

*Proposed Wireless
Telecommunications Facility*

Cornwall
16 Bell Road Extension
Cornwall, Connecticut

Prepared for



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

April 2010

Visual Resource Evaluation

Cellco Partnership, dba Verizon Wireless ("Verizon Wireless") 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 16 Bell Road Extension in the Town of Cornwall 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"). In addition to the Town of Cornwall, the Study Area also contains land located within the neighboring municipality of Sharon, Connecticut.

Project Introduction

The proposed Facility includes the installation of a 110-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 fence-enclosed compound. According to information provided by the project engineers, Centek Engineering Inc., the proposed project area is located at approximately 999 feet Above Mean Sea Level ("AMSL"). Access to the Facility would follow an existing driveway and then a woods road currently located on the host property (to be improved to accommodate service vehicles). 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.

Site Description and Setting

Identified in the Town of Cornwall land records as Map C07/Block 1/ Lot 1, the host property consists of approximately 41 acres of mostly wooded land. A single-family residence is located in the south-central portion of the parcel. The proposed site location lies on the east slope of Mine Mountain. Land use in the immediate vicinity of the host property consists mainly of undeveloped woodlands and low-density residential development to the east along Bell Road Extension and Popple Swamp Road. The Housatonic Meadows State Forest lies immediately to the west of the host property. Segments of Route 4, Route 7, Route 125 and Route 128 are contained within the Study Area. In total, the Study Area features approximately 46 linear miles of roadways.

The topography within the Study Area is characterized by mountainous terrain typical of northwest Connecticut and the Housatonic River, which flows north to south through the west-central portion of the Study Area. Steep, extended ridgelines run parallel to the Housatonic River in this area. Ground elevations within the Study range from approximately 430 feet AMSL along portions of the river valley floor and rise to approximately 1,454 feet AMSL on top of Colts Foot Mountain located nearly two miles to the southeast of the proposed Facility. The Study Area contains approximately 84 acres of surface water which mainly includes portions of the Housatonic River and Popple Swamp. The tree cover within the Study Area consists of mixed deciduous hardwood species and

mature evergreen species. The tree canopy occupies approximately 7,229 acres of the 8,042-acre study area (90%). 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 65 feet.

METHODOLOGY

In order to better represent the visibility associated with the proposed 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.

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 would 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, 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. 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. Additionally, segments of the Appalachian National Scenic Trail traverse the western portion of the Study Area. Lastly, based on both a review of published information and discussions with municipal officials in Cornwall and Sharon it was determined that there are two state-designated scenic roadways located within the Study Area that include segments of Route 4 and Route 7.

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.

Balloon Float and Study Area Reconnaissance

Vanasse Hangen Brustlin Inc. (VHB) conducted balloon floats at the proposed site location on August 7, 2009 and December 2, 2009 to further evaluate the potential viewshed within the Study Area during both leaf-on and leaf-off conditions. The balloon floats consisted of raising and maintaining an approximate four-foot diameter, helium-filled weather balloon at the proposed site location at heights of 117 feet AGL during the August 7, 2009 field activities and 110 feet during the December 2, 2009 field activities. At the time that the August 7, 2009 balloon float was conducted, Verizon Wireless was exploring the possible installation of a monopine (designed to resemble an evergreen) at the proposed site location which would have included an additional seven (7) feet beyond its antennas (for a total height of 117 feet AGL) to accommodate the top taper of the stealth pine tree. 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, scenic roads 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. In addition to the drive-by reconnaissance, VHB staff hiked portions of the Appalachian Trail and Pine Knob Loop Trail within the Study Area that are known to have views in the general direction of the proposed Facility. During the August 7, 2009 balloon float, the temperature was approximately 80 degrees Fahrenheit with calm wind conditions and sunny skies. Weather conditions for the December 2, 2009 consisted of partly sunny skies, calm winds and a temperature of approximately 55 degrees Fahrenheit.

