Lake Encroachment Permit Application Narrative

VERMONT TRANSCO, LLC

PV-20 SUBMARINE CABLE REPLACEMENT PROJECT

Lake Champlain, Grand Isle, Vermont

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1.0 Introduction and Regulatory Background

On behalf of Vermont Transco, LLC (and Vermont Electric Power Company hereinafter collectively referred to as "VELCO"), VHB has prepared this Lake Encroachment Permit Application for the proposed PV-20 Project ("Project"). The proposed PV-20 Project is to replace a segment of the existing 115 kV K20 circuit that extends west-to-east between New York Power Authority ("NYPA") Cumberland Head Substation in Plattsburgh, New York and VELCO's Grand Isle terminal station in Grand Isle, Vermont. This segment of the existing circuit currently consists of seven oil-filled cables that are buried along the land portions and within the shallows of Lake Champlain (the "Lake") and directly laid along the bottom in the deeper portions of the Lake. These cables were installed in two phases; the first phase of installation occurred in 1958 followed by a second phase of installation that occurred in 1970.

The existing cables are at the end of their expected useful service life. Given the vital interconnection that the PV-20 line provides between the Vermont and New York transmission grids, several factors have contributed to the proposal by VELCO and NYPA to replace the existing cables, which include: the extended lead time that would be needed to manufacture replacement parts and equipment if there was a failure of the existing cables, the extended lead time that would be needed to retain a qualified firm to repair the failure, and the potential for a release of oil to the land or Lake in the event of a cable failure. VELCO and NYPA propose to replace the existing seven cables with four new extruded dielectric (oil-free) submarine electric transmission line cables, and replace the existing substation/terminal stations. Upon commissioning of the replacement cables and new terminal stations, the existing cables and substation/terminal stations will be completely removed.

According to Vermont Statutes Annotated ("V.S.A.") Title 29, Chapter 11 Management of Lakes and Ponds §402(3), the alteration of the lands underlying any waters, or the placement of a cable or similar structure beyond the shoreline is considered to be an encroachment, and is prohibited without obtaining a Lake Encroachment Permit. In addition, a shoreline is further delineated as the mean water level ("MWL") of a lake which in the case of Lake Champlain is established to be at elevation 95.5 feet above mean sea level ("amsl"). Therefore, this application has been prepared to demonstrate how the proposed Lake installation from the Vermont shoreline to the New York/Vermont border will meet the applicable permitting criteria. This portion of the Project includes installation of the four new cables and removal of the seven existing cables, described further herein. VELCO is the sole applicant for this permit, since this permit will cover activities within Vermont. The following documents, in addition to the Statutes, have been referenced in preparation of the application materials:

- Vermont Department of Environmental Conservation ("DEC") *Interim Procedures for the Issuance or Denial of Encroachment Permits*, dated October 6, 1989 ("Interim Procedures"), accessed on DEC Watershed Management Division ("WMD") website February 2016.

- DEC *Explanation of Public Trust Review of Encroachment Permit Applications*, undated, accessed on DEC WMD website February 2016 ("Explanation").
- DEC *Instruction Sheet – Application for Permit Management of Lakes and Ponds,* undated, accessed on DEC WMD website February 2016.

The completed DEC Individual Permit Application for a Lake Encroachment Permit is enclosed in Appendix 1, and this report serves to supplement the information provided on the Application Form. The Abutting Landowner Addendum and a corresponding map are also provided in Appendix 1. A site location map and representative photographs of the Project Site are provided in Appendix 2. Additional supporting materials, such as maps, plans, and technical reports, are provided in Appendices 2, 3, and 4, as referenced by the attached Document Tracking Table.

1.1 Public Trust Determination

As described by the DEC Explanation document, in order to find that an LEP application meets the Public Trust Doctrine and can therefore be permitted, DEC must find that the public purpose and benefits outweigh adverse effects on the public good. In making this determination, the DEC applies a three-part test, as described in the Interim Procedures ("Public Trust Determination"). In addition to the information requested by the application form, this report narrative presents our evaluation of how the Project and Project components were developed in accordance with the three-part Public Trust Determination test:

- Part 1 of the Public Trust Determination assesses the effect of the Encroachment, with consideration of the extent of the encroachment, potential for less intrusive alternatives, measures taken to reduce impacts on the public resources, and the placement of fill beyond the Lake's mean water level that could potentially impact the public use of the state's natural resource. Sections 2.0 through 6.0 of this Report provide information relevant to this assessment.
- Part 2 of the Public Trust Determination examines the effect of the encroachment on statutory criteria including water quality, fish and wildlife habitat, aquatic and shoreline vegetation, navigation, and other recreational and public uses, including fishing and swimming. In addition, the Department will examine the proposed encroachment's consistency with the natural surroundings, any applicable municipal shoreland zoning ordinances, and any applicable state plans. Section 7.0 of this Report provides Project information that demonstrates the Project's conformance with this Part.
- Part 3 of the Public Trust Determination determines if the potential cumulative effect of the encroachment, when considered in conjunction with other existing encroachments, is adverse. Section 8.0 of this Report provides information relative to this assessment.

The completed DEC Individual Permit Application for a Lake Encroachment Permit is enclosed, and this report serves to provide supplemental information beyond that provided on the Application Form, with consideration of the Public Trust Determination. Additional supporting materials, such as maps, plans, and technical reports, are provided in the Appendices, as referenced by the Attached Document Tracking Table. Each following section corresponds to a Box Item on the Individual Permit Application for a Lake Encroachment Permit form.

2.0 Project Description (Box E.1.)

2.1 Project Overview

The overall proposed Project includes: construction of new transition/terminal stations in Plattsburgh, New York (NYPA) and Grand Isle, Vermont (VELCO), installation of four new submarine cables, removal of the seven existing cables, and removal of the existing terminal stations (also referred to as substations). In addition, the Vermont portion of the Project will involve the replacement of one existing overhead utility line structure and installation of one new overhead utility line structure associated with VELCO's existing K20 line circuit. Details for each proposed Project component are shown on the Permitting Plans (Appendix 2). The new cable installation and existing cable removal work will extend beyond the mean water level of the Lake; therefore, these Project components and their encroachment within the Vermont portion of the Lake are the focus of this application, and are further described in Sections 2.2 and 2.3 below.

For additional Project context, the new VELCO terminal station will be constructed approximately 120 feet north of the existing station in an existing grassed field. The station will consist of an approximate 110-foot by 120-foot fenced-in gravel pad to support the equipment for the transition of the submarine cable to overhead electric line. The new terminal station will include a small 12-foot by 16-foot control building, which will house system protection equipment. A new gravel access road will be located just south of the proposed station and run parallel along the property line to VT Route 314. Following installation and activation of the new terminal station and cables, the existing terminal station and associated equipment will be dismantled and removed. The existing terminal station area will be re-graded and restored to grassed open space similar to its current surroundings. The existing cables will also be removed, as further discussed in Section 2.4.

