Exhibit Petitioner JTR-3
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Archaeological Resource Assessment, Phase IB Archaeological Survey, and Architectural Reconnaissance Survey for the New Haven Operations Facility

Town of New Haven, Addison County, Vermont

Prepared for:

Vermont Electric Power Company
366 Pinnacle Ridge Road
Rutland, Vermont 05701

Prepared by:

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A WSP Company
140 State Street, Suite 101
Albany, New York 12207

November 1, 2019

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Prepared by:

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Abstract

On behalf of Vermont Electric Power Company (VELCO), Louis Berger U.S., Inc., a WSP company (WSP), of Albany, New York, completed an Archaeological Resource Assessment (ARA) and a Phase IB archaeology survey for a portion of the 110-acre VELCO property adjacent to the New Haven Substation in the Town of New Haven, Addison County, Vermont. WSP conducted this ARA and Phase IB survey in support of VELCO's 2019 Section 248 Permit filing application to the Public Utility Commission. VELCO proposes to use a portion of the parcel for the construction of the New Haven Operations Facility (NHOF). The overall goal of this investigation was to investigate each part of the project area determined to be archaeologically sensitive to determine if archaeological resources are present and make recommendations on the eligibility of such resources for listing in the National Register of Historic Places (NRHP). WSP conducted an ARA of the 29.3-hectare (72.3-acre) assessment area, and conducted Phase IB subsurface testing of 15.51 acres (6.28 hectares) within the project area deemed archaeologically sensitive by the ARA.

In 2017, WSP conducted the ARA covering the northern portion of this project area, while the ARA for the southern portion of the project area was conducted in 2019. During the background research, 29 previously recorded sites were identified within 1.6 kilometers (1 mile) of the project area, three of which lie within the area of activities associated with project construction.

Archaeologists excavated a total of 513 shovel tests at 10-meter (33-foot) or less intervals in areas of defined archaeological sensitivity. Soil types were consistent with those predicted for the project area. During the Phase IB survey, WSP recovered one precontact artifact and six historic artifacts, and relocated Site VT-AD-460 with the recovery of eight lithic artifacts and three historic artifacts. The new precontact artifact not associated with a previously recorded site is one broken, narrow, side-notched projectile point. No additional precontact material was recovered from radial shovel tests. This single artifact represents an isolated find. The recovered historic material consists of five whiteware sherds (1850-present) and one manganese glass stopper (1880-1915). This assemblage is representative of dispersed field scatter of limited research value, and therefore no site designation is recommended for the historic assemblage, which is located outside the boundaries of Site VT-AD-460.

No new precontact or historic archaeological sites were identified during the survey of previously unsurveyed areas. Previously identified Site VT-AD-448 had consisted of a single stemmed projectile point. Attempts to relocate previously identified Site VT-AD-1471 were unsuccessful, and therefore the prior assessment of not eligible for the NRHP is confirmed. Previously identified Site VT-AD-460 was relocated [redacted]. Given the limited subsurface artifacts present, the lack of diagnostic materials, the absence of intact subsurface deposits or cultural features, and the restriction of all cultural materials to the hill crest, it is WSP's opinion that the portion of Site VT-AD-460 located within the NHOF's project design plans lacks the potential to further our understanding of Late Archaic or Early Woodland lithic scatters in the Champlain Valley region of Vermont or our understanding of eighteenth- or early nineteenth-century Euro-American domestic occupation sites, and therefore this portion of the site would not contribute to NRHP eligibility under Criterion D. WSP's opinion is that further archaeological testing in this portion of the site would not yield additional data, and therefore recommends the proposed project design as not adversely affecting this portion of Site VT-AD-460.

Portions of Site VT-AD-460 outside the project design plans and Pole [redacted] remain unevaluated as to level of integrity and NRHP eligibility, and should project design plans change, further archaeological testing of unevaluated portions of the site might be required.

To maintain the rural landscape setting of the locale and to blend in with nearby building types, VELCO has designed the NHOF building to resemble an agricultural structure (i.e., a barn). In addition, screening plantings are proposed to limit any further impact to the local viewshed. These efforts are intended to have beneficial effects as they will limit the view of the proposed building from VT Route 17 and Town Hill Road. The property at 214 Town Hill Road, which is just outside a 0.25-mile radius of the project area, is listed in the Vermont State Register of Historic Places and is also recommended as eligible for listing in the NRHP (the requirements for both are identical). Because of distance, intervening vegetation, and the substation's present location on the landscape, construction of the NHOF is anticipated to have no adverse effect on this property.

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I. Introduction

A. General Project Overview

On behalf of Vermont Electric Power Company (VELCO), Louis Berger U.S., Inc., a WSP company (WSP), Albany, New York, completed an Archaeological Resource Assessment (ARA) and a Phase IB archaeology survey for a portion of the 110 Acre VELCO Property adjacent to the New Haven Substation in the Town of New Haven, Addison County, Vermont (Figure 1). WSP conducted this ARA and Phase IB survey in support of VELCO's 2019 Section 248 Permit filing application to the Public Utility Commission (PUC).

The project area consists of a 29.3-hectare (72.3-acre) assessment area that surrounds and is inclusive of the existing New Haven Substation. An ARA has been conducted of the entire 29.3-hectare (72.3-acre) assessment area. Based on the ARA, a total of 8.91 hectares (22.02 acres) of this parcel was deemed archaeologically sensitive and recommended for subsurface testing. WSP conducted Phase IB subsurface testing of 15.51 acres (6.28 hectares) of the archaeologically sensitive areas, including all areas that would be impacted by proposed project designs. VELCO proposes to use a portion of the parcel for the construction of the New Haven Operations Facility (NHOF). The proposed building will be two stories in height, with an exterior designed to resemble a large agricultural structure or barn, and with an associated stormwater management system and landscaped planting area. The agricultural façade is designed to allow the building to blend into the rural landscape, while the landscape plan has been developed to provide additional screening of the building from both Route 17 and Town Hill Road. The Phase IB survey conducted in 2018 covered the location of the proposed building and a portion of the stormwater management system, whereas the 2019 testing focused on the remainder of the stormwater management system, and the landscape planting area.

The 2017 ARA for this project covered the entire project area as identified by VELCO at that time to identify archaeologically sensitive areas (Louis Berger 2018). The ARA's purpose was allow VELCO maximum flexibility in avoiding sites that are eligible for the National Register of Historic Places (NRHP). The two ARAs identified 29 previously recorded sites within 1.6 kilometers (1 mile) of the project area, three of which lie within the project area. WSP did not identify any additional archaeological sites in the project area.

B. Scope of Services

The overall goal of this investigation was to investigate each part of the project area determined to be archaeologically sensitive to determine if archaeological resources are present and make recommendations on the eligibility of such resources for listing in the NRHP. The project area, or area of potential effect (APE), is the zone within which foreseeable effects to archaeological resources may occur as a result of a proposed project, which for this project includes those areas that might be impacted by the proposed project construction for the NHOF. WSP conducted an ARA of the 29.3-hectare (72.3-acre) assessment area, and conducted Phase IB subsurface testing of 15.51 acres (6.28 hectares) within the assessment area deemed archaeologically sensitive

An Architectural Reconnaissance Survey was also conducted for this project.

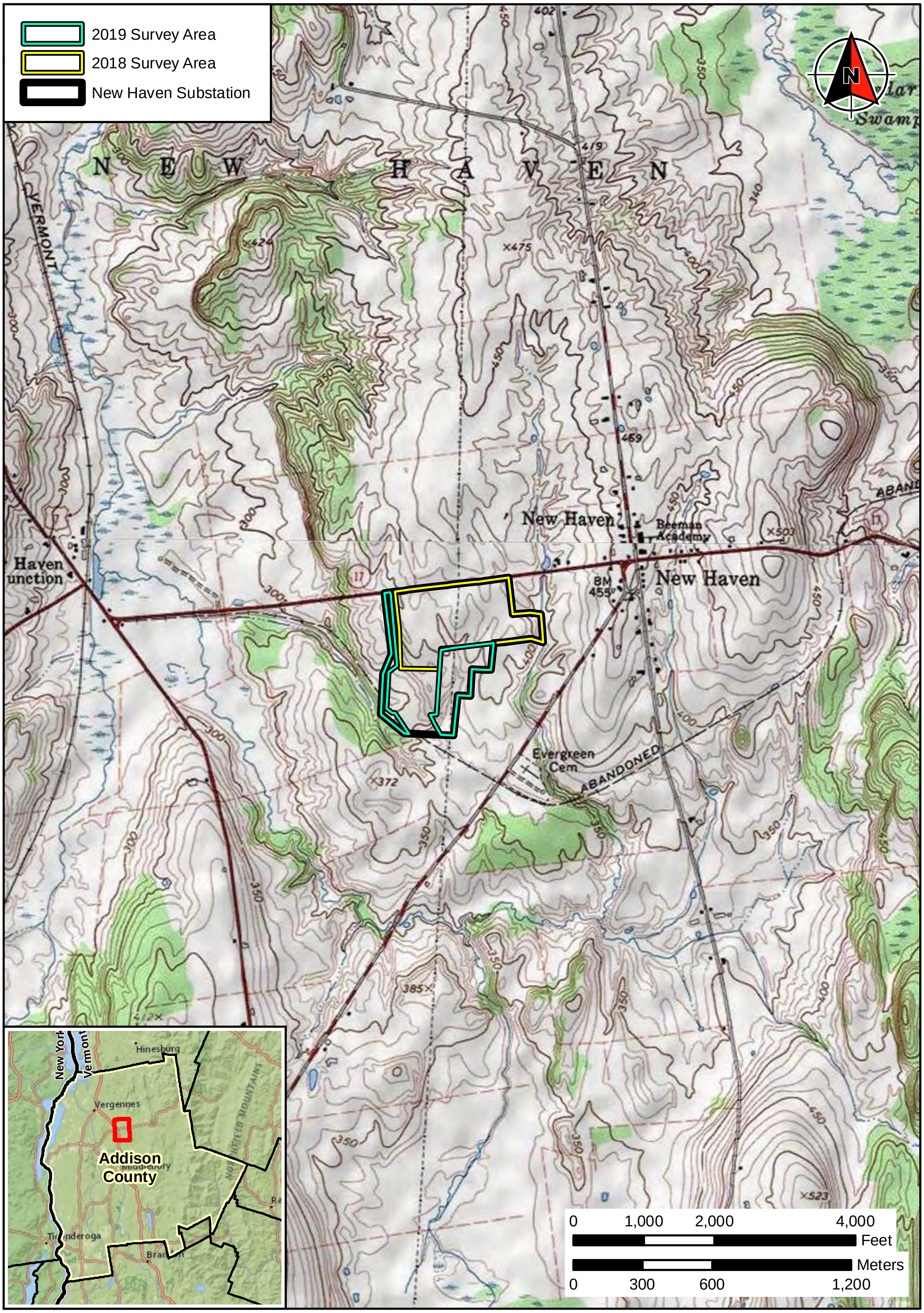

FIGURE 1: Location of Project Area (ESRI USA Topo Maps 2019)

All cultural resource services were performed using professional guidelines and standards set forth in the Procedures for the Protection of Historic and Cultural Properties (36 CFR 800) and the Procedures for Determining Site Eligibility for the National Register of Historic Places (36 CFR 60 and 63). This investigation also conformed to the Secretary of the Interior's Standards for Archaeology and Historic Preservation (48 Federal Register 44716) and the Vermont Division for Historic Preservation (VDHP) Guidelines for Conducting Archaeology in Vermont (VDHP 2017a). The cultural resource specialists who performed this work satisfy the Secretary of the Interior's Professional Qualifications standards as specified in 36 CFR 66.3(6)(2).

This report has been organized into eight chapters. After the introduction in Chapter I, Chapter II provides an environmental setting for the project area. Chapter III discusses the cultural context for the project area, briefly summarizing the 11,000-year history of the region. Chapter IV presents the methodology and results for the ARA. Chapter V provides the methodology and results of the Phase IB investigations. Chapter VI contains the results of the Architectural Reconnaissance Survey conducted for this project. Chapter VII presents the summary and discussion of the findings, and Chapter VIII lists the references cited.

The cultural resource survey was conducted under the direction and supervision of Hope E. Luhman, PhD, Senior Vice President (Registered Professional Archaeologist [RPA] No. 10505). The 2017 ARA was conducted by Archaeologist Christopher Morine with the assistance of Field Archaeologist Jackie Poveromo. The 2018 Phase IB subsurface testing was conducted under the direction of Field Supervisor Tracey Jones, with the assistance of Field Archaeologists Ashley Himmelstein, Paul Stansfield, Gene Virgilio, and Thomas Wambach. The 2019 archaeological fieldwork was conducted under the direction of Field Supervisor Tracey Jones, with the assistance of Field Archaeologist Jackie Poveromo. The architectural resource survey was conducted by Architectural Historian Amber Courselle. Kevin E. Sheridan, PhD (RPA No. 33420836) and Ms. Jones and Ms. Courselle wrote the report. Principal Draftsperson/GIS Analyst Jacqueline L. Horsford prepared the graphics. Principal Editor Anne Moiseev supervised the editing of the report.

II. Environmental Setting

A. General Setting

The project area is located in western Vermont in the Champlain Valley. The Champlain Valley is approximately 175 kilometers (109 miles) long and lies between the Adirondack Mountains to the west and the Green Mountains to the east. The region measures 32 kilometers (20 miles) at its widest, narrowing to only 8 kilometers (5 miles) south at the Taconics, and is characterized by a low relief with isolated hills rising up to between 183 and 213 meters (600 and 700 feet). The climate of the Champlain Valley is milder with more frost-free days than what is found elsewhere in Vermont, thanks to the surrounding mountains and the lake. Clay and thick silt typify the soils of the region because rivers brought deposits down at the end of the Ice Age into what was once Lake Vermont. Farmers have long take advantage of fertile and level soils found in the Champlain Valley (Allen 1989; Johnson 1980).

B. Project Area Soils

Soils mapped in the project area, according to the United States Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS) (2019), consist of Melrose fine sandy loam (MrA, MrB), Nellis loam (NeB, NeC, NsC), Raynham silt loam (RaB), and Vergennes clay (VgB, VgD) (Figure 2; Table 1). Melrose fine sandy loam is mapped in the eastern portion of the project area and encompasses an area of approximately 4.4 hectares (10.8 acres). These soils are located in lake or marine plains and outwash plains and deltas. Melrose soils are very deep, well-drained soils used for hay, pasture, and row crops when located on more level landforms. Areas with more slope containing Melrose soils are typically wooded. Nellis loam is mapped in the western, central, and southeastern portions of the project area and encompasses approximately 6.2 hectares (15.3 acres). Located on upland ridges, knolls, and hillsides, Nellis soils are very deep and well drained. Most areas with Nellis soils have been cleared and are used for growing hay, corn, small grains, and some vegetables; other areas are used as pastureland. A small portion of the project area’s northeastern corner consists of Raynham silt loam and encompasses approximately 0.1 hectare (0.3 acre). Raynham soils are very deep and poorly drained and are located on glacial lake plains and marine terraces. Most cleared areas are used for hay and pasture, but some are used for corn and other row crops. Mapped throughout the project area and encompassing the western edge and most of the southern portion of the parcel is Vergennes clay, encompassing approximately 18.6 hectares (46 acres). Located on glacial lake plains, Vergennes soils are very deep and moderately well drained. Areas that are cleared are used mostly for hay, pasture, silage corn, and apple orchards.

