ATTACHMENT I

Supplement to Appendix D: Alternatives Analysis

CHAMPLAIN HUDSON POWER EXPRESS
HVDC TRANSMISSION PROJECT

SUPPLEMENTAL ALTERNATIVES ANALYSIS

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CHAMPLAIN HUDSON POWER EXPRESS
HVDC TRANSMISSION PROJECT

SUPPLEMENTAL ALTERNATIVES ANALYSIS

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HVDC TRANSMISSION PROJECT

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List of Acronyms

AC	alternating current
CHPEI	Champlain Hudson Power Express, Inc.
CP	Canadian Pacific Railway
CSX	CSX Transportation, Inc.
DC	direct current
DOE	U.S. Department of Energy
HDD	horizontal directional drilling
HVAC	high-voltage alternating current
HVDC	high-voltage direct current
kV	kilovolt
LEDPA	least environmentally damaging practicable alternative
MW	megawatt
NYPA	New York Power Authority
NYSDEC	New York State Department of Environmental Conservation
NYSDOT	New York State Department of Transportation
NYSDPS	New York State Department of Public Service
Project	Champlain Hudson Power Express Project
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USEPA	U.S. Environmental Protection Agency
VOCs	volatile organic compounds
XLPE	cross-link polyethylene

Executive Summary

The U.S. Environmental Protection Agency (USEPA) and the U.S. Army Corps of Engineers (USACE) developed Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR Part 230) (Guidelines) to implement Section 404(b)(1) of the Clean Water Act.[1] Pursuant to § 230.10 of the Guidelines, the USACE may not issue a permit for the discharge of dredged or fill material if there is a practical alternative to the proposed discharge that would have a less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant environmental consequences. The standards established under the Guidelines require an applicant for a permit under Section 404(b)(1) to demonstrate that an undertaking is the least environmentally damaging practicable alternative (LEDPA).

Champlain Hudson Power Express, Inc. (CHPEI, and, together with its wholly owned subsidiary, CHPE Properties, Inc., the Applicants) have reviewed practical transmission route alternatives presented by the New York State Department of Public Service (NYSDPS) on overland routes utilizing existing highway and utility corridors, and buried underground utilizing existing railroad right-of-ways, with the goal of avoiding or minimizing potential environmental impacts associated with the construction and installation of the High Voltage Direct Current (HVDC) cables. Alternatives which have been determined to be practical and feasible have been accepted as part of the recently concluded New York State Public Service Commission settlement conferences.

The Applicants believe that they have explored all of the practical alternatives, both in the process of developing the LEDPA as well as through settlement discussions conducted in the context of the New York State Public Service Law Article VII process. Settlement parties underwent an intensive review of the routing, with a specific focus on locating the cables out of the water to the extent practical and feasible, and the agreed upon route is shown in Figure 1. In their Joint Proposal of Settlement (Joint Proposal), the settlement parties[2] stated that various alternative routes had been considered and rejected so that:

[1] 33 U.S.C. 1344.

[2] Settlement parties endorsing the Joint Proposal for all purposes include: the Applicants, New York State Department of Public Service; New York State Department of Environmental Conservation; New York State Department of State; Adirondack Park Agency; New York State Office of Parks, Recreation and Historic Preservation, Riverkeeper, Inc.; Scenic Hudson, Inc.; and

> *The preferred route as presented in this Joint Proposal was determined to be the best suited for the Facility, since it provides an appropriate balance among the various state interests, and it represents the minimum adverse environmental impact, considering the state of available technology, the nature and economics of the studied alternatives and other pertinent considerations.*

The signatory parties also noted that they supported the issuance of an Article VII Certificate of Environmental Compatibility and Public Need to the Applicants based on factors that included environmental impact as well as the availability and impact of alternatives. Based on these findings, the Applicants believe that, as a result of rigorous analysis, they have developed a route for which there is not a practical alternative which would have a less adverse impact on the aquatic ecosystem without also having other significant environmental consequences.

New York State Council of Trout Unlimited. The New York State Department of Transportation and Vermont Electric Power Company signed the JP for the limited purposes of participating in the sections of importance to them.

