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**Reserved for**  
**Exhibit # 4**

# *Proposed Wireless Telecommunications Facility*

Two Alternative Site Locations

*Site 1*- 99 Summer Hill Road  
Madison, Connecticut

*Site 2* - Town of Madison Bulky Waste Facility  
252 Ridge Road  
Madison, Connecticut

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Prepared for



Prepared by **VHB/Vanasse Hangen Brustlin, Inc.**  
54 Tuttle Place  
Middletown, CT 06457

January 2008

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## Visual Resource Evaluation

Crown Castle International seeks approval to construct a wireless telecommunications facility ("Facility") to be located within the Town of Madison, Connecticut. As part of the approval process, Crown Castle has selected two alternative sites for further evaluation that are referred to herein as Site 1 and Site 2. Site 1 is located on a residential property at 99 Summer Hill Road while Site 2 is located on municipally-owned property at 252 Ridge Road ("host properties"). The alternative project sites are located approximately 1.60-miles apart. This "Visual Resource Evaluation" was conducted to approximate the visibility of a Facility at the proposed locations within a two-mile radius around each of the two alternative Sites ("Study Area") and present the results of the analysis in a comparative format.

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## Project Introduction

Development of either site location would include the construction of a galvanized steel monopole tower with associated ground equipment to be installed within a fence-enclosed compound area at the base of the tower structure. The proposed Site 1 monopole would stand at 150 feet Above Ground Level (AGL). For the purposes of this evaluation, VHB has studied heights of 150 feet AGL and 180 feet AGL for Site 2. The Site 1 project area is located at approximately 185 feet Above Mean Sea Level (AMSL) and the Site 2 project area is located at approximately 150 feet AMSL. Access to Site location 1 would initially follow an existing driveway then extend in a westerly direction to the project area via a proposed 12-foot wide, gravel driveway. The Site 2 project area would utilize existing town roads for access.

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## Site Description and Setting

Identified in the Town of Madison Tax Assessors records as Map 103/Lot 68, the Site 1 host property consists of approximately 3.78 acres of land and is currently occupied by a single family residence. The proposed Facility would be situated within a wooded area on the western portion of the host property. The Site 2 project area is located on a municipally-owned, 42.58-acre parcel identified in the Town of Madison Tax Assessors records as Map 78/Lot 1. The property, along with several other large parcels, is currently occupied by the Town of Madison Bulky Waste Facility and several associated outbuildings. The proposed Site is located adjacent to the main entrance of the host property. A photograph of each project area is included in Attachment A. Attachment A also includes two maps that depict the location of each site over a high resolution, 2006 aerial photograph. The Alternative Sites are located approximately 1.60-mile apart (see the Photolog Documentation map also contained in Attachment A). Land use within the general vicinity of Site 1 is comprised of medium-density residential parcels. Land use within the general vicinity of Site 2 includes the Town's bulky waste facility; undeveloped woodlands associated with Cockaponset State Forest; and medium-density residential parcels located beyond the surrounding forested areas. Segments of Interstate 95, US Route 1 and Route 77 are contained within the Study Area. In total, the Study Area features approximately 119 linear miles of roadways.

The topography within the Study Area is characterized by gently rolling hills with ground elevations ranging from approximately 10 feet AMSL to nearly 400 feet AMSL. Overall, the Study Area contains approximately 109 acres of surface water. The tree cover within the Study Area consists mainly of mixed deciduous hardwood species. The tree canopy occupies approximately 10,406 acres of the 11,986-acre study area (87%). During the in-field activities associated with this analysis, an infrared laser range finder was used to accurately determine the average tree canopy height throughout the Study Area. Numerous trees were selected for measurement and the average tree canopy established, in this case 50 feet.

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## METHODOLOGY

In order to better represent the visibility associated with the Facility, Vanasse Hangen Brustlin, Inc. (VHB) uses a two-fold approach incorporating both a predictive computer model and in-field analysis. The predictive model is employed to assess potential visibility throughout the entire Study Area, including private property and/or otherwise inaccessible areas for field verification. A "balloon float" and Study Area drive-through reconnaissance are also conducted to obtain locational and height representations, back-check the initial computer model results and provide documentation from publicly accessible areas. Results of both activities are analyzed and incorporated into the final viewshed map. A description of the methodologies used in the analysis is provided below.

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### Visibility Analysis

Using ESRI's ArcView® Spatial Analyst, a computer modeling tool, the areas from which the top of the Facility is expected to be visible are calculated. This is based on information entered into the computer model, including Facility height, its ground elevation, the surrounding topography and existing vegetation. Data incorporated into the predictive model includes a digital elevation model (DEM) and a digital forest layer for the Study Area. The DEM was derived from the United States Geological Survey (USGS) National Elevation Dataset (NED), a seamless, publicly available elevation dataset with an approximate 30-meter resolution. The forest layer was derived through on-screen digitizing in ArcView® GIS from 2006 digital orthophotos with a 1-foot pixel resolution.