C. Environmental History of Vermont

Paleoecologists have constructed the environmental history of Vermont from a variety of sources, including pollen cores, sedimentation histories, and faunal collections. The ruggedness of Vermont and the pronounced differences in elevation across its landscape have resulted in regional contrasts in vegetation, creating a “patchy” landscape. Today it is possible to find tundra at a few thousand feet on the highest peaks of the Green Mountains in contrast to the deciduous and coniferous vegetation in lowlands to the east and west (VDHP 1991).

Before 13,500 years before present (BP), glacial ice largely covered present-day Vermont. Within a thousand years the glaciers had moved north of the St. Lawrence lowland, and in their wake grew a landscape of moss, lichens, and stunted shrubs. A frigid arctic climate prevailed, leaving the ground frozen for most of year. By about 12,000 BP most of Vermont was within an herb to spruce zone,

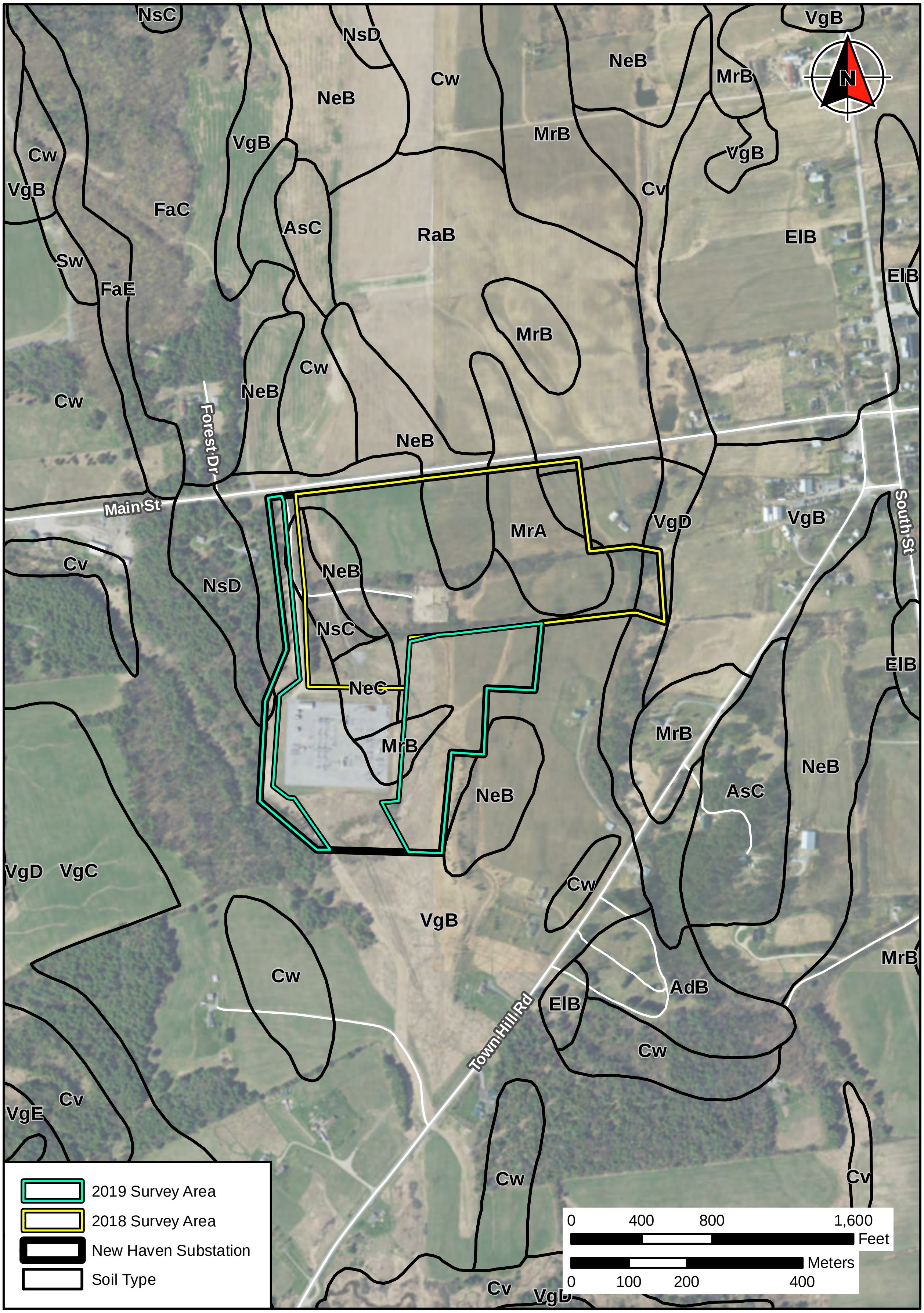

FIGURE 2: Project Area Soils (ESRI World Imagery 2018; USDA-NRCS 2017)

TABLE 1: PROJECT AREA SOILS

SERIES NAME	SOIL HORIZON	DEPTH	COLOR	TEXTURE, INCLUSIONS	SLOPE %	DRAINAGE	LANDFORM
Melrose (MrA, MrB)	Ap	0-18 cm (0-7 in)	V Dk Gry Brn	Fi Sa Lo	0 – 8	Well drained	Lake and marine plains, and outwash plains and deltas
	Bw	18-43 cm (7-17 in)	Yw Brn	Fi Sa Lo			
	BC	43-58 cm (17-23 in)	Lt Yw Brn	Sa Lo			
	2C1	58-76 cm (23-30 in)	Ol	Si Cl Lo			
	2C2	76-16 cm (30-65 in)	Ol	Si Cl			
Nellis (NeB, NeC, NsC)	Ap	0-23 cm (0-9 in)	Dk Brn	Fi Sa Lo; 5% Rock	3 – 50	Well drained	Upland ridges, knolls, and hillsides
	Bw1	23-41 cm (9-16 in)	Dk Yw Brn	Fi Sa Lo; 5% Rock			
	Bw2	41-53 cm (16-21 in)	Brn	Fi Sa Lo; 5% Rock			
	BC1	53-66 cm (21-26 in)	Brn	Fi Sa Lo; 6% Rock			
	BC2	66-94 cm (26-37 in)	Brn	Fi Sa Lo; 8% Rock			
	C	94-152 cm (37-60 in)	Gry Brn	Fi Sa Lo; 9% Rock			
	Cd	152-203 cm (60-80 in)	Gry Brn	Fi Sa Lo; 13% Rock			
Raynham (RaB)	Ap	0-15 cm (0-6 in)	Dk Gry Brn	Si Lo	0 – 6	Poorly drained	Glacial lake plains and marine terraces
	Bw	15-25 cm (6-10 in)	Lt Ol Brn	Si Lo			
	Bg	25-43 cm 10-17 in)	Ol Gry	Si Lo			
	Bw	43-56 cm (17-22 in)	Ol Brn	Si Lo			
	C1	56-122 cm (22-48 in)	Ol Gry and Dk Gry Brn	Si Lo			
	C2	122-183 cm (48-72 in)	Ol	Si Lo			
Vergennes (VgB, VgD)	Ap	0-20 cm (0-8 in)	Dk Gry Brn	Cl	2 – 25	Moderately well drained	Glacial lake plains
	B/E	20-25 cm (8-10 in)	Brn	Cl			
	Bt	25-56 cm (10-22 in)	Brn	Cl			
	BC	56-74 cm (22-29 in)	Dk Gry Brn and Brn	Cl			
	C1	74-94 cm (29-37 in)	Dk Gry Brn and Brn	Cl			
	C2	94-114 cm (37-45 in)	Brn	Cl			
	C3	114-196 cm (45-77 in)	Dk Gry Brn, Gry, Brn	Cl			

KEY: *Shade:* Dk – Dark, V – Very, Lt – Light; *Color:* Brn – Brown, Gry – Gray, Ol – Olive, Yw – Yellowish; *Soils:* Cl – Clay, Lo – Loam, Sa – Sand, Si – Silt; *Other:* Fi – Fine

followed by the higher elevations about 500 to 1,000 years later. Fauna during this period likely included wooly mammoths, mastodons, moose, elk, herds of caribou, and musk ox, as well as smaller arctic animals such as ptarmigan, arctic shrews, and lemmings. By 11,000 BP a subarctic climate dominated the region. Before the end of the 11th millennium BP, the Champlain Sea was drained. This sea once covered an area about twice the size of present-day Vermont and may have provided Vermont's earliest human settlers with many resources.

With the close of the Pleistocene, an open park-like woodland of largely spruce, fir, and birch had extended into Vermont's lowlands and then into the mountains by the following millennium. Evidence exists of larch and alder in wet lowlands and beech, oak, ash, and maple in the better drained bottomland and low hills of the Champlain and Connecticut valleys. These changes led to growth in the populations of many animals that today live in Vermont, including moose, beaver, lynx, porcupine, snowshoe rabbit, spruce grouse, mice, voles, and other animals that likely came in from the south.

Pollen cores indicate a sharp increase by 9000 BP in the amount of white pine, hemlock, oak, poplar, elm, ash, sweet gale, and ferns throughout Vermont. Pine pollen takes up 50 percent of pollen diagrams for this period, indicating that Vermont lay within a true "pine zone." The presence of pine-dominated forests indicates a warming trend, and thin alluvial beds on floodplains from this period suggest low precipitation rates (Thomas and Dillon 1983). Within 1,000 years pollen cores illustrate a drop in the rates of red, jack, pitch, and white pine pollen and a rise in the amount of oak, beech, birch, sugar maple, elm, and ash pollen, indicating the beginning of a Temperate Oak Forest (VDHP 1991:2-4).

Different strands of evidence from the Upper Midwest and the Northeast reveal that between 7500 and 5300 BP precipitation was higher than today and the climate was fairly warm. Along the Missisquoi River evidence of rapid sedimentation and increased channel migration between 6,500 and 5,400 BP indicates a higher level of rainfall. Other evidence of a wetter environment includes high rates of hemlock and beech pollen deposition as well as beech, cedar, maple, and hemlock logs found along the Missisquoi floodplain and dating to this time period (Brakenridge 1988; COHMAP Members 1988; Thomas and Dillon 1983).

After 6500 BP the mixed deciduous-coniferous forest in the lowlands of eastern and western Vermont provided good habitat for deer, bear, wolf, raccoon, otter, fox, gray squirrel, wild turkey, and passenger pigeon. In the higher, mountainous elevations of central Vermont, spruce-fir-northern hardwood forests were home to moose, elk, and possibly small herds of woodland caribou (VDHP 1991:2-10).

After 5000 BP the quantity of hemlock went into steep decline and the amount of oak and hickory increased (Whitehead and Bentley 1963), possibly indicating the onset of drier conditions. Evidence of drier conditions includes the entrenchment and infrequent river flooding in the upper Midwest (Thompson and Bettis 1982) as well as a lack of substantial alluvial deposits along floodplains of the Missisquoi River (Brakenridge 1988; Thomas and Dillon 1983). An apparent drop in the water table of Shelburne Pond in the Champlain Lowlands of Vermont (Carr et al. 1977) provides further evidence of decreased precipitation. The climate was probably between two and four degrees centigrade higher than today (Dincauze 1989). Chestnut appears after about 2000 BP. The dominance of oak continues in Vermont's forests today.

Temperatures likely became cooler after about 2800 BP, and precipitation increased to about AD 270. These changes led to greater quantities of spruce and fir at higher elevations and a general increase in pine in the lowlands (Bernabo and Webb 1977; Whitehead and Bentley 1963). Warmer temperatures then returned during the first millennium AD, with a rise in precipitation after about AD 750 (Swain 1978). After AD 1050 drought conditions and higher temperatures prevailed. Evidence of lower water tables, a decrease in stream flow and frequency, and the duration of flooding demonstrate that the period between AD 1000 and 1200 may have been the warmest in Vermont in over 2,000 years. After AD 1550 cooler and moister conditions came with the beginning of the so-called "Little Ice Age" (VDHP 1991:2-9).

III. Cultural Context

Archaeologists typically divide the history of Vermont before Contact into three major periods: Paleoindian (11,000 to 10,000 BP), Archaic (10,000 to 3000 BP), and Woodland (3000 BP to AD 1600), with the latter two further divided into early, middle, and late subperiods. Historians and archaeologists call the time between AD 1600 to 1760 the Contact period (VDHP 1991:1-4).

A. Precontact Background

1. Paleoindian Period (11,000 to 10,000 BP)

The earliest known archaeological remains in Vermont date to the Paleoindian period. These sites were created by small groups of hunter-gatherers who colonized the recently deglaciated sections of the state during the 11th millennium BP. Few archaeologists have published on excavated sites in Vermont dating to this period. Nevertheless, it is possible to infer some aspects of Paleoindian life from sites investigated in neighboring areas of New York, New England, and the Canadian Maritimes (e.g. Deller and Ellis 1992; Ellis and Deller 2000; Stork 1997, 2004).

Assemblages from these sites indicate three consistent attributes of Paleoindian technology that were probably also true for groups in Vermont. First, in addition to fluted points, the stone technologies of these groups consisted of a flake-based toolkit with general categories of wide- and narrow-bit unifacial tools, unifacial gravers, utilized flakes, bipolar artifacts, and large bifaces. Second, people during the Paleoindian period in the Northeast probably preferred bedrock lithic sources as opposed to secondary cobble and such a lithic procurement strategy may have been driven, in part, by the design requirements of their transported stone toolkits. Finally, locations of raw material sources for Paleoindian stone toolkits are often many kilometers distant from the sites where these tools are recovered. These distances indicate that people in the Northeast traveled far to collect stone for tool making either during their seasonal movements or as part of trips made specifically to gather new supplies of lithic materials (Seeman 1994).

Disagreement exists over whether people at the end of the Pleistocene in the Northeast were specialists following herds of caribou, or generalists living off a diverse environment, collecting and hunting a wide range of resources (Dincauze and Curran 1983; Pelletier and Robinson 2005). More than likely the reality varied over time and across space and was a question not of specialist versus generalist but rather of degree and scale (VDHP 1991:3-7). As specialists, people likely gathered together in larger, multifamily settlements at key times of year along strategic intercept points to hunt caribou. These larger aggregations then split up into smaller groups and moved widely across the landscape. As generalists, the people of the Paleoindian period may have moved in small family-sized groups, mapping their movements to the availability of resources.

Archaeologists know of substantial Paleoindian sites south of the present project area in the Connecticut River valley, including the Whipple Site just off the Ashuelot River in New Hampshire (Curran 1984); the DEDIC Site on the Connecticut River in Deerfield, Massachusetts (Chilton et al. 2005); and the Turner's Falls Site, also on the Connecticut River in Turner's Falls, Massachusetts (Binzen 2005). In northwestern Vermont Loring (1980) documented the recovery of fluted points on and below Champlain Sea beach deposits, from adjacent interior lowlands, and from higher elevation settings in the western foothills of the Green Mountains.

2. Archaic Period (10,000 to 3000 BP)

The Archaic period began 10,000 years ago following the end of the Pleistocene and the beginning of the Holocene. It is further subdivided into at least three periods, the Early (9000 to 7500 BP), Middle (7500 to 6000 BP), and Late Archaic (6000 to 3000 BP). These periods are largely demarcated by changes in projectile point styles.