2.2 Existing Project Components

The seven existing PV-20 transmission line cables extend between the existing terminal stations on either side of the Lake and along the Lake bottom for approximately 1.6 miles, with 0.6 miles of cable length located in Vermont and the remaining 1.0 mile of cable length located in New York. Of the 0.6 miles located in Vermont, 0.56 miles of cable length is submarine with 0.04 miles of cable length being subterranean (see Table 1). The existing cables consist of four 2.9-inch diameter cables[1] (including three cables to support the three phase circuit and one spare cable) installed in 1958, and three additional 3.4-inch diameter cables[2] installed in 1970. One of the original cables failed in late 1969, at which point the spare cable was utilized to ensure the circuit remained operational. The three additional cables were added in 1970 to support the increasing load on the circuit. The cable that failed was abandoned in place and remains inoperable.

[1] Cable conductor is 500-thousands of circular mil ("kcmil").

[2] Cable conductor is 1,000 kcmil.

Table 1: Summary of Existing PV-20 Cable Lengths in Vermont	
Segment	**Approximate Length (per cable)**
Land	240 feet (0.04 miles)
Lake (submarine)	2,945 feet (0.56 miles)
Total Length	**3,185 feet (0.60 miles)**

The existing cables are an oil-filled design with gravity-fed oil reservoirs at each substation/ terminal station. In addition to the oil reservoirs, the existing VELCO terminal station consists of an approximate 40 by 50-foot gravel pad, which supports the structures and concrete foundations associated the equipment for the terminal of the submarine cable to the overhead electric line. A small (approximately 10 by 12-foot) building is located within the terminal station yard. The existing terminal station yard is completely fenced in and grass covered with the exception of the gravel pad.

Sediment Cover over Existing Cables

The Project team reviewed previous inspection reports and submarine videos to assess the amount of sediment covering the existing cables. A summary of findings from this review is as follows:

- 1958 Logan Diving & Salvage diver survey reported up to two feet of covering from shore out to 100 feet of water depth.
- 1962 As-Built Drawing
    - The cables enter the Lake as a group in a single trench that is 11 feet wide and then separate into individual cables in a 1.5 foot wide trench as they extend out 250 feet into the water. The cable trench includes two feet of rip rap underlain by one foot of sand into which the cable is placed.
    - Although not depicted in the 1962 as-built drawing, the trench sizes and construction are assumed to be same dimensions for the 1969 cables. Figure C-111 in Appendix 2 depicts the existing cable trench construction.
- A 1971 Presentation reported that divers observed four feet of covering during the 1970 fault investigation of the 1958 single cable failure. The fault location was at a water depth of 190 feet. The divers found that the cable was covered in up to four feet of silt in the area they examined.
- A 2003 video inspection by Underwater Construction Corporation found rip rap covering the cables off-shore, and then up to two to four inches of covering out to approximately 45 feet of water depth. Remote operated vehicle ("ROV") inspection was done in deeper waters with no thickness of cover reported, however, the cables were visible at times and not visible at other times. The inspection report indicates that in the deeper waters "well over half the time, the 500 MCM cables remained hidden below the silt of the lake bottom."
- The July 24, 2014 Wreck A video inspection shows the 1958 cables exposed and resting on the lake bottom with a "dusting" of silt in NY at water depth of nearly 200 feet.

Based on this review of available documentation, the amount of sediment covering the cables can be characterized as follows:

1. Rip Rap/ Sand Cover
    a. Cables are covered with approximately three feet of rip rap and sand from shore for approximately 250 feet into the Lake, based on as-built drawings.
2. Two to four inches of cover for 50 percent of each cable length based on the 2003 video inspection.
3. Greater than four inches of cover for 50 percent of the cable length.
    a. The cables are covered with a layer of silt below the lake bottom and are not visible. Based on conflicting documentation, it is conservatively estimated that a maximum cover thickness of four feet may be present over a portion of some of the cables, however actual thickness is not confirmed. Therefore, an average thickness of two feet is assumed.

2.3 New Submarine Cable Installation

2.3.1 New Cable Specifications

The Project involves the installation of four new, extruded dielectric (oil-free) submarine cables within an approximate 500-foot-wide corridor starting approximately 30 feet north of the northernmost existing cable and extending northward then westward within the Lake (see PV-20 Cable Replacement Project Plans, provided in Appendix 2). Three cables will be operational to support the three phase circuit with the fourth cable being installed as a spare in the event of a failure. The new cables are estimated to be between 5 and 6 inches in diameter[3] and weigh approximately 27 pounds per foot. The cables will have a load capacity of 230 kV, but will be operated at 115 kV, as restricted by the existing capacity of the K-20 circuit. The 230kV capacity cables are proposed in order to accommodate potential future upgrades to the remainder of the K-20 circuit.

The cables will be suitable for use on AC high voltage circuits in dry or completely submersed operating conditions. Each cable will be supplied and installed as a continuous length. The conductor will be compact round copper, walled with a semi-conducting water blocking compound. Additional layers will include the conductor shield, insulation, insulation shield, metallic sheath, jacket, and armor. A cable cross-section and materials table is provided as Appendix 2. The cable and armor will be designed for a minimum service life of 40 years.

2.2.2. Installation Methods

Cable installation methods starting from the east at the terminal station to the west at the Vermont/New York state line within the Lake will include open trenching, horizontal directional drilling ("HDD"), jet sledding, and direct laying, as summarized in Table 2, and further described below. The total proposed cable length within the Vermont portion of the Project from the terminal station to the Vermont/New York state line is

[3] 2,400- to 4,000-kcmil

approximately 0.7 miles per cable. The approximate lengths for each installation method for each cable are summarized in Table 2.

Table 2: Summary of Proposed PV-20 Cable Length Installation in Vermont			
Installation Method	**Location**	**Length (per cable)**	**Length (per cable beyond 95.5 foot MWL)**
Open Trench	Proposed terminal station to proposed manhole located approximately 270 feet from Lake MWL	110 feet (0.02 miles)	--
HDD	Proposed manhole (on land) to 30-foot water depth (gravity cell)	894 feet (0.17 miles)	620 feet (0.12 miles)
Jet Sled	30-foot (gravity cell) to 100-foot water depth	610 feet (0.11 miles)	610 feet (0.11 miles)
Direct Lay	100-foot water depth to the Vermont/New State Line (200 foot water depth)	1,890 feet (0.36 miles)	1,890 feet (0.36 miles)
	Total Length:	**-18 feet (0.66 miles)**	**3,120 feet (0.60 miles)**
Note: Refer to Figure C-104 in Appendix 1. All locations and lengths are approximate.			

Open Trenching

The cables will be installed by open trenching from the terminal station to the manhole located approximately 270 feet from the shoreline defined by the MWL. An Erosion Prevention and Sediment Control ("EPSC") plan will be submitted with the Construction Stormwater Permit Application, and measures will be used around the trenches to prevent stormwater runoff from exposed soil in accordance with the finalized and approved EPSC plan.

