

*Proposed Wireless
Telecommunications Facility*

CT33XC019

Haddam Neck Road
Cove Road
Haddam, Connecticut

Prepared for



Prepared by

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

September 2006

Visual Resource Evaluation

Sprint PCS seeks approval from the Connecticut Siting Council for a Certificate of Environmental Compatibility and Public Need to construct a telecommunications Facility on property off Cove Road in the Town of Haddam, Connecticut ("host property"). This "Visual Resource Evaluation" was conducted to approximate the visibility of the proposed Facility within a two-mile radius of the Site ("Study Area").

Project Introduction

The proposed Facility includes the construction of a 180-foot tall, self-supporting lattice tower and associated ground equipment to be located within a fenced enclosure at the base of the tower structure. Based on information provided by the project engineer, URS Corporation, the proposed project area is located at approximately 317 feet above mean Sea level (AMSL). Access to the site area would be provided via a proposed gravel driveway which would extend in a southerly direction from Cove Road.

Site Description and Setting

Identified in the Town of Haddam land records as Map 27/Lot 12A, the host property currently consists of heavily wooded, undeveloped land (see Photolog Documentation map contained in Attachment A). The proposed Facility would be located approximately 620 feet west of Cove Road. Land use within the general vicinity of the proposed Facility is comprised of large tracts of wooded, undeveloped land, an electrical substation located approximately 750 feet to the southeast and overhead electrical transmission infrastructure located to the northeast and southeast. Portions of Route 149, Route 151 and Route 154 are contained within the Study Area. In total, the Study Area contains roughly 64 linear miles of vehicular roadways.

The topography in the Study Area is generally characterized by the Connecticut River and its associated River Valley as ground elevation range from approximately 8 feet AMSL along the banks of the river to over 400 feet AMSL to the north and south. The tree cover within the Study Area consists mainly of mixed deciduous hardwood species. The tree canopy occupies approximately 5,792 acres of the 8,042-acre study area (72%). 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 65 feet. The Study Area features approximately 1,063 acres of surface water (representing over 13%), dominated in large measure by the Connecticut River, the Salmon River and Salmon Cove.

METHODOLOGY

To estimate the visibility associated with a proposed Facility, VHB incorporates a two-fold approach utilizing 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 photographic 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.

Visibility Analysis

Using ESRI's ArcView® Spatial Analyst, a computer modeling tool, the areas from where the proposed 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, existing vegetation and any significant structures/objects that may act to obstruct potential views. Data incorporated in the model includes 7.5 minute digital elevation models (DEMs) and a digital forest layer for the Study Area. The DEMs were produced by the United States Geological Survey (USGS) in 1982 at a 30 meter resolution. The forest layer was derived through on-screen digitizing in ArcView® GIS from 2004 digital orthophotos with a 0.5 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 provides a reference for comparison once the tree canopy is established and also assists in the evaluation of potential seasonal visibility of the proposed Facility. A conservative 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, 65 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 65 feet added and the visibility calculated. The forested areas are then 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. Lastly, this analysis was conducted in 36-foot increments from 180 feet down to 36 feet and the results consolidated into a single thematic layer in order to determine the approximate amount of the tower structure that would be visible from any given location.

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 available data published by the Connecticut Department of Transportation and discussions with town staff in Haddam, it was determined that the portion of Route 154 that traverses the Study Area is a state-designated scenic roadway.

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 2004 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.

Balloon Float and Study Area Reconnaissance

On September 6, 2006 Vanasse Hangen Brustlin Inc., (VHB) conducted a balloon float at the proposed site location to 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 180 feet. Once the balloon was aloft, VHB personnel drove the public road system in the study area to inventory those areas where the balloon was visible. During the balloon float, weather conditions were sunny. The temperature was approximately 80 degrees with calm winds.

Photographic Documentation

During the balloon float, 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 and refine the results of the preliminary viewshed map and to verify where the balloon was, and was not, visible above and/or through the tree canopy. The balloon was photographed from a number of different vantage points to document the actual view towards the proposed Facility. The locations and orientations of the photos are described below:

1. View from Haddam Meadows State Park, looking northeast.
2. View from Route 154 south of entrance to Haddam Meadows State Park, looking northeast.