Earlier archaeologists generalized the environment of the early Holocene (Early and Middle Archaic) in the Northeast as closed woodlands dominated by conifers (Dincauze and Mulholland 1977; Fitting 1968; Ritchie 1980). Since a low carrying capacity characterizes such an environment, they hypothesized there was a low population until about 6,000 years ago, which resulted in low site density during the period. More recently archaeologists have questioned this understanding. George Nicholas (1991a, 1991b, 1998) cites evidence that the landscape in the early Holocene was far more diverse, supporting a broader resource base than that characterized by a closed conifer forest environment. According to Nicholas's "glacial lake basin mosaic model" (Nicholas 1991a, 1991b, 1998), people took advantage of a highly productive ecosystem that contained a complex system of lakes, ponds, and wetlands. Robinson and Petersen (1993) cite the problems encountered with trying to attach changing demographics to known frequencies of temporally diagnostic projectile points. Since earlier archaeologists did not find many sites with temporally diagnostic points in early Holocene contexts, they assumed this meant there were few people and that the region was fairly uninhabited. Robinson and Petersen (1993), however, write that the lithic technology recovered from known early Holocene components is typically very expedient, resulting in the production of few temporally diagnostic formal artifacts such as projectile points. Rather, assemblages from these sites consist mostly of flake assemblages, and as a result many of the components dating to this time period have likely gone unrecognized.

In southern Vermont the transition to the Early Archaic was contemporaneous with the continued warming trend in the early Holocene and the replacement of spruce and fir by pine as the dominant tree species in forests (Carr et al. 1977). The combination of environmental and technological changes during the transition to the Early Archaic may indicate an increase in the importance of plant foods and shifts in the exploitation of certain terrestrial fauna such as the hunting of deer rather than caribou. As opposed to Paleoindian use of high-quality cherts brought long distances before discard, evidence from early Holocene sites indicates a switch to the use of local chert, quartzite, and quartz during the Early Archaic. The change is likely the result of people living in far more restricted areas than their Paleoindian period ancestors as well as a lack of wide-spread external contacts (VDHP 1991:5-6). Archaeologists have long thought that people remained within these territories, spending portions of the year in larger base camps and then moving to smaller, more task-specific camps in the surrounding area (Snow 1980:171).

The number of known sites and diagnostic artifact types and projectile points dating to the Late Archaic (6000 to 3000 BP) is far greater throughout the Northeast and Vermont than for any of the preceding periods. There is also evidence for the development of mortuary ceremonialism. Archaeologists have traditionally characterized the Late Archaic in the Northeast and Vermont into three basic traditions based on these numerous changing artifact types. The Laurentian tradition is thought to date to between about 5600 to 4400 BP and is known from sites in western Vermont, as well as elsewhere throughout the Northeast including New York, southern Ontario, southern Quebec, and northern New England. The Narrow Point Tradition follows the Laurentian and dates roughly between 4400 and 3600 BP. Archaeologists have found artifacts associated with this tradition up and down the East Coast from as far south as North Carolina and as far north as the Upper St. Lawrence River. The Susquehanna Tradition is later, dating to between about 3800 to 1800 BP. Traits associated with this tradition are thought to have moved north from the Southeastern Piedmont to as far north as Maine and the Upper St. Lawrence.

Although these traditions differ from each other based largely on changing artifact traits, Dean Snow (1980) and others (e.g., Braun and Braun 1994) geographically split the Northeast during the Late Archaic into three very general sections. They base these divisions on broad generalizations about adaptations to major regional environments. The Maritime Archaic lay in the coastal regions of northern New England and the Canadian Maritimes and is defined as an adaptation based on the resources of the ocean. The Lake Forest Archaic stretched from the Eastern Great Lakes across northern New England. Snow (1980) believes the people of the Lake Forest Archaic lived around the many lakes and rivers found in the region. The Mast Forest Archaic ran from the coastal plains of southern New England into the oak forests of the interior. Here people are thought to have made use of the abundant nut-bearing deciduous trees in the region. Although these models are useful in a very general sense, they are also problematic because they are so general. They mask much of the potential for variation across the Northeast.

Our understanding of the lives people led in the Northeast are largely shaped by where the vast majority of archaeologists have worked along the great rivers of the region, including the Connecticut, the Hudson, and the Merrimack. Thousands of years ago, people migrated to these rivers each spring to take advantage of the abundant annual migrations of anadromous fish. Each spring around April these fish swam far up the rivers and their tributaries to spawn until stopped by falls. They created a plentiful food resource for people at the leanest time of year, when the winter stocks were empty. These large groups likely stayed together throughout much of the warm weather months, splintering off periodically to hunt, gather different food, and collect other needed resources. There is ample archaeological evidence along the floodplains of large rivers in much of the Northeast for these large gatherings at so-called “base camps.” With the onset of the cold weather, people are thought to have splintered into smaller groups, likely extended families, and moved inland away from the river. This pattern of small groups of hunter-gatherers aggregating during the spring and then splintering in the fall has been defined as the “central-based wandering pattern” (Ritchie and Funk 1973:340).

The problem with applying these interpretations to eastern Vermont is the lack of anadromous fish coming up the Connecticut River beyond Bellows Falls. Andrea Ohl (1994:55) comments on the lack of known sites dating to the Middle Archaic north of the falls, although sites dating from this period are known south of the falls up the West River and Ashuelot River in New Hampshire. Site VT-WD-3 sits just south of the confluence of the West and Connecticut Rivers and may have been the location of one of these large warm weather group aggregations. Elsewhere in eastern Vermont, however, since the major impetus for large gatherings appears to have been absent north of Bellows Falls, the lives people lived in this region were likely very different from elsewhere in the Northeast.

3. Woodland Period (3000 BP to AD 1600)

The Woodland period is marked by the introduction of ceramic technology about 3,000 years ago. This new technology allowed the production of containers that could withstand cooking with direct heat. This new capability likely affected nutrition and therefore population dynamics. Ceramics also enhanced the capability to store food. The ability to store food to offset seasonal changes in the availability of different foods made it possible for people to become more sedentary. Despite the possibilities presented by this new technology, there is little evidence for any profound changes in life across Vermont. In addition, the elaborate ceremonialism represented by the rich grave-good assemblages found at Early (3000 to 2000 BP) and Middle Woodland (2000 to 1000 BP) sites such as Swanton, Boucher, East Creek, and Bennett (Loring 1985; VDHP 1991:9-9) indicate continuity with the burial ceremonialism of the Late Archaic.

There is little archaeological evidence of the Early Woodland in Vermont. Excavations at Middle Woodland sites in western Vermont such as Winooski (Power et al. 1980) and McNeil Generating Station (Thomas 1980) illustrate the use of areas along the lower reaches of rivers flowing into Lake Champlain. These sites indicate the presence of large gatherings of people who fished, harvested nuts, and hunted. At

Middle Woodland sites like Winooski and McNeil, lithic artifacts are predominantly from non-local cherts. By the Late Woodland (AD 1000 to 1600), however, people were using local cherts. These changes may suggest changes in trade with and end to the long-distance trade and political relationships that had existed during the Middle and perhaps Early Woodland periods (Haviland and Power 1984:132-133; VDHP 1991:9-9). In addition, the ceramics at Winooski are "related to ceramics from the Lake Forest Middle Woodland 'cultural complex' of the Great Lakes-St. Lawrence drainage" (Petersen and Power 1983:142), whereas later ceramic assemblages "seem more clearly related to other local assemblages within the Lake Champlain drainage basin" (Petersen and Power 1983:143).

Throughout the Northeast the Late Woodland period is associated with the introduction of horticulture, particularly the importation of domesticated maize. However, it is more than likely that maize did not appear in New England until after about AD 1300 (Chilton 2006), several centuries after the Iroquois to the west had adopted it. In New York maize became a key component in the development of large permanent villages. Although maize was adopted throughout New England, in Vermont and elsewhere in New England, there is little evidence for the development of large sedentary villages based on maize horticulture (c.f., Petersen and Cowie 2002). Rather, archaeological evidence indicates that people remained mobile hunter-gatherers, only using maize as a dietary supplement. These people therefore become what Elizabeth Chilton (2002) has called mobile farmers, as although they planted, they did not become sedentary farmers like the Iroquois.

4. Contact Period (circa AD 1600 to 1750)

The coming of Europeans to New England in the seventeenth century brought immense and catastrophic changes to the Native peoples of the region, changes that we are only beginning to understand today. The Native inhabitants of Vermont, the Abenaki, faced severe population loss to European diseases. Their traditional lifeways were forever changed by Europeans taking their lands, refugee populations of American Indians moving in from elsewhere in New England, and their involvement in European wars and European demand for trade goods, such as beaver pelts. The Abenaki, who call their homeland Ndakinna, meaning "our land," received tribal recognition from the State of Vermont in 2006. They are still seeking Federal recognition and are referred to as the St. Francis/Sokoki Band of the Abenaki Nation of Missisquoi (Abenaki Nation 2007).

B. Historical Overview of Vermont

The first Euro-Americans to venture into the region that would become Vermont in the eighteenth century were trappers and hunters. Reaching much of this area was impeded by mountains, and colonization was slow because the political situation was unsettled. Recurring hostilities between the British and French authorities initially inhibited settlers from making Vermont their home; however, even before the final surrender of the French at Quebec in 1760, applications for land grants were being made by many parties.

The colony of Connecticut made the first land grants within what is now Vermont in the early eighteenth century, after Massachusetts, which had erroneously granted its own citizens 436 square kilometers (172 square miles) within the borders of Connecticut, transferred these land grants (the "equivalent lands") to Connecticut. Connecticut immediately sold these lands to people from both Connecticut and Massachusetts, who in turn sold the land to prospective settlers at a profit. After the final resolution of the Massachusetts-New Hampshire territorial disputes in 1740, these lands became New Hampshire territory. Nevertheless, most of the region's settlers continued to come from Connecticut and Massachusetts (Tosi 1948:48-49). European settlement was slow in all parts of today's Vermont until 1761, when Benning Wentworth, governor of New Hampshire, claimed the lands for New Hampshire and began establishing illegal land grants. These territories became the State of Vermont in 1791.

Land use in eastern Vermont conformed to practices common in other parts of New England. These practices included fairly contiguous areas organized into towns, containing villages spaced relatively evenly wherever topography and soil conditions permitted (Meeks 1986:14).

Prior to 1830, subsistence farming was the principal household economic activity. The earliest economic activity outside the household was the sale of potash and lumber obtained from land clearing. Potash, owing to its high market value and use in the production of glass, became the only inspected product in Vermont at that time (Elliott 1977:18). Small manufacturers, including gristmills and sawmills, sprang up throughout the region to process locally grown materials. Distilleries (using rye and corn) and starch factories (using potatoes) also developed. Taverns and general stores opened to cater to the local populace in nearly every town. By 1830 the region's agricultural economy was concentrated on the cultivation of potatoes and grains, some of which was shipped to Eastern and Southern markets. Wheat was initially an important crop, so much so that it was used as money by the earliest settlers. As transportation increased to wider markets, farmers focused more on a smaller number of specialized products.

Apple growing in particular became an important part of the Vermont economy. John McIntosh, born in 1776, eventually began selling his apple seedlings to settlers, and the McIntosh apple became the dominant apple in Vermont because of its acclimation to cool nights and warm, sunny days. In 1899 Vermont boasted 1,675,131 apple trees and produced 1,176,822 bushels of apples. Commercial apple production in Vermont continued into the twentieth century but declined owing to the lack of modernized facilities. The introduction of the automobile boosted apple production again; in 1955 Vermont produced over 1,100,000 bushels, and in the 1980s roughly 79 commercial growers on 3,500 bearing acres of land produced roughly 1.25 million bushels annually (VDHP 1990, "Apple Orchards":6).

By the late eighteenth century some industry had begun to develop in Vermont. Lumbering in the oak forests brought much-needed money into the state and also cleared land for farming (Stratton 1980:250). Large fallen trees were ideal for making masts for ships and were usually shipped to Quebec. Production of hats was also an early trade, which used local wool and beaver hides from trappers. Other early businesses included blacksmithing, brick making, and dyeing.

The developing livestock industry rapidly took over in Vermont, however, as both cattle and horses thrived on the local grasslands and climate (Bearse 1968; Tosi 1948:58-59; VDHP 1990). During the early nineteenth century the Spanish Merino sheep, an outstanding wool producer easily adapted to rugged terrain and climate, arrived in Vermont. The self-sufficiency of the Vermont farmers diminished considerably as many turned to sheep farming for an alternative source of income, almost to the complete exclusion of other agricultural products. The improved machinery and larger woolen mills that were introduced around 1830 permitted Vermont farmers to produce more wool, and 33 wool factories were built in Vermont during that period. In addition to wool, raw cotton was imported into Vermont mills for processing (Meeks 1986; Tosi 1948:62).

Although some textile production occurred in fulling and cleansing mills, and later also carding mills, the production of textiles remained a household activity until about 1820. After about 1820 factories took over the production of textiles, and the number of fulling and carding mills increased by 200 percent (from 136 to 273) and 275 percent (from 87 to 234), respectively. By 1830 the home manufacture of textiles was almost non-existent. Since a typical textile mill required the labor of about nine or so workers, the mills typically sprang up where the workers lived. In many cases the wool factories were an outgrowth of earlier textile mills as the mills became suppliers for developing wool factories (Meeks 1986; Steponaitis 1975:43-50).

The breeding of wool sheep reached its peak in Vermont in the early 1840s, but by the end of the decade, the industry had begun to decline, partly the result of lower protective tariffs on imported wool and partly the result of competition from the West with its larger pastures, less costly grain, and better transportation following the opening of the Ohio and Pennsylvania canal systems (Tosi 1948:59-60; VDHP 1989b). The number of wool factories in Vermont decreased from 97 in the mid-1840s to 89 a decade later. In addition, the number of textile concerns in Vermont began to drop as the industry consolidated into fewer, larger firms using more efficient machinery and located along more traveled transportation routes. The number of mills fell from a peak of over 400 in the 1820s to only 75 in the early 1850s. The sheep industry revived briefly in the 1860s and immediately afterward, as the Civil War prompted a greater demand and higher prices for wool products because of the low availability of Southern cotton as well as the imposition of higher tariffs (Steponaitis 1975:60-67).

With the initial decline of the sheep and woolen industry in the late 1840s, many farmers returned to breeding cattle, although not before mutton sheep slowly infiltrated many farms formerly devoted to wool-bearing sheep (VDHP 1989a:2). Dairy farming in Vermont and elsewhere in New England had been introduced by the 1840s (Barron 1980; Russell 1982). Dairying proved to be a protection against the fluctuating price of wool and allowed farmers to take advantage of expanding urban markets to the south. The introduction of dairy breeds to replace beef cattle was a slow and intermittent process. Barron (1980) believes that one reason farmers in Vermont were slow to switch from wool to dairy was problems with labor. The young of Vermont were moving out West and to the big cities, depopulating the countryside during the second half of the nineteenth century (discussed further below). Because sheep farming was far less labor-intensive, it remained a more efficient use of resources during this period even as prices for wool dropped. Dairy farming, on the other hand, was becoming more labor-intensive, and Barron (1980:333) estimates that because of technological changes, the labor demand for cows grew by 68 percent per cow between 1850 and 1910. As a result, because the available pool of labor was declining after the mid-nineteenth century, farmers were hesitant to make the switch from wool to dairy even though the wool market was unstable. It was not until the market for wool completely collapsed at the end of the century that the switch from sheep to cows became complete.

Up until the 1850s, only private dairying took place. As the industry became more widespread, cheese factories, and later creameries, were built to service entire dairying communities. The three staple crops for the mid-nineteenth century Vermont farmer became wool, butter, and maple sugar, and after the Civil War dairy farming dominated the agriculture of eastern Vermont (Bremer 1929:587; Tosi 1948:63). Butter and cheese were manufactured in centrally located factories, although up until 1900 almost 40 percent of manufactured dairy products were produced in the home for sale to a private clientele. The number of dairy cows in some Vermont counties reached a peak in 1900. By the close of the nineteenth century, however, the Vermont dairy farmer faced direct competition from the dairy industries of Ohio and Wisconsin, for whom the transport of perishable goods did not pose as great an obstacle after development of the railroads connected these states with the East. Dairying declined slowly until 1920, then rose sharply until 1930 (Tosi 1948:62-64). By the end of the twentieth century, however, the need for expensive equipment had put many small hill country farmers out of business (VDHP 1989a).

