



MEMO

DATE: August 12, 2022  
TO: Andy McMillian  
FROM: Lauren Hayden, Amber Courselle, and Tracey Jones  
SUBJECT: **VELCO– Highgate Substation Summary of Archaeological Survey and Architectural Review, Town of Highgate Center, Highgate, Franklin County, Vermont**

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**Introduction and Scope of Services**

On behalf of the Vermont Electric Power Company (VELCO), WSP USA Inc. (WSP) completed a gap analysis, an Archaeological Resource Assessment (ARA), and an architectural review of the Highgate Substation parcel in the Town of Highgate, Franklin County, Vermont. Planned upgrades at the substation will require obtaining approval from the Public Utilities Commission (PUC) through a Certificate of Public Good, and the project area will therefore require documentation addressing the §248 Historic Sites criterion. The proposed improvements to the substation include the installation of a septic system with a control building, the realignment of the existing driveway, and minor alterations to the existing fence line. The proposed improvements will also require soil percolation testing of roughly 0.25 acres (0.1 hectares) outside and to the north of the existing substation perimeter fence, which will result in ground disturbance. The project will also require temporary laydown yard and construction support areas totaling 3.9 acres (1.6 hectares). The existing substation pad and perimeter fencing occupies 2.3 acres (0.93 hectares), while the proposed driveway alteration encompasses roughly 0.26 acres (0.11 hectares), inclusive of the existing driveway. The total project area acreage, including the existing substation pad, is 6.46 acres (2.6 hectares).

Based on the initial mapping provided by VELCO, the field inspection conducted by WSP included a larger initial area for the percolation testing, located to the east and northeast of the existing substation, which contained four discrete sensitive areas. However, in updated project plans provided by VELCO, the percolation testing will be limited to the area immediately north of the existing substation pad, and so these sensitive areas will not be impacted by the current project. The planned construction areas include a large rectangular 2.1-acre (0.85-hectare) area south of Route 78 in the existing transmission line ROW, an irregular shaped 1.1-acre (0.45-hectare) area immediately north of the existing substation, and two irregular polygons (0.25 and 0.16 acres [0.1 and 0.06 hectares]) adjacent to the existing driveway. The planned construction laydown and support areas are located in areas of prime agricultural farmland or wetland buffer zones. Therefore, VELCO intends to protect the natural ground surface with stone on fabric overlay during the project. Once the project is complete, the stone and fabric will be removed, and the areas will be restored to grass.

The area inspected for the ARA by WSP (the assessment area) encompassed 9.1 acres (3.7

hectares), and included the wooded the immediate area surrounding the existing substation pad, the area north of the pad to the boundary with the walking trail, the wooded area to the northeast of the existing pad, the driveway area, and the existing transmission line to the east of the pad. The construction support area located south of Route 78 had been previously inspected for another VELCO project, and confirmed non-sensitive, and was not revisited. Within the ARA assessment area, there were eight distinct mapped archaeologically sensitive areas that were assessed. The areas around the existing substation included two small areas along the western fence of the existing pad, one small area along the northern fence, and an irregularly shaped polygon immediately north of the substation pad. The remaining four areas were located east and northeast of the pad and included one small triangular area in the eastern transmission line, and three polygons in the wooded area. In addition, portions of two sensitive areas on the western side of the substation pad fell within newly delineated wetlands and were confirmed as non-sensitive.

The archaeological component of the project included a gap analysis of the entire Highgate substation and VELCO-owned property, and an ARA of the portion of the project area where impacts from ground disturbance were anticipated to occur (the project area). The objectives of gap analysis and the ARA were to determine the project area's sensitivity for archaeological resources based on its potential for intact subsurface soils, its relationship to nearby known archaeological sites and historic structures, as well as other criteria, including soil types, topography, and proximity to water. For the gap analysis WSP conducted background research, analyzed the assessment area, and created a predictive model, while the ARA included a review of the gap analysis results and a field inspection of the project area. The predictive model was developed using the Vermont Division for Historic Preservation's (VDHP) Environmental Predictive Model for Locating Precontact Archaeological Sites, soil survey data, and historical maps of the project area to identify possible map-documented structures. The field inspection was conducted on July 28, 2022. The investigation complied with all applicable VDHP (2002, 2017) guidelines.

