

# *Proposed Wireless Telecommunications Facility*

CTNL801A  
61-1 Buttonball Road  
Old Lyme, Connecticut

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Prepared for 

Prepared by **VHB/Vanasse Hangen Brustlin, Inc.**  
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## Visual Resource Evaluation

Omni Point Communications, Inc., dba T-Mobile, seeks approval from the Connecticut Siting Council for a Certificate of Environmental Compatibility and Public Need for the construction of a wireless telecommunications facility ("Facility") to be located on property at 61-1 Buttonball Road, in the Town of Old Lyme, Connecticut (identified herein as the "host property"). This Visual Resource Evaluation was conducted to assess the visibility of the proposed Facility within a two-mile radius ("Study Area"). Attachment A contains a photograph of the proposed project area. Attachment A also contains a map that depicts the location of the proposed Facility and the limits of the Study Area.

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## Project Introduction

The proposed Facility includes the installation of a 100-foot tall monopole with associated ground equipment to be located at its base. Both the proposed monopole and ground equipment would be situated within a 50-foot by 50-foot fence-enclosed compound. The proposed Facility is located at approximately 40 feet Above Mean Sea Level ("AMSL"). Access to the Facility would be provided via an existing paved driveway currently located on the host property.

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## Site Description and Setting

Identified in the Town of Old Lyme land records as Map 8/Block 11/ Lot 1, the host property consists of approximately 2.53 acres of land and is currently occupied by a single-story commercial building. The proposed Facility would be located in an open, undeveloped area behind the existing commercial building. Land use in the immediate vicinity of the host property consists of the Black Hall Golf Course to the south and east; an existing Amtrak railroad corridor and associated overhead electrical infrastructure to the north; and medium-density residential development to the west. Segments of Interstate 95 and Route 156 (Shore Road) are contained within the Study Area. In total, the Study Area features approximately 78 linear miles of roadways and rail line.

The topography within the Study Area is characterized by gently rolling hills with ground elevations that range from approximately sea level to approximately 185 feet AMSL. The Study Area contains approximately 1,767 acres of surface water, dominated in large measure by portions of Long Island Sound. The tree cover within the Study Area consists mainly of mixed deciduous hardwood species. The tree canopy occupies approximately 5,041 acres of the 8,042-acre study area (63%). During the in-field activities associated with this analysis, an infrared laser range finder was used to determine the average tree canopy height throughout the Study Area. Numerous trees were selected for measurement and the average tree canopy was determined to be 60 feet.

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## METHODOLOGY

In order to better represent the visibility associated with the Facility, 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 where 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 Connecticut LiDAR-based digital elevation data. The LiDAR data was produced by the University of Connecticut Center for Land Use Education and Research (CLEAR) in 2007 and has a horizontal resolution of 10 feet. In order to create the forest layer, digital aerial photographs of the Study Area are incorporated into the computer model. The mature trees and woodland areas depicted on the aerial photos are manually traced in ArcView® GIS and then converted into a geographic data layer. The aerial photographs were produced in 2006 and have a pixel resolution of one foot.

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. The average height of the tree canopy was determined in the field using a laser range finder. The average tree canopy height is incorporated into the final viewshed map; in this case, 60 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 60 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 State of Connecticut Department of Environmental Protection (“CTDEP”), which depicts various land and water resources such as parks and forests, recreational facilities, dedicated open space, CTDEP boat launches and other categories. Lastly, based on both a review of published information and discussions with municipal officials in Old Lyme, it was determined that there are no designated scenic roadways located within the Study Area.

A preliminary viewshed map (using topography only) is used during the in-field activity to assist in determining if significant land use changes have occurred since the aerial photographs used in this analysis were produced and to compare the results of the computer model with observations of the balloon float. Information obtained during the reconnaissance was then incorporated into the final visibility map.

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## Balloon Float and Study Area Reconnaissance

On May 5, 2009 Vanasse Hangen Brustlin Inc., (VHB) conducted a balloon float at the proposed Facility location to further evaluate the potential viewshed within the Study Area. The balloon float consisted of raising and maintaining an approximate four-foot diameter, helium-filled weather balloon at the proposed site location at a height of 100 feet. Once the balloon was 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 document where the balloon was, and was not, visible above and/or through the tree canopy. During the balloon float, the temperature was approximately 60 degrees Fahrenheit with calm wind conditions and sunny skies.