Photographs of the balloon from the view points listed above were taken with a Nikon Digital Camera COOLPIX 5700, which has a lens focal length equivalent to a 35 mm camera

with a 38 to 115 mm zoom. "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 optical zoom lens for the Nikon COOLPIX was set at a range of 50 mm to 70 mm for the purposes of this Visual Resource Evaluation.

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.

Photographic Simulation

Photographic Simulations were generated for the two locations identified above. The Photographic Simulations represent a scaled depiction of the proposed lattice tower from these locations. The height of the Facility is determined based on the location of the balloon in the photographs and a proportional self-supporting lattice image is simulated into the photographs. The simulations are contained in Attachment A.



CONCLUSIONS

Based on this analysis, areas from where the proposed 180-foot lattice tower would be visible above the tree canopy comprise approximately 573 acres. As depicted on the viewshed map (contained in Attachment B), the majority of the visibility associated with the proposed lattice structure occurs over open water on the Connecticut River. Visibility over the Connecticut River accounts approximately 526 acres or 92% of the 573-acre total. Land-based visibility generally occurs on private or otherwise inaccessible properties to the southeast and northeast and along the southern riverbanks of the Connecticut River, spanning the entire length of the Study Area. Limited areas of visibility are also anticipated from within select portions of Haddam Meadows State Park and along an approximate 500-foot stretch of Route 154, a state designated scenic roadway. Views from these areas would be minimized by adjacent vegetative screening both within Haddam Meadows State Park and along Route 154. VHB estimates that approximately 9 residences within the Study Area would have at least partial year round views of the proposed Facility. The viewshed map also depicts several additional areas where seasonal (i.e. during "leaf off" conditions) views through the trees are anticipated. These areas comprise approximately 271 additional acres and are mostly located adjacent to the southern banks of the Connecticut River and along select portions of Route 154. Limited seasonal views are also anticipated from Haddam Meadows State Park where a row of mature deciduous trees just south of the Connecticut River would provide adequate screening during "leaf-on" conditions, but may yield seasonal views