The wool industry in Vermont changed in the late nineteenth century with the emergence of large town-based manufacturing firms (employing more than 100 employees) in places such as Bennington, Winooski, Rutland, Johnson, and Fair Haven. Vermont still enjoyed prominence in the manufacture of wool and knit goods during the 1880s; however, the state’s industry declined steadily through the first half of the twentieth century despite a brief rise during the World War II years (Steponaitis 1975:118; VDHP 1991:10-11). Mills gradually closed after the end of the nineteenth century as they became unable to compete with mills and factories in the South (Barron 1980:326).

The population decline during the second half of the nineteenth century had perhaps one of the greatest historical impacts on the Vermont landscape. As the United States expanded, new opportunities arose, and young people moved out West. The hill farms of southeastern Vermont could not compete with

Western agriculture. In addition, as already noted, many of the Vermont's rural youth left for jobs in the growing big cities. Barron (1980), however, describes contemporary writing of abandoned farms as "hyperbole," writing that agriculture in New England did not collapse after the Civil War but only experienced stagnation. He points out that throughout Vermont two-thirds of male household heads remained farmers/farm laborers throughout the second half of the nineteenth century, 90 percent of farms were family-owned, and that two-thirds of the land remained agricultural land. In short, the number, size, and location of farms throughout Vermont remained stable. In addition, the output of wool, butter, and maple sugar from these farms remained constant into the late 1890s. The number of tradesmen also remained constant, although a number of mills and factories were replaced because they could not compete with those in the South (Barron 1980:326). Vermont farmers may have been able to survive the slow attrition of labor throughout the second half of the nineteenth century, but the lack of available labor ultimately prevented them from adapting to more economically advantageous forms of farming.

Mining and the processing of stone and mineral deposits were significant Vermont industries dating to the time of the early settlement. The first reported lime kiln in Vermont was at Isla la Motte, where the French burned lime to make mortar circa 1665. Lime kilns started appearing in large numbers with the opening of farms and the discovery of good quality limestone deposits. Eventually lime kilns were present in the vicinity of nearly all outcrops of limestone. The earliest type of kiln in Vermont, the farm kiln, was constructed to fulfill local demand for agricultural lime and building mortar, although the surplus was sold to tanneries, paper mills, and chemical factories. These kilns were operated up to the 1840s. Larger and more complex kilns were constructed in association with multiple quarry operations and later near railroad lines for easier transportation to external markets (Rolando 1992:216-217).

The railroad also played an important role in the development of Vermont. One of the most important railroads to provide access to central and northern Vermont was the Vermont Central Railroad Company. The company was chartered on October 31, 1843, with the construction of the line beginning in the fall of the same year. The line was opened from White River Village to Bethel (25 miles) on June 26, 1848; to Northfield (53 miles) on October 10, 1848; to Montpelier (63 miles) on June 20, 1849; to Middlesex (69.5 miles) on August 30; to Waterbury (75 miles) on September 29; and finally, to Burlington (105 miles) on December 31, 1849 (Poor 1860:78).

The Vermont and Canada Railroad was chartered October 31, 1845, as a continuation of the Vermont Central north and west to Rouses Point, New York, splitting at Essex Junction (east of Burlington) and running north via St. Albans and Swanton. A branch split at Swanton and ran north to the border with Canada. On August 24, 1849, the Vermont Central Railroad Company took a lease of the Vermont and Canada Railroad, then under construction, at an annual rent of 8 percent on its cost (amounting at that time to $1,348,500) with the privilege of purchasing the road at cost after 20 years. The provisions of the lease created a mortgage on the Vermont Central Railroad as security for the payment of the rent. The Vermont Central defaulted on rent payment, however, and on June 28, 1852, surrendered the railroad to its original owners (Poor 1860:79).

The Rutland Railroad linked the Vermont Central Railroad and the Boston and Montreal Railroad via Vermont, and traveled west to Ogdensburg, New York, on the Hudson River. For residents of central and northern Vermont, this expansion of the railroad represented an opportunity to sell produce outside the community. The railroad transported goods and was also instrumental in bringing tourism to Vermont. Today, the Central Vermont Railroad line is used by Amtrak for its service through Vermont to Canada.

C. Known Sites and Previous Cultural Resource Management Projects

A total of 29 sites are located within 1.6 kilometers (1 mile) of the project area in the Town of New Haven (Table 2). Of these, 17 were identified by collectors, particularly the work of Langdon Smith. Four sites (VT-AD-448, -459, -460, and -806) are discussed in surveys conducted by the University of Maine at Farmington (UMF) for the Champlain Pipeline (Robinson et al. 1992) and by University of Vermont (UVM) for the VELCO 34.5kV line (Robinson et al. 2009). Although little is known about the assemblages collected by Langdon Smith and other collectors, it appears that many of the collections are relatively small, consisting of only a handful of artifacts. Three sites north of Main Street and west of the current VELCO transmission line were identified as part of the VELCO Northwest Reliability Project (Sites VT-AD-1451, -1452, and -1453). The Kaolin 1 and 2 Native American Sites were identified as eligible for listing in the NRHP and mitigated through Phase III limited data recovery. Archaeologists conducted a Phase II site evaluation on Kaolin Site 3, but it yielded no additional artifacts and was recommended as not eligible for the NRHP.

Three sites (VT-AD-1471, VT-AD-448, and VT-AD-460) are located in the project area, in the current VELCO transmission line right-of-way (ROW) and the original substation property. Site VT-AD-1471 was identified as part of the VELCO Northwest Reliability Project; the site consists of a single Jack's Reef corner notched point and a quartzite flake. No other artifacts were recovered, and the site was recommended as not eligible for listing in the NRHP. Site VT-AD-448 was identified during field inspection for the Champlain Pipeline project and consisted of a single stemmed projectile point (Robinson et al. 1992).

Site VT-AD-460 was also identified during field inspection for the Champlain Pipeline Project. This site is a multi-component site consisting of a precontact lithic scatter dating from the late Archaic to the Early Woodland, and a historic eighteenth- to nineteenth-century domestic artifact scatter located within a large agricultural field. The site is situated on a rolling upland with crests, swales, and slopes, and is located approximately 800 meters (2,625 feet) east of [redacted]. During the surface survey a total of 700 precontact artifacts were recovered, consisting of debitage (n=673), fire-cracked rock (n=10), bifaces (n=6), unifaces (n=5), utilized flakes (n=2), one groundstone tool (n=1), and projectile points (n=3). Nearly all of the recovered lithics were quartzite. Also collected were 903 historic artifacts, consisting of ceramics (n=413; pearlware, creamware, Jackfield ware, whiteware, stoneware, redware, and earthenware), glass fragments (n=396), metal pieces (n=43), brick fragments (n=17), and miscellaneous objects (n=34). The historic scatter of artifacts was similarly distributed [redacted], although two additional high-density clusters of historic artifacts were noted in the southwest and southeast corners of the site. No subsurface testing of the site was conducted during the 1989 Champlain Pipeline survey (Robinson et al. 1992).

In 2006, during investigations for the Northwest Vermont Reliability Project for the New Haven Substation and 345kv Transmission Line conducted by UVM-CAP, limited subsurface testing of Site VT-AD-460 was conducted. This testing was restricted to the APE for the proposed New Haven Substation lot and the transmission pole locations that fell within or adjacent to the site's boundaries (Poles 297, 298, and 307). A surface survey of the southwest vicinity of the site resulted in the collection of two quartzite flakes, one lithic uniface, and one quartzite projectile point tip. Subsequent subsurface testing in the vicinity of these surface finds yielded no additional artifacts. Subsurface testing a pole location resulted in the recovery of 480 historic artifacts from 13 shovel tests and a test unit. No precontact artifacts were

TABLE 2: KNOWN ARCHAEOLOGICAL SITES WITHIN 1.6 KILOMETERS (1 MILE) OF PROJECT AREA

SITE NUMBER (VT-AD-)/ SITE NAME	TIME PERIOD	ARTIFACTS/FEATURES	REPORTED BY
*448/Champlain Pipeline Project	Precontact	1 quartzite stemmed point base	University of Maine at Farmington (UMF) (Robinson et al. 1992)
459/Champlain Pipeline Project 65A	Precontact	2 quartzite flakes and 3 bifaces	UMF (Robinson et al. 1992)
*460	Late Archaic, Early Woodland	Historic artifacts also present; 690 lithic artifacts	UMF 1990 and University of Vermont Consulting Archaeology Program (UVM CAP), 2006
736/Langdon Smith #1	Precontact	Small pointed quartzite knives	Jack Rosse with Langdon Smith, 1993
737/Langdon Smith #2	Precontact	Quarry-type bifaces	Jack Rosse with Langdon Smith, 1993
738/Langdon Smith #3	Precontact	Dense quartzite scatter of flakes, cores, and chunks; over 100 quarry style bifaces	Jack Rosse, 1993
792/Parker Site Smith #6	Precontact	3 loci of quartzite debitage, drill and scraper	Langdon Smith, 1995
793/Langdon Smith #7	Precontact	1 black chert biface	Langdon Smith, n.d.
794/Langdon Smith #8	Late Archaic	1 black chert Otter Creek, 1 quartzite knife/scraper	Langdon Smith, n.d.
806/Langdon Smith #20	Precontact	Quartzite and blue/black debitage	Langdon Smith and UVM CAP, 2006
807/Langdon Smith #21	Late Archaic, Middle and Late Woodland	1 side-notched Brewerton, 2 triangle points, 2 broken tipped projectile points, 2 preforms, four scrapers—all quartzite, but 1 black chert lithic	Langdon Smith, 1995
808/Langdon Smith #22	Late Archaic	2 Perkiomen gray flint projectile points; 1 hammerstone, 3 broken tips, 3 preforms and 4 scrapers—all quartzite	Langdon Smith, 1995
809/Langdon Smith #23	Middle and Late Woodland	2 quartzite and 2 chert triangles, 6 broken quartzite triangles, 3 quartzite preforms, 5 quartzite scrapers, 1 quartzite knife, quartzite flakes	Langdon Smith, 1995
810/Langdon Smith #24	Precontact	Adjacent to Site 811; 3 projectile points, biface, preforms, scrapers	Langdon Smith, 1995
811	Middle–Terminal Archaic, Late Woodland	3 projectile points, 11 broken points, 21 preforms, 26 scrapers—all Quartzite; base of Otter Creek and 3 triangles	Langdon Smith, n.d.
812/Langdon Smith #25	Precontact	Large preform/scraper (broken); flakes left on site	Langdon Smith, 1995
822/Langdon Smith #34	Precontact	Quartzite scraper/preform; projectile point; all flakes left on site	Langdon Smith, 1995
824/Langdon Smith #36	Middle and Late Woodland	Quartzite debitage, triangle points, biface, scrapers	Langdon Smith, 1995
917/Langdon Smith #64	Precontact	2 preforms, 1 scraper, and quartzite flakes	Langdon Smith, 1997
1105/Langdon G. Smith #123	Precontact	3 loci with black chert and quartzite debitage, bifaces, and FCR	Langdon G. Smith, 1999
1405	Precontact	1 biface	UVM CAP, 2006
1451/Kaolin 1 Native American Site	Precontact	114 quartz flakes, a chert flake, and quartzite core	UMASS Archaeological Services 2008
1452/Kaolin 2 Native American Site	Late Woodland	80 quartzite flakes, a Madison-like projectile point, a bifacially worked quartzite blade fragment, retouched quartzite flake, 5 Levanna points	UMASS Archaeological Services 2008

TABLE 2 (continued)

SITE NUMBER (VT-AD-)/ SITE NAME	TIME PERIOD	ARTIFACTS/FEATURES	REPORTED BY
1453/Kaolin 3 Native American Site	Precontact	Single flake	UMASS Archaeological Services 2008
*1471	Middle Woodland	Irregular Jack's Reef corner-notched projectile point and 1 quartzite flake	UVM CAP, 2010
1475/Elgin Native American Site	Precontact	Ground limestone (possible hoe), chert and quartz flakes	UMASS Archaeological Services 2008
1476/KW1 Native American Site	Precontact	1 chert flake	UMASS Archaeological Services 2008
1477/KW2 Native American Site	Precontact	1 quartzite and 1 rhyolite flake	UMASS Archaeological Services 2008
1706/VGL TL19	Precontact	Chert, quartz, and quartzite flakes; 1 quartzite biface tip	TRC Solutions, 2016

*In or adjacent to project area

recovered from this area of the site. The historic artifacts included brick fragments (n=195), window glass (n=22), nail fragments (n=10), ceramics (n=197), personal items (n=9), faunal remains (n=18), and miscellaneous objects (n=2), as well as minimal amounts or vessel/curved glass (n=9). The ceramics included creamware, pearlware, redware, and whiteware. Seven kaolin pipe fragments were among the personal items recovered. The 1x1-meter test unit was excavated at the location of one of the shovel tests to investigate the potential remnants of a rubble-filled cellar hole. The investigators concluded that the artifacts collected from this portion of the site represented a Euro-American residential site dating to the early 1800s. They also concluded that the Phase IB/II testing [redacted] had exhausted the potential for data collection in that portion of the site, and that the 345kV construction would have no adverse impact on significant archaeological resources in that portion of the project APE, as no structural remains or intact subsurface features were identified. They further noted that "Unevaluated portions of site VT-AD-460 continue to exist outside of the [Northwest Vermont Reliability 345kV Transmission Line] project's APE and continue to be archaeologically sensitive" (Robinson et al. 2009:339-356).

Six cultural resource management survey reports have been completed for previous cultural resource management projects within a 1.6-kilometer (1-mile radius) of the project area in the Town of New Haven and are available on the VDHP ORC website (Table 3). Of these, four were related to the VELCO Northwest Vermont Reliability Project. The studies determined that the area surrounding the New Haven Substation was highly sensitive for precontact resources, given the environmental conditions and proximity to known precontact sites. During these studies, a Phase I survey was conducted of the then-proposed New Haven Substation, located south of the current project area, as well as the transmission line corridor south of the substation (Robinson et al. 2009) and north of the current substation in the current project area (Robinson et al. 2009; UMAS 2008). The only sites identified as a result of these surveys within the project area are Sites VT-AD-448, Site VT-AD-460, and VT-AD-1471.

Additional surveys that have identified sites within a 1.6-kilometer (1-mile) radius of the APE for which reports are not available on the ORC website include the Champlain Pipeline Project survey conducted in the early 1990s (Robinson et al. 1991, 1992) and the Vermont Green Line (VGL) project survey conducted in 2016.