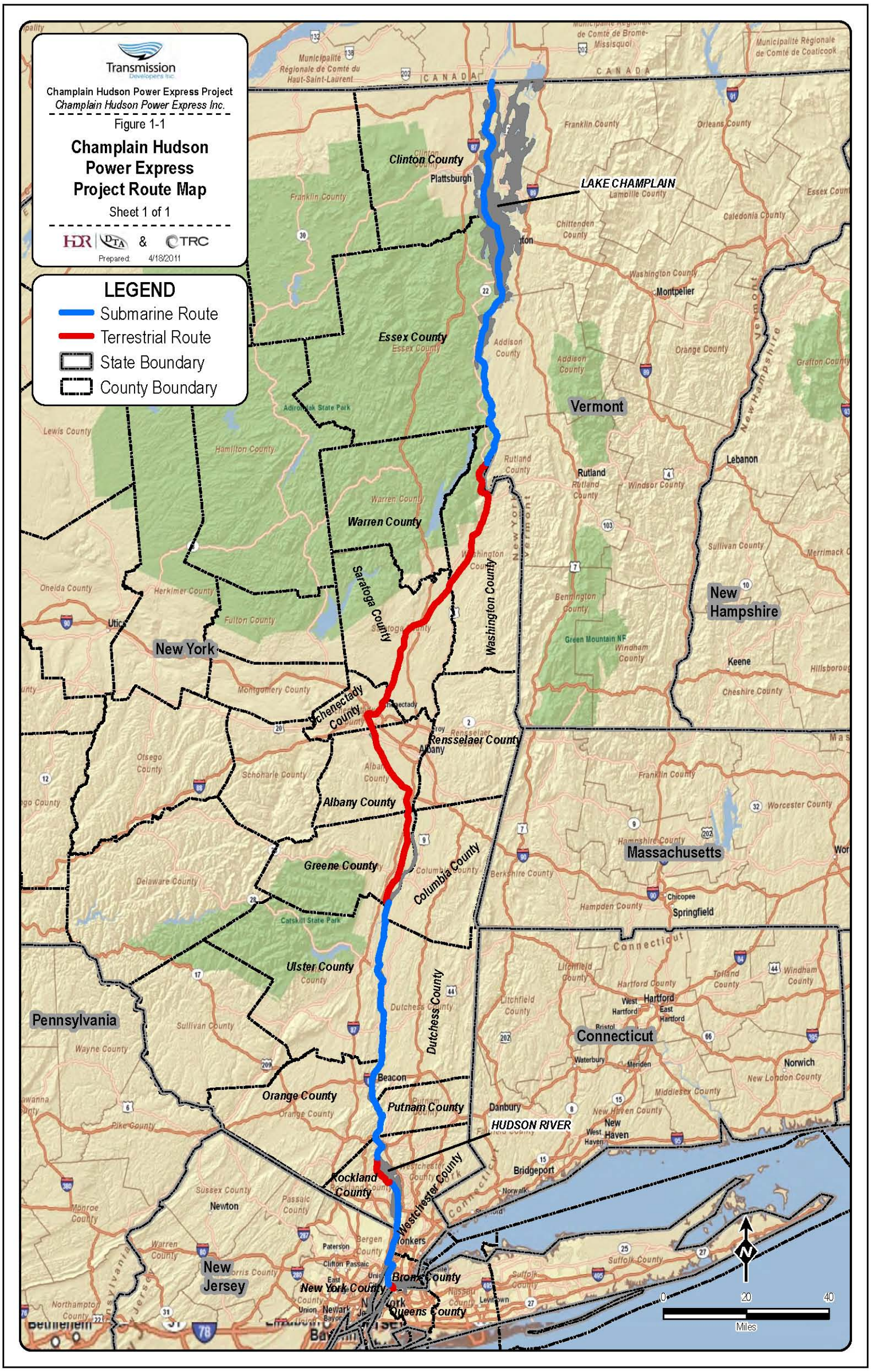
Section 1
Introduction

In accordance with the Clean Water Act Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (Guidelines), the Applicants developed a "least environmentally damaging practicable alternative" (LEDPA) analysis for the Champlain Hudson Power Express project ("Project"), which was submitted in April of 2010. In response to a letter sent by the USACE in July of 2010, the Applications provided supplemental materials in August of 2010. The Applicants also developed a summary of alternative analyses which had been conducted from March 2010 through December of that same year. These documents were provided in Appendix D of the USACE application submitted in December of 2010.

In a letter dated July 5, 2011, the USACE determined that additional information would be needed for the application to be considered complete. The letter requested an updated alternative analysis as well as additional information on the likely impacts of the proposed Project. This document serves as the Applicants' response to this request.

Previous alternatives analysis materials were based on the Project route and specifications submitted to the New York State Public Service Commission (Commission) in July of 2010 in the context of the New York State Public Law Article VII process. On February 25, 2012, the Article VII settlement parties were able to reach settlement on a Joint Proposal, Certificate Conditions, Best Management Practices, and other items related to the design, construction and operation of the Project. One of the most significant modifications is presented by the Project routing, inasmuch as a greater percentage of the Project is now located outside of the water (see Figure 1 as well as the routing mapping provided in Attachment A of the Supplemental Application). In responding to the USACE's request for additional information, the Applicants are using this settlement route as the baseline.

FIGURE 1
PROPOSED PROJECT ROUTE



Section 2
Alternatives

In their letter of July 5, 2011, the USACE identified five alternatives for evaluation:

1. Any New York State Department of Public Service proposed alternatives;
2. Overland transmission line using existing highway corridors and/or utility corridors;
3. Railroad right-of-way (ROW) underground transmission line route;
4. Buried HVDC Transmission System Collocated along Freeway Corridor (now that the timeline has changed, this alternative can be fully evaluated); and
5. Any combination of route alternatives that would have less impact to the aquatic environment than the proposed route.

Each of these alternatives is considered below in terms of whether it constitutes a practical alternative to the proposed route. 40 CFR 230.10(a)(2) states that an alternative is practical if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purpose.

2.1 Any New York State Department of Public Service Proposed Alternatives

In a letter dated October 27, 2010, the New York State Public Service Commission (NYSDPS) proposed three alternative route segments, identified as the Hudson River Western Rail Line Route, the Harlem River Rail Route, and the Hell Gate Bypass Route. Additionally, the NYSDPS identified an alternate converter station site in the Bronx that would coincide with the Hell Gate Bypass Route. Each of these options is discussed below.

2.1.1 Hudson River Western Rail Line Route

The NYSDPS staff identified the Hudson River Western Rail Line Route, which begins in the Town of Bethlehem, Albany County and follows within the railroad rights-of-way of the River Subdivision of CSX Transportation, Inc. (CSX) to the west of the Hudson River. The NYSDPS

alternative route rejoins the Applicants' preferred route within the Hudson River in the Town of Clarkstown, Rockland County.

At the request of the New York State Department of State and settlement parties, the Applicants conducted a detailed analysis of the routing constraints and available alternatives along the DPS' "Western Hudson Alternative," which is presented below. For ease of review, the Hudson River Western Rail Line Route was divided into segments with reference to the route miles.

Route Mile 202 to 223 (Coeymans to Catskill)

The Project route as originally proposed would enter the Hudson River in Coeymans, New York, reaching that point by following the CSX Transportation (CSX) ROW. The Applicants reviewed the CSX ROW from Selkirk south to north of Catskill and identified no significant engineering constraints, therefore, this portion of the Hudson River Western Rail Line was accepted by the Applicants.