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

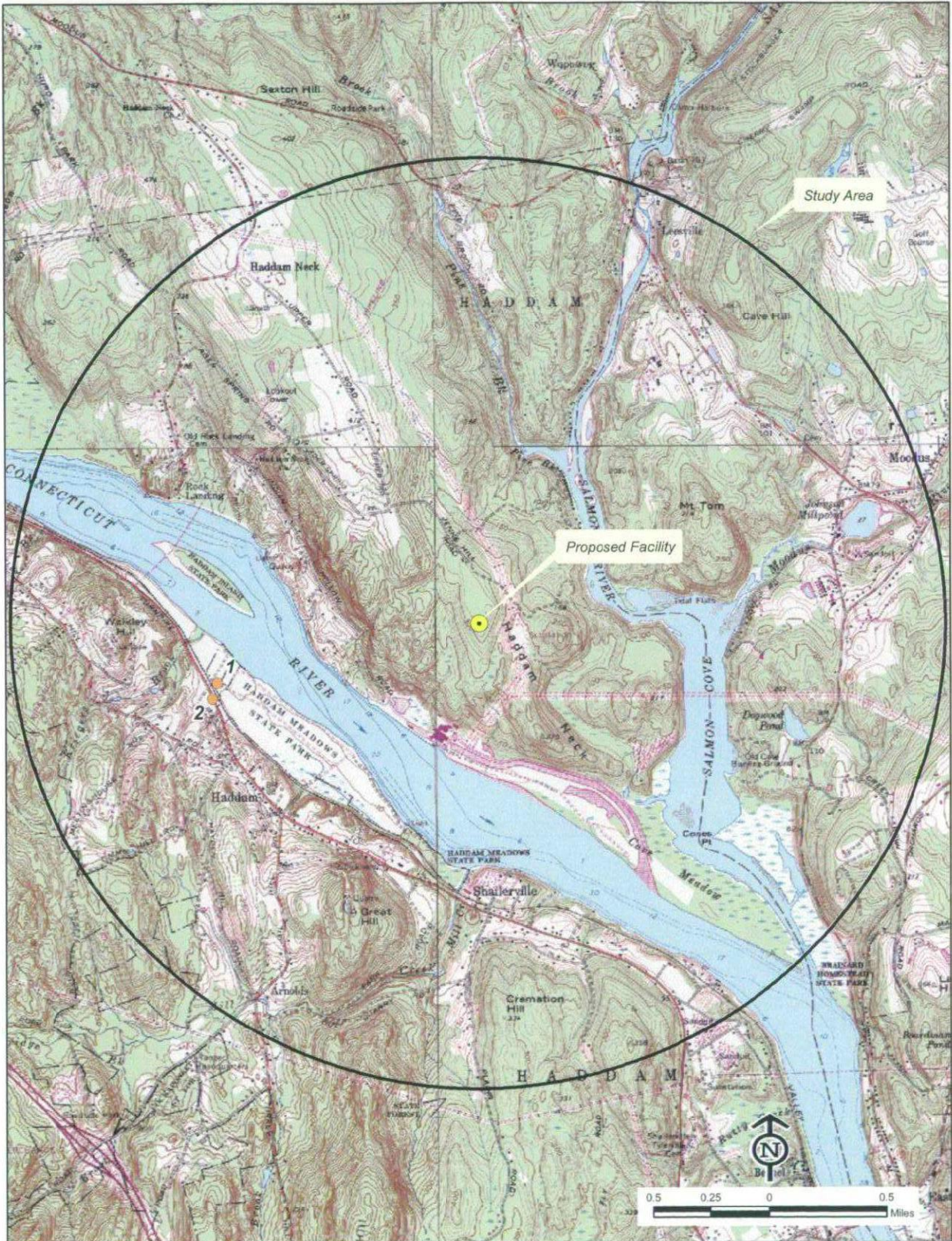
during the fall and winter months. In total, VHB estimates that approximately 12 residences within the Study Area would have limited seasonal views of the proposed Facility from their respective properties. Overall, the potential visual effects associated with the proposed Facility would be minimized by three factors: the topography of the Study Area which is characterized by the steep river valley that acts to limit most of the visibility to open water; the abundance of vegetative screening both surrounding the proposed Facility and adjacent to residential areas; and the generally sparse residential development within the Study Area which diminishes the number of potential visual receptors.

Attachment A

Photolog Documentation Map, Balloon Float Photographs and Photographic Simulations

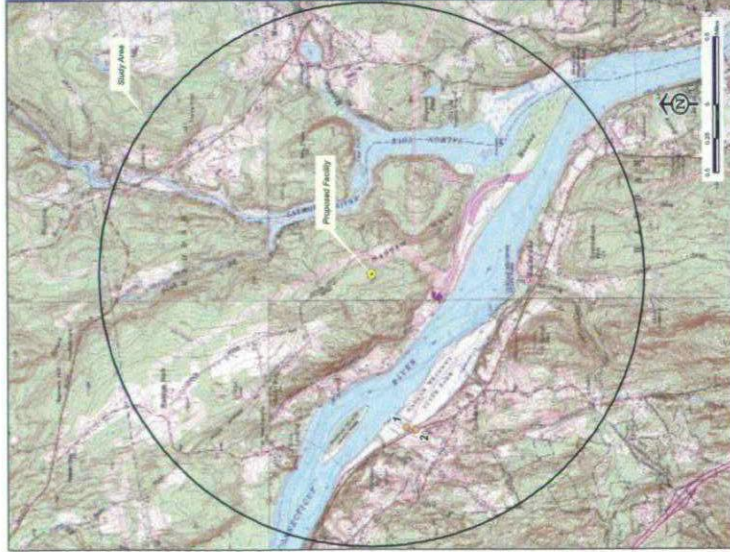
Photolog Documentation

Town of
Haddam
Connecticut



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Photographic Documentation and Simulation *View 1*