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## Photographic Documentation

During the balloon float, VHB personnel drove the public road system within the Study Area to inventory those areas where the balloon was visible. The balloon was photographed from a number of different vantage points to document the actual view towards the proposed Facility. Several photographs where the balloon was not visible are also included. The locations of the photos are described below:

1. View from Buttonball Road adjacent to house #54.
2. View from Smith Neck Road adjacent to house #47.
3. View from Buttonball Road (at entrance to Black Hall Club).
4. View from Buttonball Road at entrance to host property.
5. View from Shore Road (Route 156) south of Homestead Circle.
6. View from Homestead Circle adjacent to house #20.
7. View from Shore Road (Route 156).
8. View from Mile Creek Road over Black Hall River.

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 50 mm. "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."<sup>1</sup>

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

Photographic simulations were generated for the four representative locations where the balloon was visible during the in-field activities. The photographic simulations represent a scaled depiction of the proposed Facility (a 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 100-foot tall monopole may be visible above the tree line comprise approximately 289 acres, or roughly 3.6 percent of the total area contained within the 8,042-acre Study Area. As depicted on the attached viewshed map, the majority of the potential visibility occurs over the southern portion of the Great Island tidal marsh, located 1.25 to nearly two miles southwest of the proposed Facility and/or over open water on Long Island Sound located to the south. Any views achieved from these areas would be similar to that depicted in View #2. Year-round visibility from these areas accounts for approximately 263 acres of the 289-acre total (91%). Other areas of potential year-round visibility include select portions of Buttonball Road located within the general vicinity of the proposed monopole; select portions of Smith Neck Road located roughly 1.25 miles to the southwest; and several open areas within the northern portion of the Black Hall golf course which is located immediately adjacent to the proposed site location. In total, VHB estimates that at least partial year-round views of the proposed facility may be achieved from approximately seven residential properties within the Study Area. This includes four residences along Buttonball Road located to the south of the proposed Facility and three residences along Smith Neck Road located to the southwest (roughly 1.25-miles from the proposed Facility).

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

The viewshed map also depicts several additional areas where seasonal (i.e. during “leaf off” conditions) views are anticipated. These areas comprise approximately 39 additional acres and are generally limited to the host property and the Black Hall golf course located immediately to the south of the proposed Facility. VHB estimates that seasonal views of the proposed monopole may be achieved from portions of approximately two additional residential properties located along Buttonball Road.