Route Mile 223 to 233 (Catskill to Malden-on-Hudson)

From Catskill to Malden-on-Hudson (north of Saugerties), the Applicants noted only one potential engineering issue, the Catskill Trestle which crosses Catskill Creek and Route 9. Previous conversations with CSX suggested that the cables could be attached to this structure. Following the railroad ROW until it intersects with Route 34, the cables could be laid in the roadway ROW to the east to connect with Riverside Road and then Riverside Drive. Settlement parties rejected this alternative inasmuch as the only parcel with sufficient room for a horizontal directional drill (HDD) into the Hudson River was determined by the NYSDPS to be classified as a municipal park and therefore the rights to the land could not be transferred to a private party without state legislation.

Route Mile 233 to 245 (Malden-on-Hudson to Kingston)

Siting in this segment is complicated by the dense development within the Ulster / Kingston area. As the CSX railroad travels beneath Route 209 in Ulster, the railroad corridor is constrained on either side by existing transmission lines. Typically when collocating in a common ROW, the utility companies must maintain a specified separation from other facilities, which would not be

possible along this segment. The route in this area would have to collocate in the ROW of John M. Clark Drive, which runs parallel to the tracks until they both intersect with Route 157, at which point the transmission lines no longer run on both sides of the railroad ROW. The utilization of the roadway does not represent an obstacle but is presented so as to be clear that the Applicants would need to leave the railroad ROW in this area.

After passing through the Kingston railyard and over Route 32/Flatbush Avenue, the railroad corridor traverses the middle of St Mary's Cemetery with an overhead transmission line on the western side of the railroad corridor. There is insufficient room between the cemetery (actual gravestones) and the railroad tracks along the eastern side of the railroad corridor to install the Project's cables. A roadway bypass would require utilizing the Route 32 ROW to access Farrelly Street to the east or Foxhall Avenue to the west. Utilizing either of these roadways would require traveling through residential neighborhoods where the houses are tightly packed and close to the roads, making installation extremely difficult and disruptive.

View (Looking East) of the Railroad Corridor Extending through St. Mary's Cemetery in Kingston

Immediately south of the cemetery, the railroad corridor extends through a heavily developed urban area where large buildings are located immediately adjacent to the railroad corridor (within ~10 ft), resulting in insufficient horizontal clearance to install the Project cables within

this section of ROW. This level of development is intermittent until the railroad crosses a small bridge over the Broadway roadway. As with the roads proximal to the cemetery, the roadways that might be utilized as an alternative to this segment (e.g. Foxhall Avenue, Cornell Street, Ten Broeck Avenue, and Grand Street) also have buildings immediately adjacent to the roadway as well as residential houses where construction would be disruptive.

View of Large Buildings Immediately Adjacent to Railroad Corridor in Kingston

The Applicants also reviewed roadway alternatives that would bypass the city of Kingston. Route 9W could be accessed by following Route 157 east at the terminus of John M. Clark Drive. While 9W has a low density of development north of Route 32, it becomes a limited access highway (controlled-access road) once it crosses Route 32. The New York State Department of Transportation (NYSDOT) has indicated that it would highly restrict the longitudinal use of limited access highway ROW by utilities. Route 32 becomes Flatbush Road and Flatbush Avenue as it passes within the city center and experiences the same high level of development as other roadways within the city.

Based on this analysis, the Applicants were unable to identify any reasonable alternative that traversed the municipalities of Ulster and Kingston and therefore the cables will need to enter the water prior to this point. Moving north along the railroad ROW, the track runs parallel to the

Hudson River until it intersects with Route 31, at which point it veers to the northeast towards Saugerties. As the Esopus Estuary Significant Coastal Fish and Wildlife Habitat (SCFWH) stretches along the riverbank north from where Esopus Creek empties into the Hudson River, the entry point would need to be in or north of Malden-on-Hudson. From the ROW, Route 34 could be followed to the east into Malden-on-Hudson and private land accessed to allow for an HDD into the Hudson at approximately mile 233 of the original route.

In terms of roadway alternatives, the only road that travels in relatively close proximity to the Hudson River is Route 32 with a separation distance of approximately one-half mile. However, this roadway, as well as Route 9W, traverses the Esopus Creek Bridge to cross the Esopus Creek. To date the NYSDOT has indicated that it would not permit hanging cables on structures owned and operated by the agency. An HDD would be complicated by the depth of the gorge (approximately 75 feet), the gravity dam downstream of the bridge, and existing buildings at both ends of the bridge. There are no existing launch /exit sites that meet the necessary spacing criteria for a safe drill under these constraints. Therefore, routes 9W and 32 south of Esopus Creek are considered inaccessible to the northern portion of the cable route and therefore not a feasible alternative.

Route Mile 245 to 254 (Kingston to West Park)

South of Kingston, the access point to the railroad will require that the cables be installed within Rondout Creek, which is a SCFWH. Rondout Creek is one of the largest freshwater tributaries of the Hudson River Estuary and the concentrations of anadromous and resident freshwater fish have been described by the NYSDOS as unusual in Ulster County. In addition, the Applicants were aware of significant issues associated with a now defunct gasification plant at the mouth of the creek currently undergoing remediation, which would severely limit the construction window. The railroad ROW does not appear to have any significant engineering constraints until it intersects with Route 9W in West Park. The Applicants also considered utilizing Routes 81 / 24 (River Road), which run parallel to the Hudson River but connecting to these roadways would require installing a significant length of the cable on privately held land and, therefore, the Applicants consider this alternative to be impractical.