## **Project Setting**

The project area and Highgate Substation are located west of the Town of Highgate Center, on the north side of VT-78, with one construction support area located on the south side. An existing gravel driveway connects VT-78 to the substation entrance; this driveway traverses private property through which VELCO has easement rights. The project consists of four principal components: 1) the driveway realignment from VT-78 to a new entrance location on the eastern side of the existing substation; 2) the portion of the existing substation pad where the control building and septic support structures will be constructed; 3) the exterior perimeter fence on or immediately adjacent to the pad; and 4) a 0.25-acre (0.1-hectare) polygon to the north of the existing pad where the soil percolation testing will be conducted. The construction support areas are temporary and will be restored to their natural state at the completion of the project.

The Highgate Substation is located in the Champlain Valley within the Vermont Lowlands. 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, narrows 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. The bedrock of the valley is most typically Ordovician-age limestone that has been metamorphosed into marble. Glaciers scoured and deepened the valley floor during the Pleistocene while leaving

kame terrace deposits on the valley sides. The project area is primarily underlain by the Highgate Formation and the Morses Line Slate, which both date to the Ordovician period, and are formed from a variety of sedimentary rocks, including slate, banded limestone, and conglomerates (Ratcliffe et. al 2011). The surficial geology of the project area is mapped as pebbly marine sand from Champlain Sea deposits (VCGI 2020). Farmers have long taken advantage of fertile and level soils found within the Champlain Valley (Allen 1989; Johnson 1980).

The Highgate substation and assessment area are located in a rural, agrarian setting, with scattered residences and small commercial properties situated along VT 78 on both sides of the road outside the assessment area. A small residential subdivision is located east of Highgate Road, along Hilltop Lane. The St Louis Cemetery is located east of the subdivision, occupying lots on both sides of VT 78. On the north side of VT 78, the original substation’s lot has been graded and leveled to accommodate development and construction needs and includes both the VELCO and Citizen’s substation infrastructure. The surrounding project area is located on glacial lake plains, marine terraces, and glaciated uplands. It is covered in secondary-growth deciduous forest, except where areas have been clearcut for transmission lines, or the pad and surrounding vicinity. Transmission lines extend through the assessment area north, south, and west of the substation. A small clearcut line extends east of the substation behind the residential lot before turning south and crossing VT 78, at which point it parallels Highgate Road. The small residential lot that was included in the gap analysis assessment is covered in maintained lawn in the front yard area and deciduous woods in the backyard. The elevation in the assessment area ranges between 90 and 99 meters (290 and 325 feet) above mean sea level (amsl).

Topography in the project area varies considerably. The western half of the parcel where the ARA assessment area is located is generally level and flat due to grading activities during the construction of the substation, while the remainder of the assessment area slopes steeply upward to an upland crest or bench. Intermittent areas of ledge or exposed bedrock are prevalent along the western crest edge and slope overlooking the substation pad. The eastern transmission line has slightly more rugged, rolling topography than the wooded upland north of it, which is generally more level.

The Highgate Substation is located within the Lake Champlain Drainage Basin, within the Rock River subbasin and the McGowan Brook-Missisquoi River subbasin of the Missisquoi Bay Watershed. No named stream flow through the assessment area; the closest stream is an unnamed tributary of the Missisquoi River that located outside the assessment area to the west. A few small mapped wetlands, delineated by VELCO or mapped by the National Wetlands Inventory (FWS 2019), are present or adjacent to the project area.

The USDA-NRCS (2022) maps soils in the assessment area as either Farmington loam (FaC) or Raynham silt loam (RaB). Farmington loam (FaC) consists of a shallow, well-drained to somewhat excessively drained, very rocky soil formed from till on nearly level to steep slopes on glaciated uplands. Raynham silt loam (RaB) is a very deep, poorly drained soil that forms on glacial lake plains and marine terraces from silty estuarine or glaciolacustrine deposits.