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# Attachment A

## Project Area Photograph, Photolog Documentation Map, Balloon Float Photographs, and Photographic Simulations

# PHOTOGRAPHIC DOCUMENTATION

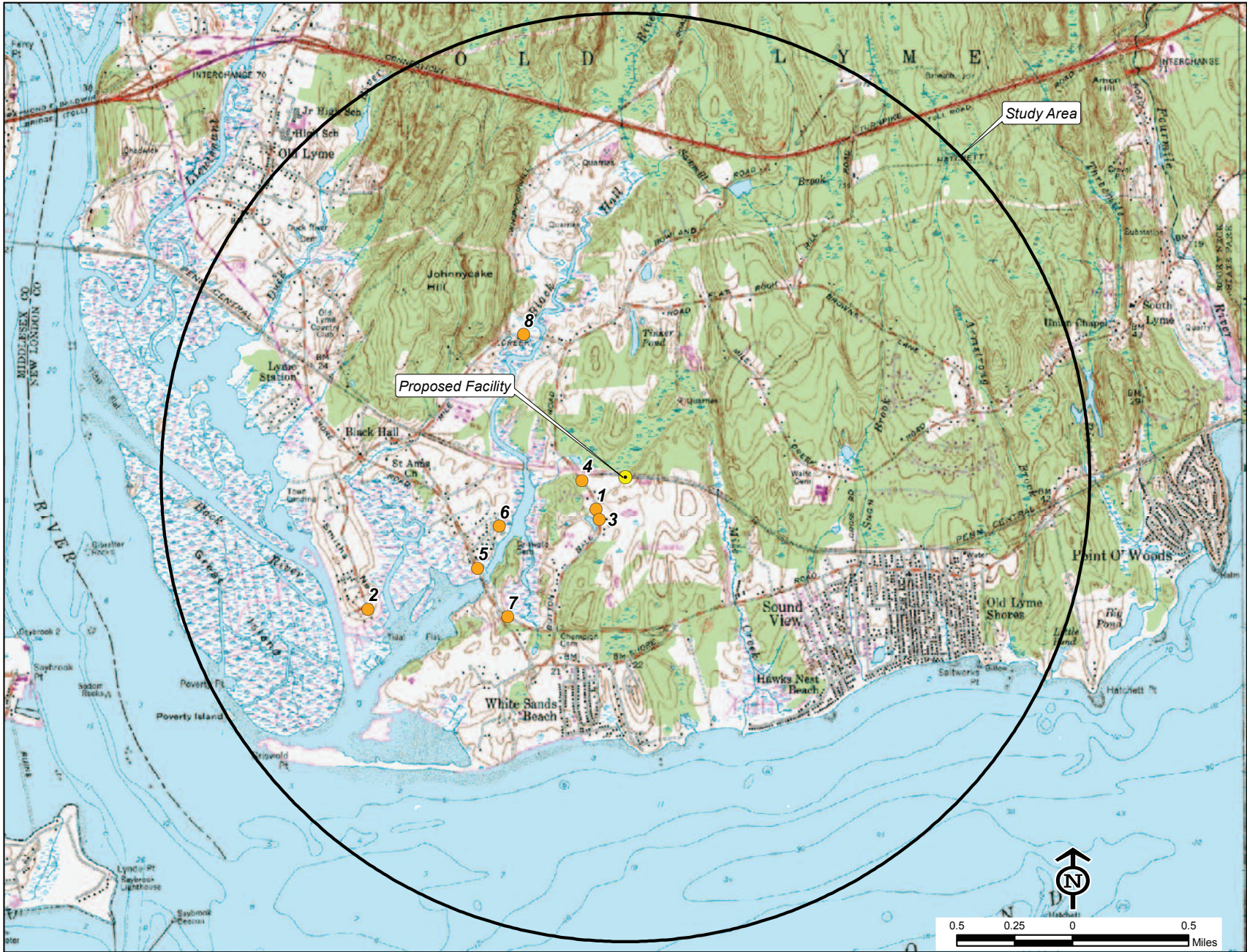


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**PROPOSED PROJECT AREA**



# PHOTOLOG MAP



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VIEW 1



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PHOTO TAKEN FROM BUTTONBALL ROAD ADJACENT TO HOUSE #54, LOOKING NORTHEAST  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.18 MILE +/-

VIEW 1



ct:\mddat\40505.06\graphics\FIGURES\40505.06\_Photosim.indd

PHOTO TAKEN FROM BUTTONBALL ROAD ADJACENT TO HOUSE #54, LOOKING NORTHEAST  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.18 MILE +/-

VIEW 2



PHOTO TAKEN FROM SMITH NECK ROAD ADJACENT TO HOUSE #47, LOOKING NORTHEAST  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 1.25 MILES +/-

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VIEW 2



ct:\mddat\40505.06\graphics\FIGURES\40505.06\_Photosim.indd

PHOTO TAKEN FROM SMITH NECK ROAD ADJACENT TO HOUSE #47, LOOKING NORTHEAST  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 1.25 MILES +/-

VIEW 3



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PHOTO TAKEN FROM BUTTONBALL ROAD (AT ENTRANCE TO BLACK HALL GOLF COURSE), LOOKING NORTHEAST  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.22 MILE +/-

**VIEW 3**



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**PHOTO TAKEN FROM BUTTONBALL ROAD (AT ENTRANCE TO BLACK HALL GOLF COURSE), LOOKING NORTHEAST  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.22 MILE +/-**

VIEW 4



PHOTO TAKEN FROM BUTTONBALL ROAD AT ENTRANCE TO HOST PROPERTY, LOOKING EAST  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.18 MILE +/-

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VIEW 4



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PHOTO TAKEN FROM BUTTONBALL ROAD AT ENTRANCE TO HOST PROPERTY, LOOKING EAST  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.18 MILE +/-

VIEW 5



PHOTO TAKEN FROM SHORE ROAD (ROUTE 156) SOUTH OF HOMESTEAD CIRCLE, LOOKING NORTHEAST  
BALLOON IS NOT VISIBLE

DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.75 MILE +/-

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VIEW 6



ct:\mddat\40505.06\graphics\FIGURES\40505.06\_Photosim.indd

**PHOTO TAKEN FROM HOMESTEAD CIRCLE ADJACENT TO HOUSE #20, LOOKING NORTHEAST  
BALLOON IS NOT VISIBLE**

DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.59 MILE +/-

VIEW 7



PHOTO TAKEN FROM SHORE ROAD (ROUTE 156), LOOKING NORTHEAST

BALLOON IS NOT VISIBLE

DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.79 MILE +/-

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VIEW 8



ct:\mddat\40505.06\graphics\FIGURES\40505.06\_Photosim.indd

**PHOTO TAKEN FROM MILE CREEK ROAD OVER BLACK HALL RIVER, LOOKING SOUTHEAST**

**BALLOON IS NOT VISIBLE**

DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.76 MILE +/-

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# Attachment B

## Viewshed Map