Once the data are entered, a series of constraints are applied to the computer model to achieve an estimate of where the Facility will be visible. Initially, only topography was used as a visual constraint; the tree canopy is omitted to evaluate all areas of potential visibility without any vegetative screening. Although this is an overly conservative prediction, the initial omission of these layers assists in the evaluation of potential seasonal visibility of the proposed Facility. A tree canopy height of 50 feet is then used to prepare a preliminary viewshed map for use during the Study Area reconnaissance. The average height of the tree canopy is determined in the field using a hand-held infra-red laser range finder. The average tree canopy height is incorporated into the final viewshed map; in this case, 50 feet was

identified as the average tree canopy height. The forested areas within the Study Area were then overlaid on the DEM with a height of 50 feet added and the visibility calculated. As a final step, the forested areas are extracted from the areas of visibility, with the assumption that a person standing among the trees will not be able to view the Facility beyond a distance of approximately 500 feet. Depending on the density of the vegetation in these areas, it is assumed that some locations within this range will provide visibility of at least portions of the Facility based on where one is standing.

Also included on the map is a data layer, obtained from the Connecticut State Department of Environmental Protection ("CTDEP"), which depicts various land and water resources such as state parks and forests, recreational facilities, dedicated open space and CTDEP boat launches among other categories. This layer is useful in identifying potential visual impacts to any sensitive receptors that may be located within the Study Area. In addition, based on a review of information published by the Connecticut Department of Transportation (ConnDOT) and discussions with municipal officials in Madison, VHB has determined that there are no state- or locally-designated scenic roadways contained within the Study Area.

A preliminary viewshed map is generated for use during the in-field activity in order to confirm that no significant land use changes have occurred since the aerial photographs used in this analysis were produced and to verify the results of the model in comparison to the balloon float. Information obtained during the reconnaissance is then incorporated into the final visibility map.

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### **Balloon Float and Study Area Reconnaissance**

On December 28, 2007 Vanasse Hangen Brustlin Inc., (VHB) conducted a publicly-noticed "balloon float" at Sites 1 and 2 from 9:00 AM to 3:00 PM to further evaluate the potential viewshed within the Study Area and to provide residents in Madison an opportunity to assess areas of likely visibility. Balloons at both Site locations were aloft prior to that time, beginning at approximately 8:00 AM. The balloon float consisted of raising and maintaining approximate four-foot diameter, helium-filled weather balloons at the proposed site locations to a height of 150 feet AGL at Site 1 and two balloons tethered on the same line with one at 150 feet AGL and one at 180 feet AGL for Site 2. Once the balloons were secured at their respective heights, VHB personnel drove the public road system in the Study Area to inventory those areas where the balloons were visible. During the balloon float, the temperature ranged from approximately 35 to 45 degrees Fahrenheit with generally calm wind conditions.

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### **Photographic Documentation**

Once the balloons were secured, VHB staff conducted a drive-by reconnaissance along the roads located within the Study Area with an emphasis on nearby residential areas and other

potential sensitive receptors in order to evaluate the results of the preliminary viewshed map and to verify where the balloons were, and were not, visible above and/or through the tree canopy. The balloons were photographed from several vantage points to document the actual view towards the proposed Facility. The locations and orientations of the photos are described below:

1. Views from Green Springs Drive west of Fox Run Road.
2. Views from High Hill Circle adjacent to house #77.
3. Views from High Hill Circle east of Crestview Drive.
4. View from Granby Drive adjacent to house #46.
5. View from Madison Land Conservation Trust hiking trail (along Hammonasset River).
6. View from Crestview Drive adjacent to house #20.
7. Views from Bar Gate Trail adjacent to house #21.

Photographs of the balloon from the view points listed above were taken with a Nikon D-80 digital camera body and Nikon 18 to 135 mm zoom lens. For the purposes of this report, the lens was set to 50mm. "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."

The locations of the photographic points are recorded in the field using a hand held GPS receiver and are subsequently plotted on the maps contained in the attachments to this document.

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## Photographic Simulation

A photographic simulation was generated for each of the photo locations introduced above. The photographic simulations represent a scaled depiction of the proposed monopole from these locations. The height of the Facility is determined based on the location of the balloon in the photograph and a proportional monopole image is simulated into the photographs. The simulations are contained in Attachment A.