TABLE 1: MAPPED SOIL SERIES IN THE PROJECT AREA

SYMBOL/SERIES	SOIL HORIZON (in)	SOIL COLOR	TEXTURE	SLOPE %	DRAINAGE
Farmington loam, very rocky (FaC)	Ap:0-4	Dk Gry Bm	Si Lo	8-15	Well drained to somewhat excessively drained
	Bw:4-18	Yw Bm	Si Lo		
	R:18	Unweathered Limestone	Bedrock		
	Ap:0-7	Dk Gry Bm	Si Lo		

(RaB)	Bg:7-17	Lt Ol Brn	Si Lo	3-8	Poorly drained
	C:17-60	Ol Gry	Si Lo		

Legend: Soil Color: Dk=Dark; Lt=Light; Gry=Gray; Brn=Brown; Ol=Olive; Yw=Yellow;  
Texture: Si= Silt; Lo=Loam;

USDA-NRCS 2020

### Background Research: Previously Identified Sites

WSP's background research included examination of the VDHP's files on the Online Resource Center (ORC) to identify known sites and the results of previously conducted cultural resource management surveys in the vicinity. Twelve previously identified sites are located within 1.6 kilometers (1 mile) of the Highgate Substation gap analysis assessment area (Table 2) (VDHP 2022). Of these, eight were identified as precontact, mostly consisting of chert, quartz, and quartzite flakes, fire-cracked rock, and limited non-diagnostic lithic tools, with occasional projectile point and bifaces recovered from a few of the sites. One of the precontact sites, VT-FR-0010, dates to the Archaic period, and one site has a Late Archaic component. Two of the precontact sites have Late Woodland components. Only one site, VT-FR-0203, yielded precontact ceramics. Only three sites were historic: Site VT-FR-0177 was identified as the Sheridan Foundry, the ruins of a mid-nineteenth- to mid-twentieth-century foundry on the Missisquoi River near the bridge; Site VT-FR-0223 was identified as a nineteenth-century domestic occupation/farmstead site on the north terrace of the river; and Site 1834.08-18 was identified as a mid-eighteenth- to mid-nineteenth-century domestic occupation site in an upland agricultural field. The precontact sites were generally found in agricultural fields or pastures or in wooded areas on terraces or floodplains on both banks of the Missisquoi River. Sites VT-FR-0365 and 1834.08-18 were found on glaciated upland landforms in agricultural fields or pastures. The sites are generally located south, southeast, and southwest of the assessment area near the Missisquoi River, except for Site VT-FR-0365, located to the northeast, and Site 1834.08-18, located to the north. Site VT-FR-0202 has no information recorded in the site file except for its approximate location. Site 1834.08-18 has never been registered for a permanent site number and so a site file is not available in the VDHP files. One site (VT-FR-0161) is located within the assessment area boundaries, and a second site (VT-FR-0202) has only an approximate location plotted in VDHP records and may cross into the southeast corner of the assessment area. However, while both of these sites are located within the gap analysis assessment area for Highgate substation, both are located south of VT-78, and neither are located within the current project area. As recorded on the topographic mapping, Site VT-FR-0203 may correspond to the location of Site VT-FR-0185/0223 and therefore may not represent a unique site. Site VT-FR-0161, within the gap analysis assessment area, has been subjected to multiple survey and evaluations and has been determined ineligible for the National Register of Historic Places (NRHP) by VDHP. The site has been mostly destroyed by the construction of the Highgate converter station. No previously recorded sites are located within or immediately adjacent to the current project area.

In addition to these 12 sites, the Highgate Falls Archaeological District (HFAD) is located within 1.6 kilometers (1 mile) of the assessment area. To date, the HFAD consists of 15 identified precontact sites believed to represent related occupations situated on the floodplains and terraces overlooking the Missisquoi River. Of the 15 sites in this district, three (Sites VT-FR-0103, -0130, and 0151) are located within a 1.6-kilometer (1-mile) radius of the assessment area. The boundaries of the HFAD on its west edge correspond with the Highgate dam and impoundment area of the Missisquoi River, and do not extend into the assessment area. The HFAD has been determined eligible for the NRHP (Thomas 1983).