Haddam Neck Road
Cove Road
Haddam, CT
CT33XC019

Lattice tower installation

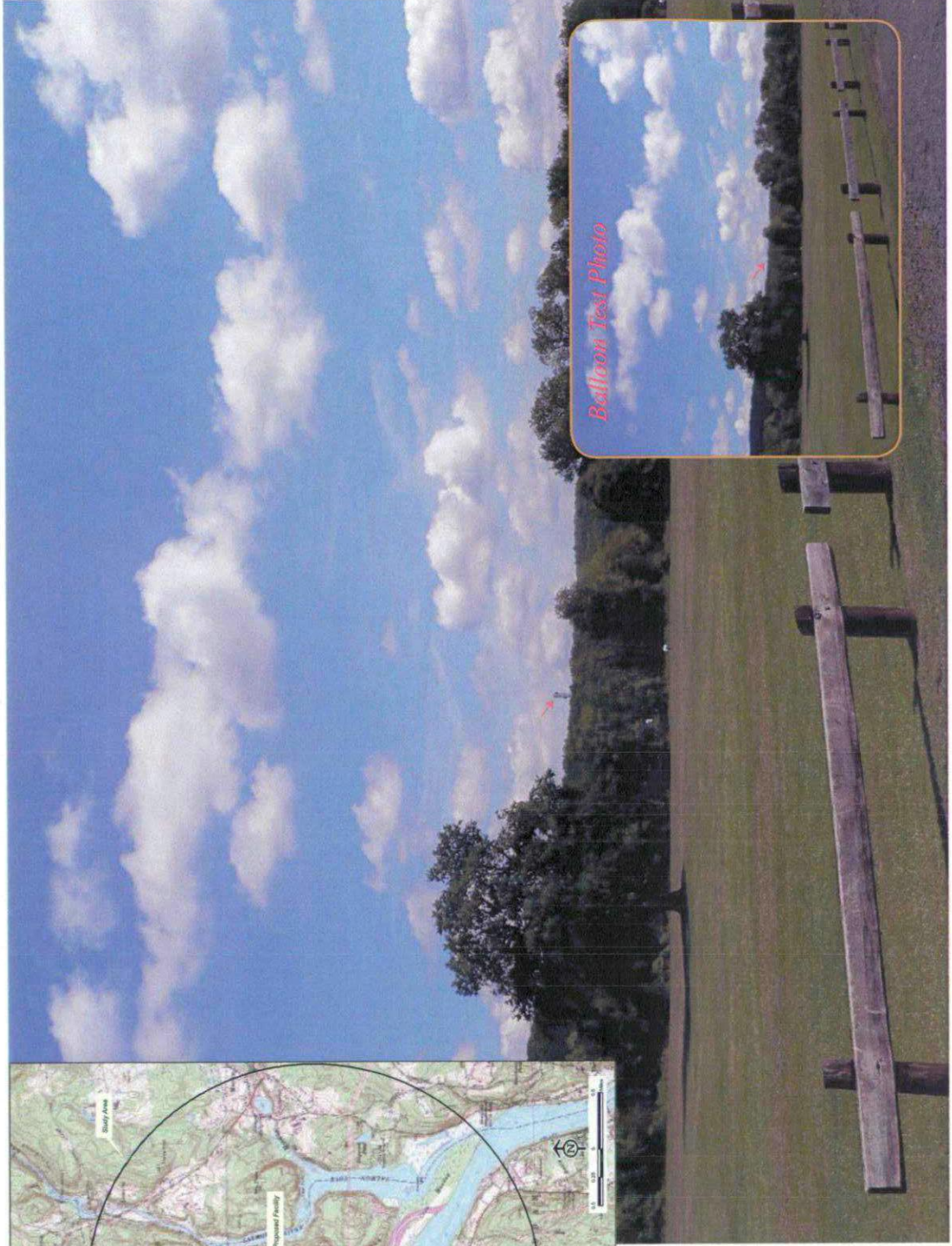
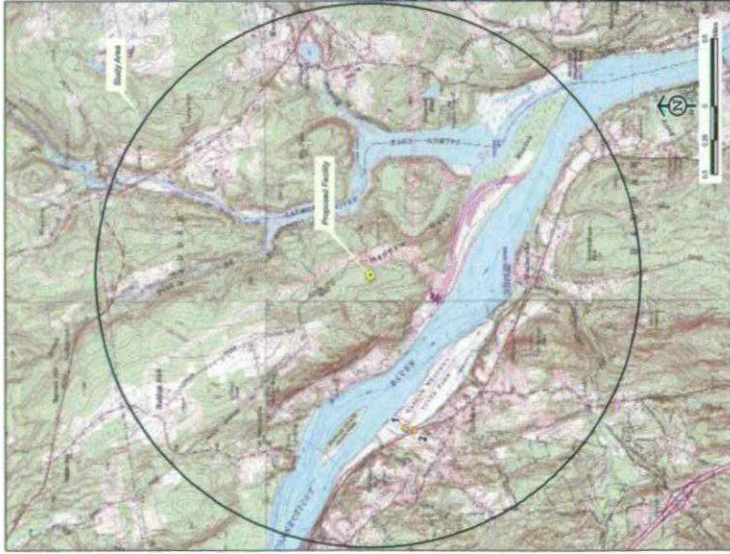