Photographic Documentation

During the balloon floats, VHB personnel drove the public road system within the Study Area and hiked portions of several nearby trails, 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. One photographic location located beyond the limits of the Study Area where the balloon was observed during the in-field activities is also included (View 2). The locations of the photos are described below:

1. View from Valley Road.
2. View from East Street north of Upper Ridge Road.
3. View from Valley Road at Essex Road.
4. View from Jewell Street at School Street.
5. View from Jewell Street adjacent to house #42.
6. View from School Street north of Jewell Street.
7. View from Popple Swamp Road.
8. View from Route 7 across from Housatonic Meadows State Park Campground.
9. View from Route 7.
10. View from Route 7 at covered bridge.
11. View from Pine Street adjacent to house #31.
12. View from Pine Street at Cornwall Town Hall.
13. View from Bolton Hill Road adjacent to house #14A.
14. View from Pierce Road north of Route 4.
15. View from Route 4.
16. View from Appalachian Trail at Pine Knob lookout.

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."¹

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.

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

Photographic Simulation

Photographic simulations were generated for the six 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.

CONCLUSIONS

Based on this analysis, areas from where the proposed 110-foot tall Facility would be visible above the tree canopy comprise approximately 14 acres, or less than one half of one percent of the 8,042-acre Study Area. As depicted on the viewshed map (provided in Attachment B), once beyond the immediate Facility site location, areas of potential year-round visibility are generally located over open land between 1.50-miles and 2.00-miles to the east/southeast of the proposed Facility. The viewshed map also depicts small areas of visibility over the southern-most portions of Popple Swamp approximately 0.5 mile south of the proposed Facility and over portions of other open fields on private properties nearly two miles to the southwest in Sharon. VHB estimates that select portions of four residential properties within the Study Area may have at least partial year-round views of the proposed monopole. This includes three properties located along Jewell Street and one located off School Street, all beyond 1.5 miles away from the Site. Overall, the steep topography and extensive vegetative screening contained within the Study Area, which includes significant stands of mature evergreens, would serve to limit the extent of year-round visibility associated with the proposed Facility to distant and intermittent views (generally in excess of 1.50 mile from the proposed site location). No year-round views are anticipated from the segments of the Appalachian Trail, Pine Knob Loop Trail or Mohawk Trail located within the Study Area. Moreover, no views are anticipated from Route 4 or Route 7 which are state-designated scenic roadways.

The viewshed map also depicts areas where seasonal (i.e. during "leaf off" conditions) views are anticipated. These areas comprise approximately 13 additional acres and are primarily limited to the host property within the immediate vicinity of the proposed Facility.