TABLE 2: KNOWN ARCHAEOLOGICAL SITES WITHIN 1.6 KILOMETERS (1 MILE) OF ASSESSMENT AREA, TOWN OF HIGHGATE

VT-AD-	SITE NAME	PERIODS	DESCRIPTION
0010	Highgate Island Site	Archaic	Observation from collector: small camp site and workshop with lithic artifacts (stemmed points, chert and quartzite flakes); at mouth of small brook.
0103		Precontact	4 discrete loci with total lithic artifact assemblage of 27 chert flakes and 10 FCR; identified by subsurface testing.
0130		Precontact	2 discrete concentrations; 6 quartzite flakes, 1 chert flake, and 5 FCR identified by surface collection.
0151		Precontact	Hearth feature encountered in single shovel test; 62 FCR, 2 quartz flakes, 1 chert flake, 6 calcined bone; eroding from stream bank.
0161	Highgate Converter	Late Archaic- Late Woodland	5 loci representing at least 4 cultural periods. Projectile points, scrapers, flakes and lithic manufacture evidence, FCR, calcined bone, and charcoal; 160 feet amsl, above Missisquoi River. Determined Not Eligible for NRHP by VDHP.
0177	Sheridan Foundry	Historic, ~1850-1950	Various stone foundation ruins (walls, stone tower, a raceway) and standing steel/iron structure; interpreted as various foundry buildings (surge tank, cupola, raceway, hoist apparatus); circular deposit of slag and brick; no artifacts observed; surface inspection only.
0185	M-6-4; Dalcourt Site	Precontact	Two discrete loci (single-component activity area and dispersed lithic scatter); 32 flakes, 1 whetstone fragment, 1 chert biface, 17 FCR, 5 calcined bone, and charcoal. Hearth feature identified in sub-plowzone deposits. Identified by subsurface testing; artifacts recovered from 11 shovel tests.
0202	CP M-6-4	Unknown	Site file contains no information besides location.
0203	M-6-14	Precontact	Chert, quartzite, and quartz flakes; whetstone fragments; FCR; 1 chert point tip; dentate-stamped ceramics. Artifacts recovered in 13 of 23 shovel tests; one FCR concentration noted; some artifacts recovered from potentially intact sub-plowzone deposits; miscellaneous historic artifacts also recovered.
0223	M-6-4; Dalcourt Site	Historic; 19th-century (Dalcourt Site)	Historic-period artifacts (N=619): ceramics, brick, glass, and metal; 2 foundations (1 house and 1 barn); 2 dump sites; identified by subsurface testing;

VT-AD	SITE NAME	PERIOD	DESCRIPTION
0365	Cassidy Meadow	Late Woodland	Three distinct loci; 61 flakes, 1 Levanna-type projectile point, 1 chert biface; possible cultural feature identified in Locus 1 (basin-shaped feature fill pit); surface collection and subsurface testing conducted.
N/A	1834.08-18	Historic, Late 18th to early/mid-19th century)	Concentration of historic artifacts around Pole 481; 193 artifacts include ceramics, bottle glass, window glass, kaolin pipe bowl and stem fragment, cut nails, 1 wrought nail, metal button, brick fragments. Ceramics include pearlware, coarse earthenware, creamware, refined earthenware, coarse stoneware, and porcelain; surface collection and subsurface testing (32 shovel tests; 24 positive); potential domestic occupation site

### Background Research: Previously Conducted Surveys

Several archaeological resource assessments (ARAs) and surveys have been conducted in the Highgate gap analysis assessment area (Table 3). These archaeological investigations have been the result of planned development for either VELCO projects or the defunct Champlain Pipeline project. Of these ARAS, surveys, and background research efforts, seven have been conducted within the current project area. Table 3 summarizes all ARAs and surveys conducted within the gap analysis assessment area, while more detailed descriptions are provided for those investigations that extended into the current project area. Four archaeological assessments or investigations have also been conducted in proximity to the assessment area; these include a Phase I survey and mitigation plan for the Highgate Falls Hydroelectric Project, one NCRS Farm Review, and one Phase I archaeological survey for VTrans. These projects are summarized in Table 4.