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## CONCLUSIONS

Based on this analysis, areas from where the proposed monopoles would be visible above the tree canopy comprise approximately four acres for Site 1 and four acres for Site 2 at 150-foot AGL or 180-foot AGL. This represents less than one half of one percent of the total land cover within Study Area. As depicted on the attached viewshed map, areas of potential year-round visibility associated with Site 1 generally occur within the adjacent residential

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<sup>1</sup> Warren, Bruce. *Photography*, West Publishing Company, Eagan, MN, c. 1993, (page 70).

neighborhoods located to the south, east and northwest. This includes portions of Granby Drive, High Hill Circle, Summer Hill Road and Bar Gate Trail. In total, VHB estimates that at least partial, year-round views of a monopole at the Site 1 project location would be achieved from approximately 13 residential properties within the Study Area. Areas of potential year-round visibility associated with Site 2, with a 150-foot or 180-foot tall tower, would be confined to the host property and would therefore not be visible from any residential properties within the Study Area.

Overall, the topography and extensive tree cover contained within the Study Area would serve to minimize the year-round visibility associated with each of the alternative Sites and limit potential views to the areas identified above. This is particularly true for Site 2 where the undeveloped woodlands surrounding the host property would act as a significant visual buffer.

The viewshed map also depicts several additional areas where seasonal (i.e. during "leaf off" conditions) views are anticipated. These areas comprise approximately 18 acres and 7 acres for Site 1 and Site 2, respectively. Generally, seasonal visibility associated with Site 1 would be limited to the immediate vicinity of the project area, including portions High Hill Circle, Granby Drive, Crestview Drive and Summer Hill Road. Seasonal views would also extend to a short segment of the nearby Madison Land Conservation Trust hiking trail located to the southeast of the Site 1 project area (as depicted in View 5). Given the site's proximity to adjacent residential dwellings, potential seasonal views could feature a significant portion of the monopole structure and the equipment compound located at its base. Potential seasonal views associated with Site 2 would also be limited to the immediate vicinity of the project area with the exception of an approximate 250-foot long portion of Green Springs Drive where intermittent, seasonal views of Site 2 may be achieved. This area is situated roughly 0.5-mile to the northeast of the Site 2 project location. As evidenced by the photographic documentation and simulations contained in Attachment A, such views would be mostly obstructed by existing vegetation and would also be limited to the upper portion of the proposed monopole structure (at either 150 feet AGL or 180 feet AGL). VHB estimates that seasonal views of the proposed Site 1 location would be achieved from approximately eight additional residential properties within the Study Area while Site 2 could be seasonally visible from select portions of four residential properties.

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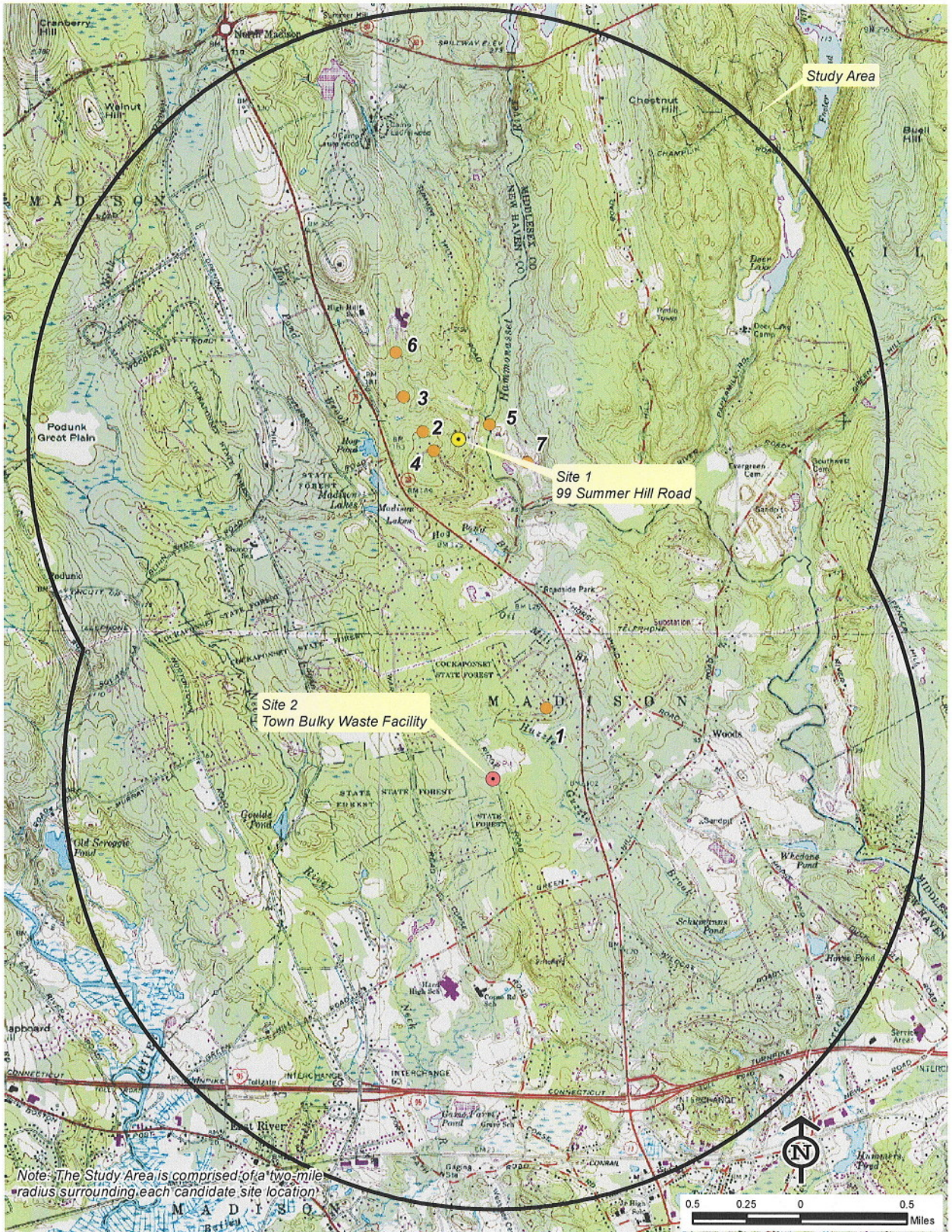
## Attachment A