Route Mile 254 to 261 (West Park to Highland)

South of the intersection with Route 9W, the railroad line runs adjacent to the Hudson River and often the railroad lines are sited in a narrow opening between the edge of the Hudson River and large rock outcroppings or very steep terrain to the west. Installation in these areas will require either blasting of the bedrock to create a sufficient degree of separation from the railroad or an expensive HDD installation (assuming that there is available space for this technique). Using an internet mapping site that provided aerial photography, the Applicants identified sixteen distinct outcrops with an estimated average length 490 feet and a range of 230 to 1020 feet. However, this desktop analysis only accounts for exposed outcroppings, so the actual extent of bedrock material may be far more extensive. In Highland, Oakes Road runs immediately adjacent to the railroad ROW for approximately 3,200 feet, so there is insufficient room to install the cables for much of this stretch. The Applicants consider installation in this section of railroad ROW to be at least impractical and likely infeasible due to limits on the HDD technology.

The Applicants also considered the use of Route 9W, which initially travels through largely undeveloped countryside. Transmission poles border the western side of the road for less than two miles until it intersects with Upper North Road in Highland, so installation in this area would be on the eastern side. A short distance after the intersection with Upper North Road, Route 9W expands to four lanes. Over the next approximately four miles, the transmission system switches sides eight times. In order to maintain the required separation, the cables would need to cross underneath the roadway. As Routes 44 and 55 overlap with Route 9W in Highland, the transmission system poles occupy both sides of the roadway. In addition, the density of businesses with access points on the roadway increases. Route 9W also has two bridges before it connects with Route 44/55 for which there are no readily identifiable bypasses. Due to the notice and participation requirements of the PSC's settlement rules, the Applicants are have been restricted from speaking with representatives of the NYSDOT without due notice to all parties on issues relating to settlement; however, previous conversations suggest that the intensity of development as the highway enters Highland and high traffic volume would make utilization of Route 9W infeasible.

Route Mile 261 to 277 (Highland to Newburgh)

Immediately south of the intersection of the ROW with the Route 44 bridge, what appears to be a maintenance road is located to the west of the tracks. The width of this road appeared insufficient to meet CSX's minimum separation distance from the tracks. Between the Route 44 bridge and U.S. Highway 84 bridge in Newburgh, the Applicants identified eighteen rock outcrops that would significantly complicate installation if the railroad companies allowed for the necessary construction activities. The average length of each outcrop is approximately 770 feet with a range of 160 feet to 2950 feet. This segment also has seven instances where the railroad has water on both sides of the tracks for an average distance of 1250 feet. As was noted earlier, the desktop analysis only accounts for visible bedrock and so the actual length of ROW where upland construction is essentially infeasible may be far longer. A short distance south of the U.S. Highway 84 bridge, the railroad occupies a raised berm. The cables would either need to be laid at the foot of the berm with HDDs for the road crossings or, in congested sections, the ROW of an alternate roadway such as Water Street would need to be accessed. The Applicants consider installation in this section of railroad ROW to be impractical.

In terms of roadway alternatives, Oakes Road passes under the Route 44 bridge but reaches a dead end within a mile. Other roadway route alternatives would need to be accessed through Highland and, as previously discussed, the level of development in the vicinity of the intersection of Routes 9W and 44 would prevent cable installation in a reasonable manner.

Following the Hudson River south from Highland, the first roadway to come in close proximity to the river is Old Indian Trail Road in Milton at approximately Route Mile 266. At its closest point, the road is adjacent to the railroad ROW and is less than a mile away from connecting to Route 9W. As Route 9W travels south, it traverses lightly to moderately developed areas. However, as was observed in a northern segment, the transmission poles cross the roadway multiple times which would require HDD drillings or open cut trenching at each location. The transmission line crossings are often necessary in order to avoid natural and anthropogenic obstacles, thereby making installation of the Project's cables more problematic since cables would not only need to avoid the transmission lines but also these features.

As the road approaches Marlboro, development becomes more pronounced with the hamlet buildings directly adjacent to the roadway. South of the hamlet's center, the road has transmission poles on one side and a cemetery on the other for approximately 500 feet. Bypassing this section would require utilizing residential roads for approximately one-half mile. Continuing south, Route 9W continues to travel through low to moderate density developments, with transmission poles that cross the highway at infrequent intervals. The Applicants did not identify any engineering "fatal flaws" with this segment, but the high per-mile cost as well as the disruption to homes and businesses does not appear justified given the length of the bypass. In addition, as is discussed below, there are significant engineering constraints as the road passes beneath Route 84 with no readily available bypass options. The Applicants consider installation in this alternative to be impractical.

Route Mile 277 to 280 (Newburgh to Cornwall on Hudson)

South of Newburgh, the Applicants did not identify any significant engineering constraints until the railroad reaches Cornwall on Hudson where Shore Road is proximal to the railroad tracks.

Within a one-half mile distance of the Route 84 bridge, Route 9W experiences significant industrial development. In the center of Newburgh, the road is bordered by tightly packed residential homes as well as occasional park and recreational facilities. South of Newburgh proper, Route 9W becomes a divided four-lane highway for approximately 2 miles with transmission poles on the eastern side of the road. Once the divided highway ends, there is a bridge crossing of Moodna Creek which, based on previous conversations with NYSDOT about the use of their bridges by transmission cables, will require that the Project utilize an HDD drill to bypass. As Route 9W crosses Route 107 in Cornwall, it transitions to a limited access highway and collocation of transmission cables in the ROW of limited access highways is highly restricted and discouraged by NYSDOT. Due to constraints in the Hamlet of Newburg and engineering constraints at Cornwall on Hudson, the Applicants consider installation in this alternative section to be impractical.