Horizontal Directional Drilling

HDD is a trenchless construction technique that will be used to avoid impacts to the Lake shore and nearshore habitat, to a water depth of approximately 30 feet. Each HDD will be approximately 894 feet in length (Table 2), approximately 620 feet of which will be beyond the 95.5 foot MWL.

The main equipment used for HDD include:

1. A directional drill rig sized for the Project, which will be located onshore;
2. Drill rods linked together to form a drill string for advancing the drill bit and for pulling back reamers and products, such as the plastic conduit;
3. A transmitter/receiver or wire line for tracking and recording the location of the drill and product;

4. A tank for mixing and holding drilling fluid;
5. A pump for circulating the drilling fluid and various pumping and centrifugal pumps/cyclones to recycle the drilling fluid and remove cuttings.
6. Gravity cell at exit point to contain fluids
7. Drill support barge, frac tank barge, and other support vessels

The HDDs involve a land based launch site and pull-back area that will be positioned approximately 270 feet from the annual mean water elevation of 95.5 feet amsl where the directional drill rig will be staged and positioned to guide the drill along a planned path to an exit point within the Lake. An entry pit will be dug at the launch site to capture drilling fluid returns. A gravity cell, which is an open bottom and top containment structure (refer to Figure C-110) will temporarily be situated at the exit points in the Lake to confine drilling fluids or cutting material that may escape from the drill holes.

The gravity cells are anticipated to be approximately 11 feet by 25 feet in size, and will be slowly lowered off the barge, using support lines from the a barge until the gravity cell is located in the correct position on the lakebed. Drilling fluid will consist of a non-hazardous bentonite slurry (a combination of bentonite clay, water, and drilling additives). Safety Data Sheets ("SDSs") for typical drilling mud additives are attached to the Inadvertent Return Plan provided in Appendix 3. The drilling fluid will be continually cleaned and recycled for use in the drilling operations.

Based on site conditions associated with this project, the HDD installation will utilize a "Push Reaming" methodology. This process is visually presented and described in detail in the pictorial representation and Inadvertent Return Plan, respectively, which are provided in Appendix 3. As discussed further in Section 5.2, VHB and CHA have prepared a Spill Prevention, Containment, and Countermeasure Plan that describes the spill prevention and contingency methods and procedures to be utilized for the installation part of Project, which is provided in Appendix 3.

Jet Sledding

Jet sledding, also referred to as "jet plowing," involves a skid-mounted jet sled which is towed by a barge. The jet sled uses pressurized water to fluidize the sediments to create a temporary trench, which allows the cables to settle to a specific desired depth then the sediments fall out of suspension back to the approximate original contours. A typical detail of jet sledding is provided in Figure C-110 in Appendix 2. The temporary trench will be approximately 1.5 feet wide by four feet deep. The Project proposes to bury the cables via jet sledding from approximately 30 feet of water depth to 100 feet of water depth, which equates to approximately 610 linear feet per cable.

Direct Lay

From water depths greater than 100 feet to the Vermont/New York state line, the cables will be directly laid on the Lake bottom for approximately 1,890 feet (0.36 miles) using a linear cable engine on a dynamically positioned barge to control the cable tension and placement.

2.4 Removal Methods

Once the new cables are installed, tested, and commissioned into service, the seven existing oil-filled cables will be removed. VELCO and NYPA have determined that complete removal of the cables is necessary to prevent a release of residual oil to the Lake, avoid potential future degradation issues, and avoid the need to remove them at a future date when their condition may have deteriorated further. Further, NYPA is committed to removing the cables per their existing easement agreement with the New York State Office of General Services. In addition, the U.S. Army Corps of Engineers ("USACE") has also expressed a preference for complete removal of the cables.

Prior to removal of the existing cables, the free-phase oil will be drained and purged with water, air or another innocuous material, to remove oil from within the cables. Purging activities will be conducted within a containment structure on land to protect immediately adjacent areas, including the Lake, from any potential incidental releases. Prior to purging the cables, the oil from the conservator tanks will be removed. A vacuum truck and air compressor will be used to purge the oil from the cables, and a minimum of three purging events for each cable are planned. Each purge event will consist of connecting a vacuum truck to the cable to draw the oil from the cable. The use of a vacuum truck and air compressor will be utilized separately or together to recover as much oil as possible. Second and third purge events will be completed following 36 hour waiting periods after each purge event. If significant oil is still recovered during the third purge event, additional purge events, as described, will be performed. Purged oil will be collected and disposed of in accordance with applicable state regulations. The removal contractor, Miller Environmental Group, has developed a Spill Prevention, Containment and Contingency Plan for the purging of oil and removal of the existing cables, which is provided in Appendix 3.

The land portions of the cables will be removed via open trench excavation. Temporary impacts to the Lake may also result from trench excavation below the mean water level to uncover and remove the sections of cable where they enter the Lake. As described in Section 2.2, the cables enter the Lake as a group in a single trench that is 11 feet wide and separate into individual cables in a 1.5 foot wide trench as they extend out about 250 feet into the water at a water depth of approximately 20 feet. The documentation indicates hand placed rip-rap, two feet thick and underlain by one foot of sand, covers the existing cables in the trenches. The material overlying the cables is proposed to be excavated from the existing trenches, and a total of approximately 305 cubic yards (CY) of rip-rap (204 CY) and sand (102 CY) is planned to be temporarily side cast adjacent to the cable trenches, prior to cable removal and then placed back into the excavated trench upon completion of cable removal activities. Temporary and permanent impacts related to this material removal and side casting are summarized in Table 3 of Section 2.6.

Within deeper portions of the Lake, divers will confirm, either by visual inspection or by ROV, that the cables are free of any obstructions or debris. If significant amounts of sediment overlying the cables is encountered

and determined to put unacceptable tension on the cable during extraction, diver-assisted water jetting efforts may be required to minimize sediment cover over the cables to facilitate extraction. The cable will then be secured to a spool, mounted on a work barge. The cable will be recovered from shore to the end of the rip-rap covered area at which point the barge will be spun about to allow for cable recovery from the bow of the vessel at which point the spool will reel up the cable directly off the Lake bottom, with little to no substantial lateral movement of the cable during removal. Once a cable has been fully recovered, the cable will be transferred onto a truck mounted spool on land, where it will be brought to a waste containment area for disposal preparation. VELCO anticipates that the barge and hoist cable removal rate will be approximately 800 feet per hour, or approximately 4 hours per cable for the portions that are bottom laid. The removal of all cables, including the portions covered with rip-rap, will take place over approximately 24 days, but may not be consecutive. Cable removal rates may be adjusted according to prevailing conditions, and therefore this timeframe is an estimate only. The general timeframe for cable removal work within Lake Champlain is expected to occur between June 1 and September 30, 2018.