PHOTO TAKEN FROM HADDAM MEADOWS STATE PARK, LOOKING NORTHEAST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 1.15 MILES +/-

Photographic Documentation and Simulation View 2



Haddam Neck Road
Cove Road
Haddam, CT
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Lattice tower installation

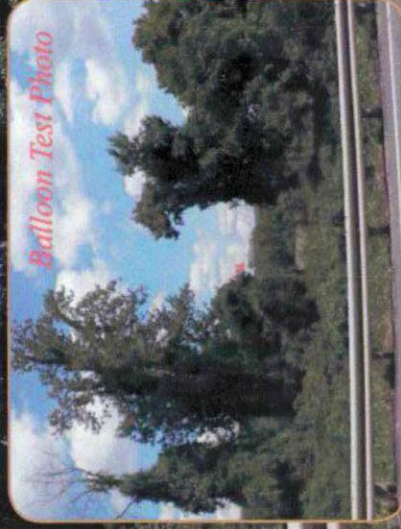


PHOTO TAKEN FROM ROUTE 154 SOUTH OF ENTRANCE TO HADAM MEADOWS STATE PARK, LOOKING NORTHEAST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 1.19 MILES +/-

Attachment B

Viewshed Map

Viewshed Map

Topography and Forest Cover as Constraints

Town of
Haddam
Connecticut

Proposed Telecommunications Facility Sprint Site ID # CT33XC019 Haddam Neck Road Cove Road Haddam, Connecticut