Route Mile 280 to 284 (Cornwall on Hudson to West Point)

As the railroad reaches Cornwall on Hudson, Shore Road runs parallel the tracks for approximately one mile and for more than half that distance the Hudson River lies along the eastern side. The Applicants identified five rock outcroppings with an average length of 960 feet (range of 380 to 1920) and a berm through a water way extending approximately 300 feet. In West Point, River Road and the Upton Road run parallel to the railroad tracks with the Hudson River to the east for approximately 4,060 feet before entering the tunnel beneath West Point Military Academy. Given the engineering constraints presented over this relatively short segment, the Applicants do not consider it reasonable to utilize his route.

As previously discussed, Route 9W becomes a limited access highway in Cornwall and NYSDOT has indicated that it would highly restrict the collocation in the ROW of limited access highways. As an alternate route, the Applicants considered Route 218, which intersects the highway prior to the transition to a limited access roadway. Route 218, however, travels through the center of Cornwall on Hudson through tightly packed residential and commercial districts. Trees line both sides of road through the town, so that any installation would either require their removal or risk damage. Outside the town proper, Route 218 enters Storm King State Park and climbs up Storm King Mountain along a steep and windy roadway. As the road crosses the front of the mountain, there is an approximately half-mile stretch where the road has been carved out of the cliff face. Based on this engineering constraint, the Applicants do not consider this roadway to be a feasible alternative.

Route Mile 284 to 285 (West Point)

The tunnel beneath West Point extends for approximately 3,500 feet. The Applicants' insurance company has stated the cables must be fully protected to secure coverage. Installation of the cables within the tunnel ceiling would present a serious liability should any type of failure occur. Similarly, the railroad company has specified safety setbacks which could not be met within this tunnel. Rock cuts into the sides of the wall are theoretically possible, although a geophysical analysis would be required to ensure there was no impact on the integrity of the tunnel. Past conversations with representatives of the railroad line suggest they would not allow this approach as it would require work within the tunnel for months, significantly impacting railway

use. As the railroad leaves the tunnel, there is a short stretch (approximately 500 feet) where an Academy parking lot lies to the east and Williams Road to the west. The parking lot would need to be excavated in order to install the cables or an HDD enacted. The Applicants consider installation in this section of railroad ROW to be impractical.

There are no state roads in close proximity to either entrance to the tunnel. Both River Road and Upton Road are in close proximity to the water and connect into existing local roads. However, these roads are built perpendicular to the slope of the foothills of Storm King Mountain and the rights-of-way are narrow. In addition, the most likely alternatives are under the control of the Academy, which may not permit installation on a military facility. The Applicants believe that an in-water route is the most practical approach considering the short reach necessary to bypass this tunnel.

View of Railroad along Storm King State Park & Hudson Highlands State Park

Route Mile 285 to 290 (West Point to Fort Montgomery)

As with earlier segments, the railroad runs parallel to the Hudson River. The Applicants identified ten rock outcroppings with an average length of 720 feet (range of 265 to 1,606) and four water crossings with an average length of approximately 490 feet (range of 402 to 644). In

addition, the ROW travels through the Bear Mountain tunnel, which extends for approximately 800 feet. The Applicants consider installation in this section of railroad ROW to be impractical.

View of Tunnel and Waterbody Crossing in Bear Mountain State Park

There are no state roads or local roads in close proximity to the water for this segment. Mine Dock Road in Fort Montgomery could be accessed if the cables came out of the water into the railroad ROW and were laid a short distance before entering the road. However, Mine Dock Road runs underneath Route 9W and private homes are located on either side of the bridge abutments. Therefore, the Applicants did not identify any overland alternative to this segment or specifically the Bear Mountain tunnel.

Route Mile 290 to 296 (Fort Montgomery to Haverstraw)

The Applicants identified six rock outcroppings with an average length of 490 feet (range of 190 to 860) and seven water crossings with an average length of 1,080 feet (range 391 to 2,373). In addition, north of Stony Point Lighthouse is an approximately 2,020-foot stretch of railroad where water is to the east and utility grade transmission lines are to the west. As the railroad curves around Dunderberg Mountain past Jones Point, River Road runs parallel to the tracks for approximately 1,400 feet. Further along the tracks, West Shore Drive in Tomkins Cove runs in

close proximity to the railway for approximately 1,600 feet. The Applicants consider installation in this section of railroad ROW to be impractical due to the constrained ROW.

A steep rock embankment lies beneath the bridge that connects Routes 6/202 into a round-about with 9W/202 and the Palisades Interstate Parkway. The Applicants are unsure if this feature is considered part of the parkway and therefore unusable by a transmission system. Assuming Route 9W/202 is available, the roadway travels south through Bear Mountain State Park. Trees line both sides of the road, which is kept in a natural setting. The roadway passes a boat launch near Iona Island, whose bay is a SCFWH. The Applicants identified six rock outcroppings for an average length of 850 feet (range of 141 to 2,556 feet). The Applicants consider installation in this section of road to be impractical due to the extent of clearing, blasting and/or other activities that would be required within a state park for a relatively short overland segment.

Route Mile 296 to 303 (Haverstraw Bay)

The Applicants worked collaboratively with settlement parties to develop a bypass of Haverstraw Bay, which roughly follows the southern portion of the Hudson River Western Route.