Upon construction and commissioning of the new terminal station, the existing station and equipment will also be decommissioned.

2.5 Planned Work Schedule

Construction activities are anticipated to commence in 2016 and continue through 2018 with operation of the new cables and terminal stations commencing in 2017 and removal activities completed in 2018. Specifically, VELCO anticipates the following timeline for Project activities scheduled to occur in Lake Champlain:

1. Gravity cell use related to the HDD activities: September 1, 2016 through November 15, 2016
2. Vessel and Equipment Mobilization prior to new cable installation: April 1, 2017 through June 20, 2017
3. Cable Installation: June 1, 2017 through July 31, 2017
4. Cable Removal: June 1, 2018 through August 30, 2018

This schedule may be subject to change due to unanticipated conditions, however the Project is committed to limiting in-lake construction activities, such as jet sledding, direct laying, and removal, to between June 1 and September 30 of a calendar year. HDD activities may occur between May 1 and November 15 of a calendar year.

2.6 Placement of Fill

Because the Project includes work within the Lake itself, physical impacts to the Lake resulting from the installation of the proposed cables and removal of the existing cables have been assessed. Minor, temporary impacts to the Lake substrate associated with dredge and/or fill material include the temporary installation of four 11 foot by 25 foot gravity cells to facilitate the in-Lake HDD portion of cable installations, and the excavation and side casting of rip-rap material to facilitate cable removal. No in-Lake utilities currently intersect the Project Area, however, if other proposed in-Lake utilities are installed prior to the PV-20 cable installation, articulated concrete mats or other protective structures will be placed over the existing lines underlain by grout bags to

protect both the existing utility and the Project cables, which would be considered permanent impacts. Based on this, temporary and permanent impacts to the Lake resulting from Project implementation have been calculated, and are summarized below in Table 3.

Table 3. Summary of Proposed Impacts Associated with Dredge and Fill Material in Lake Champlain within Vermont

Impact	Area (Square Feet)	Volume (cubic yards)
Temporary: Gravity Cell (4) x (11 foot x 25 foot)	1,100	--
Temporary: Existing Cable Removal – Rip Rap Side Casting (approx. 15 foot wide corridor for temporary rip-rap placement)	7,500	--
Temporary: Trench Excavation (approx. 11 foot wide trench to uncover existing cables)	5,500	--
Permanent: Articulated Concrete Mats (20) x (8-foot x 40-foot)	6,400	--
Temporary: Rip-rap removal from trench and replacement after cables are removed		204
Temporary: Sand removal from trench and replacement after cables are removed		102
TOTAL	**20,500**	**306**

3.0 Purpose of the Project (Box E.2.)

The PV-20 line is a vital interconnection between the Vermont and New York electrical grids; this line is one of the five transmission lines that support the greatest electrical energy demand center of Vermont. A recent assessment determined that the existing cables are approaching the end of their design life and are regarded as being at risk for long term continued service. Based on this, the importance of this transmission interconnection, the long lead times for custom fabrication and repair of the existing cables, and the potential for a significant release of oil to the land or Lake in the event of a cable failure, VELCO is proposing to replace the existing cables, prior to any failures associated with these cables.

4.0 Alternatives Analysis (Box E.3)

Prior to developing the detailed design of the Project, VELCO considered a number of potential alternatives to the current Project in order to determine if one alternative would accomplish the Project purpose and result in less impacts to sensitive resources (e.g., aquatic and other natural resources, cultural resources, aesthetics). VELCO considered alternative Project locations and installation techniques for the construction of the replacement cables to determine the preferred methods that would result in the least impacts to the environment. The combination of proposed installation methods represent the least intrusive alternative by:

1. Avoiding impacts to the shoreline by using HDD,
2. Avoiding impacts to the cable itself and to recreation by burying the cable below the Lake bed in shallow waters (less than 100 feet deep), and
3. Directly laying the cable on the Lake bed in deeper waters (greater than 100 feet deep) to avoid impacts associated with resuspension of sediment.

An Alternatives Analysis prepared for support of the Project's application for a Department of the Army Individual Permit under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act for the Project provides additional details of the alternatives considered, and is included in Appendix 4.

To supplement the alternatives discussion regarding the use of shear plowing, the contractor supplied additional information as to why shear plowing is not feasible for this Project, which is presented in VELCO's Supplemental Responses to Certain Vermont Agency of Natural Resources ("ANR") Discover Requests, Docket 8604, and dated January 21, 2016. According to the contractor, a large vessel would be required to accommodate the weight (45 ton) of a commercially available shear plow. Such large vessels would not be reasonable to bring into Lake Champlain through the lock system. Given the conditions along the Project corridor, a custom built shear plow could potentially be utilized, however a custom shear plow would be limited to a maximum burial depth of three feet. A three foot burial depth would be less protective of the cable and would not meet the required burial depth outlined in the USACE Nationwide General Permit 12 – Utility Line Activities, which requires a burial depth of four feet. In addition, a custom built shear plow would be cost prohibitive for the Project based on the limited extent of burial required for the Project.

5.0 Prevention Measures (Box E.3)

Measures will be used to limit the Project's potential impact on the natural environment during installation. These include the overall Project design, installation methods, proposed installation inspection and monitoring, and spill prevention planning and response for hazardous materials.

5.1 Overall Project Design and Installation/Removal Methods

The Project itself is being proposed as a means to reduce the potential adverse impacts on the Lake by removing and replacing the existing oil-filled cables with oil-free cables. Oil will be drained and purged from the cables with an innocuous material prior to the cable removal in order to avoid the risk of a release during removal.

Purged oil will be collected and disposed of in accordance with applicable state regulations. The removal contractor, Miller Environmental Group, has developed a spill prevention, containment and contingency plan (or similar) for the purging of oil and removal of the existing cables, which is provided as Appendix 3.

The Lake crossing route represents the shortest distance between the New York and Vermont terminal stations, and as discussed in Section 4.0 and the Alternatives Analysis provided in Appendix 4, alternative terrestrial routes and installation methods would likely result in greater impact to the natural environment. With the Lake route being the most feasible alternative, VELCO completed several environmental assessments within the proposed Project corridor (further described in Section 7.0) and designed the route using selected installation methodologies that will avoid or limit adverse impacts to water quality, aquatic habitat, and cultural resources while meeting the Project objectives. These environmental assessments have concluded that sensitive aquatic habitats and cultural resources do not exist within the Project corridor.

The following prevention measures related to the proposed installation methods include:

HDD

- The use of HDD technology to enter the Lake will avoid impacts to the shoreline and near shore habitat.
- HDD equipment and laydown area will be set back over 270 feet from the mean water level of the Lake.
- The HDD launch pit will be constructed to contain drilling fluids at the entry point of the HDD borehole.
- A temporary gravity cell will be used at the exit point within the Lake to collect drilling fluid and prevent it from entering the Lake beyond the gravity cell.
- The contractor will pump out drilling fluid from the gravity cell prior to it being removed from the Lake.
- EPSC measures to be installed on land around the HDD launch pit as needed.