Archaeological reports for the Champlain Pipeline project are not available on ORC because the project was canceled. Sites identified in or near the APE are Sites VT-AD-448, -459, and -460 (see Table 2). Site VT-AD-460 was identified during the Champlain Pipeline project; a small portion of the site around Transmission Pole [redacted] and within the fenced portion of the New Haven Substation was subject to Phase

TABLE 3: PREVIOUS ARCHAEOLOGY SURVEYS IN PROJECT VICINITY

REPORT	PROJECT	RESULTS/RECOMMENDATIONS	REPORT No.
Frink 2003	Summary of the Archaeological Resource Assessments and Phase I Archaeological Site Identification Studies for the VELCO Northwest Reliability Project	New Haven Substation parcel highly sensitive for precontact archaeological sites; substation is within a historic property (Site VT-AD-460). Archaeologists proposed MOA to include site identification procedures, avoidance of identified sites, and commitments to data recovery for significant sites that will be affected by the project.	1301
Frink and Baker 2003	Archaeological Resource Assessment for the VELCO High Voltage Transmission System Upgrade for the Northwest Reliability Project between the New Haven Substation and Queen City Substation	Portions of project near New Haven substation deemed archaeologically sensitive (proximity to drainages, wetlands, known precontact sites). Archaeologists proposed MOA to include site identification procedures, measures to avoid identified sites, and commitments to data recovery for significant sites that will be affected by the project.	194
Frink et al. 2003	Phase IA Archaeological Investigation of the Proposed VELCO Northwest Reliability Project	Portions around New Haven Substation scored over 32 on VDHP model (glacial lake shoreline). Field inspection identified drainages and level terraces. Archaeologists considered area archaeologically sensitive (environmental factors coupled with known precontact sites in vicinity). Archaeologists proposed MOA to include site identification procedures, avoidance of identified sites, and commitments to data recovery for significant sites that will be affected by the project.	1291
WAC 2005	Archaeological Resources Assessment for NH9813(1)S Middlebury-New Haven, U.S. Route 7	No further archaeological investigation recommended. Proposed road improvements limited to areas disturbed by existing road and ditch improvements.	187
Brigham et al. 2006	Archaeological Resources Assessment of the Proposed New Haven Community Playground and Athletic Fields	Two areas of archaeological sensitivity identified, recommended for Phase I subsurface testing.	237
Donta et al. 2009	Phase II Archaeological Site Evaluation and Limited Phase III Data Recovery projects at 28 archaeological sites for the proposed Northwest Reliability Project	*Kaolin Site 1*: Over 500 additional artifacts found in 26 test units; none temporally diagnostic. Almost all raw material gray quartzite. One feature identified as precontact burn feature, e.g., hearth. Considered eligible for NRHP. Avoidance not possible, therefore conducted limited Phase III, which yielded eight pieces of chipping debris. Site considered a habitation area, e.g., short-term or seasonal camp. *Kaolin Site 2*: Over 130 additional precontact artifacts found in 23 test units. Three lithic concentration loci and one feature of unknown function identified. Considered eligible for NRHP. Avoidance not possible, therefore conducted limited Phase III: 55 excavation units yielded additional 232 artifacts, four cultural features identified. Interpreted as occupation site. *Kaolin Site 3*: 11 Phase II shovel tests yielded no additional artifacts; site recommended as not eligible for NRHP.	1241

IB survey and Phase II Site Evaluation as part of the VELCO Northwest Vermont Reliability Project (Robinson et al. 2009). This survey yielded additional data on the historic component of Site VT-AD-460, but the investigated area was restricted to the existing modern New Haven Substation and Transmission Pole [redacted]. A copy of the Robinson et al. 2009 report is not on file on the ORC website but was available through VELCO archives. In subsequent surveys Site VT-AD-448 has not been relocated, in part because the original find spot is identified only generally. However, since no additional materials have been found in the subsequent surveys, it appears likely that this site consisted only of the single projectile point that was collected and no additional evidence of this site is present.

In 2016 TRC Solutions identified Site VT-AD-1706 as part of the VGL project (see Table 2). The Vermont Gas Systems (VGS) Addison Natural Gas Project (ANGP) survey conducted in the 2010s (Robinson and Crock 2012) occurred in the adjacent parcel, but no sites were identified within 1 mile of the APE.

D. Development in the Project Area

WSP reviewed publicly available historical maps and aerial imagery of the project area. An 1857 map depicts no structures in the APE (Walling 1857). The Beers (1871) map depicts only one structure near the project area, a building marked as belonging to a J. Bloss depicted east of the east boundary; however, the initials “G.D.H.” are written in the northern parcel adjacent to what is now Route 17 (Main Street) (Figure 3). This likely refers to “G.D. Hinman,” depicted on the west side of North Street, and the initials indicate that G.D. Hinman owned the land south of Main Street where the APE is located. Topographic maps from the early twentieth century (United States Geological Survey [USGS] 1905, 1920, 1943) and aerial imagery from the mid- to late twentieth century (Nationwide Environmental Title Research, LLC [NETR] 2019) do not indicate any structures in the APE. Recent aerial imagery indicates that the much of the area north of the existing substation and west of Site VT-AD-460, which had been previously surveyed, has undergone significant disturbance from cut-and-fill, grading, graveling, and other construction activities. Along the west edge, the construction of the gas pipeline and associated disturbances related to that construction are also apparent from recent aerial imagery.

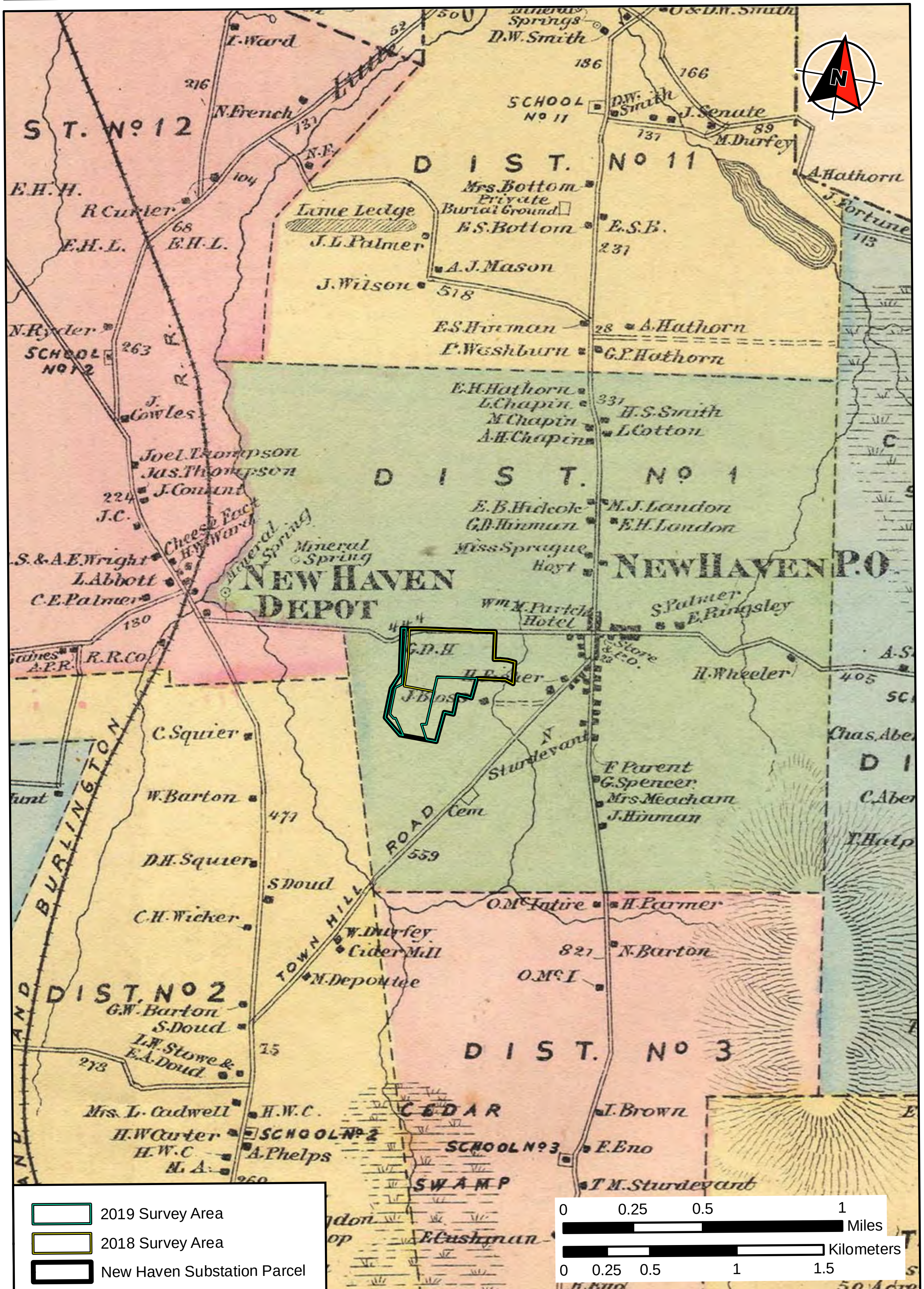

FIGURE 3: Project Area in 1871 (Beers 1871)

IV. Methodology and Results of ARA

A. ARA Methodology and Research Design

1. Background Research

WSP's goal for the ARA was to survey the 29.3-hectare (72.3-acre) parcel (the project area) as identified by VELCO in 2017 and 2019 to identify archaeologically sensitive areas. This would allow VELCO maximum flexibility in avoiding sites that are eligible for the NRHP. The parcel containing the New Haven Substation and the location of the proposed NHOF was subject to an ARA in 2017 (Louis Berger 2018). An ARA of the southern half of the parcel, conducted in October 2019, was performed in support of the 248 Permit filing application to the PUC

For the ARA WSP conducted background research, an analysis of the project area using the *Environmental Predictive Model for Locating Precontact Archaeological Sites* (VDHP 2002) and the Vermont Online Resource Center (ORC) map tool (VDHP 2017b) to inform its assessments, and a field inspection of the entire project area. The background research included a review of site files from sites located within 1.6 kilometers (1 mile) of the project area, reports from projects conducted within the Town of New Haven, and historical maps and local histories (see Chapter III).

2. Determination of Archaeologically Sensitive Areas

WSP's ARA of VELCO's New Haven Substation parcel followed several stages. WSP first reviewed the APE using the VDHP ORC online map tool (2017b) and predictive model (VDHP 2002) to identify the distribution of key environmental criteria possibly affecting the location of precontact archaeological sites. The environmental criteria listed in these two predictive tools are summarized below.

- Proximity to a:
  - Permanent Stream/River
  - Waterbody
  - Wetlands
  - Stream/Waterbody Confluence
  - Head of Drainage
  - Stream Confluence
  - Waterfalls
- The presence of:
  - Glacial Lake Shore Line
  - Glacial Outwash and Kame Terrace
  - Floodplain Soils
  - Level Terrain
  - Significantly Sloped Terrain

For the seven criteria defined by proximity, the radius of proximity defined as significant is typically 180 meters (590 feet). The value attached to proximity was refined according to the Environmental Predictive Model, with a higher significance and greater score given to areas within 90 meters (295 feet) of a particular environmental criterion, versus a lower significance and half the score given to locations between 90 and 180 meters (295 and 590 feet) of the same criterion. The other five criteria are based on presence/absence (i.e., presence on level terrain versus presence on significantly sloped terrain) and not on varying levels of proximity. The Environmental Predictive Model attaches scores to each of these criteria as well as other criteria, including the presence of burials and known archaeological sites.

The GIS model developed for this project consists of a digital version of the Environmental Predictive Model (VDHP 2002). Because the GIS-based model was created using the ArcGIS 10.2.1 model builder from available environmental data layers, the results of the model required visual confirmation by field inspection. Areas identified as archaeologically sensitive by the GIS model were visually assessed and field inspected to confirm sensitivity. The presence and/or absence of environmental variables used to construct the model was visually assessed (water sources, soils, topography, etc.). The field inspection also assessed and/or recorded evidence of recent disturbance in areas of sensitivity, and looked for traces of structural remains, particularly in areas where historical roads, map-documented structures, or other features might be located. The field inspection clarified the boundaries and sensitivity of each area. The data from the background research discussed in Chapter III and the predictive modeling data were combined with the results of the field inspection to evaluate archaeological sensitivity. WSP conducted the field inspections, walking over the entire project area, on November 14, 2017, and October 15, 2019.

WSP determined sensitivity for the possibility of historical archaeological sites through an analysis of historical maps of the project area (Beers 1871; Walling 1857) as well as regional histories. These historical maps are useful sources of information about old roads as well as the location of historic-era structures and other features. WSP also researched the VDHP report and site files available through the ORC as well as in-house resources to identify known sites and the results of previously conducted cultural resource management surveys surrounding the project area, as described in Chapter III. Familiarity with known sites is useful both for understanding where sites might be located and for interpreting what is found and assessing its potential significance.

B. Results of ARA

[redacted]

Evidence of grading, cut-and-fill activities, and subsurface construction disturbances were evident along the west edge (Plate 1). [redacted] much of the west edge was moderately to steeply sloped, and had been artificially leveled in some areas to accommodate the gas pipeline.

[redacted]

Figure 4
4 Project Area Showing Archaeological Sensitivity (REDACTED)

PLATE 1: Project Area, Disturbed Gas Pipeline and Slope Along Western Edge, View to Southwest

IMAGE HAS BEEN REDACTED

PLATE 2:

IMAGE HAS BEEN REDACTED

PLATE 3:

IMAGE HAS BEEN REDACTED

PLATE 4:

IMAGE HAS BEEN REDACTED

PLATE 5:

IMAGE HAS BEEN REDACTED

PLATE 6:

IMAGE HAS BEEN REDACTED

PLATE 7:

V. Methodology and Results of Phase IB Archaeological Survey

A. Phase IB Methodology

The first Phase IB subsurface survey was conducted July 3-20, 2018. A 10-meter shovel testing grid was established over all level, dry, and undisturbed portions of the APE, resulting in the excavation of 482 shovel tests, including radials excavated at 5-meter intervals. Of the planned total of 506 tests, 24 could not be excavated.

The 2018 New Haven Substation project area (APE) was located in two rectangular agricultural fields separated by a thin treeline (Figure 5a-b; Plates 8-13). [redacted] The north field of the project area was relatively flat with gentle dips and crests across the landform (see Plates 8, 9, and 13). The south field was more uniform and contained fewer dips and crests than the north field (see Plates 11 and 12). A transmission line traversed the north portion of the south field. At the east edge of the south field, a wood line sloped down to a drainage (see Plate 10).

The second Phase IB subsurface survey was conducted October 14-16, 2019. A 10-meter shovel testing grid was established over all level, dry, and undisturbed portions of the project area located within the area of potential impacts for project design elements associated with the proposed NHOF, resulting in the excavation of 31 shovel tests. Areas of slope or man-made disturbances were excluded from subsurface testing. The area subjected to subsurface testing was located within Site VT-AD-460. [redacted]. A fairly level hill crest sloped down to the west to the man-made drainage; the area west of the ditch was level or gently to moderately sloped.

Transects were labeled by letters, and shovel tests were labeled by transect and in numerical order along the transect (e.g., H-1, MM-7). Shovel tests, placed at 10-meter (33-foot) intervals, measured 50 centimeters (1.6 feet) square and were excavated by stratum. As each natural or cultural stratum was excavated, that stratum was assigned an alphabetic designation (Stratum A, Stratum B, etc.) to indicate its stratigraphic relationship to the other strata in the shovel test. The letter designations were assigned beginning with the first excavated stratum of the shovel test and proceeded alphabetically through each subsequent stratum, until the termination of the shovel test. All excavated material was screened through 0.64-centimeter (0.25-inch) mesh hardware cloth to recover any possible artifacts. The shovel test data were recorded on standardized WSP forms and included depth, soil texture, soil color according to Munsell soil color charts, and artifact content. Shovel test proveniences were recorded using a Trimble 7x Global Positioning System (GPS) unit with sub-meter capability, and project area conditions were recorded on a project plan map. Color photographs were taken of the project area to document disturbances and topographic features and to complement the field notes. Appendix A provides a complete log of the shovel test data.