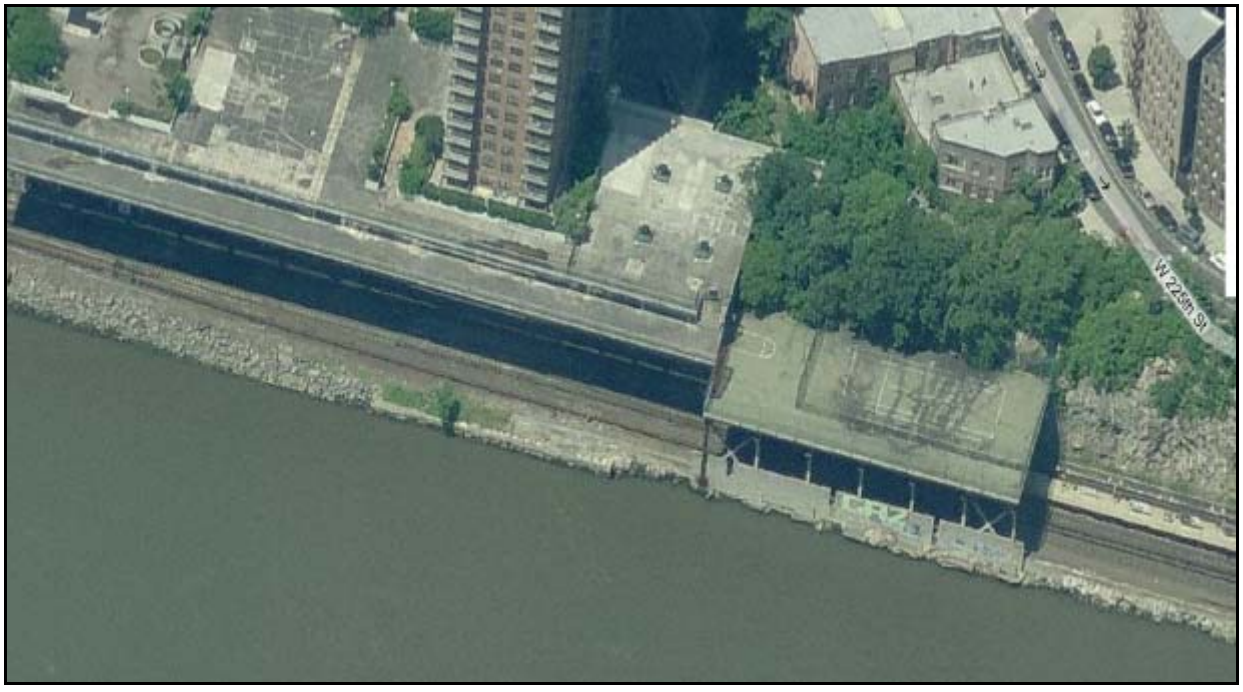
2.1.2 Harlem River Rail Route

The NYSDPS staff identified the Harlem River Rail Route, which begins at MP 323.4 in the Hudson River in the Bronx, and makes landfall at Spuyten Duyvil, and then proceeds along the Metropolitan Transit Authority and NYSDOT railroad corridor along the northerly and easterly banks of the Harlem River for approximately 6 miles to the rail yards of Willis Avenue, where it joins the alignment of the Hell Gate Bypass Route. The NYSDPS identified this route as an alternative to locating the proposed electric transmission cables in 6 miles of the Harlem River, where engineering constraints and environmental conditions may limit constructability.

The Harlem River Rail Route is the same as the southern-most portion of the Railroad Alternative Route identified by the Applicants in the April 2010 LEDPA evaluation and July 2010 supplement to the CECPN Application. There are numerous engineering constraints associated with this route. Often times, the railroad lines are sited in a narrow opening between the edge of the waterway and large rock outcroppings or very steep terrain. At multiple locations

the railroad line is sited within a narrow opening between the Harlem River and a building. In at least two cases, the buildings have been constructed over and around the railroad line. Cable installation in these areas is infeasible within the railroad corridor.

View of Railroad between Large Rock Outcropping along Harlem River



View of Building over Railroad along the Harlem River

View of Building Immediately adjacent to Railroad along Harlem River

2.1.3 Hell Gate Bypass Route

The NYSDPS staff identified the Hell Gate Bypass Route, which begins in the Harlem River north of the Willis Avenue Bridge and proceeds easterly to landfall at the NYSDOT railroad corridor and rail yards, following the rail corridor along the northerly side of the Bronx Kill to the East River. The NYSDPS identified the Hell Gate Bypass Route as an alternative to locating the proposed electric transmission cables in a longitudinal occupancy of the Hell Gate reach of the East River, where engineering constraints and environmental conditions may limit constructability.

The Applicants accepted this route as part of the recently released Joint Proposal.

2.2 Overland Transmission Line Using Existing Highway Corridors and/or Utility Corridors

The Applicants note that long standing siting policy of multiple uses within existing utility and transportation corridors is now being reconsidered in light of heightened concerns about terrorism. Increased security is required when installing new utility infrastructure in any new

ROW. Submarine routes inherently offer enhanced security due to the absence of readily visible identification. Constructing a transmission line in its own ROW, rather than concentrating utility infrastructure in multiple use corridors, increases reliability by decreasing the chances that accidents and maintenance and repair work on other facilities will result in disruptions.

2.2.1 Highway Corridors

The Applicants evaluated an alternative Project route that would collocate the transmission cables along existing major roadway rights-of-way. In order to minimize impacts to communities and neighborhoods throughout eastern New York, the Applicants limited the potential alternative routes to major highway infrastructure in New York. Based on the existing highway infrastructure in New York and the geographical requirements of the Project, Interstate 87 was determined to be the most feasible roadway alternative route for evaluation.

The buried roadway alternative route would be collocated within the I-87 right-of-way from the international border between the U.S. and Canada into New York City. Along this alternative route, the Project would cross through approximately 100 miles within the Adirondack Park and potentially within land designated as Forest Preserve. Article XIV of the New York State Constitution prohibits the removal or destruction of timber and forbids the lease, sale, or exchange of any land within the Forest Preserve without an amendment to the New York State Constitution. Although this alternative route is located along the highway right-of-way, it is anticipated that the Project may require additional width to bury the transmission cables, which would require tree and/or brush clearing. Therefore, Project construction for this alternative route is considered impractical.