Attachment A

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

Photographic Documentation and Simulations

Proposed Wireless Telecommunications Facility

Verizon - Cornwall
16 Bell Road Extension
Cornwall, CT

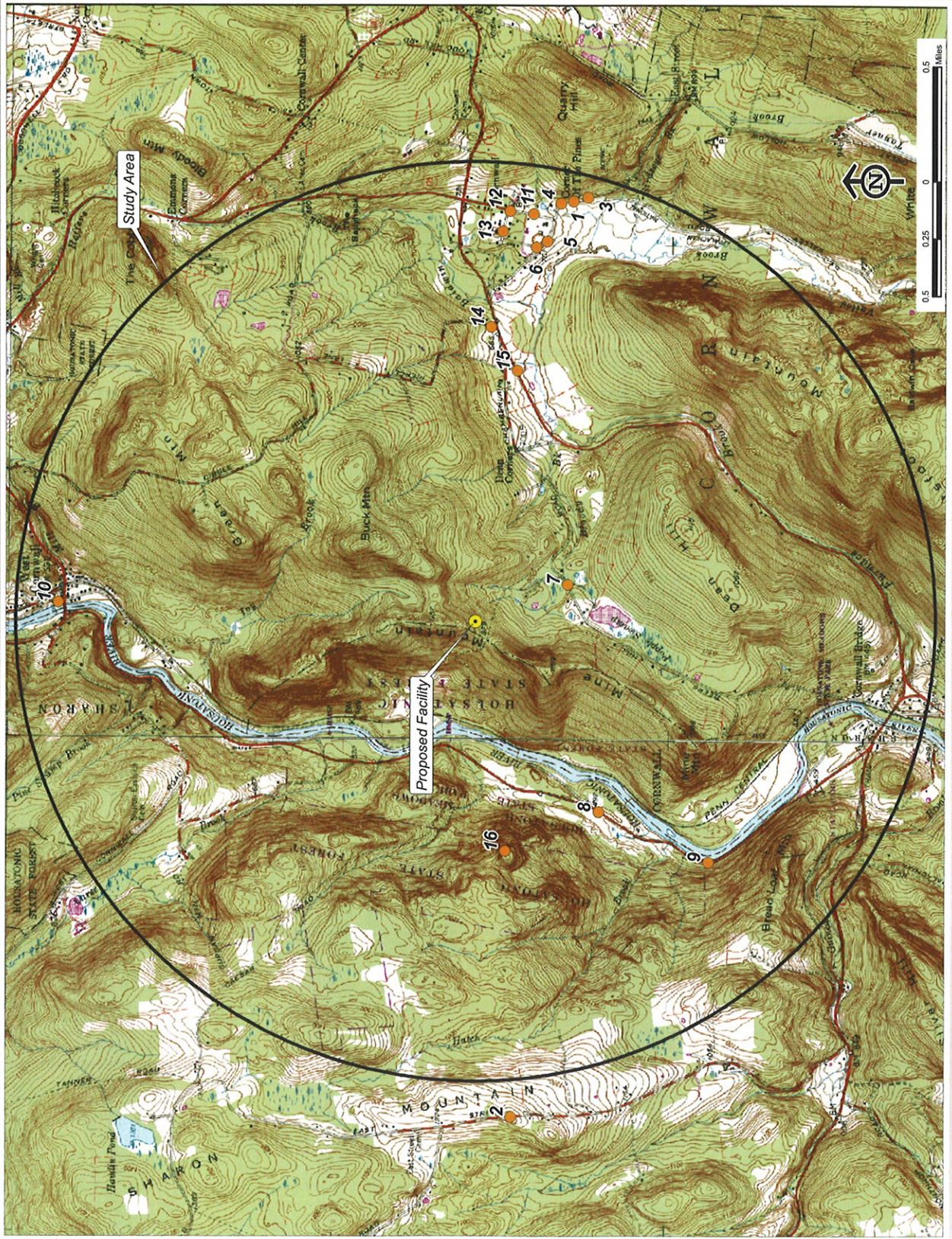
SUBMITTED TO:



SUBMITTED BY:



Photolog Map



J:\1240_32\graphics\FIGURE5\1240_32_photolms.indd

Photographic Documentation



J:\41240_32\graphics\FIGURES\41240_32_photos\ms.indd

PROPOSED PROJECT AREA



PHOTO TAKEN FROM VALLEY ROAD, LOOKING NORTHWEST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 1.89 MILES +/-



PHOTO TAKEN FROM VALLEY ROAD, LOOKING NORTHWEST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 1.89 MILES +/-



PHOTO TAKEN FROM EAST STREET NORTH OF UPPER RIDGE ROAD, LOOKING EAST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 2.15 MILES +/-



PHOTO TAKEN FROM EAST STREET NORTH OF UPPER RIDGE ROAD, LOOKING EAST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 2.15 MILES +/-



PHOTO TAKEN FROM VALLEY ROAD AT ESSEX ROAD, LOOKING NORTHWEST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 1.91 MILES +/-