Jet Sled

The use of jet sled installation technologies will limit the Project's potential impact to water quality. Compared to traditional mechanical dredging and trenching operations, use of the jet sled for aquatic cable installation is considered the most effective and least environmentally damaging installation method for this Project. This method allows for the simultaneous laying and burying of the cables, resulting in a short duration of Lake bottom disturbance. The fluidized sediment is expected to settle back into the trench following installation, resulting in the approximate original contours of the Lake bottom. This method is being proposed for water depths between 30 feet and 100 feet in order to protect the cables and avoid impacts to anglers or boaters that may fish or anchor at these depths. Refer to Section 4.0 for a discussion as to why shear plowing is not feasible for this Project.

Direct Lay

Directly laying the cables on the Lake bed in deeper waters (greater than 100 feet in depth) avoids potential temporary water quality impacts related to sediment resuspension. This method is the least invasive, but is only proposed in deeper waters because cables located in shallow waters (less than 100 feet depth) are more susceptible to impacts from anchoring and other recreational use.

5.2 Installation/Removal Prevention Plans and Monitoring

HDD – Drilling Fluid and Inadvertent Returns

As previously discussed, HDD installation methodology involves the circulation of drilling fluid in the borehole to reduce friction, hydraulically excavate soil, provide borehole stabilization, and provides other key functions. In ideal circumstances, the drilling fluid flows back to the entry through the drilled annulus. However, existing fractures in sediment or rock can provide a path of least resistance for fluid to escape the borehole, resulting in discharge of fluids at a location other than the entry or exit points. This unintentional release is referred to as an "inadvertent return." The risk of inadvertent returns can be avoided or reduced through the implementation of best management practices, including prevention planning and continuous monitoring. The impacts of a potential inadvertent return can also be reduced or mitigated through the implementation of a response plan. An Inadvertent Return Contingency Plan provided as Appendix 3 describes procedures and contingency measures in the event of an inadvertent return during HDD operations.

Hazardous Materials

The installation of the aquatic cable would require the transport, handling, use, and onsite storage of hazardous materials and petroleum products, primarily associated with the operation of the equipment and vehicles. To avoid potential impacts from hazardous materials and wastes, VHB and CHA have prepared a Spill Prevention, Containment, and Countermeasure Plan that describes the spill prevention and contingency methods and procedures to be utilized for the Project, which is provided in Appendix 3.

The removal contractor, Miller Environmental Group has developed a spill prevention, containment and contingency plan (or similar) for the purging of oil and removal of the existing cables, which is also provided in Appendix 3.

Installation Inspection/Monitoring

During portions of installation, a qualified Environmental Inspector will be on-board the installation vessel and responsible for monitoring. As described in Section 7.0, a temporary and limited amount of sediment resuspension is expected due to the installation via jet sled. Sediment resuspension within the Lake will be visually monitored at the surface of the water from support vessels, in addition to real-time in-situ turbidity monitoring which will be conducted in accordance with the Turbidity Monitoring Plan ("TMP"), provided in Appendix 3. As indicated in the TMP, VELCO will work with ANR to establish turbidity thresholds that would trigger the need to consider additional environmental protective measures, such as changing the rate of jet sled installation, modifying hydraulic pressures, or implementing other reasonable operational controls that may reduce suspension of sediments.

Aquatic Invasive Species Management

The nature of the Project requires the transport of marine vessels into Lake Champlain via overland or the Champlain Hudson Lock System. The transport of marine vessels/equipment from one water body to another poses the risk of introducing new aquatic invasive species ("AIS") to the Lake. Where possible, overland transport will avoid the risk of AIS as it prevents the need to bring vessels in through the Champlain Hudson canal system. Equipment is planned to be transported to the Lake on tractor trailers overland and assembled at a marina on the lake or via the vessels traveling through the Champlain Hudson canal system (e.g. deck barges, transport barges). Materials for the Project are also planned to be transported to the Project site overland, with the exception of the replacement cables.

The replacement cables will be manufactured in South Korea and transported to a port in New Jersey or New York, where each of the four cables will be unloaded from the ocean vessel and placed within a specially designed barge for transport to the Lake through the Champlain Hudson canal system.

An AIS Management ("AISM") Plan prepared in consultation with the contractors is included as Appendix 3, and includes more information regarding vessel types, precautionary measures, and decontamination procedures.

6.0 Public Benefits of the Project (Box E.4)

As previously stated, the PV-20 line is a vital interconnection between the Vermont and New York electrical grids and this line is one of the five transmission lines that support the greatest electrical energy demand center of Vermont. This Project creates economic and safety benefits to Vermont because it replaces aged and damaged infrastructure before its complete failure. Failure of one of the existing operating cables would likely result in a lengthy line outage, which would hinder the electrical reliability serving the Chittenden County area. Such a failure would result in higher wholesale electricity prices, generation limits, difficulty in performing transmission system maintenance, and potentially exposing the system to voltage collapse problems. Loss of this interconnection would have a significant impact upon the overall reliability of the VT electrical transmission grid.

An outage caused by a cable failure could reduce the Vermont Grid's ability to deal with contingencies, likely increasing the costs for the electric distribution utilities within Vermont. This condition would also expose the system to voltage collapse problems for several contemporaneous contingencies, which could not be remedied with area generation. Electric energy remains a cornerstone of local and state economies, quality of life, and communities, and is depended upon by private, commercial, and public customers for communication, lighting, heating, ventilation, and the operation of appliances and equipment. The Project provides an overall benefit to the state and its residents by reducing the risk of these losses of necessary services, as well as creating economic and safety benefits to the citizens of Vermont by replacing aged and damaged infrastructure.

The Project will also increase property and education tax revenues based on the capital investment required for the replacement assets.

7.0 Public Trust Determination Part 2: Effect of the Encroachment on Statutory Criteria

Part 2 of the Public Trust Determination examines the effect of the encroachment on statutory criteria including water quality, fish and wildlife habitat, aquatic and shoreline vegetation, navigation, and other recreational and public uses, including fishing and swimming. In addition, the Department will examine the proposed encroachment's consistency with the natural surroundings, any applicable municipal shoreland zoning ordinances, and any applicable state plans.

