEAR ROUND**

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DOCUMENTATION

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
9	**ADJACENT TO #64 MINOR BRIDGE ROAD**	**SOUTHEAST**	**+/- 1.33 MILES**	**YEAR ROUND**

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SIMULATION

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
9	**ADJACENT TO #64 MINOR BRIDGE ROAD**	**SOUTHEAST**	**+/- 1.33 MILES**	**YEAR ROUND**

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DOCUMENTATION

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
10	**INTERSECTION OF HUT HILL ROAD AND TOWN LINE ROAD**	**SOUTHEAST**	**+/- 1.81 MILES**	**YEAR ROUND**

SIMULATION

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
10	**INTERSECTION OF HUT HILL ROAD AND TOWN LINE ROAD**	**SOUTHEAST**	**+/- 1.81 MILES**	**YEAR ROUND**

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DOCUMENTATION

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
11	**TOWN LINE ROAD**	**SOUTHEAST**	**+/- 1.89 MILES**	**YEAR ROUND**

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