TABLE 3: PREVIOUS INVESTIGATIONS IN ASSESSMENT AREA, TOWN OF HIGHGATE

REPORT	PROJECT	RESULTS/RECOMMENDATIONS
Thomas and Dillon 1985	Highgate Converter Station Site, Phase I Archaeological Survey and Phase II Evaluation	Phase I archaeological survey of 10-acre APE for proposed Highgate Converter Station site. Phase I subsurface testing (474 shovel tests); identified precontact Site VT-FR-0161; Phase II testing (test unit and block excavations at 5 loci). Recommended site as Not Eligible for NRHP (limited data and high level of disturbance across site). VDHP concurred.
Petersen et al. 1990	Letter Report, VELCO Transformer Project Archaeological Phase I Survey	Phase I archaeological survey of transformer station APE (77 shovel tests); recovered precontact artifacts from Site VT-FR-0185 and historic artifacts from Site VT-FR-0223. Recommended Phase II evaluation of both sites.
Bartone et al. 1991	Report, VELCO Transformer Project Archaeological Phase I Survey	Phase I archaeological survey of transformer station APE (surface survey, 77 shovel tests); recovered precontact artifacts from Site VT-FR-0185 and historic artifacts from Site VT-FR-0223. Recommended Phase II evaluation of both sites.
Frink 1990	EOF Letter, VELCO Converter Station (Highgate #2) Project, Phase I Reconnaissance Study	Phase I archaeological survey (115 shovel tests over 6 acres) of converter station. No significant archaeological resources or sites identified.

REPORT	PROJECT	RESULTS/RECOMMENDATIONS
Frink 1991a	Report, VELCO Highgate #2 Substation Project, Phase I Archaeological Survey	Phase I archaeological survey (133 shovel tests over 6 acres) of converter station. No significant archaeological resources or sites identified. Concluded that proposed project would have no adverse effect on archaeological resources.
Frink 1991b	Letter Report, Proposed Access Road for VELCO Converter Station (Highgate #2) Project, ARA	Archaeological resource assessment (field inspection) for proposed access road to Highgate Converter Station. Recommended south portion of road as sensitive for precontact sites; north portion previously tested and non-sensitive. Phase I survey recommended for south portion
Robinson et al. 1991*	Archaeological Phase I Survey, Vermont Segment of the Champlain Pipeline Project	Phase I archaeological survey of proposed corridor for Champlain Pipeline Project. Surface survey and subsurface testing conducted in area of corridor that crosses assessment area. One site (VT-AD-0202) identified, may be located partially within the assessment area. Multiple sites identified south of assessment area.
Frink and Hathaway 1997	Phase IA Archaeological Site Sensitivity Study, Proposed Highgate Industrial Park	Desktop review, background research, field inspection for to assess overall precontact and historic sensitivity of proposed industrial park surrounding VELCO substation area. Portion of assessed area extending into current VELCO parcel recommended as archaeologically sensitive.
Scharoun and Bartone 2002*	Letter Report, ARA, VELCO 115 kV Transmission Line and Highgate Substation, Northern Loop Project	Background research, field inspection of small parcel adjacent to existing VELCO Highgate Substation. Entire parcel recommended as archaeologically sensitive. Phase I survey recommended.
Frink and Dow 2002*	Phase I Archaeological Site Identification Study, VELCO and Citizens Utilities Substations	Phase I archaeology survey (32 shovel tests) of 0.78-acre parcel. No significant precontact or historic resources sites identified.
Penney 2011* (Louis Berger)	K-41 Line Repair and Upgrade Project	Background research for K-41 line, including the section that extends into Highgate Substation. Research focused on archaeological resources within 0.8 kilometer (0.5 mile) of existing line to identify existing sites. Five sites identified in vicinity of Highgate substation. Recommended that proposed repair and upgrade to existing lines as having no impact on recorded archaeological resources..
Gould 2013* (Louis Berger)	Statewide Structure Condition Improvement Program (SCIP), Cultural Resource Data Collection, Line Group D, (1429, K-42, and K-80 Lines)	Background research for 1429 and K-42 lines, including the section that extends into Highgate Substation. Research focused on archaeological resources within 0.8 kilometer (0.5 mile) of existing line to identify existing sites. No sites identified for 1429 line. Seven sites identified in vicinity of Highgate Substation for K-42 line. No recommendations made.
Willoughby 2016a* (Louis Berger)	Statewide Structure Condition Improvement Program (SCIP), 1429 Line Archaeological Assessment and Survey	Assessment and survey of 1429 line included four poles located in the current assessment area. Two poles assessed as non-sensitive, two assessed as sensitive and subsurface tested; no sites identified. All pole locations culturally sterile, one location was disturbed.
Willoughby 2016b* (Louis Berger)	Statewide Structure Condition Improvement Program (SCIP), K-41 Line Archaeological Assessment and Survey	Assessment and survey of K-41 line included one pole located in the current assessment area, which was subsurface tested and assessed as culturally sterile and partially disturbed; no sites identified. Site TS-1834.08-18 identified at Pole 481, located outside assessment area.
Willoughby 2016c (Louis Berger)	Statewide Structure Condition Improvement Program (SCIP), Phase I State Site Delineation Testing, K-41 Line	Additional testing conducted at Pole 481 for historic Site TS-1834.08-18, located outside assessment area; multiple shovel tests excavated. Site recommended as potentially eligible but site boundaries do not extend into current assessment area owing to the railroad line.
Willoughby 2016d (Louis Berger)	Statewide Structure Condition Improvement Program (SCIP), K-42 Line Archaeological Assessment and Survey	Assessment and survey of K-42 line included seven poles located in or adjacent to the current assessment area. Two poles assessed as non-sensitive; five assessed as sensitive and subsurface tested. Site VT-FR-0185/0223 relocated at Pole 41. No other sites identified.