7.1 Water Quality (Box F.1.)

7.1.1. Construction

VELCO completed studies to characterize Lake conditions and assess the Project's potential impacts on natural resources in the Lake during construction. Analysis of potential impacts to surface waters included the assessment of impacts to Lake Champlain that may result from the installation of the submarine cables, including the potential resuspension of lakebed sediments. As presented in VHB's *VELCO PV-20 Lake Champlain Crossing Water Quality Assessment Memorandum* ("PV-20 Technical Memorandum"; Appendix 4), the analysis of available Lake water quality data, Project-specific data (Appendix 4), and the review of water quality modeling efforts recently completed for a comparable electric transmission line project, demonstrate that the installation of the proposed PV-20 Project will not result in adverse impacts to water quality of the Lake. Specifically, it was identified that limited temporary and localized total suspended solids ("TSS") and total phosphorus ("TP") levels will increase in the overlying water column during installation, however these limited increases are expected to occur for only a short duration during cable installation, with a rapid decline immediately following installation, and will not result in an exceedance of the Vermont Water Quality Standards ("VWQS"). The VWQS criterion for TSS is based on an assessment of impacts to existing uses. As described in the PV-20 Technical Memorandum, the limited extent of installation-related TSS increases of up to 200 feet horizontally and 10 feet vertically, and the temporary duration of the TSS increase of no more than four hours will not prevent the full support of the Lake's uses, which include recreation (boating, fishing, and swimming), navigation, and wildlife habitat. The VWQS criterion for TP is based on an annual mean concentration of open Lake waters in the euphotic zone. The very short duration of TP increase (no more than four hours) will not have any measurable effect on the annual average concentration. Also, based on project-specific sediment data and analysis presented in the PV-20 Technical Memorandum (Appendix 4), the installation also will not result in the release of metals or other pollutants from the sediment into the overlying water column in concentrations that exceed the VWQS. As presented in the PV-20 Technical Memorandum, the comprehensive review of relevant available datasets and

model outcomes, in addition to Project specific studies, indicates that the installation of the Project will not result in undue adverse effects to water quality and will maintain compliance with all applicable VWQS criteria.

7.1.2 Operation

The transmission of energy through the cables will result in heat loss from the cables to the surrounding environment. As summarized in the PV-20 Technical Memorandum and detailed in CHA's "Estimated Thermal Discharge for Existing and Proposed Cables Memos" provided in Appendix 4[4], thermal modeling of the PV-20 cables during operation indicates that the new cables will operate at lower temperatures than the existing cables, thus having less impact to the water surrounding the cables. This modeling further identified that water temperature increases from cable operation will remain well below one degree F at 0.4 inches from the cable and will have a zero degree temperature change on the water at 0.5 inches from the cable and beyond. Therefore, the Project specific temperature modeling indicates that the operation of the Project will not result in undue adverse effects to water quality and will maintain compliance with applicable VWQS temperature criteria.

The new cables will result in a decrease in the maximum magnetic field compared to the existing cables. The results of magnetic modeling are summarized in the PV-20 Technical Memorandum and in the "Calculated Magnetic Field Levels for the PV-20 Submarine Cable Replacement Project" prepared by Electrical Consulting Engineers, P.C., and provided in Appendix 4.

7.1.3 Removal

Prior to removal of the existing cables, the free-phase oil will be drained and purged with water or another innocuous material, such as air, to remove oil from within the cables. Purging activities will be conducted within a containment structure on land to protect immediately adjacent areas, including the Lake, from any potential incidental releases. Removal of the oil-filled cables eliminates potential future water quality impacts associated with the cables remaining within the Lake. The removal contractors have prepared a Spill, Prevention, Containment, and Contingency Plan (Appendix 4), and based on the proposed design/approach and protective measures described in the plan, the Project will not result in undue adverse water pollution.

7.1.4 Turbidity Monitoring

Although modeling indicates that resuspended sediment resulting from the jet sled installation will be limited in extent and duration, VELCO proposes to monitor turbidity in the Lake on the north and south sides of the Project corridor, and in between the Project and the water intake that supplies the Grand Isle Consolidated Water District and the Vermont Fish and Wildlife Ed Weed Fish Hatchery (refer to Section 8.0), as proposed in the TMP provided in Appendix 3. The TMP has been prepared in consultation with DEC and the Vermont Fish

[4]A more detailed memorandum outlining the methodology and calculations for the thermal modeling is provided in Appendix 3.

and Wildlife Department ("FWD"), and VELCO will continue to work with DEC and the FWD to establish acceptable turbidity thresholds at the proposed monitoring locations.

7.2 Fish and Wildlife Habitat (Box F.2.)

No significant or measurable impacts on fish and wildlife habitat are anticipated as a result of the construction or operation of the Project. VELCO retained EcoLogic, LLC ("EcoLogic") of Syracuse, New York to complete an aquatic habitat and biota assessment for the Project corridor. EcoLogic assessed the use of the Lake littoral zone by other fish and wildlife species. They determined the area of the Lake proximal to the Project corridor could be expected to support a number of sport fish species, including smallmouth bass (*Micropterus dolomieu*), walleye (*Sander vitreus*), and northern pike (*Esox lucius*). However, no habitats were identified within the Project corridor that would provide exceptional value for fish spawning or nursery areas, and therefore the Project corridor within the Lake does not represent critical habitat. Additionally, several bird species were observed during EcoLogic's field investigation including double-crested cormorants (*Phalacrocorax auritus*), mallards (*Anas platyrhynchos*), and ring-billed gulls (*Larus delawarensis*) were observed. These species are wide-spread and common, and use similar habitats throughout the Lake, therefore the potential habitat for these species in the Project vicinity is not critically important. The FWD also indicated that Rare, Threatened, or Endangered mussels species are not known to occur in this section of the Lake[5], which was confirmed by EcoLogic's field assessment.

Based on their assessment, EcoLogic found that no significant short-term or permanent impacts are anticipated to occur as a result of installation of the four new cables based on the proposed installation methods, which will avoid impacts to the littoral zone to a water depth of 30 feet via HDD installation and will result in only temporary impacts to the profundal zone bottom sediments for Jet Sledding and Direct Lay installation methodologies in deeper waters. EcoLogic concluded that these deeper water installation methods will not have any significant negative impact on aquatic habitat or biota given the lack of aquatic invertebrates occupying the substrate in these regions. Additionally, EcoLogic assessed potential impacts to aquatic habitat and biota due to proposed removal activities within the Lake, and determined that the Lake sediment will likely be minimally disturbed and suspended when the cables and other structures are removed, with this disturbance being temporary and localized in nature, thus will not result in adverse impacts to the aquatic habitat and biota within the Lake.

In addition, VELCO will avoid potential impacts to fish spawning by limiting significant Lake bed disturbing activities to timeframes generally outside of potential fish spawning periods. These activities, which specifically include jet-sledding and cable removal, would be limited to the June 1st to September 30 timeframe, to avoid potential fish spawning impacts. Given the schedule and sequencing requirement of the Project, VELCO would require performing gravity cell installation and HDD work activities during and outside of this timeframe, but

[5] Per e-mail from Bill Coster, ANR, dated August 18, 2014. Provided in Appendix 3.

between May 1 and November 15. VHB notes that disturbance to the lakebed would be limited to only the area within the gravity cell and would have no significant impact on fish spawning.