In addition to the constraints associated with the Adirondack Park and Forest Preserve land, current Federal Highway Law (23 CFR §§645.209 and 645.211), New York State Transportation Regulations (17NYCRR Part 131), and the Accommodation Plan for Longitudinal Use of Freeway ROW by Utilities issued by the NYSDOT provides significant hurdles. The NYSDOT has indicated that it would highly restrict the longitudinal use of limited access highway ROW by utilities. Based on the existing regulatory environment, the Applicants do not believe collocation in existing highway corridors is a practical alternative.

2.2.2 Utility Corridors

The April 2010 LEDPA analysis evaluated two potential overhead utility routes. The first route followed existing utilities corridors to the south west, circumventing the Adirondack Park until reaching the City of Albany, New York, while the second would have utilized corridors in Vermont and Massachusetts to reach Albany. The routes would then each travel south parallel to the Hudson River before arriving in New York City. Both routes presented significant siting challenges in terms of acquiring the necessary ROWs to expand existing corridors as necessary to accommodate the need for larger lattice towers. The Central New York alternative was particularly problematic as a similar overhead route had recently been abandoned by its proponents due to the likely environmental impacts as well as public opposition. As noted in their letter of August 2010, the Applicants believe that opposition by local communities and environmental groups would make the pursuit of this option an extraordinarily arduous process, and that no sources of development capital sufficient to sustain such an effort exist or are likely to come to exist in the future.

Moreover, as shown by the environmental analysis conducted in the LEDPA, the utilization of utility corridors does not necessarily equate to a decrease in impacts to the waters of the United States. The use of land-based corridors in these areas requires the crossing of a significant number of streams and wetlands, presenting the risk of greater cumulative impacts to resources. Available information indicates that the preferred in-water route will only have temporary impacts to the water bodies.

Finally, as part of settlement discussion, the Applicants spoke with the three utilities who own the ROWs under discussion and each voiced opposition to collocation with their facilities. The New York Power Authority noted that it was were under the same statutory restrictions as the New York State Canal Corporation in terms of its ability to dispose of public lands and that it does not believe that it would have the ability to grant the necessary long-term land interests. National Grid expressed concern regarding the impact this project would have on its system reliability and potential expansion of its own facilities within the ROW. A representative of Consolidated Edison Inc. (Con Edison) stated that for safety and reliability reasons it would not want the cables installed in near proximity to its tower foundations. In addition, its transmission

lines within Westchester County are buried and the Con Edison representative did not believe that Con Edison could grant the right to use its ROW to a separate private entity. These conversations have confirmed the Applicants' previous position that any attempt to collocate the Project with an existing utility ROW would require the acquisition of land rights adjacent to the ROW either through purchase or eminent domain due to concerns by the ROW owners over the safety of their system and their desire to preserve the ROW for potential future expansion.

2.3 Railroad Right-of-Way Underground Transmission Line Route

As discussed in the April 2010 LEDPA document, the Applicants considered a railroad route which follows the Canadian Pacific Railway (CP) railroad lines extending along the western shore of Lake Champlain and the Champlain Canal from Canada to Schenectady. In Schenectady, the CP Railroad continues west and intersects with the CSX railroad lines. The route follows the CSX railroad and continues south along the western shore of the Hudson River toward New York City. In the vicinity of Poughkeepsie, where the Hudson River narrows, the HVDC cable route would exit the CSX railroad right-of-way and cross beneath the Hudson River to the eastern shore. The bipole would follow the Metropolitan Transportation Authority Metro-North Commuter Railroad Co. (MNCR) ROW into New York City. As discussed in the April 2010 LEPDA evaluation and the August 2010 subsequent letter to the USACE, this alternative poses several siting issues. The Applicants completed an economic analysis that concluded the additional installation costs associated with buried overland construction make this alternative, as a whole, financially impractical.

To supplement this finding, engineering personnel scanned the corridor using Google Earth software in order to assess the constructability of a 1,000 MW HVDC buried transmission system along the alternative route. A site visit was also conducted by engineering staff along the southern portion of Lake Champlain. In the southern portion of Lake Champlain, the railroad line runs immediately adjacent to the lake along a narrow levee. Due to either insufficient construction space for equipment or proper physical space to place the cable, installation along these levee areas is infeasible. South of Lake Champlain, the Applicants have accepted a route along the CP and CSX railroad ROWs from Whitehall to the Catskills. As discussed in the analysis of the "Hudson River Western Rail Route," the engineering challenges associated with

utilization of the railroad corridors south of this location are significant and the Applicants do not believe there is practical route available.

2.4 Buried HVDC Transmission System Collocated along Freeway Corridor

As discussed above, current Federal Highway Law (23 CFR §§645.209 and 645.211), New York State Transportation Regulations (17NYCRR Part 131), and the Accommodation Plan for Longitudinal Use of Freeway Right-of-Way by Utilities issued by the NYSDOT provide significant limitations on the placement of utilities within highways. The NYSDOT has indicated that it would highly restrict the longitudinal use of limited access highway ROW by utilities. Based on the existing regulatory environment, the Applicants do not believe collocation in existing highway corridors is a practical alternative. The Applicants also note that the NYSDOT was a participant in settlement negotiations where routing alternatives were discussed.

2.5 Any Combination of Route Alternatives that Would Have Less Impact to the Aquatic Environment than the Proposed Route

The Applicants believe that they have explored all of the practical alternatives, both in the process of developing the LEDPA as well as in the context of the New York State Public Service Law Article VII process. Settlement parties underwent an intensive review of the routing, with a specific focus on locating the cables out of the water to the extent practical and feasible, and the agreed upon route is shown in Figure 1. In their Joint Proposal, the settlement parties[3] stated that various alternative routes had been considered and rejected so that:

> *The preferred route as presented in this Joint Proposal was determined to be the best suited for the Facility, since it provides an appropriate balance among the various state interests, and it represents the minimum adverse environmental impact, considering the state of available technology, the nature and economics of the studied alternatives and other pertinent considerations.*

[3] Settlement parties endorsing the Joint Proposal for all purposes include: the Applicants, New York State Department of Public Service; New York State Department of Environmental Conservation; New York State Department of State; Adirondack Park Agency; New York State Office of Parks, Recreation and Historic Preservation, Riverkeeper, Inc.; Scenic Hudson, Inc.; and New York State Council of Trout Unlimited. The New York State Department of Transportation and Vermont Electric Power Company signed the JP for the limited purposes of participating in the sections of importance to them.