# Project Area Photographs, Aerial Photo Maps, Photolog Documentation Map and Balloon Float Photographs/ Photographic Simulations



# Photolog Documentation

Town of  
Madison  
Connecticut



crmidat/proj/40708/tech/Madison\_Crown Graphics/visuals/support/Photosim\_Madison

# Photographic Documentation

## Site 1

Town of  
Madison  
Connecticut



Crown Castle Installation  
99 Summer Hill Road  
Madison, CT

PROPOSED PROJECT AREA - SITE 1

# Aerial Photograph Site 1 & Surrounding area

Town of  
Madison  
Connecticut



Note: Basemap is comprised of a 2006 aerial photograph with a 1-foot pixel resolution.

c:\mcd\proj\40706\tech\Madison\_Crown\Graphics\visuals\support\Photosm\_Madison

# Photographic Documentation

## Site 2

Town of  
**Madison**  
Connecticut



APPROXIMATE  
SITE LOCATION

Crown Castle Installation  
Madison Bulky Waste  
Facility  
252 Ridge Road  
Madison, CT

**PROPOSED SITE AREA - SITE 2**

# Aerial Photograph Site 2 & Surrounding area

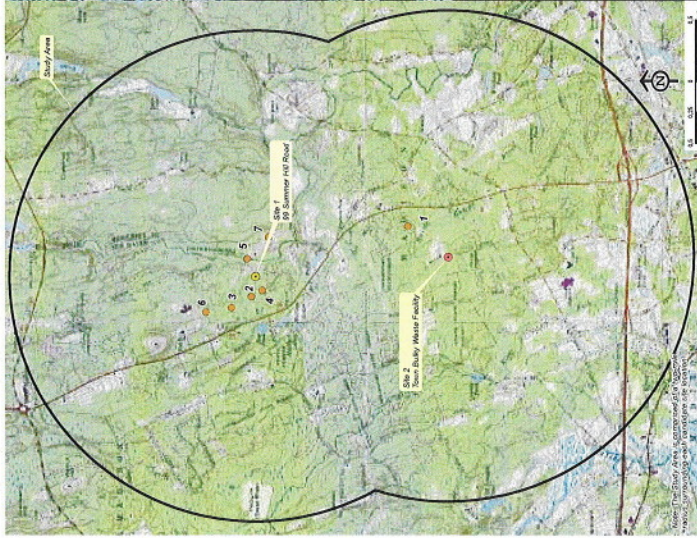
Town of  
Madison  
Connecticut



crmidatiprj\40706\tech\Madison\_Crown\Graphics\visuals\support\Photos\m\_Madison

Town of  
Madison  
Connecticut

# Photographic Documentation and Simulation View 1 Site 2 at 180°



Crown Castle Installation  
Madison Bulky Waste  
Facility  
252 Ridge Road  
Madison, CT