Willoughby 2016e (Louis Berger)	Statewide Structure Condition Improvement Program (SCIP), Phase I State Site Delineation Testing, K-42 Line	Additional 18 shovel tests at Pole 416 for Site VT-FR-0185/0223, located outside assessment area. Site recommended as highly disturbed in vicinity of pole location, with no clearly intact archaeological deposits. Recommended finding of no impacts from proposed construction activities to any significant resources.
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\*Denotes background research, ARA, or survey conducted within the current project area

Archaeologists from multiple firms and institutions conducted archaeological surveys in the late 1980s along the proposed corridor of the Champlain Pipeline Project, a gas pipeline project that was ultimately canceled. The proposed corridor passed through the vicinity of the Highgate Substation and the assessment area, although detailed maps of the subsurface tested areas could not be located in the ORC files. A surface survey of plowed fields as well as some subsurface testing was conducted of this portion of the proposed corridor in 1988 and 1989, during which Sites VA-FR-0185 and -0203 were identified as precontact sites. Site VT-FR-0202 was also identified during this survey, but no information other than the approximate location was recorded. Site VT-FR-0185 included both precontact and historic components; the historic component was later reassigned by VDHP as Site VT-FR-0223. The sites are located south of the assessment area on the original plan maps, but more recent investigations conducted by Louis Berger (now WSP) suggest that the sites may extend onto the upper terrace closest to the assessment area, and a portion of Site VT-FR-0202 may extend into the assessment area; no recommendation has been made regarding the eligibility of Site VT-FR0202 for the NRHP (Robinson et al. 1991).

The remainder of the studies and surveys conducted within the Highgate assessment area have mostly been conducted on behalf of VELCO for various substation improvements, transmission line projects, and new construction projects related to energy infrastructure. In 2002 UMF ARC conducted an ARA for a transmission line corridor associated with VELCO's Northern Loop Project, which included an ARA for the Highgate Substation area. The ARA for the Highgate Substation consisted of background research and a field inspection of a small, rectangular parcel on the north side of VT 78 between the existing VELCO substation and the Citizen's substation. UVM ARC recommended the entire parcel as archaeologically sensitive and that a Phase I survey should be conducted (Scharoun and Bartone 2002). Later in 2002, ACT conducted a Phase I archaeological survey of the Highgate Substation parcel. The 0.32-hectare (0.78-acre) APE included the UVM ARC ARA parcel and additional areas. ACT excavated a total of 32 shovel tests and identified no significant precontact or historic resources in the APE. ACT concluded that no historic properties would be affected by the proposed upgrades to the substation (Frink and Dow 2002).

In 2011 The Louis Berger conducted archaeological background research for VELCO's K-41 Repair and Upgrade Project. Louis Berger reviewed site files at the VDHP and in Louis Berger's own archives to identify known sites within 0.8 kilometer (0.5 mile) of the existing K-41 line. The project area included the portion of the K-41 line that extends into Highgate substation. Louis Berger identified five known sites in this portion of the line; however, none were located within the existing K-41 line. Louis Berger concluded that the proposed repairs and upgrades to the existing K-41 line would have no impacts to any known archaeological sites (Penney 2011).