7.3 Aquatic and Shoreline Vegetation (Box F.3.)

In order to meet the overall purpose and design of the Project, (i.e., removal of existing terminal station and cables, and installation of new terminal stations and cables to connect with the existing electrical grid), a portion of the Project must be located within the shoreline of the Lake. However, Project impacts have been minimized to the maximum extent feasible while still achieving the Project purpose. As previously discussed, HDD installation methodology is being proposed to avoid impacts to the shoreline. Project activities involving ground disturbance within the shoreline of the Lake will be primarily associated with the removal of the existing cables. Impacts due to trench excavation within the defined shoreline area total approximately 2,030 square feet (0.05 acre). VELCO also anticipates that herbaceous vegetation in the existing mowed field, where the new terminal substation will be located, will be disturbed during construction activities. During all construction activities, specific EPSC measures will be utilized to avoid unintended releases of sediment to the Lake will occur. The Project will also retain the existing tree line between the proposed terminal station and the Lake to screen the development and to maintain shoreline stabilization. Once cable removal activities are completed, the shoreline will be restored, including bank stabilization measures, to pre-construction conditions to the extent feasible. The existing substation area will be restored with herbaceous vegetation (e.g. grass). VELCO is not proposing additional revegetation measures at this time because they anticipate the need to use this corridor for future cable replacements. In summary, although a portion of the Project is located within the shoreline area, the Project will not impinge on the current shoreline condition, recreational use, existing riparian vegetation, or result in decreased bank stability from the current condition and will therefore, not have any undue adverse effect on the shoreline.

7.4 Consistency with Natural Surroundings (Box F.4.)

The new terminal station will be similar in size and content to the existing station. The cables will not be visible along the shoreline and to water depths of 100 feet as they will be buried beneath soil, bedrock, and Lake sediment. Vegetation (tree line) along the shoreline will be maintained to shield the view of the station and its components. As reported by T.J. Boyle Associates in the Aesthetic Analysis Report (provided as Exhibit Petitioner SSM-8 in Docket 8604 filed with the Public Service Board), the Project's effects on the aesthetics of the area will not be unduly adverse.

7.5 Navigation, Recreation, and other Public Uses (Box F.5.)

During periods of in-Lake work (installation and removal), VELCO anticipates temporary, moving no-travel safety work zones around the HDD and cable laying and recovery barges. A US Coast Guard local notice to mariners will alert lake users about the work and work zones. In addition, VELCO will implement a public lake user notification strategy to alert users about timing and impacts of construction. The strategy includes press releases, newspaper ads, and postings in Fish and Wildlife lake access kiosks, if allowed, to explain the Project,

the construction schedule, and to provide contact information. VELCO will maintain updates about the Project construction on its website, and will develop a mailing list of interested Lake users who wish to receive individual construction update notices. This notification mailing list will include the U.S. Coast Guard, USACE, local harbor/marina masters, and Lake Champlain Ferries contacts.

Once installed, there would be no significant or measurable impacts on recreation and public uses. The alternating current through the cables will emit magnetic fields, but the magnetic field will not affect compass readings or operation of recreational vessels (refer to Technical Memorandum and the Magnetic Fields Memorandum, Appendix 4). In addition, the magnetic fields from the new cables will be less than the existing cables.

7.6 Consistency with Applicable Municipal Shoreland Zoning Ordinances

The Project is located within the Commercial Recreation Shoreline District of Grand Isle. VELCO reviewed the Land Use Plan Section of the Grand Isle Town Plan, which states that the purpose of the Commercial Recreation Shoreline District is to "provide for commercial recreation and other compatible uses which require locations on or access to the public waters of Lake Champlain. Future development in this District must comply with the State's setbacks from the shoreline of Lake Champlain which is sufficient to maintain the lakeshore as a scenic and natural resource and to prevent erosion and pollution of Lake Champlain Waters (Town Plan, at 18, 2012)."

As discussed herein, the manhole structures (or similar structures) and the new terminal station will be constructed approximately 270 and 330 feet, respectively, from the 95.5 foot elevation contour of the Lake, which complies with the Shoreland Protection Act setback of 250 feet. Temporary construction will take place closer to the shoreline as part of the removal of existing cables. VELCO will implement EPSC measures as needed to minimize potential for erosion and control sediment.

In addition, VELCO contacted the Grand Isle Select Board and Planning Commission to discuss the Project's scope of work and potential impacts. VECLO also provided information regarding the proposed Project to these entities, the Regional Planning Commission, and adjoining landowners, as part of the Section 248 45-day notice procedure. VELCO has also held public meetings to discuss questions and concerns with the Town and the general public. The Town of Grand Isle has given VELCO a letter of support for the Project.

7.6.1 Consistency with Applicable State Plans

State Plans that are potentially applicable to the Project are the Lake Champlain Phosphorus Total Maximum Daily Load ("TMDL") Plan, and relevant Tactical Basin Plans.

<u>TMDL Plan</u>

A final TMDL plan has not been issued by the U.S. Environmental Protection Agency at this time. As previously discussed, the Project will not significantly contribute to existing exceedances of the VWQS for total phosphorus in Lake Champlain. Furthermore, the cable installation does not represent a new source of

phosphorous contribution to the lake but rather represents the potential for temporary resuspension of phosphorus associated with existing lake sediments into the water column on a short term basis (one to four hours per cable).

Tactical Basin Plan

The Project is located within the North Lake Champlain Drainage Basins, which has an established Tactical Basin Plan (DEC, 2015). According to the DEC Watershed Management Division's website, "Tactical Basin Plans focus on the projects or actions needed to protect or restore specific waters and identify appropriate funding sources to complete the work based on monitoring and assessment data." The plans are developed to meet the goals and objectives of the Vermont Surface Water Management Strategy ("VT SWMS") to protect, maintain, enhance, and restore the biological, chemical, and physical integrity, and public use and enjoyment of Vermont's water resources, and to protect public health and safety. As demonstrated herein, the Project will conform to these goals and objectives of the VT SWMS.

8.0 Public Trust Determination Part 3: Potential Cumulative Effect of the Encroachment

Part 3 of the Public Trust Determination determines if the potential cumulative effect of the encroachment, when considered in conjunction with other existing encroachments, is adverse. Although other utility lines exist within the Lake, no existing utilities currently intersect the Project Area.

A portion of the Project is located at the northern edge of the Source Protection Area for the Grand Isle Consolidated Water District's ("GICWD") water intakes in the Lake (refer to the Water Supply Assessment Map in Appendix 2). Therefore, VHB investigated this water supply source in order to assess potential water quality impacts during Project installation activities within the Lake. Based on available records, the GICWD has two intakes in the Lake, Identified as the "deep intake" and "shallow intake". The "deep intake" is shared with a FWD fish hatchery and is approximately 180 feet below the mean water level of the Lake. This intake is located over 3,900 feet to the south of the closest Project Area boundary. This deep water intake supplies water to the fish hatchery, which has unidentified limitations associated with turbidity increases. The "shallow intake" is approximately 28 feet below the mean water level of the Lake, and is approximately 2,700 feet to the south of the closest Project Area boundary. As previously discussed, the extent of water quality impacts, particularly TSS, is expected to be less than 200 feet from the area of installation and will not impact either of these two water intakes.