4 Carrier Monopole

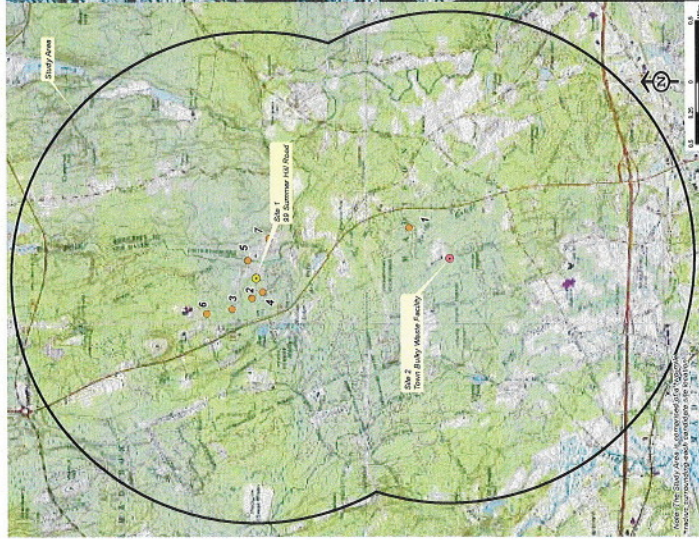


PHOTO TAKEN FROM GREEN SPRINGS DRIVE WEST OF FOX RUN ROAD, LOOKING SOUTHWEST -  
SITE 2 BALLOON AT 180° IS VISIBLE THROUGH TREES; SITE 1 BALLOON IS NOT VISIBLE FROM THIS LOCATION  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE 2 IS 0.41 MILE +/-  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE 1 IS 1.30 MILES +/-



Town of  
Madison  
Connecticut

# Photographic Documentation and Simulation View 1 Site 2 at 150'



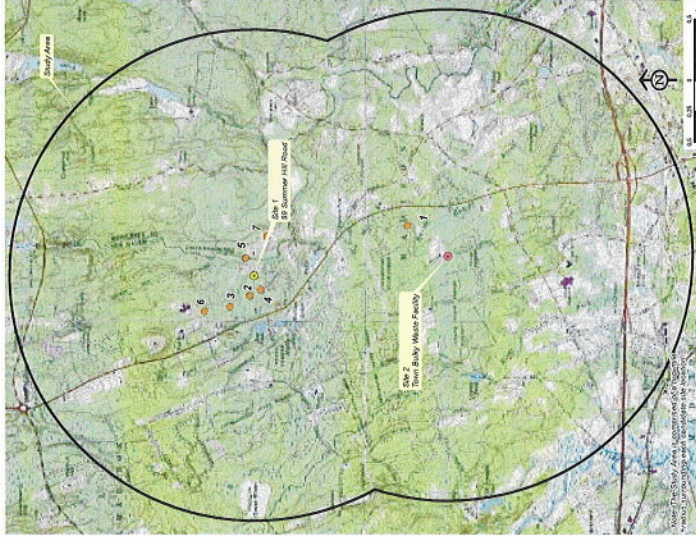
Crown Castle Installation  
Madison Bulky Waste  
Facility  
252 Ridge Road  
Madison, CT

4 Carrier Monopole

PHOTO TAKEN FROM GREEN SPRINGS DRIVE WEST OF FOX RUN ROAD, LOOKING SOUTHWEST -  
SITE 2 BALLOON AT 150' IS VISIBLE THROUGH TREES; SITE 1 BALLOON IS NOT VISIBLE FROM THIS LOCATION  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE 2 IS 0.41 MILE +/-  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE 1 IS 1.30 MILES +/-



# Photographic Documentation and Simulation View 2 Site 1



Crown Castle Installation  
99 Summer Hill Road  
Madison, CT

4 Carrier Monopole

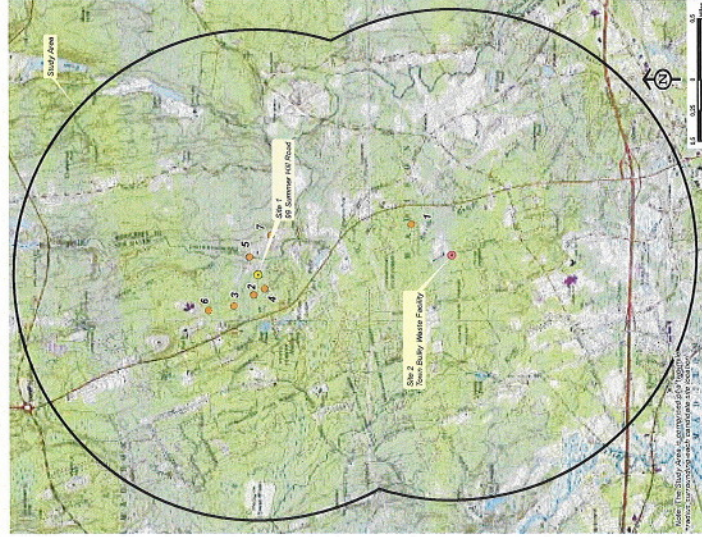


PHOTO TAKEN FROM HIGH HILL CIRCLE ADJACENT TO HOUSE #77, LOOKING SOUTHEAST -  
SITE 1 BALLOON IS VISIBLE; SITE 2 BALLOONS ARE NOT VISIBLE FROM THIS LOCATION  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE 1 IS 0.15 MILE +/-  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE 2 IS 1.62 MILES +/-