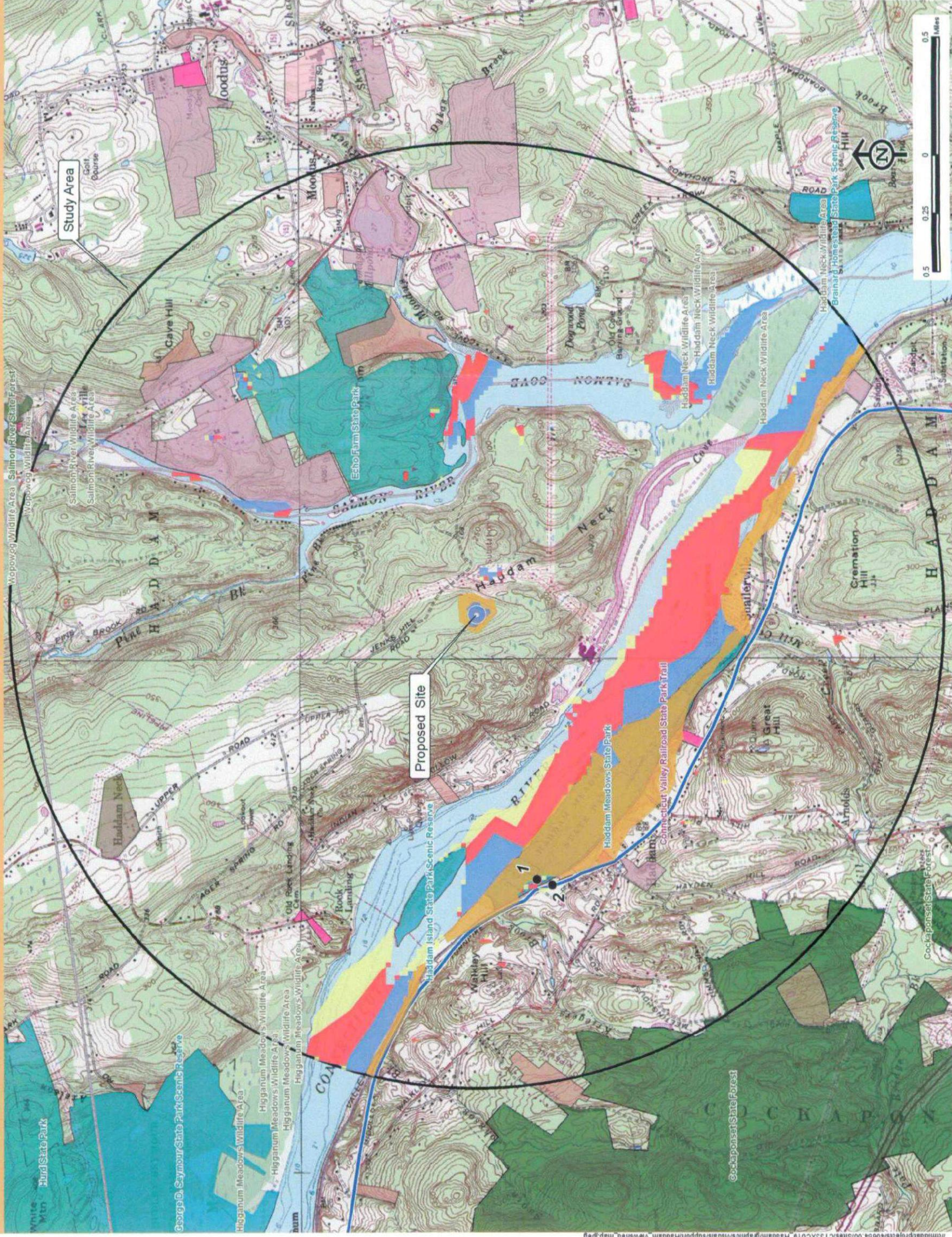
NOTE:

- Viewshed analysis conducted using ESRI's Spatial Analyst.
- Proposed Facility height is 180 feet.
- Existing tree canopy height estimated at 65 feet.

DATA SOURCES:

- 7.5 minute digital elevation model (DEM) with 30 meter resolution produced by the USGS, 1982
- Forest areas derived from 2004 digital orthophotos with 0.5-foot pixel resolution; digitized by VHB, 2006
- Base map comprised of Deep River, East Haddam, Haddam, and Moodus USGS Quadrangle Maps
- Protected properties data layer provided CTDEP, 2003
- Scenic Roads layer derived from available State and Local listings.

Map Compiled September, 2006



Legend

- Proposed Tower Location (Includes area of visibility approximately 500 feet around facility)
- Photos - September 9, 2006
- Balloon visible above the trees
- Anticipated Seasonal Visibility (Approximately 271 Acres)
- Approx. % of Tower Visible (Year-Round)
 - Tree Line View - 88 Acres
 - Upper 25% - 292 Acres
 - 50% - 187 Acres
 - 75% - 1 Acre
 - Entire Facility Visible - 5 Acres
- Total Year-Round Visibility Approximately 573 Acres
- Protected Properties (Municipal)
 - Cemetery
 - Preservation
 - Conservation
 - Existing Preserved Open Space
 - Recreation
 - General Recreation
 - School
 - Uncategorized
- Protected Properties (CTDEP)
 - State Forest
 - State Park
 - DEP Owned Waterbody
 - State Park Scenic Reserve
 - Historic Preserve
 - Natural Area Preserve
 - Fish Hatchery
 - Flood Control
 - Other
 - State Park Trail
 - Water Access
 - Wildlife Area
 - Wildlife Sanctuary
- DEP Boat Launches
- Scenic Road (State and Local)
- Town Line
- Protected Properties (Federal)