The signatory parties also noted that they supported the issuance of an Article VII Certificate of Environmental Compatibility and Public Need to the Applicants based on factors that included environmental impact as well as the availability and impact of alternatives. Based on these findings, the Applicants believe that, as a result of rigorous analysis, they have developed a route for which there is not a practical alternative which would have a less adverse impact on the aquatic ecosystem without also having other significant environmental consequences.

Section 3
Proposed Route Impacts

In their letter of July 5, 2011, the USACE requested additional information on the impacts associated with the proposed Project route. The Applicants are providing information based on the routing agreed to within the settlement proceedings.

1. **Recalculate proposed route impacts based on the above listed in-water installation requirements.**

   The routing for the Project has been modified to largely avoid installation in or around maintained Federal navigation channels. However, as was discussed with the USACE at a meeting on August 18, 2011, the Applicants propose to align the cables within and in close proximity to the Federal navigation channels located in the narrows of Lake Champlain (Sheets 26 - 27 of Submarine Route Plan View Maps) and the Harlem River (Sheets 52 and 53 of the Submarine Route Plan View Maps). Detailed plan and cross-section diagrams provided in Attachment J show the Applicants' proposed depth of installation within the narrows of Lake Champlain and the Harlem River. The Applicants request a meeting with USACE engineering staff to review this proposed configuration.

   The expected impacts of the Project due to installation within or under waterways are summarized in Table 1. The expected impacts to wetlands due to fill and construction activities are summarized in Tables 2 and 3 below, respectively. The assumptions that went into these estimates are provided in Section 5 of the Project Purpose and Description provided in Attachment A of the Supplemental Application.

TABLE 1
EXPECTED IMPACTS TO WATERS OF THE UNITED STATES (EXCLUDING WETLANDS) FROM CABLE INSTALLATION ACTIVITIES

Cable Installation Activity	Area of Impact (Square Feet)	Volume of Permanent Fill (cubic yards)
Cable Burial (Submarine Route)	14,718,703	
Cable Burial at Waterbody Crossings (Overland Route)	9,950	
Non-burial Cable Protection Locations (Submarine Route)	2,150,203	55,296
Cofferdam Locations (Submarine Route)	3,360	747*
Anchor Placement Locations (Submarine Route)	8,040	
Total	**16,889,895**	**56,043**

* Volume of Dredge Material is equal to the Volume of Permanent Fill (20,160 ft^3) for the cofferdam locations along the submarine route.

TABLE 2
EXPECTED TEMPORARY AND PERMANENT FILL INTO WETLANDS DURING CABLE INSTALLATION ACTIVITIES ALONG THE OVERLAND ROUTE

Overland Route Segment	Temporary Fill (cubic yards)	Permanent Fill (cubic yards)
Route 22	169	243
Whitehall to Rotterdam (CP Railroad)	5,281	3,192
Rotterdam to Selkirk (CSX Railroad)	3,997	3,629
Selkirk to Cementon (CSX Railroad)	10,917	12,160
Haverstraw Bay Bypass (CSX Railroad)	0	3
Total	**20,364**	**19,228**

TABLE 3
EXPECTED IMPACTS TO WETLANDS DURING CABLE INSTALLATION ACTIVITIES ALONG THE OVERLAND ROUTE

Overland Route Segment	Temporary Impacts		Permanent Impacts	
	Forested Wetland (square foot)	Non-Forested Wetland (square foot)	Forested Wetland (square foot)	Non-Forested Wetland (square foot)
Route 22	3,101	18,318		4,022.50
Whitehall to Rotterdam (CP Railroad)	354,496.80	1,216,169.40	15201.9	119553.6
Rotterdam to Cementon, Haverstraw Bay Bypass (CSX Railroad)	347,699	996,306	72,641	236,866
Total	**705,296 (16.2 acres)**	**2,230,794 (51.2 acres)**	**87,842 (2.0 acres)**	**360,442 (8.3 acres)**

2. **Provide additional proprietary and confidential information related to the cost-benefit analysis.**

   The Applicants would request that the USACE specify what information is needed and that this information be transmitted at an in-person meeting with the Applicants' financial team.

3. **If there have been changes in the DOE funding situation that would impact the cost/benefit analysis, readjust the calculations.**

   As indicated in the letter of August 25, 2010, the tariff required for the "Railroad Only" and "Overhead Only" alternatives is significantly higher than the Applicants' proposed route with or without DOE loan guarantee funding.

4. **If the impacts listed in Table 2 do not include submarine anchor drag/anchor sweep impacts, add those impacts to the table.**

   Table 1 above includes impacts due to anchoring.

5. **Provide quantitative information for the amount of material to be deposited outside the proposed submarine route for all installation methods (jetting, plowing, dredging).**

   Water quality modeling was completed for Lake Champlain and the Hudson, Harlem and East Rivers. These reports are provided in Attachment M of this Supplemental Application.

6. **In Table 2, specify temporary and permanent impacts.**

   In Table 1 above, only impacts associated with non-burial protection over existing utilities (22,343 cubic yards) are expected to be permanent. For Tables 2 and 3, only the conversion of approximately two (2) acres of forested wetland to scrub-shrub wetland is expected to be a permanent impact.