Town of  
Madison  
Connecticut

# Photographic Documentation and Simulation View 3 Site 1



Crown Castle Installation  
99 Summer Hill Road  
Madison, CT

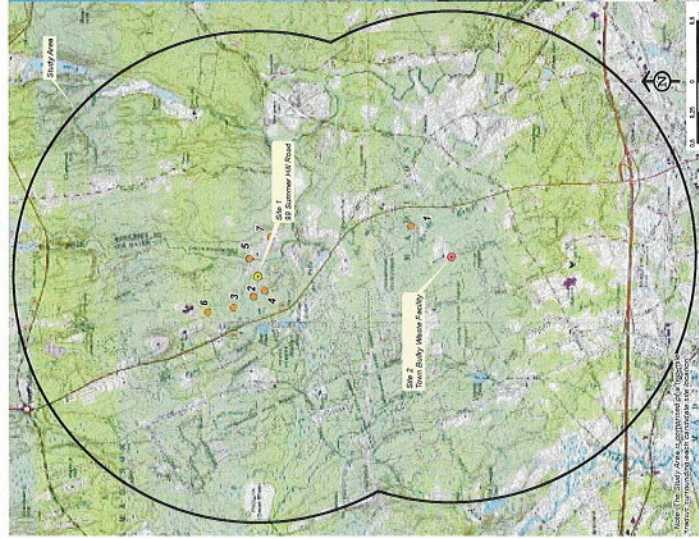
4 Carrier Monopole



PHOTO TAKEN FROM HIGH HILL CIRCLE EAST OF CRESTVIEW DRIVE, LOOKING SOUTHEAST -  
SITE 1 BALLOON IS VISIBLE; SITE 2 BALLOONS ARE NOT VISIBLE FROM THIS LOCATION  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE 1 IS 0.30 MILE +/-  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE 2 IS 1.80 MILES +/-



# Photographic Documentation and Simulation View 4 Site 1



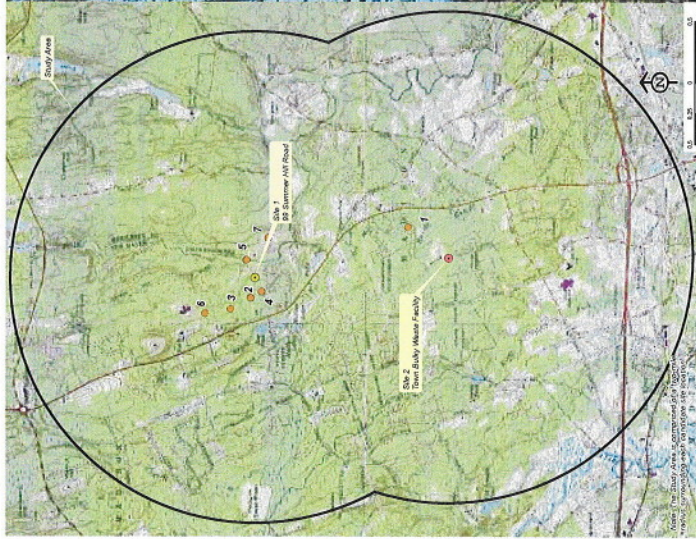
Crown Castle Installation  
99 Summer Hill Road  
Madison, CT

4 Carrier Monopole



PHOTO TAKEN FROM GRANBY DRIVE ADJACENT TO HOUSE # 46, LOOKING NORTHEAST -  
SITE 1 BALLOON IS VISIBLE; SITE 2 BALLOONS ARE NOT VISIBLE FROM THIS LOCATION  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE 1 IS 0.11 MILE +/-  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE 2 IS 1.54 MILES +/-

# Photographic Documentation and Simulation View 5 Site 1

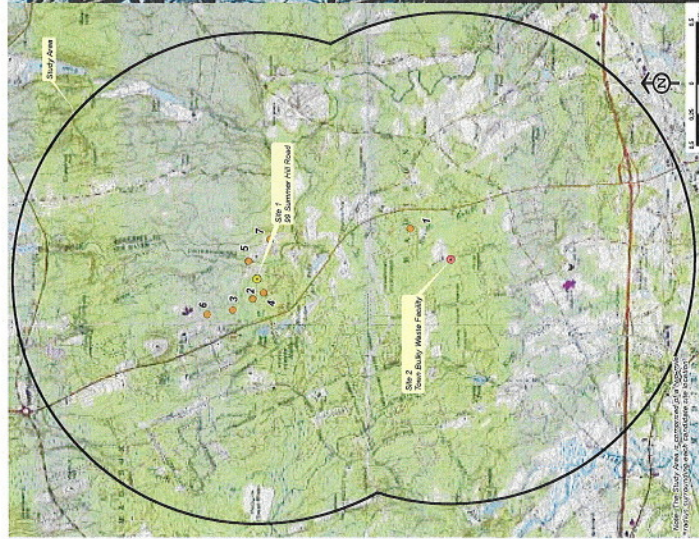


Crown Castle Installation  
99 Summer Hill Road  
Madison, CT

4 Carrier Monopole



PHOTO TAKEN FROM MADISON LAND CONSERVATION TRUST HIKING TRAIL (ALONG HAMMONASSET RIVER), LOOKING SOUTHWEST - SITE 1 BALLOON IS VISIBLE THROUGH TREES; SITE 2 BALLOONS ARE NOT VISIBLE FROM THIS LOCATION  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE 1 IS 0.15 MILE +/-  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE 2 IS 1.63 MILES +/-