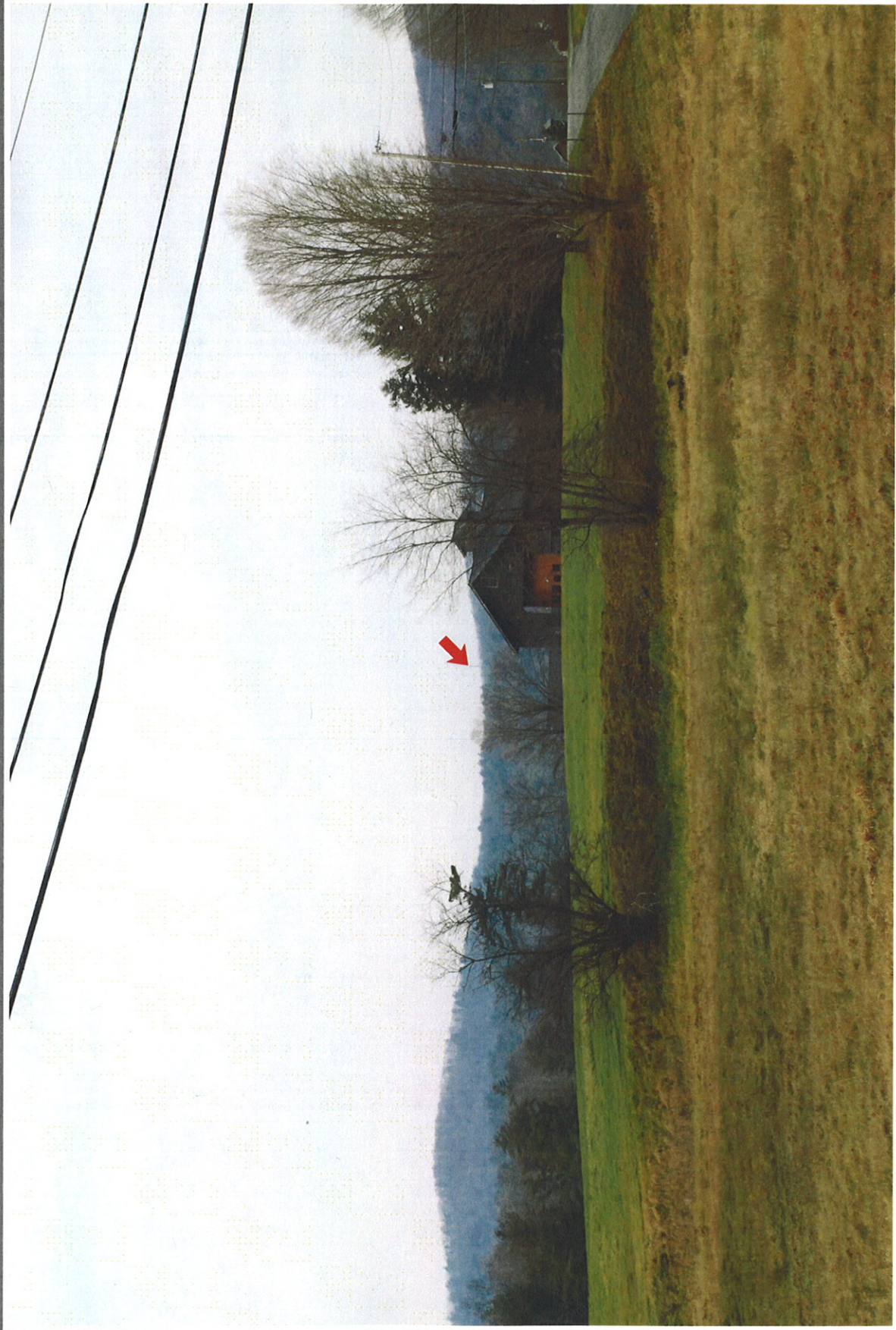


PHOTO TAKEN FROM VALLEY ROAD AT ESSEX ROAD, LOOKING NORTHWEST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 1.91 MILES +/-



J:\41240_32\graphics\FIGURES\41240_32_photos.ms.indd

PHOTO TAKEN FROM JEWELL STREET AT SCHOOL STREET, LOOKING NORTHWEST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 1.85 MILES +/-



J:\41240_32\graphics\FIGURES\41240_32_photosims.mxd

PHOTO TAKEN FROM JEWELL STREET AT SCHOOL STREET, LOOKING NORTHWEST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 1.85 MILES +/-