B. 2018 Phase IB Survey

WSP excavated a total of 482 shovel tests in all testable portions of the areas of archaeological sensitivity. The tested areas include the proposed location of the NHOF (see Figure 5a). During the excavations a single precontact projectile point was recovered. Investigators excavated radial shovel tests around this find at 5-meter (16.4-foot) and 2.5-meter (8.2-foot) intervals to determine whether this find represents an extant prehistoric site assemblage or an isolated find. No artifacts were recovered in the vicinity of the proposed location of the NHOF.

Figure 5
5a	Location of Subsurface Testing and Results (REDACTED)

Figure 5
5b Location of Subsurface Testing and Results (REDACTED)

PLATE 8: Project Area, Area E, View to East

IMAGE HAS BEEN REDACTED

PLATE 9:

IMAGE HAS BEEN REDACTED

PLATE 10:

PLATE 11: Project Area, Area H, View to Southwest


PLATE 12: Project Area, Area F, View to Northwest


PLATE 13: Project Area, Area J, View to North

IMAGE HAS BEEN REDACTED

PLATE 14:

Some of the sensitive areas spanned the north and west boundaries of the project area (see Figure 5a). The most common soil profile for these sections was typified by Shovel Test G-1. Stratum A consisted of an olive brown (2.5Y 4/3) silty clay loam with 2 to 5 percent gravel, extending from 16 to 40 centimeters (0.5 to 1.3 feet) below ground surface (bgs), for an average of 28.4 centimeters (0.9 foot) bgs; Stratum B consisted of a light olive brown (2.5Y 5/4) compact sandy loam mottled with light yellowish brown (2.5Y 6/3) compact sandy loam with 2 to 5 percent gravel. The second most common soil profile for this section was typified by Shovel Test F-1. Stratum A consisted of dark brown (10YR 3/3) silt loam; Stratum B consisted of a light yellowish brown (2.5Y 6/3) mottled with brown (2.5Y 5/3) clay loam with 10 percent cobble rocks, ranging from 30 to 55 centimeters (1.0 to 1.8 feet) bgs, for an average of 42.1 centimeters (16.6 inches) bgs.

In the center portion of the project area, a typical soil profile is illustrated by Shovel Test YY-10. Stratum A consisted of a light olive brown (2.5Y 5/6) compact silt loam; descriptions of Stratum A in other shovel tests include pale brown (10YR 6/3) compact silt loam, olive brown (2.5 Y 4/4) silty clay loam with 10 percent gravel, and brown (10YR 4/3) silt loam with 5 to 10 percent gravel. Stratum A extended to between 9 and 50 centimeters (0.75 and 1.76 feet) bgs, averaging 27.5 centimeters (0.85 foot) bgs. Stratum B consisted of grayish brown (2.5Y 5/2) compact silt loam; variants included strong brown (7.5YR 5/6) silt loam and light olive brown (2.5Y 5/6) silt loam. Stratum B extended from 23 to 70 centimeters (0.75 to 2.32 feet) bgs, averaging 41.3 centimeters (1.87 feet) bgs. Stratum C consisted of a light yellowish brown (2.5Y 6/4) silty clay loam with ferrous oxide staining; variants included a light olive brown (2.5Y 5/6) silty clay loam with ferrous oxide staining and pale yellow (2.5Y 7/4) silty clay loam, extending from 36 to 80 centimeters (1.2 to 2.7 feet) bgs and averaging 52.5 centimeters (1.84 feet) bgs. Some shovel tests were excavated into a Stratum D, which varied from a grayish brown (2.5Y 5/2) silty clay with ferrous oxide staining, a light gray (2.5Y 7/2) mottled with light yellowish brown (10YR 6/8) silt loam, an olive yellow (2.5Y 6/6) mottled with yellow (2.5Y 7/6) silt loam with ferrous oxide staining, a grayish brown (2.5Y 5/2) silty clay, to a light olive brown (2.5Y 5/3) mottled with yellowish brown (10YR 5/6) sandy clay loam with ferrous oxide staining and less than 1 percent gravel. Stratum D ranged between 55 and 71 centimeters (1.87 and 2.32 feet) bgs, averaging 63 centimeters (24.8 inches) bgs.

Areas G, H, and L spanned the south and east parts of the project area (see Figure 5a). The stratigraphy was typified by Shovel Test AW-6. Stratum A consisted of a brown (10YR 4/3) silt loam; variants included olive brown (2.5Y 4/3) compact silt loam and dark brown (10YR 3/3) silt loam with 5 to 10 percent cobble rock. Stratum A extended between 6 and 35 centimeters (2.4 and 13.8 inches) bgs, averaging 21.8 centimeters (8.6 inches) bgs. Stratum B consisted of a grayish brown (2.5 5/2) silt loam; variants included olive brown (2.5Y 4/4) compact silty clay loam with ferrous oxide staining and light gray (2.5Y 7/1) compact silty clay with ferrous oxide staining. Stratum B extended from 19 to 53 centimeters (7.5 to 20.9 inches) bgs, averaging 34.8 centimeters (13.7 inches) bgs. Stratum C consisted of a gray (2.5Y 6/1) compact silty clay loam with ferrous oxide staining, extending from 32 to 60 centimeters (1.0 to 2.0 feet) bgs, averaging 43.7 centimeters (17.2 inches) bgs.

Archaeologists recovered a single broken, narrow, side-notched projectile point from [redacted] in Stratum B, located 17 to 28 centimeters (0.55 to 0.95 foot) below datum. In terms of morphology, the point resembles either the Brewerton Side-Notched or Meadowood point type. The former is consistent with a Middle to Late Archaic temporal affiliation (5000 to 4000 BP), and the latter is consistent with an Early Woodland period affiliation (3000 to 2000 BP). Damage to the base makes positive identification of either type difficult. The material appears to be Onondaga chert sourced from outcroppings west of the project location, possibly in New York State. Potential signs of retouching are present over the surface of the point. A series of 12 radial shovel tests excavated in the cardinal directions surrounding the shovel test recovered no additional precontact material. The projectile point represents an isolated precontact find probably associated with a single hunting episode. This projectile point is an isolated find, similar to Site VT-AD-448 located [redacted].

Historic cultural material was recovered from [redacted] [six] shovel tests. [redacted] [The assemblage includes] two unaffiliated whiteware shreds (1850-present), [redacted] three whiteware sherds (1850-present) [redacted] and one manganese glass stopper (1880-1915). Historic cultural material from all areas was recovered from Stratum A, which extended from 0 to 35 centimeters (0 to 13.8 inches) bgs, averaging 30.5 centimeters (12 inches) bgs. This assemblage is representative of dispersed field scatter reflecting mid- to late nineteenth-century through early twentieth-century occupation and utilization of the project area. Because the historic material is limited in density and diversity, the identified assemblage is of limited research value, and therefore no historic site designation is recommended for the historic artifact assemblage.

As part of the shovel testing, an attempt was made to relocate Site VT-AD-1471 ([redacted]) (see Figure 5a), which had been identified by two previous surface surveys when the field was actively farmed in row crops. Despite modeled sensitivity, no additional shovel testing had been done in the previously surveyed areas. Nothing was recovered from the reported location of Site VT-AD-1471, and it therefore appears that no materials comprising this site are still in place.

C. 2019 Phase IB Survey

The 2019 Phase IB survey was limited to areas [redacted] within or near potential areas of development associated with the NHOF project design plans, specifically the area designated for the stormwater management system and the landscape planting area. WSP excavated a total of 31 shovel tests [redacted]. The densest portion of the site was situated [redacted], and the entirety of the densest portion that fell within potential impact areas was subsurface tested at 10-meter intervals (Transects A, B, C, D, and E). Portions of the site that fell within sloped or disturbed man-made drainage areas were not subsurface tested. A single transect of shovel tests (Transect A) placed at 10-meter intervals was excavated along the proposed alignment of the landscaped planting area. One north-south transect (Transect F) was placed on the level ground west of the man-made drainage ditch, at the base of the east-facing slope. Two shovel tests (Transect G) were excavated in an area proposed for drainage connections to an existing man-made ditch.

In general, the typical soil profile for the shovel tests excavated [redacted] consisted of two strata, as typified by Shovel Test E-1: Stratum A (Ap horizon), a grayish brown (2.5Y 5/2) silty clay extending from 0 to 24 centimeters (0 to 9.4 inches) bgs; and Stratum B (Bt horizon), a light brownish gray (2.5Y 6/2) mottled with a light olive brown (2.5Y 5/4) clay extending from 24 to 56 centimeters (9.4 to 22 inches) bgs. The B/E horizon was absent from most shovel tests, but it was present in Shovel Test A-1 as a grayish brown (2.5Y 5/2) clay loam extending from 20 to 30 centimeters (7.9 to 11.8 inches) bgs. In some shovel tests a third stratum appeared, Stratum C (BC horizon), consisting of a gray (10YR 5/1) clay or a light brownish gray (2.5Y 6/2) mottled with a dark yellowish brown (10YR 4/4) clay. Stratum A soil colors varied slightly near the drainage ditch, where they consisted of a dark grayish brown (2.5Y 4/2). Stratum B soil colors were occasionally mottled with a yellowish red (5YR 4/6). Soil textures for Stratum A typically ranged from a silty clay loam to silty clay; Stratum B and C textures ranged from silty clay to clay. Stratum A ranged from 13 to 33 centimeters (5.1 to 13 inches) in depth, with an average depth of 23 centimeters (9.1 inches) bgs. Stratum B ranged between 28 and 60 centimeters (11 and 23.6 inches) bgs, with an average excavated thickness of 20 centimeters (7.9 inches). Stratum C, where present, extended from 49 to 63 centimeters (19.3 to 24.8 inches) bgs. The mapped soil series for this area of the site is a Vergennes clay (VgB).

A total of six shovel tests contained artifacts. Eight precontact artifacts consisting of quartzite debitage and three historic artifacts consisting of fragments from a pocket knife or straight razor (n=2) and a miscellaneous iron fastener (n=1) were recovered from Stratum A (Ap horizon), and were recovered at depths of 26 centimeters (10.2 inches) or less, with all but one recovered from depths of less than 21 centimeters (8.3 inches) or less. No recovered materials were temporally diagnostic. With the exception of the miscellaneous fastener fragment, all of the artifacts were recovered from the area mapped as the high-density zone for artifacts during the previous surface survey conducted for the Champlain Pipeline Project. No precontact artifacts were recovered outside this zone.

The precontact artifacts consist of lithic debitage and are generally very small, secondary or tertiary quartzite or quartz flakes with no evidence of heating or cortex. The recovered artifacts include four biface reduction flakes (three quartzite and one quartz) and two general quartz debitage pieces. Two of the shovel tests contained only historic artifacts, and the remaining four contained only precontact artifacts. Of those, two shovel tests yielded only one debitage piece each, one shovel test yielded two debitage pieces, and one shovel test yielded four debitage pieces. The two pocket knife fragments were recovered from the same shovel test. The pocket knife fragments are not dateable, and it is possible that this artifact represents a more recent episode of casual or accidental discard [redacted].

VI. Architectural Reconnaissance Survey

The purpose of the Architectural Reconnaissance Survey was to determine if any historic architectural resources are present within a 0.25-mile radius of the New Haven Operations Facility building (project area) that have been previously listed in the Vermont State Register of Historic Places (SRHP) and/or the NRHP (the criteria for listing in both are identical), and to identify any previously unsurveyed historic architectural resources in the project area that may be eligible for listing in the SRHP and/or NRHP. The historic architectural investigations were undertaken pursuant to 10 VSA Chapter 151 and 30 VSA Chapter 5, Section 248. All structures more than 50 years of age were included in the survey, and those that appeared to meet the NRHP criteria were evaluated for eligibility.

Architectural survey of the project area was conducted on October 15, 2019. Historical aerial photography was used to determine the buildings located within a 0.25-mile radius of the project area that are greater than 50 years of age. All of these buildings were marked on current maps (Figure 6), then surveyed and documented. The survey included pedestrian reconnaissance from public roadways and documentation with digital photography and field notes.

The majority of the surrounding buildings were built in the last quarter of the twentieth century and have not yet reached 50 years of age, and were therefore not surveyed. A split-level Ranch, located at 372 Town Hill Road (Plate 15), was estimated to have been constructed in the mid-1970s, but research with the New Haven Town Lister confirmed that the dwelling was constructed in 1989, and it is therefore recommended as not eligible for listing in the NRHP. A garage (Plate 16) adjacent to the driveway for 538 Town Hill Road, appears to have been constructed between 1972 and 1980, and this structure is recommended as not eligible for listing in the NRHP. One property, 214 Town Hill Road (Plates 17-20), is just outside the 0.25-mile radius and was added to the survey because it is listed in the Vermont SRHP. Because the Vermont SRHP and the NRHP have the same listing requirements, it is recommended as eligible for listing in the NRHP. The New Haven Village State Register Historic District is located northeast of the 0.25-mile radius and was not surveyed, but it is noted here for reference (Table 4).

TABLE 4: SURVEYED PROPERTIES WITHIN 0.25 MILE OF NEW HAVEN SUBSTATION

PROPERTY NAME/ADDRESS	CONSTRUCTION DATE	SURVEY RECOMMENDATION/ DESIGNATION STATUS
372 Town Hill Road	1989	Not Eligible
538 Town Hill Road	ca. 1975	Not Eligible
214 Town Hill Road	ca. 1870	SRHP Listed/NRHP Eligible

214 Town Hill Road

The one-and-one-half-story Greek Revival frame residence is located on the west side of Town Hill Road and faces southeast. The main block is two bays wide and two units deep with a front-gable roof and center brick chimney and rests on a parged stone foundation. A three-bay by one-bay, one-and-one-half story side-gable ell with central chimney extends to the north from the dwelling, featuring a hipped-roof enclosed porch and a modern garage door at the north end. A six-over-six wood-sash double-hung window is located at the second level of the gable end. A small gabled ell also extends off the west elevation of the main block.