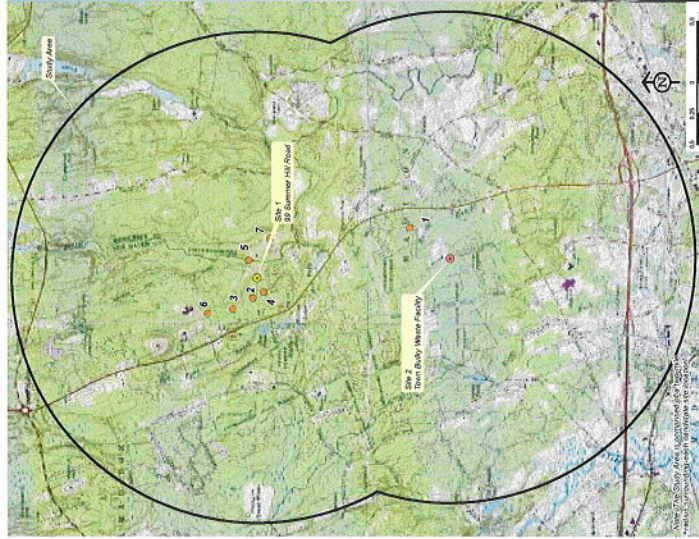


Crown Castle Installation  
99 Summer Hill Road  
Madison, CT

4 Carrier Monopole



PHOTO TAKEN FROM CRESTVIEW DRIVE ADJACENT TO HOUSE # 20, LOOKING SOUTHEAST -  
SITE 1 BALLOON IS VISIBLE THROUGH TREES; SITE 2 BALLOONS ARE NOT VISIBLE FROM THIS LOCATION  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE 1 IS 0.49 MILE +/-  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE 2 IS 2.00 MILES +/-