In 2013 Louis Berger conducted a cultural resource data collection and review that included the 1429 line and K-42 line as part of the statewide Structure Condition Improvement Program (SCIP) project. Louis Berger identified no sites within a 0.8-kilometer (0.5-mile) radius of the 1429 line near the Highgate assessment area. Seven sites (VT-FR-0010, -0103, -0161, -0185, -0202, -0203, and -0223) were identified within the same radius of the K-42 line near the Highgate assessment area. No recommendations were provided as a result of this data collection



effort (Gould 2013).

In 2015 Louis Berger conducted ARAs and surveys for VELCO as part of the SCIP. These projects included three transmission lines leading into the Highgate Substation: the 1429, K-41, and K-42 lines (Willoughby 2016a-e) The goal of the project was to determine the presence of archaeological resources in proximity to existing pole locations. Archaeologically sensitive pole locations were identified through the predictive model and then confirmed with a field inspection, followed by subsurface testing if warranted. Typically four shovel tests were excavated in a 10-meter grid around the existing structure location, with additional limited radial testing conducted as warranted. On the 1429 line, two pole locations (2 and 4) of the four pole locations located in the Highgate assessment area were considered to be archaeologically sensitive and were subjected to subsurface testing. The remaining four locations were either located in non-sensitive areas or found to be non-sensitive during the field inspection (Pole 3, for slope or disturbance). Eight shovel tests were excavated at the two pole locations; no archaeological sites were identified as a result of the testing, and Pole 2 was found to be disturbed (Willoughby 2016a).

On the K-41 line, only one pole location was located inside the assessment area (Pole 482). Two shovel tests were excavated at this pole location, which was found to be disturbed. At a pole located outside the assessment area to the north, Louis Berger excavated nine shovel tests and identified a late eighteenth- to mid-nineteenth-century historic site (1834.08-18) based on the recovery of 90 historic artifacts. This site was recommended for additional testing (Willoughby 2016b). The site does not extend into the assessment area; it is bounded in that direction by an old railroad bed.

TABLE 4: ARCHAEOLOGICAL INVESTIGATIONS CONDUCTED IN PROXIMITY TO HIGHGATE SUBSTATION ASSESSMENT AREA

DHP/AGENCY LETTER	PROJECT	DESCRIPTION/RECOMMENDATIONS
Thomas 1981, 1983	Phase I Archaeological Survey, Highgate Falls Hydroelectric Project; A Proposed Mitigation Plan for the Highgate Falls Prehistoric Archeological District	Archaeological survey conducted within 100-acre impoundment APE for Highgate Falls hydroelectric project; surface survey and subsurface testing identified 15 precontact sites, which were nominated collectively as the Highgate Falls Archaeological District
Skinas 2003	NRCS Farm Review, Nadeaur Farm Well	Desktop review of proposed well on private farm; well location determined non-sensitive for archaeological resources
Brodeur 2015 (Louis Berger)	Phase I Archaeology Survey, Highgate STP SCRP(2) Culvert Replacement	Archaeological survey (25 shovel tests) conducted for VTrans of 0.5-acre APE for proposed culvert replacement. No archaeological resources identified. No further work recommended for the APE.

### Results of the ARA

The field inspection partially confirmed the archaeologically sensitive portions of the assessment area as identified by the predictive model. The gap analysis results and predictive model indicated that the assessment area had multiple discontinuous sensitivity areas totaling approximately 1.6 acres (0.65 hectares) in size. These areas included a sensitive area located within the eastern transmission line, three sensitive areas located on the upland ridge crest in the forest to the northeast of the existing substation pad, one irregular area of sensitivity to the north of the existing substation pad, and two small areas of sensitivity along the western fence of the substation. The rest of the assessment area, including the existing substation pad, and the existing driveway and proposed driveway realignment area, was mapped as non-sensitive, and the field inspection confirmed this determination. The immediate vicinity of the driveway and