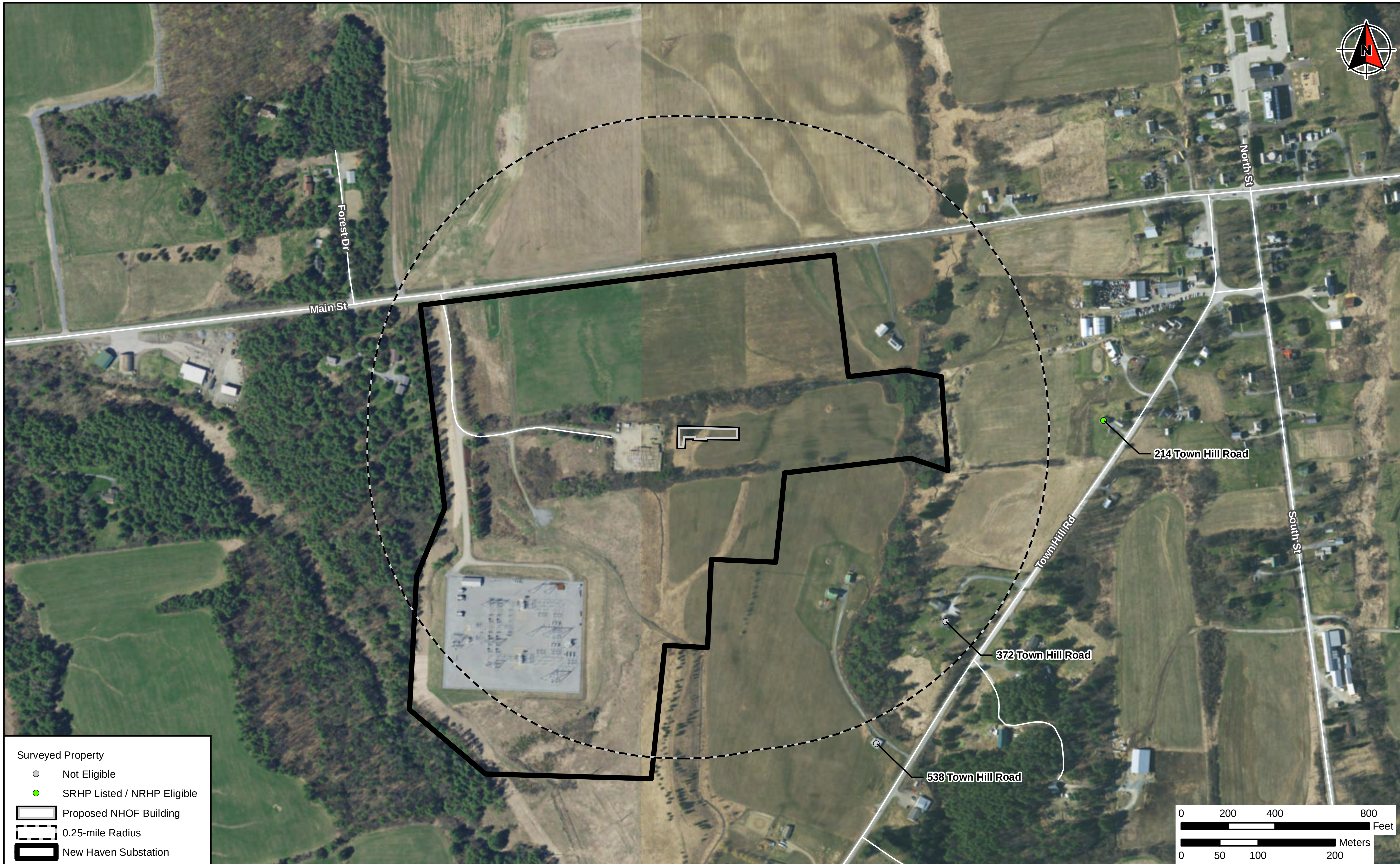

FIGURE 6: Surveyed Properties within 0.25 miles of New Haven Substation (ESRI World Imagery 2018)

PLATE 15: 372 Town Hill Road, View to West

PLATE 16: Garage at 538 Town Hill Road, View to West

PLATE 17: 214 Town Hill Road, View to Southwest

PLATE 18: 214 Town Hill Road, View to West

PLATE 19: 214 Town Hill Road, View to North

PLATE 20: Sheds at 214 Town Hill Road, View to West

The residence is encased in aluminum siding, and the roofs are clad in polychrome slate shingles. The east elevation features a wood door surround with entablature hood molding, multi-light sidelights, and a six-panel wood door, currently covered with an aluminum storm door. The lower-level picture window with flanking double-hung window units is a modern replacement, as are the two upper-level double-hung windows. The cornice returns and vergeboard remain despite the modern aluminum siding. The south elevation features a three-part bay window within which the window units have been replaced with modern double-hung sash. A small gable-roof shed likely covers an entrance to the basement. The one window visible on the rear ell is also a modern double-hung replacement unit.

A small barn and a shed are also located on the property. These wood frame structures are in poor condition. The gable roofs currently display polychrome slate shingles.

The property at 214 Town Hill Road was listed in the Vermont SRHP around 1992 (Johnson and Gilbertson 1992), and at that time it likely displayed a similar level of historical integrity. It retains its original massing and entrance, and despite material changes to the windows and siding, it is recommended as remaining eligible for listing in the SRHP/NRHP.

To maintain the rural landscape setting of the locale and to blend in with nearby building types, VELCO has designed the NHOF building to resemble an agricultural structure (i.e., a barn). In addition, screening plantings are proposed to limit any further impact to the local viewshed. These efforts are intended to have beneficial effects as they will limit the view of the proposed building. The property is outside the 0.25-mile radius of the project area, and the existing substation is not highly visible from the house because of distance and intervening vegetation. In terms of potential effects, the New Haven Substation is an established component of the existing landscape, and upgrades to the substation would be consistent with existing equipment. The proposed project is expected to have no adverse effect on this historic property.

VII. Summary and Conclusions

On behalf of VELCO, WSP completed an ARA and a Phase IB archaeology survey for a portion of the assessment area for the New Haven Substation in the Town of New Haven, Addison County, Vermont. WSP conducted this ARA and Phase IB survey in support of VELCO's 2019 Section 248 Permit filing application to the Public Utility Commission. The overall project area consists of a parcel totaling 29.3 hectares (72.3 acres). VELCO proposes to use a portion of the expansion area for the construction of the New Haven Operations Facility (NHOF). The overall goal of this investigation was to investigate each part of the project area determined to be archaeologically sensitive to determine if archaeological resources are present and make recommendations on the eligibility of such resources for listing in the National Register of Historic Places (NRHP). The entire 29.3-hectare (72.3-acre) assessment area was surveyed during two ARA field visits conducted in 2017 and 2019. The Phase IB subsurface testing was conducted during two field investigations in 2018 and 2019, and covered a total of 15.51 acres (6.28 hectares)

Archaeologists excavated a total of 513 shovel tests at 10-meter (33-foot) intervals in areas of defined archaeological sensitivity, including 20 radial shovel tests excavated around positive Shovel Test [redacted] and selected shovel tests containing historic material. No additional material was recovered from radial shovel tests. The single projectile point recovered is an isolated find. The historic material recovered from the survey consists of five whiteware sherds (1850-present) and one manganese glass stopper (1880-1915). This assemblage is representative of dispersed field scatter of limited research value. As a result these resources are not considered eligible for inclusion in the NRHP.

Of the excavated shovel tests, 31 shovel tests were excavated within the previously recorded boundaries of Site VT-AD-460, which may be impacted by proposed project designs. Although the previous surface survey indicated that this area included the area of highest artifact concentration, no subsurface testing had ever been conducted to assess subsurface integrity. The 31 excavated shovel tests yielded a total of eight non-diagnostic pieces of lithic debitage and three non-diagnostic historic artifacts (one iron fastener, two pocket knife fragments). These artifacts were recovered from the Ap horizon, generally within 20 centimeters (7.9 inches) of the surface. All precontact material was recovered from the hill crest, within the previously recorded high-density artifact zone. The downward slope to the ditch and the portion of the site west of the man-made ditch yielded no artifacts. No intact subsurface cultural deposits or subsurface features were encountered during the subsurface testing.

No new precontact or historic archaeological sites were identified during the survey of previously unsurveyed areas. Of the three previously identified sites in the project area, Site VT-AD-448 was an isolated find. Attempts to relocate Site VT-AD-1471 were unsuccessful, and therefore the prior assessment of not eligible for the NRHP is confirmed. Site VT-AD-460 was relocated [redacted]; however, recovered artifacts were limited to non-diagnostic precontact lithic debitage and historic ferrous material. Subsurface artifact density across the site was low, and artifacts were recovered from shallow plowzone (Ap horizon) deposits only. Given the limited subsurface artifacts present, the lack of diagnostic materials, the absence of intact subsurface deposits or cultural features, and the restriction of all cultural materials to the hill crest, it is WSP's opinion that the portion of Site VT-AD-460 located within the NHOF's project design plans lacks the potential to further our understanding of Late Archaic or Early Woodland lithic scatters in the Champlain Valley region of Vermont or our understanding of eighteenth- or early nineteenth-century Euro-American domestic occupation sites. This portion of the site would therefore not contribute to NRHP eligibility under Criterion D. WSP's opinion is that further archaeological testing in this portion of the site would not yield additional data, as the archaeological potential of this portion of the site has been exhausted.

WSP therefore recommends the proposed project design as not adversely affecting this portion of Site VT-AD-460.

Portions of Site VT-AD-460 outside the project design plans and Pole [redacted] remain unevaluated as to level of integrity and NRHP eligibility, and should project design plans change, further archaeological testing of unevaluated portions of the site might be required. WSP found no NRHP-eligible historic resources in the other surveyed areas of the New Haven Substation property, and recommends the planned ground-disturbing activities at this property as having no effect on the evaluated portion of Site VT-AD-460.

To maintain the rural landscape setting of the locale and to blend in with nearby building types, VELCO has designed the NHOF building to resemble an agricultural structure (i.e., a barn). In addition, screening plantings are proposed to limit any further impact to the local viewshed. These efforts are intended to have beneficial effects as they will limit the view of the proposed building. The property at 214 Town Hill Road, which is just outside a 0.25-mile radius of the project area, is listed in the Vermont SRHP and is recommended as eligible for listing in the NRHP. Because of distance, intervening vegetation, and the substation's present location on the landscape, construction of the NHOF is anticipated to have no adverse effect on this property.

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Appendix A

SHOVEL TEST LOGS
NOTE: THIS APPENDIX HAS BEEN REDACTED

Appendix B

METHODS OF ARTIFACT CATALOGING AND ANALYSIS
ARTIFACT INVENTORY
NOTE: THE ARTIFACT INVENTORY HAS BEEN REDACTED

METHODS OF ARTIFACT CATALOGING AND ANALYSIS

A. LABORATORY PROCESSING

All artifacts were transported from the field to the archaeological laboratory at Louis Berger Inc., a WSP Company (WSP). In the field, artifacts were bagged in 4-mil, resealable polyethylene bags. Artifact cards bearing provenience information were included in the plastic bags. A Field Number was assigned to each unique provenience in the field. This number appears with all the provenience information and is used throughout processing and analysis to track artifacts.

Prehistoric lithics and most historic artifacts were washed in water with a soft toothbrush. Prehistoric ceramics, faunal material, and fragile artifacts were wet-brushed with a soft natural-bristle paintbrush or were simply dry-brushed. Metal objects were cleaned using a dry toothbrush or stainless steel wire brush. All artifacts were laid out to air-dry in preparation for analysis.

During analysis, individual Specimen Numbers were assigned to artifacts. After analysis, the artifacts were re-bagged into clean, perforated 4-mil resealable polyethylene bags. Artifacts are organized sequentially first by Site Number, then Field Number and finally by Specimen Number. Artifacts were either returned to the landowner or submitted for curation. Before submitting for curation, catalog numbers were assigned in accordance with Vermont Archaeology Heritage Center guidelines. An acid-free artifact card listing full provenience information and analytical class was included in each bag.

When labeling, all artifacts dime sized and larger were labeled as follows:

State Site Number	Example:	VT-AD-123
Catalog Number		CAT ####

No conservation treatment on the artifacts was needed nor performed.

B. ANALYTICAL METHODS

All artifact analyses were conducted by the Laboratory Supervisor and/or Material Specialist(s). WSP maintains an extensive comparative collection and laboratory research library to contribute to the completeness and accuracy of the analyses.

WSP has developed a flexible analytical database system that fully integrates all artifacts in one database for use in data manipulation and interpretation. The computerized data management system is written using Microsoft Access, a relational database development package that runs on a Windows® platform. Each class of artifacts (historic ceramics, curved (vessel) glass, small finds/architectural, historic tobacco pipes, and faunal) has a series of attributes, sometimes unique to that class, that are recorded to describe each artifact under analysis. Artifact information (characteristics) was entered into the system during the process of analysis. The system was then used to enhance the artifact records with the addition of provenience information. WSP maintains a complete type and attribute coding system maintained in the database.

The format for the historic artifacts is based on the South/Noël Hume typology (South 1977), as modified for use in a computerized system (Louis Berger 2013).

The Notes field allows individual written comments applicable to a specific entry. In general, notes are used to describe particulars of decorative motifs or unusual characteristics, or to record bibliographic references used for identification or dating.

C. SMALL FINDS/ARCHITECTURAL ANALYSIS

For the small finds/architectural analysis, each artifact was identified by its group and class, Material Type and Part/Portion, and received a count and/or weight. Additional information, including Characteristic, Maker's Marks, Backmark, Color, and Decoration, is recorded as identified for the individual artifacts if present or needed.

Begin/End Date. Dates for certain artifact were generated in the database based on the Type/Subtype. Other dates were entered manually and were based on various artifact characteristics. References used for dating of artifacts include but are not limited to Edwards and Wells (1993), Friedel (1987), Gurcke (1987), Hogg (1985), Hughes and Lester (1981), Johnson (1942), King (1991), Kovel and Kovel (1961), Lamm et al. (1970), Lavitt (1983), Luscomb (1967), Martells (1976), McGuinn and Bazelon (1984), Melton (2014), Munsey (1970), Nelson (1968), Noël Hume (1969b), Rock (2000), Sacharow (1978), and Thomas and Thomas (1996).

Characteristic. A modifier that best described the form or manufacturing technique of each artifact was entered in this field.

D. LITHIC ARTIFACT ANALYSIS

The analytical approach to stone tool production and use that was used in this analysis can be described as technomorphological; that is, artifacts were grouped into general classes and then further divided into specific types based upon key morphological attributes, which are linked to or indicative of particular stone tool production (reduction) strategies. Function was inferred from morphology as well as from use-wear. Data derived from experimental and ethnoarchaeological research were relied upon in the identification and interpretation of artifact types. The works of Callahan (1979), Clark (1986), Crabtree (1972), Flenniken (1981), Justice (1987), and Parry (1987) were drawn upon most heavily. All types were quantified by both count and weight (in grams).

a. Debitage

Debitage is the by-product of lithic reduction and includes all types of chipped-stone refuse that bear no obvious traces of having been utilized or intentionally modified. There are two basic forms of debitage: flakes and shatter. Observations on raw material and cortex were recorded and are discussed later. The following descriptions are for the debitage types identified, but not the full range of types described in Taylor et al. (1996).

Decortication Flakes are intact or nearly intact flakes with 50 percent or more cortex covering their dorsal surface. These are the first series of flakes detached during lithic reduction.

Early Reduction Flakes are intact or nearly intact flakes with less than 50 percent dorsal cortex, fewer than four dorsal flake scars, on the average, and irregularly shaped platforms with minimal faceting and lipping. Platform grinding is not always present. These flakes could have been detached from early-stage bifaces or cores of the freehand and bipolar types.

Biface Reduction Flakes are intact or nearly intact flakes with multiple overlapping dorsal flake scars and small elliptically shaped platforms with multiple facets. Evidence of platform grinding is usually present. Platforms are distinctive because they represent tiny slivers of what once was the edge of a biface. Biface reduction flakes are generated during the middle and late stages of biface reduction and also during biface maintenance (resharpening).

Pressure Flakes are made using a flaker. Because the force is applied by pressing and not striking, there are some morphological differences as compared with hard and soft hammer flakes. First, the platform is not a flat surface, but a slightly crushed edge. The edge grinding appears as the result of the edge preparation procedure.

Bipolar Reduction Flakes are intact or nearly intact flakes that have been struck from a bipolar core. They typically exhibit sheared cones, diffuse bulbs, closely spaced ripples, and crushed and splintered platforms. Crushing can also occur on the termination of flakes (distal end).

Finishing Flake are small flakes, usually detached through pressure flaking and are used to create the final cutting edge of the blade.

Resharpening Flake are small, often rounded, flakes that are usually detached through pressure flaking and exhibit evidence of prior use on the dorsal surface. These flakes are the byproduct of resharpening the blade edge for further use.

Uniface Resharpening Flakes are small J-shaped flakes that have been removed from the margins of a uniface. Their platforms often bear traces of use damage or polish.

Flake Fragments are sections of flakes that are too fragmentary to be assigned to a particular flake type.