Although Lake Champlain dischargesflows to the north, and these intakes are located to the south of the Project, seiche events in the Lake can result in a change in direction of the bottom currents (per communication with DEC and Tom and Pat Manley, Middlebury College). The fish hatchery also reports that

elevated turbidity levels in the deepwater intake appear to be associated with these seiche events. The water quality modeling completed for the NECPL Project and relied on for this Project (in addition to Project-specific analyses) did not produce an output for specific seiche events. However, the modeling incorporated a year's worth of data and its output "reasonably represents the observed temperatures and vertical temperature structures at most stations" (HDR, 2014), indicating that internal seiche dynamics (defined by the vertical migration of the thermocline) are incorporated into the model. Further, the model outputs were based on a summer period (July/August) and a fall period (September). Therefore the model accounts for internal seiche dynamics, but the outputs represent average conditions over 1 to 2 month periods. As described in the Technical Memorandum, the results of the HDR model are applicable to this Project and sufficiently predict the average conditions within the Project corridor. These average conditions represent the conditions when in-Lake work would be completed, because cable installation and removal efforts will not be performed during unacceptable weather conditions such as periods of high velocity winds and water current, which would likely trigger significant seiche events. The installation and removal contractors will routinely monitor weather patterns and will adjust work plans accordingly. We note that the prediction of seiche events based on weather forecasts is complex, so as an additional layer of protection, VELCO propose to monitor turbidity levels before and during construction activities. Specifically, VELCO proposes to monitor turbidity in the Lake between the Project and the deep and shallow intakes, as proposed in the TMP provided in Appendix 3. As the fish hatchery may be susceptible to turbidity increases, the monitoring plan establishes a means of identifying potential turbidity increases resulting from Project construction activities that could affect the fish hatchery filtration system, and steps that will be taken to reduce resuspension if specific thresholds are observed.

No other known Lake Champlain water supply intakes are located within the vicinity of the Project. Therefore, the Project will not have undue adverse effect to water system intakes in the Lake, nor would it result in an adverse cumulative effect of the encroachment.

9.0 Conclusions

VELCO is seeking a Lake Encroachment Permit for the replacement of the seven existing PV-20 submarine cables that extend across Lake Champlain between the existing Grand Isle, VT and Plattsburgh, NY terminal stations with four new submarine cables. The existing cables are oil-filled and consist of four 2.9-inch diameter cables and three 3.4-inch diameter cables. They will be replaced with four 5 to 6–inch diameter extruded dielectric (oil-free) submarine cables within an approximate 500-foot-wide corridor located approximately 30 feet north of the northernmost existing cable.

As presented in this Application Narrative, application of the three part Public Trust Doctrine Procedure demonstrates that the Project conforms to the Public Trust Doctrine, as follows:

Public Trust Doctrine Procedure: Part 1

- The extent of the Project's encroachment is not excessive for its stated purpose. The cables will be installed in close proximity to the existing PV-20 corridor and will not result in unduly adverse impacts to the aesthetics of the area.
- As described by the alternatives analysis, the replacement Project, as proposed, represents the least overall environment impact.
- Construction methodology (HDD, jet sledding, and direct laying) have been designed to avoid impacts to the Lake.
- The installation of the cables would not create an obstruction to navigation, nor would it result in the elimination of public use of any portion of the Lake.
- The Project will result in numerous Public Benefits:
    - The PV-20 line is a vital electrical interconnect between Vermont and New York grids, and is one of five interstate connections that provides backup power to the Vermont grid. Replacement of the cables is required to maintain this transmission line as the cables have reached the end of their lifespan. This Project creates economic and safety benefits to the citizens of Vermont because it replaces aged and damaged infrastructure before its complete failure.
    - The state and its residents benefit from reliable electric transmission service because it is fundamental to the state's economic development.
    - The Project will also increase property and education tax revenues based on the capital investment required for the replacement assets.

Public Trust Doctrine Procedure: Part 2

- VELCO completed various studies as described herein to ensure that the Project's construction and operation would avoid adverse impact to Lake Champlain's water quality, fish and wildlife habitat, aquatic and shoreline vegetation, navigation, and other recreational and public uses, including fishing and swimming.
- The Project's encroachment is consistent with the natural surroundings, applicable municipal zoning ordinances, and applicable state plans.

Public Trust Doctrine Procedure: Part 3

- The Project's encroachment in Lake Champlain does not result in an adverse potential cumulative effect when considered in conjunction with other existing encroachments.

As presented herein, the Project brings significant public benefits to the State of Vermont. VELCO believes that these benefits outweigh any potential impacts to the Lake associated with the Project's construction and/or operation, or to any potential cumulative effects of existing encroachments. The Project conforms to the Public Trust Doctrine, and therefore should be permitted in accordance with 29 V.S.A. §402.

References

This permit application relied on the following Prefiled Testimony and Discovery Responses submitted to the State of Vermont Public Service Board, Docket 8604:

- Prefiled Direct Testimony and Exhibits of Timothy Follensbee II, VELCO (September 8, 2015)
- Prefiled Direct Testimony and Exhibits of Scott Mallory, VELCO (September 8, 2015)
- Docket No. 8604 – Petitioners' Response to ANR Discovery (January 21, 2016)

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CHA, 2016. PV-20 Submarine Cable Replacement Project Inadvertent Return Contingency Plan. February 2016.

EcoLogic, LLC, 2015. Characterization of the littoral zone and sediment-depth distribution of aquatic macroinvertebrates in the vicinity of the pv-20 submarine transmission line, Lake Champlain, Cumberland Head, NY and Grand Isle, VT. January 25, 2015.

Electrical Consulting Engineers, P.C., 2016. Calculated Magnetic Field Levels for the Pv-20 Submarine Cable Replacement Project. December 14, 2015.

LS Cable and System, Table 1. Design Particular and Cross-sectional Drawing of Submarine Power Cable.

T.J. Boyle Associates, 2015. Aesthetic Analysis Report. VELCO PV20 Submarine Cable Replacement Project Grand Isle, Vermont. June 15, 2015.

Miller Environmental Group, Inc. Spill Prevention, Containment and Contingency Plan. CPR 460: PV-20 Submarine Cable Replacement Submarine Transmission Line Decommissioning Plattsburgh, New York Grand Isle, Vermont. April 2015. Revised March 2016.

Safety Data Sheets, various (see Inadvertent Return Plan, Appendix 3)

VHB, 2016. PV-20 Submarine Cable Replacement Project – Installation Spill Prevention, Containment, and Contingency Plan. March 10, 2016.

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DEC, 2014. Vermont Water Quality Standards. Environmental Protection Rule Chapter 29. Effective October 30, 2014. Vermont Agency of Natural Resources, Department of Environmental Conservation, Watershed Management Division.

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