the existing substation pad have been disturbed by construction of the existing substation. The area north of the substation to the parcel boundary also appeared to be disturbed by grading, cutting, or other construction activities that have created a large area of exposed subsoil as well as multiple dirt roads to the south and west of that area, with new successional growth present in some areas. Therefore the entire sensitive area to the north of the substation pad was determined to be non-sensitive. This is the planned area for percolation testing, and therefore the percolation testing will be limited to an area of non-sensitivity. The small sensitive area in the transmission line east of the substation was also determined to be non-sensitive, as the terrain was sloped or otherwise disturbed by the construction of a transmission line pole. No planned upgrades are proposed for this area. The small sensitive areas that were immediately adjacent to the western side of the substation pad, where fence line alterations may be necessary, was also determined to be non-sensitive due to construction disturbance. However, the three sensitive areas located on the upland crest to the northeast were determined to remain archaeologically sensitive, excluding a very small wetland area recently delineated by VELCO. These three areas, which total 1.2 acres (0.46 hectares) in size are all located outside the limits of the current project area and will therefore not be impacted by any of the planned upgrades or the percolation testing. All of the temporary construction support areas north of Route 78 were confirmed as non-sensitive during the field inspection, including the support area north of the existing pad, as the sensitive area north of the substation pad was determined to be non-sensitive. The construction area south of Route 78 had been previously assessed by non-sensitive.

### **Architectural Review**

The desktop review included properties adjacent to and visible from the project area. Modern modular housing units are located to the east and west of the project area. Another substation is located south of the project area, across Vermont Route 78. One National Register of Historic Places (NRHP) eligible property, the former Lamoille Valley Railroad corridor (now known as the Lamoille Valley Rail Trail), is located at the northern edge of the VELCO property.

The Lamoille Valley Railroad corridor was determined eligible for the NRHP upon its abandonment as a functioning railroad circa 1995. Originally constructed in 1877 to connect with the Portland & Ogdensburg Railroad, in 1880 it was reorganized as the St. Johnsbury and Lake Champlain Railroad (St.J&LC), a subsidiary of what would become the Boston & Maine Railroad. The line served the region for years, carrying farm and industrial products to markets and allowing the northern towns to prosper. In the early twentieth century, however, like most railroads, the Boston and Maine lost traffic to trucking and the private automobile. The Great Flood of 1927, while disastrous, also allowed the St.J&LC to upgrade their facilities via recovery money and the railroad was once again able to turn a profit for several years until finally filing for bankruptcy in 1944. The line was reorganized under different names and served different short-run purposes from 1948 until it was abandoned in 1965. The State of Vermont purchased it in 1973 and renamed it the Lamoille Valley Railroad. From 1984 through the end of its operations in 1994, the line only carried tourists. At that time, the decision was made to abandon the railroad again and turn it into a recreational trail, which is still in development. It is unclear whether a full cultural resource survey has yet been completed for the former Lamoille Valley Railroad right of way, but it is considered eligible for listing in the NRHP.

The changes to the existing substation will be small to the casual observer and will not affect the existing setting. Due to the location of the rail trail on the north-northwest side of the existing substation, and the project area's location on the eastern side mostly within the existing

compound, and the distance and intervening vegetation, the project should have no effect on the Lamoille Valley Railroad. A dense wooded area is located east of the substation, so the only visibility of the project area would be through the existing substation and under the existing transmission line corridor which crosses the former Lamoille Valley Railroad corridor.

## **Conclusions**

The Highgate Substation project area was the subject of an ARA completed by WSP in July 2022 which identified a total of 1.2 acres (0.46 hectares) as archaeologically sensitive. The portions of the ARA assessment area that may be impacted by project related construction were confirmed or determined to be non-sensitive including the proposed driveway realignment, the areas for fence line alterations, any areas located within the existing substation pad, and the area designated for percolation testing. In addition, the temporary construction support areas are confirmed as non-sensitive, though VELCO plans protective measures to minimize ground disturbance in those areas due to other environmental concerns. Therefore, it is WSP's opinion that the project will have no undue adverse impact on historic sites . The three areas of archaeological sensitivity confirmed by the ARA are all located outside the current project area, and will not be impacted by the planned upgrades. One historic property was located adjacent to the project area, but the limited nature of the proposed construction at the site is expected to have low visibility and therefore will have no effect on the former Lamoille Valley Railroad corridor.

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