Block Shatter are angular or blocky fragments that do not possess platforms or bulbs. Generally the result of uncontrolled fracturing along inclusions or internal fracture planes, block shatter is most frequently produced during the early reduction of cores and bifaces. Block shatter is also common in bipolar reduction, and it is equivalent to Binford and Quimby's (1963) "primary shatter." Thermal fracturing can also produce block shatter.

Flake Shatter are small, flat fragments or splinters that lack platforms, bulbs, and other obvious flake attributes. Flake shatter is generated throughout a reduction sequence but is most common in later stages. It is a common by-product of bipolar reduction, and it is equivalent to "secondary shatter" (Binford and Quimby 1963). Trampling of debitage on living surfaces also generates flake shatter, while thermal fracturing produces both flake and block shatter.

Other Flake Types are flake types for which there is no Lithica (Taylor et al. 1996) designation. Their characteristics are described in the Notes field, as needed.

Indeterminate Flakes are flakes that cannot be assigned to a specific type because their surface has been damaged (e.g., pot lidding) or severely eroded (e.g. argillite debitage).

b. Cores

Cores are cobbles or blocks of raw material that have had one or more flakes detached and that have not been shaped into tools or used extensively for tasks other than as a nucleus from which flakes have been struck. The types of cores identified are listed below, but this does not represent the full range of types possible, as discussed in Taylor et al. (1996).

Freehand Cores are blocks or cobbles that have had flakes detached in multiple directions by holding the core in one hand and striking it with a hammerstone held in the other (Crabtree 1972). This procedure generates flakes that can be used as expedient tools or can be worked into formalized tools. Freehand percussion cores come in various shapes and sizes, depending upon the raw material form and degree of reduction.

Bipolar Cores are blocks or cobbles that have had flakes detached by direct hard-hammer percussion on an anvil: the core is placed on the anvil and struck vertically with a hammerstone (Crabtree 1972; Hayden 1980). Cores typically take on a tabular shape, exhibit heavy crushing and battering, and flake scars tend to run between areas of crushing and battering. Bipolar cores are normally smaller than freehand cores because bipolar reduction is a technique for maximizing available raw materials. Most flakes that are detached are only suitable for expedient flake tools.

Bifacial cores are specific types of freehand, amorphous cores flaked on both sides, i.e., reduced along one or more bifacially prepared edges for the purpose of flake production. Flaking occurs on both sides of a nodule to fully exploit the material.

Flake cores are made from tubular large flakes usually flaked on one side, often with a defined flaking pattern. Some large early reduction flakes could have been used as flake cores to produce flake-based scrapers or perhaps burins.

Tested Cobbles are unmodified cobbles, blocks, or nodules that have had a few flakes detached to examine raw-material quality.

Other Core Types are cores that do not easily fit into existing types as for example, formalized blade cores. (The Notes field is used to record important attributes.)

c. Bifaces

A biface is a flake or cobble that has had multiple flakes removed from the dorsal and ventral surfaces. Bilateral symmetry and a lenticular cross section are common attributes; however, these attributes vary with the stages of production, as do thickness and uniformity of edges (see Callahan 1979). Included in this artifact class are all hafted and unhafted bifaces that functioned as projectile points and/or knives, as well as bifacially worked drill bits and unfinished bifaces. Specific types of bifaces represented in the collection are described below.

Projectile Points are finished bifaces that were usually hafted and functioned primarily as projectiles. Projectile points are usually triangular in overall form, with various types of hafting elements.

Knives are finished bifaces that were usually hafted and functioned primarily as cutting implements. Knives are characterized by one or more elongate cutting edges.

Finished Bifaces are finished bifaces that were probably hafted, but are too fragmentary or ambiguous to assign to a functional category.

Late-Stage Bifaces are basically finished bifaces; they are well thinned, symmetrical in outline and cross section, and edges are centered. Small areas of cortex may still exist on one or both faces. These bifacial preforms are analogous to Callahan's Stage 4 bifaces (1979).

Middle-Stage Bifaces look more like bifaces; they have been initially thinned and shaped. A lenticular cross section is developing, but edges are sinuous, and patches of cortex may still remain on one or both faces. These bifaces are roughly equivalent to Callahan's Stage 3 bifaces (1979). Biface reduction is a continuum; therefore, middle-stage bifaces are often difficult to distinguish from early- and late-stage bifaces, depending upon the point at which their reduction was halted. Plus, rejected bifaces may have been used for other tasks (recycled).

Early-Stage Bifaces are cobbles, blocks, or large flakes that have had their edges bifacially trimmed and a few large reduction flakes detached. These bifacial blanks are equivalent to Callahan's Stage 2 bifaces (1979). Because of their crude condition, these bifaces can be confused with freehand percussion cores and choppers.

Choppers or cleavers are sizable bifaces that may have been employed in tasks that required heavy-duty cutting, chopping, or severing. These implements are often crudely formed and can be mistaken for cores or early-stage bifaces.

Drills are slender bifaces that could have been used to perforate or pierce various materials.

Adzes or gouges are bifaces that were hafted and used as heavy duty woodworking tools.

Other Bifaces are bifaces that do not easily fit into the above types. (The Notes field is used to record distinctive attributes).

Indeterminate Bifaces are sections of bifaces that are too badly damaged to be assigned to a specific type.

d. Unifaces

A uniface is a formalized tool fashioned from a flake by uniformly retouching its edges to create a specific working edge and a standardized shape. There are two basic types of formal unifaces - endscrapers and sidescrapers. In the former, the working edge is transverse to the long axis of the tool; in the latter, the working edge (or edges) parallels the long axis of the tool.

Endscrapers are formalized unifaces that have uniformly retouched edges, which creates a working edge and a standardized shape. The working edge is transverse to the long axis of the tool, and retouching often erases obvious indications that the tool is made on a flake.

Sidescrapers are formalized unifaces that have uniformly retouched edges, which creates a working edge and a standardized shape. The working edge parallels the long axis of the tool, and retouching often erases obvious indications that the tool is made on a flake.

Other Uniface Types are unifaces that do not fit easily into existing types. The Notes field is used to record distinctive attributes.

Indeterminate Uniface Fragments are unifaces that are too fragmentary to be assigned to a specific type.

e. Flake Tools

Utilized and edge-retouched flakes are informal expedient tools. They are flakes that were struck from a core or a biface and used to perform one or more tasks, with little or no prior modification. In some cases, it is difficult to distinguish intentional retouch from use damage.

Utilized Flakes are expedient tools that exhibit traces of use damage and/or polish on one or more edges. These flakes could have been detached from cores or bifaces.

Retouched Flakes are expedient tools that have had one or more edges retouched, either to resharpen the working edge, to create a dulled edge for grasping, or to form a specific edge angle or shape. The flake itself could have been detached from a core or a biface.

Notched Flakes or spokeshaves are a special type of retouched flake. The retouching of one or more flake edges into a concavity distinguishes this morphological type.

Graver Flakes are a special type of retouched flake. The retouching of one or more edges into acute projections distinguishes this type.

Denticulated Flakes are a special type of retouched flake. They are distinctive because appropriately spaced flakes have been detached from one or more edges to form a toothed or serrated edge.

f. Cobble Tools

Alluvial cobbles or slabs of bedrock were used for various tasks, with little or no prior modification. These simple tools were used as hammers, anvils, grinding stones, abraders, or for a combination of functions. Battered, crushed, pitted, and/or smooth surfaces identify these stones as tools.

Netsinkers are notched cobbles. Direct hard hammer percussion was used to remove a few flakes from both ends of a cobble to facilitate the cobble's attachment to a net. Some specimens could have functioned as bolas stones.

Hammerstones are cobbles that show evidence of battering and crushing along their margins, indicating that they were intentionally used as percussors either for flaking siliceous materials or working other resistant materials.

Manos or grinding stones are hand-sized cobbles with one or more flat surfaces that were used to crush and grind various materials, as is evidenced by smoothed and polished surfaces.

Metates or grinding slabs are large cobbles or blocks of bedrock with one or two flat or concave surfaces, which exhibit evidence of grinding and crushing.

Pestles are linear (oblong) cobbles that exhibit crushing and smoothing on one or both ends or poles. Pestles can also be formalized tools that were shaped by pecking and grinding.

Mortars are large cobbles or blocks of bedrock with at least one deeply concave surface, which was used to hold various materials to be crushed and ground.

Pitted Cobbles or “nutting stones” are cobbles or blocks of bedrock with at least one smooth depression smaller than 4 cm in diameter. Unlike anvil depressions, these are smooth and tend to be circular or oval. These depressions may be the result of processing nuts, differing from anvil depressions created by bipolar lithic reduction.

Abraders are chunks of sandstone or related materials that were used to shape and sharpen tools made of various materials. Slotted abraders are believed to have been used in the manufacture and maintenance of bone and wood tools (e.g., needles, awls, shafts), and flat abraders are believed to have been used in the manufacture and maintenance of stone tools in addition to bone and wood tools.

Anvil Stones are cobbles or blocks of bedrock that were used as a base on which to rest materials while they were struck with a hammer. Anvil surfaces tend to possess shallow, coarse-textured depressions with amorphous outlines.

Other Cobble Tools are cobble tools that do not have pre-existing Lithica codes. A description of the specimen appears in the Notes field.

g. Groundstone Tool

Groundstone tools are formal stone tools and ornaments that were manufactured by pecking, grinding, and sometimes flaking. Typical artifact types are grooved axes, pipes, pendants, etc.

Stone Bowls are stone cooking vessels that were manufactured by carving, grinding, and polishing.

Grooved Axes are formal tools that were designed to be hafted, and their primary function was heavy-duty woodworking.

Celts are ungrooved axes; they were hafted by a different method than grooved axes.

Adzes or gouges manufactured from granitic materials by pecking and grinding were hafted and functioned as heavy duty woodworking tools, much like their chipped stone tool counterparts.

Mauls are large, heavy duty, round implements with a blunt bit and are most commonly associated with quarrying activities. Mauls are usually grooved and have defined polls. Mauls are often made from granite, diorite, basalt, or other hard stone. Ungrooved mauls are generally defined as hammerstones.

Other Groundstone Tools are those tools and ornaments that are not covered by the above types, for example, bannerstones, pipes, and pendants.

Indeterminate Groundstone Fragments are sections of groundstone tools or ornaments that are too badly damaged to be assigned to a specific type.

h. Minerals

These are unmodified or minimally modified crystals or chunks of naturally occurring chemical elements, for example, galena (lead ore) and limonite and hematite (iron ores). These materials can be manufactured into tools and ornaments, but then, these artifacts would not be quantified as minerals. (The total number of items is recorded).

Other Minerals These are mineral types for which there is no Lithica designation. Their characteristics are described in the Notes field.

i. Fire-cracked Rock

Cracked rock includes all fragments of lithic debris that cannot be attributed to stone tool production. Generally, fire-cracked rock is recognized by surfaces that exhibit reddening and irregular breakages. Whether a broken cobble is actually fractured as a result of thermal stress is often difficult to discern. For this study, all fractured cobbles are considered fire-cracked rock, even if they exhibit no clear signs of being thermally altered.

j. Unmodified Cobbles and Pebbles

Unmodified Cobbles exhibit no evidence of cultural use or modification;. however, these items are of potential importance because they may represent manuports and/or cached raw materials. A cobble is generally greater than 6 centimeters in maximum dimension.

Unmodified Pebbles exhibit no evidence of cultural use or modification, however, may allow for interpretation of environmental conditions. A pebble is generally smaller than 6 centimeters in maximum dimension.

E. HISTORIC CERAMIC ANALYSIS

The ceramic tabulation provides the following information: identification of ware types and techniques of surface decoration; dates based on manufacturing and decorative techniques and, if present, maker's marks; identification of vessel forms and functions; and descriptions of decoration motifs.

Begin/End Dates. Sources for these dates include but are not limited to Cameron (1986), Denker and Denker (1985), Diagnostic Artifacts of Maryland (2018), Erickson and Hunter (2001), Howard (1984), Ketchum (1983), Magid and Means (2003), McAllister and Michel (1993), Miller (1980, 1987, 1991), Noël Hume (1969b), Rickard (2006), South (1977), and Wetherbee (1980, 1985). When more precise dates can be determined from maker's marks or particular decorations or forms, these fields are entered manually. Sources used for identification of Maker's Marks or Decoration/Motif include Barber (1968), Gates and Ormerod (1982), Godden (1964), Godden (1999), Hunter and Miller (1994), Kowalsky and Kowalsky (1999), and Lehner (1988).

Form. Form indicates the shape and possible function of the complete vessel as represented by the sherds present. General categories, such as "Tableware, Hollowware," are used for sherds whose small size or ambiguous characteristics make determination of form problematical. **Part** is used to indicate what part of a vessel is represented by the sherd(s) present. Definitions of forms are based, for the most part, on Beaudry et al. (1983), Greer (1981), Ketchum (1983), and Towner (1963).

F. CURVED (VESSEL) GLASS ANALYSIS

The glass artifacts from the collection were broken down, for analytical purposes, into functionally distinct groupings based on Bottle, Table, Lighting, and Other use-categories. All artifacts identified as to specific function and form were coded as such regardless of the degree of fragmentation. Window glass, considered more functionally inclusive under an architectural group of artifacts, was subsumed for analysis under Small Finds/Architectural materials.

Begin/End Date. Dating of the glass artifacts was completed according to established diagnostic criteria. These criteria, utilized either singly or in combination, can include various technological aspects of glass manufacture such as finish treatments, tooling methods, empontilling techniques, mold markings, Brand, Maker's Marks, Color, and various stylistic elements (including Decoration/Motif) associated with certain tablewares. Sources for glass dating include but are not limited to Busch (1987), Cheney (1980), Ferraro and Ferraro (1964, 1969), Fike (1987), Haynes (1959), Jones (1971, 1983, 1986), Jones and Smith (1985), Jones and Sullivan (1985), Kaplan (1982), Klamkin (1973), Kovel and Kovel (1986), Lief (1965), Lockhart (2004), Lorrain (1968), McKearin (1970), McKearin and McKearin (1948), McKearin and Wilson (1978), Miller and Sullivan (1984), Munsey (1970), Noël Hume (1961, 1968, 1969a, 1969b), Paul and Parmalee (1973), Riley (1958), Society for Historical Archaeology (2018), Spillman (1981, 1982, 1983), and Toulouse (1971, 1969).

Finish. Common names, such as "Blob-top," "Crown," and "Screw," were used when appropriate. Sources include Everette 1982

Base. The majority of coded base types in the collection indicate the marks on the basal surfaces of glassware. "Snap case" indicates the lack of any markings when this device was used to hold a bottle in place while its finish was formed. Machine-made basal markings were also coded, if identifiable.

Manufacturing Technique. Manufacturing Technique refers to the distinctive mold seams and markings found on the bodies (and sometimes bases, finishes, or rims) of glassware.

Wear. The wear category has been devised to aid in specialized analyses, e.g., in distinguishing commercial as opposed to domestic deposits from urban sites (Diamond in Geismar 1983:315). Vessels from establishments offering glassware for sale would not be expected to show more than slight evidence of use-wear. On the other hand, vessels from domestic deposits would be expected to show use-wear ranging from heavy to very heavy. The code Wear on Interior can be used to indicate artifacts associated with fill deposits. The code Waterworn or Rolled can be used to indicate artifacts that have been rolled in surf.

Lead/Non-lead (Comments). A short-wave ultraviolet light was utilized to examine select colorless glass vessels and sherds for the presence of lead. Leaded glass exposed to UV light appears ice-blue in color while non-leaded glass appears pale yellow or has no change.

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