Crown Castle Installation  
99 Summer Hill Road  
Madison, CT

4 Carrier Monopole



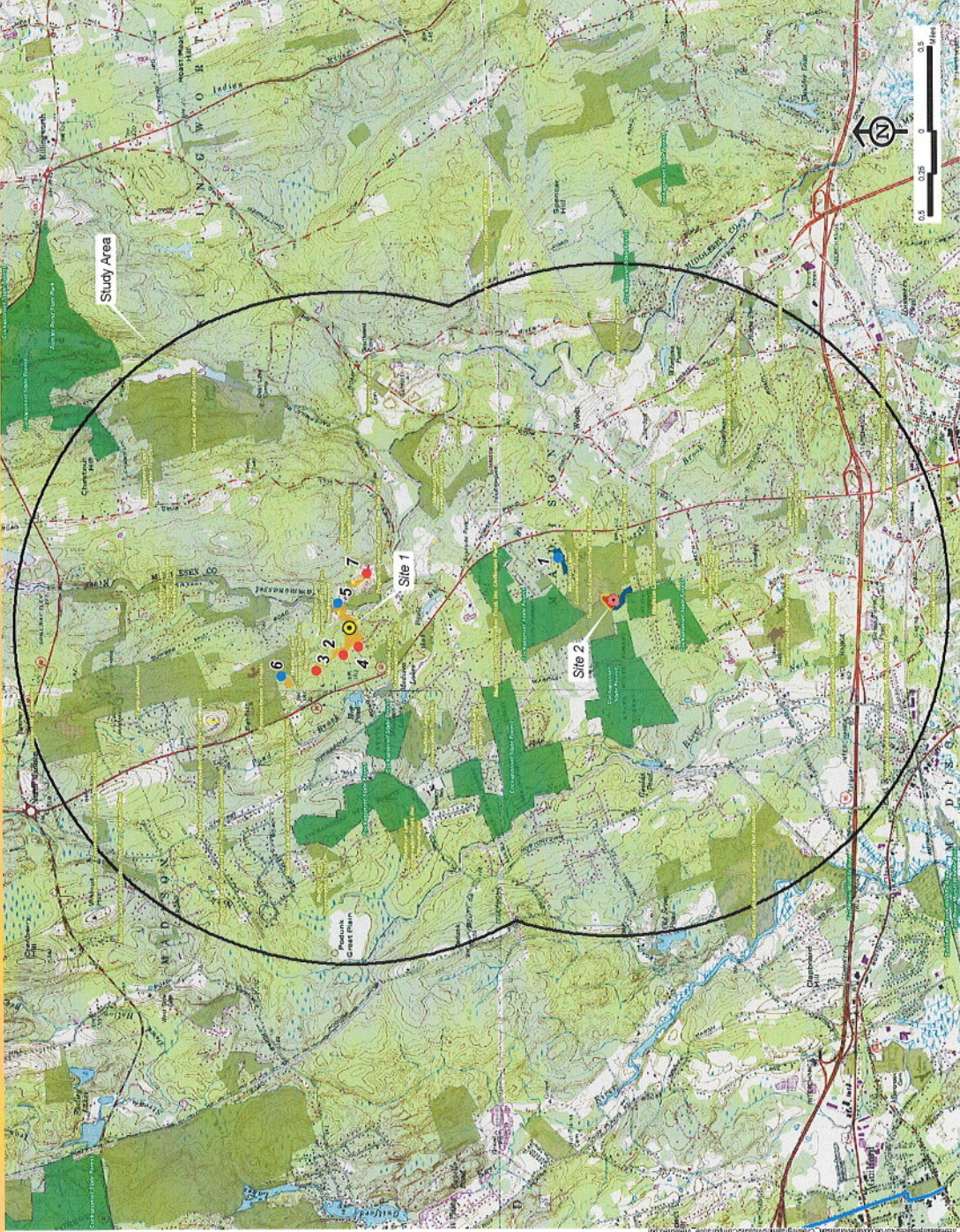
Balloon Float Photo

PHOTO TAKEN FROM BAR GATE TRAIL ADJACENT TO HOUSE # 21, LOOKING NORTHWEST -  
SITE 1 BALLOON IS VISIBLE; SITE 2 BALLOONS ARE NOT VISIBLE FROM THIS LOCATION  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE 1 IS 0.37 MILE +/-  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE 2 IS 1.48 MILES +/-

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# Attachment B

## Viewshed Map



Proposed Telecommunications Facility

Site 1

99 Summer Hill Road

Site 2

Town of Madison Bulky Waste Facility  
252 Ridge Road

NOTE:

- Viewshed analysis conducted using ESRI's Spatial Analyst.
- Proposed Facility heights are 150 feet at Site 1; Heights of 150 feet and 180 feet are being evaluated at Site 2.
- Existing tree canopy height estimated at 50 feet.
- Study Area includes a two-mile radius surrounding each site location.

DATA SOURCES:

- Digital elevation model (DEM) derived from USGS National Elevation Dataset (NED) with a resolution of one arc-second (approximately 30 meters) produced by the USGS, 1925 - 1999
- Forest areas derived from 2006 digital color orthophotos with 1-foot pixel resolution; digitized by VHB, 2007
- Base map comprised of Clinton (1984) and Guilford (1984) USGS Quadrangle Maps
- Protected properties data layer provided CTDEP; May, 2007

Map Compiled January, 2008

Legend

|  |  |
|--|--|
| <ul style="list-style-type: none"> <li>Two Candidate Locations (includes select areas of visibility approximately 500 feet around facility)</li> <li>Photographs - December 28, 2007</li> <li>Ballon visible above trees</li> <li>Ballon visible through trees</li> <li>Seasonal Visibility - Site 1 (Approximately 18 Acres)</li> <li>Seasonal Visibility - Site 2 (Approximately 7 Acres)</li> <li>Year-Round Visibility - Site 1 (Approximately 2 Acres)</li> <li>Year-Round Visibility - Site 2 At 150' AGL (Approximately 4 Acres)</li> <li>Year-Round Visibility - Site 2 At 180' AGL (Approximately 4 Acres)</li> </ul> | <ul style="list-style-type: none"> <li>Protected Properties (CTDEP)</li> <li>State Forest</li> <li>DEP Owned Waterbody</li> <li>State Park/Scenic Reserve</li> <li>Historic Preserve</li> <li>Natural Area Preserve</li> <li>Fish Hatchery</li> <li>Flood Control</li> <li>Other</li> <li>State Park Trail</li> <li>Water Access</li> <li>Wildlife Area</li> <li>Wildlife Sanctuary</li> </ul> |
| <ul style="list-style-type: none"> <li>Protected Properties (Municipal)</li> <li>Cemetery</li> <li>Preservation</li> <li>Conservation</li> <li>Existing Preserved Open Space</li> <li>Recreation</li> <li>General Recreation</li> <li>School</li> <li>Uncategorized</li> </ul>   | <ul style="list-style-type: none"> <li>DEP Boat Launches</li> <li>Town Line</li> <li>Protected Properties (Federal)</li> </ul>   |